

November 2019

Merrill Crescent Wastewater Local Service Asset Management Plan



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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 Merrill Crescent wastewater local service.

Version	Revised By	Date	Description
1	D. Joseph		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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1. Local Service Information

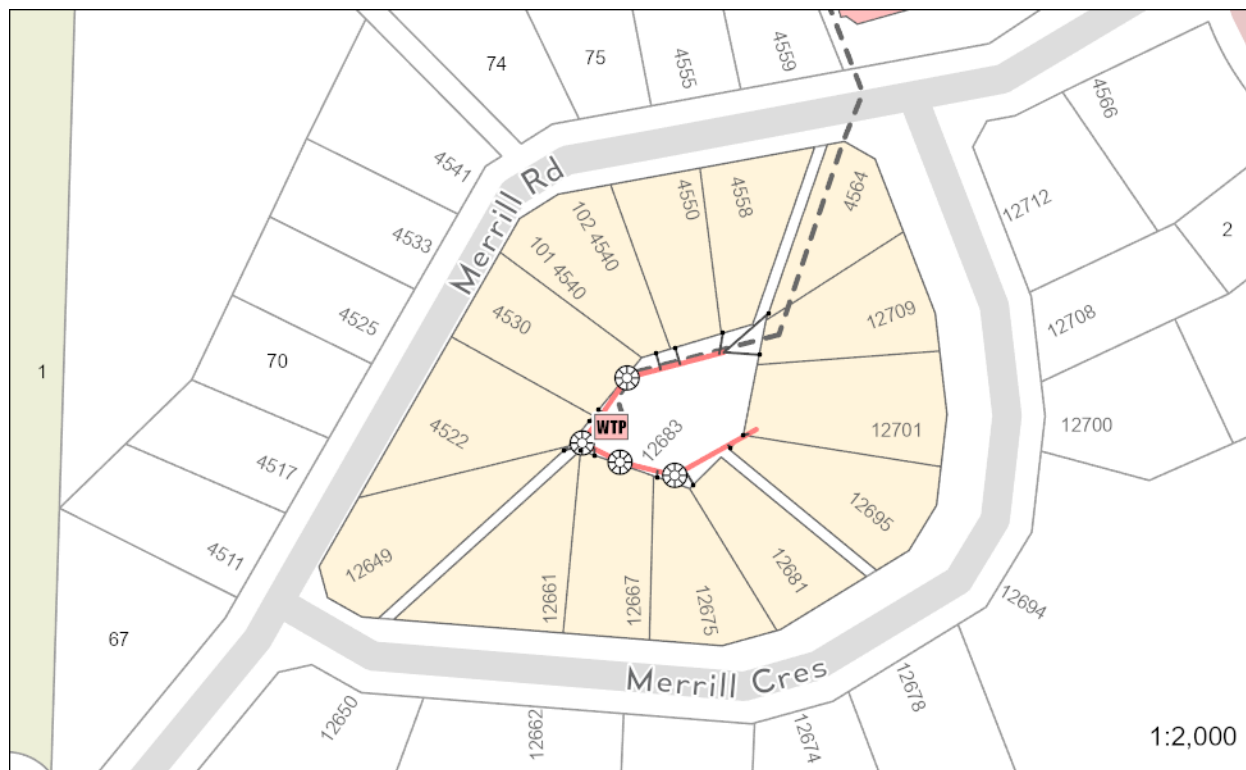


Figure 1 – Map of Wastewater Local Service Area and Infrastructure

- Address: 12683 Merrill Crescent
- Original Construction: 1982
- Taken over by Sunshine Coast Regional District (SCRD): 1994
- Establishment of Local Service: 1996
- Major Upgrades: 2018 (Replacement of disposal system)
- Treatment System Owner: SCRCD
- Number of Fronting Parcels: 14 Residential
- Number of Users: 12
- Treatment Process: NPS sequencing batch reactor
- Treatment Permit #: Not required
- Permitted Discharge Amount: < 22.7 m³/day
- Regulatory Authority: Public Health Act
- Effluent Receiving: Ground
- EOCP Classification: Unclassified
- Statutory Right of Ways: None required

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1.1. Development Details

The Merrill Crescent 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 parcel with the treatment plant on it is located behind the rear yards of the service area's parcels and has three points of access from Merrill Road and Merrill Crescent.

These community wastewater systems were constructed in 1982 to assist with the development of new single-family dwellings in the neighbourhood. The parcels in this service area were identified as having insufficient pervious soil material in their rear yards for constructing an onsite drainfield. The systems were managed by the developer until 1994 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 Merrill Crescent 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.
359	Sunshine Coast Sewage Service Unit Sewer Rates (Merrill Crescent) (1994)	To provide for the imposition of a charge against the owners for the use of the sewage system.
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 above ground poured in place concrete tank with a series of divider walls forming individual treatment sections within. The top of the tank is a fiberglass lid with fiberglass hatches that open, allowing access to each section.

Wastewater enters into a solids retention tank where fluid has to pass through a screened section into the aeration tank. Treatment is conducted in batches controlled by float switches, timers and wall levels. After aeration treatment, effluents are transferred into final clarifier for settling and discharge to the dosing tank.

There are two outlets from the dosing tank which allows the effluent to be diverted to separate drainfields in the same parcel. The fields provide effluent disposal through a combined 290 m of perforated drainage pipe.

2.2. Collection System

The collection system has approximately 250 m of 150 mm diameter, polyvinyl chloride (PVC), gravity mains, and four manholes. The infrastructure depth varies between 1.76 m and 3.80 m below grade.

All of the collection system infrastructure is located within the same parcel of land as the treatment plant.

2.3. Asset Accessibility

There are multiple accessibility concerns regarding infrastructure maintenance and replacement at Merrill Crescent.

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- General, everyday access to the treatment plant can be challenging due to the narrow path off of Merrill Road. and
- Access to the wastewater collection system will require the 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.

Based on the Estimated Useful Life (EUL), the community septic tank has approximately 26% of its lifespan remaining. There were no reported structural concerns noted when the tank was last pumped out in 2018. The treatment system is in fair condition.

The pumps at Merrill Crescent frequently get plugged, burn out, and require replacement. Inappropriate materials have been deposited in the wastewater mains that cannot be managed by the pumps. Residents have been reminded on best wastewater practices in hopes that a change in practices may alleviate this problem and improve the overall condition of the pumping equipment.

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

The condition of the collection system was assessed in 2018 through CCTV inspections. During the inspection two pipe segments were observed to have minor defects. The collection system is in good condition.

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2.5. Asset Replacement Value

It is expected that the treatment process that was installed 37 years ago will not meet regulatory requirements once the treatment system is due for replacement. A replacement value was estimated using the replacement value of the treatment and disposal systems at Canoe Road wastewater local service area.

At Canoe Road, influent is pumped to elevated treatment modules where it is processed through filter media and disposed of in a trenchless drainfield. The drainfield at Merrill Crescent was replaced in 2018 but it is unknown whether it will continue to be acceptable regardless of the new treatment process.

The treatment process from Canoe Road was chosen for determining a replacement cost for Merrill Crescent based on a similar number of users and relatively low construction cost. A feasibility study should be completed by a professional engineer to determine the treatment and disposal process best suited for the conditions at Merrill Crescent wastewater local service.

Replacement value for the collection system was estimated based on individual component replacement values. Additional costs for the removal and replacement of bushes and trees 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	\$ 240,754	1982	50	13
Drainfield	N/A ¹	2018	40	40
Collection System	\$ 169,030	1982	85	48

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.

¹ The treatment system and drainfield have been assigned a single replacement cost. Both systems are anticipated to be replaced at the same and have the same estimated useful life.

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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 Merrill Crescent wastewater local service are charged user fees of \$681.25 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 \$265.20 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 Merrill Crescent 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	\$ 8,347.00	\$ 8,182.00	\$ 7,845.00	\$ 8,015.00	\$ 8,097.25
Actual	\$ 16,623.00	\$ 7,227.00	\$ 8,772.00	\$ 18,827.43	\$ 12,862.36
Variance	\$(8,276.00)	\$ 955.00	\$ (927.00)	\$(10,812.43)	\$ (4,765.11)

Overall, the operations budget decreased by 4% between 2015 and 2018. The actual expenditure averaged in excess of 1.5 times the budgeted amount during the same period of time. The majority of the actual expenditure (60%) was to pay for staffing expenses of operational and administrative staff, while other significant expenditures include equipment repairs and maintenance (18%) and B.C. Hydro utility payment (15%).

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The irregularities noted in this budget review, 2015 and 2018, incurred costs approximately double the budgeted amount due to failures in the electrical panel and pumps, and operational wages relating to the drainfield replacement.

3.3. Potential O&M Budget

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

Significant expenses included in the budget are:

- Staffing expenses, including
 - O&M staffing requirement;
 - Administration of the wastewater system by Utilities Services staff;
 - SCRD Administration Services contribution;
- Proportioned charges for non-annual contracted services;
- Proportioned charges for non-annual equipment replacement;
- B.C. Hydro utility charges; and
- Proportioned share of service vehicles, tools, and miscellaneous expenses.

Future replacement of the treatment system may result in an increased O&M budget. The treatment system mentioned in the Section 2.5 would increase the required O&M hours by as much as 25%. As mentioned in the Section 2.4, continued deposits of inappropriate material in the collection system will keep equipment and repair charges high and could add to the estimated required hours.

With the inclusion of ancillary charges, the potential operating budget for Merrill Crescent wastewater local service is \$21,192.00. The potential user fee for the 12 users in this local service area is \$1,766, a 159% increase from 2019 rates. This increase is primarily attributed to the separation of property tax revenue from the operating budget and improving the level of service delivered to 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 SCR D does not have a long-term capital funding plan in place for the wastewater infrastructure at Merrill Crescent.

4.1. Reserve Balances

As of the end of 2018, there were no capital reserves and \$886.77 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 Merrill Crescent to have a set level, by either denomination or percentage, of reserves in place. Based on the current reserve balance and 2019 budget transfers, Merrill Crescent's reserves are 1% 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 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 all be replaced.

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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	\$ 3,984,800	\$ 3,558
Plan 2	80-Year	Treatment System (2) Drainfield (2) Collection System (1)	10% Increase Every Five Years	\$ 5,705,222	\$ 2,267
Plan 3	50-Year	Treatment System (1) Drainfield (1) Collection System (1)	Even Annual Contribution	\$ 1,575,000	\$ 2,250
Plan 4	50-Year	Treatment System (1) Drainfield (1) Collection System (1)	10% Increase Every Five Years	\$ 1,822,445	\$ 1,634
Plan 5	20-Year	Treatment System (1) Drainfield (1) Collection System (0)	Even Annual Contribution	\$ 530,800	\$ 1,896
Plan 6	20-Year	Treatment System (1) Drainfield (1) Collection System (0)	10% Increase Every Five Years	\$ 543,229	\$ 1,672
Plan 7	10-Year	Treatment System (0) Drainfield (0) Collection System (0)	Even Annual Contribution	\$ 78,400	\$ 560
Plan 8	10-Year	Treatment System (0) Drainfield (0) Collection System (0)	10% Increase Every Five Years	\$ 78,750	\$ 536

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

- Payment of the short-term debt for the new disposal 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.

As mentioned in Section 2.3, replacement costs and timing were based on the infrastructure recently constructed at Canoe Road. Different treatment and disposal systems may have different replacement times than noted in Table 4. For example, the proposed trenchless drainfield was assigned a longer EUL than a drainfield with perforated pipe. If the piped drainfield were to still be usable it is assumed that, based on its EUL, it would need to be replaced in the 50-Year model, prior to the treatment system replacement.

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

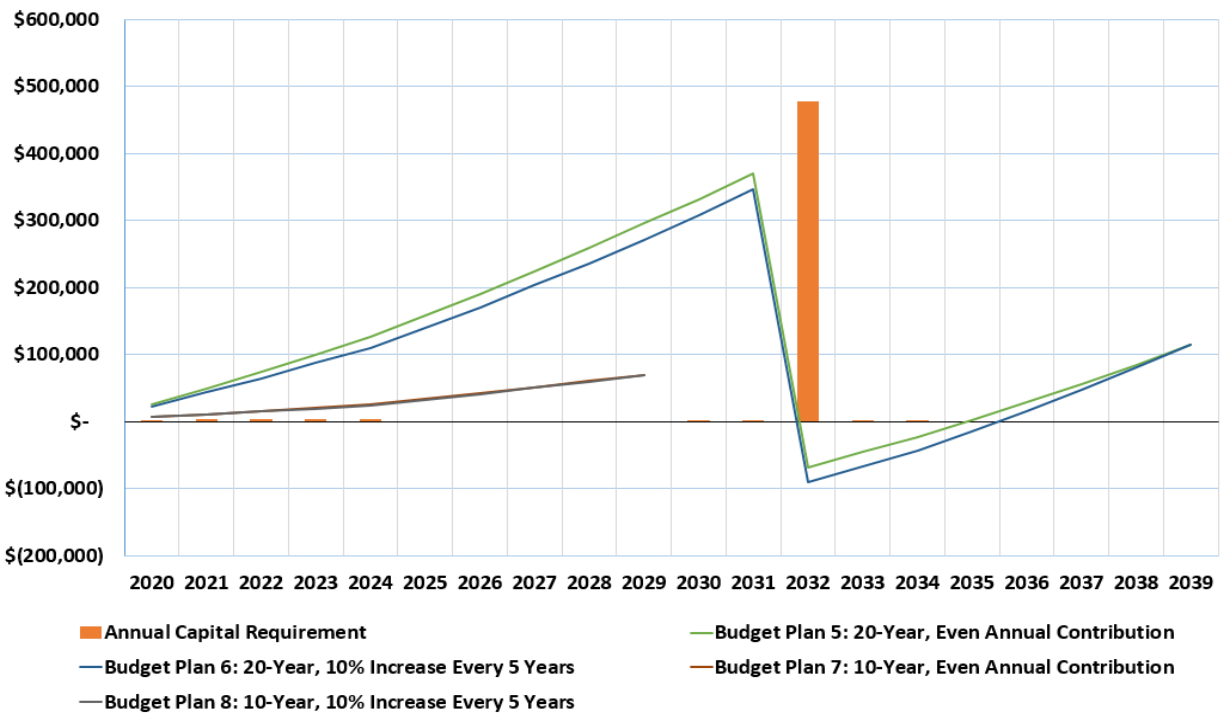


Figure 3 – Wastewater Local Service 10-Year and 20-Year Capital Plans

5. Additional Local Service Improvement Actions

Additional operational work is required in the Merrill Crescent 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.

Table 5 – Local Service Improvement Actions

Action Item	Target Year	Cost Estimate	Result
Engage consulting services to complete a feasibility study on potential options for treatment replacement.	2020	\$ 7,500	To be determined.

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