



2018/2019 Water Rate Study

Union Water Supply System

December 19, 2018

Watson & Associates Economists Ltd.
905-272-3600
info@watsonecon.ca

December 19, 2018

Mr. Rodney Bouchard
General Manager
Union Water Supply System
1615 Union Avenue, Box 340
Ruthven, Ontario
N0P 2G0

Dear Mr. Bouchard:

Re: 2018/2019 Water Rate Study

We are pleased to provide our letter report regarding the calculation of the water rates for the Union Water Supply System (U.W.S.S.). The report provided herein is based upon the most recent available information provided by staff regarding the capital expenditure plan and operating budget as well as presently anticipated servicing plans. We would thank you at the onset for the assistance you provided to Watson in the preparation of this analysis.

1. Background

U.W.S.S. is owned by and serves the Municipality of Leamington and the Towns of Kingsville, Essex (Wards 1 & 2), and Lakeshore. The U.W.S.S. is managed by the U.W.S.S. Joint Board of Management and is operated by the Ontario Clean Water Agency (OCWA). Water is supplied from Lake Erie, treated, sold wholesale to the member municipalities, and then distributed to the residents. U.W.S.S. utilizes 4 water towers, a low lift station, a station in Cottam, and a water treatment plant to provide water. Additionally, there are approximately 88 kilometres of watermains of varying sizes (250mm to 1,067mm) and types (PVC, cast iron, ductile iron, etc.). The serviced areas of the U.W.S.S. member municipalities consist primarily of low-density residential housing, industrial/commercial, and some institutional land uses. (Some medium density residential housing also exists).

To recover the cost of providing water services, U.W.S.S. imposes a constant volumetric rate to the local municipalities based on the amount of water consumed. Note that historically, a separate volumetric rate was imposed for Highbury Canco (formerly Heinz), however, an agreement was reached whereas this separate rate would discontinue at the end of 2018. The 2018 water rates are shown on the table below:



Table 1
Union Water Supply System
Current Water Rates

Union Water Supply System		
2018 - Water Billing Rates		
Wholesale Rate		
	2.77	per 1,000 gallons
\$	0.6088	per m ³
Highbury Canco Preferred Rate		
	2.05	per 1,000 gallons
\$	0.4395	per m ³

2. Study Purpose

The objectives of the study and the steps involved in carrying out this assignment are summarized below:

- Identify all current and future water system capital needs to assess the immediate and longer-term implications;
- Identify existing operating costs by component and estimate future operating costs over the next six years. This assessment identifies fixed and variable costs in order to project those costs sensitive to changes to the existing infrastructure inventory, as well as costs which may increase commensurate with growth; and
- Provide staff and the U.W.S.S. Board the findings to assist in gaining approval of the rates for 2019 and future years.

3. Regulatory Changes in Ontario

Resulting from the water crisis in Walkerton, significant regulatory changes have been made in Ontario over the past one and a half decades. These changes arise as a result of the Walkerton Commission and the 93 recommendations made by the Walkerton Inquiry Part II report. Areas of recommendation include:

- watershed management and source protection;
- quality management;
- preventative maintenance;
- research and development;
- new performance standards;
- sustainable asset management; and
- lifecycle costing.



The legislation which would have most impacted municipal water and wastewater rates is the Sustainable Water and Sewage Systems Act (S.W.S.S.A.) which would have required municipalities to implement full cost pricing. The Act was passed in 2002, however, and has not been proclaimed pending the approval of its regulations. This Act was subsequently replaced by the Water Opportunities Act.

3.1 Summary of the Sustainable Water and Sewage Systems Act

The Sustainable Water and Sewage Systems Act (S.W.S.S.A.) was passed on December 13, 2002. The intent of the Act is to introduce the requirement for municipalities to undertake an assessment of the “full cost” of providing their water and the wastewater services. It is noted that this Act has been repealed, however, to provide broader context and understanding to other legislation discussed herein, a description of the Act is provided below.

Full costs for water service was defined in subsection 3(7) of the Act and included “source protection costs, operating costs, financing costs, renewal and replacement costs and improvement costs associated with extracting, treating or distributing water to the public and such other costs which may be specified by regulation.” Similar provisions were made for wastewater services in subsection 4(7) respecting the “collecting, treating or discharging waste water.”

The Act would have required the preparation of two reports for submission to the Ministry of the Environment (or such other member of the Executive Council as may be assigned the administration of this Act under the Executive Council Act). The first report would regard the “full cost of services” and the second would relate to the “cost recovery plan.” Once these reports would have been reviewed and approved by the Ministry, the municipality would be required to implement the plans within a specified time period.

In regard to the “Full Cost of Services” report, the municipality (deemed a regulated entity under the Act) would prepare and approve a report concerning the provision of water and sewage services. This report was to include an inventory of the infrastructure, a management plan providing for the long-term integrity of the systems and address the full cost of providing the services (other matters may be specified by the regulations) along with the revenue obtained to provide them. A professional engineer would certify the inventory and management plan portion of the report. The municipality’s auditor would be required to provide a written opinion on the report. The report was to be approved by the municipality and then be forwarded to the Ministry along with the engineer’s certification and the auditor’s opinion. The regulations would stipulate the timing for this report.

The second report was referred to as a “Cost Recovery Plan” and would address how the municipality intended to pay for the full costs of providing the service. The regulations were to specify limitations on what sources of revenue the municipality may



use. The regulations may have also provided limits as to the level of increases any customer or class of customer may experience over any period of time. Provision was made for the municipality to implement increases above these limits, however ministerial approval would be required first. Similar to the first report, the municipal auditor would provide a written opinion on the report prior to Council's adoption, and this opinion must accompany the report when submitted to the Province.

The Act provided the Minister the power to approve or not approve the plans. If the Minister was not satisfied with the report or if a municipality did not submit a plan, the Minister may have a plan prepared. The cost to the Crown for preparing the plan would be recovered from the municipality. As well, the Minister may direct two or more regulated municipalities to prepare a joint plan. This joint plan may be directed at the onset or be directed by the Minister after receiving the individual plans from the municipalities.

The Minister also had the power to order a municipality to generate revenue from a specific revenue source or in a specified manner. The Minister may have also ordered a regulated entity to do, or refrain from doing, such things as the Minister considered advisable to ensure that the entity pays the full cost of providing the services to the public.

Once the plans were approved and in place, the municipality would be required to submit progress reports. The timing of these reports and the information to be contained therein would be established by the regulations. A municipal auditor's opinion must be provided with the progress report. Municipalities would also revise the plans if they deem the estimate did not reflect the full cost of providing the services, as a result of a change in circumstances, regulatory or other changes that affect their plan, etc. The municipality would then revise its prior plan, provide an auditor's opinion, and submit the plan to the Minister.

As noted earlier, this Act was subsequently replaced by the Water Opportunities Act.

3.2 Financial Plans Regulation

On August 16, 2007, the Ministry of Environment (M.O.E.) passed O.Reg. 453/07 which requires the preparation of financial plans for water (and wastewater) systems. The M.O.E. has also provided a Financial Plan Guidance Document to assist in preparing the plans. A brief summary of the key elements of the regulations is provided below:

- The financial plan will represent one of the key elements for the Municipality to obtain its Drinking Water License.
- The financial plans shall be for a period of at least six years but longer planning horizons are encouraged.



- As the regulation is under the Drinking Water Act, the preparation of the plan is mandatory for water and encouraged for wastewater.
- The plan is considered a living document (i.e. will be updated as annual budgets are prepared) but will need to be undertaken at a minimum every five years.
- The plans generally require the forecasting of capital, operating and reserve fund positions, providing detailed inventories, forecasting future users and volume usage and corresponding calculation of rates. In addition, Public Sector Accounting Board (P.S.A.B.) information on the system must be provided for each year of the forecast (i.e. total non-financial assets, tangible capital asset acquisitions, tangible capital asset construction, betterments, write-downs, disposals, total liabilities and net debt).
- The financial plans must be made available to the public (at no charge) upon request and be available on the Municipality's web site. The availability of this information must also be advertised.
- The financial plans are to be approved by Resolution of the Council or governing body indicating that the drinking water system is financially viable.

In general, the financial principles of the draft regulations follow the intent of S.W.S.S.A. to move municipalities towards financial sustainability. However, many of the prescriptive requirements have been removed (e.g. preparation of two separate documents for Provincial approval, auditor opinions, engineer certifications, etc.).

A Guideline ("Towards Financially Sustainable Drinking-Water and Wastewater Systems") has been developed to assist municipalities in understanding the Province's direction and provides a detailed discussion on possible approaches to sustainability. The Province's Principles of Financially Sustainable Water and Wastewater Services are provided below:

Principle #1: Ongoing public engagement and transparency can build support for, and confidence in, financial plans and the system(s) to which they relate.

Principle #2: An integrated approach to planning among water, wastewater, and stormwater systems is desirable given the inherent relationship among these services.

Principle #3: Revenues collected for the provision of water and wastewater services should ultimately be used to meet the needs of those services.

Principle #4: Life-cycle planning with mid-course corrections is preferable to planning over the short-term, or not planning at all.

Principle #5: An asset management plan is a key input to the development of a financial plan.



Principle #6: A sustainable level of revenue allows for reliable service that meets or exceeds environmental protection standards, while providing sufficient resources for future rehabilitation and replacement needs.

Principle #7: Ensuring users pay for the services they are provided leads to equitable outcomes and can improve conservation. In general, metering and the use of rates can help ensure users pay for services received.

Principle #8: Financial Plans are “living” documents that require continuous improvement. Comparing the accuracy of financial projections with actual results can lead to improved planning in the future.

Principle #9: Financial plans benefit from the close collaboration of various groups, including engineers, accountants, auditors, utility staff, and municipal council.

This regulation continues until the requirements of the Water Opportunities Act are proclaimed into force.

3.3 Water Opportunities Act, 2010 (Bill 72)

As noted earlier, since the passage of the Safe Drinking Water Act, continuing changes and refinements to the legislation has been introduced. Some of these Bills have found their way into law while others have not been approved. Bill 72 was introduced into the legislation on May 18, 2010 and received Royal Assent on November 29, 2010.

On November 29, 2010, Bill 72, The Water Opportunities Act, 2010 received Royal Assent.

The Act provides for the following elements:

- Foster innovative water, wastewater and stormwater technologies, services and practices in the private and public sectors;
- Prepare water conservation plans to achieve water conservation targets established by the regulations;
- Prepare sustainability plans for municipal water services, municipal wastewater services and municipal stormwater services.

With regard to the sustainability plans:

- The Act extends from the water financial plans and requires a more detailed review of the water financial plan and requires a full plan for wastewater and stormwater services;



- Regulations will provide performance targets for each service – these targets may vary based on the jurisdiction of the regulated entity or the class of entity.

The Financial Plan shall include:

- An asset management plan for the physical infrastructure;
- Financial Plan;
- For water, a water conservation plan;
- Assessment of risks that may interfere with the future delivery of the municipal service, including, if required by the regulations, the risks posed by climate change and a plan to deal with those risks;
- Strategies for maintaining and improving the municipal service, including strategies to ensure the municipal service can satisfy future demand, consider technologies, services and practices that promote the efficient use of water and reduce negative impacts on Ontario's water resources, and increase co-operation with other municipal service providers.

Performance indicators will be established by service:

- May relate to the financing, operation or maintenance of a municipal service or to any other matter in respect of which information may be required to be included in a plan;
- May be different for different municipal service providers or for municipal services in different areas of the Province.

Regulations will prescribe:

- Timing;
- Contents of the plans;
- Identifying what portions of the plan will require certification;
- Public consultation process;
- Limitations, updates, refinements, etc.

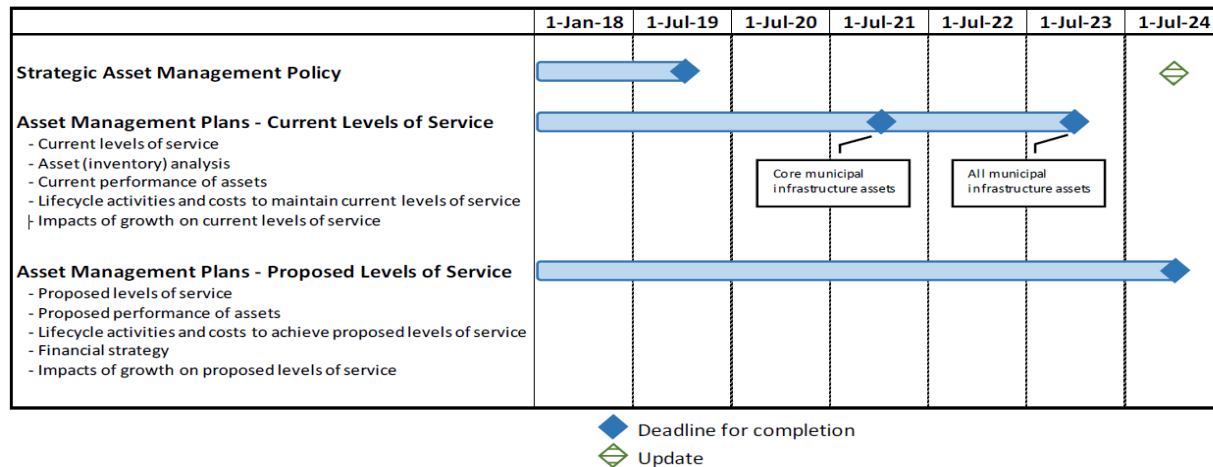
As noted earlier, it is expected that this Act will implement the principles of the Sustainable Water and Sewage Systems Act once all regulations are put in place.

3.4 Infrastructure for Jobs and Prosperity Act (I.J.P.A.), 2015

On June 4, 2015, the province passed the Infrastructure for Jobs and Prosperity Act (I.J.P.A.) which, over time, will require municipalities to undertake and implement asset management plans for all infrastructure they own. On December 27, 2017, the Province



of Ontario released Ontario Regulation 588/17 under I.J.P.A. which has 3 phases that municipalities must meet:



Every municipality in Ontario will have to prepare a strategic asset management policy by July 1, 2019. Municipalities will be required to review their strategic asset management policies at least every five years and make updates as necessary. The subsequent phases are as follows:

- Phase 1 – Asset Management Plan (by July 1, 2021):
 - For core assets – Municipalities must have the following:
 - Inventory of assets;
 - Current levels of service measured by standard metrics; and
 - Costs to maintain levels of service.
- Phase 2 – Asset Management Plan (by July 1, 2023):
 - Same steps as Phase 1 but for all assets.
- Phase 3 – Asset Management Plan (by July 1, 2024):
 - Builds on Phase 1 and 2 by adding:
 - Proposed levels of service; and
 - Lifecycle management and Financial strategy.

In relation to water and wastewater (which is considered a core asset), municipalities will need to have an asset management plan that addresses the related infrastructure by July 1, 2021 (Phase 1). O.Reg. 588/17 specifies that the municipality’s asset management plan must include the following for each asset category:



- the current levels of service being provided;
 - determined in accordance with the following qualitative descriptions and technical metrics and based on data from at most the two calendar years prior to the year in which all information required under this section is included in the asset management plan.

- the current performance of each asset category;
- a summary of the assets in the category,
- the replacement cost of the assets in the category,
- the average age of the assets in the category, determined by assessing the average age of the components of the assets,
- the information available on the condition of the assets in the category, and
- a description of the municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate; and
- the lifecycle activities that would need to be undertaken to maintain the current levels of service.

Upon completion of the asset management plan for water and wastewater services, the Town will need to consider the impacts on the capital plan provided herein.

4. Forecast Growth and Servicing Requirements

A review of the U.W.S.S.'s 2018 customers and volumes was undertaken. In 2018 the U.W.S.S. provided a total of approximately 16.30 million cubic metres of water to its customers. Based on an average annual consumption of 200 cu.m. per residential customer, this would provide for approximately, 81,500 residential equivalent customers.

Water usage by the member municipalities (for future growth) has been calculated at approximately 200 cu.m per single-detached equivalent unit annually, consistent with the previous rate analysis completed for the U.W.S.S. Forecasted system growth information utilized for this process is summarized in Table 2 and is based upon the municipal D.C. studies and discussions with staff.



Table 2
Union Water Supply System
Water System User Forecast

Water Users Forecast

Year	Total Users	2018	2019	2020	2021	2022	2023	2024
2019	329		165	329	329	329	329	329
2020	329			165	329	329	329	329
2021	329				165	329	329	329
2022	329					165	329	329
2023	329						165	329
2024	329							165
Total	3,290	-	165	494	823	1,152	1,481	1,810
m ³ /user	200	200	200	200	200	200	200	200
Annual Flow		-	33,000	98,800	164,600	230,400	296,200	362,000

Water Customer Forecast	2018	2019	2020	2021	2022	2023	2024
Existing	81,516	81,516	81,516	81,516	81,516	81,516	81,516
New - Growth	-	165	494	823	1,152	1,481	1,810
Total	81,516	81,681	82,010	82,339	82,668	82,997	83,326

Water Volume Forecast (m ³)	2018	2019	2020	2021	2022	2023	2024
Block 1							
Existing	16,303,100	16,303,100	16,303,100	16,303,100	16,303,100	16,303,100	16,303,100
New	-	33,000	98,800	164,600	230,400	296,200	362,000
Total	16,303,100	16,336,100	16,401,900	16,467,700	16,533,500	16,599,300	16,665,100

5. Lifecycle Costing

For many years, lifecycle costing has been used in the field of maintenance engineering and to evaluate the advantages of using alternative materials in construction or production design. The method has gained wider acceptance and use in the areas of industrial decision-making and the management of physical assets.

By definition, lifecycle costs are all the costs which are incurred during the lifecycle of a physical asset, from the time its acquisition is first considered, to the time it is taken out of service for disposal or redeployment. The stages which the asset goes through in its life cycle are specification, design, manufacture (or build), install, commission, operate, maintain and disposal.

Detailed water system inventory information was obtained from the U.W.S.S. The age of the water systems dates back to the 1950's. The detailed inventory worksheets are provided in Appendix A.

The updated summary of water system inventory are provided in the table below:



Table 3
Union Water Supply System
Inventory Summary

Area	Total Replacement Value	Amount included in 6-year forecast	Net Replacement for Future Lifecycle	Annual Lifecycle Replacement for Remaining Useful Life
Water				
Water Facilities	63,141,261	} 8,895,000	} 100,617,724	1,506,175
Water Machinery & Equipment	16,949,469			569,398
Watermains	59,837,102			2,828,799
Total	139,927,832	8,895,000	100,617,724	4,904,372

Investment per residential equivalent customer is \$1,717 for water

6. Base Charge Calculations

The wholesale water rates provided to the municipalities do not include a base charge, only a volumetric rate.

7. Water Service

7.1 Capital Expenditures and Revenues

Table 5 presents the 2019-2024 water capital program which totals \$32.78 million (inflated \$).

Capital works are funded through the Water Capital Reserve. The Rate Stabilization Reserve provides funds required to ensure the capital reserve remains positive and is utilized to stabilize future rate increases. The balance of the Water Capital Reserve at December 31, 2017 was \$6.21 million, and the balance of the Rate Stabilization Reserve at December 31, 2017 was \$10.00 million. Note: the funds in the Rate Stabilization Reserve are currently invested into a 5-year G.I.C. and cannot be accessed until 2022 without penalty. As a result, this investment is available to fund future capital works, however, in 2020 and 2021 the capital funding requirements are greater than the balance in the rest of the reserves. Consideration was given to whether this short-term note (G.I.C.) should be cashed or whether short-term borrowing should be utilized. The analysis provided herein assumes the latter.

Funding over the 6-year forecast period for the above capital works has been developed as follows:



Table 4
Union Water Supply System
Capital Financing Summary

Capital Financing	
Provincial/Federal Grants	-
Non-Growth Related Debenture Requirements	3,600,000
Water Working Fund (WCFU Account)	-
Operating Contributions	-
Rate Stabilization Reserve	4,167,000
Water Stabilization Reserve	
Water Capital Reserve	25,010,000
Total Capital Financing	32,777,000

The complete water rate calculations are presented in Appendix B.



Table 5
Union Water Supply System
Capital Budget Forecast
(Inflated \$)

Description	Budget 2018	Total	Forecast					
			2019	2020	2021	2022	2023	2024
Studies and Programs	-	-	-	-	-	-	-	-
Water Quality Investigations	33,000	303,000	61,000	62,000	64,000	38,000	39,000	39,000
New Ruthven WTP Reservoir #3 Study	-	41,000	41,000	-	-	-	-	-
Backup Power Generation/ Energy Study	-	41,000	41,000	-	-	-	-	-
Water Demand/ Loss Study	85,000	-	-	-	-	-	-	-
UWSS Operations Contract Assessment	10,000	-	-	-	-	-	-	-
Water Rate Study/ Financial Plan Update	32,500	-	-	-	-	-	-	-
Cottam 12-inch main replacement- EA & Prelim Eng	-	260,000	-	260,000	-	-	-	-
Contingency (un-identified future studies)	-	656,000	-	-	159,000	162,000	166,000	169,000
Low Lift	-	-	-	-	-	-	-	-
Intake #1 & 2* (Note 5)	-	65,000	-	31,000	-	-	-	34,000
Intake # 2 (See Item 16 for more detail)	-	32,000	-	-	-	32,000	-	-
Intake # 3, shoreline intake	-	104,000	-	104,000	-	-	-	-
Travelling Screen #3	-	125,000	-	125,000	-	-	-	-
Low Lift Pump 1 *(Note 1)	35,000	32,000	-	-	32,000	-	-	-
Low Lift Pump 2	-	39,000	-	-	-	-	39,000	-
Low Lift Pump 3	-	32,000	-	-	-	32,000	-	-
Low Lift Pump 4	-	33,000	-	-	-	-	33,000	-
Low Lift Pump 5	-	70,000	36,000	-	-	-	-	34,000
Low Lift Pump 6	-	36,000	-	36,000	-	-	-	-
Low Lift Pump 7	-	37,000	-	-	37,000	-	-	-
Zebra Mussel Control System	-	53,000	-	-	53,000	-	-	-
Low Lift Surge Tanks (2) and Compressor System *(Note 6)	-	41,000	41,000	-	-	-	-	-
Low Lift Diesel Generator	-	53,000	-	-	53,000	-	-	-
Low Lift Electrical Transformer Upgrade	-	204,000	204,000	-	-	-	-	-
General Building Maintenance & Equipment	-	-	-	-	-	-	-	-
Roadway upgrades to Maintenance Area -	-	81,000	-	-	-	81,000	-	-
Building/Grounds -	-	264,000	51,000	52,000	53,000	108,000	-	-
Clarification System	-	-	-	-	-	-	-	-
Clarifier 1 -	-	13,000	13,000	-	-	-	-	-
Clarifier 3	-	13,000	13,000	-	-	-	-	-
Chemical System	-	-	-	-	-	-	-	-
Coagulant Feed System	-	32,000	-	-	32,000	-	-	-
Coagulant Storage	-	32,000	-	-	32,000	-	-	-
Coagulant Aid System	-	21,000	-	21,000	-	-	-	-
Carbon Feed System	-	-	-	-	-	-	-	-
Recirc. Pump	-	10,000	10,000	-	-	-	-	-
Carbon Feed Pumps (4)	-	74,000	31,000	-	-	43,000	-	-
Carbon Scrubber System	-	51,000	51,000	-	-	-	-	-
Filtration	-	-	-	-	-	-	-	-
Filter 2	-	15,000	15,000	-	-	-	-	-
Filter 4	-	15,000	15,000	-	-	-	-	-
Filter 6	65,000	-	-	-	-	-	-	-
Filter 8	65,000	-	-	-	-	-	-	-
Turbidity Meters for Filter Backwash	17,500	10,000	10,000	-	-	-	-	-
Filter Meter Replacements	-	36,000	36,000	-	-	-	-	-
Pumps	-	-	-	-	-	-	-	-
Backwash Pump 1 - Actuator upgrade	9,541	-	-	-	-	-	-	-
Backwash Pump 2	-	108,000	-	-	-	108,000	-	-
High Lift Pump 9	-	135,000	-	-	-	135,000	-	-
High Lift Pump No. 10	-	255,000	255,000	-	-	-	-	-
High Lift Reservoirs (2)	-	210,000	102,000	-	53,000	-	55,000	-
Wastewater Pumps (2)	-	21,000	10,000	-	-	11,000	-	-
Diesel Generator Upgrades	-	1,689,000	-	-	-	-	-	1,689,000
HL Compressor 2	-	16,000	-	16,000	-	-	-	-
HL Compressor 3	-	32,000	-	-	16,000	16,000	-	-



Table 5 - continued
 Union Water Supply System
 Capital Budget Forecast
 (Inflated \$)

Description	Budget 2018	Total	Forecast					
			2019	2020	2021	2022	2023	2024
Main Plant Electrical	-	-	-	-	-	-	-	-
Electrical/Lighting Upgrades	13,000	10,000	10,000	-	-	-	-	-
Power Factor Capacitors for Energy Management	-	51,000	51,000	-	-	-	-	-
Generator B Transfer Switch Automation	-	36,000	36,000	-	-	-	-	-
SCADA /Communication/Security	-	-	-	-	-	-	-	-
Security System Install	-	61,000	61,000	-	-	-	-	-
System upgrade and Maintenance	100,000	1,284,000	1,122,000	31,000	32,000	32,000	33,000	34,000
UWSS Wide Communication System Improvements	-	161,000	20,000	21,000	21,000	54,000	22,000	23,000
Monitoring Equipment	-	-	-	-	-	-	-	-
Turbidity Meter Replacement -	-	10,000	10,000	-	-	-	-	-
Chlorine Analyzer Replacements	-	26,000	26,000	-	-	-	-	-
Blue Green Algae Monitoring Probe	-	31,000	31,000	-	-	-	-	-
Building Maintenance	-	-	-	-	-	-	-	-
Maintenance Shop Roof Replacement	29,323	-	-	-	-	-	-	-
Admin Building	-	31,000	31,000	-	-	-	-	-
Laboratory Upgrade	-	102,000	102,000	-	-	-	-	-
Kitchen Upgrade	24,847	-	-	-	-	-	-	-
Cottam Reservoir & Booster PS	-	-	-	-	-	-	-	-
Booster Pump 4	-	37,000	-	-	37,000	-	-	-
Compressor	-	16,000	-	-	16,000	-	-	-
Reservoir Cover Regrading/Repairs	60,000	61,000	61,000	-	-	-	-	-
Emergency Disinfection System	-	31,000	31,000	-	-	-	-	-
Distribution System	-	-	-	-	-	-	-	-
Leamington Tower	23,225	-	-	-	-	-	-	-
Albuna Tower	-	271,000	-	-	-	271,000	-	-
Kingsville Tower	-	1,144,000	-	1,144,000	-	-	-	-
Essex Water Tower Rehabilitation (interior and exterior)	1,070,232	32,000	-	-	32,000	-	-	-
Distribution System Maintenance	45,000	395,000	77,000	104,000	106,000	108,000	-	-
Master Water Meter Replacement/Upgrades	-	51,000	51,000	-	-	-	-	-
Wastewater Treatment System	-	-	-	-	-	-	-	-
Wastewater Lagoon Upgrades	-	223,000	-	-	-	-	110,000	113,000
NEW CAPITAL WORKS	-	-	-	-	-	-	-	-
CO2 pH Adjustment System Install	125,000	1,581,000	1,581,000	-	-	-	-	-
UV Disinfection - In-reservoir UV vault	-	5,815,000	-	1,040,000	4,775,000	-	-	-
Dry Scrubber - Chlorine Gas system	-	1,581,000	1,581,000	-	-	-	-	-
Pre-Treatment/clarification upgrades (DAF)	-	4,558,000	153,000	2,081,000	159,000	2,165,000	-	-
Residuals management Polymer system waste system upgr	-	1,657,000	-	-	531,000	-	-	1,126,000
Admin Building upgrades, expansion and elevator	19,261	1,236,000	-	-	-	-	110,000	1,126,000
Replacement of 12-inch Cottam Water Main	-	6,895,000	-	-	-	271,000	6,624,000	-
Total Capital Expenditures	1,862,429	32,777,000	6,071,000	5,128,000	6,293,000	3,667,000	7,231,000	4,387,000



7.2 Operating Budget Impacts

In this report the forecasted budget figures (2019-2024) are based on the 2018 operating budget. The costs for each component of the operating budget have been reviewed with staff to establish forecast inflationary adjustments. The table below summarizes these assumptions:

Table 6
Union Water Supply System
Operating Expenditures

Description	Budget 2018	Forecast						Inflation Assumptions
		2019	2020	2021	2022	2023	2024	
Expenditures								
Operating Costs								
Wages and Benefits								
Salaried	175,000	180,000	187,200	194,700	202,500	210,600	219,000	4.0%
Part time	-	-	-	-	-	-	-	4.0%
Benefits - Full time	62,000	63,250	65,800	68,400	71,100	73,900	76,900	4.0%
Benefits - Part time	-	-	-	-	-	-	-	4.0%
Office Overhead, Rents and Services								
Office supplies	1,600	2,000	2,000	2,000	2,000	2,000	2,000	2.0%
Board expenses	-	-	-	-	-	-	-	2.0%
Dues, Memberships, Subsc	4,100	5,000	5,100	5,200	5,300	5,400	5,500	2.0%
Travel & Mileage	2,806	2,500	2,600	2,700	2,800	2,900	3,000	2.0%
Training	1,500	6,000	6,100	6,200	6,300	6,400	6,500	2.0%
Conferences	4,619	6,000	6,100	6,200	6,300	6,400	6,500	2.0%
Meeting Expenses	850	2,000	2,000	2,000	2,000	2,000	2,000	2.0%
Uniforms/Clothing	-	500	500	500	500	500	500	2.0%
Legal/Professional fees	72,000	45,000	45,900	46,800	47,700	48,700	49,700	2.0%
Audit Fees	5,877	6,500	6,600	6,700	6,800	6,900	7,000	2.0%
Property Taxes	146,283	147,500	150,500	153,500	156,600	159,700	162,900	2.0%
Operational Purchases/Maint.	17,500	17,500	17,900	18,300	18,700	19,100	19,500	2.0%
Sundry	-	250	300	300	300	300	300	2.0%
Leamington Assistance	30,000	30,000	30,600	31,200	31,800	32,400	33,000	2.0%
Communications	950	1,500	1,500	1,500	1,500	1,500	1,500	2.0%
Postage & Courier	98	500	500	500	500	500	500	2.0%
Advertising & Promotion	4,000	7,000	7,100	7,200	7,300	7,400	7,500	2.0%
Insurance	13,805	15,000	15,300	15,600	15,900	16,200	16,500	2.0%
Donations & Grants	3,000	4,000	4,100	4,200	4,300	4,400	4,500	2.0%
Office equipment Purchases/Maint.	2,300	5,000	5,100	5,200	5,300	5,400	5,500	2.0%
OCWA Operating & Maintenance Contract	2,800,000	3,265,000	3,330,300	3,396,900	3,464,800	3,534,100	3,604,800	2.0%
Electricity and Natural Gas	1,175,000	1,250,000	1,275,000	1,300,500	1,326,500	1,353,000	1,380,100	2.0%
CO2 Gas Bulk Purchase	-	175,000	178,500	182,100	185,700	189,400	193,200	2.0%
Operational Programs & Studies	175,500	140,000	310,000	210,000	185,000	185,000	185,000	
Residuals Ponds Maintenance	75,000	150,000	153,000	156,100	159,200	162,400	165,600	2.0%
Watermain Repairs	48,000	100,000	102,000	104,000	106,100	108,200	110,400	2.0%
Municipal DW License Renewal	12,500	-	-	-	-	-	-	2.0%
Facility Enhancements - General	19,000	20,000	20,400	20,800	21,200	21,600	22,000	2.0%
Sub Total Operating	4,853,288	5,647,000	5,932,000	5,949,300	6,044,000	6,166,300	6,291,400	
Capital-Related								
Existing Debt (Principal) - Non-Growth Related	902,009	1,021,638	1,154,638	1,302,487	1,466,829	1,649,492	1,852,503	
Existing Debt (Interest) - Non-Growth Related	1,411,432	1,310,662	1,196,641	1,067,891	922,766	759,442	575,889	
New Non-Growth Related Debt (Principal)	-	-	-	16,658	3,583,342	-	-	
New Non-Growth Related Debt (Interest)	-	-	-	8,000	142,641	-	-	
Transfer to Capital	1,431,281	-	-	-	-	-	-	
Transfer to Working Fund (WCFU Account)	-	-	-	-	-	-	-	
Transfer to Water Rate Stabilization Reserve	-	-	-	-	-	-	-	
Transfer to Water Capital Reserve	1,498,068	2,394,949	2,542,100	2,951,903	3,355,185	3,726,229	4,118,222	
Sub Total Capital Related	5,242,789	4,727,249	4,893,378	5,346,939	9,470,764	6,135,163	6,546,614	
Total Expenditures	10,096,077	10,374,249	10,825,378	11,296,239	15,514,764	12,301,463	12,838,014	



Operating revenues for water programs normally consist of charges to users (via volumetric rate for volume) as well as various service charges and miscellaneous fees. These miscellaneous revenues have been assumed to increase at 2% annually over the forecast period. The table below summarizes these assumptions:

Table 7
Union Water Supply System
Operating Revenues

Description	Budget 2018	Forecast						Inflation Assumptions
		2019	2020	2021	2022	2023	2024	
Revenues								
Investment Income	150,000	152,500	155,600	158,700	161,900	165,100	168,400	2.0%
Sundry revenue	20,750	21,000	21,400	21,800	22,200	22,600	23,100	2.0%
Contributions from Working Fund (WCFU Account)	-	56,031	56,031	56,031	56,031	56,031	56,031	
Contributions from Water Rate Stabilization Reserve	-	-	-	-	3,725,983	-	-	
Contributions from Water Capital Reserve	-	-	-	-	-	-	-	
Total Operating Revenue	170,750	229,531	233,031	236,531	3,966,114	243,731	247,531	

7.3 Water Rate Calculations

The net amount to be recovered by the water rates (operating expenditures less operating revenues – i.e. Table 6 less Table 7) is shown in the following table. This recovery is provided by dividing the forecast water volumes into the net operating costs to be recovered. As noted in section 1, the U.W.S.S.’s current policy is to provide only a volumetric rate. It has been assumed that this policy will continue.

Based on the discussions above, the following forecast rates are provided for the U.W.S.S.’s Board for consideration. It is noted that the updated rates increase by 2% for 2019 then increase by 4% thereafter.

Table 8
Union Water Supply System
Water Rate Calculations

Description	2018	2019	2020	2021	2022	2023	2024
Total Water Billing Recovery	9,925,327	10,144,718	10,592,347	11,059,707	11,548,650	12,057,732	12,590,483
Total Volume (m ³)	16,303,100	16,336,100	16,401,900	16,467,700	16,533,500	16,599,300	16,665,100
Constant Rate	0.6088	0.6210	0.6458	0.6716	0.6985	0.7264	0.7555
Annual Percentage Change		2.0%	4.0%	4.0%	4.0%	4.0%	4.0%



8. Considerations for the U.W.S.S. Board

As presented within this report, capital and operating expenditures have been identified and forecasted over a six-year period for water services. In addition, a long-term lifecycle plan has been provided consistent with the principles of sustainability as provided in S.W.S.S.A., Ontario Regulation 453/07, and the Water Opportunities Act.

Based upon the foregoing, the following recommendations are put forth for the Board's consideration:

1. That the Board consider the capital program for water services along with the associated funding.
2. That the Board provides for the recovery of all water costs, where the capital is fully funded by the U.W.S.S. financial resources and by the use of long-term debt.
3. That the Board consider increasing the 2018 water rate of \$0.6088 per cu.m by 2% to \$0.6205 per cu.m for 2019 then by 4% for 2020.
4. That the Financial Plan Report, for submission to the Province, be prepared based upon this 2018/2019 water rate study.

We trust that the foregoing is satisfactory and would be pleased to discuss it further with you, at your convenience.

Yours very truly,

WATSON & ASSOCIATES ECONOMISTS LTD.

Gary Scandlan
Director



Appendix A

Water System Inventory



Appendix A: Water System Inventory

Appendix A-1 Union Water Supply System Summary of Water Infrastructure

Area	Total Replacement Value	Amount included in 6-year forecast	Net Replacement for Future Lifecycle	Annual Lifecycle Replacement for Remaining Useful Life
Water				
Water Facilities	63,141,261	} 8,895,000	} 100,617,724	1,506,175
Water Machinery & Equipment	16,949,469			569,398
Watermains	59,837,102			2,828,799
Total	139,927,832	8,895,000	100,617,724	4,904,372

Investment per residential equivalent customer is \$1,717 for water



Table A-2
 Union Water Supply System
 Water Facility Inventory

Item	Description	Category	Asset ID	Location	Year Installed	Estimated Life	Replacement Year	Replacement Cost	Years until Replacement	Annual Lifecycle Contribution	Amount to be included in 10 year Forecast
Cottam Station - Building		Cottam Station	1307	Cottam Station	1998	50	2048	4,159,572	29	190,418	-
Original Low-Lift Building	Low Lift Station - Building	Low Lift Station	1425	Low Lift Station	1960	20	2019	1,438,369		suggested for 10 year capital forecast	1,438,369
Extension to Low-Lift Building	Low Lift Station - Building	Low Lift Station	1426	Low Lift Station	1994	50	2044	3,628,883	25	185,873	-
Low-Lift Roof	Low Lift Station - Building	Low Lift Station	1427	Low Lift Station	2009	20	2029	18,019	10	2,006	-
ESSEX TOWER	Essex Water Tower	Water Towers	2554	Essex Tower	1959	50	2019	1,832,481		suggested for 10 year capital forecast	1,832,481
KINGSVILLE TOWER	Kingsville Water Tower	Water Towers	2555	Kingsville Tower	1959	50	2019	576,032		suggested for 10 year capital forecast	576,032
LEAMINGTON TOWER	Leamington Water Tower	Water Towers	2556	Leamington Tower	1959	50	2019	11,421,269		suggested for 10 year capital forecast	11,421,269
ORIGINAL WTP BUILDING		Water Treatment Plant	2568	Water Treatment Plant	1960	50	2019	15,492,526		suggested for 10 year capital forecast	15,492,526
UNION RESERVOIR #2		Water Treatment Plant	2571	Water Treatment Plant	1981	50	2031	3,011,997	12	284,813	-
CLARIFIER DOMES		Water Treatment Plant	2574	Water Treatment Plant	1992	20	2019	706,414		suggested for 10 year capital forecast	706,414
UNION FILTER EXTENSION	Filters 5 through 8	Water Treatment Plant	2575	Water Treatment Plant	1999	50	2049	6,488,384	30	289,706	-
HIGH-LIFT STATION EXTENSION		Water Treatment Plant	2576	Water Treatment Plant	1999	50	2049	4,424,492	30	197,553	-
POST CHLORINATION BUILDING		Water Treatment Plant	2577	Water Treatment Plant	1999	20	2019	299,982		suggested for 10 year capital forecast	299,982
AMONIA BUILDING	Building & System	Water Treatment Plant	2581	Water Treatment Plant	2004	50	2054	2,503,689	35	100,153	-
WTP ROOF	Replaced in 2009	Water Treatment Plant	2584	Water Treatment Plant	2009	20	2029	93,200	10	10,376	-
Steel Tank		Water Towers	2613	Albuna Water Tower	2012	50	2062	2,700,599	43	94,224	-
Pedestal		Water Towers	2614	Albuna Water Tower	2012	50	2062	2,057,987	43	71,803	-
Risers & overflow pipes		Water Towers	2615	Albuna Water Tower	2012	50	2062	474,022	43	16,539	-
Electrical		Water Towers	2627	Albuna Water Tower	2012	50	2062	241,387	43	8,422	-
Overhead Door		Water Treatment Plant	2637	Water Treatment Plant	2013	50	2063	20,502	44	705	-
Windows	8 - in Filter Room 2, 4, & Base	Water Treatment Plant	2638	Water Treatment Plant	2013	50	2063	6,933	44	238	-
Union Filter Extension	Filter #1	Water Treatment Plant	2647	Water Treatment Plant	2013	50	2063	469,300	44	16,138	-
Office Lighting		Water Treatment Plant	2648	Water Treatment Plant	2013	50	2063	80,017	44	2,752	-
Circuit Breaker	200 AMP Circuit Breaker	Water Towers	2652	Albuna Water Tower	2013	40	2053	9,800	34	400	-
Union Filter Extension	Filter #3	Water Treatment Plant	2669	Water Treatment Plant	2014	50	2064	621,338	45	21,069	-
Union Filter Extension	Filter #4	Water Treatment Plant	2676	Water Treatment Plant	2015	50	2065	120,157	46	4,020	-
Low Lift Station Lighting	Low Lift Station Lighting	Low Lift Station	2677	Low Lift Station	2015	50	2065	10,401	46	348	-
Cottam Station Lighting	Cottam Station Lighting	Cottam Station	2679	Cottam Station	2015	50	2065	7,050	46	236	-
Windows	26-Main Building West and No	Water Treatment Plant	2683	Water Treatment Plant	2015	50	2065	51,650	46	1,728	-
Union Filter Extension	Filter #2	Water Treatment Plant	2692	Water Treatment Plant	2015	50	2065	130,043	46	4,350	-
Pole Barn Roof	Pole Barn Roof Replaced in 20	Water Treatment Plant	2712	Water Treatment Plant	2016	20	2036	9,921	17	694	-
Chlorine Building Roof	Chlorine Building Roof Replace	Water Treatment Plant	2714	Water Treatment Plant	2016	20	2036	12,701	17	889	-
Windows	2 - in Generator Room	Water Treatment Plant	2747	Water Treatment Plant	2017	50	2067	3,922	48	128	-
Windows	6 - in Micro Screen Room	Water Treatment Plant	2748	Water Treatment Plant	2017	50	2067	11,913	48	388	-
Windows	8 - in Circle Filter Room Lower	Water Treatment Plant	2749	Water Treatment Plant	2017	50	2067	6,309	48	206	-
Total								63,141,261		1,506,175	31,767,074



Table A-3
Union Water Supply System
Water Machinery & Equipment Inventory

Item	Description	Category	Asset ID	Location	Year Installed	Estimated Life	Replacement Year	Replacement Cost	Years until Replacement	Annual Lifecycle Contribution	Amount to be included in 10 year Forecast
ESSEX TOWER FENCING	Essex Water Tower Fencing	Water Towers	2557	Essex Tower	2008	15	2023	11,552	4	suggested for 10 year capital forecast	11,552
LOW LIFT SCREEN #1	Low Lift Screen #1	Low Lift Station	2558	Low Lift Station	2007	20	2027	187,915	8	suggested for 10 year capital forecast	187,915
PUMP #5	Pumping System	Low Lift Station	2563	Low Lift Station	1970	20	2019	209,926	0	suggested for 10 year capital forecast	209,926
PUMPS #1, #3 & #4 (#2 disposed of in 2013)	Pumping System	Low Lift Station	2564	Low Lift Station	1960	20	2019	271,167	0	suggested for 10 year capital forecast	271,167
LOW LIFT ELECTRICAL	Electrical System	Low Lift Station	2566	Low Lift Station	1960	50	2019	966,744	0	suggested for 10 year capital forecast	966,744
CLARIFIER #2		Water Treatment Plant	2569	Water Treatment Plant	1970	50	2020	1,314,056	1	suggested for 10 year capital forecast	1,314,056
MICROSTRAINER #2		Water Treatment Plant	2570	Water Treatment Plant	1970	50	2020	667,505	1	suggested for 10 year capital forecast	667,505
UNION ACTIVATED CARBON FACILITIES		Water Treatment Plant	2572	Water Treatment Plant	1991	20	2019	808,141	0	suggested for 10 year capital forecast	808,141
CLARIFIER #3		Water Treatment Plant	2573	Water Treatment Plant	1992	50	2042	2,191,116	23	119,784	-
ELECTRICAL		Water Treatment Plant	2578	Water Treatment Plant	1998	50	2048	2,145,178	30	95,782	-
WASTEWATER STATION		Water Treatment Plant	2579	Water Treatment Plant	1999	20	2019	642,202	0	suggested for 10 year capital forecast	642,202
TRANSFORMER #2		Water Treatment Plant	2580	Water Treatment Plant	2003	20	2023	365,556	4	suggested for 10 year capital forecast	365,556
CLARIFIER #4		Water Treatment Plant	2582	Water Treatment Plant	2006	50	2056	3,185,761	37	122,673	-
LEAMINGTON TOWER FENCING	Water Tower Fence	Water Towers	2585	Leamington Water Tower	2008	15	2023	10,960	4	suggested for 10 year capital forecast	10,960
KINGSVILLE TOWER FENCING	Kingsville Water Tower Fencing	Water Towers	2586	Kingsville Tower	2008	15	2023	10,449	4	suggested for 10 year capital forecast	10,449
WTP FENCING & GATE	Water Treatment Plant Fence	Water Treatment Plant	2587	Union Water Treatment Plant	2008	15	2023	21,290	4	suggested for 10 year capital forecast	21,290
(10) FIRE HYDRANT PRESSURE TESTER	10 Hydrant Testers	Water Treatment Plant	2588	Union Water Treatment Plant	2008	10	2019	18,533	0	suggested for 10 year capital forecast	18,533
HIGH LIFT HEADER		Water Treatment Plant	2590	WTP	1995	40	2035	823,576	16	60,656	-
Ammonia System Softner Tank #3	Part of Chlorination System	Water Treatment Plant	2592		2010	20	2030	11,397	11	1,165	-
Regulators, Strainers, Valves	Delivery 2010, Install 2011	Water Treatment Plant	2595	Chlorine Building	2011	10	2021	16,336	2	suggested for 10 year capital forecast	16,336
SCADA Upgrade		Water Treatment Plant	2603	Water Treatment Plant	2011	20	2031	286,770	12	27,117	-
Vacuum Pump		Water Treatment Plant	2604	Water Treatment Plant	2011	20	2031	8,589	12	812	-
Polymer pumps (5)		Water Treatment Plant	2605	Water Treatment Plant	2011	20	2031	17,661	12	1,670	-
Fuel System Upgrade	Fuel tank for backup generator	Water Treatment Plant	2606	Water Treatment Plant	2011	20	2031	10,156	12	960	-
Fuel System Upgrade	Fuel tank for backup generator	Low Lift Station	2607	Low Lift Station	2011	20	2031	8,489	12	803	-
LOW LIFT SCREEN #2	Low Lift Screen #2	Low Lift Station	2609	Low Lift Station	2012	20	2032	198,135	13	17,459	-
Essex Tower - Mixer	Mixer	Water Towers	2610	Essex Tower	2012	10	2022	14,872	3	suggested for 10 year capital forecast	14,872
Electric Chain Hoist	Chain Hoist for Travel Screen	Low Lift Station	2611	Low Lift Station	2012	10	2022	2,946	3	suggested for 10 year capital forecast	2,946
Valve Room - Relief Pressure Valve		Water Towers	2616	Albuna Water Tower	2012	10	2022	14,585	3	suggested for 10 year capital forecast	14,585
Valve Room - Butterfly Valves	18-inch Butterfly Valve with Elbow	Water Towers	2617	Albuna Water Tower	2012	20	2032	21,440	13	1,889	-



Table A-3
Union Water Supply System
Water Machinery & Equipment Inventory

Item	Description	Category	Asset ID	Location	Year Installed	Estimated Life	Replacement Year	Replacement Cost	Years until Replacement	Annual Lifecycle Contribution	Amount to be included in 10 year Forecast
Valve Room - Butterfly Valves	18-inch manual Butterfly Valve	Water Towers	2618	Albuna Water Tower	2012	20	2032	10,574	13	932	-
Valve Room - Butterfly Valves	24-inch manual Butterfly Valve	Water Towers	2619	Albuna Water Tower	2012	20	2032	19,033	13	1,677	-
Valve Room - Check Valves	18-inch Check Valve with Back	Water Towers	2620	Albuna Water Tower	2012	20	2032	29,972	13	2,641	-
Valve Room - Check Valves	24-inch Check Valve with Back	Water Towers	2621	Albuna Water Tower	2012	20	2032	61,914	13	5,456	-
Valve Room - Electromagnetic Flow Meter		Water Towers	2622	Albuna Water Tower	2012	15	2027	23,337	8	suggested for 10 year capital forecast	23,337
Valve Room - Piping and Connections		Water Towers	2623	Albuna Water Tower	2012	50	2062	561,533	43	19,592	-
Plumbing and drainage system		Water Towers	2624	Albuna Water Tower	2012	20	2032	62,717	13	5,526	-
Circulation pump, piping & valves		Water Towers	2625	Albuna Water Tower	2012	10	2022	13,127	3	suggested for 10 year capital forecast	13,127
Chlorine residual analyzers		Water Towers	2626	Albuna Water Tower	2012	10	2022	61,259	3	suggested for 10 year capital forecast	61,259
Tank Mixing System		Water Towers	2628	Albuna Water Tower	2012	20	2032	139,144	13	12,261	-
Albuna Tower Fencing & Gate	Albuna Tower Fencing & Gate	Water Towers	2629	Albuna Water Tower	2012	30	2042	22,461	23	1,228	-
Kubota Tractor		Water Treatment Plant	2634	Water Treatment Plant	2013	10	2023	43,413	4	suggested for 10 year capital forecast	43,413
Boom Mower		Water Treatment Plant	2635	Water Treatment Plant	2013	10	2023	23,606	4	suggested for 10 year capital forecast	23,606
SCADA Upgrade		Water Towers	2636	Cottam/Essex Water Tower	2013	20	2033	38,872	14	3,211	-
MAIN WASH #1 PUMP	Part of Backwash System	Water Treatment Plant	2639		2013	20	2033	92,427	14	7,635	-
PUMP #2	High Lift Pumping System	Water Treatment Plant	2640	Water Treatment Plant	2013	20	2033	26,551	14	2,193	-
PUMP #6	Pumping System	Low Lift Station	2641	Low Lift Station	2013	20	2033	37,194	14	3,072	-
PLC Upgrades (Hardware)		Low Lift Station	2644	Low Lift Pump	2013	20	2033	18,927	14	1,563	-
Cottam Booster Station - Mixer	Mixers (2)	Cottam Station	2645	Cottam Booster Station	2013	10	2023	29,442	4	suggested for 10 year capital forecast	29,442
Cottam Booster Station - Air Compressors	Air Compressors (2)	Cottam Station	2650	Cottam Booster Station	2013	15	2028	11,435	9	suggested for 10 year capital forecast	11,435
Luminutra Instrument		Water Treatment Plant	2653	Water Treatment Plant	2014	5	2019	8,160	0	suggested for 10 year capital forecast	8,160
Turbidimeter	For Filter #3, small capital	Water Treatment Plant	2656	Water Treatment Plant	2014	10	2024	3,105	5	suggested for 10 year capital forecast	3,105
Turbidimeter	For Filter #1, small capital	Water Treatment Plant	2657	Water Treatment Plant	2014	10	2024	4,725	5	suggested for 10 year capital forecast	4,725
Combined Treated Analyzer #1	Combined Treated Analyzer #1	Water Treatment Plant	2658	Water Treatment Plant	2014	10	2024	4,305	5	suggested for 10 year capital forecast	4,305
Air Compressor	Air Compressor #3	Water Treatment Plant	2659	Water Treatment Plant	2014	15	2029	11,177	10	1,244	-
Sodium System	Pumps - Sodium System	Cottam Station	2660	Cottam Booster Station	2014	10	2024	4,455	5	suggested for 10 year capital forecast	4,455
Raw Water Turbidimeter	Raw Water Turbidimeter, small	Low Lift Station	2663	Low Lift Station	2014	10	2024	4,814	5	suggested for 10 year capital forecast	4,814
Transfer Switch	Back Up Generator B	Water Treatment Plant	2668	Water Treatment Plant	2014	45	2059	246,205	40	9,000	-
Coagulant System		Water Treatment Plant	2670	Water Treatment Plant	2014	15	2029	30,053	10	3,346	-
Toshiba 58" TV	Training Room TV	Water Treatment Plant	2674	Water Treatment Plant	2015	7	2022	960	3	suggested for 10 year capital forecast	960



Table A-3
Union Water Supply System
Water Machinery & Equipment Inventory

Item	Description	Category	Asset ID	Location	Year Installed	Estimated Life	Replacement Year	Replacement Cost	Years until Replacement	Annual Lifecycle Contribution	Amount to be included in 10 year Forecast
Magnetic Flowmeter	Magnetic Flowmeter for Filter #1	Water Treatment Plant	2675	Water Treatment Plant	2015	10	2025	13,199		suggested for 10 year capital forecast	13,199
PUMP #2	Pumping System	Low Lift Station	2678	Low Lift Station	2015	20	2035	76,892	16	5,663	-
Pump #1	High Lift Pump #1	Water Treatment Plant	2680	Water Treatment Plant	2015	20	2035	49,781	16	3,666	-
Flow Meter	Flow Meter for Main Wash #1	Water Treatment Plant	2681	Water Treatment Plant	2015	10	2025	5,542		suggested for 10 year capital forecast	5,542
Variable Frequency Drive for Main Wash #1		Water Treatment Plant	2682	Water Treatment Plant	2015	10	2025	9,643		suggested for 10 year capital forecast	9,643
Turbidity Analyzer		Water Treatment Plant	2684	Water Treatment Plant	2015	10	2025	4,364		suggested for 10 year capital forecast	4,364
Turbidity meter	Clarity II Turbidity Measurement	Water Treatment Plant	2685	Water Treatment Plant	2015	10	2025	9,529		suggested for 10 year capital forecast	9,529
Communication System		Water Treatment Plant	2690	Water Treatment Plant	2015	6	2021	17,755	2	suggested for 10 year capital forecast	17,755
Chlorine Analyzer	AMI Trides Chlorine	Water Treatment Plant	2691	Water Treatment Plant	2015	10	2025	5,497		suggested for 10 year capital forecast	5,497
Office Chair	Tempur-Pedic Fabric Chair	Water Treatment Plant	2697	Water Treatment Plant	2015	15	2030	721	11	74	-
Floor Structure for CLARIFIER #1 Cat Walk	Component of Clarifier #1	Water Treatment Plant	2698	Water Treatment Plant	2015	30	2045	6,202	26	308	-
Pump #8	High Lift Pump #8	Water Treatment Plant	2699	Water Treatment Plant	2015	10	2025	20,261		suggested for 10 year capital forecast	20,261
Generator	Portable Diesel Generator	Water Treatment Plant	2700	Water Treatment Plant	2016	30	2046	137,798	27	6,655	-
Water Heaters	Water Heaters	Water Towers	2701	Albuna Water Tower	2016	10	2026	1,758		suggested for 10 year capital forecast	1,758
Communication Upgrade	Wireless Link	Water Towers	2702	Kingsville Water Tower	2016	10	2026	2,041		suggested for 10 year capital forecast	2,041
Pump #3	Pump #3	Cottam Station	2703	Cottam Booster Station	2016	20	2036	5,848	17	409	-
Turbidity Analyzer	Turbidity Analyzer for Filter #1	Water Treatment Plant	2704	Water Treatment Plant	2016	10	2026	4,516		suggested for 10 year capital forecast	4,516
Magnetic Flowmeter	Flowmeter for Filter #2	Water Treatment Plant	2705	Water Treatment Plant	2016	10	2026	7,901		suggested for 10 year capital forecast	7,901
Turbidity Analyzer	Turbidity Analyzer for Filter #4	Water Treatment Plant	2706	Water Treatment Plant	2016	10	2026	4,516		suggested for 10 year capital forecast	4,516
Magnetic Flowmeter	Flowmeter for Filter #4	Water Treatment Plant	2707	Water Treatment Plant	2016	10	2026	7,901		suggested for 10 year capital forecast	7,901
PUMP #3	Pumping System	Low Lift Station	2708	Low Lift Station	2016	20	2036	20,477	17	1,433	-
Chlorine Line for Intake #1	Chlorine Line for Intake #1	Low Lift Station	2709	Low Lift Station	2016	20	2036	93,386	17	6,534	-
Turbidimeters	Raw Water Turbidimeters	Low Lift Station	2710	Low Lift Station	2016	10	2026	9,219		suggested for 10 year capital forecast	9,219
PUMP #3	High Lift Pumping System	Water Treatment Plant	2711	Water Treatment Plant	2016	20	2036	29,140	17	2,039	-
LED Lighting in Driveway	LED Lighting in Driveway	Water Treatment Plant	2713	Water Treatment Plant	2016	20	2036	3,925	17	275	-
Chlorine Analyzer	Chlorine Analyzer for filter #2	Water Treatment Plant	2716	Water Treatment Plant	2016	10	2026	4,883		suggested for 10 year capital forecast	4,883



**Table A-3
Union Water Supply System
Water Machinery & Equipment Inventory**

Item	Description	Category	Asset ID	Location	Year Installed	Estimated Life	Replacement Year	Replacement Cost	Years until Replacement	Annual Lifecycle Contribution	Amount to be included in 10 year Forecast
Chlorine Analyzer	Chlorine Analyzer for filter #3	Water Treatment Plant	2717	Water Treatment Plant	2016	10	2026	4,639		suggested for 10 year capital forecast	4,639
Chlorine Analyzer	Chlorine Analyzer for filter #4	Water Treatment Plant	2718	Water Treatment Plant	2016	10	2026	4,639		suggested for 10 year capital forecast	4,639
Sewer for SCADA System	Sewer for SCADA System	Water Treatment Plant	2727	Water Treatment Plant	2016	5	2021	7,240		suggested for 10 year capital forecast	7,240
Chlorine Analyzer	Chlorine Analyzer for filter #2	Water Treatment Plant	2728	Water Treatment Plant	2016	10	2026	3,979		suggested for 10 year capital forecast	3,979
Laptop	LENOVO TO YOGA 260	Water Treatment Plant	2729	Water Treatment Plant	2016	4	2020	2,487		suggested for 10 year capital forecast	2,487
Security Camera System		Water Treatment Plant	2730	Water Treatment Plant	2016	10	2026	2,934		suggested for 10 year capital forecast	2,934
Billing Meter Communication System		Water Treatment Plant	2731	Water Treatment Plant	2016	10	2026	24,267		suggested for 10 year capital forecast	24,267
Turbidity Monitor	For Clarifier #2	Water Treatment Plant	2733	Water Treatment Plant	2017	10	2027	8,202		suggested for 10 year capital forecast	8,202
Filter #5 Media Replacement	Filter #5 Media Replacement	Water Treatment Plant	2734	Water Treatment Plant	2017	20	2037	58,517	18	3,903	-
Chlorine Analyzer for Filter #5	Chlorine Analyzer for Filter #5	Water Treatment Plant	2735	Water Treatment Plant	2017	10	2027	4,698		suggested for 10 year capital forecast	4,698
Turbidimeters for Filter #6	Turbidimeters for Filter #6	Water Treatment Plant	2736	Water Treatment Plant	2017	10	2027	9,311		suggested for 10 year capital forecast	9,311
Chlorine Analyzer for Filter #6	Chlorine Analyzer for Filter #6	Water Treatment Plant	2737	Water Treatment Plant	2017	10	2027	4,698		suggested for 10 year capital forecast	4,698
Turbidimeter for Filter #7	Turbidimeter for Filter #7	Water Treatment Plant	2738	Water Treatment Plant	2017	10	2027	4,653		suggested for 10 year capital forecast	4,653
Chlorine Analyzer for Filter #7	Chlorine Analyzer for Filter #7	Water Treatment Plant	2739	Water Treatment Plant	2017	10	2027	4,698		suggested for 10 year capital forecast	4,698
Filter #8 Media Replacement	Filter #8 Media Replacement	Water Treatment Plant	2740	Water Treatment Plant	2017	20	2037	58,190	18	3,881	-
Turbidimeter for Filter #8	Turbidimeter for Filter #8	Water Treatment Plant	2741	Water Treatment Plant	2017	10	2027	4,653		suggested for 10 year capital forecast	4,653
Chlorine Analyzer for Filter #8	Chlorine Analyzer for Filter #8	Water Treatment Plant	2742	Water Treatment Plant	2017	10	2027	4,698		suggested for 10 year capital forecast	4,698
Turbidimeter	Turbidimeter	Low Lift Station	2745	Low Lift Station	2017	10	2027	5,820		suggested for 10 year capital forecast	5,820
Pump #4	High Lift Pump #4	Water Treatment Plant	2746	Water Treatment Plant	2017	20	2037	32,440	18	2,164	-
Air Compressor #1	Air Compressor #1	Water Treatment Plant	2750	Water Treatment Plant	2017	10	2027	12,053		suggested for 10 year capital forecast	12,053
Gear Assembly for Valve Chamber	Gear Assembly for Valve Chamber	Cottam Station	2756	Cottam Booster Station	2017	20	2037	2,876	18	192	-
Blue/Green Algae Monitor Instrument	Blue/Green Algae Monitor Instrument	Water Treatment Plant	2759	Water Treatment Plant	2017	5	2022	10,907		suggested for 10 year capital forecast	10,907
AED Device	AED Device	Water Treatment Plant	2761	Water Treatment Plant	2017	5	2022	1,932		suggested for 10 year capital forecast	1,932
Alarmed Wall Cabinet for AED Device	Alarmed Wall Cabinet for AED Device	Water Treatment Plant	2762	Water Treatment Plant	2017	5	2022	336		suggested for 10 year capital forecast	336
Monitor	ASUS 27" Monitor	Water Treatment Plant	2763	Water Treatment Plant	2017	7	2024	327		suggested for 10 year capital forecast	327
Rectifier	Dual Circuit Rectifier	Water Towers	2765	Kingsville Water Tower	2017	15	2032	9,679	13	853	-
Total								16,949,469		569,398	6,046,574



Table A-4
Union Water Supply System
Watermain Inventory

Location	Asset ID	Length (km)	Diameter (mm)	Material	Year Installed	Estimated Life	Replacement Year	Replacement Cost / m	Total Main Replacement Costs	Years until Replacement	Annual Lifecycle Contribution	Amount to be included in 10 year Forecast
Cty Rd 45 (Union Ave) - WTP to Cty Rd 34	1230	1.190	762	CPP	1957	75	2032	1,038	1,235,289	13	108,852	-
Cty Rd 34 (Talbot Rd) - Cty Rd 45 to Cty Rd 31	1231	2.366	762	CPP	1957	75	2032	999	2,362,712	13	208,198	-
Cty Rd 34 (Talbot Rd) - Cty Rd 31 to Cty Rd 48	1232	1.805	762	CPP	1957	75	2032	996	1,798,647	13	158,494	-
Cty Rd 48 (Oak St) - Cty Rd 34 to Erie St	1233	1.887	762	CPP	1957	75	2032	973	1,835,455	13	161,737	-
Cty Rd 45 (Union Ave) - WTP to Cty Rd 20	1234	0.407	305	CCI	1957	75	2032	193	78,382	13	6,907	-
Cty Rd 20 (Seacliff Dr) - Cty Rd 45 to Cty Rd 31	1235	2.303	305	CCI	1957	75	2032	243	559,809	13	49,329	-
Cty Rd 34 (Talbot Rd) - Cty Rd 45 to Hwy 3	1236	1.696	305	CCI	1957	75	2032	244	413,454	13	36,433	-
Cty Rd 34 (Talbot Rd) - Hwy 3 to Olinda Sideroad	1237	1.477	305	CCI	1957	75	2032	273	403,100	13	35,520	-
Cty Rd 34 (Talbot Rd) - Olinda Sideroad to Graham Sideroad	1238	1.207	305	CCI	1957	75	2032	256	308,672	13	27,200	-
Cty Rd 34 (Talbot Rd) - Graham Sideroad to Inman Sideroad	1239	3.948	305	CCI	1957	75	2032	118	465,972	13	41,061	-
Cty Rd 34 (Talbot Rd) - Inman Sideroad to Cty Rd 29	1240	1.910	305	CCI	1957	75	2032	283	540,823	13	47,656	-
Cty Rd 34 (Talbot Rd) - Cty Rd 29 to Cottam PS	1241	1.238	305	CCI	1957	75	2032	143	176,911	13	15,589	-
Cty Rd 34 (Talbot Rd) - Cottam PS to Cty Rd 27	1242	0.598	305	AC	1957	75	2032	167	99,817	13	8,796	-
Cty Rd 34 (Talbot Rd) - Cty Rd 27 to Cameron Sideroad	1243	3.688	305	AC	1957	75	2032	165	608,460	13	53,617	-
Cty Rd 34 (Talbot Rd) - Cameron Sideroad to Cty Rd 23	1244	3.643	305	AC	1957	75	2032	167	608,460	13	53,617	-
From Cty Rd 23 (Albuna) to Essex Water Tower (via Talbot, Wellington, Alice N alleyway,	1245	1.690	305	AC	1957	75	2032	295	497,935	13	43,877	-
Armstrong - Oak to Talbot	1246	0.252	305	AC	1963	75	2038	401	101,016	19	6,443	-
Talbot - Armstrong to Johnson	1247	0.318	305	AC	1963	75	2038	401	127,472	19	8,130	-
Johnson - Talbot to Easement	1248	0.322	305	AC	1963	75	2038	401	129,072	19	8,232	-
Easement - Johnson to Hodgins (at former C&O ROW)	1249	0.461	305	AC	1963	75	2038	401	184,787	19	11,786	-
Cty Rd 29 (Division Road) - Road 2 E to Highway 3	1250	5.285	406	AC	1972	75	2047	534	2,824,618	28	132,728	-
Cty Rd 29 (Division Road) - Highway 3 to EWRR ROW	1251	1.360	406	AC	1972	75	2047	534	726,866	28	34,155	-
EWRR ROW - Cty Rd 29 to Cty Rd 34	1252	0.684	406	AC	1972	75	2047	1,973	1,349,487	28	63,412	-
Cty Rd 29 (Division Road) - Road 2 E to Old K'ville Bdy	1253	0.612	406	AC	1972	75	2047	534	327,087	28	15,370	-
Cty Rd 29 (Division Road) - Old K'ville Bdy to Pulford	1254	0.695	305	DI	1993	75	2068	409	284,451	49	9,160	-
Pulford St - Cty Rd 29 (Division) to Kingsville Water Tower	1255	0.168	305	CI	1961	75	2036	401	67,344	17	4,712	-
Road 2 E - Cty Rd 45 to Peterson Sideroad	1256	0.390	610	AC	1972	75	2047	959	373,833	28	17,566	-
Road 2 E - Peterson Sideroad to Graham Sideroad	1257	1.231	610	AC	1972	75	2047	959	1,179,968	28	55,446	-
Road 2 E - Graham Sideroad to Jasperson	1258	2.320	610	AC	1972	75	2047	959	2,223,816	28	104,496	-
Road 2 E - Jasperson to Cty Rd 29	1259	1.377	610	AC	1972	75	2047	959	1,319,914	28	62,022	-
Union WTP to 2nd Conc Rd. (via UWSS Corridor)	1260	0.805	914	CPP	1995	75	2070	1,186	954,752	51	30,035	-
Peterson Sideroad - Road 2 E to Road 3 E	1261	1.408	610	PVC	2002	75	2077	650	915,814	58	26,821	-
Easement - Road 3 E to Cty Rd 18	1262	1.824	610	PVC	2002	75	2077	650	1,186,395	58	34,746	-
Cty Rd 18 - Easement to Cty Rd 34	1263	0.973	610	PVC	2002	75	2077	650	632,874	58	18,535	-
Road 2 E - WTP to Peterson Sideroad	1264	0.382	1,067	CPP	2007	75	2082	1,708	652,527	63	18,309	-
Road 2 E - WTP to Cty Rd 45	1265	0.243	1,067	CPP	2003	75	2078	1,598	388,366	59	11,271	-
Road 2 E - Cty Rd 45 to Easement	1266	0.609	1,067	CPP	2003	75	2078	1,598	973,310	59	28,248	-
Easement - Road 2 E to Cty Rd 34 (Talbot)	1267	0.650	1,067	CPP	2003	75	2078	1,598	1,038,835	59	30,150	-
Easement - Cty Rd 35 to C&O Railway	1268	0.241	1,067	CPP	2003	75	2078	1,598	385,169	59	11,179	-
C&O Railway - Easement to Cty Rd 31 (Albuna)	1269	1.479	1,067	CPP	2003	75	2078	1,608	2,377,986	59	69,015	-
Cty Rd 31 - C&O Railway to Easement	1270	0.222	1,067	CPP	2003	75	2078	1,598	354,803	59	10,297	-
Cty Rd 31 - Easement to Cty Rd 34 (Talbot)	1271	0.425	914	CPP	2003	75	2078	1,370	582,204	59	16,897	-
Easement - Cty Rd 31 (Albuna) to Meter Chamber 29	1272	0.098	914	CPP	2003	75	2078	1,370	134,249	59	3,896	-
Cty Rd 31 - C&O Railway to dead end (14m)	1273	0.014	610	PVC	2003	75	2078	913	12,785	59	371	-
Easement - Meter Chamber 29 to C&O Railway	1274	0.750	762	CPP	2003	75	2078	1,004	752,864	59	21,850	-
C&O Railway - Easement to Hodgins St	1275	2.341	762	CPP	2003	75	2078	1,004	2,349,941	59	68,201	-
C&O Railway - Hodgins St to Penn Central Railway	1276	0.144	762	CPP	2003	75	2078	1,004	144,550	59	4,195	-
C&O Railway - Penn Central Railway to Erie St	1277	0.660	610	CPP	2003	75	2078	626	413,056	59	11,988	-
Erie Street - C&O Railway to Clark St	1278	0.231	305	PVC	2005	75	2080	406	93,835	61	2,676	-
Erie Street - Clark St to John St	1279	0.175	305	PVC	2005	75	2080	406	71,088	61	2,028	-



Table A-4
Union Water Supply System
Watermain Inventory

Location	Asset ID	Length (km)	Diameter (mm)	Material	Year Installed	Estimated Life	Replacement Year	Replacement Cost / m	Total Main Replacement Costs	Years until Replacement	Annual Lifecycle Contribution	Amount to be included in 10 year Forecast
Erie Street - John St to Talbot St	1280	0.092	203	CI	1965	75	2040	325	29,930	21	1,759	-
Erie Street - Talbot St to Robinson St	1281	0.422	305	DI	1987	75	2062	408	172,354	43	6,013	-
Erie Street - Robinson St to Montgomery St	1282	0.145	203	CI	1965	75	2040	325	47,168	21	2,773	-
Erie Street - Montgomery St to Oak St	1283	0.155	305	DI	1981	75	2056	416	64,526	37	2,485	-
Cty Rd 27 - Nth Talbot to Cty Rd 8	1284	3.906	203	AC	1968	75	2043	325	1,270,712	24	67,184	-
Cty Rd 34 - EWRR RoW to Cottam Centre	1285	1.468	406	PVC	1988	75	2063	542	795,835	44	27,367	-
Forest Avenue - Essex Tower to Bell	1286	0.226	305	AC	1975	75	2050	401	90,592	31	3,949	-
Bell Avenue - Forest to Maidstone	1287	0.292	305	AC	1975	75	2050	401	117,045	31	5,103	-
Maidstone Avenue - Bell to College	1288	0.070	305	AC	1975	75	2050	401	28,058	31	1,223	-
College St - Maidstone to Talbot	1289	0.180	305	PVC	1995	75	2070	409	73,653	51	2,317	-
Talbot St - College to Meter Chamber 10	1290	0.702	305	PVC	1995	75	2070	409	287,244	51	9,036	-
Cty Rd 8 (Maidstone Ave) - Cty Rd 23 (N) to Cty Rd 23 (S) (Arner)	1291	0.036	254	PVC	1989	75	2064	368	13,258	45	450	-
Cty Rd 8 (Maidstone Ave) - Cty Rd 23 (S) to W side CN railway	1292	0.850	254	PVC	2006	75	2081	372	316,401	62	8,950	-
Cty Rd 8 (Maidstone Ave) - W side CN railway to Cameron	1293	0.282	254	PVC	1981	75	2056	380	107,187	37	4,127	-
Cty Rd 8 (Maidstone Ave) - Cameron to Golfway	1294	0.190	254	PVC	2006	75	2081	372	70,725	62	2,001	-
Cty Rd 8 (Maidstone Ave) - Golfway to Station	1295	0.076	254	PVC	1991	75	2066	371	28,202	47	931	-
Cty Rd 8 (Maidstone Ave) - Station halfway to Talbot	1296	0.188	254	PVC	1994	75	2069	374	70,337	50	2,238	-
Cty Rd 8 (Maidstone Ave) - to Talbot	1297	0.188	254	PVC	1987	75	2062	373	70,105	43	2,446	-
Talbot - Maidstone to College	1298	0.214	305	PVC	1995	75	2070	409	87,564	51	2,755	-
Nth Talbot Rd - Easement to 8th Conc Rd	1299	0.670	406	PVC	1996	75	2071	546	311,295	52	9,684	-
8th Conc Rd - Nth Talbot to Graham Sideroad	1300	2.467	406	PVC	1996	75	2071	546	1,347,304	52	41,913	-
Graham Sideroad - 8th Conc Rd to Cty Rd 14	1301	1.362	406	PVC	1996	75	2071	546	743,829	52	23,140	-
Graham Sideroad - Cty Rd 14 to Cty Rd 8	1302	3.955	305	PVC	1996	75	2071	410	1,619,958	52	50,395	-
Easement - Cottam PS to Nth Talbot Rd	1303	1.544	508	CPP	1996	75	2071	683	1,054,031	52	32,790	-
Nth Talbot Rd - Easement to Cty Rd 27	1304	1.131	406	PVC	1996	75	2071	546	617,672	52	19,215	-
Nth Talbot Rd - Cty Rd 27 to Cty Rd 8	1305	7.099	406	PVC	1996	75	2071	546	3,876,978	52	120,609	-
Cty Rd 8 - Nth Talbot Rd to Cty Rd 23 (N)	1306	0.168	406	PVC	1996	75	2071	546	91,750	52	2,854	-
UNION INTAKE #2	2560				1991	50	2041		4,818,392	22	272,872	-
UNION INTAKE #1	2561				1960	50	2019		892,386	0	suggested for 10 year capital forecast	892,386
DISCHARGE MAIN #2	2562				1977	75	2052		1,501,347	33	62,586	-
DISCHARGE MAIN #1	2565				1960	50	2019		653,467	0	suggested for 10 year capital forecast	653,467
WASTEWATER LINE	2567				1960	50	2019		384,523	0	suggested for 10 year capital forecast	384,523
Pipe Corrosion Replacement	2583				2010	20	2030		30,763	11	3,143	-
Pipe Corrosion Replacement	2602				2011	20	2031		83,703	12	7,915	-
Albuna Tower Feeder Main	2631		600	CPP	2012	75	2087		268,661	68	7,262	-
Essex Tower Overflow Extension	2651		tba	Carbon Steel	2013	75	2088		31,370	69	842	-
Water Meter #17	2665		tba		2014	10	2024		3,483	5	suggested for 10 year capital forecast	3,483
Essex Water Tower Drainage/Sewer Pipe	2667		tba		2014	40	2054		2,150	35	86	-
Actuator for Valve #423	2686		tba		2015	20	2035		5,344	16	394	-
Billing Meter #16	2688		tba		2015	20	2035		6,140	16	452	-
Billing Meter #8 (was #27)	2689		tba		2015	20	2035		4,877	16	359	-
Billing Meter #11	2719		tba		2016	20	2036		6,052	17	423	-
Valve	2720		tba		2016	30	2046		9,625	27	465	-
Billing Meter #9	2721		tba		2016	20	2036		12,560	17	879	-
Solar Panel for Billing Meter #27	2722		tba		2016	20	2036		6,493	17	454	-
Billing Meter #19	2723		tba		2016	20	2036		7,706	17	539	-
Flange & Spool for Billing Meter #uc26	2724		tba		2016	20	2036		2,910	17	204	-
Meter Chamber upgrade for Meter #3	2725		tba		2016	20	2036		31,917	17	2,233	-
Billing Meter #22	2726		tba		2016	20	2036		9,180	17	642	-
Meter Chamber upgrade for Meter #26	2751		tba		2017	20	2037		6,870	18	458	-
Billing Meter #27	2752		tba		2017	20	2037		8,970	18	598	-
Billing Meter #6	2753		tba		2017	20	2037		6,174	18	412	-
Billing Meter 14	2754		tba		2017	20	2037		5,742	18	383	-
Billing Meter #1B Bypass	2755		tba		2017	20	2037		3,028	18	202	-
Spool & Flange Adapter to Billing Meter #8	2757		tba		2017	20	2037		521	18	35	-
Total		86.180							59,837,102		2,828,799	1,933,859



Appendix B

Water Rate Calculations



Appendix B: Water Rate Calculations

Table B-1
Union Water Supply System
Capital Budget Forecast
Inflated \$

Description	Budget 2018	Total	Forecast					
			2019	2020	2021	2022	2023	2024
Studies and Programs	-	-	-	-	-	-	-	-
Water Quality Investigations	33,000	303,000	61,000	62,000	64,000	38,000	39,000	39,000
New Ruthven WTP Reservoir #3 Study	-	41,000	41,000	-	-	-	-	-
Backup Power Generation/ Energy Study	-	41,000	41,000	-	-	-	-	-
Water Demand/ Loss Study	85,000	-	-	-	-	-	-	-
UWSS Operations Contract Assessment	10,000	-	-	-	-	-	-	-
Water Rate Study/ Financial Plan Update	32,500	-	-	-	-	-	-	-
Cottam 12-inch main replacement- EA & Prelim Eng	-	260,000	-	260,000	-	-	-	-
Contingency (un-identified future studies)	-	656,000	-	-	159,000	162,000	166,000	169,000
Low Lift	-	-	-	-	-	-	-	-
Intake #1 & 2* (Note 5)	-	65,000	-	31,000	-	-	-	34,000
Intake # 2 (See Item 16 for more detail)	-	32,000	-	-	-	32,000	-	-
Intake # 3, shoreline intake	-	104,000	-	104,000	-	-	-	-
Travelling Screen #3	-	125,000	-	125,000	-	-	-	-
Low Lift Pump 1 *(Note 1)	35,000	32,000	-	-	32,000	-	-	-
Low Lift Pump 2	-	39,000	-	-	-	-	39,000	-
Low Lift Pump 3	-	32,000	-	-	-	32,000	-	-
Low Lift Pump 4	-	33,000	-	-	-	-	33,000	-
Low Lift Pump 5	-	70,000	36,000	-	-	-	-	34,000
Low Lift Pump 6	-	36,000	-	36,000	-	-	-	-
Low Lift Pump 7	-	37,000	-	-	37,000	-	-	-
Zebra Mussel Control System	-	53,000	-	-	53,000	-	-	-
Low Lift Surge Tanks (2) and Compressor System *(Note 6)	-	41,000	41,000	-	-	-	-	-
Low Lift Diesel Generator	-	53,000	-	-	53,000	-	-	-
Low Lift Electrical Transformer Upgrade	-	204,000	204,000	-	-	-	-	-
General Building Maintenance & Equipment	-	-	-	-	-	-	-	-
Roadway upgrades to Maintenance Area -	-	81,000	-	-	-	81,000	-	-
Building/Grounds -	-	264,000	51,000	52,000	53,000	108,000	-	-
Clarification System	-	-	-	-	-	-	-	-
Clarifier 1 -	-	13,000	13,000	-	-	-	-	-
Clarifier 3	-	13,000	13,000	-	-	-	-	-
Chemical System	-	-	-	-	-	-	-	-
Coagulant Feed System	-	32,000	-	-	32,000	-	-	-
Coagulant Storage	-	32,000	-	-	32,000	-	-	-
Coagulant Aid System	-	21,000	-	21,000	-	-	-	-
Carbon Feed System	-	-	-	-	-	-	-	-
Recirc. Pump	-	10,000	10,000	-	-	-	-	-
Carbon Feed Pumps (4)	-	74,000	31,000	-	-	43,000	-	-
Carbon Scrubber System	-	51,000	51,000	-	-	-	-	-
Filtration	-	-	-	-	-	-	-	-
Filter 2	-	15,000	15,000	-	-	-	-	-
Filter 4	-	15,000	15,000	-	-	-	-	-
Filter 6	65,000	-	-	-	-	-	-	-
Filter 8	65,000	-	-	-	-	-	-	-
Turbidity Meters for Filter Backwash	17,500	10,000	10,000	-	-	-	-	-
Filter Meter Replacements	-	36,000	36,000	-	-	-	-	-
Pumps	-	-	-	-	-	-	-	-
Backwash Pump 1 - Actuator upgrade	9,541	-	-	-	-	-	-	-
Backwash Pump 2	-	108,000	-	-	-	108,000	-	-
High Lift Pump 9	-	135,000	-	-	-	135,000	-	-
High Lift Pump No. 10	-	255,000	255,000	-	-	-	-	-
High Lift Reservoirs (2)	-	210,000	102,000	-	53,000	-	55,000	-
Wastewater Pumps (2)	-	21,000	10,000	-	-	11,000	-	-
Diesel Generator Upgrades	-	1,689,000	-	-	-	-	-	1,689,000
HL Compressor 2	-	16,000	-	16,000	-	-	-	-
HL Compressor 3	-	32,000	-	-	16,000	16,000	-	-



Table B-1 - continued
 Union Water Supply System
 Capital Budget Forecast
 Inflated \$

Description	Budget 2018	Total	Forecast					
			2019	2020	2021	2022	2023	2024
Main Plant Electrical	-	-	-	-	-	-	-	-
Electrical/Lighting Upgrades	13,000	10,000	10,000	-	-	-	-	-
Power Factor Capacitors for Energy Management	-	51,000	51,000	-	-	-	-	-
Generator B Transfer Switch Automation	-	36,000	36,000	-	-	-	-	-
SCADA /Communication/Security	-	-	-	-	-	-	-	-
Security System Install	-	61,000	61,000	-	-	-	-	-
System upgrade and Maintenance	100,000	1,284,000	1,122,000	31,000	32,000	32,000	33,000	34,000
UWSS Wide Communication System Improvements	-	161,000	20,000	21,000	21,000	54,000	22,000	23,000
Monitoring Equipment	-	-	-	-	-	-	-	-
Turbidity Meter Replacement -	-	10,000	10,000	-	-	-	-	-
Chlorine Analyzer Replacements	-	26,000	26,000	-	-	-	-	-
Blue Green Algae Monitoring Probe	-	31,000	31,000	-	-	-	-	-
Building Maintenance	-	-	-	-	-	-	-	-
Maintenance Shop Roof Replacement	29,323	-	-	-	-	-	-	-
Admin Building	-	31,000	31,000	-	-	-	-	-
Laboratory Upgrade	-	102,000	102,000	-	-	-	-	-
Kitchen Upgrade	24,847	-	-	-	-	-	-	-
Cottam Reservoir & Booster PS	-	-	-	-	-	-	-	-
Booster Pump 4	-	37,000	-	-	37,000	-	-	-
Compressor	-	16,000	-	-	16,000	-	-	-
Reservoir Cover Regrading/Repairs	60,000	61,000	61,000	-	-	-	-	-
Emergency Disinfection System	-	31,000	31,000	-	-	-	-	-
Distribution System	-	-	-	-	-	-	-	-
Leamington Tower	23,225	-	-	-	-	-	-	-
Albuna Tower	-	271,000	-	-	-	271,000	-	-
Kingsville Tower	-	1,144,000	-	1,144,000	-	-	-	-
Essex Water Tower Rehabilitation (interior and exterior)	1,070,232	32,000	-	-	32,000	-	-	-
Distribution System Maintenance	45,000	395,000	77,000	104,000	106,000	108,000	-	-
Master Water Meter Replacement/Upgrades	-	51,000	51,000	-	-	-	-	-
Wastewater Treatment System	-	-	-	-	-	-	-	-
Wastewater Lagoon Upgrades	-	223,000	-	-	-	-	110,000	113,000
NEW CAPITAL WORKS	-	-	-	-	-	-	-	-
CO2 pH Adjustment System Install	125,000	1,581,000	1,581,000	-	-	-	-	-
UV Disinfection - In-reservoir UV vault	-	5,815,000	-	1,040,000	4,775,000	-	-	-
Dry Scrubber - Chlorine Gas system	-	1,581,000	1,581,000	-	-	-	-	-
Pre-Treatment/clarification upgrades (DAF)	-	4,558,000	153,000	2,081,000	159,000	2,165,000	-	-
Residuals management Polymer system waste system up	-	1,657,000	-	-	531,000	-	-	1,126,000
Admin Building upgrades, expansion and elevator	19,261	1,236,000	-	-	-	-	110,000	1,126,000
Replacement of 12-inch Cottam Water Main	-	6,895,000	-	-	-	271,000	6,624,000	-
Total Capital Expenditures	1,862,429	32,777,000	6,071,000	5,128,000	6,293,000	3,667,000	7,231,000	4,387,000
Capital Financing								
Provincial/Federal Grants	-	-	-	-	-	-	-	-
Non-Growth Related Debenture Requirements	-	3,600,000	-	200,000	3,400,000	-	-	-
Water Working Fund (WCFU Account)	-	-	-	-	-	-	-	-
Operating Contributions	1,431,281	-	-	-	-	-	-	-
Rate Stabilization Reserve	-	4,167,000	-	-	-	667,000	3,500,000	-
Water Stabilization Reserve	-	-	-	-	-	-	-	-
Water Capital Reserve	431,148	25,010,000	6,071,000	4,928,000	2,893,000	3,000,000	3,731,000	4,387,000
Total Capital Financing	1,862,429	32,777,000	6,071,000	5,128,000	6,293,000	3,667,000	7,231,000	4,387,000



Table B-2
Union Water Supply System
Schedule of Non-growth-related Debenture Repayments
Inflated \$

Debenture Year	2018	Principal (Inflated)	Forecast					
			2019	2020	2021	2022	2023	2024
2019		-		-	-	-	-	-
2020		200,000			24,658	189,983		
2021		3,400,000				3,536,000		
2022		-					-	-
2023		-						-
2024		-						-
Total Annual Debt Charges	-	3,600,000	-	-	24,658	3,725,983	-	-

*Assumed short-term borrowing @ 4% interest

Table B-3
Union Water Supply System
Water Capital Reserve Continuity
Inflated \$

Description	2018	2019	2020	2021	2022	2023	2024
Opening Balance	6,212,722	6,049,547	2,420,966	35,767	96,563	460,784	465,133
Transfer from Operating	149,354	2,394,949	2,542,100	2,951,903	3,355,185	3,726,229	4,118,222
Transfer to Capital	431,148	6,071,000	4,928,000	2,893,000	3,000,000	3,731,000	4,387,000
Transfer to Operating	-	-	-	-	-	-	-
Closing Balance	5,930,928	2,373,496	35,066	94,670	451,749	456,013	196,355
Interest	118,619	47,470	701	1,893	9,035	9,120	3,927

Table B-4
Union Water Supply System
Water Working Fund (WCFU Account) Reserve Continuity
Inflated \$

Description	2018	2019	2020	2021	2022	2023	2024
Opening Balance	8,628,273	2,857,600	2,857,600	2,857,600	2,857,600	2,857,600	2,857,600
Transfer from Operating	-	-	-	-	-	-	-
Transfer to Capital	-	-	-	-	-	-	-
Transfer to Operating	-	56,031	56,031	56,031	56,031	56,031	56,031
Closing Balance	2,801,569	2,801,569	2,801,569	2,801,569	2,801,569	2,801,569	2,801,569
Interest	56,031	56,031	56,031	56,031	56,031	56,031	56,031

Table B-5
Union Water Supply System
Water Rate Stabilization Reserve Continuity
Inflated \$

Description	2018	2019	2020	2021	2022	2023	2024
Opening Balance	10,000,000	10,255,000	10,510,000	10,765,000	11,020,000	6,759,558	3,324,749
Transfer from Operating	-	-	-	-	-	-	-
Transfer to Capital	-	-	-	-	667,000	3,500,000	-
Transfer to Operating	-	-	-	-	3,725,983	-	-
Closing Balance	10,000,000	10,255,000	10,510,000	10,765,000	6,627,017	3,259,558	3,324,749
Interest	255,000	255,000	255,000	255,000	132,540	65,191	66,495

*UWSS invested in a 5-year GIC at 2.55% annual interest ending in 2022



Table B-6
 Union Water Supply System
 Operating Budget Forecast
 Inflated \$

Description	Budget	Forecast					
	2018	2019	2020	2021	2022	2023	2024
Expenditures							
<u>Operating Costs</u>		-	-	-	-	-	-
Wages and Benefits		-	-	-	-	-	-
Salaried	175,000	180,000	187,200	194,700	202,500	210,600	219,000
Part time	-	-	-	-	-	-	-
Benefits - Full time	62,000	63,250	65,800	68,400	71,100	73,900	76,900
Benefits - Part time	-	-	-	-	-	-	-
Office Overhead, Rents and Services		-	-	-	-	-	-
Office supplies	1,600	2,000	2,000	2,000	2,000	2,000	2,000
Board expenses	-	-	-	-	-	-	-
Dues, Memberships, Subsc	4,100	5,000	5,100	5,200	5,300	5,400	5,500
Travel & Mileage	2,806	2,500	2,600	2,700	2,800	2,900	3,000
Training	1,500	6,000	6,100	6,200	6,300	6,400	6,500
Conferences	4,619	6,000	6,100	6,200	6,300	6,400	6,500
Meeting Expenses	850	2,000	2,000	2,000	2,000	2,000	2,000
Uniforms/Clothing	-	500	500	500	500	500	500
Legal/Professional fees	72,000	45,000	45,900	46,800	47,700	48,700	49,700
Audit Fees	5,877	6,500	6,600	6,700	6,800	6,900	7,000
Property Taxes	146,283	147,500	150,500	153,500	156,600	159,700	162,900
Operational Purchases/Maint.	17,500	17,500	17,900	18,300	18,700	19,100	19,500
Sundry	-	250	300	300	300	300	300
Leamington Assistance	30,000	30,000	30,600	31,200	31,800	32,400	33,000
Communications	950	1,500	1,500	1,500	1,500	1,500	1,500
Postage & Courier	98	500	500	500	500	500	500
Advertising & Promotion	4,000	7,000	7,100	7,200	7,300	7,400	7,500
Insurance	13,805	15,000	15,300	15,600	15,900	16,200	16,500
Donations & Grants	3,000	4,000	4,100	4,200	4,300	4,400	4,500
Office equipment Purchases/Maint.	2,300	5,000	5,100	5,200	5,300	5,400	5,500
OCWA Operating & Maintenance Contract	2,800,000	3,265,000	3,330,300	3,396,900	3,464,800	3,534,100	3,604,800
Electricity and Natural Gas	1,175,000	1,250,000	1,275,000	1,300,500	1,326,500	1,353,000	1,380,100
CO2 Gas Bulk Purchase	-	175,000	178,500	182,100	185,700	189,400	193,200
Operational Programs & Studies	175,500	140,000	310,000	210,000	185,000	185,000	185,000
Residuals Ponds Maintenance	75,000	150,000	153,000	156,100	159,200	162,400	165,600
Watermain Repairs	48,000	100,000	102,000	104,000	106,100	108,200	110,400
Municipal DW License Renewal	12,500	-	-	-	-	-	-
Facility Enhancements - General	19,000	20,000	20,400	20,800	21,200	21,600	22,000
Sub Total Operating	4,853,288	5,647,000	5,932,000	5,949,300	6,044,000	6,166,300	6,291,400
<u>Capital-Related</u>							
Existing Debt (Principal) - Non-Growth Related	902,009	1,021,638	1,154,638	1,302,487	1,466,829	1,649,492	1,852,503
Existing Debt (Interest) - Non-Growth Related	1,411,432	1,310,662	1,196,641	1,067,891	922,766	759,442	575,889
New Non-Growth Related Debt (Principal)	-	-	-	16,658	3,583,342	-	-
New Non-Growth Related Debt (Interest)	-	-	-	8,000	142,641	-	-
Transfer to Capital	1,431,281	-	-	-	-	-	-
Transfer to Working Fund (WCFU Account)	-	-	-	-	-	-	-
Transfer to Water Rate Stabilization Reserve	-	-	-	-	-	-	-
Transfer to Water Capital Reserve	1,498,068	2,394,949	2,542,100	2,951,903	3,355,185	3,726,229	4,118,222
Sub Total Capital Related	5,242,789	4,727,249	4,893,378	5,346,939	9,470,764	6,135,163	6,546,614
Total Expenditures	10,096,077	10,374,249	10,825,378	11,296,239	15,514,764	12,301,463	12,838,014
Revenues							
Investment Income	150,000	152,500	155,600	158,700	161,900	165,100	168,400
Sundry revenue	20,750	21,000	21,400	21,800	22,200	22,600	23,100
Contributions from Working Fund (WCFU Account)	-	56,031	56,031	56,031	56,031	56,031	56,031
Contributions from Water Rate Stabilization Reserve	-	-	-	-	3,725,983	-	-
Contributions from Water Capital Reserve	-	-	-	-	-	-	-
Total Operating Revenue	170,750	229,531	233,031	236,531	3,966,114	243,731	247,531
Water Billing Recovery - Operating	9,925,327	10,144,718	10,592,347	11,059,707	11,548,650	12,057,732	12,590,483
Water Billing Recovery - Total	9,925,327	10,144,718	10,592,347	11,059,707	11,548,650	12,057,732	12,590,483



Table B-7
Union Water Supply System
Water Rate Forecast
Inflated \$

Description	2018	2019	2020	2021	2022	2023	2024
Total Water Billing Recovery	9,925,327	10,144,718	10,592,347	11,059,707	11,548,650	12,057,732	12,590,483
Total Volume (m ³)	16,303,100	16,336,100	16,401,900	16,467,700	16,533,500	16,599,300	16,665,100
Constant Rate	0.6088	0.6210	0.6458	0.6716	0.6985	0.7264	0.7555
Annual Percentage Change		2.0%	4.0%	4.0%	4.0%	4.0%	4.0%