902.H2O.WATR
902.420.9287
450 Cowie Hill Road
P.O. Box 8388 RPO CSC
Halifax, Nova Scotia
Canada B3K 5M1

January 22, 2020

Craig MacMullin, MBA, CPA, CGA, Chair
Halifax Water
Halifax, NS

The regular meeting of the Halifax Water Board will be held on Thursday, January 30, 2020. The In-Camera meeting will be held at 9:00 am, followed by the Regular Meeting at 10:00 a.m. in the Boardroom at 455 Cowie Hill Road, Halifax.

AGENDA

In Camera Reports

1C Approval of Minutes of the In-Camera Meeting held on Thursday, November 28, 2019

2C Business Arising from Minutes
a)

3C Governance Matter - Verbal
Motion: That the Halifax Water Board convene to In Camera (private) to discuss the matter.

4C Personnel Matter
Motion: That the Halifax Water Board approve the recommendation as outlined in the confidential report dated January 17, 2020.

5C Regulatory Matter
Motion: That the Halifax Water Board approve the recommendation as outlined in the confidential report dated January 30, 2020.

6C Land Matter
Motion: That the Halifax Water Board approve the recommendation as outlined in the confidential report dated January 23, 2020.

7C Contractual Matter
Motion: That the Halifax Water Board approve the recommendation as outlined in the confidential report dated January 17, 2020.

Regular Reports

1. a) Ratification of In-Camera Motions
   b) Approval of the Order of Business and Approval of Additions and Deletions

2. Approval of Minutes of the Regular Meeting held on Thursday, November 28, 2019

3. Business Arising from Minutes
   a) Nomination of Committee Representative – Verbal
   Motion: That the Halifax Water Board appoint a representative to the Board Environmental, Health and Safety Committee

Financial

4.1 Operating Results for the Nine Months Ended December 31, 2019

4.2 Proposed 2020/21 Capital Budget

Motion: That the Halifax Water Board approve:

1. The 2020/21 Capital Budget at a total value of $96,514,000 as detailed in Schedule 1 of the attached report.
2. List of routine capital expenditure items required for on-going departmental operation, at a total value of $7,023,000 as indicated in Schedule 1 of the attached report.

4.3 Proposed 2020/21 Water, Wastewater, Stormwater Operational Budget

Motion: That the Halifax Water Board approve the proposed 2020/21 Water, Wastewater and Stormwater operating budget, inclusive of the proposed 2020/21 budget for unregulated activities.

4.4 2020 Rate Application – Water & Wastewater

Motion: That the Halifax Water Board approve an Application to the NSUARB for the approval of a Schedule of Rates and Charges for water, and Wastewater for customers of the Halifax Regional Water Commission, to become effective for services rendered on and after September 1, 2020, as discussed in Attachment.

4.5 Proposed 2020 Halifax Region Water Commission Employees' Pension Plan Budget

Motion: That the Halifax Water Board approve the proposed 2020 Pension Plan budget covering the period January 1, 2020 to December 31, 2020.

Capital Approvals

N/A

Other Business:

5. Proposed 2020/21 Business Plan

Motion: That the Halifax Water Board approve the 2020/21 Business Plan in the substantive form attached and direct the General Manager to submit the annual Business Plan to Halifax Council for approval.

6. Proposed Five-Year Business Plan (2020/21 to 2024/25)

Motion: That the Halifax Water Board approve the Five Year (2020/21 – 2024/25) Business Plan in the substantive form attached.

Information Reports

1-I Financial and Operations Monthly Update
2-I Capital Budget Approvals to Date – 2019/20
3-I Bank Balance
4-I Quarterly Remittance Certification
5-I 2019 Annual Customer Survey
6-I 2019 Employee Survey
7-I HRM Pension Plan Investment Performance, Third (3rd) Quarter, 2019
8-I 2019 Annual Report – Pension and Benefits Advisory Committee
9-I 2019/20 Third Quarter Cost Containment

Original Signed By: _____
Heidi Schedler
Secretary

ITEM # 4.1

Halifax Water Board

January 30, 2020

TO: Craig MacMullin, MBA, CPA, CGA, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*

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

APPROVED: *Original Signed By:*

Cathie O'Toole, MBA, FCPA, FCGA, ICD.D
General Manager

DATE: January 23, 2020

SUBJECT: **Operating Results for the Nine Months Ended December 31, 2019**

INFORMATION REPORT

ORIGIN

Financial Statements

BACKGROUND

The Board is required to review periodic financial information throughout the year.

DISCUSSION

Attached are the operating results for the first nine (9) months of the 2019/20 fiscal year, period ending December 31, 2019. The statements reflect direct operating costs by department and allocations among water, wastewater and stormwater for common costs shared across all the services provided by Halifax Regional Water Commission (Halifax Water).

Halifax Water is a fully regulated government business enterprise, falling under the jurisdiction of the Nova Scotia Utility and Review Board (NSUARB). The NSUARB requires that Halifax Water file Financial Statements and rate applications with the Board based on the NSUARB Handbook for Accounting and Reporting for Water Utilities. The Accounting Standards Board (AcSB) requires rate regulated entities to conform to International Financial Reporting Standards (IFRS). The Commission maintains the financial records in IFRS for the purposes of the annual audit and consolidation of the financial statements with those of Halifax Regional Municipality (HRM).

The budget for the 2019/20 fiscal year was prepared using the NSUARB format and financial results continue to be provided in NSUARB format.

Summary information in NSUARB format is provided for the Balance Sheet on Page 1 and the Income Statement on Page 2. A detailed presentation of the Balance Sheet and Income Statement is provided on Pages 3 and 4. Pages 5 through 8 provide Income Statements by Service and for Regulated and Un-Regulated Services. Pages 9 and 10 provide the Balance Sheet and Income Statement in IFRS format.

Consolidated Income Statement - Page 2 of attachment

Summarized Consolidated Operating Results				
	Actual YTD 2019/20 '000	Prior YTD 2018/19 '000	$ Change	% Change
Operating Revenue	**$105,344**	$105,181	$163	0.2%
Operating Expenses	**$79,328**	$76,057	$3,271	4.3%
Operating Surplus (Deficit)	**$26,016**	$29,124	($3,108)	(10.7%)
Financial Revenue	**$873**	$1,391	($518)	(37.2%)
Financial Expenses	**$23,199**	$25,586	($2,387)	(9.3%)
Net Surplus before Pension	**$3,690**	$4,929	($1,239)	(25.1%)
Accrued Pension Expense	**($5,619)**	($3,899)	($1,720)	44.1%
Net Surplus (Deficit)	**($1,929)**	$1,030	($2,959)	(287.3%)

Key items of note:

- Operating revenue to date of $105.3 million is $0.2 million higher than the prior year.
- Operating expenses to date of $79.3 million are $3.3 million higher than the prior year.
- The Net Surplus, before Accrued Pension Expense, for the year to date is $3.7 million, a decline of $1.2 million from the prior year.
- The Net Deficit, after Accrued Pension Expense, for the year to date is a loss of $1.9 million, a decline of $3.0 million from the prior year.

The approved Net Deficit after Accrued Pension Expense was $14.0 million for the full fiscal year. The approved Net Deficit before Accrued Pension Expense was $8.4 million. (See page 2 of the attachment).

The forecasted Net Deficit before Accrued Pension Expense is $11.2 million for the full fiscal year. This is an improvement of $2.8 million from the approved Budget. (See page 2 of the attachment).

- Cumulative changes to the forecast include:
    - A reduction in Operating Revenue of $0.8 million, as a result of lower revenue for several unregulated activities;
    - A reduction in Financial Revenue of $0.3 million, as a result of lower investment income;

- A reduction in Operating Expenses of $3.8 million from lower expected costs in several departments;
- A reduction in debt servicing costs of $2.3 million;
- The forecast for the Accrued Pension Expense increased by $2.3 million. This is an accrued expense and does not influence the rate regulated activities.

Balance Sheet - Page 3 of attachment

Key indicators and balances from the Balance Sheet are provided on the following tables (figures shown are in thousands):

Cash		
	2019/20	2018/19
Cash	**$51,763**	$57,356

Balance Sheet Liquidity (Current Ratio)		
	2019/20	2018/19
Current Assets	**$94,550**	$101,791
Current Liabilities	**$42,665**	$48,041
Current Ratio	**2.22**	2.12

- Cash balance includes funds held in bank accounts reduced by outstanding cheques. It has decreased $5.6 million from the prior year as there have been several large progress claim repayments in the current year.

Accounts Receivable		
	2019/20	2018/19
Customer Receivables	**$14,692**	$13,960
Unbilled Services	**$19,780**	$19,590
Halifax Regional Municipality	**$6,637**	$7,256
Total	**$41,109**	$40,806

Accounts Payable		
	2019/20	2018/19
Trade Payables	**$12,303**	$15,841
LT Debt Interest	**$1,475**	$1,664
Halifax Regional Municipality	**$6,014**	$4,237
Total	**$19,792**	$21,742

- Customer Receivables have increased $0.7 million from the prior year. The increase is largely a result of billing cycle timing for customer invoices. Compared to the prior year, there was an additional week in the billing cycle prior to the end of the quarter. This resulted in the final customer invoices of the quarter being issued just prior to the end of the month.
- HRM receivables have decreased $0.6 million mainly due to there being fewer and smaller invoices receivable related to cost shared projects, such as the Fall River Water Servicing project, for which there was $0.8 million owing in the prior year.
- Trade Payables have decreased $3.5 million due to there being fewer and smaller progress claims and Wastewater Rebates payable as compared to the prior year. In particular, the prior year included a $1.3 million Wastewater rebate and progress claims such as the Northwest Arm Sewer Rehab ($0.5 million) and Lakeside Pump Station Diversion ($0.2 million).
- HRM payables are higher by $1.8 million due to the timing of the semi-annual payment to HRM for debt associated with the Halifax Harbour Solutions Project.

Capital Assets Under Construction	
	Cumulative
AMI - Advanced Metering Infrastructure	**$16,552**
JD Kline Filtration Replacement	**$8,358**
Lake Major Dam Replacement	**$7,764**
Lucasville Transmission Main Replacement	**$5,269**
All other projects	**$47,219**
Total Capital Expenditures	**$85,162**
External Funding Received	**($7,358)**
Net Assets Under Construction	**$77,804**

- Total Capital Expenditures as of December 31, 2019 are $85.2 million. By the end of the fiscal year it is expected that over $90 million in capital projects will be completed and capitalized including AMI, JD Kline, Lake Major Dam, and Lucasville Transmission Main Replacement.

Long Term Debt by Service		
	2019/20	2018/19
Water	**$62,648**	$55,385
Wastewater	**$122,121**	$120,977
Stormwater	**$15,822**	$12,963
Combined	**$200,591**	$189,325

Net change in Long Term Debt (full fiscal year)		
	2019/20	2018/19
New Debt	**$30,000**	$15,000
Debt repayments	**($18,209)**	($21,130)
Change in current portion	**$5,225**	($2,079)
Change in Debt	**$17,016**	($8,209)

- Long Term Debt increased $11.3 million as new debt acquired was greater than the prior year. New debt of $30 million was received in November 2019. For the full fiscal year, Long Term Debt will be up $17.0 million after declining for the past three years.

Debt Servicing Ratio by Service		
	YTD Debt Servicing Cost Ratio	
	2019/20	2018/19
Water	**11.4%**	17.6%
Wastewater	**23.6%**	23.5%
Stormwater	**20.2%**	18.4%
Combined	**18.4%**	20.7%

- The debt servicing ratio for Water of 11.4% is substantially lower than the prior year because the prior year includes the final, large repayment for the original Lake Major debt.
- The debt servicing ratio of 18.4% is well below the maximum 35% ratio allowed under the blanket guarantee agreement with HRM.

Operating Surplus		
	YTD 2019/20	YTD 2018/19
Opening Operating Surplus	**$15,663**	$20,481
Year to Date Suplus/(Deficit)	**($1,929)**	$1,030
Cumulative Operating Surplus	**$13,734**	$21,511

- Cumulative Operating Surplus, after Accrued Pension Expense, for the nine-months ended December 31, 2019 is lower than the prior year due to there being a projected deficit.

Income Statement – All Services - Page 4 of attachment

The following tables compare the actual results for the year to date with the prior year actual results and forecasts for the year.

Summarized Consolidated Operating Results			
	Actual YTD 2019/20 '000	Prior YTD 2018/19 '000	$ Variance
Operating Revenue	**$105,344**	$105,181	$163
Operating Expenses	**$79,328**	$76,057	$3,271
Operating Surplus (Deficit)	**$26,016**	$29,124	($3,108)
Financial Revenue	**$873**	$1,391	($518)
Financial Expenses	**$23,199**	$25,586	($2,387)
Surplus (Deficit)	**$3,690**	$4,929	($1,239)

Summarized Consolidated Operating Results			
	Actual YTD 2019/20 '000	Forecast YTD 2019/20 '000	$ Variance
Operating Revenue	**$105,344**	$103,472	$1,872
Operating Expenses	**$79,328**	$83,430	($4,102)
Operating Surplus (Deficit)	**$26,016**	$20,042	$5,974
Financial Revenue	**$873**	$809	$64
Financial Expenses	**$23,199**	$23,243	($44)
Surplus (Deficit)	**$3,690**	($2,392)	$6,082

- The year to date surplus of $3.7 million is $1.2 million less than the surplus for the same period in the prior year. The surplus is $6.1 million greater than the pro-rated forecast for the year. The following is a discussion on factors influencing the variances.

Operating Revenue

Operating Revenue Results			
	Actual YTD 2019/20 '000	Prior YTD 2018/19 '000	$ Variance
Consumption Revenue	**$65,759**	$65,774	($15)
Base Charge Revenue	**$25,118**	$25,057	$61
Wastewater Rebate	**($774)**	($1,227)	$453
Metered Sales Sub-total	**$90,103**	$89,604	$499
SW Site Generated Charge	**$4,616**	$4,660	($44)
HRM Fire Protection & Right of Way	**$8,182**	$8,182	$0
Other Operating Revenue	**$2,443**	$2,735	($292)
Operating Revenue Total	**$105,344**	$105,181	$163

Operating Revenue Results			
	Actual YTD 2019/20 '000	Forecast YTD 2019/20 '000	$ Variance
Consumption Revenue	**$65,759**	$64,271	$1,488
Base Charge Revenue	**$25,118**	$25,109	$9
Wastewater Rebate	**($774)**	($1,047)	$273
Metered Sales Sub-total	**$90,103**	$88,333	$1,770
SW Site Generated Charge	**$4,616**	$4,648	($32)
HRM Fire Protection & Right of Way	**$8,182**	$8,182	$0
Other Operating Revenue	**$2,443**	$2,309	$134
Operating Revenue Total	**$105,344**	$103,472	$1,872

Operating revenue has declined $0.2 million as compared to the previous year. Key items of note include:

- Water and Wastewater consumption is down 0.12% on a volumetric basis as compared to the previous year. Consumption had been budgeted to remain consistent with the prior year.

- The total of Metered Sales revenue is up $0.5 million because the Wastewater Rebate is less than the prior year. The Wastewater Rebate is an offset to revenue. It is available to certain large customers whose water does not enter the Wastewater system.
- Stormwater Site Generated Charge revenue is less than the prior year. A large portion of Stormwater revenue is billed annually to Stormwater-only customers. Previously this was done in March of each year but will now be done over a period of several weeks from January to March. This will allow better management of customer inquiries about the invoices and enable payment and collection within the fiscal year.
- Other Operating Revenue categories are down slightly as compared to budget and forecasted amounts.

Operating Expenses

Summary of Operating Expenses by Department			
	Actual YTD 2019/20 '000	Prior YTD 2019/20 '000	$ Variance
Water Services	**$14,866**	$15,049	($183)
WW Services	**$24,753**	$23,631	$1,122
SW Services	**$3,680**	$3,672	$8
Engineering & IS	**$7,317**	$6,118	$1,199
Regulatory Services	**$2,793**	$2,406	$387
Corporate Services	**$8,345**	$8,744	($399)
Depreciation	**$17,574**	$16,437	$1,137
Total Operating Expenses	**$79,328**	$76,057	$3,271

Summary of Operating Expenses by Department			
	Actual YTD 2019/20 '000	Forecast YTD 2019/20 '000	$ Variance
Water Services	**$14,866**	$16,222	($1,356)
WW Services	**$24,753**	$25,117	($364)
SW Services	**$3,680**	$3,958	($278)
Engineering & IS	**$7,317**	$6,675	$642
Regulatory Services	**$2,793**	$3,163	($370)
Corporate Services	**$8,345**	$9,540	($1,195)
Depreciation	**$17,574**	$18,755	($1,181)
Total Operating Expenses	**$79,328**	$83,430	($4,102)

Key items to note:

- Operating expenses of $79.3 million are $3.3 million higher than the prior year and $4.1 million below the nine-month forecast for the year.
- Costs for most departments are under the nine-month budget.
- Compared to the prior year, expense categories with the largest increases in costs to date are Engineering and Information Systems (mostly related to Wastewater operations, page 6 of attachment), Wastewater Treatment Plants, and Depreciation (mostly related to Wastewater assets, page 6 of attachment).

Financial Revenue

Key items to note:

- Interest income is lower than the previous year despite higher than anticipated cash balances and rising interest rates. To align with the requirements of the Regional Development Charge (RDC) regulations, the portion of interest earned attributable to RDC funds is now allocated to those funds. This results in lower interest income attributable to Water, Wastewater and Stormwater services of $0.4 million to date.
- Miscellaneous revenue includes various un-regulated activities such as tower leases, energy generation, consulting activities and some contracted services.

Financial Expenses

Key items to note:

- Long Term Debt principal and interest expenses are $2.4 million lower than in the prior year.
- Debt servicing savings are a result of two factors: (1) new debt issues having lower interest rates than older, maturing issues; (2) lower debt discount expense resulting from a lower total debt balance. For the previous three years debt repayments have been greater than new debt, however, new debt issued in November of $30.0 million exceeds the debt repayments of $18.2 million this fiscal year.

Operating Results by Service - Pages 5-7 of attachment

Year to Date Operating Results by Service		
	2019/20	2018/19
	'000	'000
Water	**$2,387**	$1,066
Wastewater	**($3,129)**	$584
Stormwater	**($1,187)**	($620)
Surplus (Deficit)	**($1,929)**	$1,030

Regulated and Unregulated Operations - Page 8 of attachment

Results by Activity		
	2019/20	2018/19
	'000	'000
Regulated Activities	**$3,186**	$3,933
Unregulated Activities	**$504**	$996
Surplus (Deficit)	**$3,690**	$4,929
Accrued Pension Expense	**($5,619)**	($3,899)
Surplus (Deficit)	**($1,929)**	$1,030

Key items to note:

- Two factors have contributed to the decline in the surplus for Unregulated Activities. One factor is a decline in revenue from Septage Tipping as former customers have been using other vendors. The other is a reduction in the allocation of revenue from regulated operations for the dewatering of biosolids to the unregulated dewatering facility at Aerotech. Aerotech was incurring costs associated with treating septage, so a portion of the revenue had been allocated there. Now most of the dewatering process is being handled within the other Halifax Water facilities that the revenue allocation to Aerotech is reduced.

Results under International Financial Reporting Standards - Pages 9 & 10

As noted previously, the AcSB requires Halifax Water, as a rate regulated utility, to report financial results using IFRS.

On the IFRS Balance Sheet, Accumulated Depreciation is higher producing a lower value for assets, Contributed Capital is treated as a long term liability and amortized rather than being treated

as a contribution to equity, and the Operating Surplus is much higher due to changes in the Income Statement.

On the IFRS Income Statement, revenue is the same. Depreciation expense is higher as contributed assets are depreciated and some assets are depreciated more quickly. Financial revenue is higher as the amortization of contributed capital is treated as revenue. The most significant change is financial expenses are lower as there is no expense for the Long Term Debt Principal appropriation – a difference of $18.6 million for the full year.

The IFRS Surplus for the year to date is $10.1 million.

ATTACHMENTS

Unaudited Operating Results for the nine (9) months ended December 31, 2019

Report prepared by: *Original Signed By:*

Alicia Scallion, CPA, CA, Manager, Accounting, 902-490-4814

HALIFAX WATER
UNAUDITED BALANCE SHEET - CONSOLIDATED
AS OF DECEMBER 31, 2019

	December 31, 2019 '000	December 31, 2018 '000
ASSETS		
Cash	$51,763	$57,356
Accounts Receivable	$41,109	$40,807
Materials & Supplies	$1,659	$3,096
Prepaid Expenses	$19	$531
	$94,550	$101,791
Regulatory Asset	$2,861	$3,053
Plant in Service	$1,243,347	$1,199,960
Assets Under Construction	$77,804	$60,719
	$1,324,011	$1,263,731
Unamortized Debt Discount & Issue Expense	$977	$885
	$1,419,539	**$1,366,407**
LIABILITIES & CAPITAL		
Trade Payables & Accrued Liabilities	$19,791	$21,742
Deposits & Unearned Revenue	$3,390	$3,669
Current Portion of Long Term Debt	$19,484	$22,630
	$42,665	$48,041
Pension & Accrued Retirement Benefits	$75,357	$73,850
RDC & Special Purpose Reserves	$49,442	$36,354
Long Term Debt	$200,591	$189,325
Total Liabilities	$368,055	$347,569
Capital Surplus, Committed Reserves, & Accumulated OCI	$1,037,750	$997,328
Operating Surplus	$15,663	$20,481
Excess (Deficiency) of Revenue over Expenditure - Consolidated	($1,929)	$1,029
Total Capital & Surplus	$1,051,484	$1,018,838
	$1,419,539	**$1,366,407**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - CONSOLIDATED
APRIL 1/19 - DECEMBER 31/19 (9 MONTHS)
75.00%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/19 MAR 31/20 BUDGET* '000	APR 1/19 MAR 31/20 FORECAST '000	% of FORECAST
$11,599	$9,079	**OPERATING REVENUE**	$105,344	$105,181	$138,727	$137,963	76.36%
$8,768	$8,234	**OPERATING EXPENSES**	$79,328	$76,057	$115,088	$111,240	71.31%
$2,831	**$844**	**OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES**	**$26,017**	**$29,124**	**$23,639**	**$26,723**	**97.36%**
		FINANCIAL REVENUE					
$46	$115	INVESTMENT INCOME	$383	$834	$816	$500	76.69%
$44	$71	MISCELLANEOUS	$489	$556	$553	$578	84.56%
$90	**$186**		**$873**	**$1,391**	**$1,369**	**$1,078**	**80.91%**
		FINANCIAL EXPENSES					
$616	$633	LONG TERM DEBT INTEREST	$5,349	$5,619	$8,182	$7,109	75.24%
$1,655	$1,858	LONG TERM DEBT PRINCIPAL	$13,861	$16,026	$19,822	$18,572	74.63%
$17	$18	AMORTIZATION DEBT DISCOUNT	$137	$154	$202	$187	73.33%
$423	$417	DIVIDEND/GRANT IN LIEU OF TAXES	$3,809	$3,750	$5,147	$5,079	74.99%
$9	$10	MISCELLANEOUS	$43	$37	$21	$43	100.53%
$2,719	**$2,936**		**$23,199**	**$25,586**	**$33,374**	**$30,990**	**74.86%**
$202	**($1,906)**	**OPERATING SURPLUS (DEFICIT) BEFORE OTHER COMPREHENSIVE INCOME**	**$3,690**	**$4,928**	**($8,366)**	**($3,189)**	**215.72%**
		NON NSUARB ITEMS					
($472)	($433)	ACCRUED PENSION EXPENSE	($5,619)	($3,899)	($5,668)	($8,013)	70.12%
$0	$0	OTHER COMPREHENSIVE INCOME	$0	$0	$0	$0	0.00%
($472)	**($433)**		**($5,619)**	**($3,899)**	**($5,668)**	**($8,013)**	**70.12%**
($270)	**($2,339)**	**OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES**	**($1,929)**	**$1,029**	**($14,034)**	**($11,202)**	**17.22%**

HALIFAX WATER
UNAUDITED BALANCE SHEET
AS OF DECEMBER 31, 2019

	December 31, 2019 '000	December 31, 2018 '000
ASSETS		
Cash	$51,763	$57,356
Accounts Receivable		
Customers & Contractual	$14,692	$13,960
Customers & Contractual - Unbilled Services	$19,780	$19,590
Halifax Regional Municipality	$6,637	$7,256
Materials & Supplies	$1,659	$3,096
Prepaid Expenses	$19	$531
	$94,550	$101,791
Regulatory Asset	$2,861	$3,053
Plant in Service - Water	$659,158	$635,230
Plant in Service - Wastewater	$807,898	$761,811
Plant in Service - Stormwater	$271,499	$263,952
Less: Accumulated Depreciation - Water	($197,006)	($188,611)
Accumulated Depreciation - Wastewater	($240,423)	($221,680)
Accumulated Depreciation - Stormwater	($57,778)	($50,742)
	$1,246,207	$1,203,013
Assets Under Construction	$77,804	$60,719
	$1,324,011	$1,263,731
Unamortized Debt Discount & Issue Expense	$977	$885
	$1,419,539	**$1,366,407**
LIABILITIES & CAPITAL		
Trade Payables	$12,303	$15,841
Interest on Long Term Debt	$1,475	$1,664
Halifax Regional Municipality	$6,014	$4,237
Contractor & Customer Deposits	$206	$208
Unearned Revenue	$3,184	$3,461
Current Portion of Long Term Debt	$19,484	$22,630
	$42,665	$48,041
Accrued Post-Retirement Benefits	$380	$430
Accrued Pre-Retirement Benefit	$1,602	$4,035
Deferred Pension Liability	$73,374	$69,385
Special Purpose Reserves not allocated to projects	$1,540	$1,307
Regional Development Charge	$47,902	$35,047
Long Term Debt-Water	$62,648	$55,385
Long Term Debt-Wastewater	$122,121	$120,977
Long Term Debt-Stormwater	$15,822	$12,963
Total Liabilities	$368,055	$347,569
Capital Surplus	$1,064,188	$1,027,500
Committed Reserves	$2,391	$2,391
Accumulated Other Comprehensive Income	($41,209)	($44,943)
Operating Surplus used to Fund Capital	$12,380	$12,380
Operating Surplus	$15,663	$20,481
Excess (Deficiency) of Revenue over Expenditure - Consolidated	($1,929)	$1,029
Total Capital & Surplus	$1,051,484	$1,018,838
	$1,419,539	**$1,366,407**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - ALL SERVICES
APRIL 1/19 - DECEMBER 31/19 (9 MONTHS)
75.00%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/19 MAR 31/20 BUDGET* '000	APR 1/19 MAR 31/20 FORECAST '000	% of BUDGET*	% of FORECAST
		OPERATING REVENUE						
$4,019	$3,833	METERED SALES - WATER	$36,545	$36,509	$47,758	$47,983	76.52%	76.16%
$5,898	$3,554	METERED SALES - WASTEWATER	$53,558	$53,095	$70,031	$69,796	76.48%	76.74%
$514	$508	STORMWATER SITE GENERATED SERVICE	$4,616	$4,660	$6,351	$6,197	72.69%	74.50%
$590	$590	FIRE PROTECTION	$5,306	$5,306	$7,074	$7,074	75.00%	75.00%
$320	$320	STORMWATER RIGHT OF WAY SERVICE	$2,876	$2,876	$3,835	$3,835	75.00%	75.00%
$204	$205	OTHER SERVICES AND FEES	$1,794	$2,104	$2,825	$2,225	63.52%	80.64%
$37	$29	CUSTOMER LATE PAY./COLLECTION FEES	$349	$313	$453	$453	76.97%	76.97%
$19	$41	MISCELLANEOUS	$299	$318	$400	$400	74.81%	74.81%
$11,599	**$9,079**		**$105,344**	**$105,181**	**$138,727**	**$137,963**	**75.94%**	**76.36%**
		OPERATING EXPENSES						
$516	$1,008	WATER SUPPLY & TREATMENT	$5,785	$6,320	$9,596	$8,725	60.29%	66.31%
$822	$623	TRANSMISSION & DISTRIBUTION	$7,371	$7,172	$11,128	$10,633	66.23%	69.32%
$1,057	$829	WASTEWATER COLLECTION	$8,732	$8,455	$10,972	$11,193	79.58%	78.01%
$1,806	$1,468	WASTEWATER TREATMENT PLANTS	$13,401	$12,778	$19,139	$18,381	70.02%	72.91%
$340	$320	STORMWATER COLLECTION	$3,639	$3,635	$5,750	$5,237	63.29%	69.49%
$284	$222	SMALL SYSTEMS AND OTHER SERVICES	$2,450	$2,250	$3,622	$3,370	67.65%	72.70%
$189	$182	SCADA, CONTROL & PUMPING	$1,920	$1,741	$2,861	$2,856	67.11%	67.23%
$719	$584	ENGINEERING & INFORMATION SERVICES	$7,317	$6,118	$8,579	$8,900	85.29%	82.21%
$291	$225	REGULATORY SERVICES	$2,793	$2,406	$4,081	$4,218	68.45%	66.23%
$404	$414	CUSTOMER SERVICE	$3,887	$3,695	$5,727	$5,717	67.87%	67.98%
$401	$575	ADMINISTRATION & PENSION	$4,458	$5,049	$8,547	$7,003	52.16%	63.66%
$1,939	$1,784	DEPRECIATION	$17,574	$16,438	$25,085	$25,007	70.06%	70.28%
$8,768	**$8,234**		**$79,328**	**$76,057**	**$115,088**	**$111,240**	**68.93%**	**71.31%**
$2,831	**$844**	**OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES**	**$26,017**	**$29,124**	**$23,639**	**$26,723**	**110.06%**	**97.36%**
		FINANCIAL REVENUE						
$46	$115	INVESTMENT INCOME	$383	$834	$816	$500	46.99%	76.69%
$44	$71	MISCELLANEOUS	$489	$556	$553	$578	88.39%	84.56%
$90	**$186**		**$873**	**$1,391**	**$1,369**	**$1,078**	**63.72%**	**80.91%**
		FINANCIAL EXPENSES						
$616	$633	LONG TERM DEBT INTEREST	$5,349	$5,619	$8,182	$7,109	65.38%	75.24%
$1,655	$1,858	LONG TERM DEBT PRINCIPAL	$13,861	$16,026	$19,822	$18,572	69.93%	74.63%
$17	$18	AMORTIZATION DEBT DISCOUNT	$137	$154	$202	$187	67.90%	73.33%
$423	$417	DIVIDEND/GRANT IN LIEU OF TAXES	$3,809	$3,750	$5,147	$5,079	74.00%	74.99%
$9	$10	MISCELLANEOUS	$43	$37	$21	$43	208.14%	100.53%
$2,719	**$2,936**		**$23,199**	**$25,586**	**$33,374**	**$30,990**	**69.51%**	**74.86%**
$202	**($1,906)**	**OPERATING SURPLUS (DEFICIT) BEFORE OTHER COMPREHENSIVE INCOME**	**$3,690**	**$4,928**	**($8,366)**	**($3,189)**	**144.11%**	**215.72%**
		NON NSUARB ITEMS						
($472)	($433)	ACCRUED PENSION EXPENSE	($5,619)	($3,899)	($5,668)	($8,013)	99.13%	70.12%
$0	$0	OTHER COMPREHENSIVE INCOME	$0	$0	$0	$0	0.00%	0.00%
($472)	**($433)**		**($5,619)**	**($3,899)**	**($5,668)**	**($8,013)**	**99.13%**	**70.12%**
($270)	**($2,339)**	**OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES**	**($1,929)**	**$1,029**	**($14,034)**	**($11,202)**	**13.75%**	**17.22%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - WATER OPERATIONS
APRIL 1/19 - DECEMBER 31/19 (9 MONTHS)
75.00%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/19 MAR 31/20 BUDGET* '000	APR 1/19 MAR 31/20 FORECAST '000	% of FORECAST
		OPERATING REVENUE					
$4,019	$3,833	METERED SALES	$36,545	$36,509	$47,758	$47,983	76.16%
$590	$590	FIRE PROTECTION	$5,306	$5,306	$7,074	$7,074	75.00%
$77	$75	PRIVATE FIRE PROTECTION SERVICES	$660	$651	$873	$873	75.61%
$17	$13	BULK WATER STATIONS	$271	$266	$292	$292	92.76%
$17	$15	CUSTOMER LATE PAY./COLLECTION FEES	$186	$179	$223	$223	83.18%
$7	$19	MISCELLANEOUS	$125	$134	$166	$166	75.22%
$4,727	**$4,544**		**$43,093**	**$43,046**	**$56,387**	**$56,612**	**76.12%**
		OPERATING EXPENSES					
$516	$1,008	WATER SUPPLY & TREATMENT	$5,785	$6,320	$9,596	$8,725	66.31%
$822	$623	TRANSMISSION & DISTRIBUTION	$7,371	$7,172	$11,128	$10,633	69.32%
$80	$83	SMALL SYSTEMS (inc. Contract Systems)	$1,004	$921	$1,237	$1,217	82.50%
$72	$68	SCADA, CONTROL & PUMPING	$706	$635	$1,037	$1,055	66.93%
$262	$252	ENGINEERING & INFORMATION SERVICES	$3,119	$2,837	$3,901	$4,071	76.62%
$65	$44	REGULATORY SERVICES	$633	$510	$1,142	$1,209	52.35%
$206	$211	CUSTOMER SERVICE	$1,983	$1,883	$2,918	$2,913	68.06%
$447	$516	ADMINISTRATION & PENSION	$5,156	$4,588	$7,243	$7,651	67.39%
$746	$714	DEPRECIATION	$6,800	$6,586	$9,955	$9,871	68.89%
$3,217	**$3,519**		**$32,557**	**$31,452**	**$48,159**	**$47,344**	**68.77%**
$1,510	**$1,025**	**OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES**	**$10,536**	**$11,593**	**$8,229**	**$9,268**	**113.68%**
		FINANCIAL REVENUE					
$20	$52	INVESTMENT INCOME	$166	$376	$367	$210	79.10%
$28	$37	MISCELLANEOUS	$404	$436	$431	$456	88.62%
$47	**$89**		**$571**	**$812**	**$798**	**$666**	**85.62%**
		FINANCIAL EXPENSES					
$166	$173	LONG TERM DEBT INTEREST	$1,353	$1,457	$2,239	$1,824	74.14%
$418	$702	LONG TERM DEBT PRINCIPAL	$3,494	$6,047	$5,165	$4,657	75.02%
$6	$8	AMORTIZATION DEBT DISCOUNT	$47	$70	$67	$64	72.73%
$423	$417	DIVIDEND/GRANT IN LIEU OF TAXES	$3,809	$3,750	$5,147	$5,079	74.99%
$2	$8	MISCELLANEOUS	$18	$16	$11	$18	102.62%
$1,015	**$1,308**		**$8,720**	**$11,340**	**$12,630**	**$11,643**	**74.90%**
$543	**($194)**	**OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES**	**$2,387**	**$1,065**	**($3,603)**	**($1,708)**	**239.71%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - WASTEWATER OPERATIONS
APRIL 1/19 - DECEMBER 31/19 (9 MONTHS)
75.00%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/19 MAR 31/20 BUDGET* '000	APR 1/19 MAR 31/20 FORECAST '000	% of FORECAST
		OPERATING REVENUE					
$5,898	$3,554	METERED SALES	$53,558	$53,095	$70,031	$69,796	76.74%
$1	$0	WASTEWATER OVERSTRENGTH AGREEMENTS	$14	$45	$50	$30	46.83%
$28	$26	LEACHATE CONTRACT	$267	$236	$394	$344	77.79%
$9	$8	CONTRACT REVENUE	$65	$64	$86	$86	75.51%
$0	$17	DEWATERING FACILITY/SLUDGE LAGOON	$0	$157	$210	$0	0.00%
$49	$29	AIRLINE EFFLUENT	$77	$87	$160	$100	76.92%
$21	$36	SEPTAGE TIPPING FEES	$440	$596	$760	$500	87.93%
$18	$17	CUSTOMER LATE PAY./COLLECTION FEES	$145	$135	$164	$164	88.20%
$7	$14	MISCELLANEOUS	$106	$112	$139	$139	76.12%
$6,032	**$3,702**		**$54,672**	**$54,527**	**$71,993**	**$71,158**	**76.83%**
		OPERATING EXPENSES					
$1,057	$829	WASTEWATER COLLECTION	$8,732	$8,455	$10,972	$11,193	78.01%
$1,806	$1,468	WASTEWATER TREATMENT PLANTS	$13,401	$12,778	$19,139	$18,381	72.91%
$116	$100	SMALL SYSTEMS	$868	$926	$1,323	$1,300	66.77%
$63	$17	DEWATERING FACILITY/ SLUDGE MGM'T	$345	$171	$636	$478	72.28%
$0	$0	BIOSOLIDS TREATMENT	$1	$26	$101	$51	1.47%
$24	$22	LEACHATE CONTRACT	$233	$206	$325	$325	71.54%
$113	$111	SCADA, CONTROL & PUMPING	$1,174	$1,070	$1,784	$1,761	66.64%
$393	$286	ENGINEERING & INFORMATION SERVICES	$3,611	$2,814	$3,556	$3,685	97.99%
$81	$65	REGULATORY SERVICES	$849	$661	$1,007	$1,508	56.31%
$170	$174	CUSTOMER SERVICE	$1,638	$1,559	$2,536	$2,532	64.68%
$367	$423	ADMINISTRATION & PENSION	$4,233	$3,750	$5,997	$6,335	66.82%
$1,108	$997	DEPRECIATION	$10,001	$9,177	$13,921	$13,981	71.53%
$5,299	**$4,493**		**$45,084**	**$41,592**	**$61,299**	**$61,531**	**73.27%**
$733	**($790)**	**OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES**	**$9,587**	**$12,935**	**$10,695**	**$9,628**	**99.58%**
		FINANCIAL REVENUE					
$17	$52	INVESTMENT INCOME	$143	$375	$367	$188	76.05%
$17	$34	MISCELLANEOUS	$85	$121	$122	$122	69.41%
$34	**$85**		**$228**	**$496**	**$489**	**$310**	**73.44%**
		FINANCIAL EXPENSES					
$394	$409	LONG TERM DEBT INTEREST	$3,548	$3,743	$5,133	$4,677	75.87%
$1,101	$1,037	LONG TERM DEBT PRINCIPAL	$9,290	$9,007	$12,965	$12,444	74.66%
$10	$9	AMORTIZATION DEBT DISCOUNT	$81	$76	$113	$110	73.79%
$7	$2	MISCELLANEOUS	$25	$20	$10	$25	99.07%
$1,513	**$1,457**		**$12,944**	**$12,847**	**$18,220**	**$17,255**	**75.02%**
($746)	**($2,162)**	**OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES**	**($3,129)**	**$584**	**($7,036)**	**($7,317)**	**42.76%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - STORMWATER OPERATIONS
APRIL 1/19 - DECEMBER 31/19 (9 MONTHS)
75.00%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/19 MAR 31/20 BUDGET* '000	APR 1/19 MAR 31/20 FORECAST '000	% of FORECAST
		OPERATING REVENUE					
$514	$508	STORMWATER SITE GENERATED SERVICE	$4,616	$4,660	$6,351	$6,197	74.50%
$320	$320	STORMWATER RIGHT OF WAY SERVICE	$2,876	$2,876	$3,835	$3,835	75.00%
$1	($3)	CUSTOMER LATE PAY./COLLECTION FEES	$18	($0)	$66	$66	27.79%
$5	$8	MISCELLANEOUS	$69	$72	$95	$95	72.21%
$840	**$832**		**$7,580**	**$7,608**	**$10,347**	**$10,193**	**74.36%**
		OPERATING EXPENSES					
$340	$320	STORMWATER COLLECTION	$3,639	$3,635	$5,750	$5,237	69.49%
$4	$4	SCADA, CONTROL & PUMPING	$40	$36	$39	$40	101.64%
$64	$46	ENGINEERING & INFORMATION SERVICES	$587	$467	$1,122	$1,144	51.33%
$144	$115	REGULATORY SERVICES	$1,311	$1,235	$1,932	$1,501	87.38%
$28	$28	CUSTOMER SERVICE	$266	$253	$273	$272	97.85%
$60	$69	ADMINISTRATION & PENSION	$689	$610	$975	$1,030	66.83%
$85	$73	DEPRECIATION	$773	$675	$1,208	$1,154	66.96%
$725	**$656**		**$7,306**	**$6,912**	**$11,299**	**$10,379**	**70.39%**
$115	**$177**	**OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES**	**$274**	**$696**	**($952)**	**($186)**	**247.42%**
		FINANCIAL REVENUE					
$9	$11	INVESTMENT INCOME	$74	$83	$82	$102	72.90%
$0	$0	MISCELLANEOUS	$0	$0	$0	$0	0.00%
$9	**$11**		**$74**	**$83**	**$82**	**$102**	**72.90%**
		FINANCIAL EXPENSES					
$55	$51	LONG TERM DEBT INTEREST	$448	$419	$810	$608	73.72%
$136	$119	LONG TERM DEBT PRINCIPAL	$1,077	$972	$1,692	$1,471	73.21%
$1	$1	AMORTIZATION DEBT DISCOUNT	$10	$8	$22	$13	72.40%
$192	**$171**		**$1,535**	**$1,399**	**$2,524**	**$2,092**	**73.35%**
($68)	**$17**	**OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES**	**($1,187)**	**($620)**	**($3,395)**	**($2,177)**	**54.53%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - REGULATED AND UNREGULATED OPERATIONS
APRIL 1/19 - DECEMBER 31/19 (9 MONTHS)
75.00%

DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR	LAST YEAR	APR 1/19 MAR 31/20 BUDGET*	APR 1/19 MAR 31/20 FORECAST	% of FORECAST
REGULATED ACTIVITIES					
OPERATING REVENUE					
METERED SALES	$94,720	$94,264	$124,139	$123,975	76.40%
FIRE PROTECTION	$5,306	$5,306	$7,074	$7,074	75.00%
PRIVATE FIRE PROTECTION	$660	$651	$873	$873	75.61%
STORMWATER SERVICE	$2,876	$2,876	$3,835	$3,835	75.00%
OTHER OPERATING REVENUE	$908	$910	$1,158	$1,138	79.82%
	$104,470	**$104,008**	**$137,079**	**$136,895**	**76.31%**
OPERATING EXPENSES					
WATER SUPPLY & TREATMENT	$5,785	$6,320	$9,596	$8,725	66.31%
TRANSMISSION & DISTRIBUTION	$7,371	$7,172	$11,128	$10,633	69.32%
WASTEWATER & STORMWATER COLLECTION	$12,349	$12,063	$16,604	$16,312	75.71%
WASTEWATER TREATMENT PLANTS	$13,401	$12,778	$19,139	$18,381	72.91%
SMALL SYSTEMS	$1,861	$1,832	$2,534	$2,490	74.74%
SCADA, CONTROL & PUMPING	$1,920	$1,741	$2,861	$2,856	67.23%
ENGINEERING & INFORMATION SERVICES	$7,317	$6,118	$8,579	$8,900	82.21%
REGULATORY SERVICES	$2,793	$2,406	$4,081	$4,218	66.23%
CUSTOMER SERVICE	$3,857	$3,668	$5,687	$5,677	67.94%
ADMINISTRATION & PENSION	$10,052	$8,920	$14,195	$14,995	67.04%
DEPRECIATION	$17,560	$16,424	$25,050	$24,972	70.32%
	$84,268	**$79,443**	**$119,454**	**$118,159**	**71.32%**
FINANCIAL REVENUE					
INVESTMENT INCOME	$383	$834	$816	$500	76.69%
MISCELLANEOUS	$138	$183	$110	$135	102.44%
	$522	**$1,017**	**$926**	**$635**	**82.17%**
FINANCIAL EXPENSES					
LONG TERM DEBT INTEREST	$5,349	$5,619	$8,182	$7,109	75.24%
LONG TERM DEBT PRINCIPAL	$13,861	$16,026	$19,822	$18,572	74.63%
AMORTIZATION DEBT DISCOUNT	$137	$154	$202	$187	73.33%
DIVIDEND/GRANT IN LIEU OF TAXES	$3,809	$3,750	$5,147	$5,079	74.99%
	$23,156	**$25,549**	**$33,354**	**$30,948**	**74.82%**
OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES	**($2,433)**	**$33**	**($14,802)**	**($11,577)**	**21.02%**
UNREGULATED ACTIVITIES					
OPERATING REVENUE					
SEPTAGE TIPPING FEES	$440	$596	$760	$500	87.93%
LEACHATE CONTRACT	$267	$236	$394	$344	77.79%
CONTRACT REVENUE	$65	$64	$86	$86	75.51%
DEWATERING	$0	$157	$210	$0	0.00%
AIRLINE EFFLUENT	$77	$87	$160	$100	76.92%
ENERGY PROJECTS	$120	$119	$168	$168	71.43%
MISCELLANEOUS	$25	$32	$38	$38	66.67%
	$994	**$1,292**	**$1,816**	**$1,236**	**80.45%**
OPERATING EXPENSES					
WATER SUPPLY & TREATMENT	$10	$15	$26	$26	40.04%
WASTEWATER TREATMENT	$600	$429	$1,180	$972	61.73%
SPONSORSHIPS & DONATIONS	$55	$55	$61	$61	89.39%
DEPRECIATION	$13	$13	$35	$35	38.42%
	$678	**$513**	**$1,302**	**$1,094**	**62.01%**
FINANCIAL REVENUE					
MISCELLANEOUS	$231	$255	$275	$275	83.82%
	$231	**$255**	**$275**	**$275**	**83.82%**
FINANCIAL EXPENSES					
MISCELLANEOUS	$43	$37	$21	$43	100.53%
	$43	$37	$21	$43	**100.53%**
OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES	**$504**	**$996**	**$768**	**$375**	**134.47%**
TOTAL OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES (REGULATED AND UNREGULATED)	**($1,929)**	**$1,029**	**($14,034)**	**($11,202)**	**17.22%**

HALIFAX WATER
UNAUDITED BALANCE SHEET - IFRS FORMAT
AS OF DECEMBER 31, 2019

	December 31, 2019 '000	December 31, 2018 '000
ASSETS		
Cash	$51,763	$57,356
Accounts Receivable		
Customers & Contractual	$14,692	$13,960
Customers & Contractual - Unbilled Services	$19,780	$19,590
Halifax Regional Municipality	$6,637	$7,256
Materials & Supplies	$1,659	$3,096
Prepaid Expenses	$19	$531
	$94,550	$101,791
Regulatory Asset	$2,861	$3,053
Plant in Service - Water	$659,158	$635,230
Plant in Service - Wastewater	$807,898	$761,811
Plant in Service - Stormwater	$271,499	$263,952
Less: Accumulated Depreciation - Water	($210,956)	($198,511)
Accumulated Depreciation - Wastewater	($255,007)	($231,678)
Accumulated Depreciation - Stormwater	($57,838)	($50,738)
	$1,217,613	$1,183,120
Assets Under Construction	$77,804	$60,719
	$1,295,418	$1,243,839
Unamortized Debt Discount & Issue Expense	$977	$885
	$1,390,945	**$1,346,514**
LIABILITIES		
Trade Payables	$12,303	$15,841
Interest on Long Term Debt	$1,475	$1,664
Halifax Regional Municipality	$6,014	$4,237
Contractor & Customer Deposits	$206	$208
Unearned Revenue	$3,184	$3,461
Current Portion of Deferred Contributed Capital	$13,846	$13,405
Current Portion of Long Term Debt	$19,484	$22,630
	$56,511	$61,446
Accrued Post-Retirement Benefits	$380	$430
Accrued Pre-Retirement Benefit	$1,602	$4,035
Deferred Pension Liability	$73,374	$69,385
Deferred Contributed Capital	$864,562	$841,510
Long Term Debt-Water	$62,648	$55,385
Long Term Debt-Wastewater	$122,121	$120,977
Long Term Debt-Stormwater	$15,822	$12,963
Total Liabilities	$1,197,020	$1,166,130
EQUITY		
Accumulated Other Comprehensive Income	($41,209)	($44,943)
Accumulated Surplus	$225,007	$212,604
Excess (Deficiency) of Revenue over Expenditure	$10,126	$12,723
Total Equity	$193,925	$180,384
	$1,390,945	**$1,346,514**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - IFRS FORMAT - ALL SERVICES
APRIL 1/19 - DECEMBER 31/19 (9 MONTHS)
75.00%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/19 MAR 31/20 BUDGET* '000	APR 1/19 MAR 31/20 FORECAST '000	% of BUDGET*	% of FORECAST
		OPERATING REVENUE						
$4,019	$3,833	METERED SALES - WATER	$36,545	$36,509	$47,758	$47,983	76.52%	76.16%
$5,898	$3,554	METERED SALES - WASTEWATER	$53,558	$53,095	$70,031	$69,796	76.48%	76.74%
$514	$508	STORMWATER SITE GENERATED SERVICE	$4,616	$4,660	$6,351	$6,197	72.69%	74.50%
$590	$590	FIRE PROTECTION	$5,306	$5,306	$7,074	$7,074	75.00%	75.00%
$320	$320	STORMWATER RIGHT OF WAY SERVICE	$2,876	$2,876	$3,835	$3,835	75.00%	75.00%
$204	$205	OTHER SERVICES AND FEES	$1,794	$2,104	$2,825	$2,225	63.52%	80.64%
$37	$29	CUSTOMER LATE PAY./COLLECTION FEES	$349	$313	$453	$453	76.97%	76.97%
$19	$41	MISCELLANEOUS	$299	$318	$400	$400	74.81%	74.81%
$11,599	**$9,079**		**$105,344**	**$105,181**	**$138,727**	**$137,963**	**75.94%**	**76.36%**
		OPERATING EXPENSES						
$516	$1,008	WATER SUPPLY & TREATMENT	$5,785	$6,320	$9,596	$8,725	60.29%	66.31%
$822	$623	TRANSMISSION & DISTRIBUTION	$7,371	$7,172	$11,128	$10,633	66.23%	69.32%
$1,057	$829	WASTEWATER COLLECTION	$8,732	$8,455	$10,972	$11,193	79.58%	78.01%
$1,806	$1,468	WASTEWATER TREATMENT PLANTS	$13,401	$12,778	$19,139	$18,381	70.02%	72.91%
$340	$320	STORMWATER COLLECTION	$3,639	$3,635	$5,750	$5,237	63.29%	69.49%
$284	$222	SMALL SYSTEMS AND OTHER SERVICES	$2,450	$2,250	$3,622	$3,370	67.65%	72.70%
$189	$182	SCADA, CONTROL & PUMPING	$1,920	$1,741	$2,861	$2,856	67.11%	67.23%
$719	$584	ENGINEERING & INFORMATION SERVICES	$7,317	$6,118	$8,579	$8,900	85.29%	82.21%
$291	$225	REGULATORY SERVICES	$2,793	$2,406	$4,081	$4,218	68.45%	66.23%
$404	$414	CUSTOMER SERVICE	$3,887	$3,695	$5,727	$5,717	67.87%	67.98%
$874	$1,008	ADMINISTRATION & PENSION	$10,078	$8,948	$14,216	$15,016	70.89%	67.11%
$3,638	$3,837	DEPRECIATION	$33,063	$34,982	$25,085	$37,610	131.81%	87.91%
$10,939	**$10,720**		**$100,436**	**$98,500**	**$120,756**	**$131,856**	**83.17%**	**76.17%**
$660	**($1,641)**	**OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES**	**$4,908**	**$6,680**	**$17,971**	**$6,107**	**27.31%**	**80.37%**
		FINANCIAL REVENUE						
$46	$115	INVESTMENT INCOME	$383	$834	$816	$500	46.99%	76.69%
$1,537	$1,629	MISCELLANEOUS	$14,110	$14,623	$553	$13,078	2549.93%	107.89%
$1,583	**$1,743**		**$14,493**	**$15,457**	**$1,369**	**$13,578**	**1058.42%**	**106.74%**
		FINANCIAL EXPENSES						
$616	$633	LONG TERM DEBT INTEREST	$5,349	$5,619	$8,182	$7,109	65.38%	75.24%
$17	$18	AMORTIZATION DEBT DISCOUNT	$137	$154	$202	$187	67.90%	73.33%
$423	$417	DIVIDEND/GRANT IN LIEU OF TAXES	$3,809	$3,750	$5,147	$5,079	74.00%	74.99%
$9	$10	MISCELLANEOUS	($21)	($109)	$15	$15	-134.80%	-134.80%
$1,065	**$1,078**		**$9,275**	**$9,414**	**$13,547**	**$12,391**	**68.46%**	**74.85%**
$1,179	**($976)**	**SURPLUS (DEFICIT) BEFORE OTHER COMPREHENSIVE INCOME**	**$10,126**	**$12,723**	**$5,793**	**$7,294**	**174.81%**	**138.84%**
$0	$0	**OTHER COMPREHENSIVE INCOME**	$0	$0	$0	$0	0.00%	0.00%
$1,179	**($976)**	**SURPLUS (DEFICIT)**	**$10,126**	**$12,723**	**$5,793**	**$7,294**	**174.81%**	**138.84%**

Halifax Water
Halifax Regional Water Commission

ITEM # 4.2

HRWC Board

January 30, 2020

TO: Craig MacMullin, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*

Russell Walker, Chair, Board Audit and Finance Committee

DATE: January 21, 2020

SUBJECT: **Proposed 2020/21 Capital Budget**

ORIGIN

- Staff compilation of the Annual Capital Budget.
- Audit and Finance Committee Meeting of November 25, 2019.

RECOMMENDATION

The Halifax Water Board approve:

1. The 2020/21 Capital Budget at a total value of $96,514,000 as detailed in the attached Schedule 1.
2. List of routine capital expenditure items required for on-going departmental operation, at a total value of $7,023,000 as indicated in Schedule 1.

BACKGROUND

Halifax Water's 2019 updated *Integrated Resource Plan* (IRP) identifies a 30-year capital investment plan valued at $4.054 billion (2019$) with a net present value of $2.691 billion. In relation to the IRP, the capital budget program focuses on providing required infrastructure for asset renewal, regulatory compliance and growth.

The capital program helps ensure that we continue to provide services in a cost effective and efficient manner with a focus on long-term sustainability.

DISCUSSION

Attached, in Schedule 1, is the proposed Capital Budget for Halifax Water for the fiscal year April 1, 2020 to March 31, 2021. It includes projects for Water, Wastewater, and Stormwater service delivery with a total value of $96,514,000. The proposed budget includes a series of routine capital expenditures, not related to major projects that are required for ongoing operations. These items total $7,023,000.

The Capital Budget document reflects the Integrated Resource Plan (IRP) completed in 2019. The IRP was developed with stakeholder consultation, was approved by the Halifax Water Board on November 28th, 2019, and will be reviewed by the Nova Scotia Utility and Review Board as evidence supporting future hearings. This 30-year plan provides a strong vision for the infrastructure requirements needed to ensure the long-term integrity of the utility's assets. The 2020/21 Capital Budget includes many early projects from the IRP that will begin to shape the overall direction of the capital plan for years to come.

The Capital Budget funds traditional capital requirements for utility operation, along with a focus on several key strategic initiatives. The following sections provide highlighted details of the Capital Budget by asset category.

Water: Major Water capital projects include:

- Main Street to Caledonia Road Transmission Main
- Water Distribution – Main Renewal Program
- Lead Service Line Replacement Program
- Design Phase of the JD Kline & Lake Major Water Supply Plant Upgrade projects
- Bedford South Reservoir – New Construction
- HRM Cogswell Redevelopment – Water Transmission Main Relocation

Wastewater: Major Wastewater capital projects include:

- Wastewater System – Trenchless Rehabilitation Program
- Integrated Wastewater Collection Projects
- Autoport/Main Road Pumping Station Replacement
- Wastewater Lateral Replacement
- Halifax North Peninsula Sewer Separation Program
- HRM Cogswell Redevelopment – Wastewater Sewer Relocation

Stormwater: Major Stormwater capital projects include:

- Integrated Stormwater Collection Projects
- Driveway and Cross Culvert Renewal Program
- Ellenvale Run Retaining Wall System Replacement – Phase 4
- HRM Cogswell Redevelopment – Storm Sewer Relocation

Corporate Projects: Major Corporate Projects include:

- IT Strategic Plan Implementation Year 3
- Corporate Flow Monitoring Program
- Design Phase of East/Central Operations Facility
- Fleet Upgrade Program

The proposed 2020/21 capital budget does not include the Cogswell District Energy Project. If that project proceeds, it will have a separate capital budget which would be brought forward to the Halifax Water Board in conjunction with the business case and recommendation to proceed.

BUDGET IMPLICATIONS

The funding plan for the proposed Capital Budget is shown below:

2020/2021 Capital Budget Funding Sources

Water:	Depreciation	$11,479,000
	Debt	$23,183,300
	RDC	$150,000
	External Funding Building Canada & CWWF	$4,770,000
	Capital Cost Contributions	$9,347,200
TOTAL		**$48,929,500**

Wastewater:	Depreciation	$15,974,000
	Debt	$17,740,970
	RDC	$3,798,400
	External Funding HRM	$934,630
TOTAL		**$38,448,000**
Stormwater:	Depreciation	$1,582,000
	External Funding HRM	$18,280
	Debt	$7,536,220
TOTAL		**$9,136,500**
TOTAL CAPITAL FUNDING:		**$96,514,000**

The Capital Budget presented and the projected funding matches the projected capital expenditure within the current 5-Year Capital Budget.

ATTACHMENTS

Schedule 1 – Halifax Water 2020/21 Capital Budget

Report Prepared by: *Original Signed By:*
Jamie Hannam, MBA, P. Eng.
Director, Engineering & IS Department, 902-490-4804

Financial Review by: *Original Signed By:*
Louis de Montbrun, CPA, CA
Director, Corporate Services/CFO, 902-490-3685

Report Approved by *Original Signed By:*
Cathie O'Toole, MBA, FCPA, FCGA, ICD.D
General Manger

HALIFAX WATER

Capital Budget 2020/21

Summary

ITEM # 4.2
HRWC Board
January 30, 2020
ATTACHMENT

Asset Category	Project Costs
Water - Land -- T O T A L	$100,000
Water - Transmission -- T O T A L	$10,453,000
Water - Distribution -- T O T A L	$5,277,000
Water - Structures -- T O T A L	$10,980,000
Water - Treatment Facilities -- T O T A L	$15,129,000
Water - Energy -- T O T A L	$200,000
Water - Security -- T O T A L	$50,000
Water - Equipment -- T O T A L	$103,000
Water - Corporate Projects - T O T A L	$6,637,500
TOTAL - Water	**$48,929,500**

Wastewater - Trunk Sewers -- T O T A L	$500,000
Wastewater - Collection System -- T O T A L	$14,473,000
Wastewater - Forcemains -- T O T A L	$825,000
Wastewater Structures -- T O T A L	$8,415,000
Wastewater - Treatment Facility -- T O T A L	$5,525,000
Wastewater - Energy -- T O T A L	$75,000
Wastewater - Security -- T O T A L	$200,000
Wastewater - Equipment -- T O T A L	$255,000
Wastewater - Corporate Projects -- T O T A L	$8,180,000
TOTAL - Wastewater	**$38,448,000**

HALIFAX WATER

Capital Budget 2020/21

Summary

Asset Category	Project Costs
Stormwater - Pipes -- T O T A L	$2,380,000
Stormwater - Culverts -- T O T A L	$3,107,000
Stormwater - Structures -- T O T A L	$1,900,000
Stormwater - Corporate Projects -- T O T A L	$1,749,500
TOTAL - Stormwater	**$9,136,500**

G R A N D T O T A L	**$96,514,000**

HALIFAX WATER

Capital Budget 2020/21

Water

Project Number	Project Name	Project Cost
	Water - Land	
3.033	Watershed Land Acquisition	$100,000
	Water - Land -- T O T A L	**$100,000**
	Water - Transmission	
3.042	Critical Valve Replacement Program	$300,000
3.503	Chain Control Valve Upgrade Program	$45,000
3.581	Transmission Main Monitroing System Pilot	$200,000
3.549	Chain Control Transmission - Peninsula Low Upsize - Design	$100,000
3.552	Chain Control Transmission - Peninsula Intermediate Upsize - Design	$100,000
3.564	Herring Cove Road Looping-McIntosh Street	$228,000
3.568	Tacoma PRV Chamber	$420,000
3.291	Port Wallace Transmission Main - Main Street to Caledonia Road	$6,000,000
3.554	North End Feeder Replacement - Design	$200,000
3.399	Cogswell Interchange - Water Transmission Main Realignments	$2,850,000
3.045	Bedford West CCC - Various Phases	$5,000
3.261	Lakeside Timberlea CCC	$5,000
	Water - Transmission -- T O T A L	**$10,453,000**
	Water - Distribution	
3.022	Water Distribution - Main Renewal Program	$3,525,000
3.067	~ Valves Renewals	$125,000
3.068	~ Hydrants Renewals	$75,000
3.069	~ Service Lines Renewals	$100,000
3.390	Lead Service Line Replacement Program	$1,000,000
3.294	Automated Flushing Program	$20,000
3.334	Coburg Road Bridge Watermain Replacement	$300,000
3.501	South Street CN Bridge Watermain Installation	$25,000
3.296	Water Sampling Station Relocation Program	$10,000
3.513	Meadowbrook PRV Chamber - Replace PRV Valves	$35,000
3.569	Fall River Rechlorination Station	$25,000
3.573	Spring Garden Road - Main Renewal - Design	$37,000
	Water - Distribution -- T O T A L	**$5,277,000**

HALIFAX WATER

Capital Budget 2020/21

Water

Project Number	Project Name	Project Cost
	Water - Structures	
3.512	Eaglewood Pumping Station - New Pump Control Panel	$35,000
3.514	Steel Reservoir Climbing Systems - Safety Upgrades	$225,000
3.116	Bedford South (Hemlock) Reservoir CCC	$10,160,000
3.309	Cowie Hill Reservoir Replacement - Design	$200,000
3.515	Meadowbrook Reservoir Overflow Pipe Replacement	$70,000
3.517	Mount Edward Control Chamber - Extension of Power Supply	$20,000
3.523	Lake Major Dam - Site Improvements	$240,000
3.528	Beaver Bank Booster Station - Pump Upgrades	$30,000
	Water - Structures -- T O T A L	**$10,980,000**
	Water - Treatment Facilities	
	J D Kline Water Supply Plant:	
3.541	JD Kline WSP - Process Upgrades - Phase 1 - New Clarifier and Pre-Treatment	$1,475,000
3.542	JD Kline WSP - Process Upgrades - Phase 1 - Backwash Optimization	$1,700,000
3.543	JD Kline WSP - Process Upgrades - Phase 1 - Building Improvements	$110,000
3.141	JD Kline WSP - Raw Water Valve Actuators Replacement	$100,000
3.428	JD Kline WSP - Caustic Tank Liner Replacements	$25,000
3.465	JD Kline WSP - Low Lift Pump Replacements	$1,120,000
3.351	JD Kline WSP - Replace Westinghouse Electrical Panels	$8,000
3.530	JD Kline WSP - Alum Tank Liner Replacement	$45,000
3.531	J D Kline WSP - New Ultrasonic Level Transmitter	$10,000
3.472	JD Kline WSP - Replace Floc Tank Valve Actuators	$35,000
3.374	J D Kline WSP - Replace Filter Isolation Gates Program	$300,000
	Lake Major Water Supply Plant:	
3.532	Lake Major WSP - Phase 1 - Temporary Side Stream	$3,320,000
3.533	Lake Major WSP - Phase 1 - New Clarifiers and Pre-Treatment	$1,770,000
3.534	Lake Major WSP - Phase 1 - Filtration System Replacement	$370,000
3.535	Lake Major WSP - Phase 1 - Raw Water Pump Station	$265,000
3.536	Lake Major WSP - Phase 1 - Building Additions	$184,000
3.162	Lake Major WSP - Butterfly Valve Replacement Program	$350,000
3.507	Lake Major WSP - New Boat Launch	$42,000

HALIFAX WATER

Capital Budget 2020/21

Water

Project Number	Project Name	Project Cost
3.321	Lake Major WSP - Replace Fluoride Tank and Piping	$250,000
3.557	Lake Major WSP - Sludge Drying Beds Improvements	$500,000
3.526	Lake Major WSP - Roof Replacement	$400,000
3.560	Lake Major WSP - Emergency Pumps - Sitework Preparations	$320,000
3.524	Lake Major WSP - Fuel Storage for Generator at Low Lift Station	$135,000
	Bennery Lake Water Supply Plant:	
3.477	Aerotech Booster Station Capital Upgrades	$200,000
3.488	Bennery Lake WSP - Surge Anticipator Valves Replacement	$100,000
3.486	Bennery Lake WSP - Access Road Upgrade	$1,500,000
	Non-Urban Core WSP	
3.582	Bomont Equipment Upgrade	$150,000
3.518	Pump Replacement Program - Small Systems	$45,000
3.455	Reservoir Mixing and Residuals Management Upgrade Program	$300,000
	Water - Treatment Facilities -- T O T A L	**$15,129,000**
	Water - Energy	
3.221	Energy Management Capital Program (Water)	$100,000
3.107	Chamber HVAC Retro-Commissioning Program	$100,000
	Water - Energy -- T O T A L	**$200,000**
	Water - Security	
4.009	Security Upgrade Program	$50,000
	Water - Security -- T O T A L	**$50,000**
	Water - Equipment	
3.101	Miscellaneous Equipment Replacement	$50,000
3.502	Leak Detection Equipment	$8,000
3.516	Purchase Hydraulic Saws	$45,000
	Water - Equipment -- T O T A L	**$103,000**
	Water - Corporate Projects - T O T A L	**$6,637,500**
	GRAND TOTAL - WATER	**$48,929,500**

HALIFAX WATER

Capital Budget 2020/21

Wastewater

Project Number	Project Name	Project Cost
	Wastewater - Trunk Sewers	
2.822	Odour Level of Service and Optimization Review	$100,000
2.584	Fairview Cove Trunk Sewer - Design	$400,000
	Wastewater - Trunk Sewers - -- T O T A L	**$500,000**
	Wastewater - Collection System	
2.052	Integrated Wastewater Projects - Program	$2,000,000
2.168	Wastewater System - Trenchless Rehabilitation Program	$3,000,000
2.838	Albro Lakes Watershed Separation	$811,000
2.841	Local Network Upgrades on Beaver Bank Road - Design	$176,000
2.692	Cogswell Redevelopment - Sewer Relocation	$1,000,000
2.557	Punch Bowl PS Elimination	$100,000
2.746	Sewer Relocation at South Street CN Bridge	$450,000
2.437	Hines Road Rider Sewer Extension	$80,000
2.357	Manhole Renewals WW	$25,000
2.358	Lateral Replacements WW (non tree roots)	$1,720,000
2.563	Lateral Replacements WW (tree roots)	$541,000
2.223	Wet Weather Management Program	$350,000
2.074	Bedford West Collection System CCC	$39,000
2.836	Wyse Road Separation Phase 1	$386,000
2.672	Young Street - Sewer Separation	$100,000
2.674	South Park Street - Sewer Separation	$3,270,000
2.679	College Street - Sewer Separation	$100,000
2.526	Prince Albert Road Sewer Separation - Side Streets	$325,000
	Wastewater - Collection System -- T O T A L	**$14,473,000**
	Wastewater - Forcemains	
2.823	Akerley Blvd Forcemain Replacement	$65,000
2.819	Pumping Station Oil Tank Replacements	$60,000
2.82	Morris Lake Forcemain Investigation and Rehabilitation	$500,000
2.608	New Timberlea Pump Station Forcemain System - Design	$200,000
	Wastewater - Forcemains -- T O T A L	**$825,000**

HALIFAX WATER

Capital Budget 2020/21

Wastewater

Project Number	Project Name	Project Cost
	Wastewater - Structures	
2.42	Emergency Pumping Station Pump replacements	$250,000
2.442	Wastewater Pumping Station Component Replacement Program - West Region	$200,000
2.443	Wastewater Pumping Station Component Replacement Program - East Region	$200,000
2.444	Wastewater Pumping Station Component Replacement Program - Central Region	$250,000
2.818	Jamieson Pumping Station - Automatic Bar Screen	$60,000
2.853	Fairfield Holding Tank - Concept Design	$150,000
2.824	Bruce Street Pumping Station Relocation	$150,000
2.827	Wastewater Pumping Station Generator Plug/Switch Installations	$125,000
2.825	First Lake Pumping Station Upgrades	$70,000
2.654	PS Control Panel / Electrical Replacement	$725,000
2.829	Armscrest Pumping Station - Piping and Valve Upgrades	$71,000
2.005	Autoport Pleasant Street PS Replacement	$3,000,000
2.66	Bissett PS Component Upgrade	$50,000
2.655	Roach's Pond PS Component Upgrade	$550,000
2.093	Windmill Road PS Replacement	$1,355,000
2.665	CSO Upgrade Program	$300,000
2.459	William's Lake PS Rehabilitation	$100,000
2.74	Duffus PS CSO - Modification	$100,000
2.846	Upgrade Quigley's Corner Pumping Station	$287,000
2.847	Optimize Quigley's Corner Pumping Station	$22,000
2.609	New Timberlea Pumping Station - Design	$400,000
	Wastewater Structures -- T O T A L	**$8,415,000**
	Wastewater - Treatment Facility	
2.056	Plant Optimization Audit Program	$125,000
2.522	Emergency Wastewater Treatment Facility equipment replacements	$400,000
2.668	Wastewater Research Program Pilot Plant	$300,000
2.849	HSPs - OCS H2S Analyzers	$60,000
2.701	HHSP - OCS Wet Scrubber Chlorine Analyzers	$60,000

HALIFAX WATER

Capital Budget 2020/21

Wastewater

Project Number	Project Name	Project Cost
	Halifax Wastewater Treatment Facility:	
2.532	Duct Work Replacement	$50,000
2.765	Raw Water Pump Refurbishment	$50,000
2.767	Fixed Gas Meters - Replacement	$150,000
2.768	New Coagulant Dosing System	$100,000
2.769	New Polymer Dosing System	$40,000
2.77	Sludge Pumps - New Mechanical Seals	$60,000
2.706	Densadeg Hydraulic Optimization	$100,000
2.772	Grit System - Parts Replacements and New Screws	$50,000
2.776	Sludge Dewatering - Fournier Press Upgrades	$50,000
2.773	Industrial Water System Replacement	$50,000
	Dartmouth Wastewater Treatment Facility:	
2.502	Duct Work Replacement	$50,000
2.781	Fine Screens - New Perforated Plate Screens	$1,800,000
2.783	New Coagulant Dosing System	$100,000
2.784	New Polymer Dosing System	$40,000
2.707	Densadegs - CFD Analysis and Flow Diversion Vanes	$110,000
2.785	Heat Exchangers - Refurbishment	$40,000
2.787	Sludge Pumps - New Mechanical Seals	$60,000
2.791	Desadegs - Lamella Tube Settler Replacements	$300,000
2.850	Ballasted Flocculation Pilot	$75,000
2.855	Industrial Water System Replacement	$50,000
	Herring Cove Wastewater Treatment Facility:	
2.639	Duct Work Replacement Program	$50,000
2.794	Spare Sludge Tank mixer	$25,000
2.795	Sludge Pumps - New Mechanical Seals	$40,000
2.796	New Coagulant Dosing System	$30,000
2.797	Heat Exchangers - Refurbishment	$40,000
2.798	Waste Oil System - New Waste Oil Tank	$15,000
2.799	Electrical System - Spare Transfer Switch	$40,000
2.856	Industrial Water System Replacement	$50,000

HALIFAX WATER

Capital Budget 2020/21

Wastewater

Project Number	Project Name	Project Cost
	Eastern Passage Wastewater Treatment Facility:	
2.646	Secondary Launder Covers	$150,000
	Aerotech Wastewater Treatment Facility:	
2.809	Road Rehabilitation	$25,000
2.81	Bioreactors - Short Circuiting Modifications	$200,000
2.811	Lab - HVAC Modifications	$75,000
2.812	Centrifuge - Rebuild	$50,000
	Timberlea Wastewater Treatment Facility:	
2.816	Grit System - Chain and Bucket Replacement	$50,000
	Community Wastewater Treatment Facilities:	
2.761	Springfield Lake - Driveway Replacement	$15,000
	Biosolids Processing Facility:	
2.857	Building Upgrades	$250,000
2.732	Conveyor CS1 Liners	$30,000
2.733	Biofilter Media	$50,000
2.815	Dryer Upgrades	$70,000
	Wastewater - Treatment Facility -- T O T A L	**$5,525,000**
	Wastewater - Energy	
2.65	HHSP - BAS + HVAC Recommissioning	$50,000
2.651	NSPI Meter Relocations	$25,000
	Wastewater - Energy -- T O T A L	**$75,000**
	Wastewater - Security	
4.008	Security Upgrade Program	$200,000
	Wastewater - Security -- T O T A L	**$200,000**
	Wastewater - Equipment	
2.161	I&I Reduction (SIR) Program Flow Meters and Related Equipment	$25,000
2.451	Miscellaneous Equipment Replacement	$120,000
2.821	Duffus Strees PS Flow Meter Replacement	$110,000
	Wastewater - Equipment -- T O T A L	**$255,000**
	Wastewater - Corporate Projects -- T O T A L	**$8,180,000**
	GRAND TOTAL - WASTEWATER	**$38,448,000**

HALIFAX WATER

Capital Budget 2020/21

Stormwater

Project Number	Project Name	Project Cost
	Stormwater - Pipes	
1.038	Integrated Stormwater Projects - Program	$1,000,000
1.102	Manhole Renewals SW	$15,000
1.103	Catchbasin Renewals SW	$60,000
1.135	Lateral Replacements SW	$12,000
1.145	Sullivan's Pond Storm Sewer System Replacement - Phase 2 Irishtown Rd to Harbour	$25,000
1.034	Raymond Street, Phase 2 - Storm Sewer Rehabilitation	$100,000
1.188	Cogswell Redevelopment - SW Sewer Relocation	$955,000
1.201	Stormwater Pipe Condition Inspections (CSP)	$50,000
1.223	Rocky Lake and Bedford Highway Intersection Storm Sewer Upgrade	$75,000
1.224	Thistle Street Storm Drainage System Upgrade - Preliminary Engineering	$50,000
1.227	Stormwater System Upgrade near Civic #1681 Waverley Road	$38,000
	Stormwater - Pipes -- T O T A L	**$2,380,000**
	Stormwater - Culverts/Ditches	
1.104	Driveway Culvert Replacements	$1,200,000
	Street Specific Culvert Replacements:	
1.214	KIPAWA CRESCENT	$400,000
1.125	CORONET AVENUE DRIVEWAY CULVERT REPLACEMENT PROJECT	$925,000
1.147	COLE HARBOUR ROAD, near civic 1560	$350,000
1.183	ST MARGARET'S BAY ROAD, near civic 2797	$80,000
1.228	BLUE FOREST LANE, near civic 42	$38,000
1.229	DEVIL'S HILL ROAD at BOULDERBROOK LANE	$38,000
1.231	31 KETCH HARBOUR RD, near civic 832	$38,000
1.232	WAVERLEY ROAD, near civic 832	$38,000
	Stormwater - Culverts/Ditches -- T O T A L	**$3,107,000**
	Stormwater - Structures	
1.225	Ellenvale Run Retaining Wall - Phase 4	$1,900,000
	Stormwater - Structures -- T O T A L	**$1,900,000**
	Stormwater - Corporate Projects -- T O T A L	**$1,749,500**
	GRAND TOTAL - STORMWATER	**$9,136,500**

HALIFAX WATER

Capital Budget 2020/21

Corporate Projects

Project Number	Project Name	Project Cost
	Corporate - Information Technology	
4.097	Analytics Decision Support System	$335,000
4.111	Asset Condition	$125,000
4.151	Capital Planning	$100,000
4.083	Computerized Maintenance Management System (CMMS) Enhancements	$1,000,000
4.011	Desktop Computer Replacement Program	$350,000
4.146	Disaster Recovery	$630,000
4.147	Document Management Sharepoint Rollout	$300,000
4.126	Full Enterprise Data Warehouse	$200,000
4.012	Network Upgrades	$280,000
4.121	New Payroll System	$230,000
4.048	SAP Rate Structure Support	$220,000
4.15	Enterprise Resource Planning Solution	$2,630,000
4.107	Customer Portal	$50,000
4.152	Security Projects	$300,000
	Corporate - Information Technology -- T O T A L	**$6,750,000**
	Corporate - GIS	
4.04	GIS Data Program	$100,000
4.115	GIS Data Build - Services (ICI)	$150,000
4.01	Sewer Service Entry	$250,000
4.116	GIS Data Project (CAD schematic retirement)	$150,000
4.038	GIS Hardware/Software Program	$50,000
4.039	GIS Application Support Program	$150,000
4.059	Utility Network Modeling/Data Modeling	$50,000
4.118	Engineering Drawing Database	$100,000
4.155	Stormwater Billing Imagery Acquisition and Analysis	$350,000
	Corporate - GIS -- T O T A L	**$1,350,000**
	Corporate - Asset Management	
2.523	Wastewater Sewer Condition Assessment	$215,000
1.156	Storm Sewer Condition Assessment	$95,000
2.043	Corporate Flow Monitoring Program	$1,870,000

HALIFAX WATER

Capital Budget 2020/21

Corporate Projects

Project Number	Project Name	Project Cost
4.113	Vulnerability to Climate Change Risk Assessment-Asset Class Pilot	$250,000
2.562	Outfall Assessment Project	$20,000
4.14	SSO Management Program	$100,000
4.141	System Constraints Analysis HRM (was East Additional Flow Monitoring)	$252,000
4.143	Safe Yield Study	$200,000
4.144	New Hydraulic Model (infoWater)	$200,000
4.145	Transmission Main Risk Assessment and Prioritization Framework	$50,000
	Corporate - Asset Management -- T O T A L	**$3,252,000**
	Corporate - Facility	
2.176	East/Central Regional Operational Facility	$2,000,000
4.077	Building Capital Improvements	$185,000
3.221	Energy Management Capital Program	$100,000
	Corporate - Facility -- T O T A L	**$2,285,000**
	Corporate - SCADA & Other Equipment	
4.093	GPS Units - Replacement	$70,000
4.004	SCADA Control System Enhancements	$100,000
4.136	ICS Cyber Security Enhancements	$100,000
4.137	Halifax Harbour Solutions Radio Upgrade	$60,000
4.138	Wastewater Community Plants SCADA System Relocation	$45,000
4.139	PI System Enhancements	$100,000
4.154	Customer Meters - New and Replacement	$500,000
	Corporate - SCADA & Other Equipment -- T O T A L	**$975,000**
	Corporate - Fleet	
4.006	Fleet Upgrade Program Stormwater	$269,000
4.006	Fleet Upgrade Program Wastewater	$1,076,000
4.007	Fleet Upgrade Program Water	$610,000
	Corporate - Fleet -- T O T A L	**$1,955,000**
	GRAND TOTAL - Corporate Projects	**$16,567,000**

	ALLOCATION BREAKDOWN:	
	Water - Corporate Projects - T O T A L	$6,637,500
	Wastewater - Corporate Projects -- T O T A L	$8,180,000
	Stormwater - Corporate Projects -- T O T A L	$1,749,500
	GRAND TOTAL - Corporate Projects	**$16,567,000**

HALIFAX WATER

Capital Budget 2020/21

Summary of Routine Capital Expenditures included within Capital Budget

Project Number	Project Name	Project Cost	Asset Class
3.067	Valves Renewals	$125,000	Water
3.068	Hydrants Renewals	$75,000	Water
3.069	Service Lines Renewals	$100,000	Water
3.390	Lead Service Line Replacement Program	$1,000,000	Water
3.101	Miscellaneous Equipment Replacement (W)	$50,000	Water
4.007	Fleet Upgrade Program Water	$610,000	Water
2.357	Manhole Renewals WW	$25,000	Wastewater
2.358	Lateral Replacements WW (non-tree roots)	$1,720,000	Wastewater
2.563	Lateral Replacements WW (tree roots)	$541,000	Wastewater
2.161	I&I Reduction (SIR) Program Flow Meters and Related Equipment	$25,000	Wastewater
2.451	Miscellaneous Equipment Replacement (WW)	$120,000	Wastewater
4.006	Fleet Upgrade Program Wastewater	$1,076,000	Wastewater
1.102	Manhole Renewals SW	$15,000	Stormwater
1.103	Catchbasin Renewals SW	$60,000	Stormwater
1.135	Lateral Replacements SW	$12,000	Stormwater
4.006	Fleet Upgrade Program Stormwater	$269,000	Stormwater
4.011	Desktop Computer Replacement Program	$350,000	Corporate
4.093	GPS Units - Replacement	$70,000	Corporate
4.154	Customer Meters - New and Replacement	$500,000	Corporate
4.012	Network Upgrades	$280,000	Water & Wastewater
	GRAND TOTAL - Routine Capital Projects	**$7,023,000**	

Halifax Water
Halifax Regional Water Commission

ITEM # 4.3
HRWC Board
January 30, 2020

TO: Craig MacMullin, MBA, CPA, CGA
Chair, and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Louis de Montbrun, CPA, CA
Director, Corporate Services/CFO

APPROVED BY: *Original Signed By:*
Cathie O'Toole, MBA, FCPA, FCGA, ICD.D,
General Manager

DATE: January 20, 2020

SUBJECT: **Proposed 2020/21 Water, Wastewater and Stormwater Operating Budget**

ORIGIN

The Halifax Regional Water Commission Board (the "Board") approves Halifax Water's annual Water, Wastewater and Stormwater operating budget.

RECOMMENDATION

It is recommended the Board approve the attached proposed 2020/21 Water, Wastewater and Stormwater operating budget, inclusive of the proposed 2020/21 budget for unregulated activities.

BACKGROUND

The operating budget prepared for 2020/21 is based on year one of the Five-year Business Plan before the Board for approval January 30, 2020. The last rate increase for water and wastewater became effective April 1, 2016, and the last changes in stormwater rates occurred July 1, 2017. A rate application will be submitted to the Nova Scotia Utility and Review Board (the "NSUARB") in February 2020, with a rate hearing planned in June 2020. The purpose of the rate application is a request for new rates for water and wastewater, with the proposed rates to take effect the Fall of 2020.

The purpose of the 2020/21 operating budget is to detail the services provided by Halifax Water and to outline the revenue and costs required to provide these services. Managers will continue to monitor actual performance relative to the budget and provide periodic updates to the Board.

DISCUSSION

Table 1 below outlines the operating budget for 2020/21 which shows a projected deficit of $15.9 million. The budget reflects requirements to maintain current levels of service, deliver projects already in progress or approved, and address any changing environmental or regulatory requirements.

Table 1:

Operating Budget Summary (in thousands)

	Actual 2018/19	Approved Budget 2019/20	**Proposed Budget 2020/21**	Budget/Budget Variance (Unfavourable)
Operating Revenue	$138,413	$138,727	$138,618	($109)
Operating Expenses	$105,731	$115,088	$118,110	($3,022)
Operating Surplus	$32,682	$23,639	$20,508	($3,131)
Financial Revenue	$1,898	$1,369	$619	($750)
Financial Expenses	$33,190	$33,374	$37,076	($3,701)
Net Surplus (Deficit)	$1,390	($8,366)	($15,949)	($7,583)

The 2020/21 operating budget is prepared on a modified accrual basis to provide broader information for decision making and be reflective of reporting under the NSUARB Accounting and Reporting Handbook for Water Utilities, which is used in determining revenue requirements for rate making purposes. Amounts not included in the 2020/21 operating budget which would be reported under International Financial Reporting Standards (IFRS) include an accrued liability for future employee benefits (pension). Had accrued pension expenses been included in the 2020/21 operating budget there would be a projected deficit $26.2 million. The operating budget includes an expense for the principle portion of debt servicing, which is permitted by the NSUARB, but not under IFRS. Halifax Water includes the principle portion of debt servicing in the operating budget as it is a significant commitment to be paid each year.

The utility faces pressure associated with asset renewal, growth, and compliance with regulatory requirements, as described in the Five-year Business Plan and Integrated Resource Plan. Additions to utility plant in service result in increased costs including

depreciation, debt servicing, the dividend/grant in lieu of taxes payable to Halifax Regional Municipality (HRM), and increased operating costs. Building capacity to deliver programs and capital projects envisioned in the Integrated Resource Plan is also an infrastructure related budget driver requiring new employees in some departments within the organization.

As reported in Table 2 below, operating expenses in 2020/21 are budgeted to increase $3.0 million or 2.6% compared to the 2019/20 operating budget, due to drivers such as:

- Depreciation, which is budgeted to increase by $2.3 million or 9.3%, and
- Proposed salaries/wages will increase approximately 5.7% or $1.9 million. This includes an anticipated 2.5% growth in the labour force of approximately eleven (11) new employees, accounting for an estimated $0.8 million in additional operating expense. A portion of these salaries/ wages have been allocated to capital projects for budgeting purposes where appropriate.

Under financial expenses, debt servicing shows an increase of $2.7 million or 9.7% compared to the 2019/20 operating budget. Debt servicing includes long term principal and interest, and the amortization of the debt discount.

Table 2:

Expense Summary (in thousands)

	Actual 2018/19	Approved Budget 2019/20	**Proposed Budget 2020/21**	Budget/Budget Variance (Unfavourable)
Operating Expenses	$105,731	$115,088 *8.8%*	$118,110 *2.6%*	($3,022)
Debt Servicing	$28,145	$28,206 *0.2%*	$30,930 *9.7%*	($2,725)

The full 2020/21 operating budget attached provides a statement of revenue and expenses on a consolidated basis, as well as separate statements for Water, Wastewater and Stormwater Services. A budget for unregulated activities is also included on page 5 of the attachment. The 2020/21 operating budget is based on rates currently approved by the NSUARB, effective April 1, 2016 for water and wastewater, and July 1, 2017 for stormwater.

Regulated Operating Revenue

Regulated operating revenues are based upon currently approved rates. There has been no projected decline in consumption for the 2020/21 fiscal year based on recent consumption data. For the nine (9) month period ended December 31, 2019 consumption is down 0.12% compared to the prior year. Approximately 683 new customer connections, or 0.8%, are projected in the 2020/21 budget year based on historic trending.

The majority of Halifax Water's revenue is derived from rate-regulated activities, with approximately 65% of water, wastewater and stormwater revenues coming from volumetric rates and 35% from base charges. Halifax Water has a small amount of revenue from miscellaneous fees and financial revenue from interest income.

Regulated Operating Expenses

The largest components of Halifax Water's operating budget are salaries and benefits, energy, debt servicing, depreciation, and chemical costs. Some of the key assumptions are outlined below:

Salaries and Benefits – The annual increase for salaries/wages ranges between 2.00% and 2.75%, which includes an allowance 0.5% for the impact of step increases of employees within salary bands or reclassification of positions. The budget for 2020/21 includes an allowance for 11 new positions, which equates to an additional $0.8 million in operating expenses, where a portion of the new salaries/wages are being recovered from capital projects.

Depreciation – As Halifax Water's assets and future capital budgets increase so do depreciation expenses. Depreciation is an integral funding source to support renewal of existing infrastructure, as well as new infrastructure and upgrades to meet future servicing demands and changing environmental regulations. Depreciation is projected to increase from $25.1 million in 2019/20 to $27.4 million in 2020/21, an increase of 9.3%. For the purposes of the 2020/21 operating budget depreciation is calculated only on funded water and wastewater assets. In a future rate application, Halifax Water may request permission to phase in depreciation on contributed water and wastewater assets. The NSUARB approved the phase in of depreciation on contributed stormwater assets on July 1, 2017.

Debt Servicing – New debt payments are budgeted to support the 2020/21 additions to utility plant in service. The amount and timing of any increases in debt servicing are contingent upon the completion of projects, financing rates and options available. It is estimated debt servicing will increase to $30.9 million from $28.2 million in 2019/20, reflecting a $2.7 million or 9.7% increase compared to 2019/20. Halifax Water's capital financing strategy is designed to maintain a debt service ratio of 35% or less, using a mixture of infrastructure funding, development related charges (reserves), depreciation, and debt. The debt service ratio based on the proposed 2020/21 operating budget is 22.3%.

Energy – Budgets were established based on an assumption of electricity, furnace oil and natural gas rate increases as noted below. The impact of these increases are expected to be partially offset by the Energy Management Program.

- Electricity 6.0%
- Furnace Oil 3.0%
- Natural Gas 10.0%

Chemical Costs – Chemicals are tendered annually in January for optimal pricing. Chemical cost increases of 5% are anticipated for 2020/21.

Expenses such as electricity and chemicals, which are subject to greater volatility when considering rates, have been afforded special attention due to the dependence placed on these commodities. In other expense categories that carry high dollar amounts, such as contract services and materials/supplies, where there may be a certain discretionary component, these expenses are contingent upon other factors such as:

- ✓ Service expectations
- ✓ Regulatory requirements and compliance
- ✓ Maintenance and renewal of infrastructure.

This would be relevant across all services; water, wastewater and stormwater.

Consolidated Revenue and Expenses

The statement of consolidated revenue and expenses, as detailed on page 1 of the 2020/21 proposed operating budget attached, shows a budgeted deficit of $15.9 million for 2020/21. The accumulated operating surplus (based on the NSUARB Accounting and Reporting Handbook for Water Utilities) at March 31, 2020 is projected to be $36.8 million, which includes the accumulated operating surplus for the 2018/19 fiscal year and the projected results for 2019/20, based on forecasts as at December 31, 2019. With a budgeted deficit in 2020/21 of $15.9 million, the projected accumulated operating surplus as at March 31, 2021 is estimated at $20.9 million. See Table 3 below for the continuity schedule for accumulated surplus, summarized by service area.

Table 3:

Continuity Schedule - Accumulated Surplus (Deficit) on a NSUARB Handbook Basis - which Excludes Pension Accrual	Total	Water	Wastewater	Stormwater
2018/19 Fiscal Year				
Balance, beginning of year	$38,625,906	$14,669,623	$15,487,608	$8,468,674
Operating surplus (deficit) for the year	$1,390,433	$2,760,942	($570,243)	($800,266)
Balance, end of year	$40,016,339	$17,430,565	$14,917,365	$7,668,408
2019/20 Fiscal Year				
Balance, beginning of year	$40,016,339	$17,430,565	$14,917,365	$7,668,408
Projected operating (deficit) for the year	($3,188,925)	$2,374,560	($3,936,644)	($1,626,841)
Projected balance, end of year	**$36,827,414**	**$19,805,125**	**$10,980,721**	**$6,041,568**
2020/21 Fiscal Year				
Balance, beginning of year	$36,827,414	$19,805,125	$10,980,721	$6,041,568
Budgeted operating (deficit) for the year	($15,948,714)	($4,274,512)	($7,842,633)	($3,831,569)
Projected balance, end of year	**$20,878,700**	**$15,530,613**	**$3,138,088**	**$2,209,999**

Halifax Water has a target to maintain an accumulated operating surplus of 3% of total expenses to mitigate risk. Accumulated operating surplus can be used to offset operating losses, or it can be used to fund future additions to utility plant in service, subject to NSUARB approval. Based on the projected financial position as at March 31, 2021, a projected accumulated surplus of $20.9 million represents 13.4% of total expenses.

Water Service

Water operations are detailed on page 2 of the 2020/21 proposed operating budget attached, reporting a budget deficit for 2020/21 of $4.3 million.

Operating revenue is projected to be $0.4 million or 1% higher in 2020/21 compared to the 2019/20 budget. The small increase is reflective of no decrease in consumption projected in 2020/21, with a projected increase in new customers. The last rate increases for water were effective April 1, 2016.

Operating expenses are projected at $46.1 million, which is an increase compared to the 2019/20 operating budget of $0.9 million or 2%. The largest increases reported are in the categories of Depreciation ($1.0 million), Engineering and Information Services ($0.3 million), and Transmission & Distribution ($0.2 million).

Financial revenue decrease as a result of lower investment income resulting from a reallocation funds associated with the Regional Development Charge. Financial expenses are projected to increase by $2.7 million or 21%, with the majority being a result of an increase in total debt servicing, consisting of long-term interest and principal, and the amortization of the debt discount. The dividend payable to HRM is budgeted at $5.7 million representing a $0.5 million or 10% increase compared to 2019/20.

Wastewater Service

Wastewater operations are detailed on page 3 of the 2020/21 proposed operating budget attached, reporting a budget deficit of $7.8 million for 2020/21.

Operating revenue for 2020/21 in the amount of $71.8 million is comparable to 2019/20, reporting a modest decline of $0.2 million, mostly related to a decrease in septage tipping fees. As mentioned above, there was no decline in consumption projected in 2020/21. The last rate increases for wastewater were effective April 1, 2016.

Budgeted operating expenses in 2020/21 increase by $1.7 million or 3% to $61.0 million compared to the 2019/20 budget of $59.3 million. The largest increases are reported in Depreciation and Wastewater Collection, in the amount of $1.2 million and $0.9 million respectively.

Financial revenue decreases as a result of lower investment income resulting from a reallocation funds associated with the Regional Development Charge. Financial expenses increase by $0.5 million or 3% as a result of debt servicing costs, and a newly introduced dividend payable to the HRM for wastewater services, assumed to become effective September 1, 2020.

Stormwater Service

Stormwater operations are detailed on page 4 of the 2020/21 proposed operating budget attached, reporting a budget deficit of $3.8 million for 2020/21.

Operating revenue for 2020/21 totals $10.1 million which is $0.3 million or 3% lower compared to 2019/20. Revenue is reflective of the most recent changes to the rate structure for stormwater which came into effect July 1, 2017. There are initiatives underway to ensure impervious area changes, including from new development are identified and billed for stormwater service on a timely basis.

Operating expenses in 2020/21 are $10.9 million, representing a $0.5 million or 4% increase over the 2019/20 operating budget. Increases of $0.2 million appear in each of Depreciation and Engineering and Information Services.

Financial revenue in 2020/21 decreased compared to 2019/20, directly related to lower investment income resulting from a reallocation funds associated with the Regional Development Charge. Financial expenses increase by $0.5 million or 18% compared to 2019/20 as a result of debt servicing costs, and a newly introduced dividend payable to the HRM for stormwater services, assumed to become effective September 1, 2020.

Unregulated Activities

Unregulated activities appear on page 5 of the 2020/21 proposed operating budget attached, reporting a budget surplus of $0.3 million for 2020/21.

Revenue from unregulated business activities are increasingly important to mitigate future revenue requirements from rates. Unregulated revenue is used to help pay for some expenses which would otherwise be funded by rate-regulated activities and are also used to fund unregulated expenses. Revenue from unregulated activities for 2020/21 are budgeted at $1.1 million, which is $0.5 million or 32% lower compared to 2019/20, attributed partly to lower septage tipping revenue.

Operating expenses for 2020/21 are comparable to 2019/20, decreasing $0.2 million from $1.4 million to $1.2 million. Included in operating expenses are Sponsorships and Donations which are treated as an unregulated expense resulting from the 2012 NSUARB Urban Core Rate Decision. In 2020/21, these expenses are budgeted at $68,100 and consist of:

- Sponsorships and Donations $ 28,100
- Help to Others (H2O) Program $ 40,000

A full description of the costs associated with Sponsorships is provided below:

Sponsorships	
Discovery Centre	$5,000.00
Conference Sponsership	$1,000.00
NSCC Scolarships First Nations	$4,000.00
NSCC Scolarships RT Peacock	$2,000.00
NSCC Scolarships HRWC Achievement	$2,000.00
NSCC Scolarships Arnold Johnston	$3,600.00
NSCC Scolarship Women in Trades	$2,000.00
Special Olympics	$2,000.00
Chamber Conference Sponsorship	$1,500.00
Greater Halifax Partnership	$5,000.00
	$28,100.00

The proposed sponsorship for the Discovery Centre is part of a multi-year proposal to develop an educational display about the water cycle and water stewardship. The proposed contribution to the Greater Halifax Partnership is to gain access to economic information that will support Halifax Water's long-range plans; and assistance to calculate and communicate the impact that Halifax Water has on the local economy. Expenses under the Help to Others (H20) Program are budgeted at $40,000 in both 2020/21 and 2019/20 budget.

Sponsorships and Donations are relatively small in value, however the Board is requested to approve the amounts noted above as part of the overall budget.

BUDGET IMPLICATIONS

The combined operations of Water, Wastewater and Stormwater report a budget deficit of $15.9 million for 2020/21.

ALTERNATIVES

The Board could direct staff to revise the proposed 2020/21 Operating Budget.

ATTACHMENT

Proposed 2020/21 Water, Wastewater and Stormwater Operating Budget

Report Prepared by: *Original Signed By:*
Allan Campbell, B.Comm, CPA, CMA
Manager, Finance (902) 490-4288

HALIFAX WATER
CONSOLIDATED SUMMARY OF ESTIMATED REVENUE & EXPENSES
PROPOSED OPERATING BUDGET
APRIL 1, 2020 to MARCH 31, 2021
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	**PROPOSED BUDGET APR 1/20 MAR 31/21**
OPERATING REVENUE	$138,413	$138,727	**$138,618**
OPERATING EXPENSES	$105,731	$115,088	**$118,110**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$32,682	$23,639	**$20,508**
FINANCIAL REVENUE			
INVESTMENT INCOME	$1,156	$816	**$86**
MISCELLANEOUS	$742	$553	**$532**
	$1,898	$1,369	**$619**
FINANCIAL EXPENSES			
LONG TERM DEBT INTEREST	$7,430	$8,181	**$8,823**
LONG TERM DEBT PRINCIPAL	$20,516	$19,822	**$21,880**
AMORTIZATION DEBT DISCOUNT	$199	$202	**$228**
DIVIDEND/GRANT IN LIEU OF TAXES	$4,999	$5,147	**$6,113**
MISCELLANEOUS	$45	$22	**$32**
	$33,190	$33,374	**$37,076**
	#		
OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES	$1,390	($8,366)	**($15,949)**
Less:			
Pension accrual	*($6,208)*	*($5,668)*	*($10,204)*
Operating Deficit on an Accrual Basis	*($4,818)*	*($14,034)*	*($26,152)*

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

HALIFAX WATER
ESTIMATED REVENUE AND EXPENSES - WATER OPERATIONS
PROPOSED OPERATING BUDGET
APRIL 1, 2020 to MARCH 31, 2021
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	**PROPOSED BUDGET APR 1/20 MAR 31/21**
OPERATING REVENUE			
METERED SALES	$48,040	$47,744	**$48,069**
FIRE PROTECTION	$7,074	$7,074	**$7,074**
PRIVATE FIRE PROTECTION SERVICES	$869	$873	**$884**
BULK WATER STATIONS	$227	$292	**$303**
CUSTOMER LATE PAY./COLLECTION FEES	$244	$223	**$238**
MISCELLANEOUS	$98	$179	**$177**
	$56,552	$56,387	**$56,746**
OPERATING EXPENSES			
WATER SUPPLY & TREATMENT	$8,516	$9,597	**$9,369**
TRANSMISSION & DISTRIBUTION	$10,014	$11,127	**$11,282**
SMALL SYSTEMS (incl. Contract Systems)	$1,251	$1,237	**$1,221**
TECHNICAL SERVICES (SCADA)	$889	$1,037	**$1,029**
ENGINEERING & INFORMATION SERVICES	$3,749	$3,901	**$4,162**
REGULATORY SERVICES	$679	$1,142	**$1,195**
CUSTOMER SERVICE	$2,524	$2,918	**$2,758**
ADMINISTRATION & PENSION	$3,986	$4,355	**$4,112**
DEPRECIATION	$9,046	$9,955	**$10,993**
	$40,655	$45,270	**$46,121**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$15,898 #	$11,117	**$10,625**
FINANCIAL REVENUE			
INVESTMENT INCOME	$521	$367	**$39**
MISCELLANEOUS	$559	$431	**$394**
	$1,080	$798	**$432**
FINANCIAL EXPENSES			
LONG TERM DEBT INTEREST	$1,924	$2,238	**$3,127**
LONG TERM DEBT PRINCIPAL	$7,181	$5,165	**$6,465**
AMORTIZATION DEBT DISCOUNT	$85	$67	**$84**
DIVIDEND/GRANT IN LIEU OF TAXES	$4,999	$5,147	**$5,654**
MISCELLANEOUS	$24	$12	**$2**
	$14,214	$12,630	**$15,332**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES	$2,764	($715)	**($4,275)**

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

HALIFAX WATER
ESTIMATED REVENUE AND EXPENSES - WASTEWATER OPERATIONS
PROPOSED OPERATING BUDGET
APRIL 1, 2020 to MARCH 31, 2021
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19		APPROVED BUDGET * APR 1/19 MAR 31/20	**PROPOSED BUDGET APR 1/20 MAR 31/21**
OPERATING REVENUE				
METERED SALES	$69,901		$70,031	**$70,365**
WASTEWATER OVERSTRENGTH AGREEMENTS	$75		$50	**$30**
LEACHATE	$330		$394	**$387**
CONTRACT REVENUE	$87		$86	**$86**
SEPTAGE TIPPING FEES	$764		$760	**$505**
DEWATERING FACILITY/ SLUDGE LAGOON	$210		$210	**$0**
AIRLINE EFFLUENT	$143		$160	**$105**
CUSTOMER LATE PAY./COLLECTION FEES	$186		$164	**$176**
MISCELLANEOUS	$185		$139	**$136**
	$71,881		$71,993	**$71,790**
OPERATING EXPENSES				
WASTEWATER COLLECTION	$11,676		$10,972	**$11,847**
WASTEWATER TREATMENT PLANTS	$18,197		$19,139	**$19,332**
SMALL SYSTEMS	$1,262		$1,323	**$1,239**
DEWATERING FACILITY/ SLUDGE MGM'T	$226		$636	**$404**
BIOSOLIDS TREATMENT	$27		$101	**$101**
LEACHATE CONTRACT	$286		$325	**$337**
TECHNICAL SERVICES (SCADA)	$1,450		$1,784	**$1,652**
ENGINEERING & INFORMATION SERVICES	$3,783		$3,556	**$3,769**
REGULATORY SERVICES	$886	#	$1,434	**$1,537**
CUSTOMER SERVICE	$2,057		$2,536	**$2,352**
ADMINISTRATION & PENSION	$3,242		$3,606	**$3,405**
DEPRECIATION	$12,986		$13,921	**$15,072**
	$56,079		$59,334	**$61,045**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$15,801		$12,659	**$10,745**
FINANCIAL REVENUE				
INVESTMENT INCOME	$520		$367	**$39**
MISCELLANEOUS	$183		$122	**$139**
	$703		$489	**$178**
FINANCIAL EXPENSES				
LONG TERM DEBT INTEREST	$4,939		$5,133	**$4,772**
LONG TERM DEBT PRINCIPAL	$12,015		$12,965	**$13,442**
AMORTIZATION DEBT DISCOUNT	$103		$113	**$124**
DIVIDEND/GRANT IN LIEU OF TAXES	$0		$0	**$398**
MISCELLANEOUS	$21		$10	**$30**
	$17,077		$18,220	**$18,766**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES	($573)		($5,072)	**($7,843)**

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

HALIFAX WATER
ESTIMATED REVENUE AND EXPENSES - STORMWATER OPERATIONS
PROPOSED OPERATING BUDGET
APRIL 1, 2020 to MARCH 31, 2021
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19		APPROVED BUDGET * APR 1/19 MAR 31/20	**PROPOSED BUDGET APR 1/20 MAR 31/21**
OPERATING REVENUE				
STORMWATER SITE RELATED SERVICE	$5,906		$6,351	**$6,047**
STORMWATER RIGHT-OF-WAY SERVICE	$3,835		$3,835	**$3,835**
CUSTOMER LATE PAY./COLLECTION FEES	$118		$66	**$106**
MISCELLANEOUS	$120		$95	**$92**
	$9,980		$10,347	**$10,081**
OPERATING EXPENSES				
STORMWATER COLLECTION	$4,901		$5,750	**$5,779**
TECHNICAL SERVICES (SCADA)	$49		$39	**$42**
ENGINEERING & INFORMATION SERVICES	$624		$1,122	**$1,273**
REGULATORY SERVICES	$1,587		$1,505	**$1,627**
CUSTOMER SERVICE	$335		$273	**$304**
ADMINISTRATION & PENSION	$527		$586	**$554**
DEPRECIATION	$974		$1,208	**$1,365**
	$8,997		$10,484	**$10,943**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$983		($137)	**($862)**
FINANCIAL REVENUE				
INVESTMENT INCOME	$116	#	$82	**$9**
MISCELLANEOUS	$0		$0	**$0**
	$116		$82	**$9**
FINANCIAL EXPENSES				
LONG TERM DEBT INTEREST	$567		$810	**$924**
LONG TERM DEBT PRINCIPAL	$1,320		$1,692	**$1,973**
AMORTIZATION DEBT DISCOUNT	$11		$22	**$20**
DIVIDEND/GRANT IN LIEU OF TAXES	$0		$0	**$62**
MISCELLANEOUS	$0		$0	**$0**
	$1,899		$2,524	**$2,978**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES	($800)		($2,579)	**($3,832)**

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

HALIFAX WATER
ESTIMATED REVENUE & EXPENSES, SEGREGATED BY REGULATED AND UNREGULATED ACTIVITIES
PROPOSED OPERATING BUDGET
APRIL 1, 2020 to MARCH 31, 2021
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	**PROPOSED BUDGET APR 1/20 MAR 31/21**
REGULATED ACTIVITIES			
OPERATING REVENUE			
METERED SALES	$117,941	$117,775	**$118,434**
FIRE PROTECTION	$7,074	$7,074	**$7,074**
PRIVATE FIRE PROTECTION	$869	$873	**$884**
STORMWATER SITE RELATED SERVICE	$5,906	$6,351	**$6,047**
STORMWATER RIGHT-OF-WAY SERVICE	$3,835	$3,835	**$3,835**
OTHER OPERATING REVENUE	$1,216	$1,171	**$1,221**
	$136,841	$137,079	**$137,496**
OPERATING EXPENSES			
WATER SUPPLY & TREATMENT	$8,516	$9,591	**$9,363**
TRANSMISSION & DISTRIBUTION	$10,014	$11,127	**$11,282**
WASTEWATER COLLECTION	$11,643	$10,840	**$11,723**
STORMWATER COLLECTION	$4,901	$5,750	**$5,779**
WASTEWATER TREATMENT PLANTS	$18,197	$19,139	**$19,332**
SMALL SYSTEMS	$2,493	$2,534	**$2,431**
SCADA, CONTROL & PUMPING	$2,388	$2,860	**$2,722**
ENGINEERING & INFORMATION SERVICES	$8,156	$8,559	**$9,184**
REGULATORY SERVICES	$3,152	$4,081	**$4,359**
CUSTOMER SERVICE	$4,881	$5,687	**$5,373**
ADMINISTRATION & PENSION	$7,713	$8,456	**$7,972**
DEPRECIATION	$22,989	$25,022	**$27,349**
	$105,043	$113,648	**$116,869**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$31,798	$23,432	**$20,627**
FINANCIAL REVENUE			
INVESTMENT INCOME	$1,156	$816	**$86**
MISCELLANEOUS	$213	$110	**$39**
	$1,369	$926	**$126**
FINANCIAL EXPENSES			
LONG TERM DEBT INTEREST	$7,430	$8,166	**$8,807**
LONG TERM DEBT PRINCIPAL	$20,516	$19,802	**$21,860**
AMORTIZATION DEBT DISCOUNT	$199	$202	**$227**
DIVIDEND/GRANT IN LIEU OF TAXES	$4,999	$5,147	**$6,113**
MISCELLANEOUS	$0	$11	**$1**
	$33,145	$33,327	**$37,009**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES	$23	($8,970)	**($16,256)**
UNREGULATED ACTIVITIES			
OPERATING REVENUE			
SEPTAGE TIPPING FEES	$764	$760	**$505**
LEACHATE	$330	$394	**$387**
CONTRACT REVENUE	$87	$86	**$86**
DEWATERING FACILITY/ SLUDGE LAGOON	$210	$210	**$0**
AIRLINE EFFLUENT	$143	$160	**$105**
ENERGY PROJECTS	$165	$0	**$0**
MISCELLANEOUS	$38	$38	**$38**
	$1,737	$1,648	**$1,121**
OPERATING EXPENSES			
- DIRECT			
WATER SUPPLY & TREATMENT	$20	$26	**$28**
WASTEWATER COLLECTION	$0	$118	**$111**
WASTEWATER TREATMENT	$572	$1,062	**$842**
SPONSORSHIPS & DONATIONS	$78	$61	**$68**
DEPRECIATION	$18	$62	**$81**
	$688	$1,330	**$1,130**
- INDIRECT (ADMINISTRATION)	$0	$110	**$110**
	$688	$1,440	**$1,240**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$1,049	$207	**($119)**
FINANCIAL REVENUE			
MISCELLANEOUS	$364	$443	**$493**
FINANCIAL EXPENSES			
LONG TERM DEBT INTEREST	$0	$16	**$16**
LONG TERM DEBT PRINCIPAL	$0	$20	**$20**
AMORTIZATION DEBT DISCOUNT	$0	$0	**$0**
MISCELLANEOUS	$45	$11	**$31**
	$45	$47	**$67**
OPERATING SURPLUS AVAILABLE FOR CAPITAL EXPENDITURES	$1,368	$604	**$307**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES - COMBINED ACTIVITIES	$1,390	($8,366)	**($15,949)**

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

Halifax Water
Halifax Regional Water Commission

ITEM # 4.4
HRWC Board
January 30, 2020

TO: Craig MacMullin, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Louis de Montbrun, CPA, CA, Director, Corporate Services/CFO

APPROVED: *Original Signed By:*
Cathie O'Toole, MBA, FCPA, FCGA, ICD.D, General Manager

DATE: January 20, 2020

SUBJECT: 2020 Rate Application Water and Wastewater

ORIGIN

Halifax Water's Five-Year Business Plan for 2020/21 – 2024/25 presented to the Halifax Water Board January 30, 2020.

RECOMMENDATION

It is recommended that the Halifax Regional Water Commission Board approve:

> Application to the NSUARB for the approval of a Schedule of Rates and Charges for water, and Wastewater for customers of the Halifax Regional Water Commission, to become effective for services rendered on and after September 1, 2020, as discussed in Attachment One.

BACKGROUND

Halifax Water is applying for increases in water, public and private fire protection, and Wastewater rates to take effect September 1, 2020 and April 1, 2021 to maintain the high level of service to customers and recognize additions to Utility Plant in Service and continued investment in water and Wastewater infrastructure.

The test years for the rate application are 2020/21 and 2021/22 as reflected in the Five-Year Business Plan submitted to the Halifax Water Board on January 30, 2020. The Five-Year Business Plan supports this Application and provides updated information in support of the long-range financial plan for Halifax Water.

DISCUSSION

Halifax Water is applying for an increase in the water, public and private fire protection and wastewater charges effective September 1, 2020. It has been four-and-a-half years since the last rate increases, as the current rates took effect in April 2016.

The proposed rate increases are driven by continued investment in infrastructure and the impact this investment has on operating costs.

Infrastructure Investment

Since the last rate increase, Halifax Water has invested $225 million in infrastructure. Over $93 million has been contributed through the development process or funded by Regional Development Charges (RDC), Capital Cost Contributions (CCC) or other external funding. The remaining $131 million is funded by rates.

Figure 1: Halifax Water Increase in Infrastructure April 1, 2016 to March 31, 2019

	Infrastructure Investment			
	2016-17	2017-18	2018-19	Total
Water				
Regular Additions	3,630,428	24,589,196	14,828,127	43,047,751
Donated Additions	16,111,370	11,447,973	11,609,270	39,168,612
Total Water	19,741,798	36,037,169	26,437,396	82,216,363
Wastewater				
Regular Additions	14,929,355	27,723,960	28,058,315	70,711,631
Donated Additions	2,986,803	16,087,168	16,009,600	35,083,571
Total Wastewater	17,916,159	43,811,128	44,067,914	105,795,201
Stormwater				
Regular Additions	4,929,232	7,623,037	4,735,342	17,287,611
Donated Additions	6,094,763	11,077,624	2,507,989	19,680,376
Total Stormwater	11,023,994	18,700,662	7,243,332	36,967,988
Total Regular Additions	23,489,015	59,936,194	47,621,784	131,046,993
Total Donated Additions	25,192,936	38,612,764	30,126,858	93,932,559
Total	48,681,951	98,548,959	77,748,642	224,979,552

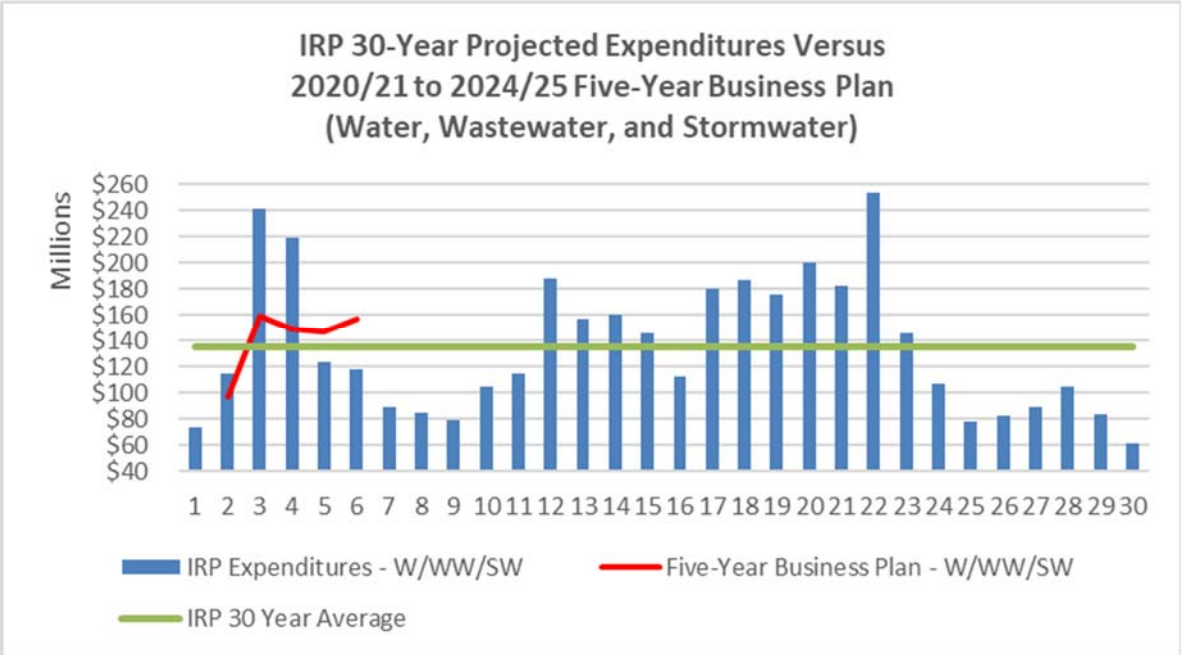
Source: Halifax Water's Audited Financial Statements

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

Looking forward, based on the 2019 Integrated Resource Plan (IRP) approved by the Halifax Water Board in November 2019, the anticipated investment will be over $4.0 billion. This results in an average yearly investment of over $132 million. As in prior years, Halifax Water continues to increase Capital Budgets to meet the required level of investment.

A comparison between the 30-year IRP level of spend to the proposed Five-Year Capital Budget appears below:

Figure 2 – Five-Year Capital Budget Compared to the IRP



Operating Costs

Since the last rate application, Halifax Water's Accumulated Surplus has increased. Starting in 2019/20, this trend will reverse as a $3.2 million operating deficit is projected. Without an increase in rates, Halifax Water is budgeting a deficit of $15.9 million in 2020/21 and a further $26.2 million in 2021/22. These deficits will result in an Accumulated Deficit of $5.3 million at the end of 2021/22.

Figure 3: Accumulated Operating Surplus (Deficit) to March 31, 2022

Continuity Schedule - Accumulated Surplus (Deficit) on a NSUARB Handbook Basis - which Excludes Pension Accrual	Total	Water	Wastewater	Stormwater
2018/19 Fiscal Year				
Balance, beginning of year	$38,625,906	$14,669,623	$15,487,608	$8,468,674
Operating surplus (deficit) for the year	$1,390,433	$2,760,942	($570,243)	($800,266)
Balance, end of year	$40,016,339	$17,430,565	$14,917,365	$7,668,408
2019/20 Fiscal Year				
Balance, beginning of year	$40,016,339	$17,430,565	$14,917,365	$7,668,408
Projected operating (deficit) for the year	($3,188,925)	$2,374,560	($3,936,644)	($1,626,841)
Projected balance, end of year	**$36,827,414**	**$19,805,125**	**$10,980,721**	**$6,041,568**
2020/21 Fiscal Year				
Balance, beginning of year	$36,827,414	$19,805,125	$10,980,721	$6,041,568
Budgeted operating (deficit) for the year	($15,948,714)	($4,274,512)	($7,842,633)	($3,831,569)
Projected balance, end of year	**$20,878,700**	**$15,530,613**	**$3,138,088**	**$2,209,999**
2021/22 Fiscal Year				
Balance, beginning of year	$20,878,700	$15,530,613	$3,138,088	$2,209,999
Budgeted operating (deficit) for the year	($26,155,637)	($9,179,931)	($11,980,107)	($4,995,599)
Projected balance, end of year	**($5,276,937)**	**$6,350,682**	**($8,842,019)**	**($2,785,600)**

The operating deficits for the next two years show the impact of the infrastructure investment on key areas of the operating budget. As we see below in Figure 4, Halifax Water's operating expenses are budgeted to increase marginally over the 2019/20 budget, 0.72% in 2020/21 and 3.75% in 2021/22. These increases are driven primarily by salary increases and wage settlements with our two unions as per our signed five-year contracts.

Two areas with significant increases, deprecation and debt services, are the result of investment in infrastructure. Depreciation is budgeted to increase by $4.2 million, 9.17% in 2020/21 and a further 7.75% in 2021/22. Debt service costs are budgeted to increase by $5.4 million, 9.12% in 2020/21 and a further 10.79% in 201/21.

Figure 4 - Water and Wastewater Expense Trends

	2019/20 Budget	2020/21 Budget	2021/22 Budget
Operating Expenses	$ 80,518,000	81,101,000	84,146,000
Increase		0.72%	3.75%
Depreciation	$ 23,876,000	$ 26,065,000	$ 28,084,000
Increase		9.17%	7.75%
Grant in Lieu of Taxes	$ 5,147,000	$ 6,052,000	$ 6,514,000
Increase		17.58%	7.63%
Debt Servicing	$ 25,703,000	$ 28,046,000	$ 31,071,000
Increase		9.12%	10.79%

Another area of cost that increases at a rate higher than CPI is the Dividend/Grant in Lieu of taxes paid to HRM. The current agreement with HRM expires on March 31, 2020 and Halifax Water is in the process of negotiating a new agreement. Halifax Water's current proposal is to continue to pay a dividend on water assets at a rate of 1.56% ($1.56/$100) and to add additional dividends of 0.25% ($0.25/$100) on Wastewater assets and a further 0.25% ($0.25/$100) on Stormwater assets. To reduce the increase in the dividend/grant in lieu as a result of the investment in infrastructure, and smooth the impact on future rate, Halifax Water has proposed a cap to the annual increase dividend of 1%.

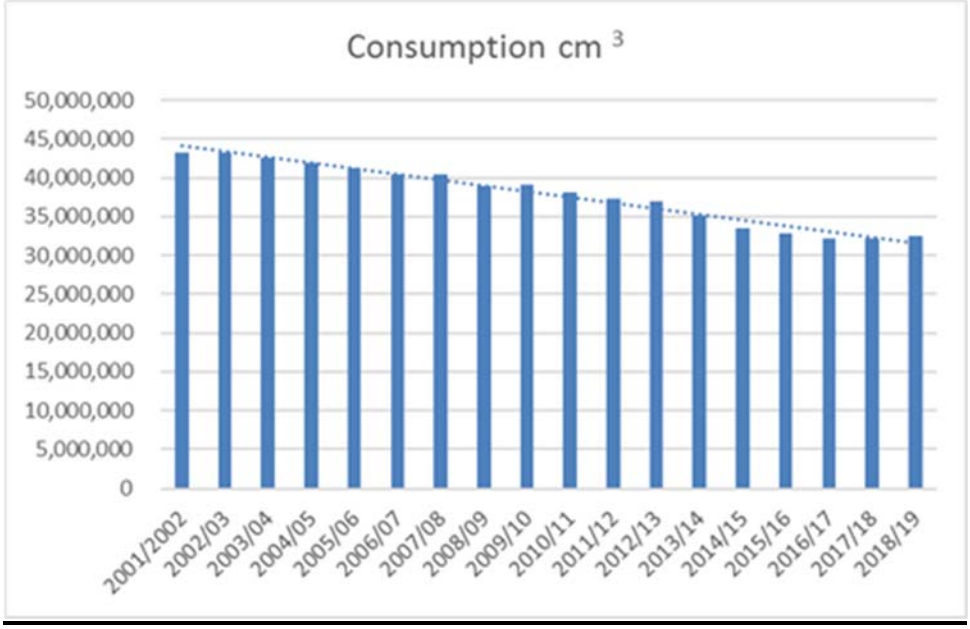
The proposal, which has not been agreed with HRM, would see the dividend/grant in lieu increase by $1.4 million, 17.58% in 2020/21 and a further 7.63% in 2021/22.

Consumption and Customer Connections

One of the key areas of consideration is the actual and budgeted consumption and the increase in the number of Halifax Water customers.

Halifax Water had experienced average, yearly, net metered consumption decreases of 1.64%, over seventeen years, as indicated in Figure 5. The total decrease since 2001/02 is a 24.7% reduction.

Figure 5 – Historic Consumption



For the purpose of the budget and rate application, consumption is budgeted to be flat in 2020/21 and to decrease by 1% in 2021/22. This assumes some continued decline in consumption which is offset by new customer growth. This is the first time in seventeen years that consumption is not projected to decrease. There is some risk associated with this assumption. After a long-term trend of declining water consumption, Halifax Water has had back to back increases in consumption of

0.1% and 1.4% in 2017/18 and 2018/19 respectively due to customer growth and conversion to new meters increasing accuracy. Consumption is projected to remain relatively flat as growth in customers will offset decreasing consumption due to conservation and increases in water efficiency.

In terms of the customer base, Halifax Water has projected an increase in new customer connections of 638 per year, allocated to the various meter sizes based on a review of connection history. The breakdown of customer accounts as of March 31, 2019 is indicated in Figure 6.

Figure 6 – Customer Connections as of March 31, 2019

March 31, 2019 (Fiscal Year: 2018/2019)		
Customer Numbers by Type		
	Number of Accounts	**% of Total**
Water, Wastewater and Stormwater	74,081	70.59%
Stormwater only	19,373	18.46%
Water and Wastewater	6,416	6.11%
Water and Stormwater	4,064	3.87%
Wastewater and Stormwater	654	0.62%
Water only	286	0.27%
Wastewater only	80	0.08%
Total of all Types	**104,954**	**100.00%**

These key factors have result in the need for a rate application and the proposed rate increases.

The Application is proposed to address the following objectives.

1) Provide sufficient operating revenue for the two test years to cover the operating and non-operating costs for water, and wastewater.

2) Provide sufficient operating revenue to accommodate depreciation for additions to utility plant in service.

3) Provide sufficient operating revenue to accommodate increased debt servicing requirements.

4) Provide sufficient operating revenue for the two test years to enable HRWC to continue to address the infrastructure deficit and regulatory compliance issues facing the utility.

5) Recognize an annual increase in customer base of 638 customer connections divided between domestic, industrial, commercial, multi-residential and institutional based on the average increase over the past four years.

6) Recognize flat water consumption in 2020/21 and a modest reduction in consumption of 1% in 2021/22.

7) Recognize increased operating costs primarily as a result of increased salary and benefit costs.

The Application is submitted based on the Cost of Service Manual approved by the NSUARB.

HRWC considered various Rate Design options, which is discussed in Attachment One. It is important to note that for the two weeks, staff will be conducting additional quality control as the Rate Application is assembled. There may be minor changes in the proposed rate application as a result. The HRWC Board will be notified if any anything substantive is changed that causes an impact greater than +/- 1% on the combined proposed rates (water and wastewater), over the two test years.

The proposed rates smooth the rate impacts over the two test years. The base charge has been maintained at the current level and the volumetric charge and fire protection charges are proposed to increase.

Maintaining the base rate, helps provide financial stability to Halifax Water and adjusting only the volumetric rate, could allow customers to reduce their consumption as a means of mitigating the proposed rate increase.

Proposed Changes in Rules and Regulations

Attachment Two contains a summary of the changes to the proposed Rules and Regulations. A number of the changes are administrative in nature. There are two changes arising from direction previously provided by the Halifax Water Board.

1. Implementation of a manual meter read fee to recover the incremental cost of a manual meter read.

2. Implementation of enhancements to the lead service line replacement program to pay 100% of the cost of private side replacements for lead service line replacements done in conjunction with municipal street renewal projects.

Halifax Water is proposing some new fees and adjustments to existing fees to recover incremental costs from specific customers if the costs are not incurred for the benefit of the entire rate base.

Additionally, some amendments to the Regulations are proposed to enhance Halifax Water's ability to protect the environment and Halifax Water infrastructure.

BUDGET IMPLICATIONS

The 2020/21 and 2021/22 revenue requirements for regulated activities are prepared in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities. Operating losses from operating activities of $15.9 million for 2020/21 and $26.2 million for 2021/22 are projected based on existing rates.

The proposed rates and comparison to the existing rates for Water and Wastewater are summarized below and listed in Attachment One in more detail.

Impact on residential customers – Total annual residential bills, based on average water consumption, would increase by 5.8% in 2020/21, and 5.8% in 2021/22.

Impact on Institutional, Commercial, Industrial (ICI) customers – Combined water and wastewater bills would increase from 7.7% to 9.4%, depending upon meter size, in 2020/21, and 7.7% - 9.1% in 2021/22.

The rates, and impacts on customers are described in greater detail in Attachment One.

The volumetric charge for water would increase from $0.976 per cubic metre ($m^3$) in 2019/20 to $1.085 per m^3 in 2020/21 and $1.201 in 2021/22. The volumetric charge for wastewater (discharge rate) would increase from $1.753 per m^3 in 2019/20 to $1.920 per m^3 in 2020/21 and $2.097 per m^3 in 2021/22.

The charge for public and private fire protection is projected to increase from the current rate. The public fire protection cost would increase to $8.2 million, 14.2% in 2020/21 and 1.4% in 2021/22. The private fire protection costs would increase to $0.9 million, 23.5% in 2020/21 and 18.9% in 2021/22.

If the rate increases are not approved by the NSUARB, Halifax Water's proposed Operating and Capital Budgets for 2020/21 and 2021/22 will need to be revised.

ATTACHMENTS

Attachment 1 – Rate Application – Summary Section
Attachment 2 – Summary of proposed changes to Regulations

Report Prepared by: *Original Signed By:*

Louis de Montbrun, CPA, CA
Director, Corporate Services/CFO 902 490-3685

DRAFT – FOR DISCUSSION PURPOSES ONLY

Nova Scotia Utility and Review Board

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

- and -

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

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

FEBRUARY 2020

Contents

NOTICE OF APPLICATION

NOVA SCOTIA UTILITY AND REVIEW BOARD

IN THE MATTER OF: THE PUBLIC UTILITIES ACT

-and-

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

TO: THE NOVA SCOTIA UTILITY AND REVIEW BOARD

The Applicant hereby applies to the Board for an Order:

(a) For the approval of a Schedule of Rates, Rules and Regulations for Water, Wastewater, and Stormwater Services for water, public and private fire protection, and Wastewater services for customers of the Halifax Regional Water Commission, to become effective for services rendered on and after September 1, 2020, a copy of which is attached as Appendix 9;

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

1. The Halifax Regional Water Commission (Halifax Water) is a body corporate, incorporated under the *Halifax Regional Water Commission Act*, S.N.S. 2007, c.55, as amended, (Halifax Water Act) and has its head office and chief place of business at 450 Cowie Hill Road, Halifax, Province of Nova Scotia.

2. Halifax Water is a public utility regulated under the *Public Utilities Act,* R.S.N.S. 1989, c.380, as amended, (Public Utilities Act) and has responsibility for the supply of municipal water and fire protection services, municipal Wastewater services and municipal Stormwater services throughout the Halifax Regional Municipality (HRM).

3. The rates charged by Halifax Water for the services provided by it were last adjusted on April 1, 2016 by Order of the Board effective April 21, 2015[1].

4. Halifax Water therefore makes this Application, pursuant to the provisions of the Public Utilities Act, and the Halifax Water Act, for approval of a Schedule of Rates and Charges for the supply of water, public and private fire protection, Wastewater and Stormwater service and approval of a Schedule of Rates, Rules and Regulations for Water, Wastewater, and Stormwater Services for the provision of such services as set forth more fully in this Application.

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

[1] M06540

5. Halifax Water is represented in this proceeding by:

John C. MacPherson, Q.C.
McInnes Cooper
Purdy's Wharf Tower II
PO Box 730
1300-1969 Upper Water Street
HALIFAX, NS, B3J 2V1
Phone: (902) 425-6500
Facsimile: (902) 425-6350
Email: john.macpherson@mcinnescooper.com

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

Louis de Montbrun, CPA, CA
Chief Financial Officer
Halifax Water
PO Box 8388 Station A
450 Cowie Hill Road
HALIFAX, NS, B3K 5M1
Phone: (902) 490-3685
Fax: (902) 490-4749
E-mail: louis.demontbrun@halifaxwater.ca

Filed at Halifax, Nova Scotia this Xth day of February, 2020.

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

Overview

Halifax Water is applying for increases in water, public and private fire protection, and wastewater rates to take effect September 1, 2020 and April 1, 2021 to maintain the current high level of service to customers, and recognize additions to Utility Plant in Service and continued investments in water and wastewater infrastructure. Halifax Water's budgets and revenue requirements are developed on a "break-even" basis. The range of rate increases requested vary depending upon the size of the meter connection and the volume of water consumed. The rate increases requested for 5/8" meters, which are primarily residential customers total 5.8% for water and Wastewater in 2020/21, and 5.8%% for water and Wastewater in 2021/22. On a combined basis, the increase for all meter sizes will range from 5.8% to 9.4% in 2020/21 and from 5.8% to 9.1% in 2021/22.

Application

Halifax Water is a regulated utility pursuant to the *Public Utilities Act* and has provided potable water and fire protection services to the residents of the former City of Halifax since 1945. Following municipal amalgamation in 1996, these services have been provided to the urban core and satellite systems of the HRM.

On August 1, 2007, the municipal Wastewater and Stormwater facilities were transferred by HRM to Halifax Water and, as a result of this transfer, these services became regulated under the *Public Utilities Act.* The current rate structure and rules and regulations were approved by the Nova Scotia Utility and Review Board (Board) following a rate application and public hearing in 2013 (NSUARB-W-HRWC-R-13/2013 NSUARB 127) and became effective July 1, 2013 (2013 Decision).

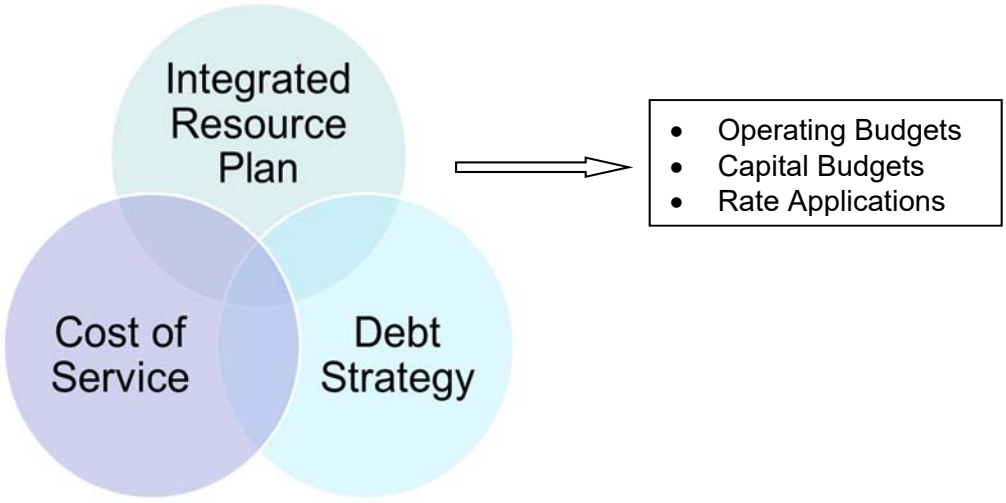
HRM transferred the operation of the Aerotech/Airport Water System to Halifax Water on April 1, 2006. The August 1, 2007 transfer of municipal Wastewater and Stormwater facilities from HRM included the Aerotech/Airport Wastewater facilities. As a result of these transfers, the Aerotech/Airport system became regulated under the Public Utilities Act. The current rate structure and rules and regulations were approved by the Board following a rate application and public hearing in 2012 (NSUARB-W-R-12 (3)/2012 NSUARB 86) and became effective August 1, 2012.

The Board approved consolidation of the Aerotech/Airport system with the Urban Core, effective April 1, 2015, in a Supplemental Decision in matter number M05463 dated October 31, 2014 and Order dated November 3, 2014.

Background to this Application

Several initiatives ordered by the Board and accepted in previous hearings provide guidance to the long-range plans for Halifax Water. Those studies included the Cost of Service Methodology, the Integrated Resource Plan (IRP), and the Debt Strategy. These studies are often referred to as the sustainability framework. This framework serves as a touchstone for operating and capital budgets and rate applications as indicated in Figure 1.

Figure 1 – Sustainability Framework



The Integrated Resource Plan was updated in 2019. The Cost of Service Manual (COS Manual) has not changed substantively but some cost allocations have been adjusted to reflect the most current information. Assumptions and data used in the Debt Study were updated in 2018 as part of work conducted on rate affordability.

Cost of Service

This Application is prepared in accordance with the COS Manual based on established methodologies from the American Water Works Association (AWWA) and the Water Environment Federation (WEF) in the context of the local and operational characteristics prevalent for Halifax Water. Cost allocations are tailored to reflect system characteristics, and the approach is adaptable to changing circumstances.

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

The COS Manual was approved in the June 24, 2013 Decision regarding M05463 [2013 NSUARB 127]. The Board also recognized the COS Manual as a living document that should be updated with any available and relevant information and data. Subsequent changes to the COS Manual have been approved by the Board.

This Application is consistent with the COS Manual; however, the concept of gradualism has been applied to the recommended Rate Design.

Integrated Resource Plan

An updated IRP was completed in 2019. The IRP update built on the previous studies to address three primary drivers: growth (Infrastructure Master Plan), asset renewal (AMPs), and regulatory compliance (Compliance Plan). This project reviewed existing supply and demand side management activities Halifax Water has done or could do to optimize service delivery, created a six-step program integration approach, and produced a comprehensive 30-year capital investment program.

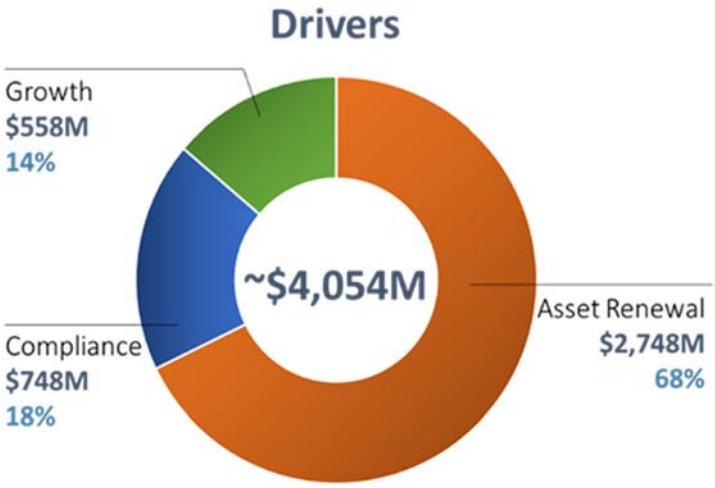
Several important initiatives aimed at filling data gaps have been completed or initiated since the first IRP in 2012, and more information is available in the Five-Year Business Plan in Appendix 5.

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

The resulting IRP update recalibrates the long-term investment to an estimated $4.1 billion over 30 years with an anticipated review as part of Halifax Water's long-term planning cycle every 5 years.

Asset renewal expenditures represent approximately 68% of the 2019 IRP; growth represents 14% and regulatory compliance expenditures represent approximately 18% each. The total 30-Year project cost is shown in Figure 2 below.

Figure 2 – Integrated Resource Plan 30-Year – By Driver



Financing Strategy and Affordability

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

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

1. Rate stability and affordability;
2. Halifax Water's long-term financial sustainability; and,
3. Intergenerational equity.

The Debt Strategy concludes that appropriate financial performance ratios for Halifax Water to utilize include:

1. Target Debt Service Ratio of 35%; and,
2. Target Debt/Equity Ratio of 40% to 60%.

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

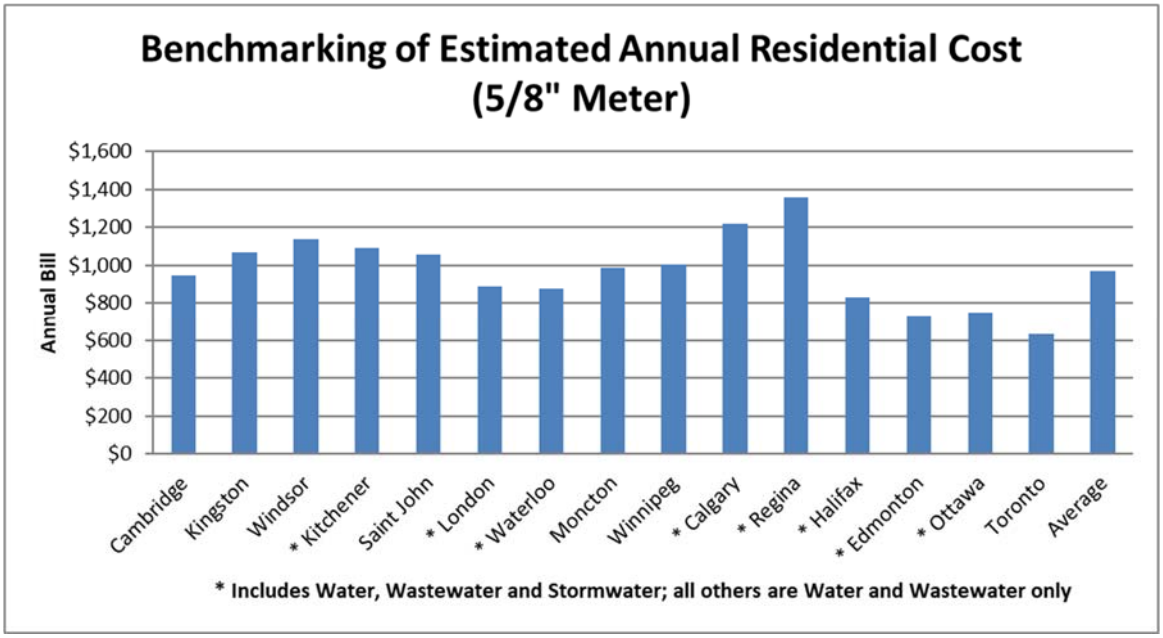
Additionally, the Debt Strategy addresses the issue of affordability and references industry studies which suggest an appropriate affordability measure is 2% of median household income for each service; i.e. 4% for both. Halifax Water is currently using 2% of median household income for combined services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

Halifax Water commissioned a more in-depth review of affordability ("Affordability Review) in 2017, which concluded there is no broad affordability issue in Halifax but there are subsets of communities and population within the service area with concerns about affordability. In 2018, in response to this Affordability Review, Halifax Water implemented some enhancements to the customer assistance program (Help to Others or H2O), and implemented two new programs that provide customer assistance: the lead service line rebate, and the private lateral replacement assistance program.

Median household income in the Halifax Census Metropolitan Area is $69,553 based on 2016 Statistic Canada Census. The median household income, if increased by CPI, would be expected to be $73,164 in 2019. The average family currently pays $787.90 for Water, Wastewater and Stormwater service. The average bill equates to 1.08% of median household income, indicating that in terms of rate affordability, Halifax Water benchmarks favourably with the rate affordability threshold. Halifax Water rates also benchmark favourably with other utilities. As of the most recent benchmarking, the average residential bill for combined water, Wastewater and Stormwater service for the 14 benchmark cities was $982. Even with the proposed rate increases, Halifax Water's total residential bills will be less than average. In fact, the margin between the Halifax Water total residential bill and the average total residential bill is increasing.

The benchmarking of estimated annual residential cost is shown in figure 3, below.

Figure 3 – Benchmarking of Estimated Annual Residential Costs



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

1. Interest rates;
2. Availability of Federal/Provincial infrastructure funding;
3. Impact of the Regional Development Charge (RDC); and,
4. Financial constraints posed by rates and affordability issues.

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

Rate Smoothing

The Halifax Water Board approved a strategy to smooth future rate increases on October 30, 2014. The main strategy elements include a more gradual increase in capital spending to the recommended IRP levels, and a more gradual implementation of Cost of Service Rates based on the COS Manual.

Five-Year Business Plan

A five-year business plan has been developed by Halifax Water and is attached to support this Application and development of a holistic approach to sustainable infrastructure. The five-year business plan is based on fiscal years that begin on April 1, and end of March 31. The first two years of the five-year business plan (2020/21 and 2021/22) are the "test years" in the Application. In rate making, a test year is a 12-month period used to calculate the revenue required to cover the eligible costs of providing the service.

Several challenges, mainly of a capital nature, during the test years support the need to increase rates, namely:

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

- **Capital Demands** – The current water and Wastewater rates are insufficient to meet the capital needs for sustainable infrastructure as identified in the IRP. The IRP acknowledges that Wastewater and Stormwater assets have been historically underfunded. Institutional capacity will have to increase over the test years in order to deliver the required capital projects.

- **New Environmental Regulations** – Increased operating expenses will be incurred by Halifax Water as it conforms to the Wastewater Systems Effluent Regulations enacted under the Federal *Fisheries Act* in June, 2012 and related to the Canadian Council of Ministers of the Environment (CCME) Municipal Wastewater Effluent Strategy,

- **Increasing Energy and Chemical Costs** – electricity and chemical costs are projected to continue to increase at a rate higher than inflation.

- **Increasing Compensation Costs –** the number of employees, and some wage, salary and compensation costs have increased since rates were last adjusted on April 1, 2016.

- **Inflationary Adjustments for other goods and services** – the cost of many goods and services required by Halifax Water are subject to inflationary increases. CPI for Halifax has increased by 1.42% in 2016, 1.56% in 2017, 2.3% in 2018 and 1.5% is projected for 2019 (final 2019 CPI has not been published)

The budgets for the test years have been prepared in conjunction with the Business Plan.

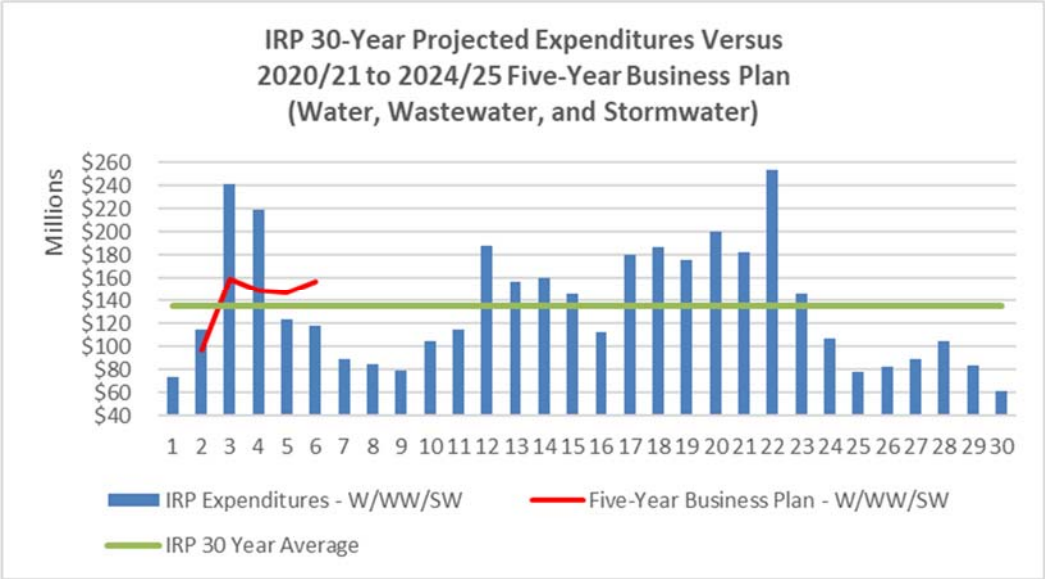
Capital Budget

Halifax Water's proposed five-year capital budget within its Business Plan incorporates IRP projects and prioritization, but is less than the level of spending recommended within the IRP as indicated in Figure 4. Halifax Water proposes to phase in the IRP level of spending with capital investments ranging from $96.5 million in 2020/21 to $159.0 million in 2021/22.

Figure 4 shows IRP expenditures of $815.7 M over the next five years, and the red line denotes the capital budgets in the Five-Year Business Plan.

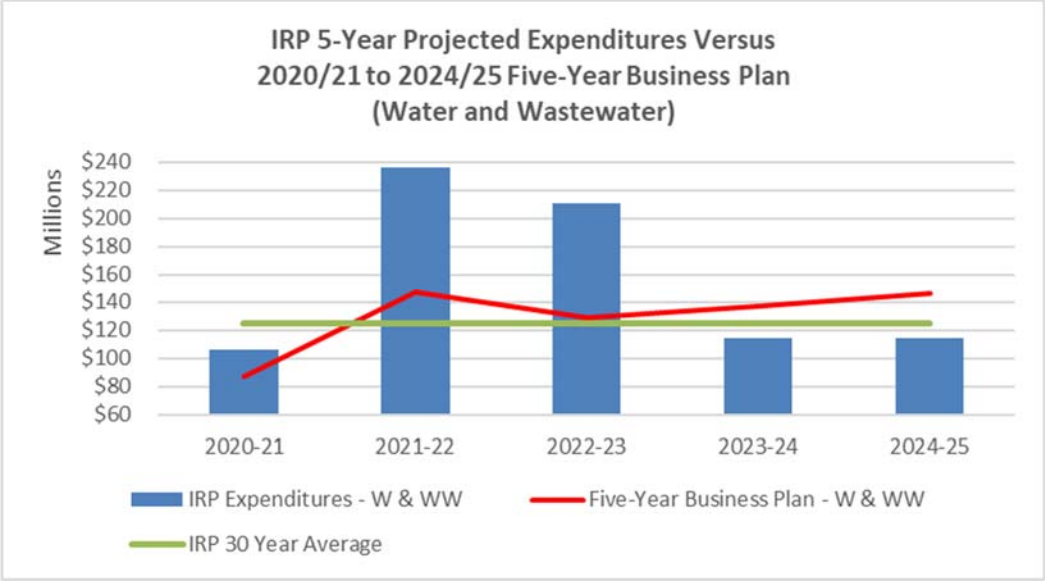
The full Five-Year Capital Budget for the Urban Core system is shown in Appendix D of the Five-Year Business Plan (Appendix 4 of the Application). The year-one, 2020/21, budget has a total project value of $96,514,000 ($48,929,500 for water, $38,448,000 for Wastewater, and $9,136,500 for Stormwater). The five-year total budgeted value is $708,451,000 ($293,775,500 for water, $352,250,500 for Wastewater, and $62,425,000 for Stormwater). Year-to-year capital funding details are provided in Figure 4, below.

Figure 4 – Five-Year Capital Compared to the IRP



As water and Wastewater are the focus of this Application, Figure 5 below compares the proposed level of capital activity in the Five-Year Business Plan for water and Wastewater against the recommended IRP level of spending.

Figure 5 – Five-Year Capital Water and Wastewater compared to the IRP



The recommended total capital spend over the next five years for water and Wastewater under the IRP would be $782.0 million dollars. The total capital spend for water and Wastewater in the Five-Year Business Plan is $646.0 million dollars. Increasing capital funding to meet the IRP recommended level of capital spending is a primary driver for this Application.

The capital funding in Figure 5 makes some assumptions about availability of external funding. No capital from operating funding is included, depreciation on contributed assets is not included, and equity financing is either depreciation or RDC funds.

Figure 6 – Five-Year Capital Funding

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

Additions to Utility Plant in Service for the two test years reflect projects that will be completed and in service during the test years, while the Capital Budget reflects planned activity during the test years. Capital projects can span fiscal years, and are often multi-year in nature. A project may commence but not be completed or in service during the test period. Additions to Utility Plant in Service are developed based on: 1) Capital projects from previously approved Capital Budgets that are expected to be completed, plus, 2) Planned future Capital Budgets, and less, 3) Capital projects that will not be completed during the test year periods, therefore they will become Additions to Utility Plant in Service in future years after the test years. Additions to Utility Plant in Service for water and Wastewater are detailed within the Water and Wastewater Rate Studies (Appendices 1 and 2 of the Application).

Revenues

Consumption and Customer Connections

Halifax Water had experienced average, yearly, net metered consumption decreases of 1.64%, over seventeen years, as indicated in Figure 7. The total decrease since 2001/02 is a 24.7% reduction, which was managed predominantly through changing rate structures to align fixed and variables costs, diversifying rate structures (Stormwater with a different billing determinant), increasing rates, increasing unregulated revenue and controlling costs.

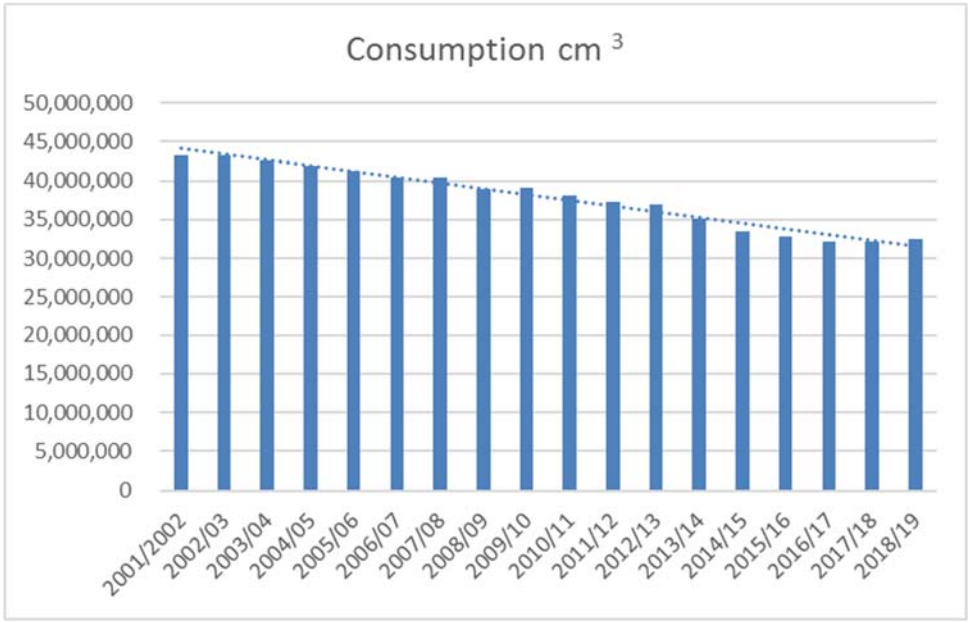
After this long-term trend of declining water consumption, Halifax Water has had back to back increases in consumption of 0.1% and 1.4% in 2017/18 and 2018/19 respectively due to customer growth and conversion to new meters increasing accuracy.

For 2019/20, consumption is projected to remain relatively flat as growth in customers will offset decreasing consumption due to conservation and increases in water efficiency.

Consumption has been budgeted to be flat in 2020/21 and to decrease by 1% in 2021/22. This assumes some continued decline in consumption which is offset by new customer growth. This is the first time in seventeen years that consumption is not projected to decrease. There is some risk associated with this assumption.

For short-term planning purposes, in relation to setting rates, Halifax Water previously used a rolling historic four-year average (net reduction) – which is currently 0.68%. Declining consumption affects both water and Wastewater revenue as the discharge fee billed to most customers is based upon water consumption. Consumption is impacted by timing of development, form of development and new customer growth. It is not certain if future development will be sufficient to offset the trend of declining consumption.

Figure 7 – Historic Consumption



Average	-1.64%
Rolling Four-Year Average Decrease	-0.68%
Median	-1.75%
Total Decrease Since 2001/02	-24.7%

The projected increase in new customer connections is 638 per year, allocated to the various meter sizes based on a review of connection history. The breakdown of customer accounts as of March 31, 2019 is indicated in Figure 8.

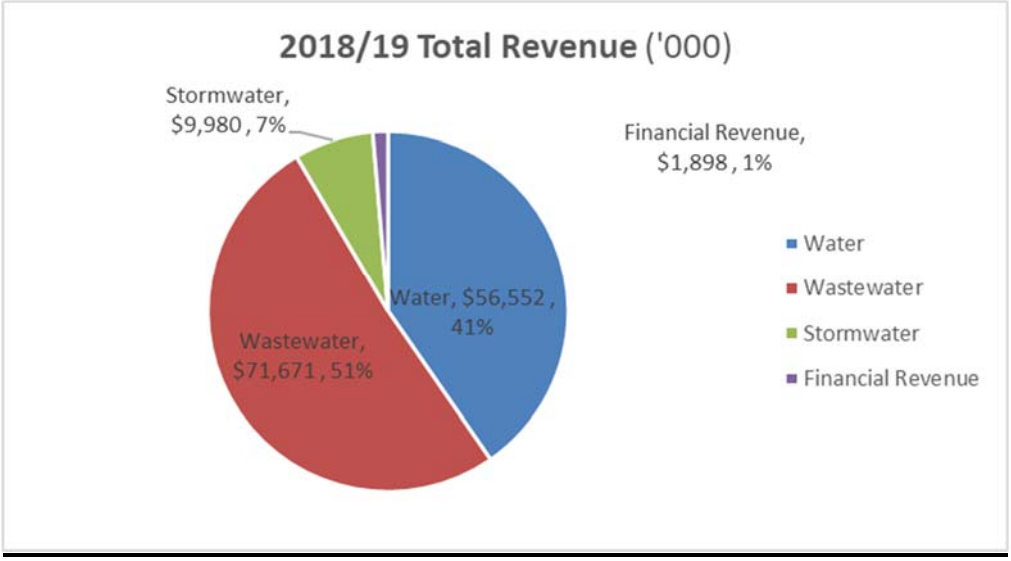
Figure 8 – Customer Connections as of March 31, 2019

March 31, 2019 (Fiscal Year: 2018/2019)		
Customer Numbers by Type		
	Number of Accounts	**% of Total**
Water, Wastewater and Stormwater	74,081	70.59%
Stormwater only	19,373	18.46%
Water and Wastewater	6,416	6.11%
Water and Stormwater	4,064	3.87%
Wastewater and Stormwater	654	0.62%
Water only	286	0.27%
Wastewater only	80	0.08%
Total of all Types	**104,954**	**100.00%**

The majority of Halifax Water's revenues come from rate-regulated activities, with approximately 60% of water and Wastewater revenues coming from volumetric rates and 40% from base charges. Halifax Water does have a small amount of other miscellaneous revenue from miscellaneous fees and financial revenue from interest income. Due to steadily decreasing historic consumption and uncertainty about future consumption, Halifax Water does not propose to increase the proportion of revenue based on volumetric charges. This is an effort to prevent further deterioration in revenue stability.

Figure 9 shows that Wastewater, and Water, account for 51% and 41% of Halifax Water's total revenues, respectively. Stormwater accounts for 7%, and only a small proportion of Halifax Water's revenues (1%) relate to interest, miscellaneous income, fees and charges, and government grants.

Figure 9 – 2018/19 Total Revenues

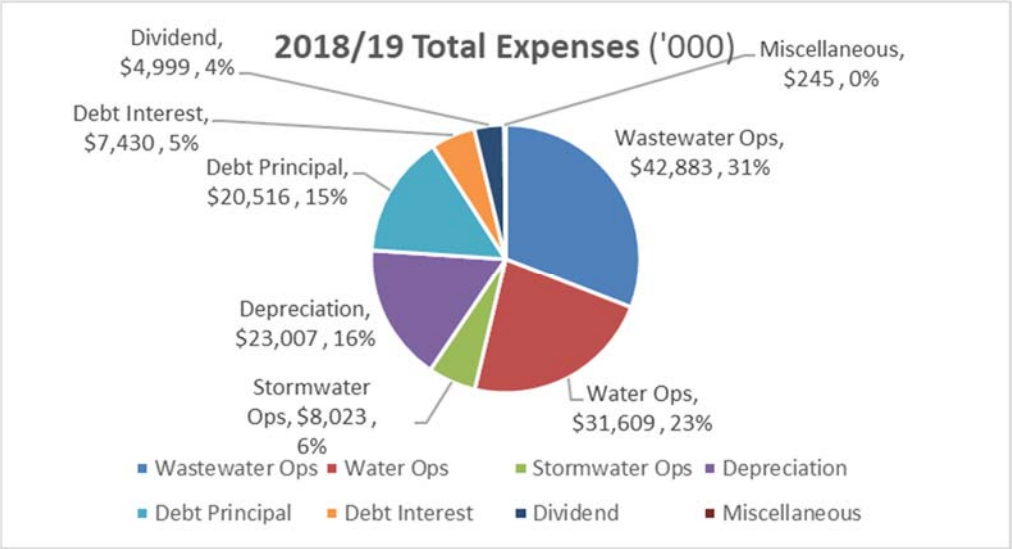


Halifax Water's revenues from unregulated business activities help mitigate the extent of future rate increases. The budget for Unregulated Activities is shown on page 6 of the Five-Year Business Plan, Appendix F, and in the Rate Application, Appendix 5.

Expenses

Halifax Water's Five-Year Operating Budget is shown on an accrual basis, which provides better information for decision making and aligns with accounting standards. As indicated in Figure 10, the largest components of Halifax Water's consolidated operating budgets are operating costs for Water, Wastewater and Stormwater services which include salaries and benefits (including accrued pension costs), electricity, and chemicals. Other major expense categories are debt service and depreciation.

Figure 10 – 2018/19 Total Expenses



The majority of Halifax Water's operating expenses increase at levels at, or less than, CPI. The cumulative increase in water and Wastewater operating expenses from the 2019/20 budget to the projected 2021/22 budget is 3.75%. Depreciation, Grant in Lieu of Taxes, and Debt Servicing all increase at levels higher than CPI, as they are driven by the level of capital activity and new additions to Utility Plant in Service. These trends are illustrated for water and Wastewater in Figure 11.

Figure 11 – Water and Wastewater Expense Trends

	2019/20 Budget	2020/21 Budget	2021/22 Budget
Operating Expenses	$ 80,518,000	81,101,000	84,146,000
Increase		0.72%	3.75%
Depreciation	$ 23,876,000	$ 26,065,000	$ 28,084,000
Increase		9.17%	7.75%
Grant in Lieu of Taxes	$ 5,147,000	$ 6,052,000	$ 6,514,000
Increase		17.58%	7.63%
Debt Servicing	$ 25,703,000	$ 28,046,000	$ 31,071,000
Increase		9.12%	10.79%

Figure 12 shows that the four-year historic average for CPI in Halifax is 1.6% per year, based on the period 2015 – 2019 the compounded impact of inflation is 6.5%.

Figure 12 – Consumer Price Index

	2014	2015	2016	2017	2018	4 year average
Halifax (N.S)	125.2	126.6	128.4	130.4	133.4	129.7
Index change per year		1.40	1.80	2.00	3.00	2.05
Percentage change per year		1.12%	1.42%	1.56%	2.30%	1.60%
Compounded inflation	$ 1.0000	$ 1.0112	$ 1.0256	$ 1.0415	$ 1.0655	

Pension

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

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

Halifax Water's Employee's Pension Plan has been redesigned since the last rate application; and the Pension Plan's related expenses included within the revenue requirements have decreased.

Salaries and Benefits

Reasonable provisions for salary increase have been provided for in the Five-Year Plan, based on five-year collective agreements signed with CUPE Locals 227 and 1431 in 2019;

and market information for non-union compensation. Halifax Water has budgeted for the impact of step increases within salary bands or reclassification of positions and increases in benefits. Halifax Water is also adding additional salaried staff to increase institutional capacity to deliver the IRP and reflect growth in services caused by increasing customers, additional infrastructure requiring maintenance, and increased calls and service requests.

Energy

Budgets were established based on assumptions of electricity, oil and natural gas rate increases in each year covered by the Application. The impacts of these increases are expected to be partially offset by Halifax Water's formal Energy Management Program initiated in 2011/12 (see Section 7 of the Halifax Water Five-Year Business Plan). The projected increases are:

- Electricity – 6% in year 2020/21 and 2% in 2021/22;
- Furnace Oil – 3% in 2020/21 and 2% in 2021/22; and,
- Natural Gas – 10% in 2020/21 and 2% in 2021/22.

Debt Financing

Over the course of the next two years, debt payments for water and Wastewater are projected to increase from $25.7 million in 2019/20 to $31.1 million by 2021/22 (Figure 10). The amount and timing of the increases will be determined by timing of the completion of the projects and the financing rates and options available. Halifax Water's capital financing strategy is designed to maintain a debt service ratio of 35% or less, and to use a mixture of infrastructure funding, development related charges (reserves), depreciation, and debt. The two test years include projected issuance of new debt totaling $105.5 M, based on an interest rate of 4.0% in 2020/21, and 2021/22. Halifax Water's weighted average cost of debt is 3.22% at December 2019. The interest rates utilized are less than the MFC recommended upper limit of 5.5%.

Depreciation

As Halifax Water's assets and future capital budgets increase, so does depreciation expenses. Depreciation is an integral funding source to support rehabilitation of the existing infrastructure and new infrastructure and upgrades to meet future capital requirements necessitated by both services demands and changing environmental regulation. Over the two test years, the depreciation expense for water and Wastewater is projected to increase from $23.9 million in 2019/20 to $26.1 million in 2020/21 and $28.1 million in 2021/22 (Figure 10). Projected depreciation reflects the completed plant in service during the test periods, and is consistent with depreciation methods and rates prescribed by the NSUARB's Accounting and Reporting Handbook for Water Utilities or otherwise as approved by the Board.

Chemical Costs

Chemicals are tendered annually in January for optimal pricing. Chemical cost increases of 5% are anticipated for 2020/21 and 5% in 2021/22. Long-range chemical prices are difficult to predict due to the volatility of the market which is closely linked with energy prices and fluctuations in supply and demand.

Grant in Lieu of Taxes

Halifax Water does not pay municipal property taxes, and instead pays a Grant in Lieu of Taxes based on 1.56% of water Utility Plant in Service. The current agreement expires March 31, 2020. A renewal is in the process of being negotiated for a five-year term (April 1, 2020 - March, 2025) based on the existing formula of 1.56% of Water Utility Plant in Service, plus 0.25% for Wastewater Utility Plant in Service and 0.25% for Stormwater Utility Plant in Service. The proposed agreement includes a provision that caps the future growth in the water, Wastewater and Stormwater dividend to 1% per year. This ensures that as the utility increased the level of capital funding to meet the IRP level recommended of spend, growth in the dividend is constrained to a reasonable level that provides recognition of increases in costs of municipal services provided to Halifax Water. Figure 13 below shows the dividend for all services is projected to grow from $5.1 million in 2019/20 to $6.6 million by 2021/22. Figure 11 shows the dividend for water and Wastewater services is projected to grow to $6.5 million by 2021/22.

Operating Surplus/Deficit

On a consolidated basis, the projected revenue requirements are shown in Figure 13. Operating Expenses (including depreciation) are projected to increase from $106.7 million in 2018/19 to $118.1 million in 2020/21 and to $123.6 million in 2021/22, or 15.8% over the 4 years, while operating revenues are projected to stay flat. Non-operating revenues are expected to decrease by $1.3 million over the period primarily as a result of interest allocated to RDC reserves. However, non-operating expenses are expected to increase by $8.1 million or 24.3% due to increased debt-servicing costs and grants in lieu of taxes.

Figure 13 – Pro Forma Income Summary (All Services)

Pro Forma Income Summary (in thousands)

	Actual 2018/19	Budget 2019/20	Proposed Budget 2020/21	Projected Budget 2021/22
Operating Revenue	$138,413	$138,727	$138,618	$138,123
Operating Expenses	$105,731	$115,088	$118,110	$123,631
Operating Surplus (Deficit)	$32,682	$23,639	$20,508	$14,492
Financial Revenue	$1,898	$1,369	$619	$621
Financial Expenses				
Long Term Debt Interest	$7,430	$8,181	$8,823	$10,124
Long Term Debt Principal	$20,516	$19,822	$21,880	$24,203
Amortization Debt Discount	$199	$202	$228	$271
Dividend/ Grant in Lieu of Taxes	$4,999	$5,147	$6,113	$6,638
Miscellaneous	$46	$22	$32	$32
	$33,190	$33,374	$37,076	$41,268
Net Surplus (Deficit)	$1,390	($8,366)	($15,949)	($26,156)
Percentage increase in revenue to cover deficit			*11.5%*	
Incremental percentage increase in operating revenue				*7.4%*

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

The 2020/21 and 2021/22 Operating Budgets are projected to yield operating deficits of $15.9 million and $26.2 million respectively, without further rate increases.

The December 2019, forecasts shows a combined operating deficit of $3.2 million for the 2019/20 fiscal year, and projects operating deficits for 2020/21 and 2021/22 for all services as shown in Figure 14, below.

Figure 14 – Operating Surplus/ (Deficit)

Continuity Schedule - Accumulated Surplus (Deficit) on a NSUARB Handbook Basis - which Excludes Pension Accrual

	Total	Water	Wastewater	Stormwater
2018/19 Fiscal Year				
Balance, beginning of year	$38,625,906	$14,669,623	$15,487,608	$8,468,674
Operating surplus (deficit) for the year	$1,390,433	$2,760,942	($570,243)	($800,266)
Balance, end of year	$40,016,339	$17,430,565	$14,917,365	$7,668,408
2019/20 Fiscal Year				
Balance, beginning of year	$40,016,339	$17,430,565	$14,917,365	$7,668,408
Projected operating (deficit) for the year	($3,188,925)	$2,374,560	($3,936,644)	($1,626,841)
Projected balance, end of year	**$36,827,414**	**$19,805,125**	**$10,980,721**	**$6,041,568**
2020/21 Fiscal Year				
Balance, beginning of year	$36,827,414	$19,805,125	$10,980,721	$6,041,568
Budgeted operating (deficit) for the year	($15,948,714)	($4,274,512)	($7,842,633)	($3,831,569)
Projected balance, end of year	**$20,878,700**	**$15,530,613**	**$3,138,088**	**$2,209,999**
2021/22 Fiscal Year				
Balance, beginning of year	$20,878,700	$15,530,613	$3,138,088	$2,209,999
Budgeted operating (deficit) for the year	($26,155,637)	($9,179,931)	($11,980,107)	($4,995,599)
Projected balance, end of year	**($5,276,937)**	**$6,350,682**	**($8,842,019)**	**($2,785,600)**

Figure 14 also shows that Stormwater service is also operating at a deficit. Halifax Water is not proposing to increase rates for Stormwater service at this time for two reasons: 1) some quality assurance work is being conducted to ensure new development is being captured and billed, and 2) satellite imagery is being updated in Spring of 2020. Both of these initiatives will result in additional Stormwater revenue due to additional customers, and additional impervious area. Halifax Water plans to file an application to adjust Stormwater rates in the Fall of 2020.

2019 Water Demand Analysis

By the fall of 2019, Halifax Water had completed installation of approximately 80,000 Advanced Meter Infrastructure (AMI) meters. An updated Water Demand Analysis was conducted, using AMI data, by Raftelis Financial Consultants, Inc. (Raftelis), which is included in Appendix 4. The Water Demand Analysis recommends some further analysis be conducted, and Halifax Water is of the opinion that this would be beneficial to conduct once all meter installations are completed and there is a full year of metering data for all customers.

The Water Demand Analysis indicates there is a basis for Halifax Water to consider adding additional customer classes and moving to an increasing block rate structure for volumetric charges.

Halifax Water has submitted this Application based on the existing COS Manual and Rate Structure (single unit volumetric rate with base charges increasing based on meter size). Halifax Water will complete the additional analysis recommended by Raftelis, and will then

update the COS Manual and file a Cost of Service/Rate Design Application in 2021/22; with a vision of moving to an increasing block rate structure at the next general rate application (GRA) which would be filed in late 2022 or early 2023.

If the Board or Intervenors determine there is sufficient evidence to support moving to an increasing block rate structure at this time, Halifax Water is not opposed to exploring this possibility.

Rate Requirements

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

In determining the proposed base and volumetric rates for the 2020 Rate Application, revenue stability, rate affordability, and gradualism were considered. When considering how quickly to phase to the cost of service-based rates there are three rate design components to consider: base charges, volumetric charges, and fire protection.

Fire Protection

In the 2015 Rate Hearing, the Board accepted a model recommended by the consultant for the Consumer Advocate – Scott Rubin. The proposed Fire Protection rates are based on that model.

The cost of service studies produced a result that would see Public Fire Protection increase in 2020/21 by $1.0 million or 14.2% and 2021/22 by $0.1 million or 1.4% compared to the current approved Public Fire Protection amount.

Figure 15 – Public and Private Fire Protection

Summary of Proposed Fire Protection			
	2019/20	**2020/21**	**2021/22**
Proposed Public Fire Protection	$7,074,373	$8,077,657	$8,187,775
Proposed Private Fire Protection	$603,909	$745,797	$886,449
Totals per the Rate Studies	**$7,678,282**	**$8,823,454**	**$9,074,224**

Base Charges and Volumetric Charges

Halifax Water prepared three scenarios for the calculation of the rates:

- Scenario 1 – Rate Studies – This scenario is based on the rates calculated using the COS Manual, without any adjustments.
- Scenario 2 - Volumetric Adjustment Only, **WITHOUT** residential smoothing – This scenario maintains the current base charge and adjust only the volumetric charge.
- Scenario 3 - Volumetric Adjustment Only, **WITH** residential smoothing – This scenario uses the rates calculated in Scenario 2 and smooths the required residential increase over the two test years.

Scenario 1 – Rate Studies: This scenario uses the rates as calculated by the Rate Studies. In this scenario, there would be adjustments to base charges and volumetric charges.

The water rate increases range from 0.7% to 18.1% for 2020/21 and 8.1% to 9.3% for 2021/22.

The Wastewater rate increases range from 2.3% to 11.8% for 2020/21 and 4.1% to 5.0% for 2021/22.

The combined water and Wastewater rate increases are from 4.8% to 11.2% for 2020/21 and 5.7% to 6.4% for 2021/22.

The impact on the average residential bill as calculated in the rate studies is 7.2% in 2020/21 and 6.4% in 2021/22.

Figure 16 – Impact on Average Residential Bill as Calculated in Rate Studies

Scenario #1: Cost of service per rate studies, with base charges rounded up to nearest dollar

	Current Rates	Proposed Rates		Changes (year over year)			
		2020/21	2021/22	2020/21		2021/22	
				$	%	$	%
Water							
Base Charge	*$156.00*	*$120.00*	*$132.00*	*($36.00)*	*-23.1%*	*$12.00*	*10.0%*
Consumption Charge	*$156.25*	*$194.34*	*$209.53*	*$38.09*	*24.4%*	*$15.19*	*7.8%*
	$312.25	*$314.34*	*$341.53*	*$2.09*	*0.7%*	*$27.19*	*8.6%*
Wastewater							
Base Charge	*$168.00*	*$192.00*	*$204.00*	*$24.00*	*14.3%*	*$12.00*	*6.3%*
Consumption Charge	*$280.65*	*$309.45*	*$322.43*	*$28.80*	*10.3%*	*$12.99*	*4.2%*
	$448.65	*$501.45*	*$526.43*	*$52.80*	*11.8%*	*$24.99*	*5.0%*
Annual total	**$760.90**	**$815.79**	**$867.96**	**$54.89**	**7.2%**	**$52.17**	**6.4%**

Scenario 2 - Volumetric Adjustment Only, **WITHOUT** residential smoothing: This scenario maintains the base rate at the current level and applies all required rate adjustments to the volumetric rate.

The water rate increases range from 5.2% to 9.4% for 2020/21 and 6.5% to 11.4% for 2021/22, see Figure 23 and Figure 24 below.

The Wastewater rate increases range from 7.0% to 10.5% for 2020/21 and 3.8% to 5.6% for 2021/22, see Figure 25 and Figure 26 below.

The combined water and Wastewater rate increases are from 6.3% to 10.1% for 2020/21 and 4.9% to 7.8% for 2021/22, see Figure 27 and Figure 28 below.

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

The impact on the average residential bill as calculated in the rate studies is 6.3% in 2020/21 and 4.9% in 2021/22.

Figure 17 – Impact on Average Residential Bill Based on Volumetric Adjustment Only, Without Residential Smoothing

Scenario #2: No change in current base charges/ change consumption rate only								
	Current	Proposed Rates		Changes (year over year)			
	Rates	2020/21	2021/22	2020/21		2021/22	
				$	%	$	%
Water							
Base Charge	*$156.00*	*$156.00*	*$156.00*	*$0.00*	*0.0%*	*$0.00*	*0.0%*
Consumption Charge	*$156.25*	*$172.34*	*$193.65*	*$16.09*	*10.3%*	*$21.31*	*12.4%*
	$312.25	*$328.34*	*$349.65*	*$16.09*	*5.2%*	*$21.31*	*6.5%*
Wastewater							
Base Charge	*$168.00*	*$168.00*	*$168.00*	*$0.00*	*0.0%*	*$0.00*	*0.0%*
Consumption Charge	*$280.65*	*$312.28*	*$330.74*	*$31.63*	*11.3%*	*$18.46*	*5.9%*
	$448.65	*$480.28*	*$498.74*	*$31.63*	*7.0%*	*$18.46*	*3.8%*
Annual total	**$760.90**	**$808.61**	**$848.39**	**$47.72**	**6.3%**	**$39.78**	**4.9%**

Scenario 3 - Volumetric Adjustment Only, **WITH** residential smoothing: This scenario uses the rates calculated in Scenario 2 and smooths the required residential increases over the test years.

The water rate increases range from 5.6% to 10.2% for 2020/21 and 5.6% to 9.8% for 2021/22.

The Wastewater rate increases range from 5.9% to 8.9% for 2020/21 and 5.9% to 8.7% for 2021/22.

The combined water and Wastewater rate increases are from 5.8% to 9.4% for 2020/21 and 5.8% to 9.1% for 2021/22, see Figure 18 and 19 below.

Figure 18 – Impact on 2020/21 Combined Rates based on Volumetric Adjustment Only, With Residential Smoothing

Halifax Regional Water Commission
Consolidated Rate Studies - Water and Wastewater Services

Status Quo
(with residential rate smoothing)

Bill Comparisons
2020/21

	Monthly Base Charge			Monthly Commodity Charge			Monthly Combined Bill			Quarterly Combined Bill		
Meter Size	Current	Status Quo Rates	% Change	Current	2020/21 Proposed Rates	% Change	Current	2020/21 Proposed Rates	% Change	Current	2020/21 Proposed Rates	% Change
Unmetered 5/8"	$27.00	$27.00	0.0%	$36.28	$39.95	10.1%	$63.28	$66.95	5.8%	$189.85	$200.85	5.8%
Unmetered 3/4"	$38.00	$38.00	0.0%	$120.44	$132.61	10.1%	$158.44	$170.61	7.7%	$475.33	$511.84	7.7%
Unmetered 1"	$62.00	$62.00	0.0%	$230.78	$254.11	10.1%	$292.78	316.11	8.0%	$878.34	$948.33	8.0%
5/8" - 15mm	$27.00	$27.00	0.0%	$36.28	$39.95	10.1%	$63.28	$66.95	5.8%	$189.85	$200.85	5.8%
3/4" - 20mm	$38.00	$38.00	0.0%	$120.44	$132.61	10.1%	$158.44	$170.61	7.7%	$475.33	$511.84	7.7%
1" - 25mm	$62.00	$62.00	0.0%	$230.78	$254.11	10.1%	$292.78	$316.11	8.0%	$878.34	$948.33	8.0%
1.5" - 40mm	$119.00	$119.00	0.0%	$507.97	$559.33	10.1%	$626.97	$678.33	8.2%	$1,880.92	$2,035.00	8.2%
2" - 50mm	$188.00	$188.00	0.0%	$1,217.30	$1,340.66	10.1%	$1,405.30	$1,528.66	8.8%	$4,215.91	$4,585.99	8.8%
3" - 80mm	$376.00	$376.00	0.0%	$2,798.91	$3,082.24	10.1%	$3,174.91	$3,458.24	8.9%	$9,524.73	$10,374.73	8.9%
4" - 100mm	$585.00	$585.00	0.0%	$4,670.01	$5,142.04	10.1%	$5,255.01	$5,727.04	9.0%	$15,765.04	$17,181.13	9.0%
6" - 150mm	$1,168.00	$1,168.00	0.0%	$14,361.01	$15,816.29	10.1%	$15,529.01	$16,984.29	9.4%	$46,587.03	$50,952.87	9.4%
8" - 200mm	$2,100.00	$2,100.00	0.0%	$16,567.42	$18,241.10	10.1%	$18,667.42	$20,341.10	9.0%	$56,002.26	$61,023.29	9.0%
10" - 250mm	$3,498.00	$3,498.00	0.0%	$15,671.28	$17,254.85	10.1%	$19,169.28	$20,752.85	8.3%	$57,507.85	$62,258.56	8.3%

Figure 19 – Impact on 2021/22 Combined Rates based on Volumetric Adjustment Only, With Residential Smoothing

Halifax Regional Water Commission
Consolidated Rate Studies - Water and Wastewater Services

Status Quo
(with residential rate smoothing)

Bill Comparisons
2021/22

Meter Size	Monthly Base Charge			Monthly Commodity Charge			Monthly Combined Bill			Quarterly Combined Bill		
	Status Quo Rates	Status Quo Rates	% Change	2020/21 Proposed Rates	2021/22 Proposed Rates	% Change	2020/21 Proposed Rates	2021/22 Proposed Rates	% Change	2020/21 Proposed Rates	2021/22 Proposed Rates	% Change
Unmetered 5/8"	$27.00	$27.00	0.0%	$39.67	$43.54	9.8%	$66.67	$70.54	5.8%	$200.01	$211.62	5.8%
Unmetered 3/4"	$38.00	$38.00	0.0%	$130.11	$142.80	9.8%	$168.11	$180.80	7.5%	$504.34	$542.40	7.5%
Unmetered 1"	$62.00	$62.00	0.0%	$251.70	$276.26	9.8%	$313.70	$338.26	7.8%	$941.10	$1,014.77	7.8%
5/8" - 15mm	$27.00	$27.00	0.0%	$39.67	$43.54	9.8%	$66.67	$70.54	5.8%	$200.01	$211.62	5.8%
3/4" - 20mm	$38.00	$38.00	0.0%	$130.11	$142.80	9.8%	$168.11	$180.80	7.5%	$504.34	$542.40	7.5%
1" - 25mm	$62.00	$62.00	0.0%	$251.70	$276.26	9.8%	$313.70	$338.26	7.8%	$941.10	$1,014.77	7.8%
1.5" - 40mm	$119.00	$119.00	0.0%	$545.25	$598.46	9.8%	$664.25	$717.46	8.0%	$1,992.76	$2,152.38	8.0%
2" - 50mm	$188.00	$188.00	0.0%	$1,316.65	$1,445.40	9.8%	$1,504.65	$1,633.40	8.6%	$4,513.96	$4,900.21	8.6%
3" - 80mm	$376.00	$376.00	0.0%	$3,035.38	$3,331.90	9.8%	$3,411.38	$3,707.90	8.7%	$10,234.14	$11,123.69	8.7%
4" - 100mm	$585.00	$585.00	0.0%	$4,968.72	$5,453.41	9.8%	$5,553.72	$6,038.41	8.7%	$16,661.15	$18,115.22	8.7%
6" - 150mm	$1,168.00	$1,168.00	0.0%	$15,816.29	$17,362.82	9.8%	$16,984.29	$18,530.82	9.1%	$50,952.87	$55,592.47	9.1%
8" - 200mm	$2,100.00	$2,100.00	0.0%	$18,241.10	$20,019.59	9.7%	$20,341.10	$22,119.59	8.7%	$61,023.29	$66,358.76	8.7%
10" - 250mm	$3,498.00	$3,498.00	0.0%	$17,254.85	$18,937.60	9.8%	$20,752.85	$22,435.60	8.1%	$62,258.56	$67,306.81	8.1%

The impact on the average residential bill as calculated in the rate studies is 5.8% in 2020/21 and 5.8% in 2021/22.

Figure 20 – Impact on Average Residential Bill Based on Volumetric Adjustment Only, With Residential Smoothing

Scenario #3: No change in current base charges/ rate smoothing for residential customers

	Current Rates	Proposed Rates		Changes (year over year)			
		2020/21	2021/22	2020/21		2021/22	
				$	%	$	%
Water							
Base Charge	*$156.00*	*$156.00*	*$156.00*	*$0.00*	*0.0%*	*$0.00*	*0.0%*
Consumption Charge	*$156.25*	*$173.70*	*$192.29*	*$17.45*	*11.2%*	*$18.59*	*10.7%*
	$312.25	*$329.70*	*$348.29*	*$17.45*	*5.6%*	*$18.59*	*5.6%*
Wastewater							
Base Charge	*$168.00*	*$168.00*	*$168.00*	*$0.00*	*0.0%*	*$0.00*	*0.0%*
Consumption Charge	*$280.65*	*$307.35*	*$335.67*	*$26.70*	*9.5%*	*$28.33*	*9.2%*
	$448.65	*$475.35*	*$503.67*	*$26.70*	*6.0%*	*$28.33*	*6.0%*
Annual total	**$760.90**	**$805.05**	**$851.96**	**$44.15**	**5.8%**	**$46.91**	**5.8%**

In summary, the rates calculated under the three scenarios are presented below, see Figure 21 for 2020/21 are Figure 22 for 2021/22.

Figure 21 – Comparison of 2020/21 Combined Water and Wastewater Quarterly Rates for 3 Scenarios

Halifax Regional Water Commission

Bill Comparisons
Consolidated Rate Studies - Water and Wastewater Services

	2020/21						
Meter Size	Current Quarterly Bill	Rate Studies	% Change	Volumetric No Smoothing	% Change	Volumetric Smoothing	% Change
Unmetered 5/8"	$189.85	$203.53	7.2%	$201.74	6.3%	$200.85	5.8%
Unmetered 3/4"	$475.33	$515.63	8.5%	$514.79	8.3%	$511.84	7.7%
Unmetered 1"	$878.34	$939.60	7.0%	$953.93	8.6%	$948.33	8.0%
5/8" - 15mm	$189.85	$203.53	7.2%	$201.74	6.3%	$200.85	5.8%
3/4" - 20mm	$475.33	$515.63	8.5%	$514.79	8.3%	$511.84	7.7%
1" - 25mm	$878.34	$939.60	7.0%	$953.93	8.6%	$948.33	8.0%
1.5" - 40mm	$1,880.92	$1,998.03	6.2%	$2,047.30	8.8%	$2,035.00	8.2%
2" - 50mm	$4,215.91	$4,580.04	8.6%	$4,614.12	9.4%	$4,585.99	8.8%
3" - 80mm	$9,524.73	$10,376.18	8.9%	$10,440.88	9.6%	$10,374.73	8.9%
4" - 100mm	$15,765.04	$17,199.21	9.1%	$17,294.91	9.7%	$17,181.13	9.0%
6" - 150mm	$46,587.03	$51,827.07	11.2%	$51,285.05	10.1%	$50,952.87	9.4%
8" - 200mm	$56,002.26	$60,945.01	8.8%	$61,431.26	9.7%	$61,023.29	9.0%
10" - 250mm	$57,507.85	$60,256.49	4.8%	$62,642.43	8.9%	$62,258.56	8.3%

Figure 22 – Comparison of 2021/22 Combined Water and Wastewater Quarterly Rates for 3 Scenarios

Halifax Regional Water Commission

Bill Comparisons
Consolidated Rate Studies - Water and Wastewater Services

	2021/22					
Meter Size	Rate Studies	% Change from Prior Year	Volumetric No Smoothing	% Change from Prior Year	Volumetric Smoothing	% Change from Prior Year
Unmetered 5/8"	$215.63	6.4%	$210.74	4.9%	$211.62	5.8%
Unmetered 3/4"	$539.63	6.3%	$539.51	6.4%	$542.40	7.5%
Unmetered 1"	$985.35	5.7%	$1,009.22	6.6%	$1,014.77	7.8%
5/8" - 15mm	$215.63	6.4%	$210.74	4.9%	$211.62	5.8%
3/4" - 20mm	$539.63	6.3%	$539.51	6.4%	$542.40	7.5%
1" - 25mm	$985.35	5.7%	$1,009.22	6.6%	$1,014.77	7.8%
1.5" - 40mm	$2,067.84	5.8%	$2,140.39	6.8%	$2,152.38	8.0%
2" - 50mm	$4,768.92	5.9%	$4,872.58	7.3%	$4,900.21	8.6%
3" - 80mm	$10,823.62	5.8%	$11,058.55	7.4%	$11,123.69	8.7%
4" - 100mm	$17,618.61	5.8%	$18,005.27	7.4%	$18,115.22	8.7%
6" - 150mm	$54,816.98	5.8%	$55,260.29	7.8%	$55,592.47	9.1%
8" - 200mm	$64,457.64	5.8%	$65,950.79	7.4%	$66,358.76	8.7%
10" - 250mm	$63,812.92	5.9%	$66,922.94	6.8%	$67,306.81	8.1%

Halifax Water proposes to smooth the impact of total increase on customers across the two test years, as illustrated below for the average residential customer.

Figure 23 shows the cost effect to a residential customer with an average annual household consumption of 160 cubic meters, which is a decrease from the average consumption of 164 cubic metres the current rates are based on.

Figure 23 – Proposed Rates for Water and Wastewater Service

Percentage split between Base and Consumption Charges						
	Current		*2020/21*		*2021/22*	
Base Charges	*$324.00*	*42.6%*	*$324.00*	*40.2%*	*$324.00*	*38.0%*
Consumption Charges	*$436.90*	*57.4%*	*$481.05*	*59.8%*	*$527.96*	*62.0%*
	$760.90	*100.0%*	*$805.05*	*100.0%*	*$851.96*	*100.0%*

Calculated consumption rates			
	Current	*2020/21*	*2021/22*
Water	*$0.976*	*$1.085*	*$1.201*
Wastewater	*$1.753*	*$1.920*	*$2.097*

Figures 24 and 25 below illustrate the revenue requirements for water and Wastewater Services respectively, the sources of revenue and comparison between Cost of Service and the recommended alternative.

Figure 24 – Comparison of Recommended Alternative for Water Rates to the Cost of Service Revenue Requirements

WATER	2020/21					2021/22				
	Cost of Service Revenue	Current Base Rate	Recommended Alternative	Variance		Cost of Service Revenue	Current Base Rate	Recommended Alternative	Variance	
	$	$	$	$	%	$	$	$	$	%
Calculated Revenues										
Unmetered 5/8"	92,292	96,521	96,919	*(398)*	*-0.4%*	100,280	102,747	102,349	*398*	*0.4%*
Unmetered 3/4"	2,438	2,395	2,409	*(14)*	*-0.6%*	2,664	2,611	2,597	*14*	*0.5%*
Unmetered 1"	10,612	10,431	10,494	*(63)*	*-0.6%*	11,484	11,420	11,357	*63*	*0.6%*
5/8" - 15mm	25,386,413	26,516,971	26,627,105	*(110,134)*	*-0.4%*	27,654,528	28,324,111	28,213,977	*110,134*	*0.4%*
3/4" - 20mm	839,030	825,665	830,402	*(4,737)*	*-0.6%*	920,603	904,023	899,286	*4,737*	*0.5%*
1" - 25mm	2,314,453	2,282,088	2,295,809	*(13,721)*	*-0.6%*	2,508,821	2,501,759	2,488,038	*13,721*	*0.5%*
1.5" - 40mm	3,625,193	3,571,795	3,594,021	*(22,226)*	*-0.6%*	3,941,497	3,938,977	3,916,751	*22,226*	*0.6%*
2" - 50mm	6,096,218	5,807,141	5,846,458	*(39,317)*	*-0.7%*	6,613,334	6,436,945	6,397,628	*39,317*	*0.6%*
3" - 80mm	5,407,292	5,131,636	5,166,964	*(35,328)*	*-0.7%*	5,862,155	5,693,990	5,658,662	*35,328*	*0.6%*
4" - 100mm	2,304,409	2,182,361	2,197,474	*(15,113)*	*-0.7%*	2,501,449	2,428,073	2,412,960	*15,113*	*0.6%*
6" - 150mm	3,017,088	2,793,240	2,813,542	*(20,301)*	*-0.7%*	3,262,157	3,110,538	3,090,237	*20,301*	*0.7%*
8" - 200mm	2,448,804	2,324,792	2,340,852	*(16,060)*	*-0.7%*	2,652,291	2,575,807	2,559,747	*16,060*	*0.6%*
10" - 250mm	93,874	93,080	93,667	*(587)*	*-0.6%*	101,994	102,254	101,667	*587*	*0.6%*
	51,638,116	51,638,116	51,916,116			56,133,256	56,133,256	55,855,256		
Fire Protection	8,823,454	8,823,454	8,823,454			9,074,224	9,074,224	9,074,224		
Total	60,461,570	60,461,570	60,739,570			65,207,480	65,207,480	64,929,480		
Revenue Requirement per Rate Application	60,461,568	60,461,568	60,461,568			65,207,475	65,207,475	65,207,475		
Rounding difference	*2*	*2*	*2*			*5*	*5*	*5*		
Smoothing adjustment			*278,000*					*(278,000)*		

Figure 25 – Comparison of Recommended Wastewater Rates to the Cost of Service Revenue Requirements

WASTEWATER	2020/21					2021/22				
	Cost of Service Revenue	Current Base Rate	Recommended Alternative	Variance		Cost of Service Revenue	Current Base Rate	Recommended Alternative	Variance	
	$	$	$	$	%	$	$	$	$	%
Calculated Revenues										
Unmetered 5/8"	493,216	472,768	467,874	*4,895*	*1.0%*	517,734	491,097	495,992	*(4,895)*	*-1.0%*
Unmetered 3/4"	6,409	6,457	6,374	*83*	*1.3%*	6,688	6,768	6,851	*(83)*	*-1.2%*
Unmetered 1"	23,578	24,363	24,041	*322*	*1.3%*	24,547	25,569	25,892	*(322)*	*-1.3%*
5/8" - 15mm	38,272,837	36,650,487	36,274,901	*375,587*	*1.0%*	40,293,062	38,149,316	38,524,902	*(375,587)*	*-1.0%*
3/4" - 20mm	1,308,458	1,318,150	1,301,258	*16,892*	*1.3%*	1,370,402	1,386,204	1,403,095	*(16,892)*	*-1.2%*
1" - 25mm	3,575,287	3,696,897	3,648,288	*48,609*	*1.3%*	3,727,261	3,884,858	3,933,466	*(48,609)*	*-1.3%*
1.5" - 40mm	5,657,418	5,940,795	5,861,115	*79,680*	*1.3%*	5,912,854	6,262,207	6,341,887	*(79,680)*	*-1.3%*
2" - 50mm	8,973,852	9,375,486	9,243,504	*131,981*	*1.4%*	9,364,190	9,888,246	10,020,227	*(131,981)*	*-1.3%*
3" - 80mm	8,039,904	8,394,685	8,274,697	*119,988*	*1.4%*	8,383,429	8,856,352	8,976,340	*(119,988)*	*-1.4%*
4" - 100mm	3,612,121	3,767,089	3,712,836	*54,253*	*1.4%*	3,770,776	3,981,804	4,036,057	*(54,253)*	*-1.4%*
6" - 150mm	4,199,009	4,336,706	4,272,357	*64,349*	*1.5%*	4,374,184	4,577,670	4,642,019	*(64,349)*	*-1.4%*
8" - 200mm	3,739,881	3,907,749	3,851,510	*56,239*	*1.4%*	3,895,485	4,118,342	4,174,580	*(56,239)*	*-1.4%*
10" - 250mm	147,152	157,490	155,367	*2,122*	*1.3%*	153,257	165,437	167,560	*(2,122)*	*-1.3%*
Total	78,049,121	78,049,121	77,094,121			81,793,869	81,793,869	82,748,869		
Revenue Requirement per Rate Application	78,049,120	78,049,120	78,049,120			81,793,820	81,793,820	81,793,820		
Rounding difference	*1*	*1*	*1*			*49*	*49*	*49*		
Smoothing adjustment			*(955,000)*					*955,000*		

Figure 26, below, illustrates the combined revenue requirements for water and Wastewater, the sources of revenue and comparison between Cost of Service and the recommended alternative.

Figure 26 – Comparison of Recommended Combined Water and Wastewater Rates to the Cost of Service Revenue Requirements

COMBINED	2020/21					2021/22				
	Cost of Service Revenue	Current Base Rate	Recommended Alternative	Variance		Cost of Service Revenue	Current Base Rate	Recommended Alternative	Variance	
	$	$	$	$	%	$	$	$	$	%
Calculated Revenues										
Unmetered 5/8"	585,508	569,289	564,793	*4,496*	*0.8%*	618,014	593,844	598,341	*(4,496)*	*-0.8%*
Unmetered 3/4"	8,847	8,852	8,783	*69*	*0.8%*	9,352	9,379	9,448	*(69)*	*-0.7%*
Unmetered 1"	34,190	34,794	34,535	*259*	*0.7%*	36,031	36,989	37,248	*(259)*	*-0.7%*
5/8" - 15mm	63,659,250	63,167,458	62,902,006	*265,452*	*0.4%*	67,947,589	66,473,427	66,738,879	*(265,452)*	*-0.4%*
3/4" - 20mm	2,147,488	2,143,815	2,131,660	*12,155*	*0.6%*	2,291,005	2,290,226	2,302,381	*(12,155)*	*-0.5%*
1" - 25mm	5,889,740	5,978,985	5,944,097	*34,888*	*0.6%*	6,236,081	6,386,617	6,421,505	*(34,888)*	*-0.5%*
1.5" - 40mm	9,282,611	9,512,590	9,455,136	*57,454*	*0.6%*	9,854,351	10,201,184	10,258,638	*(57,454)*	*-0.6%*
2" - 50mm	15,070,069	15,182,627	15,089,962	*92,664*	*0.6%*	15,977,524	16,325,191	16,417,855	*(92,664)*	*-0.6%*
3" - 80mm	13,447,197	13,526,321	13,441,661	*84,660*	*0.6%*	14,245,584	14,550,343	14,635,002	*(84,660)*	*-0.6%*
4" - 100mm	5,916,529	5,949,450	5,910,310	*39,140*	*0.7%*	6,272,225	6,409,877	6,449,017	*(39,140)*	*-0.6%*
6" - 150mm	7,216,097	7,129,946	7,085,898	*44,048*	*0.6%*	7,636,341	7,688,207	7,732,255	*(44,048)*	*-0.6%*
8" - 200mm	6,188,686	6,232,541	6,192,362	*40,178*	*0.6%*	6,547,775	6,694,149	6,734,327	*(40,178)*	*-0.6%*
10" - 250mm	241,026	250,570	249,034	*1,535*	*0.6%*	255,252	267,692	269,227	*(1,535)*	*-0.6%*
	129,687,237	129,687,237	129,010,237			137,927,125	137,927,125	138,604,125		
Fire Protection	8,823,454	8,823,454	8,823,454			9,074,224	9,074,224	9,074,224		
Total	138,510,691	138,510,691	137,833,691			147,001,349	147,001,349	147,678,349		
Revenue Requirement per Rate Application	138,510,688	138,510,688	138,510,688			147,001,295	147,001,295	147,001,295		
Rounding difference	*3*	*3*	*3*			*54*	*54*	*54*		
Smoothing adjustment			*(677,000)*					*677,000*		

Rate of Return

Section 45 in the Water Utility Accounting and Reporting Handbook - "Amount utility entitled to earn annually" states that every public utility shall be entitled to earn annually such return as the Board deems just and reasonable on the rate base as fixed and determined by the Board for each type or kind of service furnished. These earnings are in addition to such expense as the Board may allow as reasonable and prudent. Halifax Water's current and proposed rates do not include any rate of return over and above the amount required to fund depreciation and debt servicing.

Objectives and Criteria for Developing Revenue Requirements

As indicated in the previous section, a number of factors require Halifax Water to file this Application. Halifax Water is projecting an operating deficit for 2019/20, and increasing deficits in 2020/21 and 2021/22. Expenses, particularly those to support an increased level of capital spending (depreciation and debt servicing), are increasing. This Application is proposed to address the following objectives.

1) Provide sufficient operating revenue for the two test years to cover the operating and non-operating costs for Halifax Water's Water and Wastewater Systems.

2) Provide sufficient operating revenue to accommodate depreciation on additions to Utility Plant in Service.

3) Provide sufficient operating revenue to accommodate increased debt servicing requirements.

4) Provide sufficient operating revenue for the two test years to enable Halifax Water to continue to address its infrastructure deficit and the regulatory compliance issues facing the utility.

5) Recognize an annual increase in customer base of 638 customer connections divided between domestic, industrial, commercial, multi-residential and institutional customers based on the average increase over the past four years.

6) Recognize that other operating costs such as wages, goods and services, energy costs and chemicals have increased in the last four years.

The Application is submitted under the approved COS Manual with some updated to allocations as noted in Appendix 3.

Summary of Compliance with Orders from 2015 Rate Application

The Board's Decision April 14, 2015 regarding the Urban Core Rate Application [2015 NSUARB 71 M06540] directed Halifax Water to carry out a number of specific activities, the status of these activities is described below.

Safety – In the Decision, the Board noted that it "expects HRWC will endeavor to improve its safety culture to reach and potentially exceed, its future targets."

Update: Halifax Water met or exceeded all of the five Corporate Balance Scorecard targets related to safety in 2018/19 and has added another target related to safety for the 2019/20.

Meeting IRP level of spend – the Board accepted Halifax Water's position on delaying, until a review of the IRP, how it will meet future capital funding challenges. This included the need to address climate change and combined sewer outflow issues.

Update: Halifax Water completed an updated IRP in November 2019, that incorporates consideration of climate change mitigation and adaptation and combined sewer outflow issues. Halifax Water has continued to steadily increase the level of capital funding since

the 2015 Rate Application; and will continue to do so until the IRP recommended average, yearly level of spend of $135 million is achieved.

Cost Allocation to Unregulated Activities – the Board directed Halifax Water to fully explore the cost allocation to unregulated activities in the preparation of the next GRA.

Update: Following the 2015 Rate Application, Halifax Water implemented a new time tracking tool to ensure the time and costs associated with any employees working on unregulated activities are charged to the unregulated activity or project. In the 2014/15 fiscal year, Halifax Water started allocating an additional 1% mark-up to salaries and benefits charged to unregulated activities to recoup miscellaneous expenses such as office supplies, photocopying, telephone, etc. The 1% was based on the fact that unregulated revenues represented approximately 1% of Total Revenues; and overhead expenses incurred aside from salaries and benefits are minimal. Unregulated revenues as a percentage of total revenues are currently 1.1% as of 2019/20 therefore no adjustment is required at this time.

Capital Cost Allocation – The Board directed that, in the next GRA, Halifax Water is to provide complete details including all expenses and recoveries, allocation of operating costs to capital, and net costs allocated to revenue requirements.

Update: Since the 2015 Rate Application, a new activity-based costing system was implemented to allocated staff time and costs to capital projects. Information of allocation of operating costs to capital, and any net costs allocated to revenue requirements is included in the Supplementary Budget detail section of this application.

Cost Containment – The Board directed Halifax Water to file annual reports of its efforts to contain operating costs of the utility, no later than June 20 of each year. Within the Decision, the Board also expressed its appreciation in receiving HRWC's first cost containment report, and HRWC's initiatives to contain its operating costs.

Update: Halifax Water has met the annual filing requirements. The most recent report shows the results of cost containment initiatives of an ongoing nature from fiscal years 2013/14 to 2018/19 inclusive. The inclusion of initiatives and amounts from prior years reflects an intentional focus on sustainable results over the long-term. The estimated cost savings for 2018/19 was $5.4 million.

Proposed Rules and Regulations

The proposed Regulations included in Appendix 9 reflect proposed rate and fee adjustments, administrative changes to regulations, and changes to some existing programs.

Some key highlights:

Lead Service Line Replacement – Halifax Water is proposing enhancements to the existing lead service line program to permit replacement of private lead service lines with 100% of the cost borne by the utility in certain situations.

Halifax Water is proposing some new fees and adjustments to existing fees to recover incremental costs from specific customers if the costs are not incurred for the benefit of the entire rate base. For example:

- Manual meter read fee
- Private hydrant inspection fee
- Tapping fees
- Extraneous flow investigation fee

A full description of the proposed changes is listed in a Table of Concordance in Appendix 9.

Order Sought

1. Halifax Water requests approval of the Schedule of Rates, Rules and Regulations for Water, Wastewater, and Stormwater Services as set forth in this Application.

Schedule A

Table of explanatory notes for proposed amendments to the Halifax Water Regulations under section 65 of the *Public Utilities Act*

Section	Explanation
1, 3, 5(1), 7, 11, 18(3), 22, 23, 24, 26, 27, 28(7), 29, 30, 31, 34, 36, 38, 43, 45, 49, 51, 52(6), 54, 59, 60, 61, 70, 72(2), 73, 77(2), 78(4), 78B, 78D, 78H, 79	Housekeeping and cleanup of typographical errors.
3	Removal of definition of Blow Down. Addition of definition of: - Board - Commission Revision of definition of Non-contact Cooling Water.
13	Adjustments to wording to ensure the Commission has the ability to suspend service to any Customer. Addition of 'person or' for consistency.
21	Addition of updated fees and clarification of wording.
23	Removal of section addressing Extra Strength Wastewater Surcharge, which has been moved and implemented into section 65. Addition of Water Service Connection Tapping Connection Fee.
26	Addition of wording to clarify that the Commission can charge for more than two incidents.
27(1)(b)	Removal of dated language.
29(8), 30(8)	Addition of language for clarity.
31A	Addition of section addressing fire hydrant flow testing.
44(a)	Addition of language to clarify prohibited Discharge.
45A	Revisions to clarify the authority of the Commission to require installation of an AMI meter, and to apply a meter read fee where manually-read meters are installed.
51	Removal of subsections da, db, dc, dd, de, addressing lead service line replacement. Please see 51A for detailed provisions regarding lead service line replacement.
51A	Addition of section addressing lead Water Service Connection. Replacement.
52(3)	Removal of redundant language.
52(7)	Removal of reference to externally sourced documents/standards and replaced with language which maintains the Commission's ability to determine appropriate standards and requirements.
54(d)	Addition to clarify that repairs do not include lead service replacement.
65	Revisions to implement operative sections of section 23. Removal of surcharge rates and reference to Attachment 2.

	Addition of load and flow provisions from Attachment 2. Addition of language permitting the Commission to determine costs and fees on a cost-recovery basis as unregulated revenue; to recover costs for the regulated rate base.
70(2)(c)	Removal of reference to externally sourced documents/standards and replaced with language which maintains the Commission's ability to determine appropriate standards and requirements. Correction of capitalization.
71(1)	Inclusion of requirement for the installation of an oil and grease Interceptor.
71(2)	Inclusion of requirement for an Interceptor with at least two compartments. Removal of reference to externally sourced documents/standards and replaced with language which maintains the Commission's ability to determine appropriate standards and requirements.
78(2)	Removal of subsection (2) for the purpose of removing unnecessary and outdated phone numbers. Noted as repealed so as to not interfere with subsection numbering.
Attachment 2	Deleted and noted as repealed so as to not interfere with attachment numbering.

Summary of Changes to Charges and Fees

Section	Type	Current	Proposed
14	Collection of overdue bills	$35/visit	$45/visit
19(1)	Meter installation	$55	$60
21(1)(a)	Service connection inspections	$90	$150
21(2)	Driveway culvert inspections	$90	$150
21(3)	Backflow prevention device inspection	--	$150
23(2)	Extra strength wastewater surcharge	$0.9273 - $1.0951	Cost recovery
23(1)(a)	Tapping connection fees*	--	$375
23(1)(b)	Tapping connection fees*	--	$125 / 25mm
24	Audit inspections and review of drawings	$1.24/m	$2.00/m
25(1)	Missed appointment fee	$45	$55
27(1)(b)	Bulk fill consumption rates - effective September 1, 2020 - effective April 1, 2121	 $2.24 / m^3 $2.24 / m^3	 $2.18 / m^3 $2.40 / m^3
31A(2)	Fire hydrant flow testing fee - one staff attending - two staff attending - more than two staff attending	 -- -- --	 $298 $615 Cost recovery
49(3)	Fees for damage to meters and ERTs* - damaged ERT / wire cut - damaged 5/8" meter - damaged 3/4" meter - damaged 1" or larger meter	 -- -- -- --	 $80 $110 $145 Market price

*Tapping connection fees and damages are currently administered on a cost-recovery basis.

Halifax Water
Halifax Regional Water Commission

ITEM # 4.5
HRWC Board
January 30, 2020

TO: Craig MacMullin, MBA, CPA, CGA,
Chair, and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Louis de Montbrun, CPA, CA,
Director, Corporate Services/ CFO

APPROVED: *Original Signed By:*
Cathie O'Toole, MBA, FCPA, FCGA, ICD.D,
General Manager

DATE: January 16, 2020

SUBJECT: **Proposed 2020 Halifax Regional Water Commission Employees' Pension Plan Budget**

ORIGIN

The Halifax Regional Water Commission Board (the "Board") approves the annual Halifax Regional Water Commission Employees' Pension Plan (the "Pension Plan") budget.

RECOMMENDATION

It is recommended the Board approve the attached proposed 2020 Pension Plan budget covering the period January 1, 2020 to December 31, 2020.

BACKGROUND

The purpose of the 2020 Pension Plan budget, as provided in the attached statement of changes in net assets available for benefits, is to outline the various revenues, contributions and expenses for the Pension Plan for the year ending December 31, 2020.

The 2020 Pension Plan budget enclosed, reports on the defined benefit pension plan established for the employees of the Halifax Regional Water Commission (the "Commission"). Supplemental plans, namely the defined contribution plan and notional

retirement compensation agreements are not reported since budget implications related to these plans are included in the annual operating budget of the Commission.

DISCUSSION

The attached statement of changes in net assets available for benefits provides a comparison between the proposed 2020 budget, the 2019 approved budget, and year end audited results for 2018.

As reported in the attachment, for 2020 the net assets available for benefits are projected to increase by $6.8 million compared to $6.1 million in 2019, and $6.7 million in 2018. This increase is driven by favourable results anticipated related to revenues and contributions, net of expenses.

Revenue:

Revenue for 2020 is budgeted at $6.0 million, representing a $1.6 million (38%) and $1.5 million (32%) increase compared to 2019 and 2018, respectively. Revenue is derived from two (2) primary sources:

- Investment income, and
- Increase in the fair value of investment assets.

The greatest impact in 2020 affecting revenue compared with prior years relates to the projected increase in the fair value of investment assets of $3.0 million. In 2019 the increase was projected at $2.0 million, and for 2018 the reported increase in the fair value of investment assets was $1.8 million. Preliminary unaudited for 2019 show the fair value of investment assets have increased $9.9 million for the eleven (11) month period ending November 30, 2019. Although final results for 2019 are not known, it is anticipated growth and valuations will flatten given historic uncertainty in market conditions. Changes in the fair value of investment assets tend to be more volatile compared to investment income. Increases over the past 5 years have varied dramatically, going from a high of $9.3 million in 2017 to a low $1.8 million in 2018.

Investment income has been relatively consistent in the past, averaging $2.7 million during the three (3) year period 2016-2018. Preliminary unaudited results for 2019 show investment income tracking at $2.8 million for the eleven (11) month period ending November 30, 2019. Investment income budgeted in 2020 of $3.2 million represents a $0.7 million increase compared to 2019, and an increase of $0.3 million compared to 2018. Investment income budgeted for 2020 is based on the continued favourable results of the Halifax Regional Municipality (HRM) Master Trust. For the twelve (12) month period ending September 30, 2019 the Master Trust earned a return of 7%.

Contributions:

Contributions are budgeted at $6.4 million in 2020, representing a decrease $0.2 million (3%) compared to 2019, and an increase of $0.1 million (2%) compared to 2018. As a result of the January 1, 2019 actuarial valuation Pension Plan assets exceeded actuarial liabilities, leaving the Pension Plan in a surplus position. For the Commission this meant it was no longer required to make special annual contributions of $0.8 million to fund the unfunded liability, as was required the previous three (3) years. The reduction in contributions associated with the unfunded liability of $0.8 million are offset in the proposed 2020 Pension Plan budget through increased contributions resulting from net new hires at Commission, normal salary/wage increases, and movement of personnel within salary bands.

The actuarial valuation as at January 1, 2019 established new current service rates for participants and the sponsor. Effective January 1, 2019 both the Commission and employees contribute at a rate of 10.34% of pensionable earnings. Prior to January 1, 2019 employees contributed at a rate of 10.65% of pensionable earnings with the Commission matching those contributions to a rate of 9.85%.

The next actuarial valuation is scheduled for January 1, 2022.

Expenses:

Expenses of $5.6 million are budgeted for 2020, an increase of $0.7 million (15%) compared to 2019, and $1.5 million (38%) compared to 2018. Benefit payments are the main driver of total expenses, and consist of:

1. Benefits payments to pensioners,
2. Termination payments, and
3. Death benefits.

Benefits paid to pensioners increase annually as a result of employees retiring from the Commission, and as a result of indexation provided in the Pension Plan. For 2020 budgeted payments to pensioners increase from $4.0 million in 2019 to $4.6 million based on projected retirements and indexation.

Termination payments and death benefits are difficult to predict. Collectively in 2018 termination and death benefits were under $0.1 million. Unaudited results for the eleven (11) period ending November 30, 2019 total $0.9 million, which is slightly higher than the $0.7 million budgeted. For 2020 the budget has been increased by $0.8 million to a level comparable to projected results for 2019. No death benefits have been budgeted in 2020, consistent with 2018 and 2019.

Administrative expenses account for approximately 3% of the overall budgeted expenses. For 2020 total administrative expenses are $0.2 million which are comparable to 2019 and 2018. Actuarial and consulting fees represent the largest expense within the administrative grouping, showing a decline in 2020 compared to 2019. This is due to additional costs

incurred in 2019 as a result of the actuarial valuation performed. All other expenses are comparable to 2018 and 2017.

ATTACHMENT

Proposed 2020 HRWC Employees' Pension Plan Budget

Report Prepared by: *Original Signed By:*
Allan Campbell, B.Comm, CPA, CMA
Manager, Finance, (902) 490-4288

Halifax Regional Water Commission Employees' Pension Plan
Statement of changes in net assets available for benefits
January 1, 2020 to December 31, 2020

	Actual (Audited) 2018	Approved Budget 2019	**Proposed Budget 2020**
Revenue			
Net investment income:			
Total investment income	$2,939,026	$2,530,000	**$3,240,000**
Investment manager fees	($165,670)	($160,000)	**($230,000)**
Increase in the fair value of investment assets	$1,763,098	$2,000,000	**$3,000,000**
	$4,536,454	$4,370,000	**$6,010,000**
Contributions			
Participants:			
Current service (includes additional voluntary contributions)	$2,845,791	$3,028,000	**$3,236,000**
Sponsors:			
Current service	$2,578,842	$2,745,000	**$3,155,000**
Unfunded liability	$825,200	$825,000	**$0**
	$6,249,833	$6,598,000	**$6,391,000**
Expenses			
Benefit payments:			
Benefit payments	$3,848,218	$3,959,000	**$4,642,000**
Termination payments	$79,849	$700,000	**$800,000**
Death benefit payments	$0	$0	**$0**
	$3,928,067	$4,659,000	**$5,442,000**
Administrative:			
Actuarial and consulting fees	$50,409	$130,000	**$75,000**
Audit and accounting fees	$8,441	$9,000	**$9,000**
Bank custodian fees	$32,303	$25,000	**$25,000**
Insurance	$8,347	$9,000	**$9,000**
Miscellaneous	$16,195	$15,000	**$15,000**
Professional fees	$13,440	$14,000	**$15,000**
Registration fees	$2,337	$3,000	**$3,000**
Training (Trustees/ Administration/ Pension Committee)	$0	$1,000	**$2,000**
	$4,059,539	$4,865,000	**$5,595,000**
Increase in net assets available for benefits	$6,726,748	$6,103,000	**$6,806,000**

Halifax Water
Halifax Regional Water Commission

ITEM # 5
HRWC Board
January 30, 2020

TO: Craig MacMullin MBA, CPA, CGA, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*

Cathie O'Toole, MBA, FCPA, FCGA, ICD.D
General Manager

DATE: January 17, 2020

SUBJECT: **Proposed 2020/21 Business Plan**

ORIGIN

Annual operational requirement in accordance with HRWC Act, and Halifax Regional Municipality Administrative Order 2018-001-ADM

RECOMMENDATION

The Board approve the 2020/21 Business Plan in the substantive form attached and direct the General Manager to submit the annual Business Plan to Halifax Council for approval.

BACKGROUND/DISCUSSION

Halifax Water develops both long-term and short-term business plans for the approval of the Commission Board. The 2020/21 Annual Business Plan reflects the strategic direction in the 5-Year Business Plan (2020/21 – 2024/25) which is also being presented to the Board for approval on January 30, 2020. The annual and 5-Year business plans are consistent with the updated Integrated Resource Plan [IRP] approved by the Board in November 2019.

This annual business plan recognizes the need for further capital investment as contemplated in the updated IRP This year Halifax Water's capital budget is $96.5 million, and for the first time in many years, the capital investment required for water infrastructure is significantly higher than wastewater or stormwater due to the need to upgrade the two primary water supply plants [WSPs] at Pockwock Lake and Lake Major due to a combination of factors such as changes in source water due to lake recovery and age of

some treatment plant components. The budget provides a balanced investment in asset renewal, compliance and growth related projects to support utility operations.

Investments in wastewater treatment facilities over the last 12 years have realized the goal of environmental compliance and in 2020/21 Halifax Water will develop a more detailed plan to upgrade the Harbour Solutions plants to meet the objectives stipulated in the federal Wastewater System Effluent Regulations by 2040.

Investing in research and investigating new technologies is increasingly important. In 2020/21 Halifax Water will realize the vision of expanding the current NSERC Industrial Research Chair with Dalhousie to include a wastewater stream. The last twelve years have realized tremendous benefit from drinking water research and it is expected a focus on wastewater will deliver similar results. 2020/21 will be the first full year of wastewater research as part of a multi-year program focused on plant optimization and contaminants of emerging concern. From the water perspective, research will continue on the effects of lake recovery, lead, geosmin and corrosion control; and water operations will be investigating artificial intelligence for leak detection, pressure management and optimizing distribution operations to prevent breaks.

Technology is transforming all aspects of our business and changing how employees and customers can interact with the organization. Projects like the customer portal, an employee portal via a new payroll system, and a new corporate Enterprise Resource Management (ERM) system will continue to drive significant organizational change; requiring us to focus on enhancing training, professional development, organizational change management and communications.

Over the past three years, Halifax Water has upgraded most customer meters to advanced metering infrastructure [AMI]. This new technology will enable Halifax Water to put water consumption data in the hands of the customer through a Web portal in 2020/21. Detailed information on water consumption will allow refinement of Halifax Water's approach to water loss control to ensure it remains a world leader.

Halifax Water is taking positive actions towards climate adaptation in ensuring the updated Integrated Resource Plan considers climate vulnerabilities to reduce risk to infrastructure and service delivery.

Climate change mitigation is the core driver for implementation of the Cogswell District Energy System as part of the Cogswell redevelopment. This exciting initiative will lead to significant reductions in GHG emissions compared to the business as usual case for new development.

Halifax Water's mission is to provide world-class services for our customers and our environment. Focusing on the environment component of that mission, in 2020/21 the mandate of Halifax Water's Energy Management Committee will be broadened to include GHG emission reduction, developing specific targets and actions for Halifax Water that

support HalifACT 2050. One area of opportunity is anaerobic digestion for treating residual biosolids, to generate renewable gas and continuing to process the residual biosolids into Class A fertilizer for beneficial reuse. This could result in a reduction in conventional fossil fuel use and therefore GHG emissions further mitigating climate change.

The 2020/21 fiscal year will see continued investment to improve existing programs and services. For example, Halifax Water is proposing to expand the lead service line rebate program to enable Halifax Water to meet its goals for lead service line replacement by 2050 by integrating with HRM street renewal projects and by replacing the portion of lead service lines on private property at utility expense.

Customer satisfaction and employee engagement are both fundamental to success of the utility. Halifax Water is entering the 75th year of service with a commitment to continually innovate, improve, and remain cost effective with the understanding of the importance of keeping the cost of services affordable.

ALTERNATIVES

None

ATTACHMENT

1. 2020/21 Annual Business Plan on a Page
2. 2020/21 Annual Business Plan (electronic copy only)

Report Prepared by: *Original Signed By:*
Cathie O'Toole, MBA, FCPA,FCGA, ICD.D
General Manager, 902-490-4840

2020/21 Business Plan

75 YEARS 1945 - 2020

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.

Mission

To provide world class service for our customers and our environment.

Strategic Objectives

Administration

- Obtain by-law and approvals for Cogswell District Energy System
- Operationalize enterprise risk management
- Update Governance Manual and Board reporting
- Train new supervisors, and develop skills for all leaders in providing feedback
- Train all employees on Psychological health and safety
- Enhance customer communications, particularly around water and wastewater rate increases, and stormwater service

Water Services

- Water research program
- Continue Lake Major upgrades
- Initiate Pockwock upgrades
- Assure distribution system water quality during main breaks
- Enhance lead service line replacement program
- Complete Lead service line renewals in conjunction with municipal street renewals
- Complete dam safety review and develop strategy to address findings

Wastewater & Stormwater Services

- Complete first year of WW research and evaluate
- Confirm plan for HHSP upgrades to meet 2040 environmental compliance
- Complete Wet Weather Management projects and explore I&I private side reduction
- Develop level of service standard for odour and strategy to achieve it
- Interface with municipality on flooding issues and stormwater
- Evaluate success of doing large cross culvert work in house

Engineering & Information Services

- NSUARB approval of 2019 IRP
- Optimize capital project delivery and increase % of annual capital budget spent
- Obtain approvals for East/ Central Depot Consolidation
- HRM Cogswell Redevelopment infrastructure relocation
- Water supply plant upgrades
- Deliver key IT projects (payroll, customer portal, ERP)
- GIS update of impervious area
- Implement risk based condition assessment and decision making tools for asset management

Regulatory Services

- NSUARB approval of updated Regional Development Charge
- Commence corporate implementation of EMS
- Maintain regulatory compliance and enhance reporting
- Ensure large water plants have NSE approvals or permission to operate
- Implement new permitting system for Engineering Approvals
- Evaluate ISO45001 (safety) certification and complete physical security audit
- Discuss point of sale disclosures with NS Real Estate Commission

Corporate Services

- NSUARB approval of increases for water, and wastewater rates and various fees and charges
- Review stormwater service, costs, impervious area, rates
- Develop a strategy to meet IRP recommended level of spend
- Implement Customer Portal and enhance customer experience
- Transition bill printing to HRM print shop, redesign the bill, and offer monthly customer billing
- Select new ERP system and update business processes

STRAIGHT from the SOURCE

Halifax Water

DRAFT

2020/21 Annual Business Plan

Presented to Halifax Water Board

January 30, 2020

75 YEARS 1945 - 2020

STRAIGHT from the SOURCE

Halifax Water

Glossary

AMI	Advanced Meter Infrastructure
AM	Asset Management
AMP	Asset Management Plan
BPF	Biosolids Processing Facility
CBS	Corporate Balanced Scorecard
CCC	Capital Cost Contribution
DES	District Energy System
DOE	Department of Energy
E&IS	Engineering & Information Services
EMAP	Energy Management Action Plan
EMS	Environmental Management System
ERM	Enterprise Risk Management
ERP	Enterprise Resource Planning
GIS	Geographic Information System
H2O	Help to Others (Program)
HHSP	Halifax Harbour Solutions Plant
HRM	Halifax Regional Municipality
HRWC	Halifax Regional Water Commission
I&I	Inflow and Infiltration
IFRS	International Financial Reporting Standards
IRP	Integrated Resource Plan
IS	Information Services
IT	Information Technology
NOM	Natural Organic Matter
NSE	Nova Scotia Environment
NSERC	Natural Sciences and Engineering Research Council
NSPI	Nova Scotia Power Incorporated
NSUARB	Nova Scotia Utility and Review Board
OI	Organizational Indicator
RDC	Regional Development Charge
RDII	Rain Derived Inflow and Infiltration
RF	Radio Frequency
SCADA	Supervisory Control and Data Acquisition
SSES	Sanitary Sewer Evaluation Survey
UV	Ultraviolet
WRWIP	West Region Wastewater Infrastructure Plan
WSER	Wastewater System Effluent Regulations
WSP	Water Supply Plant
WWTF	Wastewater Treatment Facility

Table of Contents

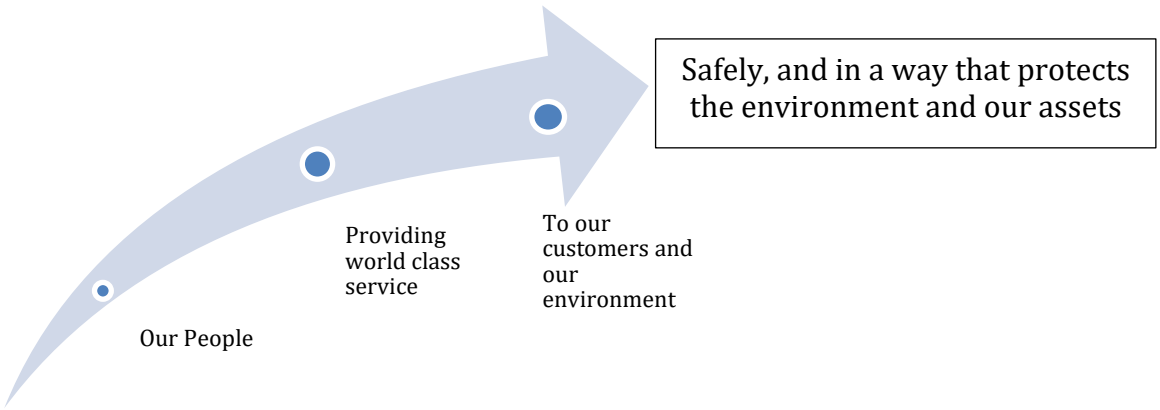
APPENDICIES

1. INTRODUCTION

January 1, 2020 marks 75 years of service for Halifax Water. Halifax Water has grown from the Halifax Public Service Commission established in 1945 to provide water service to the city of Halifax; to an integrated water, wastewater and stormwater utility serving 105,000 customers and an estimated population of 370,000.

Halifax Water has ambitious plans for continued innovation and improvement in 2020/21.

Figure 1 – Halifax Water Mission Graphic



Halifax Water's mission is **to provide world class services for our customers and our environment**; and the vision of how this will be accomplished is threefold:

1. We will provide our customers with high quality water, wastewater and stormwater service.
2. Through the adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance and stewardship of the environment.
3. We will fully engage employees through teamwork, innovation and professional development.

The organizational values were developed by employees working on Civility and Respect in the Workplace, and were accepted by the Halifax Water Board in December 2019. The vision, mission and values are shown in Appendix A.

Halifax Water has well established strategies that guide development of business plans, capital and operating budgets; and rate: The 2019 Integrated Resource Plan (IRP), the Debt Strategy, and Cost of Service Manual (COSM).

Halifax Water is working on a strategy to increase the level of capital expenditures to eventually reach the level recommended by the IRP to address the strategic drivers of asset renewal, growth, and regulatory compliance. Of the three strategic drivers included in the

IRP, asset renewal will present the greatest challenge recognizing the backlog of investments in relation to the replacement of aging infrastructure.

With thirteen years of experience operating as a "one water" utility delivering integrated water, wastewater and stormwater service, Halifax Water is well positioned to continue its tradition of stewardship.

Halifax Water delivers service through five departments; Water Services; Wastewater and Stormwater Services; Corporate Services, Engineering and Information Services; and Regulatory Services, with Administration led by the General Manager, who is responsible for overall administration of the utility. The organization structure is detailed within Section 3 and illustrated in Appendix B.

The 2020/21 fiscal year is the first year of the Five-Year Business Plan approved by the Halifax Water Board in January, 2020.

2. EXECUTIVE SUMMARY

Halifax Water develops both long-term and short-term business plans for the approval of the Commission Board. The 2020/21 Annual Business Plan reflects the strategic direction in the Five-Year Business Plan (2020/21 – 2024/25) which is also being presented to the Board for approval on January 30, 2020. The Annual and Five-Year Business Plans are consistent with the updated IRP approved by the Board in November 2019.

This annual business plan recognizes the need for further capital investment as contemplated in the updated IRP. This year Halifax Water's capital budget is $96.5 MM, and for the first time in many years, the capital investment required for water infrastructure is significantly higher than wastewater or stormwater due to the need to upgrade the two primary water supply plants ((WSPs) at Pockwock Lake and Lake Major due to a combination of factors such as changes in source water due to lake recovery and age of some treatment plant components. The budget provides a balanced investment in asset renewal, compliance and growth-related projects to support utility operations.

Investments in wastewater treatment facilities over the last 12 years have realized the goal of environmental compliance and in 2020/21 Halifax Water will develop a more detailed plan to upgrade the Halifax Harbour Solutions plants (HHSP) to meet the objectives stipulated in the federal Wastewater System Effluent Regulations by 2040.

Investing in research and investigating new technologies is increasingly important. In 2020/21, Halifax Water will realize the vision of expanding the current NSERC Industrial Research Chair with Dalhousie to include a wastewater stream. The last twelve years have realized tremendous benefit from drinking water research and it is expected a focus on wastewater will deliver similar results. 2020/21 will be the first full year of wastewater research as part of a multi-year program focused on plant optimization and contaminants of

emerging concern. From the water perspective, research will continue on the effects of lake recovery, lead, geosmin and corrosion control; and water operations will be investigating artificial intelligence for leak detection, pressure management and optimizing distribution operations to prevent breaks.

Technology is transforming all aspects of our business and changing how employees and customers can interact with the organization. Projects like the web portal for customers, an employee portal via a new payroll system, and a new corporate Enterprise Resource Management (ERM) system will continue to drive significant organizational change; requiring us to focus on enhancing training, professional development, organizational change management and communications.

Over the past three years, Halifax Water has upgraded most customer meters to advanced metering infrastructure (AMI). This new technology will enable Halifax Water to put water consumption data in the hands of the customer through a web portal in 2020/21. Detailed information on water consumption will allow refinement of Halifax Water's approach to water loss control to ensure it remains a world leader.

Halifax Water is taking positive actions towards climate adaptation in ensuring the updated IRP considers climate vulnerabilities to reduce risk to infrastructure and service delivery.

Climate change mitigation is the core driver for implementation of the Cogswell District Energy System as part of the Cogswell redevelopment. This exciting initiative will lead to significant reductions in GHG emissions compared to the business as usual case for new development.

Focusing on the environment component of the mission, in 2020/21 the mandate of Halifax Water's Energy Management Committee will be broadened to include GHG emission reduction, developing specific targets and actions for Halifax Water that support HalifACT 2050. One area of opportunity is anaerobic digestion for treating residual biosolids, to generate renewable gas and continuing to process the residual biosolids into Class A fertilizer for beneficial reuse. This could result in a reduction in conventional fossil fuel use and therefore GHG emissions further mitigating climate change.

The 2020/21 fiscal year will see continued investment to improve existing programs and services. For example, Halifax Water is proposing to expand the lead service line rebate program to enable Halifax Water to meet its goals for lead service line replacement by 2050 by integrating with HRM street renewal projects and by replacing the portion of lead service lines on private property at the utility's expense.

Customer satisfaction and employee engagement are both fundamental to success of the utility. Halifax Water is entering the 75th year of service with a commitment to continually innovate, improve, and remain cost-effective with the understanding of the importance of keeping the cost of services affordable.

From a corporate perspective, the utility will focus on several challenges and opportunities next year, namely:

1. **Implementation of the updated IRP and optimization of the processes used to plan, procure, and deliver capital projects:** The current water, wastewater and stormwater rates are insufficient to meet the funding requirement identified in the IRP. The IRP acknowledges that wastewater and stormwater assets have been grossly underfunded historically. Institutional capacity will have to be optimized over the term of this Business Plan in order to deliver the expected capital projects; and the processes used to plan, procure and deliver capital projects will be reviewed to achieve a target of spending 80 – 90% of the annual capital budget within the year it is approved. This is an aggressive target, given the multi-year nature and complexity of some of Halifax Water's capital projects and the relationship to the HRM capital program.

2. **Enhanced Customer Service:** Investment in employee training and technology are key to enhancing customer service. With the completion of installation of advanced meter infrastructure as part of the Customer Connect Project in 2020; Halifax Water is now focused on building and implementing a web portal for customers. The expectations of customers are increasing rapidly and the adoption of new technologies and business process is paramount to provide the expected level of customer service. Halifax Water has and will continue to invest in enhancing integration and functionality of existing systems Geographic Information System (GIS), Computerized Maintenance Management Systems (CMMS), the telephony system, and Customer Relationship Management (CRM) to enhance the customer experience through its Customer Care Centre. Greater emphasis will be placed on measuring customer satisfaction, and utility performance relative to customer centric service levels.

3. **Lead Line Replacement Program:** The utility will further enhance its program to replace all lead service lines (LSLs) on the Halifax peninsula and downtown Dartmouth areas by increasing the level of financial assistance, and pushing for more integration of LSL replacements in conjunction with the HRM street renewals. This is based on industry best practice and recent research conducted in partnership with Dalhousie University. As Halifax Water is in the health protection business, complete lead service line renewal will be pursued for public health outcomes.

4. **Wet Weather Management:** The level of service offered by the utility can be increased if innovative business processes and technology are embedded in day to day operations for the ultimate protection of the environment. Managing the effects of wet weather, and reducing inflow and infiltration (I&I) are key to creating capacity within existing infrastructure and avoiding some future capital costs. In addition to making continued investment in the wet weather management program, next year Halifax Water will be exploring new programs and tools to work with

customers to address I&I issues on private property. It is estimated that more than 50% of I&I originates from private property.

5. **Employee Satisfaction:** In the next five years many of Halifax Water's workforce will be eligible to retire. To compete, attract and retain top talent, in addition to providing competitive wages and benefits, Halifax Water must strive to create a respectful work environment where employees are fully engaged through teamwork, innovation and professional development. Continued investment in improving internal communications, talent management, training, civility and respect in the workplace, and diversity will help create the kind of work environment where our employees are engaged and provide service safely, and in a way that protects the environment, our assets, and always keeps the customer in mind.

6. **Regulatory Compliance:** 2020/21 will see the implementation of a new system to track regulatory compliance and support regulatory compliance activities. In addition to improved systems and processes to support environmental regulatory compliance, a new payroll system being implemented in 2020/21 will have future functionality that will promote Occupational Health and Safety (OHS) through tracking of training and certifications required by employees.

7. **Environmental Stewardship:** Halifax Water's updated IRP contains projects that will help the utility with climate change adaptation and mitigation. Recent research indicates that climate change is accelerating, as evidenced by projections of sea level rise, more intense storm events, and changing precipitation patterns. Our environmental stewardship will also be enhanced through extension of the Environmental Management System (EMS) (ISO 14001) on a corporate wide basis. The EMS will help minimize the impact our operations have on the environment, and promote compliance with applicable laws, regulations, and other environmentally oriented requirements.

8. **Water and Wastewater Research:** Building on the success of the current drinking water research program with Dalhousie University, Halifax Water is expanding the program to include wastewater to ensure that treatment plants are optimized and upgraded to meet the current federal wastewater regulations at the lowest cost. Wastewater research focused on optimizing treatment processes and dealing effectively with contaminants of emerging concerns (CEC) may help Halifax Water reduce what is estimated to be a $425 M cost to upgrade the three HHSP from advanced primary to secondary treatment.

9. **Technological Investment:** Halifax Water's Five-Year IT Strategic Plan calls for continued investment in core operating systems. In 2020/21 Halifax Water will be going live with a new payroll solution (including an employee portal), and a web portal for customers. A project to implement a new Enterprise Resource Planning system (ERP) will be underway, and will continue to make investments in

foundational security projects that support cyber-security, continuity of service and protection of data.

10. **Enterprise Risk Management:** 2020/21 will be the first year that Halifax Water is using a formalized ERM framework to track and report risks to the Halifax Water Board.

From a departmental perspective, Strategic Objectives for 2020/21 are shown below.

Water Services

- Water research program – continued research on understanding and adapting to lake recovery, and distribution system water quality
- Continue Lake Major WTP upgrade program to address lake recovery and address identified upgrade requirements
- Initiate the process to upgrade Pockwock to a conventional plant including upgrades to address changing water quality
- Improve processes to assure maintenance of distribution system water quality during water main breaks
- Obtain NSUARB approval to enhance the Lead service line program, and increase integration with municipal street renewals
- Complete lead service line renewals in conjunction with municipal street renewals in 2020/21
- Complete Dam safety review and develop strategy to address findings on a priority basis.

Wastewater and Stormwater Services

- Complete the first full year of WW research on plant optimization, assess success and report to the Halifax Water Board
- Confirm the timeline and nature of HHSP upgrades leading to WSER Compliance
- Wet weather management – Complete planned projects for 2020/21 and explore opportunities to implement programs to reduce I&I on private property
- Complete the RFP process for Bio-solids and resource recovery
- Odour Issues – develop level of service and strategy to achieve level of service
- Flooding Issues – continue to regularly interface with the municipality to mitigate flooding
- Stormwater Services – evaluate success of doing large cross culvert replacements in house, and identify other similar opportunities

Regulatory Services

- Commence corporate implementation of EMS
- Obtain approval for revised Regional Development Charge (RDC)
- Maintain regulatory compliance and enhance tracking and reporting
- Obtain larger water plant approvals, or continued permission to operate
- Implement new permitting system for Engineering approvals
- Evaluate possible ISO 45001 certification (safety), and complete physical security audit
- Complete discussions with NS Real Estate Commission re: point of sale process to promote disclosure and resolution of issues at point of sale.

Engineering & Information Services

- File updated IRP with NSUARB and gain acceptance of NSUARB and stakeholders
- Optimize capital project delivery and show improvement over prior year % of annual capital budget spent (CBS target – annually spend 80% - 90% of annual capital budget)
- Finalize business case and approval for East/Central Depot Consolidation
- HRM Cogswell Area Redevelopment Infrastructure Relocation
- Water Supply Plant Upgrades JDK and Lake Major
- Deliver significant IT projects – new payroll system, Customer Portal, and ERP
- Implement enhanced RISK based condition assessment & improved decision making tools for asset management
- Update satellite imagery and impervious area data in GIS and implement business process to ensure it remains current

Corporate Services

- Obtain increases for water and wastewater rates, and various fees and charges
- Update impervious area and review stormwater service, costs and rate structure
- Develop a plan and timeline to meet IRP level of spend
- Implement a web portal for customers and enhance customer experience – complete remaining AMI installs, reduce call wait time and abandonment rates. Enhance integrations between Customer Care Centre and operations, and set measures for service levels and targets for customer satisfaction.
- Evaluate the transition of bill printing to the HRM print shop, redesign the bill, and plan to offer monthly customer billing

- Select new ERP system and finalize updated business processes
- Update funding strategies, including implementing an updated RDC, new rates for water and wastewater services, and new fees and charges including a manual read fee for non-radio frequency (RF) customers

Administration

- Seek municipal by-law for mandatory connection and obtain Halifax Water Board, and NSUARB approvals for Cogswell District Energy
- Seek approval for HRWC Act Amendments (limitation of liability for Cogswell DES, and a few housekeeping items)
- Implement updated Governance Manual, and improved Board reporting
- Implement Enterprise Risk Management, hire ERM & Internal Audit Coordinator and develop processes to update and report on risk
- Talent Management – Train all supervisors in providing feedback, and conduct front line supervisory training for new supervisors and future leaders
- Employee engagement – Train all employees on psychological health and safety, and develop and implement action plan based on 2019 Employee Survey results
- Enhance customer communications, particularly around rate increases, and stormwater service

In order to maintain operations and achieve the strategic objectives next year, Halifax Water will have to increase rates. Annual revenues will need to increase with the primary focus on the capital needs driven by asset renewal. This will be the first increase in rates since April 1, 2016; as Halifax Water has been able to provide stable rates for over four years. A water and wastewater rate application is planned for February 2020, with new rates requested for September 1, 2020. An application to adjust stormwater rates is planned for the fall of 2020 with new rates to take effect April 1, 2021.

Halifax Water is not alone in its quest for increasing, and more sustainable funding. Unfortunately, water, wastewater and stormwater assets have been underfunded throughout North America, and other municipalities/utilities have made, or are making plans to increase rates. The projected rate increases associated with this business plan will be viewed in the context of customer affordability, with a goal of maintaining an average annual residential bill for water, wastewater and stormwater service that is less than 2% of median household income. The utility is proposing to continue with the H20 (Help to Others) Program to support low income customers, with funding from unregulated activities; and hopes to increase the funding, awareness, and utilization of this program.

Inherent in the business activities for Halifax Water is an obligation to provide value for customers as stewards of essential services. To that end, the Business Plan highlights very formal programs to deliver efficient and effective service through Enterprise Risk Management, Asset Management, Energy Management, Wet Weather Management, and the Cost Containment Program. The Wet Weather Management program, in particular, presents an opportunity to improve service delivery at a lower cost and has already shown positive results. A structured approach is in place, which is similar to the process used by the utility for water loss control. Halifax Water is recognized as a world leader in water loss control and the corporate goal is to put wet weather management in the same category.

The 2020/21 Business Plan provides an overview of the services provided by Halifax Water and an overview of the operating and capital budgets to support the delivery of these services. The Business Plan projects an operating deficit of $15.9 M, as indicated in the operating budget summary in Figure 2, and reflects the rates most recently approved by the NSUARB. The current water and wastewater rates became effective on April 1, 2016 and the stormwater rate structure came into effect on July 1, 2017.

Although a loss is indicated for 2020/21 and new rates will not come into effect before fall 2020, the utility has accumulated operating surplus which will be used to support continued operations until rates are adjusted.

Figure 2 – Operating Budget Summary

Operating Budget Summary (in thousands)

	Actual 2018/19	Approved Budget 2019/20	**Proposed Budget 2020/21**	Budget/Budget Variance (Unfavourable)
Operating Revenue	$138,413	$138,727	$138,618	($109)
Operating Expenses	$105,731	$115,088	$118,110	($3,022)
Operating Surplus	$32,682	$23,639	$20,508	($3,131)
Financial Revenue	$1,898	$1,369	$619	($750)
Financial Expenses	$33,190	$33,374	$37,076	($3,701)
Net Surplus (Deficit)	$1,390	($8,366)	($15,949)	($7,583)

The utility faces pressures associated with asset renewal and growth-related infrastructure, as described in the 2019 IRP and discussed in Section 5.13 of this document. Halifax Water continues to increase its investment in growth related infrastructure and with funding from the RDC, will continue focus on Inflow and Infiltration reduction in the Halifax area to increase wastewater trunk sewer capacity. In 2019, Halifax Water submitted an application through the Investing in Canada Infrastructure Program to leverage funding for upgrades to water transmission mains on the Halifax peninsula; which was not accepted. This application will be put forward again when the opportunity arises. The capital budget

provides a comprehensive investment across all asset classes of $96,514,000 M as outlined in Section 4.1.

3. SERVICE OVERVIEW

3.1 Water Services

The Water Services Department is responsible for operating and maintaining the municipal water system "from source to tap". The Water Services Department also provides Supervisory Control and Data Acquisition (SCADA) and process control services for all of Halifax Water. This department is organized to maintain and operate the water system as a holistic system, with managers assigned accountability for clearly defined aspects of the water system. The Water Services Department provides the following services:

- **Source Water Protection:** Managing and protecting watershed land, developing and maintaining source water plans, enforcement of Protected Water Area and other relevant source water regulations, source water community relations including working with and developing watershed advisory boards, real property maintenance of source water lands, and forestry management of watershed lands.

- **Water Quality Management:** Water quality planning, water quality monitoring, process support to treatment plants, customer inquiries and investigations, water quality support to capital projects, policy development, research and management of the Halifax Water – Natural Sciences and Engineering Research Council (NSERC) Industrial research chair at Dalhousie University.

- **Water Supply Plant Operations:** Operation and maintenance of 3 large water supply plants (Pockwock, Lake Major and Bennery Lake), 6 small systems, 6 dams, 2 emergency water supplies and 22 chlorine monitoring devices and rechlorination stations.

- **Distribution System Operations:** Operation and maintenance of the water distribution and transmission systems. The system is managed according to three geographic regions with responsibility for over 1558 km of transmission and distribution mains, 8400 fire hydrants, 85,000 service connections, 143 pressure control/flow metering facilities, 21 pumping stations, 16,000 valves and 16 water storage facilities. This also includes responding to third party requests for buried infrastructure locates.

- **Technical Services:** Operation and maintenance of the SCADA system and the process communications network; implementation of the SCADA Master Plan, process control cyber security, instrumentation maintenance, electrical maintenance, maintenance of water pumping stations, and operation and development of the process data warehouse.

Water Services is also working with Corporate Services in the planning and implementation of Customer Connect, our project to convert to AMI. Further, embedded within the department, Water Services is responsible for the following major programs.

- **Water Loss Control:** Halifax Water was the first utility in North America to adopt the International Water Association (IWA) methodology for managing leakage in the distribution system. Efforts save $650,000 per year in treatment chemical and electricity costs and have reduced water main breaks by 20%, saving $500,000 in repair costs annually. The program has won several national awards and Halifax Water staff are in demand to share expertise with industry and other utilities.

- **NSERC - Halifax Water Industrial Research Chair in Water Quality and Treatment:** This program, carried out in partnership with Dalhousie University over the last ten years, has realized significant operational savings, improved water quality and influenced Halifax Water policy. The Research Chair has produced 120 peer reviewed research papers in world recognized scientific journals over the last eleven years and has allowed Halifax Water to become industry recognized leaders in areas such as lead service line replacement and biofilm control in distribution systems. Several Halifax Water employees were trained as students under the Research Chair. Halifax Water and Dalhousie were awarded a third five-year term for the Research Chair, effective April 1, 2017.

- **Lead Service Line Replacement Program:** In September 2016, the Halifax Water Board approved an initiative which will see all lead service lines replaced by 2050. Enhancements to the program are proposed for 2020. This program is discussed in more detail in Section 5.9 and is being developed and implemented by the Water Quality division in the Water Services Department.

3.2 Wastewater/Stormwater Services

The Wastewater and Stormwater Services Department is responsible for operating and maintaining municipal systems from “drains back to the source again”. In this regard, the Wastewater and Stormwater Services Department has a mandate to protect the environment while providing essential collection and treatment services to its customers. The department also provides corporate Fleet and Building Services. These essential services are delivered through seven managers who are responsible for both stormwater and wastewater activities in three regions and fourteen treatment facilities. The supervisors and the field crews carry out both wastewater and stormwater related duties.

3.2.1 Wastewater Services

Wastewater Services strives to provide uninterrupted delivery of the following services:

- **Wastewater Treatment Facility Operations:** Operation and maintenance of 14 wastewater treatment facilities (WWTFs) and associated infrastructure, regulatory reporting, and implementing and coordinating capital upgrades with other Halifax Water departments. As per the Wastewater System Effluent Regulations; 2 plants are classified as very large, 3 are large, 2 are medium and 9 are small capacity. The department also operates 4 additional small treatment facilities under contract from Halifax Regional Municipality (HRM) and the province.

- **Biosolids Processing:** Liquid transport, dewatering and processing of sludge, operation and maintenance of various dewatering equipment at WWTFs, administering trucking contracts for dewatered biosolids and biosolids processing facility (BPF) operations contract, and processing of biosolids from on-site septic systems. The BPF, located at the Aerotech Industrial Park, produces a soil amendment for beneficial use in agriculture. Staff from WWTF operations carry out these related activities.

- **Collection System Operations:** Operation, repair and maintenance of the wastewater collection and trunk sewer system. The system is managed according to three geographic regions with responsibility for over 1425 km of collection pipes, 167 Pump Stations, 21 Combined Sewer Overflow facilities and 85,000 service connections.

- **Septage Treatment Services:** This is an unregulated activity for Halifax Water, but it provides an essential service to residents who do not have a centralized wastewater service. The septage from septic hauling companies who service these users was accepted at strategic locations within the core sewer service area and at the Aerotech WWTF. With the completion of the upgrade of Aerotech WWTF in 2019, most of the septage has been diverted to the Aerotech WWTF from the core service area.

- **Fleet and Building Maintenance Services:** Maintenance and repair of approximately 236 vehicles ranging from smaller utility vehicles to large excavation equipment, replacement of vehicles on a life cycle costing basis, and vehicle records management. This section of the department is also responsible for maintenance and physical security of corporate buildings and any other logistical support required for efficient operation of the department.

3.2.2 Stormwater Services

The Stormwater Services division is responsible for operation and maintenance of stormwater infrastructure within the public right of way or within easements. This service has undergone significant changes over the past two years and continues to progress to achieve a higher level of service.

- **Collection System Operations:** Operation, repair and maintenance of the stormwater collection and trunk sewer system. The system is managed by shared crews with Wastewater Services within the three geographic regions with responsibility for approximately 900 km of stormwater collection pipes, 45 stormwater retention facilities and over 600 km of ditches, 2337 cross culverts and 16,000 driveway culverts.

- **Service Review:** With the creation of the Stormwater Engineer position within the Regulatory Services department, resources are allocated to drainage investigations, stormwater billing exemption requests, and operations support. Drainage investigations may be triggered by a customer inquiry on private property or an operational issue on Halifax Water owned infrastructure. The Stormwater Engineer reviews the drainage issues and renders a position which may involve an operational fix or a capital improvement. Complaints stemming from stormwater billing are vetted through the Stormwater Engineer and a decision is provided to the Customer. As per the direction of the NSUARB, Halifax Water has engaged the services of a Dispute Resolution Officer (DRO) to independently review appeals and render an independent decision on any disputed utility decisions.

3.3 Engineering and Information Services

The Engineering & Information Services (E&IS) Department is responsible for the provision of engineering and technical services relating to the planning, design, construction, and maintenance of water, wastewater and stormwater infrastructure and related asset information. E&IS also provides and supports the hardware, software, application development and related services for the electronic business applications required to support the utility.

The E&IS Department has four core areas of responsibility and seven specific operational sections delivering programs. The four core areas of responsibility are Asset Management, Infrastructure, Energy Efficiency and Information Management.

Asset Management: Is responsible for development of the Asset Management program (including the overall strategy, inventories, condition and performance assessments), and the development and delivery of annual Asset Management Plans (AMP). The section is also responsible for modelling and flow monitoring, long-term infrastructure master planning

(including implementation of the IRP, and the development of the 5-Year and 1-Year Capital Budget.

Infrastructure: The Infrastructure section contains three groups that are responsible for the design, construction and project management for water, wastewater and stormwater capital projects, respectively. These three sections also provide support for capital project prioritization, master planning and asset management relating to the core infrastructure.

Energy Efficiency: s responsible for the provision of engineering services related to energy management and energy efficiency of water, wastewater and stormwater infrastructure.

Engineering Information: Is responsible for the corporate GIS, including the maintenance and distribution of all record information. The section is also responsible for on-going GIS development including both desktop and mobile GIS applications. This section also supports capital projects and other initiatives through Computer Aided Drafting (CAD) and map production.

Information Services: Is responsible for administration of services relating to network resources (storage, servers, printers, etc.), users, access control and network security, server hardware and operating systems. All computer equipment is managed by the IS section. This includes desktops, laptops, monitors, printers and servers. The IS section is the first line of support for all information technology (IT) related problems or requirements. The corporate desktop software is administered by the IS section. The IS section is responsible for the updating and delivery of the IT Strategic Plan including all IT project delivery services.

3.4 Regulatory Services

The Regulatory Services Department continues to support the corporation through the delivery of programs such as Environmental Engineering, Engineering Approvals, Regulatory Compliance, Safety and Security, Stormwater Engineering and Environmental Management System (EMS).

Environmental Engineering: Is responsible for two key programs, Pollution Prevention (P2) and Inflow and Infiltration (I&I) reduction. This past year members of the section have been providing support for updating Nova Scotia Environment (NSE) permits to operate.

Pollution Prevention: Is responsible for promoting compliance of waste discharges with the Rules and Regulations, through education and inspections. The Pollution Prevention section coordinated the repairs of five cross connections this past year and providing remedy for a new one in the last quarter of 2018/19. The section has developed a list of medium to high risk customers that, by the nature of their operations, may generate wastes that are harmful to the wastewater collection systems. The section is also using incident data from CityWorks to help focus Pollution Prevention efforts.

I&I: The I&I section assists the Wet Weather Management Program in locating and addressing private side sources of inflow and infiltration of stormwater into the wastewater systems. Two of Halifax Water's small wastewater treatment facilities, Springfield Lake and Uplands Park are subject to wet weather flows that can impact compliance with NSE operating permits. The section is finalizing investigations in both areas and required follow up inspections will continue in to the coming year.

In conjunction with an upcoming capital project on Wanda Lane and Tobin Drive in Dartmouth, the existing sanitary system will be converted to a dedicated stormwater system and a new wastewater system will be installed. As lead up to the project, a stakeholder consultation program is underway. The consultation is to promote the connection of private stormwater components (i.e. sump pumps and footing drains) to the new dedicated stormwater system.

Lake Major and Silver Sands Water Supply Systems required renewals of their associated water withdrawal permits. Those applications relating to the *NSE Permits to Operate* are currently being reviewed by NSE. The following water withdrawal permits will expire this coming year:

- Collins Park
- Lake Lamont
- Middle Musquodoboit
- Bennery Lake

Given the nature and complexity of the withdrawal permit renewal for Pockwock/Tomahawk Lake (expiry 2021), planning and preliminary work commenced in 2019/20.

Engineering Approvals: Is responsible for reviewing extensions of existing infrastructure, requests for new service connections, and enforcement of Halifax Water's design standards and specifications. The Engineering Approvals section continues to be engaged with HRM as the municipality continues to implement its Regional Plan, updated in 2014, and on the completion of its Centre Plan. The section continues to provide technical support as it relates to central services for new development. Last year, Halifax Water project managed the Local Wastewater Collection System Assessment for the municipality in support of the potential growth within the city centre and has delivered the final report for the municipality's use. Subsequently, the section has commenced discussions on the implementation, timing and coordination with capital projects for some of the infrastructure upgrades needed to support the continued growth within the Centre Plan area.

The Engineering Approvals section is currently updating the RDC to reflect the 2019 IRP. Stakeholder Consultation was held in 2019 and a public hearing is scheduled in February 2020. The update charge will be in effect by the summer of 2020.

The land owners of the Port Wallace Master Plan area are currently seeking secondary planning approvals and Halifax Water has been providing technical support for the development of the Master Infrastructure Plan. With the completion of the plan, Halifax Water will be able to evaluate whether the Port Wallace area can be considered as a new Capital Cost Contribution (CCC) area.

In keeping with the IT Strategic Plan, Halifax Water is engaged with HRM to replace their permitting software, HANSEN. It is anticipated the implementation of the new software will occur in 2020.

Safety and Security: The Safety and Security section is responsible to provide support for the entire organization with respect to the safety training program, including documentation of safety training requirements to ensure employees have the appropriate training to conduct their daily activities and manage risk to the utility.

The Safety and Security section is also responsible for the development and update of the corporate Emergency Management Plan including emergency response training. As well, Halifax Water continues to participate in Public Safety Canada's Regional Resilience Assessment Program for treatment facilities. Facilities are evaluated using the Critical Infrastructure Resilience Tool, identifying areas where security and protection of critical assets can be improved or enhanced. Over the coming year, capital improvements will be undertaken and staff will develop a plan to improve the security profile at various facilities.

Regulatory Compliance: Is responsible for sampling of the water treatment and distribution systems for bacteria and residual chlorine, ensuring compliance with Canadian Drinking Water Guidelines and Operational permits issued by NSE. Similar sampling is completed for wastewater effluent parameters for compliance with permits issued by NSE, consistent with federal regulations. The section is also tasked with compiling and submitting reports associated with the sampling results to NSE. The section continues to support E & IS, and Wastewater Operations staff on changes to regulatory permits including the Wastewater System Effluent Regulations (WSER) and assists in developing an implementation plan for required upgrades.

An audit on *Management of Drinking Water Safety* was completed by the Municipal Auditor General in November 2017 which contains nine recommendations. For the past two years, staff have been following up on the recommendations to improve business processes, reduce risk and enhance corporate performance.

Stormwater Engineering: Is responsible for reviewing drainage complaints, supporting Wastewater and Stormwater Operations and review of stormwater billing appeals. With the approval of the stormwater credit program in 2017, applications are just starting to be submitted for review and four have been processed to date.

Environmental Management: Is responsible for the Environmental Management System (EMS) and oversees the adherence to the new ISO 14001 – 2015 standard for our certified facilities at Pockwock, Lake Major, Bennery Lake, and Herring Cove, and Dartmouth WWTFs. It is anticipated the Halifax and Mill Cove WWTFs will be certified in 2020.

Halifax Water has engaged a consultant in January 2020 to develop the framework for a corporate wide EMS program. It is anticipated the implementation of a corporate EMS will be completed by 2022. Expansion of the EMS program presents a significant opportunity to reduce Halifax Water's environmental footprint.

3.5 Corporate Services

Corporate Services: Consists of 6 sections, with service to internal and external customers through Finance, Accounting, Procurement, Human Resources, Customer Service, and Metering and Billing.

Finance: Is responsible for development of operating budgets, funding plans for the capital budget, rate applications and financial modeling for business plans. This group assists E&IS in the preparation of capital budgets and confirms availability of funding sources. The group is responsible for forecasting revenues and expenditures, including associated trend analysis, pension plan administration, internal control testing, and quality assurance activities around financial transactions including payroll.

Accounting: Is responsible for timely and accurate financial reporting, financial accounting, fixed asset accounting, financial analyses, financial statements, revenue and cash flow, developing and implementing accounting procedures and internal controls, and coordinating and supporting the annual audit.

Procurement: Is responsible for planning and delivering procurement services to the organization ensuring compliance with corporate policies and legislation. This section develops and implements monitoring and reporting of systems, programs, procedures for inventory and procurement to support acquisition of goods and services to meet Halifax Water's objectives.

Customer Care: Is responsible for managing all customer contacts, establishing corporate customer service standards, goals and objectives, and coordinating the improvement of business processes in the area of Customer Care and other departments.

Metering and Billing: Is responsible for installing, maintaining, reading, sampling, and testing meters, establishing standards, and billing customers in a timely and accurate manner.

The most significant objectives for Corporate Services in the 2020/21 fiscal year are:

- Enterprise Resource Planning (ERP) system replacement – Halifax Water issued an RFP to find a new corporate ERP solution in 2019. A new ERP will be selected in 2020. In late 2019/20 Halifax Water established a project team to begin planning to upgrade the ERP system. This project will impact almost all business processes and employee groups.

- Review impervious area used for stormwater billing, update satellite imagery, and business processes to ensure impervious area from new development is captured accurately.

- Complete the Customer Connect - Advanced Meter Infrastructure (AMI) Project. This item is discussed in greater detail in Section 5.2. The project was approved by the NSUARB on October 6, 2016 and is substantially completed; however there will be 3,000 – 4,000 meter installs remaining for the 2020/21 fiscal year.

- A new telephony system is being implemented in February 2020. In 2020/21, the Customer Care business process review will continue to identify opportunities to further improve the current Customer Relationship Management System (Cayenta), performance reporting, knowledge base and scripts for customer care representatives, and workflow and integration with the Computerized Maintenance Management System (CMMS). These will be underpinned by the introduction of a customer care quality program starting with call contact and eventually spanning all means of customer contact (email, face to face etc.) An RFP was issued for a new customer portal in 2019, and the new technology will be selected and implemented in 2020/21., Customers will be able to access information about their water consumption, water saving tips, account information and billing characteristics, and conduct some business on-line with on-line service requests, bill presentment and bill payment.

- The business case and process to implement monthly billing for customers that are currently billed on a quarterly basis will be finalized in 2020/21, with a view to implement monthly billing in conjunction with the new ERP system. The work on monthly billing is dependent on the Customer Connect project as it is necessary to understand how many customers will have their meters manually read in order to finalize the business case for monthly billing.

- Halifax Water will apply for increases to rates for water and wastewater service in 2020, and will also be updating the Halifax Water Rules and Regulations. A public hearing is scheduled in June 2020.

3.6 Administration

General Managers' Office: Is responsible for overall administration of the utility. Some initiatives led by the General Manager's Office include governance, business planning, public and stakeholder relationships, and employee relations. Communications, Legal Services and Human Resources fall directly under the General Manager's Office.

Communications: Is responsible for external and internal communications, maintaining the internet and intranet sites, media relations, social media, and providing support to operations and capital delivery to ensure the public is kept informed of significant projects, service disruptions, and initiatives.

Legal Services: Includes the legal function, corporate records management, FOIPOP administration as well as land administration. The General Counsel acts as the Corporate Secretary to the Halifax Water Board and helps ensure that board governance processes function smoothly.

Human Resources: Is responsible for the effective delivery of all Human Resource initiatives including; effective workforce planning, organizational change and development, recruitment functions, disability management, health and wellness initiatives, labour/ employee relations, compensation and benefit functions, pension administration, and employment equity.

4. BUDGET SUMMARY

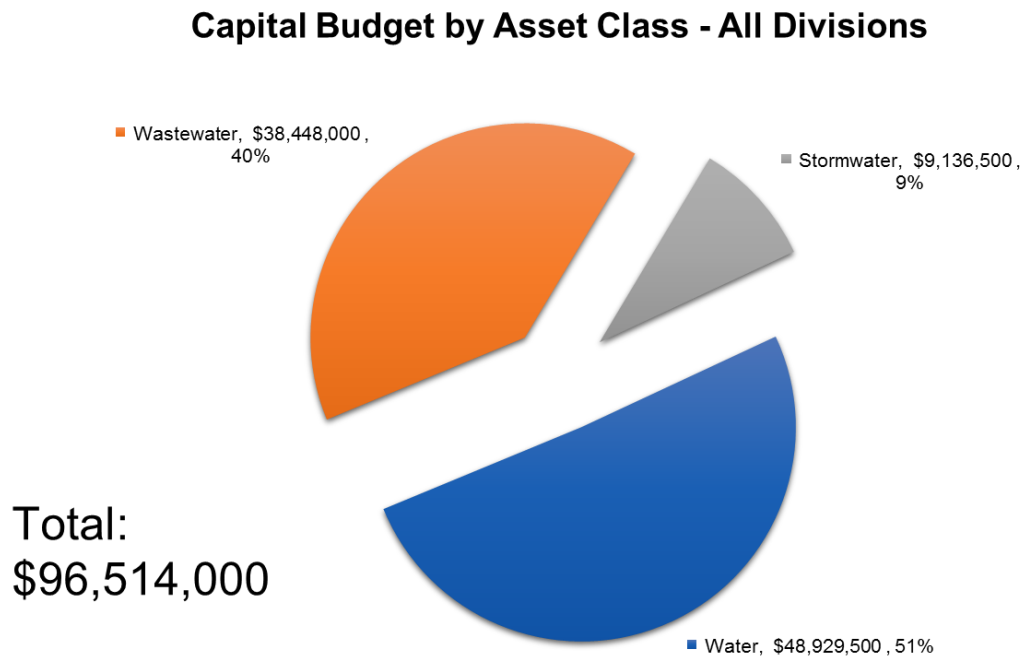
4.1 Capital

Halifax Water's 2019 IRP identifies a 30-year capital investment plan valued at $2.7 Billion (net present value). In relation to the IRP, the capital budget program focuses on providing required infrastructure for asset renewal, regulatory compliance and growth.

The capital program helps ensure that we continue to provide services in a cost-effective and efficient manner with a focus on long-term sustainability.

The proposed Capital Budget for Halifax Water for the fiscal year April 1, 2020 to March 31, 2021 is shown in Attachment C. It includes projects for Water, Wastewater, and Stormwater service delivery with a total value of $96,514,000, as demonstrated in Figure 3 below.

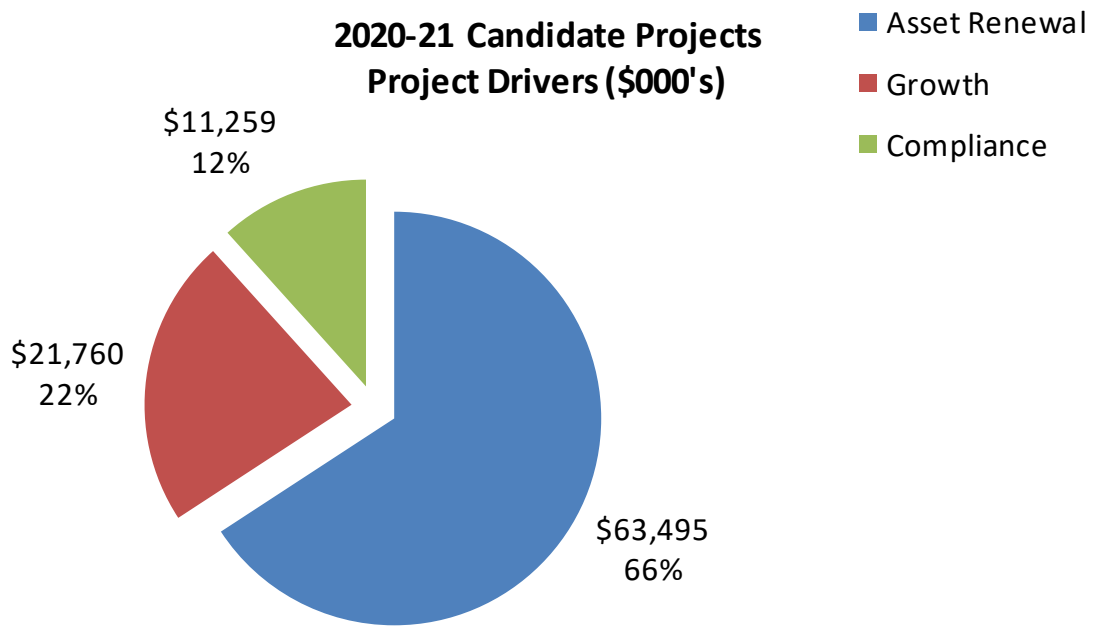
Figure 3 - Capital Budget by Asset Class



The Capital Budget document reflects the vision of the recently updated IRP. This 30-year plan provides a strong vision for the infrastructure requirements needed to ensure the long-term integrity of the utility's assets. The 2020/21 Capital Budget includes many projects from the IRP that will begin to shape the overall direction of the capital plan for years to come.

The 2020/21 Capital Budget broken down by strategic driver can be seen in Figure 4.

Figure 4 – Capital Budget by Strategic Driver

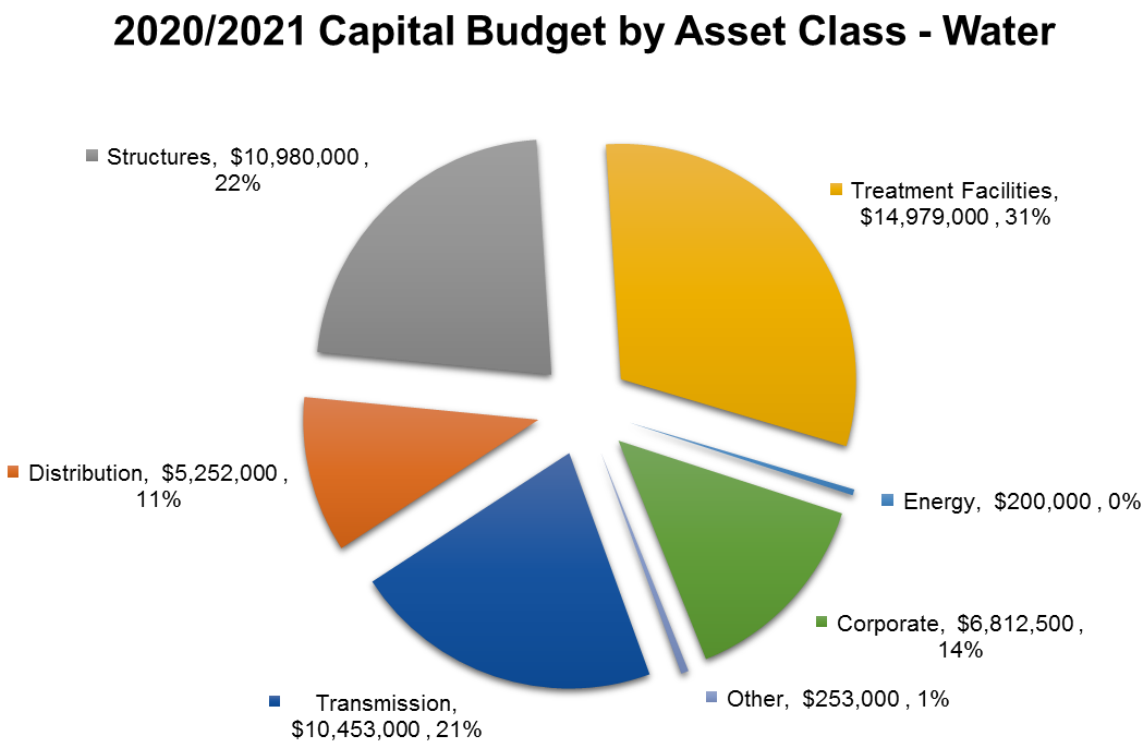


The Capital Budget funds traditional capital requirements for utility operation, along with a focus on several key strategic initiatives. The following sections provide highlighted details of the Capital Budget by asset category.

Water: Major Water capital projects include:

- Main Street to Caledonia Road Transmission Main
- Water Distribution – Main Renewal Program
- Lead Service Line Replacement Program
- Design phase of the JD Kline & Lake Major Water Supply Plant Upgrade projects
- Bedford South Reservoir – New Construction
- HRM Cogswell Redevelopment – Water Transmission Main Relocation

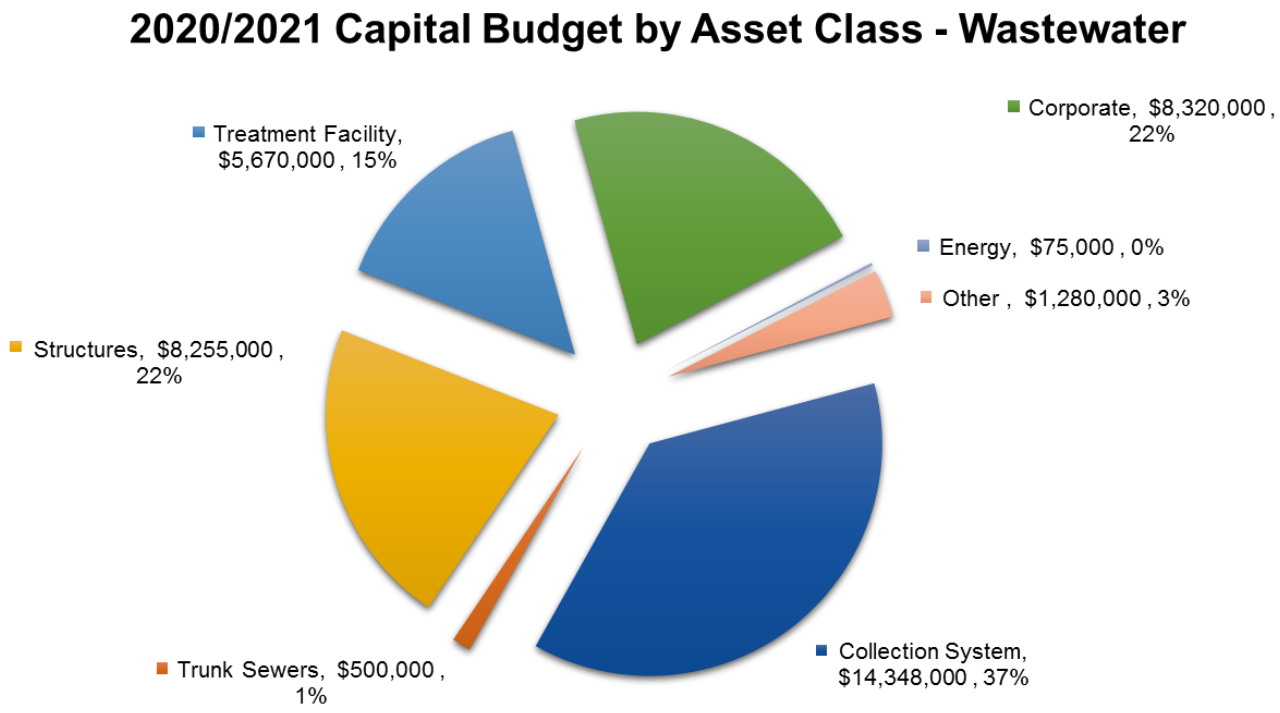
Figure 5 – Water Capital Budget



Wastewater: Major Wastewater capital projects include:

- Wastewater System – Trenchless Rehabilitation Program
- Integrated Wastewater Collection Projects
- Autoport/Main Road Pumping Station Replacement
- Wastewater Lateral Replacements
- Halifax North Peninsula Sewer Separation Program
- HRM Cogswell Redevelopment – Wastewater Sewer Relocation

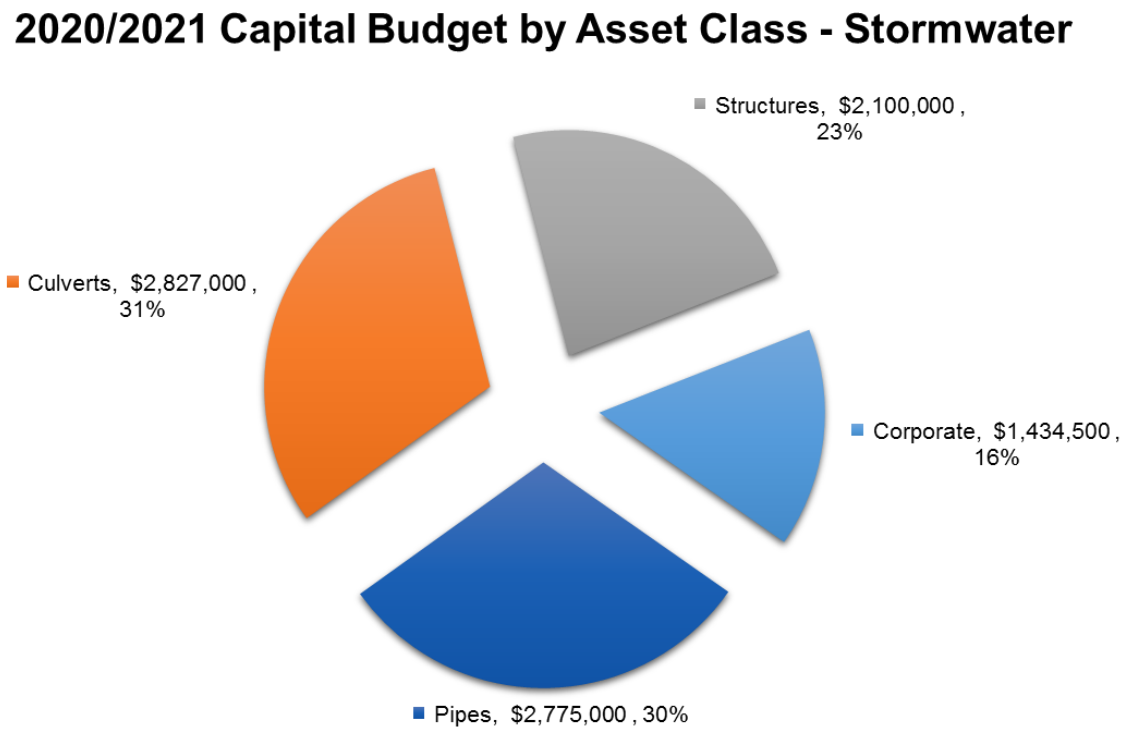
Figure 6 – Wastewater Capital Budget



Stormwater: Major Stormwater capital projects include:

- Integrated Stormwater Collection Projects
- Driveway and Cross Culvert Renewal Program
- Ellenvale Run Retaining Wall System Replacement – Phase 4
- HRM Cogswell Redevelopment – Storm Sewer Relocation

Figure 7 – Stormwater Capital Budget



Corporate Projects: Major Corporate Projects include:

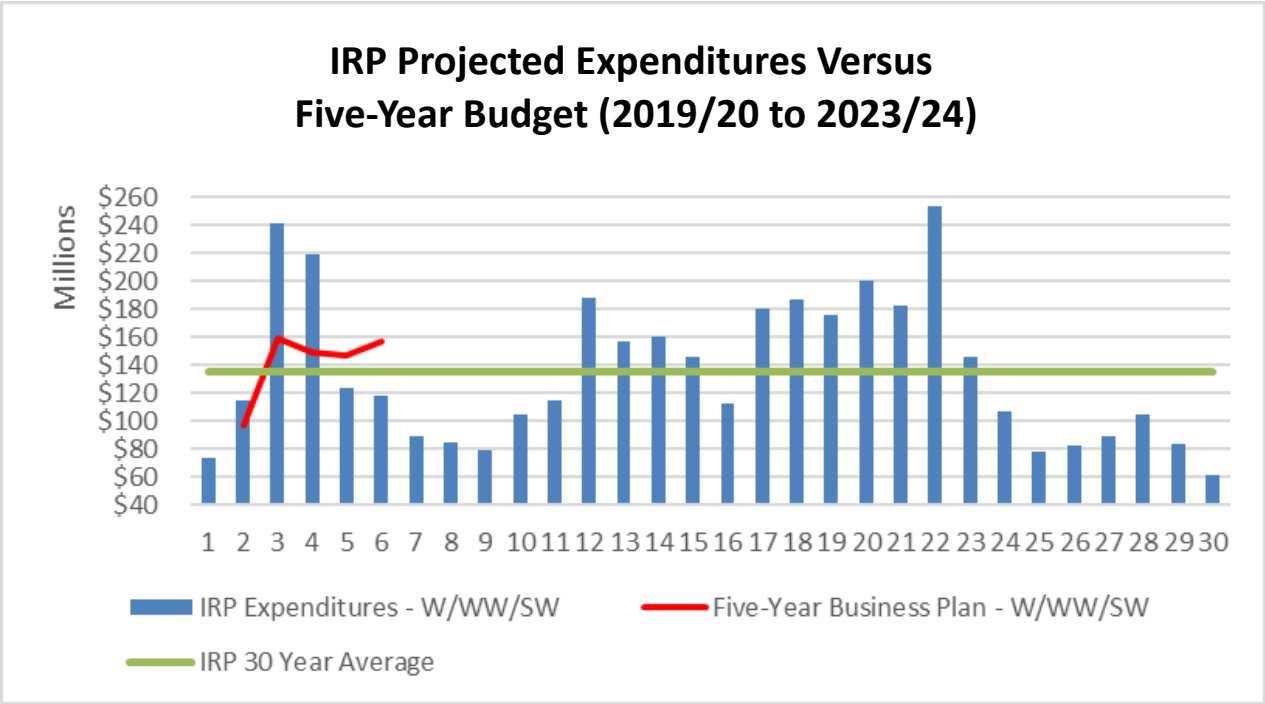
- IT Strategic Plan Implementation Year 3
- Corporate Flow Monitoring Program
- Design Phase of East/Central Operations Facility
- Fleet Upgrade Program

At this time, the 2020/21 capital budget does not include the Cogswell District Energy System (DES). If that project proceeds, it will have a separate capital budget which would be brought forward to the Halifax Water Board in conjunction with the business case and recommendation to proceed. For more details on the Cogswell DES please see Section 5.7.

The capital program balances near-term needs with long-term investments across all asset classes.

The following chart shows the proposed capital budget for the next five years compared to the 2019 IRP. The chart indicates a continued general increase in capital expenditures towards the target level.

Figure 8 – Capital Budgets versus IRP Recommended Level of Spend



The Capital Budget is funded from a variety of sources including asset depreciation accounts, debt, reserves, CCCs and external cost sharing.

Capital funding sources:

- Depreciation (funded within the rates) $29,035,000
- Debt $48,460,490
- Regional Development Charges $3,948,400
- External cost sharing (Federal & Provincial) $5,722,910
- CCCs $9,347,200

The Debt Strategy as approved by the Halifax Water Board, and accepted by the NSUARB, provides a funding strategy that is fair, equitable and cost-effective. The debt strategy sets limits for the debt service ratio (DSR) at 35% and a target debt to equity ratio of 40%/60%.

The funds for the overall Capital Budget will be generated from a combination of sources, as detailed below. The planned utilization of debt is consistent with the Debt Strategy. Halifax Water will manage risk around projected RDCs through reprioritization of growth projects or additional utilization of debt if required.

Figure 9 – Capital Funding Sources

2020/21 Capital Funding		
Water:	Depreciation	$11,479,000
	Debt	$23,183,300
	RDC	$150,000
	External Funding Building Canada & CWWF	$4,770,000
	CCCs	$9,347,200
	TOTAL	**$48,929,500**
Wastewater:	Depreciation	$15,974,000
	Debt	$17,740,970
	RDC	$3,798,400
	External Funding	$934,630
	TOTAL	**$38,448,000**
Stormwater:	Depreciation	$1,582,000
	External Funding	$18,280
	Debt	$7,536,220
	TOTAL	**$9,136,500**
TOTAL CAPITAL FUNDING:		**$ 96,514,000**

4.2 Operations

The operating budget prepared for 2020/21 is based on year one of the Five-Year Business Plan submitted to the Halifax Water Board in January 2020. The operating budget is built based on the current rates for service. The operating budget shows a loss of $15.9 M on a cash basis. If accrued pension and post-employment benefits were included, the loss would be $26.2 M. The cash basis reflects the requirements of the NSUARB Accounting and Reporting Handbook for Water Utilities which is used for rate making purposes. Halifax Water's operations in previous years have resulted in surpluses that allowed Halifax Water to delay increasing rates for over four years. The detailed 2020/21 Operations Budget is contained in Appendix D. A summary version of the Operations Budget is shown in Figure 10 – Operating Budget Summary.

Halifax Water's operating budget is sensitive to many factors including the rate of capital project delivery, interest rates, weather, water consumption, and customer growth.

Figure 10 – Operating Budget Summary

Operating Budget Summary (in thousands)

	Actual 2018/19	Approved Budget 2019/20	**Proposed Budget 2020/21**	Budget/Budget Variance (Unfavourable)
Operating Revenue	$138,413	$138,727	$138,618	($109)
Operating Expenses	$105,731	$115,088	$118,110	($3,022)
Operating Surplus	$32,682	$23,639	$20,508	($3,131)
Financial Revenue	$1,898	$1,369	$619	($750)
Financial Expenses	$33,190	$33,374	$37,076	($3,701)
Net Surplus (Deficit)	$1,390	($8,366)	($15,949)	($7,583)

Some of the primary operating budget drivers and assumptions are:

REVENUES:

The current rates for water and wastewater service took effect April 1, 2016. The current rates for stormwater service came into effect July 1, 2017 (revenue requirements for stormwater service did not increase, but the rate design changed). The majority of Halifax Water's revenues come from rate-regulated activities, with approximately 57.4% of water and wastewater revenues coming from volumetric rates and 42.6% from base charges. Operating revenues are projected to be $764 thousand less than the 2019/20 budget, based on the following assumptions:

- Volumetric water and wastewater revenues are based on projected actual consumption for 2019/20 with no decrease projected. For the first nine-month of 2019/20, consumption was down 0.12% from the prior year and down 0.9% from budget. This is attributable to many factors – growth in customers, improved meter accuracy, and weather conditions.

- Stormwater revenue is budgeted based on projected 2019/20 stormwater water revenues. Stormwater revenues in 2019/20 are less than budgeted and a project that was initiated in 2019/20 to ensure impervious area from new development is being captured is on-going.

- Other wastewater service revenue, including septage tipping and dewatering, have decreased as the customer base has changed.

- The projected increase in new customers is 638 which are allocated to various meter sizes based on a review of connection history.

Operating revenues are budgeted to decrease by $109,000 to $138.6 M. Non-Operating revenues are budgeted to decrease by $750 thousand or 54.8% to $619 thousand compared to 2019/20, as shown in Figure 10 – Operating Budget Summary.

Operating revenues are very sensitive to changes in consumption. Halifax Water has experienced net metered consumption decreases of 24.7% since 2001/02. On average, the annual reduction is 1.64% which has been managed through changing rate structures, diversifying revenues (stormwater with a different billing determinant), controlling costs, and increasing rates.

Timing of development, form of development and new customer growth is difficult to predict. The 2018/19 and 2019/20 years saw slight increases in consumption which is largely due to the installation of advanced meter infrastructure and replacing old meters, which in some cases, were under-registering consumption. Water consumption is sensitive to a combination of factors including development activity, customer growth, weather, and economic pricing signals. Halifax Water manages the risk of decreasing consumption by making prudent assumptions when preparing budgets and financial models.

Alternative Revenue: Revenues from unregulated business activities are decreasing in 2020/21 due to lower projected septage tipping revenues. Septage tipping revenue is projected to decrease by 33.6% due to decreasing volumes as some customers are tipping outside the service area. Unregulated revenues help to pay for some expenses which would otherwise be funded by rate-regulated activities, and are also used to fund unregulated expenses.

Unregulated revenues are projected to be $1.1 M in 2020/21, a decrease from the budget of $1.6 M in 2019/20.

EXPENSES:

Halifax Water's Operating Budget is shown on an accrual basis, with the exception of the liability for future employee benefits (pension) that is excluded from revenue requirements for rate making purposes.

The utility faces pressure associated with growth, asset renewal, and compliance with regulatory requirements, as described in the IRP. Halifax Water has taken significant steps to reduce risks in these areas with the development of the RDC, an asset management framework and capital projects to upgrade wastewater treatment facilities.

The largest components of Halifax Water's consolidated operating budgets are salaries & benefits, electricity, debt servicing, depreciation, and chemical costs. As outlined in Figure 11 below, operating expenses are budgeted to increase $3 M or 2.6% compared to the 2019/20 Operating Budget. One of the largest components of operating expenses is depreciation, which will increase by $2.3 M or 9.3%. Debt Servicing will increase by $2.7 M or 9.7% when compared to the 2019/20 Operating Budget.

Figure 11 – Expense Summary

Expense Summary (in thousands)

	Actual 2018/19	Approved Budget 2019/20	**Proposed Budget 2020/21**	Budget/Budget Variance (Unfavourable)
Operating Expenses	$105,731	$115,088 *8.8%*	$118,110 *2.6%*	($3,022)
Debt Servicing	$28,145	$28,206 *0.2%*	$30,930 *9.7%*	($2,725)

Figure 12 – Impact of New Full-time Equivalent Positions on Operating Budget

	New FTE's	$
By Service:		
Administration and General	1	88,310
Customer Service	1	72,189
Engineering and IS	2	176,091
Environmental Service	2	166,873
Wastewater	4	281,100
Water	1.6	173,385
	11.6	957,948

Salaries and Benefits: The budget for 2020/21 includes an allowance for 11 additional positions, the majority of which are new. A portion of the new salaries will be recovered from capital projects.

The annual increase included in the operating budget for existing employees is based on the non-union salary policy and unionized wages are based on collective agreements signed in June 2019. Salary and wage assumptions also includes some allowance for band adjustments, step increases, and re-classifications.

Energy: Budgets were established based on estimates for electricity, fuel, oil and natural gas rate increases in each specific year. The impact of these increases is expected to be partially offset by the formal Energy Management Program.

- Electricity – 6.0%
- Furnace Oil – 3.0%
- Natural Gas – 10.0%

Debt Financing: Debt payments are budgeted to support the new debentures planned for the 2020/21 additions to utility plant in service. The amount and timing of the increases will be determined by the completion of the projects and the financing rates and options available. It is estimated total debt servicing will increase to $30.9 M; a 9.7% increase from the 2019/20 budget. The capital financing strategy is designed to maintain a debt service ratio of 35% or less and to use a mixture of federal/provincial infrastructure funding, development related charges (reserves), depreciation, and debt. Long-term debt is projected to be $255 M as at March 31, 2021.

Depreciation: As Halifax Water's assets and future capital budgets increase so do depreciation expenses. Depreciation is an integral funding source to support renewal of existing infrastructure as well as new infrastructure and upgrades to meet future requirements related to servicing demands and changing environmental regulations. Depreciation is projected to increase by $2.3 M to $27.4 M in 2020/21 from $25.1 M in the 2019/20 budget, which is an increase of 9.3%.

Grant in Lieu of Taxes (Dividend to HRM): The water dividend agreement was renewed in September, 2014 for a five-year term (April 1, 2015 - March, 2020). Negotiations are underway to review the dividend agreement. The renewal of the dividend agreement and any change are subject to Halifax Water Board, HRM Council, and NSUARB approval. The dividend is calculated as 1.56% of the water system rate base and is budgeted at $6.1 M in 2020/21 based on the current formula for the water dividend, plus phase in of a wastewater dividend based on 0.25% of the wastewater rate base and a phase in of a stormwater dividend based on 0.25% of the stormwater rate base.

Chemical Costs: Chemicals are tendered annually in January for optimal pricing. Chemical cost increases of 5.0% are anticipated for next year.

On a consolidated basis, operating expenses are projected to increase by $3 M (2.6%) to $118 M from $115 M. Water Services operating expenses are projected to increase by $0.9 M, Wastewater Service by $1.7 M, and Stormwater Services by $0.4 M. Many categories of expense are increasing at a rate greater than CPI, particularly depreciation which is 23% of total operating expenses and is increasing at 9.2% compared to 2019/20 as a result of increasing capital investments.

Figure 13 – Budget Operating Expense Summary

	Actual 2018/19	Approved Budget 2019/20	Proposed Budget 2020/21	$ / % Variance (year-over-year) 2019/20	2020/21	Total
Water	**$22,168**	**$24,822**	**$24,595**	**$2,654** *12.0%*	**($228)** *-0.9%*	**$2,426**
Wastewater/ Stormwater	**$36,576**	**$38,247**	**$39,039**	**$1,671** *4.6%*	**$792** *2.1%*	**$2,463**
Engineering & Informantion Services	**$8,156**	**$8,579**	**$9,204**	**$423** *5.2%*	**$625** *7.3%*	**$1,048**
Regulatory Services	**$3,152**	**$4,081**	**$4,359**	**$929** *29.5%*	**$278** *6.8%*	**$1,207**
Customer Service	**$4,916**	**$5,727**	**$5,413**	**$811** *16.5%*	**($313)** *-5.5%*	**$497**
Administration & Pension	**$7,756**	**$8,547**	**$8,071**	**$792** *10.2%*	**($477)** *-5.6%*	**$315**
Depreciation	**$23,007**	**$25,085**	**$27,429**	**$2,078** *9.0%*	**$2,344** *9.3%*	**$4,422**
TOTAL OPERATING EXPENDITURES	**$105,731**	**$115,088**	**$118,110**	**$9,357** *8.8%*	**$3,022** *2.6%*	**$12,379**

As of March 31, 2019, Halifax Water had an accumulated operating surplus which has enabled a deficit budget in 2019/20; and will be sufficient to fund operations until rates for water and wastewater are increased. The projected operating result at March 31, 2020 is a $3.2 M deficit, and deficits of $15.9 M and $26.2 M are budgeted for 2020/21 and 2021/22.

Halifax Water is targeting maintaining an accumulated operating surplus of 3% - 5% of expenses (operating and non-operating) to mitigate risk and also help smooth timing and impact of rate increases. Accumulated operating surplus can be used to offset operating losses, or can be used to fund future additions to utility plant in service, subject to NSUARB approval.

Figure 14 – Operating Surplus (Deficit)

Continuity Schedule - Accumulated Surplus (Deficit) on a NSUARB Handbook Basis - which Excludes Pension Accrual	Total	Water	Wastewater	Stormwater
2018/19 Fiscal Year				
Balance, beginning of year	$38,625,906	$14,669,623	$15,487,608	$8,468,674
Operating surplus (deficit) for the year	$1,390,433	$2,760,942	($570,243)	($800,266)
Balance, end of year	$40,016,339	$17,430,565	$14,917,365	$7,668,408
2019/20 Fiscal Year				
Balance, beginning of year	$40,016,339	$17,430,565	$14,917,365	$7,668,408
Projected operating (deficit) for the year	($3,188,925)	$2,374,560	($3,936,644)	($1,626,841)
Projected balance, end of year	**$36,827,414**	**$19,805,125**	**$10,980,721**	**$6,041,568**
2020/21 Fiscal Year				
Balance, beginning of year	$36,827,414	$19,805,125	$10,980,721	$6,041,568
Budgeted operating (deficit) for the year	($15,948,714)	($4,274,512)	($7,842,633)	($3,831,569)
Projected balance, end of year	**$20,878,700**	**$15,530,613**	**$3,138,088**	**$2,209,999**
2021/22 Fiscal Year				
Balance, beginning of year	$20,878,700	$15,530,613	$3,138,088	$2,209,999
Budgeted operating (deficit) for the year	($26,155,637)	($9,179,931)	($11,980,107)	($4,995,599)
Projected balance, end of year	**($5,276,937)**	**$6,350,682**	**($8,842,019)**	**($2,785,600)**

Halifax Water has a goal to keep rates for combined services below 2% of median household income, well below the rate affordability threshold recommended in several industry best practice studies. The cost of annual combined services for an average household is currently estimated at 1.08% of median household income in 2019/20.

4.3 Cost Containment

Halifax Water reports semi-annually to the Halifax Water Board, and annually to the NSUARB the results of cost containment activities. The next cost containment report will be filed with the NSUARB by June 30, 2020. Some of these initiatives are on-going, and others are one time in nature. The cost containment initiatives from last year (2018/19), along with amounts of an ongoing nature from 2013/14 to 2017/18 inclusive reflected cost savings of approximately $5.4 M. The inclusion of initiatives from prior years reflects an intentional focus on sustainable results over the long-term. As of December 31, 2019, an additional $107 thousand has been realized.

Halifax Water continues to develop a cost containment culture. As salaries and benefits are the largest element in the operating budget, a significant opportunity exists to improve payroll processing, workforce planning and the staffing process. Another area of opportunity is productivity through enhanced business processes and technology, performance management, and improved time and attendance tracking.

5. STRATEGIC INITIATIVES

5.1 Customer Service Enhancements

The most recent Customer Service (Quality of Service) Survey indicates satisfaction with Halifax Water's overall service delivery remains high at 96%, consistent with the last two years.

For the first time, questions were included related to stormwater service. Of the 750 surveyed, 44% were aware they receive stormwater service and 83% of those receiving stormwater service were very or generally satisfied.

Other key highlights:

- The ratings for staff promptness have improved
- Most customers believe their water is safe and the quality is high
- Confidence in the safety of water in the Halifax Harbour remains low at 44%
- Residents continue to lack awareness of the source of their municipal tap water
- Awareness of the lead service line subsidy is low
- Awareness of the emergency assistance program (H2O Fund) is low
- Over 50% of customers would be interested in rounding up their bill to the nearest dollar with the rounded portion given as a charitable donation to help low income customers in need (this is an initiative being explored to grow the H2O Fund).

Strategic objectives for 2020/21 that will help address some of areas of potential improvement are implementation of the customer portal, enhancements in the Customer Care Centre that will reduce call wait times, and enhanced customer communications particularly around stormwater service. Many initiatives are underway that ultimately will help us continue to enhance service to customers to keep them satisfied.

5.2 Advanced Metering Infrastructure

Halifax Water will complete a multi-year project to install AMI in 2020. AMI is a system whereby, in lieu of meter readers walking routes, or driving routes to read meters with radio devices , a fixed network of telemetry devices is established over the service area to read meters on a much more frequent basis (typically hourly).

The AMI project is a $25.4 M dollar initiative impacting all customers, by upgrading 85,000 meters and changing how the utility provides service and can interact with customers. By March 31, 2020, there will be approximately 82,000 AMI devices installed.

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

These include:

- The ability to offer monthly billing to residential and small commercial customers thus 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.

- A reduction in billing errors, and elimination of estimated meter readings.

- 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.

- Customers will have the ability to manage their water consumption and see the effect of any conservation measures they take through a customer portal

AMI provides more data about customer consumption and distribution system operations. This enables earlier identification of distribution system leaks. Overall, it will improves 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 results in reduced costs for billing and collection, and reduces the need for the high cost activity of sending technicians to customer homes.

The upgrade to AMI has enabled two-way digital communication between the utility and its customers. This technology forms the backbone of the utility of the future, which means more customer-focused and efficient service. Over time, Halifax Water will be more responsive to customer inquiries based on better data, provide enhanced leak detection services, and move to monthly billing which allows customers to manage their budgets more effectively.

Strategic objectives in 2020/21 enabled by AMI are implementation of the customer portal, and expanding availability of monthly billing.

5.3 Information Technology Strategic Plan

Halifax Water continues to update its IT Strategic Plan. The business focus is on using progressive technologies to improve organizational efficiency, effectiveness and customer service.

The Strategic Business Drivers shaping the information technology environment have not changed:

- Provide world class services to our customers and our environment
- Retain leadership position as an integrated water, wastewater and stormwater utility
- Retain position as a top utility in all Lines of Business focused on Public and Employee Safety, Water Quality, Sustainable Infrastructure and Asset Renewal, Regulatory Compliance and Growth, and Environmental Stewardship.
- Follow an IRP Framework

Six Strategic Themes characterize the plan:

- **Customer Experience** – Providing customers with the ability to access most services using online services.
- **Information Integration with Location** - Having all necessary data linked together and tracked through a geographic lens.
- **Analytics Driven Decision Making** – Being able to model customer usage, financial, environmental, and infrastructure data across the Water, Wastewater and Stormwater systems and having the capability to tie data together into business intelligence.
- **Managed Knowledge and Workflow** – Capturing and storing key content in a logical and easy to access place for those who need it.
- **Enable Employees Anywhere** – Providing functionality for employees to access, capture and update the information they need to effectively do their job and support others, wherever they may be working.
- **Secure IT Foundation** – Effectively managing the IT function and providing infrastructure that is resilient, cost-effective, well supported, and recoverable within clearly defined requirements.

The IT Strategy Five-Year Roadmap 2020/21 is a high-level snapshot of the sequence of programs to deliver on the approved technology vision and recommended architecture. The plan has an estimated total cost of $28,000,000.

Projects currently underway include:

- New payroll system
- Customer portal
- Water quality data management and reporting
- Permitting approvals

- Enterprise Resource Planning (ERP) solution
- GIS and Cityworks enhancements
- Internal website (Intranet)
- Document management pilot in Legal Services
- IT Server Hosting
- IT Security assessment and roadmap
- IT Help Desk software replacement
- Office 365 migration
- Analytics Decision Support System Phase One

Projects due to start in next fiscal year include:

- Impervious Surface Area updates
- Analytics Decision Support System Phase Two
- Full Enterprise Data Warehouse
- Enterprise SharePoint rollout for Document Management
- Disaster Recovery Planning
- Asset Condition

5.4 Wet Weather Management

Halifax Water maintains approximately 1,000 km of wastewater mains, 300 km of combined sewer mains, 14 wastewater treatment facilities, and 166 wastewater pumping stations. Like many municipalities and utilities across North America, Halifax Water's wastewater collection system is subject to dramatic flow increases in response to precipitation events due to age, historical construction practices, maintenance, number of connections as well as other factors. These Inflow & Infiltration (I&I) flows can lead to wastewater releases, sewer backups/basement flooding, increased operation and maintenance costs, treatment process upsets, and treatment facility effluent quality & capacity issues.

Recognizing the impacts of wet weather generated flows on the system, Halifax Water developed a wet weather management program (WWMP). The WWMP is a strategic program to address the negative impacts of wet weather on the wastewater collection system and treatment facilities. The WWMP monitors flows within priority sewersheds before and after wet weather flow reduction activities, while separating the combined sewer systems when practical to do so. The program is long-term in nature and follows a phased implementation approach to meet objectives.

The negative impacts of wet weather can generally be managed by the following:

1. Peak flow reduction - Reduce the quantity of wet weather generated flows that are collected, pumped and treated by the wastewater collection and treatment systems.
2. Peak flow attenuation - Store wet weather generated flows during wet weather periods and release & treat the flows when the system has capacity.
3. System capacity increase

The WWMP intends to systematically identify opportunities to employ the most cost-effective wet weather management strategy. Where possible, all three methods are considered based on a cost benefit analysis and the sewershed specific driver for flow reduction, with regulatory compliance being the highest priority. By reducing wet weather flows, the wastewater system will see a reduction in untreated discharges to the environment, effluent noncompliance at WWTFs, operational and maintenance costs, and an increase in available system capacity.

I&I is grouped into two sources, public infrastructure (mains, manholes, laterals up to the property line, etc.) and private infrastructure (laterals from property line up to and including connections within buildings). The program employs a variety of strategies to reduce wet weather impacts such as pipe condition assessments, cured in place pipe (CIPP) rehabilitation, sewer separation, flow monitoring, illegal connection investigations, public communications, and modeling. To effectively address all the issues that contribute to the impacts of wet weather, multiple business units within Halifax Water are engaged to work together to achieve the goals of the WWMP. Figure 15 indicates the working relationships and activities between the contributing business units.

Figure 15 – Contributing Business Activities of the Wet Weather Management Program

A phased approach is being followed to implement the program. While the phasing is prescriptive; it is important to revisit the objectives of the program periodically and adjust where necessary.

- **Phase I:** The initial phase of the WWMP involved initiation and development of the program. It was quickly realized that strategies would have to be implemented within each priority sewershed based on individual system characteristics. The program's initial organizational structure was comprised of a wet weather steering committee and a wet weather action committee. Key contributors continue to be engaged in the program with monthly meetings between the steering committee and implementation team.

- **Phase II:** Phase II of the program required identifying priority sewersheds that demonstrated a need for wet weather management. In the absence of measured flow data, pump station run time data was used to develop a sewershed prioritization matrix. Since that time, significantly more flow monitoring data is available and has almost negated the need for pump station run time data.

- **Phase III:** Pilot sewersheds were identified from the prioritization matrix from Phase II. These pilots were selected so that specific wet weather management strategies could be assessed. Each pilot sewershed was evaluated using pre and post rehabilitation flow data and a cost benefit analysis was conducted with respect to actual wet weather flow reductions. Post rehabilitation flows continue to be monitored in the pilot sewersheds to confirm wet weather flow reductions are achieved long-term.

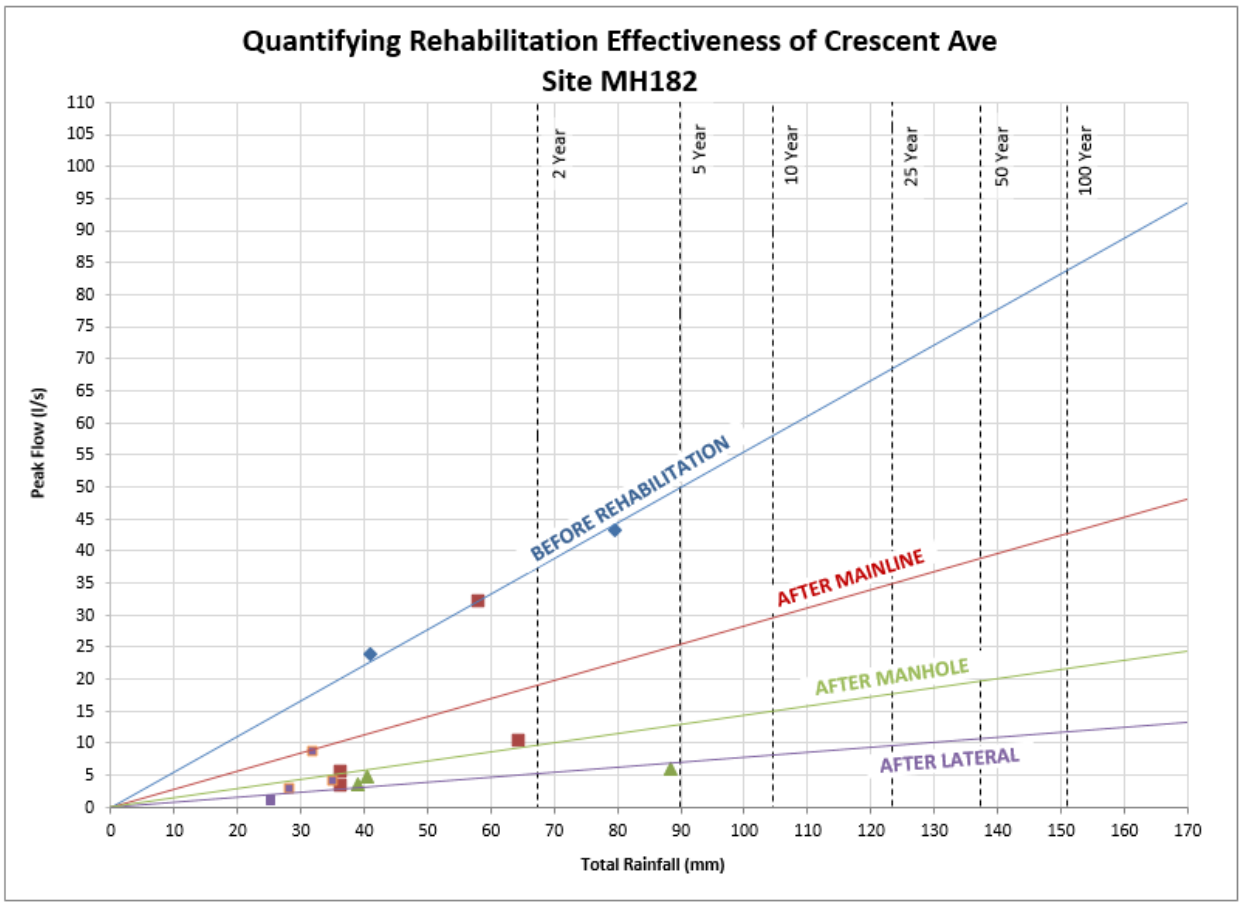
- **Phase IV:** With the information collected from pilot and other wet weather reduction projects, future project recommendations are being identified and implemented in other sewersheds. This approach allows Halifax Water to identify the most cost-effective strategies to manage wet weather flows using system-specific historical data. Since the initiation of the program, 205 sewersheds have been identified with varying degrees of impacts from wet weather.

Recognizing the importance of flow monitoring and infrastructure condition assessments, Halifax Water enhanced the service delivery of the flow monitoring and CCTV programs. Both programs have performance-based contracts to ensure accurate and dependable data delivery to the industry standard.

The near term (2020/2021) goals for Halifax Water's Wet Weather Management Program include:

1. **Rehabilitation Pilot Projects:** Halifax Water's WWMP has completed 5 pilot projects: Stuart Harris Pump Station Sewershed, Cow Bay Rd., Leiblin Park, North Preston, and Crescent Ave. These pilot areas were chosen to enable Halifax Water to assess the effectiveness of the various wet weather management strategies and collect rehabilitation cost information. Wet weather management strategies for these sewersheds included mainline, manhole, and lateral CIPP, new stormwater mains, and system spot repairs. 2020/21 will see continued flow monitoring and data analysis on pre and post activity for each pilot. As an example, Figure 16 below illustrates the reduction in rainfall derived inflow and infiltration (RDII) peak flow for the Crescent Ave pilot project. This pilot underwent a three-phase rehabilitation including mainline, manhole, and lateral renewal activities.

Figure 16 – Quantifying Rehabilitation Effectiveness



2. **Refinement of Cost Benefit Analysis:** Phase IV of the WWMP involved applying a cost benefit analysis of the various strategies to manage wet weather flows. As expected, the pilot sewersheds are demonstrating a significant reduction in RDII as the various wet weather management strategies are implemented. The financial cost of the RDII reduction was normalized so that the information can be applied to other sewersheds and compared to more traditional approaches to wet weather management such as capacity increase and storage. Additional data from various sewersheds is continually analyzed as it becomes available. In addition to flow data, cost information is available for application to larger scale rehabilitation projects.

   The cost and reductions in RDII have been compiled since the inception of the formalized WWMP. The program is structured to evaluate all wet weather management activities using the same methodology to ensure consistent application across identified areas. This enables Halifax Water to employ the most cost-effective strategy to future areas. It has become evident that the RDII reduction cost has significant dependence on the sewershed characteristics; however, it provides essential guidance for the future projects. The Program continues to augment this information and its application to future projects.

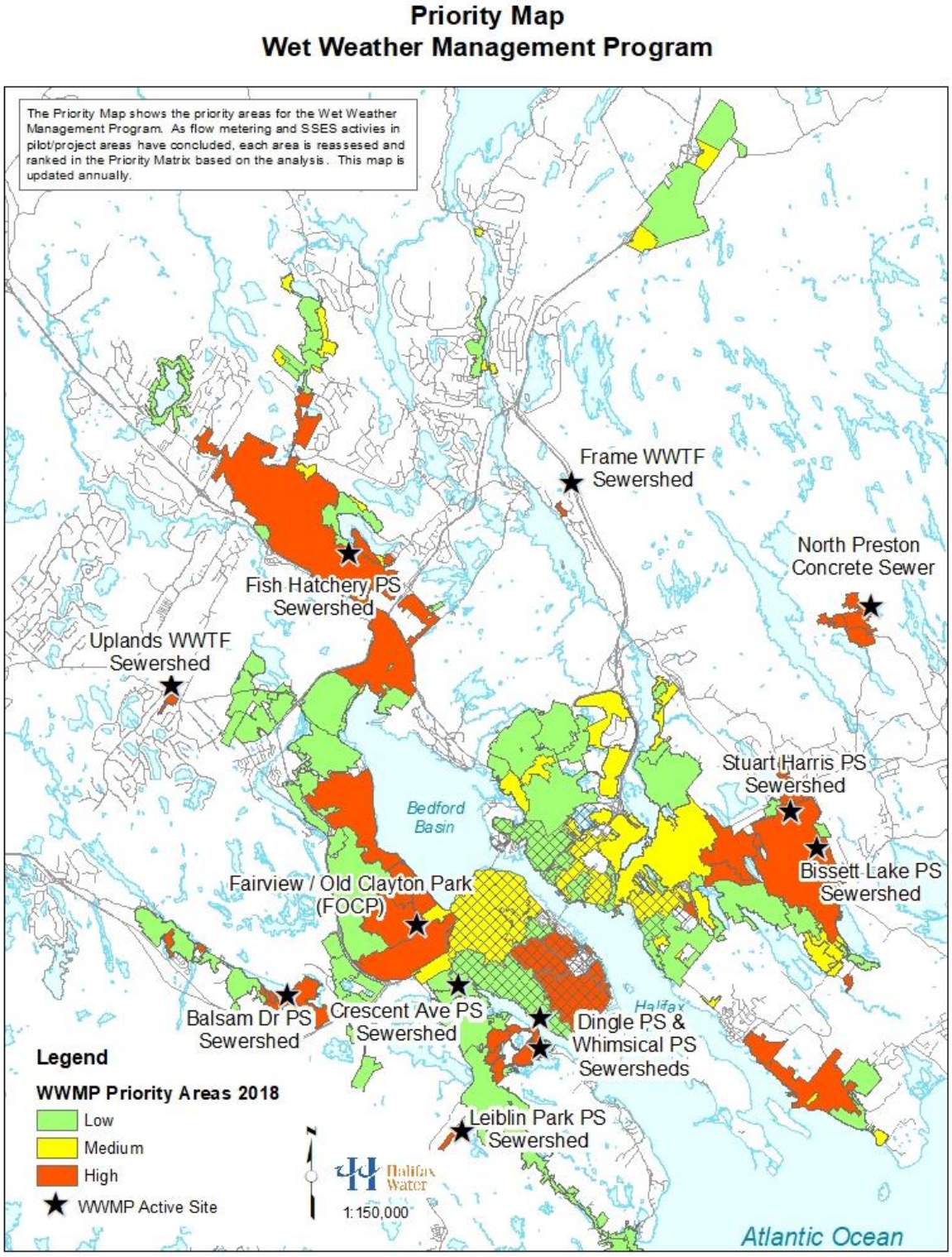
3. **Fairview / Old Clayton Park / Bridgeview:** The analysis of flow monitoring data undertaken as part of the West Region Wastewater Infrastructure Plan identified the potential for significant reductions in RDII in the Fairview, Old Clayton Park and Bridgeview areas. With the goal of reducing peak flows by approximately 200 L/s, a phased I&I reduction program was initiated in 2017. In 2018/19, approximately 11 km of CIPP lining was completed as part of Phase I and 2019/20 Phase 2 will see approximately 15 km completed. 2019/20 included smoke testing with the goal of identifying both public and private inflow sources. Flow monitoring and data analysis will continue to quantify RDII reductions for the project area and assess the effectiveness of the asset renewal during all phases of the project.

4. **Program Expansion: Central and East Region Infrastructure Master Plan:** Work on the Infrastructure Master Plan for the East and Central regions has been completed in 2019. Wet weather flow management is a part of the overall wastewater strategy for the Infrastructure Master Plan (IMP). The WWMP will continue to work with the IMP project team in strategy selection for management of wet weather flows. In 2020/21, the WWMP will continue with SSES (Sanitary Sewer Evaluation Survey) activities in the Fish Hatchery Park Pump Station and Eastern Passage sewersheds with the goal of identifying the sub-sewersheds where implementation of wet weather projects are considered feasible.

5. **Decision Matrix Implementation:** Building on the past experience with WWMP projects; an enhanced prioritization methodology is being developed with the addition of a decision matrix to assist in identifying areas that can benefit from wet weather management in a cost-effective manner. The decision matrix provides a process flow framework to prioritize candidate sewersheds for future rehabilitation projects.

Figure 17 below shows current sewershed priority ranking based on a previous methodology. Beginning in 2020/21, the WWMP is updating the sewershed prioritization methodology by incorporating recommended criteria to refine priority areas going forward.

Figure 17 – Wet Weather Management Program Priority Map



The planned WWMP activities for the next year are listed in Figure 18 below:

Figure 18 – Wet Weather Management Activities for 2020/21

2020/2021
Refresh Prioritization Matrix
SSES Activity (CCTV, Smoke Testing & Flow Monitoring)
Fish Hatchery PS Sewershed (FMZ07 & FMZ10) *Hornes Rd Sewershed - Private-side Pilot Project (FMZ37)* *Eastern Passage Sewersheds (FMZ37)* *Loon Lake Sewersheds (FMZ24)*
Rehabilitation: Capital Projects
Fairview/Old Clayton Park/Bridgeview - Phase III

5.5 Resource Recovery

The WWTF upgrades at Aerotech, Eastern Passage and installation of dewatering equipment at Mill Cove WWTF has strengthened Halifax Water's capacity to dewater sludge from its facilities. Additionally, Halifax Water has been successfully working with Nova Scotia Environment for elimination of the permitting requirements to dewater sludge at various facilities. These initiatives have provided required flexibility thereby reducing the risk of a dewatering facility malfunction and as a result the overall plant operational risks have reduced.

The Biosolids Processing Facility (BPF) is operated by Walker Environment Group with overall responsibility for operating the facility to produce a soil amendment in conformance with Canadian Food Inspection Agency (CFIA) regulations and marketing the product for beneficial reuse. The current asset management plan developed in cooperation with the contractor addresses the parts replacement/upgrade needs of the facility. The BPF is also approaching its design capacity. With population growth and the improvement in performance of treatment plants, the WWTFs are producing an increased quantity of sludge. The contract agreements with Walker Environmental expires at the end of March 2021. Staff are currently reviewing the overall operation, while simultaneously working on the capacity upgrade requirements and a new operating contract. The future BPF could utilize completely different technology with a different operating contractor. In light of the recent industry trends with focus on resource recovery from Biosolids, Halifax Water is exploring all aspects of resource recovery when considering alternatives for biosolids processing. Since this will potentially be a long-term contract, there is a medium level risk with potential changes, considering the complexities associated with the management of biosolids.

5.6 Environmental Management System Expansion

ISO 14001 is an international standard for environmental management systems (EMS) essentially it is a system of procedures, records and process to manage environmental issues and assist with regulatory compliance. It also makes day to day operations more sustainable and engages employees in these operational activities. The EMS program can be audited against ISO 14001 standards, and if found to comply, receives a Certification through ISO. The ISO standard changed from a 2004 version to a 2015 version, with greater focus placed on organizational leadership and identification of risks and the associated influences, both internal and external to an organization.

The benefit of implementing an EMS is that it drives a process of continual improvement towards meeting defined environmental goals and objectives. Minimizing environmental impacts becomes one of the defined primary goals, and standard processes are put in place to identify issues and direct improvements through documented standard operating procedures. The standard pertaining to Environmental Management Systems (EMS) is 14001- 2015 and requires an organization to:

1. Establish an environmental policy.
2. Identify environmental aspects that can impact the environment.
3. Identify our applicable Compliance obligations legal and regulatory requirements.
4. Set appropriate environmental objectives and targets.
5. Establish programs to implement our policy, achieve objectives and meet targets.
6. Periodically audit and review activities to ensure that the policy is complied with and the environmental management system remains appropriate.
7. Be stewards of the environment and local community.
8. Be capable of adapting to changing circumstances.

Staff have successfully obtained certification for the existing facilities, Pockwock, Lake Major and Bennery Water Treatment Facilities and the Herring Cove and Dartmouth WWTFs under the new Standard. Halifax Water is currently preparing for internal audits for Eastern Passage, Halifax and Mill Cove WWTFs. It is anticipated they will be certified in 2020.

A request for proposal closed in November and a Consultant will be in place by January 2020 to develop the framework for a corporate wide EMS program. It is anticipated the implementation of a corporate EMS will be completed by 2022. Expansion of the EMS program presents a significant opportunity to reduce Halifax Water's environmental footprint.

5.7 Energy Management and GHG Reduction

Halifax Water has a mature Energy Management Program, and is committed to creating and ensuring an ongoing focus on sustainability and energy efficiency throughout all operating areas. This program, is carried out in relation to Halifax Water's Energy Management Policy through the Energy Management Steering Committee delivers energy efficiency initiatives that have resulted in annual reductions of 2 – 4% per year since inception. The focus of this Committee is being broadened to include more emphasis on GHG emission reduction, and developing specific targets and actions for Halifax Water that will support HalifACT 2050. HalifACT 2050 is a long-term climate change plan to reduce emissions and help communities adapt. The annual Energy Management Action Plan (EMAP) defines the goals, objectives, accountabilities, and structure for activities related to energy efficiency, energy recovery, greenhouse gas (GHG) reductions, and environmentally responsible energy use.

For 2020/21 and beyond, initiatives have been identified in the following areas:

Infrastructure / Operational Improvements

Capital projects that will result in improved energy efficiency, energy recovery, GHG reductions and operational cost savings have been identified throughout Halifax Water's infrastructure. Projects being implemented or considered include:

Various Electrical/Mechanical System Upgrades	*UV Disinfection Upgrades*
HVAC System Re-Commissioning	*Pumping System Upgrades*
HVAC & Building Envelope Upgrades	*Pump/Meter Chamber Upgrades*

New construction capital projects (e.g. wastewater treatment facilities, pumping stations, etc.) are also reviewed at the conceptual and detailed design stages to ensure best-in-class energy efficiency and the lowest life cycle costs throughout the life of the asset.

GHG Emissions Inventory

While GHG emissions from the majority of Halifax Water's operations is being closely monitored and accounted for, a more formalized approach for collecting and reporting of this information is being considered and developed. In addition to primary fossil fuel emissions from our facility operations (i.e. heating oil and natural gas), secondary or indirect emissions from electricity use (i.e. NSPI emissions) are also being tracked and reported on an annual basis. Furthermore, a methodology is also being developed to track emissions from our fleet vehicles. Ultimately, the goal will be to use GHG emissions as an important metric within Halifax Water's annual Corporate Balanced Scorecard/Continuous Improvement system.

Renewable Energy Generation

Halifax Water has identified renewable energy as an important way of offsetting energy costs and increasing revenue that will help the utility to significantly reduce energy use and greenhouse gas emissions in the region. Two key project areas have been identified: renewable energy and energy recovery from both water and wastewater systems.

To date, two renewable energy projects have been completed: the Pockwock Community Wind Farm, located near Pockwock Lake and the Orchard In-Line Energy Recovery Turbine, located in Bedford. These projects are operating above expectations, and will continue to generate revenue for the utility for decades to come.

Energy recovery from process or waste streams is recognized as one of the biggest opportunities available to society. Recoverable energy is everywhere – in solid municipal/residential waste streams, industrial by-products, and water and wastewater streams. Halifax Water has significant recoverable energy resources available in both its water and wastewater streams. Halifax Water is currently focusing efforts on three specific energy recovery projects.

Biosolids Energy Recovery

Halifax Water currently supplies over 35,000 tonnes per year of partially de-watered sewage sludge to its Aerotech Bio-Solids Processing Facility (BPF). Currently, this sludge is turned into a soil amendment that can be used as fertilizer for topsoil manufacturing, sod growing, horticulture, and land reclamation. Energy recovery from biosolids is one of the most developed opportunities for treatment plants. This is commonly achieved through anaerobic digestion of wastewater sludge.

Halifax Water's Mill Cove WWTF and Lakeside Timberlea WWTF are equipped with anaerobic digesters and the gas generated is utilized for digester operation and excess gas is used for space heating in the plants. The Mill Cove WWTF digesters were cleaned and refurbished in 2017; it is expected that the gas yield will increase as a result. The HHSP facilities and other small facilities have sludge dewatering equipment on site as the prime resource for biosolids that are utilized as soil amendment for beneficial use. Halifax Water expects to continue this practice in the near future considering that the agricultural soil amendment program is very successful. There are several emerging technologies in the industry that show promise for alternative uses of biosolids for energy production; Halifax Water have been reviewing these technologies to determine the best opportunity; however, it must be developed cognizant of the risks that are associated with the complex issue of biosolids management.

Halifax Water continues to explore opportunities and options for the alternative re-use of biosolids as an available energy source that can contribute to overall GHG reductions and offset annual energy costs.

Cogswell District Energy System

The HalifACT 2050 program initiated by the municipality identifies the Cogswell District Energy System as a significant climate change mitigation opportunity. A study was completed in 2016 to determine the feasibility and preliminary business case for an Ambient Temperature District Energy System (ATDES) within the Cogswell Redevelopment Area of downtown Halifax. The feasibility of the DES is predicated on the assumption that connection to the DES will be mandatory within the redevelopment area. To that end, HRM has completed amendments to its Charter through the Legislature to facilitate this authorization. Work on the Cogswell ATDES continues with stakeholder consultation, and the completion of preliminary and detailed design work in parallel with the Municipality's effort to advance the Cogswell Redevelopment project. Halifax Water strategic objectives related to DEC in 2020/21 include enactment of a mandatory connection by-law by the municipality, confirming that the service will be regulated by the NSUARB, finalizing the business case, and securing necessary Halifax Water Board and NSUARB approvals to proceed.

Solar Photovoltaic (Solar PV) Systems

An application was submitted to and approved by the "Solar Electricity for Community Buildings Pilot Program" for the deployment of a 75 kW Solar PV system at the Pockwock WSP. Preliminary engineering work will be completed by the end of the 2018/19 fiscal year, with detailed design and construction of the system complete by the fall of 2020 at the latest. This project is expected to generate in excess of 100,000 kWh of clean renewable energy, and reduce annual GHG emissions within the province by over 72 Tonnes CO_{2e}.

5.8 Water Quality Master Plan

Based on research conducted by Dr. Graham Gagnon at Dalhousie University, Halifax Water is now dealing with a new source water challenge related to lake recovery.

From the 1970's onward, governments in Canada and the United States have taken broad efforts to reduce air pollution and specific efforts to reduce the effects of acid rain. Legislation to reduce sulfur oxide emissions and reduce pollution from coal burning has dramatically reduced air pollution. This has resulted in a measurable reduction in sulfate deposition into lakes in Atlantic Canada and elsewhere and a resultant rise in pH.

This is a positive development from an environmental perspective, however, it brings with it challenges from a drinking water treatment perspective. The rise in pH results in greater levels of natural organic matter (NOM) in source waters. NOM is a significant treatment challenge and we have observed that with increasing NOM levels come increased chemical costs and shorter filter run times. Increased pH levels also lead to increased levels of biotic activity in the water sources. Increased biotic activity promote greater occurrence of things like algae, and taste and odour causing compounds such as geosmin.

These two effects of lake recovery have direct impacts on Halifax Water operations. Increased NOM increases treatment cost and may exert demands on treatment plants which are beyond what was contemplated when they were designed.

Source water management and, specifically, lake recovery, will be a focus area for research for the next several years and beyond. The NSERC research chair with Dalhousie University will be a primary program in addressing this issue. Halifax Water needs to quantify the degree to which source water will change in coming years and further, what changes in treatment techniques and infrastructure might be required to effectively and efficiently treat source water.

In 2018, Halifax Water was selected by the Water Research Foundation (WRF) for a Tailored Collaboration Project. Given the interest of lake recovery to the entire water sector, particularly utilities in the northeast of North America, WRF will match a US$100,000 contribution by Halifax Water to study lake recovery and its impact on treatment processes. The international firm, Hazen & Sawyer has been selected to do this work which will deliver a decision support tool to guide utilities in making treatment process decisions in the face of rapidly changing conditions. This will be critical for making plant upgrade decisions at Halifax Water. The WRF research is expected to be completed in late 2019.

Halifax Water published its third WQMP in September 2017 and it was subsequently approved by the Halifax Water Board. The WQMP guides Halifax Water's water quality work and also guides the research chair. There are four themes in the current WQMP as follows:

1. **Understanding Lake Recovery:** As indicated above, lake recovery is a process whereby improved air quality and the reduction on acid rain is allowing lakes to recover to their previous state. Unfortunately, this process has resulted in increasing levels of total organic carbon (TOC) which is a critical treatment parameter and increasing levels of biotic activity in the lakes. The increasing levels of biotic activity are an explanation for the geosmin episodes experienced since 2012. Increasing levels of biotic activity are also a potential precursor to other taste and odour causing compounds as well as potentially harmful algal toxins such as microcystsin-LR. As well, the increasing levels of TOC are challenging the ability of the water supply plants to operate efficiently and may eventually reach levels beyond what the plants were designed to deal with. Plant improvements will be required in the medium term and understanding how far the process of lake recovery will go is necessary to design the plant processes of the future.

2. **Adapting to Lake Recovery:** As indicated above, lake recovery is already impacting the treatment plants. While treated water quality still meets Halifax Water goals, the plants are more difficult and more expensive to operate. Short and medium term strategies and operating approaches are necessary to continue to produce high quality drinking water. This includes planning for a new intake for Lake Major to get access to more treatable and more consistent water quality as well as maximizing the utilization of biofiltration.

3. **Maintaining Distribution System Water Quality:** Maintaining water quality between the water treatment plant and the customer's tap is an important part of the multiple barrier approach to providing safe drinking water. Continuing our research into lead occurrence and corrosion control chemistry will remain a focal point. This theme will also explore maintaining water quality during emergencies such as water main breaks and continuing to optimize disinfection in the distribution system to maintain chlorine residuals while reducing disinfection by-products.

4. **Water Quality Data Mining:** Ten years of research and source water protection work has resulted in an immense resource of water quality data. New resources recruited as part of the Lead Service Line Program include a data analyst whose long-term responsibility will be to work with water quality data sets to gain new insights into water quality issues and employ data analytics techniques for processes like distribution system water quality modelling.

***for*Water Network**

In 2015, Halifax Water was asked to participate in an application by researchers at the University of Waterloo and the University of Alberta in an application to NSERC for a $5 M network grant. The purpose of the network is to bring forest ecology researchers from across Canada to share ideas on how to manage forests to protect drinking water quality.

The network grant was awarded in 2016 and unites 7 research platforms across Canada, including Dalhousie University. Halifax Water staff participate in the network in addition to hosting research on our watersheds. Research in Halifax is focusing on how climate change impacts the transfer of naturally occurring carbon from the forest to water, where the carbon levels impact the treatment process.

We expect this program to have a major influence on watershed management in coming years.

5.9 Lead Service Line Replacement Program

One significant new program that has grown out of water quality master planning has been the adoption of a formal lead service line replacement program. Halifax Water has approximately 2,500 lead service lines (LSLs) remaining in the public right of way and up to 3,500 remaining on private property. Halifax Water has adopted a program intended to remove all lead service lines by 2050, consistent with the recommendation made to the USEPA by the National Drinking Water Advisory Council (NDWAC).

Halifax Water is one of a few utilities in Canada to adopt a NDWAC based approach to LSL replacement. This approach is consistent with industry association policy, is consistent with the safeguarding of public health, and positions Halifax Water well from increased public attention to the lead issues arising from the new Health Canada guideline.

The program has the following five pillars:

1. **Replace all lead service lines by 2050**, both those owned by the utility and those owned by customers. A key part of this is working in partnership with customers to get the private side work done. It will also require a 3-4 times increase in our current level of lead service line replacements from our pre-program levels in 2016.

2. **Inventory:** Getting an accurate inventory of where lead service lines are, both public and private is key to working with customers and executing an effective program. Resources and new business process will be dedicated to building an accurate inventory of lead service lines. This portion of the program has been very successful to date. Several record sources have been consolidated and confidence is improving in existing records. Halifax Water is working toward an industry best practice of an online inventory tool for customer access.

3. **Customer communication:** The NDWAC recommendations require direct communication with customers who have a lead service line, a minimum of once every three years until the LSL is removed. Further, to encourage customers to replace LSL's, it will be necessary to provide more information on our web site and interactive tools to see what type of service they have. It will also be necessary to provide them more frequent and better information on the replacement process, how to access funding programs, how to hire a contractor and the health risks associated with LSL's.

4. **Continuation of customer sampling programs:** Sampling properly for lead detection is expensive and intrusive for the customer. It is important that Halifax Water continue to offer free lead sampling for at risk homeowners in order to engage them in the issue and provide public health information. Through our partnership with Dalhousie University we have been able to provide very cost-effective lead sampling.

5. **Corrosion control:** Providing corrosion control treatment at the treatment plant is an important part of a comprehensive lead strategy. Effective corrosion control reduces lead levels where service lines exist and will continue to protect customers from lead found in solder and brass fixtures well after lead service lines are removed.

Halifax Water launched its new lead program on April 1, 2017. In August 2017, the NSUARB approved a program to enable Halifax Water to provide a 25% rebate for customers replacing a lead service line and to replace lead service lines that are disturbed during emergency repairs, at the utilities expense. This makes Halifax Water one of the first utilities in North America to take this step. To further reduce barriers to replacement, Halifax Water has applied to the NSUARB to allow Halifax Water to offer customers a financing program for the balance of the replacement cost. This financing program was approved in 2018.

In the first two years of the program, 197 public LSL's and 212 private LSL's were replaced. Unfortunately, in 2019 we saw a reduction in uptake in the program. Based on discussions with other utilities across North America, this appears to be a common phenomenon, as motivated customers participate in the program in the early years leaving less motivated customers in later years.

Accordingly, Halifax Water will be exploring further regulatory and incentive options to promote LSL replacement and anticipates an application to the NSUARB in 2020.

5.10 Safety and Security Program

Safety: Halifax Water's Occupational Health and Safety Program is based on the Internal Responsibility System (IRS), which is the foundation of the Nova Scotia Occupational Health and Safety Act. The IRS is an internal system that provides for direct responsibility for health and safety for all staff in an organization.

The Safety and Security group of Regulatory Services has principal duties and responsibilities as part of the IRS as follows:

- Assist in formulating and supervising the execution of the utility's Occupational Health and Safety Program, and assist management to fulfill, to the greatest degree possible, its responsibilities for safety.
- Co-ordinate and/or provide safety training to staff in an effort to prevent accidents, minimize losses, increase productivity and efficiency, and ensure compliance with safety legislation and policies.
- Conduct safety audits in the workplace to identify safety hazards and recommend control measures.
- Assist in the development and maintenance of a system of accident investigation, reporting, and follow-up.
- Provide program education for job safety.
- Act as a resource to the Joint Occupational Health and Safety Committee (JOHSC).
- Maintain liaison with federal, provincial, and local safety organizations by taking part in the activities and services of these groups.

Halifax Water has established and maintains an Occupational Health and Safety Program in consultation with the Joint Occupational Health and Safety Committees.

Halifax Water is a signatory of the Nova Scotia Health and Safety Leadership Charter which represents a commitment from industry leaders across Nova Scotia to the continuous growth of a positive workplace safety culture. Mental health and psychological health and safety are increasingly being recognized as an important component of occupational health

and safety. In 2020/21 Regulatory Services and Human Resources will be working together to further psychological health and safety initiatives and all Halifax Water employees will receive psychological health and safety training.

To enhance the safety culture, Safety Audits are being conducted both on Halifax Water Operation projects and the Capital Infrastructure Program, where Halifax Water engages third party contractors. The outcomes are being used as guidance on improvements to safety policies and training initiatives. Halifax Water continues to advance our Contractor Safety Program which will include improved contract language, orientation and monitoring pertaining to job site safety.

In 2020, to assist with the management of the safety program, it is proposed to review the applicability of the ***ISO 45001*** International Standard that specifies requirements for an occupational health and safety (OH&S) management system, with guidance for its use, to enable an organization to proactively improve its OH&S performance in preventing injury and ill-health.

As part of the commitment to the Incident Command System (ICS), Halifax Water continued to provide enhanced training to managers for roles related to General and Command staff under the ICS structure.

Halifax Water tracks safety indicators as part of the Corporate Balance Scorecard, which is described in Section 6.

There have been improvements in the safety indicators over the past two years, and a new metric was added in 2019/20 - the average score on internal safety audits. It is hoped that the inclusion of this metric and the continued focus on the internal safety audit program will continue to elevate the safety culture at Halifax Water.

Security: Halifax Water's Security Program is based on enterprise asset protection and is designed to protect three types of assets: people, property, and information. It also considers intangible assets such as the organization's reputation, relationships, and creditworthiness. The program has been developed to take an all-hazards approach, be it from natural, intentional, or accidental hazards, when reviewing risks to the organization.

Halifax Water uses the three basic elements of a physical security system to protect its assets to ensure it accomplishes its mission.

> ***Protection:*** The protection element is the physical barrier that delays the determined adversary and the opportunist in accomplishing their goals. Halifax Water uses barriers such as building fabric, fences, doors, door hardware, and containers to protect its assets.
>
> ***Detection:*** The detection element indicates and may also verify an actual or attempted overt or covert penetration. Halifax Water uses intrusion alarms, access control systems, CCTV, guards, and patrols to protect its assets.

Response: This element is the reaction to an attempted or actual penetration. Halifax Water uses internal staff and police forces as required, to protect its assets.

The strategic objectives for 2020/21 include an audit of physical security.

Vulnerability: Facility assessments are conducted in partnership with Public Safety Canada through the Regional Resilience Assessment Program (RRAP) utilizing the Critical Infrastructure Resilience Tool (CIRT). All major water and wastewater treatment facilities have now been evaluated. The CIRT is a voluntary and non-regulatory vulnerability assessment tool that estimates the resilience and protective posture of critical infrastructure facilities in support of the National Strategy and Action Plan for Critical Infrastructure.

Emergency Management Planning: Safe and reliable drinking water, sanitation and environmental protection are vital to the sustainability of communities within Halifax Regional Municipality. In recognition of this, Halifax Water maintains an Emergency Management Plan (EMP), as required by the provincial Emergency Management Act.

The purpose of the EMP is to establish an organizational structure and procedures for response to water wastewater, and stormwater incidents. It assigns roles and responsibilities for the activation and implementation of the plan during an emergency, using the Incident Command System (ICS). The preparation and exercising of an EMP can save lives, reduce risk to public health, enhance system security, minimize property damage, and lessen liability.

5.11 Compliance Plan

The Regulatory Compliance division of Regulatory Services has established a tracking system to monitor trends of non-compliance and associated sources for all of the wastewater treatment facilities (WWTF). A working group has been established between Asset Management, Operations and Design Services staff to track and plan for the upgrades to maintain compliance with Provincial and Federal regulations. As of 208/19, all treatment facilities are in compliance with WSER or have approval for operational variances consistent with the CCME Municipal Wastewater Effluent Strategy.

Building on the framework of the basic Compliance Plan from 2012, the plan was updated in 2019 utilizing information Halifax Water has available to create a path forward to maintain or achieve compliance for our wastewater, water and stormwater infrastructure systems over the next 30 years. The Compliance Plan highlights the current state of compliance at our wastewater treatment facilities and water supply plants as well as future compliance requirements. It also includes overall guidance on our wastewater collection system, sanitary and combined sewer overflows and our water distribution system including water reservoirs.

The key objectives of the Compliance Plan included:

- Review of previous work completed that relates to compliance, including the 2012 IRP, 2019 Infrastructure Master Plan and Five-Year Capital Program;
- Understanding current and future compliance requirements as they relate to wastewater, water and stormwater infrastructure;
- Understanding previous compliance trends and exploring potential compliance requirements taken from regional and global examples;
- Reviewing, documenting and analyzing the current performance of infrastructure against compliance requirements;
- Generation of infrastructure needs and costs to meet current and future compliance requirements;
- Incorporating the three drivers behind infrastructure planning (growth, asset management and compliance) through incorporating the impact of future growth trends and outlining projects that contain compliance components and asset renewal / growth components;
- Developing an action plan that outlines current, medium and long-term projects; and
- Identification of action plan risks and potential mitigation methods.

Halifax Water has been consistently working toward achieving the provincial level of wastewater treatment as stipulated by Nova Scotia Environment (NSE) permits and Federal Wastewater System Effluent Regulations (WSER). Historically, NSE has set compliance standards for each WWTF issuing Approval for Operation which sets the effluent limits, and the Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CSMMW) provided national standards for combined sewer overflows (CSO) and sanitary sewer overflows (SSO). Then in June 2012, the WSER was enacted which set national standards for WWTF effluent discharge and CSO and SSO standards.

Since the introduction of the federal WSER standards, NSE has been reviewing and renewing Halifax Water's operating permits with steady increases in compliance and reporting requirements.

The Compliance Plan is a key input to the Infrastructure Resource Plan (IRP). The IRP provides holistic guidance to understand the current level of compliance and actions required for maintaining compliance. Several initiatives have recently been completed and others underway shall continue. Current compliance initiatives are as follows:

- Compliance Monitoring and Reporting through the Regulatory Services Department;
- Engaging Dalhousie University in compliance research;
- Adopting the Environmental Management System (EMS);
- Environmental Risk Assessments (ERA); and
- WSER Transitional Authorization.

Halifax Water has entered into a 3-year research agreement with Dalhousie University to conduct specific research and optimization of Halifax Water facilities to stay "ahead of the curve" to meet its compliance requirements. The research program is eligible for funding under NSERC's Collaborative Research and Development Grant, an application to NSERC was made in spring 2019; the approval is pending. The NSERC is in the midst of redesigning its funding programs, Halifax Water and Dalhousie University intend to make a future application for a long-term funding when the new programs are in place. The current 3-year plan has a primary objective to improve effluent quality from chemically enhanced primary systems through bench, pilot and full scale testing and optimization of coagulation/flocculation processes; the other elements being the application of innovative UV technologies and assessment of contaminants of emerging concern

5.12 Asset Management

Asset Management Plans (AMPs) have been established by Halifax Water and asset management (AM) efforts are now focused on implementing recommendations and continuing to enhance the data that supports the annual AMP updates. Reprioritized initiatives identified in the Asset Management Roadmap Implementation (AMRI) are embedded in the AMP recommendations to support an in-house approach and balance efforts against other resourcing constraints. AM staff are continuing to develop programs to assist and enhance long-term infrastructure planning. Anticipated projects and programs for the Asset Management division in 2020/21 are outlined below.

Asset Management initiatives for 2020/21 include:

- Update the Asset Management Plan (annual)
- Continue the AMITs for three asset classes
- Support the RDC and Water and Wastewater Rate applications. Continue the driveway culvert data collection project
- Continue annual flow monitoring and sewer inspection programs
- Asset Management Program Development (subject to direction from Executive Team, the need to balance with ongoing corporate initiatives, and overlap with the IT Strategy) and may cover:
    - expand the current prioritization methodology
    - develop strategic maintenance management program
    - review levels of service
    - enhance capital budget support tools
    - develop an asset management resource library
    - assess the suitability of current data management tools and resource needs
    - continue to improve the way asset management data is shared

2020/21 will see staff continue implementation of three Asset Management Implementation Teams (AMITs) for three asset classes. The AMITs will effectively formalize meetings that Operations, Engineering and AM staff hold for reviewing capital priority needs. They will provide a forum for reviewing the AMP, consider the AMP recommendations and develop work plans for the asset class. AM staff will continue to refine the data that informs the AMPs including input of condition assessments, resolution of data discrepancies in GIS, and improvement of the 'best available' information on each asset class.

Staff will continue with the annual sewer inspection condition assessment program using conventional closed circuit television (CCTV) technology. During 2019 staff explored market interest and capabilities for continuing with zoom inspection technology for gathering condition information of the sewer networks. Efforts to streamline the way staff are able to share the outputs from the inspections will continue through 2020/21. The annual flow monitoring program will also continue in 2020/21.

5.13 Integrated Resource Plan

An updated IRP was completed in 2019. The IRP Update built on the previous studies to address three primary drivers: growth (Infrastructure Master Plan), asset renewal (AMPs), and regulatory compliance (Compliance Plan). This project reviewed existing supply and demand side management activities Halifax Water has done or could do to optimize service delivery, created a six-step program integration approach, and produced a comprehensive 30-year capital investment program.

Several important initiatives aimed at filling data gaps have been completed or initiated since the first IRP in 2012. These included:

- Implementing the Wet Weather Management Program (with inflow and infiltration reduction pilot projects);
- Continuing the implementation of the Asset Management Program (foundational elements from the AM Roadmap);
- Resolving asset attribute information gaps in GIS, and carrying out specific inventory and condition assessment projects;
- Developing Asset Management Plans (AMPs) by asset class;
- Implementing the Corporate Flow Monitoring Program;
- Implementing the Sewer Inspection Program (using closed circuit television (CCTV) inspection methods);
- Completing the Hydraulic Modelling Assessment and Strategy;
- Completing the West Region Wastewater Infrastructure Plan (WRWIP);
- Completing the Infrastructure Master Plan.

The Infrastructure Master Plan project is the latest undertaking towards data and knowledge gap completion. The Infrastructure Master Plan looked at growth requirements for the balance of the wastewater infrastructure planning (east and central regions), included the program developed in the WRWIP, and included a water infrastructure plan for all regions. The project also included a climate change assessment and a policy component to develop a climate change adaptation plan and a systems optimization plan. The project enables Halifax Water to streamline prior long-term planning initiatives to facilitate regular, holistic Infrastructure Master Plan updates on a five-year cycle for water and wastewater infrastructure.

The IRP update was completed in November 2019 and incorporates findings from work completed or planned to support the drivers of regulatory compliance, asset renewal, and growth. The IRP update features a review of demand and supply side management activities Halifax Water has been or could be involved in. Further, it uses a systematic approach to reviewing integration opportunities for outputs of the predecessor plans (Compliance Plan, AMPs, Infrastructure Master Plan).

The resulting IRP Update recalibrates the long-term investment to an estimated $4.1 billion over 30 years with and anticipated review as part of Halifax Water's long-term planning cycle every 5 years. Several key initiatives have been identified to support the next IRP update.

5.14 Enterprise Risk Management

In 2019 Halifax Water completed an Enterprise Risk Management (ERM) Framework, and the Halifax Water Board approved an ERM Policy, and a risk appetite and tolerance matrix. There are seven broad risk categories outlined in the policy, which align very closely to the Corporate Balanced Scorecard critical success factors. The risk categories and critical success factors may both change over time. In future, there will be consideration of the alignment. The more closely the risk categories and critical success factors align the less opportunity there will be for confusion or goal misalignment.

The ERM Policy will be rolled out in 2020, and Halifax Water will begin risk based reporting to the Halifax Water Board. It will take 2 – 3 years to fully embed ERM at Halifax Water; and an additional resource is required to coordinate enterprise risk management, and well as internal audit functions. Compliance with policies and standard operating procedures (SOPs) is important to help manage risk. Halifax Water will add capacity to conduct internal audits with a focus on promoting policy and SOP compliance.

Some of the most significant risks facing Halifax Water relate to infrastructure, therefore there are financial risks also - insufficient revenues to meet the projected operating requirements, and insufficient capital funding to meet the IRP recommended level of spend.

5.15 Regional Development Charge

The Halifax Water RDC is a fee payable at the building permit stage of a new development to fund regional water and wastewater infrastructure expansion requirements related to growth. The RDC was approved in 2014 and provides fairness across the rate base ensuring current customers do not subsidize new growth and development.

When the RDC rates were approved, Halifax Water committed to update the RDC on a five-year cycle, or mid-cycle if any of the assumptions used in determining the RDC impact the value of the charge by +/- 15%. No mid-cycle adjustment was required. Since approving the RDC, Halifax Water has completed a more detailed Infrastructure Master Plan, for water and wastewater infrastructure, to be used as inputs to the updating of the RDC.

In 2017 and 2019, Halifax Water conducted formal and informal stakeholder consultation on the updated RDC. The proposed updates were presented to the Halifax Water Board on October 2019, and the subsequent application was submitted to the NSUARB in November 2019. There is a Hearing scheduled for March 2020.

It is necessary to increase the RDC rates to reflect the new, comprehensive infrastructure master plan. At the time of the RDC approval in 2014, Halifax Water did not have all the components of a water system master plan. Since 2014, and in keeping with the NSUARB's requirement to update the RDC after five years, Halifax Water has completed a comprehensive infrastructure master plan. The master plan includes the first consolidated thirty year plan for water infrastructure.

The updates included current population forecasts, people per unit, the unit type ratios, design per capita consumption values, standardized costing and benefit to existing frameworks.

Money collected from the RDC funds upgrades and improvements to the regional wastewater and water systems that are required to accommodate growth anticipated within the Municipality's Regional Plan. There is no RDC for stormwater. The infrastructure requirements were identified through the Infrastructure Master Plan with growth related costs estimated at $212 M for wastewater and $165 M for water, based on a 20 year growth horizon. In keeping the outcomes of the initial application, the infrastructure costs were adjusted to reflect a 20 year growth horizon, with the post period benefits being tracked for the next five-year update.

5.16 Talent Management

Halifax Water uses the term talent management to describe our strategic workforce management activities to ensure we have the right people in the right places, at the right time, and at the right price to execute the business of the utility.

Figure 19 – Talent Management Cycle

In 2018/19, Halifax Water engaged an external consultant to review Halifax Water's succession planning, and processes to develop staff. In 2019/20 Halifax Water implemented some of the recommendations from the report. Some examples include new performance appraisal forms for non-union staff, and investment in an on-line training platform; and promotion of the existing Training and Life Long Learning programs.

In 2020, we will be focusing on building a feedback culture, as one major finding of the report was that employees would like more feedback on how they are doing. This is consistent with employee survey results. Providing feedback is one of the most important roles of a supervisor. All managers and supervisors will be trained to increase their skill and comfort with providing feedback. Additionally, in 2020/21 new managers and supervisors will participate in Halifax Water's supervisory training program "Performance Matters".

5.17 Employee Satisfaction

Each year Halifax Water engages an external consultant to conduct an employee survey. The overall rating in 2019 has increased to a B+ (3.8) from a B. The corporate balance scorecard target is an A- (4.0)

There were three areas where satisfaction improved by more than 10%:

- Being kept informed about important changes (up 14%)
- Halifax Water is interested in the well-being of its employees (up 10%)
- Feeling passionate about working at Halifax water (up 10%)

There are five areas where Halifax Water has showed some improvement, but is below the norm compared to other employers in Atlantic Canada. These will be areas that Halifax Water will examine for potential improvement in 2020/21.

- Employees understanding how they can meet personal performance targets
- Employees feeling a sense of accomplishment from their work
- Employees believing senior leadership are approachable
- Employees feeling their workplace reflects diverse cultural communities
- Employees feeling a high level of commitment to employer

In 2020/21, an action plan will be developed and implemented to respond to the 2019 employee survey results. The next survey will be conducted in November 2020.

6. PERFORMANCE MEASUREMENT

At the end of the 2020/21 fiscal year, Halifax Water's overall performance will be assessed against the Corporate Balanced Scorecard (CBS). Halifax Water has been utilizing a corporate balanced scorecard (CBS) to measure utility performance since 2001. Each year the Halifax Water Board sets organizational indicators and reviews performance results. The CBS targets for 2020/21 will be presented for approval at the March 2020 meeting of the Halifax Water board, prior to the start of the new fiscal year on April 1, 2020.

There are eight Critical Success Factors (CSFs) derived from Halifax Water's vision statement (shown in Appendix A) and under each of the CSFs, there are organizational indicators to track performance and allow for the establishment of targets. The following lists the current CSFs and corresponding results for the organizational indicators under each category.

1. High Quality Drinking Water

- Adherence with Water Quality Master Plan - Percentage of sites achieving targets
- Bacteriological tests - Percentage free from Total Coliform
- Customer satisfaction about water quality - Percentage from customer survey

2. Service Excellence

- Customer satisfaction with service - Percentage from customer survey
- Water service outages - Number of connection hours/1000 customers
- Wastewater service outages – Number of connection hours/1000 customers
- Average speed of answer – Percentage of calls answered within 20 seconds

3. Responsible Financial Management

- Operating expense/revenue ratio percentage
- Annual cost per customer connection – Water
- Annual cost per customer connection – Wastewater

4. Effective Asset Management

- Water leakage control – target leakage allowance of 160 litres/service connection /day
- I&I reduction - Number of inspections on private property for discharge of stormwater into the wastewater system
- Peak flow reduction from wet weather management capital projects
- Hours of unplanned outages in GIS and Cityworks
- Capital budget expenditures - Percentage of budget spend by end of fiscal year

5. Workplace Safety and Security

- Average score on internal safety audits
- NS Labour and Advanced Education compliance - # of Incidents with written compliance orders
- Lost time accidents -Number of accidents resulting in lost time per 100 employees
- Safe driving - Number of traffic Accidents per 1,000,000 km driven
- Training - Number of employees trained or re-certified before due date
- Percentage of completed safety talks

6. Regulatory Compliance

- Percentage of public health and environmental regulatory infractions resulting in an environmental warning report, summary offense ticket, ministerial order, or prosecution
- Percentage of WWTFs complying with NSE approval permits

7. Environmental Stewardship

- Number of ICI properties inspected by Pollution Prevention each year
- Energy management kwh/m^3 reduction associated with capital projects
- Bio-solids residual handling - % of sludge meeting bio-solids concentration targets

8. Motivated and Satisfied Employees

- Percentage of grievances resulting in arbitration
- Percentage of jobs filled with internal candidates
- Employee satisfaction survey result
- Average number of days absenteeism

Appendix A

Mission, Vision & Values

STRAIGHT from the SOURCE

Our Mission:

"To provide world class services
for our customers and our environment"

Our Vision:

- *We will provide our customers with high quality water, wastewater, and stormwater services.*
- *Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment.*
- *We will fully engage employees through teamwork, innovation, and professional development.*

Our Values:

Halifax Water promotes a culture where:

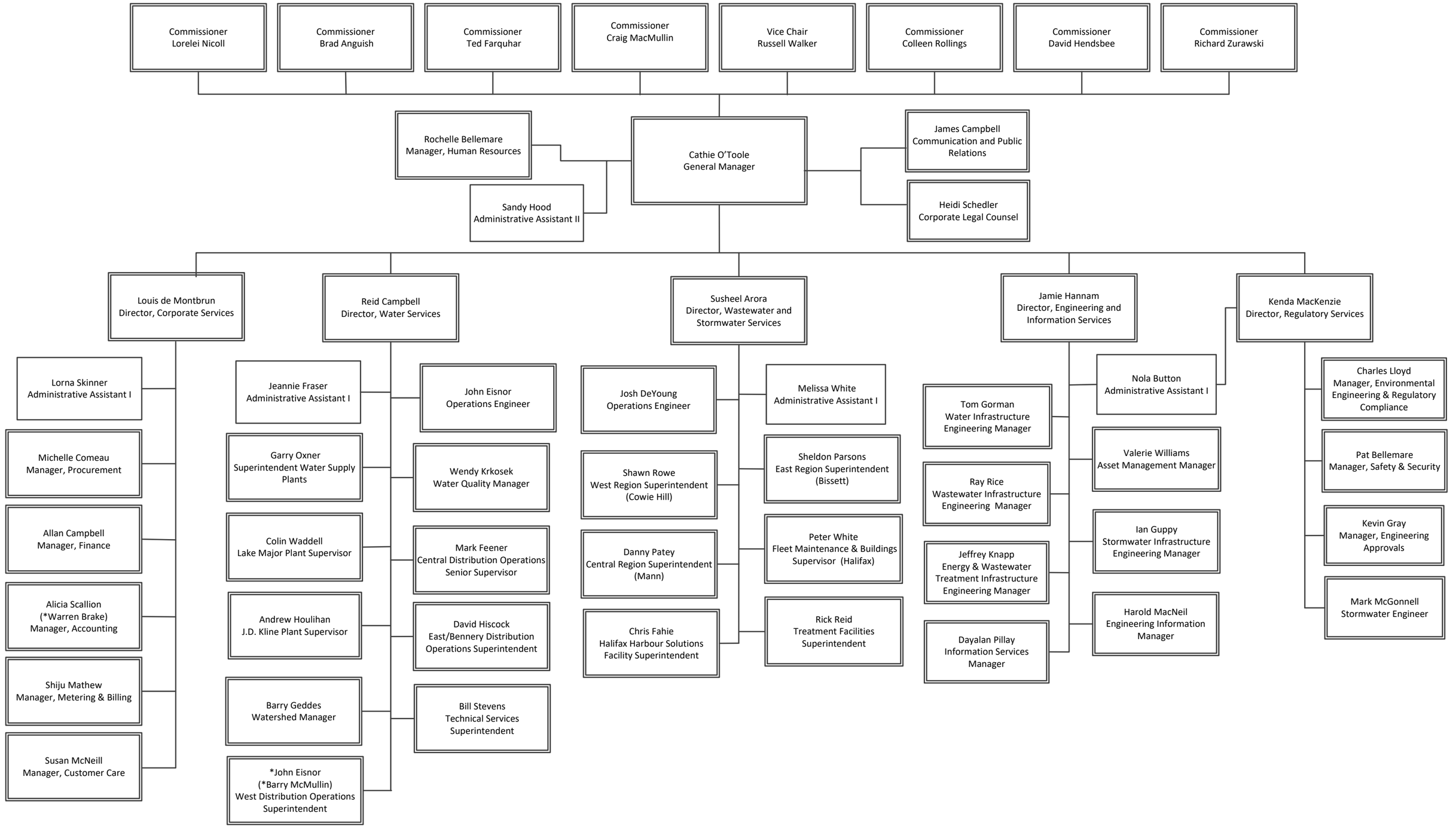
- *All Interactions are respectful, courteous, and civil*
- *We respect confidentiality of people and transparency of process*
- *We have an inclusive environment*
- *We lead by example*
- *We are positive and collaborative*
- *We treat employees and customers equitably*
- *We have a safe, accessible work environment*
- *We are accountable for our actions & behaviours*

Appendix B

Organizational Structure

STRAIGHT from the SOURCE

HALIFAX WATER ORGANIZATIONAL STRUCTURE



January 2020

Appendix C

2020/21 Capital Budget

STRAIGHT from the SOURCE

HALIFAX WATER

Capital Budget 2020/21

Summary

Asset Category	Project Costs
Water - Land -- T O T A L	$100,000
Water - Transmission -- T O T A L	$10,453,000
Water - Distribution -- T O T A L	$5,277,000
Water - Structures -- T O T A L	$10,980,000
Water - Treatment Facilities -- T O T A L	$15,129,000
Water - Energy -- T O T A L	$200,000
Water - Security -- T O T A L	$50,000
Water - Equipment -- T O T A L	$103,000
Water - Corporate Projects - T O T A L	$6,637,500
TOTAL - Water	**$48,929,500**

Wastewater - Trunk Sewers -- T O T A L	$500,000
Wastewater - Collection System -- T O T A L	$14,473,000
Wastewater - Forcemains -- T O T A L	$825,000
Wastewater Structures -- T O T A L	$8,415,000
Wastewater - Treatment Facility -- T O T A L	$5,525,000
Wastewater - Energy -- T O T A L	$75,000
Wastewater - Security -- T O T A L	$200,000
Wastewater - Equipment -- T O T A L	$255,000
Wastewater - Corporate Projects -- T O T A L	$8,180,000
TOTAL - Wastewater	**$38,448,000**

HALIFAX WATER

Capital Budget 2020/21

Summary

Asset Category	Project Costs
Stormwater - Pipes -- T O T A L	$2,380,000
Stormwater - Culverts -- T O T A L	$3,107,000
Stormwater - Structures -- T O T A L	$1,900,000
Stormwater - Corporate Projects -- T O T A L	$1,749,500
TOTAL - Stormwater	**$9,136,500**

G R A N D T O T A L	**$96,514,000**

HALIFAX WATER

Capital Budget 2020/21

Water

Project Number	Project Name	Project Cost
	Water - Land	
3.033	Watershed Land Acquisition	$100,000
	Water - Land -- T O T A L	**$100,000**
	Water - Transmission	
3.042	Critical Valve Replacement Program	$300,000
3.503	Chain Control Valve Upgrade Program	$45,000
3.581	Transmission Main Monitroing System Pilot	$200,000
3.549	Chain Control Transmission - Peninsula Low Upsize - Design	$100,000
3.552	Chain Control Transmission - Peninsula Intermediate Upsize - Design	$100,000
3.564	Herring Cove Road Looping-McIntosh Street	$228,000
3.568	Tacoma PRV Chamber	$420,000
3.291	Port Wallace Transmission Main - Main Street to Caledonia Road	$6,000,000
3.554	North End Feeder Replacement - Design	$200,000
3.399	Cogswell Interchange - Water Transmission Main Realignments	$2,850,000
3.045	Bedford West CCC - Various Phases	$5,000
3.261	Lakeside Timberlea CCC	$5,000
	Water - Transmission -- T O T A L	**$10,453,000**
	Water - Distribution	
3.022	Water Distribution - Main Renewal Program	$3,525,000
3.067	~ Valves Renewals	$125,000
3.068	~ Hydrants Renewals	$75,000
3.069	~ Service Lines Renewals	$100,000
3.390	Lead Service Line Replacement Program	$1,000,000
3.294	Automated Flushing Program	$20,000
3.334	Coburg Road Bridge Watermain Replacement	$300,000
3.501	South Street CN Bridge Watermain Installation	$25,000
3.296	Water Sampling Station Relocation Program	$10,000
3.513	Meadowbrook PRV Chamber - Replace PRV Valves	$35,000
3.569	Fall River Rechlorination Station	$25,000
3.573	Spring Garden Road - Main Renewal - Design	$37,000
	Water - Distribution -- T O T A L	**$5,277,000**

HALIFAX WATER

Capital Budget 2020/21

Water

Project Number	Project Name	Project Cost
	Water - Structures	
3.512	Eaglewood Pumping Station - New Pump Control Panel	$35,000
3.514	Steel Reservoir Climbing Systems - Safety Upgrades	$225,000
3.116	Bedford South (Hemlock) Reservoir CCC	$10,160,000
3.309	Cowie Hill Reservoir Replacement - Design	$200,000
3.515	Meadowbrook Reservoir Overflow Pipe Replacement	$70,000
3.517	Mount Edward Control Chamber - Extension of Power Supply	$20,000
3.523	Lake Major Dam - Site Improvements	$240,000
3.528	Beaver Bank Booster Station - Pump Upgrades	$30,000
	Water - Structures -- T O T A L	**$10,980,000**
	Water - Treatment Facilities	
	J D Kline Water Supply Plant:	
3.541	JD Kline WSP - Process Upgrades - Phase 1 - New Clarifier and Pre-Treatment	$1,475,000
3.542	JD Kline WSP - Process Upgrades - Phase 1 - Backwash Optimization	$1,700,000
3.543	JD Kline WSP - Process Upgrades - Phase 1 - Building Improvements	$110,000
3.141	JD Kline WSP - Raw Water Valve Actuators Replacement	$100,000
3.428	JD Kline WSP - Caustic Tank Liner Replacements	$25,000
3.465	JD Kline WSP - Low Lift Pump Replacements	$1,120,000
3.351	JD Kline WSP - Replace Westinghouse Electrical Panels	$8,000
3.530	JD Kline WSP - Alum Tank Liner Replacement	$45,000
3.531	J D Kline WSP - New Ultrasonic Level Transmitter	$10,000
3.472	JD Kline WSP - Replace Floc Tank Valve Actuators	$35,000
3.374	J D Kline WSP - Replace Filter Isolation Gates Program	$300,000
	Lake Major Water Supply Plant:	
3.532	Lake Major WSP - Phase 1 - Temporary Side Stream	$3,320,000
3.533	Lake Major WSP - Phase 1 - New Clarifiers and Pre-Treatment	$1,770,000
3.534	Lake Major WSP - Phase 1 - Filtration System Replacement	$370,000
3.535	Lake Major WSP - Phase 1 - Raw Water Pump Station	$265,000
3.536	Lake Major WSP - Phase 1 - Building Additions	$184,000
3.162	Lake Major WSP - Butterfly Valve Replacement Program	$350,000
3.507	Lake Major WSP - New Boat Launch	$42,000

HALIFAX WATER

Capital Budget 2020/21

Water

Project Number	Project Name	Project Cost
3.321	Lake Major WSP - Replace Fluoride Tank and Piping	$250,000
3.557	Lake Major WSP - Sludge Drying Beds Improvements	$500,000
3.526	Lake Major WSP - Roof Replacement	$400,000
3.560	Lake Major WSP - Emergency Pumps - Sitework Preparations	$320,000
3.524	Lake Major WSP - Fuel Storage for Generator at Low Lift Station	$135,000
	Bennery Lake Water Supply Plant:	
3.477	Aerotech Booster Station Capital Upgrades	$200,000
3.488	Bennery Lake WSP - Surge Anticipator Valves Replacement	$100,000
3.486	Bennery Lake WSP - Access Road Upgrade	$1,500,000
	Non-Urban Core WSP	
3.582	Bomont Equipment Upgrade	$150,000
3.518	Pump Replacement Program - Small Systems	$45,000
3.455	Reservoir Mixing and Residuals Management Upgrade Program	$300,000
	Water - Treatment Facilities -- T O T A L	**$15,129,000**
	Water - Energy	
3.221	Energy Management Capital Program (Water)	$100,000
3.107	Chamber HVAC Retro-Commissioning Program	$100,000
	Water - Energy -- T O T A L	**$200,000**
	Water - Security	
4.009	Security Upgrade Program	$50,000
	Water - Security -- T O T A L	**$50,000**
	Water - Equipment	
3.101	Miscellaneous Equipment Replacement	$50,000
3.502	Leak Detection Equipment	$8,000
3.516	Purchase Hydraulic Saws	$45,000
	Water - Equipment -- T O T A L	**$103,000**
	Water - Corporate Projects - T O T A L	**$6,637,500**
	GRAND TOTAL - WATER	**$48,929,500**

HALIFAX WATER

Capital Budget 2020/21

Wastewater

Project Number	Project Name	Project Cost
	Wastewater - Trunk Sewers	
2.822	Odour Level of Service and Optimization Review	$100,000
2.584	Fairview Cove Trunk Sewer - Design	$400,000
	Wastewater - Trunk Sewers - -- T O T A L	**$500,000**
	Wastewater - Collection System	
2.052	Integrated Wastewater Projects - Program	$2,000,000
2.168	Wastewater System - Trenchless Rehabilitation Program	$3,000,000
2.838	Albro Lakes Watershed Separation	$811,000
2.841	Local Network Upgrades on Beaver Bank Road - Design	$176,000
2.692	Cogswell Redevelopment - Sewer Relocation	$1,000,000
2.557	Punch Bowl PS Elimination	$100,000
2.746	Sewer Relocation at South Street CN Bridge	$450,000
2.437	Hines Road Rider Sewer Extension	$80,000
2.357	Manhole Renewals WW	$25,000
2.358	Lateral Replacements WW (non tree roots)	$1,720,000
2.563	Lateral Replacements WW (tree roots)	$541,000
2.223	Wet Weather Management Program	$350,000
2.074	Bedford West Collection System CCC	$39,000
2.836	Wyse Road Separation Phase 1	$386,000
2.672	Young Street - Sewer Separation	$100,000
2.674	South Park Street - Sewer Separation	$3,270,000
2.679	College Street - Sewer Separation	$100,000
2.526	Prince Albert Road Sewer Separation - Side Streets	$325,000
	Wastewater - Collection System -- T O T A L	**$14,473,000**
	Wastewater - Forcemains	
2.823	Akerley Blvd Forcemain Replacement	$65,000
2.819	Pumping Station Oil Tank Replacements	$60,000
2.82	Morris Lake Forcemain Investigation and Rehabilitation	$500,000
2.608	New Timberlea Pump Station Forcemain System - Design	$200,000
	Wastewater - Forcemains -- T O T A L	**$825,000**

HALIFAX WATER

Capital Budget 2020/21

Wastewater

Project Number	Project Name	Project Cost
	Wastewater - Structures	
2.42	Emergency Pumping Station Pump replacements	$250,000
2.442	Wastewater Pumping Station Component Replacement Program - West Region	$200,000
2.443	Wastewater Pumping Station Component Replacement Program - East Region	$200,000
2.444	Wastewater Pumping Station Component Replacement Program - Central Region	$250,000
2.818	Jamieson Pumping Station - Automatic Bar Screen	$60,000
2.853	Fairfield Holding Tank - Concept Design	$150,000
2.824	Bruce Street Pumping Station Relocation	$150,000
2.827	Wastewater Pumping Station Generator Plug/Switch Installations	$125,000
2.825	First Lake Pumping Station Upgrades	$70,000
2.654	PS Control Panel / Electrical Replacement	$725,000
2.829	Armscrest Pumping Station - Piping and Valve Upgrades	$71,000
2.005	Autoport Pleasant Street PS Replacement	$3,000,000
2.66	Bissett PS Component Upgrade	$50,000
2.655	Roach's Pond PS Component Upgrade	$550,000
2.093	Windmill Road PS Replacement	$1,355,000
2.665	CSO Upgrade Program	$300,000
2.459	William's Lake PS Rehabilitation	$100,000
2.74	Duffus PS CSO - Modification	$100,000
2.846	Upgrade Quigley's Corner Pumping Station	$287,000
2.847	Optimize Quigley's Corner Pumping Station	$22,000
2.609	New Timberlea Pumping Station - Design	$400,000
	Wastewater Structures -- T O T A L	**$8,415,000**
	Wastewater - Treatment Facility	
2.056	Plant Optimization Audit Program	$125,000
2.522	Emergency Wastewater Treatment Facility equipment replacements	$400,000
2.668	Wastewater Research Program Pilot Plant	$300,000
2.849	HSPs - OCS H2S Analyzers	$60,000
2.701	HHSP - OCS Wet Scrubber Chlorine Analyzers	$60,000

HALIFAX WATER

Capital Budget 2020/21

Wastewater

Project Number	Project Name	Project Cost
	Halifax Wastewater Treatment Facility:	
2.532	Duct Work Replacement	$50,000
2.765	Raw Water Pump Refurbishment	$50,000
2.767	Fixed Gas Meters - Replacement	$150,000
2.768	New Coagulant Dosing System	$100,000
2.769	New Polymer Dosing System	$40,000
2.77	Sludge Pumps - New Mechanical Seals	$60,000
2.706	Densadeg Hydraulic Optimization	$100,000
2.772	Grit System - Parts Replacements and New Screws	$50,000
2.776	Sludge Dewatering - Fournier Press Upgrades	$50,000
2.773	Industrial Water System Replacement	$50,000
	Dartmouth Wastewater Treatment Facility:	
2.502	Duct Work Replacement	$50,000
2.781	Fine Screens - New Perforated Plate Screens	$1,800,000
2.783	New Coagulant Dosing System	$100,000
2.784	New Polymer Dosing System	$40,000
2.707	Densadegs - CFD Analysis and Flow Diversion Vanes	$110,000
2.785	Heat Exchangers - Refurbishment	$40,000
2.787	Sludge Pumps - New Mechanical Seals	$60,000
2.791	Desadegs - Lamella Tube Settler Replacements	$300,000
2.850	Ballasted Flocculation Pilot	$75,000
2.855	Industrial Water System Replacement	$50,000
	Herring Cove Wastewater Treatment Facility:	
2.639	Duct Work Replacement Program	$50,000
2.794	Spare Sludge Tank mixer	$25,000
2.795	Sludge Pumps - New Mechanical Seals	$40,000
2.796	New Coagulant Dosing System	$30,000
2.797	Heat Exchangers - Refurbishment	$40,000
2.798	Waste Oil System - New Waste Oil Tank	$15,000
2.799	Electrical System - Spare Transfer Switch	$40,000
2.856	Industrial Water System Replacement	$50,000

HALIFAX WATER

Capital Budget 2020/21

Wastewater

Project Number	Project Name	Project Cost
	Eastern Passage Wastewater Treatment Facility:	
2.646	Secondary Launder Covers	$150,000
	Aerotech Wastewater Treatment Facility:	
2.809	Road Rehabilitation	$25,000
2.81	Bioreactors - Short Circuiting Modifications	$200,000
2.811	Lab - HVAC Modifications	$75,000
2.812	Centrifuge - Rebuild	$50,000
	Timberlea Wastewater Treatment Facility:	
2.816	Grit System - Chain and Bucket Replacement	$50,000
	Community Wastewater Treatment Facilities:	
2.761	Springfield Lake - Driveway Replacement	$15,000
	Biosolids Processing Facility:	
2.857	Building Upgrades	$250,000
2.732	Conveyor CS1 Liners	$30,000
2.733	Biofilter Media	$50,000
2.815	Dryer Upgrades	$70,000
	Wastewater - Treatment Facility -- T O T A L	**$5,525,000**
	Wastewater - Energy	
2.65	HHSP - BAS + HVAC Recommissioning	$50,000
2.651	NSPI Meter Relocations	$25,000
	Wastewater - Energy -- T O T A L	**$75,000**
	Wastewater - Security	
4.008	Security Upgrade Program	$200,000
	Wastewater - Security -- T O T A L	**$200,000**
	Wastewater - Equipment	
2.161	I&I Reduction (SIR) Program Flow Meters and Related Equipment	$25,000
2.451	Miscellaneous Equipment Replacement	$120,000
2.821	Duffus Strees PS Flow Meter Replacement	$110,000
	Wastewater - Equipment -- T O T A L	**$255,000**
	Wastewater - Corporate Projects -- T O T A L	**$8,180,000**
	GRAND TOTAL - WASTEWATER	**$38,448,000**

HALIFAX WATER

Capital Budget 2020/21

Stormwater

Project Number	Project Name	Project Cost
	Stormwater - Pipes	
1.038	Integrated Stormwater Projects - Program	$1,000,000
1.102	Manhole Renewals SW	$15,000
1.103	Catchbasin Renewals SW	$60,000
1.135	Lateral Replacements SW	$12,000
1.145	Sullivan's Pond Storm Sewer System Replacement - Phase 2 Irishtown Rd to Harbour	$25,000
1.034	Raymond Street, Phase 2 - Storm Sewer Rehabilitation	$100,000
1.188	Cogswell Redevelopment - SW Sewer Relocation	$955,000
1.201	Stormwater Pipe Condition Inspections (CSP)	$50,000
1.223	Rocky Lake and Bedford Highway Intersection Storm Sewer Upgrade	$75,000
1.224	Thistle Street Storm Drainage System Upgrade - Preliminary Engineering	$50,000
1.227	Stormwater System Upgrade near Civic #1681 Waverley Road	$38,000
	Stormwater - Pipes -- T O T A L	**$2,380,000**
	Stormwater - Culverts/Ditches	
1.104	Driveway Culvert Replacements	$1,200,000
	Street Specific Culvert Replacements:	
1.214	KIPAWA CRESCENT	$400,000
1.125	CORONET AVENUE DRIVEWAY CULVERT REPLACEMENT PROJECT	$925,000
1.147	COLE HARBOUR ROAD, near civic 1560	$350,000
1.183	ST MARGARET'S BAY ROAD, near civic 2797	$80,000
1.228	BLUE FOREST LANE, near civic 42	$38,000
1.229	DEVIL'S HILL ROAD at BOULDERBROOK LANE	$38,000
1.231	31 KETCH HARBOUR RD, near civic 832	$38,000
1.232	WAVERLEY ROAD, near civic 832	$38,000
	Stormwater - Culverts/Ditches -- T O T A L	**$3,107,000**
	Stormwater - Structures	
1.225	Ellenvale Run Retaining Wall - Phase 4	$1,900,000
	Stormwater - Structures -- T O T A L	**$1,900,000**
	Stormwater - Corporate Projects -- T O T A L	**$1,749,500**
	GRAND TOTAL - STORMWATER	**$9,136,500**

HALIFAX WATER

Capital Budget 2020/21

Corporate Projects

Project Number	Project Name	Project Cost
	Corporate - Information Technology	
4.097	Analytics Decision Support System	$335,000
4.111	Asset Condition	$125,000
4.151	Capital Planning	$100,000
4.083	Computerized Maintenance Management System (CMMS) Enhancements	$1,000,000
4.011	Desktop Computer Replacement Program	$350,000
4.146	Disaster Recovery	$630,000
4.147	Document Management Sharepoint Rollout	$300,000
4.126	Full Enterprise Data Warehouse	$200,000
4.012	Network Upgrades	$280,000
4.121	New Payroll System	$230,000
4.048	SAP Rate Structure Support	$220,000
4.15	Enterprise Resource Planning Solution	$2,630,000
4.107	Customer Portal	$50,000
4.152	Security Projects	$300,000
	Corporate - Information Technology -- T O T A L	**$6,750,000**
	Corporate - GIS	
4.04	GIS Data Program	$100,000
4.115	GIS Data Build - Services (ICI)	$150,000
4.01	Sewer Service Entry	$250,000
4.116	GIS Data Project (CAD schematic retirement)	$150,000
4.038	GIS Hardware/Software Program	$50,000
4.039	GIS Application Support Program	$150,000
4.059	Utility Network Modeling/Data Modeling	$50,000
4.118	Engineering Drawing Database	$100,000
4.155	Stormwater Billing Imagery Acquisition and Analysis	$350,000
	Corporate - GIS -- T O T A L	**$1,350,000**
	Corporate - Asset Management	
2.523	Wastewater Sewer Condition Assessment	$215,000
1.156	Storm Sewer Condition Assessment	$95,000
2.043	Corporate Flow Monitoring Program	$1,870,000

HALIFAX WATER

Capital Budget 2020/21

Corporate Projects

Project Number	Project Name	Project Cost
4.113	Vulnerability to Climate Change Risk Assessment-Asset Class Pilot	$250,000
2.562	Outfall Assessment Project	$20,000
4.14	SSO Management Program	$100,000
4.141	System Constraints Analysis HRM (was East Additional Flow Monitoring)	$252,000
4.143	Safe Yield Study	$200,000
4.144	New Hydraulic Model (infoWater)	$200,000
4.145	Transmission Main Risk Assessment and Prioritization Framework	$50,000
	Corporate - Asset Management -- T O T A L	**$3,252,000**
	Corporate - Facility	
2.176	East/Central Regional Operational Facility	$2,000,000
4.077	Building Capital Improvements	$185,000
3.221	Energy Management Capital Program	$100,000
	Corporate - Facility -- T O T A L	**$2,285,000**
	Corporate - SCADA & Other Equipment	
4.093	GPS Units - Replacement	$70,000
4.004	SCADA Control System Enhancements	$100,000
4.136	ICS Cyber Security Enhancements	$100,000
4.137	Halifax Harbour Solutions Radio Upgrade	$60,000
4.138	Wastewater Community Plants SCADA System Relocation	$45,000
4.139	PI System Enhancements	$100,000
4.154	Customer Meters - New and Replacement	$500,000
	Corporate - SCADA & Other Equipment -- T O T A L	**$975,000**
	Corporate - Fleet	
4.006	Fleet Upgrade Program Stormwater	$269,000
4.006	Fleet Upgrade Program Wastewater	$1,076,000
4.007	Fleet Upgrade Program Water	$610,000
	Corporate - Fleet -- T O T A L	**$1,955,000**
	GRAND TOTAL - Corporate Projects	**$16,567,000**

	ALLOCATION BREAKDOWN:	
	Water - Corporate Projects - T O T A L	$6,637,500
	Wastewater - Corporate Projects -- T O T A L	$8,180,000
	Stormwater - Corporate Projects -- T O T A L	$1,749,500
	GRAND TOTAL - Corporate Projects	**$16,567,000**

HALIFAX WATER

Capital Budget 2020/21

Summary of Routine Capital Expenditures included within Capital Budget

Project Number	Project Name	Project Cost	Asset Class
3.067	Valves Renewals	$125,000	Water
3.068	Hydrants Renewals	$75,000	Water
3.069	Service Lines Renewals	$100,000	Water
3.390	Lead Service Line Replacement Program	$1,000,000	Water
3.101	Miscellaneous Equipment Replacement (W)	$50,000	Water
4.007	Fleet Upgrade Program Water	$610,000	Water
2.357	Manhole Renewals WW	$25,000	Wastewater
2.358	Lateral Replacements WW (non-tree roots)	$1,720,000	Wastewater
2.563	Lateral Replacements WW (tree roots)	$541,000	Wastewater
2.161	I&I Reduction (SIR) Program Flow Meters and Related Equipment	$25,000	Wastewater
2.451	Miscellaneous Equipment Replacement (WW)	$120,000	Wastewater
4.006	Fleet Upgrade Program Wastewater	$1,076,000	Wastewater
1.102	Manhole Renewals SW	$15,000	Stormwater
1.103	Catchbasin Renewals SW	$60,000	Stormwater
1.135	Lateral Replacements SW	$12,000	Stormwater
4.006	Fleet Upgrade Program Stormwater	$269,000	Stormwater
4.011	Desktop Computer Replacement Program	$350,000	Corporate
4.093	GPS Units - Replacement	$70,000	Corporate
4.154	Customer Meters - New and Replacement	$500,000	Corporate
4.012	Network Upgrades	$280,000	Water & Wastewater
	GRAND TOTAL - Routine Capital Projects	**$7,023,000**	

Appendix D

2020/21 Operating Budget

STRAIGHT from the SOURCE

HALIFAX WATER
CONSOLIDATED SUMMARY OF ESTIMATED REVENUE & EXPENSES
PROPOSED OPERATING BUDGET
APRIL 1, 2020 to MARCH 31, 2021
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	**PROPOSED BUDGET APR 1/20 MAR 31/21**
OPERATING REVENUE	$138,413	$138,727	**$138,618**
OPERATING EXPENSES	$105,731	$115,088	**$118,110**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$32,682	$23,639	**$20,508**
FINANCIAL REVENUE			
INVESTMENT INCOME	$1,156	$816	**$86**
MISCELLANEOUS	$742	$553	**$532**
	$1,898	$1,369	**$619**
FINANCIAL EXPENSES			
LONG TERM DEBT INTEREST	$7,430	$8,181	**$8,823**
LONG TERM DEBT PRINCIPAL	$20,516	$19,822	**$21,880**
AMORTIZATION DEBT DISCOUNT	$199	$202	**$228**
DIVIDEND/GRANT IN LIEU OF TAXES	$4,999	$5,147	**$6,113**
MISCELLANEOUS	$45	$22	**$32**
	$33,190	$33,374	**$37,076**
	#		
OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES	$1,390	($8,366)	**($15,949)**
Less:			
Pension accrual	*($6,208)*	*($5,668)*	*($10,204)*
Operating Deficit on an Accrual Basis	*($4,818)*	*($14,034)*	*($26,152)*

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

HALIFAX WATER
ESTIMATED REVENUE AND EXPENSES - WATER OPERATIONS
PROPOSED OPERATING BUDGET
APRIL 1, 2020 to MARCH 31, 2021
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	**PROPOSED BUDGET APR 1/20 MAR 31/21**
OPERATING REVENUE			
METERED SALES	$48,040	$47,744	**$48,069**
FIRE PROTECTION	$7,074	$7,074	**$7,074**
PRIVATE FIRE PROTECTION SERVICES	$869	$873	**$884**
BULK WATER STATIONS	$227	$292	**$303**
CUSTOMER LATE PAY./COLLECTION FEES	$244	$223	**$238**
MISCELLANEOUS	$98	$179	**$177**
	$56,552	$56,387	**$56,746**
OPERATING EXPENSES			
WATER SUPPLY & TREATMENT	$8,516	$9,597	**$9,369**
TRANSMISSION & DISTRIBUTION	$10,014	$11,127	**$11,282**
SMALL SYSTEMS (incl. Contract Systems)	$1,251	$1,237	**$1,221**
TECHNICAL SERVICES (SCADA)	$889	$1,037	**$1,029**
ENGINEERING & INFORMATION SERVICES	$3,749	$3,901	**$4,162**
REGULATORY SERVICES	$679	$1,142	**$1,195**
CUSTOMER SERVICE	$2,524	$2,918	**$2,758**
ADMINISTRATION & PENSION	$3,986	$4,355	**$4,112**
DEPRECIATION	$9,046	$9,955	**$10,993**
	$40,655	$45,270	**$46,121**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$15,898 #	$11,117	**$10,625**
FINANCIAL REVENUE			
INVESTMENT INCOME	$521	$367	**$39**
MISCELLANEOUS	$559	$431	**$394**
	$1,080	$798	**$432**
FINANCIAL EXPENSES			
LONG TERM DEBT INTEREST	$1,924	$2,238	**$3,127**
LONG TERM DEBT PRINCIPAL	$7,181	$5,165	**$6,465**
AMORTIZATION DEBT DISCOUNT	$85	$67	**$84**
DIVIDEND/GRANT IN LIEU OF TAXES	$4,999	$5,147	**$5,654**
MISCELLANEOUS	$24	$12	**$2**
	$14,214	$12,630	**$15,332**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES	$2,764	($715)	**($4,275)**

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

HALIFAX WATER
ESTIMATED REVENUE AND EXPENSES - WASTEWATER OPERATIONS
PROPOSED OPERATING BUDGET
APRIL 1, 2020 to MARCH 31, 2021
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19		APPROVED BUDGET * APR 1/19 MAR 31/20	**PROPOSED BUDGET APR 1/20 MAR 31/21**
OPERATING REVENUE				
METERED SALES	$69,901		$70,031	**$70,365**
WASTEWATER OVERSTRENGTH AGREEMENTS	$75		$50	**$30**
LEACHATE	$330		$394	**$387**
CONTRACT REVENUE	$87		$86	**$86**
SEPTAGE TIPPING FEES	$764		$760	**$505**
DEWATERING FACILITY/ SLUDGE LAGOON	$210		$210	**$0**
AIRLINE EFFLUENT	$143		$160	**$105**
CUSTOMER LATE PAY./COLLECTION FEES	$186		$164	**$176**
MISCELLANEOUS	$185		$139	**$136**
	$71,881		$71,993	**$71,790**
OPERATING EXPENSES				
WASTEWATER COLLECTION	$11,676		$10,972	**$11,847**
WASTEWATER TREATMENT PLANTS	$18,197		$19,139	**$19,332**
SMALL SYSTEMS	$1,262		$1,323	**$1,239**
DEWATERING FACILITY/ SLUDGE MGM'T	$226		$636	**$404**
BIOSOLIDS TREATMENT	$27		$101	**$101**
LEACHATE CONTRACT	$286		$325	**$337**
TECHNICAL SERVICES (SCADA)	$1,450		$1,784	**$1,652**
ENGINEERING & INFORMATION SERVICES	$3,783		$3,556	**$3,769**
REGULATORY SERVICES	$886	#	$1,434	**$1,537**
CUSTOMER SERVICE	$2,057		$2,536	**$2,352**
ADMINISTRATION & PENSION	$3,242		$3,606	**$3,405**
DEPRECIATION	$12,986		$13,921	**$15,072**
	$56,079		$59,334	**$61,045**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$15,801		$12,659	**$10,745**
FINANCIAL REVENUE				
INVESTMENT INCOME	$520		$367	**$39**
MISCELLANEOUS	$183		$122	**$139**
	$703		$489	**$178**
FINANCIAL EXPENSES				
LONG TERM DEBT INTEREST	$4,939		$5,133	**$4,772**
LONG TERM DEBT PRINCIPAL	$12,015		$12,965	**$13,442**
AMORTIZATION DEBT DISCOUNT	$103		$113	**$124**
DIVIDEND/GRANT IN LIEU OF TAXES	$0		$0	**$398**
MISCELLANEOUS	$21		$10	**$30**
	$17,077		$18,220	**$18,766**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES	($573)		($5,072)	**($7,843)**

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

HALIFAX WATER
ESTIMATED REVENUE AND EXPENSES - STORMWATER OPERATIONS
PROPOSED OPERATING BUDGET
APRIL 1, 2020 to MARCH 31, 2021
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19		APPROVED BUDGET * APR 1/19 MAR 31/20	**PROPOSED BUDGET APR 1/20 MAR 31/21**
OPERATING REVENUE				
STORMWATER SITE RELATED SERVICE	$5,906		$6,351	**$6,047**
STORMWATER RIGHT-OF-WAY SERVICE	$3,835		$3,835	**$3,835**
CUSTOMER LATE PAY./COLLECTION FEES	$118		$66	**$106**
MISCELLANEOUS	$120		$95	**$92**
	$9,980		$10,347	**$10,081**
OPERATING EXPENSES				
STORMWATER COLLECTION	$4,901		$5,750	**$5,779**
TECHNICAL SERVICES (SCADA)	$49		$39	**$42**
ENGINEERING & INFORMATION SERVICES	$624		$1,122	**$1,273**
REGULATORY SERVICES	$1,587		$1,505	**$1,627**
CUSTOMER SERVICE	$335		$273	**$304**
ADMINISTRATION & PENSION	$527		$586	**$554**
DEPRECIATION	$974		$1,208	**$1,365**
	$8,997		$10,484	**$10,943**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$983		($137)	**($862)**
FINANCIAL REVENUE				
INVESTMENT INCOME	$116	#	$82	**$9**
MISCELLANEOUS	$0		$0	**$0**
	$116		$82	**$9**
FINANCIAL EXPENSES				
LONG TERM DEBT INTEREST	$567		$810	**$924**
LONG TERM DEBT PRINCIPAL	$1,320		$1,692	**$1,973**
AMORTIZATION DEBT DISCOUNT	$11		$22	**$20**
DIVIDEND/GRANT IN LIEU OF TAXES	$0		$0	**$62**
MISCELLANEOUS	$0		$0	**$0**
	$1,899		$2,524	**$2,978**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES	($800)		($2,579)	**($3,832)**

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

HALIFAX WATER
ESTIMATED REVENUE & EXPENSES, SEGREGATED BY REGULATED AND UNREGULATED ACTIVITIES
PROPOSED OPERATING BUDGET
APRIL 1, 2020 to MARCH 31, 2021
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	**PROPOSED BUDGET APR 1/20 MAR 31/21**
REGULATED ACTIVITIES			
OPERATING REVENUE			
METERED SALES	$117,941	$117,775	**$118,434**
FIRE PROTECTION	$7,074	$7,074	**$7,074**
PRIVATE FIRE PROTECTION	$869	$873	**$884**
STORMWATER SITE RELATED SERVICE	$5,906	$6,351	**$6,047**
STORMWATER RIGHT-OF-WAY SERVICE	$3,835	$3,835	**$3,835**
OTHER OPERATING REVENUE	$1,216	$1,171	**$1,221**
	$136,841	$137,079	**$137,496**
OPERATING EXPENSES			
WATER SUPPLY & TREATMENT	$8,516	$9,591	**$9,363**
TRANSMISSION & DISTRIBUTION	$10,014	$11,127	**$11,282**
WASTEWATER COLLECTION	$11,643	$10,840	**$11,723**
STORMWATER COLLECTION	$4,901	$5,750	**$5,779**
WASTEWATER TREATMENT PLANTS	$18,197	$19,139	**$19,332**
SMALL SYSTEMS	$2,493	$2,534	**$2,431**
SCADA, CONTROL & PUMPING	$2,388	$2,860	**$2,722**
ENGINEERING & INFORMATION SERVICES	$8,156	$8,559	**$9,184**
REGULATORY SERVICES	$3,152	$4,081	**$4,359**
CUSTOMER SERVICE	$4,881	$5,687	**$5,373**
ADMINISTRATION & PENSION	$7,713	$8,456	**$7,972**
DEPRECIATION	$22,989	$25,022	**$27,349**
	$105,043	$113,648	**$116,869**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$31,798	$23,432	**$20,627**
FINANCIAL REVENUE			
INVESTMENT INCOME	$1,156	$816	**$86**
MISCELLANEOUS	$213	$110	**$39**
	$1,369	$926	**$126**
FINANCIAL EXPENSES			
LONG TERM DEBT INTEREST	$7,430	$8,166	**$8,807**
LONG TERM DEBT PRINCIPAL	$20,516	$19,802	**$21,860**
AMORTIZATION DEBT DISCOUNT	$199	$202	**$227**
DIVIDEND/GRANT IN LIEU OF TAXES	$4,999	$5,147	**$6,113**
MISCELLANEOUS	$0	$11	**$1**
	$33,145	$33,327	**$37,009**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES	$23	($8,970)	**($16,256)**
UNREGULATED ACTIVITIES			
OPERATING REVENUE			
SEPTAGE TIPPING FEES	$764	$760	**$505**
LEACHATE	$330	$394	**$387**
CONTRACT REVENUE	$87	$86	**$86**
DEWATERING FACILITY/ SLUDGE LAGOON	$210	$210	**$0**
AIRLINE EFFLUENT	$143	$160	**$105**
ENERGY PROJECTS	$165	$0	**$0**
MISCELLANEOUS	$38	$38	**$38**
	$1,737	$1,648	**$1,121**
OPERATING EXPENSES			
- DIRECT			
WATER SUPPLY & TREATMENT	$20	$26	**$28**
WASTEWATER COLLECTION	$0	$118	**$111**
WASTEWATER TREATMENT	$572	$1,062	**$842**
SPONSORSHIPS & DONATIONS	$78	$61	**$68**
DEPRECIATION	$18	$62	**$81**
	$688	$1,330	**$1,130**
- INDIRECT (ADMINISTRATION)	$0	$110	**$110**
	$688	$1,440	**$1,240**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$1,049	$207	**($119)**
FINANCIAL REVENUE			
MISCELLANEOUS	$364	$443	**$493**
FINANCIAL EXPENSES			
LONG TERM DEBT INTEREST	$0	$16	**$16**
LONG TERM DEBT PRINCIPAL	$0	$20	**$20**
AMORTIZATION DEBT DISCOUNT	$0	$0	**$0**
MISCELLANEOUS	$45	$11	**$31**
	$45	$47	**$67**
OPERATING SURPLUS AVAILABLE FOR CAPITAL EXPENDITURES	$1,368	$604	**$307**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES - COMBINED ACTIVITIES	$1,390	($8,366)	**($15,949)**

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

Halifax Water
Halifax Regional Water Commission

ITEM # 6
HRWC Board
January 30, 2020

TO: Craig MacMullin MBA, FCPA, FCGA , Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*

Cathie O'Toole, MBA, FCPA, FCGA, ICD.D
General Manager

DATE: January 15, 2020

SUBJECT: **Proposed Five Year Business Plan (2020/21 – 2024/25)**

ORIGIN

NSUARB Water Utility Accounting and Reporting Handbook requirement to submit multi-year budget information

The corporate business planning process, and Halifax Water Board workshop in December 2019

RECOMMENDATION

It is recommended the Halifax Water Board approve the Five Year (2020/21 – 2024/25) Business Plan in the substantive form attached.

BACKGROUND

Halifax Water develops both long-term and short-term business plans for the approval of the Commission Board. The Five Year Business Plan is consistent with the updated Integrated Resource Plan [IRP] approved by the Board in November 2019.

The Nova Scotia Utility and Review Board (NSUARB) Accounting and Reporting Handbook requires the submission of multi-year (three year) operating and capital budgets by September 30th of each year. The three years submitted are a subset of the Five Year budget. To meet the annual three-year reporting requirement, the Five Year budget must be refreshed mid-cycle. A refresh would also be considered as part of rate applications to ensure the information submitted is current. The last Five Year Business Plan covered the period 2018/19 to 2022/23; and was based on the 2012 Integrated Resource Plan.

DISCUSSION

The Five-Year Business Plan provides an overview of the framework and strategic drivers that impact the delivery of water, wastewater and stormwater services over the long term. The framework consists of the 2019 Integrated Resource Plan, the Debt Strategy, and Cost of Service Manual. These mature strategies guide development of business plans, capital and operating budgets; revenue requirements and rates.

January 1, 2020 marks 75 years of service for Halifax Water. Halifax Water has grown from the Halifax Public Service Commission established in 1945 to provide water service to the city of Halifax; to an integrated water, wastewater and stormwater utility serving 105,000 customers and an estimated population of 370,000.

This Five Year Business Plan and 75th Anniversary presents a great opportunity to reflect on accomplishments but also provides an opportunity to recalibrate business plans for current strategic drivers. As such, staff have compiled a Five-Year Business Plan to capture the most current information. The attached Business Plan will serve as a guidance document for the implementation of programs and strategies over the next five years and position the utility for service delivery in the long term. This Five Year Business Plan recognizes the need for further capital investment as contemplated in the updated Integrated Resource Plan. Halifax Water is taking positive actions towards climate adaptation in ensuring the updated Integrated Resource Plan considers climate vulnerabilities to reduce risk to infrastructure and service delivery.

As indicated in the 2019 IRP, there is a pressing need to replace aging water, wastewater and stormwater infrastructure that will affect operating and capital budgets. The Business Plan presents the capital program and projected operating budgets for the next five years, and includes many major capital projects such as upgrades to the Pockwock and Lake Major water supply plants, upgrades to the Mill Cove Wastewater Treatment facility, and the next phase of the Sullivan's Pond stormwater project. Over the next five years, Halifax Water will be developing and implementing strategies to increase the level of capital expenditures to the level recommended by the IRP to address the strategic drivers of asset renewal, growth, and regulatory compliance. Of the three strategic drivers included in the IRP, asset renewal will present the greatest challenge recognizing the backlog of investments in relation to the replacement of aging infrastructure.

The updated Five Year Business Plan is important to support the application to increase water and wastewater rates in 2020. No rate changes for stormwater service are planned at this time; however, the need to adjust stormwater rates will be considered after satellite imagery used to measure billable impervious area is updated in spring 2020.

Halifax Water has ambitious plans for continued innovation and improvement that are outlined in the Five Year Business Plan. Along with many other technology and customer focused projects, a customer portal combined with recently installed Advanced Meter Infrastructure will help transform Halifax Water into the utility of the future. The

document also recognizes the increased importance of enterprise risk management, formal asset management, energy management and wet weather management programs to optimize service delivery and demonstrate value for our customers.

The attached document describes many of the risks and mitigation strategies that the Utility will face and adopt, respectively, in the short to long term. The Business Plan culminates with the main recommendation to submit a Rate Application to the NSUARB in February 2020 to cover operational and capital programs for the test years of 2020/21 and 2021/22.

In addition to this Rate Application, it is recognized that rate increases will be a theme over the long term and, as such, the utility needs to ensure customers recognize the value of public health and environmental protection embedded in the utility's mission. In particular, it will be crucial to educate the public to realize that environmental protection has moved to a new level and infrastructure renewal supports our local economy and quality of life.

The Business Plan development was led by the Halifax Water Executive Team with support from many employees in all departments. It is therefore important that information related to the Business Plan continue to be shared with management and employees to ensure our strategic direction is well understood and embraced. Following approval of the Five Year Business Plan Halifax Water will develop and implement a strategy to communicate the Five Year Business Plan with customers, employees and stakeholders.

ALTERNATIVES

None

ATTACHMENT

Five Year Business Plan (2020/21 – 2024/25) (electronic copy only)

Report Prepared by: *Original Signed By:*
Cathie O'Toole, MBA, FCPA,FCGA, ICD.D
General Manager, 902-490-4840

DRAFT

2020/21 - 2024/25

Five-Year Business Plan

Draft

Presented to Halifax Water Board

January 30, 2020

STRAIGHT from the SOURCE

Halifax Water

Glossary

AM	Asset Management
AMIT	Asset Management Implementation Team
AMP	Asset Management Plan
AO	Aesthetic Objective
AMI	Advanced Metering Infrastructure
AWWA	American Water Works Association
BLT	Beechville-Lakeside Timberlea
BMPs	Best Management Practices
BOD	Biochemical Oxygen Demand
BPF	Biosolids Processing Facility
CapEx	Capital Expenditures
CBOD	Carbonaceous Biochemical Oxygen Demand
CCME	Canadian Council of Ministers of the Environment
CCTV	Closed Circuit Television
CEC	Contaminants of Emerging Concern
CIPP	Cured in Place Pipe
CFIA	Canadian Food Inspection Agency
COMFIT	Community Feed-In Tariff
COS	Cost of Service
CMMS	Computerized Maintenance Management System
CRM	Customer Relationship Management
CSO	Combined Sewer Overflow
CSMMW	Canada-Wide Strategy for the Management of Municipal Wastewater Effluent
CUPE	Canadian Union of Public Employees
CWWF	Clean Water and Wastewater Fund
dia.	Diameter
EMAP	Energy Management Action Plan
EMP	Emergency Management Plan
EMS	Environmental Management System
EMSC	Energy Management Steering Committee
EMO	Energy Management Opportunities
EPWWTF	Eastern Passage Wastewater Treatment Facility
ERA	Environmental Risk Assessment
ERM	Enterprise Risk Management
ERP	Enterprise Resource Planning
GHG	Greenhouse Gas
GIS	Geographic Information System
HHSP	Halifax Harbour Solutions Project
HRM	Halifax Regional Municipality
HRWC	Halifax Regional Water Commission
I&I	Inflow & Infiltration
ICI	Industrial, Commercial & Institutional

ICIP	Investing in Canada Infrastructure Program
ICS	Incident Command System
IDF	Intensity-Duration-Frequency
IMP	Infrastructure Master Plan
IRP	Integrated Resource Plan
IRS	Internal Responsibility System
IS	Information Systems
JOHSC	Joint Occupation Health & Safety Committee
LSL	Lead Service Line
m3	Cubic Metre
MAC	Maximum Acceptable Concentration
MGD	Million Gallons per Day
NDWAC	National Drinking Water Advisory Council
NOM	Natural Organic Matter
NSE	Nova Scotia Environment
NSERC	Natural Sciences and Engineering Research Council
NSPI	Nova Scotia Power Inc.
NSUARB	Nova Scotia Utility and Review Board
OHS	Occupational Health & Safety
OpEx	Operating Expenditures
PIEVC	Public Infrastructure Engineering Vulnerability Committee
PRV	Pressure Reducing Valve
PS	Photovoltaic
PV	Pumping Station
PWI	Preventing Workplace Injury
RDC	Regional Development Charge
RDII	Rainfall Derived Inflow & Infiltration
ROW	Right of Way
RWWFP	Regional Wastewater Functional Plan
SCADA	Supervisory Control and Data Acquisition
SSES	Sanitary Sewer Evaluation Survey
SSO	Sanitary Sewer Overflow
TA	Transitional Authorization
TOC	Total Organic Carbon
TRC	Total Residual Chlorine
TSS	Total Suspended Solids
UV	Ultraviolet
WEF	Water Environment Federation
WRWIP	West Region Wastewater Infrastructure Plan
WSER	Wastewater Systems Effluent Regulations
WWMP	Wet Weather Management Plan
WWTF	Wastewater Treatment Facility
WQMP	Water Quality Master Plan

Table of Contents

APPENDICES

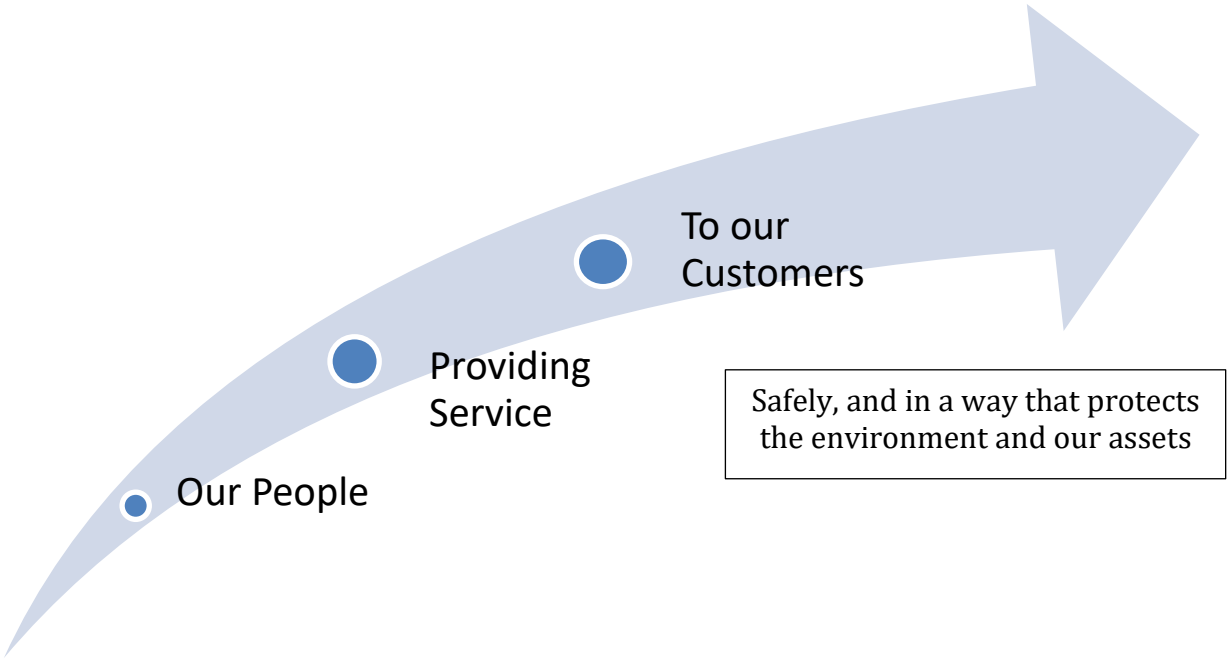
1. EXECUTIVE SUMMARY

January 1, 2020 marks 75 years of service for Halifax Water. Halifax Water has grown from the Halifax Public Service Commission established in 1945 to provide water service to the city of Halifax; to an integrated water, wastewater and stormwater utility serving 105,000 customers and an estimated population of 370,000.

Halifax Water has ambitious plans for continued innovation and improvement that are outlined in this Five-Year Business Plan for the period 2020/21 – 2024/25.

This Five-Year Business Plan and 75th Anniversary presents a great opportunity to reflect on accomplishments but also provides an opportunity to recalibrate business plans for current strategic drivers. As such, staff have compiled a Five-Year Business Plan to capture the most current information. The attached Business Plan will serve as a guidance document for the implementation of programs and strategies over the next five years and position the utility for service delivery in the long-term. This Five-Year Business Plan recognizes the need for further capital investment as contemplated in the updated Integrated Resource Plan (IRP). Halifax Water is taking positive actions towards climate adaptation in ensuring the updated IRP considers climate vulnerabilities to reduce risk to infrastructure and service delivery.

Figure 1: Graphic Representation of Halifax Water Mission



HALIFAX WATER
Five-Year Business Plan
2020/21 to 2024/25

Halifax Water's mission is **to provide world class services for our customers and our environment**; and our vision of how we will accomplish this is threefold.

1. We will provide our customers with high quality water, wastewater and stormwater service.
2. Through the adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance and stewardship of the environment.
3. We will fully engage employees through teamwork, innovation and professional development.

In addition to the mission, vision and values Halifax Water's business plans are guided by decisions of the Halifax Water Board, and regulations, policies and direction from two regulators – the Nova Scotia Utility and Review Board and the Nova Scotia Department of Environment.

Halifax Water develops both long-term and short-term business plans for the approval of the Commission Board. The Five-Year Business Plan is consistent with the updated IRP approved by the Halifax Water Board in November 2019.

The Nova Scotia Utility and Review Board (NSUARB) Accounting and Reporting Handbook requires the submission of multi-year (three year) operating and capital budgets by September 30th of each year. The three years submitted are a subset of the Five-Year budget. To meet the annual three-year reporting requirement, the Five-Year budget must be refreshed mid-cycle. A refresh would also be considered as part of rate applications to ensure the information submitted is current. The last Five-Year Business Plan covered the period 2018/19 to 2022/23; and was based on the 2012 IRP.

The Five-Year Business Plan provides an overview of the framework and strategic drivers that impact the delivery of water, wastewater and stormwater services over the long-term. The framework consists of the 2019 IRP, the Debt Strategy, and Cost of Service Manual. These mature strategies guide development of business plans, capital and operating budgets; revenue requirements and rates.

As indicated in the 2019 IRP, there is a pressing need to replace aging water, wastewater and stormwater infrastructure that will affect operating and capital budgets. The Business Plan presents the capital program and projected operating budgets for the next five years, and includes many major capital projects such as upgrades to the Pockwock and Lake Major water supply plants, upgrades to the Mill Cove Wastewater Treatment facility, and the next phase of the Sullivan's Pond stormwater project. Over the next five years, Halifax Water will be developing and implementing strategies to increase the level of capital expenditures to the level recommended by the IRP to address the strategic drivers of asset renewal, growth, and regulatory compliance. Of the three strategic drivers included in the IRP, asset renewal

will present the greatest challenge recognizing the backlog of investments in relation to the replacement of aging infrastructure.

The updated Five-Year Business Plan is important to support the application to increase water and wastewater rates in 2020. No rate changes for stormwater service are planned at this time; however, the need to adjust stormwater rates will be considered after satellite imagery used to measure billable impervious area is updated in spring 2020.

Halifax Water has ambitious plans for continued innovation and improvement that are outlined in the Five-Year Business Plan. Along with many other technology and customer focused projects, a customer portal combined with recently installed Advanced Meter Infrastructure will help transform Halifax Water into the utility of the future. The document also recognizes the increased importance of enterprise risk management, formal asset management, energy management and wet weather management programs to optimize service delivery and demonstrate value for our customers.

Several challenges and opportunities will garner the attention of the utility over the next five years, namely:

1. **Implementation of the updated IRP and optimizing the processes used to plan, procure, and deliver capital projects:** The current water, wastewater and stormwater rates are insufficient to meet the capital needs for sustainable infrastructure as identified in the IRP. The IRP acknowledges that wastewater and stormwater assets have been grossly underfunded historically. Institutional capacity will have to be optimized over the term of this Business Plan in order to deliver the expected capital projects; and the processes used to plan, procure and deliver capital projects will be reviewed to achieve a target of spending 80 – 90% of the annual capital budget within the year it is approved. This is an aggressive target, given the multi-year nature and complexity of some of Halifax Water's capital projects.

2. **Enhanced Customer Service:** Investment in employee training and technology are key to enhancing customer service. With the completion of installation of advanced meter infrastructure as part of the Customer Connect Project in 2020; Halifax Water is now focused on building and implementing a customer portal. The expectation of customers is increasing rapidly and the adoption of new technologies and business process is paramount to provide the best in customer service. Halifax Water has and will continue to invest in enhancing integration and functionality of existing systems Geographic Information System (GIS), Computerized Maintenance Management Systems (CMMS), the telephony system, and Customer Relationship Management (CRM) to enhance the customer experience through its Customer Care Centre. Greater emphasis will be placed on measuring customer satisfaction, and utility performance relative to customer centric service levels.

3. **Lead Line Replacement Program:** The utility will further enhance its program to replace all lead service lines (LSLs) on the Halifax peninsula and downtown Dartmouth areas by increasing the level of financial assistance, and pushing for more integration of LSL replacements in conjunction with the HRM street renewals. This is based on industry best practice and recent research conducted in partnership with Dalhousie University. As Halifax Water is in the health protection` business, complete lead service line renewal will be pursued for public health outcomes.

4. **Wet Weather Management:** The level of service offered by the utility can be increased if innovative business processes and technology are embedded in day to day operations for the ultimate protection of the environment. Managing the effects of wet weather, and reducing inflow and infiltration (I&I) are key to creating capacity within existing infrastructure and avoiding some future capital costs. Over the next five years, it is anticipated Halifax Water will develop new programs and tools to work with customers to address I&I issues on private property. It is estimated that more than 50% of I&I originates from private property.

5. **Employee Satisfaction:** In the next five years many of Halifax Water's workforce will be eligible to retire. To compete, attract and retain top talent, in addition to providing competitive wages and benefits, Halifax Water must strive to create a respectful work environment where employees are fully engaged through teamwork, innovation and professional development. Continued investment in improving internal communications, talent management, training, civility and respect in the workplace, and diversity will help create the kind of work environment where our employees are engaged and provide service safely, and in a way that protects the environment, our assets, and always keeps the customer in mind.

6. **Regulatory Compliance:** 2020/21 will see the implementation of a new system to track regulatory compliance and support regulatory compliance activities. In addition to improved systems and processes to support environmental regulatory compliance, a new payroll system being implemented in 2020/21 will have new functionality that will promote Occupational Health and Safety (OHS) through tracking of training and certifications required by employees.

7. **Environmental Stewardship:** Halifax Water's updated IRP contains projects that will help the utility with climate change adaptation and mitigation. Recent research indicates that climate change is accelerating, as evidenced by projections of sea level rise, more intense storm events, and changing precipitation patterns. Our environmental stewardship will also be enhanced through extension of the Environmental Management System (EMS) (ISO 14001) on a corporate wide basis. The EMS will help minimize the impact our operations have on the environment, and promote compliance with applicable laws, regulations, and other environmentally oriented requirements.

8. **Water and Wastewater Research:** Building on the success of the current drinking water research program with Dalhousie University, Halifax Water is expanding the program to include wastewater to ensure that treatment plants are optimized and upgraded to meet the current federal wastewater regulations at the lowest cost. Wastewater research focused on optimizing treatment processes and contaminants of emerging concerns (CEC) may help Halifax Water reduce what is estimated to be a $425 M cost to upgrade the three HHSP from advanced primary to secondary treatment.

9. **Technological Investment:** Halifax Water's Five-Year IT Strategic Plan calls for continued investment in core operating systems. Throughout the span of the Five-Year Business Plan Halifax Water will implement a new payroll solution (including an employee portal), a customer portal, a new Enterprise Resource Planning system (ERP), and will continue to make investments in foundational security projects that support cyber-security, continuity of service and protection of data.

In order to achieve the strategic objectives presented in this Five-Year business plan, Halifax Water will have to increase rates. Overall annual revenues will need to increase over the five-year period with the primary focus on the capital needs driven by asset renewal. Halifax Water is not alone in its quest for more sustainable funding. Unfortunately, water, wastewater and stormwater assets have been underfunded throughout North America, and other municipalities/utilities have made, or are making plans to increase rates. The projected rate increases associated with this business plan will be viewed in the context of customer affordability, with a goal of maintaining an average annual residential bill for water, wastewater and stormwater service that is less than 2% of median household income. The utility is proposing to continue with the H20 (Help to Others) Program to support low income customers, with funding from unregulated activities; and hopes to increase the funding, awareness, and utilization of this program.

Inherent in the business activities for Halifax Water is an obligation to provide value for customers as stewards of essential services. To that end, the Business Plan highlights very formal programs to deliver efficient and effective service through Enterprise Risk Management, Asset Management, Energy Management, Wet Weather Management, and the Cost Containment Program. The Wet Weather Management program, in particular, presents an opportunity to improve service delivery at a lower cost and has already shown positive results. A structured approach is in place, similar to the process used by the utility for water loss control. Halifax Water is recognized as a world leader in water loss control and the corporate goal is to put wet weather management in the same category.

2. INTRODUCTION

Halifax Water is a "one water" utility, delivering water, wastewater and stormwater service. Halifax Water is just reaching maturity as a one water utility. 2019 was the first year since the transfer of wastewater and stormwater assets from the Halifax Regional Municipality (HRM) in 2007 that all 14 wastewater treatment facilities were in compliance with regulations.

In 2012, the utility completed its first IRP; and an updated IRP in 2019 identifying investments required over a thirty year period under the strategic drivers of asset renewal, regulatory compliance and growth. After the first IRP in 2012 plans were put in place to make progress on all three strategic drivers. Halifax Water has made significant progress on wastewater treatment facility compliance. Since the upgrade of the Aerotech plant was completed in 2019, all wastewater treatment facilities are compliant with the new federal wastewater system effluent regulations or operate under approved transitional authorizations. The utility has also kept pace with growth within the municipality and helped facilitate development while ensuring cost neutrality to the existing rate base by implementing Regional Development Charges (RDCs) consistent with the Public Utilities Act. With respect to asset renewal, there has been steady progress to increase capital investments as contemplated in the IRP, although at a more moderate pace. These capital investments continue to benefit from better information and data collected over the last ten years.

As part of Halifax Water's sustainability framework, key projects will be ready to advance under existing and future federal infrastructure programs, such as the Investing in Canada Infrastructure Program (ICIP, the Building Canada Fund and the Clean Water and Wastewater Fund (CWWF). Support from other levels of government through infrastructure funding is necessary if Halifax Water is to reach the recommended level of capital spend while preserving rate affordability.

In order to close the gap on asset renewal funding however, future rate increases are inevitable. These rate increases must follow the principle of gradualism to balance rate shock and affordability to customers. Accordingly, Halifax Water will attempt to implement its infrastructure investments with a smoothing strategy in mind. In conformance with the Public Utilities Act, all of these investments and associated funding must be based on cost causation principles and occur within the context of intergenerational equity. It is anticipated that additional funding from federal programs will be available to mitigate the impact on Halifax Water's rate base and thus temper otherwise higher rate increases.

3. CURRENT RATE STRUCTURES

Halifax Water has a Cost of Service based rate structure for water, wastewater and stormwater service, as approved by the Nova Scotia Utility and Review Board (NSUARB). Rates are adjusted periodically when the cost of providing the service is out of line with the revenue generated by the existing rates. When an adjustment is required, Halifax Water makes an application to the NSUARB, and a formal public hearing process is held to ensure proposed rates are thoroughly reviewed in an open, objective and transparent manner.

Halifax Water has programs in place to contain costs, monitor rate affordability, and project and smooth future revenue requirements to ensure that customers are not shocked by sudden or dramatic rate increases.

3.1 Water Service

The existing charges for water service have been in place since April 1, 2016 and consist of two components – a base charge, and a charge that varies according to consumption of water. Water base rates vary by meter size and range from $13.00 per month for a 15 mm (5/8") diameter meter to $1,575.00 per month for a 250 mm (10") diameter meter. The consumption charge for water service is $0.976 per m^3. The water-rate structure also provides for a public fire-protection charge to the municipality based on a formula approved by the NSUARB.

3.2 Wastewater Service

The existing charges for wastewater service have been in place since April 1, 2016 and consist of two components – a base charge, and a discharge rate that varies in relation to water consumption. Wastewater base rates vary by meter size and range from $14.00 per month for a 15 mm (5/8") diameter meter to $1,923.00 per month for a 250 mm (10") diameter meter. The wastewater discharge rate is based on metered water consumption, and is $1.753 per m^3.

Halifax Water has a wastewater rebate program that is available to customers who use more than 1,000 m^3 of water in a 12 month period and can demonstrate the volume of wastewater they discharge is less than the volume of water they use. This is covered by Section 22 of Halifax Water's Rules and Regulations. As an example, manufacturing facilities that use a large volume of water that is consumed in their product, or complexes with cooling towers may qualify for this rebate.

3.3 Stormwater Service

Stormwater rates are established based on impervious area. The current rates for stormwater service have been in place since July 1, 2017. There are two stormwater rates – one billed to all customers to recoup the cost of collecting and managing stormwater from private property (Site Related Flow Charge) and one billed to the HRM for collecting and managing stormwater from the street right of way (HRM ROW Charge). HRM, in turn, charges properties within the stormwater serviceable boundary to cover their portion of the HRM ROW Charge, and Halifax Water collects and administers this charge on HRM's behalf.

The Site Related Flow Charge for non-residential customers is $0.135 per m^2 of impervious area. The Site Related Flow Charge for residential customers is based on the same rate per m^2 but residential customers are billed according to a flat rate per tier. There are five tiers and properties are grouped according to the amount of impervious area. The lowest tier is comprised of properties with less than 50 m^2 of impervious area – and they are exempt from the charge, provide they do not have a driveway culvert. The largest properties – those with 810 m^2 or more of impervious area, are charged $81 a year. Most residential properties fall in Tier 2 or 3 and are charged $14 or $28 per year, respectively.

Effective October 1, 2017, Halifax Water is collecting the HRM ROW Charge on behalf of HRM, and the charge is currently set at $40 per year, per property.

Properties that do not receive stormwater service are exempt from both the Site Related Flow Charge and the HRM ROW Charge.

Effective July 1, 2017, a stormwater credit program was implemented for non-residential (Institutional, Commercial, Industrial) customers. Non-residential properties with stormwater Best Management Practices (BMPs), like retention ponds that help manage peak flows, may be eligible for a credit. Non-residential properties include multi-unit dwellings of four or more units.

Halifax Water plans to update satellite imagery, the cost of service model, and rates for stormwater service in 2020/21, with a few to adjusting rates in 2021/22.

3.4 Regional Development Charge

The Halifax Water Regional Development Charge (RDC) is a fee payable at the building permit stage of a new development to fund regional water and wastewater infrastructure expansion requirements related to growth. The RDC was approved in 2014 and provides fairness across the rate base ensuring current customers do not subsidize new growth and development.

When the RDC rates were approved, Halifax Water committed to update the RDC on a 5 year cycle, or mid-cycle if any of the assumptions used in determining the RDC impact the value of the charge by +/- 15%. No mid-cycle adjustment was required. Since approving the RDC, Halifax Water has completed a more detailed Infrastructure Master Plan, for water and wastewater infrastructure, to be used as inputs to the updating of the RDC.

In 2017 and 2019, Halifax Water conducted formal and informal stakeholder consultation on the updated RDC. The proposed updates were presented to the Halifax Water Board in October 2019, and the subsequent application was submitted to the NSUARB in November 2019. There is a Hearing scheduled for March 2020.

The updates included current population forecasts, people per unit, the unit type ratios, design per capita consumption values, standardized costing and benefit to existing frameworks.

Money collected from the RDC funds upgrades and improvements to the regional wastewater and water systems that are required to accommodate growth anticipated within the Municipality's Regional Plan. There is no RDC for stormwater. The infrastructure requirements were identified through the Infrastructure Master Plan which is part of the IRP, discussed in Section 7.1.

4. COST OF SERVICE/RATE DESIGN

Halifax Water has Cost of Service based rates developed using industry best practice. There is a Cost of Service (COS) Manual which clearly guides how rates are calculated for water, wastewater and stormwater service. The COS Manual was based on American Water Works Association (AWWA) and Water Environment Federation (WEF) methodologies for cost of service/rate design.

The COS Manual was developed through a process of engagement with interested parties, including prior rate case interveners and the NSUARB. The COS Manual is a living document which is periodically updated to reflect current data and new information, to support any proposed changes in rates. All changes to the COS Manual must be approved by the NSUARB.

The current rates are in line with the COS Manual, and are a true reflection of the cost of providing service in all respects except for one aspect. Halifax Water has not yet included depreciation as an expense on contributed water and wastewater assets, and most stormwater assets. Halifax Water plans to incorporate this in the future.

The COS Manual for Stormwater will be updated in Year 1 of the Five-Year Business Plan, after impervious area is updated with new satellite imagery. The COS Manual for Water and Wastewater will be updated in Year 2 of the Five-Year Business Plan, based on the first full year of AMI data after all meter conversions are completed.

5. WASTEWATER SYSTEM EFFLUENT REGULATIONS

The Wastewater System Effluent Regulations (WSER) were enacted in June 2012. These regulations, made under the Fisheries Act, implement those aspects of the Canadian Council of the Ministers of the Environment (CCME) Strategy for the Management of Municipal Wastewater Effluent which fall under federal jurisdiction, namely the discharge of deleterious substances to fish habitat. The WSER defines the following as deleterious substances, and sets national standards for their discharge:

- Carbonaceous Biochemical Oxygen Demand (CBOD); 25 mg/L
- Total Suspended Solids (TSS); 25 mg/L
- Total Residual Chlorine (TRC – for facilities using chlorine disinfection); 0.02 mg/L
- Un-ionized Ammonia; 1.25 mg/L as Nitrogen, at $15^0C \pm 1^0C$.

Wastewater treatment facilities (WWTFs) are authorized to discharge these substances at levels below the defined limits, provided that the effluent is not acutely lethal to trout as determined by standard toxicity testing. Facilities not in compliance with the limits were required to apply for a Transitional Authorization (TA) to deposit effluent exceeding those limits. The Authorization is valid for a period of 10, 20 or 30 years, depending on the risk level associated with the effluent, as determined by a defined risk-ranking system in the WSER.

Halifax Water obtained TAs effective January 1, 2015, for the Halifax and Dartmouth WWTFs, which remain in effect until December 31 of 2040. Both Halifax and Dartmouth WWTFs are medium risk, and would normally have 20 years to achieve compliance. However, both of these systems have combined sewer overflows (CSOs) which are higher risk than the WWTFs. The WSER provides that for systems having at least one CSO which is higher risk than the WWTF, the compliance period for high or medium risk WWTFs may be extended from 10 or 20 years respectively, to 30 years (from 2010). CSO discharges must also be reduced beginning in 2041, after the TA has expired. Although there are no further details in the WSER regarding the reduction, such as extent and timing, Environment Canada staff have indicated by email that "*a significant reduction … must be achieved immediately after the TA's expiry date".*

A Compliance Plan was developed as part of the IRP. The Compliance Plan provides Halifax Water with a tool to plan for upgrades to the WWTFs and reduce CSO discharges.

Instances of detected toxicity have been due to chlorine levels (where chlorine is used as a disinfectant), or are of unknown cause, and are under continuing investigation. It is recognized that pH drift during the tests can be a factor, and a pH-stabilized version of the toxicity test is in use for the Mill Cove and Eastern Passage WWTFs. The Lakeside-Timberlea WWTF is the only remaining WWTF using chlorine for disinfection (all others use Ultraviolet

systems), and includes a de-chlorination process prior to discharge to meet the WSER chlorine limit.

The WSER also requires quarterly monitoring reports for each WWTF (depending on Annual Average Daily Volume), documenting the monthly or quarterly total effluent volume, the concentrations of CBOD and TSS and results of toxicity analysis (when required). These reports have all been submitted as required by the WSER, since 2013.

6. DRINKING WATER REGULATIONS

Over the last two years, Health Canada has set a direction of proactively reviewing its guidelines on a regular basis. This is a change from the previous ten to twenty years where the Health Canada Drinking Water agenda could be predicted by the agenda of the US Environmental Protection Agency. As a result, Health Canada has produced draft guidelines for public consultation that were not anticipated by utilities and advocacy groups. This will be cause for some uncertainty in this area until the basis for Health Canada's agenda becomes more widely known.

Manganese: Manganese is a metal which is ubiquitous in most Nova Scotia groundwater and surface water sources. The most common effects of manganese have been black staining on plumbing fixtures and laundry and has, to date, been regulated as an aesthetic objective (AO) in the Guidelines for Canadian Drinking Water Quality. In Nova Scotia, AO parameters serve only as a guidepost to utilities that problems will ensue if the AO value is exceeded. They are not a regulatory compliance issue.

In 2019, Health Canada published a new manganese guideline. The new guideline decreases the AO value from 0.05 to 0.02 ug/L, but more importantly, creates a health related value or maximum acceptable concentration (MAC) of 0.1 ug/L. Health Canada has created the MAC because they believe that manganese can have effects similar to lead in drinking water.

While manganese exists in most of our water sources to some degree, the level is such that it is easily removed. Two of our systems, Bennery Lake and Silver Sands have more challenging manganese issues. Both supplies have appropriate treatment systems to keep manganese below the MAC level continuously. Based on discussion with Nova Scotia Environment regarding their compliance approach, we do not believe manganese will create treatment challenges for Halifax Water. There is no practical effect in lowering the AO value as we currently provide treatment that is aesthetically acceptable to customers the vast majority of the time.

Manganese may prove to be a concern in future as it relates to distribution system water quality. When distribution system events result in discolored water, manganese is often a component of the material causing the color. Halifax Water quality staff is continuing to work on managing distribution system water quality, considering the manganese guideline. The

new guideline may result in some changes in future to how we communicate distribution system water quality to customers.

Lead: In January of 2019, Health Canada issued a new guideline for lead. Health Canada's previous guideline was outdated, not based on the most recent science, and did not serve to protect public health. The new guideline is half of the level of the previous, and uses a more challenging sampling protocol. Based on this, it will be much more challenging to maintain regulatory compliance.

Halifax Water is currently doing everything possible to reduce lead in drinking water. We have customer sampling upon request, and a program to promote lead service line replacement with rebates and financing assistance for private lateral replacement. We also have a corrosion control treatment program that is optimized to mitigate lead exposure.

In November 2019, the Halifax Water Board approved proposed enhancements to the lead service line rebate program. The program enhancements will be submitted for NSUARB approval in conjunction with the 2020 Rate Application.

While the new guideline may result in the occasional non-compliance with NSE requirements, the solution is to work with customers to replace the lead service line. Halifax Water will continue its efforts to inventory lead service lines, communicate with customers about lead and work with them to replace LSL's.

Other Guidelines: Health Canada has the following guidelines consultations underway:

- Aluminum
- E.coli
- Natural Organic Matter (NOM)
- Total coliforms
- Chloramines
- Barium

Of the above guidelines, none are expected to be treatment or compliance challenges for Halifax Water. Aluminum and NOM are being proposed as operational guidelines. This means that they will not be automatically included in operating approvals, however, best practice language may inform future iterations of the operating approvals. While both of these may be challenging today, planned upgrades to treatment facilities should address any challenges raised by these proposed guidelines.

Nova Scotia Environment Operating Approvals: Approvals for operating all water systems expired on March 31, 2018. Nova Scotia Environment began issuing new approvals in June of 2019.

Not all approvals have been received, and Halifax Water staff is working through them as they are received to make sure business process are in place to ensure compliance. Previous approvals placed less emphasis on ancillary processes, such as disposal of treatment waste and approval administration. The new approvals appear to be placing greater emphasis on these ancillary areas, bringing them up to the standard of the core drinking water processes. This may result in the requirement to make capital investment in some plant ancillary processes.

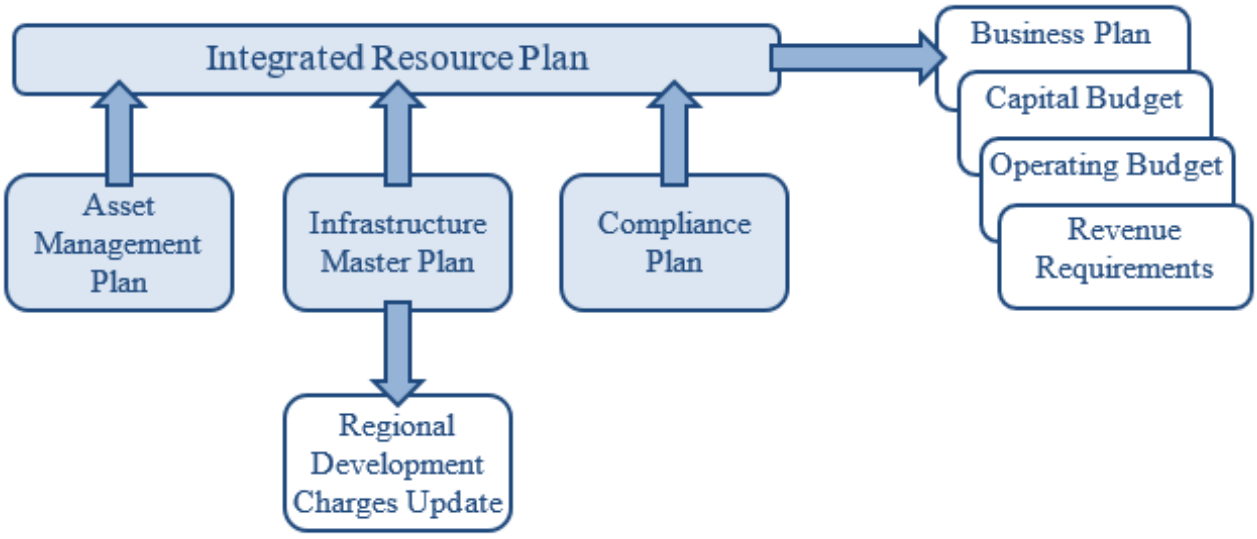
7. FINANCIAL PROGRAMS & PRO FORMA BUDGETS

7.1 Capital Program

7.1.1 2019 Integrated Resource Plan

An updated IRP was completed in 2019. The IRP Update built on the previous studies to address three primary drivers: growth (Infrastructure Master Plan), asset renewal (AMPs), and regulatory compliance (Compliance Plan). This project reviewed existing supply and demand side management activities Halifax Water has done or could do to optimize service delivery, created a six-step program integration approach, and produced a comprehensive 30-year capital investment program.

Figure 2: IRP Strategic Linkages



Several important initiatives aimed at filling data gaps have been completed or initiated since the first IRP in 2012. These included:

- Implementing the Wet Weather Management Program (with inflow and infiltration reduction pilot projects);
- Continuing the implementation of the Asset Management Program (foundational elements from the AM Roadmap);
- Resolving asset attribute information gaps in GIS, and carrying out specific inventory and condition assessment projects;
- Developing Asset Management Plans (AMPs) by asset class;
- Implementing the Corporate Flow Monitoring Program;
- Implementing the Sewer Inspection Program (using closed circuit television (CCTV) inspection methods);
- Completing the Hydraulic Modelling Assessment and Strategy;
- Completing the West Region Wastewater Infrastructure Plan (WRWIP);
- Completing the Infrastructure Master Plan.

The Infrastructure Master Plan project is the latest undertaking towards data and knowledge gap completion. The Infrastructure Master Plan looked at growth requirements for the balance of the wastewater infrastructure planning (east and central regions), included the program developed in the WRWIP, and included a water infrastructure plan for all regions. The project also included a climate change assessment and a policy component to develop a climate change adaptation plan and a systems optimization plan. The project enables Halifax Water to streamline prior long-term planning initiatives to facilitate regular, holistic Infrastructure Master Plan updates on a five-year cycle for water and wastewater infrastructure.

The IRP update was completed in November 2019 and incorporates findings from work completed or planned to support the drivers of regulatory compliance, asset renewal, and growth. The IRP update features a review of demand and supply side management activities Halifax Water has been or could be involved in. Further, it uses a systematic approach to reviewing integration opportunities for outputs of the predecessor plans (Compliance Plan, AMPs, Infrastructure Master Plan).

The resulting IRP Update recalibrates the long-term investment to an estimated $4.1 billion over 30 years with and anticipated review as part of Halifax Water's long-term planning cycle every 5 years. Several key initiatives have been identified to support the next IRP update.

7.1.2 Asset Management Program

The Asset Management division of the Engineering & IS Department provides services related to Infrastructure Planning (master planning, hydraulic system modelling, and flow monitoring), and Asset Management (program initiatives, asset management plan (AMP) development, and capital budget development).

In support of developing formal AMPs, staff have focused efforts on data collection. With some specific projects for condition assessment, staff have been able to provide detailed condition data for the Wastewater Treatment Facilities, Wastewater Pumping Stations, and Stormwater Cross Culvert asset classes. Where condition data has not been available, staff have been gathering data on asset attributes (size, age, and material) to use as a surrogate for condition in developing the AMPs.

A key outcome of the AMPs has been the recommendation for the establishment of Asset Management Implementation Teams (AMITs). AMITs are expected to work towards coordinate and integrated decisions about assets, the services they support, and the expenditures needed to meet agreed levels of service. Three AMITs were established to address Water Transmission Mains, Wastewater Forcemains, and Stormwater Cross Culverts – one for each of the infrastructure system types. Water Chambers and Booster Stations, Water Distribution Mains and Water Reservoirs have been incorporated into a "Water Network AMIT". Adding other asset classes into the Wastewater and Stormwater AMITs is under consideration to determine the most effective aggregation and efficient use of staff resources in Engineering and Operations.

The current sewer inspection program commences year five of the five-year contract in 2020/21. As such, staff will be working on preparing the request for proposal for services associated with the next five-year contract. Staff will review opportunities to pre-qualify service providers that may allow Halifax Water to re-engage mass scale inspection techniques in addition to the conventional closed circuit television (CCTV) inspections. A central focus of the program is collection of the data to enable seamless upload to Halifax Water's GIS and simplicity in sharing the outcomes with all staff.

The Asset Management Team has a well-defined, and well-executed process for capital budget development resulting in the one-year and five-year capital programs. The process leverages inputs from the capital project planning database and the supporting capital project summary reports for each project or line item identified in the capital budget

Following the completion of previous long-term planning initiatives such as the Regional Wastewater Functional Plan (RWWFP), the first IRP, and the West Region Wastewater Infrastructure Plan (WRWIP), Infrastructure Planning staff have completed the Infrastructure Master Plan and the IRP Update.

The Infrastructure Master Plan brought the findings and recommendations of the WRWIP forward, assessed long-term wastewater infrastructure needs for the east and central regions, and water infrastructure needs for all service regions. The project included a "Vulnerability to Climate Change" asset assessment framework task and a rebuild of the wastewater hydraulic model.

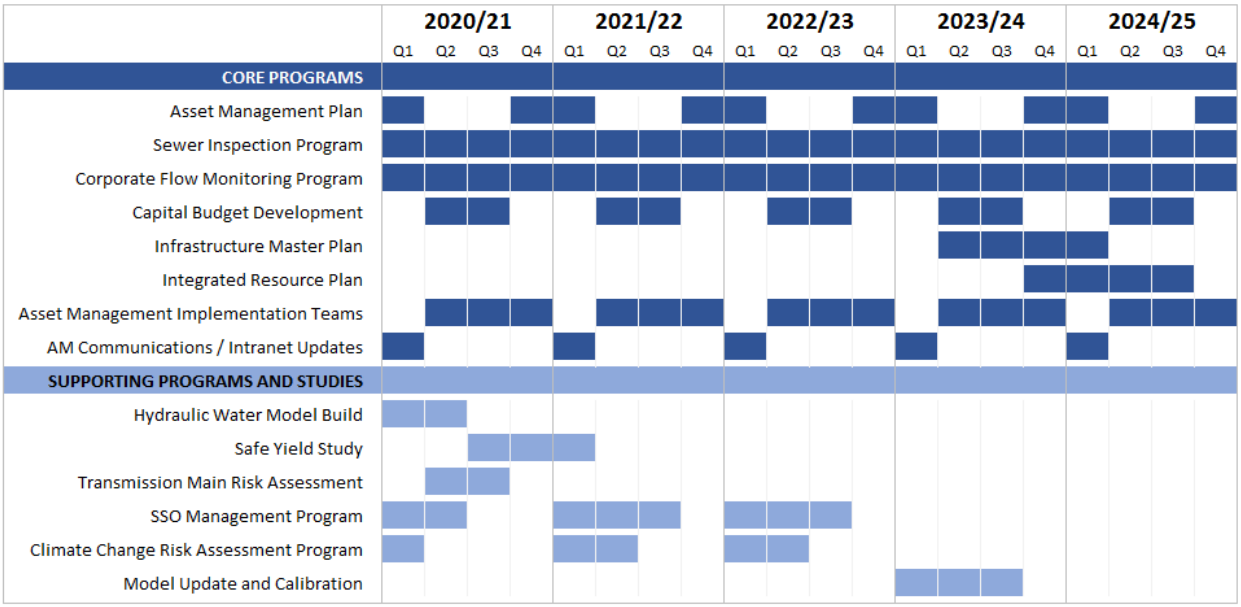
The Infrastructure Planning team manages the corporate flow monitoring program that is entering year five of the five-year contract in 2020/21. The flow monitoring program has been invaluable to Halifax Water in terms of providing accurate, reliable, and defensible data upon which model calibration, system analysis, and system decisions can be made. Similar to the CCTV program, the focus of this program is on purchasing data and its usability and accessibility for other users at Halifax Water.

Infrastructure Planning staff have worked closely on the hydraulic model build for the wastewater system with the consulting team for the Infrastructure Master Plan. Adherence to Halifax Water's Hydraulic Modelling Strategy included building with new modelling software for the wastewater system. For the water system, staff are completing a water model build assessment to confirm the components and requirements for the upcoming model build. The new water model will be able to leverage data collected through the Advance Metering Infrastructure (AMI) project to provide more accurate demand loading.

The Asset Management (AM) team has recently been working on an AM communications assessment aimed at identifying ways the AM team can better highlight the work being done by the team, help other departments connect with the AM programs and personnel, and present key reference documents and processes related to AM and infrastructure planning work. Halifax Water's intranet will be foundational for disseminating information and processes to the organization.

Anticipated projects for the Five-Year Business Plan cycle for the AM and Infrastructure Planning staff are outlined in Figure 3.

Figure 3: Five-Year Business Plan Cycle – AM and Infrastructure Plan



7.1.3 Five-Year Capital Budget – General Overview

As part of the utility's overall mission, the annual capital budget provides funds for the acquisition, replacement, or rehabilitation of capital assets. Capital assets include all equipment; facilities; and linear infrastructures that have an asset value that exceeds $5,000 and a useful life that exceeds one year. The capital budget development funding and subsequent project delivery help ensure that services are provided in a cost-effective and efficient manner with a focus on long-term integrity of systems.

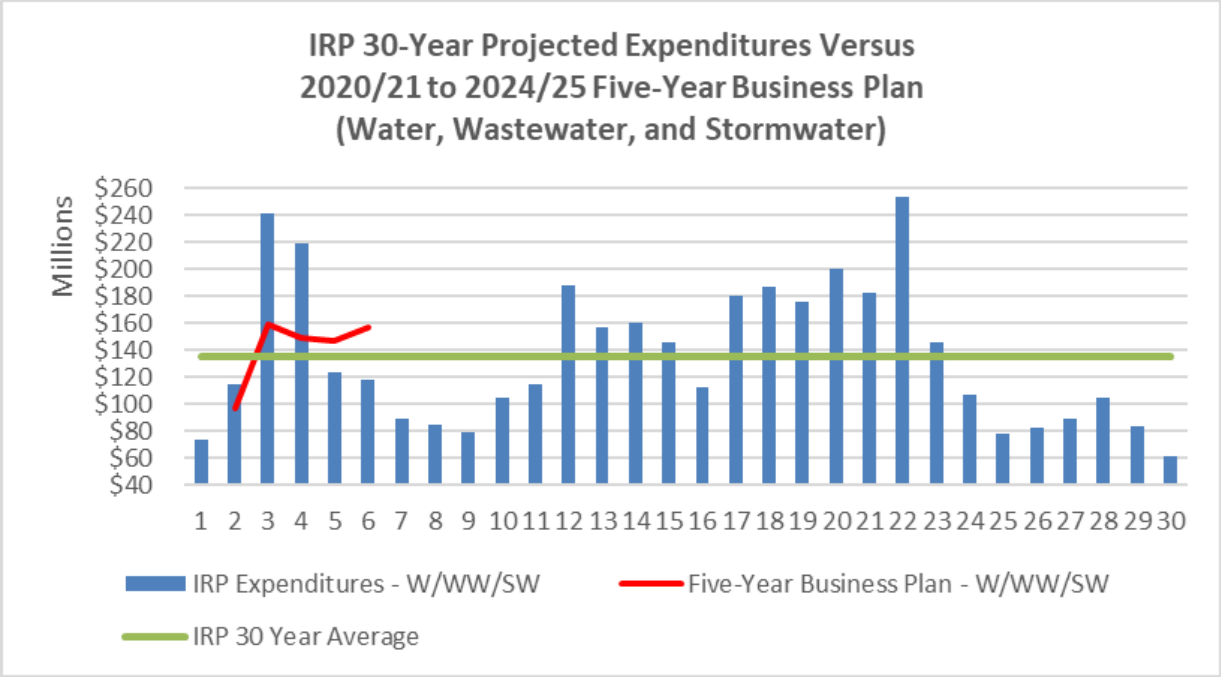
As discussed in Section 7.1, the development of the annual and long-term capital budget has its foundation with the Engineering & IS department's core Asset Management program. This program organizes, evaluates, and prioritizes all infrastructures by individual asset class. The core asset-class priorities are reviewed and coordinated with staff from Engineering & IS and Operations departments to identify the highest-priority projects. These projects are further reviewed with technical staff from the municipality's Transportation and Public Works group to review integration opportunities with the proposed Streets Program. A detailed overview of the major projects within the proposed five-year capital budget is provided in Section 7.1.4.

The proposed five-year capital budget is then reviewed against available sources of funding to consider the impact on depreciation and debt servicing, future operating expenses, and rates.

In addition to the core infrastructure projects within the capital budget, employees from all departments define annual capital-equipment requirements to meet their operational mandates. These include equipment classes such as fleet, large tools, computer equipment, and consumption meters.

The full five-year capital budget is shown in Appendix D. The totals can be seen in Figure 4 below. The year-one (2020/21) budget has a total project value of $48,929,500 for water, $38,448,000 for wastewater, and $9,136,500 for stormwater, with a five-year total project value of $293,775,500 for water, $352,250,500 for wastewater, and $62,425,000 for stormwater. The total planned capital spend over five-year period is projected to be $708,451,000

Figure 4: Five-Year Capital Program Compared to 2019 IRP



The capital budget is funded from a variety of sources. The core funding is from capital-asset depreciation accounts and long-term debt. This core funding is enhanced with regional development charges, external grants, and operating surplus, when available. The base funding amount for capital projects from depreciation increases as the NSUARB approves additions to utility plant-in-service and revenue requirements.

Figure 5: Five-Year Capital Program Funding

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

The historical and current level of capital funding is less than the amount recommended by the IRP. The required increase in capital infrastructure investments is defined in detail within the 2019 IRP. The proposed five-year capital budget shows a transition from historical spending levels towards the level recommended within the IRP, as can be seen in Figure 4 above. A transitional period allows for the development of institutional capacity to deliver the increased volume of projects, increased funding, and enhanced Asset Management protocols to identify and prioritize specific projects. The IRP recommended level of spending is not smooth or consistent, therefore increasing capital funding will be balanced with smoothing impacts on rates, and maintaining targets for debt servicing and rate affordability.

7.1.4 Major Projects

Integrated Capital Projects:

Project: Halifax Water Infrastructure Renewal Integrated with Halifax Municipal Street Renewal Program

Asset Class: Water Distribution, Wastewater and Stormwater Collection

Description: This program involves the renewal of water distribution, wastewater collection and stormwater collection infrastructure in an integrated approach with the municipality's annual Street renewal program. Water, wastewater and stormwater pipes and appurtenances are replaced or rehabilitated when approaching or exceeding their useful life cost effectively while the host municipal street is being renewed. The integrated program reduces the total project cost and minimizes the overall disturbance on community neighbourhoods. Halifax Water's planned expenditures on this program are approximately $7 M – $8 M per year.

Project: HRM Cogswell Redevelopment

Asset Class: Water, Wastewater, and Stormwater

Description: The municipality is currently finalizing the design phase of the Cogswell Redevelopment Project. The municipality plans to proceed to the tender phase of the project in late 2019 or early 2020 with approximate three year construction phase. There will be many impacts to the utility's water, wastewater and stormwater infrastructure. All net new infrastructure required to provide service to new buildings would be part of the municipal project cost. However, the relocation of existing infrastructure, required due to road alignment changes would be the responsibility of Halifax Water, based on the municipal Streets By-law. The estimated infrastructure investment for Halifax Water is $15 M.

Water Capital Projects:

Project: Main Street to Caledonia Road Transmission Main

Asset Class: Water – Transmission Main

Description: Halifax Water is working to construct a new 600 mm diameter transmission main from Main Street to Caledonia Road in Dartmouth. This is the first phase of a multiple phase project to improve capacity, resiliency and reliability for the water supply to the general area of Burnside. The overall cost estimate for this project is approximately $6 M.

Project: Chain Control to Peninsula Transmission Main Rehabilitation

Asset Class: Water – Transmission Main

Description: Replacement and rehabilitation of major components of the existing water transmission system from the Chain Lake Control area to the Halifax Peninsula. The project will provide increased capacity, improve reliability and enhance system resilience for water delivery to the peninsula. The multi-year project is estimated to cost approximately $6,500,000.

Project: Bedford South (Hemlock) Reservoir

Asset Class: Water – Structures

Description: The Hemlock Reservoir location and storage volume have been established in previous master planning studies completed for the Bedford South, Bedford West and Birch Cove North development areas. As these areas have developed over the last 20 years, the need for the reservoir is being constructed to meet level of service requirements in the water distribution system. The reservoir will be located at an existing Halifax Water control chamber on Masthead Court and will be 30 meters in diameter and height with a total storage volume of 21.5 million liters. Construction is anticipated to start in spring 2020 with substantial completion in spring 2021. The estimated project cost is approximately $10 M with majority funding for the Halifax Water Capital Cost Contribution program.

Project: Cowie Hill Reservoir Replacement

Asset Class: Water – Structures

Description: The Cowie Hill Reservoir is a 2.4 MG gunite water storage reservoir that was constructed in 1972. The reservoir underwent a significant rehabilitation from 1990 to 1996. The internal and external inspection found numerous locations where the gunite covering had spalled off leaving the underlying steel reinforcing wires exposed and rusting. There are numerous locations on the wall that show evidence of cracks and leakage through the wall of the reservoir. The gunite reservoir inspection program identified the Cowie Reservoir as a priority for rehabilitation, however, subsequent detailed design work determined that the reservoir should be replaced as it has reached the end of its useful life and replacement has a more cost effective than rehabilitation.

The project will involve retaining a consulting engineer to design and prepare a replacement plan. It is anticipated that the design work be undertaken in 2020 and the work will then be tendered and constructed in the summer of 2021.

Project: J.D. Kline Water Supply Plant – Process Upgrades

Asset Class: Water – Treatment Facilities

Description: Source Water Quality at JD Kline WSP has been changing because of the phenomenon known as lake recovery from acidification. Over the past few years, pH of the lake has been coming up. This means that the lake is more susceptible to sustain biological activity. This in turn has shown its effects in the last few years in terms of appearance of geosmin in the source water as well as most recent event in summer of 2018 where algal diatoms clogged filters to the point that it rendered the plant with not enough production to meet the distribution demand. Additionally, the amount of organics in the lake have been increasing (TOC was 1.7 mg/L in 1977 and is at 3.8 mg/l in 2019). It is to a point where it is difficult to operate the plant in its current configuration as a direct filtration plant. In order to deal with the water quality impacts from lake recovery, a clarification step needs to be added to the treatment train. Halifax Water is in the process of procuring services of a consulting team to provide expert advice and help in terms of next steps, treatment process selection, procurement and execution of projects. Some of the projects that are going to form part of these upgrades are a review and potential upgrade of existing pre-treatment setup, new or retrofit existing flocculation basins and addition of a new clarifier treatment. Other important projects that will need to happen concurrently are optimization of the existing backwash system as well as improvements to the lagoons to handle additional solids loading. All these projects are scheduled to be completed over the next five to seven years.

The J.D. Kline Water Supply Plant was commissioned in 1977 to service the City of Halifax, Town of Bedford, and parts of Halifax County. Due to the age of the facility, process equipment is nearing the end of its useful life. As well, certain treatment technologies from 30 years ago no longer meet current standards.

Project: Lake Major Water Supply Plant – Process Upgrades

Asset Class: Water – Treatment Facilities

Description: Lake Major WSP was commissioned in 1999. In the last few years, there have been changes to the source water in terms of pH and organics which are in line with similar trends experienced by Pockwock Lake from lake recovery. In addition to that, there has been a substantial increase in organics load from the mass blowdown of trees in the watershed during Hurricane Juan in 2003. All that has added up to significant increases in process chemicals and challenging conditions for optimal water treatment. Additionally, the clarifier technology employed in the plant is more suited towards highly turbid waters. Contrary to that, Lake Major has very low source water turbidity which leads to improper clarification performance. Moreover, the serviceable life of the clarifier and the filtration system is 20 years. Hence, both clarification and filtration system need to be rehabilitated with newer technology much suited for the current source water. The raw water pump station was built in 1960s and was an inheritance from the old Lake Lamont system. It has also come to the end of its serviceable life. Considering all these factors, Halifax Water has currently engaged a consulting team to help with the upgrade strategy for Lake Major WSP.

Some of the projects that are going to form part of these upgrades are new raw water pump station, clarifier replacement, filter rehabilitation, residual handling upgrades and optimization of the pre-treatment process with incorporation of pre-oxidation. All these projects are scheduled to be undertaken over the next five to eight years.

Wastewater Capital Projects:

Project: Trenchless Sewer Rehabilitation Program

Asset Class: Wastewater – Collection System

Description: The Trenchless rehabilitation program is a continuation of the successful program that Halifax Water has been implementing for the past several years. The program mythology provides full structural renewal of existing sewers reaching the end of their useful life via installation of a structural liner. The process requires no cutting of the street infrastructure and is a cost effective alternative to open cut renewal. The program is estimated at approximately $2 M per year over the five plan.

Project: Inflow/Infiltration Reduction Program

Asset Class: Wastewater – Collection Systems

Description: Inflow and Infiltration reduction is an aggregated program with a goal to reduce the amount of storm water that enters the wastewater system. The systemic evaluation of sewer sheds identifies a series of methods that are most effective within a given sewer shed including private side and public side investments. The program is proposed as a critical component of the Infrastructure Master Plan approach to reduce wastewater flows to facilitate additional regional growth. The five year plan has multiple I/I reduction programs throughout the service area.

Project: New Timberlea Pump Station and Forcemain System

Asset Class: Wastewater – Structures and Forcemains

Description: The Beechville-Lakeside-Timberlea (BLT) WWTF was commissioned in 1982, with a capacity of one million gallons per day (MGD) and the original intent was to increase the facility's capacity as required to provide service to the ultimate flow generated from the lands within the prescribed boundary. The BLT WWTF Environmental Risk Assessment and the BLT Area Wastewater Servicing Options – Concept Development Studies were completed in 2011 and 2012 respectively. Based on the results of these studies and the Regional Wastewater Functional Plan, it was determined that the phased diversion of wastewater from the BLT sewershed toward the Halifax system was the preferred approach for addressing the wastewater capacity issue in this sewershed.

In 2015 the first phase of this diversion was completed when the Lakeside PS Diversion project was undertaken. In 2017 the West Region Wastewater Infrastructure Plan was completed and it reconfirmed that the best approach was full diversion of the BLT sewershed to Halifax and that to complete this diversion a new Timberlea PS and related forcemain system is required for an estimated cost of $21 M. The project will result in the decommissioning of the BLT WWTF.

Project: Bedford to Halifax Trunk Sewer Upgrade

Asset Class: Wastewater – Trunk Sewers

Description: There is existing constraint within the trunk sewer which conveys wastewater along the Bedford Highway from Kearney Lake Road to the Duffus Street Pump Station. A section of this trunk sewer is a 1050mm dia. pipe and is located near Fairview Cove. The upstream sewer is a 2100mm x 1650mm pipe and the downstream sewer is an 1800mm dia. pipe. During major wet weather events, the Kempt Road CSO is activated resulting in discharge to the Fairview Cove Basin. There is observed flooding upstream along the Bedford Highway during mid-size events (< 1 in 2 year events) and the highway has been closed in the past due to flooding as a result of this constraint.

The concept is to twin the 1050mm dia. pipe with a new 1200mm sewer using micro tunneling and access shafts. The total length of the new tunnel will be approximately 900 metres and is estimated to cost $20 M. It is anticipated that the design is in progress and construction will be completed by 2021.

Project: Autoport Pump Station Replacement

Asset Class: Wastewater – Structures

Description: The Autoport Pump Station was constructed in the mid 70's and requires replacement due to a number of concerns which include: the equipment has reached the end of its useful life; the pump station is located within the public right-of-way such that specific measures are required in order for staff to safely access the facility; the upstream wastewater collection system was reconfigured as a result of the Eastern Passage Wastewater Treatment Facility (EPWWTF) project resulting in an increased hydraulic demand on the pump station; and capacity is exceeded in some wet weather events which results in the deployment of vacuum trucks.

In order for this project to proceed there will be the need to purchase land. Assuming that the land can be secured in 2020 then the new pump station would be constructed in 2021 for an estimated cost of $3,000,000.

Project: Pump Station Upgrade Program

Asset Class: Wastewater – Structures

Description: Halifax Water owns and operates 167 wastewater pumping stations as a critical backbone to our wastewater collection system. The maintenance and capital renewal of this asset class is critical to service provision and environmental compliance. The Pumping Station Upgrade Program is a systemic approach to condition assessment and timely renewal of pumping stations as the facility or components reach the end of useful life. The program invests in the range of $4M to $5M per year on priority pumping station upgrades.

Project: Mill Cove WWTF Upgrade

Asset Class: Wastewater – Facilities

Description: The key requirements of the Mill Cove WWTF upgrades is to meet the following objectives:

1. Projected future wastewater flows and loads;
2. Current and future regulatory requirements with respect to treatment effluent quality (Nutrient Removal);
3. Future regulatory requirements with respect to management of wet weather storm flows; and Interaction between the wastewater treatment and sludge treatment processes.

This WWTP design includes information gathered from the Integrated Master Plan taking into consideration findings outlined in the ERA to ensure the design concept is the most cost effective and reliable to achieve regulatory requirements and with flexibility for the future requirements.

Following approval of the Conceptual Design Strategy the project will progress into the following: Preliminary Engineering Design, Pre-Selection of unit process equipment, Detailed Engineering Design, Tender Phase and Construction Phases.

Based on the concept design, the estimated total project cost is approximately $75 M, with $50 M earmarked for within the next five years.

Stormwater Capital Projects:

Project: Sullivan's Pond Storm Sewer System Replacement (Phase 2)

Asset Class: Stormwater – Pipes

Description: The Sullivan's Pond storm sewer system is the outlet for Sullivan's Pond/Lake Banook watershed which is approximately 1500 hectares in size. The system was constructed in the early 1970s and is at the end of its service life. The system is designed for

the major flood event (runoff resulting from a 1 in 100 yr. rainfall event). In 2017/18 the first phase and upper section of the system was constructed between Sullivan's Pond and Irish Town Road. This project involves the lower downstream section from Irish Town Road all of the way to Halifax Harbour. Construction of the second phase will be challenging considering the congested urbanized environment in which the system is located. Construction of this second phase is expected to proceed in 2022, at a cost in the order of $11 M.

Project: Ellenvale Run Retaining Wall Replacement Program

Asset Class: Stormwater – Structures

Description: The Ellenvale Run is a highly urbanized watercourse that runs from Lake Lemont to Morris Lake in Dartmouth. The approximately 3.5 km long watercourse has been rerouted and encroached upon as a result of adjacent development. This has resulted in the stream being contained within culverts and channels made of retaining walls. The majority of the retaining walls are at the end of their service life and need to be replaced. The system is designed for the major flood event (runoff resulting from a 1 in 100 yr. rainfall event). This program involves the systematic replacement of the retaining walls over the period of 2018 – 2024. The estimated cost of the program is $10 M.

Project: Cross Culvert Replacement Program

Asset Class: Stormwater – Culverts/Ditches

Description: Halifax Water owns and maintains approximately 1700 cross road culverts. This infrastructure is a distinct asset class in addition to driveway culverts. They convey stormwater under roads and are less than three metres in diameter. Approximately five percent of the inventory of cross road culverts are in critical condition and another seven percent in poor condition. This program involves the systematic replacement of cross road culverts at the end of their service life. The estimated annual cost of this program is $2 M.

Project: Halifax Water Sewer Separation Program

Asset Class: Wastewater and Stormwater Collection

Description: This program involves the separation of existing combined sewers in key areas of the Halifax peninsula to divert storm flows from the wastewater system as a key component to providing increased wastewater capacity for proposed growth within the Halifax WWTF sewershed. The sewer separation program will generally involve the installation of a new storm sewer on local streets for the collection of surface drainage and select building connections. In the near term, the program will be focused on the Young Street, Kempt Road and Spring Garden Road areas. This program is primarily funded from the Regional Development Charge program. Halifax Water's planned expenditures on this program are approximately $6 M per year.

Corporate Projects:

Project: Information Technology Strategic Plan Implementation

Asset Class: Water, Wastewater and Stormwater

Description: Halifax Water completed an IT Strategic Plan in 2017. The Plan (updated annually) provides a five-year program and investment roadmap consisting of a series of defined initiatives, each supporting a key strategic theme and each contributing to the continuous improvement of one or more facets of the IT environment: organization, applications and infrastructure. Halifax Water's planned expenditures on this program are approximately $8 M per year. See Section 10.4 for a detailed summary.

7.2 Five-Year Operating Budgets

Budgets have been developed to cover the period from 2020/21 to 2025/26, as shown in Appendix E. The operating budgets reveal that rate increases will be required to maintain current levels of service, deliver projects already in progress or approved, meet changing environmental requirements, and generate more funding to meet infrastructure investment demands.

Halifax Water has a goal to keep rates for combined services below 2% of median household income. The cost of annual combined services for an average household is currently estimated as 1.08% of current estimated median household income.

Halifax Water has a customer assistance program - Help to Others (H2O). The H2O program provides dedicated funding for low income households to offset water bills, administered through the Salvation Army, similar to other heating fuel or electricity bill assistance programs. Funds for the program are derived from unregulated activities of the utility.

Some of the primary operating budget drivers and assumptions are:

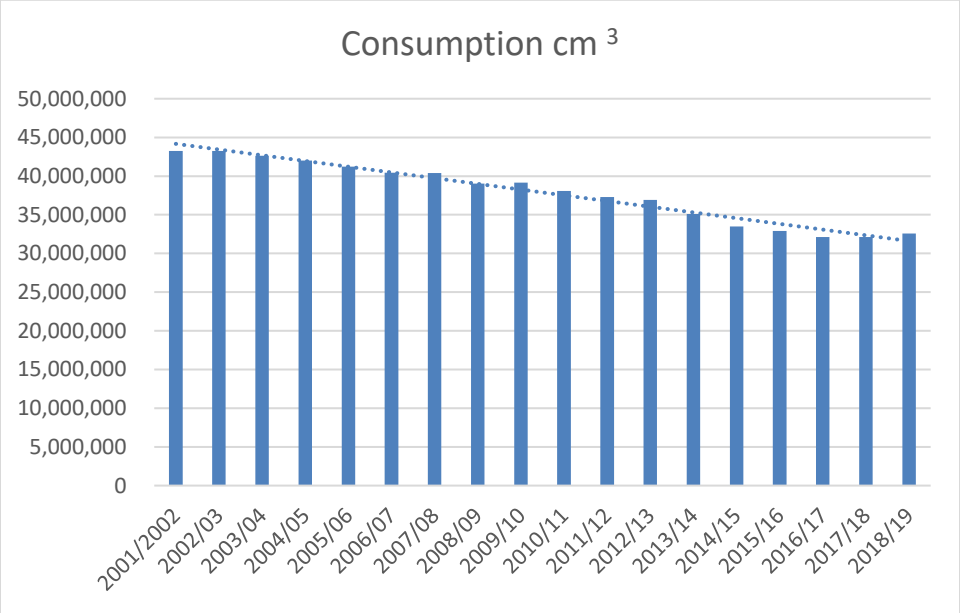
Revenues

After a long-term trend of declining water consumption, Halifax Water has had back to back increases in consumption of 0.1% and 1.4% in 2017/18 and 2018/19 respectively due to customer growth and conversion to new meters increasing accuracy. Consumption is projected to remain relatively flat as growth in customers will offset decreasing consumption due to conservation and increases in water efficiency.

Halifax Water had experienced net metered consumption decreases of 1.64% per year on average, over seventeen years, as indicated in Figure 6. The total decrease since 2001/02 is a 25% reduction, which was managed predominantly through changing rate structures to align fixed and variables costs, diversifying rate structures (stormwater with a different billing determinant), increasing rates, increasing unregulated revenue and controlling costs.

For short-term planning purposes, in relation to setting rates, Halifax Water previously used a rolling historic 4 year average (net reduction) – which is currently 0.7%. Declining consumption affects both water and wastewater revenue as the discharge fee billed to most customers is based upon water consumption. Consumption is impacted by timing of development, form of development and new customer growth. It is not certain if future development will be sufficient to offset the trend of declining consumption, so by budgeting based on flat consumption Halifax Water is assuming some risk.

Figure 6: Metered Consumption History



Average	-1.64%
Rolling 4 Year Average decrease	-0.68%
Median	-1.75%
Total Decrease since 2001/02	-24.7%

- The amount of impervious area and number of properties receiving stormwater services is projected to increase gradually over the course of the next five years.

- 638 (0.8%) new customer connections are projected each year based on the actual customer growth in recent years.

- Revenues from unregulated business activities are increasingly important to mitigate future revenue requirements from rates. These are described in more detail in Section 7.4. Unregulated revenues are used to fund unregulated expenses and generate additional unregulated revenues for the benefit of the rate base.

Expenses

Halifax Water's Five-Year Operating Budget is completed on a modified accrual basis and excludes pension expense accrual to provide better information for decision making and align with the NSUARB Accounting and Reporting Handbook for Water Utilities, which is used in determining the revenue requirements for rate making purposes. Reporting on an accrual basis under the International Financial Reporting Standards (IFRS) would require the inclusion of accrued amounts such as a liability for future employee pension benefits. If accrued pension expenses were included, the projected deficit would be greater than currently shown in Figure 7 below. There is sufficient accumulated operating surplus to offset the budgeted operating loss in 2019/20, however, rate adjustments will be required in 2020/21.

The largest components of Halifax Water's consolidated operating budgets are salaries & benefits, electricity, furnace oil and natural gas, debt financing, depreciation, dividend and chemical costs.

Salaries and Benefits: In 2020/21, the increase for salaries/wages ranges between 2.00% and 2.75%, which includes an allowance of 0.5% for the impact of step increases for employees within salary bands or reclassification of positions. For subsequent years, the annual increases for salaries and benefits is budgeted at 3.5%. Any planned new hires are reflected within the budgets.

Electricity: 6.0% in year 1, 2% each year thereafter. The impact of these increases is expected to be partially offset by the formal Energy Management Program.

Natural Gas: 10% in year 1, 2% each year thereafter.

Furnace Oil: 3% in year 1, 2% each year thereafter.

Debt Financing: New debt payments are budgeted to support the five-year capital plan. Over the course of the next five years, debt payments are projected to increase significantly. The amount and timing of the increases will be determined by timing of the completion of the projects and the financing rates and options available. Halifax Water's capital financing strategy is designed to maintain a debt service ratio of 35% or less; and to use a mixture of infrastructure funding, development related charges (reserves), depreciation; and debt. The cost of borrowing is based on the weighted average cost of capital of 3.22%.

Depreciation: As Halifax Water's assets and future capital budgets increase so do depreciation expenses. Depreciation is an integral funding source to support rehabilitation of the existing infrastructure as well as new infrastructure and upgrades to meet future requirements. The depreciation expenses shown in the Five-Year Business Plan are net of depreciation on contributed assets for contributed water and wastewater assets. In the next

rate application, Halifax Water will be requesting permission to phase in depreciation on contributed water and wastewater assets.

Dividend to Halifax Regional Municipality: The current five-year water dividend agreement expires in March 2020 and a new agreement will be negotiated in advance of the 2020/21 fiscal year. HRM staff have expressed interest in expanding the scope of the dividend to include wastewater and stormwater, however this will require approval from the NSUARB and would be considered as part of a rate application. Based on the current agreement, the dividend would grow from $5.1 M in 2019/20 to $7.9 M by 2024/25.

Chemical Costs: Chemicals are tendered annually in January for optimal pricing. Chemical cost increases of 5% are anticipated for year 1, with a 5% increase for years 2, 3, 4 and 5. Long range chemical prices are difficult to predict due to the volatility of the market which is closely linked with energy prices and fluctuations in supply and demand.

Energy and electricity cost assumptions are described within Section 12.10 of the Business Plan.

On a consolidated basis, the projected five-year operating budgets are shown in Figure 7. Over the next five years, operating expenses are projected to increase from $118 M in 2020/21 to $136 M in 2025/26, or 15%, while operating revenues are projected to decrease by $2 M or 1.41%. Non-operating revenues are projected to remain stable. Non-operating expenses will more than double from $37 M to $61 M driven by increasing debt servicing costs as Halifax Water issues debt previously approved to fund prior years' capital budgets and ramps up capital spending to meet the IRP recommendations.

Figure 7: Pro-Forma Income Summary 2018/19 to 2020/21

Operating Budget Summary (in thousands)

	Actual 2018/19	Approved Budget 2019/20	**Proposed Budget 2020/21**	Budget/Budget Variance (Unfavourable)
Operating Revenue	$138,413	$138,727	$138,618	($109)
Operating Expenses	$105,731	$115,088	$118,110	($3,022)
Operating Surplus	$32,682	$23,639	$20,508	($3,131)
Financial Revenue	$1,898	$1,369	$619	($750)
Financial Expenses	$33,190	$33,374	$37,076	($3,701)
Net Surplus (Deficit)	$1,390	($8,366)	($15,949)	($7,583)

Based on figures presented in Figure 7, revenue increases are required over the next five years. Halifax Water will not be able to deliver the existing level of service plus meet the requirements for growth, asset renewal and compliance identified in the IRP without revenue increases. Halifax Water has a rate smoothing strategy that promotes gradual rate increases to avoid rate shock and maintain affordability.

Appearing in Figure 8 is a continuity schedule of the accumulated surplus (deficit) for Halifax Water on a cash basis. As of March 31, 2019, Halifax Water had an accumulated operating surplus of $40.0 M. Results have been reviewed by budget managers in conjunction with plans for the remainder of the 2019/20 fiscal year and Halifax Water is forecasting a net deficit on a cash basis of $3.2 M. This coupled with a budgeted deficit for 2020/21, in the amount of $15.9 M, results in an ending surplus as at March 31, 2021 of $20.9 M. There is sufficient accumulated operating surplus to offset operating deficits in 2019/20 and 2020/21, however, the budgeted deficit for 2021/22 is $26.2 M resulting in an accumulated deficit of $5.3 M. Rate adjustments will be required in the fiscal years thereafter; and Halifax Water needs to begin the process to adjust rates.

Figure 8: Continuity Schedule - Accumulated Surplus (Deficit) on a Cash Basis

Continuity Schedule - Accumulated Surplus (Deficit) on a NSUARB Handbook Basis - which Excludes Pension Accrual	Total	Water	Wastewater	Stormwater
2018/19 Fiscal Year				
Balance, beginning of year	$38,625,906	$14,669,623	$15,487,608	$8,468,674
Operating surplus (deficit) for the year	$1,390,433	$2,760,942	($570,243)	($800,266)
Balance, end of year	$40,016,339	$17,430,565	$14,917,365	$7,668,408
2019/20 Fiscal Year				
Balance, beginning of year	$40,016,339	$17,430,565	$14,917,365	$7,668,408
Projected operating (deficit) for the year	($3,188,925)	$2,374,560	($3,936,644)	($1,626,841)
Projected balance, end of year	**$36,827,414**	**$19,805,125**	**$10,980,721**	**$6,041,568**
2020/21 Fiscal Year				
Balance, beginning of year	$36,827,414	$19,805,125	$10,980,721	$6,041,568
Budgeted operating (deficit) for the year	($15,948,714)	($4,274,512)	($7,842,633)	($3,831,569)
Projected balance, end of year	**$20,878,700**	**$15,530,613**	**$3,138,088**	**$2,209,999**
2021/22 Fiscal Year				
Balance, beginning of year	$20,878,700	$15,530,613	$3,138,088	$2,209,999
Budgeted operating (deficit) for the year	($26,155,637)	($9,179,931)	($11,980,107)	($4,995,599)
Projected balance, end of year	**($5,276,937)**	**$6,350,682**	**($8,842,019)**	**($2,785,600)**

Projections for 2020/21 and beyond are based on expected normal weather patterns. Should weather patterns deviate from the norm, operating results could be impacted accordingly as significant rain events, prolonged periods of deep cold, or droughts, impact operating revenues and expenses.

As new and more current information becomes available, five-year projections will change. The five-year plan is sensitive to changes in consumption, weather, interest rates, availability of external infrastructure funding, level of development activity and operating results

7.3 Debt Strategy

Halifax Water has an efficient capital financing structure which has been reviewed and accepted by the NSUARB and was developed based on the policies of other utilities, its longer-term capital needs, and consideration of fairness to present and future ratepayers. Utilization of debt is a key component of the capital financing structure. Debt impacts the operating budget and, therefore, the future rate requirements in several ways:

1. Increased debt payments need to be accommodated through rates.
2. Increased depreciation related to growth in the capital program needs to be accommodated through rates.
3. Operating costs of new capital assets need to be accommodated through rates.
4. Capital requirements not funded by debt will increase the requirement of capital from operating funding through rates.

Different financing alternatives were considered taking into account rate stability and affordability, Halifax Water long term financial sustainability, and intergenerational equity.

The debt strategy approved for Halifax Water concludes that appropriate financial ratios for Halifax Water to utilize are:

1. Target Maximum Debt Service Ratio of 35%
2. Target Debt/Equity Ratio of 40%/60%

In essence, the two targets serve as a framework for Halifax Water's utilization of debt. Long-term debt is projected to increase from $208 M at March 31, 2019[1], to $436 M by March 31, 2025. It is estimated that additional debt servicing will increase from $30.9 M in 2020/21 to $54 M in 2024/25, and the debt service ratio will increase from 22.0% to 39.0 % during this five-year period.

The amount of timing of issuance of debt is dependent on the timing of capital projects and also on availability of infrastructure funding from other levels of government. Any changes in capital plans or availability of other funding sources will impact the requirement for new debt.

[1] March 31, 2019Audited Financial Statements

7.4 Alternative Revenue

Revenues from unregulated business activities are increasingly important to mitigate future revenue requirements from rates. Unregulated revenues help to pay for some expenses which would otherwise be funded by rate-regulated activities, and are also used to fund unregulated expenses. Halifax Water has had success generating alternative revenues aside from user fees on both the regulated and unregulated side of the business. On the regulated side, Halifax Water has entered into agreements for the sale of land deemed to be no longer used or useful for utility purposes. With NSUARB approval, revenue from land sales can be used as a source of funds for capital projects related to the delivery of water services in recognition that the land was originally purchased with water-rate base funds. As much of the surplus land has been sold, this is not a significant source of funds in the future.

Notwithstanding limitations for generating revenue from the regulated side of the business, there has and will continue to be opportunities from the unregulated side. Currently, Halifax Water generates revenue from third-party contracts for water and wastewater treatment operations, septage tipping fees, and treatment of airline effluent.

Halifax Water also generates revenue for the lease of land for telecommunications facilities throughout the municipality in recognition that reservoir and watershed sites are located on higher elevations that afford more direct line of site for telemetry. In conjunction with these leases, Halifax Water installs telecommunications equipment on these facilities for its own needs for the ultimate benefit of the water, wastewater, and stormwater rate base. As Halifax Water continues to expand the Supervisory Control and Data Acquisition (SCADA) system in accordance with its master plan, further opportunities for leases and hosting of Halifax Water equipment will be realized.

Halifax Water has expertise in water-loss control, the utility offers a wide range of related services to generate revenue. These range from leak-detection services, for Halifax Water customers and other municipalities, to consulting services under contract to municipalities and First Nation communities. There is potential to expand these services to generate additional revenue and, at the same time, provide professional development opportunities for staff.

Halifax Water also recognizes that its assets can be leveraged to bring in revenue from energy generation. This includes projects to generate electricity from wind turbines and control chambers where water pressure is reduced. These opportunities have been developed for interface with the Nova Scotia Department of Energy's Community Feed-In Tariff (COMFIT) program, which provides preferential rates to feed electricity into Nova Scotia Power Incorporated (NSPI) distribution grid. Halifax Water has completed the installation of a hydrokinetic turbine in the Orchard control chamber in Bedford, in October 2014, and the projected net revenues are in the current business plan. These projects are structured to ensure they are compliant with the Public Utilities Act with the recognition that regulated activities cannot subsidize the unregulated side of the business.

In partnership with HRM, Halifax Water has also studied the potential for a green thermal utility whereby energy can be extracted from the heat in sewage and delivered through a local distribution system in the vicinity of treatment facilities. The planned redevelopment of the Cogswell interchange in Halifax will provide an opportunity to advance this concept since the Halifax WWTF is adjacent to the Cogswell interchange. This project is currently being pursued as a regulated activity subject to the approval of the NSUARB.

In an effort to be open and transparent to stakeholders, including the NSUARB, Halifax Water discloses revenue and expenses associated with unregulated business separately within the financial statements and budgets. Net gains from these activities ultimately go to the benefit of the rate base as they are closed out to accumulated operating surplus/(deficit) each fiscal year.

Rates for some the main sources of unregulated revenue – septage tipping fees and treatment of airline effluent were increased in 2018. Halifax Water periodically reviews and adjusts these rates.

Unregulated revenues are budgeted to be $ 1.1 M in 2020/21 and will remain consistent for the next 5 years.

8. CUSTOMER SERVICE ENHANCEMENTS

The most recent Customer Service (Quality of Service) Survey indicates satisfaction with Halifax Water's overall service delivery remains high at 96%, consistent with the last two years.

For the first time, questions were included related to stormwater service. Of the 750 surveyed, 44% were aware they receive stormwater service and 83% of those receiving stormwater service were very or generally satisfied.

Other key highlights:

- The ratings for staff promptness have improved
- Most customers believe their water is safe and the quality is high
- Confidence in the safety of water in the Halifax Harbour remains low at 44%
- Residents continue to lack awareness of the source of their municipal tap water
- Awareness of the lead service line subsidy is low
- Awareness of the emergency assistance program (H2O Fund) is low
- Over 50% of customers would be interested in rounding up their bill to the nearest dollar with the rounded portion given as a charitable donation to help low income customers in need (this is an initiative being explored to grow the H2O Fund)

Strategic objectives that will help address some of areas of potential improvement are implementation of the customer portal, enhancements in the customer care centre that will reduce call wait times, and enhanced customer communications particularly around stormwater service. Many initiatives are underway that ultimately will help us continue to enhance service to customers to keep them satisfied.

In early 2020, the phone system used to answer customer calls is being improved, to enable their calls to be answered more quickly and their issues resolved more easily.

2020/21 will see the implementation of a Customer Portal that will increase and improve the options for customers to engage with Halifax Water and get easier access to information on their account at their convenience. The Customer Connect (AMI) Project has surpassed the 90% installation mark and the information on customer water usage is being successfully received. The ability of our customers to access their water usage data will be a significant component of the Customer Portal. Customers will also be able to request many services online, the Halifax Water website will be easier for customers to use and navigate, and there will be increased functionality for customers to receive information about their account, water consumption, property characteristics used to bill for stormwater, and receive and pay bills electronically.

Within the Five-Year Business Plan, there are significant technology initiatives that will enhance integration of key corporate systems such as CMMS, GIS, and the ERP with the Customer Care Centre. The utility is well positioned to implement a corporate customer service strategy and utilize information received through AMI and the computerized maintenance management system (CMMS) to track resolution of customer requests. Halifax Water is continuing to improve and enhance service standards to respond to customer issues and the mechanisms to monitor and report to ensure all departments are meeting service standards.

The Dispute Resolution Process continues to provide an opportunity for customers to have an outside review of their complaint, but adds additional costs to revenue requirements. Statistics from the last two years are shown in table 3 below:

Figure 9: DRO Statistics

Year	Cost Paid to DRO
2017/18	$225,850
2018/19	$137,730

It is hoped that increasing the focus on customer communication, and early resolution will help reduce complaints going to the Dispute Resolution Officer, as the majority of the complaints are without merit and result in unnecessary costs that are passed on to rate payers.

9. ENERGY EFFICIENCY AND GHG REDUCTION

9.1 Energy Management Program

Through its Energy Management Program, Halifax Water is committed to creating and ensuring an ongoing focus on sustainability and energy efficiency throughout all operating areas. This program defines the goals, objectives, accountabilities, and structure for activities related to sustainability and responsible energy use. The focus of this Program is being updated to include more emphasis on GHG emission reduction, and developing specific targets and actions for Halifax Water that will support HalifACT 2050. HalifACT 2050 is a long-term climate change plan to reduce emissions and help communities adapt.

In support of this program, Halifax Water's Energy Management Policy defines longer-term goals and commits Halifax Water to the principles of responsible energy management. This includes reducing dependence on fossil fuels through energy conservation and best practices; identifying and implementing cost-effective energy-reduction initiatives; developing alternative and renewable forms of energy from utility assets; and reducing pollution by increasing the usage of energy supplied from sources that are less greenhouse gas intensive.

Halifax Water has an Energy Management Steering Committee (EMSC) that guides creation and implementation the corporate Energy Management Action Plan (EMAP).

Energy Management Action Plan

The EMAP includes details of energy-management activities that will be developed and undertaken by Halifax Water each year. Key activities contained in the action plan include:

- Delegation of the responsibility for achieving energy goals;
- Assignment of team members as required to meet goals;
- Development of an employee-awareness strategy to facilitate energy savings at work and home;
- Establishment of an energy accounting system that allows for collection, monitoring, and reporting of all data on energy-consuming assets, energy consumption, energy costs, energy savings, and key performance indicators;
- Preparation of energy audits on all facilities on a priority basis;
- Implementation of identified energy projects based on sound financial principles;
- Benchmarking of Halifax Water's facilities and establishment of annual energy-reduction targets;
- Identification of funding requirements and external funding sources for the EMAP;

- Refinement of contract and purchasing policies to incorporate energy-efficient practices; and
- Development of renewable energy generation projects.

Greenhouse Gas (GHG) Emissions

Following on its recent endorsement of the Pan-Canadian Framework on Clean Growth and Climate Change, the government of Nova Scotia implemented a carbon "Cap & Trade" program in 2018 to comply with the federal government's carbon pricing regulations. This program applies only to very large industrial GHG emitters (> 100,000 tonnes CO_2e per year), electric utilities, petroleum product suppliers and natural gas distributors. Halifax Water's GHG emissions at source are currently very low, and do not meet the industrial threshold as implemented. As such, Halifax Water will continue to monitor the provincial Cap & Trade program, and will continue to work to reduce energy usage, GHG emissions, and track energy savings achieved through various energy efficiency projects and annual initiatives.

Halifax Water's efforts to reduce energy use and GHG emissions began in 2010. Since that time, over 57,000 MWh_e of cumulative energy savings, over 37,000 tonnes CO_{2e} of cumulative GHG emission reductions, and over $5,700,000 in cumulative operational cost savings have been realized from either the numerous and specific energy efficiency projects, or annual energy savings initiatives such as our annual UV shutdown program, or the annual winter season Odour Control System by-pass program in the HHSPs. Halifax Water will continue to focus on annual targets for energy savings and GHG reductions, and will work with external funding organizations such as Efficiency Nova Scotia to advance and implement more projects in the future.

In January 2019, HRM declared a climate emergency. Halifax Water staff have been engaged in HaliFACT 2050. The Intergovernmental Panel on Climate Change (IPCC) released a special report on global warming that indicates the global community has only 10 years to table actions to course-correct if there is any hope of keeping global warming at 1.5°C. Halifax Water will update the Energy Management Policy and EMAP to reflect aggressive targets in support of broader community objectives.

9.2 Renewable-Energy Generation

Halifax Water has identified renewable energy as an important way of offsetting energy costs and increasing revenue that will help the utility to significantly reduce energy use and greenhouse gas emissions in the region.

To date, two key project areas have been identified: renewable energy and energy recovery from both water and wastewater systems.

9.2.1 Solar Energy

Under Nova Scotia's Solar Energy for Community Buildings Pilot Program, Halifax Water was awarded a 75 kW solar photovoltaic (Solar PV) project in 2018. This project is scheduled to be installed at our Halifax Wastewater Treatment Facility in early 2020. This project will see 264 solar panels installed on the roof of the Halifax WWTF, and will generate approx. 108,000 kWh/yr of clean, renewable energy. Additional Solar PV projects are being considered for other Halifax Water facilities in the future.

9.2.2 Energy Recovery Turbines

Halifax Water installed an in-line hydrokinetic turbine in its Orchard Pressure Reducing Valve (PRV) Chamber in 2014. Since that time, the system has performed flawlessly, generating in excess of 1,100 MWh of clean renewable energy to date, and over $150,000 in operating revenue. The system produces enough energy annually to power in excess of 25 average Nova Scotian households. Additional in-line turbine projects are being considered for other Halifax Water facilities in the future.

9.2.3 Wind Energy

In 2014, Halifax Water worked with the Chebucto Community Wind Fields to install a 10 MW wind farm, on lands near Halifax Water's J.D. Kline Water Supply Plant, as part of the provincial Community Feed-In Tariff (COMFIT) program. Since that time, the system has performed as expected, generating in excess of 150,000 MWh of clean renewable energy, and delivering almost $600,000 in operational royalties to Halifax Water.

9.3 Energy/Nutrient Recovery

Energy recovery from process or waste streams is recognized as one of the biggest renewable energy opportunities available to society. Recoverable energy is everywhere – in solid municipal/residential waste streams, industrial by-products, and water and wastewater streams. Halifax Water has significant recoverable energy resources available in both its water and wastewater streams. Specifically, as noted in the previous section, inline turbines can be used in place of pressure reducing valves (PRVs) to recover energy from water distribution systems. In the wastewater system, energy can be recovered from the waste sludge produced by wastewater treatment facilities, along with thermal energy from the effluent streams.

Reducing the cost of wastewater collection and treatment has been an important issue and has been on the radar of most utilities for some time. Over the years, the field of wastewater treatment has seen a gradual progression with a focus changing from sewage treatment to

water reclamation to resource recovery. Following industry best practices, many utilities currently view the wastewater components of water, biosolids, nutrients, and energy as valuable resources. Nutrients, such as phosphorus, can be recovered in various forms for use in agricultural fertilizers. Energy can be extracted from organics to offset energy demands of the facility, or sold to the local community. Halifax Water has been progressing several initiatives over the years on all four forms of resources available from wastewater. These efforts will continue in the future.

9.3.1 Biosolids Strategy

Halifax Water currently supplies approximately 30,000 tonnes per year of partially de-watered sewage sludge, or biosolids, to its Aerotech Biosolids Processing Facility (ABPF). Currently, the biosolids are turned into a soil amendment and fertilizer for beneficial reuse for agricultural purposes such as topsoil manufacturing, sod growing, horticultural use, and land reclamation.

Energy recovery from biosolids is one of the most developed opportunities for wastewater treatment plants. This is commonly achieved through anaerobic digestion of wastewater sludge. Halifax Water's Mill Cove WWTF and Lakeside Timberlea WWTF are equipped with anaerobic digesters, and the methane gas generated within those digesters is utilized for digester operation and space heating within the plants. All of Halifax Water's WWTFs currently produce biosolids that are subsequently treated in the ABPFs alkaline stabilization process and utilized as soil amendment for beneficial reuse. Halifax Water expects to continue this practice given the success of the current beneficial reuse program. There are several emerging technologies in the industry that show promise for alternative uses of biosolids for energy production. Halifax Water staff have reviewed these technologies as part of the recently completed biosolids management planning process, along with the risks associated with the complex issue of biosolids management.

Halifax Water will be issuing an RFP in 2020 seeking innovative solutions to utilize biosolids and maximize resource recovery.

9.3.2 Wastewater Effluent Heat Recovery

The volume of wastewater effluent flowing out of wastewater treatment facilities is immense. The capacity of water to store energy in the form of heat is also immense, as noted in Figure 10 below. This combination presents a real and readily available resource for an efficient, cost-effective heat sync that can be used, at a minimum, to provide or remove energy to and from wastewater treatment facilities, or to the local community at large.

Figure 10: Wastewater Effluent Heat-Recovery Potential

Facility	Annual Flow (m^3/yr.)	Available Power Capacity[(1)] (MW)
Halifax WWTF	36,825,000	59.7
Dartmouth WWTF	22,100,000	35.3
Herring Cove WWTF	4,630,000	7.4
Totals	**63,555,000**	**102.4**

Notes: *Total available power based on an average effluent temperature of 12°C.*
Based on 2013/14 usage and cost data.

Halifax Water has completed studies at the three Harbour Solutions plants to determine and understand the technical and financial challenges associated with these types of energy-recovery systems, and then implement the projects that make sense from an energy efficiency and financial perspective.

Cogswell District Energy System

The HalifACT 2050 program initiated by the municipality identifies the Cogswell District Energy System as a significant climate change mitigation opportunity. A study was completed in 2016 to determine the feasibility and preliminary business case for an Ambient Temperature District Energy System [ATDES] within the Cogswell Redevelopment Area of downtown Halifax. The feasibility of the DES is predicated on the assumption that connection to the DES will be mandatory within the redevelopment area. To that end, HRM has completed amendments to its Charter through the Legislature to facilitate this authorization. Work on the Cogswell ATDES continues with stakeholder consultation, and the completion of preliminary and detailed design work in parallel with the Municipality's effort to advance the Cogswell Redevelopment project. Halifax Water strategic objectives related to DES in 2020/21 include enactment of a mandatory connection by-law by the municipality, confirming that the service will be regulated by the NSUARB, finalizing the business case, and securing necessary Halifax Water Board and NSUARB approvals to proceed.

10. CONTINUOUS IMPROVEMENT

10.1 Organizational Cultural Change

Halifax Water has approximately 475 employees, 3/4 of which are unionized under CUPE Locals 227 and 1431. Changing culture within a large organization takes time, but is often accelerated by new technology or societal events. Halifax Water is going through an

accelerated period of change during the next five years, prompted by new technology, new business processes, new policies and turnover in key positions as a result of demographics and retirement. One advantage Halifax Water has as employer implementing change, is that turnover is low relative to other public sector organizations, and employee satisfaction is generally high.

Halifax Water conducts an employee survey every year. The survey is a very important tool to help identify opportunities and challenges from the perspective of employees. The 2019 employee survey results indicated a "B+" rating, and improvement over the 2018 B rating. Halifax Water's target is an A, and it is hoped that target will be achieved during the period covered by this Five-Year Business Plan.

As part of the overall approach to talent management, Halifax Water has a succession plan for key positions, and has an approach to total compensation that supports attraction and retention of employees. Many initiatives are underway, or planned that will help maintain a positive culture within the organization and build resilience to respond to new challenges. The primary areas of focus in the next five years will be:

- Ensuring all employees are aware of Halifax Water's strategic objectives
- Helping employees understand how they can meet personal career or performance targets and providing access to training and development opportunities
- Communicating and recognizing achievements to help employees feel a sense of accomplishment from their work
- Demonstrating that senior leadership is approachable, and promoting more two-way communication and feedback at all levels
- Promoting a workplace that is psychologically safe and healthy, respectful and civil for all employees, and reflective of the diverse community served by Halifax Water
- Developing employees to be ready to take on new responsibilities in the organization, and building resilience to adapt to change.

10.2 Cost Containment

Halifax Water reports semi-annually to the HRWC Board, and annually to the NSUARB on the results of cost containment initiatives. The next cost containment report will be filed with the NSUARB in June 2020. Some of these initiatives are on-going, and some are one time in nature. The containment initiatives from 2013/14 to 2019/20 reflect cost savings of $6.3 M. The inclusion of initiatives and amounts from prior years reflects an intentional focus on sustainable results over the long-term.

Halifax Water continues to promote and develop a cost containment culture. As salaries and benefits are the largest element in the operating budget, the most significant opportunity identified is to improve workforce planning and the staffing process. The redesign of the Halifax Water Pension Plan has resulted in the Plan being fully funded as of January 1, 2019. The result is an elimination of the special payment, saving Halifax Water over $800 thousand annually. Another area of opportunity is focusing on productivity through enhanced business processes and technology, performance management, and improving time and attendance tracking.

10.3 Advanced Metering Infrastructure (AMI)

With the approval of the Customer Connect (AMI) Project by the NSUARB in the fall of 2016 and the launch in December 2016, Halifax Water has installed over 90% of the new meters, 80,000 meters. We have begun to collect customer water usage information without the need to visit a customer and have been using the water usage information to bill customers.

In addition to removing the need to visit a customer to read the meter, the Customer Connect Project will improve the level of service Halifax Water can offer its customers. These include:

- The ability to offer monthly billing to residential and small commercial customers; making it easier for customers to manage cash flow and automated payments.
- The ability to provide an accurate reading of water usage for customers moving into or out of a residence.
- The capability to alert customers to higher than normal consumption including plumbing leaks; almost as they happen. This will reduce billing disputes and high bills.

The ability, through the Customer Portal, to manage their water consumption, in near real time, and see the effect of any conservation measures they take. To realize the full benefits of the AMI, we continue to strive for installation of meters to all Halifax Water customers, however, some customers have not been accepting of the radio frequency technology. We continue to work with these customers but we do expect that a small number of meters will need to be read in the traditional manner and a manual read fee may apply in the future.

The new technology will enable significant reductions in the cost of reading meters, billing and collecting from customers and the number of disputes related to high bills.

10.4 IT Five-Year Strategic Plan

Halifax Water continues to update its IT Strategic Plan. The business focus is on using progressive technologies to improve organizational efficiency, effectiveness and customer service.

The Strategic Business Drivers shaping the information technology environment have not changed:

- Provide world class services to our customers and our environment
- Retain leadership position as an integrated water, wastewater and stormwater utility
- Retain position as a top utility in all Lines of Business focused on Public and Employee Safety, Water Quality, Sustainable Infrastructure and Asset Renewal, Regulatory Compliance and Growth, and Environmental Stewardship.
- Follow an IRP Framework

Six Strategic Themes characterize the plan:

- **Customer Experience:** Providing customers with the ability to access most services using online services.
- **Information Integration with Location:** Having all necessary data linked together and tracked through a geographic lens.
- **Analytics Driven Decision Making:** Being able to model customer usage, financial, environmental, and infrastructure data across the Water, Wastewater and Stormwater systems and having the capability to tie data together into business intelligence.
- **Managed Knowledge and Workflow:** Capturing and storing key content in a logical and easy to access place for those who need it.
- **Enable Employees Anywhere:** Providing functionality for employees to access, capture and update the information they need to effectively do their job and support others, wherever they may be working.
- **Secure IT Foundation:** Effectively managing the IT function and providing infrastructure that is resilient, cost effective, well supported, and recoverable within clearly defined requirements.

The IT Strategy Five-Year Roadmap 2020/21 is a high-level snapshot of the sequence of programs to deliver on the approved technology vision and recommended architecture. The plan has an estimated total cost of $28,000,000. The projects contained within the Five-Year Business plan can be seen in the detailed Capital Budget under Corporate Projects in Appendix D.

10.5 Water Quality Master Plan

Halifax Water began developing its first Water Quality Master Plan (WQMP) in 2005 to assess its water quality program and to keep in front of the rapidly changing drinking water regulations. The initial WQMP established a road map towards more effective water quality management and staff determined at the time that a water quality research program was the most effective way to achieve the plan goals.

In 2006, Halifax Water executed a research agreement with Dr. Graham Gagnon of Dalhousie to execute the WQMP research. Subsequently, Dr. Gagnon applied to the Natural Sciences and Engineering Research Council (NSERC) for an Industrial Research Chair (IRC). Under the research chair, NSERC matches all funds provided to Dr. Gagnon by research chair partners, effectively doubling Halifax Water's investment.

In April 2017, Dr. Gagnon was awarded a third, five-year research chair term and the chair has grown to include other partners including Cape Breton Regional Municipality, the City of Moncton, CBCL Limited consulting engineers, and several water analysis technology companies, further multiplying the value of Halifax Water's investment.

Since its beginning in 2007, the IRC has created many benefits. Through our collective efforts, Dr. Gagnon and Halifax Water have emerged as leaders in North America on drinking water quality. Dr. Gagnon has trained many graduate students who have found employment, in some cases, at Halifax Water, and also in prominent roles in the drinking water sector.

Direct benefits of this Chair to Halifax Water include:

- Documentation for NSE that there was no public health benefit to install filter-to-waste at the JD Kline water supply plant, thus avoiding a $5 M capital cost and ongoing organizational risk. Halifax Water did improve public health as part of this process by adopting new filter washing practices at minimal cost.

- Halifax Water chose not to adopt chloramines as a secondary disinfectant, which was a preferred strategy for disinfection byproduct removal when research showed that chloramines would have adverse effects for lead levels in drinking water.

- Identifying the need to increase corrosion control levels, reducing lead levels in drinking water by 35%.

- Adoption of biofiltration at the JD Kline plant, saving $40,000 per year in chlorine costs and reducing disinfection by-product levels by 40%. Longer term plans are in place to convert Lake Major to biofiltration.

- Determination that partial replacement of lead service lines was not protective of public health and possibly harmful. Halifax Water was one of the first utilities to take this stand in 2012, a position that is now commonly held in the water industry.

- Identified the phenomenon of lake recovery. This is a process where lakes are experiencing increasing pH as a result of the reduction of sulfur oxide emissions into the atmosphere. This process has negative consequences for water treatment and early discovery has led to a head start on planning treatment upgrades.

Halifax Water published its third WQMP in September 2017 and it was subsequently approved by the Halifax Water Board. The WQMP guides Halifax Water's water quality work and also guides the research chair. There are four themes in the current WQMP as follows:

1. **Understanding Lake Recovery:** As indicated above, lake recovery is a process whereby improved air quality and the reduction on acid rain is allowing lakes to recover to their previous state. Unfortunately, this process has resulted in increasing levels of total organic carbon (TOC) which is a critical treatment parameter and increasing levels of biotic activity in the lakes. The increasing levels of biotic activity are an explanation for the geosmin episodes experienced since 2012. Increasing levels of biotic activity are also a potential precursor to other taste and odour causing compounds as well as potentially harmful algal toxins such as microcystsin-LR. As well, the increasing levels of TOC are challenging the ability of the water supply plants to operate efficiently and may eventually reach levels beyond what the plants were designed to deal with. Plant improvements will be required in the medium term and understanding how far the process of lake recovery will go is necessary to design the plant processes of the future.

2. **Adapting to Lake Recovery:** As indicated above, lake recovery is already impacting the treatment plants. While treated water quality still meets Halifax Water goals, the plants are more difficult and more expensive to operate. Short and medium term strategies and operating approaches are necessary to continue to produce high quality drinking water. This includes planning for a new intake for Lake Major to get access to more treatable and more consistent water quality as well as maximizing the utilization of biofiltration.

3. **Maintaining Distribution System Water Quality:** Maintaining water quality between the water treatment plant and the customer's tap is an important part of the multiple barrier approach to providing safe drinking water. Continuing our research into lead occurrence and corrosion control chemistry will remain a focal point. This theme will also explore maintaining water quality during emergencies such as water

main breaks and continuing to optimize disinfection in the distribution system to maintain chlorine residuals while reducing disinfection by-products.

4. **Water Quality Data Mining:** Ten years of research and source water protection work has resulted in an immense resource of water quality data. New resources recruited as part of the Lead Service Line Program include a data analyst whose long-term responsibility will be to work with water quality data sets to gain new insights into water quality issues and employ data analytics techniques for processes like distribution system water quality modelling.

***for*Water Network**

In 2015, Halifax Water was asked to participate in an application by researchers at the University of Waterloo and the University of Alberta in an application to NSERC for a $5 M network grant. The purpose of the network is to bring forest ecology researchers from across Canada to share ideas on how to manage forests to protect drinking water quality.

The network grant was awarded in 2016 and unites 7 research platforms across Canada, including Dalhousie University. Halifax Water staff participate in the network in addition to hosting research on our watersheds. Research in Halifax is focusing on how climate change impacts the transfer of naturally occurring carbon from the forest to water, where the carbon levels impact the treatment process.

It is expected that this program will have a major influence on watershed management in coming years.

10.6 Lead Service Lines

One significant new program that has grown out of water quality master planning has been the adoption of a formal lead service line replacement program. Halifax Water has approximately 2,500 lead service lines (LSLs) remaining in the public right of way and up to 3,500 remaining on private property. Halifax Water has adopted a program intended to remove all lead service lines by 2050, consistent with the recommendation made to the USEPA by the National Drinking Water Advisory Council (NDWAC).

Halifax Water is one of a few utilities in Canada to adopt a NDWAC based approach to LSL replacement. This approach is consistent with industry association policy, is consistent with the safeguarding of public health, and positions Halifax Water well from increased public attention to the lead issues arising from the new Health Canada guideline.

The program has the following five pillars:

1. **Replace all lead service lines by 2050:** Both those owned by the utility and those owned by customers. A key part of this is working in partnership with customers to get the private side work done. It will also require a 3-4 times increase in our current level of lead service line replacements from our pre-program levels in 2016.

2. **Inventory:** Getting an accurate inventory of where lead service lines are, both public and private is key to working with customers and executing an effective program. Resources and new business process will be dedicated to building an accurate inventory of lead service lines. This portion of the program has been very successful to date. Several record sources have been consolidated and confidence is improving in existing records. Halifax Water is working toward an industry best practice of an online inventory tool for customer access.

3. **Customer communication:** The NDWAC recommendations require direct communication with customers who have a lead service line, a minimum of once every three years until the LSL is removed. Further, to encourage customers to replace LSL's, it will be necessary to provide more information on our web site and interactive tools to see what type of service they have. It will also be necessary to provide them more frequent and better information on the replacement process, how to access funding programs, how to hire a contractor and the health risks associated with LSL's.

4. **Continuation of customer sampling programs:** Sampling properly for lead detection is expensive and intrusive for the customer. It is important that Halifax Water continue to offer free lead sampling for at risk homeowners in order to engage them in the issue and provide public health information. Through our partnership with Dalhousie University we have been able to provide very cost effective lead sampling.

5. **Corrosion control:** Providing corrosion control treatment at the treatment plant is an important part of a comprehensive lead strategy. Effective corrosion control reduces lead levels where service lines exist and will continue to protect customers from lead found in solder and brass fixtures well after lead service lines are removed.

Halifax Water launched its new lead program on April 1, 2017. In August 2017, the NSUARB approved a program to enable Halifax Water to provide a 25% rebate for customers replacing a lead service line and to replace lead service lines that are disturbed during emergency repairs, at the utilities expense. This makes Halifax Water one of the first utilities in North America to take this step. To further reduce barriers to replacement, Halifax Water has applied to the NSUARB to allow Halifax Water to offer customers a financing program for the balance of the replacement cost. This financing program was approved in 2018.

In the first two years of the program, 197 public LSL's and 212 private LSL's were replaced. Unfortunately, in 2019 we saw a reduction in uptake in the program. Based on discussions with other utilities across North America, this appears to be a common phenomenon, as motivated customers participate in the program in the early years leaving less motivated customers in later years.

Accordingly, Halifax Water will be exploring further regulatory and incentive options to promote LSL replacement and anticipates an application to the NSUARB in 2020.

10.7 Compliance Plan

The Regulatory Compliance division of Regulatory Services has established a tracking system to monitor trends of non-compliance and associated sources for all of the wastewater treatment facilities (WWTF). A working group has been established between Asset Management, Operations and Design Services staff to track and plan for the upgrades to maintain compliance with Provincial and Federal regulations. As of 208/19, all treatment facilities are in compliance with WSER or have approval for operational variances consistent with the CCME Municipal Wastewater Effluent Strategy.

Building on the framework of the basic Compliance Plan from 2012, the plan was updated in 2019 utilizing information Halifax Water has available to create a path forward to maintain or achieve compliance for our wastewater, water and stormwater infrastructure systems over the next 30 years. The Compliance Plan highlights the current state of compliance at our wastewater treatment facilities and water supply plants as well as future compliance requirements. It also includes overall guidance on our wastewater collection system, sanitary and combined sewer overflows and our water distribution system including water reservoirs.

The key objectives of the Compliance Plan included:

- Review of previous work completed that relates to compliance, including the 2012 IRP, 2019 Infrastructure Master Plan and 5-year Capital Program;
- Understanding current and future compliance requirements as they relate to wastewater, water and stormwater infrastructure;
- Understanding previous compliance trends and exploring potential compliance requirements taken from regional and global examples;
- Reviewing, documenting and analyzing the current performance of infrastructure against compliance requirements;
- Generation of infrastructure needs and costs to meet current and future compliance requirements;

- Incorporating the three drivers behind infrastructure planning (growth, asset management and compliance) through incorporating the impact of future growth trends and outlining projects that contain compliance components and asset renewal / growth components;
- Developing an action plan that outlines current, medium and long-term projects; and
- Identification of action plan risks and potential mitigation methods.

Halifax Water has been consistently working toward achieving the provincial level of wastewater treatment as stipulated by Nova Scotia Environment (NSE) permits and Federal Wastewater System Effluent Regulations (WSER). Historically, NSE has set compliance standards for each wastewater treatment facility (WWTF) issuing Approval for Operation which sets the effluent limits, and the Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CSMMW) provided national standards for combined sewer overflows (CSO) and sanitary sewer overflows (SSO). Then in June 2012, the WSER was enacted which set national standards for WWTF effluent discharge and CSO and SSO standards.

Since the introduction of the federal WSER standards, NSE has been reviewing and renewing Halifax Water's operating permits with steady increases in compliance and reporting requirements.

The Compliance Plan is a key input to the Infrastructure Resource Plan (IRP). The IRP provides holistic guidance to understand the current level of compliance and actions required for maintaining compliance. Several initiatives have recently been completed and others underway shall continue. Current compliance initiatives are as follows:

- Compliance Monitoring and Reporting through the Regulatory Services Department;
- Engaging Dalhousie University in compliance research;
- Adopting the Environmental Management System (EMS);
- Environmental Risk Assessments (ERA); and
- WSER Transitional Authorization.

Halifax Water has entered into a 3-year research agreement with Dalhousie University to conduct specific research and optimization of Halifax Water facilities to stay "ahead of the curve" to meet its compliance requirements. The research program is eligible for funding under NSERC's Collaborative Research and Development Grant, an application to NSERC was made in spring 2019; the approval is pending. The NSERC is in the midst of redesigning its funding programs, Halifax Water and Dalhousie University intend to make a future application for a long-term funding when the new programs are in place. The current 3-year plan has a primary objective to improve effluent quality from chemically enhanced primary systems through bench, pilot and full scale testing and optimization of coagulation/

flocculation processes; the other elements being the application of innovative UV technologies and assessment of contaminants of emerging concern.

Post Walkerton, Nova Scotia was a leading province in modernizing its drinking water regulatory framework. Between 2005 and 2010, Halifax Water went through the provincial process to make sure all water supply plants were compliant at that time. This process resulted in minor upgrades to most facilities and major upgrades to two of the small systems. Nova Scotia Environment maintains a process of doing a systems assessment of all water plants, compare to design standards every ten years with the next round of system assessment reports due to be completed in 2023.

With the discovery of the lake recovery phenomenon, Halifax Water's focus now is to keep water supply plants compliant in the face of changing source water. It is almost certain that significant upgrades will be required to the Pockwock and Lake Major plants to equip them to deal with a source water that is significantly different than when the plants were designed.

10.8 Environmental Management System Expansion

An Environmental Management System (EMS) is a system of procedures, records and processes to manage environmental issues and assist with regulatory compliance. It also makes day to day operations more sustainable and engages employees in these operational activities. The EMS program can be audited against ISO 14001 standards, and if found to comply, receives a Certification through ISO. The ISO standard changed from a 2004 version to a 2015 version, with greater focus placed on organizational leadership and identification of risks and the associated influences, both internal and external to an organization.

Staff have successfully obtained certification for the existing facilities, Pockwock, Lake Major and Bennery Water Treatment Facilities and the Herring Cove and Dartmouth Wastewater Treatment Facility under the new Standard. Halifax Water is currently preparing for internal audits for Eastern Passage, Halifax and Mill Cove WWTFs. It is anticipated they will be certified in 2020.

A request for proposal closed in November and a Consultant will be in place by January 2020 to develop the framework for a corporate wide EMS program. It is anticipated the implementation of a corporate EMS will be completed by 2022. Expansion of the EMS program presents a significant opportunity to reduce Halifax Water's environmental footprint.

10.9 Wet Weather Management

Halifax Water maintains approximately 1,000 km of wastewater mains, 300 km of combined sewer mains, 14 wastewater treatment facilities, and 166 wastewater pumping stations. Like many municipalities and utilities across North America, Halifax Water's wastewater collection system is subject to dramatic flow increases in response to precipitation events due to age, historical construction practices, maintenance, number of connections as well as other factors. These Inflow & Infiltration (I&I) flows can lead to wastewater releases, sewer backups/basement flooding, increased operation and maintenance costs, treatment process upsets, and treatment facility effluent quality & capacity issues.

Recognizing the impacts of wet weather generated flows on the system, Halifax Water developed a wet weather management program (WWMP). The WWMP is a strategic program to address the negative impacts of wet weather on the wastewater collection system and treatment facilities. The WWMP monitors flows within priority sewersheds before and after wet weather flow reduction activities, while separating the combined sewer systems when practical to do so. The program is long-term in nature and follows a phased implementation approach to meet objectives.

The negative impacts of wet weather can generally be managed by the following:

1. Peak flow reduction - Reduce the quantity of wet weather generated flows that are collected, pumped and treated by the wastewater collection and treatment systems.
2. Peak flow attenuation - Store wet weather generated flows during wet weather periods and release & treat the flows when the system has capacity.
3. System capacity increase

The WWMP intends to systematically identify opportunities to employ the most cost effective wet weather management strategy. Where possible, all three methods are considered based on a cost benefit analysis and the sewershed specific driver for flow reduction, with regulatory compliance being the highest priority. By reducing wet weather flows, the wastewater system will see a reduction in untreated discharges to the environment, effluent noncompliance at WWTFs, operational and maintenance costs, and an increase in available system capacity.

I&I is grouped into two sources, public infrastructure (mains, manholes, laterals up to the property line, etc.) and private infrastructure (laterals from property line up to and including connections within buildings). The program employs a variety of strategies to reduce wet weather impacts such as pipe condition assessments, cured in place pipe (CIPP) rehabilitation, sewer separation, flow monitoring, illegal connection investigations, public communications, and modeling. To effectively address all the issues that contribute to the impacts of wet weather, multiple business units within Halifax Water are engaged to work together to achieve the goals of the WWMP. Figure 11 indicates the working relationships and activities between the contributing business units.

Figure 11: Contributing Business Activities of the Wet Weather Management Program

A phased approach is being followed to implement the program. While the phasing is prescriptive; it is important to revisit the objectives of the program periodically and adjust where necessary.

- **Phase I:** The initial phase of the WWMP involved initiation and development of the program. It was quickly realized that strategies would have to be implemented within each priority sewershed based on individual system characteristics. The program's initial organizational structure was comprised of a wet weather steering committee and a wet weather action committee. Key contributors continue to be engaged in the program with monthly meetings between the steering committee and implementation team.

- **Phase II:** Phase II of the program required identifying priority sewersheds that demonstrated a need for wet weather management. In the absence of measured flow data, pump station run time data was used to develop a sewershed prioritization matrix. Since that time, significantly more flow monitoring data is available and has almost negated the need for pump station run time data.

- **Phase III:** Pilot sewersheds were identified from the prioritization matrix from Phase II. These pilots were selected so that specific wet weather management strategies could be assessed. Each pilot sewershed was evaluated using pre and post rehabilitation flow data and a cost benefit analysis was conducted with respect to actual wet weather flow reductions. Post rehabilitation flows continue to be monitored in the pilot sewersheds to confirm wet weather flow reductions are achieved long-term.

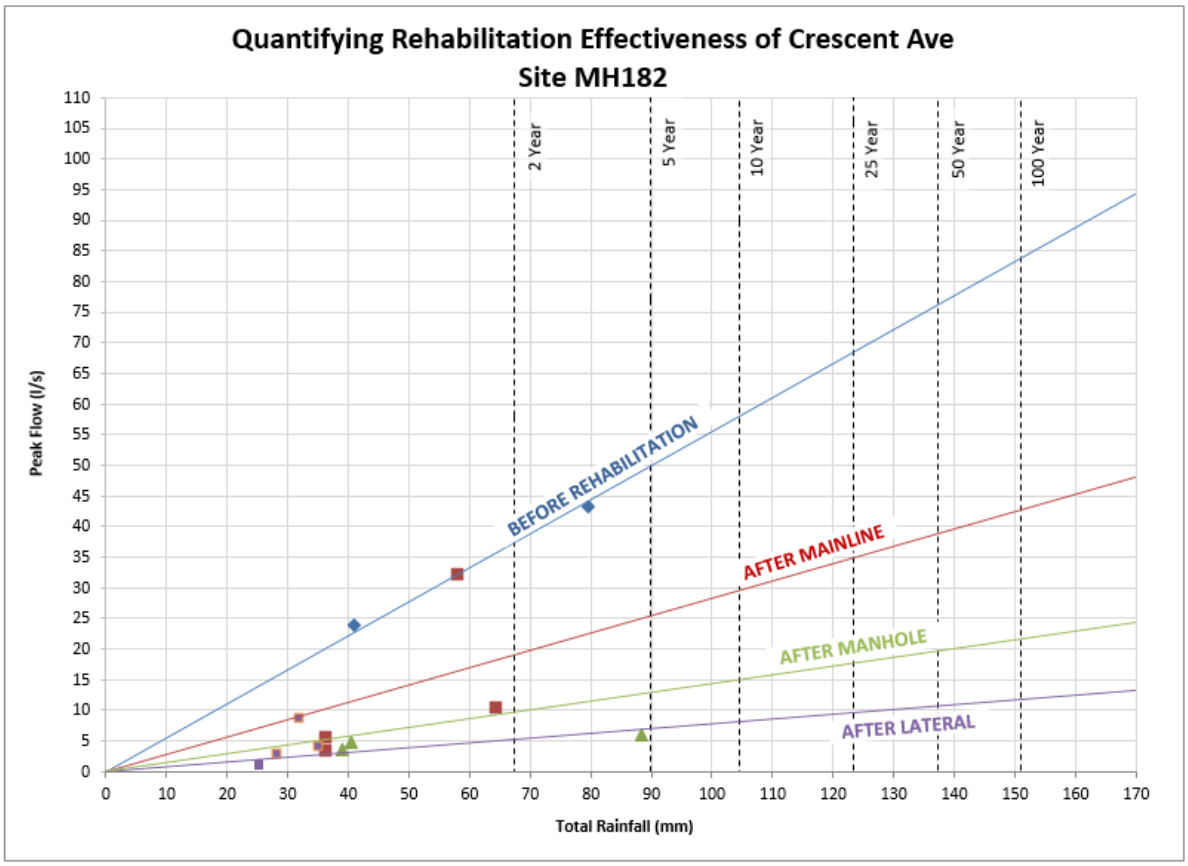
- **Phase IV:** With the information collected from pilot and other wet weather reduction projects, future project recommendations are being identified and implemented in other sewersheds. This approach allows Halifax Water to identify the most cost-effective strategies to manage wet weather flows using system-specific historical data. Since the initiation of the program, 205 sewersheds have been identified with varying degrees of impacts from wet weather.

Recognizing the importance of flow monitoring and infrastructure condition assessments, Halifax Water enhanced the service delivery of the flow monitoring and CCTV programs. Both programs have performance-based contracts to ensure accurate and dependable data delivery to the industry standard.

The near term (2020/2021) goals for Halifax Water's Wet Weather Management Program include:

1. **Rehabilitation Pilot Projects:** Halifax Water's WWMP has completed 5 pilot projects: Stuart Harris Pump Station Sewershed, Cow Bay Rd., Leiblin Park, North Preston, and Crescent Ave. These pilot areas were chosen to enable Halifax Water to assess the effectiveness of the various wet weather management strategies and collect rehabilitation cost information. Wet weather management strategies for these sewersheds included mainline, manhole, and lateral CIPP, new stormwater mains, and system spot repairs. 2020/21 will see continued flow monitoring and data analysis on pre and post activity for each pilot. As an example, Figure 12 below illustrates the reduction in rainfall derived inflow and infiltration (RDII) peak flow for the Crescent Ave pilot project. This pilot underwent a three-phase rehabilitation including mainline, manhole, and lateral renewal activities.

Figure 12: Crescent Ave. Pilot Project RDII Peak Flow Reduction by Rehabilitation Phase



2. **Refinement of Cost Benefit Analysis:** Phase IV of the WWMP involved applying a cost benefit analysis of the various strategies to manage wet weather flows. As expected, the pilot sewersheds are demonstrating a significant reduction in RDII as the various wet weather management strategies are implemented. The financial cost of the RDII reduction was normalized so that the information can be applied to other sewersheds and compared to more traditional approaches to wet weather management such as capacity increase and storage. Additional data from various sewersheds is continually analyzed as it becomes available. In addition to flow data, cost information is available for application to larger scale rehabilitation projects.

   The cost and reductions in RDII have been compiled since the inception of the formalized WWMP. The program is structured to evaluate all wet weather management activities using the same methodology to ensure consistent application across identified areas. This enables Halifax Water to employ the most cost effective strategy to future areas. It has become evident that the RDII reduction cost has significant dependence on the sewershed characteristics; however, it provides essential guidance for the future projects. The Program continues to augment this information and its application to future projects.

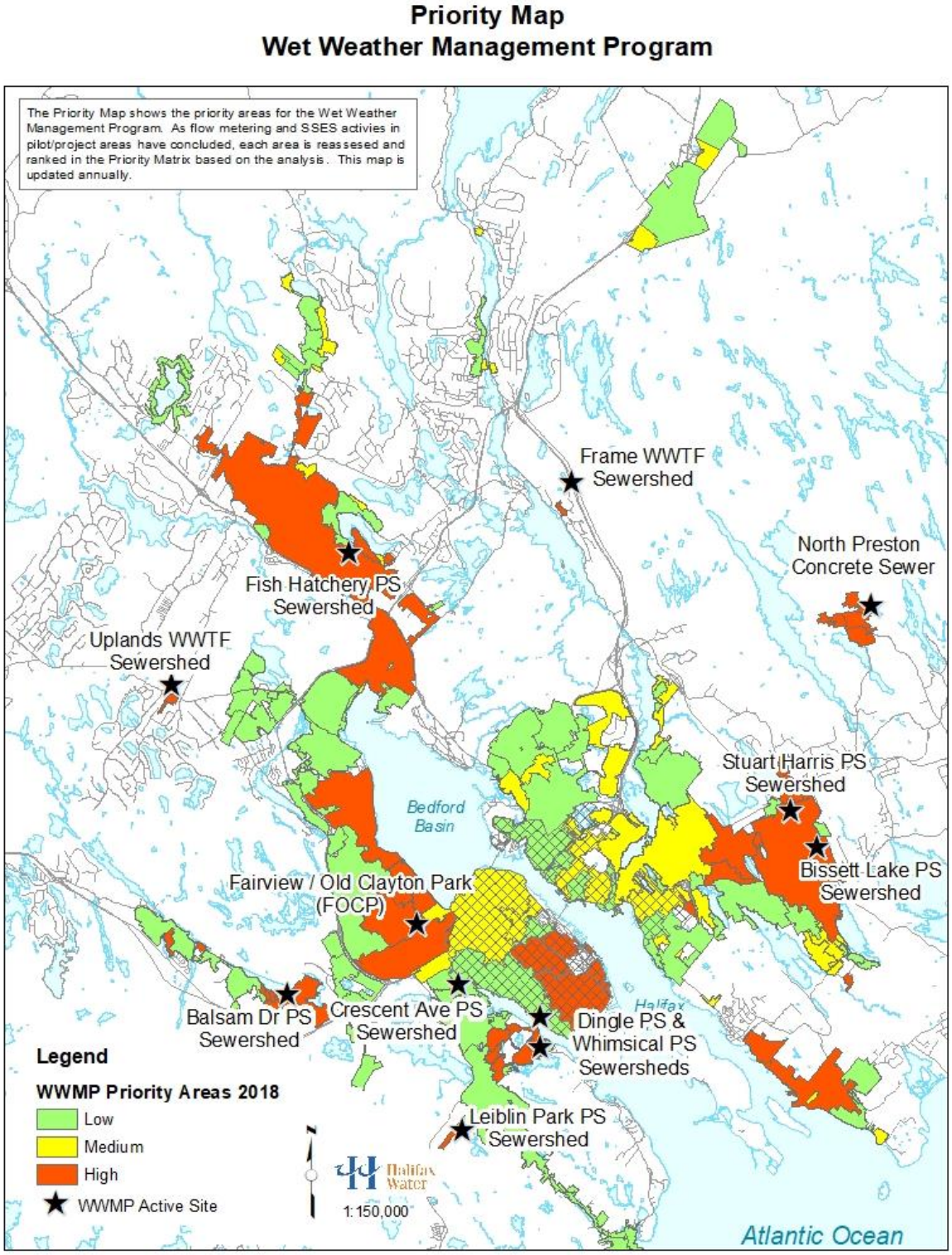
3. **Fairview / Old Clayton Park / Bridgeview:** The analysis of flow monitoring data undertaken as part of the West Region Wastewater Infrastructure Plan identified the potential for significant reductions in RDII in the Fairview, Old Clayton Park and Bridgeview areas. With the goal of reducing peak flows by approximately 200 L/s, a phased I&I reduction program was initiated in 2017. In 2018/19, approximately 11 km of CIPP lining was completed as part of Phase I and 2019/20 Phase 2 will see approximately 15 km completed. 2019/20 included smoke testing with the goal of identifying both public and private inflow sources. Flow monitoring and data analysis will continue to quantify RDII reductions for the project area and assess the effectiveness of the asset renewal during all phases of the project.

4. **Program Expansion: Central and East Region Infrastructure Master Plan:** Work on the Infrastructure Master Plan for the East and Central regions has been completed in 2019. Wet weather flow management is a part of the overall wastewater strategy for the Infrastructure Master Plan (IMP). The WWMP will continue to work with the IMP project team in strategy selection for management of wet weather flows. In 2020/21, the WWMP will continue with SSES (Sanitary Sewer Evaluation Survey) activities in the Fish Hatchery Park Pump Station and Eastern Passage sewersheds with the goal of identifying the sub-sewersheds where implementation of wet weather projects are considered feasible.

5. **Decision Matrix Implementation:** Building on the past experience with WWMP projects; an enhanced prioritization methodology is being developed with the addition of a decision matrix to assist in identifying areas that can benefit from wet weather management in a cost effective manner. The decision matrix provides a process flow framework to prioritize candidate sewersheds for future rehabilitation projects.

Figure 13 below shows current sewershed priority ranking based on a previous methodology. Beginning in 2020/21, the WWMP is updating the sewershed prioritization methodology by incorporating recommended criteria to refine priority areas going forward.

Figure 13: Priority Map Wet Weather Management Program



The planned WWMP activities for the next five years are listed in Figure 14 (WWMP Preliminary 5 Year Plan) below. Note that activities planned in years 1-2 are unlikely to change and the activities in years 3-5 are subject to change as the program evolves.

Figure 14: WWMP Preliminary 5 Year Plan

2020/2021

Refresh Prioritization Matrix
SSES Activity (CCTV, Smoke Testing & Flow Monitoring)
Fish Hatchery PS Sewershed (FMZ07 & FMZ10) *Hornes Rd Sewershed - Private-side Pilot Project (FMZ37)* *Eastern Passage Sewersheds (FMZ37)* *Loon Lake Sewersheds (FMZ24)*
Rehabilitation: Capital Projects
Fairview/Old Clayton Park/Bridgeview - Phase III

2021/2022

Refresh Prioritization Matrix
SSES Activity (CCTV, Smoke Testing & Flow Monitoring)
Fish Hatchery PS Sewershed (FMZ07 & FMZ10) *Hornes Rd Sewershed - Private-side Pilot Project (FMZ37)* *Eastern Passage Sewersheds (FMZ37)* *Loon Lake Sewersheds (FMZ24)*
Rehabilitation: Capital Projects
Fish Hatchery PS Sewershed (FMZ10) - Phase I *Eastern Passage Sewersheds (FMZ37) - Phase I*

2022/2023

Refresh Prioritization Matrix
SSES Activity (CCTV, Smoke Testing & Flow Monitoring
Fish Hatchery PS Sewershed (FMZ07 & FMZ10) *Hornes Rd Sewershed - Private-side Pilot Project (FMZ37)* *Loon Lake Sewersheds (FMZ24)* *Bissett PS Sewersheds*
Rehabilitation: Capital Projects
Fish Hatchery PS Sewershed (FMZ10) - Phase II *Eastern Passage Sewersheds (FMZ37) - Phase II*

2023/2024

Refresh Prioritization Matrix	
SSES Activity (CCTV, Smoke Testing & Flow Monitoring)	
	Hornes Rd Sewershed - Private-side Pilot Project (FMZ37)
	Eastern Passage Sewersheds (FMZ37)
	Loon Lake Sewersheds (FMZ24)
	Bissett PS Sewersheds
Rehabilitation: Capital Projects	
	Fish Hatchery PS Sewershed (FMZ07) - Phase III
	Fish Hatchery PS Sewershed (FMZ10) - Phase I
	Loon Lake Sewersheds (FMZ24) - Phase I

2024/2025

Refresh Prioritization Matrix	
SSES Activity (CCTV, Smoke Testing & Flow Monitoring)	
	Hornes Rd Sewershed - Private-side Pilot Project (FMZ37)
	Bissett PS Sewersheds
Rehabilitation: Capital Projects	
	Fish Hatchery PS Sewershed (FMZ10) - Phase II
	Loon Lake Sewersheds (FMZ24) - Phase II

**Subject to change due to data review supporting refresh of prioritization matrix*

10.10 National Water and Wastewater Benchmarking Initiative (NWWBI)

The Nova Scotia Utility and Review Board approved Halifax Water participation in the Canadian National Water and Wastewater Benchmarking Initiative (NWWBI) as a recommendation from a previous rate review process. The Canadian NWWBI was started in 1998 and has since grown to include about 45 of Canada's most progressive municipal and regional water, wastewater, and stormwater utilities from coast to coast.

The success of the initiative comes from how data is collected to ensure quality. To guarantee that data is collected on a like-for-like basis between utilities, significant effort is placed on the definition of each performance measure and the data items that are collected. Halifax Water has participated in the initiative since 2014 and has been refining the data collection process in that time.

Initial data collection efforts in the first three years of participation were challenging and NWWBI consultants cautioned Halifax Water that initial years would require extra effort around data collection. The effort was front loaded and entering the fifth year of data collection, Halifax Water has a more streamlined approach to data collection.

There have been several enhancements to the NWWBI program in recent years. In 2018, a new web-based data collection portal was launched. The objective of the new system is to help simplify the data collection process and ultimately reduce the workload burden of data collection. Additionally, the data collection deadline date has changed aligning better with our business processes particularly with financial year end.

Halifax Water has participated in the NWWBI survey for the past five years. Internal data collection procedures have matured quickly and will continue to streamline as Cityworks is implemented across the service areas.

The results of the annual surveys reveal industry trends and identify individual diversions from normal. Halifax Water reviews the trends and diversions to identify areas of improvement within the business. Generally Halifax Water is not an outlier in any particular business area for which data is collected and compared. Over the next few years, the NWWBI program will continue to be monitored to determine the strategic benefits to our organization of information received.

10.11 Talent Management

Halifax Water uses the term talent management to describe strategic workforce management activities to ensure the right people are in the right place, at the right time, and at the right price to execute the business of the utility.

Figure 15: Talent Management Cycle

Talent Management encompasses a variety of Human Resource strategies to ensure Employees continue to feel valued and are ready for more challenging careers as they become available. Employee engagement is a vital piece for a successful talent management program and continues to be a focus for Halifax Water. Another focus will be to create a culture of feedback which is necessary in developing employees at all levels of the organization. Halifax Water recognizes that a workplace which is psychologically safe and healthy is another key component in managing talent and, therefore, will be embarking on many initiatives to create a workplace that is psychologically healthy and safe for all.

10.12 Performance Measurement

Halifax Water's overall performance is assessed against the Corporate Balanced Scorecard (CBS). Halifax Water has been utilizing a corporate balanced scorecard (CBS) to measure utility performance since 2001. Each year the Halifax Water Board sets organizational indicators and reviews performance results. Adjusting the CBS targets to ensure they are relevant and challenging, keeps the utility focused on continuous improvement

There are eight Critical Success Factors (CSFs) derived from Halifax Water's vision statement (shown in Appendix A) and under each of the CSFs, there are organizational indicators to track performance and allow for the establishment of targets. The following lists the current CSFs and corresponding results for the organizational indicators under each category.

1. High Quality Drinking Water

- Adherence with Water Quality Master Plan - Percentage of sites achieving targets
- Bacteriological tests - Percentage free from Total Coliform
- Customer satisfaction about water quality - Percentage from customer survey

2. Service Excellence

- Customer satisfaction with service - Percentage from customer survey
- Water service outages - Number of connection hours/1000 customers
- Wastewater service outages – Number of connection hours/1000 customers
- Average speed of answer – Percentage of calls answered within 20 seconds

3. Responsible Financial Management

- Operating expense/revenue ratio percentage
- Annual cost per customer connection – Water
- Annual cost per customer connection – Wastewater

4. Effective Asset Management

- Water leakage control – target leakage allowance of 160 litres/service connection/ day
- I&I reduction - Number of inspections on private property for discharge of stormwater into the wastewater system
- Peak flow reduction from wet weather management capital projects
- Hours of unplanned outages in GIS and Cityworks
- Capital budget expenditures - Percentage of budget spend by end of fiscal year

5. Workplace Safety and Security

- Average score on internal safety audits
- NS Labour and Advanced Education compliance - # of Incidents with written compliance orders
- Lost time accidents -Number of accidents resulting in lost time per 100 employees
- Safe driving - Number of traffic Accidents per 1,000,000 km driven
- Training - Number of employees trained or re-certified before due date

6. Regulatory Compliance

- Percentage of public health and environmental regulatory infractions resulting in an environmental warning report, summary offense ticket, ministerial order, or prosecution
- Percentage of WWTFs complying with NSE approval permits

7. Environmental Stewardship

- Number of ICI properties inspected by Pollution Prevention each year
- Energy management kwh/m^3 reduction associated with capital projects
- Bio-solids residual handling - % of sludge meeting bio-solids concentration targets

8. Motivated and Satisfied Employees

- Percentage of grievances resulting in arbitration
- Percentage of jobs filled with internal candidates
- Employee satisfaction survey result
- Average number of days absenteeism

11. SAFETY & SECURITY

11.1 Occupational Health & Safety Programs

Halifax Water's Occupational Health and Safety Program is based on the Internal Responsibility System (IRS), which is the foundation of the Nova Scotia Occupational Health and Safety Act. The IRS is an internal system that provides for direct responsibility for health and safety for all staff in an organization.

The Safety and Security Division of Regulatory Services has principal duties and responsibilities as part of the IRS as follows:

- Assisting in formulating and supervising the execution of the utility's Occupational Health and Safety Program, and assist management to fulfill, to the greatest degree possible, its responsibilities for safety.
- Coordinating and/or providing safety training to staff in an effort to prevent incidents, minimize losses, increase productivity and efficiency, and ensure compliance with safety legislation and policies.
- Conducting safety audits in the workplace to identify safety hazards and recommend control measures.

- Assisting in the development and maintenance of a system of incident investigation, reporting, and follow-up.
- Providing program education for job safety.
- Acting as a resource to the Joint Occupational Health and Safety Committee (JOHSC).
- Liaising with federal, provincial, and local safety organizations by taking part in the activities and services of these groups.

Halifax Water has established and maintains an Occupational Health and Safety Program in consultation with the Joint Occupational Health and Safety Committees (JOHSC). Halifax Water's JOHSC's continue to mature and grow in knowledge and ability and will continue to be a large part of creating a positive workplace safety culture.

Halifax Water is a signatory of the Nova Scotia Health and Safety Leadership Charter which represents a commitment from industry leaders across Nova Scotia to the continuous growth of a positive workplace safety culture. Mental health and psychological health and safety are increasingly being recognized as an important component of occupational health and safety. In 2020/21 Regulatory Services and Human Resources will be working together to further psychological health and safety initiatives and all Halifax Water employees will receive psychological health and safety training.

In 2020, to assist with the management of the safety program, it is proposed to review the applicability of the ***ISO 45001*** International Standard that specifies requirements for an occupational health and safety (OH&S) management system, with guidance for its use, to enable an organization to proactively improve its OH&S performance in preventing injury and ill-health. Implementing ISO 45001 would be a multi-year initiative within the period covered by the Five-Year Business Plan.

11.2 Corporate Security Program

Halifax Water's Security Program is based on enterprise asset protection and is designed to protect three types of assets: people, property, and information. It also considers intangible assets such as the organization's reputation, relationships, and creditworthiness. The program has been developed to take an all-hazards approach, be it from natural, intentional, or accidental hazards, when reviewing risks to the organization.

Halifax Water uses the three basic elements of a physical security system to protect its assets.

> ***Protection:*** The protection element is the physical barrier that delays the determined adversary and the opportunist in accomplishing their goals. Halifax Water uses barriers such as building fabric, fences, doors, door hardware, and containers to protect its assets.

Detection: The detection element indicates and may also verify an actual or attempted overt or covert penetration. Halifax Water uses intrusion alarms, access control systems, CCTV, and patrols to protect its assets.

Response: This element is the reaction to an attempted or actual penetration. Halifax Water works closely with local and national police and security agencies to ensure a rapid response to events.

Halifax Water will be updating its Security Plan and will be providing training to all employees based on their roles and responsibilities.

Emergency Management Planning

Safe and reliable drinking water, sanitation and environmental protection are vital to the sustainability of communities within HRM. In recognition of this, Halifax Water maintains an Emergency Management Plan (EMP), as required by the provincial Emergency Management Act.

The purpose of the EMP is to establish an organizational structure and procedures for response to water and wastewater/stormwater incidents. It assigns roles and responsibilities for the activation and implementation of the plan during an emergency, using the Incident Command System (ICS). The preparation and exercising of an EMP can save lives, reduce risk to public health, enhance system security, minimize property damage, and lessen liability.

With the challenges posed by climate change, such as more frequent, intense storms, heat waves, drought, extreme flooding and sea levels it is important that Halifax Water continues to exercise the actions contained within the Emergency Response Plan, both internally and with external partners.

Halifax Water continues to liaise with the municipality with respect to flooding events and will encourage the municipality to complete an updated response plan to extreme flooding events. Halifax Water will assist in the development of the plan, providing information on critical infrastructure, known drainage restrictions and flood prone areas.

The Municipality has developed a GIS based Situational Awareness to assist in tracking and monitoring impacts to the systems/infrastructure during an emergency. Halifax Water is exploring the development of its own tool and potentially integration with the Municipality's in the coming years.

12. BUSINESS RISKS & MITIGATION STRATEGIES

12.1 Enterprise Risk Management

In 2019 Halifax Water completed an Enterprise Risk Management (ERM) Framework, and the Halifax Water Board approved an ERM Policy, and a risk appetite and tolerance matrix. There are seven broad risk categories outlined in the policy, which align very closely to the Corporate Balanced Scorecard critical success factors. The risk categories and critical success factors may both change over time. In future, there will be consideration of the alignment. The more closely the risk categories and critical success factors align the less opportunity there will be for confusion or goal misalignment.

The ERM Policy will be rolled out in 2020, and Halifax Water will begin risk based reporting to the Halifax Water Board. It will take 2 – 3 years to fully embed ERM at Halifax Water; and an additional resource is required to coordinate enterprise risk management, and well as internal audit functions. Compliance with policies and standard operating procedures (SOPs) is important to help manage risk. Halifax Water will add capacity to conduct internal audits with a focus on promoting policy and SOP compliance.

12.2 Nova Scotia Environment (NSE) Regulatory Compliance

Wastewater:

Since the last Five-Year Business Plan was completed, a number of upgrades, optimizations, system enhancements and one decommissioning has occurred to achieve compliance with the WSER for all WWTFs.

Halifax Water meets and communicates regularly with NSE staff, with the objective of achieving consensus on priorities. Regulatory compliance plans have been updated.

Funding of capital improvements for a number of the wastewater treatment facilities has already been approved, or are in process in the Five-Year Capital Budget, namely:

- Decommissioning of the Timberlea WWTF, with diversion to Halifax
- Upgrades to the Mill Cove WWTF for increased capacity
- On-going studies for the management of Sanitary Sewer Overflows (SSOs) and Combined Sewer overflows (CSOs)

Halifax Water continues to take advantage of the seasonal disinfection program, allowing for enhanced and easier maintenance of the ultraviolet disinfection systems at Eastern Passage, Dartmouth, Halifax and Herring Cove WWTF.

Water:

The Approvals for the water treatment facilities expired in 2018, with interim approvals issued by NSE. Renewal applications have been submitted to NSE and updated permits have been provided or are being finalized this year.

The Bennery Lake withdrawal permit requires options for the continued supply of water to the Airport and Aerotech areas be established. A master plan will be completed in 2020 to review alternatives to the continued use of Bennery Lake. The water withdrawal permit for the Pockwock system expires in 2021 staff are currently preparing the supporting documents required to obtain the renewal of the permit.

Upgrades are planned for JD Kline (Pockwock) and Lake Major water treatment facilities to improve ease operability, asset renewal and continued compliance. These projects will be completed over two phases at each facility.

With the extension of water services to the Fall River area, Halifax Water completed an extension of the watermain to the Miller Lake Water system. This will allow for the decommissioning of the Miller Lake system in 2019 and the customers will be included in the Pockwock water system.

System Assessments:

Halifax Water is committed to supplying safe and clean water, and effective wastewater collection and treatment. In support of these goals, Halifax Water undertakes assessments of all water and wastewater systems, in conformance with NSE regulations.

It is a regulatory requirement that Water System Assessments be completed every ten years with the latest reports for all water systems submitted to NSE in 2013, except for Bomont, which was prepared in 2015. Assessments of municipal drinking water systems are conducted to evaluate the capability of the system to consistently and reliably deliver an adequate quantity of safe drinking water; to verify compliance with regulatory requirements; and provide preliminary costs and timelines to address any identified deficiencies and/or concerns. Corrective Action Plans are in place where required by NSE, as follow-up to the Water System Assessments.

Wastewater System Assessments (similar to water system assessments) are currently not a regulatory requirement. However, Halifax Water regularly reports to NSE on the performance of some components of the wastewater system for conformance with regulatory requirements. Additionally, Halifax Water conducts wet weather flow studies on parts of the wastewater system. These studies are similar to system assessments, but are not as comprehensive.

12.3 Climate Change

Climate change is a documented global phenomenon. Climate data indicates a global warming progression since the beginning of the industrial era. The Intergovernmental Panel on Climate Change forecasts continued warming with global increases of between 2 and 4 degrees Celsius or more by the end of this century. Changes will be gradual, progressive, and will impact communities and natural systems well before the end of the century. Climate change may have a number of effects on the water cycle and natural water systems, with resulting impacts on water, wastewater and stormwater operations and infrastructure.

12.3.1 Overview

Climate change effects may include:

- greater weather variability (more extreme wet-weather events and more dry-weather periods),
- greater intensity of precipitation during extreme events,
- greater risk of hurricanes in the Maritimes,
- increased stormwater runoff,
- increased risk of flooding and sea level rise of up to 1 metre by 2100,
- decreased water supplies during dry weather, and
- ecological changes from nuisance or disease-causing organisms.

Consequently, the impact to utilities may include:

- increased stormwater flows during extreme events,
- increased risk of erosion,
- increased flows during snow melt events,
- increased flows within combined systems during extreme events (increased risk of inflow/infiltration and overflows for wastewater systems),
- increased water demand and storage requirements during dry summer weather,
- increased uncertainty regarding water supply,
- reservoir replenishment and groundwater recharge due to uncertainty of local annual precipitation patterns,
- increased risk of power failures during extreme weather events, and
- infrastructure impacts due to sea-level rise.

These effects and impacts of climate change will require that water/wastewater /stormwater utilities be proactive in planning for contingencies and emergencies.

12.3.2 Mitigation Strategies

Climate change mitigation involves actions that reduce the rate of climate change. Halifax Water's mission statement, "To provide world-class services for our customers and our environment" declares our commitment to good environment stewardship. As good stewards of the environment, it is not enough to simply adapt to the effects of climate change but to pro-actively participate in limiting or preventing greenhouse gas emissions.

Halifax Water is working and delivering on numerous projects that will contribute to the mitigation of climate change:

- Increasing energy efficiency through the Energy Management Program (Section 9)
- Renewable-Energy Generation
- Solar Energy
- Wind Energy
- Wastewater Effluent Heat Recovery
- In-line hydro power turbine

Halifax Water is also an active participant in HRMs "HalifACT 2050: Acting on Climate Together" initiative. HalifACT 2050 is a collaborative project to bring together the municipal government, industry, academia, and community groups to develop a plan to reduce emissions, and adapt to climate change.

12.3.3 Adaptation Strategies

Vulnerability to Climate Change Assessment Framework

The Infrastructure Master Plan, referenced in Section 7, included development of a Vulnerability to Climate Change Assessment Framework.

The Vulnerability to Climate Change Risk Assessment Framework was developed based on a review of best practices and the existing body of knowledge.

The Vulnerability to Climate Change Assessment Framework was developed such that it can be applied consistently across assets groups to complete vulnerability assessments of existing infrastructure. In addition to assessing the vulnerability of Halifax Water's infrastructure, the framework includes the development of action plans and implementation of climate adaptation measures.

Stage 1, Assessment Stage, of the Vulnerability to Climate Change Assessment Framework follows an existing framework: The Public Infrastructure Engineering Vulnerability Committee (PIEVC). This developed in Canada framework was chosen as it provides a step by step guide to evaluating municipal assets vulnerability and responses to the impacts of changing climate and aligns with the ISO 31000 Risk Assessment standards.

Beginning in the next capital year, Halifax Water plans to conduct a PIEVC assessment for each asset class already delimited by the Asset Management Plans (Section 7.1.2). The Asset Management Plans are a report card on the state of the infrastructure in each asset class. Their goal is to provide information to decision makers supporting reinvestment decisions for those assets. The Climate Change Vulnerability and Risk appendix to the asset management plan will provide additional information to decision makers on the climate change risks to existing infrastructure in each class.

The Vulnerability to Climate Change Assessment will also create a formalized body of knowledge to be used when designing new or upgrades to infrastructure in that asset class. This body of knowledge of climate change factors specific to our region will be used to supplement national design standards resulting in better designs that adapt to climate change in the Halifax context.

Updated Design Standards

The Infrastructure Master Plan included recommended some immediate changes to Design and Construction Specifications to begin adapting new infrastructure to climate change. Specifically, this includes:

- a modified Intensity-Duration-Frequency (IDF) curve for calculating rainfall for design, and
- guidelines on sea level rise including storm surge and wave run-up.

These updated design standards were used in the development of the Infrastructure Master Plan and will also be included in Halifax Water's Design and Construction Specification when it is next published in 2020.

Investing in Canada Infrastructure Program

The Government of Canada has created the "Investing in Canada Infrastructure Program" (ICIP) to fund investments in infrastructure. The funding plan identifies five priority investment streams: Public Transit, Green Infrastructure, Social Infrastructure, Rural and Northern Communities, and Trade and Transportation Infrastructure.

The Green Infrastructure stream includes three sub-streams: climate change mitigation; adaptation, resilience, disaster mitigation; and, environmental quality. To qualify for funding, proposed projects must meet at least one of the following outcomes:

- Climate Change Mitigation
- Adaptation, Resilience and Disaster Mitigation
- Environmental Quality

Several of Halifax Water's planning projects are likely to meet the requirements for the Green Infrastructure stream.

In conjunction with the Investing in Canada Infrastructure Program, the Government of Canada has created the "Climate Lens" assessment requirement. The Climate Lens requirement consists of two components: The Green House Gas (GHG) Mitigation Assessment, and the Climate Change Resilience Assessment. Proponents could be asked to undertake one or both types of assessment, depending on the program, funding stream, and the estimated total eligible cost of the project". Projects must have completed the relevant Climate Lens assessments complete with an attestation signed by a certified or qualified party when applying for ICIP funding.

Halifax Water is undertaking a project to identify projects that may qualify for funding through the Investing in Canada Infrastructure Program and complete the required Climate Lens assessments. This will result in a selection of projects that are ready for application when the next round funding is released.

12.4 WSER Regulations

On February 14, 2009, the Canadian Council of Ministers of the Environment (CCME) adopted a national strategy for the management of municipal wastewater. The strategy advocates a risk-based approach to management of wastewater effluent whereby requirements are based on environmental and health-risk assessments that are to be carried out for all treatment facilities. However, the strategy also includes a prescriptive approach with a requirement for a uniform minimum standard for all effluent equivalent to secondary treatment. Halifax Water's inland treatment facilities that discharge to fresh water already provide secondary or better treatment, as does the Mill Cove facility in Bedford and the Eastern Passage facility. However, the three Halifax Harbour Solutions Project (HHSP) facilities are advanced-primary. Upgrading to secondary level is required for the HHSP facilities under the WSER, with estimated capital costs in the order of $286 M. As outlined in Section 5 of this Business Plan (Wastewater System Effluent Regulations), the upgrade deadlines could be up to 30 years for Halifax and Dartmouth WWTFs under Transitional Authorizations sought under the WSER, due to high-risk CSOs. The Herring Cove WWTF currently is able to meet the WSER discharge limits since it is well under capacity, although

it was designed as an advanced-primary facility. As growth in the Herring Cove sewershed brings the facility closer to its rated capacity, effluent quality may come closer to exceeding WSER limits. In this case, advance planning for an upgrade will be required so that the facility remains compliant.

A more immediate operational/regulatory issue with Halifax Water's wastewater system is wet weather flow and resultant overflows into the environment as detailed in Section 5. Many of the sewers in the municipality are combined, built many decades ago with many greater than 100 years in age. Combined sewers have not been permitted since the early sixties, but even the older, separate sanitary sewers experience significant I&I problems.

Of the approximately 166 wastewater pumping stations owned by Halifax Water, approximately 35 stations experience overflows during wet weather or high rain events. Many of these overflows go to inland receiving waters and, as such, represent higher environmental and health risks than marine discharge of primary treated effluent. As an initial step, a program is underway to provide sensors to detect overflow conditions and estimate volumes for the sanitary sewer overflows. Eighteen such installations are complete. Halifax Water staff are utilizing a combination of flow monitoring and estimating of overflows to provide the additional flow volumes.

Much of the capital and operating budgets have been allocated to mitigate these wet weather flow problems based on a priority-ranking process. It is preferred that resources be allocated based on risk and assessed priority, rather than on the basis of a national standard (the CCME/WSER) that does not consider local conditions. Identification of funding mechanisms and cost-sharing arrangements with senior levels of government will be critical now that the WSER regulations are in force.

12.5 Pension Plan

Halifax Water has a defined benefit pension plan (Halifax Water Employees' Pension Plan) which was redesigned effective January 1, 2016 to make the plan more affordable and sustainable for current and future Halifax Water employees. Pension plan re-design was achieved through collective bargaining. In 2018, the employer and the employee contributions on pensionable earnings totaled $6.2 M. The contribution rates were 10.34% for the employees and 9.85% for the employer. From 2019 - 2021, the contribution rates will be 10.34% for both the employees and the employer.

The financial position of the plan, based on the most recent audited financial statements, is shown in Figure16 below. As at December 31, 2018 there were $126 M in assets, and $124 M in pension obligations, for a surplus of $2 M. Assets of the Plan are invested as part of the Halifax Regional Municipality Master Trust, and represent 6.2% of the Master Trust's assets. The next actuarial valuation is required by January 1, 2022.

Figure 16: Pension Plan Statement of Financial Position as of December 31, 2018

Statement of financial position December 31				
			Change	
	2018	2017	$	%
Net assets available for benefits (note 4)	$126,458,630	$119,731,882	$6,726,748	5.6%
Pension obligations (note 5)	$124,371,400	$121,473,083	$2,898,317	2.4%
Surplus (Deficiency)	$2,087,230	($1,741,201)	$3,828,431	219.9%

Halifax Water also has almost 100 employees that joined the utility as part of the 2007 Wastewater/Stormwater transfer, that are members of the HRM Pension Plan.

12.6 Development Pressures and Obligations

As growth is a strategic driver of the Infrastructure Master Plan, Halifax Water continues to work closely with the development community to facilitate infrastructure necessary for a rapidly growing municipality. The Municipality completed the last Regional Plan update in 2014 with a current focus on the completion of the Centre Plan. In that regard, Halifax Water project managed the Local Wastewater Collection System Assessment for HRM in support of the potential growth within the city centre and is currently coordinating with the Municipality on the implementation of the required projects.

Staff recently updated the Bedford West and Geizer Hill Capital Cost Contribution plan to reflect the modifications respective servicing scenarios and population projections. Applications are currently before the Nova Scotia Utility and Review Board (NSUARB).

The land owners of the Port Wallace Master Plan area are currently seeking secondary planning approvals and Halifax Water have been providing technical support in the evaluation of whether the Port Wallace area will include a possible new capital cost contribution charge and the required implementation of the servicing strategies.

Halifax Water is currently engaged with the Municipality to support their replacement of the permitting software, HANSEN and move to a digital platform for development approvals.

12.7 Biosolids

The WWTF upgrades at Aerotech, Eastern Passage and installation of dewatering equipment at Mill Cove WWTF has strengthened Halifax Water's capacity to dewater sludge from its facilities. Additionally, Halifax Water has been successfully worked with Nova Scotia Environment for elimination of the permitting requirements to dewater sludge at various facilities. These initiatives have provided required flexibility thereby reducing the risk of a dewatering facility malfunction and as a result the overall plant operational risks have reduced.

The Biosolids Processing Facility (BPF) is operated by Walker Environment Group with overall responsibility for operating the facility to produce a soil amendment in conformance with Canadian Food Inspection Agency (CFIA) regulations and marketing the product for beneficial reuse. The current asset management plan developed in cooperation with the contractor addresses the parts replacement/upgrade needs of the facility. The BPF is also approaching its design capacity. With population growth and the improvement in performance of treatment plants, the WWTFs are producing an increased quantity of sludge. The contract agreements with Walker Environmental expires at the end of March 2021. Staff are currently reviewing the overall operation, while simultaneously working on the capacity upgrade requirements and a new operating contract. The future BPF could utilize completely different technology with a different operating contractor. In light of the recent industry trends with focus on resource recovery from Biosolids, Halifax Water is exploring all aspects of resource recovery when considering alternatives for biosolids processing. Since this will potentially be a long-term contract, there is a medium level risk with potential changes, considering the complexities associated with the management of biosolids.

12.8 Halifax Harbour Solutions Project (HHSP) Facilities

Climate change is considered to be one of the main challenges to urban wastewater systems in future decades as these Wastewater systems are vulnerable to extreme precipitation events; earlier snowmelt runoff, increased flooding and storm-induced wastewater system failures often lead to environment pollution and put public health at risk. The HHSP, specifically Halifax and Dartmouth operate as combined treatment systems and are most vulnerable to climate changes. When issuing new or updated operational permits Nova Scotia Environment requires that facilities comply with the New Atlantic Canada Design Guidelines. Once the guidelines are finalized the effect of the new guidelines will be taken into consideration for future IRP and Compliance Plan updates along with Halifax Water's infrastructure asset vulnerability to climate change assessments.

Currently the Halifax and Dartmouth WWTFs are operating under WSER transitional authorization that expires on December 31, 2040. At such time the facility will be required to achieve the WSER Baseline Minimal Effluent Quality Standards that are currently more stringent that than existing regulations. The Herring Cove WWTF is required to comply with

the WSER as of June 2015 although existing NSE permits are less stringent the facility can maintain compliance due existing flows and loadings less than the facilities design capacity. To help reduce and eliminate non-compliance with existing Approvals to Operate Halifax Water has developed a Compliance Plan as a part of the IRP to address its long-term compliance needs.

To further strengthen the Compliance Plan, in June 2019 Dalhousie University and Halifax Water have signed a Memorandum of Understanding that will direct research initiatives to the advancement of wastewater effluent quality for the protection of public and environmental health. The initial phase of the partnership will focus on improving wastewater effluent quality from the enhanced primary treatment Harbour Solutions Wastewater Treatment Facilities located in Halifax, Dartmouth and Herring Cove to align with the Federal Wastewater Systems Effluent Regulations. This will be accomplished through bench-, pilot-, and full-scale optimization of coagulation/flocculation processes, tracer studies, computational fluid dynamic work to understand the tank hydraulics, application of innovative UV disinfection technology, and assessment of contaminants of emerging concern. The initial phase of the project will span three years to address research needs surrounding the increasing complexity of Canada's wastewater and address the current operational challenges. The program will provide training of highly qualified personnel to address regulatory challenges, outline cost effective methods to meet the Federal effluent regulations, provide advancements in wastewater treatment beneficial to Halifax Water and the industry, as well as align with the research efforts at Dalhousie University for Clean Technology, Energy Efficiency, Environment Protection, Clean Water and Sanitation Sustainable Development Goals.

Additionally, Halifax Water has recommended and is on the process of implementing strategies to address compliance deficiencies are outlined below.

Halifax Water is undertaking the following activities to address ongoing cause of the non-compliances related to disinfection:

- All Trojan UV 3000+ system ultraviolet disinfection lamps and sleeves were replaced during the 2018/19 winter season. Additionally, Halifax Water will be changing the lamps and sleeves on a set time frame rather than relying on UV transmittance.
- Investigating potential modifications to the UV channels by replacing the hydraulic leveling system with motorized weir gates with electrical actuators to ensure lamps remain submerged and reduce scaling on the sleeves.
- Removal of the existing UV baffles and increase UV dose and exposure time by reducing channel velocities by adding additional UV modules and controls within buildout footprint of the existing channels.
- Address the need for improved screenings capture to reduce material being caught up on the screens and allowing of the lamp sleeves to be automatically cleaned efficiently.

Halifax Water acknowledges that the challenges associated with the combined system and is currently planning process improvement to maintain optimal and realistic removal efficiencies with the existing infrastructure. The following activities are being implemented to ensure existing permit compliance related to cBOD and TSS:

- Review of coagulation and flocculation process, i.e.: conducting additional jar testing to arrive at optimum dose across the various design flow regimes and investigate alternative coagulants.
- Further review of data and influent pump/s optimization to enhance hydraulics through the plant.
- Conduct computation fluid dynamics modeling to help improve hydraulic balancing both through passive modifications (baffles, weirs etc.) and active modifications (flow dosing compensation).
- Replacing the chemical feed pumps with pumps that have a wider ranges of flow to meet both high chemical demand periods and low chemical demand periods.
- Relocating the chemical application points to more evenly distribute chemicals to both Densadeg trains, and to both coagulation and flocculation tanks in each train, during times of dry weather flow.
- Investigate setting up two separate chemical feed systems: one to handle low flow conditions and one to handle high flow conditions if a single pump does not meet turndown requirements.
- Implement flow monitoring to each treatment train and reactors to ensure adequate process chemicals are injected to achieve optimal coagulation and flocculation.
- Assessment of exiting tube settlers for optimal surface area to allow for floc to settle and assess alternative clarifications enhancements that allow for easier maintenance and eliminate blockage.
- The Harbour Solutions facilities are were not designed to treat soluble BOD as that requires secondary level of treatment. During periods of unusually low flows, the influent soluble BOD increases which results in CBOD concentrations over the permit values. Additionally, the coagulation/flocculation process is negatively impacted by the wide range of flows typical of a combined sewer system. Ultimately this will have to be addresses as we move to comply with the deadline of the transitional authorization:
- Assess through ongoing research the implications of enhanced removal on secondary treatment requirements such as low alkalinity and effects on nitrification, sludge residual handing requirements, changes in influent wastewater characteristics, aeration system implications and installation issues.

Short-term initiatives relevant to the Harbour Solutions WWTF for the 2020-21 to 2024-25 Business Plan include:

- Preliminary Screening Improvements
- Coagulating Dosing System Upgrades;
- Hydraulic Balancing Improvements;
- Disinfection Upgrades,
- Odour Control Asset Renewal; and
- Solids Dewatering Upgrades.

12.9 Small to Medium Wastewater Treatment Facilities

Halifax Water has seven community based WWTFs in the communities of Springfield Lake, Frame Subdivision, Middle Musquodoboit, Uplands Park, North Preston, Fall River and Wellington. Besides these facilities, there are other medium sized facilities located in the Aerotech Business Park and at Beechville-Lakeside-Timberlea. The compliance with NSE permits has improved at all of these facilities either by virtue of upgrades, asset renewal and process optimization. Aerotech and Frame WWTF are equipped with leading edge Membrane Bioreactor technology while other facilities have seen improvement via peak flow reductions through Wet Weather Management program. These efforts will continue in the future. As regional development encroaches on these systems, there are opportunities to connect them to the larger core systems as identified in the IMP and IRP. The risk of non-compliance with the NSE permits have lowered when compared with previous business plan.

12.10 Energy Costs

Through its Energy Management Program, Halifax Water has committed to an ongoing focus on sustainability and energy efficiency throughout the utility, including water and wastewater operations. This program serves to define the goals, objectives, accountabilities, and structure for activities related to responsible energy use.

The Water and Wastewater/Stormwater departments operating budgets are significantly impacted by energy costs that are expected to increase over the life of this business plan and beyond. Figure 17 provides projected energy cost impacts over the next five years:

Figure 17: Projected Energy Cost Increases and Budget Impacts

Year	Electricity [1]	Heating Fuel Oil [2]	Natural Gas [3]	Water Budget Impact	Wastewater Budget Impact	Total Budget Impact
2019/20	3.01%	5.0%	10.0%	$76,000	$168,000	$244,000
2020/21	5.41%	5.0%	7.6%	$134,000	$285,000	$419,000
2021/22	0.28%	2.0%	7.6%	$11,000	$36,000	$47,000
2022/23	2.7%	2.0%	7.6%	$70,000	$159,000	$229,000
2023/24	2.0%	2.0%	7.6%	$54,000	$128,000	$182,000
2024/25	2.0%	2.0%	7.6%	$55,000	$132,000	$187,000

Notes:
(1) Projected electricity rate increases based on NSPI 2020 – 2022 Fuel Stability Plan and NSUARB rate application dated June 27, 2019, and on historical trends.
(2) Projected HFO rate increases based on historical trends from 2012 to present day.
(3) Projected Natural Gas rate increases based on historical trends from 2012 to present day.

The Energy Management Action Plan identifies energy reduction targets for Water and Wastewater Operations over a five-year planning period. Targets will be reviewed each year and adjusted for future years based on the previous year's performance, operating and capital budget allocations, and anticipated energy price increases.

Water and Wastewater Operation's energy-reduction targets over the next five years are outlined in Figure 18:

Figure 18: Energy Reduction Targets

Year	Water Operations Projected Savings		Wastewater Operations Projected Savings	
	Energy Reduction Target	Energy Savings (kWh_e)	Energy Reduction Target	Energy Savings (kWh_e)
2019/20	3.0%	576,000	3.0%	1,209,000
2020/21	2.0%	372,000	2.0%	782,000
2021/22	2.0%	365,000	2.0%	766,000
2022/23	2.0%	357,000	2.0%	751,000
2023/24	2.0%	350,000	2.0%	736,000
2024/25	2.0%	343,000	2.0%	721,000

As a result of Halifax Water's Energy Management Action Plan, presented with the last general rate application, Halifax Water was able to reduce revenue requirements associated with energy by 2%. Presently the Five-Year Business Plan operating budgets do not incorporate the energy reduction targets outlined in Figure 18. As future electricity rates become known with greater certainty and the energy savings of various initiatives are measured, budgets will be adjusted on an annual basis. The projected savings shown above are also contingent on the availability of human and capital resources as approved in the annual operating and capital budgets. As capital budgets are approved or amended, actual energy savings may need to be adjusted on an annual basis.

To date, a number of potential energy-management opportunities (EMOs) have been identified through low to mid-level energy audits in a number of facilities.

For Water Operations and Corporate facilities, EMOs include HVAC system upgrades, retro-commissioning of PRV- station HVAC systems, lighting retrofits; reactive power correction, variable frequency drive upgrades, pumping system performance upgrades, and new construction design review for energy efficiency.

For Wastewater Operations, EMOs include effluent stream heat recovery, energy recovery from biosolids, retro-commissioning of WWTF and pumping station HVAC systems, UV disinfection system upgrades, UV system channel isolation, variable frequency drive upgrades, and new construction design review for energy efficiency.

A number of these EMOs have been successfully implemented, and some have been partially funded through Efficiency Nova Scotia's various programs.

As new or existing facility construction projects occur, those projects are also evaluated for energy efficiency improvements. Recently completed projects include the new Aerotech Wastewater Treatment Facility, the Eastern Passage WWTF upgrade, the Bedford West Trunk Sewer and Pumping Station Upgrade, the Lakeside/Bayer's Lake PS Upgrade, the Bedford pump station upgrade, and the Herring Cove sanitary pump station. Energy efficiency is now an integral part of the overall project evaluation and design process ensuring improvements are incorporated prior to the construction phase of a given project.

A number of Halifax Water's standard design specifications have also been reviewed to ensure energy efficiency is taken into account in any future new construction activities (e.g., wastewater pumping stations, booster stations, treatment plants).

12.11 Chemical Costs

Water treatment chemicals represent 30% of the cost of running our large water treatment facilities, totally approximately $3 M per year.

Chemicals for water treatment are a secondary markets for many chemical manufactures. For example, chlorine and caustic soda markets are driven by the demand for PVC plastic in the construction and home building industries. Phosphates for corrosion control, and fluoride are secondary markets to the agriculture industry. As a result, demand created by these primary industries can put cost pressure on chemicals consumed by water utilities.

In the last couple of years, after about five years of stable market prices, we have experienced two consecutive years of double digit increases for coagulants due to market consolidation. Caustic Soda Caustic soda has also seen greater and inflation rate increases the last two years

As we begin to look at upgrading treatment process due to lake recovery, this presents an opportunity to select processes which are viable with a wide range of treatment chemical options, thereby opening broader markets for the purchase of treatment chemicals. We will also look for opportunities to use bulk delivered commodity chemicals rather than proprietary or packaged chemicals.

Wastewater and Stormwater Services uses chemicals for wastewater treatment, sludge processing, and odour control. The chemicals represent 13% of the cost of running our WWTFs, at approximately $2,750,000 per year.

All of the WWTFs use UV systems for disinfection with the exception of one community plant in Timberlea which uses chlorine based products. The cost fluctuation risk is mitigated by the very small quantities that is required. Halifax Water has seen stable prices for wastewater treatment chemicals over the last 5 years. Alum and polymers are the largest share of the cost and quantity. The recent contract for polymers is a 3 year term and the price per kilogram is 6% lower than the 2017-18 pricing. As mentioned above, alum is a commodity product. Halifax Water has experienced stable pricing over the years, and it is expected to remain stable over the 5 year period.

Wastewater Collection Services use Bioxide for odour control in the collection system. This proprietary product is proven in the industry to be most effective. Currently, this product is used in Dartmouth at an approximate cost of $150,000 per year. The utility will continue to explore other opportunities or make system enhancements in order to reduce this cost. However, it is expected that the chemical price will remain stable in the near future.

12.12 Lake Recovery

Lake recovery will ultimately require modifications or upgrades to the Pockwock and Lake Major plants. It is also possible that the Bennery lake plant will require upgrades, however that plant has completed a multi-year optimization program that should equip it well enough to deal with water quality challenges for the next several years.

A three pronged approach has been implemented to deal with lake recovery as follows:

Immediate: Operational improvements have been made at all three treatment plants to make them more robust and better equipped to deal with treatment challenges. This includes upgrading and adding instrumentation to provide better information for operators, upgrading chemical delivery systems, and instituting a filter surveillance program so that operators have the best available information about filter performance.

Short-term: Several short-term plant improvements are planned, or have been completed, which will improve plant performance. This includes upgrading filter media and underdrains and installing air scour at Pockwock, and continuing through a ten year upgrade program at

Lake Major which will make the plant more flexible and provide better quality water. Lake Major projects include replacing clarifier plates and tubes, and planning for construction of a new intake and pumping station.

Medium-term: Preparation for plant upgrades have begun on a number of fronts. Recently, design team have been procured to plan out the process upgrade projects. As mentioned above, understanding the impact of lake recovery and studying the impact on the plants makes up two of three research themes through the NSERC Industrial Research Chair with Dalhousie University. Halifax Water was also successful in an application to the Tailored Collaboration Program through the Water Research Foundation which will provide guidance on designing a new plant process while water quality is changing. This project will be completed in early 2020 and the outcome will inform the plant upgrade design teams. All of these activities will position the utility to begin a plant upgrade process for Pockwock and Lake Major in the next 2-4 years, while achieving interim process in the short-term.

12.13 External Funding

The federal and provincial governments have a current bilateral agreement for infrastructure funding under the ***Investing in Canada Infrastructure Program*** (ICIP). The five-year business plan was developed with assumptions with respect to external funding from provincial or federal government partners under the ICIP. The Five-Year Business Plan assumes $51,657,700 in external funding broken down as follows:

- Water - $39,411,200
- Wastewater - $11,972,370
- Stormwater - $274,130

It is anticipated that the federal and provincial governments will announce another round of infrastructure funding in 2020 for implementation beginning in 2021/22.

12.14 Flood Plain Delineation

The Municipality has completed a municipal wide flood risk assessment study for the identified high risk areas across the Municipality. The outcome of the completed study was two detailed studies for the Sackville Rivers and Shubenacadie watersheds. The Sackville study focuses on creating a mitigation plan along the system based on the completed studies. As for the Shubenacadie watershed, the plan is to have a consultant create updated flood mapping for the watershed from Lock 2 to Lock 5. Halifax Water operational and engineering staff will be providing much needed input relating to system knowledge as these and other projects progress.

This information will assist HRM in the planning exercises relating to the placement for new development projects. As well, it will allow for risk assessments and emergency planning to occur relating to existing critical infrastructure and transportation routes.

Halifax Water cost shared this exercise with the Municipality in relation to the National Disaster Mitigation plan to prioritize known drainage issues and flood prone areas. Halifax Water continues to engage with the Municipality on projects where a joint benefit can be achieved with the implementation of mitigation strategies and programs.

12.15 Financial Risks

Some of the most significant risks facing Halifax Water relate to infrastructure, therefore there are financial risks also - insufficient revenues to meet the projected operating requirements, and insufficient capital funding to meet the IRP recommended level of spend.

Halifax Water has experienced net metered consumption decreases of 24.7% over the past seventeen years. On average, the annual reduction is 1.64% which has been managed through changing rate structures, diversifying revenues (stormwater with a different billing determinant), controlling costs, and increasing rates.

13. RECOMMENDATIONS FOR RATE APPLICATIONS

Halifax Water maintains a long range financial model that projects future impacts on revenue requirements, but not rates. It is not possible to accurately project rates, as updated demand analyses and rate studies would have to be conducted for each service prior to an application.

The projected five-year financial model indicates that water and wastewater rate increases will be required after the 2019/20 fiscal year. Halifax Water is planning to submit an application to increase rates for water and wastewater service in February 2020, for rate increases over a two year test period.

A rate application to adjust stormwater rates is also planned for late 2020, with rates to take effect April 1, 2021.

Appendix A

Mission, Vision & Values

&

Corporate Balanced Scorecard

STRAIGHT from the SOURCE

Our Mission:

"To provide world class services
for our customers and our environment"

Our Vision:

- *We will provide our customers with high quality water, wastewater, and stormwater services.*
- *Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment.*
- *We will fully engage employees through teamwork, innovation, and professional development.*

Our Values:

Halifax Water promotes a culture where:

- *All Interactions are respectful, courteous, and civil*
- *We respect confidentiality of people and transparency of process*
- *We have an inclusive environment*
- *We lead by example*
- *We are positive and collaborative*
- *We treat employees and customers equitably*
- *We have a safe, accessible work environment*
- *We are accountable for our actions & behaviours*

Corporate Balanced Scorecard		
Organizational Indicators	**2018/19 Result**	**2019/20 Target**
High Quality Drinking Water		
1. Adherence with 5 objectives of Water Quality Master Plan for all water systems - Percentage of sites achieving targets	64/100	80 - 100/100
2. Bacteriological tests - Percentage free from Total Coliform	99.97%	99.3%
3. Customer satisfaction about water quality - Percentage from customer survey	89%	85%
Service Excellence		
4. Customer satisfaction with service - Percentage from customer survey	96%	90%
5. Water service outages - Number of connection hours/1000 customers	203	200
6. Wastewater service outages – Number of connection hours/1000 customers	2.06	8
7. Average speed of answer – Percentage of calls answered within 20 seconds * Revised in 2019/20. Was previously average call wait time.	N/A	60 – 65%
Responsible Financial Management		
8. Operating expense/revenue ratio percentage	0.764	0.815
9. Annual cost per customer connection – Water	$477	$517
10. Annual cost per customer connection – Wastewater	$684	$708
Effective Asset Management		
11. Water leakage control – target leakage allowance of 160 litres/service connection/day	172	160-170
12. I&I reduction - Number of inspections on private property for discharge of stormwater into the wastewater system	932	900
13. Peak flow reduction from wet weather management capital projects * New in 2019/20	N/A	34-38 l/sec
14. Hours of unplanned outages in GIS and Cityworks	70.85%	95-97%
15. Capital budget expenditures - Percentage of budget spend by end of fiscal year	68.4%	80-90% approved
Workplace Safety and Security		
16. Average score on internal safety audits *New in 2019/20	N/A	85-95%
17. NS Labour and Advanced Education compliance - # of Incidents with written compliance orders	1	0-2
18. Lost time accidents -Number of accidents resulting in lost time per 100 employees	2.5	2.0-3.0

19. Safe driving - Number of traffic Accidents per 1,000,000 km driven	4.3	4
20. Training - Number of employees trained or re-certified before due date	81%	80-90%
21. Percentage of completed safety talks	81%	80-90%
Regulatory Compliance		
22. Percentage of public health and environmental regulatory infractions resulting in an environmental warning report, summary offense ticket, ministerial order, or prosecution	3	0-2
23. Percentage of WWTFs complying with NSE approval permits	94.9%	95-100%
Environmental Stewardship		
24. Number of ICI properties inspected by Pollution Prevention each year	528	500
25. Energy management kwh/m^3 reduction associated with capital projects	4.7%	3%
26. Bio-solids residual handling - % of sludge meeting bio-solids concentration targets	99.5%	92-97%
Motivated and Satisfied Employees		
27. Percentage of grievances resulting in arbitration	0	0
28. Percentage of jobs filled with internal candidates	63%	80%
29. Employee satisfaction survey result	B	A-
30. Average number of days absenteeism	7.8	<7

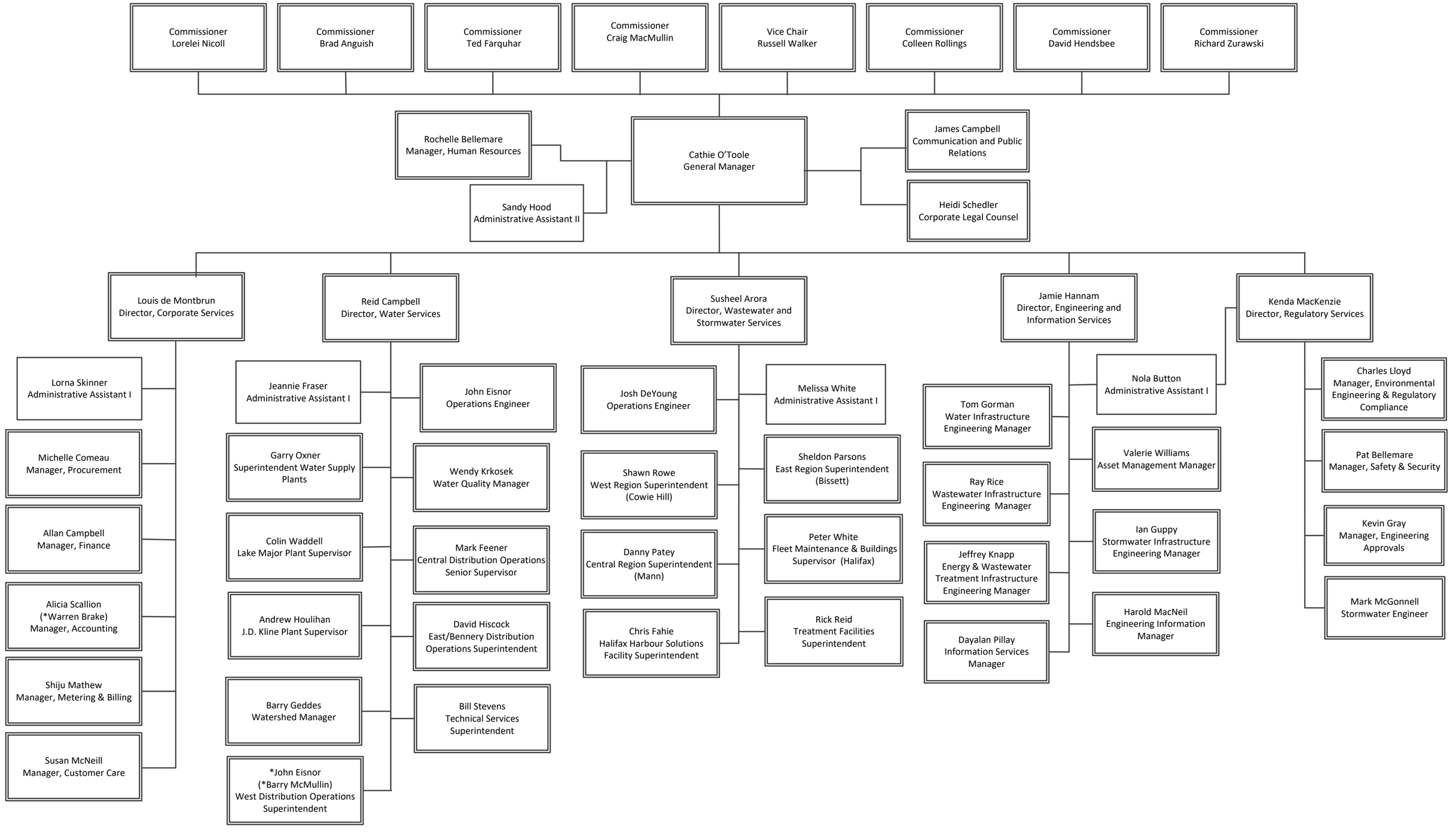
Halifax Water

Appendix B

Organizational Structure

STRAIGHT from the SOURCE

HALIFAX WATER ORGANIZATIONAL STRUCTURE

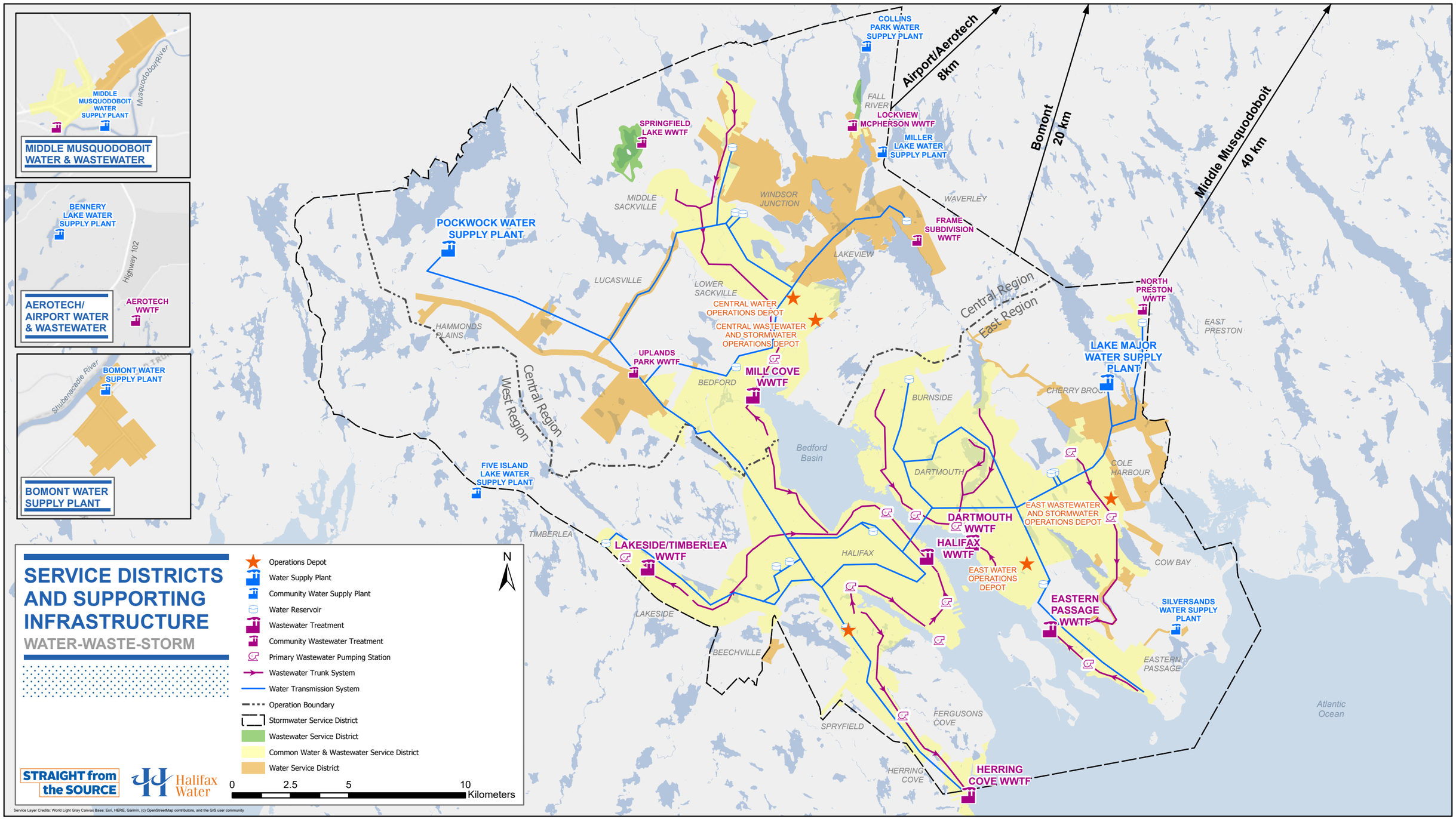


January 2020

Appendix C

Water, Wastewater & Stormwater Service Districts and Supporting Infrastructure

STRAIGHT from the SOURCE


MIDDLE MUSQUODOBOIT WATER & WASTEWATER
MIDDLE MUSQUODOBOIT WATER SUPPLY PLANT
Musquodoboit River
AEROTECH/ AIRPORT WATER & WASTEWATER
BENNERY LAKE WATER SUPPLY PLANT
Highway 102
AEROTECH WWTF
BOMONT WATER SUPPLY PLANT
Shubenacadie River
BOMONT WATER SUPPLY PLANT
COLLINS PARK WATER SUPPLY PLANT
Airport/Aerotech 8km
Bomont 20 km
Middle Musquodoboit 40 km
FALL RIVER
LOCKVIEW MCPHERSON WWTF
MILLER LAKE WATER SUPPLY PLANT
SPRINGFIELD LAKE WWTF
MIDDLE SACKVILLE
WINDSOR JUNCTION
WAVERLEY
FRAME SUBDIVISION WWTF
POCKWOCK WATER SUPPLY PLANT
LAKEVIEW
LUCASVILLE
LOWER SACKVILLE
CENTRAL WATER OPERATIONS DEPOT
CENTRAL WASTEWATER AND STORMWATER OPERATIONS DEPOT
HAMMONDS PLAINS
UPLANDS PARK WWTF
BEDFORD
MILL COVE WWTF
BURNSIDE
Central Region
East Region
NORTH PRESTON WWTF
EAST PRESTON
LAKE MAJOR WATER SUPPLY PLANT
CHERRY BROOK
West Region
Central Region
FIVE ISLAND LAKE WATER SUPPLY PLANT
Bedford Basin
DARTMOUTH
COLE HARBOUR
DARTMOUTH WWTF
EAST WASTEWATER AND STORMWATER OPERATIONS DEPOT
TIMBERLEA
LAKESIDE/TIMBERLEA WWTF
HALIFAX
HALIFAX WWTF
EAST WATER OPERATIONS DEPOT
COW BAY
EASTERN PASSAGE WWTF
SILVERSANDS WATER SUPPLY PLANT
LAKESIDE
BEECHVILLE
EASTERN PASSAGE
Atlantic Ocean
FERGUSONS COVE
SPRYFIELD
HERRING COVE
HERRING COVE WWTF
SERVICE DISTRICTS AND SUPPORTING INFRASTRUCTURE
WATER-WASTE-STORM
Operations Depot
Water Supply Plant
Community Water Supply Plant
Water Reservoir
Wastewater Treatment
Community Wastewater Treatment
Primary Wastewater Pumping Station
Wastewater Trunk System
Water Transmission System
Operation Boundary
Stormwater Service District
Wastewater Service District
Common Water & Wastewater Service District
Water Service District
N
0
2.5
5
10
Kilometers
STRAIGHT from the SOURCE
Halifax Water
Service Layer Credits: World Light Gray Canvas Base: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Appendix D

Projected Capital Budgets for

2020/21 to 2024/25

STRAIGHT from the SOURCE

2020 - 21 to 2024 - 25 Capital Expenditure Program	TOTALS					
	All $ in 000's					
	Y1	Y2	Y3	Y4	Y5	Y1 to Y5
	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Totals
Water / Wastewater / Stormwater Budget Summary						
Water - Land	$100	$100	$100	$100	$100	$500
Water - Transmission	$10,453	$6,738	$7,894	$8,122	$11,036	$44,243
Water - Distribution	$5,277	$6,595	$6,495	$6,320	$6,495	$31,182
Water - Structures	$10,980	$9,520	$11,197	$5,360	$7,400	$44,457
Water - Treatment Facilities	$15,129	$38,418	$30,438	$25,496	$23,846	$133,327
Water - Energy	$200	$200	$200	$200	$200	$1,000
Water - Security	$50	$50	$50	$50	$50	$250
Water - Equipment	$103	$50	$50	$50	$50	$303
Water - Corporate Projects	$6,638	$12,485	$12,051	$3,623	$3,718	$38,515
Sub Total - Water	$48,930	$74,156	$68,475	$49,321	$52,895	$293,777
Wastewater - Trunk Sewers	$500	$14,025	$2,000	$2,000	$2,000	$20,525
Wastewater - Collection System	$14,473	$24,407	$22,165	$31,582	$26,560	$119,187
Wastewater - Forcemains	$825	$1,000	$1,000	$1,000	$16,100	$19,925
Wastewater - Structures	$8,415	$9,343	$8,144	$5,900	$11,677	$43,479
Wastewater - Treatment Facilities	$5,525	$9,841	$13,286	$39,771	$29,804	$98,227
Wastewater - Energy	$75	$600	$600	$600	$600	$2,475
Wastewater - Security	$200	$200	$200	$200	$0	$800
Wastewater - Equipment	$255	$145	$145	$145	$145	$835
Wastewater - Corporate Projects	$8,180	$13,434	$12,751	$6,246	$6,188	$46,799
Sub Total - Wastewater	$38,448	$72,995	$60,291	$87,444	$93,074	$352,252
Stormwater - Pipes	$2,380	$3,992	$14,469	$5,474	$6,101	$32,416
Stormwater - Culverts/Ditches	$3,107	$2,930	$2,125	$2,950	$2,445	$13,557
Stormwater - Structures	$1,900	$2,100	$500	$1,000	$1,000	$6,500
Stormwater - Security	$0	$0	$0	$0	$0	$0
Stormwater - Equipment	$0	$0	$0	$0	$0	$0
Stormwater - Corporate Projects	$1,750	$2,827	$2,999	$1,017	$1,360	$9,953
Sub Total - Stormwater	$9,137	$11,849	$20,093	$10,441	$10,906	$62,426
TOTALS - Water/Wastewater/Stormwater	$96,514	$158,999	$148,859	$147,205	$156,874	$708,451

Five Year Capital Budget - Water

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Water - Land									
3.033	Watershed Land Acquisition	HRM	$100	$100	$100	$100	$100	$500	$0
Water - Land -- T O T A L S			**$100**	**$100**	**$100**	**$100**	**$100**	**$500**	**$0**
Water - Transmission									
3.042	Critical Valve Replacement Program	HRM	$300	$300	$300	$300	$300	$1,500	$0
3.503	Chain Control Valve Upgrade Program	West	$45					$45	$0
3.581	Transmission Main Monitoring System Pilot	HRM	$200					$200	$0
3.550	Burnside Connextor - Transmission Main Corridor - Rock Trench	East/Central			$815			$815	$0
3.549	Chain Control Transmission - Existing Peninsula Low Upsize	West	$100	$2,013			$1,728	$3,841	$0
3.552	Chain Control Transmission - Existing Peninsula Intermediate Upsize	West	$100	$1,358			$1,192	$2,650	$0
3.553	Peninsula Intermediate Looping - Quinpool Rd to Young St	West					$431	$431	$3,888
3.562	Geizer 158 to Lakeside High Looping	West					$225	$225	$2,000
3.564	Herring Cove Rd Looping - McIntosH Street	West	$228					$228	$0
3.568	Tacoma PRV Chamber	East	$420					$420	$0
3.291	Port Wallace Transmission Main - Caledonia Section	East	$6,000					$6,000	$0
3.571	Highway 118 Crossing - Shubie Park to Dartmouth Crossing	East			$300	$5,763		$6,063	$0
3.554	North End Feeder Replacement	West	$200	$200	$1,731	$1,731	$6,919	$10,781	$16,595
3.572	New Primary Feed to Sackville High	Central						$0	$4,953
3.574	Cobequid Looping	Central				$223	$223	$446	$1,784
3.551	Wellington Connector - Transmission Main Corridor - Rock Trench	Bennery			$505			$505	$0
3.399	Cogswell Interchange - Water Transmission Main Realignments	West	$2,850	$2,850	$2,850			$8,550	$0
3.504	Burnside Expansion Phase 13 - Watermain Oversizing Cost Share	East			$1,220			$1,220	$0
3.045	Bedford West CCC - Various Phases	Central	$5	$2	$28	$5	$18	$58	$0
3.260	Morris (Russell) Lake Estates CCC	East		$15				$15	$0
3.261	Lakeside Timberlea CCC	West	$5			$100		$105	$0
3.343	Northgate Oversizing	Central			$145			$145	$0
Water - Transmission -- T O T A L S			**$10,453**	**$6,738**	**$7,894**	**$8,122**	**$11,036**	**$44,243**	**$29,220**
Water - Distribution									
3.022	Water Distribution - Main Renewal Program	HRM	$3,525	$5,000	$5,175	$5,000	$5,175	$23,875	$0
3.067	Valves Renewals	HRM	$125	$125	$125	$125	$125	$625	$0
3.068	Hydrants Renewals	HRM	$75	$75	$75	$75	$75	$375	$0
3.069	Service Lines Renewals	HRM	$100	$100	$100	$100	$100	$500	$0
3.390	Lead Service Line Replacement Program	HRM	$1,000	$1,000	$1,000	$1,000	$1,000	$5,000	$0
3.294	Automated Flushing Program	HRM	$20	$20	$20	$20	$20	$100	$0
3.334	Coburg Road Bridge Watermain Replacement	West	$300					$300	$0
3.501	South Street CN Bridge Watermain Installation	West	$25	$275				$300	$0
3.296	Water Sampling Station Relocation Program	HRM	$10					$10	$0
3.513	Meadowbrook PRV Chamber - Replace PRV Valves	Central	$35					$35	$0

Five Year Capital Budget - Water

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
3.569	Fall River Rechlorination Station	Central	$25					$25	$0
3.573	Spring Garden Road - Water Design Services	West	$37					$37	$0
Water - Distribution -- T O T A L S			**$5,277**	**$6,595**	**$6,495**	**$6,320**	**$6,495**	**$31,182**	**$0**
Water - Structures									
3.262	Chambers, Pumping Stations and Distribution Monitoring Asset Renewal Program	HRM	$0	$350	$350	$350	$350	$1,400	$0
3.512	Eaglewood Pumping Station - New Pump Control Panel	Central	$35					$35	$0
3.514	Steel Reservoir Climbing Systems - Safety Upgrades	HRM	$225	$225				$450	$0
3.116	Bedford South (Hemlock) Reservoir CCC	West	$10,160					$10,160	$0
3.309	Cowie Hill Reservoir Replacement	West	$200	$8,040				$8,240	$0
3.288	Akerley Reservoir Rehabilitation	East		$300	$5,100			$5,400	$0
3.515	Meadowbrook Reservoir Overflow Pipe Replacement	Central	$70					$70	$0
3.517	Mount Edward Control Chamber - Extension of Power Supply	East	$20					$20	$0
3.508	Beaver Bank Reservoir Rehabilitation	Central			$720			$720	$0
3.509	Aerotech Reservoir Rehabilitation	Aerotech			$200	$2,160		$2,360	$0
	Aerotech Storage	Aerotech		$400	$4,352			$4,752	$0
3.511	Stokil Reservoir Rehabilitation	Central					$300	$300	$5,330
3.510	Mount Edward 2 Steel Reservoir Rehabilitation	East				$300	$5,100	$5,400	$0
3.453	Geizer 123 Reservoir Rehabilition	West			$150	$2,400		$2,550	$0
3.454	Robie Street Reservoir Rehabilitation	West				$150	$1,650	$1,800	$0
3.523	Lake Major Dam - Site Improvements	East	$240					$240	$0
3.528	Beaver Bank Booster Station - Pump Upgrades	Central	$30	$180				$210	$0
3.561	Prince Albert PRV Chamber Replacement	East		$25	$325			$350	$0
Water - Structures -- T O T A L S			**$10,980**	**$9,520**	**$11,197**	**$5,360**	**$7,400**	**$44,457**	**$5,330**
Water - Treatment Facilities									
	JD Kline Water Supply Plant:								
3.264	JD Kline WSP Upgrade Program	W/C				$300		$300	$0
3.541	JD Kline WSP - Process Upgrades - Phase 1 - New Clarifier and Pre-Treatment	W/C	$1,475	$16,220	$12,535	$3,690		$33,920	$0
3.542	JD Kline WSP - Process Upgrades - Phase 1 - Backwash Optimization	W/C	$1,700	$1,700				$3,400	$0
3.543	JD Kline WSP - Process Upgrades - Phase 1 - Building Improvements	W/C	$110	$1,440	$1,000			$2,550	$0
3.544	JD Kline WSP - Process Upgrades - Phase 1 - Raw Water Pumping Station	W/C			$670	$5,975	$6,900	$13,545	$1,725
3.545	JD Kline WSP - Process Upgrades - Phase 1 - Lagoon Upgrades	W/C				$740	$3,900	$4,640	$3,840
3.546	JD Kline WSP - Process Upgrades - Phase 1 - Pilot Plant Replacement	W/C					$150	$150	$1,550
3.141	JD Kline WSP - Pumping Station - Raw Water Valve Actuators Replacement	W/C	$100	$100	$100			$300	$0
3.428	JD Kline WSP - Caustic Tank Liner Replacements	W/C	$25					$25	$0
3.465	JD Kline WSP - Low Lift Pump Replacements	W/C	$1,120	$1,000				$2,120	$0
3.351	JD Kline WSP - Replace Westinghouse Electrical Panels	W/C	$8	$8	$8	$8	$8	$40	$0
3.530	JD Kline WSP - Alum Tank Liner Replacement	W/C	$45					$45	$0
3.531	JD Kline WSP - New Ultrasonic Level Transmitter	W/C	$10					$10	$0

Five Year Capital Budget - Water

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
3.472	JD Kline WSP - Replace Floc Tank Valve Actuators	W/C	$35					$35	$0
3.374	JD Kline WSP - Replace Filter Isolation Gates Program	W/C	$300	$300	$300	$300	$300	$1,500	$0
3.463	JD Kline WSP - New Fluoride Supply Line	W/C		$15				$15	$0
3.431	JD Kline WSP - Fluoride Tank Liner Replacement	W/C		$19				$19	$0
3.475	JD Kline WSP - Low Lift Station Intake Structure Concrete Rehabilitation	W/C			$160			$160	$0
	Lake Major Water Supply Plant:								
3.532	Lake Major WSP - Phase 1 - Temporary Side Stream	East	$3,320	$2,990	$1,330			$7,640	$0
3.533	Lake Major WSP - Phase 1 - New Clarifiers and Pre-Treatment	East	$1,770	$9,290	$7,520	$1,770		$20,350	$0
3.534	Lake Major WSP - Phase 1 - Filtration System Replacement	East	$370			$4,055	$4,055	$8,480	$0
3.535	Lake Major WSP - Phase 1 - Raw Water Pump Station	East	$265	$665	$4,380	$5,710	$4,250	$15,270	$0
3.536	Lake Major WSP - Phase 1 - Building Additions	East	$184	$2,396	$1,660			$4,240	$0
3.537	Lake Major WSP - Phase 1 - New Pilot Plant	East			$150	$1,550		$1,700	$0
3.538	Lake Major WSP - Phase 1 - Residuals Management	East				$738	$3,908	$4,646	$3,834
3.162	Lake Major WSP - Butterfly valve replacement program	East	$350	$350				$700	$0
3.507	Lake Major WSP - New Boat Launch	East	$42					$42	$0
3.321	Lake Major WSP - Replace Fluoride Tank and Piping	East	$250					$250	$0
3.557	Lake Major WSP - Sludge Drying Beds Improvements	East	$500	$500				$1,000	$0
3.526	Lake Major WSP - Roof Replacement	East	$400					$400	$1,000
3.506	Lake Major WSP - Driveway Pavement Renewal	East		$0				$0	$390
3.560	Lake Major WSP - Emergency Pumps - Sitework Preparations	East	$320					$320	$0
3.524	Lake Major WSP - Fuel Storage for Generator at Low Lift Station	East	$135					$135	$0
	Bennery Lake Water Supply Plant:								
3.267	Bennery Lake WSP - Upgrade Program	Bennery	$0	$225	$225	$0	$225	$675	$0
3.477	Aerotech Booster Station Capital Upgrades	Aerotech	$200	$800				$1,000	$0
3.488	Bennery Lake WSP - Surge Anticipator Valves Replacement	Bennery	$100					$100	$0
3.486	Bennery Lake WSP - Access Road Upgrade	Bennery	$1,500					$1,500	$0
3.489	Bennery Lake WSP - Manganese Removal Strategy	Bennery			$100	$435		$535	$0
	Non - Urban Core Water Supply Plant:								
3.266	Non-Urban Core WSP Upgrade program	HRM		$150	$150	$150	$150	$600	$0
3.582	Bomont Equipment Upgrade	HRM	$150					$150	$0
3.518	Pump Replacement Program - Small Systems	HRM	$45					$45	$0
3.455	Reservoir Mixing and Residuals Management Upgrade Program	HRM	$300	$250	$150	$75		$775	$0
Water - Treatment Facilities -- T O T A L S			**$15,129**	**$38,418**	**$30,438**	**$25,496**	**$23,846**	**$133,327**	**$12,339**
Water - Energy									
3.221	Energy Management Capital Program (Water)	HRM	$100	$100	$100	$100	$100	$500	$0
3.107	Chamber HVAC Retro-Commissioning Program	HRM	$100	$100	$100	$100	$100	$500	$0
Water - Energy -- T O T A L S			**$200**	**$200**	**$200**	**$200**	**$200**	**$1,000**	**$0**

Five Year Capital Budget - Water

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Water - Security									
4.009	Security Upgrade Program	HRM	$50	$50	$50	$50	$50	$250	$0
Water - Security -- T O T A L S			**$50**	**$50**	**$50**	**$50**	**$50**	**$250**	**$0**
Water - Equipment									
3.101	Miscellaneous Equipment Replacement	HRM	$50	$50	$50	$50	$50	$250	$0
3.502	Leak Detection Equipment	HRM	$8					$8	$0
3.516	Purchase Hydraulic Saws	HRM	$45					$45	$0
Water - Equipment -- T O T A L S			**$103**	**$50**	**$50**	**$50**	**$50**	**$303**	**$0**
TOTALS - Water			**$42,292**	**$61,671**	**$56,424**	**$45,698**	**$49,177**	**$255,262**	**$46,889**

Five Year Capital Budget - Wastewater

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Wastewater - Trunk Sewers									
2.526	Wastewater Trunk Sewer Asset Renewal Program	HRM			$2,000	$2,000	$2,000	$6,000	$0
2.822	Odour Level of Service and Optimization Review	West	$100					$100	$0
2.467	Kearney Lake Road Wastewater Sewer Upgrades	West						$0	$4,100
2.584	Fairview Cove Trunk Sewer	West	$400	$14,025				$14,425	$0
Wastewater - Trunk Sewers -- T O T A L S			**$500**	**$14,025**	**$2,000**	**$2,000**	**$2,000**	**$20,525**	**$4,100**
Wastewater - Collection System									
2.052	Integrated Wastewater Projects - Program	HRM	$2,000	$1,700	$1,800	$1,700	$1,840	$9,040	$0
2.168	Wastewater System - Trenchless Rehabilitation Program	HRM	$3,000	$2,000	$2,000	$2,000	$2,000	$11,000	$0
2.504	Collection System Asset Renewal Program	HRM			$0	$500	$500	$1,000	$0
2.830	Eastern Passage RDII Reduction Program FMZ24	East				$862	$707	$1,569	$0
2.831	Eastern Passage RDII Reduction Program FMZ37	East		$1,364	$1,116			$2,480	$0
2.832	Mill Cove RDII Reduction Program FMZ07 & FMZ40	Central		$3,271	$2,500	$1,241		$7,012	$0
2.833	Mill Cove RDII Reduction Program FMZ10	Central				$157	$1,414	$1,571	$0
2.834	Ellenvale area RDII Reduction Program	East			$370	$1,667	$1,667	$3,704	$0
2.835	LoWSCA: Canal Street Separation	East			$184	$829	$829	$1,842	$0
2.836	Wyse Road Separation Phase 1	East	$386	$1,737	$1,737			$3,860	$0
2.837	Wyse Road Separation Phase 2	East			$280	$1,261	$1,261	$2,802	$0
2.838	Albro Lakes Watershed Separation	East	$811	$3,650	$3,650			$8,111	$0
2.839	Eastern Passage Gravity Pressure Sewer	East		$300	$2,037	$5,843	$5,843	$14,023	$11,686
2.840	Eastern Passage Gravity Pressure Sewer - Install new pump out stations	East				$168	$168	$336	$1,340
2.841	Local network upgrades on Beaver Bank Road - Design (and North of Glendale Drive)	Central	$176	$138	$939	$939		$2,192	$0
2.842	Local network upgrades on Beaver Bank Road. At Galloway Drive	Central	$0		$100	$670	$670	$1,440	$0
2.843	Local network upgrades on Beaver Bank Road. By Windgate Drive	Central	$0		$111	$750	$750	$1,611	$0
2.844	Atlantic Street Upgrade	East		$50		$383	$383	$816	$3,015
2.845	Pleasant Street Upgrade	East				$77	$690	$767	$0
2.852	Maynard Lake and Clement Street Wetland Separation	East			$642	$4,540	$1,155	$6,337	$453
2.692	Cogswell Redevelopment - Sewer Relocation	West	$1,000	$1,000	$1,000			$3,000	$0
2.557	Punch Bowl PS Eliminiation	West	$100	$2,320				$2,420	$0
2.746	Sewer Relocation at South Street CN Bridge	West	$450					$450	$0
2.437	Hines Road Rider Sewer Extension	East	$80	$400				$480	$0
2.356	Auburn Avenue PS Elimination	West		$60	$645			$705	$0
2.357	Manhole Renewals WW	HRM	$25	$25	$28	$28	$28	$134	$0
2.358	Lateral Replacements WW (non-tree roots)	HRM	$1,720	$1,750	$1,785	$1,820	$1,856	$8,931	$0
2.563	Lateral Replacements WW (tree roots)	HRM	$541	$552	$567	$582	$594	$2,836	$0
2.223	Wet Weather Management Program	HRM	$350	$350	$350	$350	$350	$1,750	$0
2.074	Bedford West Collection System CCC	West	$39		$24			$63	$0

Five Year Capital Budget - Wastewater

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
	- WRWIP PROJECTS							$0	$0
2.672	Young Street - Sewer Separation	West	$100	$1,430				$1,530	$0
2.674	South Park Street - Sewer Separation	West	$3,270					$3,270	$0
2.679	College Street - Sewer Separation	West	$100	$2,310				$2,410	$0
2.675	Bayers Road Phase 1 - Sewer Separation	West			$100	$1,375		$1,475	$0
2.743	Spring Garden Road Phase 1 - Sewer Separation	West			$100	$1,880		$1,980	$0
1.233	Spring Garden Road Phase 2 - Sewer Separation	West				$100	$1,570	$1,670	$0
2.742	Windsor - Almon - Sewer Separation	West				$100	$2,285	$2,385	$0
2.744	Young Street Pocket - Sewer Separation - Side Streets	West			$100	$1,760		$1,860	$0
2.526	Prince Albert Road Sewer Separation - Side Streets	East	$325					$325	$0
Wastewater - Collection System -- T O T A L S			**$14,473**	**$24,407**	**$22,165**	**$31,582**	**$26,560**	**$119,187**	**$16,494**
Wastewater - Forcemains									
2.080	Forcemain Replacement Program	HRM		$400	$1,000	$1,000	$1,000	$3,400	$0
2.823	Akerley Blvd Forcemain Replacement	East	$65	$600				$665	$0
2.819	Pumping Station Oil Tank Replacements	HRM	$60					$60	$0
2.820	Morris Lake Forcemain Investigation and Rehabilitation	East	$500					$500	$0
2.608	New Timberlea Pump Station Forcemain System	West	$200				$15,100	$15,300	$0
Wastewater - Forcemains -- T O T A L S			**$825**	**$1,000**	**$1,000**	**$1,000**	**$16,100**	**$19,925**	**$0**
Wastewater - Structures									
2.420	Emergency Pumping Station Pump Replacements	HRM	$250	$250	$250	$250	$250	$1,250	$0
2.442	Wastewater Pumping Station Component Replacement Program - West Region	West	$200	$200	$200	$200	$200	$1,000	$0
2.443	Wastewater Pumping Station Component Replacement Program - East Region	East	$200	$200	$200	$200	$200	$1,000	$0
2.444	Wastewater Pumping Station Component Replacement Program - Central Region	Central	$250	$250	$250	$250	$250	$1,250	$0
2.476	Wastewater Pumping Station Asset Renewal Program	HRM			$0	$4,000	$4,000	$8,000	$0
2.818	Jamieson Pumping Station - Automatic Bar Screen	East	$60	$840				$900	$0
2.853	Fairfield Holding Tank - Concept Design	West	$150					$150	$0
2.824	Bruce Street Pumping Station Relocation	East	$150	$1,380				$1,530	$0
2.827	Wastewater Pumping Station Generator Plug/Switch Installations	HRM	$125					$125	$0
2.825	First Lake Pumping Station Upgrades	Central	$70	$640				$710	$0
2.654	PS Control Panel / Electrical Replacement	HRM	$725					$725	$0
2.829	Armcrest Pumping Station - Piping and Valve Upgrades	Central	$71					$71	$0
2.005	Autoport Pleasant Street PS Replacement	East	$3,000					$3,000	$0
2.660	Bissett PS Component Upgrade	East	$50	$1,200				$1,250	$0
2.655	Roach's Pond PS Component Upgrade	West	$550					$550	$0
2.088	Russell Lake PS Upgrade	East	$0	$2,475				$2,475	$0
2.093	Windmill Road PS Replacement	East	$1,355					$1,355	$0
2.665	CSO Upgrade Program	HRM	$300	$300	$1,000	$1,000	$1,000	$3,600	$0

Five Year Capital Budget - Wastewater

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
2.459	William's Lake PS Rehabilition	West	$100		$2,710			$2,810	$0
2.740	Duffus PS CSO - Modification	West	$100		$2,240			$2,340	$0
2.846	Upgrade Quigley Corner Pumping Station	East	$287	$1,294	$1,294			$2,875	$0
2.847	Optimize Quigley Corner Pumping Station	East	$22	$314				$336	$0
2.609	New Timberlea Pumping Station	West	$400				$5,560	$5,960	$0
2.617	WRWIP_YoungeStreet: Upgrade Young Pumping Station Capacity - Pumps_YNG_PS	West					$217	$217	$1,952
Wastewater Structures -- T O T A L S			**$8,415**	**$9,343**	**$8,144**	**$5,900**	**$11,677**	**$43,479**	**$1,952**
Wastewater - Treatment Facility									
2.056	Plant Optimization Program	HRM	$125	$125	$125	$125	$125	$625	$0
2.522	Emergency Wastewater Treatment Facility equipment replacements	HRM	$400	$400	$400	$400	$400	$2,000	$0
2.668	Wastewater Research Program Pilot Plant	HRM	$300					$300	$0
2.564	Carbon Media Replacement	HRM		$50			$50	$100	$0
2.849	HHSP - OCS H2S Analysers	HRM	$60					$60	$0
2.720	Harbour WWTFs - Outfall Inspection Program	HRM					$30	$30	$0
2.701	HHSP - OCS Wet Scrubber Chlorine Analyzers	HRM	$60					$60	$0
	Halifax Wastewater Treatment Facility:								
2.506	Halifax WWTF - Asset Renewal Program	West			$750	$750	$750	$2,250	$0
2.532	Halifax WWTF - Duct Work Replacement	West	$50	$50	$50	$50	$50	$250	$0
2.765	Halifax WWTF - Raw Water Pump Refurbishment	West	$50	$50	$50	$50	$50	$250	$0
2.767	Halifax WWTF - Fixed Gas Meters - Replacement	West	$150					$150	$0
2.768	Halifax WWTF - New Coagulant Dosing System	West	$100					$100	$0
2.769	Halifax WWTF - New Polymer Dosing System	West	$40					$40	$0
2.770	Halifax WWTF - Sludge Pumps - New Mechanical Seals	West	$60					$60	$0
2.706	Halifax WWTF - Desadeg Hydraulic Optimization	West	$100					$100	$0
2.762	Halifax WWTF - Fine Screens - Replace with Perforated Plate Screens	West		$1,900				$1,900	$0
2.772	Halifax WWTF - Grit System - Parts Replacements and New Screws	West	$50	$150				$200	$0
2.773	Halifax WWTF - Industrial Water System - Replacement	West	$50	$0				$50	$0
2.774	Halifax WWTF - UV Disinfection System - New Modules and PLC Upgrade	West			$900			$900	$0
2.775	Halifax WWTF - UV Disinfection System - New Automatic Level Controls	West			$500			$500	$0
2.776	Halifax WWTF - Sludge Dewatering - Fournier Press Upgrades	West	$50	$1,000				$1,050	$0
2.777	Halifax WWTF - Densadegs - Sludge Scraper Rebuilds (x2)	West		$100				$100	$0
2.778	Halifax WWTF - Densadegs - Mixer Gearbox Rebuilds	West		$70	$70	$70		$210	$0
2.779	Halifax WWTF - Densadegs - Lamella Tube Settler Upgrades	West		$800				$800	$0
	Dartmouth Wastewater Treatment Facility:								
2.507	Dartmouth WWTF - Asset Renewal Program	East	$0	$500	$500	$500	$500	$2,000	$0
2.502	Dartmouth WWTF - Duct Work Replacement	East	$50	$50	$50	$50	$50	$250	$0
2.781	Dartmouth WWTF - Fine Screens - New Perforated Plate Screens	East	$1,800					$1,800	$0

Five Year Capital Budget - Wastewater

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
2.783	Dartmouth WWTF - New Coagulant Dosing System	East	$100					$100	$0
2.784	Dartmouth WWTF - New Polymer Dosing System	East	$40					$40	$0
2.707	Dartmouth WWTF - Densadegs - CFD Analysis and Flow Diversion Vanes	East	$110					$110	$0
2.785	Dartmouth WWTF - Heat Exchangers - Refurbishment	East	$40					$40	$0
2.787	Dartmouth WWTF - Sludge Pumps - New Mechanical Seals	East	$60					$60	$0
2.788	Dartmouth WWTF - UV Disinfection System - New Modules and PLC Upgrade	East		$775				$775	$0
2.789	Dartmouth WWTF - UV Disinfection System - New Automatic Level Controls	East		$500				$500	$0
2.790	Dartmouth WWTF - Fournier Press - Sludge Dewatering Upgrade	East				$800		$800	$0
2.791	Dartmouth WWTF - Desadegs - Lamella Tube Settler Replacements	East	$300	$300				$600	$0
2.850	Dartmouth WWTF - Ballasted Flocculation Pilot	East	$75					$75	$0
2.855	Dartmouth WWTF - Industrial Water System Replacement	East	$50					$50	$0
2.851	Dartmouth WWTF - New Coarse Screen	East					$400	$400	$0
	Herring Cove Wastewater Treatment Facility:								
2.508	Herring Cove WWTF - Asset Renewal Program	West	$0	$250	$250	$250	$250	$1,000	$0
2.639	Herring Cove WWTF - Duct Work Replacement Program	West	$50	$50	$50	$50	$50	$250	$0
2.794	Herring Cove WWTF - Spare Sludge Tank Mixer	West	$25					$25	$0
2.795	Herring Cove WWTF - Sludge Pumps - New Mechanical Seals	West	$40					$40	$0
2.796	Herring Cove WWTF - New Coagulant Dosing System	West	$30					$30	$0
2.797	Herring Cove WWTF - Heat Exchangers - Refurbishment	West	$40					$40	$0
2.798	Herring Cove WWTF - Waste Oil System - New Waste Oil Tank	West	$15					$15	$0
2.799	Herring Cove WWTF - Electrical System - Spare Transfer Switch	West	$40					$40	$0
2.856	Herring Cove WWTF - Industrial Water System Replacement	West	$50					$50	$0
2.800	Herring Cove WWTF - Densadegs - Lamella Tube Settler Replacement	West		$400				$400	$0
2.801	Herring Cove WWTF - Fine Screens - New Perforated Plate Screens	West			$1,500			$1,500	$0
2.802	Herring Cove WWTF - UV Disinfection System - New Automatic Level Controls	West				$400		$400	$0
2.803	Herring Cove WWTF - Ballasted Flocculation Upgrades	West				$3,500		$3,500	$0
	Mill Cove Wastewater Treatment Facility:								
2.505	Mill Cove WWTF - Asset Renewal Program	Central		$350	$350			$700	$0
2.804	Mill Cove WWTF - OCS Carbon Replacements	Central	$0	$40	$40			$80	$0
2.640	Mill Cove WWTF - Process Upgrades - Preliminary + Detailed Design	Central		$901	$901			$1,802	$0
2.817	Mill Cove WWTF - Plant Upgrade - Design and Contract Admin	Central			$5,850	$5,850		$11,700	$0
2.805	Mill Cove WWTF - Plant Upgrade - Construction and Commissioning	Central				$25,499	$25,499	$50,998	$25,500
	Eastern Passage Wastewater Treatment Facility:								
2.666	Eastern Passage WWTF - Asset Renewal Program	East	$0	$150	$150	$150	$150	$600	$0
2.468	Eastern Passage WWTF - Process Upgrade Program	East	$0	$0	$0	$0	$0	$0	$0
2.646	Eastern Passage WWTF - Secondary Launder Covers	East	$150					$150	$0
2.806	Eastern Passage WWTF - Carbon Replacement	East	$0	$120				$120	$0

Five Year Capital Budget - Wastewater

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
2.807	Eastern Passage WWTF - UV Disinfection System - Spare Parts	East		$40				$40	$0
2.808	Eastern Passage WWTF - New Yard Tractor	East				$12		$12	$0
	Aerotech Wastewater Treatment Facility:								
2.667	Aerotech WWTF - Asset Renewal Program	Aerotech		$150	$200	$250	$250	$850	$0
2.809	Aerotech WWTF - Road Rehabilition	Aerotech	$25					$25	$0
2.810	Aerotech WWTF - Bioreactors - Short Circuiting Modifications	Aerotech	$200					$200	$0
2.811	Aerotech WWTF - Lab - HVAC Modifications	Aerotech	$75					$75	$0
2.812	Aerotech WWTF - Centrifuge - Rebuild	Aerotech	$50		$50		$50	$150	$0
2.814	Aerotech WWTF - Lagoon Dredging	Aerotech					$600	$600	$0
	Timberlea Wastewater Treatment Facility:								
2.509	Asset Renewal Program	West		$50	$50			$100	$0
2.647	Decommissioning	West				$500		$500	$0
2.816	Timberlea WWTF - Grit System - Chain and Bucket Replacement	West	$50					$50	$0
	Community Wastewater Treatment Facility:								
2.050	Community WWTFs - Asset Renewal Program	HRM	$0	$250	$250	$250	$250	$1,000	$0
2.761	Springfield Lake - Driveway Refurbishment	HRM	$15					$15	$0
	Biosolids Processing Facility:								
2.126	Biosolids Processing Facility - Asset Renewal Program	HRM				$250	$250	$500	$0
2.857	Biosolids Processing Facility - Building Upgrades	HRM	$250					$250	$0
2.732	Biosolids Processing Facility - Conveyor CS1 Liners	HRM	$30					$30	$0
2.733	Biosolids Processing Facility - Biofilter Media	HRM	$50		$50		$50	$150	$0
2.815	Biosolids Processing Facility - Dryer Upgrades	HRM	$70					$70	$0
2.734	Biosolids Processing Facility - Serpentix Conveyor Refurbishment	HRM		$30				$30	$0
2.735	Biosolids Processing Facility - Live Bottom Bin Rebuild	HRM		$150				$150	$0
2.513	Biosolids Processing Facility - Silo Painting	HRM		$90				$90	$0
2.736	Biosolids Processing Facility - CS1 Conveyor Replacement	HRM			$200			$200	$0
2.737	Biosolids Processing Facility - Scissor Lift Replacement	HRM				$15		$15	$0
Wastewater - Treatment Facility -- T O T A L S			**$5,525**	**$9,841**	**$13,286**	**$39,771**	**$29,804**	**$98,227**	**$25,500**
Wastewater - Energy									
2.362	Energy Management Capital Program (Wastewater)	HRM		$500	$500	$500	$500	$2,000	$0
2.491	Pump Station HVAC Retro-Commissioning Program	HRM		$100	$100	$100	$100	$400	$0
2.650	HHSP - BAS + HVAC Recommissioning	HRM	$50					$50	$0
2.651	Wastewater Pump Stations - NSPI Meter Relocations	HRM	$25					$25	$0
Wastewater - Energy -- T O T A L S			**$75**	**$600**	**$600**	**$600**	**$600**	**$2,475**	**$0**
Wastewater - Security									
4.008	Security Upgrade Program	HRM	$200	$200	$200	$200		$800	$0
Wastewater - Security -- T O T A L S			**$200**	**$200**	**$200**	**$200**	**$0**	**$800**	

Five Year Capital Budget - Wastewater

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Wastewater - Equipment									
2.161	I&I Reduction (SIR) Program Flow Meters and Related Equipment	HRM	$25	$25	$25	$25	$25	$125	$0
2.451	Miscellaneous Equipment Replacement	HRM	$120	$120	$120	$120	$120	$600	$0
2.821	Duffus Street PS Flow Meter Replacement	West	$110					$110	$0
Wastewater - Equipment -- T O T A L S			**$255**	**$145**	**$145**	**$145**	**$145**	**$835**	**$0**
TOTALS - Wastewater			**$30,268**	**$59,561**	**$47,540**	**$81,198**	**$86,886**	**$305,453**	**$48,046**

Five Year Capital Budget - Stormwater

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Stormwater - Pipes									
1.108	Stormwater Pipe Asset Renewal Program	HRM				$4,000	$4,700	$8,700	$0
1.140	Stormwater Main Sewer Lining - Program	HRM		$100	$100	$100	$100	$400	$0
1.038	Integrated Stormwater Projects - Program	HRM	$1,000	$1,000	$1,000	$1,000	$1,000	$5,000	$0
1.102	Manhole Renewals SW	HRM	$15	$16	$16	$17	$17	$81	$0
1.103	Catchbasin Renewals SW	HRM	$60	$63	$65	$68	$70	$326	$0
1.135	Lateral Replacements SW	HRM	$12	$13	$13	$14	$14	$66	$0
1.204	National Disaster Mitigation Program	HRM		$50	$100	$200	$200	$550	$0
1.134	Stormwater Quality Compliance Needs Assessment from IRP	HRM			$75	$75		$150	$0
1.145	Sullivan's Pond Storm Sewer System Replacement - Phase 2 Irishtown Rd to Harbour	East	$25	$350	$11,000			$11,375	$0
1.034	Raymond Street, Phase 2 - Storm Sewer Rehabilitation	East	$100	$1,000	$750			$1,850	$0
1.188	Cogswell Redevelopment - SW Sewer Relocation	West	$955	$1,350	$1,350			$3,655	$0
1.201	Stormwater Pipe Condition Inspections (CSP)	HRM	$50	$50	$0	$0	$0	$100	$0
1.223	Rocky Lake and Bedford Highway Intersection Storm Sewer Upgrade	West	$75					$75	$0
1.224	Thistle Street Storm Drainage System Upgrade - Preliminary Engineering	East	$50					$50	$0
1.227	Stormwater System Upgrade near Civic #1681 Waverley Road	East	$38					$38	$0
Stormwater - Pipes -- T O T A L S			**$2,380**	**$3,992**	**$14,469**	**$5,474**	**$6,101**	**$32,416**	**$0**
Stormwater - Culverts/Ditches									
1.104	Driveway Culvert Replacement Program	HRM	$1,200	$930	$925	$950	$945	$4,950	$0
1.109	Cross Culvert Renewal Program	HRM	$0	$2,000	$1,200	$2,000	$1,500	$6,700	$0
	Street Specific Culvert Replacement:								
1.205	Kipawa Crescent	Central	$400					$400	$0
1.125	Coronet Avenue Driveway Culvert Replacement Project	West	$925					$925	$0
1.147	Cole Harbour Road (near #1560) - Culvert Replacement	East	$350					$350	$0
1.183	St Margarets Bay Rd, near Civic 2797 - Culvert Replacement	West	$80					$80	$0
1.228	Blue Forest Lane, near civic 42	Central	$38					$38	$0
1.229	Devils Hill Rd at Boulderbrook Lane	West	$38					$38	$0
1.231	Ketch Harbour Rd, near civic 31	West	$38					$38	$0
1.232	Waverley Rd, near civic 832	East	$38					$38	$0
Stormwater - Culverts/Ditches -- T O T A L S			**$3,107**	**$2,930**	**$2,125**	**$2,950**	**$2,445**	**$13,557**	**$0**
Stormwater - Structures									
1.133	Ellenvale Run Retaining Wall System - Replacement	East			$500	$1,000	$1,000	$2,500	$0
1.225	Ellenvale Run Retaining Wall - Phase 2	East	$1,900					$1,900	$0
1.226	Ellenvale Run Retaining Wall - Phase 3 (Wanda Lane)	East		$2,100				$2,100	$0
Stormwater - Structures -- T O T A L S			**$1,900**	**$2,100**	**$500**	**$1,000**	**$1,000**	**$6,500**	**$0**
TOTALS - Stormwater			**$7,387**	**$9,022**	**$17,094**	**$9,424**	**$9,546**	**$52,473**	**$0**

Five Year Capital Budget - Corporate Projects

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
Corporate - Information Technology									
4.031	IT Strategic Projects	HRM				$3,770	$4,150	$7,920	$0
4.097	Analytics Decision Support System	HRM	$335	$350	$150			$835	$0
4.102	Approval Forms Framework	HRM		$280	$250			$530	$0
4.111	Asset Condition	HRM	$125	$190	$190			$505	$0
4.151	Capital Planning	HRM	$100	$500	$1,000	$100		$1,700	$0
4.105	Cityworks Upgrade	HRM		$200		$200		$400	$0
4.083	Computerized Maintenance Management System (CMMS) Enhancements	HRM	$1,000	$500	$1,000	$100		$2,600	$0
4.011	Desktop Computer Replacement Program	HRM	$350	$350	$350	$350	$350	$1,750	$0
4.146	Disaster Recovery	HRM	$630					$630	$0
4.147	Document Management SharePoint Rollout	HRM	$300					$300	$0
4.149	Electronic Content Management Linkage	HRM			$200			$200	$0
4.126	Full Enterprise Data Warehouse	HRM	$200	$300	$300			$800	$0
4.153	General Analytic Tool	HRM		$400				$400	$0
4.131	HR Training and Benefits	HRM		$320				$320	$0
4.012	Network Upgrades	HRM	$280	$280	$280	$280	$280	$1,400	$0
4.101	Mobile Devices and Applications	HRM		$600				$600	$0
4.095	New CRM with Integration	HRM		$200	$1,000			$1,200	$0
4.121	New Payroll System	HRM	$230					$230	$0
4.048	SAP Rate Structure Support	HRM	$220		$220		$220	$660	$0
4.150	Enterprise Resource Planning Solution	HRM	$2,630	$1,580	$200	$200		$4,610	$0
4.130	Team Collaboration	HRM			$230			$230	$0
4.107	Customer Portal	HRM	$50	$50				$100	$0
4.152	Security Projects	HRM	$300	$100				$400	$0
Corporate - Information Technology -- T O T A L S			**$6,750**	**$6,200**	**$5,370**	**$5,000**	**$5,000**	**$28,320**	**$0**
Corporate - GIS									
4.040	GIS Data Program	HRM	$100	$250	$100	$250	$100	$800	$0
4.115	GIS Data Build - Services (ICI)	HRM	$150	$150	$0	$0	$0	$300	$0
4.010	Sewer Service Entry	HRM	$250	$150	$0	$0	$0	$400	$0
4.116	GIS Data Project	HRM	$150	$0	$100	$0	$200	$450	$0
4.038	GIS Hardware/Software Program	HRM	$50	$50	$50	$50	$50	$250	$0
4.039	GIS Application Support Program	HRM	$150	$150	$150	$150	$150	$750	$0
4.059	Utility Network modeling/Data Modeling	HRM	$50	$250	$250	$50	$50	$650	$0
4.118	Engineering Drawing Database	HRM	$100	$50		$100	$50	$300	$0
4.155	Stormwater Biling Imagery Acquisition and Analysis	HRM	$350		$350		$350	$1,050	$0
Corporate - GIS -- T O T A L S			**$1,350**	**$1,050**	**$1,000**	**$600**	**$950**	**$4,950**	**$0**
Corporate - Asset Management									
4.020	Asset Management Program Development	HRM		$100	$100	$100	$100	$400	$0

Five Year Capital Budget - Corporate Projects

Project ID	Project Name	Region	All $ in 000's						
			Y1	Y2	Y3	Y4	Y5	Total Y1 to Y5	Future Years
			2020-2021	2021-2022	2022-2023	2023-2024	2024-2025		
2.523	Wastewater Sewer Condition Assessment	HRM	$215	$220	$225	$230	$235	$1,125	$0
1.156	Storm Sewer Condition Assessment	HRM	$95	$100	$105	$110	$115	$525	$0
2.043	Corporate Flow Monitoring Program	HRM	$1,870	$2,000	$2,000	$2,000	$2,000	$9,870	$0
4.113	Vulnerability to Climate Change Risk Assessment - Asset Class Pilot	HRM	$250	$275	$250			$775	$0
2.562	Outfall Assessment Project	HRM	$20					$20	$0
4.140	SSO Management Program	HRM	$100					$100	$0
4.141	System Constraints Analysis HRM (Was East Additional Flow Monitoring)	HRM	$252					$252	$0
4.143	Safe Yield Study	HRM	$200					$200	$0
4.144	New Hydraulic Water Model (InfoWater)	HRM	$200					$200	$0
4.145	Transmission Main Risk Assessment and Prioritization Framework	HRM	$50					$50	$0
Corporate - Asset Management -- T O T A L S			**$3,252**	**$2,695**	**$2,680**	**$2,440**	**$2,450**	**$13,517**	**$0**
Corporate - Facility									3
2.176	East/Central Regional Operational Facility	East	$2,000	$16,000	$16,000			$34,000	$0
4.077	Building Capital Improvements	West	$185	$100	$100	$100	$100	$585	$0
3.221	Energy Managerment Capital Program	HRM	$100	$100	$100	$100	$100	$500	$0
Corporate - Facility -- T O T A L S			**$2,285**	**$16,200**	**$16,200**	**$200**	**$200**	**$35,085**	**$0**
Corporate - SCADA & Other Equipment									
4.093	GPS Units - Replacement	HRM	$70					$70	$0
4.004	SCADA Control System Enhancements	HRM	$100	$100	$100	$100	$100	$500	$0
4.136	ICS Cyber Security Enhancements	HRM	$100					$100	$0
4.137	Halifax Harbour Solutions Radio Upgrade	HRM	$60					$60	$0
4.138	Wastewater Community Plants SCADA System Relocation	HRM	$45					$45	$0
4.139	PI System Enhancements	HRM	$100					$100	$0
4.154	Customer Meters - New and Replacement	HRM	$500	$415	$500	$575	$545	$2,535	$0
Corporate - SCADA & Other Equipment -- T O T A L S			**$975**	**$515**	**$600**	**$675**	**$645**	**$3,410**	**$0**
Corporate - Fleet									
4.006	Fleet Upgrade Program - Stormwater	HRM	$269	$354	$297	$327	$315	$1,562	$0
4.006	Fleet Upgrade Program - Wastewater	HRM	$1,076	$1,416	$1,188	$1,308	$1,260	$6,248	$0
4.007	Fleet Upgrade Program - Water	HRM	$610	$315	$466	$335	$445	$2,171	$0
Corporate - Fleet -- T O T A L S			**$1,955**	**$2,085**	**$1,951**	**$1,970**	**$2,020**	**$9,981**	**$0**
TOTALS - Corporate Projects			**$16,567**	**$28,745**	**$27,801**	**$10,885**	**$11,265**	**$95,263**	**$3**

Appendix E

Projected Operating Budgets for

2020/21 to 2024/25

STRAIGHT from the SOURCE

HALIFAX WATER
CONSOLIDATED SUMMARY OF ESTIMATED REVENUE & EXPENSES
PROPOSED 5 YEAR BUSINESS PLAN
APRIL 1, 2020 to MARCH 31, 2025
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	BUSINESS PLAN APR 1/20 MAR 31/21	APR 1/21 MAR 31/22	APR 1/22 MAR 31/23	APR 1/23 MAR 31/24	APR 1/24 MAR 31/25
OPERATING REVENUE	$138,203	$138,517	**$138,618**	**$138,123**	**$137,632**	**$137,145**	**$136,663**
OPERATING EXPENSES	$105,521	$114,878	**$118,110**	**$123,631**	**$128,761**	**$131,998**	**$135,962**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$32,682	$23,639	**$20,508**	**$14,492**	**$8,871**	**$5,148**	**$700**
FINANCIAL REVENUE							
INVESTMENT INCOME	$1,156	$816	**$86**	**$86**	**$86**	**$86**	**$86**
MISCELLANEOUS	$742	$553	**$532**	**$535**	**$537**	**$539**	**$541**
	$1,898	$1,369	**$619**	**$621**	**$623**	**$625**	**$628**
FINANCIAL EXPENSES							
LONG TERM DEBT INTEREST	$7,430	$8,181	**$8,823**	**$10,124**	**$12,654**	**$15,254**	**$17,417**
LONG TERM DEBT PRINCIPAL	$20,516	$19,822	**$21,880**	**$24,203**	**$28,150**	**$32,131**	**$36,180**
AMORTIZATION DEBT DISCOUNT	$199	$202	**$228**	**$271**	**$328**	**$401**	**$439**
DIVIDEND/GRANT IN LIEU OF TAXES	$4,999	$5,147	**$6,113**	**$6,638**	**$6,705**	**$6,772**	**$6,840**
MISCELLANEOUS	$45	$22	**$32**	**$32**	**$31**	**$31**	**$31**
	$33,190	$33,374	**$37,076**	**$41,268**	**$47,868**	**$54,588**	**$60,906**
OPERATING SURPLUS (DEFICIT) AVAILABLE FOR CAPITAL EXPENDITURES	$1,390	($8,366)	**($15,949)**	**($26,156)**	**($38,374)**	**($48,815)**	**($59,578)**

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

HALIFAX WATER
ESTIMATED REVENUE AND EXPENSES - WATER OPERATIONS
PROPOSED 5 YEAR BUSINESS PLAN
APRIL 1, 2020 to MARCH 31, 2025
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	BUSINESS PLAN APR 1/20 MAR 31/21	APR 1/21 MAR 31/22	APR 1/22 MAR 31/23	APR 1/23 MAR 31/24	APR 1/24 MAR 31/25
OPERATING REVENUE							
METERED SALES	$48,040	$47,744	**$48,069**	**$47,904**	**$47,738**	**$47,574**	**$47,409**
FIRE PROTECTION	$7,074	$7,074	**$7,074**	**$7,074**	**$7,074**	**$7,074**	**$7,074**
PRIVATE FIRE PROTECTION SERVICES	$869	$873	**$884**	**$893**	**$903**	**$912**	**$922**
BULK WATER STATIONS	$227	$292	**$303**	**$303**	**$303**	**$303**	**$303**
CUSTOMER LATE PAY./COLLECTION FEES	$244	$223	**$238**	**$238**	**$238**	**$238**	**$238**
MISCELLANEOUS	$98	$179	**$177**	**$177**	**$177**	**$177**	**$177**
	$56,552	$56,387	**$56,746**	**$56,590**	**$56,434**	**$56,279**	**$56,125**
OPERATING EXPENSES							
WATER SUPPLY & TREATMENT (including Small Systems)	$9,747	$10,808	**$10,562**	**$10,910**	**$11,272**	**$11,647**	**$11,982**
TRANSMISSION & DISTRIBUTION	$10,014	$11,127	**$11,282**	**$12,283**	**$12,633**	**$12,994**	**$13,248**
OTTER LAKE CONTRACT	$20	$26	**$28**	**$29**	**$30**	**$31**	**$32**
TECHNICAL SERVICES (SCADA)	$889	$1,037	**$1,029**	**$1,060**	**$1,093**	**$1,127**	**$1,157**
ENGINEERING & INFORMATION SERVICES	$3,749	$3,901	**$4,162**	**$4,280**	**$4,402**	**$4,527**	**$4,618**
REGULATORY SERVICES	$679	$1,142	**$1,195**	**$1,233**	**$1,273**	**$1,313**	**$1,350**
CUSTOMER SERVICE	$2,524	$2,918	**$2,758**	**$2,839**	**$2,923**	**$3,009**	**$3,076**
ADMINISTRATION & PENSION	$3,986	$4,355	**$4,112**	**$4,230**	**$4,351**	**$4,477**	**$4,571**
DEPRECIATION	$9,046	$9,955	**$10,993**	**$11,971**	**$13,082**	**$13,488**	**$13,555**
	$40,655	$45,270	**$46,121**	**$48,837**	**$51,059**	**$52,614**	**$53,589**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$15,898	$11,117	**$10,625**	**$7,754**	**$5,376**	**$3,665**	**$2,536**
FINANCIAL REVENUE							
INVESTMENT INCOME	$521	$367	**$39**	**$39**	**$39**	**$39**	**$39**
MISCELLANEOUS	$559	$431	**$394**	**$395**	**$397**	**$399**	**$401**
	$1,080	$798	**$432**	**$434**	**$436**	**$438**	**$440**
FINANCIAL EXPENSES							
LONG TERM DEBT INTEREST	$1,924	$2,238	**$3,127**	**$3,983**	**$5,484**	**$6,996**	**$8,027**
LONG TERM DEBT PRINCIPAL	$7,181	$5,165	**$6,465**	**$7,564**	**$9,548**	**$11,450**	**$13,138**
AMORTIZATION DEBT DISCOUNT	$85	$67	**$84**	**$108**	**$136**	**$173**	**$173**
DIVIDEND/GRANT IN LIEU OF TAXES	$4,999	$5,147	**$5,654**	**$5,710**	**$5,767**	**$5,825**	**$5,883**
MISCELLANEOUS	$24	$12	**$2**	**$2**	**$1**	**$1**	**$1**
	$14,214	$12,630	**$15,332**	**$17,368**	**$20,936**	**$24,445**	**$27,223**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES	$2,764	($715)	**($4,275)**	**($9,180)**	**($15,124)**	**($20,343)**	**($24,247)**

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

HALIFAX WATER
ESTIMATED REVENUE AND EXPENSES - WASTEWATER OPERATIONS
PROPOSED 5 YEAR BUSINESS PLAN
APRIL 1, 2020 to MARCH 31, 2025
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	BUSINESS PLAN APR 1/20 MAR 31/21	APR 1/21 MAR 31/22	APR 1/22 MAR 31/23	APR 1/23 MAR 31/24	APR 1/24 MAR 31/25
OPERATING REVENUE							
METERED SALES	$69,901	$70,031	**$70,365**	**$69,994**	**$69,625**	**$69,258**	**$68,893**
WASTEWATER OVERSTRENGTH AGREEMENTS	$75	$50	**$30**	**$30**	**$30**	**$30**	**$30**
LEACHATE	$330	$394	**$387**	**$395**	**$403**	**$411**	**$419**
CONTRACT REVENUE	$87	$86	**$86**	**$86**	**$86**	**$86**	**$86**
SEPTAGE TIPPING FEES	$764	$760	**$505**	**$530**	**$556**	**$584**	**$613**
AIRLINE EFFLUENT	$143	$160	**$105**	**$105**	**$105**	**$105**	**$105**
CUSTOMER LATE PAY./COLLECTION FEES	$186	$164	**$176**	**$176**	**$176**	**$176**	**$176**
MISCELLANEOUS	$185	$139	**$136**	**$136**	**$136**	**$136**	**$136**
	$71,671	$71,783	**$71,790**	**$71,451**	**$71,116**	**$70,785**	**$70,457**
OPERATING EXPENSES							
WASTEWATER COLLECTION	$11,676	$10,972	**$11,847**	**$12,167**	**$12,496**	**$12,835**	**$13,184**
WASTEWATER TREATMENT PLANTS (including Small Systems)	$19,459	$20,463	**$20,571**	**$21,156**	**$21,761**	**$22,385**	**$23,030**
DEWATERING FACILITY/ SLUDGE MGM'T	$16	$426	**$404**	**$421**	**$438**	**$455**	**$473**
BIOSOLIDS TREATMENT	$27	$101	**$101**	**$103**	**$105**	**$107**	**$109**
LEACHATE CONTRACT	$286	$325	**$337**	**$346**	**$355**	**$365**	**$375**
TECHNICAL SERVICES (SCADA)	$1,450	$1,784	**$1,652**	**$1,703**	**$1,755**	**$1,809**	**$1,858**
ENGINEERING & INFORMATION SERVICES	$3,783	$3,556	**$3,769**	**$3,876**	**$3,986**	**$4,099**	**$4,181**
REGULATORY SERVICES	$886	$1,434	**$1,537**	**$1,585**	**$1,636**	**$1,688**	**$1,735**
CUSTOMER SERVICE	$2,057	$2,536	**$2,352**	**$2,421**	**$2,492**	**$2,566**	**$2,623**
ADMINISTRATION & PENSION	$3,242	$3,606	**$3,405**	**$3,502**	**$3,603**	**$3,706**	**$3,784**
DEPRECIATION	$12,986	$13,921	**$15,072**	**$16,113**	**$17,195**	**$17,187**	**$18,429**
	$55,870	$59,124	**$61,045**	**$63,393**	**$65,821**	**$67,203**	**$69,780**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$15,801	$12,659	**$10,745**	**$8,059**	**$5,295**	**$3,582**	**$677**
FINANCIAL REVENUE							
INVESTMENT INCOME	$520	$367	**$39**	**$39**	**$39**	**$39**	**$39**
MISCELLANEOUS	$183	$122	**$139**	**$139**	**$140**	**$140**	**$141**
	$703	$489	**$178**	**$178**	**$179**	**$179**	**$179**
FINANCIAL EXPENSES							
LONG TERM DEBT INTEREST	$4,939	$5,133	**$4,772**	**$4,970**	**$5,707**	**$6,202**	**$7,028**
LONG TERM DEBT PRINCIPAL	$12,015	$12,965	**$13,442**	**$14,277**	**$15,768**	**$16,984**	**$18,810**
AMORTIZATION DEBT DISCOUNT	$103	$113	**$124**	**$136**	**$158**	**$181**	**$207**
DIVIDEND/GRANT IN LIEU OF TAXES	$0	$0	**$398**	**$804**	**$812**	**$820**	**$828**
MISCELLANEOUS	$21	$10	**$30**	**$30**	**$30**	**$30**	**$30**
	$17,077	$18,220	**$18,766**	**$20,217**	**$22,474**	**$24,216**	**$26,903**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES	($573)	($5,072)	**($7,843)**	**($11,980)**	**($17,001)**	**($20,455)**	**($26,047)**

** 2019/20 Operating Budget approved by the Halifax Water Board of Commissioners, January 31, 2019.*

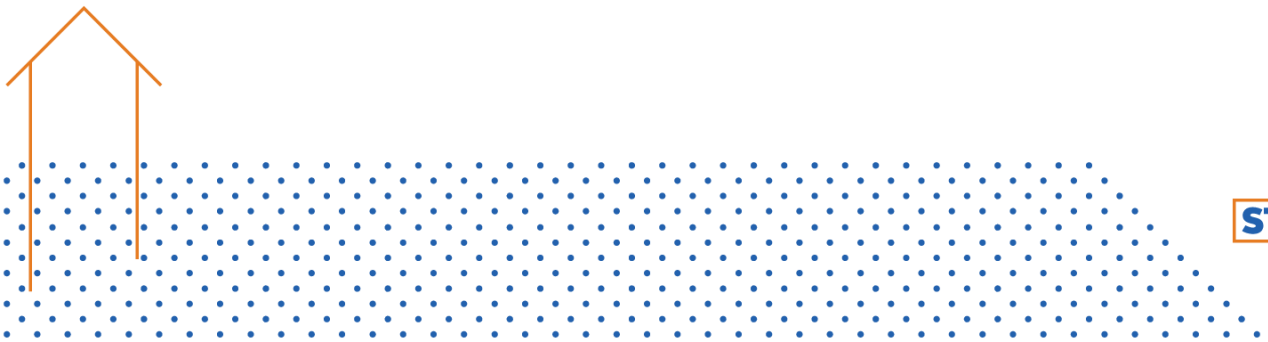
HALIFAX WATER
ESTIMATED REVENUE AND EXPENSES - STORMWATER OPERATIONS
PROPOSED 5 YEAR BUSINESS PLAN
APRIL 1, 2020 to MARCH 31, 2025
(in thousands)

DESCRIPTION	ACTUAL APR 1/18 MAR 31/19	APPROVED BUDGET * APR 1/19 MAR 31/20	BUSINESS PLAN APR 1/20 MAR 31/21	APR 1/21 MAR 31/22	APR 1/22 MAR 31/23	APR 1/23 MAR 31/24	APR 1/24 MAR 31/25
OPERATING REVENUE							
STORMWATER SITE RELATED SERVICE	$5,906	$6,351	**$6,047**	**$6,047**	**$6,047**	**$6,047**	**$6,047**
STORMWATER RIGHT-OF-WAY SERVICE	$3,835	$3,835	**$3,835**	**$3,835**	**$3,835**	**$3,835**	**$3,835**
CUSTOMER LATE PAY./COLLECTION FEES	$118	$66	**$106**	**$106**	**$106**	**$106**	**$106**
MISCELLANEOUS	$120	$95	**$92**	**$92**	**$92**	**$92**	**$92**
	$9,980	$10,347	**$10,081**	**$10,081**	**$10,081**	**$10,081**	**$10,081**
OPERATING EXPENSES							
STORMWATER COLLECTION	$4,901	$5,750	**$5,779**	**$5,935**	**$6,095**	**$6,260**	**$6,429**
TECHNICAL SERVICES (SCADA)	$49	$39	**$42**	**$44**	**$45**	**$46**	**$48**
ENGINEERING & INFORMATION SERVICES	$624	$1,122	**$1,273**	**$1,309**	**$1,346**	**$1,384**	**$1,412**
REGULATORY SERVICES	$1,587	$1,505	**$1,627**	**$1,679**	**$1,733**	**$1,788**	**$1,838**
CUSTOMER SERVICE	$335	$273	**$304**	**$312**	**$322**	**$331**	**$339**
ADMINISTRATION & PENSION	$527	$586	**$554**	**$570**	**$586**	**$603**	**$615**
DEPRECIATION	$974	$1,208	**$1,365**	**$1,554**	**$1,755**	**$1,768**	**$1,913**
	$8,997	$10,484	**$10,943**	**$11,402**	**$11,881**	**$12,181**	**$12,594**
OPERATING SURPLUS BEFORE FINANCIAL REVENUE AND EXPENSES	$983	($137)	**($862)**	**($1,321)**	**($1,800)**	**($2,100)**	**($2,513)**
FINANCIAL REVENUE							
INVESTMENT INCOME	$116	$82	**$9**	**$9**	**$9**	**$9**	**$9**
MISCELLANEOUS	$0	$0	**$0**	**$0**	**$0**	**$0**	**$0**
	$116	$82	**$9**	**$9**	**$9**	**$9**	**$9**
FINANCIAL EXPENSES							
LONG TERM DEBT INTEREST	$567	$810	**$924**	**$1,170**	**$1,463**	**$2,057**	**$2,362**
LONG TERM DEBT PRINCIPAL	$1,320	$1,692	**$1,973**	**$2,362**	**$2,834**	**$3,697**	**$4,232**
AMORTIZATION DEBT DISCOUNT	$11	$22	**$20**	**$27**	**$34**	**$46**	**$58**
DIVIDEND/GRANT IN LIEU OF TAXES	$0	$0	**$62**	**$125**	**$126**	**$127**	**$128**
MISCELLANEOUS	$0	$0	**$0**	**$0**	**$0**	**$0**	**$0**
	$1,899	$2,524	**$2,978**	**$3,683**	**$4,457**	**$5,927**	**$6,780**
OPERATING DEFICIT AVAILABLE FOR CAPITAL EXPENDITURES	($800)	($2,579)	**($3,832)**	**($4,996)**	**($6,249)**	**($8,018)**	**($9,284)**

Appendix F

Water Quality Master Plan

Version 3.0



STRAIGHT from the SOURCE

Water Quality Master Plan

V3.0

September 2016

Reid Campbell and Wendy Krkosek

Table of Contents

1 Introduction

Halifax Water has consistently produced drinking water that has safeguarded public health and achieved regulatory compliance, despite the challenges that occur as regulations become more stringent, infrastructure ages and once current technologies are eclipsed by more modern designs to meet the new regulatory environment. One important tool Halifax Water uses is water quality strategic planning which is formally executed through a Water Quality Master Plan (WQMP). Water quality master planning describes the process whereby a water utility assesses the public's expectations for water quality and the direction of water quality regulations and trends, sets corresponding water quality goals and then plans for necessary capital or operational improvements.

In 2006, Halifax Water completed its first formal WQMP. This plan was designed to set goals for water quality that exceed regulatory requirements and to set a path for Halifax Water to achieve those goals while treating water at an optimal cost. In 2011, the WQMP Version 2.0 was created and focused mainly on upgrades and investigations concerning the JD Kline Water Treatment Plant; Halifax Water's most mature treatment facility.

WQMP Version 3.0 has a shift in focus away from one plant in particular and focuses more on source water quality and its impact on treatment processes and distribution system water quality as a whole. There are two main drivers for this change in focus. Firstly, recent research indicates that lakes in Nova Scotia may be experiencing a recovery from acid rain, as sulphur emissions have drastically decreased over the past few years. Recovery results in higher pH, increased productivity, and increased total organic carbon. Both the Lake Major and J.D. Kline plants have been dealing with recent changing source water quality which has been challenging the treatment process at both plants, resulting in higher chemical usage and increased stress on treatment processes. WQMP V3.0 will focus efforts on identification of lake recovery processes, what this means for future source water quality, and also how to provide effective and robust treatment with existing infrastructure in the short term, while developing a plan for capital upgrades to address changing source water quality and aging infrastructure in the long term. Secondly, with the recent events in Flint Michigan around lead exposure in homes, outcomes of research with Dalhousie University, and a shift in the industry approach (via American Water Works Association policy) towards managing lead in the distribution system, WQMP V3.0 will focus on developing a plan for removal of both public and private lead service lines by 2050, while concurrently optimizing corrosion control treatment. It is likely that a Canadian regulatory requirement will be adopted in the coming years in this direction and Halifax Water wants to ensure they are at the forefront of this change in industry approach. Lead is a shared responsibility between the utility and the homeowner, and as such, the focus will be a shift away from sampling and towards public engagement and policy as new ways of engaging the public in uptake of replacement programs will need to be identified and pursued.

Implementation of the WQMP is a combined effort between Halifax Water staff and a research partnership with Dr. Graham Gagnon at Dalhousie University, and ultimately consulting engineers and contractors who design and construct identified necessary changes. The NSERC/Halifax Water Industrial Research Chair in Water Quality and Treatment is an integral part of conducting the research that leads to internal policy and operational changes, treatment optimization opportunities, and ensures that

Halifax Water is at the forefront of water quality research and active in the development of best practice for water utilities.

2 Research Accomplishments

Numerous research accomplishments since inception of the IRC program have led to both public health benefits and cost savings for Halifax Water. The following table provides an overview of some of the major discoveries and their associated impacts to Halifax Water of water quality research with the Dalhousie Research Chair. Many of these discoveries form the basis of the direction of WQMP V3.0.

Discovery	Impact to Halifax Water
A) Identification of Lake Recovery. Discovered through assessment of plant data over a 20-year period that both Pockwock and Lake Major are experiencing increased pH, color and TOC due to decreases in sulphur deposition.	• Increased dosing of coagulant at both Lake Major and J.D. Kline but J.D. Kline is pushing the limits of a direct filtration plant • Decreased filter run times • Potential explanation for algal occurrence and geosmin
B) Development of NOM Monitoring Tools. Developed a new method for oxygen demand in water industry: peCOD. Developed a new model for Fluorescence excitation-emission matrix (FEEM) analysis.	• peCOD is a new tool for assessing NOM that has ideal applications for oxidation processes, and shows promise for detecting subtle changes in organic profiles over traditional TOC/DOC techniques. • FEEM models will lead to online tools for improved treatment operation
C) Coagulant Mixing. Demonstrated that coagulation mixing energy can be reduced by 4-5 times without compromising NOM removal	• Outside of pumping, mixing represents the highest energy costs to water plants • Applied new particle analysis technology to demonstrate discovery
D) Biological Removal of NOM in Direct Filtration. Successfully demonstrated that biofiltration can be applied in a direct filtration plant without pre-oxidation	• Biofiltration reduced THM concentrations by 40% for Halifax Water • Bio filtration was reliable under broad temperature range (4-25°C) • Reduced chlorine costs by $30,000 per year
E) Monitoring Biological Filtration. Demonstrated that biomass measurements of ATP evolve operationally and within filter cycles	• Applied ATP as an emerging monitoring technology for biofiltration • Developed protocols to demonstrate appropriate ATP range and application to be used as performance monitoring tools moving forward
F) Partial Lead Service Lines. Demonstrated that PLSLs are an inappropriate solution for Halifax Water	• Research based on 5-years of water sample analysis by Dalhousie students • Led to policy change at Halifax Water in 2012, partials are no longer conducted unless part of an existing disruption. • Neither PVC or copper provide decreased lead concentrations post PLSLs
G) Lead Exposure. Demonstrated that current	• Halifax Water now uses a 4L profile sampling to

Health Canada guideline for sampling does not give true indication of lead exposure	monitor lead concentrations rather than a first draw sample.
H) Impact of Iron on Lead. Developed a fundamental understanding of the relationship between iron particles and lead	• Established that cast iron water mains interact with lead materials • Developed new analytical method for quantifying colloidal lead in water and a new procedure to evaluate iron mineral and lead interaction • Allows Halifax Water to target specific areas of the distribution for future LSL replacement programs
I) Role of Phosphate in Distribution System. Demonstrated that phosphate has a significant role in stabilizing iron particles and controlling lead release	• Halifax Water increased phosphate dose to reduce lead in water and continues to study the impact of this increase in customers' homes
J) Lead Release in Large Buildings Showed how localized lead release can be in large buildings and demonstrated long-term risks of fountains to children with researchers from École Polytechnique	• Halifax Water has developed sampling protocols for large buildings • Halifax Water was part of a national survey of lead management in Canada
K) Avoided Unintended Consequences of Disinfectant Changeover. Demonstrated that conversion from free chlorine to chloramines would lead to increased lead exposure	• Halifax Water was able to avoid negative consequences of lead exposure by avoiding a planned disinfectant changeover
L) Filter-to-Waste. Demonstrated that there was no public health benefit to implementing filter-to-waste at J.D. Kline.	• NSE accepted evaluation, which saved Halifax Water from a $5 Million capital investment. Led to changes in NSE Treatment Standard • Implemented zero cost filter resting procedures in place of filter-to-waste

In addition to these major discoveries, the IRC has published a total of 45 peer reviewed publications since 2006 that are directly related to Halifax Water operations or research questions. Of these publications, 5 have been in the Journal of the American Water Works Association, which is the most widely read journal by utilities in North America. The two figures below show the publications by year and also by topic area. Research through the IRC has generated 111 conference posters or presentations provided by IRC staff and students since 2006. Dr. Gagnon has trained 20 PhDs, 50 MASc students, 6 Post Doctoral students and numerous undergrad students. Four of these graduate students are now employed with Halifax Water, several more are working as consultants for key local firms, and a few are employed in government, at both the provincial and federal levels. Bi-annual symposia are held twice per year where research findings and current issues are transferred to Halifax Water Engineering and Water Services staff. Furthermore, treatment plant operators are trained by Dalhousie twice per year on specific relevant operational issues. This knoweldge transfer between the Chair and Halifax Water staff ensures the utility is at the forefront of water research discovery and engages and elevates staff to be able to address complex operational issues with a solid knowledge base.

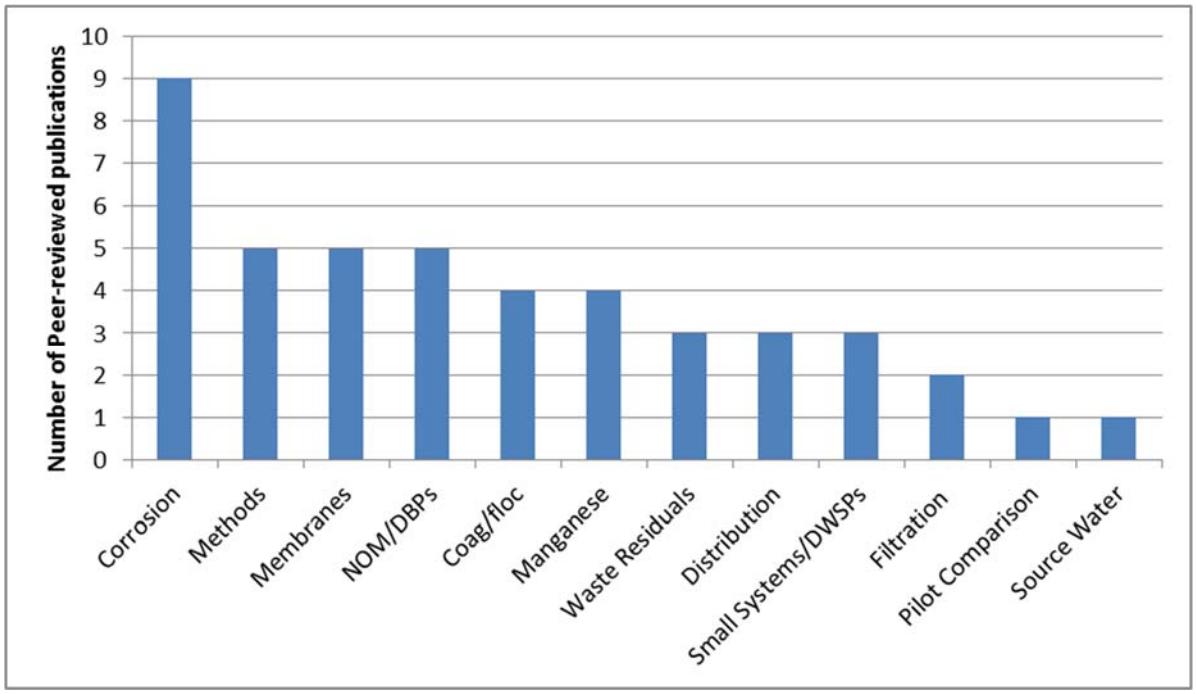


Figure 1 – Number of peer-reviewed publications by the IRC since 2006, by topic area.

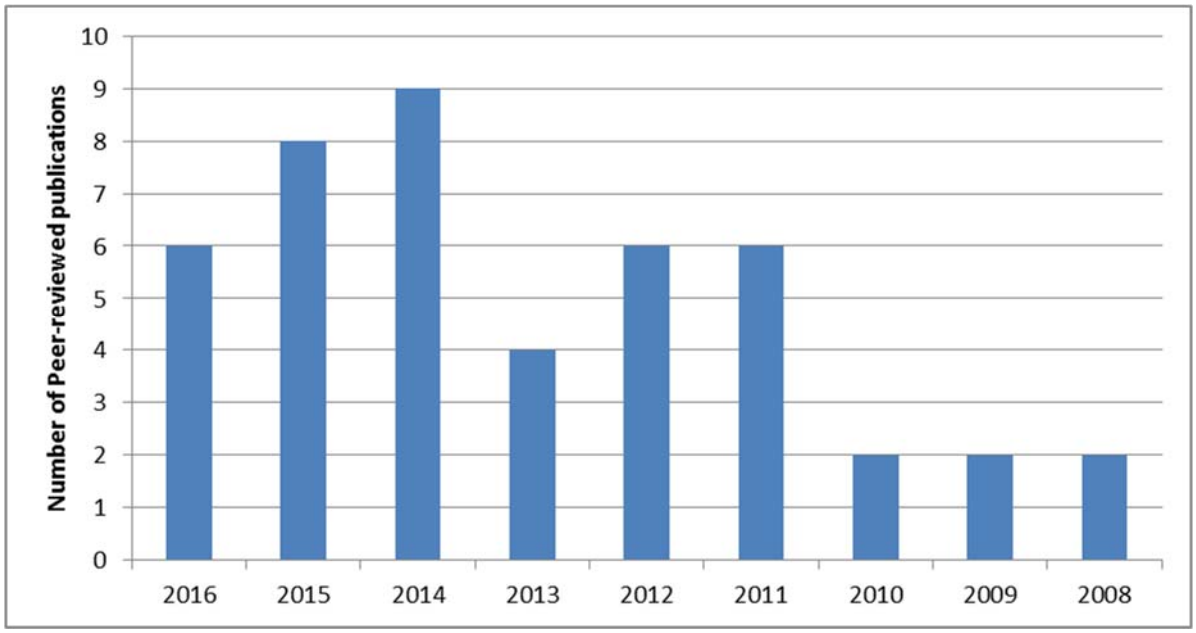


Figure 2 – Number of peer-reviewed publications by the IRC by year since 2006.

3 WQMP Direction

The overall water quality goals identified in the original WQMP remain on the priority list of Halifax Water. There are also other water quality objectives that the utility has identified as being significant to improving or strengthening water quality management and performance within the utility. Efforts will also be placed on shifting the focus of Halifax Water's strategic planning partially away from long term WQ goals and more towards what can be done to support treatment plant operations and improve water quality from a day to day perspective.

Over the course of the last five years, several water quality challenges have emerged that will challenge Halifax Water's ability to meet its water quality goals on an ongoing basis. There challenges are listed as follows:

- Changing Source Water Quality. Due to lake recovery from reductions in acid rain, and the effects of climate change, Halifax Water's primary water sources are undergoing a quality change that will challenge the capabilities of our treatment plants.
- Water Treatment. The effects of aging plants, and source water quality changes are requiring Halifax Water to look at the effectiveness of our treatment processes. There is a need to determine if the current processes are suitable for long term efforts and also to come up with short term solution to provide effective robust treatment capability while long term solutions are explored.
- Lead. Research has revealed that removing lead service lines from the system, combined with optimal corrosion control is the best way to protect customers from exposure to lead.
- Data. Halifax Water has accumulated an immense resource of water quality data. The appropriate tools and business processes need to be brought to bear to ensure that water quality is well managed and that the investments in water quality and treatment are sound.

The research and operations plan (Appendix A) is organized according to four themes aligning with these identified challenges.

3.1 Source Water: Lake Recovery and Changing Source Water Quality

Source Water quality is changing as a result of the effects of lake recovery from acid rain and possibly climate change. This is being realized through increased difficulty in operating both the JD Kline and Lake Major water supply plants. It manifests itself in increased chemical costs at Lake Major and in high head loss and shorter filter runs at JD Kline. JD Kline is now operating near the margins of its design capability. The major emphasis of this theme will include:

- Identification of Changing Source Water Quality. Existing water and air quality data will be mined and analyzed to better understand how the phenomenon affects water quality from both a biological and physical/chemical point of view. Paleolimnological work will be continued to better understand the effects of industrialization on water quality and what the natural or post recovery water quality might be.
- Lake Recovery Monitoring. The water quality response to lake recovery will be evaluated and characterized. This will include evaluation of the effects of lake recovery on algal activity and the

occurrence of taste and odour causing compounds. Existing programs to sample and monitor lakes will be evaluated to ensure that the appropriate monitoring is being undertaken. Also a program to monitor algae throughout the growing season will be developed to understand its occurrence and plan an appropriate response.

- Asssessment of Intake Structure Locations. The Lake Major Water Supply Plant optimization study identified diurnally changing source water quality as a limitation on plant performance. A new intake that draws a more consistent water quality is predicted to improve plant performance. Evaluating intake location and design at other facilities, including JD Kline, is also seen as a way to mitigate impacts of changing source water quality broadly and issues like geosmin occurrence more specifically.

3.2 Treatment

Treatment processes are being challenged due to the lake recovery phenomenon. It is necessary to develop both long term strategies and short term mitigation approaches to dealing with the effects of changing source water. Additionally, the recently completed Lake Major Water Supply Plant Optimization Study identified over one hundred plant improvements to address process deficiencies and component obsolescence. Further investigation is required to ensure that plant improvements consider other treatment factors and the changing source water. This theme will also include provision for shorter term research that is intended to assist plant operations staff with specific short term treatment challenges that may arise. Major components, listed by plant, include:

- JD. Kline Water Supply Plant. Previous research has identified deficiencies in pre-treatment and flocculation processes. Work will be conducted to further evaluate improvement opportunities and identify physical improvement projects and treatment strategies. Flocculation will be evaluated to consider whether the proposed investment in mechanical flocculation is worthwhile, or whether improved flocculation can be realized with changes to existing hydraulic flocculator operation. Filter performance will be evaluated through a formalized filter surveillance program. Further research will be conducted on passive biofiltration to see if it can be enhanced through changes to pre-oxidation strategies or nutrient addition and through a greater understanding of biofiltration processes. Further work will be conducted on coagulant optimization to improve filter headloss performance and to ensure that the plant can source coagulants that perform optimally and consistently. Further work will be conducted to optimize backwash and air scour cycles and monitoring the effects of new media, underdrains and air scour capability on treatment performance .
- Lake Major Water Supply Plant. A ten year capital program was developed as an output of the Lake Major Optimization Study. Research will be aimed at supporting and enhancing the ten year capital improvement plan and will include research to support determination of a new intake location, premix optimization, coagulant selection, clarification process optimization, possible consideration of biofiltration, manganese optimization, and all aspects of filter operation and filter performance. This theme will also support improvements in the process waste system.

- Bennery Lake Water Supply Plant. This plant is nearing the end of an optimization cycle. Remaining significant improvements include installation of plate settlers, the establishment of filter surveillance, and continued optimization of manganese optimization.

3.3 Distribution System Water Quality

Historically, within Halifax Water and the water industry as a whole, distribution system water quality has received less attention than treatment process operations and performance. Recently, there has been an increased focus on possible risk factors to public health associated with distribution systems, a good example of this is the recent attention being focused on the health risks associated with lead pipe in the distribution system and the lack of understanding of the appropriate methods to replace such materials without presenting additional health risks to people directly affected by replacement efforts. In light of the increasingly stringent regulations surrounding distribution water quality, and to remain loyal to the multi-barrier approach to water quality management, Halifax Water will direct efforts towards actively monitoring and assessing both distribution system water quality and physical integrity, and understanding the interrelationships between the two. Establishing a baseline of distribution water quality, hydraulic and integrity information will allow the utility to integrate water quality and hydraulic goals into the operation of the distribution system and focus attention on identifying and mitigating areas that are a high risk for contamination or sensitive to significant water quality fluctuations. The results of the monitoring program will be used to improve distribution system practices and implement another layer of protection to public health. The main components of this theme include:

- Lead. Based on operational experience and previous research, Halifax Water has determined that the removal of lead service lines and optimized corrosion control treatment are required to protect customers from exposure to lead. This will be realized through operationally adopting the 2015 recommendations of the National Drinking Water Advisory Council (NDWAC). The program will support this transformational initiative while continuing to grow the understanding of the occurrence of lead in our local systems in order to continue to optimize corrosion control practices.
- Distribution System Water Quality and Integrity Monitoring. Programs to monitor the integrity of distribution system water quality will be continued. This will include incorporation of the Partnership for Safe Water distribution program. Success of a recent fluoride tracer study in the Lake Major system conducted to understand water age will be translated to other systems. This will provide staff with an understanding of hydraulics and impacts on water quality throughout the distribution system. Programs to monitor biological water quality will be evaluated and operational strategies to optimize disinfection residuals will be identified and implemented. Development of water quality integrity protocols through distribution systems events will also be developed to ensure continuous safe water delivery.
- Disinfection Efficiency and Minimizing Disinfection By Product Formation. Significant work has been done in monitoring and minimizing DBP formation. However, there is further opportunity for improvement in this area, including work on chlorine age in water storage facilities and optimal chlorine dosing.

3.4 Data Management

Better tools and processes are required to use and integrate the large quantity of water quality data that exists. Enhanced data management tools will allow for better monitoring, day to day operational decisions and sound investment in process improvements. Data management tools and business processes will be explored and integrated.

4 Water Quality Goals

Water Quality Goals are based on the outcomes of previous terms of the WQMP combined with what has been achieved by other "best in class" utilities that have adopted similar programs. These goals are intended to ensure that Halifax Water not only meets current regulatory requirements, but will be well positioned to meet predicted regulatory changes and maintain water quality that well exceeds the current regulatory requirements. Though many of these goals remain the same, there are some additional goals being added to this version of the WQMP to reflect overall direction and focus of the WQMP and to set a standard for the associated research tasks. Many of these goals are a product of the utility's commitment to adapting a more proactive approach to water quality management, monitoring and optimization.

Halifax Water has developed both global and specific water quality goals. The global goals are very general and are intended to describe the overall objectives of the specific water quality goals. The specific goals clearly define measurable objectives associated with priority water quality targets identified by Halifax Water.

4.1 Overall Objectives:

4.1.1 Compliance

- Full compliance with Guidelines for Canadian Drinking Water Quality.
- Full permit compliance

4.1.2 Source Water Quality

- Proactively protect our source water quality.
- Monitor source water quality to provide early warning of potential problems.

4.1.3 Water Quality and Treatment

- Adapt a pro-active approach to water quality monitoring and operations.
- Develop indicators of pending non-compliance events.
- Provide required training to improve operator knowledge of operational, treatment and water quality objectives.
- Actively optimize treatment processes through monitoring and assessing the relationships between treatment operations and finished water quality.
- Develop facility specific water quality and operational goals.

4.1.4 Distribution System Water Quality

- Integrate water quality goals into the operation of the distribution system.
- Actively monitor and understand water quality and physical integrity in the distribution system.

- Identify distribution system contamination vulnerabilities and clearly identify communication plans, responsibilities and accountabilities.

4.1.5 Customer Expectations

- Maintain customer perception of water quality that exceeds corporate strategic objectives.
- Incorporate our understanding of customer perspectives when developing overall water quality goals.

4.2 Specific Goals:

4.2.1 Particle/Precursor Removal Goals

These goals describe HW's efforts to optimize the basic treatment process to improve particle removal, which is the fundamental pathogen barrier, while at the same time also optimizing for TOC removal.

- 2 to 3 log removal of giardia by filtration
- 3/4/4 log removal for giardia/viruses/cryptosporidium
- Individual filter turbidity values <0.1NTU: 95%, 0.3 NTU: 100%

DBP Goals: *These goals describe how HW will improve disinfection which is one of the primary barriers to protect public health, while at the same time also lowering disinfection by-products such as THM's and HAA's.*

- THM's < 80 ug/L (LRAA)
- HAA's < 60 ug/L (LRAA)

4.2.2 Distribution Water Quality Goals

These goals recognize that water quality is managed not only at the treatment plant but also to the customers tap. They also recognize that the distribution system and water quality can positively or negatively affect each other.

- Minimum distribution chlorine residual of 0.2 mg/L at all locations
- Develop and achieve distribution system HPC targets
- Maintain 90th percentile residential lead levels below 15-µg/L
- Removal of 100 public lead service lines per year
- Removal of all public and private lead service lines by 2050

4.2.3 Waste Treatment Goals

These goals recognize that plant waste processing is a significant operating cost and that waste management costs can be impacted by process changes. While secondary to public health issues, plant process improvements must also consider the impact on waste treatment.

- Optimize residual disposal costs
- Achieve wastewater permit requirements

5 Overall Strategy to Achieve Goals

Based on the research findings to date and an overview of industry best practices, Halifax Water has identified a number of tasks to be carried out to achieve the goals outlined above and to address facility specific and system wide operational and treatment challenges that have been identified since the initial WQMP was completed. Some tasks will serve to achieve multiple goals and others are focused on very specific research tasks pertaining to the optimization of a specific treatment process. These tasks take the form of several different types of activities such as the following:

- Pilot scale research studies.
- Consultant studies.
- Data collection and surveillance techniques.
- Development/evaluation of long-term monitoring programs.
- Best practice adoption.
- Operational changes.
- Training programs.

Some tasks will be completed by means of a well-defined research project over a relatively short period of time and others, specifically treatment and distribution monitoring and optimization programs, will require a significantly larger time commitment. Such programs encompass multiple planning, development and implementation stages which may include identifying and setting achievable and realistic goals, the development and implementation of monitoring programs, baseline performance assessments, operator training programs, and the development of optimization plans, to name a few.

All of the tasks have been organized into the WQMP research and operations plan (Appendix A). Justification and description of the themes in this plan were provided in section 3. As tasks are completed, process changes, some resulting in capital projects, will be identified. These modifications will be scheduled as resources and financing allow.

6 Research Plan and Execution

The overall program will be governed by a steering committee consisting of staff from Halifax Water and Dalhousie University. The steering committee will periodically review research projects and progress. The steering committee will meet quarterly to review research proposals for upcoming research and the results of previous and ongoing research. At this time, Dalhousie will present detailed research results in a seminar format to the steering committee and Halifax Water staff that are directly impacted by the particular research tasks. Technical reports will be submitted as requested for specific research tasks. Bi-annual symposia will be held to update a broader group of Halifax Water Operations and Water Services staff on relevant research.

Depending on the specific research and expertise requirements, individual research tasks will be executed either internally by Halifax Water staff or externally by the Dalhousie University research team or external consultants, as required. An outline of parties responsible for each task is provided in Appendix B.

6.1 Halifax Water Research Team

Tasks that involve the optimization of day-to-day process operations or monitoring programs will be completed internally using in-house staff and resources. The Water Quality Manager has been assigned a leadership role in the provision of high quality drinking water; specifically related to treatment, water quality and distribution operations optimization, monitoring and research. This person will play a lead role in conducting water quality research, solving water quality, treatment and distribution problems, pro-actively monitoring and improving treatment and distribution operations and methodologies, and developing, implementing and monitoring water quality plans.

The Water Quality Manager has the role of advocate for the development and implementation of water quality strategic plans and research programs. However, implementation of these programs will require cooperation and commitment of several other stakeholders within the utility structure including the general management, plant managers and operations superintendents, distribution superintendents, and all directly impacted operations staff.

As Halifax Water undertakes the transformational lead service line replacement program, a new lead team will be developed at Halifax Water to ensure that adequate resources are put towards the program to achieve goals. The team will report to the Water Quality Manager, and will consist of a Lead Program coordinator, a Data Analyst and a Water Quality Inspector specific to lead. These three staff will work with staff in a variety of other departments, including Operations, GIS, Customer Service, metering, and Water Services to implement new initiatives.

Water Quality Master Plan

V3.0

Appendix A – Research and Operating Plan

September 2016

Wendy Krkosek, Ph.D., P.Eng.
Water Quality Manager

Table of Contents

Theme 1: Source Water: Lake Recovery and Variable Source Water Quality

As a result of successful air emissions control, a number of studies have shown evidence of lake recovery from acidification, mainly in parts of Europe and the UK. The impact of recovery is healthier ecosystems as measured by changes in natural organic matter, pH and changes in biological activity and species.

In the fall of 2016, through both an analysis of basic historical data, and noticeable operational changes at both J.D. Kline and Lake Major, it became apparent that there has been a change in source water quality resulting in higher colour, TOC and pH. At J.D. Kline, the source water quality is approaching the upper limits of design for a direct filtration plant, including a TOC of 3.5 mg/L and colour of 20 TCU. At Lake Major, colour has gone from 20 to 45 TCU since commissioning of the plant, and as a result, the alum dose to remove the increased organics has gone from 15 to 50 mg/L over this time frame. These observed changes challenge earlier thinking of scientists studying the recovery from acidification in Atlantic Canada but are consistent with the observations of drinking water operators in the UK and Scandinavia. The Atlantic Canadian studies were published in 2007 and 2011, and many of the changes described have occurred within the past five years, so it is possible that water quality has recently hit a threshold that has allowed for recovery.

Very recent changes to sulphur emissions from marine fuels and continuing conversion of coal plants to natural gas in the Northeastern United States will continue to result in lower sulphur deposition, thus it can be expected that source waters will continue to change, which is expected to produce more challenges for Halifax Water treatment plants.

A large component of the research activities associated with this Water Quality Master Plan involve issues related to lake recovery, including:

- Identifying changes to source water quality,
- Developing appropriate monitoring strategies for changing source water quality,
- Developing operational tools to assist with plant operations in the short term, and
- Developing long term capital plans for robust design or retrofit of existing treatment plants to deal with a moving target of source water quality.

Task 1.1 Identification of Changing Source Water Quality

The major objective of this task is to develop an understanding of possible lake recovery and changing source water quality in Halifax Water's source waters after years of acidification caused by sulphur deposition, and to understand how this phenomenon impacts water chemistry from a drinking water quality standpoint. This research activity will:

- Mine currently available source water and air quality data to understand changing water quality both biologically and chemical/physical including changes to organic matter, pH, sulphate, nutrients, and biological species and richness.
- Expand and update currently available paleolimnological sediment analyses to include key source waters to estimate pre-industrial lake chemistry, and response of lakes to changes in land management practices.

- Determine which source waters and tributaries are susceptible to experiencing algal blooms in the future, and where these blooms may occur.

Task 1.2 Lake Recovery Monitoring

The overall research objective of this task is to identify responses to lake recovery in source water through a comprehensive monitoring program. Building on data mining and related activity conducted in Task 1.1, this research activity will look for changes in water chemistry and biology in response to trends found in task 1.1. Specifically, the objectives are to:

1. Evaluate the effect of lake recovery on algal activity, including algal organic matter (AOM) and the occurrence of commonly affiliated taste and odour compounds, including determination of which source water and tributaries are susceptible to experiencing algal blooms in the future, and potential management options to reduce bloom occurrence.
2. Monitor for trends in organic matter concentration and characterization in response to lake recovery.
3. Review existing watershed and deep lake sampling programs to ensure that parameters of interest are being collected with an appropriate frequency at appropriate locations.
4. Additionally, a program to monitor presence and composition of algae throughout the growing season will be developed for Pockwock, Major and Bennery, to understand areas that are vulnerable to blue/green algae, taste and odour presence and potential algal toxins.

Task 1.3 Assessment of Intake Locations and Structures

Optimizing the location of the intake structures and depth of intakes have been discussed for Lake Major, Bennery Lake, Pockwock Lake and The Shubenacadie River for Bomont. Pockwock and Lake Major both have fixed depth intakes that are susceptible to large daily fluctuations in water temperature which can pose downstream treatment challenges, and the intake at Bennery is susceptible to seasonal fluctuations in manganese concentrations.

1.3.1 Lake Major Intake Structure

The current intake for LMWSP is susceptible to significant diurnal temperature changes that pose operational challenges downstream, particularly with the sludge blanket in the UltraPulsators. A new-multi-level intake would allow for control of incoming water quality, thus reducing the operational burden downstream. In order to determine a suitable location, a research program will be initiated that involves monthly sampling year round at different depths at several locations within 200 m of the existing intake to identify an optimum location for a future intake. A bathymetric map will be developed to help in assessment of future intake locations. While conducting the bathymetric assessment, temperature profiling will also be conducted to provide an indication of areas of upwelling which could also provide a more consistent water quality.

A detailed raw water quality investigation of the existing raw water source will be used to understand water quality in terms of NOM, algal activity, and AOM in Lake Major, and to determine whether specific fractions of NOM are more pronounced compared to previous studies. Initially, this research will utilize conventional online water quality measurements in addition to novel online NOM characterization tools

in order to understand the potential changes in NOM composition. Grab samples will be collected from the raw water intake in order to confirm measurements from online instruments. A new at-line system to measure photoelectrochemical oxygen has been installed at Lake Major as part of this initiative.

If the existing transmission main will be used with the new intake, an evaluation of the manganese coating should be undertaken to ensure no negative impacts on raw water quality will occur with a change in intake location.

1.3.2 Pockwock Lake Intake Structure

For Pockwock, there is some discussion as to the impact of the berm location and structure on influent water quality, particularly because high geosmin concentrations are often found at the boat launch nect to the berm. A research program will utilize paleolimnological assessment to evaluate the impact of construction of the berm on organic loading in the intake area. Further characterization of geosmin in the area will also be done to provide indication of its impact on raw water quality and whether there are control measures that could mitigate the situation. A bathymetric map will be developed to help in assessment of future intake locations. While conducting the bathymetric assessment, temperature profiling will also be conducted to provide an indication of areas of upwelling which could also provide a more consistent water quality.

1.3.3 Bennery Lake Intake Structure

At Bennery Lake, the stratification in the summer creates an anoxic zone in the hypolimnion which leads to increases in dissolved manganese at the depth of the current drinking water intake. Concentrations increase significantly which poses downstream treatment challenges. There are two potential solutions to this seasonal problem. The first is to install a hypolimnic aeration system to prevent the formation of dissolved manganese at the intake, or to install a multi-level intake, which would allow plant staff to change the intake level to eliminate the elevated manganese levels in raw water and focus on plant removal of TOC. The current plan is to collect background information (bathymetry) and develop a design for an aeration system to submit to Nova Scotia Environment for approval.

Upon installation of the aeration system, a rigorous raw water monitoring program will be developed for 1-2 years to provide baseline water quality data to aid plant staff in understanding seasonal treatment requirements.

1.3.4 Bomont Community Water Supply Plant

Following precipitation events, there is runoff from neighbouring fields which increases turbidity in the Shubenacadie River, resulting in deteriorated water quality, which forces shutdown of the plant. While the plant is offline, water is trucked into the facility, increasing the cost of providing drinking water to customers. The possibility of installing riverbank filtration will be explored as a way to mitigate the fluctuations in raw water quality, thus eliminating the need for plant shutdown and expense of trucked water.

Theme 2: Treatment

Task 2.1 Roadmap for Robust Treatment Plant Design for a Changing Source Water Quality

Historically, treatment plants have been designed for a specific and narrow range of source water quality, leading to specific unit processes, often with limitations, such as those posed by direct filtration at J.D. Kline. The challenges with treating a moving target of source water quality due to lake recovery, combined with the occurrence of more extreme weather events due to climate change, is leading to a paradigm shift in treatment plant design. The need for more robust and adaptable unit processes for a wider range of water qualities is becoming increasing important for water utilities. Halifax Water has undertaken a consultant study to look at unit treatment processes for the removal of geosmin, but in looking at geosmin occurrence through the larger lens of lake recovery and changing source water quality, it has become clear that a more holistic approach to design is necessary.

To address this larger design question, Halifax Water will pursue a Tailored Collaboration project with the Water Research Foundation to bring together leading consultants and utilities in North America to develop a roadmap for robust water treatment plant design in a climate of changing source water quality. The outcome of this project will provide a path forward specifically for the J.D. Kline Water Supply Plant, but will also provide value for future considerations at all other Halifax Water surface water treatment plants.

Task 2.2 J.D. Kline Water Supply Plant

The following section describes shorter term operational tasks for optimizing existing treatment strategies to manage changing source water quality as water quality reaches the threshold for direct filtration design parameters, while longer term measures for capital improvements to treatment plant design are explored through the Tailored Collaboration in Task 2.1.

2.2.1 Improvement of pre-mix and pre-oxidation processes

With an increased TOC load in the raw water and potential changes to iron and manganese cycling, it is possible that a different pre-oxidation step (either higher permanganate dose or alternative oxidant) could provide manganese oxidation as well as provide some pre-oxidation of organics so that organics are in a more assimilable form for biofiltration.

A study conducted in 2016 identified several locations within the pre-mix that could be optimized in terms of chemical addition points, and mixing speeds. Specifically, experiments will be conducted in modified jar tests and at pilot scale to evaluate point of application of polymer to optimize floc formation. Evaluation of the premix process will be conducted to determine whether the point of CO_2 addition can be moved towards the head of the plant and away from concurrent addition with Alum to increase coagulant performance.

2.2.2 Flocculation optimization

Previous research by the Dalhousie Industrial Research Chair has shown that the conversion to mechanical mixers would provide significant benefit to the existing hydraulic mixing process. However,

this comes at an increased capital cost. Another alternative is to only run 2 of 4 floc trains at one time. As the plant is running under 50% capacity at this time, it is conceivable that running all four 4 floc trains does not provide adequate velocity for collisions and mixing and that speeding the water up by taking two trains offline might enhance mixing and eliminate the need for an increased alum dose and subsequent aluminum breakthrough.

2.2.3 Improved filter performance

2.2.3.1 Filter Surveillance

The objective of this task is to Implement a filter surveillance program to monitor existing filter performance and backwash routines, and to help identify deficiencies or opportunities for optimization. Samples will be analyzed for typical filter surveillance target parameters (i.e., turbidity and aluminum). However, the investigation will also include measurement of other inorganic and organic potential foulants by performing acid digestion and scans for additional metals (i.e., iron and manganese) and measuring NOM surrogates (i.e., TOC, DOC, PeCOD, UV_{254}, FEEM). Analysis of different FEEM regions will provide an indication of the relative fulvic, humic and protein content of NOM. To understand the fouling contribution of biological material, biomass will be quantified using ATP and cell counting, and extracellular polymeric substances (EPS) will be quantified as glucose and as proteins.

Implementation of a filter surveillance program would involve development of a filter surveillance team and data collection templates and procedures so that data is accessible and can be compiled and used by plant and water quality staff.

2.2.3.2 Biofiltration optimization

Currently the filters at J.D. Kline are running as passive biofilters as there are no chemical or nutrient enhancements to the process. Research using the pilot plant can provide insight on whether addition of pre-oxidants and/or nutrients could provide enhanced organics removal through biofiltration processes. Additionally, monitoring tools and operational controls to measure biofilter performance and health need to be developed and added to operational monitoring programs.

Extracellular polymeric substances (EPS) can contribute to headloss in biofilters. The direct biofiltration process at the JD Kline WTP does not incorporate sedimentation prior to filtration. The purpose of this investigation will be to understand the interaction between floc material and biomass and determine the extent to which alum floc competes with biomass for space in the filter bed and if alum toxicity limits biomass concentration (as measured by ATP), potentially reducing the capability of the filter to perform biodegradation of substrate, or impacts the formation of EPS, potentially contributing to filter clogging.

2.2.3.3 Coagulant optimization

Research conducted by Knowles in 2011 showed that coagulation with alum as currently practiced provided the longest filter run times combined with minimal downstream unintended consequences. With the change in source water quality, these studies should be revisited. Additionally, the chemical supplier recently changed the supplier and process for alum production from bauxite to trihydrate, which has had an impact on plant performance. Bauxite is being phased out as a type of alum and thus

it is important to determine an appropriate coagulant for the new source water quality which maximizes filter run times while minimizing downstream unintended consequences.

Research at the pilot scale will be conducted to determine whether increasing alum doses or using alternative coagulants can overcome increasing NOM concentrations, while given the constraints of current treatment process design (i.e. particle loads for direct filtration, downstream water quality impacts).

2.2.3.4 Backwash optimization

Following conversion of the JD Kline WTP filters to biofilters, operational strategies (e.g., backwash, loading rate) have remained fundamentally unchanged. Results following the conversion showed that the biofilters could be operated in the same manner as before and still meet effluent turbidity requirements and previous benchmarks for initial and terminal headloss, loading rate and unit filter run volume. However, recent filter surveillance shows that there is significant material remaining in the lower third of the biofilters, post backwash. Adjustments to the backwash protocol, loading rate and empty bed contact time could potentially optimize this process and increase biofiltration hydraulic performance.

2.2.3.5 Filter media replacement and addition of air scour

The existing filter media is original to the plant and recent filter assessment by consultants has indicated that both filter media and underdrains require replacement. A capital project is underway to replace both filter media and underdrains in all filters, with a completion date of March 2018. Air scour equipment will be installed at the same time to provide enhanced backwash performance. The filter media design has been altered slightly (slightly larger effective size) to be more compatible with biofiltration processes. New backwash routines for air scour will be developed post installation, and filter health will be monitored using filter surveillance techniques.

Task 2.3 Lake Major Water Supply Plant (LMWSP)

In 2015/16 a Lake Major Water Supply Plant Process Optimization Study was completed by CBCL Limited and HDR Engineering Inc. The report provides an implementation strategy based on recommendations, and research requirements. Halifax Water staff have developed a 10 year Capital Improvement Plan based on this report, which includes both capital upgrades and research requirements. The research requirements over the next five years are highlighted in the following sections.

As described in Theme 1, Lake Major has seen recent changes in source water quality which have resulted in increases in chemical dosage to remove increased organic loads. The LMWSP has been able to adapt to an increased alum dosage of approximately 50 mg/L due to the presence of upflow clarifiers prior to filtration, however the plant is experiencing challenges with coagulant performance, disinfection byproducts and residuals handling. The research and operational tasks presented below detail improvements that can be made to existing operations with enhanced monitoring of process change outcomes and bench-scale testing. The longer term research plan, beyond the scope of this 5 year WQMP, would be to install and operate a pilot plant at Lake Major to further optimize treatment processes once initial improvements have been made.

2.3.1 Premix optimization

There is a need for optimization of pre-mix chemical types and injection location as well as mixing speeds. The impact of increasing mixing intensity will be evaluated as the current mixing speed is below that of rapid mix but above a floc mixing intensity. The current lime system is in need of an overhaul, and prior to this occurring, investigation of the use of soda ash instead of lime for pH/alkalinity control should be explored in more detail at the bench scale.

2.3.2 Coagulant changeover

LMWSP has experienced the same challenges as J.D. Kline with respect to the type of alum used (bauxite versus trihydrate). With the current increased cost of bauxite and eventual discontinuation of the product, it is prudent to perform coagulant changeover studies to develop a suitable process moving forward. This research task will incorporate bench-scale jar testing to evaluate different coagulant types. However, due to the plant configuration as upflow clarification, jar tests can provide good initial insight, but results may not be representative of full-scale operation. Therefore, a way to simulate upflow clarification at the bench scale will be explored to provide more replicable data for comparison to full-scale operation. Further pilot scale testing would then be conducted upon installation of a pilot plant, beyond year 2022. In addition to evaluating filter performance and organics removal with alternative coagulants, impacts on corrosion downstream need to be evaluated to ensure that changing the chloride:sulphate mass ratio does not lead to increased corrosion in the distribution system.

2.3.3 Clarification

The UltraPulsator technology is not seen as ideal for the application of clarification at LMWSP. The current tubes and plates are in need of replacement so a capital inspection and replacement project will be initiated. With installation of a new intake with consistent daily temperatures and water quality, improvements in pre-mix chemistry and injection, optimization of coagulants and replacement of tubes and plates within the UltraPulsators, it is possible that improvements in operation and finished water quality will provide an extended life for the existing units. Enhanced water quality monitoring post tube and plate replacement will be conducted to help with optimizing performance.

2.3.4 Manganese oxidation

LMWSP was originally designed to use potassium permanganate for manganese oxidation. Shortly after plant commissioning, potassium permanganate was shutoff and manganese was oxidized with pre-filtration chlorination. This has allowed the filter media to become coated with manganese dioxide over time which acts as a catalyst for manganese oxidation. Although effective for oxidizing manganese, pre-filter chlorination can lead to increased disinfection byproduct formation through reactions between remaining organics and chlorine prior to filtration. With the anticipation of replacement of filter media, it is a good time to remove the pre-filter chlorination step and provide manganese oxidation at the head of the plant. The filter media has been operating with pre-chlorination for so long that it is likely that manganese from the filter media could leach into finished water if the pre-chlorine is turned off while existing media is still in place. Different manganese oxidation strategies will be tested to determine a suitable process moving forward for post filter media replacement.

2.3.5 Improved filter performance

2.3.5.1 Filter Surveillance

LMWSP has implemented a filter surveillance program to monitor existing filter performance and backwash routines, and to help identify deficiencies or opportunities for optimization. As mentioned for J.D. Kline, a team and consistent data collection procedures and templates will be developed so that data is accessible and can be compiled and used by plant and water quality staff. In addition to the regular filter surveillance program, additional parameters may be measured periodically to provide a more detailed picture of filter performance. This will be important once new filter media is installed and pre-chlorine is shut off to monitor the conversion to passive biofiltration. In order to monitor the performance of the biofilters, the investigation will also include measurement of other inorganic and organic potential foulants by performing acid digestion and scans for additional metals (i.e., iron and manganese) and measuring NOM surrogates (i.e., TOC, DOC, PeCOD, UV_{254}, FEEM). Analysis of different FEEM regions will provide an indication of the relative fulvic, humic and protein content of NOM. To understand the fouling contribution of biological material, biomass will be quantified using ATP and cell counting, and EPS will be quantified as glucose and as proteins.

2.3.5.1 Filter media replacement

Filter excavation box tests indicate that there is poor stratification of filter media, and that garnet layers are mismatched with sand and anthracite. Additionally, as previously described, there is a likelihood that manganese dioxide has built up on the media due to pre-filter chlorination. Further sieve analysis and characterization of organics and metals through filter surveillance will be conducted to determine whether media should be replaced, or whether washing media to remove manganese dioxide could be adequate to restore filter integrity. Following a conversion in manganese oxidation strategy and media wash or replacement, the filters will then begin to operate as passive biofilters like those at Pockwock. Monitoring of performance and establishment of biofilm will be conducted through filter surveillance.

2.3.5.2 Backwash optimization

Existing filter surveillance data suggests that media particularly between 18-24 inches is not being sufficiently cleaned, and thus optimizing backwash rates and times to achieve enhanced particle removal would be beneficial. Extended subfluidization terminal wash (ETSW) procedures could also be investigated to determine whether ETSW would reduce filter ripening times. Additionally, upon conversion to passive biofiltration, buildup of EPS and biofilm could lead to changes in filter operation and performance as well as a requirement for different backwash procedures.

2.3.6 Waste residuals management study

The current waste residuals process does not meet the water quality discharge guidelines for aluminum. There are two options moving forward to address this issue. The existing residuals management process could be modified in order to meet the existing water quality discharge guidelines and maximize treatment efficiency, reliability and capacity. Alternatively, the residuals could be discharged to a new sanitary sewer without treatment. Both of these options will be explored in detail from a cost/benefit perspective.

Task 2.4 Bennery Lake Water Supply Plant (BLWSP)

2.4.1 Installation of plate settlers

The sedimentation basins were originally designed to contain plate settlers, but the plates were never installed. The basins currently operate under a high overflow rate and particles are travelling through the sedimentation basin and being deposited in the filters, compromising filter integrity. Plate settlers will be installed in 2016-2017. Upon installation, detailed water quality investigations throughout the treatment train will be conducted to help with process optimization. Installation of the plate settlers will likely improve filter turbidity and runtime and will also require optimization of the backwash process with the new water quality reaching the filters.

2.4.2 Filter Surveillance

The 2013 optimization study completed by Stantec suggests that the media should be evaluated due to its age. Similar to JD Kline, and LMWSP, BLWSP will implement a filter surveillance program to monitor filter performance, health and backwash routines, and to help identify deficiencies or opportunities for optimization, as well as to determine whether media needs to be replaced. The same suite of biotic and abiotic parameters will be evaluated as part of filter surveillance to provide the same breadth of analysis as mentioned for J.D. Kline and LMWSP.

Theme 3: Distribution System Water Quality

Task 3.1 Lead – Implementing NDWAC Recommendations

In 2015, the USEPA convened the National Drinking Water Advisory Council (NDWAC) to advise the USEPA on how to change the way lead in drinking water is regulated. The NDWAC recommended to the USEPA that the only truly effective solution is for utilities to commit to replacing all lead service lines (public and private) by 2050. To accomplish this, utilities must: develop an accurate inventory of lead service lines, reach out to customers who have lead service lines, work with customers to find a way for them to replace the private portion, and do much more sampling for customers. The NDWAC recommendations were endorsed by the American Water Works Association in March 2016.

Halifax Water has an estimated 2500 public lead service lines, most of which are in Halifax. The number of private lead service lines is unknown but expected to be much higher. Developing strategies for both public and private renewals is a major culture shift, as historically utilities have not taken responsibility for private lead service lines from an ownership, or inventory perspective.

Halifax Water's new approach to manage its customer's exposure to lead is designed to be consistent with the NDWAC recommendations, to the degree they can be applied in Canada and do not conflict with local regulatory requirements. The following five sections describe the research and operational approach that will be taken to address each of the main NDWAC themes:

1. Development of an inventory of lead service lines – both public and private
2. Development of a LSL replacement strategy to meet complete LSL removal by 2050
3. Enhanced public outreach on risks, shared responsibility, results, programs

4. Enhanced customer based sampling, using a variety of types of sampling, chosen from a menu to reflect certain uses. All customer sampling will be used to develop a 3-year continuous 90th percentile that must be below a specified system action level.
5. Enhanced water quality parameter monitoring and evaluation of corrosion control treatment.

3.1.1 Lead Service Line Inventory

The NDWAC recommendations require that utilities inventory the amount and location of LSL's and further take the approach that in areas developed before the cessation of LSL's that the service should be assumed to be made of lead unless proven otherwise. This makes development of an inventory complex but is crucial to other programs and ensuring all of the lead service lines are removed by the target date.

For public services, the existing inventory is fairly reliable but is still populated with a number of "unknown" services. The private inventory is much less reliable. This is due to the fact that there is no positive mechanism that requires a customer to contact us upon renewal of a service but also due to the fact that the pre-existing utilities exercised varying and inconsistent levels of attention to the private service lateral database.

As a first step, areas of the distribution system that would have been serviced by a central water system and potentially had lead service lines installed prior to 1960 has been developed. This is a baseline map that can be used to narrow down the presence of lead on a house by house basis. Some techniques that will be used to update the inventory include:

- Analysis of existing records for anything that contains lead or unknown on the public or private portion of the service lines.
- When new meters are being installed as part of the Advanced Metering Infrastructure (AMI) program, all staff that will be in homes will be trained to identify lead service lines, and will report information back to be included in service cards.
- Gathering and recording information anytime there is work done on a sewer line or a service box in the area with potential lead service lines.
- Participation in industry research to explore and test methodologies for non-intrusive identification of LSL material.
- Conducting a pilot trial for successful identification using more invasive techniques (i.e. hydro-vac excavation at the service box) to determine composition of both public and private portions.

3.1.2 Lead service line replacement strategy

HW will develop a strategy for replacing all public and private lead service lines by 2050. The current rate of 20-30- replacements per year will need to be tripled to about 100 per year in order to replace all of the public portions of the lead service line within this timeframe. The number of private renewals requiring replacement per year is expected to be much higher as there are significantly more private than public lead service lines.

Up until 2012, Halifax Water proactively replaced lead service lines in the distribution system in conjunction with municipal street-paving and sidewalk renewal projects, water main replacement

projects and other distribution system infrastructure upgrades. In light of recent national and internal research initiatives, including research with Dalhousie University, which demonstrate the increase in lead concentrations at the tap following partial service line replacements, Halifax Water has changed its policy regarding service line replacements to minimize the occurrence of partial lead service lines in the distribution system. This practice is expected to continue even with the increased replacement goals. Following are some strategies that will be used to increase the number of lead service lines replaced each year, while continuing to avoid partial replacements to protect public health.

- Halifax Water will explore options with the UARB to allow access to private property to replace the full service line during emergency events when Halifax Water replaces the public portion due to a leak or work on the main.
- Halifax Water will develop a business case to present to UARB that will identify potential cost savings of doing full LSL replacement (private and public) in coordination with HRM paving and sidewalk renewal projects. Cost savings on the public portion would include only one mobilization for multiple services, and a significant reduction in reinstatement costs as this would be covered by the HRM paving project. Being able to coordinate with HRM paving projects would allow for a significant increase in the numbers of renewals per year.
- Halifax Water will continue to provide a program where there is a standing contract with several contractors to replace the public portion of the service line in conjunction with the private portion. This program was initiated in 2016, and provides the option to minimize any potential time with a partial replacement between coordination of the private and public renewals, and also streamlines the process for customers.
- Following any disturbance or replacement of a lead service line, home owners will be provided with instructions for appropriate flushing procedures to carry out immediately following disturbance and protocols to follow to minimize lead exposure for a defined period of time following a LSL replacement. Homeowners will also be provided with a pitcher style water filter and cartridges for one year following disturbance. Different pitcher style filters will be tested for removal of high concentrations of lead post-disturbance to ensure filters provided are adequate for the conditions expected.
- A significant barrier to private uptake of lead service line replacement is expected to be financial challenges. HW will develop a financial enabling program for residents to pay for private LSL replacement. HW will work to ensure that financial enabling strategies are accessible to all customers, to ensure that all demographics have access and ability to replace lead service lines. It is expected that challenges will exist with low-income households, long-time homeowners and also rental units.

3.1.3 Communications

Communications and outreach will be critical components to the success of the lead service line replacement program. Customers must have access to transparent, easy to understand information on the risks associated with lead, and programs available to help with getting lead out of the system. Contact with customers will need to occur through the website, through mail-outs and targeted campaigns in areas that may have lead service lines and vulnerable populations. Significant efforts will be placed on meeting with realtor groups, building inspectors and plumbers to disseminate information

about lead service lines. A real estate transaction is a great opportunity to renew service lines. As such, customer service staff will flag any new customers in the lead hot spot areas so that appropriate information can be mailed out to them when they open an account.

A research program will be initiated to determine effective means of customer communications, so that programs put into place will be an effective use of resources and will provide positive outcomes for private side LSL replacement.

3.1.4 Corrosion Control Treatment

Halifax Water maintains an effective corrosion control program to minimize the corrosion of lead and other materials in the distribution system by controlling pH and using zinc ortho-phosphate for corrosion control.

Recent changes have been made to the corrosion control product and the dose. In 2015, poly phosphate was removed from the product due to research showing it can negatively impact lead release, and in April 2016, the dose was doubled from 0.5 to 1.0 mg/L as PO_4 for both J.D. Kline and Lake Major based on recommendations from consultant reviews of Halifax Water's programs, and research conducted by Dalhousie that shows a decrease in lead concentrations after an increased dose of orthophosphate.

There is a need to further understand the influence of general water chemistry, presence of other metals (i.e. iron, manganese and aluminum) and seasonality on lead release. Research is also required to understand lead phosphate deposition rates following adjustment of orthophosphate dose or changes to source chemicals (i.e. zinc orthophosphate, orthophosphate and phosphoric acid to optimize corrosion control), while balancing costs, minimizing lead release and minimizing unintended consequences.

3.1.5 Water Quality Monitoring

Currently, the effectiveness of the corrosion inhibitor is monitored by Water Quality Inspectors through:

- biweekly distribution system sampling at 25 sites for pH, orthophosphate, zinc, iron, manganese, alkalinity, chloride, sulphate, aluminum and turbidity
- quarterly monitoring of metal coupons (copper, lead and steel placed at 10 locations in the distribution system; and
- bench and pilot scale research conducted in coordination with Dalhousie University,

Additionally, samples are taken from residential homes through three different programs:

- Annual Health Canada lead and copper residential program
  - 100 homes, half lead and half copper, 4 L profile and a flush sample, in August
- Customer initiated sampling
  - Year-round, 4 L profile and a flush sample, any time of year
- LSL replacement sampling program
  - Pre and 72 hrs, 1 month, 3 months and 6 months post construction samples, 4 L profile and flush sample.

Although this is a robust monitoring program, there is room for improvement through evaluation of the program. There is some question as to the value of the coupon monitoring, which will be explored. Additionally, the corrosion sampling sites should be reviewed to ensure their representation of the system. Finally, customer sampling is the only way to provide an indication of lead concentrations in homes, however it relies on the customer to take the sample, which can lead to sample integrity issues. Furthermore it is difficult to compare data from year to year because customers often opt to replace their service line once they find out their lead concentrations. To provide a more robust and stable way to monitor lead concentrations at the tap, Halifax Water will install permanent lead pipe racks in at least 4 places in the distribution system (one in Dartmouth and three in Halifax) to mimic lead levels at the tap. These pipe racks would be similar to those used by Dalhousie University at J.D. Kline previously but would be located in Halifax Water infrastructure in the distribution system to be more representative of at the tap concentrations. This would allow for routine lead sampling to monitor corrosion control, and would also allow for exploration of different stagnation time sample regimes. Pipe racks would also allow monitoring of changes to corrosion control chemistry and impacts from seasonal variations in water quality, including metals, temperature, etc.

Task 3.2 Distribution System Water Quality and Integrity Monitoring

Halifax Water has a comprehensive program to actively monitor and assess both distribution system water quality and physical integrity, through programs such as HPC monitoring, reservoir water quality monitoring, and corrosion monitoring. Data is currently compiled into technical memos and distributed to appropriate staff for review. The monitoring programs are constantly being reviewed for relevance and completeness and this should continue, to ensure that there is appropriate data collection but also interpretation to help understand and predict water quality in the distribution system. One example would be the use of ATP to monitor biological growth in correlation with HPCs. ATP is a rapid test that can be done within minutes versus 7 days for an HPC test. Therefore, understanding the correlation between ATP and HPCs would be very useful for monitoring biological health when low chlorine residuals are present in the warmer months. ATP data collection has started, but should continue to develop a database that provides relationships between ATP and other water quality parameters in the distribution system.

A fluoride tracer study for LMWSP distribution system showed that water age depends on a number of factors including distance from the plant, time of day and reservoir operation. A fluoride tracer study will be repeated on targeted areas within the LMWSP to determine whether there are operational changes that can be made (operation of valves) to decrease water age to some regions of the distribution system. A fluoride tracer study will also be completed for the JDKWSP to provide an overview of water age within the distribution system. Having an indication of water age, particularly at extents of the system and around reservoirs provides valuable information and insight for optimizing water quality, maintaining chlorine residuals and minimizing DBP formation.

As part of the Partnership for Safe Water program, conducting a review of existing chlorine residual monitoring sites and ensuring that sites are representative of the distribution system, including extents, is an important part of understanding distribution system integrity. The fluoride tracer studies will also provide valuable information for assessing the relevance of existing monitoring locations.

Task 3.3 Disinfection efficiency and minimizing disinfection byproduct formation

Although significant work has been done on minimizing distribution system disinfection byproducts both through treatment process changes (removal of pre-chlorine at JDKWSP) and installation of chlorine booster stations on reservoir outflows (North Preston), there is still work that can be done to both reduce DBP formation and also manage reservoir operation to ensure adequate chlorine residuals in all extents of the distribution system, throughout all seasons. Targeted chlorine investigations and review of reservoir monitoring data will provide insight on changes to reservoir operation processes such as installing rechlorination stations, changes in reservoir cycling (volume and timing), installation of mixers, or point of use treatment for removal of disinfection by products that can be implemented to increase disinfection efficiency while minimizing DBP formation.

Theme 4: Theme 4: Data Management

Task 4.1 Adoption of a Data Management Tool

Water Quality Data collected by Halifax Water staff currently gets stored in several different places. Some is entered into WaterTrax, some exists in Pi, and some is stored in spreadsheets at various locations on the K Drive. There is no central place to store, extract and analyze data. Similarly, all water quality data generated by consultants, IRC students and staff is generally contained within reports, student theses, and on personal computers. As this dataset grows, it is becoming clear that there needs to be a mechanism to manage and store all of these data sources, so that data is not lost and both staff and students have access to historical data. This is also becoming increasingly important in the context of Lake Recovery and changing source water quality.

This task will aim to identify, compare, select and integrate a data management approach for water quality data. There exist commercial solutions, provided by companies such as Kisters, EarthFX, Locus Technologies, Aquatic Informatics, Etc. that provide geocoded solutions to water quality data management and analysis. Other options could include development of a Laboratory Information Management System (LIMS), or design of a custom solution. This data management tool will be used to pull all data sources into one central system.

The primary objective of this exercise is to ensure that the valuable resource of water quality data is utilized both as an operational tool to make sound day to day operating decisions and also to ensure that sound investment decisions are made when considering capital improvements to treatment plants and other water quality investments.

Appendix B - Research and Operations Approach

Theme and Task	Halifax Water Role	Dalhousie Role	Comments
Theme 1: Source Water: Lake Recovery and Variable Source Water Quality			
Task 1.1: Identification of Changing Source Water Quality	Sampling	Research lead	
Task 1.2: Lake Recovery Monitoring	Program Evaluation	Research lead	
Task 1.3: Assessment of Intake Locations and Structures			
Task 1.3.1: Lake Major	Bathymetry	Research lead	
Task 1.3.2: Pockwock Lake	Bathymetry	Research lead	Paleolimnological studies
Task 1.3.3: Bennery Lake	Bathymetry and equipment installation	Research lead	HW and Dal to develop raw water monitoring program
Task 1.3.4: Bomont	Lead investigation		
Theme 2: Treatment			
Task 2.1: Roadmap for Robust Treatment Plant Design for a Changing Source Water Quality	Lead tailored collaboration through WRF	Act as in-kind partner	
Task 2.2: J.D. Kline Water Supply Plant			
Task 2.2.1: Improvement of pre-mix and pre-oxidation processes	Capital improvements	Pilot research lead	
Task 2.2.2: Flocculation Optimization	Implement process changes	Monitoring lead	
Task 2.2.3: Improved Filter Performance			
Task 2.2.3.1: Filter Surveillance	Develop and lead Filter Surveillance Team	Lead filter WQ analysis	
Task 2.2.3.2: Biofiltration Optimization		Lead pilot research	
Task 2.2.3.3: Coagulant Optimization		Lead pilot research	
Task 2.2.3.4: Backwash Optimization	Full-scale testing	Lead pilot research	
Task 2.2.3.5: Filter media replacement and addition of air scour	Capital improvements and filter surveillance	Lead filter WQ analysis	
Task 2.3: Lake Major Water Supply Plant			
Task 2.3.1: Premix Optimization	Capital improvements	Lead bench-scale testing	Bench-scale testing for pH/alkalinity control
Task 2.3.2: Coagulant Changeover		Research Lead	
Task 2.3.3: Clarification	Capital improvements and optimization	Monitoring lead	
Task 2.3.4: Manganese Oxidation		Research Lead	
Task 2.3.5: Improved Filter Performance			
Task 2.3.5.1: Filter Surveillance	Develop and lead Filter Surveillance Team	Lead filter WQ analysis	
Task 2.3.5.2: Filter Media Replacement	Capital improvements	Lead filter WQ analysis	
Task 2.3.5.3: Backwash Optimization	Make process changes	Lead filter WQ analysis	
Task 2.3.6: Waste Residuals Management Study	Lead study		Will utilize previous Dal research
Task 2.4: Bennery Lake Water Supply Plant			
Task. 2.4.1: Installation of Plate Settlers	Capital improvements and optimization		
Task 2.4.2: Filter Surveillance	Develop and lead Filter Surveillance Team	Lead filter WQ analysis	
Theme 3: Distribution System Water Quality			
Task 3.1: Lead - Implementing NDWAC Recommendations			
Task 3.1.1: Lead Service Line Inventory	Initiate and manage program, participate in WRF projects		
Task 3.1.2: Lead Service Line Replacement Strategy	Initiate and manage program	Provide technical guidance	
Task 3.1.3: Communications and Outreach	Initiate and manage program	Lead research on customer buy-in	
Task 3.1.4: Corrosion Control Treatment		Research lead	
Task 3.1.5: Water Quality Monitoring	Evaluate and update program		
Task 3.2: Distribution System Water Quality and Integrity Monitoring	Conduct review and research		
Task 3.3: Disinfection Efficiency and Minimizing Disinfection Byproduct Formation	Monitoring lead	Research Lead	
Theme 4: Data Management			
Task 4.1: Adoption of a Data Management Tool	Research, procurement and adoption	Partner as appropriate	Dal to develop integrative data tools

TO: Craig MacMullin, MBA, CPA, CGA, Chair, and Members of the Halifax Regional Water Commission Board

SUBMITTED BY:

Original Signed By:
Louis de Montbrun, CPA, CA, Director, Corporate Services/CFO

Original Signed By:
Reid Campbell, P.Eng. Director, Water Services

Original Signed By:
Susheel Arora, M.A.Sc., P.Eng. Director, Wastewater & Stormwater Services

Original Signed By:
Kenda MacKenzie, P.Eng. Director, Regulatory Services

APPROVED: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, ICD.D, General Manager

SUBJECT: **Financial and Operations Information Report**

INFORMATION REPORT

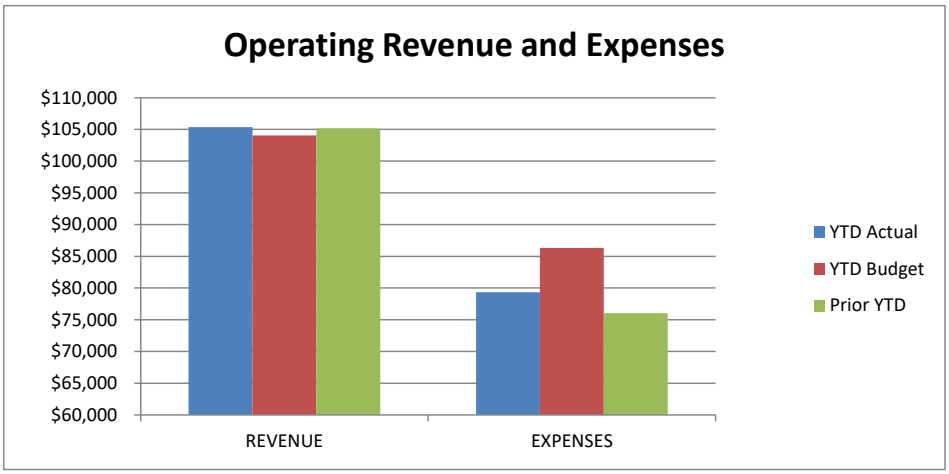
ORIGIN:

Regular update.

This report provides a high level overview of financial and operational performance for the utility. Financial results are presented first, followed by indicators and statistics for water and wastewater.

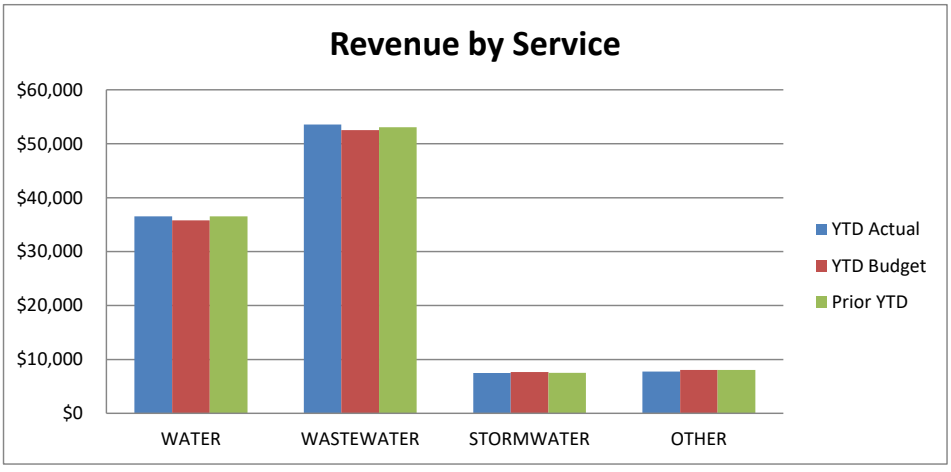
FINANCIAL

HALIFAX WATER
UNAUDITED FINANCIAL INFORMATION
APRIL 1/19 - DECEMBER 31/19 (9 MONTHS)
'000



OPERATING REVENUE AND EXPENSES

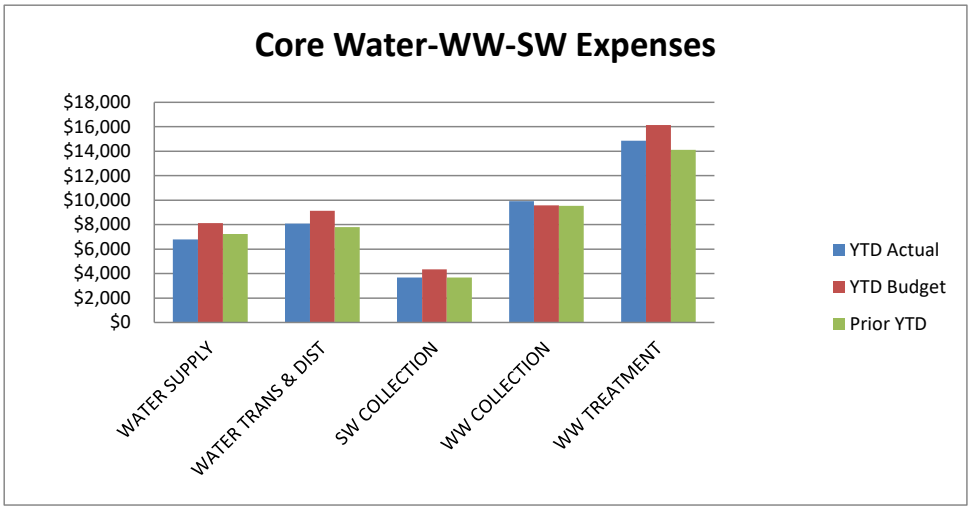
	YTD Actual	YTD Budget	Prior YTD	% of Budget
REVENUE	$105,344	$104,045	$105,181	75.94%
EXPENSES	$79,328	$86,316	$76,057	68.93%
	$26,017	**$17,729**	**$29,124**	**110.06%**



REVENUE BY SERVICE (METERED SALES AND SITE GENERATED FEE)

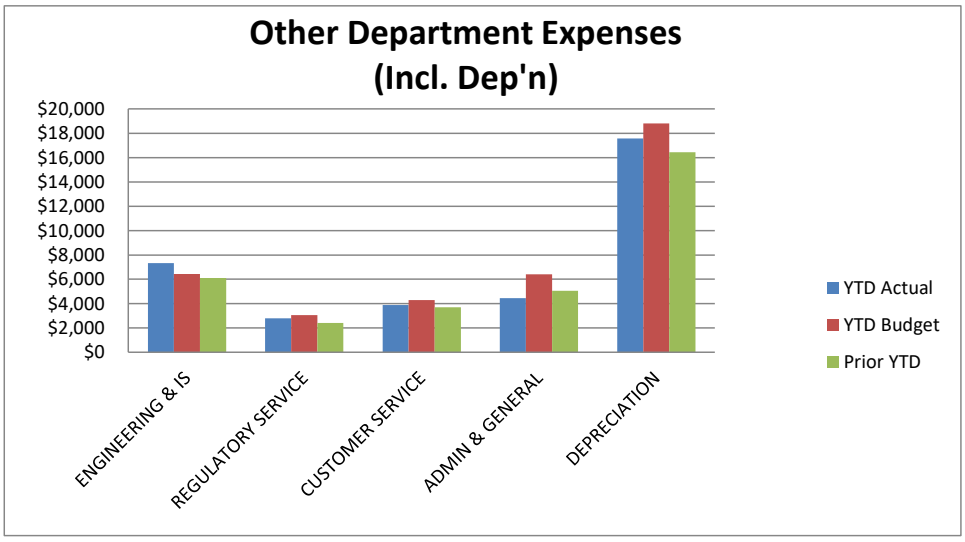
	YTD Actual	YTD Budget	Prior YTD	% of Budget
WATER	$36,545	$35,818	$36,509	76.52%
WASTEWATER	$53,558	$52,523	$53,095	76.48%
STORMWATER	$7,493	$7,639	$7,536	73.56%
OTHER	$7,748	$8,065	$8,040	72.06%
	$105,344	**$104,045**	**$105,181**	**75.94%**

HALIFAX WATER
UNAUDITED FINANCIAL INFORMATION
APRIL 1/19 - DECEMBER 31/19 (9 MONTHS)
'000



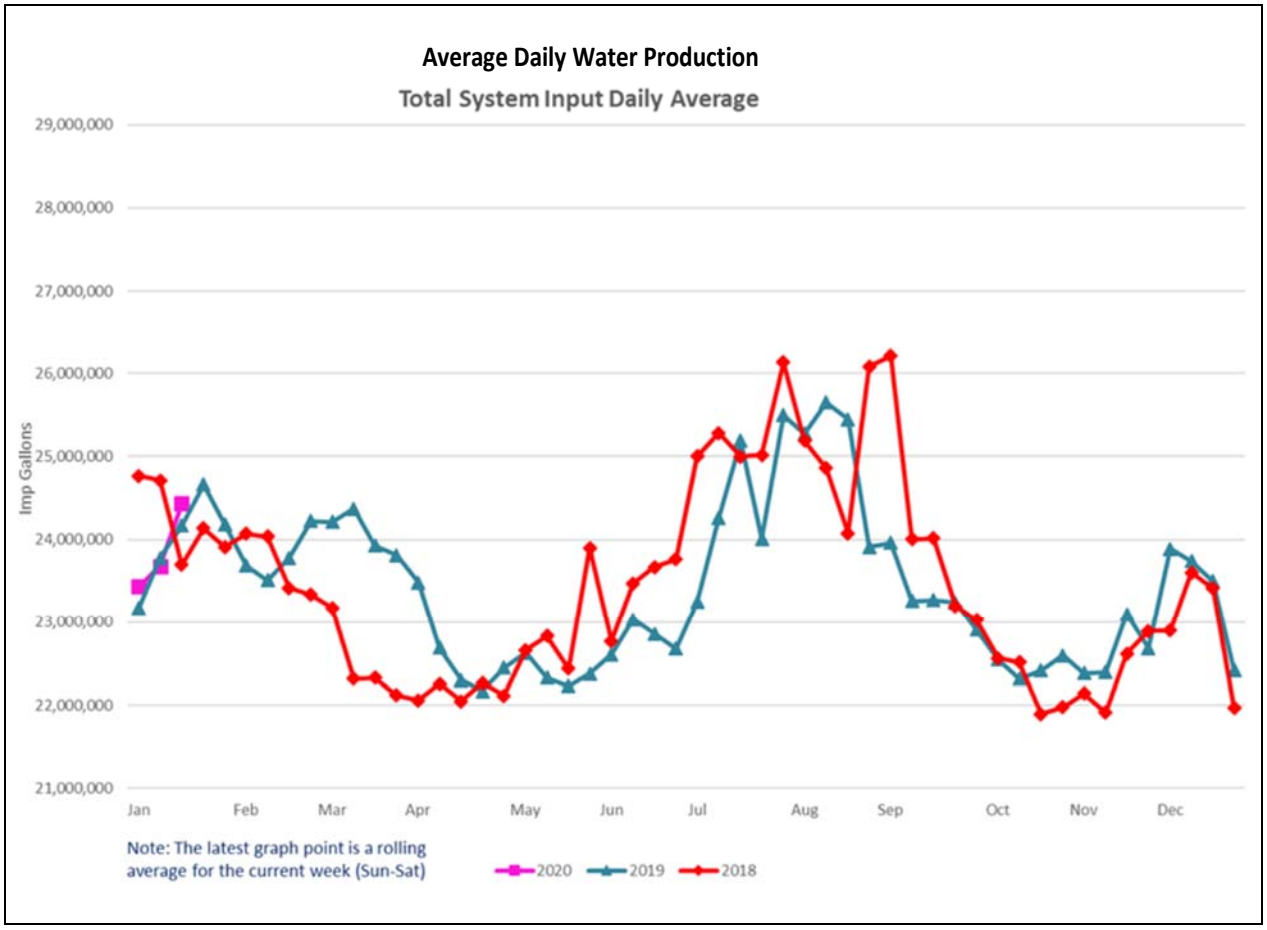
CORE WATER-WW-SW EXPENSES

	YTD Actual	YTD Budget	Prior YTD
WATER SUPPLY	$6,789	$8,125	$7,242
WATER TRANS & DIST	$8,076	$9,124	$7,807
SW COLLECTION	$3,680	$4,342	$3,672
WW COLLECTION	$9,905	$9,567	$9,524
WW TREATMENT	$14,847	$16,143	$14,107
	$43,298	**$47,302**	**$42,351**



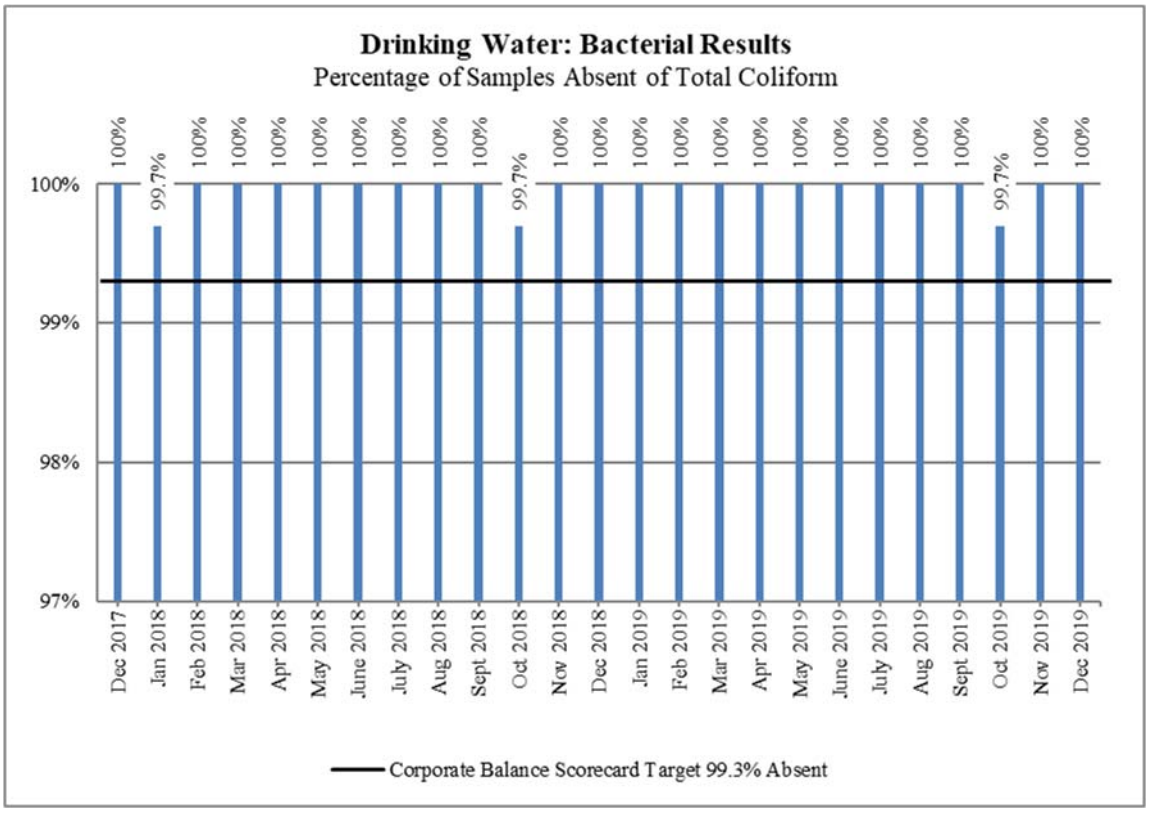
OTHER DEPARTMENT EXPENSES (INCL DEP'N)

	YTD Actual	YTD Budget	Prior YTD
ENGINEERING & IS	$7,317	$6,434	$6,118
REGULATORY SERVICE	$2,793	$3,061	$2,406
CUSTOMER SERVICE	$3,887	$4,295	$3,695
ADMIN & GENERAL	$4,458	$6,410	$5,049
DEPRECIATION	$17,574	$18,814	$16,438
	$36,029	**$39,014**	**$33,706**



Regional Water Main Break/Leak Data		
Year	**Total Breaks/Leaks**	**Current 12 Month Rolling Total *(up to December 2019)***
2017/18	206	167
2016/17	216	
2015/16	226	
2014/15	210	
2013/14	213	
Total	**1071**	
Yr. Avg.	**214.2**	

Water Accountability
Losses per Service Connection/Day (International Water Association Standard)
Period Ending June, 2019
Real Losses: 178 litres CBS Target: 160



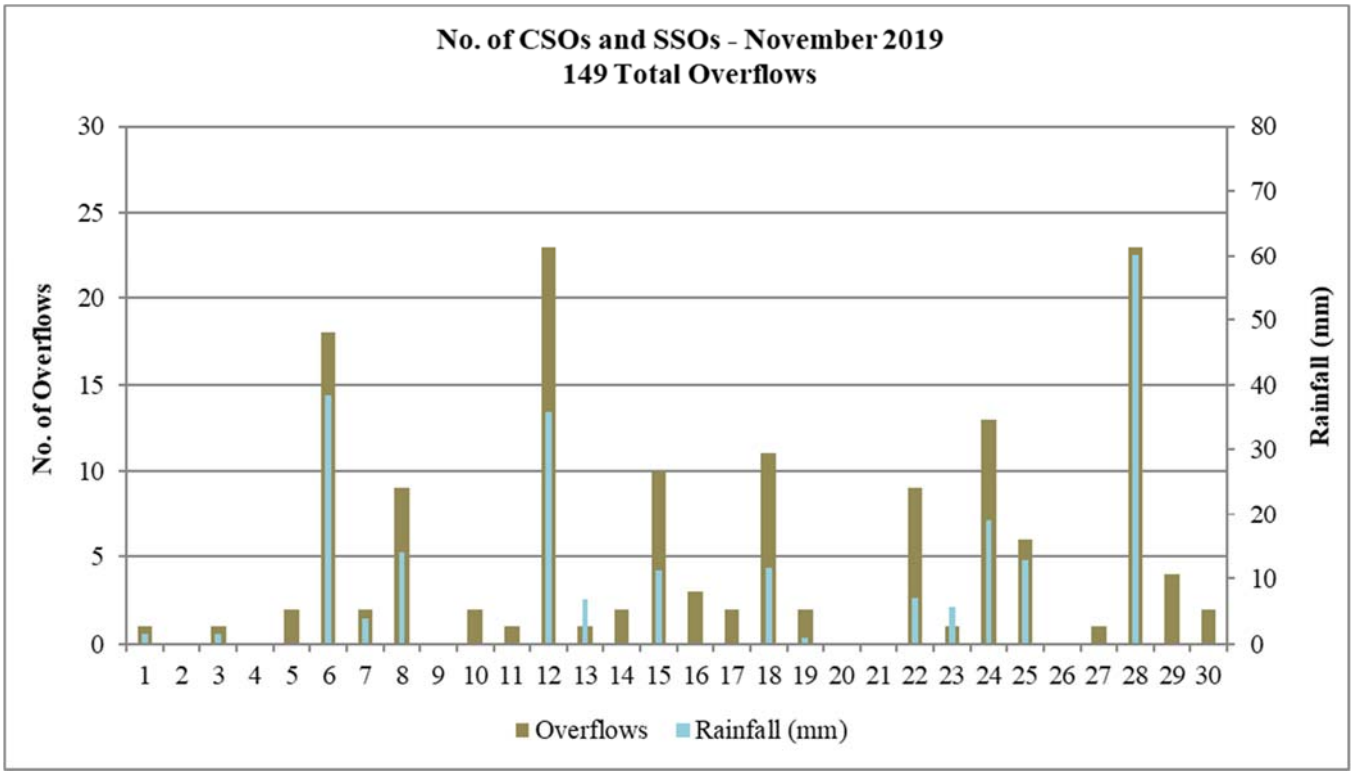
Water Quality Master Plan Objectives 2019-2020 Q3				
Objective	Total Sites	% Sites Achieving Target	All Sites: 90th Percentile < 15 µg/L	CBSC Awarded Points
Disinfection	66	97%	---	17
Total Trihalomethanes	25	80%	---	3
Haloacetic Acids	21	100%	---	20
Particle Removal	5	100%	---	20
Corrosion Control	69	---	4.08	20
Summary Total				80

In this report each facility is assessed using monthly or quarterly averages, depending on the averaging period specified in its Approval to Operate.

Wastewater Treatment Facility	**Wastewater Treatment Facility Compliance Summary** Rolling Averages - October, November, and December 2019																Toxicity	Trend
	CBOD5 (mg/L)		TSS (mg/L)		E. coli (counts/ 100mL)		pH		Ammonia (mg/L)		Phosphorous (mg/L)		TRC (mg/L)		Dissolved Oxygen (mg/L)			
	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.		
Halifax	50	35	40	16	5000	1,905	6-9	6.8	-		-		-		-		Not acutely lethal	Improved
Dartmouth	50	50	40	47	5000	2,022	6-9	6.8	-		-		-		-		Not acutely lethal	Improved
Herring Cove	50	22	40	13	5000	153	6-9	7.0	-		-		-				Not acutely lethal	Continued
Eastern Passage	25	7	25	9	200	20	6-9	6.8	-		-		-		-		Not acutely lethal	Continued
Mill Cove	25	18	25	19	200	16	6-9	6.5	-		-		-		-		Not acutely lethal	Continued
Springfield	20	4	20	4	200	14	6-9	6.9	-		-		-		-		-	Continued
Frame	20	4	20	1	200	10	6-9	6.9	-		-		-		-		-	Continued
Middle Musq.	20	4	20	7	200	22	6-9	7.5	-		-		-		-		-	Continued
Uplands	20	5	20	9	200	17	6-9	6.5	-		-		-		-		-	Continued
Aerotech	5	4	5	1	200	10	6-9	7.3	5.7 W 1.2 S	8.1	0.13	0.09	-		6.5	8.2	Not acutely lethal	Continued
North Preston	10	4	10	13	200	10	6-9	6.8	3	0.2	1.5	0.4	-		-		-	Declined
Lockview	20	9	20	8	200	10	6.5-9	7.0	8.0 S	1.5	1.2 S	0.3	-		-		-	Continued
Steeves (Wellington)	20	10	20	1	200	10	6.5-9	7.0	14.4 S	0.2	1.0 S	0.1	-		-		-	Continued
BLT	15	9	20	22	200	19	6-9	7.2	5 W 3 S	5	3 W 1 S	1	0.02 *	0.10	-		Not acutely lethal	Continued
Avg. of all Facilities	13		12		303		6.9		3.0		0.4		0.18		8.2			

NOTES & ACRONYMS:
CBOD5 - Carbonaceous 5-Day Biochemical Oxygen Demand
TSS - Total Suspended Solids
* TRC - Total Residual Chlorine - Maxxam can only measure 0.10 mg/L residual; results of 0.1 mg/L are compliant
BDL - Below Detection Limit
W / S - Winter / Summer compliance limits
NSE requires monthly averages be less than the NSE Compliance Limit for each parameter (Dartmouth, Eastern Passage, Halifax, Herring Cove, Mill Cove)
NSE requires quarterly averages be less than the NSE Compliance Limit for each parameter (Aerotech, Lockview, Mid. Musq., Frame, BLT, Uplands, North Preston, Steeves, Springfield)
Continued - All parameters remain essentially unchanged since the last report
Improved - One or more parameter(s) became compliant since the last report
Declined - One or more parameters(s) became non-compliant since the last report

LEGEND
NSE Compliant
NSE Non-Compliant



NOTES & ACRONYMS: CSO - Combined Sewer Overflow SSO - Sanitary Sewer Overflow

- Rainfall data is from Halifax Water's rain gauge at the Halifax WWTF.
- There were fifteen overflows on days when there was no recorded rainfall, as follows:

1. November 5: The CSOs at Lyle St CSO and Ferguson Rd CSO were due to the Park Ave PS being taken offline for repairs, causing overflows at these locations.

2. November 10: The CSO at Duffus St PS was due to the combination of rain on the previous day and snow melt. The CSO at Maitland St PS & CSO was the result of blockages caused by debris.

3. November 11: The CSO at the Maitland St PS & CSO was the result of blockages caused by debris.

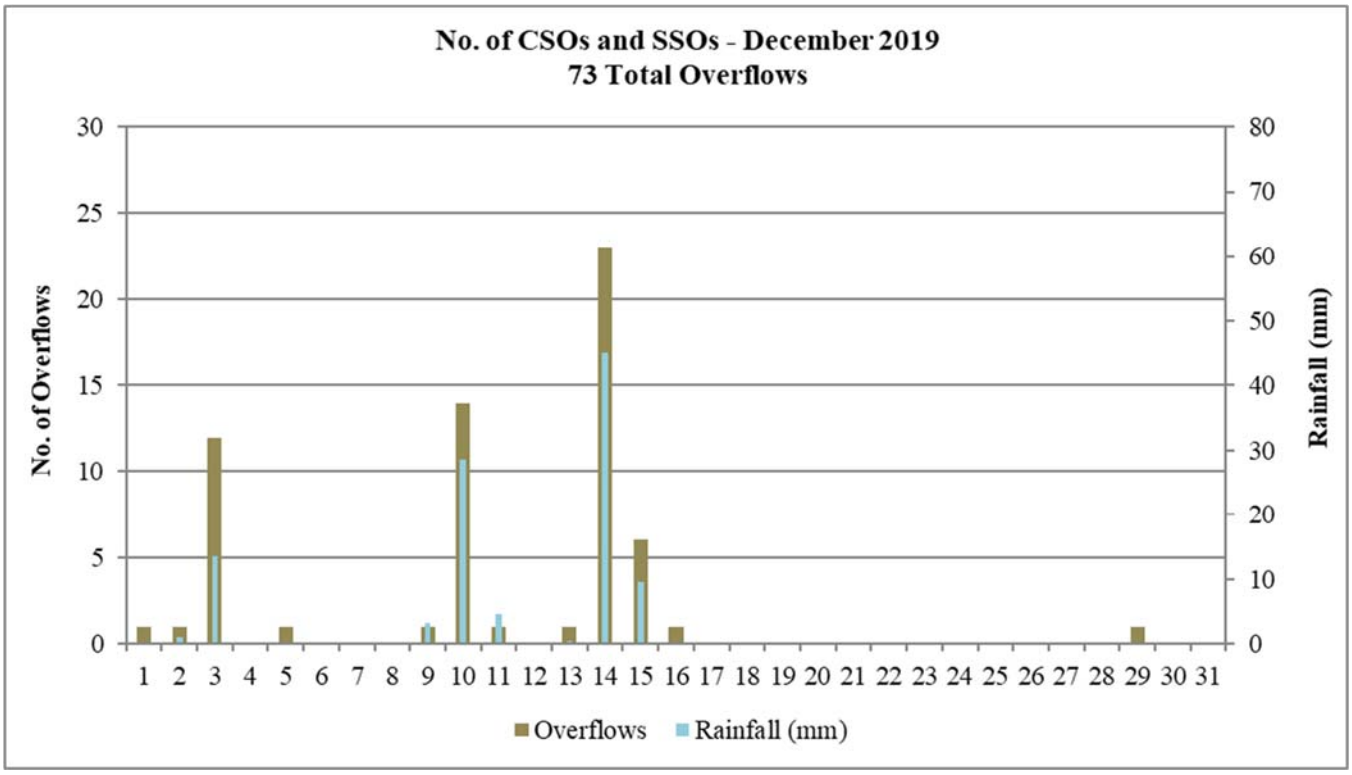
4. November 14: The SSOs at Mill Cove Surge Tank were due to rain on the previous day.

5. November 16: The CSO at Duffus St PS was due to rain on the previous day. The CSOs at Maitland St PS & CSO were the result of blockages caused by debris.

6. November 17: The CSO at Duffus St PS was due to a mechanical failure of the pumping station. The CSO at Maitland St PS & CSO was the result of blockages caused by debris.

7. November 27: The SSO at Mill Cove Surge Tank was due to rain on the previous day.

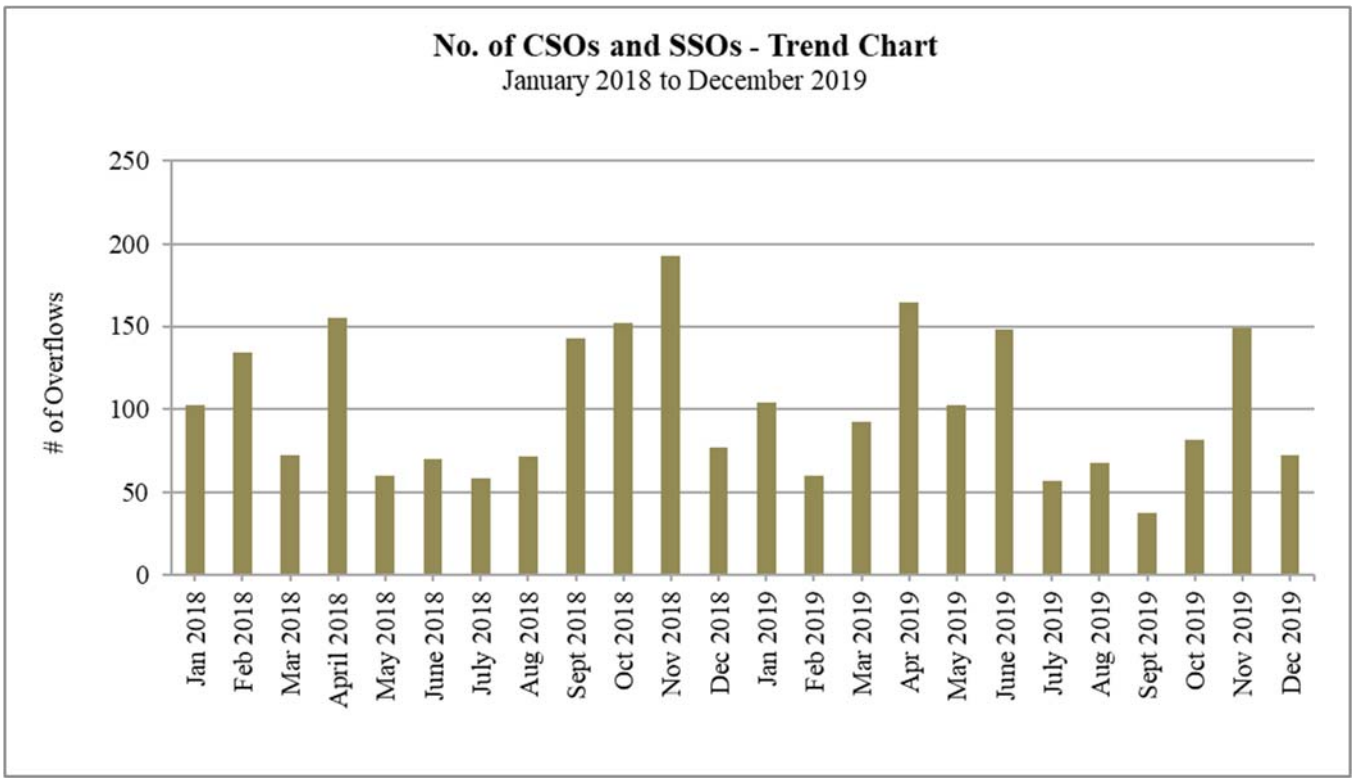
8. November 30: The CSOs at Lyle St CSO were the result of blockages caused by debris.

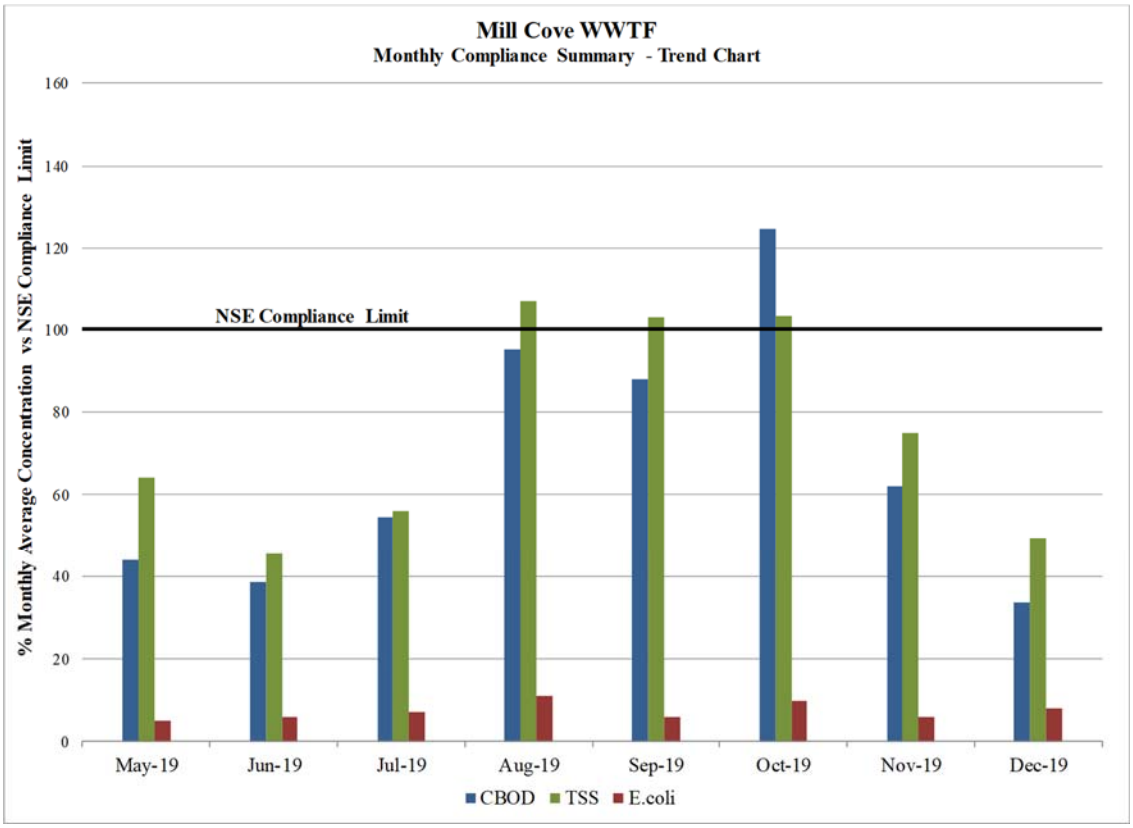


NOTES & ACRONYMS: CSO - Combined Sewer Overflow SSO - Sanitary Sewer Overflow

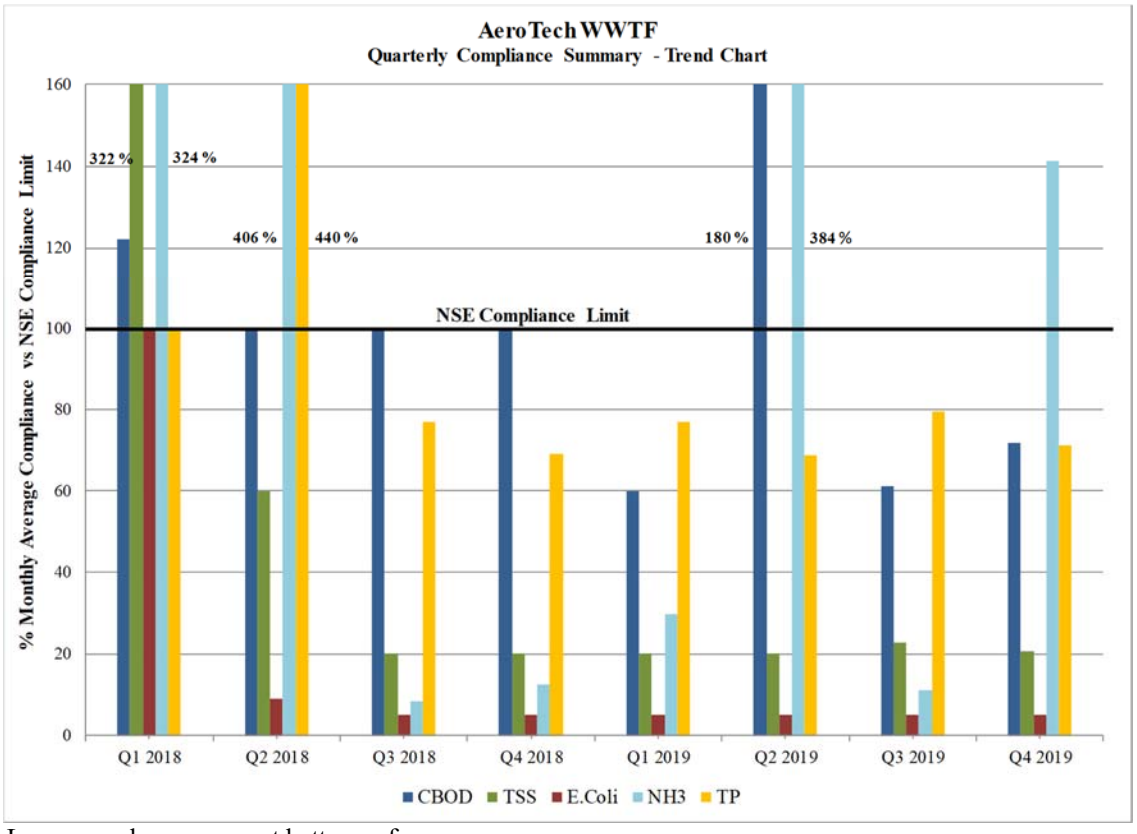
- Rainfall data is from Halifax Water's rain gauge at the Halifax WWTF.
- There were three overflows on days when there was no recorded rainfall, as follows:

    1. December 1: The SSO at Mill Cove Surge Tank was due to rain on the previous days.
    2. December 16: The CSO at Maitland St PS & CSO was the result of blockages caused by debris.
    3. December 29: The CSO at King St PS & CSO was due to a radio communication failure that caused a pump inhibit at Dartmouth Cove PS.

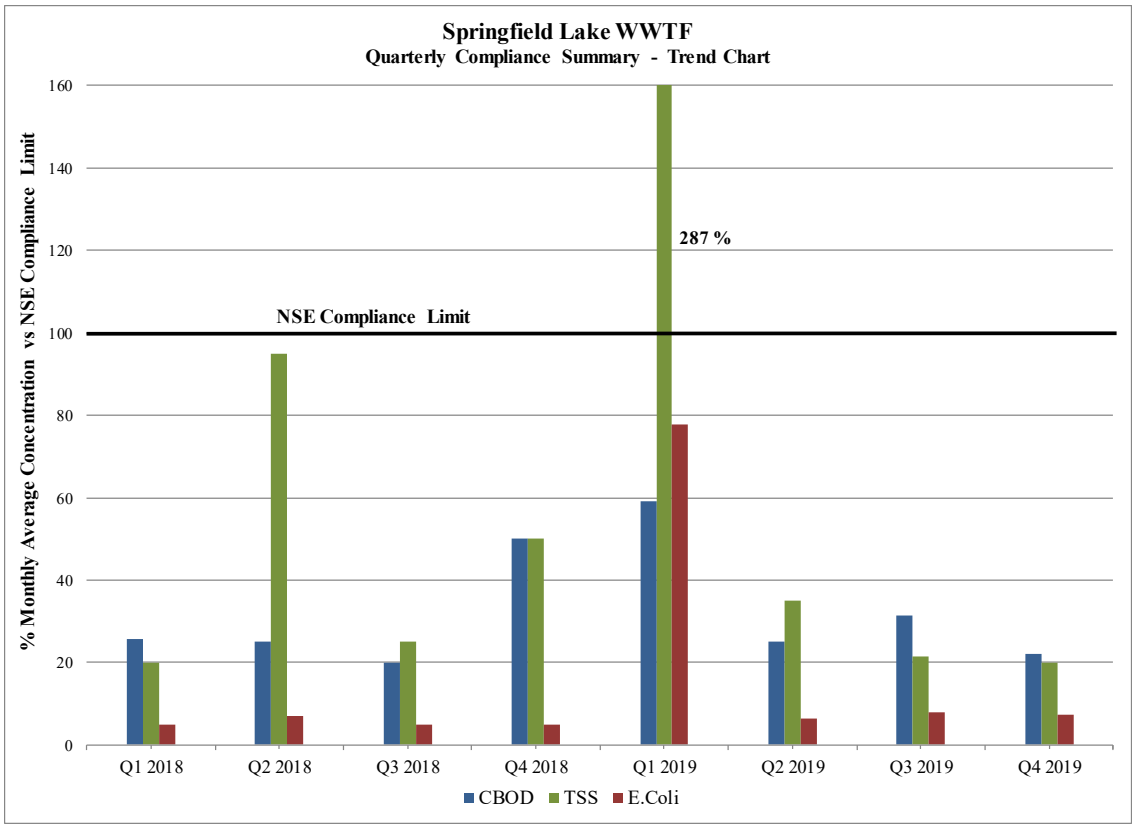

No. of CSOs and SSOs - Trend Chart
January 2018 to December 2019
# of Overflows
250
200
150
100
50
0
Jan 2018
Feb 2018
Mar 2018
April 2018
May 2018
June 2018
July 2018
Aug 2018
Sept 2018
Oct 2018
Nov 2018
Dec 2018
Jan 2019
Feb 2019
Mar 2019
Apr 2019
May 2019
June 2019
July 2019
Aug 2019
Sept 2019
Oct 2019
Nov 2019
Dec 2019



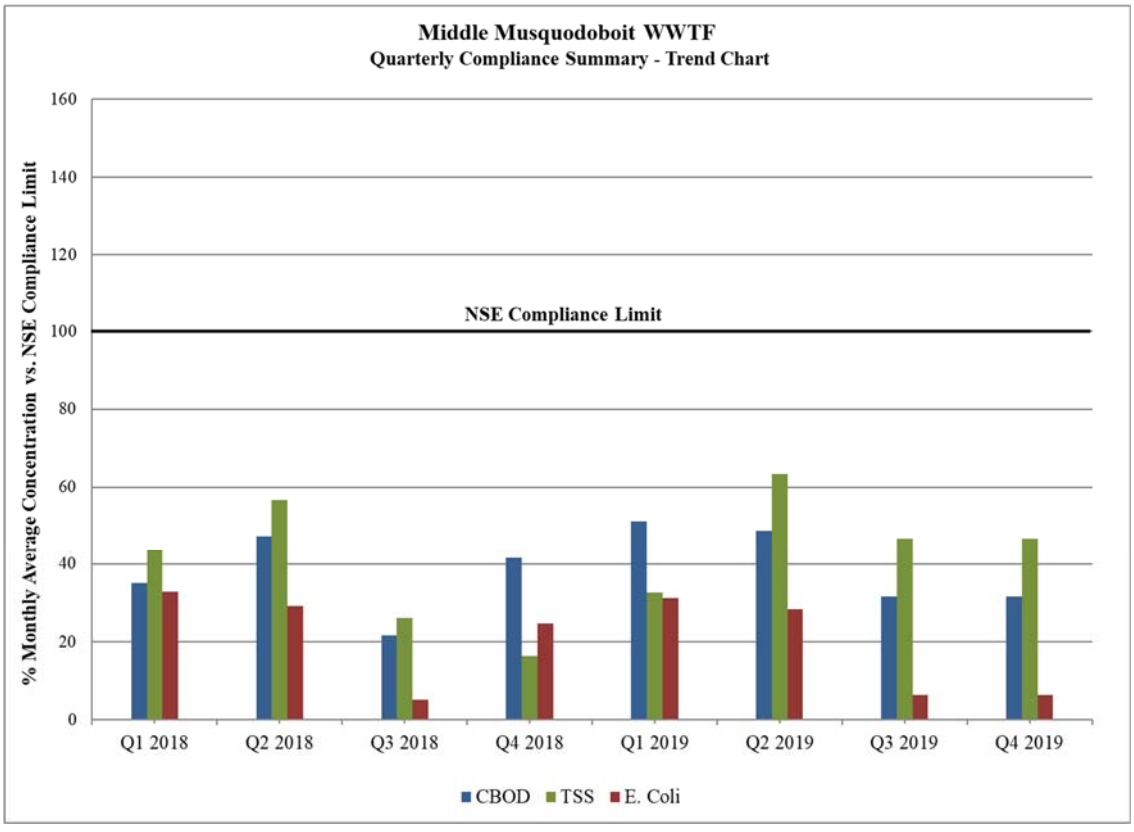
Lower numbers represent better performance.



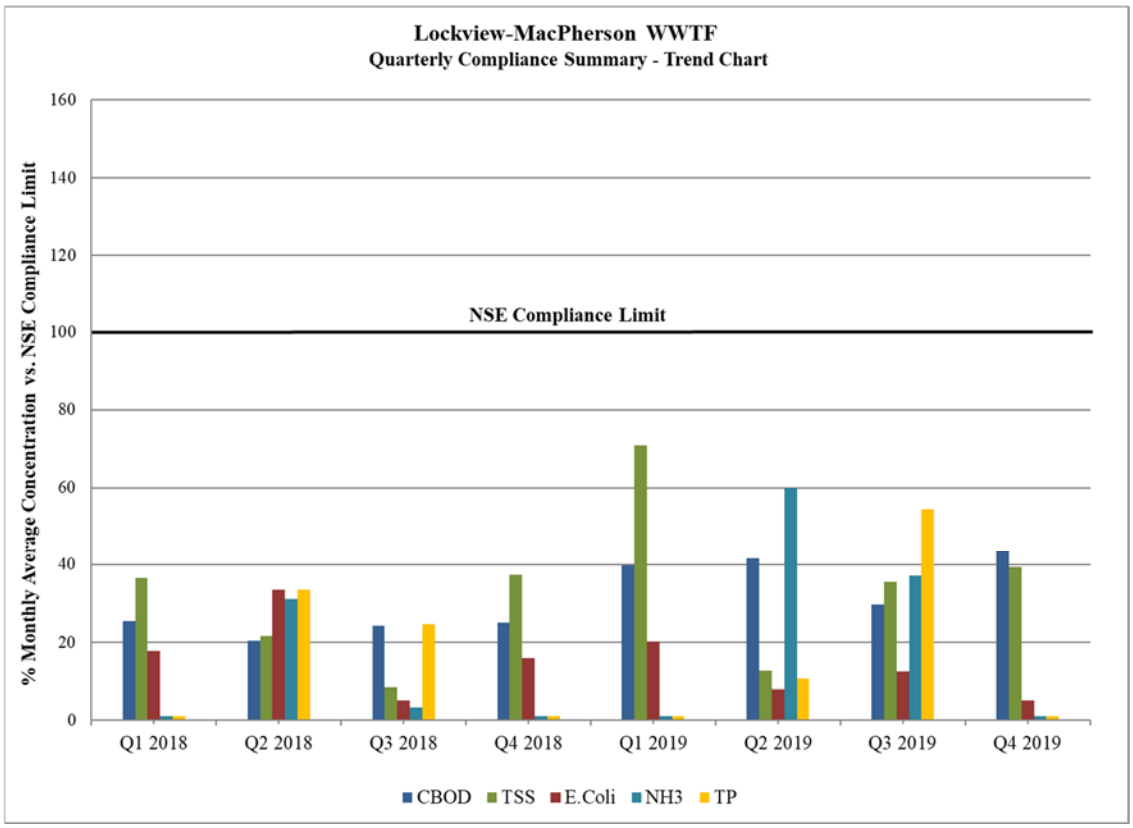
Lower numbers represent better performance.



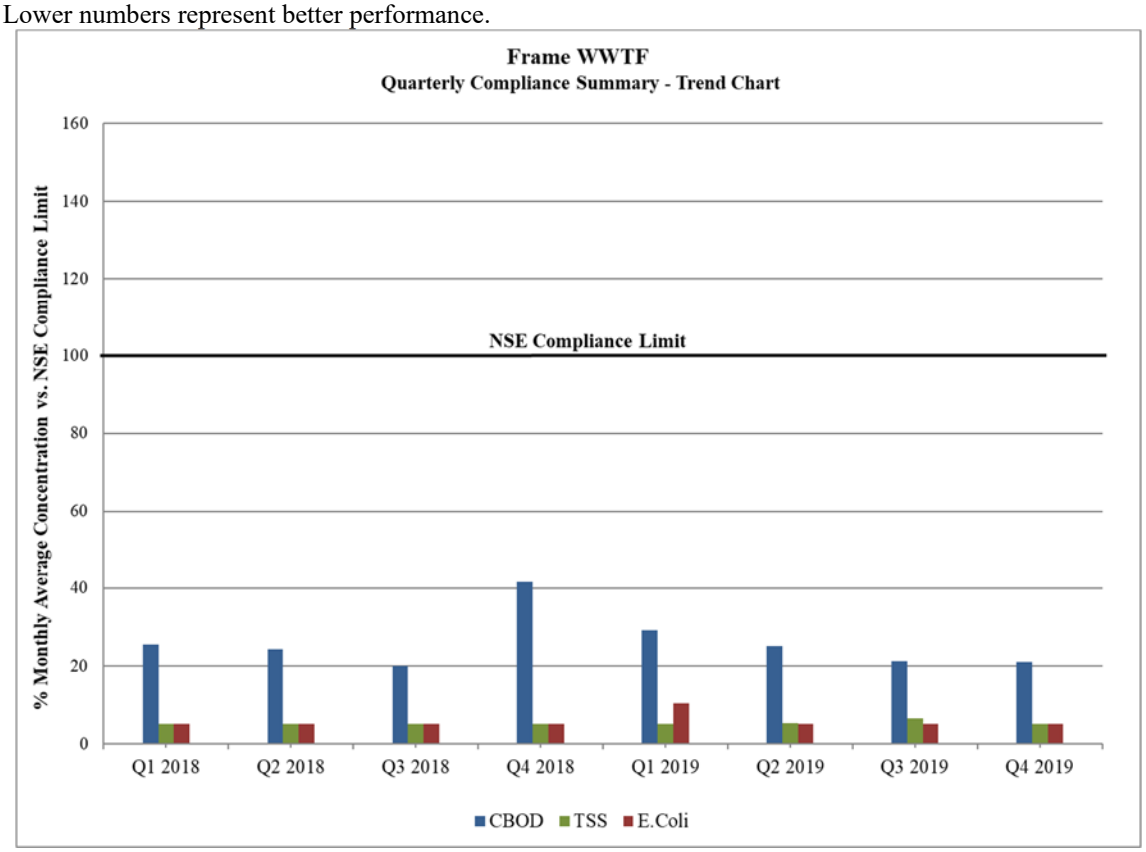
Lower numbers represent better performance.



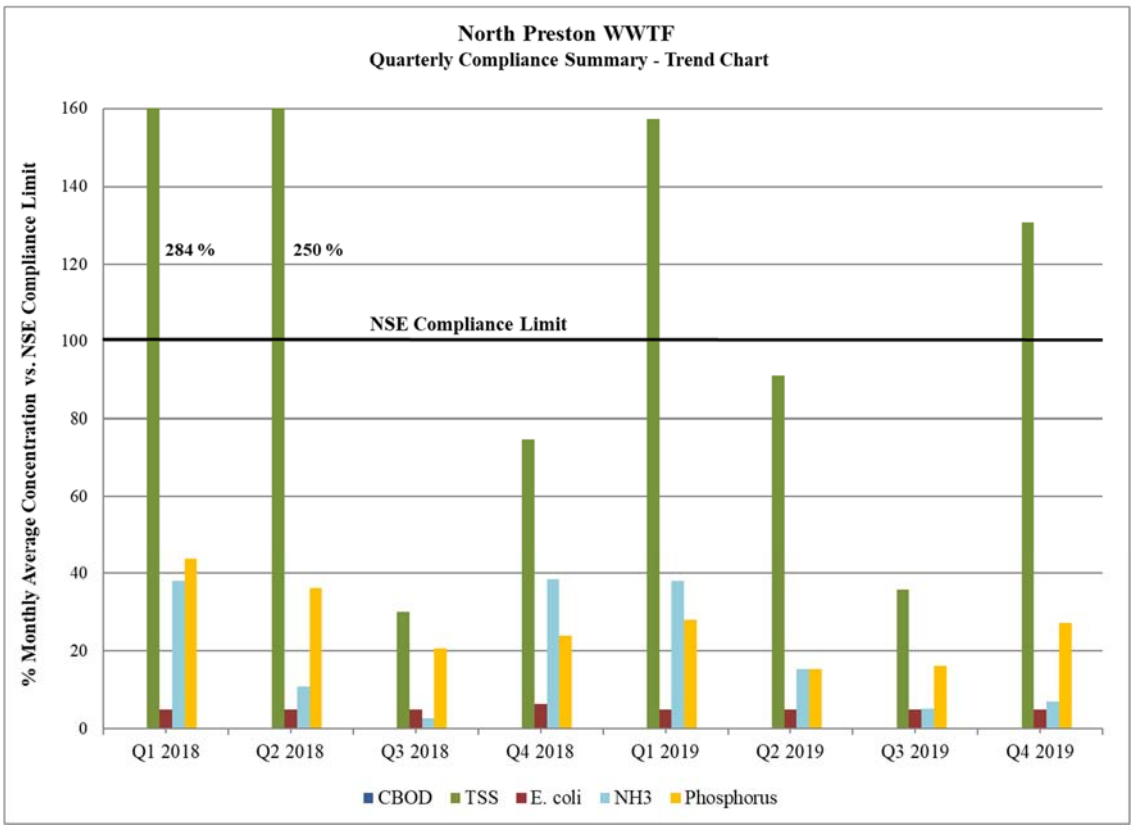
Lower numbers represent better performance.



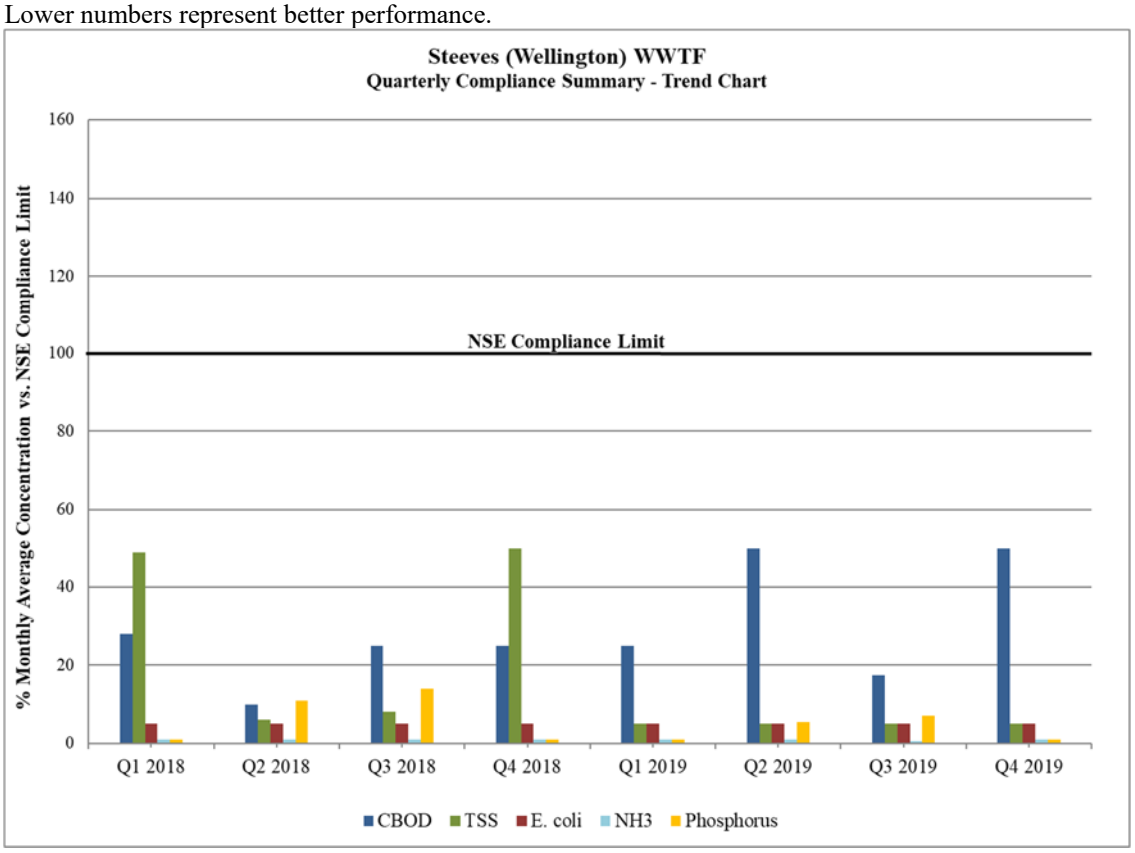
Lower numbers represent better performance.



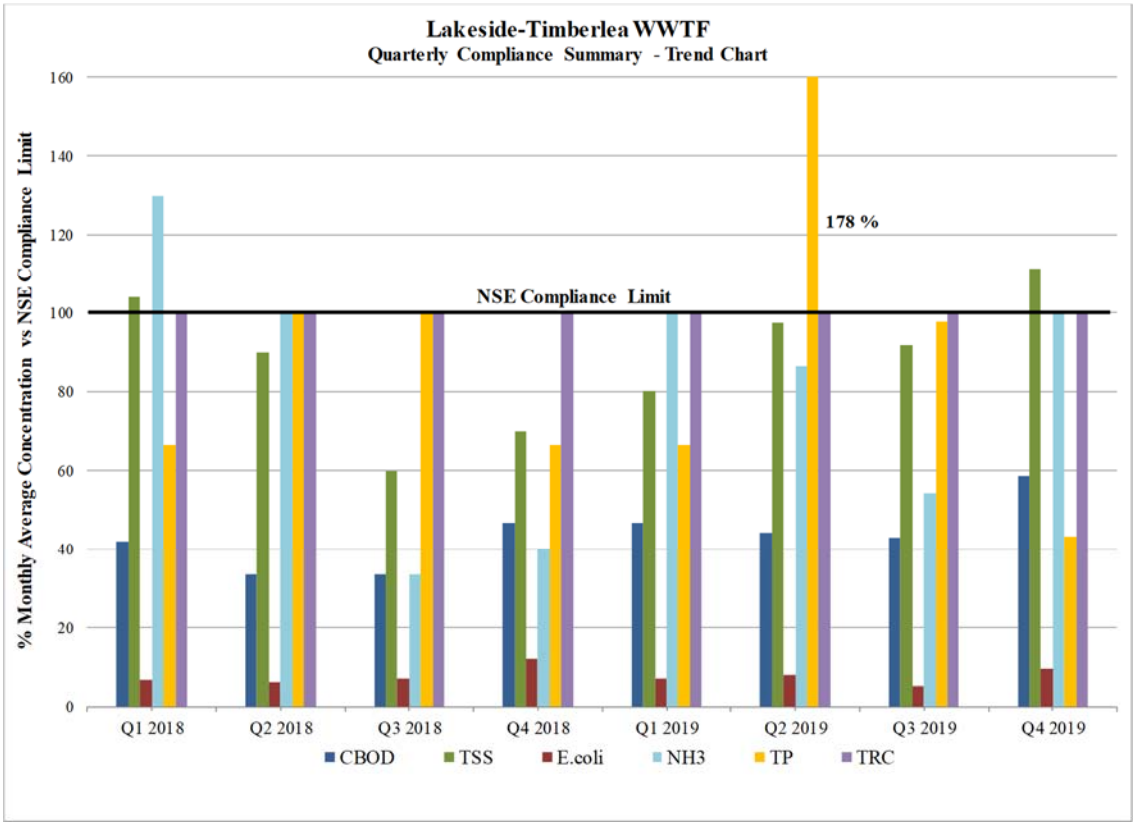
Lower numbers represent better performance.



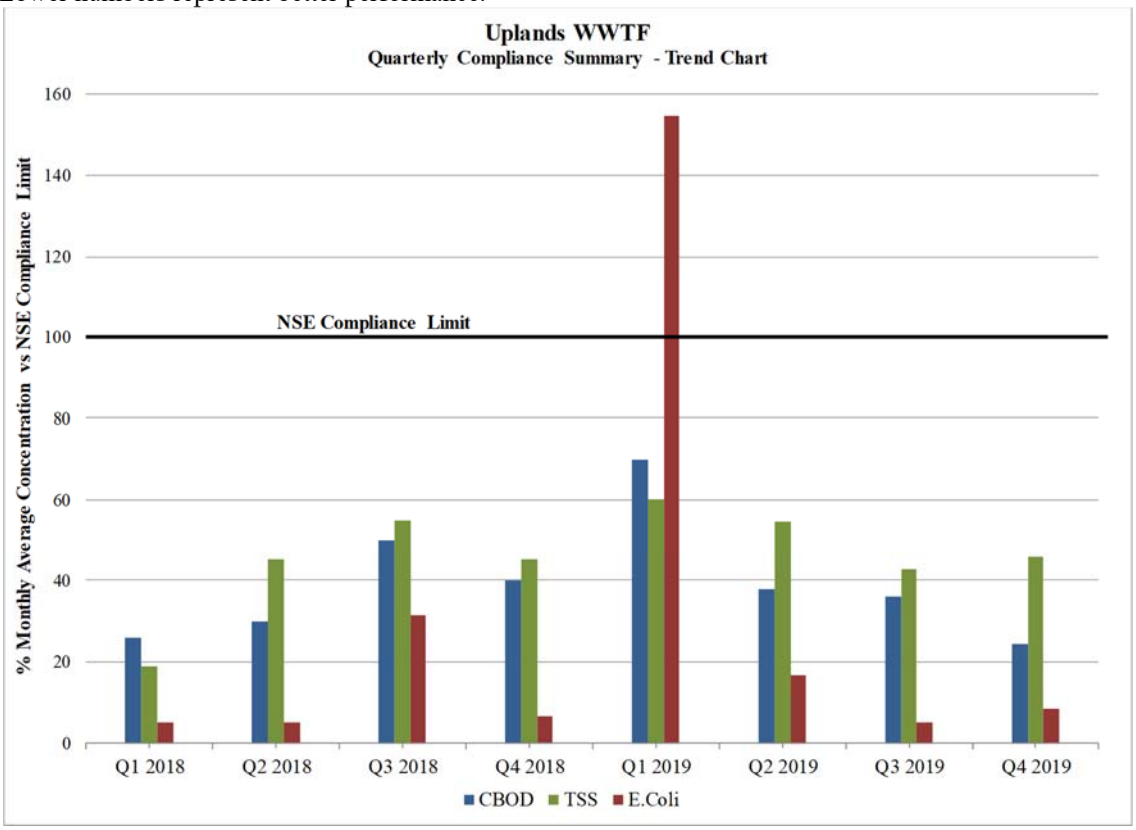
Lower numbers represent better performance.



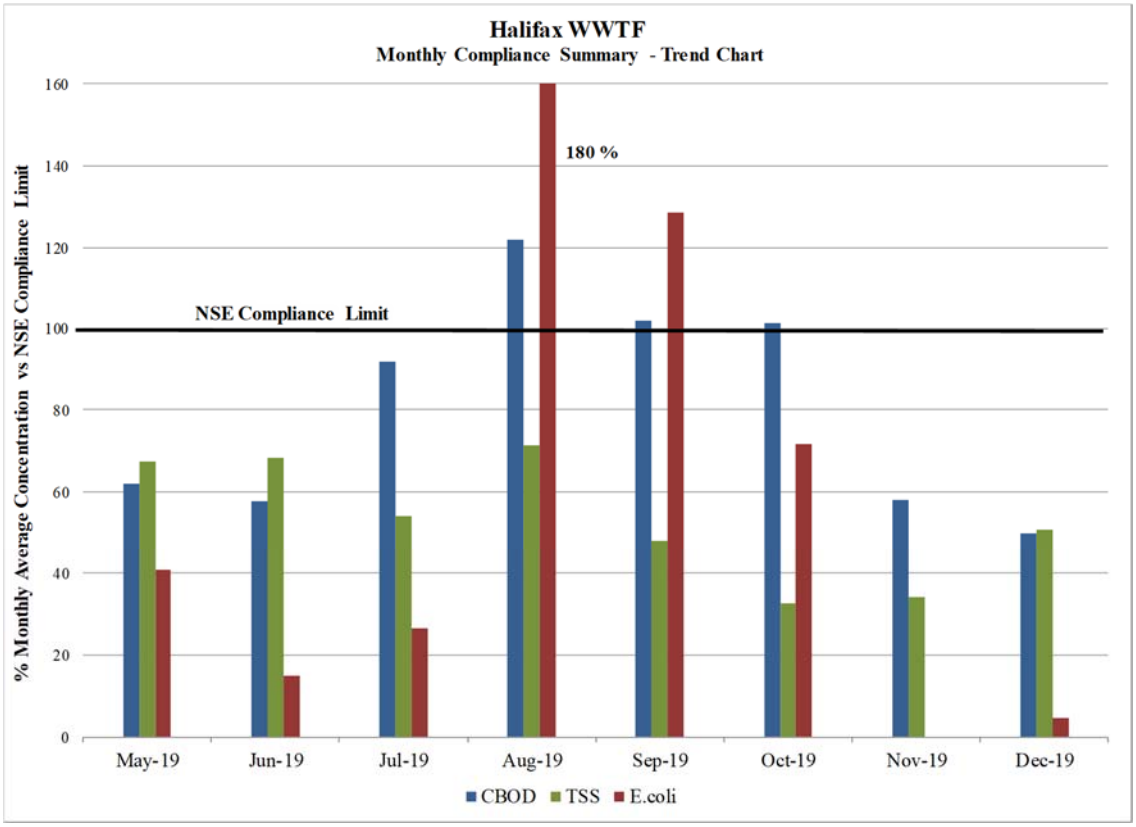
Lower numbers represent better performance.



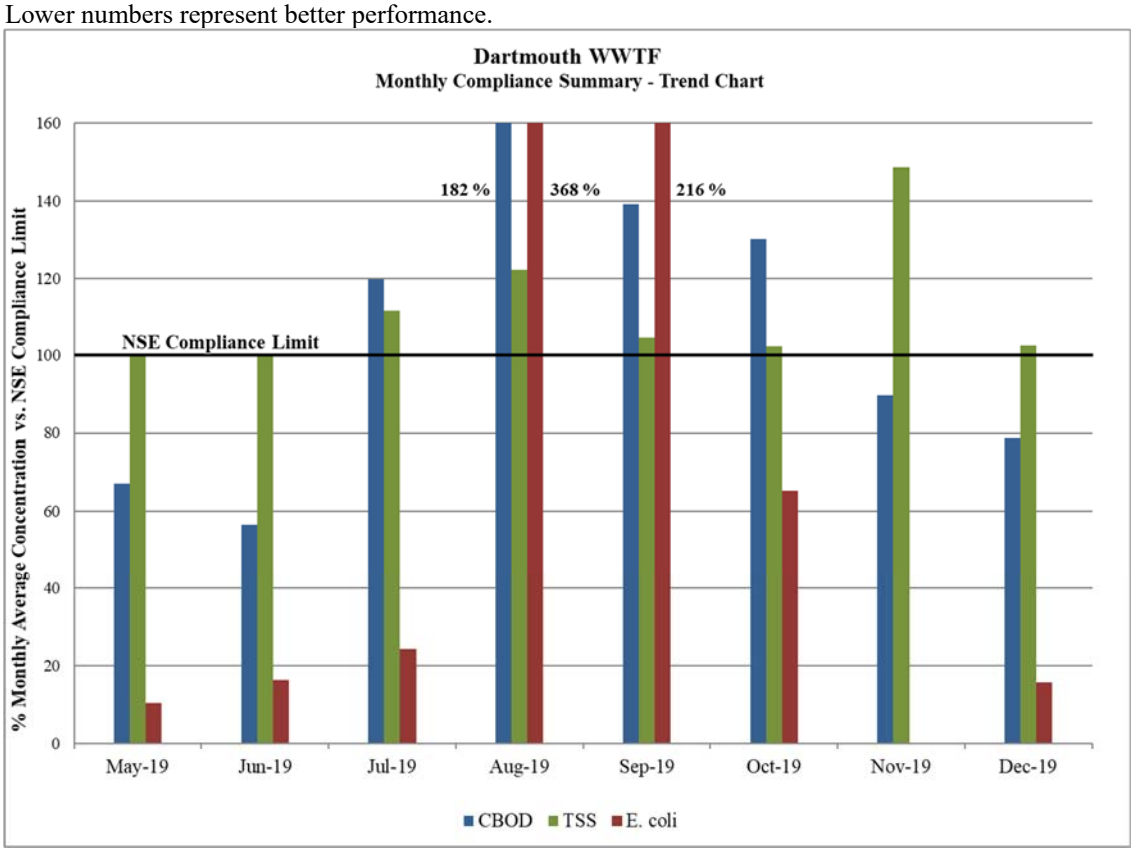
Lower numbers represent better performance.



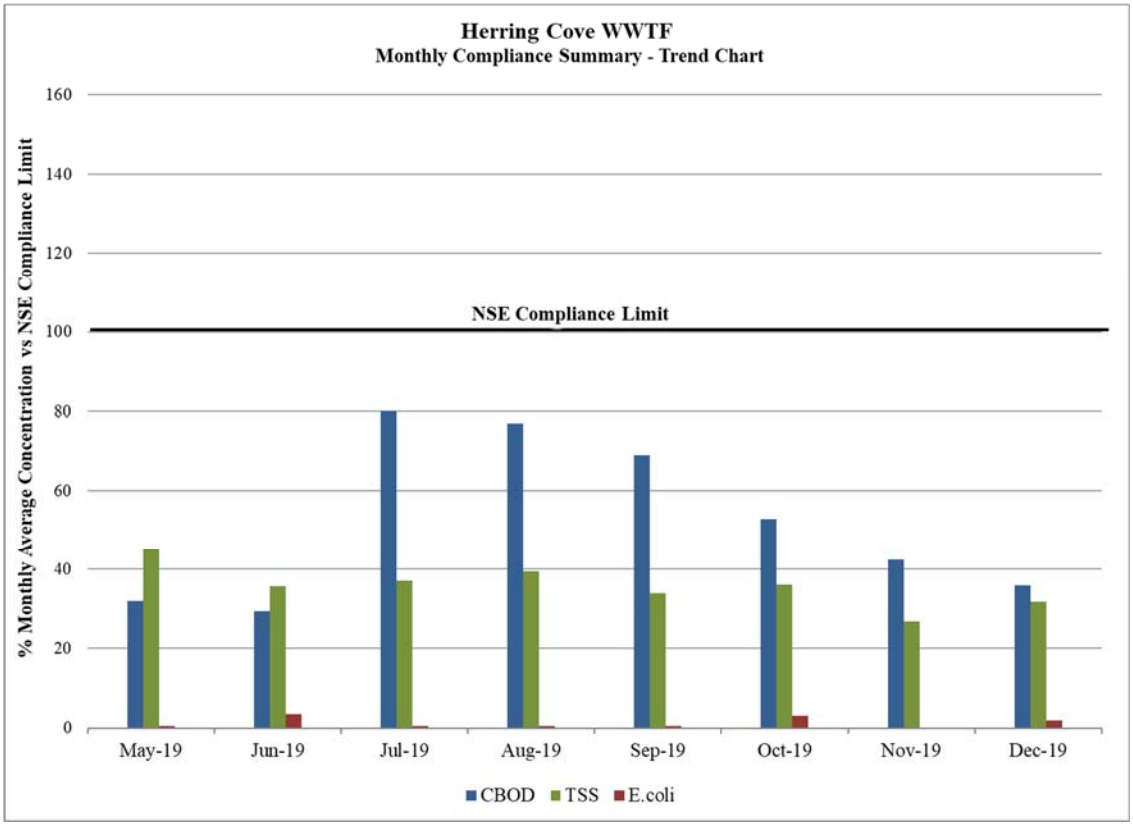
Lower numbers represent better performance.



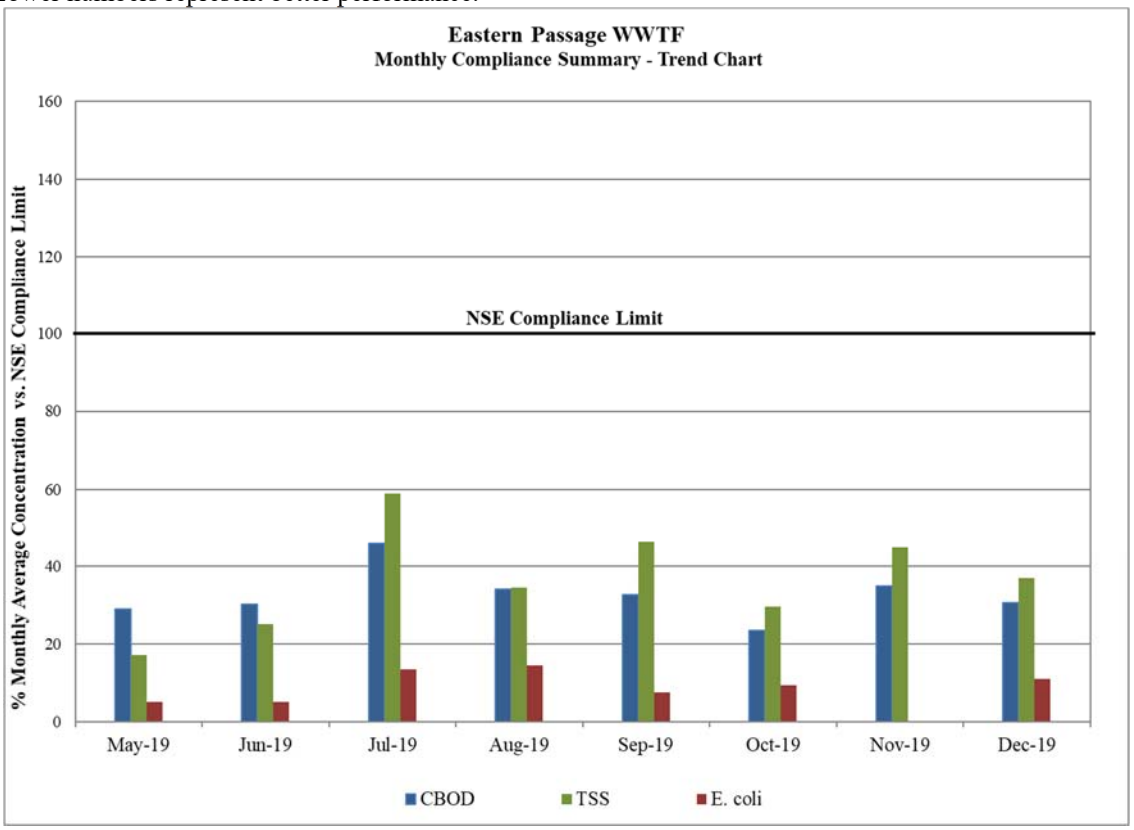
Lower numbers represent better performance.



Lower numbers represent better performance.



Lower numbers represent better performance.

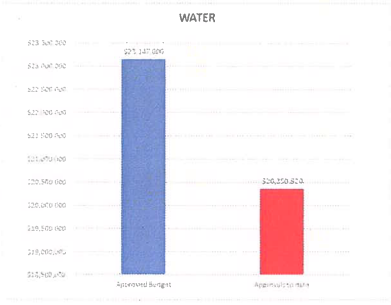


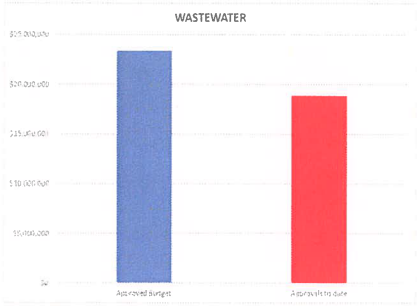
Lower numbers represent better performance.

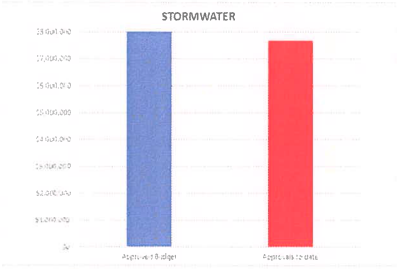
Halifax Water
Halifax Regional Water Commission

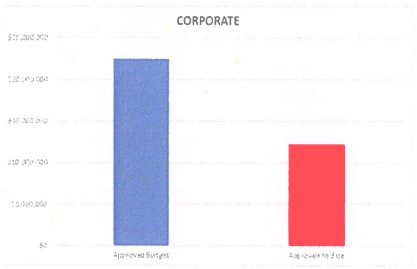
ITEM 2-1
HRWC Board
January, 2020

CAPITAL BUDGET APPROVALS TO DATE - 2019 -2020









WATER

Approved Budget	$23,147,000
Approvals to date	**$20,350,920**

WASTEWATER

Approved Budget	$23,336,000
Approvals to date	**$18,826,526**

STORMWATER

Approved Budget	$8,438,000
Approvals to date	**$7,676,000**

CORPORATE PROJECTS

Approved Budget	$22,427,000
Approvals to date	**$12,201,078**

Total Budget:	$77,348,000
Total To Date:	**$59,054,524**
Total %	**76%**

Original Signed By:
Jamie Hannam, MBA, P.Eng

Report Approved: **Date**
Jamie Hannam

HRWC Board Report #2-1
Capital Projects Funding Approvals 2019-2020

Category	Total Approved	Net Impact on Budget	Approval Date
Water			
Collection System			
Scotia Drive Duffus Drive Watermain Interconnection	$26,000	$0	18-May-19
Culverts/Ditches			
Quarry Road Integrated Project - Additional Funding Component Water	$193,000	$0	3-Sep-19
Distribution			
Automated Flushing Program	$20,000	$20,000	18-Mar-19
Coburg Road Bridge Watermain Replacement	$40,000	$40,000	3-Sep-19
Hydrants	$75,000	$75,000	3-May-19
Lead Service Line Replacement Program	$1,000,000	$1,000,000	3-May-19
Service Lines Renewals	$100,000	$100,000	3-May-19
Valve Renewal	$125,000	$125,000	3-May-19
Water Distribution - Main Renewal Program	$1,839,000	$1,839,000	28-Feb-19
Sewer Separation Program Construction of Romans Federal Avenues	$1,459,000	$1,459,000	
Watermain Renewal Program	$2,435,920	$2,435,920	5-Jun-19
Energy			
Bennery Lake WSP - Tank Insulation Repairs			
Bennery Lake WSP MCC Replacement	$150,000	$150,000	3-Sep-19
Lake Major WSP Process Area HVAC Upgrades	$60,000	$60,000	3-Dec-19
Equipment			
Miscellaneous Equipment Replacement	$50,000	$50,000	3-May-19
Lake Major WSP - Purchase New Microscope	$20,000	$20,000	6-Nov-19
Facility			
Lake Major Dry Polymer Feed System	$120,000	$0	1-Aug-19
Lake Major WSP Butterfly Valve Replacement Program	$120,000	$0	26-Aug-19
JD Kline WSP Raw Water Pump Station HVAC Controls	$75,000	$0	
Land			
Bennery Lake Watershed Land			
Lake Major Watershed - Glasgow Lands			
Watershed Land Acquisition			
Security			
Security Upgrade Program	$50,000	$50,000	6-Aug-19
Structures			
Dam Safety Review	$210,000	$210,000	7-Nov-19
Lake Major Dam Monitoring Program	$40,000	$40,000	11-Sep-19
Robie 2 Emergency Pump Meter Installation	$21,000	$21,000	1-Apr-19
Transmission			
Bedford West CCC - Various Phases			
Cogswell Interchange Water Transmission Main Realignments	$150,000	$150,000	9-Jul-19
Critical Valve Replacements 2019	$225,000	$225,000	18-Mar-19
Halifax Peninsula Transmission Main Project	$398,000	$398,000	27-Sep-19
Lakeside Timberlea CCC			
Lucasville Road Transmission Main - Phase 1	$6,647,000	$6,647,000	15-Apr-19
MacIntosh Estates Phase 1 Oversizing	$100,000	$100,000	15-Apr-19
Port Wallace Transmission Main - Caledonia Section	$120,000	$120,000	27-Mar-19
Treatment Facilities			
Aerotech Booster Station Capital Upgrades			
Bennery Lake Access Road Upgrade	$100,000	$100,000	17-Apr-19
Bennery Lake Filter Influent Valves	$64,000	$64,000	18-Mar-19
Bennery Lake Sludge Valve Replacement Program	$7,000	$7,000	18-Mar-19
Bennery Lake Surge Anticipator Valve Replacement	$20,000	$20,000	18-Mar-19
Chlorine Analyzer Replacement Program	$16,000	$16,000	18-Mar-19
JD Kline Back Up Power Supply Study	$25,000	$25,000	23-Oct-19
JD Kline Building Envelope Upgrades	$100,000	$100,000	17-Sep-19
JD Kline Caustic Tank Liner Replacements	$16,000	$16,000	20-Mar-19
JD Kline Effluent Valve Actuator Replacement Program	$200,000	$200,000	20-Mar-19
JD Kline Low Lift Pump #3			
JD Kline Low Lift Station Crane Renewal	$75,000	$75,000	20-Mar-19
JD Kline Low Lift Station Roof Fan Shroud Replacement	$21,000	$21,000	20-Mar-19
JD Kline New Alum Chemical Supply	$15,000	$15,000	20-Mar-19
JD Kline New Lime Blower System	$35,000	$35,000	27-Mar-19
JD Kline Pilot Plant Upgrades	$200,000	$200,000	26-Mar-18
JD Kline Pre-Mix Area Mixers Upgrade	$90,000	$90,000	8-Apr-19
JD Kline Process Upgrades	$250,000	$250,000	26-Nov-19
JD Kline Purchase New Microscope	$17,000	$17,000	20-Mar-19
JD Kline Raw Water Intake Traveling Screen Replacement Program	$245,000	$245,000	8-Apr-19
JD Kline Raw Water Pump Station Electrical Room Ventilation	$50,000	$50,000	16-Sep-19
JD Kline Raw Water Pump Station Window/Wall/Building Envelope	$50,000	$50,000	23-Oct-19
JD Kline Replace C02 Feeders	$475,000	$475,000	15-Aug-19
JD Kline Replace Floc Tank Valve	$35,000	$35,000	20-Mar-19
JD Kline Replace Westinghouse Electrical Panels	$8,000	$8,000	20-Mar-19
JD Kline Roof Replacement	$270,000	$270,000	1-May-19
JD Kline Upgrade the PCL			

Category	Total Approved	Net Impact on Budget	Approval Date
JD Kline Upgrades to the Process Wastewater Lagoons	$150,000	$150,000	20-Mar-19
Lake Major Butterfly Valve Replacement Program	$200,000	$200,000	20-Mar-19
Lake Major C02 System Replacement Construction	$215,000	$215,000	23-May-19
Lake Major Clarifier Repair			
Lake Major Filtration System Replacement			
Lake Major Lab Relocation	$235,000	$235,000	20-Mar-19
Lake Major Overall Process and Design Study	$230,000	$230,000	18-Jun-19
Lake Major Purchase Spectrophotometers	$15,000	$15,000	20-Mar-19
Lake Major Replace Contactors in the MCC	$34,000	$34,000	20-Mar-19
Lake Major Replace the Lime Feed and Delivery System	$120,000	$120,000	27-Mar-19
Miller Lake Small System Public Main Extension Miller Lake Road	$495,000	$495,000	12-Apr-19
Purchase and Install TOC Analyzers WSP Facilities	$90,000	$90,000	18-Mar-19
Purchase and Install Water Quality Sonde Equipment	$70,000	$70,000	20-Mar-19
Reservoir Mixing and Residual Management Upgrade Program	$150,000	$150,000	10-Apr-19
Silversands WSP - Electrical/Architectural Upgrades	$150,000	$150,000	3-Sep-19
Lake Major Purchase Turbidimeter	$18,000	$18,000	20-Mar-19
Lake Major Dry Polymer Feed System Replacement	$305,000	$305,000	14-Aug-19
Lake Major WSP - New Alum Tank	$155,000	$155,000	3-Dec-19
Peninsula Transmission Main	$211,000	$0	
Water Total	**$21,095,920**	**$20,350,920**	
Wastewater			
Collection System			
Bayers Rd Phase 2 - Sewer Separation			
Bedford West Collection System CCC	$20,000	$20,000	30-May-19
Cogswell Redevelopment Sewer Relocation	$170,000	$170,000	
Fairview, Clayton Park Bridgeview I/I Reduction	$2,500,000	$2,500,000	
Integrated Wastewater Projects Program	$1,315,000	$1,315,000	28-Feb-19
Lateral Replacements WW (non-tree roots)	$1,685,000	$1,685,000	3-May-19
Lateral Replacements WW (tree roots)	$526,000	$526,000	3-May-19
Main Street Sewer Main Replacement	$100,000	$100,000	19-Feb-19
Manhole Renewals WW	$20,000	$20,000	3-May-19
Romans - Federal Avenues Sewer Separation	$2,456,000	$2,456,000	16-Oct-19
Sewer Relocation at South Street CN Bridge	$25,000	$25,000	15-Apr-19
Wanda Lane Sanitary Sewer Replacement	$1,050,000	$1,050,000	5-Jun-19
Wastewater System Trenchless Rehabilitation Program	$2,673,026	$2,473,026	22-May-79
Wet Weather Management Program	$250,000	$250,000	29-May-19
WRWIP Project Bayers Rd Phase 1 - Sewer Separation			
Energy			
HHSP - BAS+ HVAC Recommissioning	$50,000	$50,000	1-May-19
NSPI Meter Relocations	$25,000	$25,000	15-Apr-19
Pump Station HVAC Retro-Commissioning Program	$90,000	$45,000	
Wastewater Pumping Station Performance Testing	$249,000	$249,000	27-Sep-19
Cogswell District Energy System - Engineering Consulting Services	$150,000	$0	3-Sep-19
Halifax WWTF Flow Splitting Computational Fluid Dynamics (CFD) Analysis	$35,000	$0	11-Sep-19
Dartmouth WWTF - New CSA Approved Raw Water Pumps	$225,000	$0	11-Sep-19
Equipment			
I&I Reduction (SIR) Program Flow Meters and Related Equipment	$25,000	$25,000	3-May-19
Miscellaneous Equipment Replacement	$120,000	$120,000	3-May-19
Mill Cove WWTF New Yard Tractor	$10,000	$0	27-Sep-19
Wastewater CCTV Equipment Replacement	$183,000	$183,000	6-Nov-19
Facility			
Community Wastewater Treatment Facilities: Personal Monitoring Devices	$15,000	$0	20-Jun-19
DWWTF New Air Compressors	$55,000	$0	25-Jun-19
Halifax WWTF South Access Gate Rehabilitation	$16,000	$0	30-Jul-19
Eastern Passage WWTF Plant Optimization Funding Increase	$18,000	$0	17-Oct-19
DWWTF Old Raw Water Pump Rebuild & Storage Container	$0	$0	23-Oct-19
Forcemains			
Beaver Crescent PS - FM Replacement	$500,000	$500,000	23-May-19
Caldwell Road ARV/MH Replacement	$75,000	$75,000	28-Feb-19
Security			
Security Upgrade Program	$200,000	$200,000	6-Aug-19
Structures			
Autoport Pleasant Street PS Replacement			
CSO Upgrade Program			
Duffus PS CSO - Modification	$50,000	$50,000	18-Jun-19
Emergency Pumping Station Pump Replacements	$250,000	$250,000	31-May-19
Fairfield Holding Tank Rehabilitation	$25,000	$25,000	26-Mar-19
Fish Hatchery FM - ARV Chamber Water Proofing	$25,000	$25,000	28-Feb-19
Pump Station Elimination - Concept Design	$25,000	$25,000	12-Mar-19
Russell Lake PS Upgrade			
Upper Water Street PS CSO Replacement			
Wastewater Pumping Station Component Replacement Program - Central	$250,000	$250,000	1-May-19
Wastewater Pumping Station Component Replacement Program - East	$200,000	$200,000	24-Jul-19
Wastewater Pumping Station Component Replacement Program - West	$200,000	$200,000	24-Jul-19
Windmill Road PS Replacement			
Treatment Facilities			
Aerotech WWTF Asset Renewal Program	$50,000	$50,000	5-Jun-19
Aerotech WWTF Upgrade and Expansion Project Extra Cost	$500,000	$500,000	15-Apr-19

Category	Total Approved	Net Impact on Budget	Approval Date
Building Cleaning and Corrosion Protection	$480,000	$240,000	19-Feb-60
Carbon Media Replacement			
Dartmouth WW Treatment Facility Coagulant Dosing Pump Replacements	$40,000	$40,000	17-Oct-19
Dartmouth WW Treatment Facility Densadeg Flow Meters	$70,000	$70,000	7-Nov-19
Dartmouth WW Treatment Facility Duct Work Replacement	$25,000	$25,000	8-Apr-19
Easement for Sewer and Access			
Eastern Passage WWTF Atlas Copco Blowers Spare VFD	$20,000	$20,000	8-Apr-19
Eastern Passage WWTF Drum Thickener Overhaul Spare Parts	$15,000	$15,000	8-Apr-19
Eastern Passage WWTF Outfall Inspection and Warning Signage	$15,000	$15,000	26-Apr-19
Eastern Passage WWTF Primary Sludge Pumps Spare Parts	$15,000	$15,000	8-Apr-19
Eastern Passage WWTF Process Upgrade Program	$50,000	$50,000	17-Oct-19
Eastern Passage WWTF RAS Pumps Spare Parts	$40,000	$40,000	8-Apr-19
Eastern Passage WWTF Yard Lighting	$35,000	$35,000	8-Apr-19
Emergency Wastewater Treatment Facility equipment replacements	$335,000	$335,000	16-Sep-19
Grit Pump Replacement	$75,000	$75,000	15-Apr-19
Halifax WWTF AHU Coil Replacement	$45,000	$45,000	18-Jun-19
Halifax WWTF Duct work Replacement	$50,000	$50,000	8-Apr-19
Halifax WWTF New Raw Water Pumps	$50,000	$275,000	10-Jun-19
Herring Cove Wastewater Treatment Facility Duct Work Replacement Program	$25,000	$25,000	8-Apr-19
HHSP - OCS Wet Scrubber Chlorine Analyzers	$125,000	$125,000	29-May-19
HSPs - Outfall Inspection Program	$20,000	$20,000	26-Apr-19
Management Plan	$60,000	$60,000	17-Oct-19
Mill Cove WW Treatment Facility Digester Mixers Failure Analysis	$20,000	$20,000	21-May-19
Mill Cove WW Treatment Facility Lining of Supernatant Pump Croc	$50,000	$50,000	21-May-19
Mill Cove WW Treatment Facility New Lab Cabinets and Countertops	$69,500	$60,000	18-Apr-19
Mill Cove WW Treatment Facility Process Upgrades - Preliminary & Detailed Design	$150,000	$150,000	17-Oct-19
Mill Cove WW Treatment Facility Replace Oxygen Analyzer	$75,000	$75,000	21-May-19
Mill Cove WW Treatment Facility South Secondary Clarifier Recoat/Replace Mechanisms	$100,000	$100,000	17-Oct-19
Mill Cove WW Treatment Facility South Secondary Splitter Box Rehabilitation	$30,000	$30,000	21-May-19
Plant Optimization Audit Program	$125,000	$125,000	23-May-19
Springfield Lake and North Preston - Driveway Replacement	$15,000	$15,000	23-May-19
Timberlea WWTF Asset Renewal Program	$50,000	$50,000	17-Oct-19
Eastern Passage WWTF Rebuild Centrifuge 801	$50,000	$50,000	8-Apr-19
Dartmouth WWTF Grit Pump replacement	$37,500	$0	18-Jun-19
Aerotech BFP LBB Refurbishment	$130,000	$0	8-Jul-19
HHSPs - Neutral Grounding Investigation	$8,500	$8,500	3-Dec-19
Emergency Pumping Station Pump Replacements - Duffus Street	$126,000	$126,000	8-Jan-20
Solar PV Project - Construction and Commissioning	$220,000	$0	
WW Collections - Wastewater Trenchless Rehabilation Program (155K), WWT Mill Cove WWTF - Replace Chlorine Analyzer ($31,500), and WW Eastern Passage WWTF Replace Yard lighting)	$220,000	$0	17-Dec-19
Trunk Sewers			
Fairview Cove Trunk Sewer	$600,000	$600,000	11-Apr-19
Sackville Trunk Sewer - Condition Assessment	$155,000	$155,000	2-Jul-19
Wastewater Total	**$20,227,526**	**$18,826,526**	
Stormwater			
Collection System			
Joe Street Additional Integrated Project	$62,000	$0	18-May-19
Pernix Crt Additional Integrated Project	$17,000	$0	18-May-19
Athorpe Street Additional Integrated Project	$10,000	$0	18-May-19
Forestglen Drive Additional Integrated Project	$44,000	$0	18-May-19
Lakeview Drive Additional Integrated Project	$31,000	$0	18-May-19
Gottingen Street Additional Integrated Project	$43,000	$0	18-May-19
Eastview Drive Additional Integrated Project	$15,000	$0	18-May-19
Quaker Cres Additional Integrated Project	$23,000	$0	18-May-19
Culverts/Ditches			
Bundy Lane near civic 79			
Coronet Avenue driveway culvert replacement project	$100,000	$100,000	30-Jul-19
Driveway Culvert Replacements	$812,000	$812,000	8-May-19
Frederick Drive at Dyke Road			
Highway 2, near civic 1380	$200,000	$170,000	25-Jun-19
Lucasville Road Sta 0+910 near civic 1155	$38,000	$38,000	15-Apr-19
Lucasville Road Sta 1+595 at Third Street	$38,000	$38,000	15-Apr-19
Lucasville Road Sta 2+695 near civic 758	$38,000	$38,000	15-Apr-19
Lucasville Road Sta 2+850 near civic 749 and 743	$38,000	$38,000	15-Apr-19
Millers Road near civic 1			
Murray Road at Caldwell Road			
Parkway Drive and Atholea Drive			
Stormwater Survey and Studies Program			
Kipawa Crescent - Culvert Replacement Design Phase	$31,000	$0	1-Apr-19
Yankeetown Road near civic 16 (project is deferred to next budget year)	$88,000	$88,000	15-Apr-19
Kingswood Drive near civic 10	$34,000	$0	30-Jul-19
Kingswood Drive near civic 60	$34,000	$0	30-Jul-19
Sewer Separation Program - Bayers Road Phase II Project - Detailed Engineering Design	$75,000	$0	31-Jul-19
Seth Aaron Drive near civic 40	$37,000	$0	30-Jul-19
Dartmoor Crescent Integrated Project Culvert Replacements	$134,000	$0	3-Oct-19
Sunrise Hill SW IP 19/20	$82,000	$0	1-Oct-19
Pipes			
Catchbasin Renewals SW	$60,000	$60,000	3-May-19

Category	Total Approved	Net Impact on Budget	Approval Date
Celtic Drive Storm Sewer Renewal	$120,000	$120,000	22-Feb-19
Cogswell Redevelopment SW Sewer Relocation	$300,000	$300,000	12-Jul-19
Drainage Remediation Program Surveys/Studies			
Everette Street at Bonnie Brae Drive Drainage Upgrade			
Integrated Stormwater Projects	$1,200,000	$1,200,000	28-Feb-19
Lakecrest Drive CMP Replacement			
Lateral Replacements SW	$12,000	$12,000	3-May-19
Manhole Renewals SW	$15,000	$15,000	3-May-19
National Disaster Mitigation Program			
Stormwater Pipe Condition Inspections (CSP)	$100,000	$100,000	15-Apr-19
Wanda Lane Deep Storm Sewer	$205,000	$205,000	5-Jun-19
Wanda Lane Storm System Upgrade	$210,000	$210,000	5-Jun-19
Structures			
Clement St. Berm	$82,000	$82,000	1-Oct-19
Ellenvale Run Retaining Wall System Phase 2	$2,220,000	$2,220,000	15-Apr-19
Ellenvale Run Retaining Wall System Phase 3 (Wanda Lane)	$1,830,000	$1,830,000	5-Jun-19
Stormwater Total	**$8,378,000**	**$7,676,000**	
Corporate			
Facility			
Building Capital Improvements	$98,500	$98,500	19-Sep-19
East/Central Regional Operational Facility			
Fleet			
Fleet - Stormwater	$295,000	$295,000	3-May-19
Fleet - Wastewater	$1,180,000	$1,180,000	3-May-19
Fleet - Water	$385,000	$385,000	3-May-19
GIS			
Engineering Drawing Database			
GIS Application Support Program	$85,000	$85,000	23-Oct-19
GIS Data Build			
GIS Data Project			
GIS Hardware/Software Program			
Sewer Service Entry			
Water Data Base Model			
Information Technology			
Analytics Decision Support System	$225,000	$225,000	23-Sep-19
Approval Forms Framework	$415,000	$415,000	9-Apr-39
Computer Maintenance Management System (CMMS) Enhancements	$1,000,000	$1,000,000	24-Jun-19
Customer Portal	$220,000	$220,000	19-Sep-19
Customer Transactional Site			
Data Governance	$150,000	$150,000	29-May-19
Desktop Computer Replacement Program	$290,000	$290,000	3-May-19
Document/Content Management	$100,000	$100,000	12-Dec-19
IT Foundations	$200,000	$200,000	1-Nov-19
IT Server Hosting			
Migrate to Office 365	$250,000	$250,000	9-Dec-19
Mobile Devices and Applications	$40,000	$40,000	7-Nov-19
New payroll System	$600,000	$600,000	30-Apr-19
Permit Approvals	$1,360,000	$770,000	12-Dec-19
Regulatory Reporting	$33,000	$33,000	30-Jul-19
SAP S4 Hana Upgrade	$348,000	$348,000	15-May-19
Stormwater Billing Support			
Telephony	$90,000	$90,000	1-Nov-19
Water/Wastewater Data Quality Software Replacement			
Asset Registry			
ERP Solution Project Request for proposal Phase	$248,000	$0	24-Jul-19
Regulatory Reporting - Phase 1 Executing	$189,578	$189,578	3-Sep-19
SCADA & Other			
GPS Units - Replacement	$67,000	$67,000	22-Feb-19
Large and New Customer Meters	$460,000	$460,000	3-May-19
Meter Deployment	$2,600,000	$2,600,000	3-May-19
SCADA Control System Enhancements	$100,000	$100,000	21-May-19
Central SCADA System Redesign/Relocation	$90,000	$0	18-Mar-19
Asset Management			
Corporate Flow Monitoring Program	$1,760,000	$1,760,000	20-Jun-19
Storm Sewer Condition Assessment	$60,000	$60,000	22-May-19
Vulnerability to Climate Change Risk Assessment - Asset Call Pilot	$100,000	$100,000	8-Jul-19
Wastewater Sewer Condition Assessment	$143,000	$90,000	22-May-19
Hydraulic Water Model Build			
Corporate Total	**$13,182,078**	**$12,201,078**	
Grand Total	**$62,883,524**	**$59,054,524**	

ITEM 3-I

FINANCIAL REPORT - Bank Balance

Consolidated Bank Balance		
As Of:	January 23, 2020	$5,454,094,545
Investment Rate of Return:	December 2019	0.192%
For month of:		2.258%
Annual:		

ITEM # 4-I
HRWC Board
January 30, 2020

Halifax Water Compliance Statement
Quarterly Certification

For the period of October 1, 2019 to December 31, 2019

We hereby certify that the Halifax Regional Water Commission is current in making all statutory remittances for payroll taxes, Harmonized Sales Tax and other remittances as required under the laws of the Government of Canada and its Provinces (the significant remittances are noted in the appendix) and that all legal claims have been disclosed.

Original Signed By:
Cathie O'Toole
General Manager

Original Signed By:
Louis de Montbrun
Director of Corporate Services/CFO

Dated:

January 20, 2020

Halifax Water Compliance Statement
Quarterly Certification
Appendix I

Significant statutory remittances for payroll taxes, Harmonized Sales Tax and other remittances as required under the laws of the Government of Canada and its Provinces for the HRWC

Statutory Payroll Remittances

- **Canada Revenue Agency (CRA) -** Statutory employee payroll deductions and employer related contributions for:
  - Income Tax
  - Canada Pension Plan (CPP)
  - Employment Insurance (EI)

- **Workers' Compensation Board of Nova Scotia (WCB)** – Employer remittance based on employee payroll

Other Payroll Remittances

- **Northern Trust -** Employee payroll deductions and employer contributions to Halifax Water and HRM defined benefit pension plans

- **Industrial Alliance** – employer and employee contributions to defined contribution pension plan

- **Medavie Blue Cross & SSQ** – employee payroll deductions and employer related contributions for Health & dental, LTD, and Life benefit coverage, and payroll deductions for AD&D

- **Canadian Union of Public Employees** – Employee payroll deductions of union dues
  - CUPE Local 227
  - CUPE Local 1431

HST and Other Remittances

- **Canada Revenue Agency (CRA) -** Harmonized Sales Tax (HST) is filed online and a refund issued as HST paid is greater than HST collected

- **Workers' Compensation Board of Nova Scotia (WCB)** – Remittance for sub-contractors

Quarterly Remittance Certification

Appendix II

Period: **October to December** **2019**

Vendor	Vendor #	Items Remitted	Total remitted	Exceptions
Statutory Payroll Remittances				
CRA	174	Tax, CPP, EI, WCB	$ 2,940,401.48	
Other Payroll				
Northern Trust	1215	HW Pension Plan	$ 1,616,314.53	
Northern Trust	1216	HRM Pension Plan	$ 281,379.67	
Manulife Financial	1171	Bedford Pension Plan	$ 2,042.42	
Industrial Alliance	2971	DCPP	$ 7,440.16	
Medavie Blue Cross	340, 3101	Health, Dental, Life, LTD	$ 467,855.28	
SSQ Insurance	429	AD&D	$ 4,831.61	
CUPE	160	Union Dues 1431	$ 29,918.34	
CUPE	161	Union Dues 227	$ 56,906.06	
Other payroll not noted				
United Way, Credit Union, Garnishments (WCB, CRA, Family Court, Sherriff's Office), Water for People, Salvation Army, Racially Visible Caucus				
HST and Other				
CRA	N/A	HST (refunds)	$ (3,138,995.22)	
Receiver General	210	WCB subcontractors	$ 869.54	

Exceptions, errors and/or late remittances

Halifax Water
Halifax Regional Water Commission

ITEM # 5-I
HRWC Board
January 30, 2020

TO: Craig MacMullin, MBA, CPA, CGA, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
James Campbell, Communications and PR Manager

APPROVED: *Original Signed By:*
Cathie O'Toole, MBA, FCPA, FCGA, ICD.D
General Manager

DATE: January 14, 2020

SUBJECT: **2019 Annual Customer Survey**

INFORMATION REPORT

ORIGIN

Operational Requirement, Corporate Balanced Scorecard (CBS) Performance Measurement.

BACKGROUND

Since 2000, Halifax Water has engaged Corporate Research Associates (recently rebranded as Narrative Research Inc.), a highly respected local research firm, to compile information on a number of topics critical to the operation of the utility as it relates to public confidence and perception. The questions generally focus on customer satisfaction with services and products provided for water, wastewater and stormwater service delivery.

For 2019, Halifax Water commissioned questions in the Fourth Quarter 2019 Halifax Urban Report and the Fourth Quarter 2019 Atlantic Quarterly. Information from the Halifax Urban Report is based on telephone interviews conducted from October 24 to November 10, 2019. Information from the Atlantic Quarterly is based on telephone interviews conducted from November 12 to November 28, 2019.

The overall results are based on 750 interviews with individuals from the Halifax Municipality population. A sample of 750 respondents would be expected to provide results accurate to within plus or minus 3.6 percentage points in 95 out of 100 samples.

DISCUSSION

Results this year across key survey categories indicates that residents continue to rate Halifax Water's performance highly across a multitude of categories, with a high proportion of customers surveyed providing very positive ratings for the indicators related to Water Quality and Service Excellence. Strong customer support is essential as the utility prepares to file a General Rate Application in 2020 and continues to roll out customer and environment focused programs and projects across the region, in this our 75th year of service.

Two of our Critical Success Factors as outlined in the Corporate Balanced Scorecard are: **High Quality Drinking Water** and **Service Excellence**. In these 2 categories the target for organizational indicators is set high. Our target is 85% of customers rating drinking water as either good or excellent, and 90% of customers satisfied or very satisfied with overall service from Halifax Water.

This year's results indicate 87% of customers perceive water quality as good or excellent, a slight decrease from 89% in 2018. A sub-category surveyed under drinking water quality is Water Safety. In this category, Halifax Water came in at 95% of customers rating our water as safe or very safe, compared to 96% in 2018. These excellent numbers show our customers continue to place a high value on the overall quality and safety of our water across the region.

For Service Excellence, two categories address this broader topic, Satisfaction with Halifax Water's Products & Services, and Satisfaction with Halifax Water's Overall Service Delivery. In these categories, the results were 93% and 96% respectively. These figures represent a consistent high rating in satisfaction with Halifax Water's Products & Services, and our Overall Service Delivery, and match 2018 results.

Halifax Water's Lead Service Line (LSL) Replacement Subsidy Program came into place in August 2017. The program provides for a 25% subsidy, up to $2500.00, toward the replacement of a private lead service line. Awareness of the subsidy program in 2018 was 14%. 2019 saw that rise to 16%; 47% were very or somewhat interested in participating, down marginally from 48% in 2018. At the November 28, 2019 Halifax Water Board meeting, Commissioners authorized staff to include enhancements to the LSL program in the next general rate application. The enhancements would see Halifax Water again take an industry leadership role on removing LSLs and assume responsibility for the replacement of the public and private side of the LSL. Pending the filing of a general rate application and subsequent decision of the NSUARB on this proposed LSL program, decisions will be made on enhanced messaging to raise program awareness.

New for this survey period were questions related to stormwater service; customer interest in rounding up their bill to the nearest dollar as a charitable donation; and customer interest in an online account management system to monitor their water consumption, manage their account information, and pay their bills online. For customers who receive stormwater

service from Halifax Water, 83% were very/generally satisfied; 52% were very/somewhat interested in rounding up their bill; and 67% were very/somewhat interested in having access to an online account management system.

Halifax Water's services and products impact the homes and businesses of our customers every day. In order to deliver these products and services, and make short and long term investments, strong customer support is critical.

Survey results this year show continued strong customer support in key categories, but staff across the organization must continue to engage customers in a courteous, efficient, timely manner and work to promote the value of the water, wastewater and stormwater services we provide. Continued targeted public messaging with our "Straight From the Source" branding, along with expanded community outreach, will help support the messages of the need for short and long term investments in critical infrastructure, climate change adaptation and mitigation, regulatory compliance, asset renewal, system growth, protection of public health and the environment, as well as key programs and projects.

For the benefit of all staff, the survey will be placed on the Halifax Water Intranet, and hard copies distributed to all work locations. Additionally, the General Manager will be visiting work locations to speak with staff about the survey results and discuss potential areas of improvement.

Staff will be encouraged to take the time to read the survey results and provide any comments or suggestions they might have.

ATTACHMENT

Narrative Research Inc. 2019 Quality of Service Study – Final Report

Report Prepared by: *Original Signed By:*
James Campbell, Communications and PR Manager, 902-490-4604

NARRATIVE RESEARCH

2019 Quality of Service Study

Final Report Prepared for:

Halifax Water

Halifax Water STRAIGHT from the SOURCE

December 2019

Table of Contents

Introduction

Narrative Research (formerly Corporate Research Associates, Inc.) is pleased to present Halifax Water with the results of the ***2019 Quality of Service Study***. Halifax Water commissioned questions on the Fourth Quarter 2019 *Halifax Urban Report* and the Fourth Quarter 2019 *Atlantic Quarterly*®. The purpose of this research was to examine customers' perceptions of the service provided by Halifax Water, as well as to examine broader issues around water quality and service delivery.

The total sample size for questions asked on both the *Halifax Urban Report* and the *Atlantic Quarterly*® is 750. A sample of 750 residents can be expected to yield an overall margin of sampling error of ± 3.6 percentage points in 95 out of 100 samples. Of these 750 residents, 564 receive their household water from Halifax Water. A sample of 564 Halifax Water customers can be expected to yield an overall margin of sampling error of ± 4.1 percentage points in 95 out of 100 samples.

A copy of the questionnaire is appended (Appendix A), as well as comprehensive banner tables (Appendix B) that present the results for each question by key demographic subgroups. The tables are noted by number throughout the report for easy reference. Unless otherwise stated, all results in this report are expressed as a percentage.

Executive Summary

Overall, results for the ***2019 Quality of Service Study*** indicate that residents continue to rate Halifax Water's performance highly across a multitude of categories. Most Halifax Water customers believe that their water is safe and of high quality, and are satisfied with Halifax Water's products and services, findings that are consistent with the 2018 survey results.

In terms of specific aspects of the service, Halifax Water provides, ratings for *overall delivery of service* remain high and consistent compared with last year's results, as are ratings for key service indicators such as *staff accessibility, staff promptness*, *ability to answer questions*, and *politeness*. In fact, the ratings for *staff promptness* have increased over those observed last year, with other areas seeing some marginal improvement as well. In addition, Halifax Water's Customer Satisfaction Index, which provides an overall assessment of performance based on customers' ratings across six service areas remains consistent with the record high achieved last year.

Confidence in the safety of water in the Halifax Harbour is moderate at best, consistent with results observed over the past two years. Specifically, 44 percent of residents are confident that the water quality in Halifax Harbor is safe for recreational use, while over one-half of residents are not.

Residents continue to lack awareness of the primary source of their municipal tap water. Meanwhile, two in ten customers identified Pockwock Lake as the primary source of their tap water, and one in ten residents mentioned Lake Major, consistent with the previous year's results. Consistent with the last year's results, four in ten residents report using a water filter or other home water treatment device. *Improved taste*, *concerns about water quality*, and *removal of chemicals* from tap water are the top three reasons why residents use a water filter or other home treatment devices.

New this year, over four in ten residents reported receiving stormwater service from Halifax Water. Meanwhile, one in four residents was not sure in this regard. Among those who receive stormwater service from Halifax Water, the vast majority is satisfied with the service. In terms of the wastewater systems, seven in ten Halifax residents are on municipal sewer, while approximately one-quarter are on a home septic system. These findings are stable compared to last year's findings.

For the third year, a large majority of customers remain unaware of Halifax Water's subsidy program to assist residential customers with replacing their lead water service lines that connect the water main in the street to a customer's home. Awareness of the program is consistent with last year's results with one in six residents being aware of the program. Among residents with homes constructed prior to the 1960s, close to one-half indicate interest in using the subsidy program within the next few years. The findings have been stable over the past three years.

The Internet continues to be the preferred method by a large margin across regions and demographic subgroups, in terms of accessing information related to Halifax Water`s water, wastewater, and stormwater programs. Four in ten are aware of the 'Customer Connect' Water Meter Replacement Program. Among these residents who could recall the program, the main messages taken away relate to the measurement of one's water consumption online and the installation of new water meters. It should, however, be noted that four in ten residents could not identify the main message of "Customer Connect".

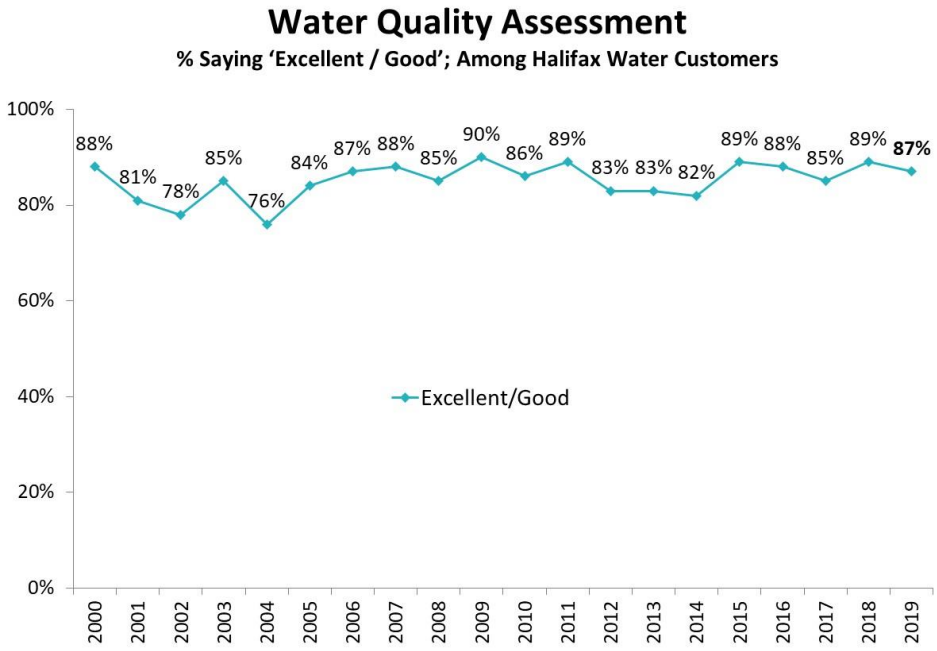
For the first time, Halifax Water customers were asked if they would be interested in rounding up their bill to the nearest dollar, with the rounded portion given as a charitable donation to help low-income customers in need. One-half of the customers expressed interest in rounding up their bill, including three in ten customers who said they were *very interested*. Similarly, customers were asked if they would be interested in managing their account online. Two-thirds of customers expressed interest in managing their accounts online, including four in ten customers who mentioned being *very interested*.

In conclusion, it is important to reiterate performance on two key quality of service indicators. Satisfaction with Halifax Water's *overall service delivery* remains strong with almost all (96%) customers satisfied, consistent with previous years. Likewise, satisfaction with Halifax Water's *products and services* also remains high, with most (93%) customers satisfied.

Detailed Analysis

Water Issues

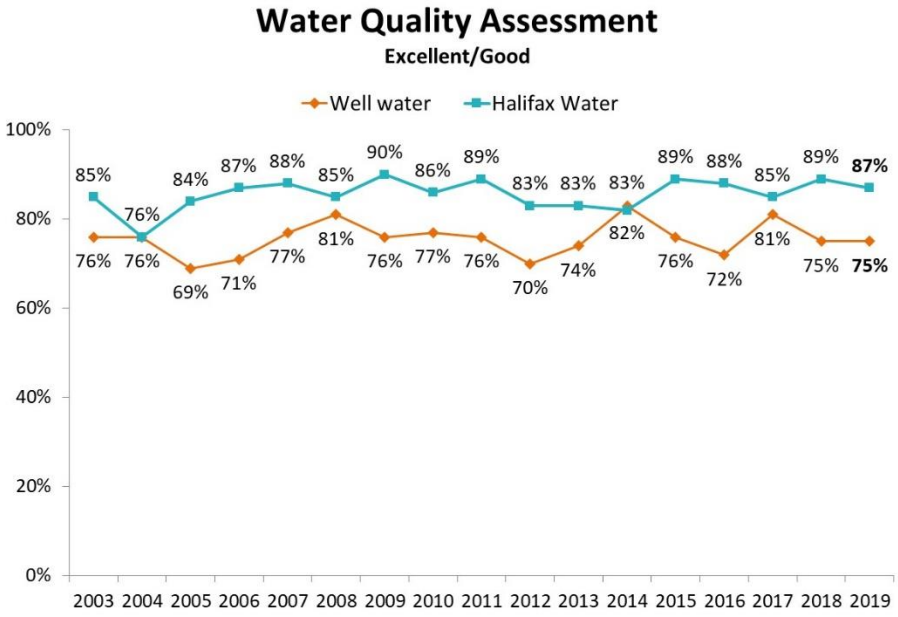
The proportion of Halifax Water customers who rate the water quality of water that they receive as *excellent* or *good* is consistent with the results observed last year. Approximately nine in ten residents (87% compared to 89% in 2018) offer a favourable assessment of the quality of water received from Halifax Water. (Table W1)



Q.W1: Overall, how would you rate the quality of water you receive in your household? Would you say it is excellent, good, only fair, or poor? (n=564)

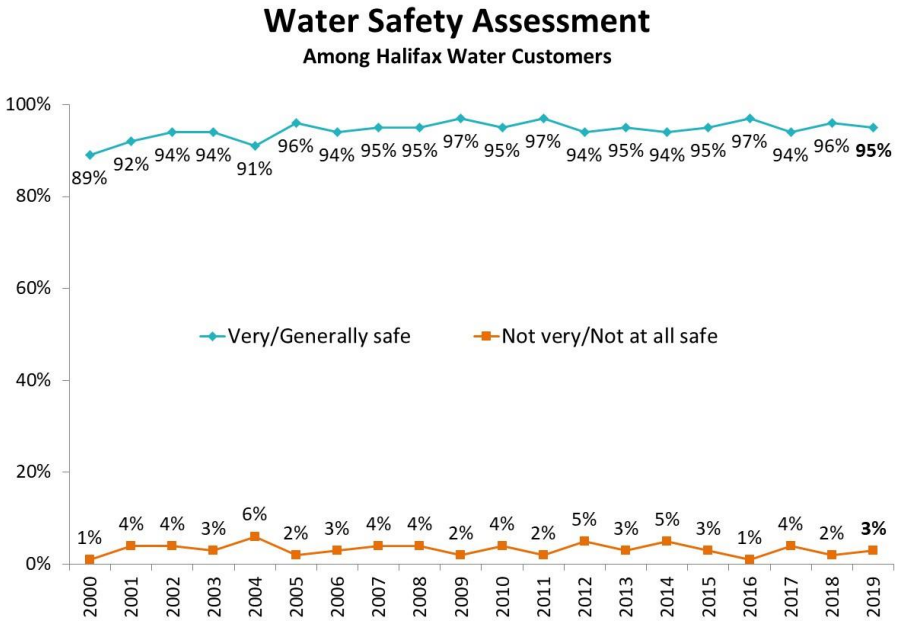
Water quality ratings are consistent regionally, while perceptions of the water quality as excellent or good are more likely among those with household incomes of $50,000 or more.

Halifax Water customers are significantly more likely than those with a well to rate the quality of their water as *excellent* or *good*. The proportion of residents with a well rating their water as excellent or good is stable after the decline evident a year ago.



Q.W1: Overall, how would you rate the quality of water you receive in your household? Would you say it is excellent, good, only fair, or poor? (Halifax Water n=564, Well n=167) *Note: In 2008, HRWC became Halifax Water.*

Nearly all Halifax Water customers perceive their water as *very* or *generally safe*, while very few rate their water as *not very* or *not at all safe*, similar to previous years. Generally, there is little difference in perceptions of water safety regionally or across most demographic subgroups as nine in ten or more provide ratings of *very* or *generally safe* across each audience. Residents with household income less than $50,000 are comparatively less likely than those with higher household incomes to perceive their water as *very* or *generally safe*. (Table W2)

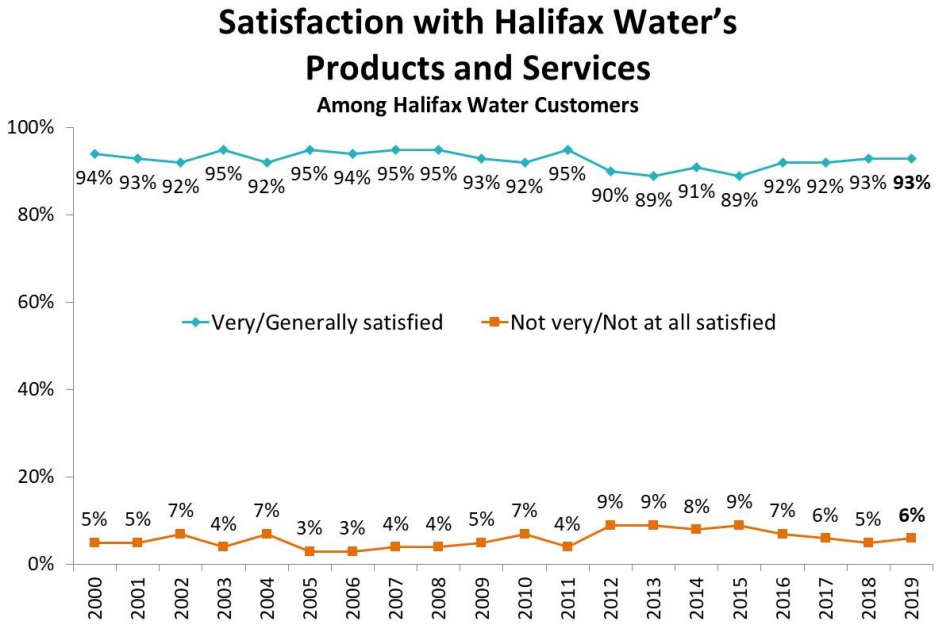


Q.W2: Overall, how safe would you say your water is? Would you say it is very safe, generally safe, not very safe, or not at all safe? (n=564)

Among the small number of Halifax Water customers who believe their water is unsafe (n=17), concerns regarding *addition of unhealthy chemicals*, *high level of chemicals*, *bad taste*, *odour, old pipes, discolouration*, and *water not being drinkable* are top mentions. (Table W3)

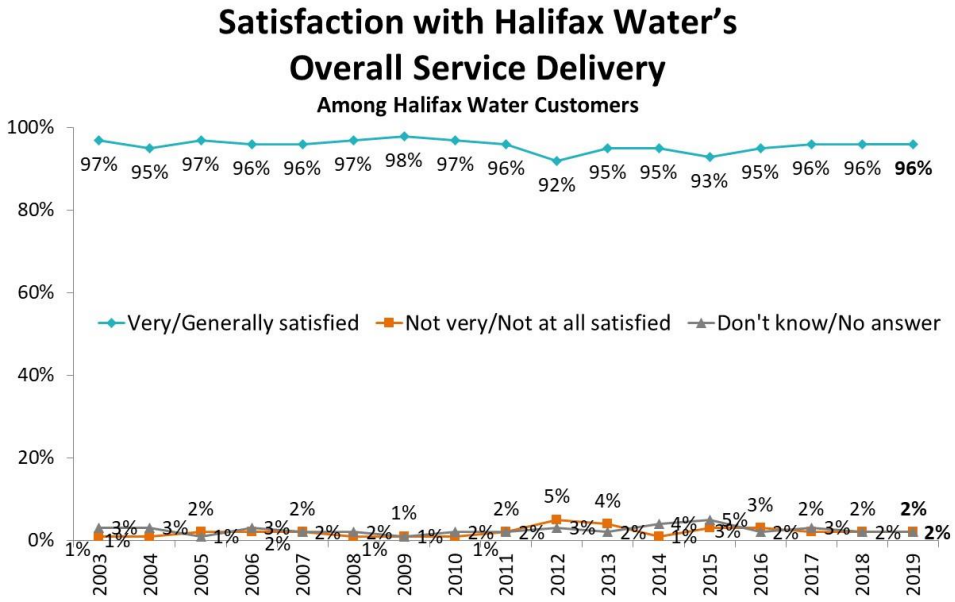
Customer Satisfaction

The vast majority of customers remain satisfied with the products and services they receive from Halifax Water. Just over nine in ten (93%) customers report being *very* or *generally satisfied* with the products and services received from Halifax Water, same as last year. Ratings of satisfaction are high across the regions and demographic subgroups. (Table W5)



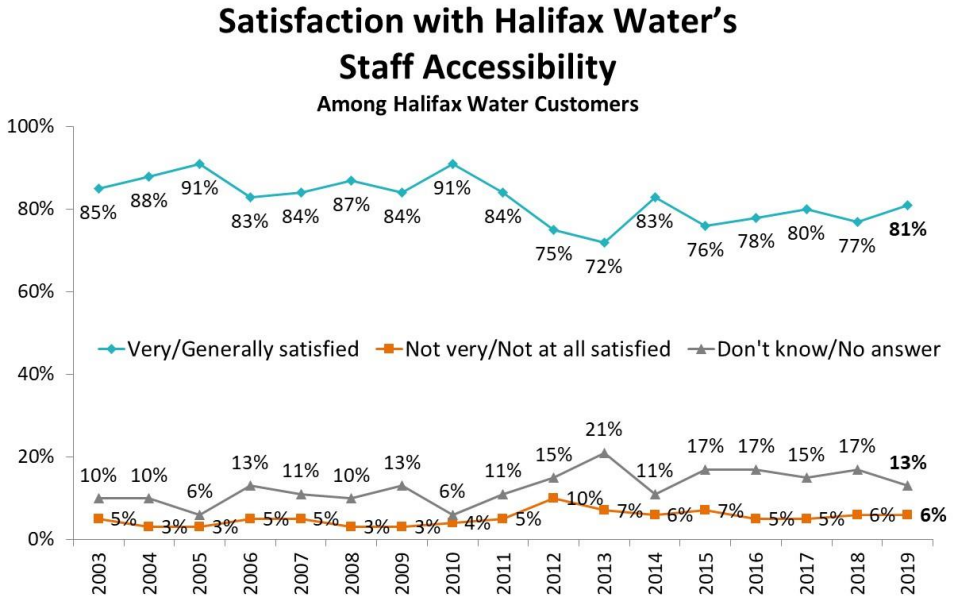
Q.W5: **[ASK ONLY IF 'YES, RECEIVE WATER FROM HALIFAX WATER' IN Q.W4]** All things considered, would you say you are very satisfied, generally satisfied, not very satisfied, or not at all satisfied with the products and services you receive from Halifax Water? (n=564)

The number of customers satisfied with Halifax Water's overall delivery of service remains widespread and is stable compared with previous findings. Specifically, 96 percent of residents offer a rating of *very* or *generally satisfied*, unchanged in the past two years. Satisfaction in this regard is widespread regionally and across the population. (Table W6a)



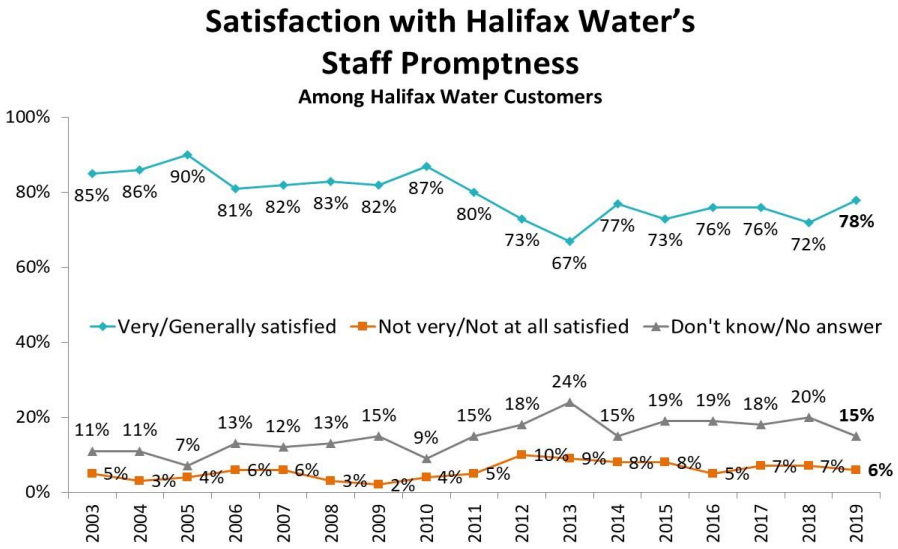
Q.W6a: **[ASK ONLY IF 'YES, RECEIVE WATER FROM HALIFAX WATER' IN Q.W4]** For each of the following, please tell me whether you are very satisfied, generally satisfied, not very satisfied, or not at all satisfied with the service you have received from Halifax Water: Overall service delivery – How well Halifax Water delivers its services to you? (n=557)
Note: Responses for 'Have not used this Halifax Water service' have been removed from this table.

Eight in ten (81%, compared with 77% last year) customers are *very* or *generally satisfied* with the accessibility of Halifax Water staff. Dissatisfaction with the accessibility of Halifax Water staff remains low, while one in eight (13%) customers provided a response of "don't know" or "no answer". Satisfaction with staff accessibility is not appreciably different across the region and demographic subgroups. (Table W6b)



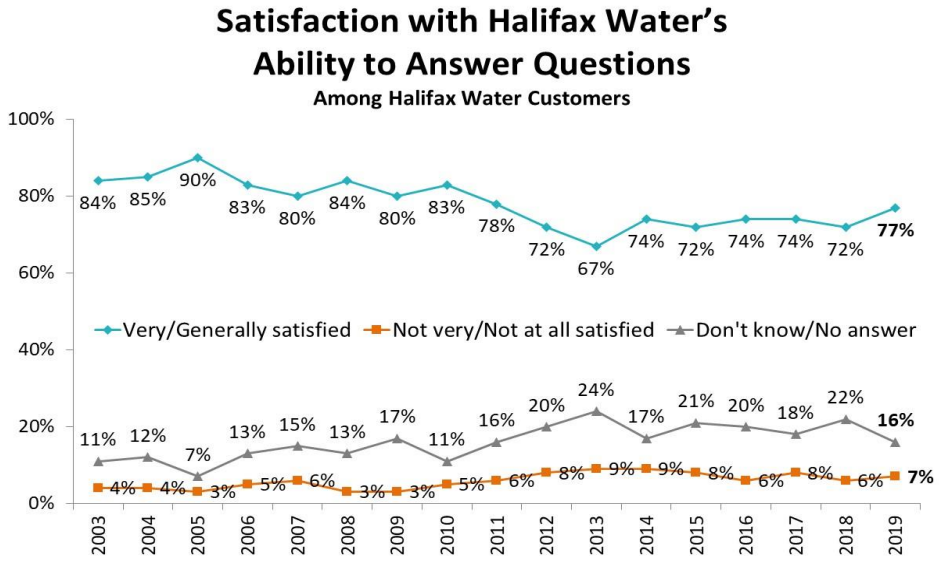
Q.W6b: **[ASK ONLY IF 'YES, RECEIVE WATER FROM HALIFAX WATER' IN Q.W4]** For each of the following, please tell me whether you are very satisfied, generally satisfied, not very satisfied, or not at all satisfied with the service you have received from Halifax Water: Accessibility – How easy it was to reach Halifax Water staff when you needed to? (n=414)
Note: Responses for 'Have not used this Halifax Water service' have been removed from this table.

Almost eight in ten (78%) customers are *very* or *generally satisfied* with the promptness of Halifax Water staff (i.e., how quickly staff were able to respond to questions), up 6 percentage points compared to 2018 results. One in seven customers do not know or is unable to provide an answer to this question. There exists little difference in results across regions as well as demographic subgroups. (Table W6c)



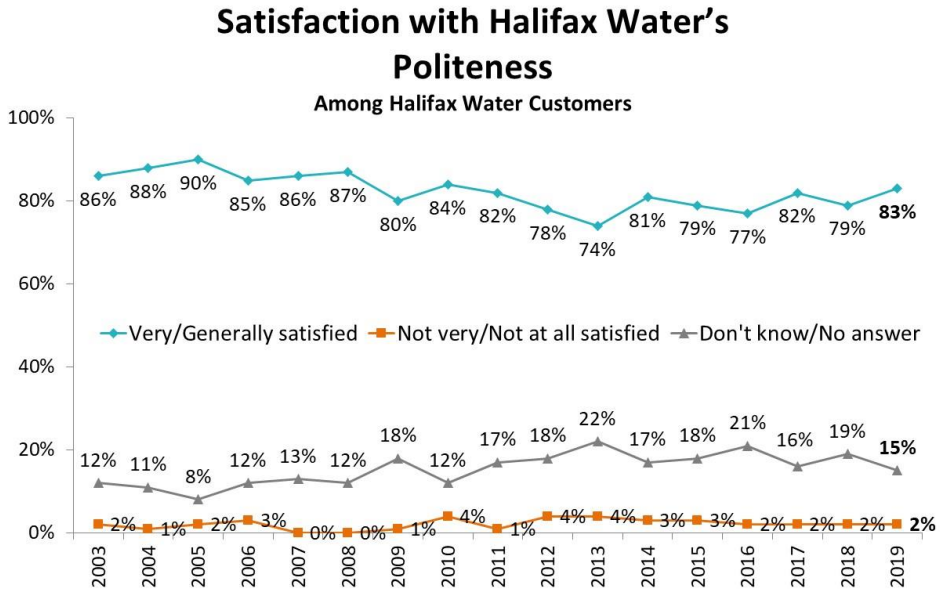
Q.W6c: **[ASK ONLY IF 'YES, RECEIVE WATER FROM HALIFAX WATER' IN Q.W4]** For each of the following, please tell me whether you are very satisfied, generally satisfied, not very satisfied, or not at all satisfied with the service you have received from Halifax Water: Promptness – How quickly Halifax Water staff were able to respond to your questions? (n=405)
Note: Responses for 'Have not used this Halifax Water service' have been removed from this table.

Increased from one year ago, three in four (77%) customers are *very* or *generally satisfied* with Halifax Water's ability to answer questions. Ratings are generally consistent across regions and demographic subgroups. One in six customers do not know or is unable to answer this question. (Table W6d)



Q.W6d: **[ASK ONLY IF 'YES, RECEIVE WATER FROM HALIFAX WATER' IN Q.W4]** For each of the following, please tell me whether you are very satisfied, generally satisfied, not very satisfied, or not at all satisfied with the service you have received from Halifax Water: Ability to answer questions – How well Halifax Water answers your questions? (n=414)
Note: Responses for 'Have not used this Halifax Water service' have been removed from this table.

Similar to findings obtained last year, a majority of Halifax Water customers remain satisfied with the politeness of Halifax Water staff, with over eight in ten (83%, compared with 79% in 2018) customers offering a rating of *very* or *generally satisfied.* Satisfaction with politeness of staff is largely consistent across the region and population; among subgroups where satisfaction scores are lower, this is largely due to a greater proportion of *don't know/no answer* responses than reports of dissatisfaction. (Table W6e)



Q.W6e: **[ASK ONLY IF 'YES, RECEIVE WATER FROM HALIFAX WATER' IN Q.W4]** For each of the following, please tell me whether you are very satisfied, generally satisfied, not very satisfied, or not at all satisfied with the service you have received from Halifax Water: Politeness – The politeness of Halifax Water staff? (n=426)

Note: Responses for 'Have not used this Halifax Water service' have been removed from this table.

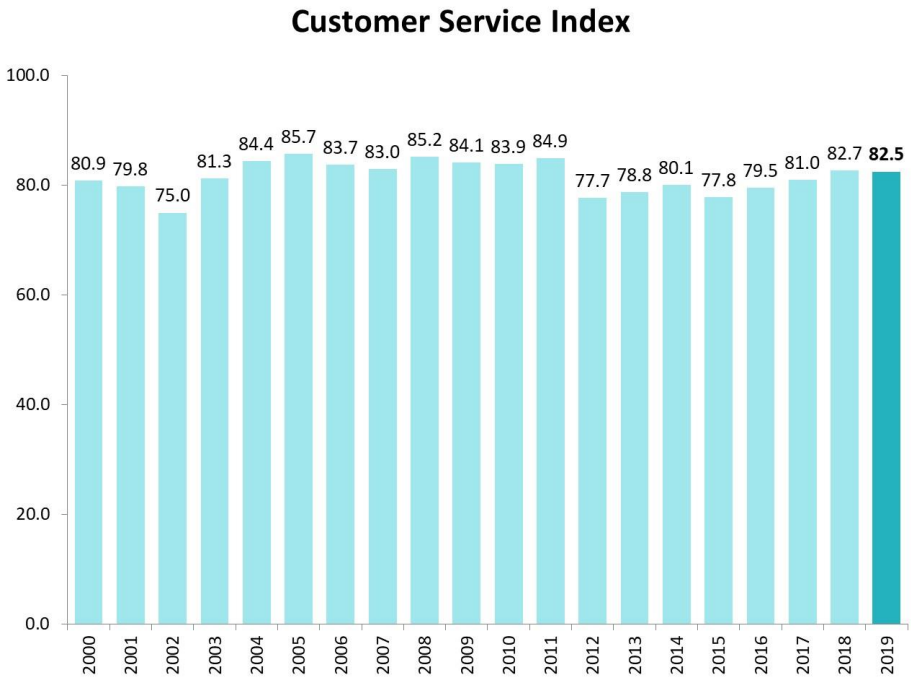
Customer Service Index

Once again, Narrative Research is pleased to present the Halifax Water Customer Service Index (CSI). To provide an overall assessment of service performance, the CSI was calculated based on customers' ratings on six service-focused questions, namely:

- *Overall satisfaction with the Halifax Water (QW5);*
- *Satisfaction with overall service delivery (QW6a);*
- *Satisfaction with accessibility of Halifax Water staff (QW6b);*
- *Satisfaction with promptness of Halifax Water in responding to questions (QW6c);*
- *Satisfaction with Halifax Water's ability to answer questions (QW6d); and*
- *Satisfaction with the politeness of Halifax Water staff (QW6e).*

The Index contains only those Halifax residents who receive Halifax Water products and services. In calculating Index scores for each year, ratings on these six questions were averaged and transformed into a scale ranging from a low of 0 to a high of 100. Thus, the maximum possible score on the CSI is 100, while the minimum is 0. Any question for which a customer did not provide a response was eliminated from the calculation, with the Index score for that customer being calculated on the remaining questions.

The Customer Service Index is 82.5 this year, stable with results observed one year ago. Customers in Dartmouth and surrounding areas have a slightly lower index score compared with others.

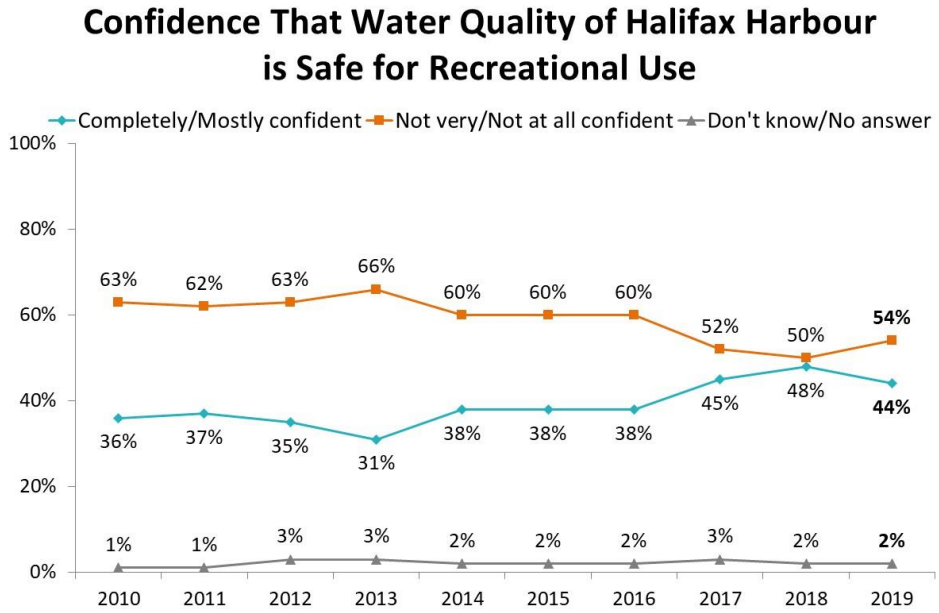


Please note: Results prior to 2011 only include residents who own their home. In 2011, the index calculation includes all Halifax Water residents.

Safety of Halifax Harbour for Recreation

Confidence among the population in terms of the safety of water in Halifax Harbour is modest. Moreover, confidence has marginally declined this year (44%, compared with 48% in 2018) to mimic the results observed in 2017. HRM residents are modestly more likely to be *not confident* regarding the safety of water in Halifax Harbour, with 54 percent of residents (compared with 50% in 2018) indicating that they are either *not very* or *not at all confident*.

Residents with household income of $100,000 plus, post-secondary graduates, and Halifax Water customers have higher confidence that the water quality of Halifax Harbour is safe for recreation. (Table W28)



	2019
Completely confident	7%
Mostly confident	37%
Not very confident	37%
Not at all confident	17%
Don't know/No answer	2%

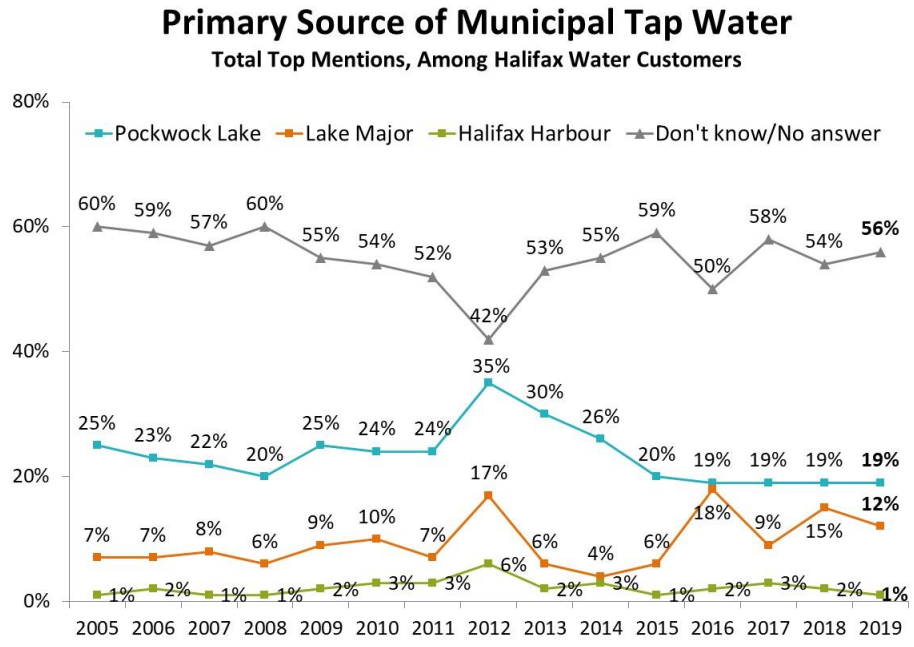
Q.W28: Halifax harbour water samples indicate that the water is safe for recreational activities such as swimming and boating. How confident are you that the water quality of Halifax Harbour is safe for recreational activities? Are you completely confident, mostly confident, not very confident, or not at all confident? (n=750) *Note: Question wording differs slightly year-over-year.*

Water Source

There continues to be uncertainty regarding Halifax residents' knowledge of the source of their municipal tap water. Specifically, 56 percent (compared with 54% last year) of Halifax Water customers cannot name the source of their tap water.

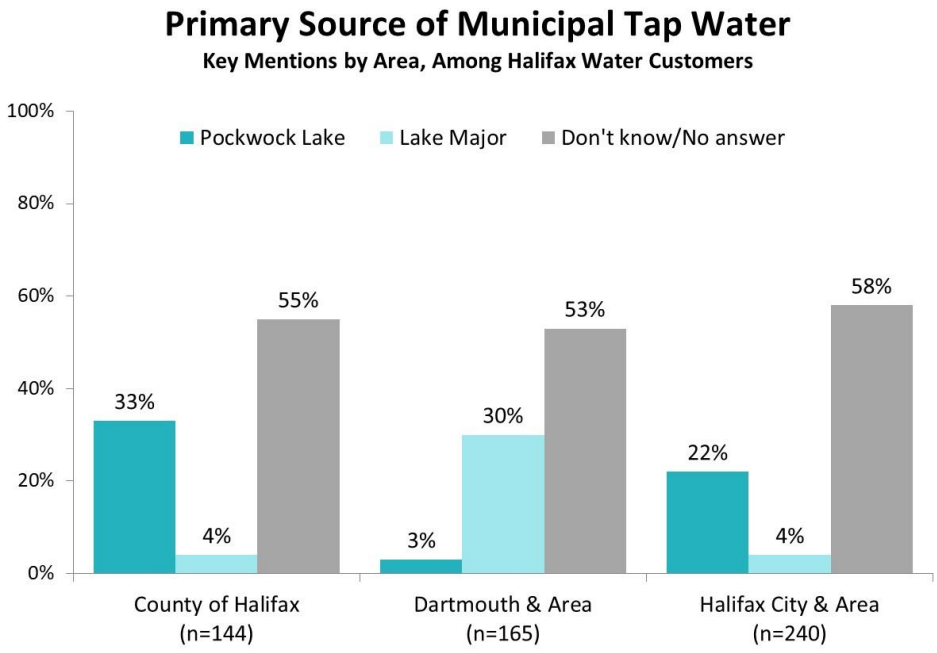
Two in ten customers identified Pockwock Lake as the primary source and one in ten residents mentioned Lake Major, consistent with the previous year's results. A total of three percent of customers cited Long Lake, while one percent of Halifax Water customers each mentioned Lake Loon, Bedford Basin, and Halifax Harbour.

Across the population, women, younger customers, and those with lower annual household income are more likely than others to be unsure of the source of their tap water. (Table W9)



Q.W9: **[ASK ONLY IF 'YES, RECEIVE WATER FROM HALIFAX WATER' IN Q.W4]** To the best of your knowledge, which body of water is the primary source of your tap water supplied by Halifax Water? Probe once: Any other sources? (n=564)

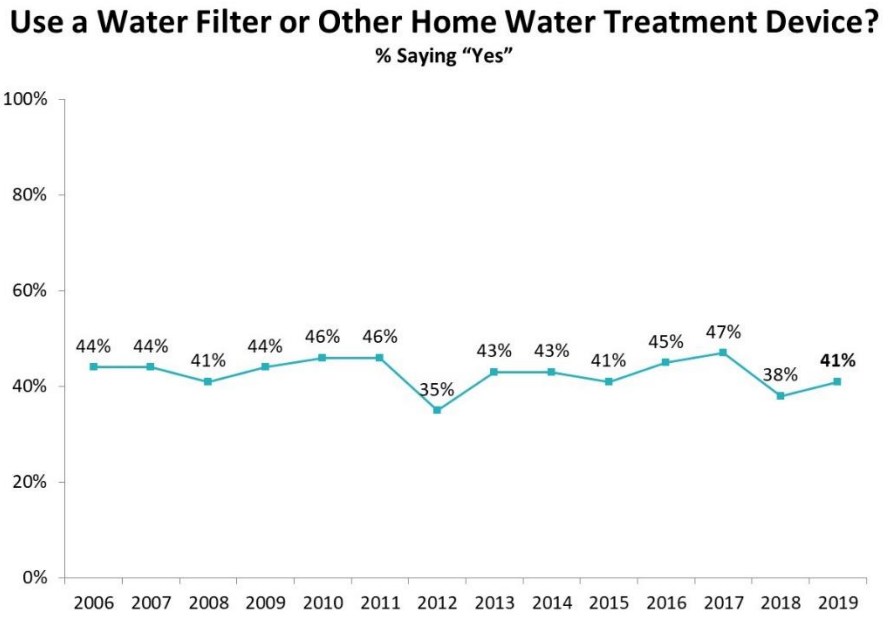
The number of customers who are unsure of their primary tap water source is highest in Halifax City. Those in Dartmouth and its surrounding area are more likely than others in the region to name Lake Major as the primary source of their tap water, and least likely to name Pockwock Lake. (Table W9)



Q.W9: **[ASK ONLY IF 'YES, RECEIVE WATER FROM HALIFAX WATER' IN Q.W4]** To the best of your knowledge, which body of water is the primary source of your tap water supplied by Halifax Water? Probe once: Any other sources?

Water Filter Use

Consistent with last year, four in ten residents (41%, compared with 38%) report using some form of water treatment device. Across the region, residents living in the County of Halifax are most likely to use a water filter or home water treatment device (County of Halifax: 49%, Dartmouth: 38%, and Halifax City: 33%). Meanwhile, residents using a well (67%) are much more likely than Halifax Water customers (34%) to use a water filtration device. (Table W17a)



Q.W17a: Do you use a water filter or other home water treatment device? (n=400)

In terms of the type of water filter or home treatment device, three in ten residents who use a water filter reported using a **pitcher with a water filter**, while one in six residents mentioned using a **fridge filter**. One in eight (13%) residents cited using a **water filter on tap** and one in ten residents each reported using a **water softener system** and **a Brita filter.** Other methods are used by five percent residents or fewer. (Table W17b)

Type of Water Filter or Other Home Treatment Device Used
Key Mentions

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Pitcher with water filter	54%	42%	43%	33%	33%	37%	21%	44%	31%	44%	25%	34%	35%	**29%**
Fridge filter/Part of refrigerator	--	2%	3%	6%	10%	10%	15%	10%	14%	13%	12%	12%	12%	**16%**
Water filter on tap	21%	19%	19%	18%	16%	10%	33%	14%	16%	9%	11%	14%	7%	**13%**
Water softener system	5%	1%	7%	12%	11%	9%	9%	10%	18%	12%	18%	11%	16%	**11%**
Brita filter/Brita	--	--	5%	9%	9%	15%	13%	2%	1%	4%	6%	4%	6%	**11%**

Q.W17b: **[IF 'YES' IN Q.17A]** What type of water filter or other home water treatment device to you use in your household? (n=153)

Halifax residents offer a number of reasons why they use a water filter or home treatment device. One in three residents offered as rationale an **improve taste** after the treatment, while three in ten residents mentioned having **concerns about water quality**. That said, two in ten residents use such devices **to remove chemicals**. All other reasons are mentioned by less than one in ten residents. (Table W17c)

Why Use a Water Filter or Other Home Treatment Device
Key Mentions

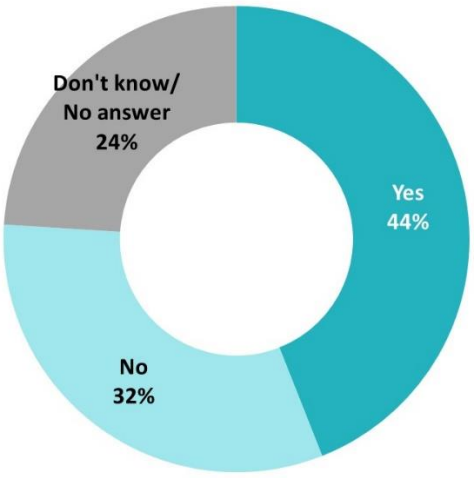
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Improved taste	33%	32%	33%	31%	36%	36%	25%	24%	33%	32%	30%	**33%**
Concerns about water quality	18%	29%	20%	25%	23%	19%	20%	26%	12%	19%	26%	**29%**
To remove chemicals	23%	24%	32%	21%	27%	27%	33%	26%	25%	28%	20%	**22%**
To remove other particles/ impurities	8%	2%	5%	9%	6%	4%	3%	4%	6%	7%	9%	**9%**
To remove bacteria	8%	7%	8%	8%	23%	9%	8%	6%	5%	6%	6%	**9%**
Was given to me/Received as a gift/Came with the fridge/house	4%	4%	9%	6%	3%	4%	6%	10%	7%	7%	8%	**7%**

Q.W17c: **[IF 'YES' IN Q.17A]** Why do you use a water filter or other home treatment device? Probe: Anything else? (n=153)

Stormwater and Wastewater Systems

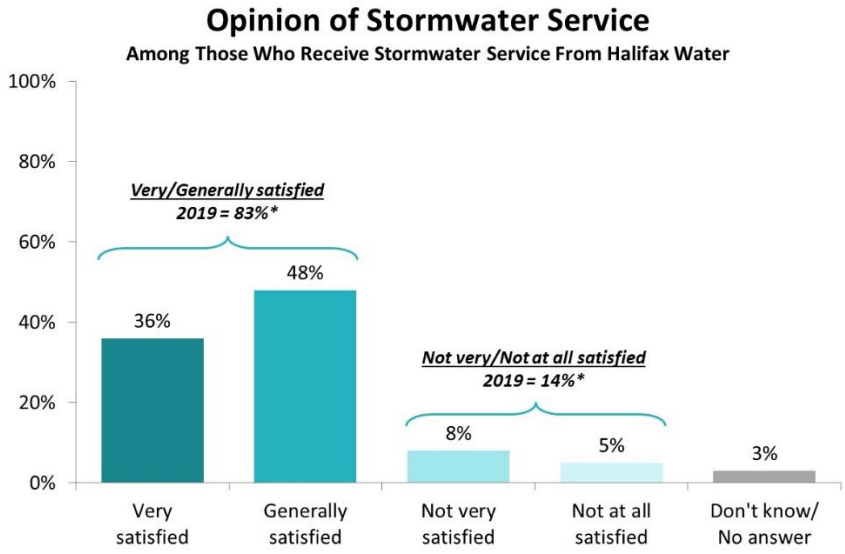
New this year, residents were asked if their household receives stormwater service from Halifax Water. Over four in ten residents reported receiving this service from Halifax Water, while approximately one in three residents indicated they did not. Notably, one-quarter of residents were unsure in this regard. Across regions, residents of Halifax County are less inclined than those living in Dartmouth and surrounding areas or Halifax City to report they receive stormwater service. Similarly, younger residents, and those with lower household income are also less likely to report receiving this service from Halifax Water. (Table W40)

Household Receives Stormwater Service From Halifax Water



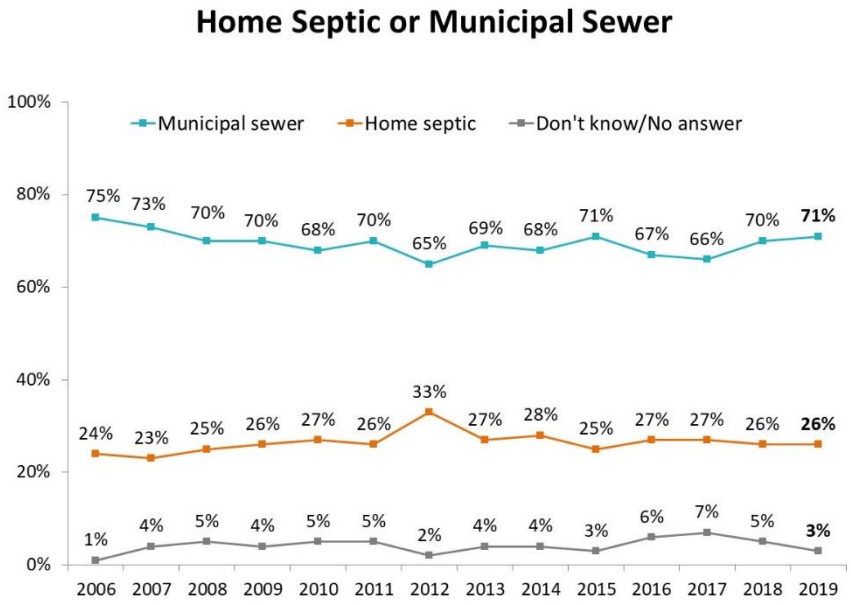
Q.W40: Stormwater service includes the maintenance of ditches and culverts in rural and suburban areas, and underground pipes and pumping systems in urban areas. Does your household receive stormwater service from Halifax Water? (n=750)

Among those who receive stormwater service from Halifax Water, a solid majority of residents (83%) are either *very* or *generally satisfied* with the service. One in seven residents is not satisfied with the service, while three percent of residents did not offer a definite opinion in this regard. Residents of Halifax County as well as older residents are less likely than their respective counterparts to be satisfied with the stormwater service provided by Halifax Water. (Table W41)



Q.W41: **[IF Q.W40=1 (RECEIVE STORMWATER SERVICE FROM HALIFAX WATER)]** All things considered, would you say you are very satisfied, generally satisfied, not very satisfied, or not at all satisfied with the stormwater service you receive from Halifax Water? (n=345) **Due to rounding.*

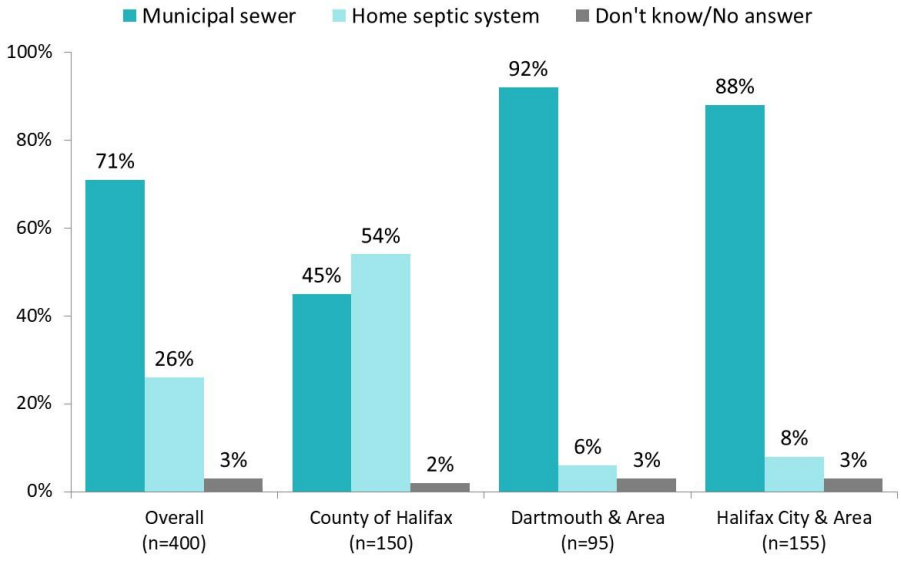
Consistent with last year's results, seven in ten Halifax residents are on municipal sewer, while one-quarter are on a home septic system. (Table W20)



Q.W20: Do you have a home septic system or are you on municipal sewer? (n=400)

Across the region, residents of Halifax County (outside of Halifax and Dartmouth) are much more likely to be on a home septic system, while those in Halifax City and Dartmouth are more likely to be on municipal sewer. Results are consistent with previous findings.

Home Septic or Municipal Sewer



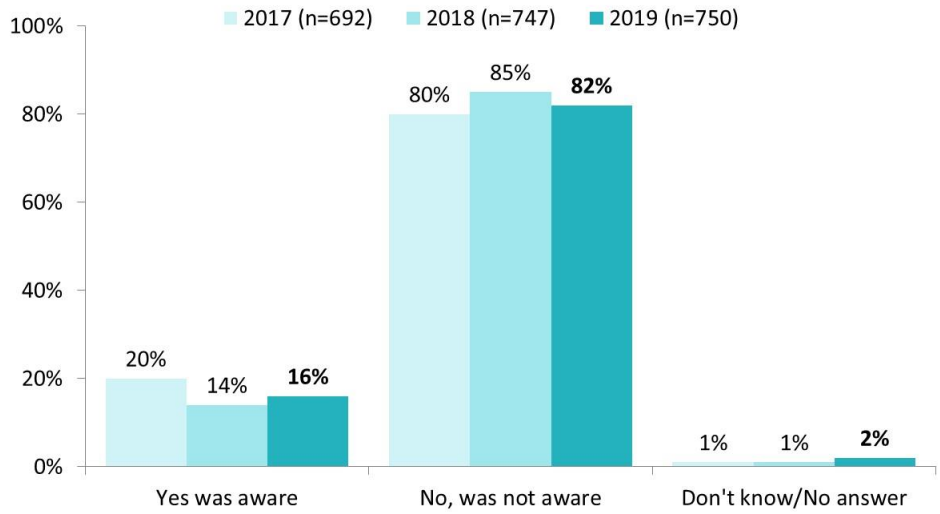
Q.W20: Do you have a home septic system or are you on municipal sewer?

Lead Water Lines

The large majority of customers remain unaware of Halifax Water's subsidy program to assist residential customers with replacing their lead water service lines that connect the water main in the street to a customer's home. Specifically, one in six residents is aware of this subsidy program.

The proportion of residents who are aware of this program is generally consistent across regions and demographic subgroups. (Table W33)

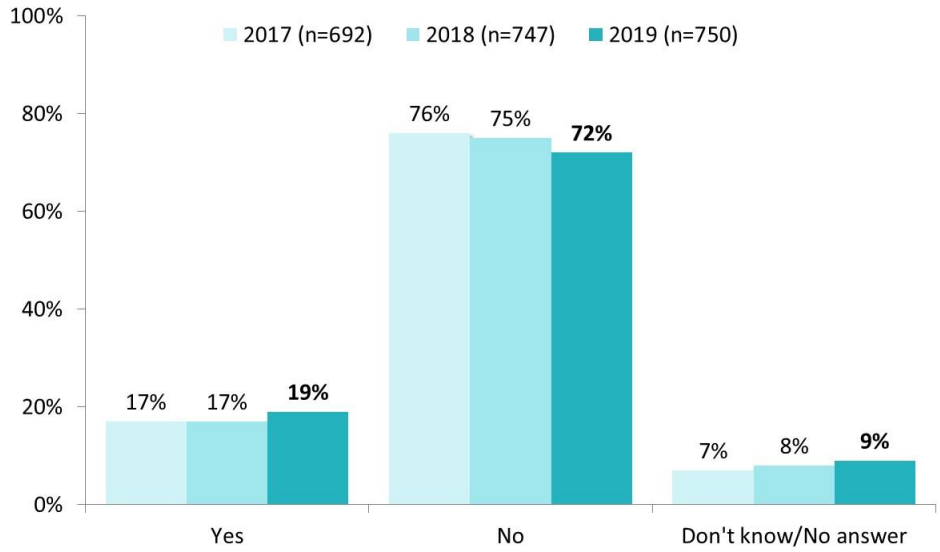
Aware of Halifax Water's Subsidy Program to Assist Residential Customers Replacing Lead Water Service Lines



Q.W33: In August 2017 Halifax Water introduced a subsidy program to assist residential customers with replacing their lead water service lines that connect the water main in the street to a customer's home. The program provides financial assistance for 25% of the cost, up to $2,500. Prior to today, were you aware of this subsidy program?

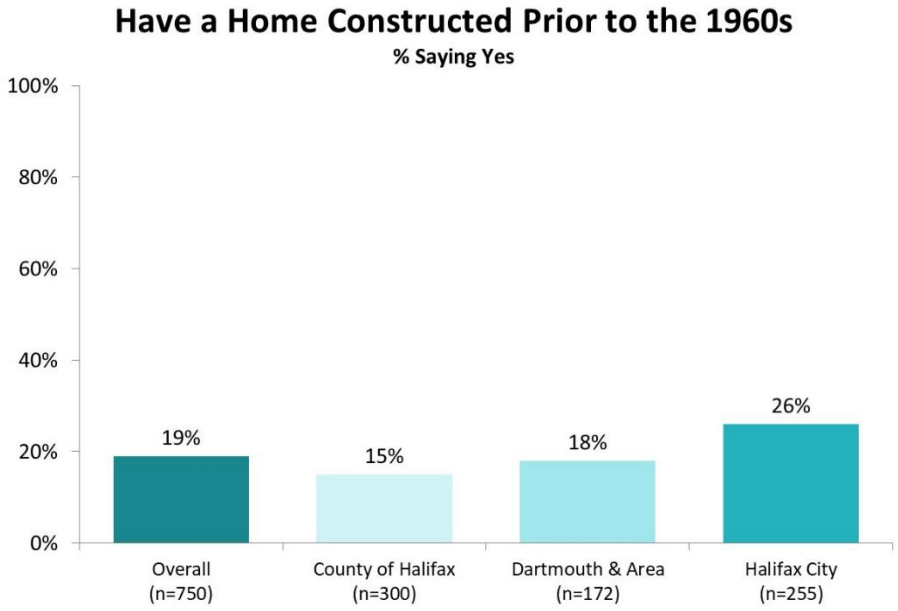
As lead service lines are found primarily in homes constructed prior to the 1960s, participants were asked if they have a home constructed prior to the 1960s. Consistent with 2018 results, two in ten residents (19%) confirm having such a home. One in ten residents were not sure if their home was constructed prior to the 1960s. (Table W34)

Have a Home Constructed Prior to the 1960s



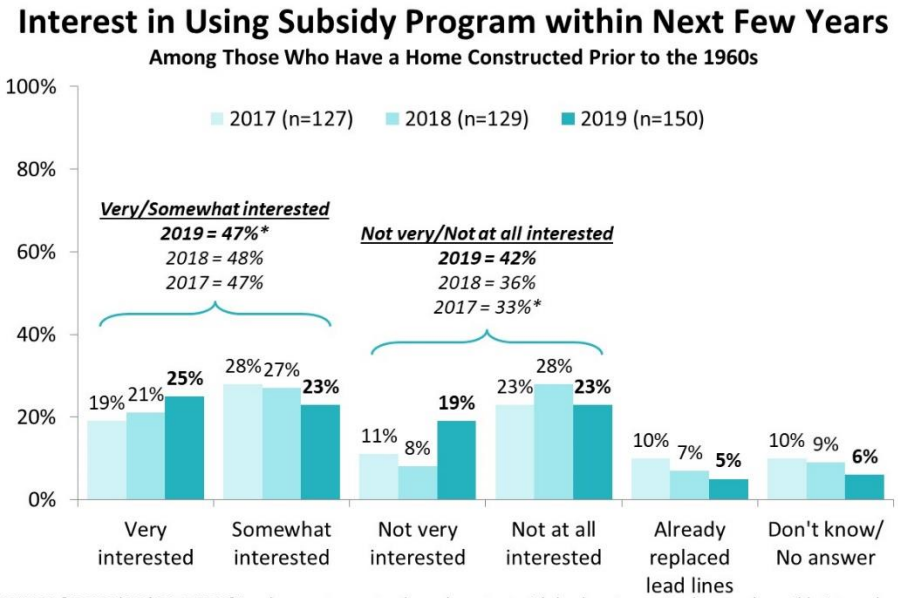
Q.W34: Lead water service lines are found primarily in homes constructed prior to the 1960s. Do you have a home that was constructed prior to the 1960s?

Those in Halifax City are most likely to have a pre-1960s home, followed by residents of Dartmouth and area and then Halifax County. (Table W34)



Q.W34: Lead service lines are found primarily in homes constructed prior to the 1960s. Do you have a home that was constructed prior to the 1960s?

Consistent with 2018 findings, among those with homes constructed prior to the 1960s there is a moderate level of interest in using the subsidy program within the next few years. Close to one-half of residents with homes built before the 1960s expressed interest in using the program. (Table W35)



Q.W35: **[ASK IF 'YES' IN Q.W34]** Lead can enter water through contact with lead water service lines and possibly internal plumbing fixtures such as taps, brass fittings, and lead or tin solder. High levels of lead can lead to serious health issues. Knowing this, are you very interested, somewhat interested, not very interested, or not at all interested in using this subsidy program within the next few years? **Due to rounding. Note slight change of question wording in 2019.*

Information Campaigns

Once again, the Internet is the most preferred method to access information related to Halifax Water's water, wastewater, and stormwater programs. Under six in ten residents (56%, up from 41% in 2018) mentioned the **Internet (in general)**, outranking any other method of accessing information by a large margin. One in ten residents mentioned the **Halifax Water website**, while six percent of residents mentioned contacting Halifax Water via phone. Other methods are mentioned by five percent of residents or fewer. Internet is the most preferred information source among residents across regions and demographic subgroups. In addition, younger residents are more likely than older residents to cite the Internet as their preferred source of information. (Table W26)

Most Preferred Method for Accessing Information About Halifax Water's Water, Wastewater, and Stormwater Programs and Services
Key Mentions

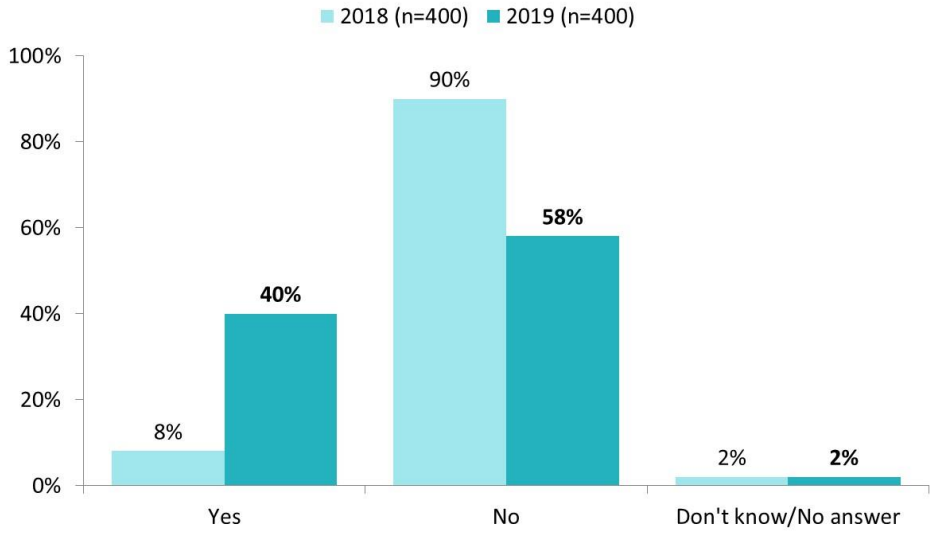
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Internet (general)	48%	53%	52%	51%	50%	54%	63%	58%	59%	52%	41%	**56%**
Halifax Water website	1%	1%	4%	3%	3%	3%	3%	6%	7%	6%	15%	**10%**
Phone/Would call them	3%	2%	2%	4%	13%	3%	8%	1%	7%	7%	5%	**6%**
Newspaper	20%	23%	20%	15%	21%	15%	11%	13%	10%	10%	8%	**5%**
Mail (flyers, newsletters)	6%	10%	7%	7%	12%	9%	5%	8%	6%	7%	2%	**5%**

Q.W26: What is your most preferred method for accessing information related to Halifax Water's water, wastewater, and stormwater programs and services? Probe: Any others? (n=400) *Note: Slight change of question wording in 2019.*

Four in ten residents confirm seeing or hearing information related to the "Customer Connect" water meter replacement program, compared to one in ten (8%) residents last year. It should be noted that the question wording was changed this year to add *water meter replacement*, providing more context to the "Customer Connect" program.

The increase in awareness of the program, by 32 percentage points over last year may be due to this additional information provided. (Table W36)

Seen or Heard Information Related to "Customer Connect" Water Meter Replacement Program

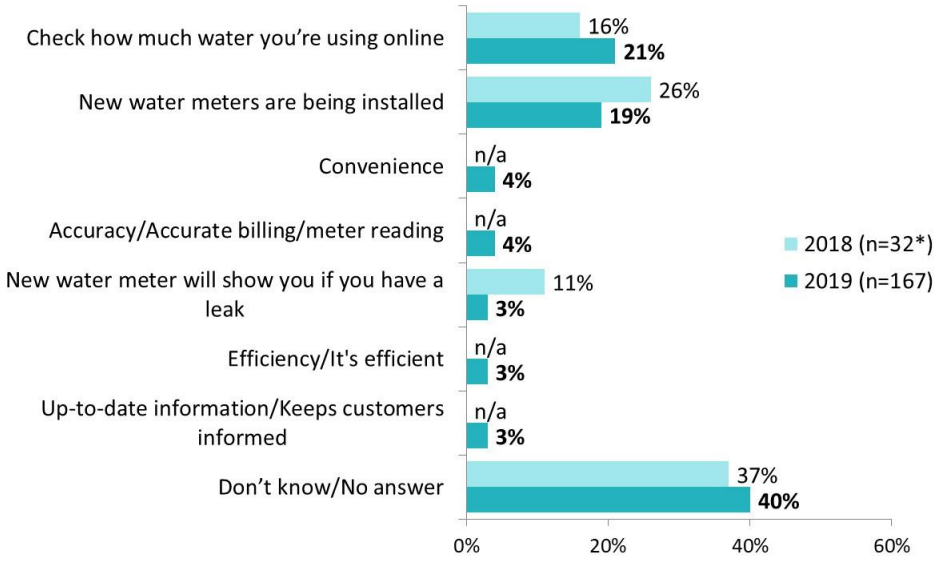


Q.W36: Prior to today, have you heard or seen any information related to the "Customer Connect" water meter replacement program? *Note slight change of question wording in 2019.*

Among the residents (n=167) who confirmed seeing or hearing information related to the "Customer Connect" Water Meter Replacement Program, the top two main messages taken away were that **residents could check how much water they were using online**, and that **new water meters are being installed.** (Table W37)

Main Message of "Customer Connect"

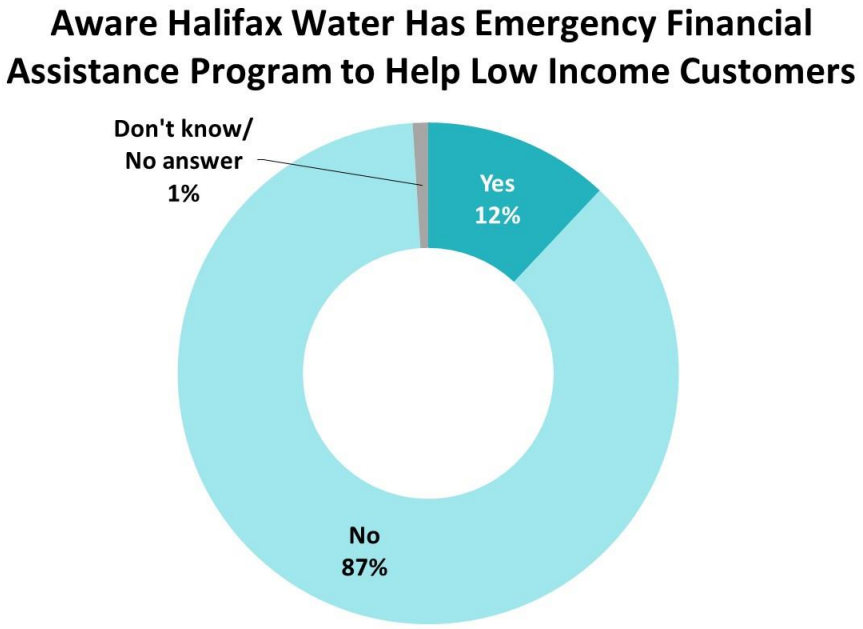
Key Unaided Mentions, Among Those Aware of "Customer Connect"



Q.W37: **[ASK IF 'YES' IN Q.W36]** To the best of your knowledge, what is the main message of "Customer Connect"? Anything else? **Caution: Small sample size.*

Program Awareness and Interest

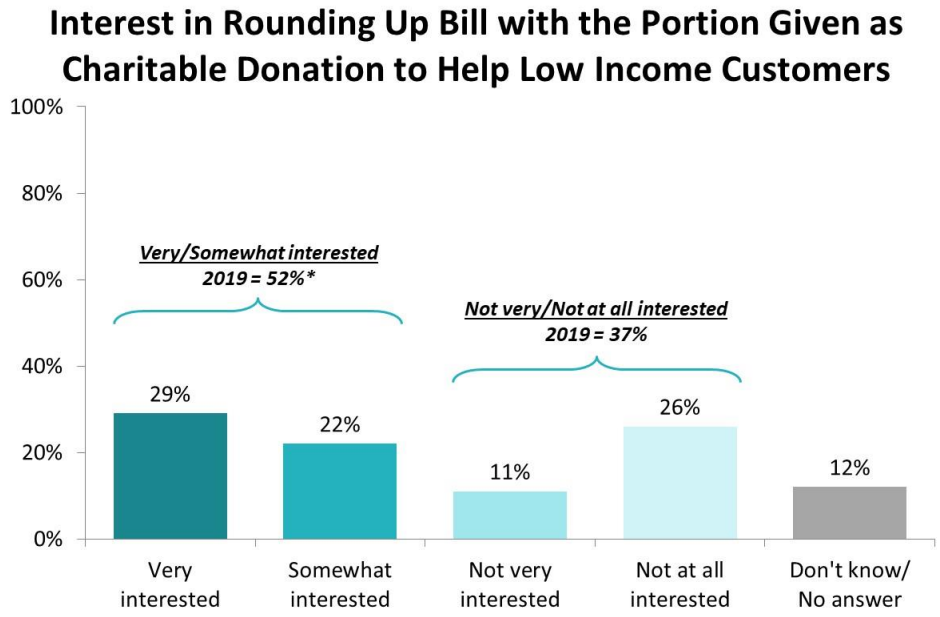
New this year, residents were asked if they were aware that Halifax Water has an emergency financial assistance program to help low income customers. The vast majority of residents are unaware that Halifax Water has such a program. One in eight residents (12%) confirmed being aware of the emergency financial assistance program. (Table W38)



Q.W38: Are you aware that Halifax Water has an emergency financial assistance program to help low income customers? (n=400)

Also new this year, Halifax Water customers were asked if they would be interested in rounding up their bill to the nearest dollar, with the rounded portion given as a charitable donation to help low income customers in need. One-half of customers expressed interest in rounding up their bill, including three in ten customers who said they were *very interested*. Meanwhile, approximately four in ten customers mentioned they were not interested, including one-quarter that mentioned being *not at all interested*. One in eight customers (12%) did not provide a definite opinion in this regard.

Across regions, residents of Halifax City are more inclined than those in County of Halifax or Dartmouth to be interested in rounding up their bill. Younger residents, those with higher education as well as those with higher household income are also more likely to express interest in rounding up their bill to the nearest dollar to help low-income customers in need. (Table W39)

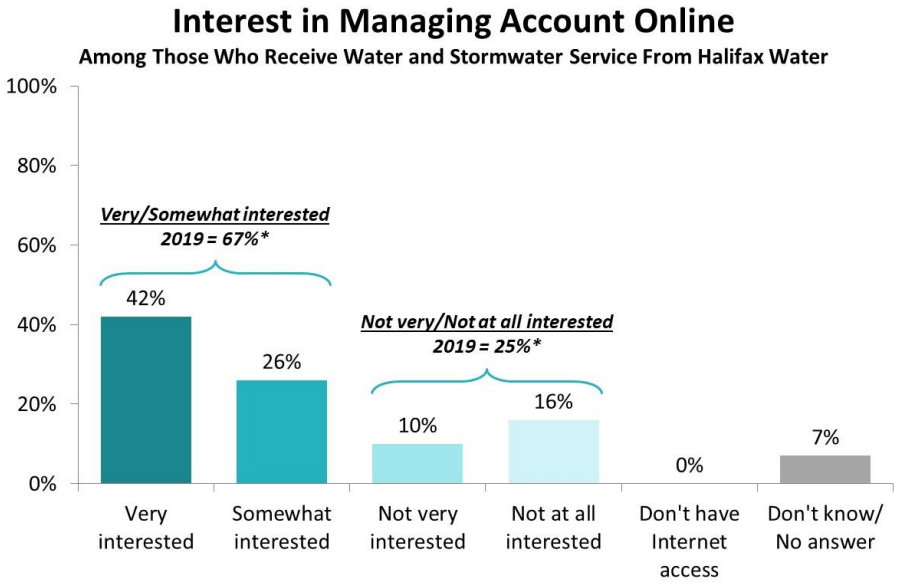


Q.W39: As a customer, would you be very interested, somewhat interested, not very interested, or not at all interested in rounding up your bill to the nearest dollar, with the rounded up portion given as a charitable donation to help low income customers in need? (n=400) **Due to rounding.*

Halifax Water is developing a way for customers to manage their account online so that customers can monitor their water consumption, manage their account information, and pay their bills online. Hence, customers were asked if they would be interested in managing their account online.

Two-thirds of customers expressed interest in managing their account online, including four in ten customers who mentioned being *very interested*. Meanwhile, one in four residents is not interested in managing an account online.

Customers with lower level of education, those with lower household income, and older residents 55 plus years old are less inclined to express interest in managing their account online compared to their respective counterparts. (Table W18)



Q.W18: **[IF Q.W4=1 (RECEIVE WATER FROM HALIFAX WATER) AND IF 'YES, RECEIVE STORMWATER SERVICE FROM HALIFAX WATER' IN Q.40]** Halifax Water is developing a way for customers to manage their account online. Customers will be able to monitor their water consumption, manage their account information, and pay their bills online. Would you be very interested, somewhat interested, not very interested, or not at all interested in managing your account online? (n=503)
**Due to rounding. Question not asked of all respondents.*

Study Methodology

Questionnaire Design

The questions commissioned by Halifax Water and used in this study were designed by Narrative Research, in consultation with Halifax Water staff.

Sample Design and Selection

Halifax Water questions were fielded on Narrative Research's *Halifax Urban Report* survey, in addition to some questions being fielded on the Halifax portion of Narrative Research's *Atlantic Quarterly*® survey. These surveys are probability telephone surveys of adults 18 or older in the target area. Sample is drawn from both landline and cellular telephone numbers. Data are weighted to ensure results reflect the true population distribution.

Survey Administration

The *Urban Report*® survey was conducted by telephone from October 24 to November 10, 2019, while the *Atlantic Quarterly*® survey was conducted by telephone from November 12 to November 28 2019. All interviewing was conducted by fully-trained and supervised interviewers and a minimum of 10 percent of all completed interviews were monitored or subsequently verified.

Completion Results

Urban Report: Among all eligible respondents contacted, the rate of interview completion was 5 percent. Completion rate is calculated as the number of cooperative contacts (788) divided by the total number of eligible numbers attempted (14,776).

Atlantic Quarterly®: Among all eligible Nova Scotia residents contacted, the response rate was 5 percent. Response rate is calculated as the number of cooperative contacts (1,383) divided by the total number of eligible telephone numbers called (28,702).

The final disposition of all telephone numbers called is displayed below.

Completion Results		
	Urban Report	Atlantic Quarterly
A. Total Numbers Attempted	23,605	46,918
Disconnect / Not in service/Not primary residence	8,163	17,871
Fax / Modem	79	192
Child/Teen Phone/Cellphone	16	6
Non-Residential Number / Incorrect Number	570	147
Duplicate	1	0
B. Eligible Numbers	14,776	28,702
Busy	351	504
Answering Machine	3,745	7,899
No Answer	5,506	11,045
Scheduled Call Back / Mid Call Back / Qualified Not Available	109	1,421
Illness / Incapable	14	33
Language Problem	33	61
Other	12	32
C. Total Asked	5,006	7,707
Respondent / Gatekeeper Refusal	218	2,135
Mid Terminate / Hang up	3,176	3,543
Never Call List	824	646
D. Co-operative Contacts	788	1,383
Did Not Qualify / Quota Full	388	578
Completed Interviews	400	805

Sample Distribution

The overall results are based on 750 interviews with individuals from the Halifax population. A sample of 750 respondents would be expected to provide overall results accurate to within plus or minus 3.6 percentage points in 95 out of 100 samples.

Sample Distribution		
Region	Sample	Margin of Error
County of Halifax	300	± 5.7%
Dartmouth and Area	172	± 7.5%
Halifax City and Area	255	± 6.1%
Halifax Water Customers	564	± 4.1%
Halifax	750	± 3.6%

Halifax Water
Halifax Regional Water Commission

ITEM # 6-I
HRWC Board
January 30, 2020

TO: Craig MacMullin, MBA, CPA, CGA, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
James Campbell, Communications and PR Manager

APPROVED: *Original Signed By:*
Cathie O'Toole, MBA, FCPA, FCGA, ICD.D
General Manager

DATE: January 15, 2020

SUBJECT: **2019 Employee Survey**

INFORMATION REPORT

ORIGIN

Operational Requirement, Corporate Balanced Scorecard (CBS) Performance Measurement

BACKGROUND

Halifax Water's Corporate Balance Scorecard target is to achieve an A- on the organizational indicator regarding the employee satisfaction survey - Motivated and Satisfied Employees.

Since 2001, Halifax Water has engaged Corporate Research Associates (recently rebranded as Narrative Research Inc.), a highly respected local research firm, to undertake the survey and compile the data. The overall purpose of the survey is to obtain an understanding of current employee attitudes, perceptions, and opinions, including employees' satisfaction with their current employment.

The 2019 survey was conducted from November 13th to 27th with all full time employees (approximately 500) invited to take part in the online survey. In total, 368 useable surveys were returned to Narrative Research, resulting in an overall response rate of 74 percent. This is the highest response rate ever achieved for the utility.

DISCUSSION

As noted above, the 2019 CBS Organizational Indicator target for the employee survey is an overall satisfaction rating of A-. The 2019 survey result was B+ matching our previous highs of B+ in 2017 and 2013.

Results this year across many survey categories show significant improvements, relative to last year, with higher levels of job satisfaction, employee willingness to recommend the organization, and employee engagement. Marked improvements are noted in the categories of employees being kept informed about important changes (up 14 percentage points); Halifax Water is interested in the well-being of its employees (up 13 percentage points); and employees feeling passionate about working at Halifax Water (up 10 percentage points).

When compared to Narrative Research's database of other Atlantic Canadian organizations, Halifax Water's position as an employer has also improved. Of 44 metrics compared, Halifax Water scores are above other Atlantic Canadian organizations on 22 metrics (versus 7 last year in 2018), behind on 5 metrics (versus 19 in 2018), and essentially equal with other organizations on 17 metrics (versus 18 in 2019).

Beginning with the 2018 survey, employees were asked if Halifax Water reflects diverse cultural communities. Just over six in ten employees (61%) agree that diverse cultural communities are reflected at Halifax Water, up from 56% in 2018.

While the 2019 Employee Survey results note a marked improvement across many key categories, it remains important to build on these gains and look to areas that could benefit from enhanced focus. These areas include, being given a fair opportunity to pursue training; being given career development opportunities and being encouraged by their supervisor to do so; and ensuring employees are provided with the feedback they need to do their job to the best of their ability. There remains an opportunity to continue to improve internal communications as well. Making sure employees are aware of the strategic direction and objectives of the utility is a key driver of employee engagement.

Halifax Water employees interact with customers on a daily basis and must work as a team to protect public health and the environment through the provision of critical water, wastewater and stormwater services. Having a highly trained, motivated and informed work force is key to our mission to provide world-class services for our customers and our environment.

For the benefit of all staff, the survey will be placed on the Halifax Water Intranet, and hard copies distributed to all work locations. Additionally, the General Manager will be

visiting work locations to speak with staff about the survey results and gather ideas for potential areas of improvement.

Staff will be encouraged to take the time to read the survey results and provide any comments or suggestions they might have.

ATTACHMENTS

Narrative Research 2019 Halifax Water Employee Study –Key Highlights Info Graphic

Report Prepared by: *Original Signed By:*
James Campbell, Communications and PR Manager, 902-490-4604

2019 Halifax Water Employee Survey

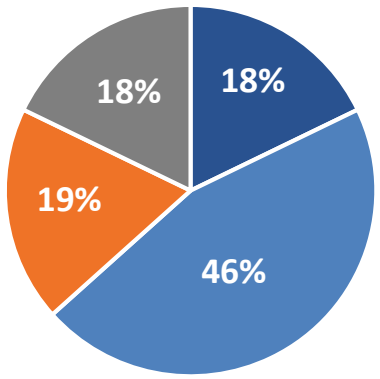
Key Highlights

Methodology: 368 online surveys
Response Rate: 74%
Data Collection: November 13–27, 2019

Report Card

		Halifax Water
Employee Commitment	3.9	B+
Personal Development	3.7	B
Communication	3.9	B+
Work Environment	3.9	B+
Employee Value	3.8	B+
Teamwork & Cooperation	3.8	B+
Overall	**3.8**	**B+**

Employee Profile



Employee Engagement

	Overall	DB
Motivated to do a good job	77	79
Would recommend organization as good place to work	76	72
Look forward to coming to work	74	74
Sense of pride in accomplishments of Halifax Water	73	74
Passionate about working for Halifax Water	70	73
Overall Employee Engagement	***74***	***74***

Commitment & Overall Satisfaction

68% *High level of commitment* ***to Halifax Water*** *(vs. 61% in 2018 and 73% DB)*

34% Halifax Water has *high level of commitment* ***to employees*** *(vs. 28% in 2018 and 25% DB)*

78% ***Satisfied*** **with their job** *(vs. 72% in 2018 and 79% DB)*

Employee Value

DB	2018	2019	
81%	80%	**83%**	Treated in a respectful manner
n/a	60%	**69%**	Satisfied with benefits
58%	61%	**69%**	Fairly paid for work
51%	47%	**52%**	Recognized for achievements

Personal Development

71% *Opportunity to pursue training* *(vs. 69% in 2018 and 61% DB)*

65% *Supervisor encourages professional development* *(vs. 66% in 2018 and 63% DB)*

60% *Career aspirations can be achieved at Halifax Water* *(vs. 52% in 2018 and 58% DB)*

46% *Job classification system is fairly administered* *(vs. 41% in 2018 and n/a DB)*

81% ***Employment is secure*** *(vs. 75% in 2018 and 66% DB)*

Held accountable for performance **83%** *(vs. 83% in 2018 and 85% DB)*

65% Think ***Halifax Water is headed in the right strategic direction*** *(vs. 56% in 2018 and 64% DB)*

58% ***Senior management*** at Halifax Water ***are accessible*** to all staff members *(vs. 54% in 2018 and 66% DB)*

Work Environment

87% Have necessary supplies to do job well *(vs. 83% in 2018 and 76% DB)*

83% Workplace safety is a high priority at Halifax Water *(vs. 80% in 2018 and 77% DB)*

82% Halifax Water satisfies the public's needs *(vs. 76% in 2018 and 79% DB)*

61% Workplace reflects diverse cultural communities *(vs. 56% in 2018 and 68% DB)*

Teamwork & Cooperation

60% Given ***regular feedback*** on job performance *(vs. 58% in 2018 and 57% DB)*

Communication

69% ***Kept informed*** about important changes *(vs. 55% in 2018 and 50% DB)*

Notes: Unless otherwise noted, percentages represent completely/mostly agree on a 5-pt. agreement scale
DB = Narrative Research's Employee Opinion Database excluding Halifax Water results
n/a = Comparison not available

NARRATIVE RESEARCH

Halifax Water

Halifax Regional Water Commission

ITEM # 7-I
HRWC Board
January 30, 2020

TO: Craig MacMullin, MBA, CPA, CGA, Chair, and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Louis de Montbrun, CPA, CA
Director, Corporate Services / CFO

APPROVED: *Original Signed By:*
Cathie O'Toole, MBA, FCPA, FCGA, ICD.D
General Manager

DATE: January 12, 2020

SUBJECT: **HRM Pension Plan Investment Performance Third (3rd) Quarter, 2019**

INFORMATION REPORT

ORIGIN

The Pension Plan investment performance is reported to the Commission periodically throughout the year.

BACKGROUND

None

DISCUSSION

The tables below and the attached Investment Report provide a performance update for the 3rd Quarter of 2019 (July to September) for the Halifax Regional Municipality (HRM) Pension Plan Master Trust, of which Halifax Regional Water Commission (HRWC) is a

part. The fair value of the investment in the Master Trust is determined and updated at year-end, and HRWC's share of the total HRM Master Trust at December 31, 2018 was 6.2%, totaling $126.4 million.

The total fund returned 1.3% in the 3rd Quarter, which outperformed the policy benchmark of 1.1% by 0.2%. The return for the one-year period ended September 30, 2019 is 7.0%, outperforming the policy benchmark of 5.2% by 1.9%. Other historical returns are provided in Table 1 below.

Table 1 – Returns

	Current Quarter (Jul to Sep)	1-Year	3 - Year Annualized	4 - Year Annualized	Since Inception (Oct 1999)
Fund Return	1.3%	7.0%	7.6%	7.6%	7.1%
Policy Benchmark	1.1%	5.2%	6.2%	6.4%	5.7%
Excess Return	0.2%	1.8%	1.4%	1.2%	1.4%

The total fund return is subject to investment management fees and plan expenses. The HRM Pension Plan performs an analysis with respect to the Master Trust to show the potential downside return risk under different scenarios. The four (4) most recent scenarios analyzed provide context as to the performance of the Master Trust during previous periods of market turmoil, and are identified in Table 2 below:

Table 2 – Stress Testing

Scenario:	Projected Return of Master Trust
2008 Financial Crisis	(22.3%)
2002 Accounting Scandals	(10.5%)
2011 Debt Ceiling Crisis	(8.2%)
1987 Black Monday	(6.3%)

As at September 30, 2019 the Master Trust was in compliance with the Statement of Investment Policies and Procedures (SIP&P), and a summary of the asset mix is provided in Table 3 below:

Table 3 – Asset Mix, as at September 30, 2019

Asset:	Actual	Policy
Cash & Equivalents	0.4%	0.0%
Canadian Equity	4.7%	5.3%
Global Equity	29.7%	27.6%
Fixed Income	30.7%	35.0%
Minimum Target Return	34.5%	32.1%

ATTACHMENT

Halifax Regional Municipality Pension Plan Investment Report 3rd Quarter, 2019

Report Prepared by: *Original Signed By:*

Allan Campbell, B. Comm, CPA, CMA
Manager, Finance (902) 490-4288

ITEM # 7-I
HRWC Board
January 30, 2020
ATTACHMENT

HRM PENSION PLAN

Investment Report

Q3 2019

Consent Agenda Item No.1

Executive Summary

Compliance

- As at September 30, 2019, the Master Trust (MT) was in compliance with the SIP&P.

Funded Status

- As at December 31, 2018, the going concern funded ratio and transfer ratio were 93.1% and 64.2% respectively.*

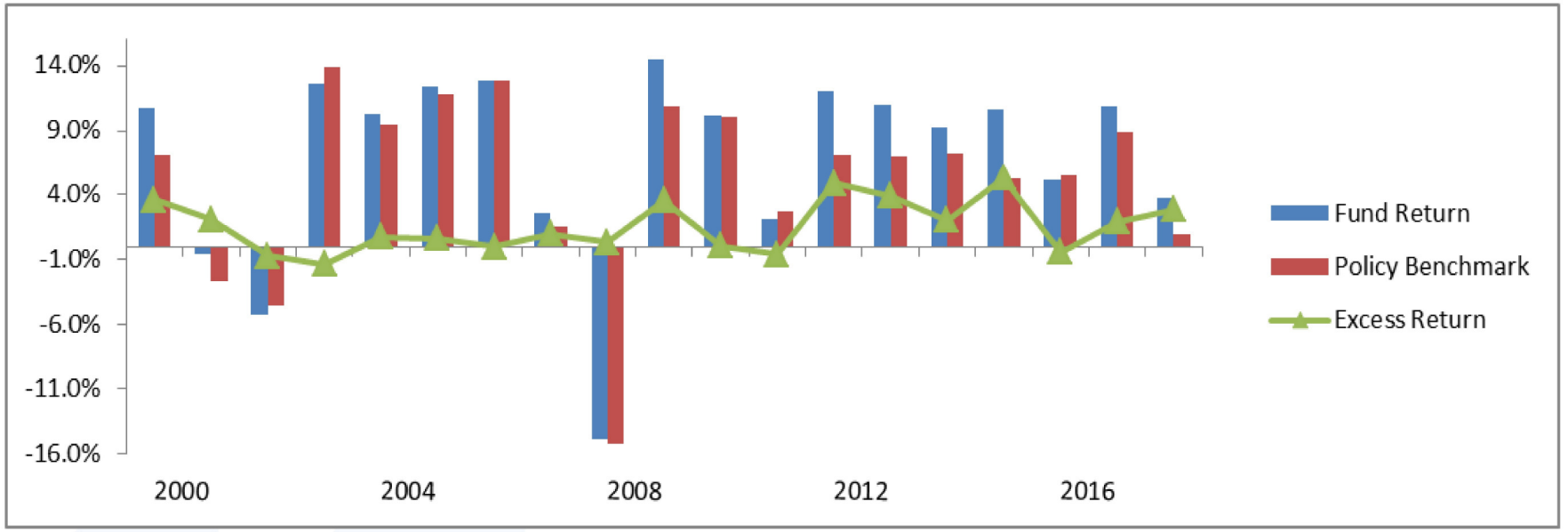
Master Trust Performance (net of fees)

- In Q3, the MT earned 1.27%, outperforming the policy benchmark return by 0.17%.
- For the one-year period ending September 30, 2019, the MT earned 7.03% outperforming the policy benchmark by 1.85%.
- The MT earned an annualized return of 7.58% over the 4-year period ending September 30, 2019, outperforming the policy benchmark by 1.23% annualized.
- Since inception (October 1999), the MT earned 7.06% annualized, outperforming the Plan's long-term rate objective of 6.10%. The table on the next slide summarizes the calendar year returns for the MT.

***Per Eckler Valuation Report as at December 31, 2018. Assumes a going concern discount rate of 6.10%.**

Executive Summary – Cont.

Calendar Returns (net of fees)



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fund Return	10.71%	-0.56%	-5.21%	12.60%	10.27%	12.38%	12.88%	2.60%	-14.83%	14.47%	10.12%	2.11%	12.01%	10.94%	9.27%	10.59%	5.13%	10.85%	3.81%
Policy Benchmark	7.12%	-2.64%	-4.50%	13.91%	9.50%	11.76%	12.85%	1.58%	-15.20%	10.92%	10.08%	2.71%	7.12%	7.01%	7.24%	5.27%	5.55%	8.91%	0.96%
Excess Return	3.59%	2.08%	-0.71%	-1.31%	0.77%	0.62%	0.03%	1.02%	0.37%	3.55%	0.04%	-0.60%	4.89%	3.93%	2.03%	5.32%	-0.42%	1.94%	2.85%

Executive Summary – Cont.

Added Value

- In Q3 of 2019, the MT outperformed its policy benchmark by 0.17%. Attribution: Minimum Target Return +0.15%, World Equity +0.08%, Global Credit +0.05%, Universe Bonds -0.01%, Canadian Equity -0.05%, and US Equity -0.05%.

Q3 Updates

- Co-invested EUR 5 million in a portfolio of data centers alongside an infrastructure manager.
- Rebalanced asset mix with CAD 38 million from global equities to fixed income (across all bond mandates).

Total Fund Net Returns

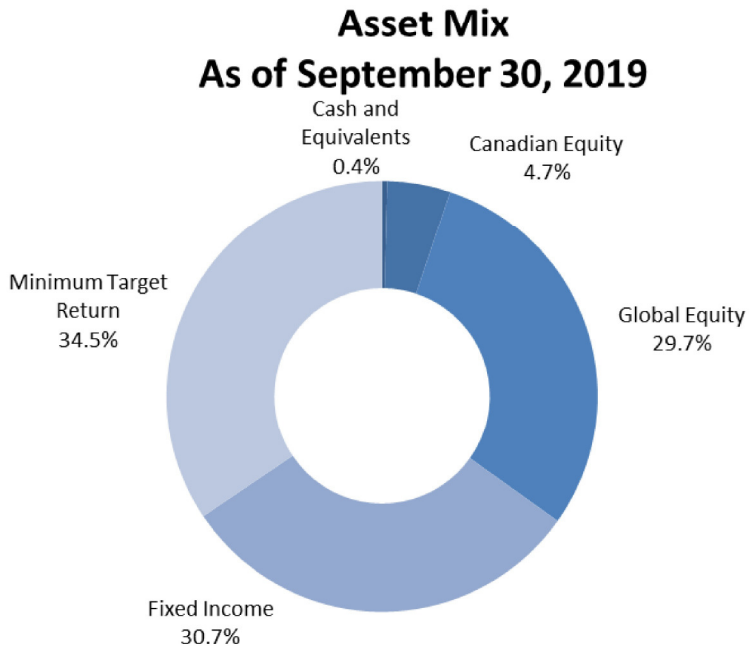
As of September 30, 2019

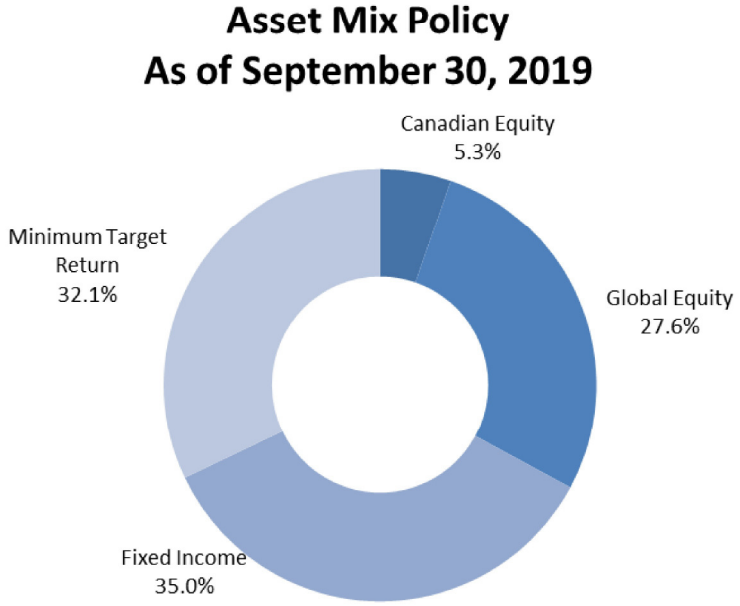
	Q3	YTD	1-Year	3-Year Annualized	4-Year Annualized	Since Inception (Oct 1999)
Fund Return	1.27%	6.42%	7.03%	7.55%	7.58%	7.06%
Policy Benchmark*	1.10%	7.57%	5.18%	6.15%	6.35%	5.65%
Excess Return	0.17%	-1.15%	1.85%	1.40%	1.23%	1.41%

*Effective September 30, 2019, the Policy Benchmark is 3.3% S&P/TSX Index + 2.0% S&P/TSX 60 + 4.9% S&P 500 Index ($USD) + 8.3% MSCI EAFE Index ($CAN) + 4.1% MSCI Emerging Markets ($CAN) + 10.3% MSCI World ($CAN) +16.6% FTSE TMX Canada Universe Bond + 18.4% 3 Month Bankers Acceptance + 32.1% Minimum Target Return.

Fund returns are shown net of fees and expenses

Asset Mix





*Effective September 30, 2019, the Policy Benchmark is 3.3% S&P/TSX Index + 2.0% S&P/TSX 60 + 4.9% S&P 500 Index ($USD) + 8.3% MSCI EAFE Index ($CAN) + 4.1% MSCI Emerging Markets ($CAN) + 10.3% MSCI World ($CAN) +16.6% FTSE TMX Canada Universe Bond + 18.4% 3 Month Bankers Acceptance + 32.1% Minimum Target Return.

Equity Market Index Returns

As of September 30, 2019

Index	Q3	YTD	1-Year	3-Year Annualized	4-Year Annualized
Canadian Equity (S&P/TSX Composite Index)	2.48%	19.11%	7.06%	7.36%	9.04%
US Equity (S&P 500 C$)	3.04%	16.86%	6.79%	13.67%	13.54%
US Equity (S&P 500 U$)	1.70%	20.55%	4.25%	13.39%	13.90%
EAFE Equity (MSCI EAFE C$)	0.23%	9.35%	1.06%	6.74%	6.16%
Emerging Markets (MSCI EM C$)	-2.98%	2.65%	0.36%	6.24%	8.24%
World Equity (MSCI World C$)	1.86%	14.01%	4.30%	10.48%	10.15%

In the third quarter:

- US equities made modest gains, despite uncertainty surrounding US-China trade.
- Canadian equities post record highs with defensive sectors such as utilities, real estate and consumer staples leading the charge.
- Emerging markets weighed down by trade concerns and other geopolitical issues

Public Equity – Q3 Summary

- The MT's Equity portfolio returned 0.84% during the quarter, underperforming the equity policy benchmark return of 0.97% by 0.13%, primarily due to underperformance of Canadian and US equities.

As of September 30, 2019 (C$ returns)

	Q3			YTD		
Equity Mandate	**Plan**	**Benchmark**	**Relative Performance**	**Plan**	**Benchmark**	**Relative Performance**
Canadian Equity	1.02%	2.56%	-1.54%	19.00%	19.07%	-0.07%
US Equity	0.17%	1.70%	-1.53%	21.40%	20.55%	0.85%
EAFE Equity	0.24%	0.23%	0.01%	9.60%	9.35%	0.25%
Emerging Equity	-2.67%	-2.98%	0.31%	6.61%	2.65%	3.96%
World Equity	2.91%	1.86%	1.05%	14.07%	14.01%	0.06%
Total	**0.84%**	**0.97%**	**-0.13%**	**13.46%**	**13.19%**	**0.27%**

*Source: Northern Trust

Bond Market Returns

As of September 30, 2019

Index	Q3	YTD	1-Year	3-Year Annualized	4-Year Annualized
Canadian Universe Bonds (FTSE TMX Canada Universe Bond)	1.19%	7.79%	9.69%	2.66%	3.56%
Canadian Government Bonds (FTSE TMX Canada Universe Government)	1.22%	7.71%	9.99%	2.36%	3.33%
Canadian Corporate Bonds (FTSE TMX Canada Universe Corporate)	1.09%	7.98%	8.91%	3.48%	4.18%

- Corporate bonds have outperformed Government bonds and the broader Universe over the YTD, 3-year and 4-year periods.
- Government bonds have outperformed Corporate bonds and the broader Universe over the Q3 and 1-year period.
- In Q3, bond yields touched new lows with concerns of recession, lack of progress in U.S. and China trade talks and Brexit leading to a flight to quality.

Public Fixed Income – Q3 Summary

- The MT's diversified Fixed Income portfolio earned 0.98%, which outperformed its benchmark return of 0.84% by 0.14%.

As of September 30, 2019 (C$ returns)

	Q3			YTD		
Fixed Income Mandate	Plan	Benchmark	Relative Performance	Plan	Benchmark	Relative Performance
Short Duration	0.88%	0.66%	0.22%	3.46%	3.40%	0.06%
Long Duration	1.26%	1.22%	0.04%	7.48%	7.71%	-0.23%
Total	**0.98%**	**0.84%**	**0.14%**	**4.38%**	**4.38%**	**0.00%**

*Source: Northern Trust

Private Market (MTR) – Summary

- The Minimum Target Return portfolio (private investment portfolio) returned 2.20% in Q3, versus a benchmark of 1.49%, outperforming by 0.71%.

As of September 30, 2019 (C$ returns)

	Q3	YTD	1-Year	3-Year Annualized	4-Year Annualized	Since Inception (Oct 1999)
MTR Return	2.20%	1.97%	11.54%	11.00%	9.95%	12.54%
Policy Benchmark	1.49%	4.54%	6.13%	6.27%	6.33%	6.50%
Excess Return	0.71%	-2.57%	5.41%	4.73%	3.62%	6.04%

The policy benchmark for the private investment portfolio is the Going Concern Discount rate. The 2019 rate is 6.1%, 2018 is 6.2%, 2017 is 6.4%, 2016 is 6.5%, 2015 is 6.55%, 2014 is 6.5%, 2013 is 6.25%, 2007-2012 is 6.75% and prior to 2007 is 7.4% respectively.

Stress Testing

Scenario Analysis

- Of the scenarios we analyze, the following provide some context to the Master Trust performance during previous periods of market turmoil:

As of September 30, 2019

Scenario	Projected Return of Master Trust
2008 Financial Crisis	-22.3%
2002 Accounting Scandals	-10.5%
2011 Debt Ceiling Crisis	-8.2%
1987 Black Monday	-6.3%

Liquidity

	Estimated 2019 Amounts ($ mln)
Contributions**	$ 87.1
Dividend & Distribution Income	$ 17.8
Interest Income	$ 12.4
Other Income	$ 0.4
Benefit Payments**	-$ 105.9
Expenses	-$ 6.2
Total Annual Net CF	**$ 5.6**
Liquid Investments*	$ 1,371.3
Actual Net Distributions	$ 62.8
Projected Net Distributions	$ 30.0
Actual Net Capital Calls	-$ 89.5
Projected Net Capital Calls	-$ 20.0
Total CF + Liquid Investments + Private Sales – Capital Calls	**$ 1,360.2**

** Liquid investments as at November 1, 2019. Includes all publicly traded equity and fixed income investments*
*** Contributions are derived from the Contribution Planner filed with Northern Trust. Benefits are based on monthly average January to September 2019 with a conservative estimate for lump sum payments*
**** Income and expense estimates based on actual amounts from January to September 2019, annualized for full year*

Halifax Water
Halifax Regional Water Commission

ITEM #8-I
HRWC Board
January 30, 2020

TO: Craig MacMullin, MBA, CPA, CGA, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original signed by Allan Campbell on behalf of:*
Gary McPherson, Chair and Members of the Pension and Benefits Advisory Committee

APPROVED: *Original signed by:*
Cathie O'Toole, MBA, FCPA, FCGA, ICD.D
General Manager

DATE: January 12, 2020

SUBJECT: **2019 Annual Report - Pension and Benefits Advisory Committee**

INFORMATION REPORT

ORIGIN

Activities of the Pension and Benefits Advisory Committee are reported to the Commission ("Administrator") annually, in accordance with the Terms of Reference of the Committee.

BACKGROUND

As defined in the Terms of Reference of the Pension and Benefits Advisory Committee, the objectives and responsibilities of the Pension and Benefits Advisory Committee include:

- Monitoring the administration of the Pension and Benefits Plans to ensure that the Plans, as administered by the Administrator, are conducted in a manner consistent with the provisions of the official Pension Plan document, group insurance and other benefit plan documents, and governing legislation;
- Making recommendations to the Administrator respecting the administration of the Pension and Benefits Plans;

- Promoting awareness and understanding of the Pension and Benefits Plans on the part of Members of the Plans and persons receiving pension or other benefits under the Plans;
- Assisting with the monitoring of Pension and Benefits Plans activities and provide input in this regard, through review of audited financial statements, actuarial valuations, key contracts and agreements, reports on investment performance and other performance metrics
- Reviewing annual communication plan to all plan stakeholders, which minimally will include a plan for:
    - ✓ Annual pension statements,
    - ✓ Newsletters (Spring and Fall),
    - ✓ Annual general meeting for pension plan members, and
    - ✓ Educational sessions for pre-retirement.

The purpose of the report is to provide a brief summary of the Committee's activities during 2019.

DISCUSSION

The Pension and Benefits Committee met as follows during 2019:

- January 23, 2019 1:00 pm
- May 10, 2019 1:00 pm
- October 18, 2019 1:30 pm

All meetings were held at 450 Cowie Hill Road, Halifax, NS.

Table 1, appearing as an addendum at the end of this report, provides a summary of attendance at Committee meetings held during 2019. Of note, Louis de Montbrun replaced Carl Yates as a Management Representative during the year, and John Keirstead replaced Todd Masters as the Alternate for CUPE Local 227.

Key issues the Committee addressed during the year included:

- Actuarial Valuation of the Pension Plan, as at January 1, 2019;
- Enhancements to health benefits including:
    - ✓ Extended health care coverage after the age of 65,
    - ✓ Increase in paramedical coverage,
    - ✓ Critical illness coverage,
    - ✓ Glucose monitors,
    - ✓ Registered Counselling Therapist, and
    - ✓ Biologic drug Nucala (Mepolizumab);

- Benefit renewals for Health and Dental;
- Continuing education for Committee Members;
- Updates regarding changes to the HRM Pension Plan governance structure;
- New payroll system;
- HRM Pension Plan Defined Contribution (DC) Account for former HRM employees who transferred to Halifax Water during the merger in 2007.

Main accomplishments of the Committee for the year were:

- Through Mercer, Halifax Water was able to successfully negotiate benefit renewals for Health and Dental, with an overall increase of 3% for Health and no change to Dental. The renewal became effective June 1, 2019.

- Implemented enhancements to health benefits during the year including:
  - ✓ Upgrading extended health care coverage for Members after the age of 65. Previously when a Member turned 65 extended health care coverage was reduced for certain services;
  - ✓ Increasing paramedical coverage to $600 from $400; and
  - ✓ The inclusion of glucose monitors in the list of prescribed equipment permitted under the Plan.

- The approval of various pension and benefit communication initiatives during the year, prepared by Halifax Water staff, such as newslettersThe purpose of these initiatives was to provide Members:
  1) Updated information regarding the financial health of the Pension Plan;
  2) Overview of the Pension Plan;
  3) Overview of health, dental and other benefits accessible to Members;

- Halifax Water staff conducted Pension and Benefit "Road Shows" in 2019, with visits to work locations. The Committee discussions helped shape the content of these presentations. Any Committee members present at the "Road Shows" were acknowledged and participated in the discussion with other employees. The presentations were well attended, and it is estimated that 275 employees attended a session.

NEAR TERM PLANS

- Benefit Plan renewals are scheduled as follows:
  - ✓ Health and Dental, June 1, 2020, and
  - ✓ Life and Long-Term Disability, April 1, 2021.

  The Committee will meet to review coverages, and any proposed changes to benefits and/or rates, before making final recommendations to the Board.

- Review and provide and recommendations as required relating to Plan enhancements for Registered Counselling Therapist and the biologic drug Nucala (Mepolizumab);

- Continuing education for Committee Members, including guest speakers at scheduled meetings.

- Broadening the scope of plan communications, especially with respect to benefits, targeting retirees in addition to active employees. Potential strategies may include benefit information sessions and a benefits newsletter.

FORMAL MOTIONS TO THE BOARD

None currently.

Report Prepared by: *Original signed by:*

Allan Campbell, B.Comm., CPA, CMA
Manager, Finance, 902-490-4288

ADDENDEM

Table 1

Pension and Benefits Advisory Committee
Attendance Report - 2019

		January 23	May 10	October 18
Representatives:				
Gary McPherson, Chair	Local 227	✓	✓	✓
Allan Campbell, Vice Chair	Non-Union	✓	✓	✓
Craig MacMullin	HW Board	✓	✓	✓
Martin Austin	Local 227	✓	✓	✓
Paul Taylor	Local 1431	✓	✓	✓
Chris MacNeil	Local 1431	✓	✓	-
Cathie O"Toole	Management	✓	✓	✓
Carl Yates	Management	✓	✓	n/a
Loius de Montbrun	Management	n/a	n/a	✓
John Eisnor	Non-Union	✓	✓	-
Cheryl Little	Pensioners	✓	✓	✓
Alternates:				
Todd Masters	Local 227	✓	-	n/a
John Keirstead	Local 227	n/a	n/a	✓
Anna McCarron	Local 1431	-	✓	✓
Heather Britten	Non-Union	✓	✓	-
Norma Dube	Pensioners	✓	-	✓
Observers:				
Rochelle Bellemare	HR Coordinator	✓	✓	✓
Todd Masters		n/a	n/a	✓
Administration Support				
Amanda Joudrey		✓	✓	✓

Legend:		
	✓	- Present
	-	- Absent
	n/a	- Not a Member of the Committee at the time

Halifax Water
Halifax Regional Water Commission

ITEM # 9-I
HRWC Board
January 30, 2020

TO: Craig MacMullin, MBA, CPA, CGA,
Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Louis de Montbrun, CPA, CA
Director, Corporate Services/ CFO

APPROVED: *Original Signed By:*
Cathie O'Toole, MBA, FCPA, FCGA, ICD.D
General Manager

DATE: January 20, 2020

SUBJECT: **2019/20 Third Quarter Cost Containment**

INFORMATION REPORT

ORIGIN

- The Cost Containment Process as approved by the Halifax Regional Water Commission Board (the "Board"), October 3, 2013.
- April 14, 2015, Nova Scotia Utility and Review Board (NSUARB) Decision - HRWC General Rate Application (M06540).

BACKGROUND

The process for cost containment as approved by the Board on October 3, 2013, called for the implementation of several recommended actions that would assist Halifax Water in addressing the NSUARB request for a more rigorous approach to cost containment. One key recommendation was the establishment of a reporting structure whereby, "*on a quarterly basis, the monthly financial report of the Board will also include an update on Cost Containment Initiatives*".

In the Decision on the 2015 Rate Hearing, the NSUARB directed Halifax Water to file annual reports on its efforts to contain the operating costs of the utility, with this report to be filed no later than June 30 of each year.

DISCUSSION

A summary report of cost containment initiatives for the third quarter (nine-month period ending December 31, 2019) is attached, showing new initiatives affecting operations implemented during the 2019/20 fiscal year. Estimated cost savings associated with these initiatives total $0.1 million, and are categorized in Figure #1 below:

Figure #1

Procurement Strategies	**$26,050**	**24.2%**
Facilities/Process Strategies	**$80,650**	**74.9%**
Reduce Paper and Printing Costs	**$936**	**0.9%**
	$107,637	**100.0%**

As shown above, cost containment initiatives implemented during the year are impacted in two main areas, Facilities/Process and Procurement Strategies. Facilities/Process Strategies contain initiatives of varying nature, including efficiencies realized in several wastewater treatment facilities dealing mainly with processes involving the optimization of polymer dosing. For example, at the Eastern Passage wastewater treatment plant better environmental controls and optimization of the polymer dose led to a reduction in the consumption of polymer and an estimated annual cost savings of $20,000. Similar optimization strategies related to polymer were also implemented at the Aerotech and Mill Cove wastewater treatment plants, as outlined in the report attached.

Under Procurement Strategies one of the main initiatives during the year occurred at the Timberlea/ Lakeside wastewater treatment plant where an alternative supplier for sodium sulfite pucks was found, resulting in an estimated annual cost savings of $10,000. Other initiatives relating to procurement are summarized in the report attached.

There are some other initiatives resulting in cost containment that will be reported at the end of the fiscal year. The major item is the phase out of the retirement allowance program. In 2019/20 employees were offered some options that result in the closure of the program to new entrants, and the gradual phase out of the retiring allowance program. As a result of some current employees selecting options which eliminate the go forward accrual of service, the go forward impact of the retiring allowance on the operating budget is significantly reduced.

BUDGET IMPLICATIONS

Available information on cost containment initiatives were taken into consideration when the 2019/20 budget was developed. Initiatives that impact future fiscal periods will be incorporated into future periods.

ATTACHMENTS

Summary Report – Cost Containment Initiatives

Report Prepared by: *Original Signed By:*
Allan Campbell, B.Comm, CPA, CMA
Manager, Finance, (902) 490-4288

Halifax Water
Summary Report - Cost Containment Initiatives
2019/2020

Initiative	Comments	2019/20 Cost Savings
Procurement Strategies		
Alternate parts replacement (Eastern Passage)	Sourced a local 3D printing shop to fabricate low cost gears which allowed us to repair the influent composite sampler instead of replacing a major part of the unit.	$3,000
Equipment calibration (Eastern Passage)	Internal staff are now able to calibrate fixed gas detectors instead of outsourcing this to a MSA technician service provider.	$3,000
In-house training (Eastern Passage)	Developed in-house method to purge primary sludge discharge line from primary gallery to the sludge holding tank. As a result and external contractor is no longer required to perform this work.	$4,500
Purchasing of sodium sulfite pucks (Timberlea/ Lakeside)	Alternative suppliers and brands for sodium sulfite pucks were sourced, and we were able to find a supplier of a product producing a similar result at a lower costs. These pucks are used to dechlorinate effluent before its release.	$10,000
Reduction in sampling (AreoTech)	Reduced the amount of lab testing over the year as greater reliance and confidence was placed on the new, in-line analyzers.	$5,000
Replacement pump (Mill Cove)	After a pump failed feeding an online odour analyzer, the manufacture quoted a price of $568 USD for a replacement pump. Upon further investigation a replacement pump was purchased from the original manufacture of the pump at a cost of $159 USD.	$550
Sub-total		$26,050
Facilities/Process Strategies		
Dosage Optimization (Eastern Passage)	Desiccant filters were fitted to the polymer totes to prevent warm, moist air from contaminating the polymer dosed to thicken centrifuge and drum thickener solids. The polymer no longer reacts early with water before being dosed, thus allowing the optimization of the dose and preventing polymer waste, leading to reduced consumption.	$20,000
Alternative product (Eastern Passage)	The HP biofilter exhaust fan motor belts will be replaced with syncrodrive timing belts, saving energy (electricity) through the prevention of slippage. Belts and sheaves have been purchased and will be installed in October, 2019.	$1,875
Building maintenance (AeroTech)	Installed new weather stripping in the overhead door in the truck bay at the AeroTech plant to reduce heating costs	$1,500
Polymer optimization (AeroTech)	Began polymer optimization in an effort to ensure good quality biosolids as well as a good quality centrate without having excess amounts of polymer reduces the feed rate from 60% to 21%.	$15,000
Improvements to aeration train (AreoTech)	Installed a curtain in the aeration train to enable better mixing of the microorganisms with the chemical, thereby reducing chemical costs and providing better quality treatment.	$15,000
Optimization of polymer dosing (Mill Cove)	By implementing daily jar testing to determine the startup dose setpoint, polymer dosing was optimized.	$14,000
Belt drive change-out (Mill Cove)	Replaced replacing the belt drive with a synchronous chain drive on a 30 horsepower blower, cost savings associated with energy consumption was realized.	$1,275
Upgrading equipment (Mill Cove)	Upgrading the water flow meter used in the dilution of polymer resulted in lowering water usage in the process by approximately 20,000 litres per day.	$12,000
Sub-total		$80,650
Reduce Paper and Printing Costs		
Cost reduction associated with 23rd Annual Report (General Manager's office)	The annual report for the year ended March 31, 2019 saw the number of copies produced drop from 275 copies in the previous year to 150 copies. This represents not only a cost savings but also an environmental benefit associated with paper reduction.	$936
Sub-total		$936
		$107,636