

November 2019

Square Bay Wastewater Local Service Asset Management Plan



Table of Contents

Version Log	ii
Acknowledgements	ii
1. Local Service Information.....	1
1.1. Development Details	2
1.2. Established Bylaws	2
2. Description of Assets.....	2
2.1. Treatment and Disposal Systems.....	3
2.2. Collection System	3
2.3. Asset Accessibility	3
2.4. Asset Condition	4
2.5. Asset Replacement Value	4
3. Operations and Maintenance (O&M) Plan	5
3.1. Current O&M Fees	5
3.2. Current O&M Budget.....	6
3.3. Potential O&M Budget	6
4. Capital Plan.....	7
4.1. Reserve Balances	7
4.2. Potential Capital Budget	7
5. Additional Local Service Improvement Actions	10

Version Log

This document was carefully prepared so that it can be maintained as a living document; a document that is continually edited and updated. Through the various edits and updates, this document may evolve and be expanded as needed. This may be as a result of infrastructure replacement or could be due to changes in regulatory requirements, technology, staffing, or environmental conditions. Regardless of the reason, updates to this asset management plan will be key to the ongoing operation of the Square Bay wastewater local service.

Version	Revised By	Date	Description
1	D. Joseph	November 28, 2019	Final report for Board of Directors approval

Acknowledgements

Completion of this Asset Management Plan would not have been possible without contributions and support from the following staff:

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SQUARE BAY WASTEWATER LOCAL SERVICE ASSET MANAGEMENT PLAN

1. Local Service Information

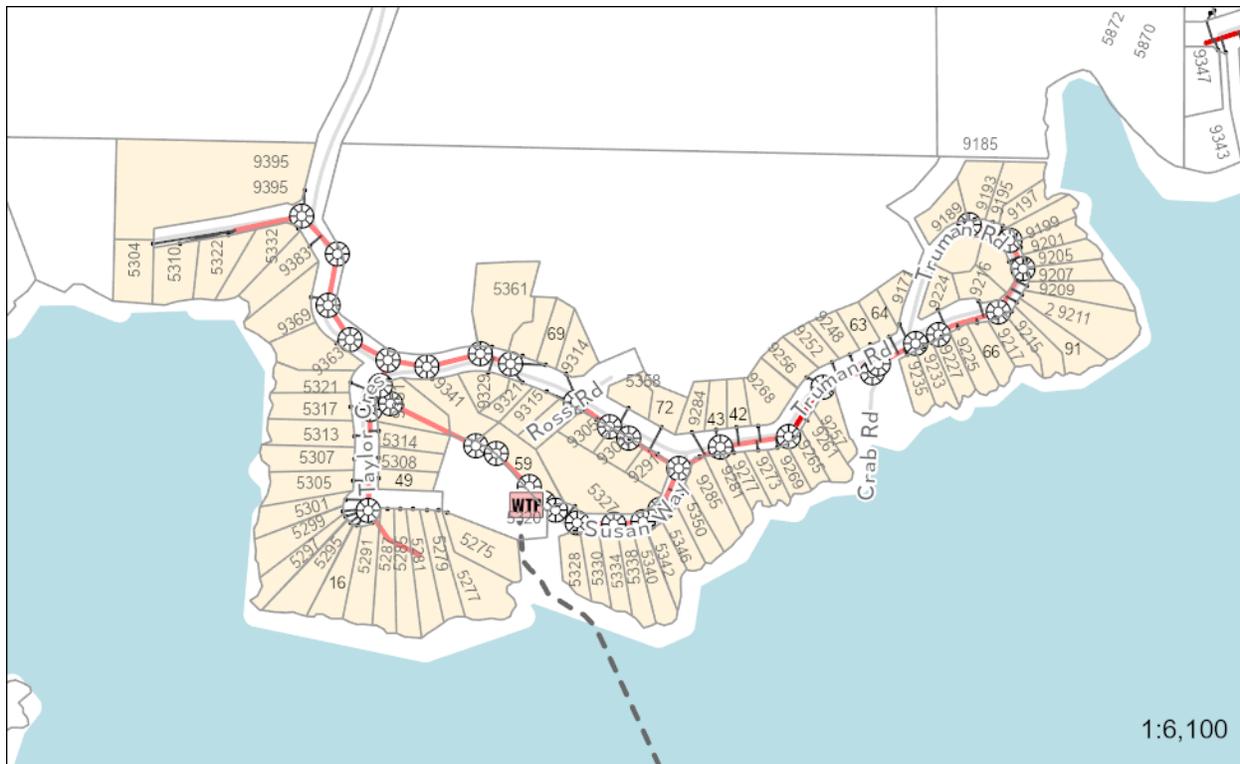


Figure 1 – Map of Wastewater Local Service Area and Infrastructure

- Address: 5320 Susan Way
- Original Construction: 1970
- Taken over by Sunshine Coast Regional District (SCRD): 1981
- Establishment of Local Service: 1996
- Major Upgrades: 2019 (Replacement of treatment system)
- Treatment System Owner: SCR D
- Number of Fronting Parcels: 93 Residential
- Number of Users: 79
- Treatment Process: ECOfluid Upflow Sludge Blanket Filtration (USBF®)
- Treatment Permit #: PE-375
- Permitted Discharge Amount: 171 m³/day
- Regulatory Authority: Ministry of Environment Permit
- Effluent Receiving: Ocean
- EOCP Classification: MWWT-III (Municipal Wastewater Treatment – Level 3)
- Statutory Right of Ways: Required for side yard access to the collection system (C76466 registered December 8, 1975, in favour of the developer)

SQUARE BAY WASTEWATER LOCAL SERVICE ASSET MANAGEMENT PLAN

1.1. Development Details

The Square Bay wastewater local service area is located in the Halfmoon Bay Electoral Area (Area B) of the SCR D. The treatment systems is located in a vacant parcel of land used exclusively for the processing of wastewater.

The community wastewater systems were constructed in 1970 to assist with the development of new single-family dwellings in the neighbourhood. The ground conditions in this area are very rocky and have been identified as having insufficient pervious soil material in their yards for constructing an onsite drainfield. The service area was expanded in 1982. The systems were managed by the developer until 1981 when the SCR D began overseeing the service.

1.2. Established Bylaws

There have been various bylaws adopted by the SCR D Board of Directors that are relevant to the Square Bay wastewater local service, as listed in Table 1.

Table 1 – Established Bylaws Pertaining to the Wastewater Local Service

Bylaw No.	Bylaw Name	Purpose
232A.4	Package Plants Service Unit (1994)	Established a designated area for the purpose of providing sewage collection, treatment and disposal within Areas A, B and E.
1026	Sewage Treatment Facilities Local Service (1996)	Converted the Package Plants Service Unit to a local service.
428.19	Sewage Treatment Facilities Service Unit (2019)	Establishment of, and subsequent updates thereto, sewage treatment facilities frontage and user charges.
512	Sewage Treatment Facilities Reserve Fund (2001)	Established a capital reserve fund for sewage treatment facilities.
608	Sewage Treatment Facilities Service Operating Reserve Fund (2007)	Established an operating reserve fund for sewage treatment facilities.

2. Description of Assets

The following sections outline the current state of the wastewater systems by providing answers to the following questions:

- What do we own?
- Where is it?
- What is its condition?
- What is its useful life?
- What is its value?

2.1. Treatment and Disposal Systems

The wastewater treatment process initiates with solids being screened at the equalization tank. From the equalization tank the wastewater is pumped to the anoxic zone, followed by the aeration zone where the wastewater flows through the bottom of the Upflow Sludge Blanket Filtration (USBF®). After the USBF the effluent flows into the filter feed tank where it is pumped to the sand filters and ultraviolet (UV) disinfection equipment. Finally, the wastewater flows into the treated effluent tank and gravity feeds through a flow meter before it discharges to the ocean.

The backwash pump in the treated effluent tank uses the treated water to backwash the sand filters. Return activated sludge is drawn from the bottom of the USBF tank and pumped to the head of the anoxic zone. Waste activated sludge is pumped from the aeration zone and stored in the pre-thickener tank where it gets pumped out by a vacuum truck and disposed of.

The effluent disposes through a 300 mm diameter, high density polyethylene (HDPE) outfall pipe approximately 300 m offshore at a depth of 35 m in the open ocean.

2.2. Collection System

The collection system has approximately 635 m of 150 mm diameter, asbestos cement (AC) and 625 m of 150 mm diameter, polyvinyl chloride (PVC) gravity mains, 120 m of 150 mm diameter, PVC force main, and 34 manholes. The infrastructure depth varies between 1.50 m and 4.95 m below grade.

Approximately 75 m of the mains is accessed through the side yard of a dwelling between Taylor Crescent and Susan Way.

2.3. Asset Accessibility

There are a couple of accessibility concerns regarding infrastructure maintenance and replacement.

- The ground conditions are very rocky and therefore the ground will require blasting to replace the main segments.
- Access to the wastewater collection system in the private property will require removal of the existing vegetation, including various bushes and trees.

2.4. Asset Condition

Wastewater treatment system condition was determined by staff based on several factors.

- Previous or immanent failure of the system;
- Frequency of system repairs;
- Age of system; and
- Ability to regularly meet effluent quality regulations.

Based on these factors each system in the local service area was assigned a condition rating from excellent to poor. An excellent condition is assigned to systems in near new condition, good to systems with few minor defects, fair to systems with moderate defects or signs of aging, and poor to systems that cannot currently function as designed, or will soon cease functioning without repair, due to flow volumes, defects, or aging.

The new treatment has been operating in accordance with the design parameters and is in excellent condition.

The ocean outfall was last inspected in December 2017 and observed to be in good condition. It was noted that the concrete anchors, which are securely attached to the pipe and holding the outfall pipe to the ocean bottom, are nearing the end of their service life.

The condition of the collection system was assessed in 2018 through CCTV inspections. During the inspections six of the gravity pipe segments observed to have severe defects, nine have moderate defects, and 18 have minor defects (only three segments were observed to have no defects). The collection system, including the force main, is in poor condition.

2.5. Asset Replacement Value

It is expected that the new treatment process along with the current ocean outfall will still meet regulatory requirements once they are due for replacement.

SQUARE BAY WASTEWATER LOCAL SERVICE ASSET MANAGEMENT PLAN

Replacement value for the collection system was estimated based on individual component replacement. Additional costs for the removal and replacement of bushes and trees located along the main accessed through private property were factored into the replacement cost.

Table 2 – Asset Replacement Value Summary

Asset Type	Replacement Cost (2018 \$)	Year Installed	Estimated Useful Life	Remaining Useful Life
Treatment System	\$ 959,069	2019	50	50
Ocean Outfall	\$ 176,697	1970	85	36
Collection System	\$ 1,295,270	1970	85	36
Collection System	\$ 2,084,692	1982	85	36
Force Main	\$ 254,709	1982	50	13
Lift Station	\$ 206,449	2014	50	45

3. Operations and Maintenance (O&M) Plan

Operations and maintenance (O&M) are the activities that ensure the wastewater systems are able to continue to function as designed throughout their EUL. These activities include routine inspections and readings, unforeseen repairs, effluent sampling, and ongoing condition assessments. User fees and parcel taxes are collected annually to fund these activities.

As discussed in the Wastewater Service Review, the current fees and taxes are combined and can be used to fund the operational expenditures for the year. The recommendation in the Wastewater Service Review is for user fees to provide sufficient revenue for operational expenditures and for parcel taxes to be invested in capital renewal and replacement.

3.1. Current O&M Fees

The users of the Square Bay wastewater local service are charged user fees of \$412.50 per year (including a 25% increase in user fees in 2019) and those properties within the service area boundary as outlined in Bylaw No. 1026 are charged \$102.00 in parcel tax per year (including a 2% parcel tax increase in 2019).

SQUARE BAY WASTEWATER LOCAL SERVICE ASSET MANAGEMENT PLAN

3.2. Current O&M Budget

The budgeted and actual expenditures of the Square Bay wastewater local service from 2015 to 2018 are shown in Table 3.

Table 3 – Budgeted and Actual Operations and Maintenance Expenditures

Expenditures	2015	2016	2017	2018	Average
Budget	\$ 50,184.00	\$ 35,504.00	\$ 32,121.00	\$ 33,030.00	\$ 37,709.75
Actual	\$ 36,843.00	\$ 33,871.00	\$ 36,915.00	\$ 50,533.11	\$ 39,540.53
Variance	\$ 13,341.00	\$ 1,633.00	\$(4,794.00)	\$(17,503.11)	\$(1,830.78)

Overall, the operations budget decreased by 34% between 2015 and 2018. The actual expenditure increased by 37% during the same period of time. The majority of the actual expenditure (63%) was to pay for staffing expenses of operational and administrative staff, while other significant expenditures include contracted services (14%) equipment repairs and maintenance (13%), and B.C. Hydro utility charges (7%).

The irregularity in this budget review, 2017 and 2018, incurred costs in excess of the budgeted amount due to labour associated to the replacement of the treatment system and emergency repairs to the collection system.

3.3. Potential O&M Budget

The potential O&M budget was created based on an optimal level of service for the systems at Square Bay local service area. Similar to the existing O&M budget, staff wages account for the majority of the potential annual O&M budget for Square Bay. The required semi-weekly, monthly, quarterly, semi-annual, and annual tasks are primarily completed by a Utility Technician.

Significant expenses in the potential operating budget include:

- Staffing expenses, consisting of:
 - O&M staffing requirement;
 - Administration of the wastewater system by Utilities Services staff;
 - SCRD Administration Services contribution;
- Annual material and equipment replacement;
- Annual and proportioned non-annual contracted services;

- B.C. Hydro utility charges; and
- Proportioned share of service vehicles, tools, and miscellaneous expenses.

With the inclusion of all ancillary charges, the potential operating budget for Square Bay wastewater local service is \$64,780.00. The potential user fee for the 79 users in this local service area is \$820.00, a 99% increase from 2019 rates. This increase is primarily attributed to the separation of property tax revenue from the operating budget and the newly installed treatment system requiring a greater amount of effort to maintain than the system it replaced.

4. Capital Plan

Capital expenditure is required for the periodic renewal or replacement of wastewater systems or system components. A capital plan considers many of the topics already covered in this plan including asset replacement values and EULs, asset condition, and following a well-developed O&M plan.

The SCR D does not have a long-term capital funding plan in place for the wastewater infrastructure at Square Bay.

4.1. Reserve Balances

As of the end of 2018, there was \$31,789.18 in capital reserves and \$79,427.92 contributed to operating reserves. Under the existing method of revenue collection and use, these reserves could be combined to invest in capital renewal or replacement projects if required.

There is currently no requirement for Square Bay to have a set level, by either denomination or percentage, of reserves in place. Based on the current reserve balance and 2019 budget transfers, Square Bay's reserves are 2% of the estimated replacement value of the infrastructure.

4.2. Potential Capital Budget

Budget models considering four different time frames (10, 20, 50, and 80 year periods) were prepared for consideration, each with varying impact on parcel tax and with different systems requiring replacement over the selected time frame. For each model two plans were prepared: a 10% parcel tax increase every five years, or a fixed parcel tax throughout the model time frame.

SQUARE BAY WASTEWATER LOCAL SERVICE ASSET MANAGEMENT PLAN

Each model factors in funding the full cost of the infrastructure requiring replacement within the life of the model. Any debt incurred during the timeframe of the model is paid off in full with interest and the model terminates with a reserve balance equal to 10% of the projected value of the infrastructure in the last year of the model.

The highlighted budget plans represent the shortest term in which all infrastructure (i.e. the treatment, disposal, and collection systems) will need to be replaced.

Table 4 – Potential Capital Budget Options Based on Model and Payment Method

Capital Budget	Model	Infrastructure Replaced	Payment Method	Total Revenue	Parcel Tax (Year 1)
Plan 1	80-Year	Treatment System (1) Ocean Outfall (1) Collection System (1)	Even Annual Contribution	\$ 33,108,800	\$ 4,450
Plan 2	80-Year	Treatment System (1) Ocean Outfall (1) Collection System (1)	10% Increase Every Five Years	\$ 47,473,416	\$ 2,840
Plan 3	50-Year	Treatment System (1) Ocean Outfall (1) Collection System (1)	Even Annual Contribution	\$ 22,209,000	\$ 4,776
Plan 4	50-Year	Treatment System (1) Ocean Outfall (1) Collection System (1)	10% Increase Every Five Years	\$ 25,674,394	\$ 3,464
Plan 5	20-Year	Treatment System (0) Ocean Outfall (0) Collection System (0)	Even Annual Contribution	\$ 1,293,600	\$ 695
Plan 6	20-Year	Treatment System (0) Ocean Outfall (0) Collection System (0)	10% Increase Every Five Years	\$ 1,322,917	\$ 613
Plan 7	10-Year	Treatment System (0) Ocean Outfall (0) Collection System (0)	Even Annual Contribution	\$ 859,300	\$ 924
Plan 8	10-Year	Treatment System (0) Ocean Outfall (0) Collection System (0)	10% Increase Every Five Years	\$ 863,205	\$ 884

In addition to the replacement of the wastewater systems, other items that appear in the capital budget include:

- Replacement of the security fencing around the perimeter of the site;

SQUARE BAY WASTEWATER LOCAL SERVICE ASSET MANAGEMENT PLAN

- Replacement of the standby generator;
- Replacement of the air blower units;
- Replacement of the ultraviolet (UV) disinfection equipment;
- One-time replacement of the ocean outfall anchors;
- Payment of the short-term debt for the new treatment system. (The Clean Water and Wastewater Fund grant funded 83% of the project.); and
- Proportioned short-term debt payments for the purchase and replacement of two service vehicles.



Figure 2 – Wastewater Local Service 50-Year and 80-Year Capital Plans

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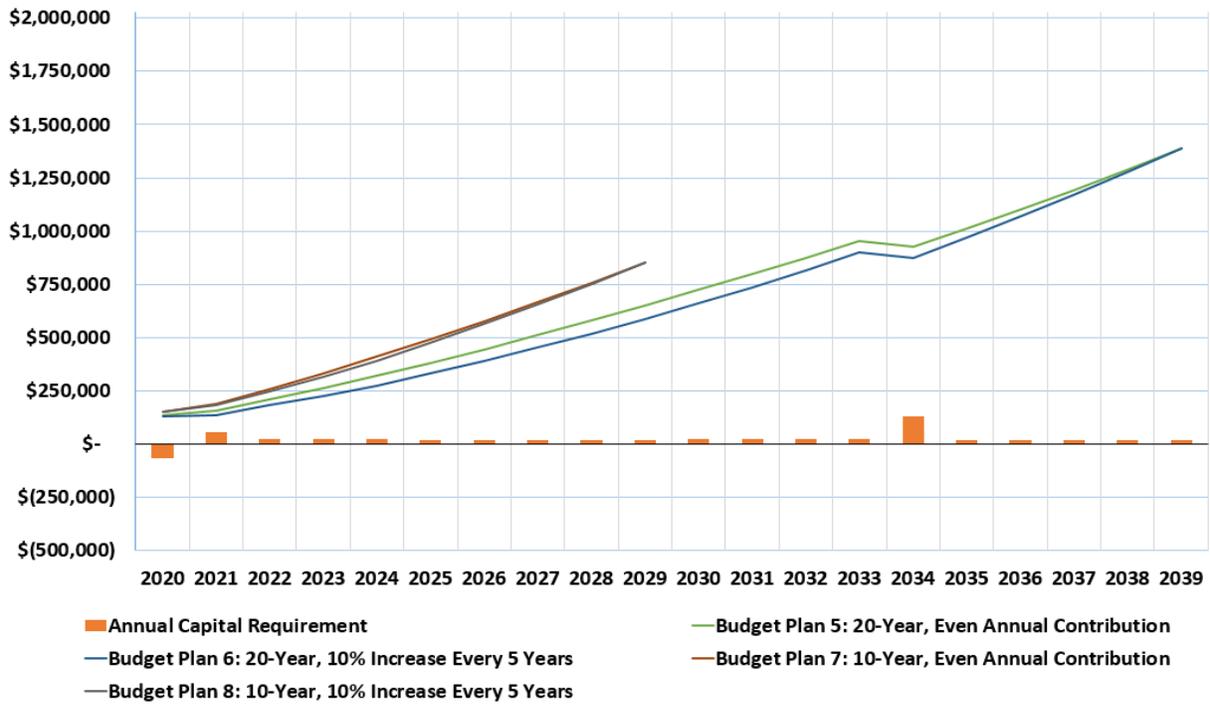


Figure 3 – Wastewater Local Service 10-Year and 20-Year Capital Plans

5. Additional Local Service Improvement Actions

Additional operational work is required in the Square Bay wastewater local service area that falls outside of the typical operational and maintenance plan. These items have been listed due to the potential impact that they may have on the users and fronting properties of the local service.

**SQUARE BAY WASTEWATER LOCAL SERVICE
ASSET MANAGEMENT PLAN**

Table 5 – Local Service Improvement Actions

Action Item	Target Year	Cost Estimate	Result
Repair the severe rated defects in the collection system noted in the CCTV inspection.	2020-2021	\$ 26,600	To be determined.
Transfer Statutory Right of Away from developer to SCRD over portion of private property for the operation, maintenance, and replacement of the wastewater collection system.	2021	\$ 1,300	To be determined.
Repair the moderate rated defects in the collection system noted in the CCTV inspection.	2021-2023	\$ 4,500	To be determined.

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