ONTARIO CLEAN WATER AGENCY
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Township of Ramara

Water and Wastewater System Capital Plan

SUBMITTED BY

Ontario Clean Water Agency
2085 Hurontario Street, 5th Floor
Mississauga, ON L5A 4G1

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Report prepared by:

Natalie Colantonio, P.Eng.
Project Engineer

Report approved by:

Nick Larson, P.Eng.
Senior Project Engineer

STATEMENT OF CONFIDENTIALITY

OCWA's Report to
the Township of Ramara for the
Water and Wastewater System Capital Plan

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1 Introduction

The Ontario Clean Water Agency (OCWA) has prepared this capital investment plan for the Township of Ramara, hereinafter referred as the "Township". The capital plan addresses both vertical (facilities) and linear assets of all water and wastewater systems owned by the Township.

The purpose of this capital investment plan is to assist the Township in estimating the annual capital expenditures required to maintain the water and wastewater systems over a ten year period from 2021 to 2030 with a focus on the next five years.

The outcomes of this report support other asset management planning processes in the Township, including the Asset Management Plan, Water and Wastewater Rate Study and Water Financial Plan.

2 Scope

This report captures the following assets in the water and wastewater systems:

- South Ramara WTP
- Lagoon City WTP
- Lagoon City/Brechin Water Tower
- Bayshore WTP
- Bayshore WWTP
- Val Harbour WTP
- Park Lane WTP
- Davy Drive WTP
- Lagoon City/Brechin WWTP
- Lagoon City Sewage Pumping Stations #1-5
- Brechin Sewage Pumping Stations #6-8
- Bayshore East and West Sewage Pumping Stations
- All sanitary collection system assets
- All water distribution system assets

3 Methodology

The methodology used to complete the assessments was as follows:

- Complete a desktop analysis of all available asset information. This includes drawings, schematics, and annual reports, past budgets, asset inventory and plant maintenance data.
- Complete site visits to obtain visual condition information of assets and to understand other facility performance issues that may be observed through surveillance of the facilities. It should be noted that the scope of the project did not include the visual assessment of underground assets.
- Discuss with system operators to understand history and issues with the assets that may not be apparent through a review of available information or visual assessment observations.
- Establish the spending that is required to address any observed asset deficiencies to achieve asset/system performance objectives.
- Establish the timing of the recommended project spending. The project timing is categorized as:
    a) Immediate (as soon as possible) – highest priority projects that are recommended to complete in the next year or two, or as soon as feasible based on available resources.
    b) Medium term – projects that are recommended to complete in the next five years.
    c) Long term – projects that are recommended to complete in the 6 to 10 year time horizon.
    d) Ongoing – Annual funding for multi-year capital programs (i.e. inflow & infiltration reduction program)

4 Limitations

This report is a planning document to inform future works. The plan should be reviewed on a routine basis and updated as necessary.

The following limitations are noted:

- Some of the expenditures identified may require preceding engineering studies to properly refine associated cost estimates or refine the scope of work. The costs of potential front-end engineering work have been estimated and included in the cost estimates.
- The accuracy of spending amounts identified in the report decrease with time. OCWA uses the AACE cost estimating framework to identify our cost estimate classification. Activities recommended in the 5+ year window are considered to be Class 5 cost estimates (+/- 50%), with increasing accuracy in shorter term project cost estimates.
- Expenditures recommended in this report do not include the costs associated with:
    - Minor capital works to replace small equipment (i.e. diaphragm pumps, analyzers, etc.)

- Operational expenditures such as OCWA's operating contract, Township overhead costs, energy costs, chemical costs, communication costs, etc.

- The state of assets can change quickly. The assessment of the assets reflect a point in time based on information that was readily observable.
- No destructive or intrusive testing was completed. In some cases, recommendations for additional testing may be made to confirm the current state of an asset.

5 Facilities Overview

5.1 Water Facilities

A summary of the water facility infrastructure portfolio is shown below in Table 1.

Table 1 : Ramara Water Infrastructure Portfolio

System	Description	Rated capacity	Treatment Processes
South Ramara WTP	The South Ramara Water Treatment Plant consists of a raw water intake, a low lift pumping station, a package plant comprising two treatment units, disinfection, two on-site storage reservoirs and a high lift pumping station. The WTP services the Heritage Farm and Mara Shore Estates Subdivision.	387 m^3/day	• Intake crib with raw water sample line, pre-chlorination diffuser and a chlorine solution line • Raw water header with flow control, metering, chemical addition and static rapid mixer • Two package treatment units consisting of a flocculation tank, settling tank and dual media filter • Post filter chlorination injection point
Lagoon City WTP	The Lagoon City Water Treatment Plant consists of a raw water intake, a low lift pumping station, spiral flow flocculators, and granular activated carbon media filters over sand. Filtered water is stored in a clearwell beneath the treatment plant building. A high lift pumping station pumps the treated water to the distribution system to serve Lagoon City and Brechin.	4,000 m^3/day	• A sodium hypochlorite feed line and an alum feed line with associated diffusers at the low lift pumping • Four spiral flow flocculation tanks • Two filter-adsorber units, each consisting of 1140 mm granular activated carbon over sand and gravel along with three backwash troughs, two surface water agitators and a 200 mm underdrain • Post-filter chlorination system for primary disinfection utilizing sodium hypochlorite • Post-chlorination system for secondary disinfection utilizing sodium hypochlorite in the high lift pumping well

System	Description	Rated capacity	Treatment Processes
Bayshore WTP	The Bayshore Village Water Treatment Plant consists of three groundwater wells, a disinfection system, one underground reservoir, and one high lift pumping station.	112,000 L (reservoir Capacity)	• Three sodium hypochlorite feed systems, one for each well, for disinfection
Val Harbour WTP	The Val Harbour Water Treatment Plant serves the Val Harbour subdivision and consists of two groundwater wells, a Water Works building, two on-site below grade water reservoirs, and a high lift pumping station.	87,600 L (capacity of both reservoirs)	• Sodium hypochlorite feed system for primary disinfection • Sodium hypochlorite feed system for secondary disinfection
Park Lane WTP	The Park Lane Water Treatment Plant is a groundwater system. Water is pumped from the either Well No. 1 or Well No. 2 to the water works building. The system utilizes high lift pumping station and two 453 L pressure tanks to maintain pressure within the system. Raw water is treated with sodium hypochlorite and potassium permanganate for iron and manganese oxidation. Two greensand filters are utilized to remove particulate matter resulting from the iron and manganese oxidation process. The filtered effluent is injected with sodium hypochlorite. A water storage standpipe provides contact time before the water enters the distribution system.	1.14 L/s (Capacity of one filter)	• Two 1.14 L/s capacity greensand filters for iron/manganese removal (one duty and one standby) • Pre-chlorination system for iron oxidation using sodium hypochlorite • Iron and manganese removal system using potassium permanganate • Disinfection system utilizing sodium hypochlorite
Davy Drive WTP	The Davy Drive Water Treatment Plant services Riverleigh Woods Subdivision and consists of four groundwater wells, one drinking water treatment plant, one 43 m^3 standpipe provides potable water storage. Two high lift pumps discharge treated water into the distribution system.	75.69 m^3/d (one filter)	• Two greensand filters for iron/manganese removal • Two cartridge filter trains, each train consisting of two cartridge filters in series capable of filtering particles to 25-1 micron and 1 micron absolute, respectively • Two UV disinfection units (one in each cartridge filtration train), each rated to provide a minimum UV dose of 40 mJ/cm^2 at a flowrate of 75.69 m^3/d • Pre-chlorination system for iron oxidation using sodium hypochlorite • Iron and manganese removal system using potassium permanganate • Secondary disinfection system utilizing sodium hypochlorite
Lagoon City/Brechin Water Tower	An elevated water reservoir built in 1979	945 m^3	N/A

5.2 Wastewater Facilities

A summary of the wastewater facility infrastructure is shown below in Table 2.

Table 2: Ramara Wastewater Facility Infrastructure

System	Description	Rated capacity	Treatment Processes
Lagoon City/Brechin WWTP	The Lagoon City WWTP consists of inlet works, pre-treatment, extended aeration, final effluent clarifiers, sludge management works, UV disinfection, and an effluent outfall to Lake Simcoe.	2,273 m^3/day	• Two degritting channels to settle out sand and silt • One bar screen for the removal of larger solids • Three aeration cells equipped with mechanical aerators • Three rectangular final effluent clarifiers • One first stage aerobic sludge digester • One 162 m^3 second stage aerobic sludge digester • One aerobic sludge storage tank equipped with coarse bubble aeration system • UV channel type ultraviolet (UV) light disinfection system
Bayshore WWTP	The Bayshore WWTP consists of a sewage stabilization and storage lagoon with two cells operated in series and an effluent spray irrigation system.	Lagoon Cell A Storage Capacity: 21,600 m^3 Lagoon Cell B Capacity: 109,925 m^3	Lagoon treatment system
Lagoon City SPS #1-5	All Lagoon City Sewage Pumping Stations consist of a concrete wet well with submersible pumps with associated valves and pump control panel.	SPS #1 – 3-5 Hp pumps SPS#2 – 2-3 Hp pumps SPS #3 – 2-5 Hp pumps SPS #4 – 2-25 Hp pumps 1-30 Hp pump SPS #5 – 2-5 Hp pumps	N/A

System	Description	Rated capacity	Treatment Processes
Brechin SPS #6-8	Sewage Pumping Station #6 consists of a 1.8 m dia. concrete wet well complete with ultrasonic level controllers and float switches, a high liquid level alarm complete with an autodialer, and an above ground FRP enclosure housing two horizontal self priming pumps with associated valves and pump control panel. Sewage Pumping Station #7 consists of a 2.4 m dia. concrete wet well equipped with two submersible pumps, complete with ultrasonic level controllers and float switches, a high liquid level alarm complete with an autodialer, and a pump station by-pass connection, together with an above ground FRP enclosure with associated valves and pump control panel. Sewage Pumping Station #8 consists of a 2.4 m dia. concrete wet well equipped with ultrasonic level controllers and float switches , a high liquid level alarm complete with an autodialer and a pump station by-pass connection, together with an above ground single storey building housing two horizontal self-priming pumps with associated valves and pump control panel. The station also has an Odour Control system consisting in a Bioxide treatment system.	SPS #6 – 12.5 L/s SPS #7 – 13 L/s SPS #8 – 37.5 L/s	N/A
Bayshore SPS (East and West)	Both Bayshore Sewage Pumping Stations consist of a concrete wet well with two submersible pumps with associated valves and pump control panel, as well as a separate building housing a generator.	East SPS – 2-20 Hp pumps West SPS – 2-5 Hp pumps	N/A

6 System Assessments

6.1 Site Specific Observations

Appendix A provides the summary of observations made during the site visit for each facility, and respective actions or projects recommended for rectifying the identified issues are listed in Appendix B and summarized in Section 7.

6.2 General Observations

Sanitary Sewer Collection Systems – There are high levels of inflow and infiltration (I&I) in the sanitary sewer collection systems. Extraneous flows that enter the collection system cost money in terms of energy and chemicals, as well as taking up plant capacity that could otherwise be used to service more people. Additionally, if these flows are a result of infiltration through defects in the sewer piping, this can lead to erosion of the pipe bedding, which in turn compromises the pipe support and leads to future pipe collapse.

The capital plan contains a recommendation for an I&I reduction program that is based on completing inspections of the sewers to find places where extraneous flows are entering the system, and then conducting targeted rehabilitation or repair activities. This program should be completed on a catchment-by-catchment basis for each sewage pumping station and exacts costs will be dependent on inspection findings. Pre and post flows should also be compared to quantify the return on investment from the rehabilitation program.

Water Facilities – All of the water facilities were either constructed or underwent major refurbishment in the post-Walkerton enhancements that were completed in the late 1990s and early 2000s across Ontario. Much of the process equipment, while still meeting expectations, will require refurbishment or replacement in the 6 to 20 year time frame as major components reach the end of their lifecycle. Therefore, required average annual capital spending in the long term horizon (5+ years) will be greater that what is being recommended in the next five years.

Wastewater Facilities - Both wastewater treatment plants are functional and able to meet their regulatory objectives.

- It is noted that the Bayshore spray lagoon treatment facility is in the midst of an ongoing Environmental Assessment (EA) to determine the best option for the facility.[1] This capital plan will be updated when the EA is finalized, however until that time the capital plan is based on ensuring the facility is able to fulfill its current requirements. There is also a Process Optimization Study planned for 2021 which will provide a long-term optimization strategy for this facility.

- It is likely that in the future the Lagoon City wastewater treatment facility will require a significant capital investment to ensure it will continue to meet expectations. The schedule for this investment will depend on the timing and magnitude of growth that occurs in Brechin and the Brechin to Lagoon City corridor. The recommendation to complete a long term servicing strategy for this part of the community will bring clarity to the long term capital plan for this facility to accommodate growth, potential regulatory changes and end-of-life cycle replacements.

Energy Efficiency – An initial walk-through of the facilities has identified a number of opportunities to reduce costs from heating buildings or operating process equipment, such as:

[1] https://www.ramara.ca/en/municipal-office/bayshore-village-class-environmental-assessment-study.aspx

- Insulating process piping in the water plants to reduce heating costs (which can also reduce condensation in the summer and slow corrosion rates);
- Adding additional building insulation or other physical weather protection materials; or
- Installing more energy efficient equipment.

This capital plan has recommended an energy efficiency program that is based on spending money on energy efficiency measures that will have a positive payback in a reasonable time frame. Specific projects will be recommended on a case-by-case basis through an energy audit of individual facilities and an analysis to demonstrate the savings versus costs of the project. The funding of each project should be determined based on its specific payback period (i.e. provides a positive return in X years).

7 Capital Investment Plan

7.1 Type of Capital Investments

Future capital expenditure recommendations are grouped into two categories:

1. Costs (projects) to maintain current service levels. This represents the majority of projects in this capital plan. Examples include replacement of pumps, building roof replacements or reservoir cleaning. In select cases, a study is recommended to complete a more specialized in-depth investigation to properly understand spending needs. This is essential spending that is required to maintain services to the community.
2. Costs (projects) to enhance service levels. Examples include extending the serviced area of the South Ramara WTP. This is discretionary spending that is only required if/when higher asset performance expectations are demanded by the community.

7.2 Summary of Capital Investment Plan

A total of 69 projects have been identified in the capital plan. All but two projects are related to maintaining current service levels across the systems. The two projects related to enhancing services is the $2 million project to construct watermains to expand the serviced area of the South Ramara WTP, and the Long Term Servicing Study for Brechin and the Brechin-Lagoon City corridor. Table 4 summarizes the capital plan by system and recommended project timing.

Table 4: Capital Plan by System and Timing

SYSTEM	IMMEDIATE (AS SOON AS POSSIBLE)	MEDIUM TERM (WITHIN 5 YEARS)	LONG TERM (6 TO 10 YEARS)	ONGOING	TOTAL
All Collection Systems				$500,000	$500,000
All Facilities				$180,000	$180,000
Bayshore SPSs				$5,000	$5,000
Bayshore WTP	$37,500	$80,000		$57,000	$174,500

SYSTEM	IMMEDIATE (AS SOON AS POSSIBLE)	MEDIUM TERM (WITHIN 5 YEARS)	LONG TERM (6 TO 10 YEARS)	ONGOING	TOTAL
Bayshore WWTP	$18,000				$18,000
Brechin SPSs					$0
Davy Drive WTP	$100,100			$42,000	$142,100
Lagoon City / Brechin WWTP	$252,200	$152,000		$104,000	$408,200
Lagoon City Distribution System				$500,000	$500,000
Lagoon City SPSs	$238,600	$327,600			$566,200
Lagoon City WTP	$152,000	$60,000		$407,000	$619,000
Lagoon City/ Brechin Water Tower	$250,000	$165,000			$415,000
Park Lane WTP	$100,100			$37,000	$137,100
South Ramara WTP	$17,500	$108,300	$2,000,000	$69,000	$2,194,800
Val Harbour WTP	$20,000	$274,000		$48,000	$342,000
	$1,136,000	**$1,116,900**	**$2,000,000**	**$1,949,000**	**$6,201,900**

To help with budget processes, the recommendations were turned into a more precise year-by-year plan. The approved 2021 budget was considered as part of this analysis and identified as approved (refer to details of each project in Appendix B). The following is noted based on the understanding of the approved 2021 budget:

- Some projects were not fully funded (i.e. the project to refurbish Lagoon City SPS #4 was not provided sufficient budget to purchase a spare pump). Partially funding projects should be avoided to the extent feasible, with preference being to fully fund entire projects and move other projects off to future years.
- The replacement of the Lagoon City WTP roof is not currently planned for 2021. This project should be completed as soon as possible.

Table 5 summarizes the capital plan. Detailed project lists are included in Appendix B. It should also be noted that Appendix B will be delivered in a spreadsheet format. The specific timing of each project will be adjusted on an annual basis to reflect changing priorities, available resources, and refined project scope/budget.

Table 5: Capital Plan Summary

	2021	2022	2023	2024	2025	6 TO 10 YEAR	TOTAL
Wastewater Systems	**$292,600**	**$173,000**	**$251,500**	**$200,400**	**$107,900**	**$72,000**	**$1,097,400**

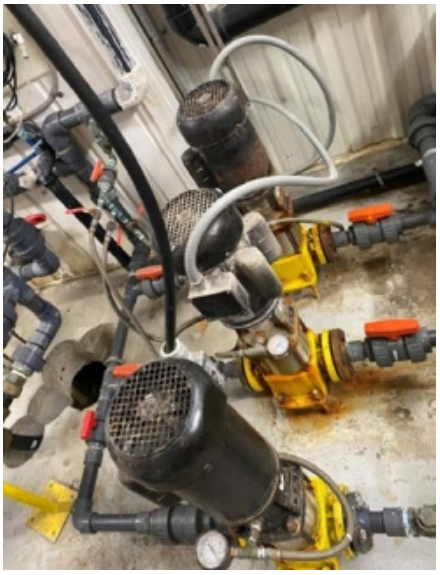
	2021	2022	2023	2024	2025	6 TO 10 YEAR	TOTAL
Water Systems	**$543,700**	**$542,500**	**$360,100**	**$525,200**	**$465,000**	**$2,668,000**	**$5,104,500**
Total	$836,300	$715,500	$611,600	$725,600	$572,900	$2,740,000	**$6,201,900**

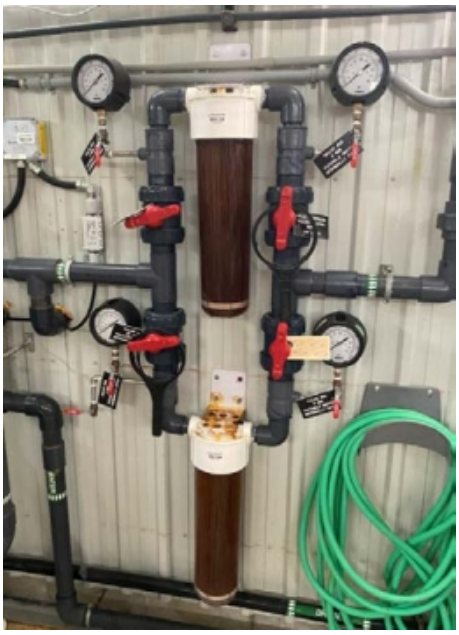
APPENDIX A
Facility Deficiency Information

Facility Name	South Ramara WTP
Picture	 
Deficiency Summary	The issues found from desktop study and site visit are: • At present, not all existing equipment and components at the WTP are connected to the emergency power generator. The electrical connection should be reviewed to see if it is feasible to provide full emergency power coverage at the WTP facility • One of the US filter vessels is leaking at the bottom and should be repaired. • The last inspection to the filter media was conducted approximately 5 years ago. The filter media should be re-tested and determine whether the filter media should be topped up or replaced in full. • The backwash cycle of the filters is currently a manual process – it should be assessed whether the process can be automated to reduce the risk of service disruption. • In some of the residential areas, water demand varies seasonally causing dead zones at the end the distribution lines. In addition, the residual chlorine level at the end of these distribution lines fluctuates substantially causing operational challenges and non-compliance with the drinking water regulations when the concentration of chlorine falls below the minimum regulatory requirement. Consideration should be given to install auto-flusher at the end of line (subdivision) to prevent dead zones and maintain adequate chlorine residuals.

Facility Name	Lagoon City WTP
Picture	  
Deficiency Summary	The issues found from desktop study and site visit are: • The filter media should be re-tested and determine whether the filter media should be topped up or replaced in full. • The reservoir and the raw water intake should be inspected regularly (i.e. every 5 years). • The backwash cycle of the filters is currently a manual process – it should be assessed whether the process can be automated to reduce the risk of service disruption. • The old decommissioned/abandoned emergency power stack located inside the facility should be removed (may contain asbestos). A designated substance study may be required. • The roof should be inspected and may require replacement. • The old AC unit at the office is at the end of its service life and should be replaced. Controlling humidity is an important step to preventing corrosion issues related to humidity and condensation.

Facility Name	Bayshore WTP
Picture	 
Deficiency Summary	The issues found from desktop study and site visit are: • The reservoir should be inspected for structural/coating damages. • The high Lift Pumps (HLP) require an upgrade/replacement. • There are potential corrosion issues throughout the plant, which should be addressed. • Reservoir hatch should be replaced.

Facility Name	Val Harbour WTP
Picture	 
Deficiency Summary	The issues found from desktop study and site visit are: • The high Lift Pumps (HLP) require an upgrade/replacement – will need engineering design services to determine best option for pumps (like-for-like pump replacement not recommended based on current operational issues with system configuration). A Feasibility Study could help improve HLP operations and could be combined with an energy audit/process review. •

Facility Name	Park Lane WTP
Picture	 
Deficiency Summary	The issues found from desktop study and site visit are: • Green Sand Filters should be replaced including new control valves, isolation valves, SCADA integration and backwash pumps.

Facility Name	Davy Drive WTP
Picture	 
Deficiency Summary	The issues found from desktop study and site visit are: • Green Sand Filters should be replaced including new control valves, isolation valves, SCADA integration and backwash pumps.

Facility Name	Brechin Water Tower
Picture	
Deficiency Summary	The issues found from desktop study and site visit are: • Control level system should be upgraded (requires engineering) • An inspection / Condition Assessment of the valve chamber is recommended (confined space entry) • From the Landmark inspection report: – The exterior of this tank is covered with a fluorocarbon-finished steel cladding which is in good condition. There is some loss of sheen as a result of ultraviolet degradation but no appreciable signs of corrosion or delamination. – The concrete roof is unfinished and a waterproofing membrane system is recommended. Some light corrosion can be seen on the painted steel handrail and the roof hatch curb as well. – The bolted manway on the side of the tank is somewhat corroded and valves and piping within the valve pit are moderately corroded. – The steel interior of this tank is lined with what appears to be an epoxy which is in moderately poor condition. There are a number of corrosion cells on the walls and floor, as well as some signs of osmotic blistering, which would indicate that the lining is nearing the end of its useful lifespan. Some of these corrosion cells may be deep and could eventually lead to leaking. – The galvanized steel decking under the ceiling is showing signs of moderate surface corrosion, with heavier corrosion around the edges. The steel support beams are heavily corroded, but this does not appear to be severe enough to effect structural integrity.

Facility Name	Bayshore WWTP
Picture	
Deficiency Summary	The issues found from desktop study and site visit are: • Remove berm on south side of driveway • Main Feed header should be replaced • Facility there is an Environmental Assessment that is on hold pending the results of the Facility Optimization Plan that will be completed on this facility.

Facility Name	Lagoon City/Brechin WWTP
Picture	 
Deficiency Summary	The issues found from desktop study and site visit are: • Polymer storage tank should be replaced • A feasibility review/study should be conducted to provide better level control at the aeration basin and at the clarifiers • Remote monitoring upgrades, including installing sensors/monitors on the tanks and other processes should be considered to reduce the risk of service disruptions at this facility. Currently, a failure of an asset resulting in reduction in plant performance can only be observed from staff attending the site. • Replace air conditioning in building • Roof required over digester • Facility Optimization Plan is recommended to develop plan to ensure this facility is fit for purpose in long term, including planning for the installation of tertiary treatment which will likely be required at the facility at some point.

Facility Name	Lagoon City Sewage Pumping Stations #1-5
Picture	 
Deficiency Summary	The issues found from desktop study and site visit are: • All SPS (1-5) require upgrades including rail system, pump support (bench) system and pump replacement – all pumps should be from same supplier • SPS# 3- Control panel in poor condition and requires replacement • SPS #5- Needs bollards around generator

Facility Name	Brechin Sewage Pumping Stations #6-8
Picture	
Deficiency Summary	The issues found from desktop study and site visit are: • SPS #6 – No deficiencies identified • SPS #8 – There is a leak in the valve chamber causing corrosion. This should be monitored to inform future action. • SPS #7 – No lifting chain on pump handles

Facility Name	Bayshore Sewage Pumping Stations East and West
Picture	
Deficiency Summary	The issues found from desktop study and site visit are: • East SPS - no capital works identified • West SPS - no capital works identified

APPENDIX B
Detailed Capital Plan

Facility	Identified Work	Cost Estimate	Timing	Year	2021	2022	2023	2024	2025	6 to 10 year
All Collection Systems	Inflow and infiltration (I&I) reduction program to reduce excess flows into the sanitary system. Flow monitoring has confirmed that significant quantities of extraneous flow enters the collection system. This flow costs money to pump and treat, and takes up capacity at facilities that could otherwise be used for servicing people. I&I enters through manholes, sewer joints and/or defects, as well as laterals (public or private side) and is addressed through a range of activities from localized spot repairs using injection grouting to cure-in-place pipe liners that run from manhole to manhole (a 'full length liner'). Program of $100,000 per year for 2 years, then reducing to $50,000 per year is suggested with funds to be used on an as needed basis. Program should be evaluated on a continuous basis to understand return on investment. Budget estimates are as follows: - CCTV $5 to $10 per m of mainline sewer + $300 per lateral inspection - Spot Repairs $1,000+ each depending on size/complexity - Lateral Repairs $5,000 to $10,000 depending on size/complexity - Full Length Liner $400 per m Approximately 13 km of sanitary sewers to inspect. Typical catchment with 4 km of pipes: $40,000 for CCTV, $10,000 for lateral inspections and $100,000 allowance for repairs/rehabilitation = $35 to $40 per m all in. Total of approximately $500,000 to do 13 km of sewers. It is recommended to start with the Bayshore collection system to reduce the volume of wastewater that needs to be sprayed at the WWTP.	$500,000	Ongoing	Ongoing	$100,000	$100,000	$50,000	$50,000	$50,000	$150,000

Facility	Identified Work	Cost Estimate	Timing	Year	2021	2022	2023	2024	2025	6 to 10 year
All Facilities	Energy Efficiency Program. Initial site observations have identified a number of potential opportunities to bring annual savings to the Township in the form of reduced energy consumption. These include: - Insulating process piping in the water plants to reduce heating costs (which can also reduce condensation in the summer and slow corrosion rates) - Adding additional insulation or other physical weather protection materials - Installing more energy efficient equipment. The total cost of the work identified is approximately $180,000 in the high priority category, which means that they are expected to provide a positive return on investment in the shortest amount of time. It is recommended that the Township allocates $20,000 per year to support this energy reduction programs. However, it is also recommended that the Township receives energy reduction calculations that clearly demonstrate a reasonable payback period for each proposed project prior to approving funding. The success of the initial projects should be evaluated and used to adjust the funding for this program. It should be noted that the IESO provides grants to support some of the projects that would be covered in this program.	$180,000	Ongoing	Ongoing	$20,000	$20,000	$20,000	$20,000	$20,000	$80,000
Bayshore SPSs	Bayshore East SPS - no capital works identified	$0								
Bayshore SPSs	Bayshore West SPS - no capital works identified	$0								
Bayshore SPSs	Major Maintenance Items - East Station flow meter	$5,000	Ongoing	Ongoing						$5,000
Bayshore WTP	Reservoir inspection	$10,000	Medium Term (within 5 years)	2024				$10,000		
Bayshore WTP	High Lift Pumps (HLP) nearing end of service life and require replacement. Estimated cost of 3 new pumps (7.5 hp) with vfd	$60,000	Medium Term (within 5 years)	2024				$60,000		
Bayshore WTP	Study to investigate corrosion issues. Improved air handling and treatment will reduce humidity and prevent accelerated deterioration of equipment.	$10,000	Medium Term (within 5 years)	2024				$10,000		

Facility	Identified Work	Cost Estimate	Timing	Year	2021	2022	2023	2024	2025	6 to 10 year
Bayshore WTP	Install new hatch on reservoir	$2,500	Immediate (as soon as possible)	Approved in 2021	$2,500					
Bayshore WTP	New Sodium Hypo pump & control panels	$35,000	Immediate (as soon as possible)	Approved in 2021	$35,000					
Bayshore WTP	Major Maintenance Items - Analyzer replacement - Flow Meter replacements - Plant computer and switch gear - Distribution swabbing	$57,000	Ongoing	Ongoing	$4,000	$22,000	$7,000	$14,000	$5,000	$5,000
Bayshore WWTP	Remove Berm on South side of driveway	$10,000	Immediate (as soon as possible)	Approved in 2021	$10,000					
Bayshore WWTP	New main feed header	$8,000	Immediate (as soon as possible)	Approved in 2021	$8,000					
Brechin SPSs	SPS #6 - no capital works identified	$0								
Brechin SPSs	SPS #7 - no capital works identified	$0								
Brechin SPSs	SPS #8 - no capital works identified	$0								
Davy Drive WTP	Green Sand Filters replacement including new control valves, isolation valves, SCADA integration and backwash pumps	$92,600	Immediate (as soon as possible)	Approved in 2021	$92,600					
Davy Drive WTP	New backwash pump	$7,500	Immediate (as soon as possible)	Approved in 2021	$7,500					
Davy Drive WTP	Major Maintenance Items - Analyzer replacement - Flow Meter replacements - Plant computer and switch gear	$42,000	Ongoing	Ongoing	$4,000	$5,000	$14,000	$9,000	$5,000	$5,000
Lagoon City / Brechin WWTP	New polymer storage tank	$32,200	Immediate (as soon as possible)	2023			$32,200			
Lagoon City / Brechin WWTP	Digester Roof	$85,000	Immediate (as soon as possible)	Approved 40k for 2021	$85,000					

Facility	Identified Work	Cost Estimate	Timing	Year	2021	2022	2023	2024	2025	6 to 10 year
Lagoon City / Brechin WWTP	Side Aerator and float system	$35,000	Immediate (as soon as possible)	Approved in 2021	$35,000					
Lagoon City / Brechin WWTP	Air conditioning	$5,500	Medium Term (within 5 years)	2023			$5,500			
Lagoon City / Brechin WWTP	Complete a Long Term Servicing Study for Brechin and the Brechin to Lagoon City corridor. A long term servicing strategy for this part of the community will bring clarity to the long term capital plan for this facility. The study will look at areas of potential development, the expected timing of the development, and forecast when the plant will exceed its capacity and require expansion/modification to gain additional capacity. The work required to accommodate growth can be combined with the upgrades required for potential regulatory changes and end-of-life cycle replacements to develop a long term plan for this facility	$50,000	Medium Term (within 5 years)	2022		$50,000				
Lagoon City / Brechin WWTP	In the absence of a FOP or plan for full plant upgrades, this project represents selected plant/ lift station control upgrades for remote monitoring	$96,500	Medium Term (within 5 years)	2025				$96,500		
Lagoon City / Brechin WWTP	Major Maintenance Items - Blower Refurbishment - Blower Replacements - Aerator replacements - Flow Meters - Analyzer replacements - Chemical Pumps - Clarifier 1 drive motor and pulleys	$104,000	Ongoing	Ongoing	$6,000	$13,000	$30,000	$12,000	$16,000	$27,000

Facility	Identified Work	Cost Estimate	Timing	Year	2021	2022	2023	2024	2025	6 to 10 year
Lagoon City Distribution System	Hydrant Replacement Program. The current hydrants are original to distribution system. In the past few years there have been more hydrants that have started to failure and require replacement. It is recommended that annual funding of $50,000 which would cover approximately 5 hydrants replacements. There are a total of 100 hydrants in the Brechin/Lagoon City system, so at this funding level it would take 20 years to replace all of the hydrants. This program can be accelerated if more failures begin to occur.	$500,000	Ongoing	Ongoing	$50,000	$50,000	$50,000	$50,000	$50,000	$250,000
Lagoon City SPSs	SPS #4 upgrades including rail system, pump support (bench) system and 3 pumps (requires engineering)	$188,600	Immediate (as soon as possible)	Approved 80k for 2021	$188,600					
Lagoon City SPSs	New electrical Panel Lift Station 3	$50,000	Immediate (as soon as possible)	2022		$50,000				
Lagoon City SPSs	SPS#1 - General SPS Refurbishment	$81,900	Medium Term (within 5 years)	2023			$81,900			
Lagoon City SPSs	SPS#2 - General SPS Refurbishment	$81,900	Medium Term (within 5 years)	2023			$81,900			
Lagoon City SPSs	SPS#3 - General SPS Refurbishment	$81,900	Medium Term (within 5 years)	2025					$81,900	
Lagoon City SPSs	SPS#5 - General SPS Refurbishment	$81,900	Medium Term (within 5 years)	2024				$81,900		
Lagoon City WTP	Treated reservoir inspection and report	$10,000	Immediate (as soon as possible)	2023			$10,000			

Facility	Identified Work	Cost Estimate	Timing	Year	2021	2022	2023	2024	2025	6 to 10 year
Lagoon City WTP	Pump Refurbishment Program. The water process pumps are all nearing the time when they will require replacement. There are eight total pumps: 3 Low Lift and 5 High Lift Pumps (3 duty pumps, 2 fire pumps). The smaller 5 hp Low Lift and 20/30 hp duty High Lift pumps are likely small enough that refurbishment of the pumps may not be cost effective. The larger 60 hp Fire Pumps could be appropriate for refurbishment. The cost of the Program represents installed budget prices to replace all pumps. A pump specialist should be consulted to determine which pumps make sense to refurbish versus replace. Budget prices are as follows: - 5 hp LL pump = $15,000 - 20 hp HL pump = $35,000 - 30 hp HL pump = $45,000 - 60 hp Fire Pump = $90,000	$340,000	Ongoing	Ongoing		$30,000	$50,000	$35,000	$45,000	$180,000
Lagoon City WTP	Complete an automation study. Installation of automated and remote controls at treatment facilities can lead to improved service levels and help reduce risks. Issues can be detected quickly and interventions to minimize service disruptions can be completed much faster. This type of equipment also increase the plant performance data that is available to find real opportunities to reduce the costs of operating the facility.	$10,000	Medium Term (within 5 years)	2024				$10,000		
Lagoon City WTP	Major Maintenance Items - Analyzer Replacement - Flow Meter replacements - Plant computer and switch gear - Chemical pumps / panels	$67,000	Ongoing	Ongoing	$4,000	$15,000	$15,000	$23,000	$5,000	$5,000
Lagoon City WTP	Filter media replacement - Media is 7 years old and requires periodic replacement to be effective	$10,000	Medium Term (within 5 years)	2024				$10,000		
Lagoon City WTP	Raw water Intake Inspection Clean and inspect intake	$25,000	Immediate (as soon as possible)	2023			$25,000			

Facility	Identified Work	Cost Estimate	Timing	Year	2021	2022	2023	2024	2025	6 to 10 year
Lagoon City WTP	Remove old decommissioned generator exhaust	$20,000	Immediate (as soon as possible)	Approved in 2021	$20,000					
Lagoon City WTP	The roof is leaking and will continue to worsen if not addressed. A leaking roof will result in accelerated degradation of assets inside the facility and may result in mould issues that create a health and safety concern.	$30,000	Immediate (as soon as possible)	2021	$30,000					
Lagoon City WTP	Replace Air Conditioning in Control Room. Proper humidity control is important to prevent the accelerated deterioration of control equipment.	$6,000	Immediate (as soon as possible)	2023			$6,000			
Lagoon City WTP	Clearwell bypass valve replacement.	$10,000	Immediate (as soon as possible)	Approved in 2021	$10,000					
Lagoon City WTP	Milltronics sensor in low lift pump chamber.	$6,000	Immediate (as soon as possible)	2023			$6,000			
Lagoon City WTP	Distribution Pump Controls. Currently the pump control is extremely limited as a result of the electrical wiring / extremely outdated control system. At the moment only 1 of the high lift pumps is on PLC control and the remaining 4 pumps are not. The wiring and control methods currently controlling the plant are putting the plant at risk of a large scales shutdown. With the components currently running the plant being obsolete and spare parts being unavailable a component failure would require a large amount of emergency repair work that could take up to weeks to complete. It is recommended to update the electrical wiring and control system in a planned method in the coming year.	$45,000	Immediate (as soon as possible)	Approved in 2021	$45,000					
Lagoon City WTP	Flushing Machines	$40,000	Medium Term (within 5 years)	2023			$40,000			
Lagoon City/ Brechin Water Tower	Remove and replace interior coating (refer to Landmark report). Report indicates that this should be done soon to prevent more costly repairs.	$250,000	Immediate (as soon as possible)	2022		$250,000				
Lagoon City/ Brechin Water Tower	Waterproof membrane on concrete roof	$25,000	Medium Term (within 5 years)	2024				$25,000		
Lagoon City/ Brechin Water Tower	Interior (dry side) galvanized steel decking membrane on concrete roof	$110,000	Medium Term (within 5 years)	2024				$110,000		

Facility	Identified Work	Cost Estimate	Timing	Year	2021	2022	2023	2024	2025	6 to 10 year
Lagoon City/ Brechin Water Tower	Other operational/safety upgrades (refer to Landmark Report)	$30,000	Medium Term (within 5 years)	2024				$30,000		
Park Lane WTP	Green Sand Filters replacement including new control valves, isolation valves, SCADA integration and backwash pumps	$92,600	Immediate (as soon as possible)	Approved in 2021	$92,600					
Park Lane WTP	New backwash pump	$7,500	Immediate (as soon as possible)	Approved in 2021	$7,500					
Park Lane WTP	Major Maintenance Items - Analyzer Replacement - Flow Meter replacements - Plant computer and switch gear	$37,000	Ongoing	Ongoing	$4,000	$5,000	$9,000	$4,000	$5,000	$10,000
South Ramara WTP	Process equipment repairs (repair leak on Filter 1, fix flocculator, replace float valve)	$5,000	Immediate (as soon as possible)	Approved in 2021	$5,000					
South Ramara WTP	New filter headloss gauges with 4-20 output for monitoring	$7,500	Immediate (as soon as possible)	2023		$7,500				
South Ramara WTP	Installation of auto-flusher at the end of watermain supplying the small subdivision.	$40,100	Medium Term (within 5 years)	2023			$40,100			
South Ramara WTP	There are currently old style Panel View Touch Screens (2) for the control of the filter systems. These touch screens have been discontinued many years ago and are no longer available for sale from the manufacture. They should be replaced with current versions.	$14,000	Medium Term (within 5 years)	2022 and 2024			$7,000		$7,000	
South Ramara WTP	Low lift wet well electrical panel and heating system	$5,000	Immediate (as soon as possible)	Approved in 2021	$5,000					
South Ramara WTP	New Filter Effluent Pump	$6,000	Medium Term (within 5 years)	2023			$6,000			
South Ramara WTP	Purchase Spare Pump	$10,000	Medium Term (within 5 years)	2023			$10,000			
South Ramara WTP	Install attic insulation to reduce heating costs and energy consumption.	$7,500	Medium Term	2024				$7,500		

Facility	Identified Work	Cost Estimate	Timing	Year	2021	2022	2023	2024	2025	6 to 10 year
			(within 5 years)							
South Ramara WTP	Filter media replacement - Media is 7 years old and requires periodic replacement to be effective	$10,000	Medium Term (within 5 years)	2024				$10,000		
South Ramara WTP	Review electrical connection to provide full emergency power coverage at the WTP facility	$10,700	Medium Term (within 5 years)	2024				$10,700		
South Ramara WTP	Complete an automation study. Installation of automated and remote controls at treatment facilities can lead to improved service levels and help reduce risks. Issues can be detected quickly and interventions to minimize service disruptions can be completed much faster. This type of equipment also increase the plant performance data that is available to find real opportunities to reduce the costs of operating the facility.	$10,000	Medium Term (within 5 years)	2024				$10,000		
South Ramara WTP	Expand Serviced Area (On Lakeshore North of Heritage Farms)	$2,000,000	Long Term (6 to 10 years)	Long Term						$2,000,000
South Ramara WTP	Major Maintenance Items - Analyzer Replacement - Flow Meter replacements - Plant computer and switch gear - Chemical pumps / panels - Filter Control valves	$69,000	Ongoing	Ongoing	$11,000	$14,000	$10,000	$19,000	$5,000	$10,000
Val Harbour WTP	High Lift Pumps (HLP) nearing end of service life and require replacement, however the design of the Val Harbour reservoir and high lift pump results in operational challenges and therefore a like-for-like replacement of existing pumps is not recommended. Preliminary options include replacing centrifugal pumps with 1) submersible pumps in exterior below grade reservoir, or 2) above grade reservoir, or 3) vertical turbine pumps with pump chamber. A feasibility study is required to engineer options/alternatives with costs.	$20,000	Immediate (as soon as possible)	2022		$20,000				
Val Harbour WTP	High Lift Pumps (HLP) upgrade project (includes engineering design)	$274,000	Medium Term (within 5 years)	2025					$274,000	

Facility	Identified Work	Cost Estimate	Timing	Year	2021	2022	2023	2024	2025	6 to 10 year
Val Harbour WTP	Major Maintenance Items - Analyzer Replacement - Flow Meter replacements - Plant computer and switch gear - Generator Transfer switch	$48,000	Ongoing	Ongoing	$4,000	$14,000	$5,000	$8,000	$4,000	$13,000