WATER & SEWER RATE STUDY

SAINT JOHN

HEMSON Consulting Ltd.

November 2019

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EXECUTIVE SUMMARY

The City of Saint John provides quality drinking water from the South Bay Wellfield and Loch Lomond/Latimer Lakes. The water is then distributed through approximately 500 kilometres of distribution and transmission water pipes. The City has recently embarked upon the construction of a 75 million litre per day water treatment plant, the renewal and installation of 26 kilometres of water transmission/distribution mains, the renewal of 3 dams and the development of the new South Bay Wellfield at a cost upwards of $200 million to bring safe, clean drinking water to the citizens of Saint John. The construction of the water treatment plant titled the "Safe Clean Drinking Water Project" became operational in August 2018 to reduce the occurrence of boil water orders and service interruptions.

In 2008, the City of Saint John undertook a water and sewer rate study to analyze the full cost of providing services, and the results of this study form the basis for which the City bills its customers today. The City of Saint John has not completed a thorough review of their water and sewer rates since 2008 and there have been changes to the pattern of water consumption in the City. Furthermore, with the new water treatment plant now complete and operational, there will be an adjustment in the way the City delivers services to both residential and non-residential customers. These changes necessitate a review of the water rates for non-residential users, most notably large industrial users using non-potable (or raw water) which would also impact user rates for potable users.

Hemson was retained by the City of Saint John to undertake a comprehensive Water and Sewer Rate Study with a view of calculating utility rates under the City's existing rate structure and to examine the costs and benefits of universal metering in the City while evaluating the user rate implications under this scenario. This report only addresses the utility rates under the City's existing structure while an independent universal metering research report was issued under separate cover. The key goals of this assignment are as follows:

- Determine water consumption and sewer usage by different types of users;
- Estimate total anticipated water and sewer demand;
- Calculate rates that reflect full recovery of system operating costs;
- Calculate rates that reflect full recovery of capital infrastructure financing needs; and
- Establish reserves to fund the rehabilitation and replacement of infrastructure.

In undertaking the analysis, a long-term financial planning model covering a ten-year period from 2020 to 2029 was developed using the 2019 approved budget and 2020 draft budget to inform new utility rates for 2020.

With the Safe Clean Drinking Water Project now online, 2020 will represent a shift in service delivery. Historically, all costs and revenues for all users have been captured under the potable water budgets. The costs of providing east and west raw water services and the revenues generated for each are now recorded independently from the potable system. The table below summarizes the 2019 consumption and billing for each customer relative to the new billing structure moving forward. It should be noted that all east and west industrial customers will transition to raw water based rates in 2020. For the purposes of this report, 2020 is considered to be the first full year of raw water billing for all industrial customers.

Non-Residential Customer Transition – Potable System to Raw Water Billing		
Non-residential Potable Water Users	**2019 Consumption & Billing** [(1)]	**New Structure: 2020 Billing**
1. Irving Oil Ltd.	4,250,000 m^3 Potable Water Rates	New **East** Industrial Raw Water Rate
2. Irving Oil Ltd.	4,150,000 m^3 Special Agreement Rates	New **East** Industrial Raw Water Rate
3. Irving Pulp and Paper.	39,000,000 m^3 Potable Water and Special Agreement Rates	New **West** Industrial Raw Water Rate
4. Coleson Cove	625,600 m^3 Potable Water Rates	New **West** Industrial Raw Water Rate
5. Irving Paper (at the Flume)	3,123,000 m^3 Special Agreement Rates	New **East** Industrial Raw Water Rate
Assessment of 2019 consumption revenue* if customers maintained under one potable system *($000) (current state revenue)		***$6,641.2***

Note 1: 2019 represents anticipated consumption.

Using the 2019 approved budget as a base, the table below summarizes costs which can reasonably be allocated to the delivery of raw water to these customers. For the purposes of this study, all costs shown are to reflect the potable budget adjusted figures which relate to the costs of providing water services to the potable customers only. A separate rate model has been developed for City staff to use in calculating raw water rates for both the east and west industrial customers.

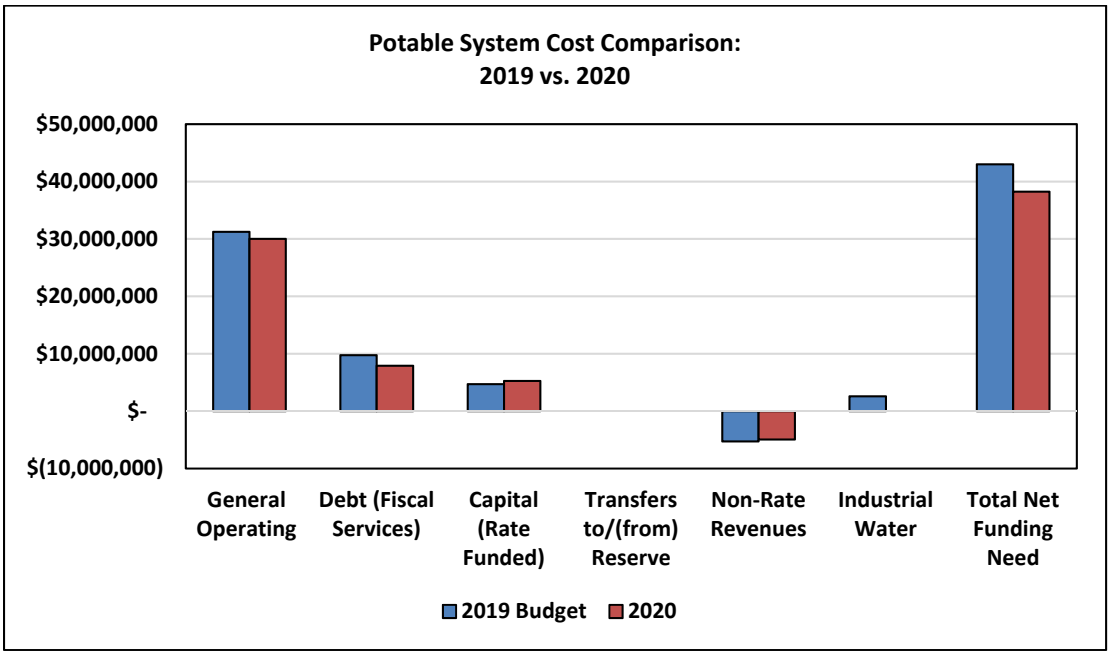
2019 Approved Water Budget Comparison ($000)				
	Base Budget	**Budget Raw Water**	**Budget Potable**	**Rationale and Description**
	2019	**2019**	**2019**	
1. General Operations:	$17,149.8	$0.0	$17,149.8	• All costs are related to the general delivery of potable water services
2. Industrial Water	$2,583.8	$2,583.8	$0	• Operating costs of $**2,583.8** associated with the supply of raw water to west and east industrial customers for recovery under the new industrial full cost rates. • These costs have historically been recovered from a combination of potable water and negotiated rates.
3. Corporate Administration	$1,523.3	$0.0	$1,523.3	• All costs are related to the general delivery of potable water services. • Corporate Administration costs are allocated within the industrial water category
4. Fiscal Charges (Debt)	$6,159.3	$1,697.6	$4,461.7	• Debt servicing costs of about **$1,697.6** associated with the west and east Industrial systems have been allocated to those specific users and removed from the city-wide potable rate calculations. • These costs have historically been recovered from a combination of potable water and negotiated rates.
Total Operating Costs	**$27,416.2**	**$4,281.4**	**$23,134.8**	
Costs Transferred from base uniform Potable System budget to Industrial System Recovery (1 + 2 + 3 + 4):				**$4,281.4**
Total Revenue if maintained under one potable system (and not charged raw water rates)				**$6,641.2**
Net Surplus/(Shortfall)				***($2,359.8)***

Note: Corporate Administration includes budget items such as infrastructure management (municipal engineering), additional post employment benefits and other internal charges

Considering the costs allocated to the industrial system from potable, the net shortfall to be recovered from existing potable users is about $2.3 million. It is important to note, additional capital costs, asset management and rate stabilization reserve transfers are accounted for in the raw water rate calculation, above the $4.3 million costs

associated to industrial users.[1] This ensures that the full cost of providing services to the raw water customers is reflected in the raw water rate calculations.

A summary of the full cost analysis is illustrated below and summarized as follows:



Note: 2019 approved budget includes the total city-wide potable and east and west industrial budgets. 2020 based on draft budget and reflects the adjusted potable budget only (i.e. east and west industrial costs are excluded).

- Despite the lower city-wide net rate funding requirement in 2020, the transition to raw water based user fees for industrial customers, from the city-wide potable rate calculation, would typically place additional pressure on the potable water user rates to cover the foregone revenue. With this said, the City has been planning for this change in service delivery for a number of years and therefore the City is targeting to maintain the existing flat rate charges in 2020.

- The required water and sewer user rate revenue from the potable system in 2020 is forecast to be $38.2 million ($22.0 million and $16.2 million respectively). This is the amount of revenue which must be collected through the sale of potable water and the sewerage surcharge to fully recover the operating, capital, rehabilitation and replacement costs of the systems.

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[1] *Detailed calculations for east and west industrial rates are provided in the standalone documents: East Saint John Industrial Raw Water Rate Report and West Saint John Industrial Raw Water Rate Report.*

- Over the long-term, it is expected the net rate funding requirements for both the City's water and sewer system are to increase at an average rate of 2.3% per annum (with 2020 at 0%), similar to the long-term average increase in operational expenditures. It is projected that the water and sewer net rate funding requirements will increase to $27.1 million and $20.3 million respectively by 2029.

- The City is committed to continuing to explore initiatives in an effort to maintain and improve services while reducing costs – such savings have been incorporated into the analysis and estimated to be $100,000 per year and calculated on a cumulative basis starting in 2021.

In order for the City to recover the costs associated with providing these services, necessary adjustments to the utility rates are required. The table below provides a summary of the calculated 2020 utility rates required under the existing rate structure.

2019 Current Rates vs. Calculated 2020 Rates				
All Accounts	**Water 2019**	**Sewer 2019 (122% of Water)**	**Water 2020**	**Sewer 2020 (81% of Water)**
Metered: Fixed Charge: $/Month				
5/8"	$18.03	$22.00	$22.20	$17.97
3/4"	$22.07	$26.93	$27.17	$22.00
1"	$30.14	$36.77	$37.10	$30.04
1 1/2"	$39.63	$48.35	$48.79	$39.50
2"	$79.06	$96.45	$97.32	$78.80
3"	$164.29	$200.43	$202.24	$163.74
4"	$285.71	$348.57	$351.71	$284.76
6"	$449.02	$547.80	$552.75	$447.52
8"	$645.20	$787.14	$794.25	$643.05
10" and over	$873.83	$1,066.07	$1,075.70	$870.92
Consumption Charge: $/m³				
Tier 1: 0 – 50m³/month	$1.6123	$1.9670	$1.9848	$1.6069
Tier 2: > 50m³/month	$1.0267	$1.2526	$1.2639	$1.0233
Non- Metered: Fixed Charge: Per Month	$53.58	$65.42	$65.76	$53.24

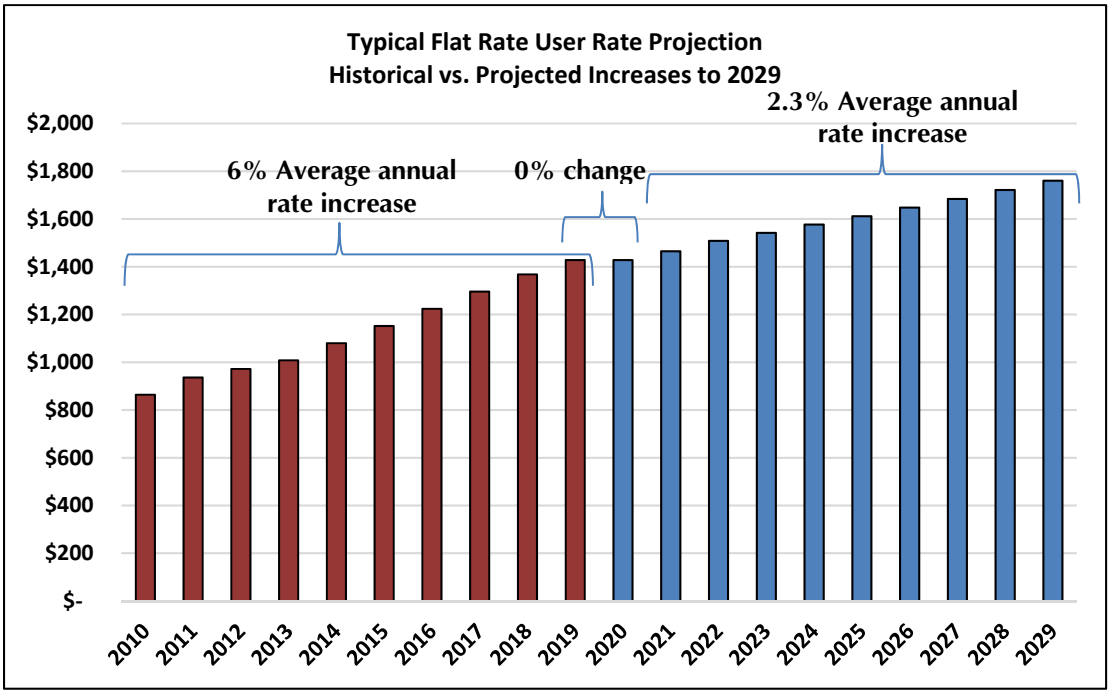
Note: The third consumption tier is eliminated and further explained in section V of this report.

In order to test the impact of the new rates on the City's residents and businesses, a sensitivity analysis was undertaken to quantify the range of rate impacts to both the residential and non-residential properties in the City. The results of the sensitivity analysis is illustrated below.

Comparison of Water and Sewer Charges per Typical Household Current vs. Calculated (Per Annum)			
	2019 Existing	**2020 Calculated**	**Change ($)**
1. Water	$643	$789	+ $146 (+22.7%)
2. Sewerage	$785	$639	- $146 (-18.61%)
3. Total Water + Sewer	**$1,428**	**$1,428**	**+ $0 (+0.0%)**

As rate adjustments are applied uniformly to all customer classes, metered properties serviced by both water and sewer will experience a similar rate change to those flat rate users identified above, regardless of the amount of water consumed. The exception rests with properties serviced only by water – rate changes are more significant as those users would not see the benefit of the decreased sewerage surcharge. Overall, the properties who are serviced only by water will see a rate increase upwards of about 23% in 2020 only. It is anticipated that users who see an increase of that magnitude is limited to less than 2% of all connections and represent about 8.5% of all potable water revenue generated. Furthermore, approximately two-thirds of the water only customers in this category are relatively low volume users with consumption only in Tier 1 and the calculated 2020 rates translate into an increase of about $12 per month over the existing rates.

The overall rate impact, per year, is anticipated to be lower than the annual rate adjustments implemented in recent years. The figure below indicates that the cumulative rate increase for customers receiving both water and sewerage services is expected to be around 2.3% per annum post 2020 (with 2020 at 0%), which is less than half of the average annual rate increases experienced over the last 10 years which were ultimately driven by the harbour clean-up and the Safe, Clean Drinking Water Project. Overall, the City has been fiscally responsible in preparing for the completion of the treatment plant as well as the transition in service delivery for raw water and potable water customers.



Note: Red Bars relate to historical period and blue bars relate to forecast. Total Household charge for users receiving both water and sewerage services.

Staff have been provided with the utility rate setting full costing model to monitor costs and revenues and assist with future rate updates. As part of its process for updating rates:

- It is recommended the City undertake a comprehensive fee review every three to five years to ensure that a nexus between costs and revenues is maintained over time; and

- Both residential and non-residential trends should be monitored closely.

I BACKGROUND AND STUDY OBJECTIVE

A. BACKGROUND

The City of Saint John is centrally located on the southern New Brunswick coast on the Bay of Fundy. The City is the second largest in New Brunswick with a current population of approximately 68,000 persons and 33,800 households.

The City of Saint John provides quality drinking water from the South Bay Wellfield and Loch Lomond/Latimer Lakes. The water is then distributed through approximately 500 kilometres of distribution and transmission water pipes. The City has recently embarked upon the construction of a 75 million litre per day water treatment plant, the renewal and installation of 26 kilometres of water transmission/distribution mains, the renewal of three dams and the development of the new South Bay Wellfield at a cost upwards of $200 million to bring safe, clean drinking water to the citizens of Saint John. The construction of the Loch Lomond drinking water treatment facility was completed in summer 2018 and began servicing the city on August 30th 2018 to reduce the occurrence of boil water orders and service interruptions.

In 2008, the City of Saint John undertook a water and sewer rate study to analyze the full cost of providing services, and the results of this study formed the basis for which the City bills its customers today. The City of Saint John has not completed a thorough review of their water and sewer rates since 2008 and there have been changes to the pattern of water consumption in the City. Furthermore, with the new water treatment plant now complete and operational, there will be an adjustment in the way the City's existing large industrial customers are billed for water services – these industrial customers moving forward will be billed for raw water while historically they have been billed potable water rates or special negotiated user rates in which the revenue was used to offset system-wide expenditures. It is in this context that the City of Saint John initiated a water and sewer rate study.

B. STUDY OBJECTIVE

Hemson was retained by the City of Saint John to undertake a comprehensive Water and Sewer Rate Study with a view of calculating utility rates under the City's existing rate structure and to examine the costs and benefits of universal metering in the City.

Universal metering measures the volume of water consumption for every household/business in the specified area through the installation of water meters that use a meter-based billing practice. The universal metering exercise is intended to provide the City with information necessary to inform future decisions of metering all properties in the City.

The objective of this report is to review and recommend new water and sewer rates that address the full cost of providing services under the City's existing rate and billing structure. The utility rate analysis and long-term projection of rates under a universal metering scenario was issued as a standalone report under separate cover.

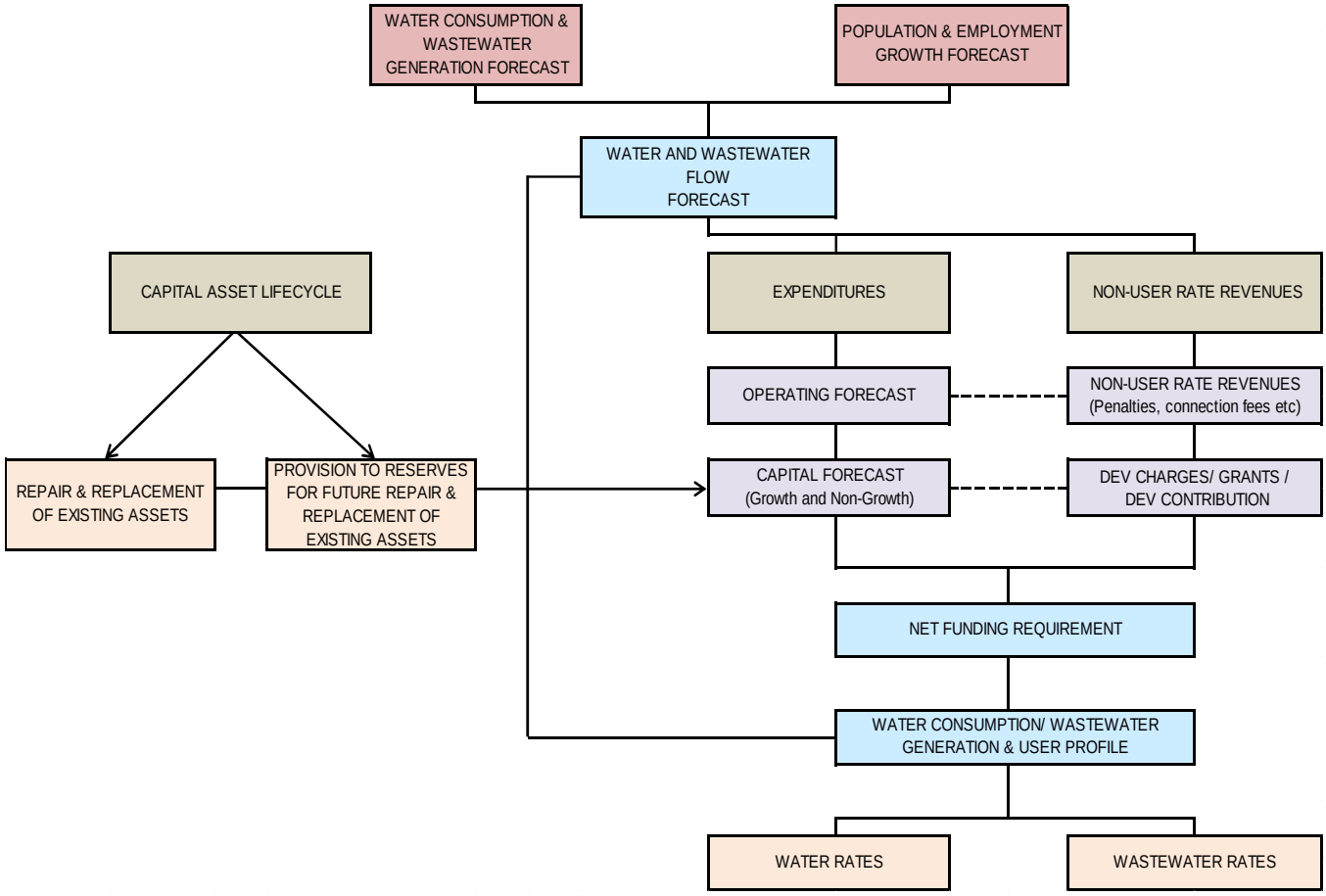
The first step in a study of this nature is to establish a population and household forecast, as this is the basis for determining anticipated water consumption and sewer generation levels. The study examines the period from 2020 through 2029, using the 2019 approved budget and 2020 draft budget to inform new utility rates for 2020.

Following the demographic analysis, the current water and sewer rates, reserves and annual operating and capital budgets are analyzed. Based on this analysis, the financial position of the City's water and sewer systems is determined.

The next step in the study process is to examine the existing rate structure and provide recommendations for change. It should be noted that alternative rate structure and funding scenarios have been tested under a universal metering exercise and those results are identified under separate cover. The final step in the process is to evaluate the impacts of implementing the proposed rate structure and resulting full cost recovery rates to the residents and businesses of the City.

In undertaking this analysis, a financial model was developed and serves as a dynamic rate setting tool. Using the model, the City is able to perform sensitivity analyses of water and sewer rates, rate structure and also phase-in options. The model includes future capital expenditure requirements and projects future operating and maintenance costs. It also calculates the water and sewer rates necessary to recover the full costs of the City's water and sewer systems. The utility rate model also ties in the raw water rate setting models for the east and west industrial customers to ensure all operating and capital costs are properly recovered. The following diagram (Figure 1) illustrates the overall approach.

Figure 1
Utility Rate Setting Model



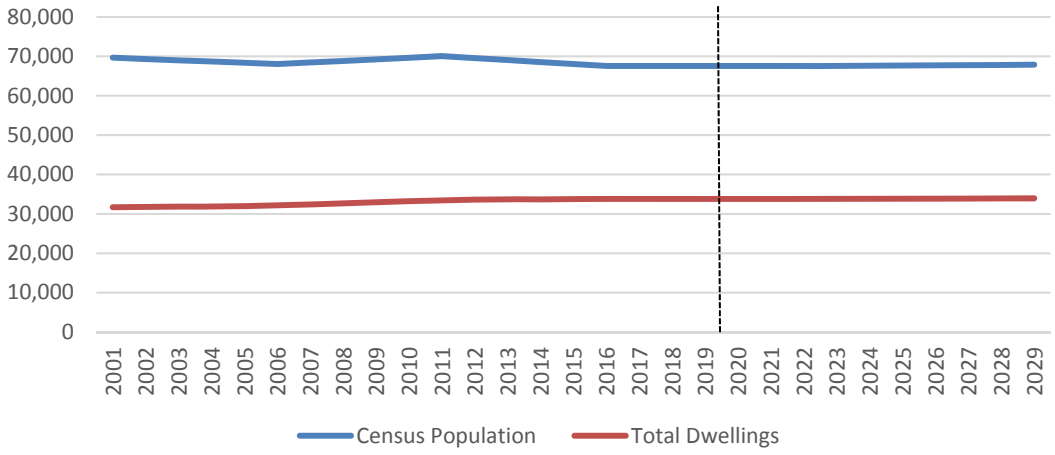
II DEMAND ANALYSIS

Future costs of the City's water and sewer system will largely be driven by demands placed on the system by water consumers. A forecast of future consumption demands must therefore be developed.

A. GROWTH FORECAST

The population and household projections used in this study were based on the City's forecast of new connections. The City's current census population of approximately 67,600 persons is expected to remain fairly constant, increasing modestly to 67,900 persons by 2029. Even with the relatively flat population due to declining household sizes, 150 new households over the same period is expected and all new units will be in the City's urban areas serviced by water and sewer. By 2029, the City will have nearly 34,000 households. Figure 2 below illustrates the projected population and growth in households over the planning period.

Figure 2
Population and Household Forecast



Source: Hemson Consulting Ltd. based on City of Census information and City data

B. METERED CONNECTIONS

The first step in the utility rate calculation is to project the number of new connections anticipated to be connected to water and sewer services over the next ten-years (2020-2029). The estimated growth in the total number of water and sewer connections over the forecast period to 2029, was informed through discussions with City staff and a review of historical growth patterns.

In the City of Saint John, most residential water and sewer customers are billed a flat rate water charge (with no volumetric charge), as this group does not have water meters. Most non-residential customers are water meter equipped and billed on a flat rate charge based on meter size, and a volumetric charge based on consumption. Furthermore, sewer generation is billed based on water consumption, however not all water service customers in the City receive sewer services. As a result, there are less billable sewer connections than billable water connections. For these reasons, separate forecasts for billable water and sewer connections have been prepared. This section outlines the assumptions used in the metered connection forecast.

1. Water Service Connections

The City's billable water connections have been forecast for both metered users and flat rate users separately.

In the City, virtually all metered connections are associated with non-residential and multi-residential customers. As of year-end 2018, there were approximately 3,100 metered connections. Approximately 1,860 customers are equipped with a 5/8" meter, which represents about 60% of total metered connections. New non-residential development is often difficult to predict and therefore for the purposes of this study, no growth in overall metered connections is assumed over the ten-year period (Table 1).

Table 1 Metered Water Connections			
Water Meter Size	**2019 Connections**	**2029 Estimated Connections**	***Growth 2019-2029***
5/8"	1,856	1,856	0
3/4"	155	155	0
1"	432	432	0
1 1/2"	284	284	0
2"	272	272	0
3"	57	57	0
4"	26	26	0
6"	13	13	0
8"	3	3	0
10" and over	6	6	0
Total Metered Connections	**3,104**	**3,104**	**0**

Flat rate connections, including customers who do not have a water meter, are billed relative to the number of units on each connection without regard to consumption. Virtually all flat rate connections in the City are associated with residential customers. As of year-end 2018, there was 16,000 billable flat rate connections – of this total, a very small share of customers receive servicing in their neighbourhoods but are not connected to the system. Similar to historical trends, only a marginal amount of growth is anticipated over the next ten years – 175 new billable connections are anticipated over the planning period to 2029 (Table 2).

Table 2 Flat Rate Water Billable Connections (Unmetered)			
Billable Units	**2019 Connections**	**2029 Estimated Connections**	***Growth 2019-2029***
Flat Rate Connections	15,995	16,170	175
Flat Rate Serviced Unconnected	29	29	0
Total	**16,024**	**16,199**	**175**

2. Sewer Service Connections

The number of billable sewer connections have been forecast in a similar approach to water. As of year-end 2018, there is approximately 2,990 sewer connections that have their water service metered in the City, with the majority of connections (about 60%) equipped with a 5/8" meter. For comparison, 96% of water metered users are also connected to sewer services. Similar to the water connection forecast, for the purposes of this study, no growth in overall sewer connections is assumed over the ten-year period (Table 3).

Table 3 Sewer Connections			
Water Meter Size	**2019 Connections**	**2029 Estimated Connections**	***Growth 2019-2029***
5/8"	1,800	1,800	0
3/4"	160	160	0
1"	422	422	0
1 1/2"	273	273	0
2"	248	248	0
3"	54	54	0
4"	24	24	0
6"	7	7	0
8"	3	3	0
10" and over	3	3	0
Total	**2,994**	**2,994**	**0**

As of year-end 2018, there were approximately 15,890 flat rate connections in the City, with a small portion of less than 1%, associated to customers who receive servicing in their neighbourhoods but are not connected to the sewer system. Similar to historical trends, only a marginal amount of growth is anticipated over the next ten years – 175 new billable connections are assumed over the planning period to 2029 (Table 4).

Table 4 Flat Rate Sewer Connections (Unmetered)			
Billable Units	**2019 Connections**	**2029 Estimated Connections**	***Growth 2019-2029***
Flat Rate Connections	15,876	16,051	175
Flat Rate Serviced Unconnected	16	16	0
Total	**15,892**	**16,067**	**175**

C. WATER CONSUMPTION FORECASTS

The water demand forecast over the planning period of 2020-2029 was developed using actual metered consumption data with consideration of the trends observed in the most recent year-end figures (as of 2017) and ongoing non-residential water conservation measures.

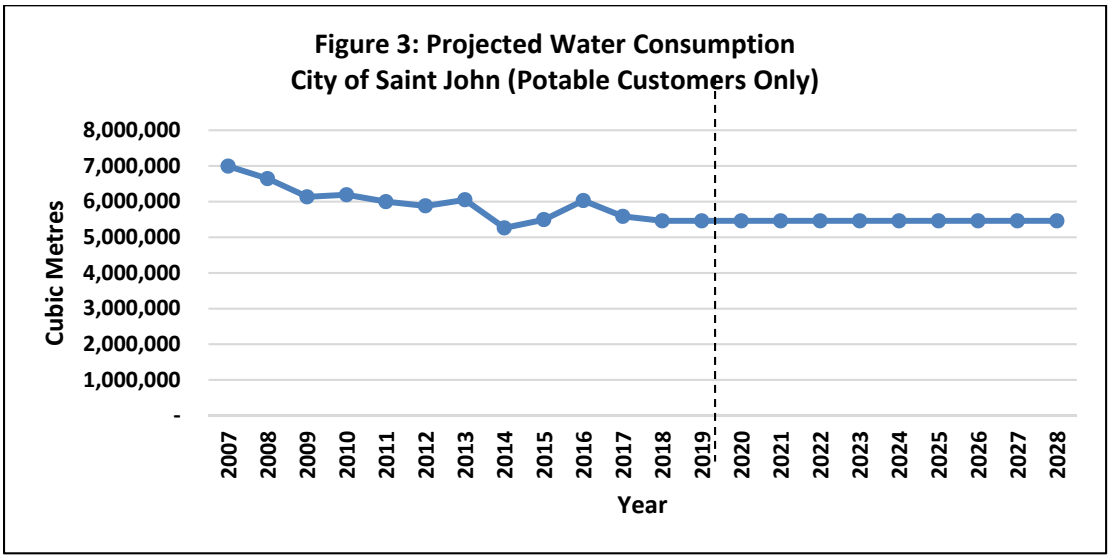
The forecasts of consumption have been prepared relative to the three areas receiving water services: city-wide potable water, west and east industrial raw water supply. The sections that follow summarize the total billed consumption assumed under the potable system. Table 5 below describes what types of users are included in each category, although, only the potable water usage component is included in the rate calculations under this report.

Table 5 Consumption Categories		
User Type	**Description**	**2019 Billed Consumption Projection**
Potable Water System	• Includes all non-residential potable water consumption and excludes raw water associated with the west and east industrial categories described below. • Does not include any consumption associated with residential users currently charged a flat rate. No water meters are presently equipped for these users.	5,460,000 m^3
West Industrial	• Consumption associated with raw water provided to specific industrial customers. • Includes raw water suppled to Irving Pulp and Paper and Coleson Cove.	39,625,600 m^3
East Industrial	• Consumption associated with raw water provided to specific industrial customers. • Includes raw water suppled to the Flume (Irving Paper) and the Irving Oil Refinery.	11,523,000 m^3
Total Consumption		**56,608,600 *m^3***

In our most recent water and sewer rate studies, we have found that customer profiles have been changing over time: generally, water consumption patterns have been declining, even with the addition of new residential and non-residential connections – similar to the trend seen in jurisdictions across Canada. For the non-residential sector, the reduced level of water consumption can largely be related to initiatives by industrial/commercial operations – non-residential users continue to adapt their business processes to be more efficient and environmentally friendly.

As illustrated in Figure 3 below, notwithstanding the uptick in non-residential (and multi-residential) water consumption in 2016, water consumption in the City has been declining since 2007. In this regard, metered consumption has declined from about 7.0 million m^3 in 2007 to about 5.5 million m^3 in 2017 while reaching a low in 2014 of 5.2 million m^3. For the purposes of this study, consumption has been moderated and maintained at about 5.46 million m^3 per annum over the planning period. This forecast recognizes that there will likely continue to be shifts in total billed water year-over-year but overall indicative of future trends. Unlike water consumption, sewer flows are not metered. For the purposes of this analysis, sewer flows were assumed to be equivalent to water flows for the serviced connections. This assumption allows for an equitable distribution of the sewerage system costs to users.

Figure 3 below illustrates the forecast of metered[2] water throughout the planning period to 2029. In 2020, the City is anticipated to bill approximately 5.46 million m^3 of water. It is important to note that these figures only recognizes consumption associated with potable water customers – those industries which are moving to industrial raw water based systems are considered separately.



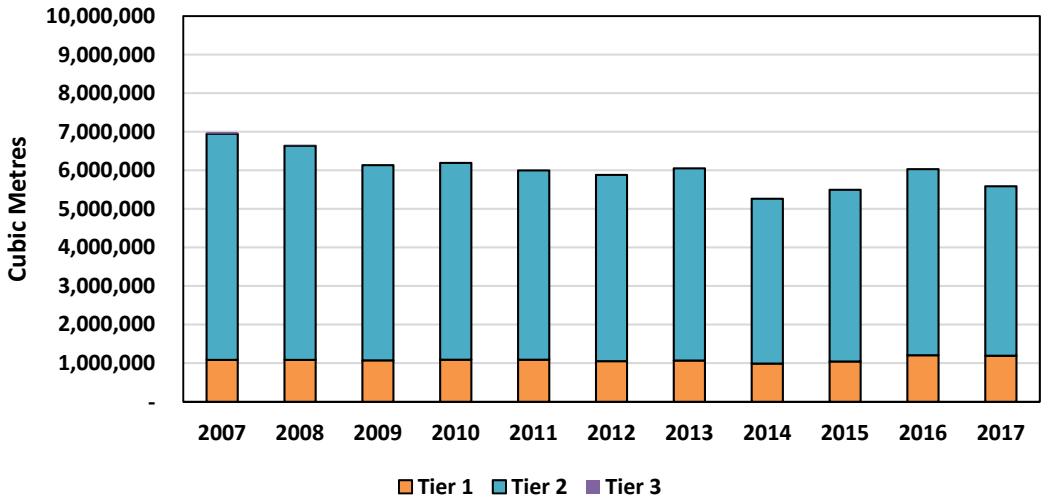
Note: Projected billed consumption is related only to the City of Saint John Potable Water Systems and excludes the consumption from those customers who will receive raw water on both the east and west industrial system (see Table 5).

Details regarding the connections and forecast of consumption for the water and sewerage systems are set out in the detailed rate calculations illustrated in Appendix A.

It is also important to note that of the total consumption, much of the billed water is only in Tier 1 and 2; no water consumption has been billed to Tier 3 since 2008 (Figure 4). For administrative purposes, it may be advisable to consider removing the third consumption tier from the rate structure.

[2] For the purpose of setting a utility rate, only the water that is billed to the end-user is incorporated into the analysis and used to calculate new utility rates. This is referred to as billable (or metered) water.

Figure 4
Saint John Water Consumption by Tier, 2007-2017



D. WATER CONSUMPTION ADJUSTMENTS

With the new treatment plant now online, separation of the potable and industrial water supply is now possible, thereby requiring an adjustment in the way the City delivers services to both residential and non-residential customers. These changes necessitate a review of the water rates for non-residential users, most notably large industrial users using non-potable (or raw water) which will also have an impact on potable user rates. These customers moving forward will be billed for the full cost of providing raw water while historically these customers have paid potable water rates or special negotiated user rates in which the revenue was used to offset system-wide expenditures. Table 6 below summarizes projected 2019 consumption and billing for each customer relative to the new billing structure in 2020. It should be noted that all east and west industrial customers will transition to raw water based rates in 2020. For the purposes of this report, 2020 is considered to be the first full year of raw water billing for all industrial customers.

Table 6 Non-Residential Customer Transition – Potable System to Raw Water Billing		
Non-residential Potable Water Users	**2019 Consumption & Billing** [(1)]	**New Structure: 2020 Billing**
1. Irving Oil Ltd.	4,250,000 m^3 Potable Water Rates	New **East** Industrial Raw Water Rate
2. Irving Oil Ltd.	4,150,000 m^3 Special Agreement Rates	New **East** Industrial Raw Water Rate
3. Irving Pulp and Paper	39,000,000 m^3 Potable Water and Special Agreement Rates	New **West** Industrial Raw Water Rate
4. Coleson Cove	625,600 m^3 Potable Water Rates	New **West** Industrial Raw Water Rate
5. Irving Paper (at the Flume)	3,123,000 m^3 Special Agreement Rates	New **East** Industrial Raw Water Rate

Note 1: Consumption projection is based on historical activity

Overall, the changes associated with the customers transitioning to raw water based fees, and removed from the city-wide potable rate calculation, are expected to result in revenue loss of about $6.6 million on the potable system (Table 7). Despite the loss in revenue, approximately $4.3 million in costs are being allocated to the industrial systems for recovery and therefore removed from the potable rate calculation. After considering the costs allocated to the industrial system from potable, the net shortfall to be recovered from existing potable users is about $2.3 million. It is important to note, additional capital costs, asset management and rate stabilization reserve transfers are accounted for in the raw water rate calculation, above the $4.3 million costs associated to industrial users.[3] This ensures that the full cost of providing services to the raw water customers is reflected in the raw water rate calculations.

It is important to note that none of these customers are receiving sewer services from the City and therefore this change in service has no effect on the sewer surcharge calculations.

[3] *Detailed calculations for east and west industrial rates are provided in the standalone documents: East Saint John Industrial Raw Water Rate Report and West Saint John Industrial Raw Water Rate Report.*

Table 7 Assessment of Foregone Revenue for Customers Transitioning to Raw Water Based Billing		
Customer	**2019 Projected Billed Consumption (m^3)**	**Total Revenue if maintained under one potable budget structure ($000)**
Irving Pulp and Paper (potable)	1,636,000	$1,589.8
Coleson Cove (potable)	625,600	$642.7
Irving Oil Ltd. (potable)	4,250,000	$2,536.9
Sub-total	**6,511,600**	**$4,769.4**
Plus: Special Agreement Revenue [(1)]	*44,637,000*	*$1,871.8*
Total	**51,148,600 m^3**	***$6,641.2***

Note 1: Special Agreement Revenue is made up of IOL and IPP special rates

III OPERATION AND MAINTENANCE COSTS

The total revenue the City needs to collect through user rates is calculated by netting off the non-user rate revenues from total expenditures.

A. OPERATING EXPENDITURES

The City of Saint John utility systems are operated in accordance to provincial legislation that strives to assure safety, quality and reliability. The City of Saint John operation and maintenance costs are comprised of four distinct components for the purposes of this report:

1. General Operations: treatment, pumping, storage, metering, distribution, etc.;
2. Fiscal Charges (Debt servicing costs incurred);
3. Industrial Water; and
4. Corporate Administration: municipal engineering, internal charges and post employment benefits.

As a result of the transition of the City's existing large industrial customers to a raw water based billing structure, a share of the City's costs have also been allocated for recovery by these customers. These costs have historically been captured under the potable water budgets. The costs of providing east and west raw water services and the revenues generated for each are now recorded independently from the potable system. Table 8 below provides a summary of the 2019 operating costs which can reasonably be allocated to the delivery of raw water to these customers. For the purposes of this study, all costs shown reflect the potable budget adjusted figures, which relate to the costs of providing water services to the potable customers only.

The in-year rate funded capital requirements (from operating) and transfers to reserves are identified separately and can be found in Section IV of this report.

Table 8 2019 Approved Water Budget Comparison ($000)				
	Base Budget	**Budget Raw Water**	**Budget Potable**	**Rational and Description**
	2019	**2019**	**2019**	
1. General Operations:	$17,149.8	$0.0	$17,149.8	• All costs are related to the general delivery of potable water services
2. Industrial Water	$2,583.8	$2,583.8	$0	• Operating costs of $**2,583.8** associated with the supply of raw water to west and east Industrial customers for recovery under the new industrial full cost rates. • These costs have historically been recovered from a combination of potable water and negotiated rates.
3. Corporate Administration	$1,523.3	$0.0	$1,523.3	• All costs are related to the general delivery of potable water services. • Corporate Administration costs are already allocated within the industrial water category
4. Fiscal Charges (Debt)	$6,159.3	$1,697.6	$4,461.7	• Debt servicing costs of about **$1,697.6** associated with the west and east Industrial systems have been allocated to those specific users and removed from the city-wide potable rate calculations. • These costs have historically been recovered from a combination of potable water and negotiated rates.
Total Operating Costs	**$27,416.2**	**$4,281.4**	**$23,134.8**	
Costs Transferred from base uniform Potable System budget to Industrial System Recovery (1 + 2 + 3 + 4):				**$4,281.4**

Note: Industrial raw water costs are allocated to east and west industrial systems.

After adjustments, total operating expenditures for the potable water system in 2019 is $23.1 million and anticipated to increase to $23.4 million by 2029. As the operational costs of the new treatment plant represent a significant share of total costs ($7.0 million or 30%), the cost projections outlined in this study should be monitored and compared to actuals regularly to ensure the City is generating sufficient revenues to cover expenses as the plant is a relatively new initiative.

The total operating expenditures for the sewer system in 2019 is $16.2 million and is expected to increase to $18.2 million by 2029. Overall, no fundamental changes in

the delivery of sewer services are expected, and therefore, the cost increases are largely driven by inflationary adjustments. Table 9 below summarizes the total operating expenditures for water and sewer services.

Table 9
Projected Operating Expenditures Potable System ($000)

	Potable Budget	Projected Costs	
	2019 [1]	2020 [2]	2029
Water Total	**$23,134.8**	**$21,586.1**	**$ 23,368.9**
General Operations [3]	*$17,149.8*	*$15,639.8*	*$18,375.5*
Fiscal Services (Debt)	*$4,461.7*	*$4,384.0*	*$3,098.4*
Industrial Water	*$0.0*	*$0.0*	*$0.0*
Corporate Administration	*$1,523.3*	*$1,562.3*	*$1,895.0*
Sewer Total	**$ 16,168.9**	**$16,333.6**	**$18,186.1**
General Operations	*$11,053.0*	*$11,285.5*	*$14,271.7*
Fiscal Services (Debt)	*$3,592.6*	*$3,512.8*	*$2,019.4*
Corporate Administration	*$1,523.3*	*$1,562.3*	*$1,895.0*

Note 1: Based on 2019 approved budget (some costs have been moved to industrial rate recovery)
Note 2: Based on draft 2020 budget.
Note 3: Includes Safe Clean Drinking Water Project costs

1. General Operating Expenditures

Using the City's 2019 approved operating budget and draft 2020 budget, most expenditures were increased annually at a rate of 2 percent to account for inflation. City contracts, salaries and utility rates were increased at higher rates to reflect historical trends. General water operating expenditures amounted to $17.1 million in 2019 and projected to increase to $18.4 million by 2029.

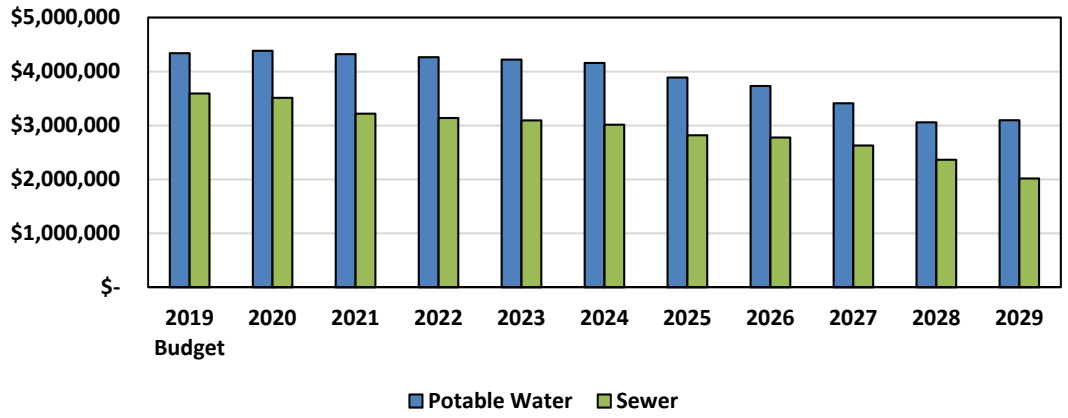
As the Safe Clean Drinking Water Project is completed and operational, it is expected that the City will experience some additional cost savings related to temporary personnel who will no longer be required now that the plant is functioning. Therefore, the City's general operating expenditures are cumulatively reduced by about $294,000 by 2022. The personnel savings are assumed to phase-in over a two year period with about $144,000 removed in 2021 and a further $150,000 in 2022. Furthermore, the City is committed to continuing to explore initiatives in an effort to maintain and improve services while reducing costs – such savings have been incorporated into the analysis and estimated to be $100,000 per year and calculated on a cumulative basis starting in 2021. The City continues to achieve operational efficiencies on an ongoing basis and therefore 2020 total operational costs are anticipated to be lower than 2019.

General sewer operating expenditures amount to $11.1 million in 2019 and are projected to increase to $14.3 million by 2029.

2. Debt - Principal and Interest Payments

The City is expected to have outstanding debt of approximately $88.3 million related to both the water and sewer systems by the end of 2020. The annual principal and interest payments associated with this debt are funded through the utility rates. The City is not planning to issue any further debt for capital related infrastructure investments over the next ten years, and as a result, total debt payments are anticipated to decline over the long-term. As debt is retired over the planning period, the City plans to increase the amount of funds contributed to reserves for future asset replacement. The annual debt payments (principal and interest) included in the calculations for the potable system and sewerage system are shown in Figure 5 below:

Figure 5: Projection of Debt Costs (Principal + Interest): Potable Water System Only and Sewer



Note: Principal and Interest payments associated with the Safe Clean Drinking Water Project are included

3. Industrial Water

Operating costs of $2.6 million, associated with the supply of raw water to west and east industrial customers, are identified in the 2019 approved budget. These costs have been reallocated to both the east and west industrial system, from the city-wide potable water system, for recovery under the new full cost rates. These costs have typically been funded by a combination of negotiated and potable water rates.

4. Corporate Administration

The Saint John Water approved 2019 budget also includes about $3.0 million of corporate administration costs which are identified independently from regular distribution, treatment, metering or debt related expenses. These costs relate to internal charges, infrastructure management and municipal engineering, as well as

additional post employment benefits and is allocated evenly (at $1.5 million each) between the water and sewerage system.

B. NON-USER RATE REVENUES

Non-user rate revenues are budget items which decrease the net operating budget and are not recovered through the City of Saint John's water or sewer user rates. Table 10 provides a summary of the forecast of non-rate revenues. Operating expenditures and non-user rate revenues for the water and sewer systems are set out in the detailed rate calculations illustrated in Appendix A.

The City is forecast to recover approximately $5.3 million in 2019 through non-user rate revenues for both the water and sewer system. Previous year's surplus funds are being phased out and removed starting in 2023 – for reference purposes about $981,000 in previous years' surpluses was used to offset the rate funding requirement in 2019 and is budgeted to be about $486,200 in 2020. Vacant building revenue has also been accounted for and amounts to $85,000 per year to 2029.

The Fire Protection and Stormwater Levies are treated as non-rate revenues. Fire protection is a service provided through the City's water distribution system and is therefore accounted in the net rate funding need for city-wide potable water services. Stormwater management services are associated with the City's sewer system and are accounted in the net rate funding requirement for sewer. Both levies are calculated based on shares of operating expenditures associated to each service, consistent with the City's yearly budgeting methodology. In 2019, the Fire Protection Levy amounts to $2.6 million and the Stormwater Levy amounts to $940,000.

Table 10 Non-Rate Revenues for Water and Sewer Services			
Description	**2019 Approved Budget**	**2020**	**2029**
Water Services			
Fire Protection Levy (Water)	$2,618,972	$2,521,321	$2,743,456
Other Revenues	$374,000	$506,250	$440,808
Previous Year's Surplus	$490,500	$243,105	$0
Vacant Building Revenue [(1)]	-	$0	$85,000
Sub-Total Water Services	**$3,483,472**	**$3,270,676**	**$3,269,264**
Sewer Services			
Stormwater Levy (Sewer)	$939,924	$937,795	$1,173,955
Other Revenues [(1)]	$374,000	$506,250	$440,808
Previous Year's Surplus	$490,500	$243,105	$0
Sub-Total Sewer Services	**$1,804,424**	**$1,576,684**	**$1,614,763**
Total Non-Rate Revenues	**$5,287,896**	**$4,957,826**	**$4,884,027**

Note 1: In 2019, vacant building revenue is included as a rate revenue. For transparency, this revenue has been reallocated to as non-rate revenue moving forward.

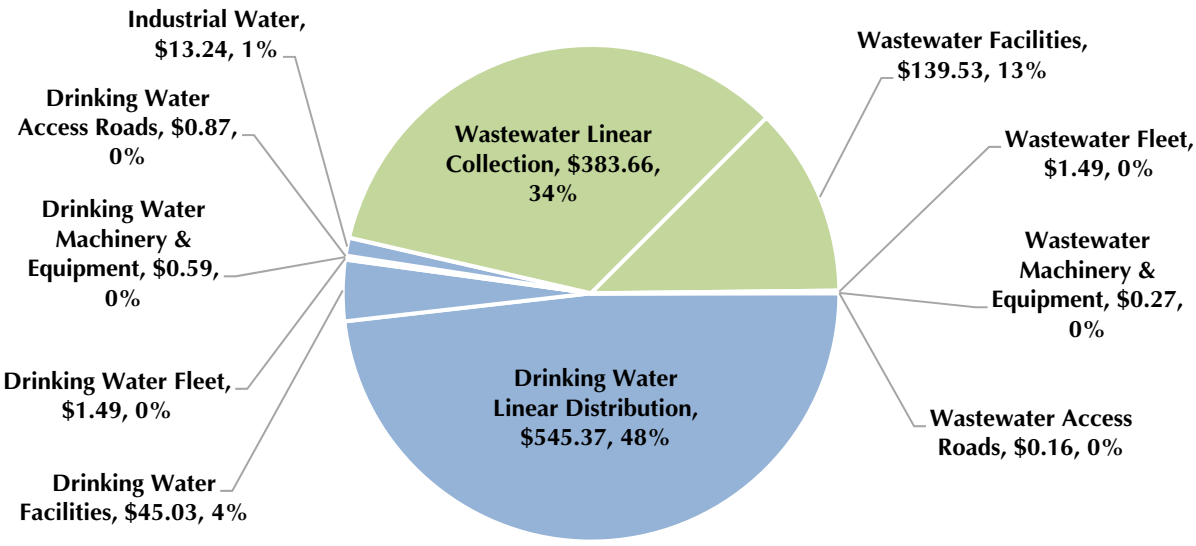
IV INFRASTRUCTURE AND CAPITAL

A. WATER AND SEWER INFRASTRUCTURE

The information contained in the analysis was gathered from the City's State of Local Infrastructure Report prepared in 2017, which is rooted in the City's existing tangible capital asset database. The information is used not only to describe, but also define the quantity, condition and replacement value of the existing infrastructure. The inventory was grouped into nine main asset categories, six of which relate to water servicing and the remaining to sewer servicing. It should be noted that as the City's asset management database is further developed, the updated information will better inform future analyses.

The City's entire water and sewer system has a replacement value of about $1.13 billion. Of this value, about 82 per cent, or $929 million, is related to the City's linear asset network (water distribution and sewer collection). Figure 6 below provides the breakdown, by category, of the replacement value of the infrastructure.

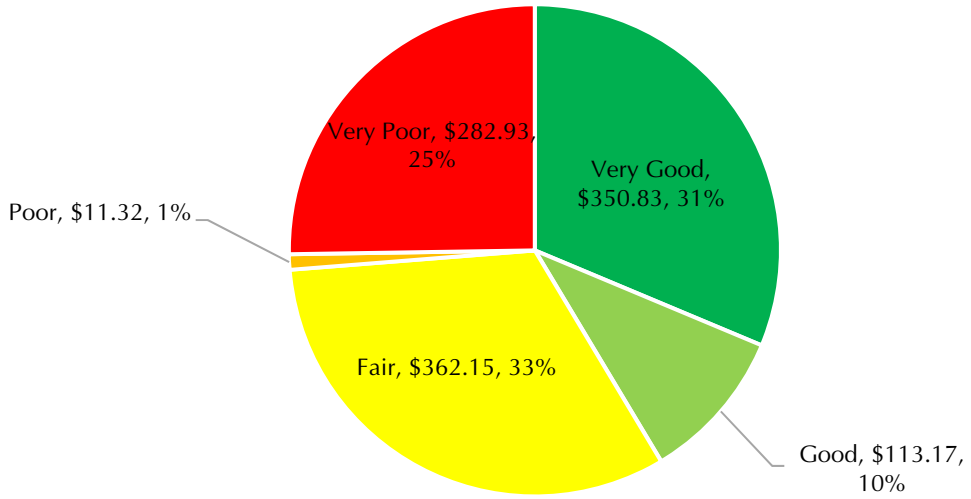
Figure 6:
Water and Wastewater Assets by Replacement Value



Source: City of Saint John 2016 State of the Infrastructure Report
Note: Water Asset Categories in Blue. Sewer Asset Categories in Green

The City's water and sewer infrastructure assets are overall considered to be in fair condition with about 33 per cent ($362.15 million) in fair condition, 31 per cent in very good condition ($350.83 million) and 10 per cent ($113.17 million) in good condition. About a quarter of the infrastructure is in poor or very poor condition, indicating that the City will likely be required to continue to invest in the repair and replacements of these assets as they continue to age and deteriorate. Figure 7 below illustrates the condition of the water and sewer system assets.

Figure 7
Saint John Water Distribution



Source: City of Saint John 2016 State of the Infrastructure Report

B. CAPITAL AND CONTRIBUTIONS TO RESERVE

The approved 2019 capital budget, Tangible Capital Asset (TCA) information and discussions with City staff were used as the basis for preparing the ten-year capital forecast. In addition to the in-year capital requirements, Hemson has included annual provisions to reserves, which would allow the City to prepare for the future repair and replacement of existing infrastructure.

1. Projected Capital Expenditures

Over the next ten-year period (2020-2029), infrastructure investments will be required to support new growth in the City and maintain the existing infrastructure network. In 2014, the City started to fund capital renewal out of the operating budget as a move to increase fiscal responsibility and reduce overall debt costs. The City has been making additional annual investments to the Safe Clean Drinking Water capital

asset reserve in recent years. In an effort to reduce the overall debt service pressure and drive positive returns in the long-term for all rate payers, the future in-year funded capital from operating is expected to be much lower than recent years. The table below illustrates the in-year funded capital (from operating) for Saint John Water, which includes both water and sewerage services over the last three budget years relative to the approved 2019 budget. Strategically, the reduction in capital from operating funding has been used to offset the new expenses associated with the Safe, Clean Drinking Water Project in 2019 – this transition has mitigated further impacts on rate payers. Moving forward, it is anticipated that the City will continue to undertake regular capital repair and replacement activities to maintain infrastructure in a state of good repair at similar funding levels to the 2019 approved capital budget, but adjusted for inflation. The annual capital costs are still expected to be funded from operating.

Table 11
Summary of Net Rate Funded Water and Sewer Capital Program ($000)

	2016 Approved Budget	2017 Approved Budget	2018 Approved Budget	2019 Approved Budget
Capital from Operating	$11,279.0	$12,725.0	$10,775.0	$4,700.0
Difference ($ and %)	-	*$1,446 or +13%*	*($1,950.0) or –15%*	*($6,075.0) or -56%*

As illustrated in Table 12, the total capital expenditures which the City will be responsible for funding is estimated at $58.8 million over the ten-year period. Overall, about 62%, or $36.5 million, of the infrastructure is required to support water services while the remaining $22.2 million is to support the sewer capital projects. It should be noted that the City does not anticipate any additional debt financing measures to fund the in-year capital expenditure requirements, therefore no additional principal and interest payments beyond the existing debt are included in the analysis. It is important to note that the figures noted below do not include any potential cost sharing or grant funding from upper levels of government, and therefore, any funds received will be applied towards further reducing the existing infrastructure deficit.

Table 12 Summary of Net Rate Funded Water and Sewer Capital Program ($000)	
	Cumulative Ten-year Capital 2020 – 2029
Water Services	$36,546.2
Sewer Services	$22,286.5
Total Net Rate Funded Capital Program (from Operating)	**$58,832.7**

Note: The allocation of capital expenses is based on the 2019 capital plan with costs allocated 60% water and 40% sewer over the longer term period to 2029.

2. Asset Repair and Replacement Provision

In addition to annual operating and maintenance costs, and in-year capital as discussed above, water and sewer infrastructure will require periodic rehabilitation and eventual replacement. Capital expenditures to carry out the rehabilitation and replacement of the aging infrastructure are not growth related and therefore would not receive funding through developer contributions. When assets require rehabilitation or are due for replacement, the source of funds are essentially limited to reserves or contributions from operating. In maintaining a user-pay approach, it is important for the City to build sufficient reserves for the scheduled replacement of infrastructure through contributions from operating.

Based on the City's Asset Management Plan and State of the Local Infrastructure Report, the average annual funding requirement to maintain the City's existing infrastructure is estimated at $17.8 million for water and $12.8 million for sewer services. A full cost approach is employed to calculate the annual reserve fund contributions and is recognized as a fair approach to charging customers for the use of these assets.

To mitigate an impractical increase of the user rates, contributions to the City's asset management reserve and infrastructure renewal related investments are phased in gradually over the analysis. By the end of the planning period, 2029, the City will be making more significant annual renewal investments and reserve contributions thereby providing a funding source for future infrastructure repair and replacement. The table below provides a snapshot of the total annual asset investment relative to the average annual sustainable funding requirement identified, by service, in 2029. The 2029 asset investment includes the in-year rate funded share of capital identified in Table 12 plus an additional allocation for future asset repair and replacement – the City will be at 29% of total sustainable investment requirement by the end of the period.

Table 13 Comparison of Annual Capital Investment vs. Sustainable Requirement by 2029 (in $000)			
Service	**2029 Asset Investment**	**2029 Sustainable Funding Need***	**% of Required Contribution**
Water	$6,994.7	$21,755.5	32%
Sewer	$3,735.8	$15,643.7	24%
Total	**$10,730.5**	**$37,399.3**	**29%**

Note: The sustainable annual funding requirements has been adjusted to account for inflation. The figure shown represents the sustainable investment in 2029 dollars.*

V RATE STRUCTURES

Various water and sewer rate structures are in place across Canadian municipalities. The varying rate structures include flat rates, constant rates, humpback block rates, declining and inclining block rates. Rate structures may also include fixed or minimum charges. The implementation of a particular rate structure depends on administrative and financial factors. Furthermore, it is also important to recognize that the rate structure is also dependent on whether the end-users are equipped with a water meter.

A. BACKGROUND

The City of Saint John provides potable water to about 14,000 residential accounts and about 3,100 ICI accounts though a distribution system of over 500 kilometres of linear water piping.

Currently, residential customers in Saint John are charged for water and sewerage services on a flat rate basis relative to the number of units serviced. Under this rate structure, the total bill remains constant regardless of the amount of water consumed in each unit. Non-residential and multi-unit residential customers are metered and water is charged on a per cubic meter basis. A fixed charge relative to the size of the water meter is also levied in addition to the consumption based charge. The City currently employs a three tier declining block structure for water services – under this structure the unit price of water decreases relative to use. Sewerage services is levied on a surcharge basis, equal to currently 122% of the water bill.

Flat-rate water bills are sent on a semi-annual basis while non-residential customers have the water meters read every two months with subsequent bills issued accordingly. Tables 14 and 15 below provide a summary of the existing 2019 water rates in Saint John for customers who are charged on a flat rate basis (Table 14) and customers charged both a fixed and consumption based fee (Table 15A and B).

Table 14
2019 Flat Rate Fees in Saint John

Service	Annual Rate
Water	$643
Sewer (at 122% of water)	$785
Total	**$1,428**

Table 15A 2019 Rates for Metered Users in Saint John – Monthly Fees		
Meter Size	**Water**	**Sewer (122% of Water)**
5/8″	$18.03	$22.00
¾″	$22.07	$26.93
1″	$30.14	$36.77
1 ½″	$39.63	$48.35
2″	$79.06	$96.45
3″	$164.29	$200.43
4″	$285.71	$348.57
6″	$449.02	$547.80
8″	$645.20	$787.14
10″ and Over	$873.83	$1,066.07

Table 15B Existing Monthly Rates for Metered Users in Saint John – Consumption Charges		
Consumption Blocks	**Water Consumption Charge ($/m³)**	**Sewer Consumption Charge ($/m³) ***
Tier 1: For the First 50	$1.6123	$1.9670
Tier 2: For the Next 124,950	$1.0267	$1.2526
Tier 3: Remaining Consumption	$0.3623	$0.4420

**Sewer consumption charge based on metered water use. Rate also represents 122% of the water charge*

B. MOVING FORWARD

In consultation with City staff, the current rate structure has generally been maintained, however, some modifications are recommended to better align with the City's ongoing consumption trends, consumer usage patterns and overall financial goals. The following rate structure observations and recommended changes are identified below:

1. Maintain Declining Block Rate Structure:

A declining block rate structure is a tiered approach in which the unit price of water decreases relative to water use – this structure is common in jurisdictions where there is a significant non-residential customer base and the structure acts as an economic development incentive to industries. Furthermore, the rate structure is designed so that only those high volume users benefit from a declining rate. Residential consumption, if metered, would fall into the higher priced water tier to continue to encourage water conservation.

2. Reduce the Number of Consumption Tiers

As consumption in the City has changed over the last decade, the existing consumption tiers do not accurately reflect potable non-residential water consumption patterns. In addition, as the City transitions some existing large industrial water customers to a raw water based billing structure, these customers will be billed separately which will not make use of the existing three tier structure. Furthermore, only in 2007 and 2008 did some potable water consumers benefit from the third tier.

It is proposed that the three tier declining block structure be amended to a two tier system with the Tier 1 consumption threshold maintained (Table 16). Therefore, this change is purely administrative, and existing non-residential customers will not see any change on the total bill as a result. The revised consumption block structure would still ensure that consumption falls predominantly into Tier 2 which provides water at the discounted rate.

Table 16
Existing Water Rate Structure vs. Proposed Structure

Existing Consumption Tier	Proposed Consumption Tier
Tier 1 (0-50 m^3)	Tier 1: 0 – 50m^3
Tier 2 (50-125,000 m^3)	Tier 2: > 50m^3
Tier 3 (>125,000 m^3)	-

3. Maintain Fixed Charges by Meter Size

The City's current fixed charge is differentiated by the size of the water meter and generally follows municipal best practices – the fixed charge is greater for those customers with a larger meter size (or service size) to reflect either the flow arising from the size of the meter or the investment required to install the meter.

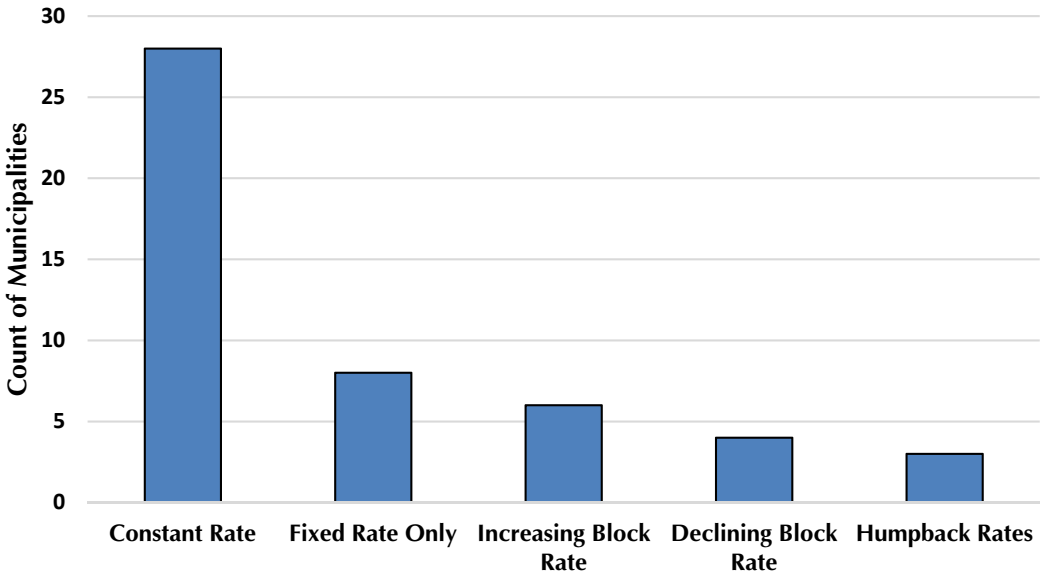
As the equivalent factors for the City are already differentiated by meter size and are somewhat reflective of sample investment equivalent ratios by the AWWA/CWWA and change is not warranted. It should be noted that any adjustments to these factors would result in a shift in the total bills paid by those in the non-residential sector.

4. Explore Universal Metering for Residential Properties

With advancements in water metering technology, many municipalities have transitioned to using a form of billing that relies on measuring end-user consumption in order to determine the quantum paid. According to the Canadian Municipal Water Priorities Report, 2014, approximately three-quarters of Canada are on metered systems. From 1991 to 2009, there has been an increase of 20 per-cent in the use of water metering by municipalities in Canada according to the last national survey.

Based on a survey of municipalities in Canada with populations ranging from 51,000 to 100,000 people, about 84 per cent, or 41 of the 49 communities surveyed have residential metering. The figure below focuses on the rate structures employed for residential customers as most communities surveyed have a metering system in place for the non-residential sector. Figure 8 below provides a summary of the benchmark findings. A detailed table comparing the rate structures applied in each community can be found in Appendix B.

Figure 8:
Residential Rate Structure Comparison



The benchmark analysis identifies a few important points:

- Over half, or 28 municipalities, employ a constant rate per cubic meter for the consumption based charge. Under this structure, the user is charged a constant rate per unit of water consumed or sewer generated. This rate structure is largely understood by the public and generally easy to administer.

- Eight municipalities, including Saint John, employ a fixed rate only fee for residential users.

- The remaining municipalities employ other consumption based rate structures, namely a declining or increasing block structure. Although both structures are common, they are utilized to meet the specific dynamics of a community – increasing block structure will increase water rates relative to use while the declining block structure decreases water rates relative to use. The declining block structure is most common in jurisdictions where there is a significant non-residential customer base. Furthermore, the rate structure is designed so that only

those high volume users benefit from a declining rate and residential consumption still falls into the higher priced water tier to continue to encourage conservation efforts.

- There are a handful of municipalities which employ a humpback rate structure which acts as a hybrid structure between an inclining and declining block structure basis.

- The fixed charge, when levied in conjunction with a consumption based billing structure, is almost always differentiated by the size of the water meter. The factors to which the fixed charges are differentiated by meter size vary by community. Overall, the fixed charge is greater for those customers with a larger meter size (or service size) to reflect either the flow arising from the size of the meter or the investment required to install the water meter.

A separate report identifying the costs and benefits of universal metering in Saint John has been prepared under separate cover with the key goal to provide the City with information necessary to inform future decisions of metering all properties in the City.

VI CALCULATED RATES

In calculating the water and sewerage rates, a number of assumptions were applied. The water and sewerage rates are calculated to fully recover the cost of operating the system and identified in-year capital needs (inclusive of debt servicing requirements). Furthermore, the rates provide for contributions to asset replacement reserves. An immediate implementation of a rate that fully funded the calculated asset replacement contributions as identified in the City's State of Local Infrastructure Report would result in significant impacts to all users in the City. The analysis is based on providing for a gradual movement towards full rates. These contributions, when combined with the City's ongoing capital works, will demonstrate a significant movement to long-term full cost recovery rates.

Table 17 below provides a summary of the 2020 rate funding requirement for each of the water and sewer systems. The net rate funding need represents the amount of money that must be funded through the utility rates by City of Saint John potable customers only (excluding east and west industrial customers). Detailed calculations of the water and sewerage rates are outlined in Appendix A.

Table 17
Calculation of the 2020 Net Rate Funding Requirement

Ref #	Categories	Water	Sewer
1	Operating Expenditures (including repayment of debt)	$21,586,107	$16,333,667
2	In-year rate funded capital	$3,723,800	$1,546,550
3	Transfer to/(from) Reserve	$0	$0
4	*Less: Non-metered Rate Revenue*	$3,270,676	$1,687,150
	Total Net Rate Funding Need = (1+2+3-4)	**$22,039,231**	**$16,193,066**

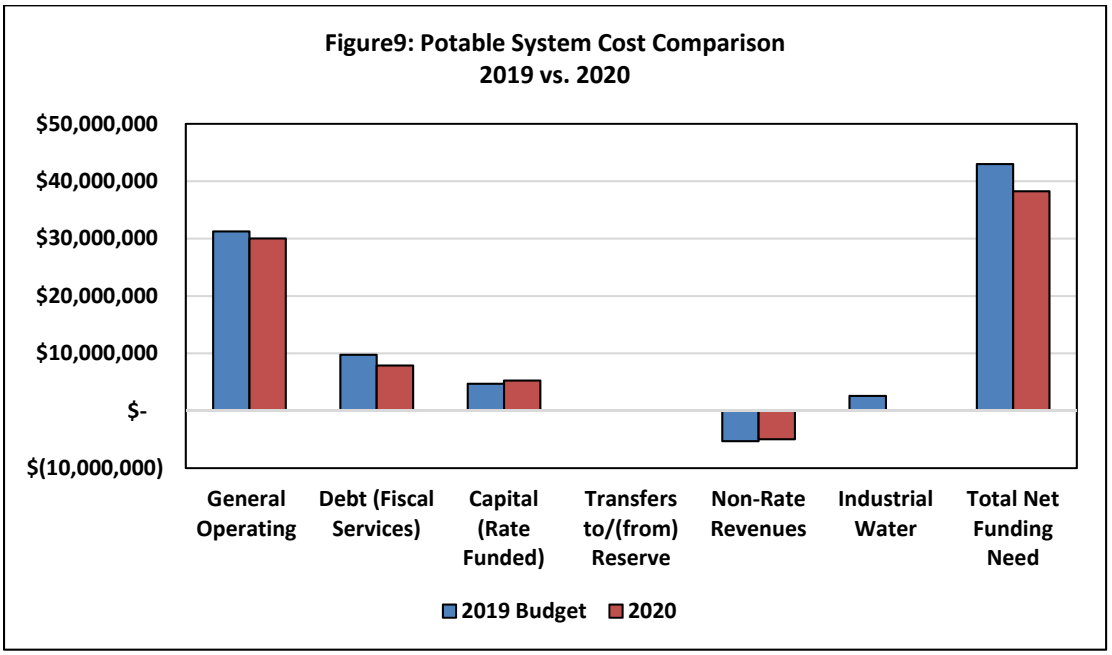
Note: Non-metered rate revenue includes funds received for: Stormwater levy, fire protection levy, previous year's surplus and other minor sources.

As mentioned, 2019 represents a shift in service delivery with the new Loch Lomond treatment plant becoming operational in August 2018. As a result, the share of costs associated with providing raw water to east and west industrial systems are attributed to those systems. Furthermore, the 2020 draft budget of expenditures differ from 2019 in a few respects which are illustrated in Figure 9 and summarized below:

- Industrial water operational costs of $2.6 million, associated with the supply of raw water to west and east industrial customers, are identified in the 2019 approved budget. These costs have been reallocated to both the east and west industrial system, from the city-wide potable water system, for recovery under the new full cost rates moving forward. These costs have typically been funded by negotiated user rates with the specific industries and potable water rates.

- A portion of the city-wide debt costs related to the water system from which they benefit from, are reallocated for recovery from those industrial users receiving raw water service. These costs are transferred to the east and west industrial systems for recovery.

- Despite the lower city-wide net rate funding requirement in 2020, the transition to raw water based user fees for industrial customers, from the city-wide potable rate calculation, would typically place additional pressure on the potable water user rates to cover the foregone revenue. With this said, the City has been planning for this change in service delivery for a number of years and therefore the City is targeting to maintain the existing flat rate charges in 2020.



Note: 2019 approved budget includes the total city-wide potable and east and west industrial budgets. 2020 based on draft budget and reflects the adjusted potable budget only (i.e. east and west industrial costs are excluded).

1. Calculated 2020 Water Rates

Based on the information provided above, the required potable water user rate revenue in 2020 is forecast to be $22.0 million. This is the amount of revenue which must be

collected through the sale of water to fully recover the operating, capital, rehabilitation and replacement costs of the systems.

It is important to note as those industrial accounts begin transitioning to the industrial raw water system, this puts greater emphasis on the remaining users to fund the annual potable system costs. As a result, a more substantial increase in the water rates are required to fund the system. With that said, there is an offsetting decrease in the sewerage calculations as a result of the increased water rates – the sewerage rates are provided in the section below. The calculated rates for 2020, compared to 2019, are outlined in Table 18 below.

Table 18
Calculated 2020 Water Utility Rates

All Accounts	2019 Current	2020 Calculated	Difference (%)
Metered: Fixed Charge: $/Month			
5/8"	$18.03	$22.20	*23.10%*
3/4"	$22.07	$27.17	*23.10%*
1"	$30.14	$37.10	*23.10%*
1 1/2"	$39.63	$48.79	*23.10%*
2"	$79.06	$97.32	*23.10%*
3"	$164.29	$202.24	*23.10%*
4"	$285.71	$351.71	*23.10%*
6"	$449.02	$552.75	*23.10%*
8"	$645.20	$794.25	*23.10%*
10" and over	$873.83	$1,075.70	*23.10%*
Consumption Charge: $/m³			
Tier 1: 0 – 50m³/month	$1.6123	$1.9848	*23.10%*
Tier 2: > 50m³/month	$1.0267	$1.2639	*23.10%*
Non- Metered: Fixed Charge: Per Month	$53.58	$65.76	*22.72%*

2. Calculated 2020 Sewerage Rates

Based on the information provided above, the required sewerage user rate revenue in 2020 is forecast to be $16.2 million. This is the amount of revenue which must be collected through the treatment of sewerage to fully recover the operating, capital, rehabilitation and replacement costs of the system.

The basis for the sewer rate is calculated as a surcharge on the water bill – the sewer surcharge rate is calculated as a percentage of the water charge that will be needed to

cover the costs of operating and maintaining the sewer infrastructure. As shown in Table 19, the calculated rate for 2020 is outlined to be 81% of the water bill – the detailed calculations of the sewerage rates are outlined in Appendix A. It is noted that the surcharge actually represents a decrease in sewerage charges over the existing rates, this occurs because:

- Due to the shift in water operations, the total potable water bill is increasing at a higher rate, in large part due to the Safe Clean Drinking Water Project, which in turn reduces the surcharge applied; and

- The water rate increase is also driven by the transition of industrial customers to raw water based charges. The sewerage system is not affected by the change.

Table 19
Calculated 2020 Sewer Utility Rates

All Accounts	2019 Current	2020 Calculated	Difference (%)
Fixed Charge: $/Month			
5/8"	$22.00	$17.97	*- 18.3%*
3/4"	$26.93	$22.00	*- 18.3%*
1"	$36.77	$30.04	*- 18.3%*
1 1/2"	$48.35	$39.50	*- 18.3%*
2"	$96.45	$78.80	*- 18.3%*
3"	$200.43	$163.74	*- 18.3%*
4"	$348.57	$284.76	*- 18.3%*
6"	$547.80	$447.52	*- 18.3%*
8"	$787.14	$643.05	*- 18.3%*
10" and over	$1,066.07	$870.92	*- 18.3%*
Consumption Charge: $/m³			
Tier 1: 0 – 50m³/month	$1.9670	$1.6069	*- 18.3%*
Tier 2: > 50m³/month	$1.2526	$1.0233	*- 18.3%*
Non- Metered: Fixed Charge: Per Month	$65.42	$53.24	*- 18.6%*

3. Cumulative Impact per Typical User

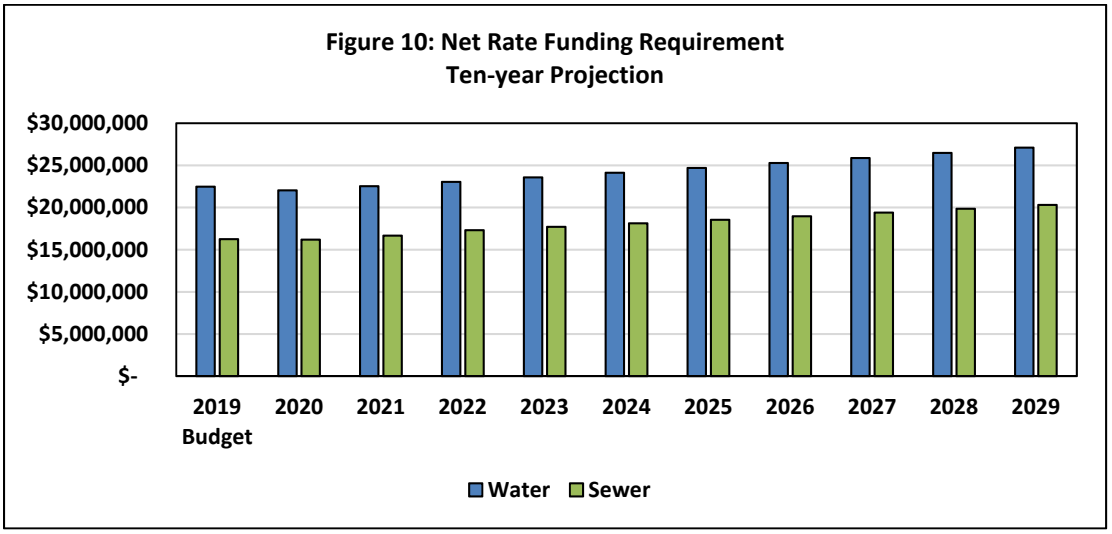
In order to test the impact of the new rates on the City's residents and businesses, a sensitivity analysis was undertaken to quantify the range of rate impacts to both the residential and non-residential properties in the City. Table 20 below illustrates the impact of the calculated water and sewerage rates on a typical residential connection per annum.

Table 20 Comparison of Water and Sewer Charges per Typical Household Current vs. Calculated (Per Annum)			
	2019 Existing	2020 Calculated	Change ($)
1. Water	$643	$789	+ $146 (+22.7%)
2. Sewerage	$785	$639	- $146 (-18.6%)
3. Total Water + Sewer	**$1,428**	**$1,428**	**+ $0 (+0.0%)**

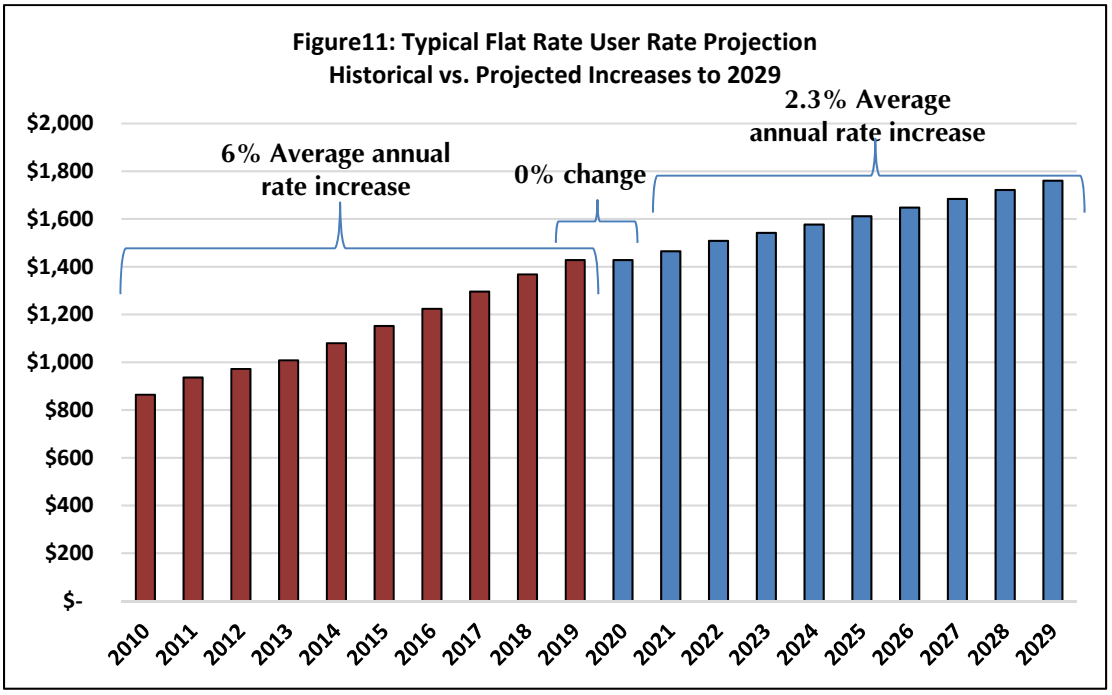
As the rate adjustments are applied uniformly to all customer classes, non-residential metered properties will experience a similar rate change to those flat rate users. The exception rests with water only properties – rate changes are more significant as those users would not see the benefit of the decreased sewerage surcharge. There will be properties who are serviced only by water which will see a rate increase upwards of about 23% in 2020 only. It is anticipated, that users who see an increase of that magnitude is limited to less than 2% of all connections and represent about 8.5% of all potable water revenue generated. Furthermore, approximately two-thirds of the water only customers in this category are relatively low volume users with consumption only in tier 1 and the calculated 2020 rates translate into an increase of about $12 per month over the existing rates.

A. LONG-TERM RATE OUTLOOK

Over the long-term, it is expected the net rate funding requirements for both the City's water and sewer system are to increase at an average rate of 2.3% per annum post 2020, similar to the average increase in operational expenditures. It is projected that the water and sewer net rate funding requirements will increase to $27.1 million and $20.3 million respectively by 2029. Figure 10 below provides a snapshot of the annual year-over-year change in costs.



In order for the City to recover costs associated with providing these services, necessary adjustments to the City's utility rates are required. The overall rate impact, per year, is anticipated to be lower than the annual rate adjustments employed in recent years. Figure 11 below indicates the projected cumulative rate increase for customers receiving both water and sewerage services is expected to be around 2.3% per annum, which is less than half of the average annual rate increases experienced over the last 10 years which were ultimately driven by the harbour clean-up and the Safe, Clean Drinking Water Project. Overall, the City has been fiscally responsible in preparing for the completion of the treatment plant.



Note: Red Bars relate to historical period and blue bars relate to forecast. Total Household charge for users receiving both water and sewerage services.

VII RECOMMENDATIONS AND FINDINGS

The calculated rates presented establish water and sewer rates to all users of the system which are fair and equitable. The analysis included in this report ensures that the water and sewer rates fully fund all of the City's anticipated annual costs including all operating costs, capital financing needs and debt repayment requirements as they relate to the potable system. It is fiscally prudent that the City contribute to reserves for the eventual repair and replacement of water and sewer infrastructure. An immediate implementation of a rate that fully funds the calculated annual funding requirement for capital asset replacement would result in significant impacts to all users in the City. The analysis includes an increasing annual contribution to reserves for asset rehabilitation and replacement. These contributions, when combined with the City's ongoing capital works, will demonstrate a movement towards long-term full cost recovery rates. The City will continue to explore and exercise any potential cost sharing or grant funding opportunities from upper levels of government in an effort to further reduce the existing infrastructure deficit.

The results of this study are in part, Hemson and City staff's best estimates of what could transpire in the short-to-medium term using the data available. It is especially important that the City continue to monitor all consumption data on a monthly basis to identify usage trends and variance in the projections to ensure costs and revenues are managed accordingly. Further to this, as the treatment plant is a new initiative, the cost projections outlined in this study should be monitored and compared to actuals regularly to ensure the City is generating sufficient revenues to cover expenses. A financial model was developed to undertake the analysis and serves as a dynamic rate setting tool. Using the model, the City is able to perform sensitivity analyses of water and sewer rates, rate structures and also phase-in options.

It is recommended the City undertake a comprehensive fee review every three to five years to ensure that a nexus between costs and revenues is maintained over time.

APPENDIX A

DETAILED RATE CALCULATIONS

APPENDIX A

CITY OF SAINT JOHN
WATER & SEWER RATE STUDY
WATER RATE CALCULATIONS - POTABLE WATER SYSTEM

Potable Water Services	Base Year 2019	Budget 2020	Forecast 2021	Forecast 2022	Forecast 2023	Forecast 2024	Forecast 2025	Forecast 2026	Forecast 2027	Forecast 2028	Forecast 2029
1. Operating Expenditures											
General Operating Expenditures											
Watershed Management	$ 202,489	$ 257,313	$ 262,947	$ 268,711	$ 274,611	$ 280,648	$ 286,828	$ 293,154	$ 299,629	$ 306,258	$ 313,045
Water Treatment	$ 10,035,415	$ 8,399,439	$ 8,631,757	$ 8,870,675	$ 9,116,387	$ 9,369,089	$ 9,628,986	$ 9,896,289	$ 10,171,214	$ 10,453,984	$ 10,744,830
Water Pumping & Storage	$ 1,222,006	$ 1,308,576	$ 1,348,210	$ 1,389,267	$ 1,431,807	$ 1,475,891	$ 1,521,583	$ 1,568,951	$ 1,618,066	$ 1,669,001	$ 1,721,834
Transportation & Distribution	$ 4,975,937	$ 4,915,719	$ 4,881,637	$ 4,843,681	$ 4,951,817	$ 5,062,530	$ 5,175,890	$ 5,291,967	$ 5,410,834	$ 5,532,567	$ 5,657,245
Customer Metering	$ 713,941	$ 758,782	$ 775,523	$ 792,644	$ 810,154	$ 828,063	$ 846,380	$ 865,115	$ 884,279	$ 903,881	$ 923,933
Less: Operational Efficiencies	*$ -*	*$ -*	*$ (100,000)*	*$ (202,250)*	*$ (306,801)*	*$ (413,704)*	*$ (523,012)*	*$ (634,780)*	*$ (749,062)*	*$ (865,916)*	*$ (985,399)*
Subtotal General Operating Expenses	***$ 17,149,786***	***$ 15,639,830***	***$ 15,800,074***	***$ 15,962,729***	***$ 16,277,975***	***$ 16,602,517***	***$ 16,936,655***	***$ 17,280,696***	***$ 17,634,959***	***$ 17,999,775***	***$ 18,375,486***
Corporate Administration											
Infrastructure Management (Municipal Engineering)	$ 409,807	$ 408,987	$ 418,032	$ 427,281	$ 436,738	$ 446,409	$ 456,298	$ 466,409	$ 476,750	$ 487,324	$ 498,137
Other Internal Charges	$ 452,500	$ 455,000	$ 464,100	$ 473,382	$ 482,850	$ 492,507	$ 502,357	$ 512,404	$ 522,652	$ 533,105	$ 543,767
Additional Post Employment Benefits	$ 661,000	*$ 698,304*	*$ 714,016*	*$ 730,081*	*$ 746,508*	*$ 763,304*	*$ 780,479*	*$ 798,040*	*$ 815,995*	*$ 834,355*	*$ 853,128*
Subtotal Corporate Administration	***$ 1,523,307***	***$ 1,562,291***	***$ 1,596,148***	***$ 1,630,744***	***$ 1,666,096***	***$ 1,702,220***	***$ 1,739,133***	***$ 1,776,853***	***$ 1,815,397***	***$ 1,854,784***	***$ 1,895,033***
Fiscal Services (Debt)											
Debt Payments (Fiscal Services)	$ 6,159,292	$ 6,037,686	$ 5,828,497	$ 5,730,363	$ 5,649,893	$ 5,481,023	$ 5,082,208	$ 4,831,360	$ 4,311,062	$ 3,720,194	$ 3,659,870
Less: Debt Payments (Fiscal Services) associated with West/East system	*$ (1,697,567)*	*$ (1,653,700)*	*$ (1,506,071)*	*$ (1,466,045)*	*$ (1,429,609)*	*$ (1,323,231)*	*$ (1,194,188)*	*$ (1,099,646)*	*$ (898,719)*	*$ (661,902)*	*$ (561,458)*
Subtotal Fiscal Services (Debt)	***$ 4,461,725***	***$ 4,383,986***	***$ 4,322,427***	***$ 4,264,318***	***$ 4,220,284***	***$ 4,157,792***	***$ 3,888,020***	***$ 3,731,714***	***$ 3,412,343***	***$ 3,058,292***	***$ 3,098,411***
Service Enhancements											
Subtotal Annual Gross Operating Expenditures	***$ 23,134,818***	***$ 21,586,107***	***$ 21,718,648***	***$ 21,857,791***	***$ 22,164,354***	***$ 22,462,529***	***$ 22,563,808***	***$ 22,789,263***	***$ 22,862,700***	***$ 22,912,852***	***$ 23,368,930***
2. Capital Expenditures											
Capital Expenditures - From Operating	$ 2,820,000	$ 3,723,800	$ 3,356,015	$ 3,191,415	$ 3,287,796	$ 3,387,088	$ 3,489,378	$ 3,594,757	$ 3,703,318	$ 3,815,159	$ 3,930,376
Capital Expenditures - WTP Rehabilitation Expenditures	$ -	$ -	$ -	$ -	$ -	$ -	$ 180,918	$ 246,048	$ 313,712	$ 326,468	$ -
Capital Contribution Smoothing											
Subtotal Rate Funded Capital	***$ 2,820,000***	***$ 3,723,800***	***$ 3,356,015***	***$ 3,191,415***	***$ 3,287,796***	***$ 3,387,088***	***$ 3,670,296***	***$ 3,840,805***	***$ 4,017,030***	***$ 4,141,626***	***$ 3,930,376***
3. Contributions to/(from) Reserve											
Calculated Capital Asset Reserve Contribution											
Asset Management Funding Requirement as per AMP (Benchmark)	$ 18,243,127	$ 18,600,070	$ 18,964,151	$ 19,335,514	$ 19,714,304	$ 20,100,670	$ 20,494,764	$ 20,896,739	$ 21,306,754	$ 21,724,969	$ 22,151,548
Smoothing											
Transfer To/(From) Capital Replacement (Smoothing)			*$ 574,195*	*$ 1,014,847*	*$ 1,139,200*	*$ 1,347,602*	*$ 1,558,738*	*$ 1,786,999*	*$ 2,157,345*	*$ 2,614,170*	*$ 3,064,325*
Subtotal Reserve Contributions	***$ -***	***$ -***	***$ 574,195***	***$ 1,014,847***	***$ 1,139,200***	***$ 1,347,602***	***$ 1,558,738***	***$ 1,786,999***	***$ 2,157,345***	***$ 2,614,170***	***$ 3,064,325***
											$ 6,994,702
4. Total Annual Expenditures (1+2+3=4)	**$ 25,954,818**	**$ 25,309,907**	**$ 25,648,858**	**$ 26,064,054**	**$ 26,591,351**	**$ 27,197,219**	**$ 27,792,842**	**$ 28,417,067**	**$ 29,037,075**	**$ 29,668,648**	**$ 30,363,632**
Non-Rate Revenues											
Fire Protection Levy	$ (2,618,972)	$ (2,521,321)	$ (2,491,419)	$ (2,486,645)	$ (2,533,234)	$ (2,579,121)	$ (2,601,699)	$ (2,639,508)	$ (2,659,419)	$ (2,676,895)	$ (2,743,456)
Other revenues	$ (374,000)	$ (506,250)	$ (381,250)	$ (383,750)	$ (391,425)	$ (399,254)	$ (407,239)	$ (415,383)	$ (423,691)	$ (432,165)	$ (440,808)
Previous Year's Surplus	$ (490,500)	$ (243,105)	$ (156,075)	$ (66,505)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Vacant Building Revenue	$ -	$ -	$ (85,000)	$ (85,000)	$ (85,000)	$ (85,000)	$ (85,000)	$ (85,000)	$ (85,000)	$ (85,000)	$ (85,000)
Sub-total Non-Rate Revenues	***$ (3,483,472)***	***$ (3,270,676)***	***$ (3,113,744)***	***$ (3,021,900)***	***$ (3,009,659)***	***$ (3,063,375)***	***$ (3,093,937)***	***$ (3,139,891)***	***$ (3,168,110)***	***$ (3,194,060)***	***$ (3,269,264)***
Net Rate Funding Requirement	**$ 22,471,346**	**$ 22,039,231**	**$ 22,535,114**	**$ 23,042,154**	**$ 23,581,692**	**$ 24,133,844**	**$ 24,698,905**	**$ 25,277,176**	**$ 25,868,965**	**$ 26,474,588**	**$ 27,094,368**
Change (%)		*-1.9%*	*2.3%*	*2.2%*	*2.3%*	*2.3%*	*2.3%*	*2.3%*	*2.3%*	*2.3%*	*2.3%*

APPENDIX A

CITY OF SAINT JOHN
WATER & SEWER RATE STUDY
WATER RATE CALCULATIONS - POTABLE WATER SYSTEM

Potable Water Services		Base Year 2019	Budget 2020	Forecast 2021	Forecast 2022	Forecast 2023	Forecast 2024	Forecast 2025	Forecast 2026	Forecast 2027	Forecast 2028	Forecast 2029
Water User Rates												
1.0 Flat Rate Customer Charges (Yearly)												
Connected Users												
Flat Fee		$ 643	$ 789.11	$ 807	$ 825	$ 844	$ 863	$ 882	$ 902	$ 922	$ 943	$ 964
Number of Connections		15,995	15,995	15,995	15,995	16,020	16,045	16,070	16,095	16,120	16,145	16,170
Total Annual Flat Fee Revenue		**$ 10,284,785**	**$ 12,621,847**	**$ 12,905,839**	**$ 13,196,220**	**$ 13,514,225**	**$ 13,839,859**	**$ 14,173,305**	**$ 14,514,750**	**$ 14,864,384**	**$ 15,222,404**	**$ 15,589,010**
Unconnected Serviced Users												
Flat Fee		$ 226.00	$ 277.36	$ 283.60	$ 289.98	$ 296.50	$ 303.17	$ 309.99	$ 316.97	$ 324.10	$ 331.39	$ 338.85
Number of Users		29	29	29	29	29	29	29	29	29	29	29
Total Annual Flat Fee Revenue		**$ 6,554**	**$ 8,043**	**$ 8,224**	**$ 8,409**	**$ 8,599**	**$ 8,792**	**$ 8,990**	**$ 9,192**	**$ 9,399**	**$ 9,610**	**$ 9,827**
Vacant Building Revenue		**$ 85,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Percenatage Increase in Charge			22.72%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%
Sub-Total Flat Rate Revenue		**$ 10,376,339**	**$ 12,629,890**	**$ 12,914,063**	**$ 13,204,629**	**$ 13,522,823**	**$ 13,848,651**	**$ 14,182,295**	**$ 14,523,942**	**$ 14,873,783**	**$ 15,232,015**	**$ 15,598,837**
2.0 Metered Customer Fixed Charges (Yearly)												
Metered Fixed Charges												
Size (in)	**Size (mm)**											
5/8"	15mm	$ 216.36	$ 266.34	$ 272.34	$ 278.46	$ 284.73	$ 291.14	$ 297.69	$ 304.38	$ 311.23	$ 318.24	$ 325.40
3/4"	20mm	$ 264.84	$ 326.02	$ 333.36	$ 340.86	$ 348.53	$ 356.37	$ 364.39	$ 372.59	$ 380.97	$ 389.54	$ 398.31
1"	25mm	$ 361.68	$ 445.23	$ 455.25	$ 465.50	$ 475.97	$ 486.68	$ 497.63	$ 508.83	$ 520.27	$ 531.98	$ 543.95
1 1/2"	40mm	$ 475.56	$ 585.42	$ 598.60	$ 612.06	$ 625.84	$ 639.92	$ 654.31	$ 669.04	$ 684.09	$ 699.48	$ 715.22
2"	50mm	$ 948.72	$ 1,167.89	$ 1,194.17	$ 1,221.04	$ 1,248.51	$ 1,276.60	$ 1,305.33	$ 1,334.70	$ 1,364.73	$ 1,395.43	$ 1,426.83
3"	75mm	$ 1,971.48	$ 2,426.93	$ 2,481.53	$ 2,537.37	$ 2,594.46	$ 2,652.84	$ 2,712.52	$ 2,773.56	$ 2,835.96	$ 2,899.77	$ 2,965.02
4"	100mm	$ 3,428.52	$ 4,220.57	$ 4,315.54	$ 4,412.64	$ 4,511.92	$ 4,613.44	$ 4,717.24	$ 4,823.38	$ 4,931.90	$ 5,042.87	$ 5,156.34
6"	150mm	$ 5,388.24	$ 6,633.03	$ 6,782.27	$ 6,934.87	$ 7,090.90	$ 7,250.45	$ 7,413.58	$ 7,580.39	$ 7,750.95	$ 7,925.34	$ 8,103.67
8"	200mm	$ 7,742.40	$ 9,531.04	$ 9,745.49	$ 9,964.76	$ 10,188.97	$ 10,418.22	$ 10,652.63	$ 10,892.32	$ 11,137.39	$ 11,387.98	$ 11,644.21
10" and over	250mm and over	$ 10,485.96	$ 12,908.41	$ 13,198.85	$ 13,495.83	$ 13,799.48	$ 14,109.97	$ 14,427.45	$ 14,752.06	$ 15,083.99	$ 15,423.38	$ 15,770.40
Number of Metered Users												
Size (in)	**Size (mm)**											
5/8"	15mm	1,856	1,856	1,856	1,856	1,856	1,856	1,856	1,856	1,856	1,856	1,856
3/4"	20mm	155	155	155	155	155	155	155	155	155	155	155
1"	25mm	432	432	432	432	432	432	432	432	432	432	432
1 1/2"	40mm	284	284	284	284	284	284	284	284	284	284	284
2"	50mm	272	272	272	272	272	272	272	272	272	272	272
3"	75mm	57	57	57	57	57	57	57	57	57	57	57
4"	100mm	26	26	26	26	26	26	26	26	26	26	26
6"	150mm	13	13	13	13	13	13	13	13	13	13	13
8"	200mm	3	3	3	3	3	3	3	3	3	3	3
10" and over	250mm and over	6	6	6	6	6	6	6	6	6	6	6
Revenue from Fixed Charges												
Size (in)	**Size (mm)**											
5/8"	15mm	$ 401,564	$ 494,333	$ 505,456	$ 516,828	$ 528,457	$ 540,347	$ 552,505	$ 564,936	$ 577,647	$ 590,645	$ 603,934
3/4"	20mm	$ 41,050	$ 50,534	$ 51,671	$ 52,833	$ 54,022	$ 55,237	$ 56,480	$ 57,751	$ 59,050	$ 60,379	$ 61,738
1"	25mm	$ 156,246	$ 192,341	$ 196,669	$ 201,094	$ 205,619	$ 210,245	$ 214,976	$ 219,813	$ 224,759	$ 229,816	$ 234,986
1 1/2"	40mm	$ 135,059	$ 166,260	$ 170,001	$ 173,826	$ 177,737	$ 181,736	$ 185,825	$ 190,006	$ 194,282	$ 198,653	$ 203,123
2"	50mm	$ 258,052	$ 317,667	$ 324,814	$ 332,123	$ 339,595	$ 347,236	$ 355,049	$ 363,038	$ 371,206	$ 379,558	$ 388,098
3"	75mm	$ 112,374	$ 138,335	$ 141,447	$ 144,630	$ 147,884	$ 151,212	$ 154,614	$ 158,093	$ 161,650	$ 165,287	$ 169,006
4"	100mm	$ 89,142	$ 109,735	$ 112,204	$ 114,729	$ 117,310	$ 119,949	$ 122,648	$ 125,408	$ 128,230	$ 131,115	$ 134,065
6"	150mm	$ 70,047	$ 86,229	$ 88,169	$ 90,153	$ 92,182	$ 94,256	$ 96,377	$ 98,545	$ 100,762	$ 103,029	$ 105,348
8"	200mm	$ 23,227	$ 28,593	$ 29,236	$ 29,894	$ 30,567	$ 31,255	$ 31,958	$ 32,677	$ 33,412	$ 34,164	$ 34,933
10" and over	250mm and over	$ 62,916	$ 77,450	$ 79,193	$ 80,975	$ 82,797	$ 84,660	$ 86,565	$ 88,512	$ 90,504	$ 92,540	$ 94,622
Percenatage Increase in Charge			23.10%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%
Total Annual Fixed Charge Revenue		**$ 1,349,677**	**$ 1,661,478**	**$ 1,698,861**	**$ 1,737,085**	**$ 1,776,170**	**$ 1,816,134**	**$ 1,856,997**	**$ 1,898,779**	**$ 1,941,502**	**$ 1,985,185**	**$ 2,029,852**

APPENDIX A

CITY OF SAINT JOHN
WATER & SEWER RATE STUDY
WATER RATE CALCULATIONS - POTABLE WATER SYSTEM

Potable Water Services	Base Year 2019	Budget 2020	Forecast 2021	Forecast 2022	Forecast 2023	Forecast 2024	Forecast 2025	Forecast 2026	Forecast 2027	Forecast 2028	Forecast 2029
3.0 Metered Customer Consumption Charges (Yearly)											
Consumption Charges (Yearly)											
Tier 1 (0-50 m3)	$ 1.6123	$ 1.9848	$ 2.0294	$ 2.0751	$ 2.1218	$ 2.1695	$ 2.2183	$ 2.2682	$ 2.3193	$ 2.3715	$ 2.4248
Tier 2 (50-125,000 m3)	$ 1.0267	$ 1.2639	$ 1.2923	$ 1.3214	$ 1.3511	$ 1.3815	$ 1.4126	$ 1.4444	$ 1.4769	$ 1.5101	$ 1.5441
Tier 3 (>125,000 m3)	$ 0.3623	$ 0.4460	$ 0.4560	$ 0.4663	$ 0.4768	$ 0.4875	$ 0.4985	$ 0.5097	$ 0.5212	$ 0.5329	$ 0.5449
Consumption per Year (m3)											
Tier 1 (0-50 m3)	1,175,000	1,175,000	1,175,000	1,175,000	1,175,000	1,175,000	1,175,000	1,175,000	1,175,000	1,175,000	1,175,000
Tier 2 (50-125,000 m3)	4,285,000	4,285,000	4,285,000	4,285,000	4,285,000	4,285,000	4,285,000	4,285,000	4,285,000	4,285,000	4,285,000
Tier 3 (>125,000 m3)	-	-	-	-	-	-	-	-	-	-	-
Total Consumption (Excludes Specials and Colson Cove)	**5,460,000**	**5,460,000**	**5,460,000**	**5,460,000**	**5,460,000**	**5,460,000**	**5,460,000**	**5,460,000**	**5,460,000**	**5,460,000**	**5,460,000**
Revenue from Consumption Charges											
Tier 1 (0-50 m3)	$ 1,894,453	$ 2,332,107	$ 2,384,579	$ 2,438,232	$ 2,493,092	$ 2,549,187	$ 2,606,544	$ 2,665,191	$ 2,725,158	$ 2,786,474	$ 2,849,169
Tier 2 (50-125,000 m3)	$ 4,399,410	$ 5,415,756	$ 5,537,611	$ 5,662,207	$ 5,789,606	$ 5,919,873	$ 6,053,070	$ 6,189,264	$ 6,328,522	$ 6,470,914	$ 6,616,510
Tier 3 (>125,000 m3)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Tier 1: Percenatage Increase in Charge		23.10%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%
Tier 2: Percenatage Increase in Charge		23.10%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%
Tier 3: Percenatage Increase in Charge		23.10%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%
Total Annual Consumption Charge Revenue (Metered)	**$ 6,293,862**	**$ 7,747,863**	**$ 7,922,190**	**$ 8,100,439**	**$ 8,282,699**	**$ 8,469,060**	**$ 8,659,613**	**$ 8,854,455**	**$ 9,053,680**	**$ 9,257,388**	**$ 9,465,679**
4.0 Grand Total Water Rate Revenue	**$ 18,019,878**	**$ 22,039,231**	**$ 22,535,114**	**$ 23,042,154**	**$ 23,581,692**	**$ 24,133,844**	**$ 24,698,905**	**$ 25,277,176**	**$ 25,868,965**	**$ 26,474,588**	**$ 27,094,368**
Check: Must be Equal to Zero against Net Rate Funding Need		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

APPENDIX A

CITY OF SAINT JOHN
WATER & SEWER RATE STUDY
SEWER RATE CALCULATIONS

Sewer Services	Base Year 2019	Budget 2020	Forecast 2021	Forecast 2022	Forecast 2023	Forecast 2024	Forecast 2025	Forecast 2026	Forecast 2027	Forecast 2028	Forecast 2029
1. Operating Expenditures											
General Operating Expenditures											
Wastewater Pumping	$ 3,085,934	$ 3,023,470	$ 3,106,406	$ 3,192,042	$ 3,280,483	$ 3,371,838	$ 3,466,220	$ 3,563,748	$ 3,664,546	$ 3,768,743	$ 3,876,474
Wastewater Collection	$ 3,157,230	$ 3,205,433	$ 3,278,869	$ 3,354,119	$ 3,431,233	$ 3,510,263	$ 3,591,263	$ 3,674,289	$ 3,759,398	$ 3,846,650	$ 3,936,107
WasteWater Treatment	$ 4,809,871	$ 5,029,628	$ 5,168,479	$ 5,311,885	$ 5,460,023	$ 5,613,078	$ 5,771,242	$ 5,934,716	$ 6,103,711	$ 6,278,447	$ 6,459,153
Subtotal General Operating Expenses	***$ 11,053,036***	***$ 11,258,531***	***$ 11,553,754***	***$ 11,858,046***	***$ 12,171,739***	***$ 12,495,178***	***$ 12,828,724***	***$ 13,172,753***	***$ 13,527,656***	***$ 13,893,841***	***$ 14,271,734***
Corporate Administration											
Infrastructure Management (Municipal Engineering)	$ 409,807	$ 408,987	$ 418,032	$ 427,281	$ 436,738	$ 446,409	$ 456,298	$ 466,409	$ 476,750	$ 487,324	$ 498,137
Other Internal Charges	$ 452,500	$ 455,000	$ 464,100	$ 473,382	$ 482,850	$ 492,507	$ 502,357	$ 512,404	$ 522,652	$ 533,105	$ 543,767
Additional Post Employment Benefits	$ 661,000	*$ 698,304*	*$ 714,016*	*$ 730,081*	*$ 746,508*	*$ 763,304*	*$ 780,479*	*$ 798,040*	*$ 815,995*	*$ 834,355*	*$ 853,128*
Subtotal Corporate Administration	***$ 1,523,307***	***$ 1,562,291***	***$ 1,596,148***	***$ 1,630,744***	***$ 1,666,096***	***$ 1,702,220***	***$ 1,739,133***	***$ 1,776,853***	***$ 1,815,397***	***$ 1,854,784***	***$ 1,895,033***
Fiscal Services (Debt)											
Debt Payments (Fiscal Services)	$ 3,592,569	$ 3,512,845	$ 3,218,020	$ 3,137,715	$ 3,093,744	$ 3,014,494	$ 2,817,851	$ 2,776,424	$ 2,628,418	$ 2,364,655	$ 2,019,396
Subtotal Fiscal Services (Debt)	***$ 3,592,569***	***$ 3,512,845***	***$ 3,218,020***	***$ 3,137,715***	***$ 3,093,744***	***$ 3,014,494***	***$ 2,817,851***	***$ 2,776,424***	***$ 2,628,418***	***$ 2,364,655***	***$ 2,019,396***
Service Enhancements											
Subtotal Annual Gross Operating Expenditures	***$ 16,168,911***	***$ 16,333,667***	***$ 16,367,922***	***$ 16,626,506***	***$ 16,931,579***	***$ 17,211,893***	***$ 17,385,709***	***$ 17,726,030***	***$ 17,971,471***	***$ 18,113,279***	***$ 18,186,163***
2. Capital Expenditures											
Capital Expenditures	$ 1,880,000	$ 1,546,550	$ 1,807,085	$ 2,127,610	$ 2,191,864	$ 2,258,058	$ 2,326,252	$ 2,396,505	$ 2,468,879	$ 2,543,439	$ 2,620,251
Capital Contribution Smoothing											
Subtotal Rate Funded Capital	***$ 1,880,000***	***$ 1,546,550***	***$ 1,807,085***	***$ 2,127,610***	***$ 2,191,864***	***$ 2,258,058***	***$ 2,326,252***	***$ 2,396,505***	***$ 2,468,879***	***$ 2,543,439***	***$ 2,620,251***
			16.8%								
3. Contributions to/(from) Reserve											
Calculated Capital Asset Reserve Contribution											
Asset Management Funding Requirement as per AMP (Benchmark)	$ 12,833,318	$ 13,089,984	$ 13,351,784	$ 13,618,820	$ 13,891,196	$ 14,169,020	$ 14,452,400	$ 14,741,448	$ 15,036,277	$ 15,337,003	$ 15,643,743
Smoothing											
Transfer To/(From) Capital Replacement (Smoothing)						*$ 93,536*	*$ 301,793*	*$ 351,952*	*$ 505,585*	*$ 771,633*	*$ 1,115,583*
Subtotal Reserve Contributions	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ 93,536***	***$ 301,793***	***$ 351,952***	***$ 505,585***	***$ 771,633***	*$ 1,115,583*
											$ 3,735,834
4. Total Annual Expenditures (1+2+3=4)	**$ 18,048,911**	**$ 17,880,217**	**$ 18,175,007**	**$ 18,754,116**	**$ 19,123,443**	**$ 19,563,486**	**$ 20,013,754**	**$ 20,474,487**	**$ 20,945,935**	**$ 21,428,351**	**$ 21,921,997**
Non-Rate Revenues											
Storm Sewer Levy	$ (939,924)	$ (937,795)	$ (961,151)	$ (985,172)	$ (1,009,880)	$ (1,035,300)	$ (1,061,456)	$ (1,088,372)	$ (1,116,076)	$ (1,144,594)	$ (1,173,955)
Other revenues	$ (374,000)	$ (506,250)	$ (381,250)	$ (383,750)	$ (391,425)	$ (399,254)	$ (407,239)	$ (415,383)	$ (423,691)	$ (432,165)	$ (440,808)
Previous Year's Surplus	$ (490,500)	$ (243,105)	$ (156,075)	$ (66,505)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sub-total Non-Rate Revenues	***$ (1,804,424)***	***$ (1,687,150)***	***$ (1,498,476)***	***$ (1,435,426)***	***$ (1,401,305)***	***$ (1,434,554)***	***$ (1,468,695)***	***$ (1,503,756)***	***$ (1,539,767)***	***$ (1,576,759)***	***$ (1,614,763)***
Net Rate Funding Requirement	**$ 16,244,487**	**$ 16,193,066**	**$ 16,676,532**	**$ 17,318,690**	**$ 17,722,138**	**$ 18,128,932**	**$ 18,545,059**	**$ 18,970,731**	**$ 19,406,168**	**$ 19,851,592**	**$ 20,307,234**
Change (%)		*-0.3%*	*3.0%*	*3.9%*	*2.3%*	*2.3%*	*2.3%*	*2.3%*	*2.3%*	*2.3%*	*2.3%*

APPENDIX A

CITY OF SAINT JOHN
WATER & SEWER RATE STUDY
SEWER RATE CALCULATIONS

Sewer Services		Base Year 2019	Budget 2020	Forecast 2021	Forecast 2022	Forecast 2023	Forecast 2024	Forecast 2025	Forecast 2026	Forecast 2027	Forecast 2028	Forecast 2029
Sewer User Rates												
Calculation of Sewer Revenues												
Total Water Revenue		$ 22,471,346	$ 22,039,231	$ 22,535,114	$ 23,042,154	$ 23,581,692	$ 24,133,844	$ 24,698,905	$ 25,277,176	$ 25,868,965	$ 26,474,588	$ 27,094,368
% Water Revenues Charged Sewer	90.75%	$ 20,392,747	$ 20,000,602	$ 20,450,616	$ 20,910,755	$ 21,400,385	$ 21,901,464	$ 22,414,256	$ 22,939,037	$ 23,476,086	$ 24,025,689	$ 24,588,139
% Sewer Surcharge (Sewer Revenue)		**80%**	**81%**	**82%**	**83%**	**83%**	**83%**	**83%**	**83%**	**83%**	**83%**	**83%**
Total Rate Revenue		**$ 16,244,487**	**$ 16,193,066**	**$ 16,676,532**	**$ 17,318,690**	**$ 17,722,138**	**$ 18,128,932**	**$ 18,545,059**	**$ 18,970,731**	**$ 19,406,168**	**$ 19,851,592**	**$ 20,307,234**
Check: Must be Equal to Zero against Net Rate Funding Need		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Sewer User Rates												
1.0 Flat Rate Customer Charges (Yearly)												
Connected Users												
Flat Fee		$ 785.00	$ 638.89	$ 657.96	$ 683.30	$ 698.59	$ 713.99	$ 729.72	$ 745.81	$ 762.25	$ 779.05	$ 796.22
Unconnected Serviced Users												
Flat Fee		$ 276.00	$ 224.55	$ 231.26	$ 240.16	$ 245.54	$ 250.95	$ 256.48	$ 262.13	$ 267.91	$ 273.82	$ 279.85
2.0 Metered Customer Fixed Charges (Yearly)												
Metered Fixed Charges												
Size (in)	**Size (mm)**											
5/8"	15mm	$ 263.96	$ 215.64	$ 222.08	$ 230.63	$ 235.79	$ 240.99	$ 246.30	$ 251.73	$ 257.28	$ 262.95	$ 268.74
3/4"	20mm	$ 323.10	$ 263.96	$ 271.84	$ 282.31	$ 288.62	$ 294.99	$ 301.49	$ 308.13	$ 314.92	$ 321.87	$ 328.96
1"	25mm	$ 441.25	$ 360.48	$ 371.24	$ 385.53	$ 394.16	$ 402.85	$ 411.73	$ 420.80	$ 430.08	$ 439.56	$ 449.25
1 1/2"	40mm	$ 580.18	$ 473.98	$ 488.13	$ 506.92	$ 518.27	$ 529.69	$ 541.37	$ 553.30	$ 565.49	$ 577.96	$ 590.70
2"	50mm	$ 1,157.44	$ 945.56	$ 973.79	$ 1,011.29	$ 1,033.92	$ 1,056.71	$ 1,080.00	$ 1,103.80	$ 1,128.13	$ 1,153.00	$ 1,178.41
3"	75mm	$ 2,405.21	$ 1,964.91	$ 2,023.58	$ 2,101.50	$ 2,148.53	$ 2,195.88	$ 2,244.28	$ 2,293.75	$ 2,344.31	$ 2,395.98	$ 2,448.79
4"	100mm	$ 4,182.79	$ 3,417.10	$ 3,519.12	$ 3,654.63	$ 3,736.42	$ 3,818.77	$ 3,902.94	$ 3,988.96	$ 4,076.89	$ 4,166.75	$ 4,258.60
6"	150mm	$ 6,573.65	$ 5,370.29	$ 5,530.63	$ 5,743.59	$ 5,872.14	$ 6,001.56	$ 6,133.84	$ 6,269.03	$ 6,407.21	$ 6,548.44	$ 6,692.78
8"	200mm	$ 9,445.73	$ 7,716.61	$ 7,947.00	$ 8,253.01	$ 8,437.71	$ 8,623.68	$ 8,813.75	$ 9,008.01	$ 9,206.56	$ 9,409.50	$ 9,616.90
10" and over	250mm and over	$ 12,792.87	$ 10,451.03	$ 10,763.06	$ 11,177.51	$ 11,427.66	$ 11,679.53	$ 11,936.95	$ 12,200.05	$ 12,468.96	$ 12,743.80	$ 13,024.70
3.0 Metered Customer Consumption Charges (m^3)												
Consumption Charges (Yearly)												
Tier 1 (0-50 m3)		$ 1.967010	$ 1.6069	$ 1.6549	$ 1.7186	$ 1.7571	$ 1.7958	$ 1.8354	$ 1.8759	$ 1.9172	$ 1.9595	$ 2.0027
Tier 2 (50-125,000 m3)		$ 1.252570	$ 1.0233	$ 1.0538	$ 1.0944	$ 1.1189	$ 1.1436	$ 1.1688	$ 1.1945	$ 1.2209	$ 1.2478	$ 1.2753
Tier 3 (>125,000 m3)		$ 0.442010	$ 0.3611	$ 0.3719	$ 0.3862	$ 0.3948	$ 0.4035	$ 0.4124	$ 0.4215	$ 0.4308	$ 0.4403	$ 0.4500

APPENDIX B

RATE STRUCTURE SURVEY OF CANADIAN MUNICIPALITIES

Appendix B - Table 1
Canada-wide Benchmarking of Residential Metered Water Rate Structures
City of Saint John (Rate Structure as of January 1 2018)

Major City	Prov	Population (2016)	Metered (Y/N)	Fixed Charge	Description of Consumption Metering (Residential)
Red Deer	AB	100,000	Y	Based on meter size.	Constant Rate
Chatham	ON	100,000	Y	Based on meter size.	Declining Block Rate
Strathcona County	AB	98,000	Y	Based on meter size.	Constant Rate
Brantford	ON	97,000	Y	Based on meter size.	Constant Rate
Saint-Jean-sur-Richelieu	QC	95,000	Y	Fixed charge not differentiated by meter size	Constant Rate
Cape Breton	NS	94,000	Y	Fixed charge not differentiated by meter size	Declining Block Rate
Lethbridge	AB	93,000	Y	Based on meter size.	Constant Rate
Clarington	ON	92,000	Y	Based on meter size.	Increasing Block Rate
Pickering	ON	92,000	Y	Based on meter size.	Increasing Block Rate
Kamloops	BC	90,000	N	Based on the size of service	Fixed Rate Only
Nanaimo	BC	90,000	Y	Fixed charge not differentiated by meter size	Increasing Block Rate
Niagara Falls	ON	88,000	Y	Based on meter size.	Constant Rate
Sudbury	ON	88,000	Y	Fixed charge not differentiated by meter size	Constant Rate
North Vancouver	BC	86,000	N	Fixed charge not differentiated by meter size	Fixed Rate Only
Victoria	BC	86,000	Y	Based on meter size.	Constant Rate
Brossard	QC	86,000	Y	Minimum rate for 350 cubic metres	Increasing Block Rate
Repentigny	QC	84,000	Y	Fixed charge not differentiated by meter size	Increasing Block Rate
Newmarket	ON	84,000	Y	Based on meter size.	Constant Rate
Chilliwack	BC	84,000	Y	Based on meter size.	Constant Rate
Maple Ridge	BC	82,000	Y	Based on meter size.	Constant Rate
Peterborough	ON	81,000	Y	Based on meter size.	Humpback Rates
Kawartha Lakes	ON	75,000	Y	Based on meter size.	Constant Rate
Drummondville	QC	75,000	Y	Fixed charge not differentiated by meter size	Constant Rate
Saint-Jerome	QC	74,000	N	Fixed charge not differentiated by meter size	Fixed Rate Only
Prince George	BC	74,000	Y	Seasonal flat rates	Constant Rate
Sault Ste. Marie	ON	73,000	Y	Based on meter size.	Humpback Rates
Moncton	NB	72,000	Y	Based on meter size.	Declining Block Rate
Sarnia	ON	72,000	Y	Based on meter size.	Constant Rate
New Westminster	BC	71,000	N	Fixed Rate	Fixed Rate Only
Fort McMurray (Wood Buffalo)	AB	71,000	Y	Based on meter size.	Constant Rate
Saint John	NB	67,000	N	Fixed Rate	Fixed Rate Only
Caledon	ON	67,000	Y	Fixed Rate	Constant Rate
Granby	QC	66,000	Y	Fixed charge integrated into tax bill	Constant Rate
St. Albert	AB	65,000	Y	Fixed Rate	Constant Rate
Norfolk County	ON	64,000	Y	Based on meter size.	Constant Rate
Medicine Hat	AB	63,000	Y	Fixed charge not differentiated by meter size	Constant Rate
Grande Prairie	AB	63,000	Y	Based on meter size.	Increasing Block Rate
Welland-Pelham	ON	62,000	Y	Based on meter size.	Constant Rate
Airdrie	AB	61,000	Y	Based on meter size.	Constant Rate
Halton Hills	ON	61,000	Y	Based on meter size.	Humpback Rates
Port Coquitlam	BC	59,000	N	Fixed Rate based on unit type	Fixed Rate Only
Fredericton	NB	58,000	Y	Fixed charge not differentiated by meter size	Constant Rate
Blainville	QC	57,000	N	Fixed charge not differentiated by meter size	Fixed Rate Only
Saint-Hyacinthe	QC	56,000	Y	Fixed charge not differentiated by meter size	Constant Rate
Aurora	ON	55,000	Y	None	Constant Rate
North Vancouver	BC	53,000	N	Fixed charge not differentiated by meter size	Fixed Rate Only
Welland	ON	52,000	Y	Fixed charge not differentiated by meter size	Constant Rate
North Bay	ON	51,000	Y	Based on meter size.	Constant Rate
Belleville	ON	51,000	Y	Based on meter size.	Declining Block Rate