November 2019

Lee Bay Wastewater Local Service Asset Management Plan

SUNSHINE COAST REGIONAL DISTRICT

Table of Contents

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 Lee 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:

Darren Joseph	Asset Management Coordinator	Corporate Services
Brad Wing	Financial Analyst	Corporate Services
Tina Perreault	General Manager, Corporate Services	Corporate Services
Cheryl Trent	GIS Administrator	Corporate Services
Emilia Walton	GIS Technician	Corporate Services
Shane Walkey	Manager, Utility Services	Infrastructure Services
Bobby Rebner	Operations Support Technician	Infrastructure Services
Codi Abbott	Utility Operations Superintendent	Infrastructure Services
Ashley Gray	Utility Technician	Infrastructure Services

1. Local Service Information

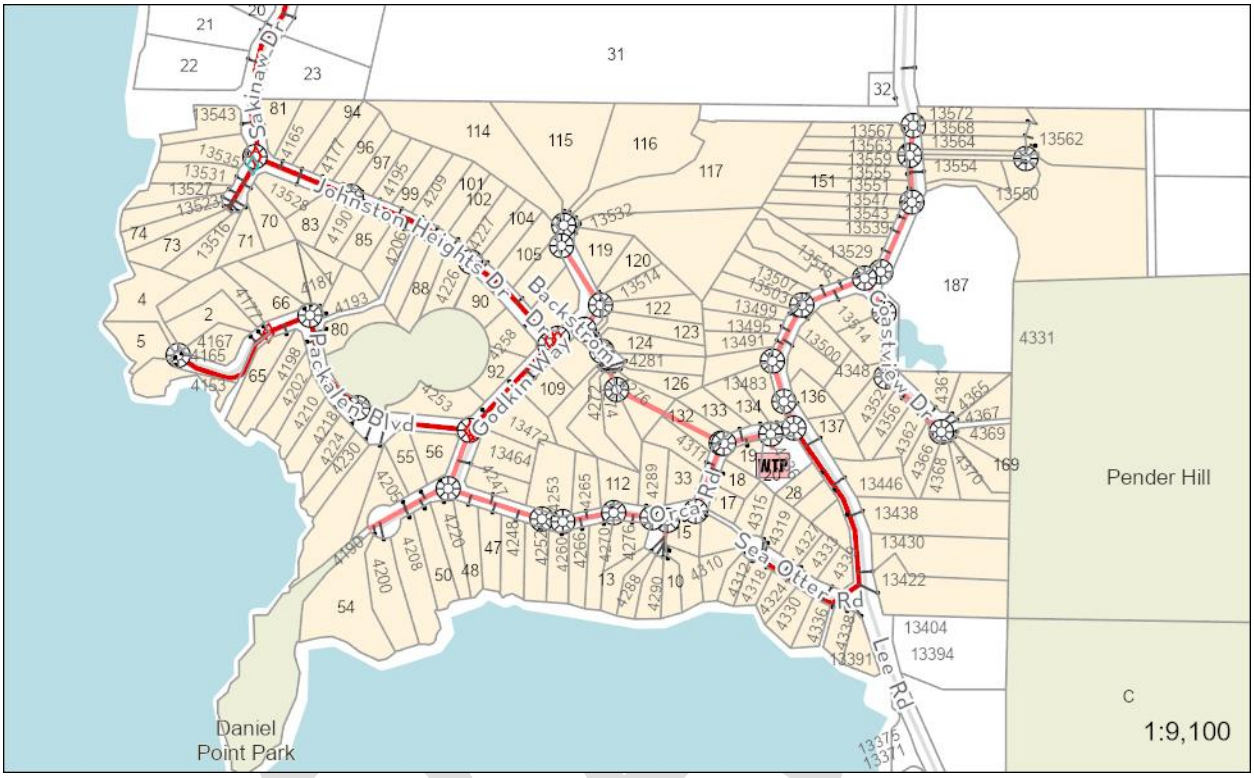

Figure 1 – Map of Wastewater Local Service Area and Infrastructure

- Address: 4336 Orca Road
- Original Construction: 1982
- Major Upgrades: 1999 (Replacement of treatment and disposal systems)
- Taken over by Sunshine Coast Regional District (SCRD): 1986
- Establishment of Local Service: 1996
- Treatment System Owner: SCRD
- Number of Fronting Parcels: 178 Residential
- Number of Users: 106
- Treatment Process: Bioclere® Trickling Filter
- Treatment Permit #: PE-5450
- Permitted Discharge Amount: 135 m^3/day
- Regulatory Authority: Ministry of Environment Permit
- Effluent Receiving: Ground
- EOCP Classification: SWWS-M (Small Wastewater Systems – Mechanical)
- Statutory Right of Ways: BX307829 (registered February 4, 2005, for collection system connection from Backstrom Drive to Lee Road)

1.1. Development Details

The Lee Bay wastewater local service area is located in the Egmont / Pender Harbour Electoral Area (Area A) of the SCRD. The treatment and disposal systems are located in separate parcels of land, which are both used exclusively for the processing of wastewater.

The community wastewater systems were constructed in 1982 to assist with the development of new single-family dwellings in the neighbourhood. The ground conditions in this area are very rocky and were identified as having insufficient pervious soil material in their yards for constructing an onsite drainfield. The service area was expanded in 1997 and again in 2005 as additional house in the area were developed. The systems were managed by the developer until 1986 when the SCRD began overseeing the service.

1.2. Established Bylaws

There have been various bylaws adopted by the SCRD Board of Directors that are relevant to the Lee 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.3	Package Plants Service Unit (1986)	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

Treatment of the influent takes place in an underground cast-in-place concrete tank with a series of divider walls forming individual treatment sections within. The top of the tank is a concrete with built-in ground level access lids. Adjacent to the tank is a site building that houses the electrical and mechanical equipment, and a backup generator.

Wastewater enters the septic tanks which flows into an equalization chamber. Flow from the equalization tank is dosed to the trickle filters. Flow from the trickling filters goes into the final clarifier for settling and discharge to the fields.

Once the effluent has been pumped from the discharge chamber, it is conveyed in a pressurized main to the drainfields. Effluent can be diverted to one of two parcels; the primary disposal site has eight separate drainfields while the backup disposal site has four separate drainfields. The primary disposal site was constructed in 1999 during the second phase of development, while the backup disposal site was constructed as part of the original development. The fields provide effluent disposal through a combined 1,950 m of perforated drainage pipe on the main parcel and 1,010 m on the backup parcel.

2.2. Collection System

The collection system has approximately 1,610 m of 2000 mm diameter, polyvinyl chloride (PVC) gravity mains, 1,870 mm of 50 mm and 75 mm pressure mains, and 37 manholes. The infrastructure depth varies between 1.25 m and 3.40 m below grade.

2.3. Asset Accessibility

For the most part, the infrastructure at Lee Bay is accessible. There is one segment of the collection system that is located through two parcels, between Backstrom Drive and Lee Road.

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.

There have been no performance issued with the treatment system. The treatment system is in good condition.

There have been issues with the operation of the primary drainfield since its construction. The backup disposal site has been used consistently and has met the operational requirement. Work is ongoing to resolve the issues with the primary drainfield as the backup drainfield is nearing the end of its estimated useful life (EUL). The disposal system is in fair condition and can be upgraded once the effluent is being directed to the primary field.

The condition of the collection system was assessed in 2018 through CCTV inspections. During the inspection one pipe segment and one manhole were observed to have severe defects. The collection system is in good condition but can be downgraded if the necessary defects are not repaired in the near future.

2.5. Asset Replacement Value

It is expected that the treatment process that was installed 20 years ago will not meet regulatory requirements once the treatment plant is due for replacement. A replacement value was estimated using the replacement value of the treatment and disposal systems at Square Bay wastewater local service area.

At Square Bay, the wastewater treatment process is a single sludge denitrification, extended aeration activated sludge process that incorporates Upflow Sludge Blanket Filtration (USBF®), an anoxic selector zone and sludge pre-thickening. Downstream processes include sand filtration and UV disinfection before effluent disposal.

Replacement values for the drainfield and collection system were estimated based on individual component replacement values. Only the primary drainfield was considered for replacement.

Table 2 – Asset Replacement Value Summary

Asset Type	Replacement Cost (2018 $)	Year Installed	Estimated Useful Life	Remaining Useful Life
Treatment System	$ 2,685,393	1999	50	30
Drainfield	$ 1,055,469	1999	40	20
Collection System	$ 825,453	1982	85	48
Collection System	$ 2,270,050	1997	85	63
Collection System	$ 1,115,466	2005	85	71

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 Lee 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).

3.2. Current O&M Budget

The budgeted and actual expenditures of the Lee Bay wastewater local service from 2015 to 2018 are shown in Table 3. The breakdown between expenditure related to the collection system and the treatment and disposal systems has not been recorded. As there have been no recent issues identified with the collection system, all expenditures are assumed to have been allocated to the treatment and disposal systems.

Table 3 – Budgeted and Actual Operations and Maintenance Expenditures

Expenditures	2015	2016	2017	2018	Average
Budget	$ 44,561.00	$ 43,468.00	$ 41,340.00	$ 41,909.00	$ 42,819.50
Actual	$ 22,160.00	$ 22,799.00	$ 23,800.00	$ 58,699.23	$ 31,864.56
Variance	$ 22,401.00	$ 20,669.00	$ 17,540.00	$(16,790.23)	$ 10,954.94

Overall, the operations budget decreased by 6% between 2015 and 2018, while the actual expenditure increased by 165% during the same period of time. The majority of the actual expenditure (48%) was to pay for staffing expenses of operational and administrative staff, while other significant expenditures include equipment repairs and maintenance (19%) and contracted services (17%).

The irregularity noted in this budget review, 2018, incurred costs in excess of the budgeted amount due to the cost of providing a new service connection to a parcel that was missed by the developer.

3.3. Potential O&M Budget

The potential O&M budget was created based on an optimal level of service for the systems at Lee 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 Lee Bay. The required weekly, bi-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;
- Proportioned charges for 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 Lee Bay wastewater local service is $43,142.00. The potential user fee for the 106 users in this local service area is $407.00, a 1% decrease from 2019 rates. The nominal change in user fees reveals that the optimal level of service is consistent with the service currently provided at this local service area.

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 SCRD does not have a long-term capital funding plan in place for the wastewater infrastructure at Lee Bay.

4.1. Reserve Balances

As of the end of 2018, there was $233,555.60 in capital reserves and $254,966.66 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 Lee 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, Lee Bay's reserves are 6% 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.

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 value of the infrastructure in the last year of the model.

The highlighted budget plans represent the model in which all infrastructure (i.e. the treatment, disposal, and collection systems) will all 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 (2) Drainfield (2) Collection System (1)	Even Annual Contribution	$ 57,955,200	$ 4,070
Plan 2	80-Year	Treatment System (2) Drainfield (2) Collection System (1)	10% Increase Every Five Years	$ 82,952,204	$ 2,593
Plan 3	50-Year	Treatment System (1) Drainfield (1) Collection System (1)	Even Annual Contribution	$ 17,799,500	$ 2,000
Plan 4	50-Year	Treatment System (1) Drainfield (1) Collection System (1)	10% Increase Every Five Years	$ 20,577,606	$ 1,451
Plan 5	20-Year	Treatment System (0) Drainfield (1) Collection System (0)	Even Annual Contribution	$ 2,945,600	$ 827
Plan 6	20-Year	Treatment System (0) Drainfield (1) Collection System (0)	10% Increase Every Five Years	$ 3,012,705	$ 729

Capital Budget	Model	Infrastructure Replaced	Payment Method	Total Revenue	Parcel Tax (Year 1)
Plan 7	10-Year	Treatment System (0) Drainfield (0) Collection System (0)	Even Annual Contribution	$ 659,500	$ 371
Plan 8	10-Year	Treatment System (0) Drainfield (0) Collection System (0)	10% Increase Every Five Years	$ 662,445	$ 354

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

- Replacement of the privacy fence between the residential properties and the treatment system;
- Replacement of the emergency standby generator; and
- Proportioned short-term debt payments for the purchase and replacement of two service vehicles.

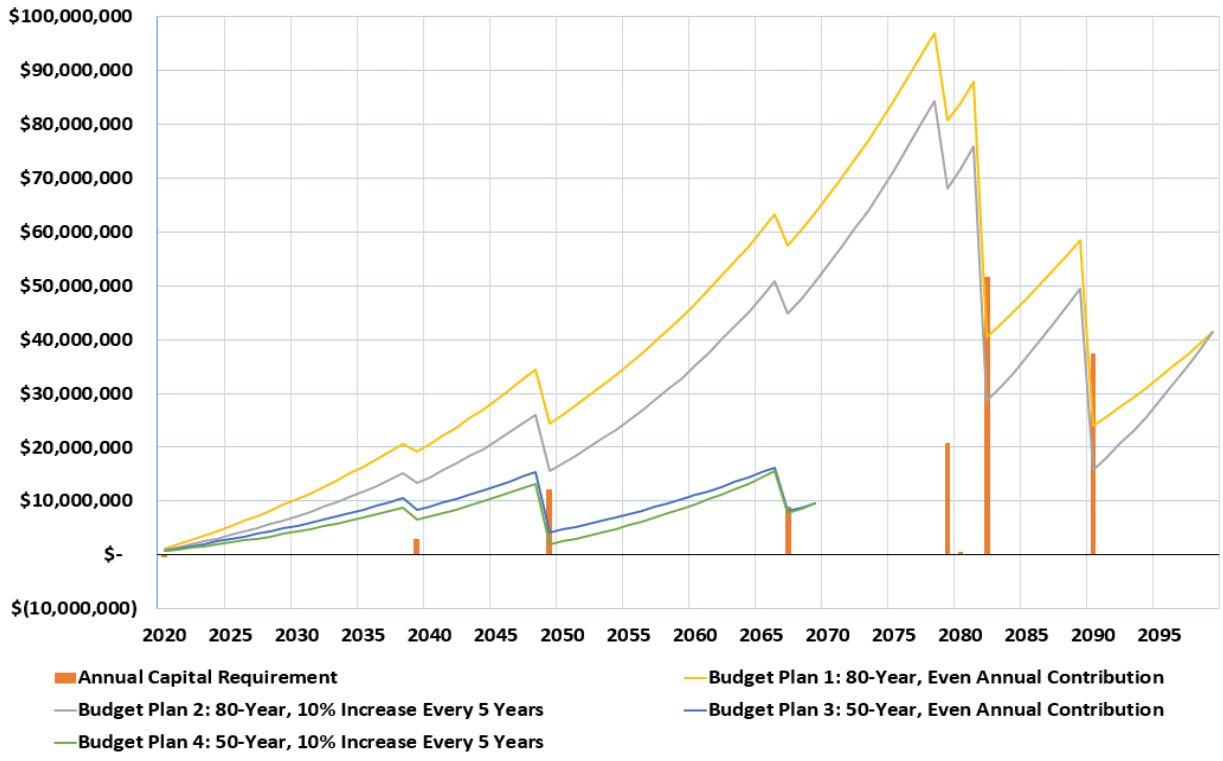

Figure 2 – Wastewater Local Service 50-Year and 80-Year Capital Plans

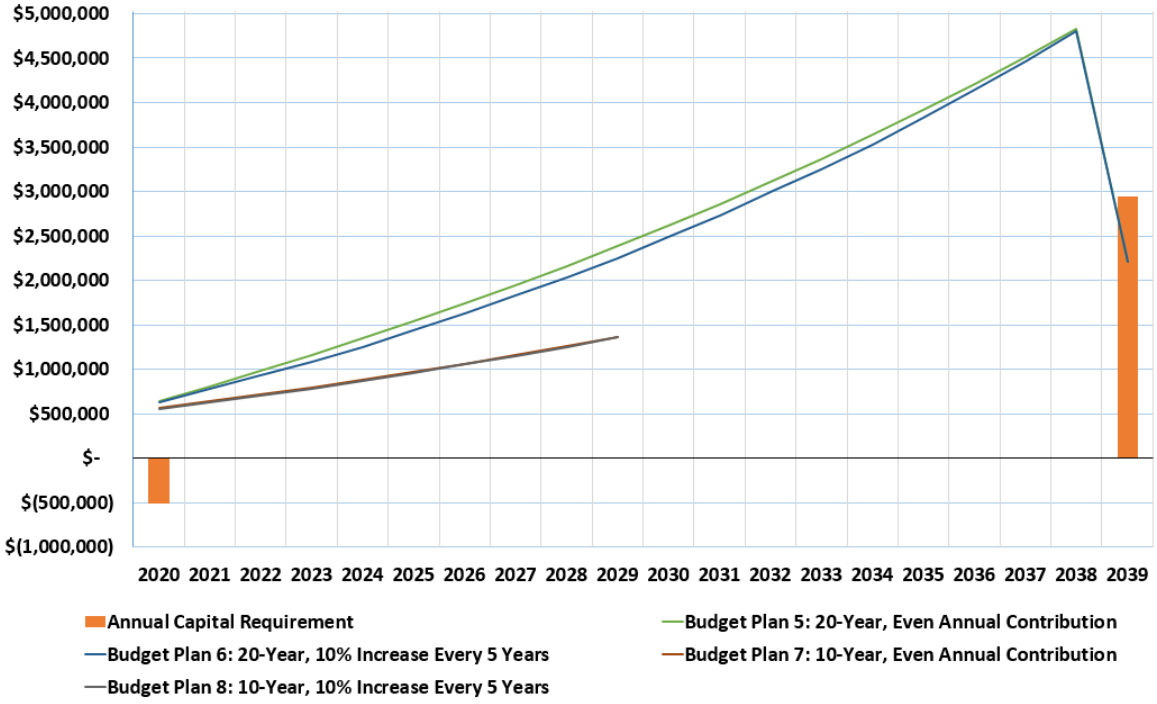

Figure 3 – Wastewater Local Service 10-Year and 20-Year Capital Plans

5. Additional Local Service Improvement Actions

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

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	$ 20,000	To be determined.