September 23, 2016

Ray Ritcey, Chair
Halifax Water
Halifax, Nova Scotia

The regular meeting of the Halifax Water Board will be held on Thursday, September 29, 2016 at 9:00 a.m. in the Boardroom at 450 Cowie Hill Road, Halifax.

AGENDA

In Camera

1C Approval of Minutes of In-Camera Meeting held on Thursday, June 30, 2016 *(5 minutes)*

2C Business Arising from Minutes
a)

3C Land Acquisition Matter

Regular Meeting

1. a) Ratification of In-Camera Motions
b) Approval of the Order of Business and Approval of Additions and Deletions (*5 minutes)*

2. Approval of Minutes of Regular Meeting held on Thursday, June 30, 2016

3. Business Arising From Minutes
a)

4. Operating Results for the Five Months Ended August 31, 2016 *(5 minutes)*

5. Capital Projects:

5.1	Quinpool Road/Peninsula Transmission Main Rehabilitation	$676,000
5.2	Northwest Arm Sewer Rehabilitation – Detailed Design	$600,000
		$1,276,000

6. 2016 Fall Debenture
7. Federal/Provincial Infrastructure Funding – Clean Water & Wastewater Fund (CWWF) Approvals
8. Renewal of NSERC Industrial Research Chair and Research Agreement with Dalhousie University
9. Mobility Contract E03.2016 – Contract Extension – Provincial RFP
10. Environmental, Health & Safety Committee – Terms of Reference
11. Audit & Finance Committee – Terms of Reference
12. Executive Committee – Terms of Reference
13. Sponsorship and Donation Policy
14. 2017 Meeting Schedule *(Verbal)*
15. Date of Next Meeting

Information Reports

1-I Operations and Financial Monthly Update
2-I Capital Budget Approvals to Date
3-I Bank Balance
4-I Pension Plan Investment Performance 2nd Quarter, 2016
5-I Communications Strategy
6-I Water Supply Lake Levels

7-I Merchant Discount Fees for RDC Credit Card Payments
8-I HRWC Employees' Pension Plan – 2016 Budget and 2nd Quarter, 2016 Financial Report

Original Signed By:

James G. Spurr
Secretary

HALIFAX REGIONAL WATER COMMISSION
MINUTES

June 30, 2016

PRESENT: Commissioner Ray Ritcey, Chair (via teleconference)
Commissioner Russell Walker, Vice Chair
Commissioner Mike Savage
Commissioner John Traves
Commissioner Darlene Fenton
Commissioner David Hendsbee
Commissioner Don Mason

REGRETS:
Commissioner Barry Dalrymple

STAFF: Carl Yates, General Manager, HRWC
Cathie O'Toole, Director, Corporate Services & Human Resources, HRWC
James Spurr, Legal Counsel, HRWC
Jamie Hannam, Director, Engineering & IS, HRWC
Lorna Skinner, Administrative Assistant, HRWC

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CALL TO ORDER

The Chair called the regular meeting to order at 9:00 a.m. in the Board Room of the HRWC, 450 Cowie Hill Road. The Board moved In Camera at 9:00 and the regular meeting reconvened at 9:35 a.m.

1.a) RATIFICATION OF IN CAMERA MOTIONS

MOVED BY Commissioner Hendsbee, seconded by Commissioner Savage that the Halifax Regional Water Commission Board ratify the In Camera motions.

MOTION PUT AND PASSED.

1.b) APPROVAL OF THE ORDER OF BUSINESS AND APPROVAL OF ADDITIONS AND DELETIONS

MOVED BY Commissioner Mason, seconded by Commissioner Savage that the Halifax Regional Water Commission Board approve the order of business and approve additions and deletions.

MOTION PUT AND PASSED

2. APPROVAL OF MINUTES – April 28 and May 26, 2016

MOVED BY Commissioner Hendsbee, seconded by Commissioner Fenton that the Halifax Regional Water Commission Board approve the minutes of April 28 and May 26, 2016.

MOTION PUT AND PASSED.

3. BUSINESS ARISING FROM MINUTES

None.

4.1 AUDITED OPERATING RESULTS FOR THE YEAR ENDED MARCH 31, 2016

Cathie O'Toole gave a brief presentation on the audited operating results for the year ended March 31, 2016. This was the first set of financial statements prepared using International Financial Reporting Standards (IFRS). There was a clean audit opinion and the financial position of Halifax Water has improved. The Chair, on behalf of the Board, thanked the accounting staff for all their hard work in transitioning to IFRS.

MOVED BY Commission Mason, seconded by Commissioner Ritcey that the Halifax Regional Water Commission Board approve the March 31, 2016, Halifax Regional Water Commission's Audited Financial Statements prepared using International Financial Reporting Standards.

MOTION PUT AND PASSED.

4.2 OPERATING RESULTS FOR THE TWO MONTHS ENDED MAY 31, 2016

Cathie O'Toole gave an overview of the operating results for the two months ended May 31, 2016.

5. CAPITAL PROJECTS

5.1 Geizer 158 Reservoir Rehabilitation – Floor Replacement - $2,750,000

A report dated June 15, 2016, was submitted.

MOVED BY Commissioner Mason, seconded by Commissioner Hendsbee that the Halifax Regional Water Commission Board approve the additional funding of $2,750,000 to complete the Geizer 158 Reservoir Rehabilitation project at a total revised cost of $4,920,000, including net HST.

MOTION PUT AND PASSED.

5.2 CAPITAL PROJECT SPENDING SUMMARY – 2015/16

A report dated June 23, 2016, was submitted.

MOVED BY Commissioner Mason, seconded by Commissioner Fenton that the Halifax Regional Water Commission Board approve the individual project over expenditures as identified within "*Capital Project Spending Summary, April 1, 2015 – March 31, 2016"* and direct staff to forward the subset of projects "over $250,000" to the NSUARB for information and approval.

MOTION PUT AND PASSED.

6. HALIFAX REGIONAL WATER COMMISSION EMPLOYEES' PENSION PLAN FINANCIAL STATEMENTS FOR THE YEAR ENDED DECEMBER 31, 2015

A report dated June 20, 2016, was submitted.

Cathie O'Toole reported that there was a clean audit report with a significant improvement in the Pension Plan.

MOVED BY Commissioner Mason, seconded by Commissioner Savage that the Halifax Regional Water Commission Board approve the Audited Financial Statements for the Halifax Regional Water Commission Employees' Pension Plan for the year ended December 31, 2015.

MOTION PUT AND PASSED.

7. COGSWELL DISTRICT ENERGY SYSTEM – PRELIMINARY FEASIBILITY STUDY

Jamie Hannam joined the meeting.

A report dated June 17, 2016, was submitted.

Jamie Hannam gave a presentation on the preliminary feasibility study of the Cogswell District Energy System and a brief overview of the conclusions and recommendations that came out of the study. Mr. Hannam also identified the next steps outlined in the study which included sharing the findings with HRM senior staff and one or more committees of Regional Council, preparing a preliminary design and seeking additional funding sources.

MOVED BY Commissioner Mason, seconded by Commissioner Walker that the Halifax Regional Water Commission Board direct HW staff to present the findings of the study to the Environment and Sustainability Committee of Regional Council, requesting endorsement of mandatory connection to properties associated with the Cogswell redevelopment project.

MOTION PUT AND PASSED

8. BOARD BOOKS FEEDBACK (Verbal)

Some Board members requested that the software be downloaded to their HRM devices. Feedback regarding usage was positive.

Cathie O'Toole informed the Board that Information Report 10-I "2015/16 Cost Containment Report" will be filed with the NSUARB by end of business today.

Commissioner Fenton requested that Information Report 6-I "Lead Service Line Replacement Policy" be brought back to the Board as a Regular Agenda Item for a broader discussion.

Carl Yates stated that it was necessary to file an Application to the NSUARB as a result of the Stormwater Cost of Service Decision (Item 8-I). A Hearing is scheduled for the latter part of January 2017. In order to conform to this schedule, a submission must be filed with the NSUARB by October 31, 2016. Therefore, Mr. Yates proposed a special Board meeting in the last week of October. The Board decided to schedule the meeting for the morning of October 26, 2016.

It was then decided that the Lead Service Line Replacement Policy will be added to the Agenda for the October 26, 2016, Board meeting.

9. DATE OF NEXT MEETING

The next meeting is scheduled for September 29, 2016.

The meeting was adjourned at 10:55 a.m.

Original Signed by:	*Original Signed by:*
James G. Spurr	*Commissioner Ray Ritcey*
Secretary	*Chair*

The following Information Items were submitted:

1-I Operations and Financial Monthly Update
2-I Capital Budget Approvals to Date
3-I Bank Balance
4-I Computerized Maintenance Management System (CMMS) – Phase 2 – Implementation – Project Update
5-I Pension Plan Investment Performance 1st Quarter, 2016
6-I Lead Service Line Replacement Policy
7-I Municipal Auditor General Report – A Performance Review of Flexible Work Arrangement Programs.
8-I Stormwater Cost of Service Decision
9-I AMI NSUARB Approval Process
10-I 2015/16 Cost Containment Report
11-I Seasonal Disinfection
12-I Capital Cost Contributions – Financial Status Report for Fiscal Year Ended March 31, 2016.

Halifax Water
Halifax Regional Water Commission

ITEM # 4
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, Director, Corporate Services

APPROVED: *Original Signed By:*
Carl Yates, M.A.Sc., P.Eng., General Manager

DATE: September 16, 2016

SUBJECT: **Operating Results for the Five Months Ended August 31, 2016**

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 five (5) months of the 2016/17 fiscal year, period ending August 31, 2016. 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 (HRWC).

HRWC is a fully regulated government business enterprise, falling under the jurisdiction of the Nova Scotia Utility and Review Board (NSUARB). The NSUARB requires that HRWC 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 has converted the SAP financial records to 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 2016/17 fiscal year was prepared using the NSUARB format and financial results will continue to be provided in NSUARB format.

The financial statements are presented in a new expanded format this month. Summary information is provided for the Balance Sheet on Page 1 and the Income Statement on Page 2. A more 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. Lastly, Pages 9 and 10 provide the Balance Sheet and Income Statement in IFRS format.

Consolidated Income Statement - Page 2

Consolidated operating revenue of $57.9 million is $2.4 million greater than revenue reported for the same year-to-date period last year. Consolidated operating expenses of $36.4 million are $1.2 million lower than the same period last year.

Summarized Consolidated Operating Results				
	Actual YTD 2016/17 '000	Actual YTD 2015/16 '000	$ Change	% Change
Operating Revenue	**$57,864**	$55,457	$2,407	4.3%
Operating Expenses	**$36,363**	$37,574	($1,211)	-3.2%
Operating Profit (Loss)	**$21,501**	$17,883	$3,618	20.2%
Non Operating Revenue	**$1,299**	$1,298	$1	0.1%
Non Operating Expenditure	**$14,564**	$13,815	$749	5.4%
Net Surplus (Deficit)	**$8,236**	$5,366	$2,870	53.5%

The Net Profit for the year is $8.2 million, an improvement of $2.9 million from the same time in the prior year. The budget for the year, approved at the January 28, 2016 Board meeting, was for a loss of $154 thousand. Results for the year to date have been reviewed in conjunction with plans for the remainder of the year. An update to the Forecast reflects the change from the budget to a profit of $2.1 million, a total change of $1.9 million.

The Net Surplus to date is primarily a result of low Operating Expenses. It is anticipated that Operating Expenses will increase during the fiscal year as planned initiatives are completed.

Balance Sheet - Page 3

The cash balance of $56.7 million is up $23.3 million from the prior year. In November, new debt was issued in the amount of $28.3 million to fund projects in the 2015/16 Capital Budget.

The Customers & Contractual Accounts Receivable balance of $14.3 million has decreased $0.5 million from the same time last year. The Customers and Contractual – Unbilled Services figure represents the estimated revenue that has been earned but not yet billed to customers due to the monthly or quarterly billing cycle. The Unbilled Services amount is up slightly to $17.5 million. The amounts receivable from HRM of $11.9 million are down $2.3 million from the prior year.

The liquidity on the balance sheet (ratio of current assets divided by current liabilities) is 2.11, up from the ratio of 1.61 at the same time last year.

Plant in Service assets net of Accumulated Depreciation is $1.1 billion and is $49.0 million higher than at this time last year. Capital Assets Under Construction is down $22.6 million to $32.2 million. In the prior year, Assets Under Construction included significant balances for the Lakeside Diversion and Kearney Lake Road projects. The following table highlights the major projects currently underway:

Capital Assets Under Construction	
	Cumulative '000
MacDonald Bridge Transmission Main	**$4,423**
Aerotech Wastewater Treatment Facility	**$2,470**
Computerized Maintenance Mgmt System	**$2,161**
All other projects	**$23,124**
Total	**$32,179**

Figures used in the various tables throughout the report may contain differences due to Excel rounding.

Trade liabilities of $11.4 million have decreased $2.1 million when compared to the prior year. Liabilities to HRM are on par with the prior year. The amount owing to HRM includes the accrual for the annual dividend ($1.9 million accrued towards the $4.6 million annual payment), the accrued balance of the valve box and manhole adjustment work ($2.6 million), the Stormwater Right of Way customer billings ($0.3 million), plus other miscellaneous operating and capital accruals. Unearned Revenue is down $0.8 million. The current liabilities section now includes the current portion of Long Term Debt which is the amount of Debt Principal to be paid in the next 12 months. The balance of $23.2 million is up $0.8 million from the prior year.

Long Term Debt is up $10.4 million from last year, which is net of repayments of $19.6 million. The debt service ratio is currently 21.8%, a slight increase from 21.5% last year. This is well below the maximum 35% ratio allowed under the blanket guarantee agreement with HRM.

Long Term Debt by Service		
	2016/17	2015/16
	'000	'000
Water	**$60,707**	$54,802
Wastewater	**$140,621**	$138,724
Stormwater	**$11,056**	$8,442
Combined	**$212,384**	$201,968

Debt Servicing Ratio by Service		
	YTD Debt Servicing Cost Ratio	
	2016/17	2015/16
Water	**19.4%**	19.2%
Wastewater	**25.3%**	24.3%
Stormwater	**11.4%**	14.9%
Combined	**21.8%**	21.5%

The cumulative Operating Surplus of $7.8 million at the beginning of the fiscal year has grown to $16.0 million with the year-to-date profit of $8.2 million at December 31, 2015.

Income Statement – All Services - Page 4

The following table compares the results with a five month pro-rated forecast for the year.

Summarized Consolidated Operating Results				
	Actual YTD 2016/17 '000	Five Month Forecast 2016/17 '000	$ Variance	% Variance
Operating Revenue	**$57,864**	$56,531	$1,332	2.4%
Operating Expenses	**$36,363**	$41,868	($5,506)	-13.1%
Operating Profit (Loss)	**$21,501**	$14,663	$6,838	46.6%
Non Operating Revenue	**$1,299**	$1,381	($82)	-5.9%
Non Operating Expenditure	**$14,564**	$15,171	($607)	-4.0%
Net Surplus (Deficit)	**$8,236**	$873	$7,363	843.0%

Rate Changes

On April 21, 2015 the NSUARB approved rate changes which took effect May 1, 2015 and April 1, 2016. The base rate for water increased in 2015 but remained the same in 2016. The base rate for wastewater had no change in 2015 but increased between 1.1% and 7.7% in 2016. The wastewater base charge for small residential meters increased from $13.00 to $14.00 which was the greatest percentage increase; the changes in the monthly charge for larger meters were larger amounts but a smaller percentage increase.

The water consumption rate increased 15.5% to $0.976 per cubic meter, while the wastewater consumption rate increased 7.0% to $1.753 per cubic meter. The combined effect is a 9.9% increase in consumption rates. These increases are expected to be somewhat offset by a decrease in consumption, which is budgeted at 3.0%.

New Stormwater rates were not requested and remain for a third year at $0.149 per square meter of impervious area or $33.39 per residential property. The HRM Stormwater Right of Way charge was has been removed from HRWC bills and will appear on HRM property tax bills in the future.

The following table summarizes the most significant customer rates.

Summary of Rate Changes				
	Effective April 1/16	Effective May 1/15	$ Change	% Change
Volumetric Charges (per m3)				
Water	**0.976**	0.845	0.131	15.5%
Wastewater	**1.753**	1.638	0.115	7.0%
Combined	**2.729**	2.483	0.246	9.9%
Base Charges (per year)				
Water	**Varies by meter size**		No Change	0.0%
Wastewater	**Varies by meter size**		Varies	1.1%-7.7%
Stormwater - Residential	**33.39**	33.39	No Change	0.0%
Stormwater- HRM ROW	**-**	41.00	Eliminated	-100.0%

Operating Revenue

Operating Revenue is $1.3 million ahead of the pro-rated forecast for the year. This reflects the seasonal pattern of consumption that is typically higher for the summer months.

Metered Sales revenue is up $1.6 million (8.9%) for Water Service and 0.9 million (3.2%) for Wastewater Service. Metered Sales consist of base and volumetric charges. Base charges are on par with budget expectations. Year-to-date billed water consumption is down 0.8% compared to the prior year. On a 12 month rolling basis, billed consumption is down 1.0%. The dry summer weather experienced in the region may generate an increase in consumption. The extent to which this may occurr is not fully reflected in the results to date as the 13 week cycle for customer bills has covered only portions of the summer months and the accrued customer balances are based on consumption in previous years. The water rates for 2016/17 were based on an assumed 3% decrease in metered consumption.

Wastewater Metered Sales also consists of a volumetric discharge component and a base charge component. For most customers, the discharge component is based on the metered water consumption, and the volumes and revenue reflect the decline in water consumption. The billed discharge volume to date has declined 1.5%, and on a rolling 12 month basis, the billed discharge volume has declined by 1.6%. The wastewater rates for 2016/17 were also based on an assumed 3% decrease in discharge based on metered consumption.

Stormwater Site Generated revenue is on par with budget and the prior year. The Fire Protection fee charged to HRM is $7.1 million for the year, down from $8.0 million in 2015/16 as per the most recent set of rates approved by the NSUARB. Stormwater Right of Way revenue of $3.9 million will be the same as in the prior year. Other Services and Fees are currently ahead of budget and the prior year, with notable increases in Bulk Water sales and Septage Tipping fees. Bulk Water sales are presumably higher due to the unusually dry weather experienced during the period.

Operating Expenses

Operating Expenses of $36.4 million are $1.2 million below the prior year and $5.5 million below the pro-rated forecast for the year. All expense categories are below budget and forecast. Compared to the prior year, Administration and Pension shows the greatest decline. This is attributable to the significant reduction in special payments for the pension plan's unfunded liability, from $2.9 million in the prior year to $0.3 million for the current fiscal year, based on the actuarial valuation of January 1, 2016. There are a few operating expenses that will be reflected in the next set of statements that were not planned when the budget was developed, , namely the Communications Strategy and development of a Stormwater Video to help educate customers on stormwater service. These expenditures will be paid for through savings within Administration and Pension

Expenses for Wastewater Treatment Plants are up $0.6 million, which is attributable to lower costs during the labour disruption in the prior year. Similar increases are seen in SCADA Control & Pumping and Engineering & Information Services.

Depreciation expense is well below budget and forecast but on par with the prior year. Depreciation is expected to increase later in the fiscal year as capital projects are completed and capitalized.

Financial Revenue

Investment income is below budget and the prior year. The investment income reported is comprised of interest earned on cash balances and the earnings through charging interest on capital work in progress. Lower interest rates have been offset by higher cash balances to earn higher bank interest; however, the lower capital work in progress balances have reduced the capital work in progress interest.

The decline in investment income has been offset by an increase in miscellaneous revenue, which includes various un-regulated activities such as tower leases, energy generation and rental properties.

Financial Expenses

Long Term Debt costs are on par with budget and up slightly from the prior year due to higher levels of debt. The Dividend/Grant In Lieu of Taxes is paid annually to HRM. The amount is based on the net asset value of water assets and will increase this year to $4.6 million.

The following table shows operating results for each service.

Year to Date Operating Results by Service		
	2016/17	2015/16
	'000	'000
Water	**$3,052**	$1,082
Wastewater	**$3,853**	$3,189
Stormwater	**$1,331**	$1,095
Net Surplus (Deficit)	**$8,236**	$5,366

Water Operations - Page 5

Water Operations show a profit of $3.1 million, compared to a profit of $1.1 million for the previous year at this time. Metered Sales revenue is up $1.6 million (8.9%). Operating Expenses have decreased by $1.0 million (6.3%) with Administration & Pension accounting for most of the decline.

Wastewater Operations - Page 6

Wastewater Operations show a profit of $3.9 million, up from a profit of $3.2 million in the prior year. Wastewater revenue has increased $1.0 million from the prior year, with Metered Sales accounting for the increase.

Operating expenses have decreased $0.2 million (1.0%) as compared to the previous year. Higher costs in Wastewater Treatment have been offset by lower costs in Wastewater Collection and Administration and Pension.

Stormwater Operations - Page 7

Stormwater Operations show a profit of $1.3 million, an improvement over the profit of $1.1 million for the same period last year. Stormwater Revenue and Expenses are similar to the prior year figures.

Financial Revenue has not been recorded in the past for Stormwater Service as it did not have a separate rate structure or capital contributions in cash. With the implementation of a separate rate structure in 2013/14 the Service has been contributing to the cash flow and Operating Surplus and so for the 2016/17 fiscal year a portion of Investment Income is allocated to Stormwater. Financial Expenses are on par with the prior year. Financial Expenses for Stormwater will continue to grow as further infrastructure upgrades are put into service.

Regulated and Unregulated Operations - Page 8

Activities regulated by the NSUARB show a profit of $7.7 million, ahead of the $5.0 million profit for the same period last year.

Unregulated activities show a profit of $0.54 million, an increase from the profit of $0.38 million for the prior year. Notable increases in Unregulated Revenue are seen in Septage Tipping Fees and Energy Projects. Unregulated Expenses are higher than the prior year, particularly in the contracted Wastewater Treatment facilities.

Results by Activity		
	2016/17	2015/16
	'000	'000
Regulated Activities	**$7,697**	$4,986
Unregulated Activities	**$539**	$380
Net Surplus (Deficit)	**$8,236**	$5,366

Results under International Financial Reporting Standards - Pages 9 & 10

As noted previously, the AcSB requires HRWC, as a rate regulated utility, to report financial results using International Financial Reporting Standards (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, Operating 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 $8.9 million to date and $22.7 million for the full year.

The IFRS Net Profit for the year is $14.9 million

ATTACHMENT

Unaudited Operating Results for the five (5) months ended August 31, 2016

Report prepared by: *Original Signed By:*
Warren Brake, Manager, Accounting, B.Comm, CPA, CGA

HALIFAX WATER
UNAUDITED BALANCE SHEET - CONSOLIDATED
AS OF AUGUST 31, 2016

	2016 '000	2015 '000
ASSETS		
Cash	$56,673	$33,403
Amounts Receivable	$43,704	$46,462
Materials & Supplies	$1,646	$1,563
Prepaid Expenses	$450	$360
	$102,473	$81,788
Regulatory Asset	$3,500	$3,708
Plant in Service	$1,051,201	$1,002,034
Assets Under Construction	$32,179	$54,819
	$1,086,880	$1,060,562
Unamortized Debt Discount & Issue Expense	$1,089	$1,034
	$1,190,442	**$1,143,384**
LIABILITIES & CAPITAL		
Trade Payables & Accrued Liabilities	$19,301	$21,443
Deposits & Unearned Revenue	$6,162	$6,937
Current Portion of LT Debt	$23,195	$22,374
	$48,657	$50,754
Pension & Accrued Retirement Benefits	$59,673	$70,297
RDC & Special Purpose Reserves	$9,039	$12,366
Long Term Debt	$212,384	$201,968
Total Liabilities	$329,753	$335,385
Capital Surplus, Committed Reserves, & Accumulated OCI	$844,633	$799,697
Operating Surplus	$7,819	$2,936
Excess (Deficiency) of Revenue over Expenditure - Consolidated	$8,236	$5,366
Total Capital & Surplus	$860,688	$807,999
	$1,190,442	**$1,143,384**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - CONSOLIDATED
APRIL 1/16 - AUGUST 31/16 (5 MONTHS)
41.67%

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 1/16 MAR 31/17 BUDGET* '000	APR 1/16 MAR 31/17 FORECAST '000	% of FORECAST
$12,108	$11,848	**OPERATING REVENUE**	$57,864	$55,457	$135,675	$135,675	42.65%
$6,927	$6,691	**OPERATING EXPENSES**	$36,363	$37,574	$102,424	$100,484	36.19%
$5,181	**$5,157**	**OPERATING PROFIT**	**$21,501**	**$17,883**	**$33,251**	**$35,192**	**61.10%**
		FINANCIAL REVENUE					
$65	$66	INVESTMENT INCOME	$292	$336	$810	$810	36.02%
$167	$167	PNS FUNDING HHSP DEBT	$833	$833	$2,000	$2,000	41.67%
$40	$16	MISCELLANEOUS	$174	$128	$504	$504	34.54%
$271	**$249**		**$1,299**	**$1,298**	**$3,314**	**$3,314**	**39.20%**
		FINANCIAL EXPENSES					
$733	$738	LONG TERM DEBT INTEREST	$3,649	$3,696	$8,872	$8,872	41.12%
$1,800	$1,649	LONG TERM DEBT PRINCIPAL	$8,884	$8,157	$22,652	$22,652	39.22%
$17	$15	AMORTIZATION DEBT DISCOUNT	$83	$75	$199	$199	41.50%
$382	$377	DIVIDEND/GRANT IN LIEU OF TAXES	$1,929	$1,887	$4,663	$4,663	41.37%
$10	$0	MISCELLANEOUS	$20	$1	$24	$24	82.95%
$2,941	**$2,779**		**$14,564**	**$13,815**	**$36,410**	**$36,410**	**40.00%**
$2,512	**$2,626**	**NET PROFIT (LOSS) BEFORE OTHER COMPREHENSIVE INCOME**	**$8,236**	**$5,366**	**$156**	**$2,096**	**392.91%**
$0	$0	**OTHER COMPREHENSIVE INCOME**	$0	$0	$0	$0	
$2,512	**$2,626**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**$8,236**	**$5,366**	**$156**	**$2,096**	**392.91%**

HALIFAX WATER
UNAUDITED BALANCE SHEET
AS OF AUGUST 31, 2016

	2016 '000	2015 '000
ASSETS		
Cash	$56,673	$33,403
Amounts Receivable		
Customers & Contractual	$14,287	$14,803
Customers & Contractual - Unbilled Services	$17,502	$17,454
Halifax Regional Municipality	$11,914	$14,205
Materials & Supplies	$1,646	$1,563
Prepaid Expenses	$450	$360
	$102,473	$81,788
Regulatory Asset	$3,500	$3,708
Plant in Service - Water	$584,609	$567,439
Plant in Service - Wastewater	$695,860	$643,290
Plant in Service - Stormwater	$131,419	$118,065
Less: Accumulated Depreciation - Water	($164,937)	($154,563)
Accumulated Depreciation - Wastewater	($170,009)	($148,667)
Accumulated Depreciation - Stormwater	($25,741)	($23,530)
	$1,054,701	$1,005,742
Assets Under Construction	$32,179	$54,819
	$1,086,880	$1,060,562
Unamortized Debt Discount & Issue Expense	$1,089	$1,034
	$1,190,442	**$1,143,384**
LIABILITIES & CAPITAL		
Trade	$11,448	$13,581
Interest on Long Term Debt	$2,886	$2,927
Halifax Regional Municipality	$4,967	$4,935
Contractor & Customer Deposits	$200	$204
Unearned Revenue	$5,961	$6,733
Current Portion of LT Debt	$23,195	$22,374
	$48,657	$50,754
Accrued Post-Retirement Benefits	$466	$458
Accrued Pre-Retirement Benefit	$3,656	$3,548
Deferred Pension Liability	$55,551	$66,291
Special Purpose Reserves not allocated to projects	$1,822	$5,477
Regional Development Charge	$7,217	$6,888
Long Term Debt-Water	$60,707	$54,802
Long Term Debt-Wastewater	$140,621	$138,724
Long Term Debt-Stormwater	$11,056	$8,442
Total Liabilities	$329,753	$335,385
Capital Surplus	$785,926	$719,045
Committed Reserves	$2,391	$13,946
Accumulated Other Comprehensive Income	$43,936	$54,325
Operating Surplus used to Fund Capital	$12,380	$12,380
Operating Surplus	$7,819	$2,936
Excess (Deficiency) of Revenue over Expenditure - Consolidated	$8,236	$5,366
Total Capital & Surplus	$860,688	$807,999
	$1,190,442	**$1,143,384**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - ALL SERVICES
APRIL 1/16 - AUGUST 31/16 (5 MONTHS)
41.67%

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 1/16 MAR 31/17 BUDGET* '000	APR 1/16 MAR 31/17 FORECAST '000	% of BUDGET*	% of FORECAST
		REVENUE						
$4,184	$4,028	METERED SALES - WATER	$19,839	$18,209	$46,475	$46,475	42.69%	42.69%
$6,115	$5,972	METERED SALES - WASTEWATER	$29,014	$28,111	$68,052	$68,052	42.64%	42.64%
$574	$566	STORMWATER SITE GENERATED SERVICE	$2,806	$2,813	$6,708	$6,708	41.82%	41.82%
$590	$669	FIRE PROTECTION	$2,948	$3,347	$7,074	$7,074	41.67%	41.67%
$323	$323	STORMWATER RIGHT OF WAY SERVICE	$1,617	$1,617	$3,881	$3,881	41.67%	41.67%
$248	$199	OTHER SERVICES AND FEES	$1,250	$989	$2,586	$2,586	48.33%	48.33%
$41	$62	CUSTOMER LATE PAY./COLLECTION FEES	$216	$233	$530	$530	40.80%	40.80%
$34	$28	MISCELLANEOUS	$173	$138	$369	$369	46.96%	46.96%
$12,108	**$11,848**		**$57,864**	**$55,457**	**$135,675**	**$135,675**	**42.65%**	**42.65%**
		EXPENSES						
$479	$459	WATER SUPPLY & TREATMENT	$2,801	$3,020	$7,983	$7,983	35.08%	35.08%
$692	$574	TRANSMISSION & DISTRIBUTION	$3,547	$3,685	$8,710	$8,657	40.73%	40.98%
$558	$634	WASTEWATER COLLECTION	$3,339	$3,890	$9,446	$9,236	35.34%	36.15%
$1,392	$953	WASTEWATER TREATMENT PLANTS	$7,121	$6,558	$19,425	$18,698	36.66%	38.08%
$277	$338	STORMWATER COLLECTION	$1,580	$1,574	$4,761	$4,829	33.18%	32.72%
$213	$189	SMALL SYSTEMS AND OTHER SERVICES	$1,193	$1,072	$3,132	$3,049	38.11%	39.14%
$166	$144	SCADA, CONTROL & PUMPING	$848	$658	$2,089	$2,088	40.57%	40.59%
$616	$562	ENGINEERING & INFORMATION SERVICES	$3,092	$2,706	$8,067	$8,068	38.33%	38.33%
$182	$219	ENVIRONMENTAL SERVICES	$898	$952	$2,605	$2,605	34.47%	34.46%
$351	$348	CUSTOMER SERVICE	$1,784	$1,922	$4,419	$4,417	40.38%	40.39%
$724	$1,022	ADMINISTRATION & PENSION	$3,772	$5,221	$10,631	$9,696	35.48%	38.90%
$1,278	$1,250	DEPRECIATION	$6,388	$6,315	$21,157	$21,158	30.19%	30.19%
$6,927	**$6,691**		**$36,363**	**$37,574**	**$102,424**	**$100,484**	**35.50%**	**36.19%**
$5,181	**$5,157**	**OPERATING PROFIT**	**$21,501**	**$17,883**	**$33,251**	**$35,192**	**64.66%**	**61.10%**
		FINANCIAL REVENUE						
$65	$66	INVESTMENT INCOME	$292	$336	$810	$810	36.02%	36.02%
$167	$167	PNS FUNDING HHSP DEBT	$833	$833	$2,000	$2,000	41.67%	41.67%
$40	$16	MISCELLANEOUS	$174	$128	$504	$504	34.54%	34.54%
$271	**$249**		**$1,299**	**$1,298**	**$3,314**	**$3,314**	**39.20%**	**39.20%**
		FINANCIAL EXPENSES						
$733	$738	LONG TERM DEBT INTEREST	$3,649	$3,696	$8,872	$8,872	41.12%	41.12%
$1,800	$1,649	LONG TERM DEBT PRINCIPAL	$8,884	$8,157	$22,652	$22,652	39.22%	39.22%
$17	$15	AMORTIZATION DEBT DISCOUNT	$83	$75	$199	$199	41.50%	41.50%
$382	$377	DIVIDEND/GRANT IN LIEU OF TAXES	$1,929	$1,887	$4,663	$4,663	41.37%	41.37%
$10	$0	MISCELLANEOUS	$20	$1	$24	$24	82.95%	82.95%
$2,941	**$2,779**		**$14,564**	**$13,815**	**$36,410**	**$36,410**	**40.00%**	**40.00%**
$2,512	**$2,626**	**NET PROFIT (LOSS) BEFORE OTHER COMPREHENSIVE INCOME**	**$8,236**	**$5,366**	**$156**	**$2,096**	**5290.44%**	**392.91%**
$0	$0	**OTHER COMPREHENSIVE INCOME**	$0	$0	$0	$0		
$2,512	**$2,626**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**$8,236**	**$5,366**	**$156**	**$2,096**	**5290.44%**	**392.91%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - WATER OPERATIONS
APRIL 1/16 - AUGUST 31/16 (5 MONTHS)
41.67%

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 1/16 MAR 31/17 BUDGET* '000	APR 1/16 MAR 31/17 FORECAST '000	% of FORECAST
		REVENUE					
$4,184	$4,028	METERED SALES	$19,839	$18,209	$46,475	$46,475	42.69%
$590	$669	FIRE PROTECTION	$2,948	$3,347	$7,074	$7,074	41.67%
$66	$54	PRIVATE FIRE PROTECTION SERVICES	$335	$264	$840	$840	39.87%
$41	$38	BULK WATER STATIONS	$170	$140	$326	$326	52.11%
$18	$23	CUSTOMER LATE PAY./COLLECTION FEES	$114	$82	$203	$203	55.99%
$14	$11	MISCELLANEOUS	$70	$52	$142	$142	49.31%
$4,913	**$4,823**		**$23,476**	**$22,094**	**$55,061**	**$55,061**	**42.64%**
		EXPENSES					
$479	$459	WATER SUPPLY & TREATMENT	$2,801	$3,020	$7,983	$7,983	35.08%
$692	$574	TRANSMISSION & DISTRIBUTION	$3,547	$3,685	$8,710	$8,657	40.98%
$96	$74	SMALL SYSTEMS (inc. Contract Systems)	$442	$449	$883	$883	50.06%
$64	$60	SCADA, CONTROL & PUMPING	$315	$266	$846	$846	37.30%
$313	$292	ENGINEERING & INFORMATION SERVICES	$1,547	$1,374	$3,848	$3,848	40.19%
$37	$51	ENVIRONMENTAL SERVICES	$188	$226	$515	$515	36.54%
$179	$177	CUSTOMER SERVICE	$909	$979	$2,251	$2,251	40.39%
$371	$521	ADMINISTRATION & PENSION	$1,922	$2,660	$5,416	$4,940	38.91%
$508	$502	DEPRECIATION	$2,539	$2,509	$8,561	$8,561	29.66%
$2,737	**$2,709**		**$14,211**	**$15,168**	**$39,013**	**$38,483**	**36.93%**
$2,175	**$2,114**	**OPERATING PROFIT**	**$9,265**	**$6,926**	**$16,048**	**$16,578**	**55.89%**
		FINANCIAL REVENUE					
$29	$34	INVESTMENT INCOME	$132	$170	$365	$365	36.13%
$28	$11	MISCELLANEOUS	$142	$105	$432	$432	32.92%
$57	**$46**		**$274**	**$275**	**$796**	**$796**	**34.39%**
		FINANCIAL EXPENSES					
$203	$207	LONG TERM DEBT INTEREST	$1,027	$1,056	$2,486	$2,486	41.30%
$706	$631	LONG TERM DEBT PRINCIPAL	$3,484	$3,139	$8,576	$8,576	40.63%
$8	$7	AMORTIZATION DEBT DISCOUNT	$39	$37	$100	$100	39.59%
$382	$377	DIVIDEND/GRANT IN LIEU OF TAXES	$1,929	$1,887	$4,663	$4,663	41.37%
$0	$0	MISCELLANEOUS	$8	$1	$24	$24	32.10%
$1,299	**$1,223**		**$6,487**	**$6,119**	**$15,848**	**$15,848**	**40.93%**
$933	**$937**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**$3,052**	**$1,082**	**$996**	**$1,526**	**200.05%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - WASTEWATER OPERATIONS
APRIL 1/16 - AUGUST 31/16 (5 MONTHS)
41.67%

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 1/16 MAR 31/17 BUDGET* '000	APR 1/16 MAR 31/17 FORECAST '000	% of FORECAST
		REVENUE					
$6,115	$5,972	METERED SALES	$29,014	$28,111	$68,052	$68,052	42.64%
($8)	$13	WASTEWATER OVERSTRENGTH AGREEMENTS	$23	$61	$0	$0	0.00%
$26	$24	LEACHATE	$133	$88	$389	$389	34.24%
$5	$7	CONTRACT REVENUE	$31	$52	$86	$86	36.01%
$17	$2	DEWATERING FACILITY/SLUDGE LAGOON	$87	$72	$210	$210	41.66%
$0	$0	AIRLINE EFFLUENT	$28	$15	$86	$86	32.96%
$101	$61	SEPTAGE TIPPING FEES	$443	$297	$650	$650	68.14%
$17	$31	CUSTOMER LATE PAY./COLLECTION FEES	$79	$120	$257	$257	30.81%
$11	$10	MISCELLANEOUS	$62	$54	$133	$133	46.32%
$6,284	**$6,120**		**$29,900**	**$28,870**	**$69,862**	**$69,862**	**42.80%**
		EXPENSES					
$558	$634	WASTEWATER COLLECTION	$3,339	$3,890	$9,446	$9,236	36.15%
$1,392	$953	WASTEWATER TREATMENT PLANTS	$7,121	$6,558	$19,425	$18,698	38.08%
$94	$82	SMALL SYSTEMS	$483	$398	$1,251	$1,253	38.53%
$1	$2	DEWATERING FACILITY/ SLUDGE MGM'T	$116	$99	$556	$471	24.73%
$0	$12	BIOSOLIDS TREATMENT	$38	$50	$101	$101	37.83%
$23	$21	LEACHATE CONTRACT	$114	$76	$341	$341	33.42%
$99	$80	SCADA, CONTROL & PUMPING	$515	$379	$1,215	$1,215	42.42%
$267	$232	ENGINEERING & INFORMATION SERVICES	$1,363	$1,146	$3,629	$3,629	37.55%
$90	$104	ENVIRONMENTAL SERVICES	$442	$454	$1,254	$1,254	35.27%
$148	$147	CUSTOMER SERVICE	$753	$811	$1,864	$1,864	40.38%
$304	$431	ADMINISTRATION & PENSION	$1,591	$2,203	$4,485	$4,091	38.88%
$721	$711	DEPRECIATION	$3,603	$3,616	$11,982	$11,983	30.07%
$3,695	**$3,408**		**$19,478**	**$19,679**	**$55,549**	**$54,135**	**35.98%**
$2,589	**$2,712**	**OPERATING PROFIT**	**$10,422**	**$9,191**	**$14,312**	**$15,726**	**66.27%**
		FINANCIAL REVENUE					
$29	$32	INVESTMENT INCOME	$132	$167	$365	$365	36.13%
$167	$167	PNS FUNDING HHSP DEBT	$833	$833	$2,000	$2,000	41.67%
$12	$5	MISCELLANEOUS	$32	$23	$72	$72	44.25%
$208	**$203**		**$997**	**$1,023**	**$2,437**	**$2,437**	**40.92%**
		FINANCIAL EXPENSES					
$479	$484	LONG TERM DEBT INTEREST	$2,373	$2,408	$5,817	$5,817	40.79%
$1,042	$929	LONG TERM DEBT PRINCIPAL	$5,142	$4,582	$12,978	$12,978	39.62%
$8	$7	AMORTIZATION DEBT DISCOUNT	$40	$35	$89	$89	44.37%
$10	$0	MISCELLANEOUS	$12	$0	$0	$0	0.00%
$1,539	**$1,420**		**$7,566**	**$7,025**	**$18,884**	**$18,884**	**40.07%**
$1,259	**$1,495**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**$3,853**	**$3,189**	**($2,135)**	**($721)**	**634.55%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - STORMWATER OPERATIONS
APRIL 1/16 - AUGUST 31/16 (5 MONTHS)
41.67%

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 1/16 MAR 31/17 BUDGET* '000	APR 1/16 MAR 31/17 FORECAST '000	% of FORECAST
		REVENUE					
$574	$566	STORMWATER SITE GENERATED SERVICE	$2,806	$2,813	$6,708	$6,708	41.82%
$323	$323	STORMWATER RIGHT OF WAY SERVICE	$1,617	$1,617	$3,881	$3,881	41.67%
$5	$8	CUSTOMER LATE PAY./COLLECTION FEES	$23	$31	$70	$70	33.35%
$9	$7	MISCELLANEOUS	$41	$32	$93	$93	44.30%
$911	**$905**		**$4,487**	**$4,493**	**$10,753**	**$10,753**	**41.73%**
		EXPENSES					
$277	$338	STORMWATER COLLECTION	$1,580	$1,574	$4,761	$4,829	32.72%
$3	$3	SCADA, CONTROL & PUMPING	$17	$13	$28	$28	60.98%
$36	$38	ENGINEERING & INFORMATION SERVICES	$183	$186	$590	$590	30.98%
$55	$64	ENVIRONMENTAL SERVICES	$267	$273	$835	$835	31.95%
$24	$24	CUSTOMER SERVICE	$122	$132	$303	$303	40.38%
$49	$70	ADMINISTRATION & PENSION	$259	$358	$729	$665	38.88%
$49	$38	DEPRECIATION	$246	$190	$614	$614	40.09%
$494	**$574**		**$2,674**	**$2,727**	**$7,862**	**$7,865**	**34.00%**
$417	**$331**	**OPERATING PROFIT**	**$1,814**	**$1,767**	**$2,891**	**$2,888**	**62.80%**
		FINANCIAL REVENUE					
$6	$0	INVESTMENT INCOME	$28	$0	$81	$81	35.01%
$0	$0	MISCELLANEOUS	$0	$0	$0	$0	0.00%
$6	**$0**		**$28**	**$0**	**$81**	**$81**	**35.01%**
		FINANCIAL EXPENSES					
$51	$47	LONG TERM DEBT INTEREST	$249	$233	$569	$569	43.72%
$52	$88	LONG TERM DEBT PRINCIPAL	$258	$436	$1,098	$1,098	23.51%
$1	$1	AMORTIZATION DEBT DISCOUNT	$4	$3	$11	$11	35.55%
$104	**$136**		**$511**	**$671**	**$1,678**	**$1,678**	30.45%
$320	**$195**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**$1,331**	**$1,095**	**$1,294**	**$1,291**	**103.09%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - REGULATED AND UNREGULATED OPERATIONS
APRIL 1/16 - AUGUST 31/16 (5 MONTHS)
41.67%

DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR	ACTUAL (YEAR TO DATE) LAST YEAR	APR 1/16 MAR 31/17 BUDGET*	APR 1/16 MAR 31/17 FORECAST	% of FORECAST
REGULATED ACTIVITIES					
REVENUE					
METERED SALES	$51,659	$49,133	$121,235	$121,235	42.61%
FIRE PROTECTION	$2,948	$3,347	$7,074	$7,074	41.67%
PRIVATE FIRE PROTECTION	$335	$264	$840	$840	39.87%
STORMWATER SERVICE	$1,617	$1,617	$3,881	$3,881	41.67%
OTHER OPERATING REVENUE	$566	$564	$1,203	$1,203	47.08%
	$57,126	**$54,924**	**$134,234**	**$134,234**	**42.56%**
EXPENSES					
WATER SUPPLY & TREATMENT	$2,801	$3,020	$7,983	$7,983	35.08%
TRANSMISSION & DISTRIBUTION	$3,547	$3,685	$8,710	$8,657	40.98%
WASTEWATER & STORMWATER COLLECTION	$4,906	$5,459	$14,207	$14,065	34.88%
WASTEWATER TREATMENT PLANTS	$7,121	$6,558	$19,425	$18,698	38.08%
SMALL SYSTEMS	$919	$845	$2,116	$2,118	43.37%
SCADA, CONTROL & PUMPING	$848	$658	$2,089	$2,088	40.59%
ENGINEERING & INFORMATION SERVICES	$3,092	$2,706	$8,067	$8,068	38.33%
ENVIRONMENTAL SERVICES	$898	$952	$2,605	$2,605	34.46%
CUSTOMER SERVICE	$1,770	$1,904	$4,384	$4,382	40.38%
ADMINISTRATION & PENSION	$3,762	$5,210	$10,610	$9,676	38.88%
DEPRECIATION	$6,386	$6,313	$21,157	$21,158	30.18%
	$36,048	**$37,310**	**$101,352**	**$99,497**	**36.23%**
FINANCIAL REVENUE					
INVESTMENT INCOME	$292	$336	$810	$810	36.02%
MISCELLANEOUS	$873	$849	$2,125	$2,125	41.07%
	$1,164	**$1,186**	**$2,935**	**$2,935**	**39.68%**
FINANCIAL EXPENSES					
LONG TERM DEBT INTEREST	$3,649	$3,696	$8,872	$8,872	41.12%
LONG TERM DEBT PRINCIPAL	$8,884	$8,157	$22,652	$22,652	39.22%
AMORTIZATION DEBT DISCOUNT	$83	$75	$199	$199	41.50%
DIVIDEND/GRANT IN LIEU OF TAXES	$1,929	$1,887	$4,663	$4,663	41.37%
MISCELLANEOUS	$0	$0	$0	$0	0.00%
	$14,544	**$13,814**	**$36,386**	**$36,386**	**39.97%**
NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES	**$7,697**	**$4,986**	**($570)**	**$1,286**	**598.76%**
UNREGULATED ACTIVITIES					
REVENUE					
SEPTAGE TIPPING FEES	$443	$297	$650	$650	68.14%
LEACHATE	$133	$88	$389	$389	34.24%
CONTRACT REVENUE	$31	$52	$86	$86	36.01%
DEWATERING	$87	$72	$210	$210	41.66%
AIRLINE EFFLUENT	$28	$15	$86	$86	32.96%
ENERGY PROJECTS	$68	$11	$184	$184	36.92%
MISCELLANEOUS	$15	$9	$22	$22	71.25%
	$806	**$543**	**$1,625**	**$1,625**	**49.58%**
EXPENSES					
WATER SUPPLY & TREATMENT	$6	$2	$18	$18	34.88%
WASTEWATER TREATMENT	$281	$231	$998	$913	30.83%
MISCELLANEOUS	$19	$0	$37	$37	51.72%
SPONSORSHIPS & DONATIONS	$24	$29	$56	$56	43.49%
DEPRECIATION	$2	$2	$0	$0	0.00%
	$333	**$264**	**$1,109**	**$1,023**	**32.58%**
FINANCIAL REVENUE					
MISCELLANEOUS	$86	$102	$232	$232	37.01%
	$86	**$102**	**$232**	**$232**	**37.01%**
FINANCIAL EXPENSES					
MISCELLANEOUS	$20	$1	$24	$24	82.95%
	$20	$1	$24	$24	**82.95%**
NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES	**$539**	**$380**	**$726**	**$811**	**66.46%**
NET PROFIT (LOSS) AVAILABLE FOR TOTAL CAPITAL EXPENDITURES (REG & UNREG)	**$8,236**	**$5,366**	**$156**	**$2,096**	**392.91%**

HALIFAX WATER
UNAUDITED BALANCE SHEET - IFRS FORMAT
AS OF AUGUST 31, 2016

	2016 '000	2015 '000
ASSETS		
Cash	$56,673	$33,403
Amounts Receivable		
Customers & Contractual	$14,287	$14,803
Customers & Contractual - Unbilled Services	$17,502	$17,454
Halifax Regional Municipality	$11,914	$14,205
Materials & Supplies	$1,646	$1,563
Prepaid Expenses	$450	$360
	$102,473	$81,788
Regulatory Asset	$3,500	$3,708
Plant in Service - Water	$584,609	$567,439
Plant in Service - Wastewater	$695,860	$643,290
Plant in Service - Stormwater	$131,419	$118,065
Less: Accumulated Depreciation - Water	($171,152)	($159,214)
Accumulated Depreciation - Wastewater	($177,364)	($154,247)
Accumulated Depreciation - Stormwater	($25,741)	($23,530)
	$1,041,131	$995,511
Assets Under Construction	$32,179	$54,819
	$1,073,310	$1,050,331
Unamortized Debt Discount & Issue Expense	$1,089	$1,034
	$1,176,872	**$1,133,152**
LIABILITIES		
Trade	$11,448	$13,581
Interest on Long Term Debt	$2,886	$2,927
Halifax Regional Municipality	$4,967	$4,935
Contractor & Customer Deposits	$200	$204
Unearned Revenue	$5,961	$6,733
Current Portion of Deferred Contributed Capital	$12,526	$12,526
Current Portion of LT Debt	$23,195	$22,374
	$61,183	$63,280
Accrued Post-Retirement Benefits	$466	$458
Accrued Pre-Retirement Benefit	$3,656	$3,548
Deferred Pension Liability	$55,551	$66,291
Deferred Contributed Capital	$712,138	$702,355
Long Term Debt-Water	$60,707	$54,802
Long Term Debt-Wastewater	$140,621	$138,724
Long Term Debt-Stormwater	$11,056	$8,442
Total Liabilities	$1,045,378	$1,037,900
EQUITY		
Accumulated Other Comprehensive Income	$43,936	$54,325
Accumulated Surplus	$72,658	$29,625
Excess (Deficiency) of Revenue over Expenditure	$14,900	$11,302
Total Equity	$131,494	$95,252
	$1,176,872	**$1,133,152**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - IFRS FORMAT - ALL SERVICES
APRIL 1/16 - AUGUST 31/16 (5 MONTHS)
41.67%

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 1/16 MAR 31/17 BUDGET* '000	APR 1/16 MAR 31/17 FORECAST '000	% of BUDGET*	% of FORECAST
		REVENUE						
$4,184	$4,028	METERED SALES - WATER	$19,839	$18,209	$46,475	$46,475	42.69%	42.69%
$6,115	$5,972	METERED SALES - WASTEWATER	$29,014	$28,111	$68,052	$68,052	42.64%	42.64%
$574	$566	STORMWATER SITE GENERATED SERVICE	$2,806	$2,813	$6,708	$6,708	41.82%	41.82%
$590	$669	FIRE PROTECTION	$2,948	$3,347	$7,074	$7,074	41.67%	41.67%
$323	$323	STORMWATER RIGHT OF WAY SERVICE	$1,617	$1,617	$3,881	$3,881	41.67%	41.67%
$248	$199	OTHER SERVICES AND FEES	$1,250	$989	$2,586	$2,586	48.33%	48.33%
$41	$62	CUSTOMER LATE PAY./COLLECTION FEES	$216	$233	$530	$530	40.80%	40.80%
$34	$28	MISCELLANEOUS	$173	$138	$369	$369	46.96%	46.96%
$12,108	**$11,848**		**$57,864**	**$55,457**	**$135,675**	**$135,675**	**42.65%**	**42.65%**
		EXPENSES						
$479	$459	WATER SUPPLY & TREATMENT	$2,801	$3,020	$7,983	$7,983	35.08%	35.08%
$692	$574	TRANSMISSION & DISTRIBUTION	$3,547	$3,685	$8,710	$8,657	40.73%	40.98%
$558	$634	WASTEWATER COLLECTION	$3,339	$3,890	$9,446	$9,236	35.34%	36.15%
$1,392	$953	WASTEWATER TREATMENT PLANTS	$7,121	$6,558	$19,425	$18,698	36.66%	38.08%
$277	$338	STORMWATER COLLECTION	$1,580	$1,574	$4,761	$4,829	33.18%	32.72%
$213	$189	SMALL SYSTEMS AND OTHER SERVICES	$1,193	$1,072	$3,132	$3,049	38.11%	39.14%
$166	$144	SCADA, CONTROL & PUMPING	$848	$658	$2,089	$2,088	40.57%	40.59%
$616	$562	ENGINEERING & INFORMATION SERVICES	$3,092	$2,706	$8,067	$8,068	38.33%	38.33%
$182	$219	ENVIRONMENTAL SERVICES	$898	$952	$2,605	$2,605	34.47%	34.46%
$351	$348	CUSTOMER SERVICE	$1,784	$1,922	$4,419	$4,417	40.38%	40.39%
$724	$1,022	ADMINISTRATION & PENSION	$3,772	$5,221	$10,631	$9,696	35.48%	38.90%
$2,756	$2,721	DEPRECIATION	$13,903	$13,667	$21,157	$21,157	65.71%	65.71%
$8,405	**$8,161**		**$43,878**	**$44,926**	**$102,424**	**$100,483**	**42.84%**	**43.67%**
$3,703	**$3,686**	**OPERATING PROFIT**	**$13,986**	**$10,531**	**$33,251**	**$35,193**	**42.06%**	**39.74%**
		FINANCIAL REVENUE						
$65	$66	INVESTMENT INCOME	$292	$336	$810	$810	36.02%	36.02%
$167	$167	PNS FUNDING HHSP DEBT	$833	$833	$2,000	$2,000	41.67%	41.67%
$1,074	$1,042	MISCELLANEOUS	$5,469	$5,259	$504	$504	1084.47%	1084.47%
$1,306	**$1,275**		**$6,594**	**$6,429**	**$3,314**	**$3,314**	**198.95%**	**198.95%**
		FINANCIAL EXPENSES						
$733	$738	LONG TERM DEBT INTEREST	$3,649	$3,696	$8,872	$8,872	41.12%	41.12%
$17	$15	AMORTIZATION DEBT DISCOUNT	$83	$75	$199	$199	41.50%	41.50%
$382	$377	DIVIDEND/GRANT IN LIEU OF TAXES	$1,929	$1,887	$4,663	$4,663	41.37%	41.37%
$10	$0	MISCELLANEOUS	$20	$1	$24	$24	82.95%	82.95%
$1,141	**$1,130**		**$5,680**	**$5,659**	**$13,758**	**$13,758**	**41.28%**	**41.28%**
$3,868	**$3,831**	**NET PROFIT (LOSS) BEFORE OTHER COMPREHENSIVE INCOME**	**$14,900**	**$11,302**	**$22,807**	**$24,749**	**65.33%**	**60.20%**
$0	$0	**OTHER COMPREHENSIVE INCOME**	$0	$0	$0	$0	0.00%	0.00%
$3,868	**$3,831**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**$14,900**	**$11,302**	**$22,807**	**$24,749**	**65.33%**	**60.20%**

Halifax Water
Halifax Regional Water Commission

ITEM #5.1
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Jamie Hannam, P. Eng.
Director, Engineering & Information Services

APPROVED: *Original Signed By:*
Carl Yates M.A.Sc., P. Eng., General Manager

DATE: September 22, 2016

SUBJECT: **Quinpool Road / Peninsula Transmission Main Rehabilitation**

ORIGIN

Halifax Water's Five Year Business Plan, approved by HWRC Board in October, 2014.

RECOMMENDATION

The HRWC Board approve the Design phase of the Quinpool Road/Peninsula Transmission Main Rehabilitation project at an estimated cost of $676,000.

BACKGROUND

The **15" Peninsula Intermediate Transmission Main** (15" PLT Main) was installed in 1856. This 375mm diameter transmission main was the original main that conveyed water from Chain Lake to the city of Halifax. The alignment of the transmission main runs from the Chain Control Chamber, near North West Arm Drive, along Crown Drive, through easements to the Armdale Roundabout, and then along Quinpool Road to the Halifax Commons. (See attached sketch). The transmission main was subsequently extended along Robie Street in 1913. Portions of this line were previously cleaned and lined in 1973.

The unlined sections of this main have significant internal tuberculation resulting in reduced system hydraulic capacity.

The **24" Peninsula Low Transmission Main** (24" PLT Main) was constructed in 1862. This 600mm diameter transmission main was installed in the same corridor as the 15" PLT Main and, in most cases there is less than 600mm separation between the two mains. A portion of this main was cleaned and lined in 1995. Flow testing has found the unlined portions of this line also to be heavily tuberculated.

A project is proposed for the installation of a structural liner inside the old transmission mains utilizing innovative 'trenchless technology' to extend the serviceable life of these critical transmission mains.

Installing a structural liner inside the old pipes will maximize the flow capacity and reduce the operational liability. It will also minimize the disturbance of other buried utilities. The only alternative would be to undertake a very expensive and disruptive, traditional 'open-cut' replacement project.

DISCUSSION

The proposed project will consist of the rehabilitation (pipe cleaning and the installation of a fully structural liner) of approximately 4000 metres of the 24" PLT Main and 1500 metres of the 15" PLT Main as indicated on the attached sketch. The work will also include the installation of some new piping/valves, and the reconfiguration of connections at various intersections along the corridor.

The portion of the 15" PLT Main on Robie St. (1913) from Quinpool to South Street has been included in the design scope. Once the design and detailed cost estimate for the work along the 24" PLT Main is complete, staff will assess whether the Robie St. work should be accommodated within the project.

Sections of the 24" PLT and the 15" PLT Mains pass under a Nova Scotia Power (NSP) electrical substation and the main CNR railway between Chebucto Road and Roosevelt Drive. Considering the high consequences of a transmission main break in this area, that section of the two mains will be a part of the project.

A secondary purpose of the project is to upgrade the transmission main to allow the 24" PLT Main to be switched from the Peninsula Low Zone to the Peninsula Intermediate Zone. To achieve this capability, the new fully structural liner will need to be specifically designed for the higher internal pressure. Additionally, new Pressure Reducing Valves (PRVs) and associated valve/piping modifications will be required at the Chain Control Chamber and near the Cogswell/Robie intersection. Subject to final design, additional PRV Chamber(s) sites may also be identified along the transmission main.

A number of customers are serviced directly off the 24" PLT Main. Some of these services are old and are identified as being lead service lines. It is planned that all lead services connected to the 24" PLT Main will be fully replaced from the main to the house and an individual PRV installed in each building serviced directly off the transmission main in order to accommodate planned pressure increases in the main.

A significant challenge will be to work with the Halifax Regional Municipality (HRM), local businesses, customers and the contractor to minimize the time and extent of disruption to all stakeholders.

On August 16, 2016, Halifax Water received Federal and Provincial infrastructure funding for this project through the Clean Water and Wastewater Fund (CWWF). The CWWF provides for 75% funding of all eligible project costs.

One of the stipulations for Clean Water and Wastewater Fund approval is that the project must be completed by March 2018. In order to meet project funding commitments, there is a need to initiate the design work immediately. A formal Request for Proposals (RFP) for Engineering Services was issued by Halifax Water, with award pending funding approval.

The estimated total cost of the design phase of this project is approximately $676,000. This includes approximately $626,000 for external consultants and $50,000 for internal staff time as well as interest and overhead.

BUDGET IMPLICATIONS

The CWWF funding provides 75% cost sharing for all eligible expenses for design and construction, with Halifax Water providing 25% of eligible costs and 100% of ineligible costs. Ineligible costs generally include internal staff time, overheads, and interest during construction. As detailed on the attached spreadsheet, this equates to $469,500 from CWWF and $206,500 from Halifax Water.

The $206,500 Halifax Water portion is available within the 2016/17 Capital Budget under "Water – Critical Valves as this work has not yet proceeded.

The 2017/18 Capital Budget will include the funding requirements for the construction phase of the project.

The proposed expenditure meets the "No Regrets – Unavoidable Needs" approach of the 2012 Integrated Resource Plan. The proposed work meets the NR-UN criteria of "Required to ensure infrastructure system integrity and safety".

ALTERNATIVES

There are no recommended alternatives.

ATTACHMENTS

1. Cost Estimate Quinpool Design Costs
2. Peninsula Transmission Rehabilitation Plan

Report Prepared By:	*Original Signed By:* Tom Gorman, Manager Water Infrastructure, 902- 490-4716
Financial Reviewed By:	*Original Signed By:* Cathie O'Toole, MBA, CPA, CGA, Director Corporate Services, 902-490-3572

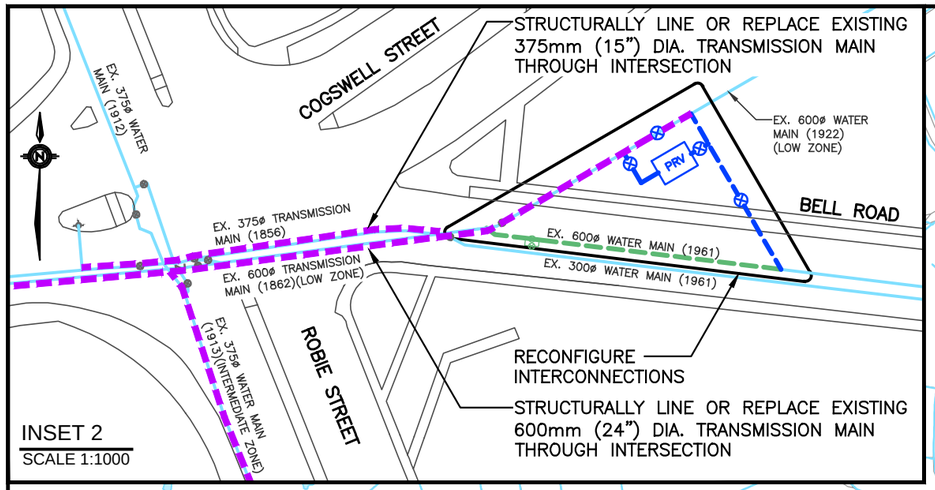
ITEM #5.1
ATTACHMENT 1

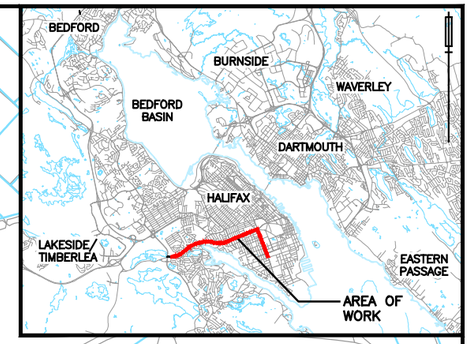
Cost Estimate for Design Work for the Quinpool Transmission Main Rehabilitation Project September 8, 2016

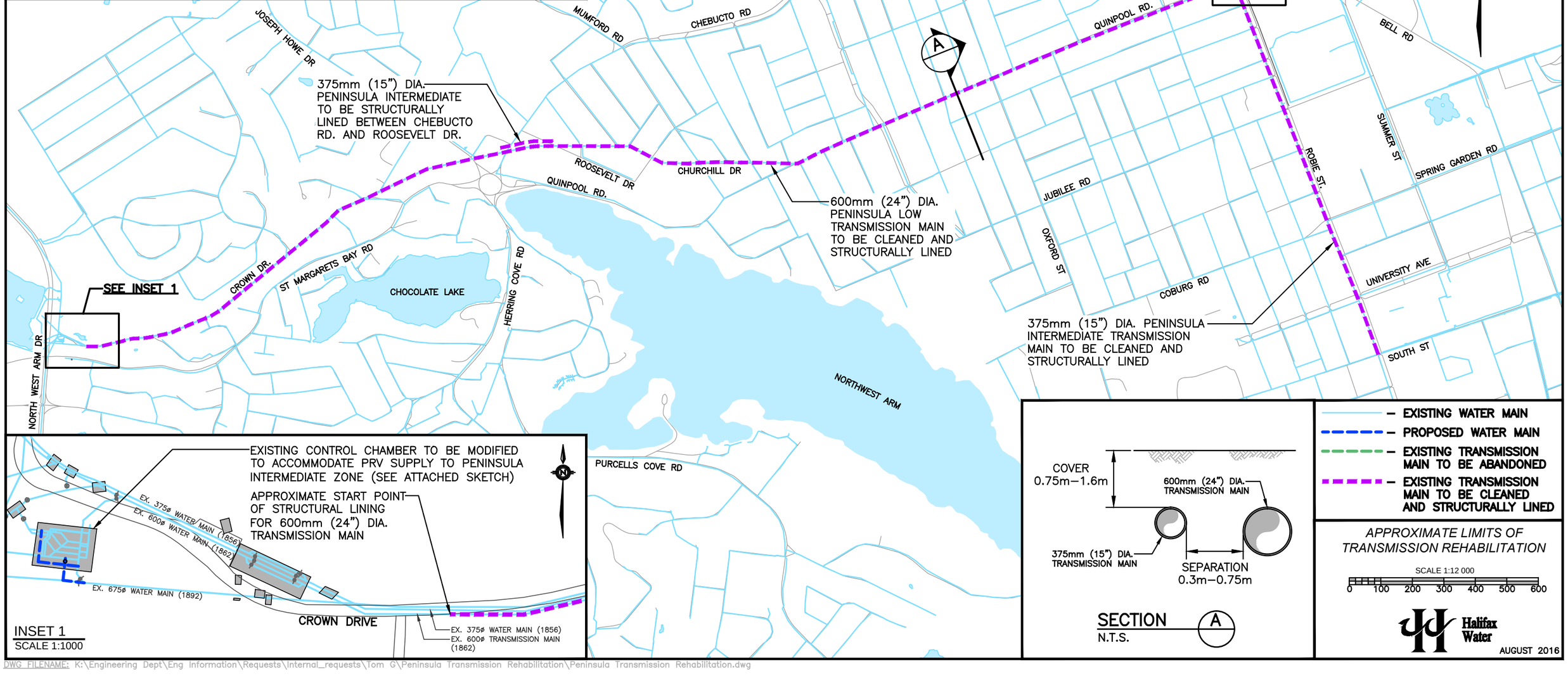
Description	Eligible Costs	Ineligible Costs	Total Costs
Eligible Costs			
Environmental Costs			
Design / Engineering Costs (Estimated)	$500,000		$500,000
Construction Costs	$0		
Contingencies at 20%	$100,000		$100,000
Sub-Total	$600,000		$600,000
15% HST	$90,000		$90,000
Gross Eligible Costs	$690,000		$690,000
Tax Rebate	($64,284)		($64,284)
Net Eligible Costs	$625,716		$625,716
Ineligible Costs			
Halifax Water Staff Time For Design - estimated		$25,000	$25,000
Overheads and interest @ 4%		$25,029	$25,029
Total Ineligible Costs		$50,029	$50,029
		Total Project Cost Estimate	$675,745

Federal-Provincial Share of Eligible Costs	$469,287	$0	$469,287
Rounded	$469,500	$0	$469,500

Halifax Water Share of Eligible and Ineligible Costs	$156,429	$50,029	$206,458
Rounded	$156,500	$50,000	$206,500







- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- EXISTING TRANSMISSION MAIN TO BE ABANDONED
- EXISTING TRANSMISSION MAIN TO BE CLEANED AND STRUCTURALLY LINED

APPROXIMATE LIMITS OF TRANSMISSION REHABILITATION

SCALE 1:12 000

0 100 200 300 400 500 600

Halifax Water

AUGUST 2016

DWG FILENAME: K:\Engineering Dept\Eng Information\Requests\Internal_requests\Tom G\Peninsula Transmission Rehabilitation\Peninsula Transmission Rehabilitation.dwg

Halifax Water
Halifax Regional Water Commission

ITEM #5.2
HRWC Board
September 29, 2016

TO: Mr. Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Jamie Hannam, MBA, P. Eng.
Director – Engineering & IS

APPROVED: *Original Signed By:*
Carl Yates M.A.Sc., P.Eng., General Manager

DATE: September 22, 2016

SUBJECT: **Northwest Arm Sewer Rehabilitation – Detailed Design**

ORIGIN

The 2016/17 Capital Budget.

RECOMMENDATION

The HRWC Board approve an increase in gross funding of $300,000 for the design phase of the Northwest Arm Sewer Rehabilitation project for a revised total budget of $600,000.

BACKGROUND

The existing Northwest Arm (NWA) sewer system is approximately 100 years old and is at the end of its service life. The NWA system is a combined sewer (conveying wastewater and storm water) and services the Armdale area which represents approximately 20% of the Halifax peninsula. This collection system comprises a 650 hectare sewershed located within a well-developed portion of land and a population base of some 22,000 people. The NWA sewer is approximately 4.5 km in length and is typically 1200 mm in diameter and was constructed using a combination of materials and cross sections. Approximately one third of the sewer is round precast concrete, one third is segmental clay, and one third is horseshoe shape concrete. Access to the sewer is difficult because of its location between the shore of the Northwest Arm and houses, buildings and other structures that were constructed along the shore.

A condition assessment of the sewer was conducted in 2006 using video and sonar equipment. The assessment identified deficiencies along the entire length of the sewer. Severe sedimentation, root penetrations, exfiltration, infiltration and limited structural problems were identified, thus a rehabilitation strategy was initiated to eliminate these problems, extend the life of the sewer, and improve serviceability.

In 2009, a pilot project was conducted which resulted in approximately 460 metres of the NWA sewer rehabilitated with cured-in-place-pipe (CIPP) lining. The pilot project was successful in establishing that the CIPP method is viable and effective for rehabilitation of the circular portion of the NWA sewer. The cost of the pilot project was $1,435,000 or approximately $3,100 per lineal metre.

Following the successful pilot project, a study was completed by Genivar in 2012 to review if other trenchless technologies are viable, potentially more cost effective, or offer additional advantages. The report recommended the continued use of a CIPP lining system to rehabilitate the remaining 4 km of sewer.

At the February 2016 Halifax Water Board meeting, $300,000 was approved for design services relative to the rehabilitation of the remaining 4 kms of sewer. At that time is was anticipated that the design would be completed in 2017 followed by construction in 2018 and 2019.

DISCUSSION

HRWC, through HRM, made application to have this project funded from the Provincial/Federal Clean Water Wastewater Fund (CWWF) and the project has been approved for funding in the amount of 75% of eligible costs up to a maximum of $12,257,781. The funding approval is based upon a project completion date of no later than March 31, 2018. It is noted that ineligible costs include Halifax Water staff time and interest and overheads.

The design phase is now being accelerated to complete over the next several months in time for a spring 2017 construction tender. At this time it is estimated that the design phase of the project will cost in the order of $600,000 including net HST. Of this amount it is estimated that $50,000 will be CWWF ineligible costs (staff time and interest/overheads) and the balance of $550,000 are CWWF eligible costs.

A future report will request approval for the construction phase.

BUDGET IMPLICATIONS

This recommendation is requesting a gross increase of $300,000 for the design phase of this project; however, no net increase to the current level of approved funding from HRWC is required. The 2016/17 Capital Budget allocated $300,000 under "*Wastewater Trunk Sewers – Northwest Arm Sewer Rehabilitation*" and these funds were approved by the Halifax Water Board at the February 2016 Board meeting. It is now recognized that the design phase cost will be in the order of $600,000. However, as the project is funded from the CWWF, the total cost to Halifax Water is estimated to be $187,500 (25% of eligible costs (25% of $550,000) plus 100% ineligible costs (100% of $50,000)) and thus the previously approved $300,000 provides adequate funding. Discussions with the NSUARB indicated that this gross level funding should be forwarded for their consideration.

The proposed expenditure meets the "No Regrets – Unavoidable Needs" approach of the 2012 Integrated Resource Plan. The proposed work meets the NR-UN criteria of "Required to ensure infrastructure system integrity and safety".

ALTERNATIVES

There are no recommended alternatives.

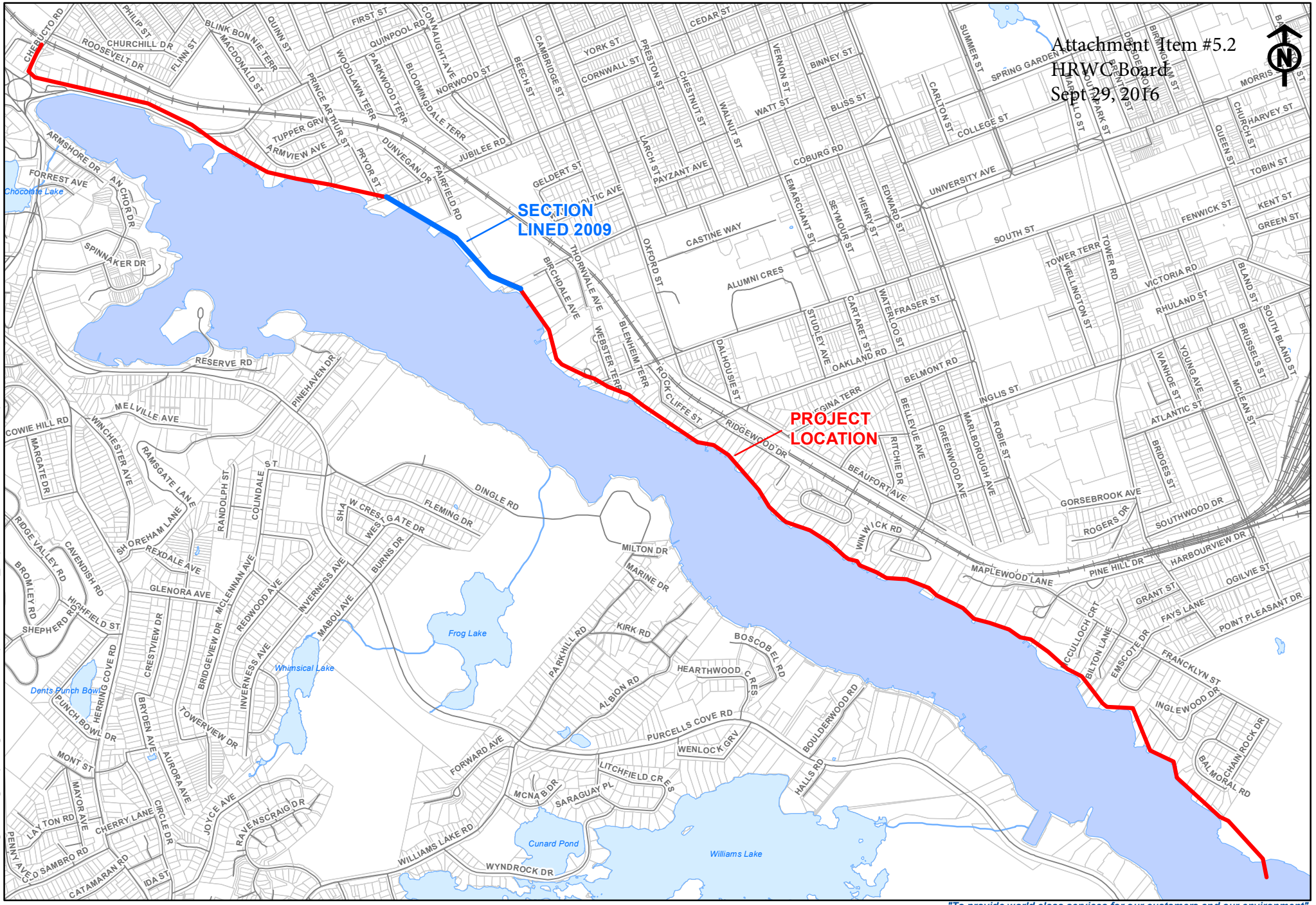
ATTACHMENT

Sketch – Northwest Arm Sewer Rehabilitation

Report Prepared by: *Original signed by Jamie Hannam on behalf of:*
David Ellis, P. Eng. Manager, Wastewater Infrastructure, 902-490-6716

Financial Review by: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, Director, Corporate Services, 902-490-3685

Attachment Item #5.2
HRWC Board
Sept 29, 2016



"To provide world class services for our customers and our environment"

Data Source: Halifax Water / HRM
Date: Wednesday, February 17, 2016

The information contained on this map may not be complete and/or accurate in all areas. Should accurate information or confirmation of completeness be required, please contact the Engineering Department of Halifax Water. Halifax Water will not be held liable for misuse of this information.

Northwest Arm Sewer Rehabilitation

Halifax Water

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Halifax Water
Halifax Regional Water Commission

ITEM # 6
HRWC Board

September 29, 2016

TO: Mr. Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA Director of Finance & Customer Service

APPROVED: *Original Signed By:*
Carl Yates M.A.Sc., P.Eng., General Manager

DATE: September 20, 2016

SUBJECT: **2016 Fall Debenture**

ORIGIN

Halifax Water (HW) participation in the Fall 2016 MFC Debenture issue to secure debt financing for 2016/17 additions to utility plant in service.

RECOMMENDATION

It is recommended that the Halifax Water Board:

1. Approve the financing of $7,052,667 for a 10 year term with a twenty year amortization schedule and an all-inclusive rate not to exceed 5.5%.

BACKGROUND

The HRWC is legally required to borrow through the MFC. The borrowing proposed in this report is consistent with the Five Year Business Plan, and the Approved Operating and Capital Budgets for 2016/17, and the approved rates.

DISCUSSION

Long term debt issued for water and wastewater projects is traditionally amortized for a period of 20 years based on the life of the asset being financed. Traditionally the market for 20 year financing in Canada has been significantly more expensive than 10 year financing so 20 year amortized debt is usually financed for 10 years and the balloon payment refinanced for the remaining 10 years.

HRWC refinanced a balloon payment of $2,000,000 in the 2016 Spring debenture process.

The 2016/17 Capital and Operating Budgets were prepared based on a projection that HRWC will be required to issue $31,946,215 of debt in 2016/17 to finance water, wastewater and stormwater additions to utility plant in service. HRWC does not require the full amount of debt at this time, based on current cash flow projections, status of capital projects, and capital spending year to date. As noted above, HRWC budgeted to borrow $31,946,215 in 2016/17 and is borrowing $7,052,667; deferring the issuance of debt for the balance to 2017/18.

The final amount, timing of the debt issuance and interest rates, will not be known with certainty until the formal debenture process concludes.

HRWC's debt is covered by a blanket guarantee approved by HRM Council in September 2014. The blanket guarantee will apply to all HRWC debt with a condition that HRWC must maintain a debt service ratio of 35% or less. HRWC's debt service ratio is 21.8% as of August 31, 2016.

HRWC's outstanding debt at March 31, 2016 was $240.1 million, and debt is projected to be $226.0 million by March 31, 2017.

BUDGET IMPLICATIONS

HRWC budgeted for $31.9 million in debt servicing in 2016/17; a 12.8% increase from 2015/16. 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.

ALTERNATIVES

Halifax Water could choose to forgo participation in the 2016 Fall Debenture and defer issuance of debt until Spring 2017, however this introduces some additional risk with respect to rising interest rates.

ATTACHMENTS

Borrowing Resolution
Updated Cash Flow Model for 2016/17 based on actual to August 2016 and forecasted Operating and Capital expenditures

Report Prepared by: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA Director of Corporate Services, 490-3685

HALIFAX REGIONAL WATER COMMISSION
BORROWING RESOLUTION

WHEREAS the Halifax Regional Water Commission, (the Commission) is incorporated under the provisions of the *Halifax Regional Water Commission Act*, Ch. 55 of the Acts of 2007 (The Act);

AND WHEREAS the Act provides that the Commission has power to borrow such sums as may be authorized and approved by the Board of the Commission for the purposes of the Commission, subject to the approval of the Nova Scotia Utility and Review Board;

AND WHEREAS the Commission wishes to borrow for the purpose of financing regular Additions to Utility Plant in Service for a 20 year amortization period;

AND WHEREAS a blanket guarantee for Halifax Regional Water Commission Debt was approved by the Halifax Regional Municipality on September 23, 2014;

BE IT THEREFORE RESOLVED

THAT under the authority of Section 16 of the Act the Commission borrow from the Municipal Finance Corporation, for the purpose set forth above, a sum or sums not exceeding $7,052,667 for a 10 year term amortized over a 20 year amortization period at an all-inclusive rate not to exceed 5.5% percent;

THAT the sum be borrowed by the issue of debentures of the Commission to such an amount at the Commission deems necessary and that the debentures be arranged with the Nova Scotia Municipal Finance Corporation, with interest to be paid semi-annually and principal payments made annually;

THAT this resolution remains in force for a period of not more than 12 months from the passing of this resolution.

I certify the above to be a true copy of a Resolution approved at a meeting of the Halifax Regional Water Commission held on September 29, 2016.

_____

James G. Spurr
Corporate Secretary and Legal Counsel

Cash Flow Model for 2016-17
As of September 20/16

	Original Budget	Revised Budget	Forecast	Adjustments for Cash Flow	Cash Flow	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total	Variance
Operating Revenue	135,675,302	135,675,302	135,675,302	-	135,675,302	9,771,513	10,694,018	10,179,483	11,458,645	11,203,859	10,893,293	19,908,370	10,393,293	10,393,293	10,093,293	10,093,293	12,033,997	137,116,353	1,441,051
Operating Expenses	(79,599,616)	(79,599,616)	(79,599,616)	3,086,400	(76,513,216)	(5,174,624)	(5,130,319)	(6,754,446)	(5,924,898)	(5,321,210)	(6,159,435)	(6,159,435)	(6,159,435)	(7,459,435)	(6,159,435)	(6,159,435)	(6,159,435)	(72,721,540)	3,791,676
Non Op Revenue	3,290,620	3,290,620	3,314,267	-	3,314,267	91,152	84,017	91,729	94,268	96,980	2,109,522	109,522	109,522	109,522	109,522	109,522	109,522	3,224,802	(89,465)
Non Op Expenses	(59,212,016)	(59,212,016)	(59,485,328)	23,386,668	(36,098,660)	(264,760)	(3,636,386)	(3,112,822)	(2,543,137)	-	(6,929,867)	(2,198,900)	(8,704,119)	(188,299)	(3,903,148)	(1,792)	(5,939,576)	(37,422,805)	(1,324,145)
Operations Total	154,290	154,290	(95,375)	26,473,068	26,377,693	4,423,280	2,011,330	403,944	3,084,878	5,979,629	(86,486)	11,659,558	(4,360,738)	2,855,082	140,233	4,041,589	44,509	30,196,809	3,819,116
Capital Expenditures (incl CCC projects)	(66,777,000)	(66,777,000)	(68,427,000)	(20,600,000)	(89,027,000)	(1,125,994)	(1,915,634)	(4,186,840)	(3,047,448)	(3,373,974)	(5,994,456)	(9,156,645)	(9,838,861)	(8,780,876)	(8,668,734)	(8,605,024)	(7,420,670)	(72,115,157)	16,911,843
New Long Term Debt	32,771,215	32,771,215	32,771,215	1,742,258	34,513,473	-	1,986,250	-	-	-	-	-	6,999,772	-	-	-	-	8,986,022	(25,527,451)
Other Incoming Cash (CCC, RDC, ROW, etc)	9,166,000	9,166,000	16,491,000	3,290,000	19,781,000	1,080,020	587,443	(114,753)	1,494,696	160,606	350,000	350,000	350,000	5,827,410	397,794	409,237	3,728,876	14,621,328	(5,159,672)
Changes in working capital	-	-	-	(350,000)	(350,000)	(293,790)	695,609	7,178,991	(5,366,165)	532,961	-	-	-	-	-	-	1,000,000	3,747,605	4,097,605
Net Cash Flow	(24,685,495)	(24,685,495)	(19,260,160)	10,555,326	(8,704,834)	4,083,516	3,364,997	3,281,341	(3,834,039)	3,299,221	(5,730,942)	2,852,913	(6,849,827)	(98,384)	(8,130,706)	(4,154,198)	(2,647,285)	(14,563,393)	(5,858,559)
Opening Cash Balance					46,478,023	46,478,023	50,561,539	53,926,536	57,207,878	53,373,839	56,673,060	50,942,118	53,795,031	46,945,204	46,846,820	38,716,114	34,561,915	46,478,023	
Ending Cash Balance					37,773,189	50,561,539	53,926,536	57,207,878	53,373,839	56,673,060	50,942,118	53,795,031	46,945,204	46,846,820	38,716,114	34,561,915	31,914,631	31,914,631	
								Peak									Valley		
Actual reconciled month end cash balance						50,561,539	53,926,536	57,207,878	53,373,839	56,673,060	-	-	-	-	-	-	-	-	
Variance						-	- 0	- 0	0	0	-	-	-	-	-	-	-	-	

Halifax Water
Halifax Regional Water Commission

ITEM #7
HRWC Board

September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Jamie Hannam, P. Eng., Director, Engineering & IS

APPROVED BY: *Original Signed By:*
Carl Yates, M.A.Sc., P. Eng., General Manager

DATE: September 22, 2016

SUBJECT: **Federal/Provincial Infrastructure Funding - Clean Water & Wastewater Fund (CWWF) Approvals**

INFORMATION REPORT

ORIGIN

August 5, 2014 HRM Council report "Building Canada Fund Infrastructure Projects".
HRWC Board Report; Federal/Provincial Infrastructure Funding – Additional Candidate Project approved May 26, 2016

BACKGROUND

The 2016 Federal Budget announced the details of the federal government's overall plan to invest more than $120 billion in infrastructure over 10 years. The plan will be implemented in two phases:

- Phase 1 of the Government's long-term infrastructure plan is currently being rolled out within a two year time horizon, with an immediate focus on maintenance and rehabilitation. The priority areas for spending are:
  - Modernize and rehabilitate public transit,
  - Water and wastewater systems
  - Affordable housing
  - Protect infrastructure systems from the effects of climate change.

- Phase 2 will occur in years 3 to 10 of the Government's long-term infrastructure plan. In this phase, the goals will be broader and more ambitious: a more modern, cleaner economy; a more inclusive society; and an economy better positioned to capitalize on the potential of global trade. The government is working with the Federation of Canadian Municipalities (FCM) throughout 2016 to develop more concrete details and criteria for this phase of the infrastructure plan.

Federal funds available for Nova Scotia municipalities during Phase 1 included:

- $86 million over 2 years for water and wastewater in the Clean Water & Wastewater Fund (CWWF). Eligible projects include rehabilitation and optimization of water, storm water and wastewater infrastructure, and upgrades to meet regulatory requirements. New construction will be considered if projects can be completed within the 2 year timeframe. Projects are cost-shared 50% by the Federal government, 25% by the Provincial government and 25% by the respective municipality/utility under this fund.

The CWWF application process required a prioritized list of projects with HRM Council approval. The Halifax Water Board approved a prioritized list of projects eligible for phase 1 of the CWWF. These projects and several HRM projects were subsequently endorsed by HRM Council. The prioritized list of projects, which were submitted on June 27, 2016 to the CWWF for cost sharing consideration, is noted below:

Halifax Water Projects:

1. **<u>Northwest Arm Sewer Rehabilitation ($ 17,153,000)</u>**

   Federal Ask: $8,576,500 Provincial Ask: $4,288,250
   Halifax Water Amount: $4,288,250

   The 4.5km Northwest Arm trunk sewer is over a century old. It is 1200 mm in diameter and a large part of the line is constructed of clay blocks mortared together. This line needs to be structurally renewed to extend its service life, prevent leakage and overflows into Northwest Arm and bring it into line with modern environmental standards.

2. Peninsula Transmission Main Rehabilitation ($7,200,000)

Federal Ask: $3,600,000 M Provincial Ask: $1,800,000 M
Halifax Water Amount: $1,800,000 M

This project involves the installation of a structural liner to extend the serviceable life of a critical water transmission main in Halifax. There has been significant development activity in peninsular Halifax in recent years, with more planned.

Increased water supply is needed for future development and increased densities. The innovative use of a structural liner using trenchless technologies will rehabilitate one of the original pipes that have served the city for over 150 years, and minimize the impact on businesses and residents along the streets.

3. Lake Major Dam ($ 5,900,000)

Federal Ask: $2,950,000 Provincial Ask: $1,475,000
Halifax Water Amount: $1,475,000

A dam is required to impound water within Lake Major to provide water supply to the greater Dartmouth area. A new dam is required to replace the existing gravity timber and earthen structure which has reached the end of its service life.

4. Sullivan's Pond Storm Sewer Renewal – Phase 1 ($ 9,890,000)

Federal Ask: $4,945,000 Provincial Ask: $2,472,500
Halifax Water Amount: $2,472,500

The existing storm sewer between Sullivan's Pond and Halifax Harbour has reached the end of its service life. A new 580 metre line is being designed.

5. JD Kline Filter Media and Underdrain Replacement ($5,600,000)

Halifax Water Amount: $1.4M Federal Ask: $2.8M Provincial Ask: $1.4M

The J.D. Kline Water Supply Plant supplies treated water to the communities of Halifax, Bedford and Sackville, and provides the only specific barrier to prevent pathogens from entering the drinking water supply. This project involves the replacement of the existing filter media and underdrains in all eight filters, the majority of which are beyond their recommended life span.

HRM Projects:

6. Fall River Water Servicing ($7,600,000)

Federal Ask: $3,800,000 M Provincial Ask: $1,900,000 M
HRM Amount: $1,900,000 M

This is a new construction project that would install approximately 3.5 km of central water services from Windsor Junction Road to Fall River Centre via Fall River Road. As this falls outside the current service boundary, HRM must facilitate a planning process to determine project scope and would be responsible for the construction costs of the water system.

7. Herring Cove Servicing – Phase 2B ($12,750,000)

Federal Ask: $6,375,000 Provincial Ask: $3,187,500
HRM Amount: $3,187,500

This is the final phase of a new construction project that is providing central water and sewer service to the community of Herring Cove. In 1999 HRM Council agreed to extend water service to the area due to the co-location of a Harbour Solutions sewage treatment plant. By 2008, the first three phases were completed; however Phase 2B has never been initiated due to the fact that escalating construction prices exceeded the original budget and insufficient funds were available to complete it. This project is located inside the service boundary with HRM being responsible for the construction costs of the water system.

DISCUSSION

CWWF Project Approvals

On August 16, 2016, Prime Minister Justin Trudeau, and the Honorable Stephen McNeil, Premier of Nova Scotia, announced that they had reached a bilateral agreement that will result in more than $238 million being invested in wastewater and public transit projects across the province with the following attributes.

- This funding is part of the first phase of *Investing in Canada*, the Government of Canada's historic $120-billion plan to support public infrastructure across the country over the next 10 years.
- Under this agreement, the Government of Canada has made its funding retroactive to April 1, 2016, so projects can proceed without delay to ensure a productive construction season.

- Details on Phase 2 of *Investing in Canada* will be announced over the next year.

All seven of the CWWF projects submitted by HRM were approved for cost sharing. The following details the project specific approvals:

Halifax Water's Project Title	Category	Total Ask	Total Approved	Federal/ Provincial
Northwest Arm Sewer	Wastewater	$17,153,000	$16,343,708	$12,257,781
Sullivan's Pond	Wastewater	$9,890,000	$8,429,190	$6,321,925
Peninsula Transmission Mains	Drinking Water	$7,200,000	$7,508,594	$5,631,446
Lake Major Dam	Drinking Water	$5,900,000	$4,517,716	$3,388,287
JD Kline Filter Media	Drinking Water	$5,600,000	$4,200,160	$3,150,120
TOTAL AMOUNTS:		**$45,743,000**	**$40,999,368**	**$30,749,559**

HRM's Project Title	Category	Total Ask	Total Approved	Federal/ Provincial
Fall River Water	Drinking Water	$7,600,000	$7,925,739	$5,944,305
Herring Cove Servicing	Wastewater	$12,750,000	*$4,561,952	$3,421,464
TOTAL AMOUNTS:		**$20,350,000**	**$12,487,691**	**$9,365,769**

*The Total Approved for this project is calculated with an assumed 25% contribution from HRM relative to the reduced Federal/Provincial amount.

The JD Kline Filter Media project approved total eligible cost was only 75% of the original estimate as 25% of the project cost was funded within the 2016/17 Halifax Water Capital Budget and thus ineligible. The balance of the Halifax Water projects were slightly under the original submission cost estimate due to some inclusion of ineligible costs and current year approval of design phase funding.

The Federal/Provincial cost sharing on the HRM Herring Cove project was limited to $3,421,464, well below the submitted request. The information to date indicates that this was the last project on the list and the approved amount was the balance of program funds remaining.

Design work, through external consultants, is in progress on all Halifax Water CWWF projects. The projects are proposed for public tender in the December 2016 to March 2017 time frame, with construction planned for 2017, and final completion by March 31, 2018 (consistent with the phase 1 CWWF requirements).

The two HRM CWWF projects are administered by HRM staff. However, consistent with historical HRM service extension projects, HRM staff have advised that they will seek formal approval to give Halifax Water "Agent" authority to manage the design and construction of these projects on behalf of HRM. As such, no design work has been initiated on these.

Aerotech WWTF Project Update

The Aerotech Wastewater Treatment facility (WWTF) Expansion and Upgrade project was approved under the New Building Canada Fund: Provincial-Territorial Infrastructure Component, Nation/Regional Projects (PTIC-NRP). Eligible costs within the PTIC-NRP approval will be shared at $7,000,000 equally for a total of $21,000,000 between the Government of Canada, Province of Nova Scotia and HRWC.

Subsequent to the Halifax Water Board approval in April 2016, the NSUARB approved the final phase of capital funding for this project on August 22, 2016.

The detailed design for the project was completed in July 2016 and was subsequently issued for public tender. The tender closed on September 9, 2016. The successful bidder was L&R Construction with a bid price of $16,000,000.

With consideration for design costs, process equipment pre-purchases, the estimated total cost of the eligible portion of the project remains just under the original $21,000,000 (eligible) and $22,755,000 (inclusive of ineligible) estimate.

Construction should begin within a few weeks and is scheduled for completion in December 2017.

BUDGET IMPLICATIONS

All of the approved Halifax Water CWWF projects were identified within the 2016 version of the Five Year Capital Plan, spread across various years. To accommodate the CWWF schedule, the Halifax Water share of the total project costs will be included within the 2017/18 Capital Budget

The availability of the required funding for these projects is consistent with the current multi-year financial plan, with some minor project deferral or re-scheduling of originally proposed 2017/18 projects.

The net impact of the CWWF funding assistance will have a positive impact on the overall capital funding plan for HRWC in future years and may reduce debt requirements and rate impacts or create capacity to fund other capital projects.

ALTERNATIVES

N/A

ATTACHMENTS

N/A

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

Financial Reviewed by: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, Director, Corporate Services
902-490-3685

Halifax Water
Halifax Regional Water Commission

ITEM #8
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Reid Campbell, M.Eng., P.Eng., Director of Water Services

APPROVED: *Original Signed By:*
Carl Yates, M.A.Sc., P.Eng., General Manager

DATE: September 16, 2016

SUBJECT: **Renewal of NSERC Industrial Research Chair and Research Agreement with Dalhousie University**

ORIGIN

Expiry of current research agreement with Dalhousie University on March 31, 2017.

RECOMMENDATION

It is recommended that the Halifax Water Board approve:

1. Support for the application by Dr. Graham Gagnon, of Dalhousie University, to the Natural Sciences and Engineering Research Council of Canada, to renew the NSERC/Halifax Water Industrial Research Chair in Water Quality and Treatment, for a further 5 year term, commencing April 1, 2017.
2. Upon successful renewal of the Industrial Research Chair, renewal of our research agreement with Dalhousie University for a further 5 year term commences April 1, 2017 at an annual fee of $190,000.

BACKGROUND

In June 2006, the Halifax Water Board approved funding of a 3-year research agreement, valued at $400,000, with Dr. Graham Gagnon of Dalhousie University to execute the research tasks identified in Halifax Water's Water Quality Master Plan (WQMP). Based on Halifax Water's commitment to fund a research agreement with Dalhousie University,

Dr. Gagnon was awarded a 5-year Natural Science and Engineering Research Council (NSERC) Industrial Research Chair in water quality and treatment, matching Halifax Water's funding contribution. In 2007, Halifax Water constructed a pilot water treatment plant, valued at $600,000, at the J. Douglas Kline Water Supply plant to be used as an investigative tool in the implementation of this research program. In 2009, Halifax Water extended the research agreement for an additional 2 years to take advantage of the full 5 year NSERC funding commitment, and to fully complete the initial phase of the research program. Additionally, Halifax Water entered a separate agreement with Dalhousie to obtain access to the new Clean Water Laboratory at Dalhousie University. Halifax Water made contributions totaling $500,000 over 7 years for access to laboratory facilities and staff. Dalhousie has also leveraged these funds for a further $500,000 towards research through NSERC.

In July of 2011, the Halifax Water Board approved support for renewal of the research chair for a subsequent five year term expiring on March 21, 2017. During the course of this term, several other parties have been invited to join the Chair as partners. The interests of these partners are complimentary to Halifax Water's or the direction of the Chair. These partners also make a financial investment in the Chair that is also matched by NSERC. These partners include:

1. Cape Breton Regional Municipality Water Utility.
2. CBCL Ltd, consulting engineers.
3. Mantech Limited (an advanced laboratory analysis instrumentation company based in Ontario).
4. LuminUltra Ltd. (a company developing and marketing biological analysis technology based in Fredericton, NB).

The partners along with the matching contribution from NSERC bring an additional $200,000 into the Chair annually, further strengthening the research program.

In November, 2016, Dr. Gagnon will be applying to NSERC for the renewal of the Research Chair for a third term.

The current water quality master plan which includes a detailed research plan is attached as Attachment I.

There are four Industrial Research Chairs in Canada in Drinking Water Quality and Treatment as follows:

University	Professor	Partners	Number of published papers in high impact journals 2010-2016
Dalhousie University	Dr. Graham Gagnon	Halifax Water, CBRM, CBCL, LuminUltra, Mantech	80
University of Waterloo	Dr. Peter Huck	18 Ontario utilities, consultants and technology providers	43
Ecole Polytechnique	Dr. Michele Prevost	City of Montreal and Laval, John Meunier Inc.	68
University of Toronto	Dr. Robert Andrews	9 southwestern Ontario utilities	36

DISCUSSION

When the first research contract was recommended to the Halifax Water Board in 2006, staff presented several reasons why this was the appropriate approach to meet Halifax Water's water quality goals. At this point where staff is asking the Board to approve renewal for a third term, it is appropriate to review the program to determine if the benefits achieve are consistent with the initial rationale for the program design which included the following:

- Research is led by a prominent and skilled researcher.
- If required, access is available to Dr. Gagnon's North American wide network of researchers and associates.
- Compared to staffing internally, flexibility is provided to staff up or staff down or use staff with different expertise depending on the project demands.
- Access to diverse training, modeling programs and analytical software is more readily available within Dr. Gagnon's research group.
- Dalhousie's water quality laboratory possesses a wide range of highly specialized analytical and laboratory equipment required to conduct this research program.
- The Dalhousie research team has developed invaluable background experience with Halifax Water treatment processes and operations staff.
- There is a solid history of knowledge transfer between Halifax water staff and graduate student researchers.
- The Halifax Water research contribution to be Chair will be matched pending the successful renewal of the Halifax Water/NSERC Industrial Research Chair.

- A strategic relationship with Dalhousie has proven to provide several ongoing benefits to Halifax Water such as support with operational or regulatory driven projects outside of the research program and the dissemination of Halifax Water research results to the water community at several prestigious conferences and workshops. This allows Halifax Water to be at the forefront of water quality research and innovation in North America.

Specific measures of the success of the program are noted below.

Benefits to Date for Halifax Water

The first ten years of the NSERC Industrial Research Chair has provided numerous benefits to Halifax Water. The benefits are consistent with and reinforce the original rationale for the program. A listing of a number of the more significant benefits is as follows:

1. Identified the dangers of partial replacement of lead service lines allowing Halifax Water to adjust our replacement strategy, thus protecting public health.
2. Identified that Health Canada lead sampling does not give true indication of customer exposure to lead.
3. Identified the impacts of lake recovery before the phenomenon was widely recognized, allowing Halifax Water time to react holistically.
4. Identified limitations of geosmin treatment strategies.
5. Adopted biofiltration at the J. Douglas Kline plant, reducing disinfection byproducts by 20% and reducing chlorine costs by $30,000 per year.
6. Determined that the occurrence of lead in public buildings (schools, hospitals, etc.) Is a function of the brand and model of fixture and building use rather than of water treatment.
7. Identified that a planned conversion of our disinfectant from free chlorine to chloramines would have negative consequences for lead, thus avoiding significant unintended consequences form a major capital investment.
8. Successfully persuaded Nova Scotia Environment that there was no public health benefit in installing filter –to-waste at Pockwock, thus avoiding a capital investment of at least $5 million. NSE has since changed their treatment standard accordingly.
9. Determined that inefficient operation of the hydraulic flocculators at the JD Kline plant are a key treatment barrier to improved plant performance. Conversion to mechanical flocculators are planned for a future date.
10. Developed filter resting as a zero cost method to mitigate the absence of filter to waste.
11. Conducted research to show that current coagulant type/dose at JD Kline yields optimum water quality and filter run times, while minimizing downstream unintended consequences.

12. Completed bench scale research which enabled Bennery lake staff to improve plant performance to successfully remove high summer time level of manganese, thus avoiding a significant capital expenditure.
13. Solved problem of high THM's in the North Preston area of the distribution system.
14. Successfully solved several low chlorine residual problem areas and eliminated summer distribution system biofilm growth in some areas.
15. There is a direct operation benefit to having Ph.D students working close to full time in water plants. They become a unique and invaluable expert resource to treatment plant staff.
16. Bi-Annual symposia are held twice per year where research findings are transferred to a variety of Halifax Water engineering and water services staff.
17. Treatment plant operators are trained by Dalhousie twice per year to address specific operational issues.
18. 5 Articles were published in the Journal of the American Water Works Association. One of those articles won best paper award in 2013 for the Distribution and Plant Operations division of AWWA.
19. Saved approximately $70,000 per year in lab work done by Dalhousie which would otherwise have been sent to outside 3rd party labs.
20. Four key Halifax Water staff were trained in Dr. Gagnon's lab, two since the establishment of the research chair. Dr. Wendy Krkosek, who is the maternity leave replacement for our incumbent Water Quality Manager is on secondment from Dr. Gagnon's lab.

In 2016, Halifax Water is facing three significant challenges in the area of drinking water quality and treatment. These challenges are as follows:

- **Rapidly changing source water quality.** The quality of source water in Pockwock Lake and Lake Major is undergoing rapid change. This is due to the phenomenon of lake recovery due to the reduction of sulfate emissions and acid rain and also possibly due to climate change. This is resulting in increasing levels of color and organic carbon in the source water which impacts the ability of the plants to meet their treatment objectives. It is also impacting the cost of treatment. Source water changes are also introducing taste and odour causing compounds, the removal of which is beyond the capability of current treatment processes. Addressing these challenges will require new approaches to treatment process operation and plant design.

- **Increasing demands on treatment plants.** In addition to the demands of changing source water quality, our treatment plants are now required to meet performance levels that were not anticipated when they were designed. Further, both plants are at the stage in their life cycle where we need to contemplate the replacement of significant treatment process components. Any upgrades to treatment plants must consider holistically, the changing source water impacts and overall water quality goals.

- **Lead Service Lines.** Halifax Water is embarking on a program to replace all existing lead service lines to protect the health of our customers. Our research to date has provided an insight into the occurrence of lead which has been used to design our lead program. Embarking on a project to remove lead service lines will be a transformation project for Halifax Water from the point of view of customer interaction and distribution system management.

Two of these challenges will demand significant investment in our treatment plants over the next ten years if we are to continue our standard of safe high quality water. The third challenge, lead service lines, is a long term initiative that is exceedingly complex. Our research efforts to date have been an important part of identifying and understanding these challenges and have helped to develop initial strategies to deal with them.

The research program for the next five years is designed to address these challenges and ensure that our improvements to treatment plants are incorporated to get the maximum leverage from our existing infrastructure and research investments. A fourth theme has been added to our research plan; data management. Over the past ten years Halifax Water has accumulated a vast amount of water quality data, derived from both operations and research. The data management focus will address how we gain maximum benefit from this data and leverage it for both better day to day operational decisions as well as long term treatment investment decisions.

Another feature of the proposed research plan is that specific resources are dedicated to day to day operational improvements. When the plan was first envisaged over ten years ago, the vision was that with time, as plant optimization challenges were met, the research would gradually shift to day to day operational improvements. While we are currently encountering new and substantial treatment challenges, the program now has dedicated research tasks aimed at helping the plant operators make day to day improvements or solve new short term problems as they occur.

The attachments to this report describe the detailed research plan to be executed over the next five year cycle. The detailed plan is organized according to the research themes and describes the related research tasks. The themes and tasks are as follows:

THEME 1: Source Water: Lake Recovery and Variable Source Water Quality.

1. Identification of Changing Source Water Quality.
2. Lake Recovery Monitoring
3. Assessment of Intake Locations and Structures

THEME 2: Treatment

1. Roadmap for a Robust Treatment Plant Design for a Changing Source Water Quality.
2. J. Douglas Kline Water Supply Plant
3. Lake Major Water Supply Plant
4. Bennery Lake Water Supply Plant

THEME 3: Distribution System Water Quality.

1. Lead: Implementing the NDWAC Recommendations.
2. Distribution System Water Quality and Integrity Monitoring
3. Disinfection Efficiency and Minimizing Disinfection Byproducts.

THEME 4: Data Management

1. Adoption of a Data Management Tool.

BUDGET IMPLICATIONS

The proposed research contribution by Halifax Water is $190,000 per year for each of the next 5 years. This is an increase from the previous contribution of $140,000. The increase is attributed to the fact that there has not been an inflationary fee adjustment in the ten years to date and also due to the significant water quality challenges that have arisen in the last few years. This will require more extensive water quality analysis and research efforts as discussed above. The increased fee supports more graduate students, the purchase of several advanced pieces of laboratory equipment to support research activities, and increased volume of water quality sample analysis for source waters and in the distribution system.

ALTERNATIVES

None Recommended

ATTACHMENT

Water Quality Master Plan

Report Prepared by: *Original Signed By:*
Reid Campbell, M.Eng, P.Eng., Director, Water Services (902)490-4877

Financial Reviewed by: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, Director, Corporate Services
(902) 490-3685

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 knowledge transfer between the Chair and Halifax Water staff ensures the utility is at the forefront of water research discovery and engages and elevates staff to be able to address complex operational issues with a solid knowledge base.

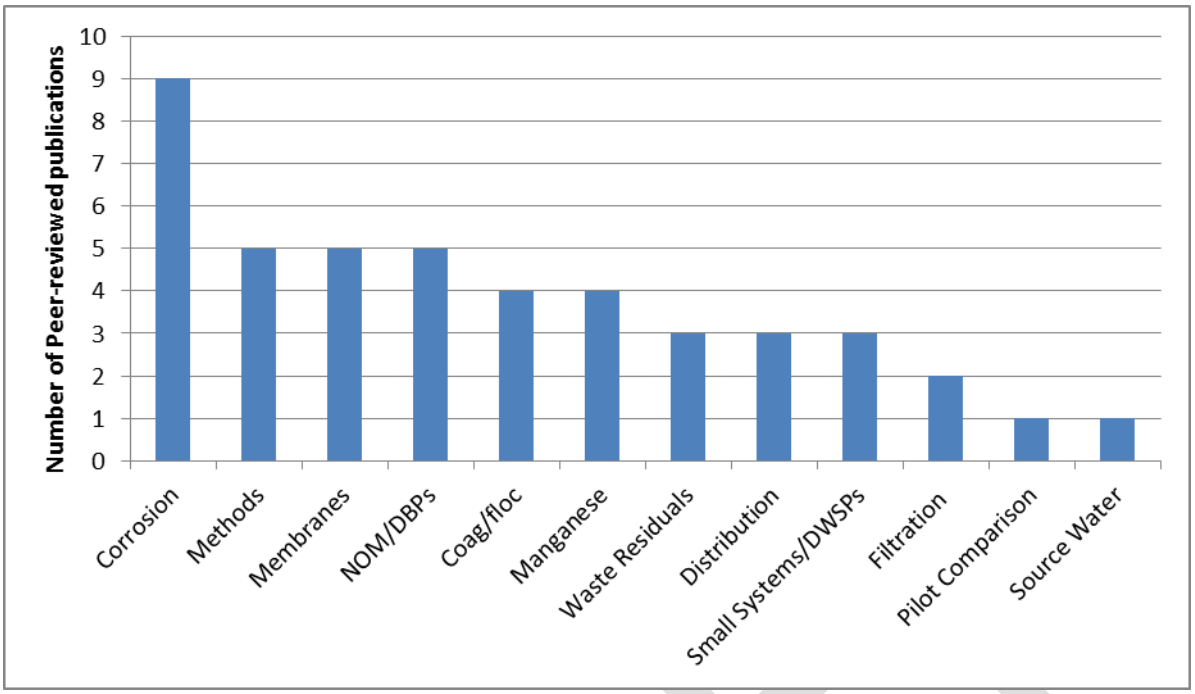

Figure 1 – Number of peer-reviewed publications by the IRC since 2006, by topic area.

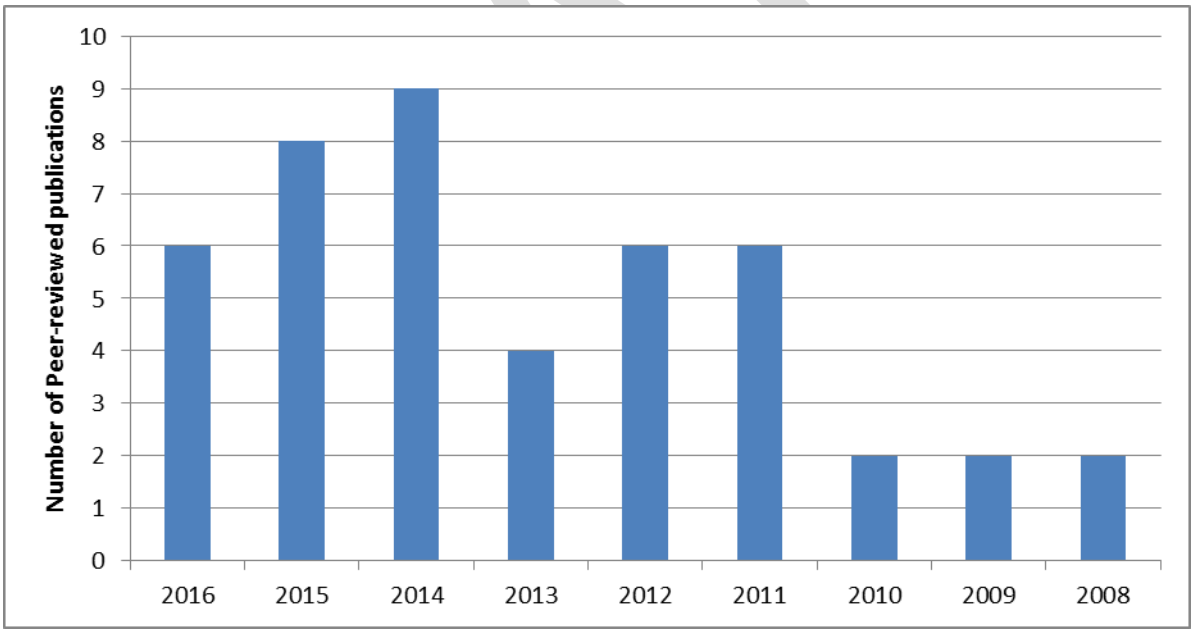

Figure 2 – Number of peer-reviewed publications by the IRC by year since 2006.

3 WQMP Direction

The overall water quality goals identified in the original WQMP remain on the priority list of Halifax Water. There are also other water quality objectives that the utility has identified as being significant to improving or strengthening water quality management and performance within the utility. Efforts will also be placed on shifting the focus of Halifax Water's strategic planning partially away from long term WQ goals and more towards what can be done to support treatment plant operations and improve water quality from a day to day perspective.

Over the course of the last five years, several water quality challenges have emerged that will challenge Halifax Water's ability to meet its water quality goals on an ongoing basis. 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.

ITEM #8
HRWC Board
September 29, 2016
ATTACHMENT

Water Quality Master Plan

V3.0

Appendix A – Research and Operating Plan

September 2016

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Water Quality Manager

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Theme 1: Source Water: Lake Recovery and Variable Source Water Quality

As a result of successful air emissions control, a number of studies have shown evidence of lake recovery from acidification, mainly in parts of Europe and the UK. The impact of recovery is healthier ecosystems as measured by changes in natural organic matter, pH and changes in biological activity and species.

In the fall of 2016, through both an analysis of basic historical data, and noticeable operational changes at both J.D. Kline and Lake Major, it became apparent that there has been a change in source water quality resulting in higher colour, TOC and pH. At J.D. Kline, the source water quality is approaching the upper limits of design for a direct filtration plant, including a TOC of 3.5 mg/L and colour of 20 TCU. At Lake Major, colour has gone from 20 to 45 TCU since commissioning of the plant, and as a result, the alum dose to remove the increased organics has gone from 15 to 50 mg/L over this time frame. These observed changes challenge earlier thinking of scientists studying the recovery from acidification in Atlantic Canada but are consistent with the observations of drinking water operators in the UK and Scandinavia. The Atlantic Canadian studies were published in 2007 and 2011, and many of the changes described have occurred within the past five years, so it is possible that water quality has recently hit a threshold that has allowed for recovery.

Very recent changes to sulphur emissions from marine fuels and continuing conversion of coal plants to natural gas in the Northeastern United States will continue to result in lower sulphur deposition, thus it can be expected that source waters will continue to change, which is expected to produce more challenges for Halifax Water treatment plants.

A large component of the research activities associated with this Water Quality Master Plan involve issues related to lake recovery, including:

- Identifying changes to source water quality,
- Developing appropriate monitoring strategies for changing source water quality,
- Developing operational tools to assist with plant operations in the short term, and
- Developing long term capital plans for robust design or retrofit of existing treatment plants to deal with a moving target of source water quality.

Task 1.1 Identification of Changing Source Water Quality

The major objective of this task is to develop an understanding of possible lake recovery and changing source water quality in Halifax Water's source waters after years of acidification caused by sulphur deposition, and to understand how this phenomenon impacts water chemistry from a drinking water quality standpoint. This research activity will:

- Mine currently available source water and air quality data to understand changing water quality both biologically and chemical/physical including changes to organic matter, pH, sulphate, nutrients, and biological species and richness.
- Expand and update currently available paleolimnological sediment analyses to include key source waters to estimate pre-industrial lake chemistry, and response of lakes to changes in land management practices.

- Determine which source waters and tributaries are susceptible to experiencing algal blooms in the future, and where these blooms may occur.

Task 1.2 Lake Recovery Monitoring

The overall research objective of this task is to identify responses to lake recovery in source water through a comprehensive monitoring program. Building on data mining and related activity conducted in Task 1.1, this research activity will look for changes in water chemistry and biology in response to trends found in task 1.1. Specifically, the objectives are to:

1. Evaluate the effect of lake recovery on algal activity, including algal organic matter (AOM) and the occurrence of commonly affiliated taste and odour compounds, including determination of which source water and tributaries are susceptible to experiencing algal blooms in the future, and potential management options to reduce bloom occurrence.
2. Monitor for trends in organic matter concentration and characterization in response to lake recovery.
3. Review existing watershed and deep lake sampling programs to ensure that parameters of interest are being collected with an appropriate frequency at appropriate locations.
4. Additionally, a program to monitor presence and composition of algae throughout the growing season will be developed for Pockwock, Major and Bennery, to understand areas that are vulnerable to blue/green algae, taste and odour presence and potential algal toxins.

Task 1.3 Assessment of Intake Locations and Structures

Optimizing the location of the intake structures and depth of intakes have been discussed for Lake Major, Bennery Lake, Pockwock Lake and The Shubenacadie River for Bomont. Pockwock and Lake Major both have fixed depth intakes that are susceptible to large daily fluctuations in water temperature which can pose downstream treatment challenges, and the intake at Bennery is susceptible to seasonal fluctuations in manganese concentrations.

1.3.1 Lake Major Intake Structure

The current intake for LMWSP is susceptible to significant diurnal temperature changes that pose operational challenges downstream, particularly with the sludge blanket in the UltraPulsators. A new-multi-level intake would allow for control of incoming water quality, thus reducing the operational burden downstream. In order to determine a suitable location, a research program will be initiated that involves monthly sampling year round at different depths at several locations within 200 m of the existing intake to identify an optimum location for a future intake. A bathymetric map will be developed to help in assessment of future intake locations. While conducting the bathymetric assessment, temperature profiling will also be conducted to provide an indication of areas of upwelling which could also provide a more consistent water quality.

A detailed raw water quality investigation of the existing raw water source will be used to understand water quality in terms of NOM, algal activity, and AOM in Lake Major, and to determine whether specific fractions of NOM are more pronounced compared to previous studies. Initially, this research will utilize conventional online water quality measurements in addition to novel online NOM characterization tools

in order to understand the potential changes in NOM composition. Grab samples will be collected from the raw water intake in order to confirm measurements from online instruments. A new at-line system to measure photoelectrochemical oxygen has been installed at Lake Major as part of this initiative.

If the existing transmission main will be used with the new intake, an evaluation of the manganese coating should be undertaken to ensure no negative impacts on raw water quality will occur with a change in intake location.

1.3.2 Pockwock Lake Intake Structure

For Pockwock, there is some discussion as to the impact of the berm location and structure on influent water quality, particularly because high geosmin concentrations are often found at the boat launch 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

ITEM # 9
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, Director of Corporate Services

APPROVED: *Original Signed By:*
Carl Yates, M.A.Sc., P. Eng., General Manager

DATE: September 21, 2016

SUBJECT: **Mobility Contract E03.2016 - Contract Extension – Provincial RFP**

ORIGIN

Halifax Water has a Mobile Device, Voice and Data Services contract with Telus, which is about to expire.

RECOMMENDATION

The HRWC Board approve Halifax Water's award for our Mobile Device, Voice and Data Services contract to Bell Mobility under the Province of Nova Scotia Mobility Contract E03.2016.

BACKGROUND

Halifax Water uses cell phones in order to conduct corporate business. Where possible, land lines have been removed, and cell phones are the only way to reach most staff. Cell phones are also used to provide connection between a mobile device (laptop, tablet, etc.) and the corporate network (tethering). Halifax Water is moving towards utilizing tablets in the field for Operations staff as part of the Operations Maintenance Management (OMM) project therefore, dependence on cellular devices is growing. The existing contract with Telus is about to expire and the Province of Nova Scotia has signed a contract for Mobile Device, Voice and Data Services that Halifax Water can access under the Provincial Public Procurement Act.

DISCUSSION

Halifax Water staff reviewed the costs of the existing Telus contract and compared those costs with the projected costs under the Bell Mobility contract. It is estimated that the current monthly cost under the Telus contract will be $12,463. Under the Bell Mobility contract, the monthly cost is estimated at $8,375. By selecting Bell Mobility, Halifax Water will save approximately $4,088 per month, or $49,056 a year. Halifax Water will also get better rates for US travel and other benefits that were not included as part of this analysis.

If approved, it is anticipated the effective date of the new contract will be January 1st, 2017 and the term will be three years.

BUDGET IMPLICATIONS

This will positively impact the annual Operating budget for Halifax Water. The projected annual operating cost savings are $49,056.

ALTERNATIVES

Renew the existing contract with Telus. This is not recommended as it results in higher costs.

Conduct a procurement process separate from the Province. This is not recommended, as it would likely result in higher costs as the smaller volume of business means loss of economies of scale.

ATTACHMENT

Power Point slides from the Province of Nova Scotia.

Report Prepared by:	*Original Signed By:* Daya Pillay, IS Manager, 902-266-8776
Financial Reviewed By:	*Original Signed By:* Cathie O'Toole, MBA, CPA, CGA, Director, Corporate Services 902-490-3685

ATTACHMENT

Excerpts from the Province of Nova Scotia.

RFP Background

- RFP released November 2015
- Multiple proposals received
- Proposal from Bell Mobility selected as delivering "Best Value"
- Contract effective immediately

NOVA SCOTIA

Contract Highlights

- Initial 3 year contract
  - April 1, 2016 – March 31, 2019
  - 2 x 2-year options to extend
- Unsubsidized Hardware
  - Will pay full cost for hardware
  - No more $0 phones
  - All phones purchased will be unlocked

NOVA SCOTIA

Contract Highlights

- Acceptable Usage Policy
  - Non-work related data usage may result in additional charges or service restrictions
- Plan only available to government employees for work
- Includes phone, Smartphone, Aircards, Tablets, AVL, M2M
- Data is Data

NOVA SCOTIA

Pricing – Voice Services

Base Monthly fee per device - $5.00
Includes
• Unlimited Calling (Air time) • Voicemail • Domestic Text • International Text • MMS • NS LD • Canadian LD • US LD • WiFi Calling

NOVA SCOTIA

Pricing – Data Services

Data Charges*			
	Price per Mb	Max Mb Charged	Max Charge**
Phone	$0.04	750 Mb	$30.00
Smart Phone	$0.04	750 Mb	$30.00
Air Card/Turbo Stick	$0.04	1,250 Mb	$50.00
Tablet	$0.04	1,250 Mb	$50.00
M2M	$0.04	2,500 Mb	$100.00
AVL	$0.04	750 Mb	$30.00
US Data Roaming	$0.10	100 Mb	$10.00

*Note: Includes tethering/WiFi Hot Spot
** Subject to acceptable usage policy

NOVA SCOTIA

Pricing – Other Charges

Other Charges			
US Voice Roaming	$0.10 per minute		
Push-to-Talk	$7.50 per month		
IP Address (Static or Dynamic)	$5.00 per month		
Directory Assistance (411)	$2.50 per call		
BlackBerry Visual Voicemail	$2.50 per month		
iPhone Visual Voicemail	$6.50 per month		
Voicemail to Text	$2.50 per month		
GPS Nav	$5.00 per month		
Text Anti-Spam	$2.50 per month		
Roadside Assistance	$5.00 per month		

NOVA SCOTIA

Pricing - International Roam

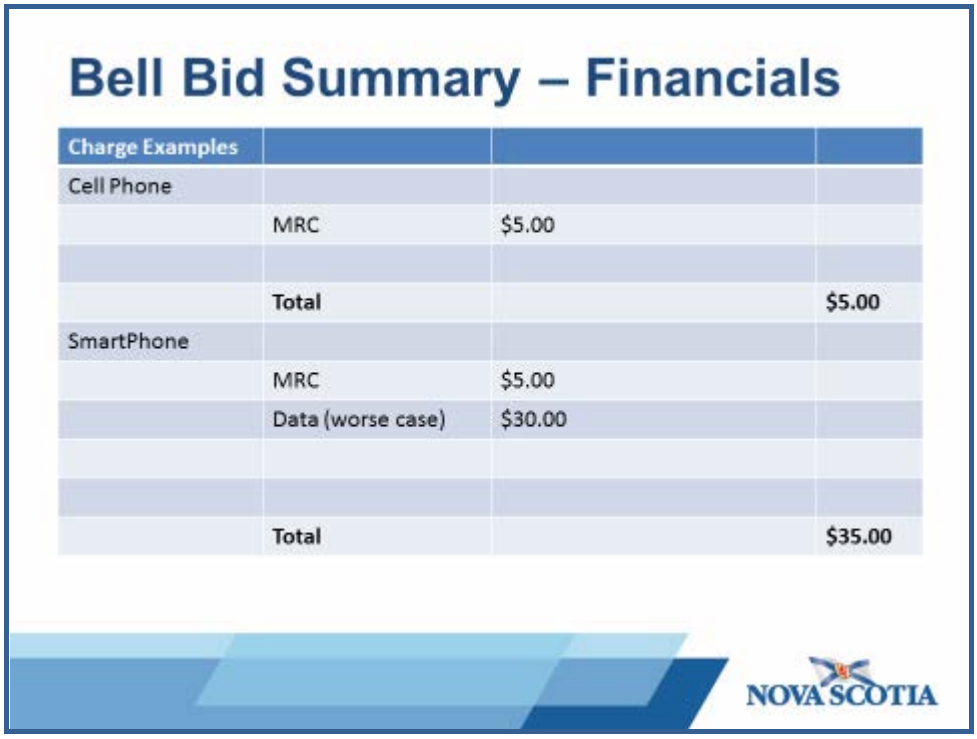
Region	Calls in Country	Calls Outside	Data (per Mb)	Text Sent	Text Received
Zone 1	$0.50	$0.50	$0.65	$0.15	$0.15
Zone 2	$0.65	$0.65	$0.65	$0.15	$0.15
Zone 3	$1.00	$1.00	$2.00	$0.15	$0.15
Zone 4	$1.10	$1.10	$3.00	$0.15	$0.15
Note: Roaming plans still available					

NOVA SCOTIA

Pricing - Hardware

Cell Phone		MSRP less $50
SmartPhone		MSRP less $250
Aircard		MSRP less $50
Tablet		MSRP less $50
Wireless Accessories		70% off reference price list
AppleCare		$169
Extended Warranty		$5.95 per month

NOVA SCOTIA



Bell Bid Summary – Financials

Charge Examples			
Cell Phone			
	MRC	$5.00	
	Total		**$5.00**
SmartPhone			
	MRC	$5.00	
	Data (worse case)	$30.00	
	Total		**$35.00**

NOVA SCOTIA

Halifax Water
Halifax Regional Water Commission

ITEM # 10
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Darlene Fenton, Chair, Environmental, Health & Safety Committee

DATE: September 13, 2016

SUBJECT: **Environmental, Health & Safety Committee Terms of Reference**

ORIGIN

Halifax Regional Water Commission Corporate Governance Manual.

RECOMMENDATION

It is recommended that the Terms of Reference for the Environmental, Health & Safety Committee be approved in the form attached hereto.

BACKGROUND

The Halifax Regional Water Commission Corporate Governance Manual was approved by the Board at its meeting of January 28, 2016. The Corporate Governance Manual references in Article 3.19 the Environmental, Health & Safety Committee and the Terms of Reference therefor.

DISCUSSION

Members of the Committee have discussed various drafts of its Terms of Reference and have settled on the text for which approval is recommended in this Report.

BUDGET IMPLICATIONS

None

ALTERNATIVES

None

ATTACHMENT

Terms of Reference, Environmental, Health & Safety Committee

Report Prepared by:	*Original Signed By:*
	James G. Spurr, Secretary 902-490-6101
Report approved by:	*Original Signed By:*
	Carl Yates, M.A.Sc., P.Eng., General Manager 902-490-4840

ITEM # 10
HRWC Board
September 29, 2016
ATTACHMENT

Halifax Water
Halifax Regional Water Commission

Environment, Health & Safety Committee

TERMS OF REFERENCE

Purpose

To assist the Board in fulfilling its role in oversight and governance by reviewing, reporting and making recommendations to the Board on the Commission's policies, standards and practices with respect to the environment, occupational health, safety, security, overall business conduct and ethics that reflects the Commission's commitment to its stakeholders.

Composition and Resources

The Committee shall consist of not less than two Commissioners.

Committee Meetings

The Committee shall meet at least semi-annually at the call of the Chair. The Chair may call additional meetings as required.

Notice of Meeting

Notice of the time and place of each meeting may be given orally, or in writing, or by facsimile, or by electronic means to each member of the Committee at least 72 hours prior to the time fixed for such meeting.

A member may in any manner waive notice of the meeting. Attendance of a member at a meeting shall constitute waiver of notice of the meeting except where a member attends a meeting for the express purpose of objecting to the transaction of any business on the grounds that the meeting was not lawfully called.

Quorum

A majority of Committee members, present in person, by video conference, by telephone or by a combination thereof, shall constitute a quorum.

Attendance at Meeting

The Committee may, by specific invitation, have other resource persons in attendance.

The Committee shall have the right to determine who shall and who shall not be present at any time during a meeting of the Committee.

Commissioners who are not members of the Committee, may attend Committee meetings, on an ad hoc basis, upon prior consultation and approval by the Committee Chair or by a majority of the members of the Committee.

Minutes

Minutes of Committee meetings shall be sent to all Committee members. The full Board of Commissioners shall be kept informed of the Committee's activities by a report following each Committee meeting.

Responsibilities

In carrying out its mandate, the Committee is expected to:

a. Act in an advisory capacity to the Board.

b. Review and recommend to the Board for approval:

(i) The Committee mandate and subsequent revisions subject to recommendation for approval by the Executive Committee. It is intended that the Committee will review its mandate annually.

(ii) Fundamental policies pertaining to corporate responsibility, environment, health and safety, and security having the potential to impact corporate activities and strategies. Corporate responsibility includes the general commitment areas of governance, people, environment, engagement, community involvement, health and safety, and security.

c. Approve and report to the Board:

(i) Administrative policies pertaining to environment, occupational health, safety, security, business conduct and ethics.
(ii) The Commission's Environment, Health and Safety Management System.

d. Review and Report to the Board:

(i) Annual corporate responsibility performance.
(ii) Environment, occupational health, safety, security, business conduct or ethics issues, trends and events that could impact the Commission, and its people or programs.
(iii) Actions and initiatives undertaken to mitigate corporate responsibility risk and/or matters having the potential to affect the Commission's activities, plans, strategies or reputation.
(iv) Significant related contraventions of regulations or policies.

e. Review:

(i) Corporate Environment, Health and Safety performance quarterly, and disclosure with respect to such performance contained in disclosure documents or presentations as required.
(ii) Mitigating actions taken by management relative to reported incidents.
(iii) Significant items resulting from periodic corporate environment, health, safety, and security audits or assessments. Inquiring of management, the General Manager and other invited participants, about significant risks or exposures and assess steps management has taken to minimize such risks to the Commission.
(iv) Remedial or mitigating action taken to manage an identified Environment, Health and Safety, and Security risk.

f. Approve:

(i) Minutes of past meetings.
(ii) The annual corporate Environment, Health and Safety audit schedule.
(iii) The need and schedule for external audits.

g. Conduct field trips to review corporate responsibility activities, including environment, health and safety, annually or as warranted.

Miscellaneous

The Committee, with unanimity, may engage outside resources if deemed advisable. Lack of unanimity requires that the matter be referred to the Executive Committee.

Halifax Water
Halifax Regional Water Commission

ITEM # 11
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Russell Walker, Chair, Audit & Finance Committee

DATE: September 14, 2016

SUBJECT: **Audit & Finance Committee**
Terms of Reference

ORIGIN

Halifax Regional Water Commission Corporate Governance Manual.

RECOMMENDATION

It is recommended that the Terms of Reference for the Audit & Finance Committee be approved in the form attached hereto.

BACKGROUND

The Halifax Regional Water Commission Corporate Governance Manual was approved by the Board at its meeting of January 28, 2016. The Corporate Governance Manual references in Article 3.19 the Audit & Finance Committee and the Terms of Reference therefor.

DISCUSSION

Members of the Committee have discussed various drafts of its Terms of Reference and have settled on the text for which approval is recommended in this Report.

BUDGET IMPLICATIONS

None

ALTERNATIVES

None

ATTACHMENT

Terms of Reference, Audit & Finance Committee

Report Prepared by:	*Original Signed By:*
	James G. Spurr, Secretary 902-490-6101
Report Approved by:	*Original Signed By:*
	Carl Yates, M.A.Sc., P.Eng., General Manager 902-490-4840

Halifax Water
Halifax Regional Water Commission

Audit & Finance Committee

TERMS OF REFERENCE

Audit and Finance Committee

The committee of the Board known as the Audit Committee (the "Committee") will have the reference as set out below.

Membership and Chairman

The Board shall elect from its number three Commissioners (the "members") to serve on the Committee until the member ceases to be a Commissioner, or resigns from or is replaced on the Committee, whichever first occurs. The Committee shall choose a Chair from among its members. Any member of the Committee may be removed from office or replaced at any time by the Board.

The Chair of the Board shall not serve as Chair of the Committee. If the Chair is absent from a meeting, the members shall select a Chair from those in attendance to act as Chair of the meeting.

Responsibilities

1. Financial Information

(a) The Committee shall review and recommend for approval by the Board:

(i) Audited annual financial statements of the Commission's operations, in conjunction with the report of the external auditors;
(ii) Audited financial statements in relation to the Halifax Regional Water Commission Employees' Pension Plan; and
(iii) All public disclosure documents, including Annual Returns, containing audited or unaudited financial information.

(b) In its review of financial statements, the Committee shall obtain an explanation from management of all significant variances between comparative reporting periods.

2. Financial Reporting and Accounting Trends

The Committee shall:

(i) Review and assess the effectiveness of management's policies and practices concerning financial reporting;
(ii) Review with management and with the external auditor any proposed changes in major accounting policies, the presentation and impact of significant risks and uncertainties, and key estimates and judgments of management that may be material to financial reporting;
(iii) Question management and the external auditor regarding significant financial reporting issues discussed and the method of resolution; and
(iv) Review general accounting trends and issues of auditing policy, standards and practices which affect or may affect the Commission.

3. Internal Controls

(a) The Committee may review and monitor management's internal control procedures, programs and policies, and assess the adequacy and effectiveness of internal controls over the accounting and financial reporting systems within the Commission, with particular emphasis on controls over computerized systems.
(b) The Committee shall review the evaluation of the internal controls by the external auditors, together with management's response.

4. External Auditor

(a) The objective of the Committee with respect to the external auditor is to support the auditor's independence.

(b) The Committee shall consider whether the external auditor should be reappointed and recommend the appointment or reappointment of the external auditor to the Board of directors.
(c) The Committee shall review the scope and terms of the external auditor's engagement and the appropriateness and reasonableness of the proposed audit fees.
(d) The Committee shall review any engagements for material non-audit services provided by the external auditor or its affiliates, together with the fees for such services, and consider the impact of this on the independence of the external auditor.
(e) When a change of auditor is proposed, the Committee shall review all issues related to the change of auditor and the planned steps for an orderly transition.
(f) The Committee shall review all reportable events, including disagreements and unresolved issues on a routine basis whether or not there is to be a change of auditor.

5. Audit Procedures
   (a) The Committee shall review the audit plans of the external auditors, and shall inquire as to the extent to which the planned audit scope can be relied upon to detect weaknesses in internal control or fraud or other illegal acts. The audit plans shall be reviewed with the external auditor and with the management, and the Committee shall recommend to the Board the scope of the external audit as stated in the audit plan.
   (b) The Committee shall review any problems experienced by the external auditor in performing the audit, including any restrictions imposed by management or significant accounting issues of which there was disagreement with management.
   (c) The Committee shall review the post-audit or management letter containing the recommendations of the external auditor, and management's response and subsequent follow-up to any identified weakness.

6. Pension Plans
   (a) The Committee shall exercise oversight of the Halifax Regional Water Commission Employees' Pension Plan.

7. Other Responsibilities
   (a) The Committee shall review such litigation, claims, transactions or other contingencies as the external auditor or any officer of the Commission may

bring to its attention, and shall periodically review the company's risk management programs.

(b) The Committee shall consider other matters of a financial nature as directed by the Board.

Meetings

(a) Regular meetings of the Committee shall be held at least quarterly. Special meetings of the Committee may be called by the Chair of the Committee, the external auditor, the Chair of the Board and the General Manager.

(b) The powers of the Committee shall be exercisable by a meeting at which a quorum is present. A quorum shall be not less than two members of the Committee from time to time. Subject to the foregoing requirements, and unless otherwise determined by the Board, the Committee shall have the power to fix its quorum and to regulate its procedure.

(c) Notice of each meeting shall be given to each member, the external auditor, the Chair of the Board, the Vice-chair of the Board, Treasurer of the Board and the General Manager, any or all of whom shall be entitled to attend.

(d) Opportunities should be afforded periodically to the external auditor and to senior management to meet separately with the Committee.

(e) Notice of meeting may be given orally or by letter, email, facsimile transmission or telephone not less than 72 hours before the time fixed for the meeting. Members may waive notice of any meeting. The notice need not state the purpose or purposes for which the meeting is being held.

(f) Matters decided by the Committee shall be decided by majority vote.

(g) The Committee may invite from time to time such persons as it may see fit to attend its meetings and to take part in discussion and consideration of the affairs of the Committee.

(h) The Secretary of the Board or designate of the Secretary shall be the Secretary of all meetings of the Committee and shall maintain minutes of all meetings and deliberations of the Committee.

(i) The Committee shall report to the Board on its proceedings, reviews undertaken and any associated recommendations.

Halifax Water
Halifax Regional Water Commission

ITEM #12
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY:
Ray Ritcey, Chair, Executive Committee

DATE: September 21, 2016

SUBJECT: **Executive Committee Terms of Reference**

ORIGIN

Halifax Regional Water Commission Corporate Governance Manual.

RECOMMENDATION

It is recommended that the Terms of Reference for the Executive Committee be approved in the form attached hereto.

BACKGROUND

The Halifax Regional Water Commission Corporate Governance Manual was approved by the Board at its meeting of January 28, 2016. The Corporate Governance Manual references in Article 3.19 the Executive Committee and the Terms of Reference therefor.

DISCUSSION

Members of the Committee have discussed various drafts of its Terms of Reference and have settled on the text for which approval is recommended in this Report.

BUDGET IMPLICATIONS

None

ALTERNATIVES

None

ATTACHMENT

Terms of Reference, Executive Committee

Report Prepared by:	*Original Signed By:*
	James G. Spurr, Secretary 902-490 6101
Report Approved by:	*Original Signed By:*
	Carl Yates, M.A.Sc., P.Eng., General Manager, 902-490-4840

Halifax Water
Halifax Regional Water Commission

Executive Committee

PART I
TERMS OF REFERENCE

Purpose

The purpose of the Committee is to enable the Corporation to facilitate the approval by the Board of those matters which may be delegated from time to time by the Board to the Committee. The Committee will also assist the Board in carrying out its responsibilities by dealing with matters relating to corporate governance consistent, with applicable legislation reviewing Board membership, complement, and compensation and making recommendations to the Board as appropriate.

Constitution

The Committee shall be composed of the Chair of the Board, the Vice-Chair of the Board and the General Manager of the Commission.

Meetings and Minutes

1. The time and place of meetings of the Committee and the procedures at such meetings shall be determined from time to time by the members thereof, provided that;

(a) A quorum for meetings shall be a majority of the members, present in person or by telephone or other telecommunication device that permits all persons participating in the meeting to speak and hear each other;

(b) The Committee shall meet at least quarterly and as otherwise required;

(c) Notice of the time and place of and an agenda and related materials respecting every meeting shall be given in writing or facsimile communication to each member of the Committee at least 48 hours prior to the time fixed for such meeting, and attendance of a member at a meeting is a waiver of notice of the meeting, except where a member attends a meeting for the express purpose of objecting to the transaction of any business on the grounds that the meeting is not lawfully called; and

(d) The Committee shall at all times have the right to determine who shall and shall not be present at any part of the meetings of the Committee.

2. All deliberations, recommendations, directions, decisions and resolutions of the Committee shall be recorded by the Committee Secretary in the minutes of the meetings of the Committee. A verbal report on such meeting shall be made by the Chair of the Committee to the Board at the next Board meeting and the minutes of such meeting shall be promptly circulated to the Committee and the Board by the Committee Secretary prior to the next following Committee and Board meetings respectively.

Scope, Duties and Responsibilities

The Committee shall be entitled to generally exercise any and all of the powers of the Board of Directors between Board meetings, with the exception of such powers, functions, duties and responsibilities reserved by the Board to itself from time to time, including:

1. Review all areas of operations as would the Board of Directors including but not limited to reviewing monthly financial operating results and such other areas referred to it by the action to the Board of Directors;
2. Review and recommend to the Board the compensation program and policies for employees;
3. Annually review and recommend to the Board the goals and objectives of the General Manager;
4. Annually review and recommend to the Board the direct compensation and additional remuneration of the General Manager;
5. Annually review and recommend to the Board remuneration policies for the Board of Directors;

6. Define and recommend to the Board approval of the Terms of Reference of Board Committees;
7. Review and ensure that all committees are operating effectively and within their Terms of Reference;
8. Recommend process for (1) Board information, (2) Board training and evaluation, and (3) Board planning;
9. Represent the interests of the Corporation and its members to elected officials, in conjunction with Executive Management;
10. Review and implement annual Board planning process and procedures;
11. Annually review the summary of Directors' expenses and report this information to the Board of Directors;

and such other specific functions, duties and responsibilities as may be delegated by the Board to the Committee from time to time subject to the following limitations, namely that:

1. No direction shall be given, no decision shall be made and no resolution shall be passed by the Committee if the postponement of such direction, decision or resolution until the next ordinarily scheduled Board meeting would not, in the opinion of the Committee prejudice and/or adversely affect the Commission or its operations; and
2. The powers, function, duties and responsibilities of the Audit & Finance Committee delegated to such Committee by the Board from time to time shall not be discharged or exercised by the Committee without the prior approval of the Board.

Any and all directions, decisions and resolutions of the Committee shall be promptly reported in writing to the Board by the Committee and, if deemed appropriate, ratified and confirmed by the Board at the next Board meeting.

If, in order to properly discharge its functions, duties and responsibilities, it is necessary, in the opinion of the Committee, that the Committee obtain the advice and counsel of external advisors, the Committee may engage the necessary advisors.

<u>Responsibility of Committee to Nominate Directors</u>

1. The Committee shall identify, consider and recruit persons qualified to become Commissioners having regard for the background, employment and qualifications of possible candidates and the criteria for service as a Commissioner as approved by the Committee.

2. The Committee shall review and periodically revise the criteria for selecting Commissioners in light of:

   (a) the personal qualities, business experience and qualifications of current Commissioners;

   (b) the opportunities and risks facing Halifax Water, its proposed strategy and its ongoing needs and circumstances;

   (c) the need to ensure that three (3) members of the Board, each of whom is an "independent Commissioner" and that at least three (3) members of the Board satisfy composition requirements for service on an audit committee;

   (d) the desire that all Commissioner nominees shall be individuals who, in the reasonable opinion of the Committee, have the ability to contribute to the broad range of issues with which the Commissioners must deal and who are able to devote the time necessary to prepare for and attend meetings of the Board and committees of the Board to which they may be appointed;

   (e) Halifax Water's corporate governance practices.

Governance and Other Responsibilities of Committee

3. The Committee's responsibilities shall also include:

   Committee Composition and Mandates

   (a) Assisting the Board and its Committees in determining Committee composition, as well as reviewing the mandate of each Committee for submission to the Board.

   Board Evaluations

   (b) The Committee shall annually determine the process by which performance assessments shall be conducted, which shall evaluate the performance of the Board, the Board Chair, individual Commissioners, Board committee Chairs and Board committee members.

   Director Compensation

   (c) Making recommendations to the Board on all components of Commissioner compensation including the Board Chair and Committee Chairs.

Corporate Governance

(d) Reviewing at least annually Halifax Water's approach to corporate governance and monitoring Halifax Water's governance practices against relevant best practices at leading corporations.

(e) Reviewing procedures to assist the Board in obtaining information necessary to carry out its duties and access to executive Management.

(f) Monitoring and assessing the relationship between the Board and Management, and making such recommendations as the Committee may deem necessary with a view to ensuring that the Board is able to function independently of Management.

(g) Reviewing annually the mandate of the Board, the Committees and the position description for the Board Chair, and make recommendations to the Board for any required changes.

(h) Assessing the needs of the Board and make recommendations with respect to rules and guidelines governing and regulating the affairs of the Board, including the frequency and location of Board and committee meetings, and procedures for establishing meeting agendas and the conduct of meetings.

(i) Monitoring Halifax Water's corporate governance practices and reviewing any disclosure of those corporate governance practices in accordance with applicable regulations.

(j) Making recommendations respecting succession planning for the Chair of the Board and, in the event of a change in the Board Chair, the Committee shall make recommendations to the Board respecting the appointment of a new Board Chair.

Director Orientation

(k) Overseeing an orientation program to familiarize new Commissioners with Halifax Water's business and operations, including its reporting structure, strategic plans, significant financial, accounting and risk issues, compliance programs and policies, management and the external auditors, and also oversee ongoing educational opportunities for all directors.

Code of Ethics

(l) Reviewing Halifax Water's Standards for Business Conduct.

Director Protection

(m) Reviewing all activity with respect to the indemnification of Commissioners by Halifax Water and oversee all payments made by the Company pursuant to such indemnity.

(n) Periodically reviewing Halifax Water's Commissioner's insurance policy and making recommendations for its renewal or amendments and any change in insurer.

Risk Oversight

6. The Committee shall oversee the development of Halifax Water's risk management framework and allocation of responsibilities for risk management.

7. The Committee's responsibilities shall include other duties as delegated to the Committee by the Board of Commissioners.

8. Nothing contained in the above mandate is intended to assign to the Committee the Board's responsibility to ensure the Company's compliance with applicable laws or regulations or to expand applicable standards of liability under statutory or regulatory requirements for the Commissioners or the members of the Committee.

PART II
COMMITTEE PROCEDURE

9. A majority of Committee members shall constitute a quorum.

10. Any Committee member may be removed or replaced at any time by the Board and shall cease to be a Committee member upon ceasing to be a Commissioner.

11. The Committee shall choose one of its own members to be its Chair.

12. Meetings of the Committee may be called by the Committee Chair or at the request of any member.

13. The times of and places where meetings of the Committee shall be held and the calling of the procedure at such meetings, shall be determined by the Committee.

14. Notice of meetings may be given at least 48 hours before the time fixed for the meeting. The accidental omission to give such notice or failure to receive such notice, shall not invalidate any resolution passed at such meeting.

15. A Committee member may participate in meetings by telephone or other communications facilities and will be considered to be present at the meeting.

16. The Committee may, at any of its meetings, set aside a portion of its meetings to discuss issues without Management in attendance.

17. The Secretary of the Corporation shall be the Secretary of the Committee and shall keep Minutes of the Committee's meetings.

18. On an annual basis the Committee shall review its Charter.

Report to the Board

19. The Committee shall report its activities to the Board at the next Board meeting following the meeting of the Committee.

Engaging Outside Advisors

20. The Committee, in consultation with the Chair of the Board, may engage and compensate any outside advisor that it determines necessary in order to carry out its duties.

Duties

21. In accordance with policies and procedures established by the Committee, the Committee may delegate certain authority to a member of the Committee or a sub-committee thereof.

PART III
ANNUAL SCHEDULE

22. The timetable on the following pages outlines the Committee's annual schedule of activities.

	Feb	Sept	Nov	As Needed
Nominating Responsibilities 1. The Committee shall identify, consider and recruit persons qualified to become Commissioners, having regard for the background, employment and qualifications of possible candidates and the criteria for service as a director as approved by the Committee.	✓	✓		
2. The Committee shall review and periodically revise the criteria for selecting Commissioners in light of: (a) The personal qualities, business experience and qualifications of current Commissioners;	✓	✓		
(b) The opportunities and risks facing Halifax, Water, its proposed strategy and its ongoing needs and circumstances;	✓	✓		
(c) The need to ensure that three (3) members of the Board each of whom is an "independent director" and that at least three (3) members of the Board satisfy composition requirements for service on an audit committee.	✓	✓		
(d) That all Commissioner nominees shall be individuals who, in the reasonable opinion of the Committee, have the ability to contribute to the broad range of issues with which the Commissioners must deal and who are able to devote the time necessary to prepare for and attend meetings of the Board and committees of the Board to which they may be appointed;	✓	✓		
(e) Halifax Water's corporate governance practices.			✓	

	Feb	Sept	Nov	As Needed
Governance and Other Responsibilities of Committee 3. The Committee responsibilities shall also include: **Committee Composition and Mandates** (a) Assist the Board and its Committees in determining Committee composition, as well as reviewing the mandate of each Committee for submission to the Board.	✓	✓		
Board Evaluations (b) The Committee shall annually determine the process by which performance assessments shall be conducted, which shall evaluate the performance of the Board, the Board Chair, individual Commissioners, Board committee Chairs and Board committee members.		✓		
Director Compensation (c) Making recommendations to the Board on all components of Director compensation including the Board Chair and Committee Chairs.		✓		
Corporate Governance (d) Reviewing at least annually Halifax Water's approach to corporate governance and monitoring Halifax Water's governance practices against relevant best practices at leading corporations.			✓	
(e) Reviewing procedures to assist the Board in obtaining information necessary to carry out its duties and access to executive Management.			✓	
(f) Monitoring and assessing the relationship between the Board and Management, and making such recommendations as the Committee may deem necessary with a view to ensuring that the Board is able to function independently of Management.				✓
(g) Reviewing annually the mandate of the Board, the Committees and the position description for the Board Chair, and make recommendations to the Board for any required changes.				✓

	Feb	Sept	Nov	As Needed
(h) Assessing the needs of the Board and make recommendations with respect to rules and guidelines governing and regulating the affairs of the Board, including the frequency and location of Board and committee meetings, and procedures for establishing meeting agendas and the conduct of meetings.			✓	
(i) Monitoring Halifax Water's corporate governance practices and reviewing any disclosure of those corporate governance practices in accordance with applicable regulations.			✓	
(j) Making recommendations respecting succession planning for the Chair of the Board and, in the event of a change in the Board Chair, the Committee shall make recommendations to the Board respecting the appointment of a new Board Chair.				✓
Director Orientation (k) Overseeing an orientation program to familiarize new Commissioners with Halifax Water's business and operations, including its reporting structure, strategic plans, significant financial, accounting and risk issues, compliance programs and policies, management and the external auditors, and also oversee ongoing educational opportunities for all directors.		✓		
Code of Ethics (l) Reviewing Halifax Water's Standards for Business Conduct.		✓		
Director Protection (m) Review all activity with respect to the indemnification of Commissioners by Halifax Water and oversee all payments made by the Company pursuant to such indemnity.			✓	
(n) Periodically review Halifax Water's Commissioners insurance policy and making recommendations for its renewal or amendments and any change in insurer.			✓	

(o)			✓	✓
Risk Oversight 4. The Committee shall oversee the development of Halifax Water's risk management framework and allocation of responsibilities for risk management.			✓	

Halifax Water
Halifax Regional Water Commission

ITEM #13
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
James Campbell, Communications & Public Relations Coordinator

APPROVED: *Original Signed By:*
Carl Yates M.A.Sc., P.Eng., General Manager

DATE: September 22, 2016

SUBJECT: **Sponsorship and Donation Policy**

ORIGIN

June 25, 2012 Order of the Nova Scotia Utility and Review Board.

RECOMMENDATION

It is recommended The Halifax Regional Water Commission Board approve the Sponsorship and Donation Policy

BACKGROUND

As an organization with a significant public profile, Halifax Water is frequently approached by various groups and individuals to sponsor or donate to a wide variety of causes and events.

As a public utility, Halifax Water is mindful that any funds or materials donated are ultimately paid for by rate payers. Halifax Water has historically taken the approach that any donations or sponsorships must be of a nature that provides a benefit to the local/wider community as well as the utility, and in keeping with the utility's overall vision.

In June, 2012 the Nova Scotia Utility and Review Board Ordered that funds for sponsorships and donations be funded from unregulated revenue generated by Halifax Water as opposed to the regulated rate base.

DISCUSSION

Sponsorships and Donations, and the Help to Others (H20) Program are treated as an un-regulated expense effective fiscal year 2013/14. These costs moved from rate-regulated expenses pursuant to the 2012 NSUARB Urban Core Rate decision.

The Sponsorships and Donations are relatively small value items but have been specifically approved by the Board as part of the operating budget from 2013/14 forward, until a formal policy for Sponsorships and Donations could be developed and approved by the Board.

BUDGET IMPLICATIONS

There is no incremental budget impact as a result of this report. Halifax Water is not proposing to increase or reduce the budget for sponsorships and donations at this time.

ALTERNATIVES

The HRWC Board could choose to amend the proposed policy.

ATTACHMENT

Sponsorship and Donation Policy

Report Prepared by: *Original Signed By:*

James Campbell, Communications & Public Relations Coordinator
902-490-4604

Financial Reviewed by: *Original Signed By:*

Cathie O'Toole, MBA, CPA, CGA, Director, Corporate Services
902-490-3685

Sponsorship and Donation Policy

Intent

The intent of this policy is to establish criteria that will help guide Halifax Water employees when approached by internal or external groups/individuals for a donation or sponsorship (cash or in-kind), or when utility employees request a sponsorship/donation from the utility.

Policy

As an organization with a significant public profile, Halifax Water is frequently approached by various groups and individuals to sponsor or donate to a wide variety of causes and events.

As a public utility, Halifax Water must be mindful that any funds or materials donated are ultimately paid for by rate payers. We must also be aware that any and all donations/sponsorships must be of a nature that provides a benefit to the local/wider community as well as the utility, and are in keeping with our overall vision. In accordance with an Order of the Nova Scotia Utility and Review Board, dated June 25, 2012, funds for sponsorships and donations can only be derived from unregulated revenue generated by Halifax Water.

Guidelines

When considering a request for sponsorship/donation, the following general criteria should be considered:

- Is there an environmental benefit (i.e. elimination of reduction in the use of bottled water at an event, promotion of tap water) to the local/wider community and utility;

- The event should be within Halifax Water's service area

- Is there a public health benefit (i.e. sports related activity) to the event/donation;

- Is there an infrastructure improvement/benefit to the local/wider community and utility;

- Does the sponsorship/donation provide a positive public image for the utility or benefit to the local/wider community and utility;

- Has the utility sponsored or donated to this group/event in the past;

- Does the event in some way connect with the vision of the utility;- Have past events/donations related to the group received positive public feedback that reflected well on the utility.

- All groups should have an equal opportunity to request support. All requests should be considered until the annual budget for sponsorships and donations is spent.

- Groups will be eligible to receive a sponsorship or donation no more than once yearly with requests being considered on a first come, first served basis.

- Cash sponsorships and donations can only be made to registered not for profits, and charities (following approval by the Community Outreach and Support Committee). No cash payments can be made directly to any individual, employee, or commercial organization - Halifax Water does not provide cash donations/sponsorships to employees of the utility. The utility may under special circumstances, as defined by the Community Outreach and Support Committee, provide cash sponsorships or donations to a group/event in which a Halifax Water employee, or group of employees is taking part in (i.e. Bluenose Marathon, Lung Run, Manulife Dragon Boat Festival etc…), or is part of. In such cases the funds will be directed to the organization and not the employee. Prior to any funds being provided, the employee must fully disclose their involvement in the organization/event.

- Community groups may request a donation of materials/wearables such as Halifax Water jackets, hats, water bottles, etc…for use as auction items for groups as deemed suitable by the General Manager or Communications & Public Relations Coordinator . Groups will be eligible to receive a donation of materials/wearables no more than once yearly with requests being considered on a first come, first served basis.

- All non-cash requests for donations/sponsorships should be directed to the General Manager or Communications & Public Relations Coordinator for review, determination of eligibility, and item value to be donated. All cash donations must be approved by the Community Outreach and Support Committee

- For all large scale sponsorships (i.e. World Junior Beach Volleyball, Bluenose Marathon, Halifax Jazzfest, Tall Ships etc…) a formal agreement must be executed. The agreement shall outline the in-kind value of Halifax Water materials and labour being provided as part of the sponsorship and what benefit the utility will derive from the sponsorship.These benefits may include Halifax Water logo placement on event promotional material such as website, signage, print material, event day announcements, social media postings/announcements etc… The level of in-kind materials/labour provided by Halifax Water will be commensurate with the benefit derived by the utility through positive public exposure of our brand.

- Routine requests for sponsorship by community groups for the provision of a water station/s and /or water cooler units do not require a formal agreement, but must be approved by the

Communications & Public Relations Coordinator, or designate. Any provision of a water station/s or water cooler unit/s will request Halifax Water logo placement on event promotional material such as website, signage, print material, event day announcements, social media postings/announcements etc…

- If a water station/s provided by Halifax Water is connected to a Halifax Water owned hydrant, the flow will be metered and the group/organization will be billed for the water used.

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, Director, Corporate Services

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:*
Carl D. Yates, M.A.Sc., P.Eng., General Manager

SUBJECT: **Financial and Operations Information Report**

INFORMATION REPORT

ORIGIN:

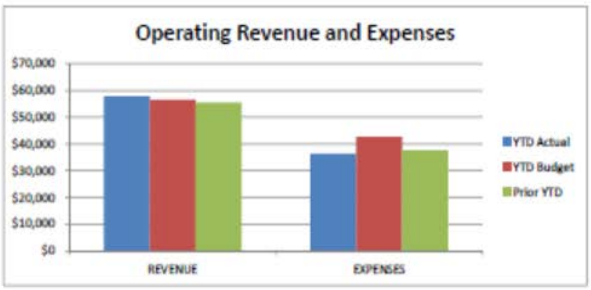
Regular update.

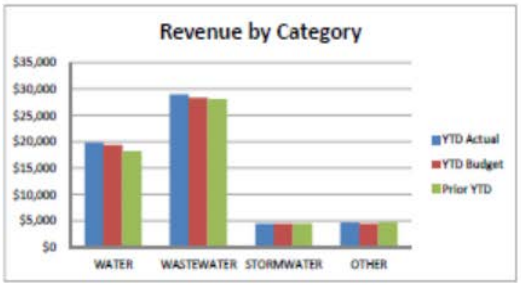
This report provides a high level overview of financial and operational performance for the utility. Financial results are presented first, followed by indicators and statistics for water and wastewater.

FINANCIAL

HALIFAX WATER
UNAUDITED FINANCIAL INFORMATION
APRIL 1/16 - AUGUST 31/16 (5 MONTHS)
'000

September 29, 2016



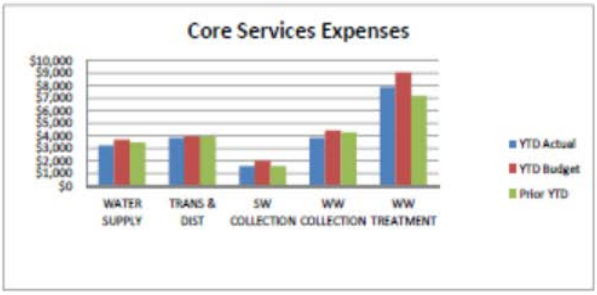


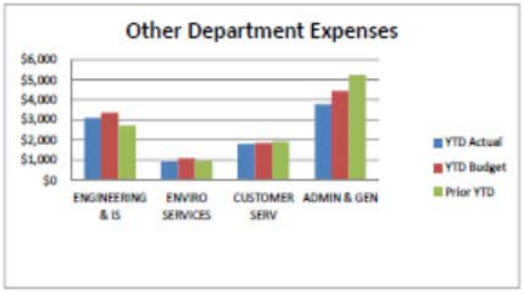
OPERATING REVENUE AND EXPENSES

	YTD Actual	YTD Budget	Prior YTD	% of Budget
REVENUE	$57,864	$56,531	$55,457	42.65%
EXPENSES	$36,363	$42,677	$37,574	35.50%
	$21,501	$13,855	$17,883	84.86%

REVENUE BY CATEGORY

	YTD Actual	YTD Budget	Prior YTD
WATER	$19,839	$19,365	$18,209
WASTEWATER	$29,014	$28,355	$28,111
STORMWATER	$4,423	$4,412	$4,430
OTHER	$4,587	$4,400	$4,706
	$57,864	$56,531	$55,457



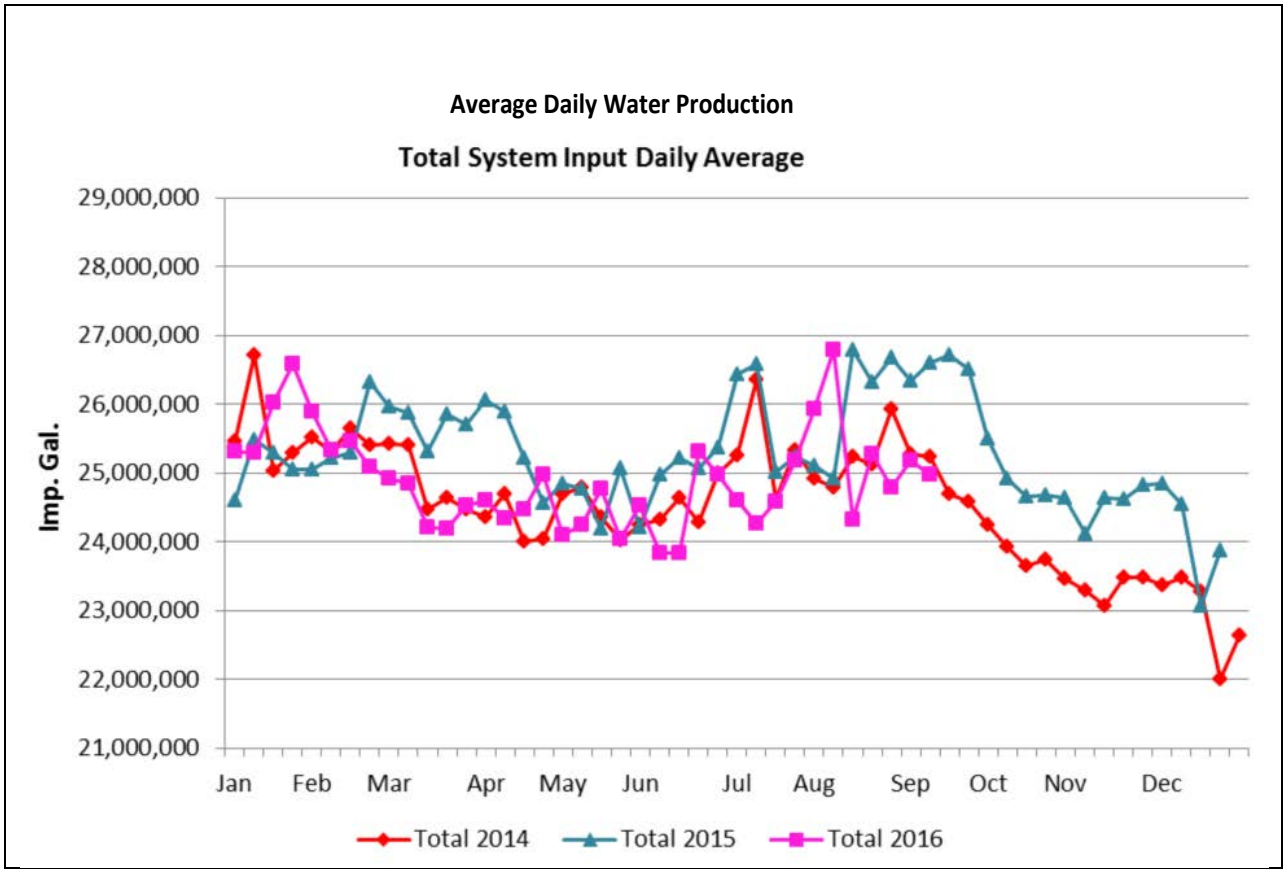


CORE SERVICES EXPENSES

	YTD Actual	YTD Budget	Prior YTD	% of Budget
WATER SUPPLY	$3,242	$3,694	$3,468	36.57%
TRANS & DIST	$3,863	$3,982	$3,951	40.42%
SW COLLECTION	$1,597	$1,996	$1,587	33.34%
WW COLLECTION	$3,854	$4,442	$4,270	36.15%
WW TREATMENT	$7,872	$9,031	$7,191	36.32%
	$20,428	$23,144	$20,467	36.78%

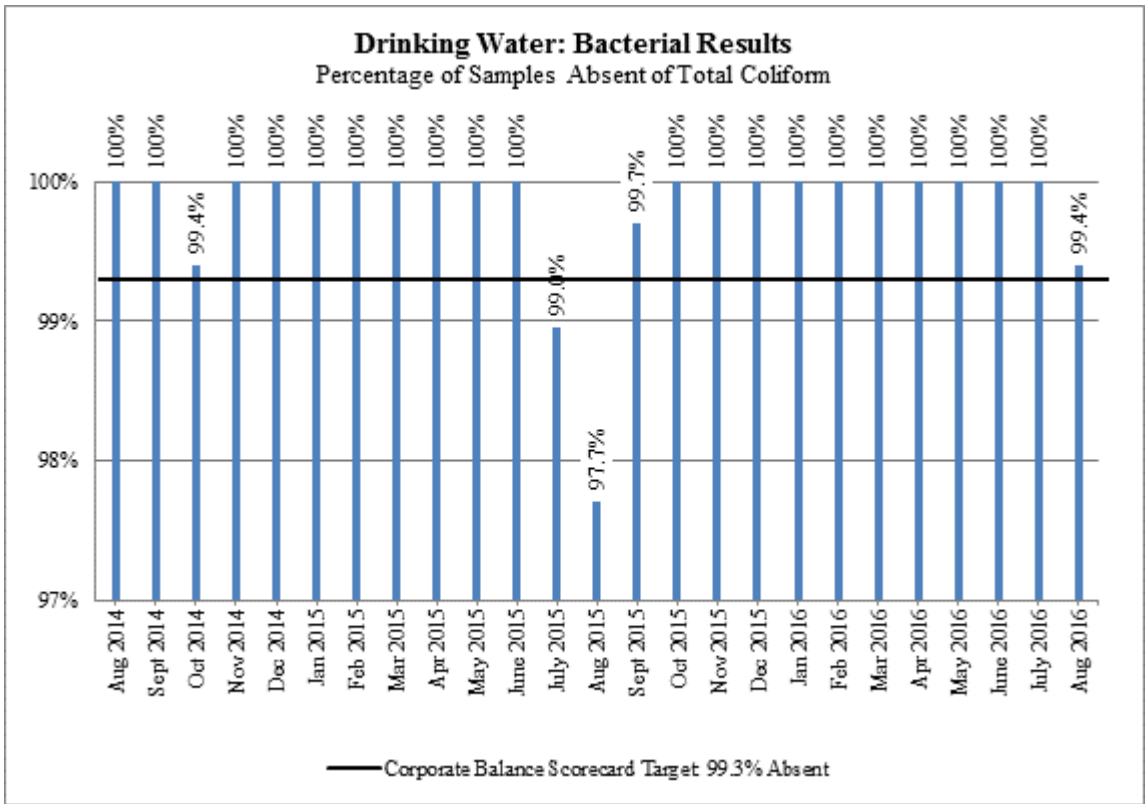
OTHER DEPARTMENT EXPENSES

	YTD Actual	YTD Budget	Prior YTD
ENGINEERING & IS	$3,092	$3,361	$2,706
ENVIRO SERVICES	$898	$1,085	$952
CUSTOMER SERV	$1,784	$1,841	$1,922
ADMIN & GEN	$3,772	$4,429	$5,221
	$9,548	$10,717	$10,801



Regional Water Main Break/Leak Data		
Year	**Total Breaks/Leaks**	**Current 12 Month Rolling Total *(up to August 31/16)***
2015/16	226	222
2014/15	210	
2013/14	213	
2012/13	262	
2011/12	205	
Total	**1116**	
Yr. Avg.	**217.6**	

Water Accountability
Losses per Service Connection/Day (International Water Association Standard)
Period Ending March 31, 2016
Real Losses: 271 litres CBS Target: 180



Water Quality Master Plan Objectives 2016-2017 Q1				
Objective	Total Sites	% of Sites Achieving Target	All Sites: 90th Percentile < 15 µg/L	CBSC Awarded Points
Disinfection	65	100%	---	20
Total Trihalomethanes	24	96%	---	17
Haloacetic Acids	21	95%	---	16
Particle Removal	5	100%	---	20
Corrosion Control*	69	---	8.88	20
TOTAL				93

Score: 93/100

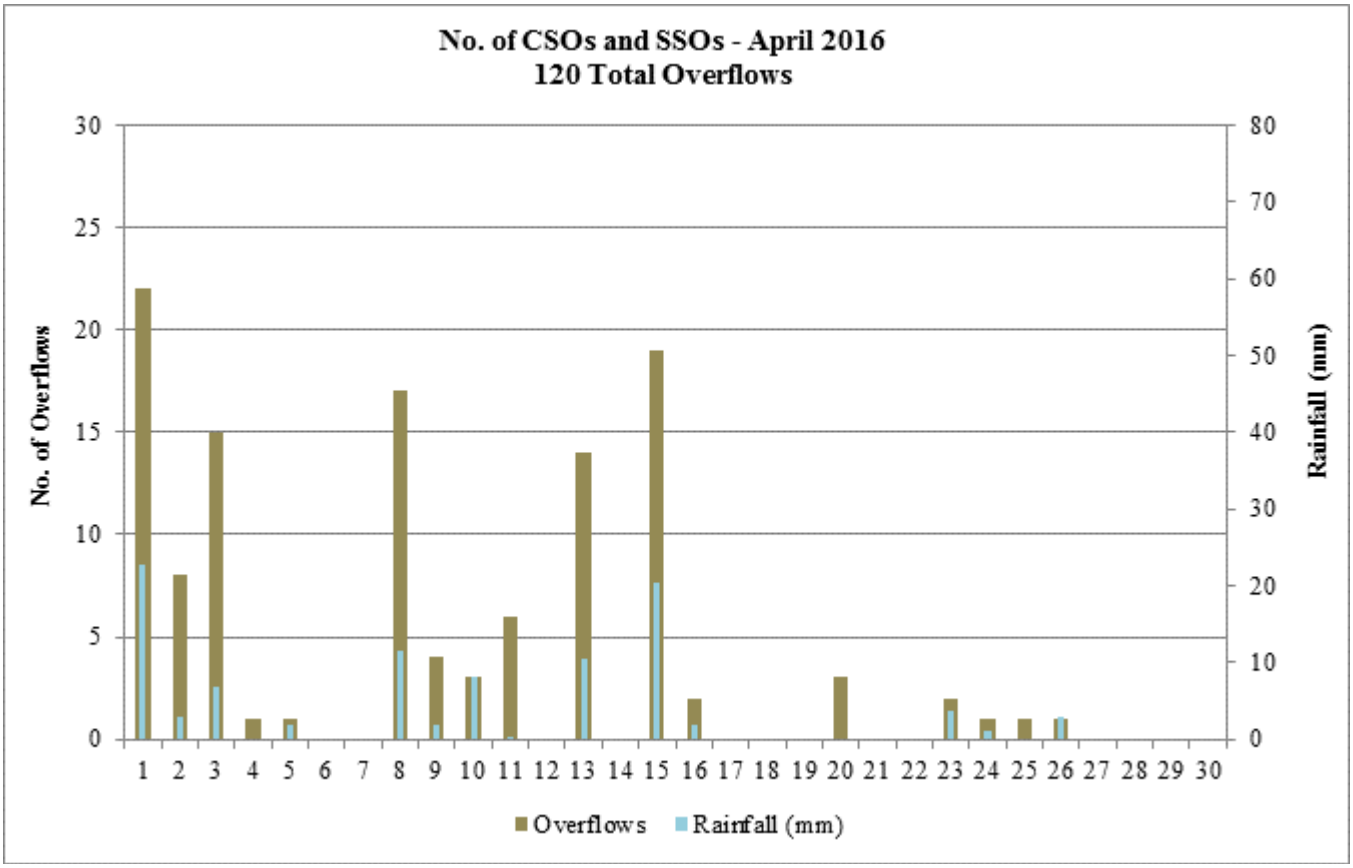
In this report each facility is assessed using monthly or quarterly averages, depending on the averaging period

specified in its Approval to Operate.

Wastewater Treatment Facility	**Wastewater Treatment Facility Compliance Summary** Rolling Averages - June, July and August 2016																Toxicity	Trend
	$CBOD_5$ (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	28	40	14	5000	2228	6-9	6.9	-		-		-		-		Not acutely lethal	Continued
Dartmouth	50	30	40	13	5000	757	6-9	6.9	-		-		-		-		Lethal	Declined
Herring Cove	50	26	40	17	5000	115	6-9	6.9	-		-		-				Not acutely lethal	Continued
Eastern Passage	50	9	40	9	5000	40	6.5-9	7.1	-		-		-		-		Lethal	Declined
Mill Cove	25	12	25	13	200	464	6.5-9	6.5	-		-		-		-		Not acutely lethal	Declined
Springfield	20	3	20	3	200	10	6-9	7.1	-		-		0.02	0.94	-		Lethal	Improved
Belmont	25	6	25	10	200	855	6-9	7.0	-		-		0.02	0.70	-		-	Improved
Frame	20	4	20	11	200	51	6-9	6.0	-		-		0.02	0.02	-		-	Improved
Middle Musq.	20	15	20	19	200	46	6-9	8.2	-		-		-		-		-	Improved
Uplands	20	17	20	17	200	63	6-9	7.1	-		-		-		-		-	Improved
Aerotech	5	5	5	6	200	11	6-9	7.7	5.7 W 1.2 S	0.2	0.5	0.4	-		-		Not acutely lethal	Continued
North Preston	10	3	10	1	200	10	6.5-9	7.5	3	0.1	1.5	0.5	-		-		-	Improved
Lockview	20	5	20	5	200	17	6.5-9	7.2	8.0 S	3.9	1.2 S	0.4	-		-		-	Continued
Steeves (Wellington)	15	5	15	1	200	10	6.5-9	7.6	14.4 S	0.1	1.0 S	0.1	-		-		-	Continued
BLT	15	6	20	14	200	10	6.5-9	7.2	5 W 3 S	1.3	3 W 1 S	2.2	0.02	0.10	5	6.2	Not acutely lethal	Declined
Avg. of all Facilities	12		10		141		7.2		1.1		0.7		0.4		6.2			

NOTES & ACRONYMS:
$CBOD_5$ - Carbonaceous 5-Day Biochemical Oxygen Demand
TSS - Total Suspended Solids
TRC - Total Residual Chlorine
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., Belmont, 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

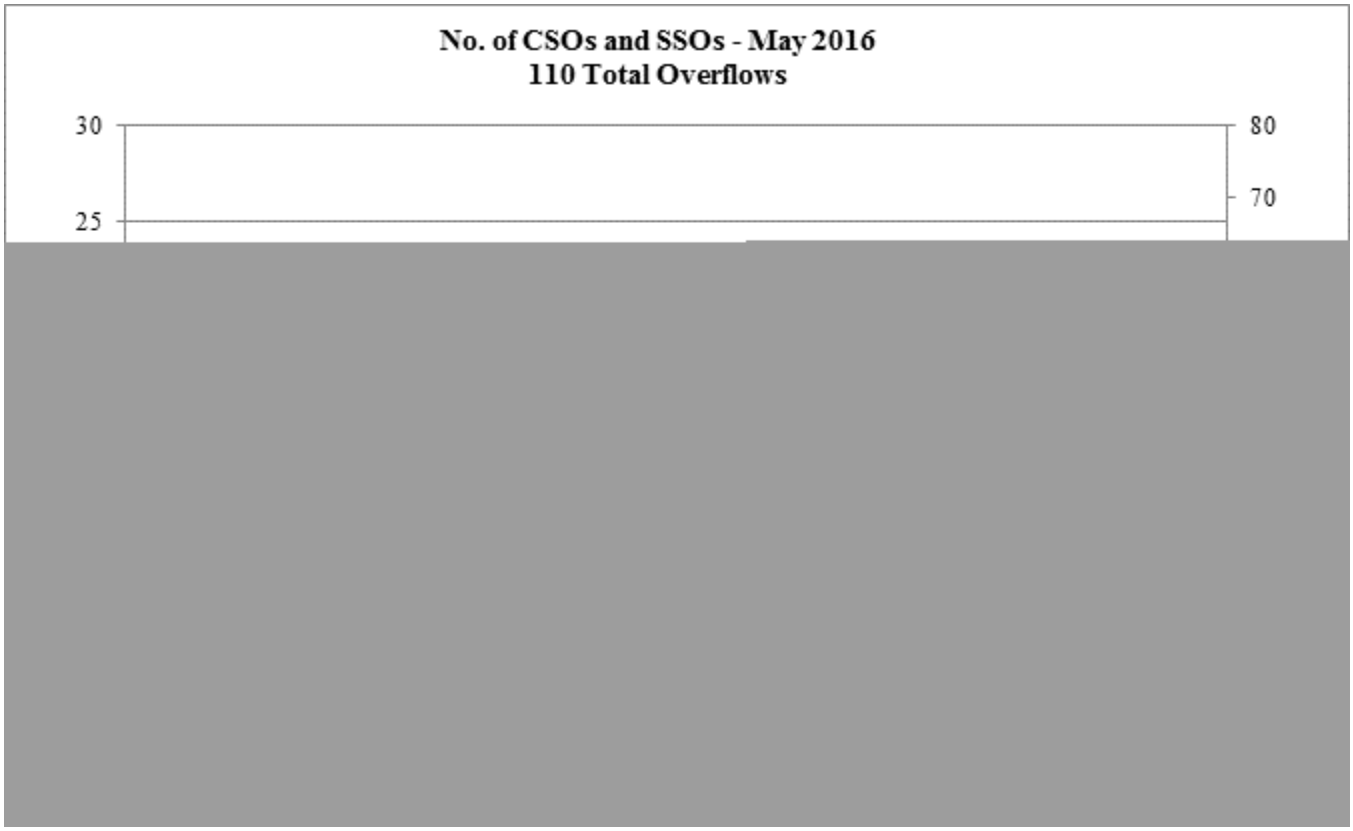
LEGEND



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 eleven overflows on days when there was no recorded rainfall, as follows:

1. April 4: The CSO at the Upper Water St CSO was due to rain on the previous day.
2. April 11: The CSOs at the Ferguson Rd CSO, Wallace St CSO, Melva St PS & CSO, Lyle St CSO, and the Old Ferry Rd PS & CSO were due to rain and snow on the previous day.
3. April 20: The CSOs at the Ferguson Rd CSO and Jamieson St PS & CSO were due to communication issues at the Park Ave PS & CSO that result in an automatic pump inhibition at the Jamieson St PS & CSO. The CSO at the King St PS & CSO was due to a confined space entry. Flow to the pump station was restricted to facilitate cleaning of the wet well and emergency repairs to piping.
4. April 25: The CSO at the Wallace St CSO was due to a valve blockage 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 fifteen overflows on days when there was no recorded rainfall, as follows:

1. May 1: The CSO at the Maritime Museum CSO was due to an obstruction of the level sensor by debris. The CSO at the Lyle St CSO was likely due to the flush cycle/level rising at neighbouring Park Ave PS & CSO. Wet well levels rise at the Lyle St CSO in response to the daily 2 AM Park Ave PS & CSO flush cycle that sees the pump station pumps shut down, wet well levels rise followed by a pump restart and forcemain scour.

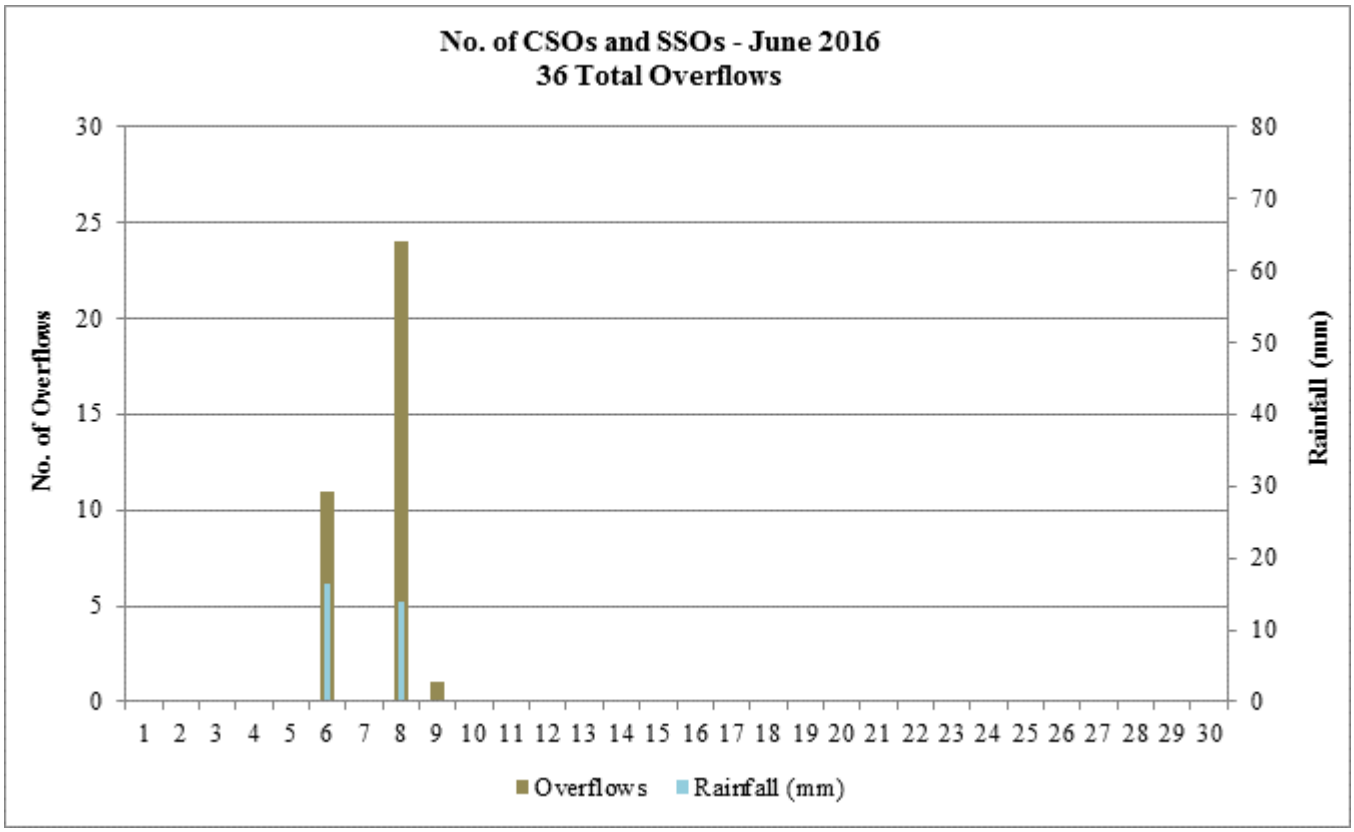
2. May 4: The CSO at the Lyle St CSO was likely due to the flush cycle/level rising at the Park Ave PS & CSO.

3. May 7: The CSO at the Lyle St CSO was likely due to the flush cycle/level rising at the Park Ave PS & CSO. The CSO at the Maitland St PS & CSO was due to debris in the valves and the pumps being plugged with debris.

4. May 8: The CSO at the Lyle St CSO was likely due to the flush cycle/level rising at the Park Ave PS & CSO. The CSOs at the Maitland St PS & CSO were due to debris in the valves and to the pumps being plugged with debris.

5. May 9: The CSO at the Lyle St CSO was likely due to the flush cycle/level rising at the Park Ave PS & CSO. The CSOs at the Ferguson Rd CSO, Jamieson St PS & CSO, Park Ave PS & CSO, Melva St PS & CSO and the Old Ferry Rd PS & CSO were due to a shutdown of the Dartmouth WWTF to facilitate maintenance.

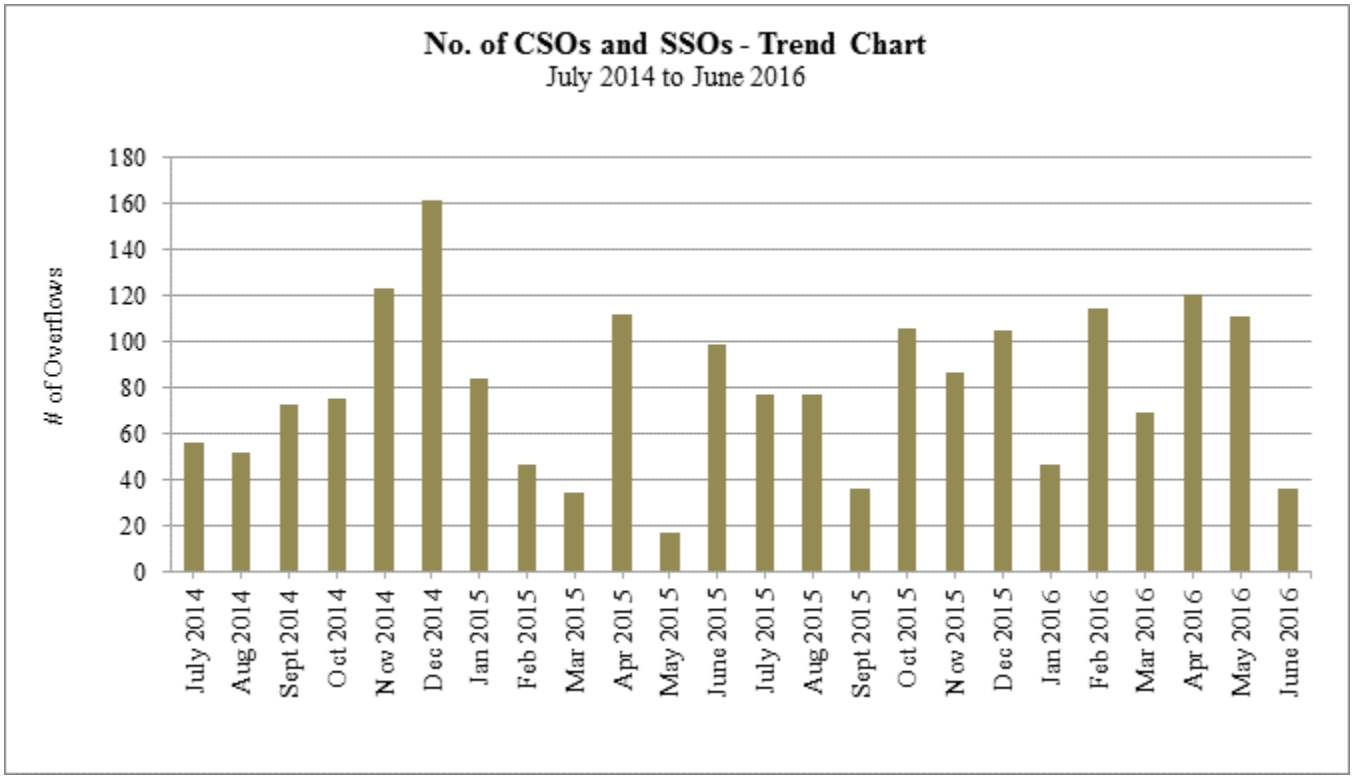
6. .May 11: The CSO at the Old Ferry Rd PS & CSO was due to the performance of maintenance.

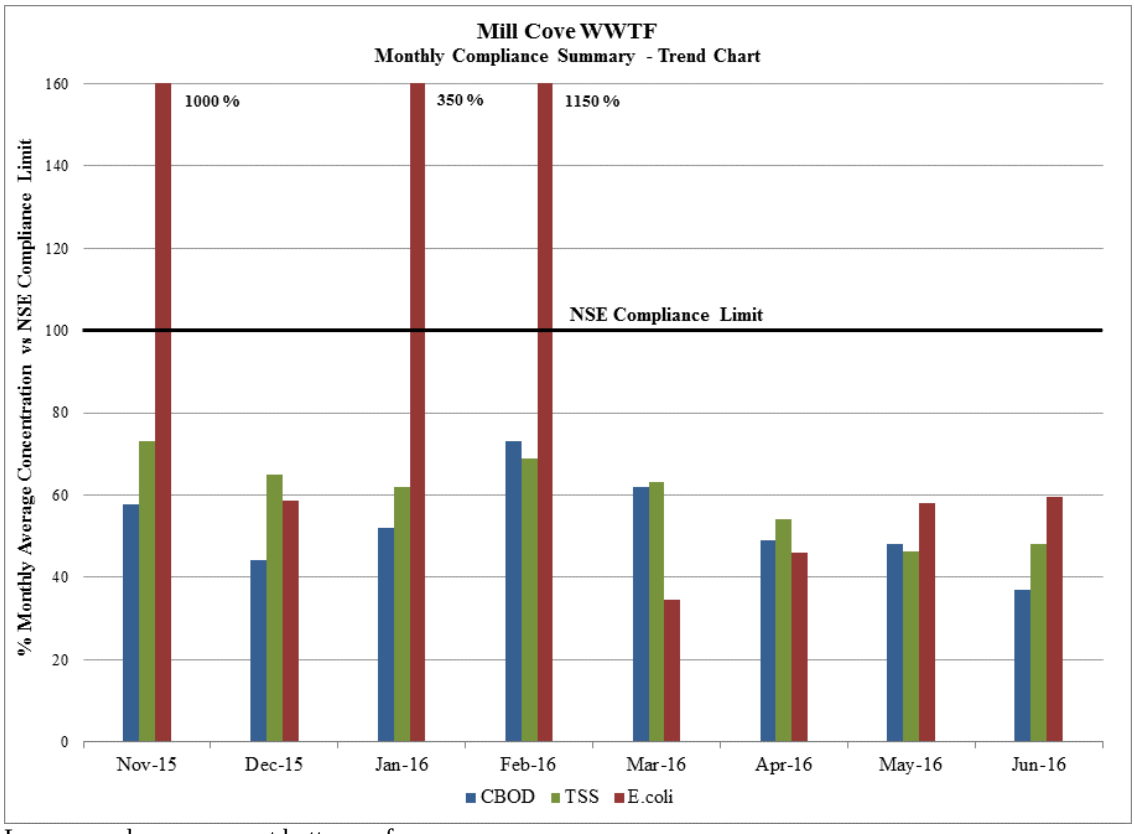


NOTES & ACRONYMS: CSO - Combined Sewer Overflow SSO - Sanitary Sewer Overflow

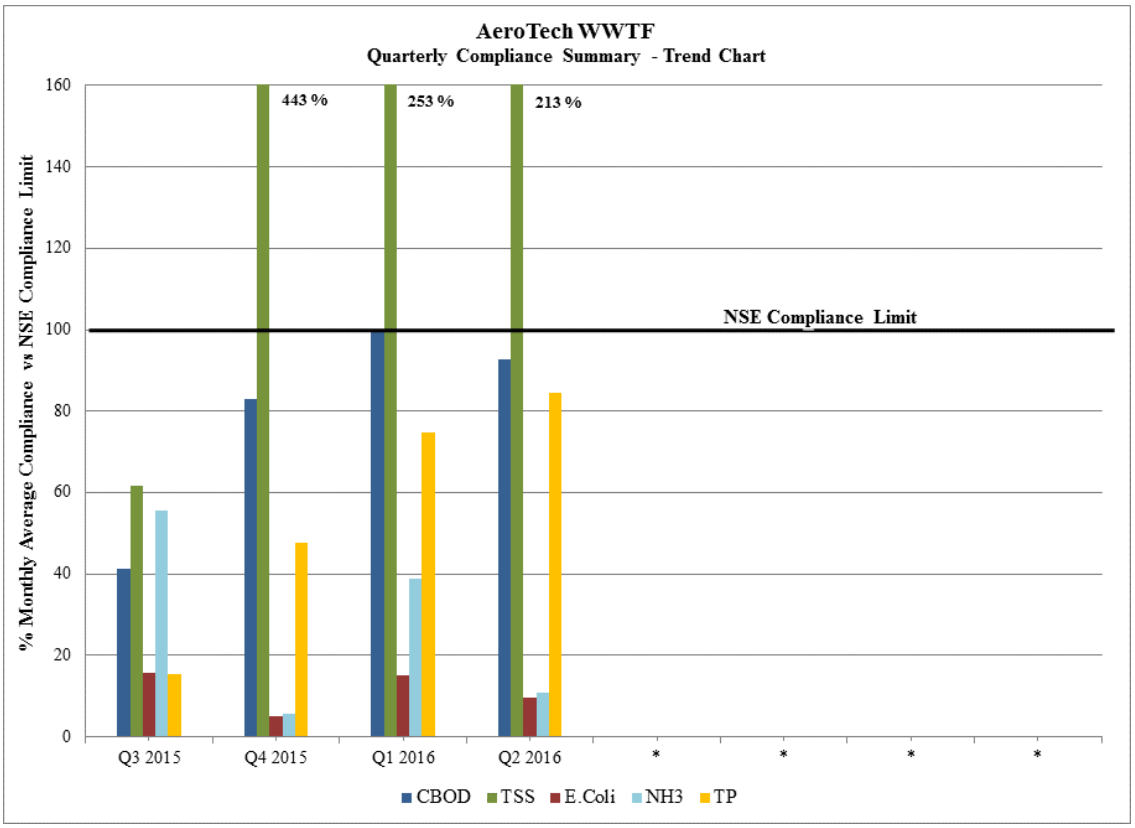
- Rainfall data is from Halifax Water's rain gauge at the Halifax WWTF.
- There was one overflow on a day when there was no recorded rainfall, as follows:

    1. June 9: The CSO at the Maitland Street PS & CSO was due to debris blockage of a valve.





Lower numbers represent better performance



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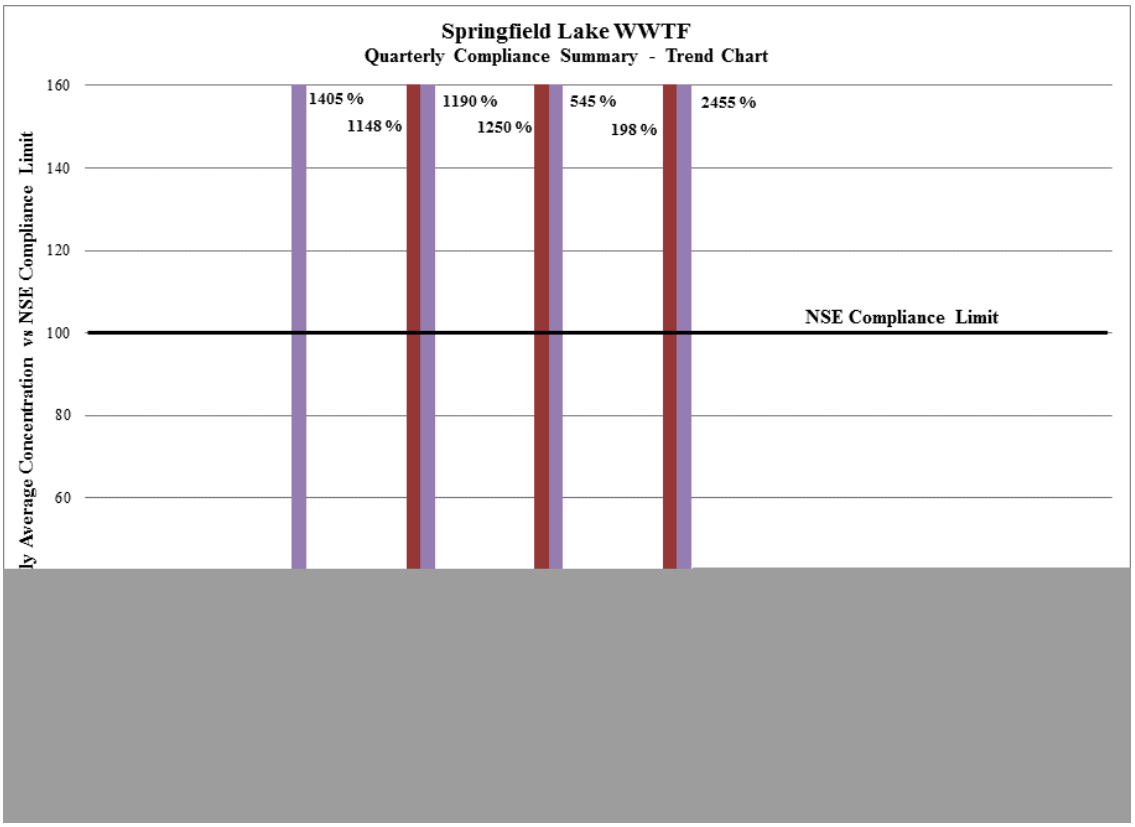

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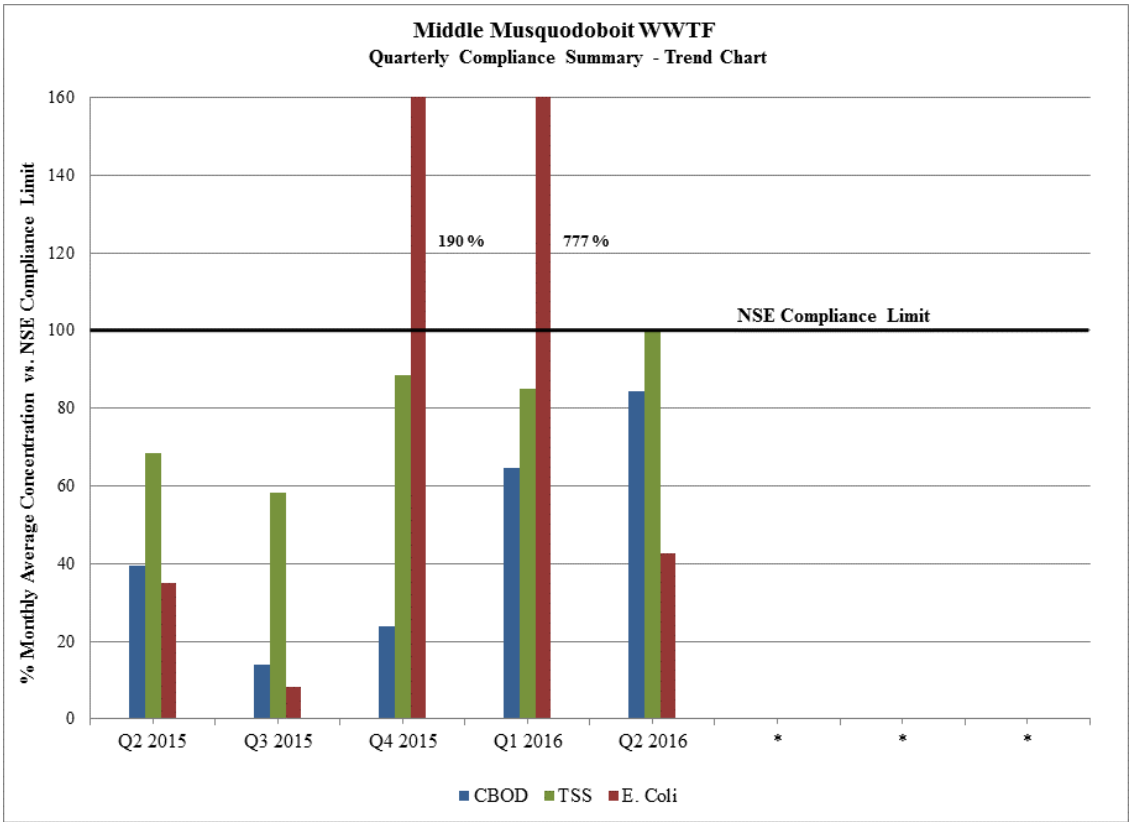

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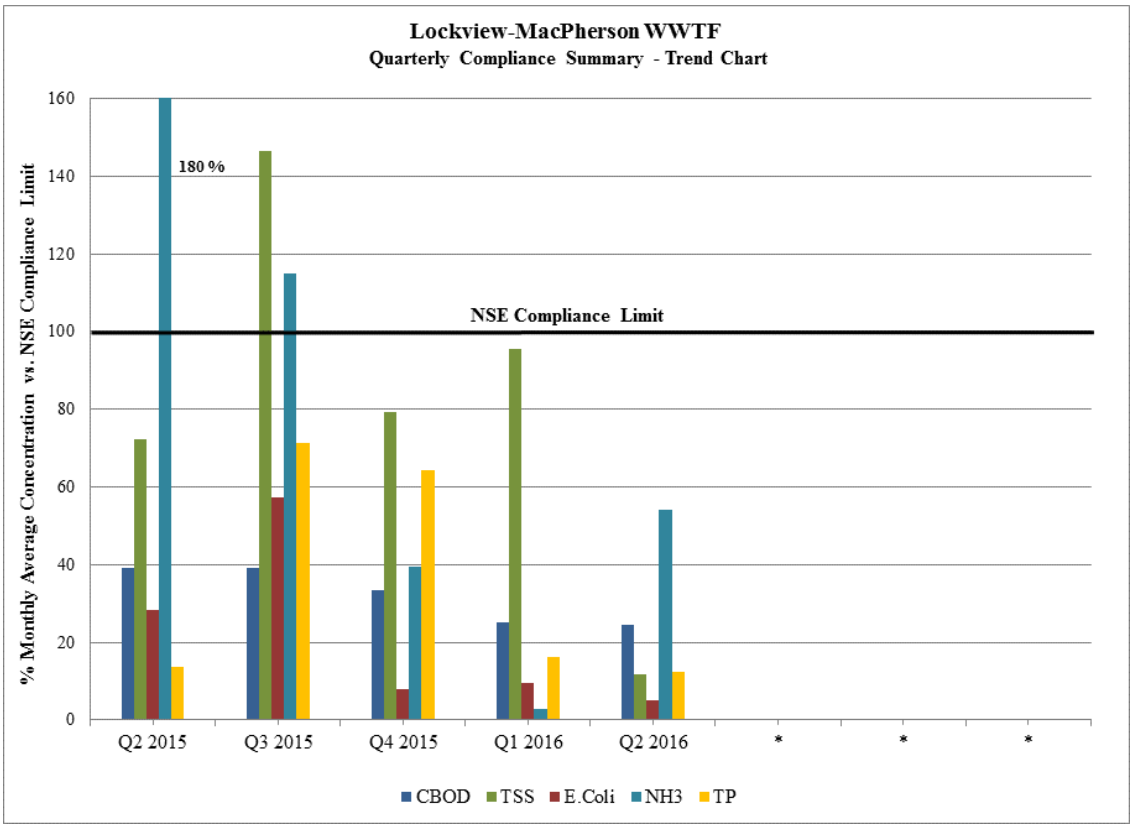

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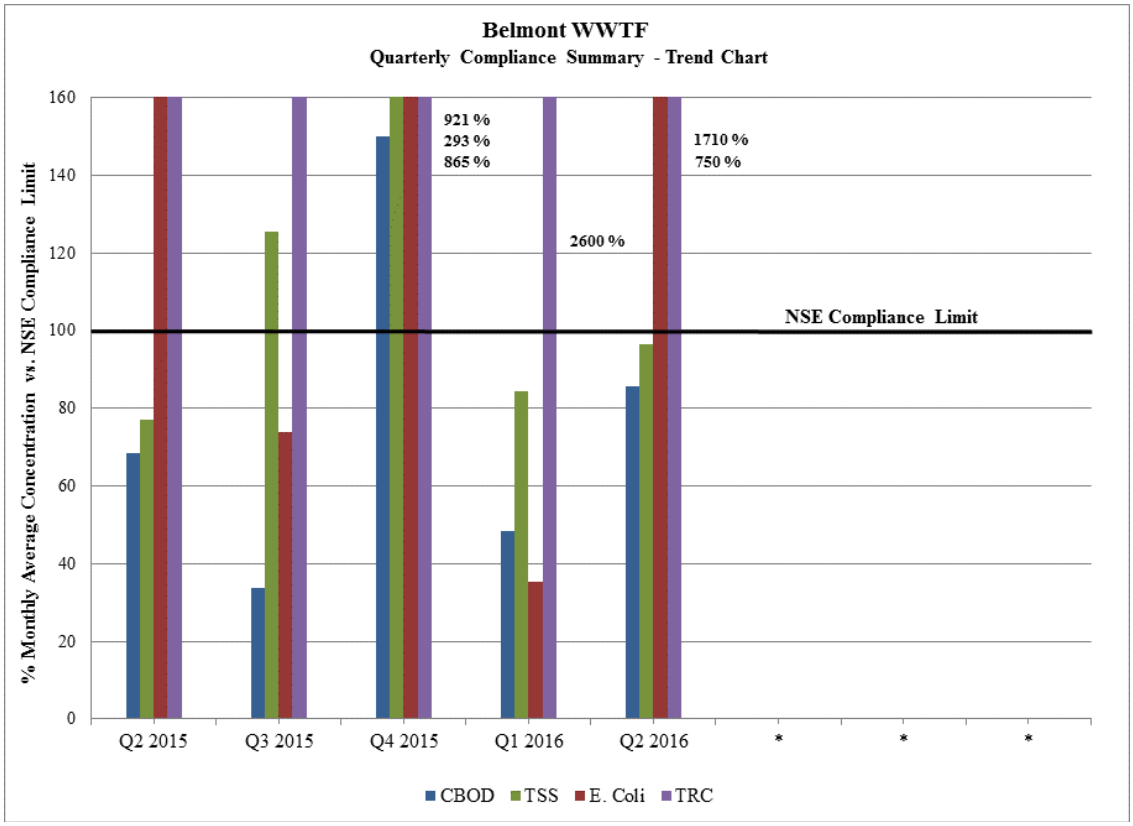

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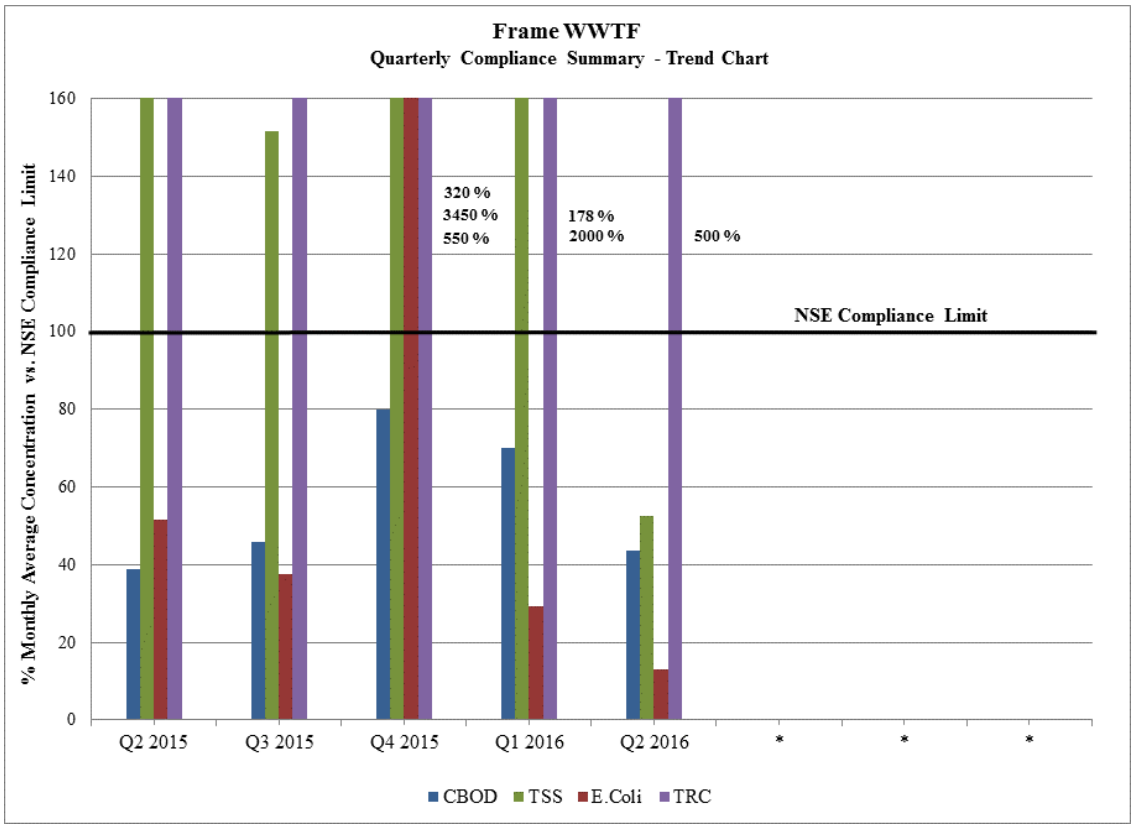

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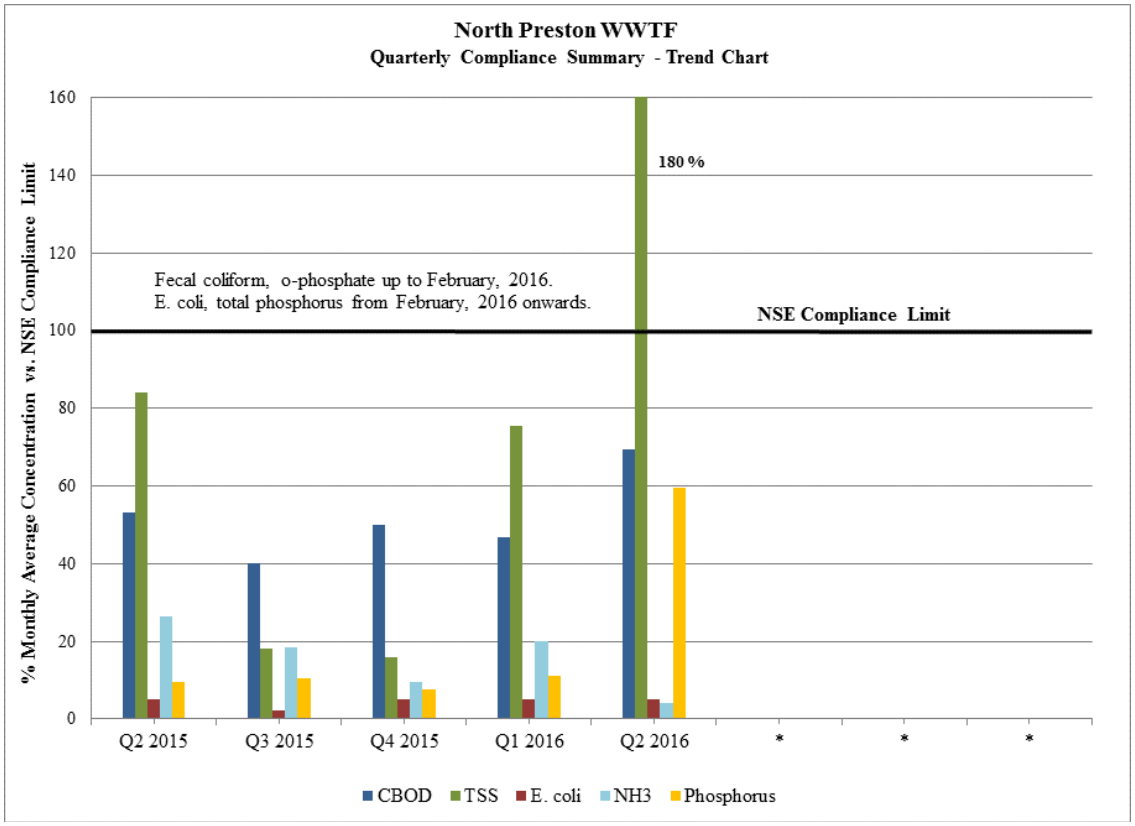

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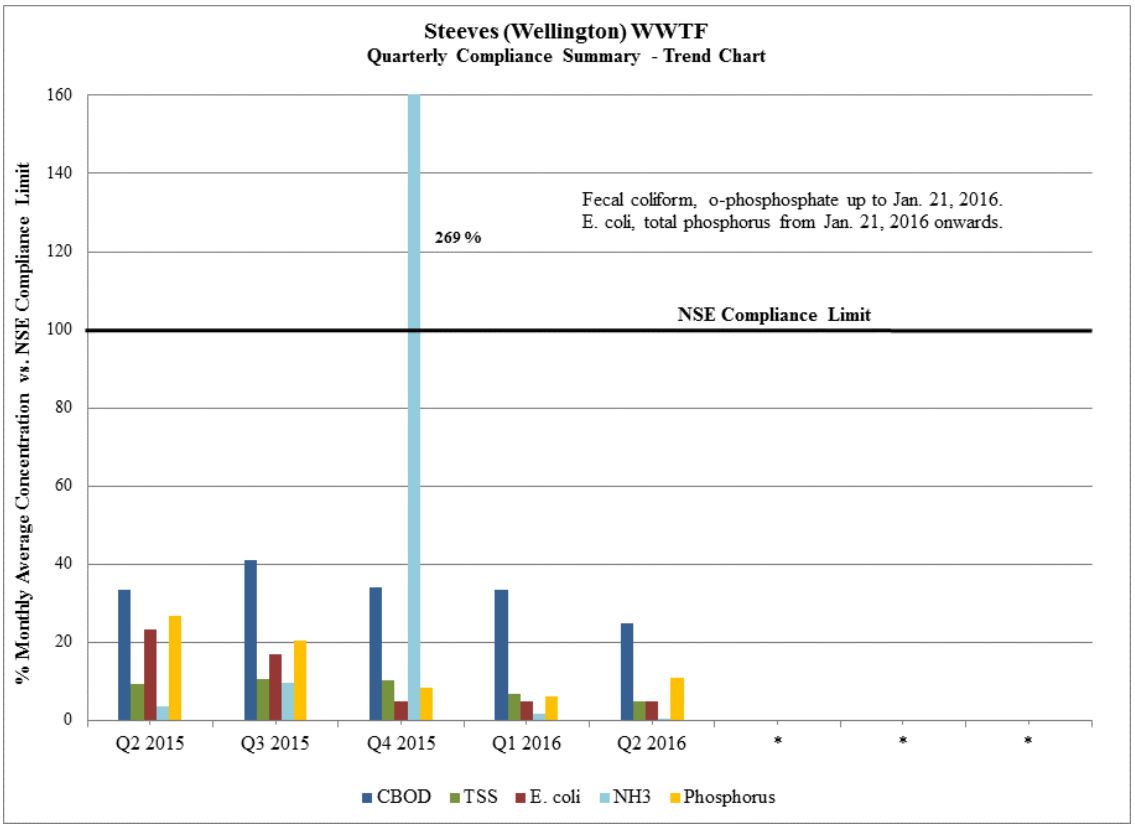

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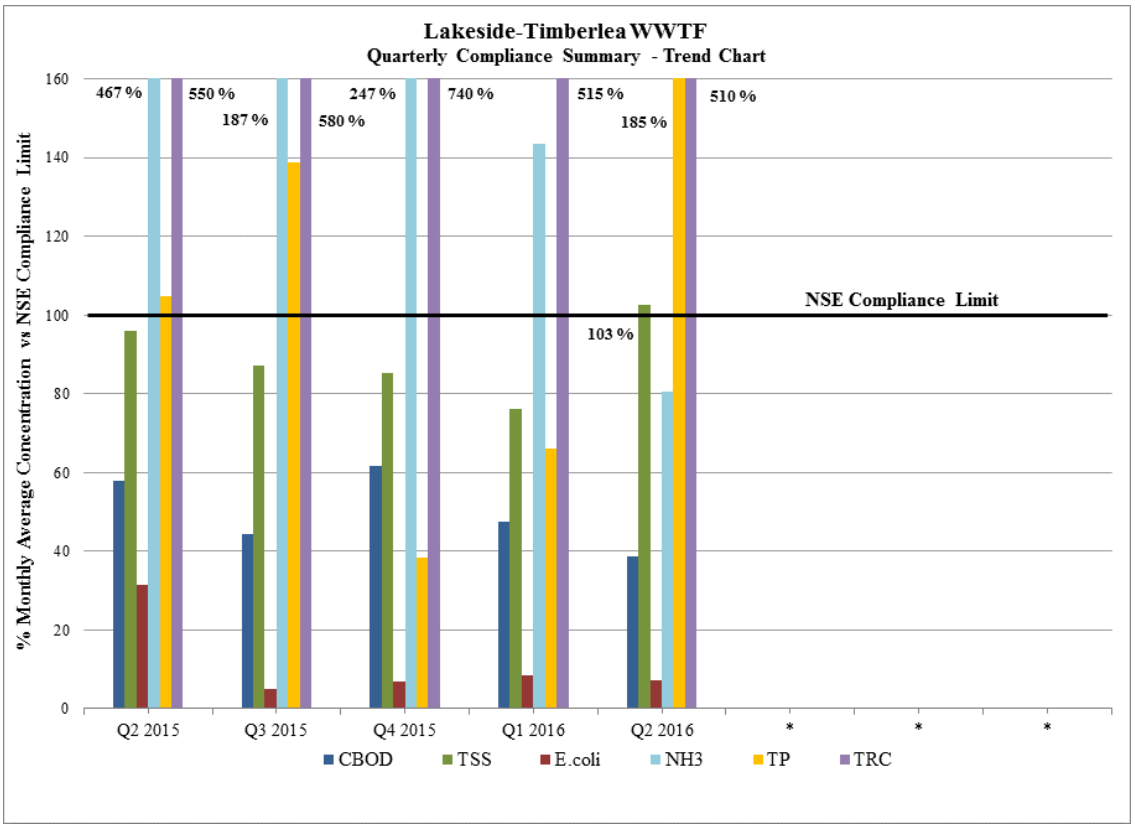

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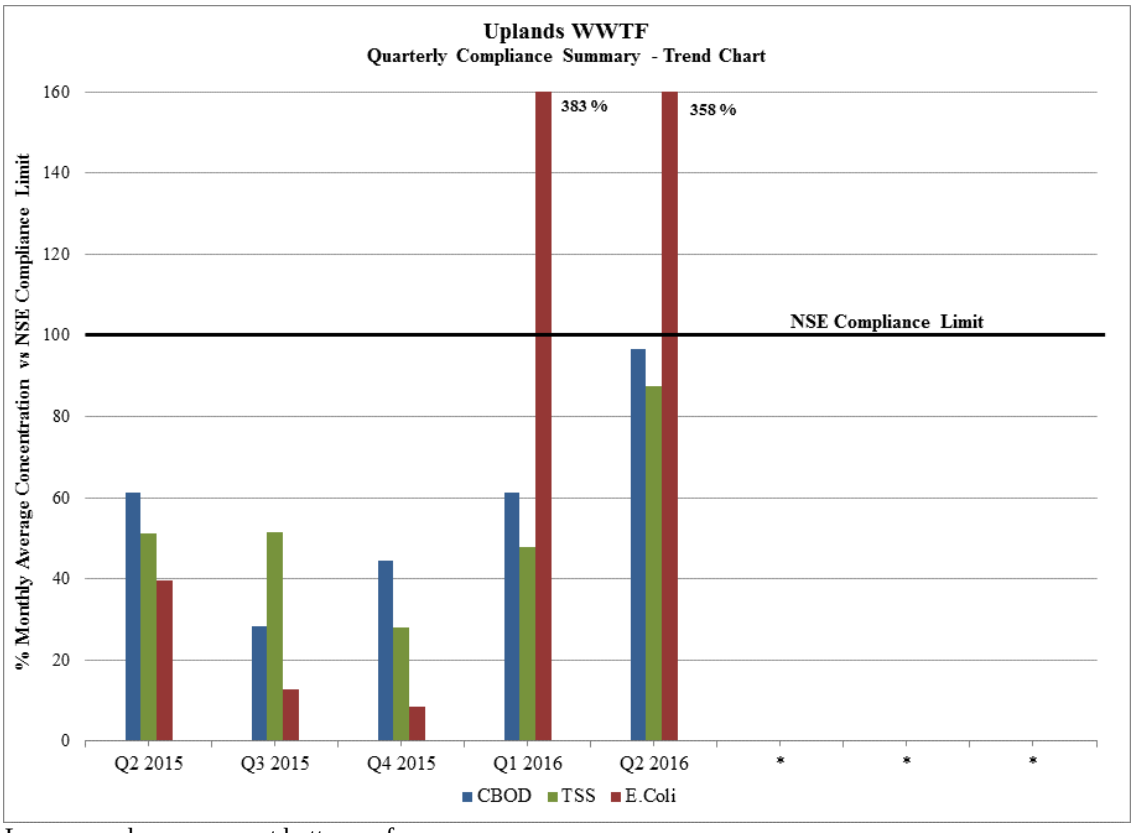

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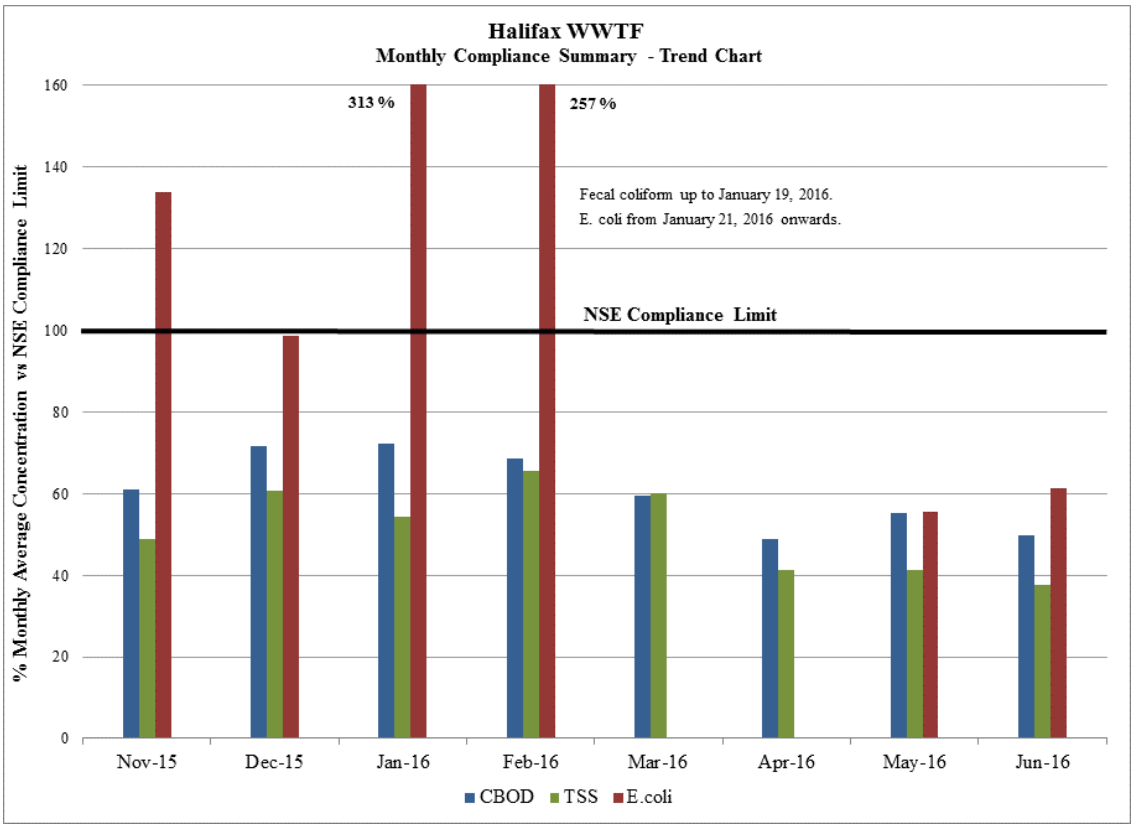

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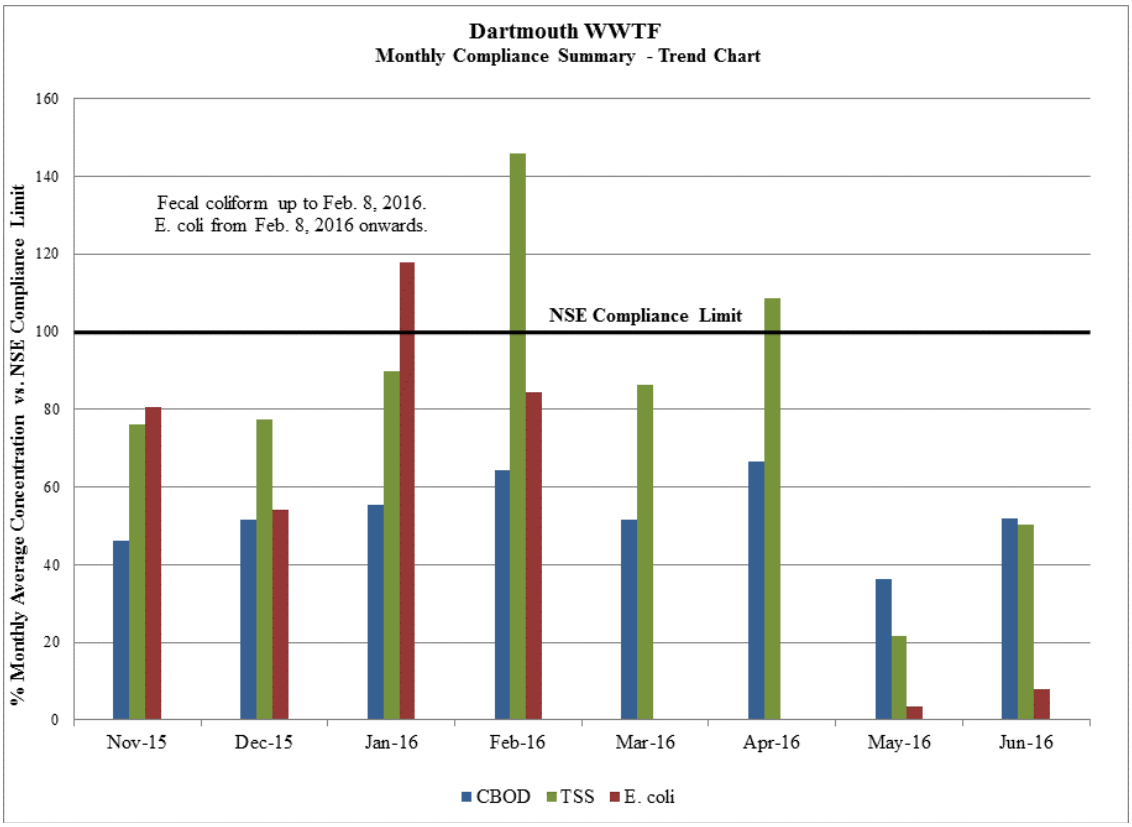

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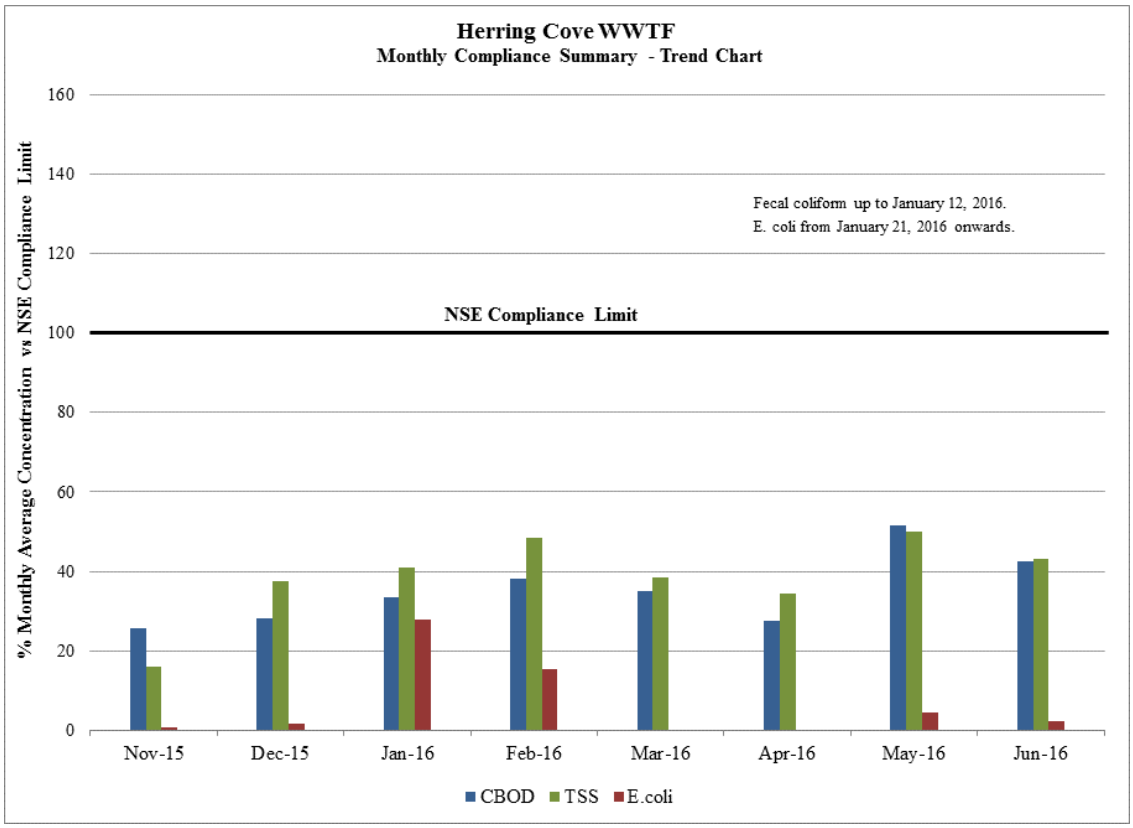

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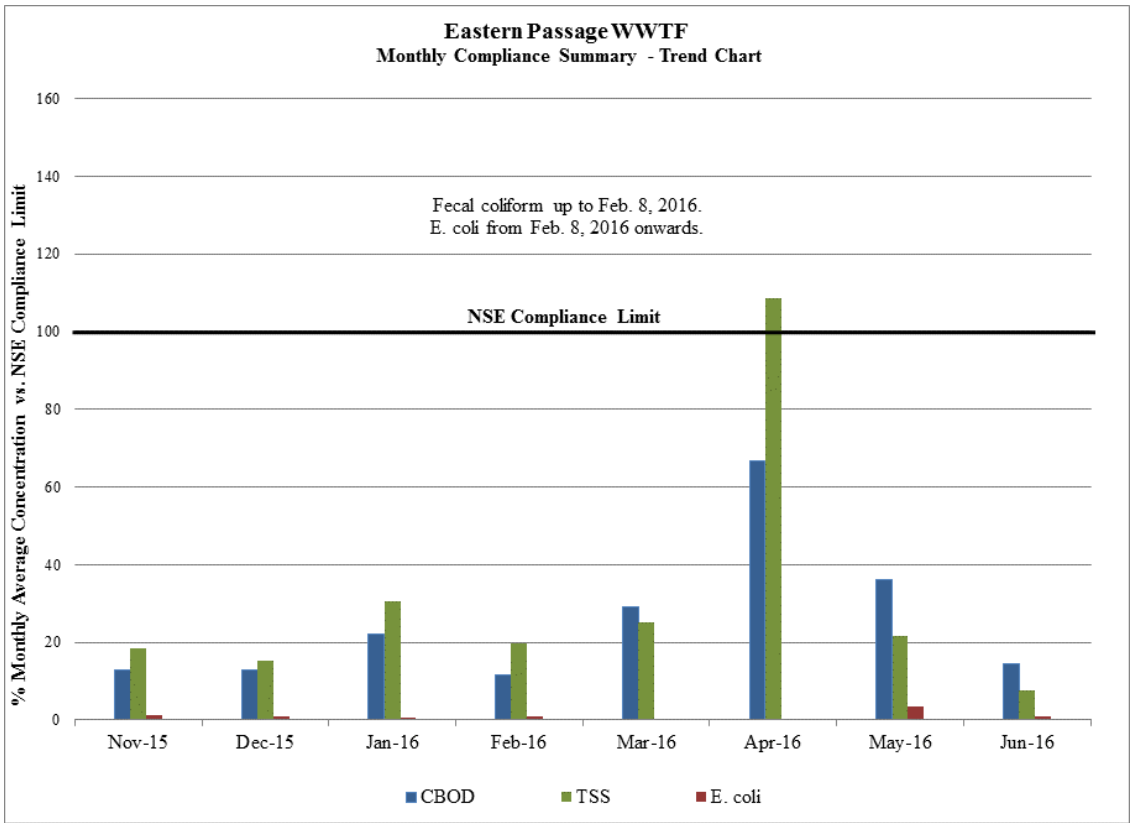
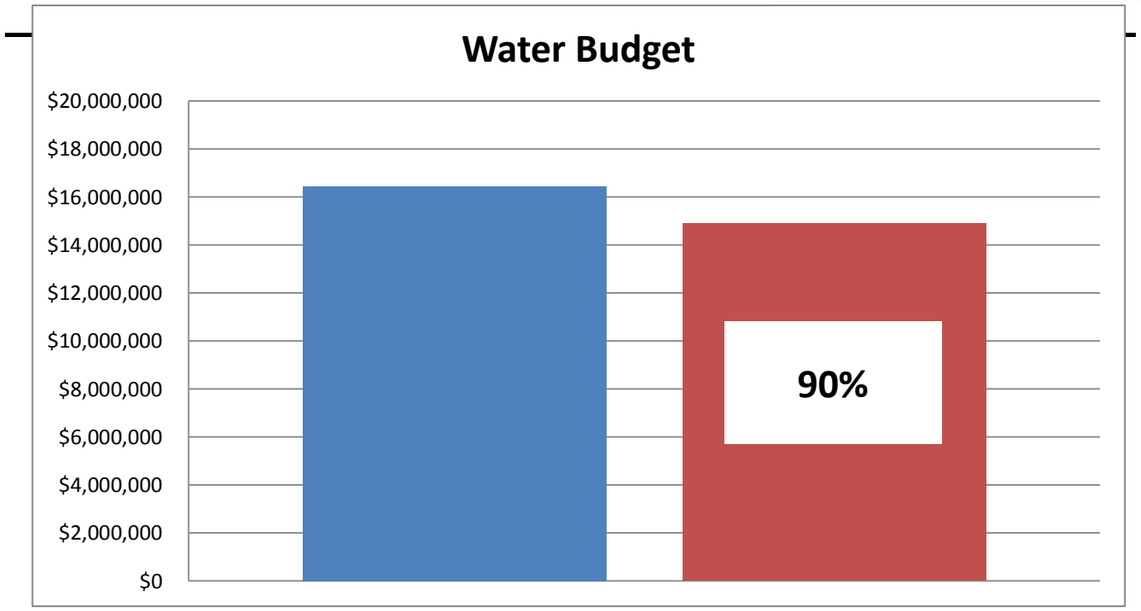
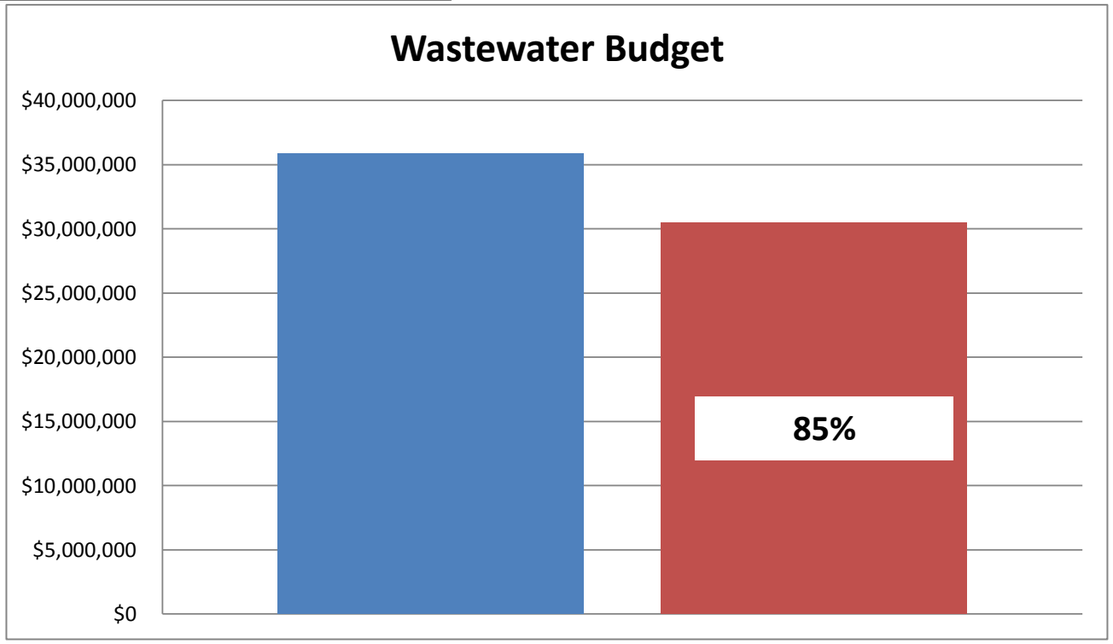


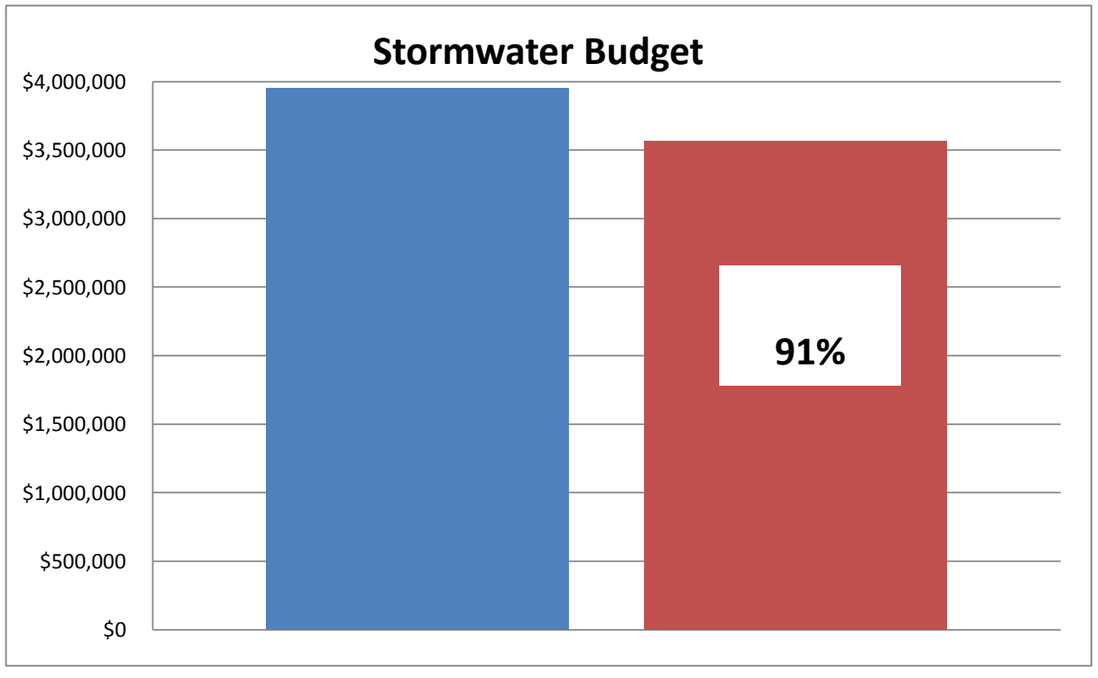
Halifax Water
Halifax Regional Water Commission

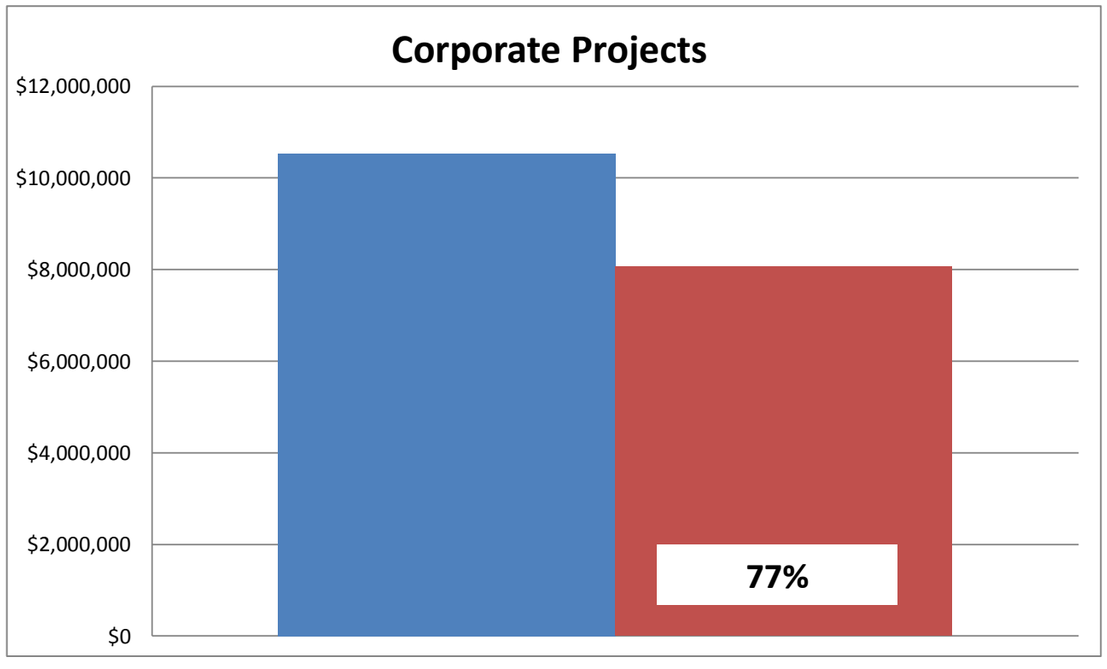
ITEM 2-I
HRWC Board
September 29, 2016

CAPITAL BUDGET APPROVALS TO DATE - 2016/17









WATER		
Approved Budget	**$16,453,000**	**91%**
Approvals to date	**$14,895,000**	
STORMWATER		
Approved Budget	**$3,951,000**	**90%**
Approvals to date	**$3,563,000**	

WASTEWATER		
Approved Budget	**$35,838,000**	**85%**
Approvals to date	**$30,474,000**	
CORPORATE PROJECTS		
Approved Budget	**$10,535,000**	**77%**
Approvals to date	**$8,058,000**	

Total Budget:	**$66,777,000.00**
Total To Date:	**$56,990,000.00**
Total % to date	**85%**

WATER
CAPITAL BUDGET APPROVALS TO DATE - 2016/17
TOTAL CAPITAL BUDGET FOR WATER $16,453,000

Date of Approval								
HRWC BOARD	GM	NSUARB	Description	Approved Amount	Net Additions to Budget	Consultant/ Contractor	Construction Tender Price	Construction Budget Estimate
			2016/17 Capital Budget					
28-Jan-16		24-Mar-16	**Advanced Funding Integrated Projects**					
			East					
			Murray Hill Drive W/M Renewal	$455,000	$455,000	Dexter	$377,077	$479,730
			Farquharson Street Water Main Renewal	$500,000	$500,000	Dexter	$387,693	$458,858
			Brompton Road	$215,000	$215,000	Dexter	$166,299	$190,582
			Everette Street Water Main Renewal	$410,000	$410,000	Dexter	$251,384	$328,500
		24-Mar-16	**West**					
			Scarlet Rd	$335,000	$335,000	To be tendered in July		
			Foxglove Lane	$150,000	$150,000	To be tendered in July		
			Parmbelle Lane	$250,000	$250,000	To be tendered in July		
			George Dauphinee Drive	$620,000	$620,000	Deferred to 2017		
			Layton Road	$325,000	$325,000	Deferred to 2017		
			Inverness Avenue	$260,000	$260,000	Deferred to 2017		
		24-Mar-16	**Central**					
			Tillock Drive	$380,000	$380,000	Sackville Trenching	$256,059	$351,245
			Tillock Court	$100,000	$100,000	Included in Tillock Drive Tender		
			Total Integrated Project	**$4,000,000**	**$4,000,000**			
5-Mar-15		13-Apr-15	Macdonald Bridge Transmission Main Replacement project $7,700,000: funding in the amount of $354,000 is available from underspending on the Kearney Lake Road Water Transmission Main Phase 2: funding in the amount of $3,750,000 is available from the 2015/16 Capital Budget under "Macdonald Bridge Transmission Main Replacement" and funding in the amount of $3,295,000 will be included in the 2016/17 Capital Budget	$7,700,000	$3,295,000	CBCL		
28-Jan-16		13-Apr-16	Valve Renewals	$125,000	$125,000			
28-Jan-16		13-Apr-16	Hydrant Renewals	$75,000	$75,000			

WATER

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

TOTAL CAPITAL BUDGET FOR WATER $16,453,000

Date of Approval HRWC BOARD	GM	NSUARB	Description	Approved Amount	Net Additions to Budget	Consultant/ Contractor	Construction Tender Price	Construction Budget Estimate
28-Jan-16		13-Apr-16	Service Line Renewals	$190,000	$190,000			
28-Jan-16		13-Apr-16	Large Tapping Machine c/w electric operator and 4" to 12" cutters	$34,000	$34,000			
28-Jan-16		13-Apr-16	Small Hydro Vac for valve box maintenance	$25,000	$25,000			
28-Jan-16		13-Apr-16	Plastic Shell Cutters for Tapping Machine	$12,000	$12,000			
28-Jan-16		13-Apr-16	Portable valve Exerciser	$10,000	$10,000			
28-Jan-16		13-Apr-16	Confined Space Entry System for Bennery Lake Water Supply Plant	$14,000	$14,000			
28-Jan-16		19-Feb-16	Geizer 158 Reservoir Rehabilitation	$2,170,000	$2,170,000	MacDonald Appl.	$1,711,189	$1,971,005
					$5,950,000			
			Accumulative Total - January, 2016		**$9,950,000**			
23-Feb-16			JD Kline Replace Power Pole at Low Lift Station	$40,000	$40,000			
23-Feb-16			Bedford Connector Transmission Main Phase 3 - Design	$90,000	$90,000			
23-Feb-16			Lyle Street Control Chamber Access Improvement	$30,000	$30,000			
23-Feb-16			Topsail Control Chamber - Confined Space Energy Retrofit - funding available from underspending in 2015/16 CB under "Geizer 158 Retrofit Chamber Retrofit which did not proceed last year	$43,000	$0			
23-Feb-16			Confined Space Entry Retrofit - Bridgeview PRV Chamber	$79,000	$79,000			

WATER

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

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HRWC BOARD	**GM**	**NSUARB**	**Description**	**Approved Amount**	**Net Additions to Budget**	**Consultant/ Contractor**	**Construction Tender Price**	**Construction Budget Estimate**
	23-Feb-16		Robie 2 Chamber Upgrades	$160,000	$160,000			
	23-Feb-16		Automated Flushing Program	$20,000	$20,000			
	24-Feb-16		Relocated CT Calculation Equipment Lucasville Meter Chamber	$31,000	$31,000			
	23-Feb-16		Critical Valves Bedford Hwy - funding in the amount of $57,000 is available from underspending in SAP #3-1921 2015/16 Capital Budget	$57,000	$0			
25-Feb-16		6-Apr-16	Lake Major Water Supply Plant - New Diesel Generator	$1,900,000	$1,900,000			
			Accumulative Total - February, 2016		**$2,350,000**			
	8-Mar-16		Bennery Lake WSP Surge Protection	$17,000	$17,000			
	8-Mar-16		Lake Major WSP Purchase Fluorescence Meter	$90,000	$90,000			
	8-Mar-16		Lake Major WSP - Replace Contactors in the MCC	$34,000	$34,000			
	8-Mar-16		Lake Major WSP - Integrate Chlorine Alarms	$50,000	$50,000			
	8-Mar-16		Lake Major WSP Chemical Feed Pump Replacements	$85,000	$85,000			
	8-Mar-16		JD Kline WSP New Laptop system to Backwash Filters	$12,000	$12,000			
	8-Mar-16		JD Kline WSP - Ampgard III to Vacuum Contactor Conversion Program	$40,000	$40,000			
	8-Mar-16		Purchase Inline Zeta Potential Meters for Water Plants	$100,000	$100,000			
	8-Mar-16		Purchase Particle Counters for Water Plants	$235,000	$235,000			
	30-Mar-16		Lake Major WSP - Dewatering Equipment	$100,000	$100,000			

WATER

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

TOTAL CAPITAL BUDGET FOR WATER $16,453,000

Date of Approval HRWC BOARD	GM	NSUARB	Description	Approved Amount	Net Additions to Budget	Consultant/ Contractor	Construction Tender Price	Construction Budget Estimate
	30-Mar-16		Cliff Street Watermain Replacement was not originally budgeted for in 2016/17. Funding in the amount of $60K is available from underspending in the "First Street Watermain Renewal Project" (SAP3-2028)	$60,000	$0			
	30-Mar-16		Lake Major WSP - Dedicated Service Water Pumping Station Design Phase	$60,000	$60,000			
	30-Mar-16		Bennery Lake WSP - Power Monitoring	$20,000	$20,000			
	30-Mar-16		Lake Major WSP - Replace Fluoride System	$10,000	$10,000			
	30-Mar-16		J.D. Kline Replace Turbidimeters and ph. Meters project was not identified for 2016/17. Funding in the amount of $11K is available from underspending in the 2015/16 JD Kline Chemical Feed Pump Replacement Program	$11,000	$0			
	30-Mar-16		2015/16 CB Governor's Brook Transmission Main Oversizing	$197,000	$0			
	30-Mar-16		Lakeside Timberlea CCC 2015/16	$2,000	$0			
31-Mar-16		22-Apr-16	JD Kline WSP - Replacement of the Lime Feed and Delivery System	$300,000	$300,000			
			Accumulative Total - March, 2016		**$1,153,000**			
	15-Apr-16	4-May-16	Bennery Lake WSP Plate Settlers	$440,000	$440,000			
			Accumulative Total - April , 2016		**$440,000**			
	25-May-16		Rechlorination Station Upgrades	$26,000	$26,000			
	25-May-16		Versa Valve Removal Project	$20,000	$20,000			
	25-May-16		Temporary Water Line - Pipe Materials Purchase East Region	$18,000	$18,000			
	25-May-16		Water Distribution Pressure Monitoring Equipment	$10,000	$10,000			
	25-May-16		Belmont PRV Valve Replacement	$10,000	$10,000			

WATER

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

TOTAL CAPITAL BUDGET FOR WATER $16,453,000

Date of Approval HRWC BOARD	GM	NSUARB	Description	Approved Amount	Net Additions to Budget	Consultant/ Contractor	Construction Tender Price	Construction Budget Estimate
	25-May-16		Chlorine Analyzer Replacement Program	$23,000	$23,000			
	25-May-16		Zinck PRV Meter Replacement	$8,000	$8,000			
	25-May-16		Bedford Reservoir Inflow Meter Replacement	$8,000	$8,000			
			Accumulative Total - May , 2016		**$123,000**			
	24-Jun-16		Gander Avenue Water Main Renewal Integrated Project This project was not budgeted for in 2016/17: Funding in the amount of $140,000 from underspending in the Farquaharson Street WM Project, and $100,000 is available from underspending in the Everette Street and Brompton Avenue Water Main Renewal IP	$240,000	$0	Dexter Construction	$230,480	$240,000
	27-Jun-16		Courtney Road Meter Chamber Abandonment project was not budgeted for in the 2016/17 CB. Funding in the amount of $17,000 is available from the 2015/16 CB - Renfrew abandonment project which has been deferred to another budget year	$17,000	$0			
	29-Jun-16		Lake Major Water Supply Plant - Isolating the Treatment Trains	$68,000	$68,000			
30-Jun-16		7-Jul-16	Geizer 158 Reservoir Rehabilitation - Floor Replacement project was not budgeted for in 2016/17 Funding in the amount of $2.75 Million is available from underspending on the Macdonald Bridge Transmission main project which will be re-budgeted for in 2017/18	$2,750,000	$0			
			Accumulative Total - June , 2016		**$68,000**			
	5-Jul-16		JD Kline WSP Industrial Water Pumps Upgrade	$160,000	$160,000			
	13-Jul-16		JD Kline - Pump Station MCC Ventilation	$72,000	$72,000			
	22-Jul-16		JD Kline WSP Geosmin Taxonomy Study	$165,000	$165,000			
	29-Jul-16		Water Treatment Facility Security Upgrades	$50,000	$50,000			

WATER

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

TOTAL CAPITAL BUDGET FOR WATER $16,453,000

Date of Approval HRWC BOARD	GM	NSUARB	Description	Approved Amount	Net Additions to Budget	Consultant/ Contractor	Construction Tender Price	Construction Budget Estimate
	29-Jul-16		Horne's Road Bridge Watermain Replacement Project was not budgeted for in 2016/17: Funding in the amount of $90,000 is available from underspending on the Tillock Drive WM Renewal Project (SAP $3-2307)	$90,000	$0			
			Accumulative Total - July , 2016		**$447,000**			
	22-Aug-16		Bennery Lake Water Supply Plant - Low Lift VFD Pump Replacement Program	$110,000	$110,000			
	23-Aug-16		Water Sampling Station Relocation Program	$29,000	$29,000			
	31-Aug-16		CSE Retrofits - Central Region project was not included in the 2016/17 CB: Funding in the amount of $100K is available from underspending in the (SAP #3-2307) Tillock Court Water Main Project	$100,000	$0			
	31-Aug-16		Hare Lane WM Emergency Renewal Project was not budgeted for in 2016/17: Funding in the amount of $25K is available from underspending in the Murray Hill WM Renewal Project	$25,000	$0			
			Accumulative Total - August, 2016		**$139,000**			
	06-Sep-16		Water transmission Main Condition Assessment Program	$75,000	$75,000			
	06-Sep-16		Water Structures Condition Assessment Program	$150,000	$150,000			
	15-Sep-16		JD Kline WS Plant Building Roof Renewal project was not identified in 2016/17: Funding in the amount of $155K is available from the 2015/16 CB under: Wastewater - JD Kline Entrance Road Project which will be deferred to 2017/18	$145,000	$0			
			Accumulative Total - September, 2016		**$225,000**			
			Total To Date		**$14,895,000**			

Halifax Water
Halifax Regional Water Commission

ITEM 2-I
HRWC Board
September 29, 2016

WASTEWATER
CAPITAL BUDGET APPROVALS TO DATE - 2016/17
TOTAL CAPITAL BUDGET FOR WASTEWATER $35,838,000

Date of Approval								
HRWC BOARD	**GM**	**NSUARB**	**Description**	**Approved Amount**	**Net Additions to Budget**	**Consultant/ Contractor**	**Construction Tender Price**	**Construction Budget Estimate**
			2016/17 Capital Budget Advanced Funding Integrated Projects					
28-Jan-16		24-Mar-16	**East**					
			Murray Hill Drive W/M Renewal	$38,000	$38,000	Dexter Construction	$6,166	$27,810
			Farquharson Street Water Main Renewal	$109,000	$109,000	Dexter Construction	$56,966	$78,215
			Brompton Road	$278,000	$278,000	Dexter Construction	$141,471	$199,881
			Everette Street Water Main Renewal	$97,000	$97,000	Dexter Construction	$52,608	$69,524
			Alfred Street	$199,000	$199,000	Dexter Construction	$55,663	$148,477
			Beckfoot Drive	$9,000	$9,000	to be undertaken by HW Ops		
			Strath Lane	$226,000	$226,000	Dexter Construction	$86,977.00	$147,739.00
			Westwood Drive	$121,000	$121,000	Dexter Construction	$5,769.00	$8,690.00
28-Jan-16		24-Mar-16	**West**			Dexter Construction	$20,112.00	$56,488.00
			Scarlet Rd	$206,000	$206,000			
			Foxglove Lane	$13,000	$13,000			
			Parmbelle Lane	$79,000	$79,000			
			George Dauphinee Drive	$54,000	$54,000	deferred to 2017		
			Layton Road	$13,000	$13,000	work not required		
			Inverness Avenue	$22,000	$22,000	work not required		
28-Jan-16		24-Mar-16	**Central**					
			Tillock Drive	$13,000	$13,000	to be undertaken by HW Ops		
			Tillock Court	$9,000	$9,000	to be undertaken by HW Ops		
			Doyle Street	$19,000	$19,000			
			McQuarrie Bridge (Fall River)	$150,000	$150,000	work not required		
			Lydgate Drive	$9,000	$9,000	to be undertaken by HW Ops		
			Total Integrated Projects		**$1,664,000**			

WASTEWATER

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

TOTAL CAPITAL BUDGET FOR WASTEWATER $35,838,000

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28-Jan-16		13-Apr-16	Manhole Renewals	$32,000	$32,000			
28-Jan-16		13-Apr-16	Lateral Replacements	$2,190,000	$2,190,000			
28-Jan-16		13-Apr-16	SIR Program Flow Meters and Related Equipment	$40,000	$40,000			
26-Nov-16		12-Jan-16	Corporate Flow Monitoring Program (2015/16, 2016/17)	$660,000	$660,000			
28-Jan-16		13-Apr-16	Miscellaneous Equipment Replacement	$70,000	$70,000			
28-Jan-16		10-Mar-16	Wastewater System - Trenchless Rehabilitation Program: Funding in the amount of $300,000 from underspending in the 2015/16 Sewer Lining Program: and $1,500,000 is available from the 2016/17 Capital Budget	$1,800,000	$1,500,000	Insituform Tec Limited	$805,192	$1,472,779
	29-Jan-16		Leiblin Pumping Station Elimination Preliminary Design Halifax	$75,000	$75,000	HW staff		
					$4,567,000			
			Accumulative Total - January, 2016		**$6,231,000**			
	03-Feb-16		The $42,500 in regulated activity funding is available from two sources. $20,000 is available from underspending on the ***Mill Cove CHP Fatal Flaw/Due Diligence Analysis, and the Preliminary Design and Cost Analysis*** , with the remaining $22,500 available from projected under spending within the 2015/16 ***Wastewater – Energy – Energy Management Capital Program.*** The $42,500 in unregulated activity funding is available from within the 2016/17 Unregulated Capital Budget - Mill Cove Biogas CHP.	$85,000	$0			
	19-Feb-16		Bisset Pumping Station Forcemain Replacement project from 2015/16 Capital Budget	$240,000	$0			
25-Feb-16		8-Apr-16	Balsam Road Pumping Station (PS) Elimination	$770,000	$770,000	Dexter Construction		
25-Feb-16		5-Apr-16	Northwest Arm Sewer Rehabilitation - Detailed Design	$300,000	$300,000	Robinson Consultants	$588,150	$585,900
25-Feb-16		6-Apr-16	Waterfront Drive Wastewater System Replacement	$500,000	$500,000	Project deferred pending outcome of other capital work		
			Accumulative Total - February 2016		**$1,570,000**			

WASTEWATER

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HRWC BOARD	**GM**	**NSUARB**	**Description**	**Approved Amount**	**Net Additions to Budget**	**Consultant/ Contractor**	**Construction Tender Price**	**Construction Budget Estimate**
	09-Mar-16		Wastewater Pump Station Upgrade Program - East Region 2015/16 Capital Budget	$110,000	$0			
	10-Mar-16		HRM Land Transfer - Subdivision Costs Project was not included in the 2016/17 Budget. Funding in the amount of $75,000 is available from underspending in the Lakeside Pumping Station Diversion Project in the 2015/16 CB	$75,000	$0			
	29-Mar-16		Halifax WWTF - Various Upgrades: $76,000: Funding available from underspending in 2012/13 CB in the following projects: Dartmouth WWTF HHSP Upgrades $5,000 Herring Cove WWTF HHSP Upgrades 13/14 CB $41,000 Halifax WWTF HHSP Upgrades 13/14 CB $14,000 Lakeside PS Diversion to HFX Sewershed: $16,000	$76,000	$0			
	29-Mar-16		WW Pump Station Upgrade Program Central Region (2015/16 CB)	$70,000	$0			
31-Mar-16		26-May-16	Bedford PS Rehabilitation (at Mill Cove WWTF) funding in the amount of $2.85M is available from the 2016/17 CB The remainder of funds in the amount of $400K is available from underspending in the 2015/16 Lakeside Pumping Station Diversion Project which came in under budget	$3,250,000	$2,850,000			
31-Mar-16		14-Apr-16	2015/16 Wastewater Pumping Station Upgrade Program - West Region	$420,000	$0			
			Accumulative Total - March 2016		**$2,850,000**			
	04-Apr-16		North Park Upgrade Integrated Project - Additional scope funding in the amount of $55K is available from under spending in the 2015/16 CB under Lahey Road Integrated Project	$55,000	$0			
	04-Apr-16		2015/16 Wet Weather Management Program	$125,000	$0			

WASTEWATER

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	15-Apr-16		HWWTF Halifax Wastewater Treatment Facility Ventilation Air Heat Recovery Project This project was originally scheduled for 2017/18. Due to the successful results from Herring Cove WWTF Vent Air Heat Recovery project, it was decided to use the funds allocated from 2015/16 CB under "WW HCWWTF - Heat Recovery Phase 2 - Effluent Heat Recovery	$250,000	$0			
28-Apr-16		22-Aug-16	Aerotech WWTF Expansion and Upgrade Project - Construction / Design	$22,755,000	$13,960,000			
			Accumulative Total - April 2016		**$13,960,000**			
	3-May-16		Eastern Passage WWTF Secondary Clarifier Launder Covers	$49,000	$49,000			
	03-May-16		Mill Cove WWTF - Various Capital Projects: Compressor Replacement: $20,000 Entrance Gate Replacement: $20,000 Wet Scrubber Media Replacement: $20,000 Digester Roof Coating: $135,000	$195,000	$195,000			
	04-May-16		Roach's Pond Pumping Station - Trash Rack	$75,000	$75,000			
	24-May-16		EPWWTF Process Water Filter Upgrades	$26,000	$26,000			
	24-May-16		EPWWTF Automation of RAS Gates	$97,000	$97,000			
	24-May-16		EPWWTF - Fall Protection Grates - Sludge Tank and Inlet Chamber	$6,000	$6,000			
	25-May-16		DWWTF - Influent Duty Pump Installation	$160,000	$160,000			

WASTEWATER

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	31-May-16		Mill Cove TF - Clarified Access - Project not budgeted for in 2016/17: Funding in the amount of $55K is available under 2016/17 "Emergency Wastewater Treatment Facility Equipment replacement	$200,000	$55,000			
			Accumulative Total - May 2016		**$663,000**			
	29-Jun-16		Pumping Station Standard	$135,000	$135,000			
	29-Jun-16		Autoport Pleasant Street PS Replacement	$200,000	$200,000			
	29-Jun-16		Additional Funding - Bedford CCC for Temporary Pumping Station#1 and Phase 5-4: Funding in the amount of $12,000 is available from underspending in the 2016/17 CB under: Leiblin PS Elimination Project that came in under budget	$12,000	$0			
			Accumulative Total - June, 2016		**$335,000**			
	05-Jul-16		NS Power Meter Relocations Funding is available from the 2015/16 CB from underspending in the Energy Management Retrofit Project	$22,750	$0			
	05-Jul-16		Beechville Lakeside Timberlea WW Treatment Facility Clarifier Access funding in the amount of $16K is available from 2016/17 CB - Emergency WW Treatment Facility Equipment Replacements)	$200,000	$16,000			
	06-Jul-16		HWWTF Installation of TSS Analyzer	$82,000	$82,000			
	05-Jul-16	6-Sep-16	Eastern Passage Pumping Station - Efficiency/Pump Control	$650,000	$650,000			
	19-Jul-16		Smallwood Avenue WW IP (2016) project was not budgeted for in 2016/17: Funding in the amount of 72,000 is available from the Waterfront Drive WW System Replacement project which will not be proceeding at this time	$72,000	$0	Dexter Construction	$57,043	$46,929
	25-Jul-16		Centrifuge Dewater Equipment - Mill Cove WWTF project was not budgetted for in 2016/17: Funding in the amount of $167,000 is available from the Dartmouth Wastewater Treatment Facility - Fine Screen Upgrade project which will not be proceeding this year	$1,000,000	$167,000			

WASTEWATER

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

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	27-Jul-16		Springfield Lake WWTF - UV Installation was not budgeted for in 2016/17. Funding in the amount of $245K is available from the 2015/16 CB under "Frame Subdivision Wastewater Collection System Replacement and Wastewater Treatment Facility Upgrade which is under budget	$245,000	$0			
	27-Jul-16		5000 lb. Forklift Acquisition Mill Cove Project was not budgeted for in 2016/17: Funding in the amount of $25,000 is available from the *Corporate Projects - Fleet Upgrade Program Wastewater*	$25,000	$0			
	22-Jul-16		Bedford Hwy SW System Emergency Repair was not budgeted for in the 2016/17 CB: Funding in the amount of $75K is available from underspending in the 2015/16 CB under the Lakeview Ave Twin Culvert Replacement Project which came in under budget	$75,000	$0			
	29-Jul-16		Hines Road Sewer Odour Issue: Funding in the amount of $25K is available under 2016/17 CB and the reminder of $35,000 is available from underspending in the Shore Drive Forecmain Replacement & Twinning project:	$60,000	$25,000			
	29-Jul-16		Wastewater Treatment facility security upgrades	$200,000	$200,000			
	29-Jul-16		Hornes Road Bridge Wastewater Main Replacement project was not budgeted for in 2016/17: Funding in the amount of $90K is available from the Waterfront Drive WW System Replacement project which will not proceed at this time	$90,000	$0			
			Accumulative Total - July, 2016		**$1,140,000**			
	11-Aug-16		Inglis Street Sewer - Hydraulic Analysis - Funding in the amount of $33,000 is available from the 2015/16 CB and there is $250K in the 2016/17 CB in which we are only using $19K at this time	$250,000	$19,000			
	12-Aug-16		Emergency Pumping Station Pump Replacements	$270,000	$250,000			
	12-Aug-16		Wastewater Pumping Station Upgrade Program - West Region	$225,000	$210,000			

WASTEWATER

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

TOTAL CAPITAL BUDGET FOR WASTEWATER $35,838,000

Date of Approval								
HRWC BOARD	**GM**	**NSUARB**	**Description**	**Approved Amount**	**Net Additions to Budget**	**Consultant/ Contractor**	**Construction Tender Price**	**Construction Budget Estimate**
	12-Aug-16		Wastewater Pumping Station Upgrade Program - East Region	$200,000	$200,000			
	12-Aug-16		Wastewater Pumping Station Upgrade Program - Central Region	$65,000	$65,000			
	23-Aug-16		BLT WWTF Lighting Upgrade	$35,000	$25,000			
	31-Aug-16		EPWWTF - Storage Shed	$41,000	$41,000			
	31-Aug-16		HWWTF Pump Replacement Sludge Mixing Systems	$140,000	$82,000			
	31-Aug-16		Hammonds Plains Road SW IP (2016) was not budgeted for in the 2016/17 CB. Funding is available from underspending in the following three approved projects: Herring Cove Road Culvert: $85,000 Drainage Remediation Program: $25,000 and Sackville Cross Road Stormwater system: $85,000	$195,000	$0			
	31-Aug-16		Mill Cove Biogas CHP - Detailed design and Cost Analysis Funding in the amount of $16K is available from underspending in the HWWTF OCS VDF Project (SAP 6-1028) which came in under budget	$16,000	$0			
			Accumulative Total - August, 2016		**$892,000**			
	06-Sep-16	19-Sep-16	BFP - Front End Loader Replacement	$370,000	$253,000			
	06-Sep-16		Wastewater Forcemains Condition Assessment	$75,000	$75,000			
	06-Sep-16		East and Central Wastewater Infrastructure Plan	$225,000	$125,000			
	08-Sep-16		HWWTF - Emergency Raw Water Pump VFD Replacement: Funding in the amount of $125K is available from the 2016/17 CB Under "WWTF - Emergency Equipment Replacement	$200,000	$125,000			
	12-Sep-16	pending	Mill Cove WW Treatment Facility UV Upgrade	$2,080,000	$2,080,000			
	12-Sep-16		WWTF Plant Optimization Program	$175,000	$175,000			
			Accumulative Total - September, 2016		**$2,833,000**			
			Total To Date:		**$30,474,000**			

Halifax Water
Halifax Regional Water Commission

ITEM 2-I

HRWC Board

September 29, 2106

STORMWATER

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

TOTAL CAPITAL BUDGET FOR STORMWATER $3,951,000

Date of Approval								
HRWC BOARD	**GM**	**NSUARB**	**Description**	**Approved Amount**	**Net Additions to Budget**	**Consultant/ Contractor**	**Construction Tender Price**	**Construction Budget Estimate**
			2016/17 Stormwater Advanced Funding Integrated Projects					
			East					
28-Jan-16		24-Mar-16	Murray Hill Drive W/M Renewal	$28,000	$28,000	Dexter Construction	$17,520	$21,292
			Farquharson Street Water Main Renewal	$19,000	$19,000	Dexter Construction	$14,391	$13,036
			Brompton Road	$151,000	$151,000	Dexter Construction	$35,835	$108,631
			Everette Street Water Main Renewal	$28,000	$28,000	Dexter Construction	$5,319	$21,075
			Alfred Street	$11,000	$11,000	work to be undertaken by HW Ops		
			Beckfoot Drive	$9,000	$9,000	work not required		
			Strath Lane	$122,000	$122,000			
28-Jan-16		24-Mar-16	**West**					
			George Dauphinee Drive	$34,000	$34,000	deferred to 2017		
28-Jan-16		24-Mar-16	**Central**					
			Tillock Court	$19,000	$19,000	work to be undertaken by HW Ops		
			Doyle Street	$75,000	$75,000	deferred to 2017		
			Baker Drive	$52,000	$52,000	work not required		
			Second Avenue	$70,000	$70,000	work to be undertaken by HW Ops		
			Total Integrated Projects	**$618,000**	**$618,000**			
28-Jan-16		13-Apr-16	Manhole Renewals	$29,000	$29,000			
28-Jan-16		13-Apr-16	Catchbasin Renewals	$29,000	$29,000			
28-Jan-16		13-Apr-16	Lateral Replacements	$87,000	$87,000			
					$145,000			
			Accumulative Total January, 2016		**$763,000**			

STORMWATER

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

TOTAL CAPITAL BUDGET FOR STORMWATER $3,951,000

Date of Approval								
HRWC BOARD	**GM**	**NSUARB**	**Description**	**Approved Amount**	**Net Additions to Budget**	**Consultant/ Contractor**	**Construction Tender Price**	**Construction Budget Estimate**
	23-Feb-16		Wilson Drive & Highway 2 - Culvert Replacement	$223,000	$223,000	Harbour Constru.	$109,270	$167,400
25-Feb-16		6-Apr-16	Sackville Cross Road Stormwater System Renewal	$1,090,000	$1,090,000	Dexter Construction	$659,680.71	$970,902.66
25-Feb-16		6-Apr-16	Bedford Highway at Shaunslieve Drive Culvert Upgrade	$407,000	$247,000	Brycon Construction	$152,128	$336,141
25-Feb-16		21-Mar-16	Sullivan's Pond Storm Sewer System Replacement - Design Funding in the amount of $100,000 is available from 2015/16 CB under "Stormwater Pipes - Sullivan's Pond Storm Sewer Replacement - Phase 1 and $300,000 is available from the 2016/17 CB Under "Stormwater Pipes Sullivan's Pond Storm Sewer Replacement Phase 1. The total approved to date is $950,000	$400,000	$300,000	CBCL		
			Accumulative Total February, 2016		**$1,860,000**			
			Accumulative Total March, 2016		**$0**			
7-Apr-16	25-Apr-16		2016/17 Driveway Culvert Program	$450,000	$450,000			
			Accumulative Total April, 2016		**$450,000**			
30-May-16			Yankeetown Road (near Civic 258) Culvert Replacement was not budgeted for in 2016/17: Funding in the amount of $200,000 is available from underspending in the 2015/16 CB under Cow Bay Road Deep Storm Sewer project which came in under budget	$200,000	**$0**	Harbour Construction		
			Accumulative Total for May, 2016		**$0**			
6-Jun-16			Bank of Montreal Stormwater Lateral - 5151 George Street	$90,000	$90,000			
			Accumulative Total for June, 2016		**$90,000**			

STORMWATER

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

TOTAL CAPITAL BUDGET FOR STORMWATER $3,951,000

Date of Approval HRWC BOARD	GM	NSUARB	Description	Approved Amount	Net Additions to Budget	Consultant/ Contractor	Construction Tender Price	Construction Budget Estimate
	22-Jul-16		Bedford Hwy SW System Emergency Repair was not budgeted for in the 2016/17 CB: Funding in the amount of $75K is available from underspending in the 2015/16 CB under the Lakeview Ave Twin Culvert Replacement Project which came in under budget	$75,000	$0			
	22-Jul-16		Clement Street Berm - SW Control System	$264,000	$264,000			
	29-Jul-16		Inverness Avenue Culvert Replacement Project	$156,000	$136,000	Harbour Construction	$83,496.24	$146,000.00
			Accumulative Total for July, 2016		**$400,000**			
			Total to Date		**$3,563,000**			

Halifax Water
Halifax Regional Water Commission

ITEM 2-I

HRWC Board

September 29, 2016

CORPORATE PROJECTS

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

TOTAL CAPITAL BUDGET FOR CORPORATE PROJECTS $10,535,000

Date of Approval								
HRWC BOARD	**GM**	**NSUARB**	**Description**	**Approved Amount**	**Net Additions to Budget**	**Consultant/ Contractor**	**Construction Tender Price**	**Construction Budget Estimate**
30-Jul-15		15-Oct-15	Computerized Management Maintenance System Phase 2 (Project was approved in October 15, 2015 by NSUARB)	$1,500,000	$1,500,000			
28-Jan-16		13-Apr-16	Desktop Computer Replacement Program	$180,000	$180,000			
28-Jan-16		13-Apr-16	Network Infrastructure Upgrades	$200,000	$200,000			
28-Jan-16		13-Apr-16	Survey Equipment - GPS Total Station	$30,000	$30,000			
28-Jan-16		13-Apr-16	Document Management Program	$200,000	$200,000			
28-Jan-16		13-Apr-16	SharePoint	$200,00	$200,000			
			AMI/AMR Meter System Upgrades	$3,300,000	$3,300,000			
28-Jan-16		13-Apr-16	Fleet Upgrade Program Water	$505,000	$505,000			
28-Jan-16		13-Apr-16	Fleet Upgrade Program Wastewater	$920,000	$920,000			
28-Jan-16		13-Apr-16	Fleet Upgrade Program Stormwater	$230,000	$230,000			
			Accumulative Total January, 2016		**$7,265,000**			
28-Apr-16		12-Aug-16	GIS Hardware/Software Program 2015/16	$400,000	$0			
	31-May-16		CRM Interfaces	$200,000	$200,000			
			Accumulative Total May, 2016		**$200,000**			

Halifax Water
Halifax Regional Water Commission

ITEM 2-I

HRWC Board

September 29, 2016

CORPORATE PROJECTS

CAPITAL BUDGET APPROVALS TO DATE - 2016/17

TOTAL CAPITAL BUDGET FOR CORPORATE PROJECTS $10,535,000

Date of Approval HRWC BOARD	GM	NSUARB	Description	Approved Amount	Net Additions to Budget	Consultant/ Contractor	Construction Tender Price	Construction Budget Estimate
	15-Jun-16		Customer Service Portal	$220,000	$220,000			
			Accumulative Total June, 2016		**$220,000**			
	5-Jul-16		SCADA Control System Enhancements 2016/17 (cost are split 50/50 for W/WW	$200,000	$200,000			
	29-Jul-16		450 Cowie Hill Road External Lighting Project	$25,000	$23,000			
			Accumulative Total July, 2016		**$223,000**			
	6-Sep-16		Asset Management Program Development	$100,000	$100,000			
	6-Sep-16		Assess Asset Management Software - Part 2	$50,000	$50,000			
			Accumulative Total September, 2016		**$150,000**			
			Total to date		**$8,058,000**			

Item 3-I

28-Sep-16

FINANCIAL REPORT

Consolidated balance of the four operating accounts maintained by the Commission as of:	28-Sep-16	$58,410,338
Rate of interest on the above balance - Investment Rate of Return	0.074%	$58,410,338.18

Halifax Water
Halifax Regional Water Commission

ITEM 4-I
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair, and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA/CGA, Director, Corporate Services

APPROVED: *Original Signed By:*
Carl Yates M.A.Sc., P.Eng., General Manager

DATE: September 20, 2016

SUBJECT: **Pension Plan Investment Performance 2nd Quarter, 2016**

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 outlines the performance update for the second quarter of 2016 (April to June) 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, 2015 was 5.87%, and totaled $100.4 million.

Returns:

	2nd Quarter Apr. to Jun.	1-Year	4-Year Annualized	Since October 1999
Fund Return	2.28%	3.95%	9.52%	6.82%
Policy Benchmark	1.66%	2.34%	6.25%	5.44%
Excess Return	0.62%	1.61%	3.27%	1.38%

Asset Mix June 30, 2016:

Asset:	Actual	Policy
Cash & Equivalents	1.69%	
Canadian Equity	7.82%	8.50%
Global Equity	29.56%	29.50%
Bonds	22.40%	26.80%
Minimum Target Return	38.53%	35.20%

The total fund returned 2.3% in the 2nd Quarter, which outperformed the policy benchmark of 1.7% by 0.6%. Year-to-date performance earned -0.7%, underperforming the policy benchmark of 1.1% by -1.8%. The return for the one-year period is 3.9%, outperforming the policy benchmark of 2.3% by 1.6%.

The total fund return is subject to investment management fees and plan expenses.

As at June 30, 2016, the Master Trust was in compliance with the Statement of Investment Policies and Procedures (SIP&P).

ATTACHMENT

Halifax Regional Municipality Pension Plan Investment Report 2nd Quarter, 2016

Report Prepared by: *Original Signed By:*

Allan Campbell, B.Comm, CPA, CMA
Manager, Finance, 902-490-4288

HRM PENSION PLAN

Investment Report

Q2 2016

ITEM # 4-I
HRWC Board
September 29, 2016
ATTACHMENT

Consent Agenda Item No. 1

Executive Summary

Compliance

As at June 30, 2016, the Master Trust (MT) was in compliance with the SIP&P.

Funded Status*

As at December 31, 2015, the accounting funded position was 104%, the estimated going concern funded status was 89.6%, and the estimated solvency funded ratio was 60%.

Master Trust Performance

In Q2, the MT earned 2.3%, outperforming the policy benchmark return by 0.6%.

For the one-year period ending June 30, 2016, the MT earned 4.0%, outperforming the policy benchmark by 1.6%.

The MT earned an annualized return of 9.5% over the 4-year ending June 30, 2016 outperforming the policy benchmark by 3.3% annualized.

Since inception (October 1999), the MT earned 6.8% annualized outperforming the Plan's long-term rate objective of 6.5%. The table on the next slide summarizes the calendar year returns for the MT.

*Source: Estimated from AON

Executive Summary – Cont.

Calendar Returns

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
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%
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%
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%

Executive Summary – Cont.

Added Value

In Q2 of 2016, the MT outperformed its benchmark by 0.62%. Attribution: Minimum Target Return +0.24%, World Equity +0.13%, Global Credit +0.13%, MSCI EAFE Equity +0.08%, Universe Bonds +0.07%, Emerging Market Equity +0.06%, US Equity -0.01%, and CAD Equity -0.08%.

Q2 Updates

During Q2 2016, 9 private investments generated realized proceeds of $93.4mm CAD generating realized capital gains of $25 million. $50.3mm CAD of the $93.4 proceeds was used to fund the capital calls for new private investments and $38.6mm CAD was invested in Fixed Income and Emerging Market Equity mandates.*

Two realized private equity investments generated annualized returns of 34% net and 38% gross**. Two realized private placements (fixed income) generated annualized net returns of 8% and 16%. One infrastructure investment was partially realized generating an annualized gross return of 26%.**

*Figures in CAD equivalent amount

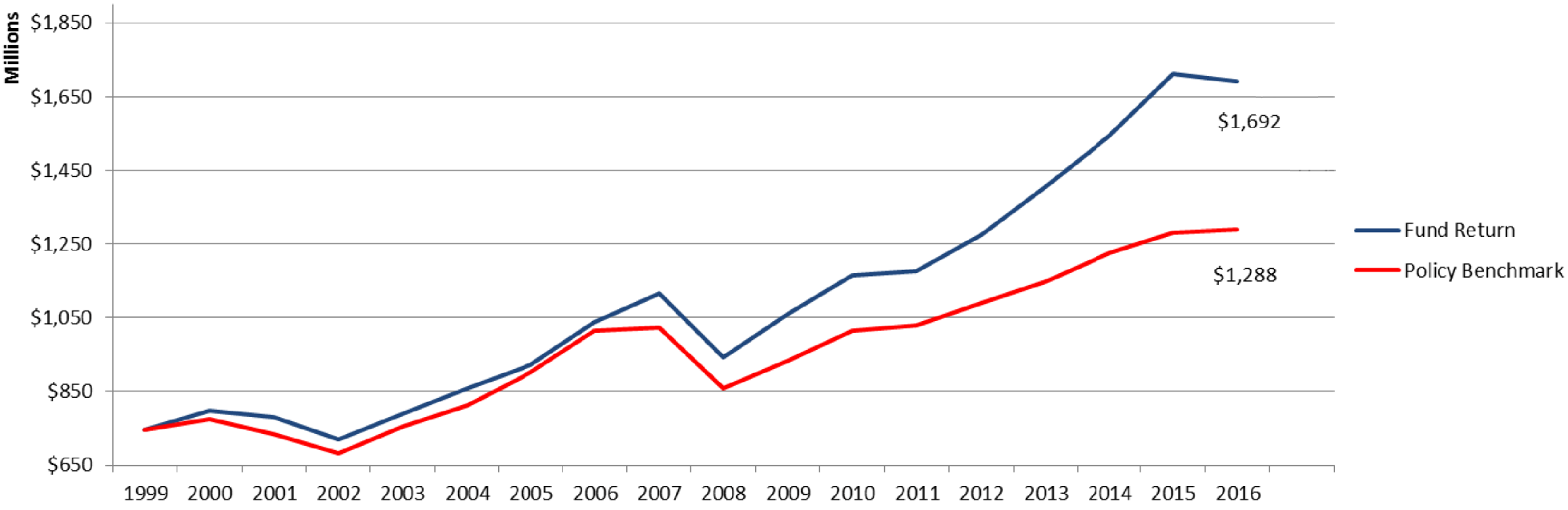
**Net returns for underlying investments in Funds are not available. Net returns for the overall Fund will be available once Fund terminates.

Total Fund Returns – June 30, 2016

	Current Quarter	YTD	1-Year	3-Year Annualized	4-Year Annualized	Inception (Oct 1999)
Fund Return	2.28%	-0.68%	3.95%	9.25%	9.52%	6.82%
Policy Benchmark*	1.66%	1.12%	2.34%	6.64%	6.25%	5.44%
Excess Return	0.62%	-1.80%	1.61%	2.61%	3.27%	1.38%

*Effective June 30, 2016, the Policy Benchmark is 5.9% S&P/TSX Index + 2.6% S&P/TSX 60 + 4.6% S&P 500 Index($USD) + 9.1% MSCI EAFE Index ($CAN) + 4.2% MSCI Emerging Markets (CAN$) + 11.6% MSCI World (CAN$) +14.6% FTSE TMX Canada Universe + 12.2.% 3 Month Bankers Acceptance + 35.2% Minimum Target Return.

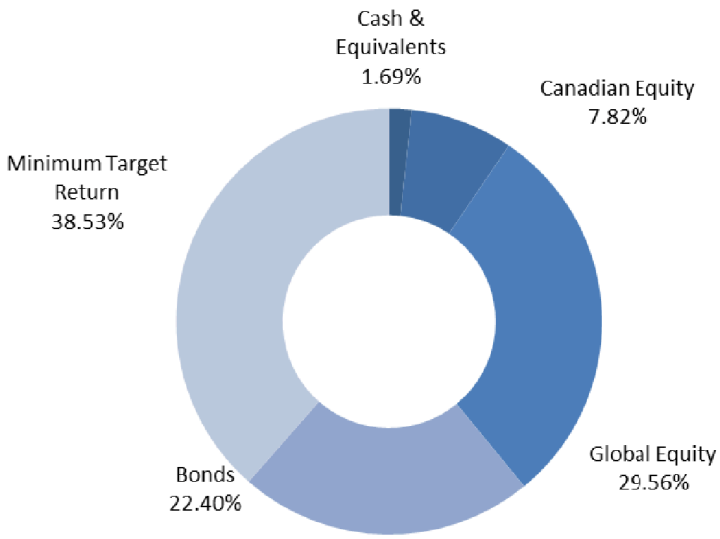
Since Inception Performance



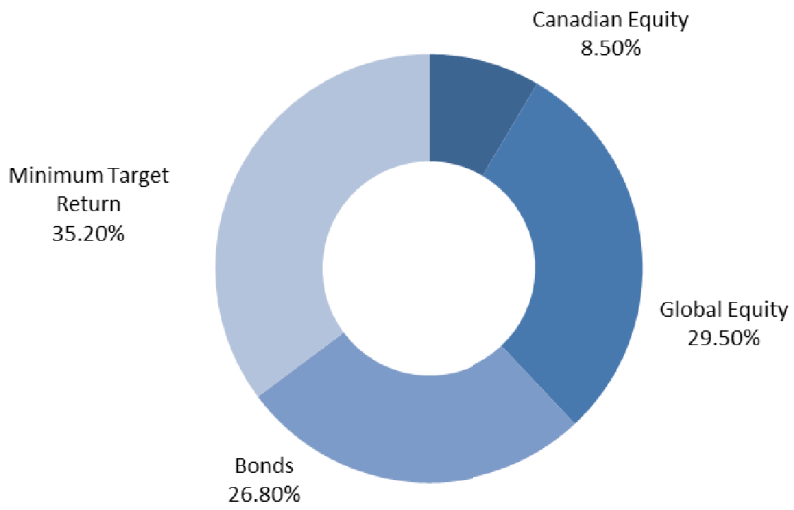
In dollar terms, the fund has grown $404.0 million in excess of the policy benchmark since inception.

Asset Mix – June 30, 2016

Actual Asset Mix
As of June 30, 2016



Asset Mix Policy
As of June 30, 2016



*Effective June 30, 2016, the Policy Benchmark is 5.9% S&P/TSX Index + 2.6% S&P/TSX 60 + 4.6% S&P 500 Index($USD) + 9.1% MSCI EAFE Index ($CAN) + 4.2% MSCI Emerging Markets (CAN$) + 11.6% MSCI World (CAN$) +14.6% FTSE TMX Canada Universe + 12.2.% 3 Month Bankers Acceptance + 35.2% Minimum Target Return.

Equity Market Index Returns

Indexes	Q2 2016	YTD	1-Year Ending June 30, 2016	4-Year Ending June 30, 2016
Canadian Equity (S&P/TSX Capped Index)	5.07%	9.84%	-0.20%	8.17%
US Equity (S&P 500 U$)	2.46%	3.84%	3.99%	13.83%
EAFE Equity (MSCI EAFE C$)	-1.06%	-10.64%	-6.55%	12.59%
Emerging Markets (MSCI EM C$)	1.07%	-0.51%	-8.52%	5.74%
World Equity (MSCI World C$)	1.42%	-5.90%	1.13%	17.19%

All markets with the exception of the MSCI EAFE earned positive returns in Q2 2016. Over the 1-year time period only the S&P 500 USD and MSCI World earned positive returns. Stock market returns have been robust over the 4-year time period.

Bond Market Index Returns

Bond Indexes	Current Quarter	YTD	1-Year Ending June 30, 2016	4-Year Ending June 30, 2016
Canadian Long Duration Bonds (FTSE TMX Canada Long Government)	5.56%	8.13%	10.18%	5.88%
Canadian Universe Bonds (FTSE TMX Canada Universe)	2.61%	4.04%	5.20%	4.13%
Canadian Corporate Bonds (FTSE TMX Canada All Corporate)	2.46%	4.00%	4.49%	4.51%

Long government bonds have outperformed Corporate bonds and Universe bonds over the Q2, YTD, 1 and 4 year periods. Long duration bonds had previously underperformed for the one year period ending March 31, 2016 at -0.33% vs 0.78% for Canada Universe bonds and 0.69% for Canadian Corporate bonds.

Fixed Income – Q2 Summary

- The MT's Fixed Income portfolio returned 2.46%, which outperformed it's benchmark return of 1.53% by +0.94%.

- The MT's Universe Bond mandate returned 3.19%, outperforming the FTSE TMX Canada Universe Bond Index return of 2.61% by +0.58%.

- The MT's Credit Bond mandate returned 4.53%, outperforming the FTSE TMX Canada Universe Corporate Bond Index return of 2.46% by +2.07%.

- The MT's Government Bond mandate returned 2.65%, underperforming the FTSE TMX Canada All Government Bond Index return of 2.67% by -0.02%.

MTR – Q2 Summary

- The Minimum Target Return portfolio returned 2.41% versus a benchmark of 1.59%, outperforming by 0.82%. The outperformance was primarily driven by realized gains and income distributions from underlying private investments.

- In Q2 2016, the MTR portfolio generated realized gains of $20.5mm CAD from two private equity investments and $4.8mm CAD from other partially realized investments.

- Fully realized investments from the MTR portfolio generated a combined gross annualized return of 34.5% (individual returns for investments ranged between 34% and 38%).

Equity – Q2 Summary

- The MT's Equity portfolio returned 2.23% during the quarter, outperforming the equity policy benchmark return of 1.67% by +0.56%, primarily due to security selection.

- Within the Equity portfolio, all equity asset classes except Canadian and US equity outperformed their benchmarks.

Equity Indexes	Excess Return Over Benchmark Q2 2016
Canadian Equity	-0.68%
US Equity	-0.18%
EAFE Equity	0.92%
EME Equity	1.32%
World Equity	1.25%

Halifax Water
Halifax Regional Water Commission

ITEM # 5-I
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
James Campbell, Communications & Public Relations Coordinator

APPROVED: *Original Signed By:*
Carl Yates, M.A.Sc., P.Eng., General Manager

DATE: September 21, 2016

SUBJECT: **Communications Strategy**

INFORMATION REPORT

ORIGIN

The 2015/16 Capital Budget.

BACKGROUND

Halifax Regional Water Commission (publicly branded as Halifax Water in 2007) is in the process of implementing an overall communications strategy.

The utility currently has a low public profile. While our customers rely on our critical water, wastewater and stormwater services every day, there is a perceived lack of understanding and/or interest in what the utility does, and the essential role it plays in the social, economic, and environmental well-being of our communities.

Halifax Water has a number of initiatives underway that will fundamentally change the way we do business and provide the opportunity for enhanced interaction with our customers. These initiatives include Advanced Metering Infrastructure, Customer Relationship Management and Operational Maintenance Management. Halifax Water is interested in transforming the utility from a silent service provider to a utility that is valued and regarded as essential to the sustainability of the communities it serves.

In order to implement a Communications Strategy, Halifax Water sought proposals for the design, development and delivery of a framework to assist Halifax Water in better serving customers, external clients and internal staff. The successful proponent

would provide recommendations and a clear program outline that will enable Halifax Water staff to implement the strategy.

DISCUSSION

On June 30, 2016, Halifax Water issued an RFP entitled Halifax Water Communications Strategy. The RFP received an excellent response with seven companies putting forward proposals. After reviewing all seven proposals, the evaluation team short listed three companies. These three companies were invited to provide a presentation to the evaluation team.

On September 8, 2016 Revolve Branding and Marketing was awarded the contract at a price of $132,025.00, including HST.

Halifax Water will now work with Revolve to refine and implement the Communications Strategy over the coming months.

BUDGET IMPLICATIONS

This initiative provides benefit to all three services – Water, Wastewater and Stormwater; and provides benefit to both operating programs and capital project delivery. It will be charged to the Administration Cost Centre #43561; which is projecting underspending in 2016/17 due to positive results from the actuarial valuation of the pension plan, and a reduced use of consultants on regulatory matters.

ALTERNATIVES

None recommended.

ATTACHMENTS

N/A

Report Prepared by: *Original Signed By:*
James Campbell, Communications & Public Relations Coordinator
902-490-4604

Financial Review by: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, Director, Corporate Services
902-490-3685

Halifax Water
Halifax Regional Water Commission

ITEM # 6-I
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Reid Campbell, P. Eng., Director, Water Services

APPROVED: *Original Signed By:*
Carl Yates, M.A.Sc., P.Eng., General Manager

DATE: September 16, 2016

SUBJECT: **Water Supply Lake Levels**

INFORMATION REPORT

ORIGIN

Water Service staff

BACKGROUND

Each of Halifax Water's three large water supply plants (J. Douglas Kline, Lake Major and Bennery Lake) and three of its small systems (Collins Park, Middle Musquodobit and Bomont) obtain their raw water from surface water sources (lakes and rivers). In south western Nova Scotia, water supply is a particular challenge with many homes being without water since June or July. This is the driest summer in the Halifax area since at least 2003 and likely for some considerable time prior to that. According to Environment Canada, since the beginning of June, the Halifax International Airport has received 207 millimeters of rain compared to normal precipitation of 387 millimeters. Since the first of August we have received 61 millimeters of rain compared to normal precipitation of 195 millimeters for the entire month.

DISCUSSION

Each of our surface water supplies is discussed as follows:

- J Douglas Kline Water Supply [Pockwock Lake] – Pockwock Lake has not yet reached its historic low level of 51.5 inches below the spillway crest, recorded on November 4, 2004. Even at its historic low level, there was an excess of four metres of accessible depth in the lake. Based on the current lake level of 44 inches

below the crest, the Pockwock water supply is not an immediate concern and would not likely become a concern unless the drought was to extend for many more months.

- Lake Major Water Supply – Lake Major is significantly below its historic low level. The crest of the dam is at elevation 19.0 metres and its typical low level is approximately 18.8 metres. As of September 15, 2016, the lake is at elevation18.47 metres and has been dropping by up to 1 centimetre per day (0.01metres), as indicated on the attached sketch. The critical level, at which point we would start encountering difficulty pumping from the lake is at elevation 18.10 metres. Based on the lake level drop of 1 centimetre per day, without appreciable rain, we have approximately 35-40 days' supply before we would encounter pumping difficulties. With no appreciable rain in the forecast for the next two weeks, the level of Lake Major is a significant concern. It is important to note that the calculation of the critical elevation for pumping is not an entirely precise exercise. There are a number of site specific factors which impact pump suction conditions. Selection of the engineering variables to quantify those factors involves some element of professional judgment. The 35-40 day estimate can be considered a conservative calculation and it is possible the amount of available storage, based on the critical elevation, could be above this estimate. Further, there are factors beyond the simple withdrawal of water from the lake that impact the rate of lake level drop both positively and negatively and even small rain events can reduce the daily rate of drop in the lake level.

  In addition to water used by our customers, Halifax Water is required by its operating approvals to provide 4 cubic feet per second of maintenance flow for fish habitat. This works out to 10 million litres per day or approximately 25% of the water used by our customers. Notwithstanding this requirement, the siphon which provides the maintenance flow has not been operating since September 6/16 due to low water levels upstream of the dam. Halifax Water has requested a variance in our operating approval from Nova Scotia Environment to maintain maintenance flows to maximize the amount of remaining water available to customers in the greater Dartmouth area.

  It is appropriate that plans be put in place to mitigate the effects of low lake levels. On September 19, Halifax Water issued mandatory water use restrictions including a ban on outdoor water use and closure of the two bulk water supply stations connected to the Lake Major system. Water services staff is developing plans to operate in emergency conditions should the lake approach the critical low level referenced above. Much work remains to be done to refine tactics but some areas for consideration include:

  - Greater emphasis on identifying and repairing system leaks (the system is currently deemed to have very low leakage).

- Cessation of system flushing except where it is necessary for public health purposes.
- The plant can potentially be operated at a slower rate which would improve pump suction conditions but would also potentially cause water shortages if customers do not voluntarily reduce use.
- Using temporary portable pumps to pump water from deeper parts of the lake into the pump station wet well is technically possible but requires considerable co-ordination. It would also be costly to operate as it would require more staff on duty and equipment rentals.
- Staff will be meeting weekly to update and develop emergency plans until lake levels recover.

- Bennery Lake – Bennery Lake is operating at its historic low water level however it still remains slightly less than 1 metre above its critical pumping elevation and in recent weeks the level has stabilized. Based on performance over the last few weeks, the supply is not an immediate concern but Bennery Lake and the treatment plant will be monitored closely.

- Collins Park, Middle Musquodoboit and Bomont – These three water supply plants operate from Lake Fletcher, the Musquodoboit River and the Shubenacadie River, respectively. All three of their intakes are relatively shallow compared to the larger plants and are operating at historically low levels. In these systems water levels change more rapidly on a day to day basis and are being monitored carefully. In the event we were to reach a critical level at any of these facilities, they can reasonably be managed by trucking bulk water from the Pockwock system. Further, these plants can operate much closer to their critical levels due to the nature of the pumping equipment and smaller size of the facilities.

Halifax Water also operates three groundwater small systems (5 Island Lake, Silver Sands and Miller Lake). Each of these systems utilizes relatively deep drilled wells. To date, none of these systems are exhibiting adverse effects from the drought conditions.

Report Prepared by: *Original Signed By:*

Reid Campbell, Director, Water Services

Halifax Water
Halifax Regional Water Commission

ITEM #7-I
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair, and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, Director, Corporate Services

APPROVED: *Original Signed By:*
Carl Yates M.A.Sc., P.Eng., General Manager

DATE: September 16, 2016

SUBJECT: **Merchant Discount Fees for RDC Credit Card Payments**

INFORMATION REPORT

ORIGIN

October 2014 Nova Scotia Utility And Review Board Decision – Permission to Accept Merchant Discount Fees for Credit Card Payments for Development Related Charges Paid Through HRM Customer Service Centres.

BACKGROUND

In July 2014, the Nova Scotia Utility and Review Board (NSUARB) approved the implementation of Regional Development Charges (RDCs) for Water and Wastewater. RDCs are paid by developers and property owners for new construction. RDCs are primarily collected by Halifax Regional Municipality (HRM) with other permit fees and are remitted to Halifax Water monthly.

In October 2014, HRM began implementation of a credit card payment system for permit payments and the NSUARB granted interim approval of the payment of RDCs via the same system. The objective of the implementation was to enhance convenience and service to permit payers. The NSUARB requested a report be filed annually on usage and costs associated with the system.

DISCUSSION

HRM implemented the credit card payment system in the 2014/15 fiscal year. HRM fully absorbed the implementation cost and began invoicing Halifax Water for the merchant discount fees associated with the payments in April 2015.

At the time the interim approval was granted, the merchant discount rate was not yet known, though a rate between 2% and 3.5% was anticipated. Total RDCs of up to $9 million per year were anticipated, with between 10% and 50% expected to be paid by credit card. Thus an annual cost between $18,000 and $157,500 in merchant discount fees was anticipated.

The actual RDCs collected, actual paid by credit card, and the merchant discount fees incurred in the 2015/16 fiscal year are as follows:

RDC Total	RDCs paid by credit card	Percentage paid by credit card	Average Discount Rate	Merchant Discount Fees
5,012,522.98	1,178,683.68	23.5%	2.00%	23,619.97

By comparison, Halifax Water estimated it would cost $172,878 to implement its own process to administer collection of development permits and it would incur a $70,000 annual cost.

Report Prepared by: *Original Signed By:*

Warren Brake, B.Comm, CPA, CGA, Manager, Accounting, 490-4814

Halifax Water
Halifax Regional Water Commission

ITEM # 8-I
HRWC Board
September 29, 2016

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, Director, Corporate Services

APPROVED: *Original Signed By:*
Carl Yates, M.A.Sc., P.Eng., General Manager

DATE: September 20, 2016

SUBJECT: **Halifax Regional Water Commission Employees' Pension Plan**

- **2016 Budget, and**
- **2nd Quarter, 2016 – Financial Report**

INFORMATION REPORT

ORIGIN

As an initiative for 2016, the Halifax Regional Water Commission Employees' Pension Plan (hereinafter called the "Plan") administration has prepared a budget, and are proposing to report on a quarterly basis, the unaudited financial results of the Plan to the Board. Budgets have not been prepared in the past, nor has there been reporting of this nature regarding the Plan's financial results, other than the Board approval of the annual, audited financial statements.

BACKGROUND

None

DISCUSSION

The attached Statement of changes in net assets available for benefits outlines the annual budget for the Plan, in addition to the financial performance to the end of the 2nd quarter of 2016 (January 1 to June 30, 2016).

2016 Budget:

For 2016, there is a budgeted decrease in net assets available for benefits of approximately $0.5 million, from $100.4 million to $100.0 million. The decrease is partially the result of a projected decrease in revenue, specifically in the fair value of investment assets for 2016 in the amount of $3.6 million. This estimate is based on early results for 2016 of the Halifax Regional Municipality (HRM) Master Trust. This is contrary to actual results for 2014 and 2015, which reported increases in the fair value of investment assets of $7.3 million and $5.2 million respectively. Budgeted investment income is comparable to prior years.

A decrease in contributions is also contributing to the decrease in net assets available for benefits. Reported contributions for 2015 and 2014 were $8.9 million and $8.6 million respectively. Budgeted contributions for 2016 are $5.5 million, which reflects lower contribution rates for Plan members and the Plan sponsor, resulting from the actuarial valuation dated January 1, 2016. Plan amendments led to the decrease in contribution rates which saw current service rates for members move from 12.95% to 10.65%, and for the Halifax Regional Water Commission (HRWC) from 12.95% to 9.85%. In addition, special payments required by the HRWC to fund the unfunded liability were reduced to $0.8.million annually compared to the $3.0 million expensed in both 2015 and 2014.

Overall expenses are comparable to prior years, especially with respect to benefit payments, which are the major expense category. There was a spike in termination benefits in 2015 due to the resignation/termination of several long serving members, plus the payout of accrued transfer deficiencies withheld from members in prior years.

Nothing has been budgeted for reciprocal transfers in 2016 for fund transfer out of the Plan, or transfers into the Plan.

2016 Actual:

Results to the end of the 2nd quarter are outlined on the Statement of changes in net assets available for benefits attached. The overall change in net assets available for benefits for the period reports a minimal decrease in the amount of $18.0 thousand. Compared to the budgeted decrease for the year of $0.5 million, on a prorated basis the resulting variance is favourable in the amount of $0.2 million for the first six (6) months of 2016.

Revenue is affected directly by the performance of the HRM Master Trust, and change tends to be more volatile compared to contributions and expenses. Although reported revenue is in a negative position in the amount of $0.5 million, this compares favourably to the 2016 annual budget which is in a negative $1.6 million position. On a prorated basis overall revenue shows a favourable variance in the amount of $0.3 million, which is attributed to better than expected fund performance with respect to total investment

income and changes in the fair value of investment assets totaling $0.2 million and $0.1 million respectively.

Contributions are tracking as expected compared to budget, and showing a $52.0 thousand or 2% favourable variance compared to prorated budget amounts.

Overall expenses are higher than expected compared to the prorated budget for 2016, showing an unfavourable variance in the amount of $0.1 million. The major contributor to the unfavourable variance is termination benefits totaling $0.5 million for the period, which is currently 85% of the annual budget alone. This is the result of the retirement of several long serving members during the period. The higher costs associated with termination benefits is offset somewhat by favourable variances for benefit payments and actuarial/consulting fees, however expenditures in these areas are expected to increase throughout the remainder of the year with more members retiring and additional costs associated with work on required changes in the Plan text.

ATTACHMENT

Statement of changes in net assets available for benefits, for the six (6) month period ended June 30, 2016.

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
For the six (6) month period ended June 30, 2016
Benchmark *50%*

	2016						
			Prorated Budget	*Variance F(U)*		**Actual**	**Actual**
	Budget	**Actual**	*50%*	*$*	*%*	**2015**	**2014**
Revenue[1]							
Net investment income:							
Total investment income	$2,056,000	$1,199,767	*1,028,000*	*171,767*	*17%*	$2,350,179	$2,297,149
Investment manager fees	($151,000)	($67,770)	*(75,500)*	*7,730*	*-10%*	($188,555)	($175,227)
Increase (decrease) in the fair value of investment assets	($3,550,000)	($1,669,238)	*(1,775,000)*	*105,762*	*-6%*	$7,313,583	$5,156,004
	($1,645,000)	**($537,241)**	*(822,500)*	*285,259*	***-35%***	**$9,475,207**	**$7,277,926**
Contributions[2]							
Participants:							
Current service (inc AVC's)	$2,420,000	$1,236,990	*1,210,000*	*26,990*	*2%*	$2,655,143	$2,768,168
Reciprocal transfers	$0	$0	*0*	*0*	*n/a*	$598,383	$0
Sponsors:							
Current service (inc LTD)	$2,207,000	$1,128,204	*1,103,500*	*24,704*	*2%*	$2,741,953	$2,885,772
Unfunded liability	$825,000	$412,500	*412,500*	*0*	*0%*	$2,952,200	$2,952,200
	$5,452,000	**$2,777,694**	*2,726,000*	*51,694*	***2%***	**$8,947,679**	**$8,606,140**
Expenses[3]							
Benefit payments:							
Benefit payments	$3,524,000	$1,730,583	*1,762,000*	*31,417*	*2%*	$3,246,032	$3,020,172
Termination payments	$550,000	$466,610	*275,000*	*(191,610)*	*-70%*	$1,021,997	$475,930
Death benefit payments	$0	$0	*0*	*0*	*n/a*	$0	$9,188
Administrative:							
Actuarial & consulting fees	$170,000	$32,195	*85,000*	*52,805*	*62%*	$134,296	$148,865
Audit & accounting fees	$9,000	$0	*4,500*	*4,500*	*100%*	$660	$8,584
Bank custodian fees	$23,000	$13,244	*11,500*	*(1,744)*	*-15%*	$21,567	$21,423
Insurance	$8,000	$0	*4,000*	*4,000*	*100%*	$7,950	$7,950
Miscellaneous	$13,000	$7,568	*6,500*	*(1,068)*	*-16%*	$11,641	$10,050
Professional fees	$20,000	$8,237	*10,000*	*1,763*	*18%*	$18,313	$13,542
Registration fees	$2,000	$0	*1,000*	*1,000*	*100%*	$2,074	$2,040
Training (Trustees/ Administration/ Pension Committee)	$8,000	$0	*4,000*	*4,000*	*100%*	$0	$0
	$4,327,000	**$2,258,438**	*2,163,500*	*(94,938)*	***-4%***	**$4,464,530**	**$3,717,744**
Increase (decrease) in net assets available for benefits	**($520,000)**	**($17,985)**	*(260,000)*	*242,015*	***-93%***	**$13,958,356**	**$12,166,322**
Net assets available for benefits, beginning of period	**$100,434,444**	**$100,434,444**				**$86,476,088**	**$74,309,766**
Increase (decrease) in net assets available for benefits	**($520,000)**	**($17,985)**				**$13,958,356**	**$12,166,322**
Net assets available for benefits, end of period	**$99,914,444**	**$100,416,459**				**$100,434,444**	**$86,476,088**

Note:

1 *Budgeted amounts for revenue are derived by annualizing the amounts reported on the unitization reports for the five (5) month period ended May 31, 2016.*

2 *Budgeted amounts for contributions are derived by using the actual amounts remitted for the five (5) month period ended May 31, 2016, then adding forecasted amounts for the remainder of the year, as reported in the annual contribution planner filed with the trustee.*

Actual contributions for the period have been adjusted to reflect contribution rate changes made in May, 2016, retroactive to January 1, 2016. Current contribution rates are 10.65% and 9.85% respectively for employees and the employer, which were reduced from 12.95% previously for each. This retroactivity also applied to the special payments made by the employer related to the unfunded liability, resulting in a reduction to $0.8 million per annum from $2,8 million.

3 *Budgeted amounts for benefit payments are derived by using the actual amounts paid to pensioners for the seven (7) months of the year, then adding an estimated amount for the remainder of the year based on actual benefit payments paid July 1, 2016. All other expenses are based on best estimates.*

For the purposes of this statement, expenses are reported on a cash basis.