District of Sechelt Septage Facility Long-Term Plan

Technical Memorandum No. 5:

Operational and Financial Plan

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1. INTRODUCTION

The District of Sechelt (the District) is in the process of developing a Septage Receiving Facility Long-Term Plan (the Plan) to replace the Dusty Road Septage Receiving Facility (DRSRF). The Plan will guide the District in reviewing design options and locations for the new facility and servicing plans with project stakeholders.

Sperling Hansen Associates (SHA) was retained in February 2023 to develop the Plan. This Technical Memorandum #5 (TM #5) outlines the operational and financial plan for a facility located on a generic lot with access to the District's sewer main. The design of the facility is based on TM 2, Demand Forecast and Statement of Requirements submitted in November 2023 and Draft TM 4, Conceptual Plan, most recently submitted in February 2026. This TM is part of the seventh phase of the project.

2. CONTEXT AND SCOPE

This report presents an operational and financial plan for the District of Sechelt's conceptual septage receiving facility. The Dusty Road septage receiving facility serves not only Sechelt but also the Shishalh Nation, The Town of Gibsons, the SCRD and external users like BC Ferries. This broad user base suggests the facility provides a regional service. Sechelt inherited the facility from the SCRD in the 1990's, a transfer that placed the operational and financial burden on Sechelt without a clear regional framework for shared responsibility.

A common challenge to providing septage receiving services is developing a financially self-sustaining operating model. The cost recovery structure of the current facility makes it challenging to cover the operating costs of the facility. This memorandum provides estimated capital and operating costs for a new standalone facility and provides a recommended strategy to ensure the service is sustainable for the long term.

As shown in TM 4, SHA developed a septage receiving facility, conceptualized for Lot L, but it is a package concept that could be sited at a different, sewer-serviced location. The septage flow concept is shown in the schematic below (Figure 1). The capital and operating costs for this concept and the cost recovery options are discussed in the following sections.

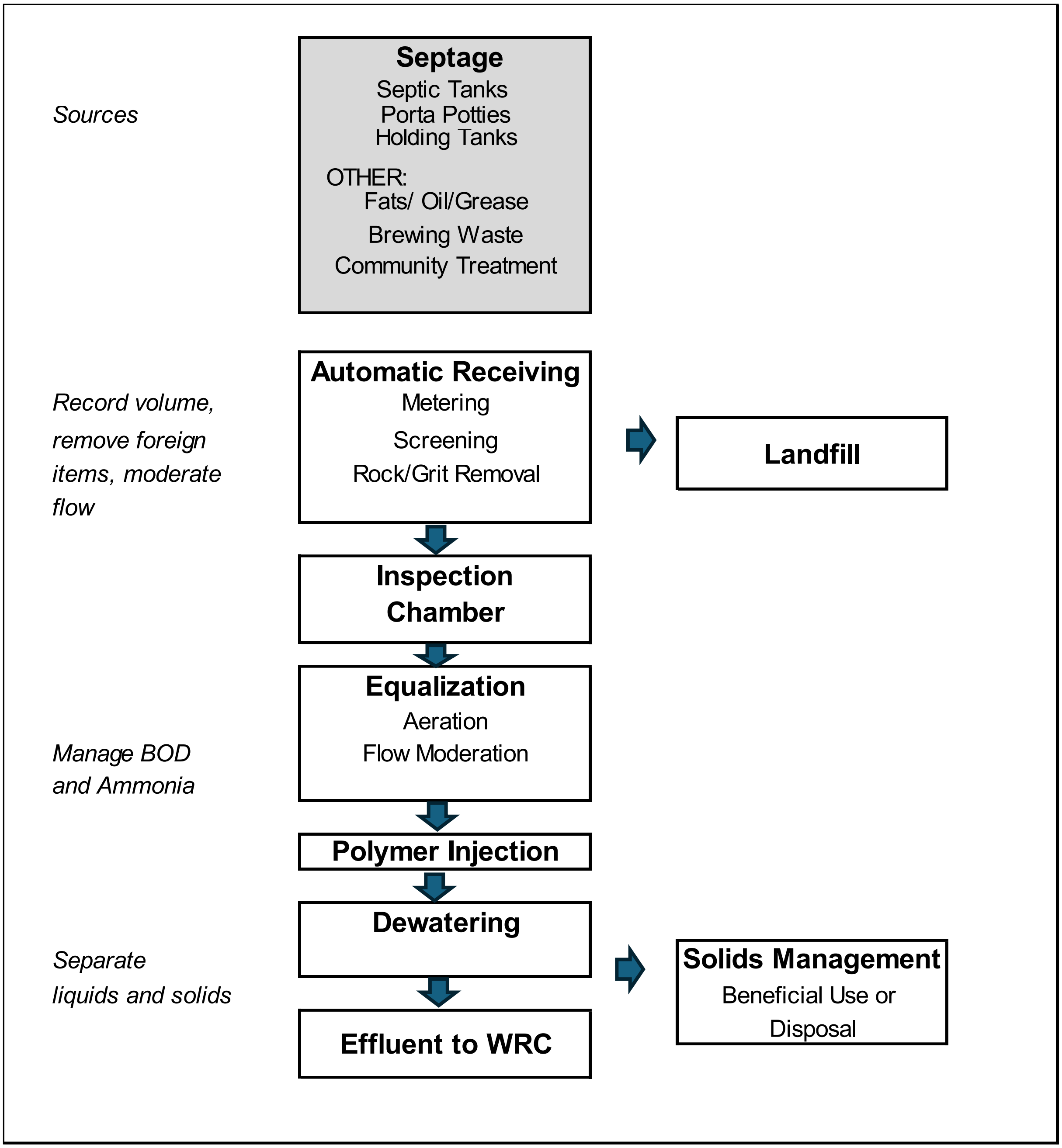

Figure 1: Conceptual Design Schematic

3. OPERATING PLAN

The following is a basic operating plan for the conceptual design to be provided for the District's new septage receiving facility. A detailed operating and maintenance manual will be required after construction and commissioning to ensure the facility is optimally managed, including inspection, monitoring, operating, and maintenance.

3.1 Operating Plan Basis and Source Hierarchy

This Operating Plan is intended to define how the facility will be managed and operated day-to-day, how waste acceptance and compliance will be controlled and enforced, and how operational data will be collected to support continuous improvement and financial sustainability.

The basis of this Operating Plan is the demand forecast and statement of requirements and the conceptual design deliverables outlined in the technical memoranda (TM#2 and TM#4). External guidance is also available from sources such as federal and provincial guidelines and standards. These sources should be documented, including version/date and applicability when the Operating Plan is revised and/or updated or converted to an Operating and Maintenance Manual during and after commissioning of the new facility.

A controlled version of this Operating Plan should be maintained by the District and updated whenever any of the following change: (a) accepted waste types and related bylaw provisions; (b) hauling/dewatering practices that materially affect influent characteristics; (c) discharge requirements to the sewer system; (d) staffing model; and/or (e) solids management/disposal pathway.

3.2 Governance, Roles, and Interfaces

The facility should be operated as a regulated public service with clear accountability for compliant waste receiving and discharge; public and worker health and safety; environmental protection; and cost recovery and reserve management. The current DRSRF is operated by the District, providing a regional service. The development of a new facility opens the opportunity to review the ownership and governance structure of this facility to deliver this regional service.

3.3 Governance Structure

The service owner takes responsibility for service performance, budgeting, rate-setting support, contract oversight, and regulatory liaison. The manager maintains controlled operating documents, including this Operating Plan, a Waste Acceptance Policy, and an Emergency Response Plan.

3.3.1 Key Operational Roles

The following are the key operational functions for a typical septage receiving facility. Operational functions may be combined within roles:

Facility Operator (lead): Responsible for daily inspections, process control, housekeeping, minor maintenance, sampling logistics, recordkeeping, and coordination with haulers.

Maintenance Lead (Service Owner or contracted): Responsible for preventive maintenance, corrective maintenance, lockout/tagout program integration, spare-parts management, and contractor coordination.

Compliance Coordinator (Service Owner; may be combined with facility manager or contractor): Responsible for waste acceptance enforcement, audit sampling program governance, chain-of-custody controls, reporting, and nonconformance management.

Finance/Administration (Service Owner): Responsible for billing/rate administration, account management, collections, and financial reporting, including reserve tracking.

3.3.2 External Interfaces

The Service Owner is expected to maintain active service interfaces with:

- Haulers (commercial users)
- District wastewater utility operations (discharge and system impacts)
- Solids management/disposal contractors
- Partner jurisdictions (as applicable) for both governance and cost recovery.

3.3.3 Facility Operation Responsibility Overview

The following RACI (Responsible/Accountable/Consulted/Informed) matrix, to be refined during commissioning of the facility, provides an overview of the recommended key personnel areas of responsibility and level of control. The roles and responsibilities should be reviewed and updated at least annually, or when staffing/contracting models change.

Table 1: Roles and Responsibilities (RACI)

Activity/ Deliverable	Service Owner	Facility Operator	Maintenance Lead	Compliance Coordinator	Finance/Admin	Hauler
Waste acceptance policy updates	A/R	C	C	R	C	C
Hauler registration and authorization	A	C	-	R	R	R

Activity/ Deliverable	Service Owner	Facility Operator	Maintenance Lead	Compliance Coordinator	Finance/Admin	Hauler
Daily inspections and logs	C	A/R	C	C	-	-
Preventive maintenance program	C	C	A/R	-	-	-
Sampling and QA/QC governance	C	C	-	A/R	-	C
Nonconforming load response	A	R	C	R	C	R
Billing data reconciliation	C	C	-	C	A/R	C
Emergency response activation	A/R	R	R	R	C	C

Legend: R = Responsible; A = Accountable; C = Consulted; I = Informed

3.4 Septage Receiving

Equipment used for receiving septage at a facility is designed to handle high-strength and debris-heavy waste delivered by specialized septage vacuum trucks, and to protect downstream wastewater treatment processes through screening, grinding, and monitoring. As outlined in Technical Memorandum 4, the nominal capacity of 400 gallons per minute (25.24 l/s) is recommended, enabling efficient truck unloading within 10 to 15 minutes.

Access control, quality and volume monitoring are also key features of the front-end works at a septage receiving facility. The ability to restrict the types and sources of waste will assist in protecting the equipment and minimizing operating and maintenance costs. Monitoring and restriction of unacceptable products ensures that customers using the facility are following bylaw requirements. The Service Owner should implement strict requirements with respect to the source and type of waste received, as well as the quantity and quality of the waste for planning and management purposes. This can be accomplished through a hauler registration process and a comprehensive and automated data collection process at the facility. Random load inspections and sampling are also recommended. Unacceptable materials should be rejected and diverted to alternate appropriate facilities.

The following is a breakdown of the key front-end program management tools used in typical septage receiving stations.

3.4.1 Waste Acceptance Policy and Hauler Program

The Waste Acceptance Policy (WAP) defines what wastes are accepted, under what conditions, and how compliance is verified and enforced. The WAP is a base operational control intended to protect: (facility equipment and process performance; the District's wastewater system and downstream treatment; worker and public health; and service sustainability.

3.4.2 Service Area and Eligibility

The District will define and maintain a service area boundary for eligible waste sources, including any out-of-jurisdiction arrangements. Acceptance rules may differ by source jurisdiction, waste type, and risk category.

3.4.3 Hauler Registration and Authorization

All commercial haulers should be registered prior to using the facility, and registrations should be renewed on a defined cycle (e.g., annually). Typically, registration requirements include:

- business identification
- Operator Training Acknowledgement
- vehicle identification
- insurance
- spill response readiness
- agreement to data collection and audit sampling.

3.4.4 Mandatory Load Information

Manifests, either electronic or manual, should be accompanied with each load entering the facility and include, at a minimum, the following information:

- company and truck registration number
- waste type category (as defined in the WAP)
- source address or source zone
- source jurisdiction
- estimated load volume and measured discharge volume
- date/time of discharge
- any pre-treatment/pre-separation performed (including dewatering or screening at a private facility, if applicable)
- special notes (e.g., holding tank, grease trap, unusual debris).

3.4.5 Acceptance Categories

It is important to maintain and regularly review a table of accepted, conditionally accepted, and prohibited wastes. Conditional acceptance may include pre-approval, limited volumes, specific discharge windows, additional fees, or enhanced sampling.

3.4.6 Enforcement and Nonconforming Loads

A staged enforcement model for non-compliant loads escalates as follows:

1. Preventing access for unregistered haulers
2. identifying disallowed loads via manifest review and screening/sensing where applicable
3. isolating, rejecting, or diverting nonconforming loads according to a defined response procedure
4. applying fees/surcharges and/or enforcement actions for violations (including suspension of access).

3.4.7 Dewatered or Modified Septage

The WAP should explicitly address whether dewatered septage or otherwise modified septage is accepted and under what conditions, including documentation requirements, additional sampling, and solids handling requirements. The intent is to avoid unmanaged changes in influent characteristics that increase operational risk or cost. The following is a typical example of a waste acceptance matrix.

Table 2: Waste Acceptance Matrix (Template)

Waste category	Acceptance status (A/C/P)	Pre-approval required (Y/N)	Sampling requirement	Fee basis	Notes/rejection triggers
Residential septic tank waste (e.g., typical pump-outs)	A	N	audit sampling	$/m3	Reject if oils, chemicals and/or /hydrocarbons are detected
Commercial septic tank waste (e.g., restaurants, mixed use)	C	Y	enhanced	$/m3 + surcharge	require source type declaration
Holding tank waste (e.g., frequent pump-outs)	C	Y	periodic	$/m3 (separate)	manage peak loads; risk of dilution or chemicals

Waste category	Acceptance status (A/C/P)	Pre-approval required (Y/N)	Sampling requirement	Fee basis	Notes/rejection triggers
Grease trap waste (FOG – fats, oils, and grease waste)	P or C	Y	enhanced	$/m3 + high-risk surcharge	Only if the facility/process is designed for it
Porta-potty (event sanitation)	C	Y	audit sampling	$/m3	controls for additives and trash
WWTP sludge/treatment plant waste (biosolids liquids)	P (recommended)	-	-	-	accept only if explicitly designed and approved
Industrial and commercial process waste (non-sanitary)	P	-	-	-	prohibited unless separately permitted

Legend: A = Accepted; C = Conditional; P = Prohibited

3.4.8 Control, Monitoring, and Security

The following methods are typically used to control and monitor the incoming flow of septage:

- **Access Control Terminal:** Card readers, keypads, or fobs to identify authorized haulers and track user data.
- **Electromagnetic Flow Meters:** These measure the precise volume of waste discharged for automated billing.
- **PLC (Programmable Logic Controller):** The central computer system that monitors levels, controls the valve opening, and runs the grinder/screen.
- **Automated Samplers/Water Quality Sensors:** These take samples for laboratory analysis and can monitor pH, conductivity, or hydrocarbons to detect prohibited materials.

3.4.9 Automated Data Collection

Key aspects of automated data collection for septage include the following:

- **Digital Manifests and Tracking:** Automated systems allow for the instant recording of data for each load, including the waste type (e.g., grease, septic), source, volume, and time of discharge, reducing reliance on manual paperwork.
- **Access Control and Security:** Facilities use automated systems to verify if a hauler is authorized to deposit waste, helping to enforce regional bans on out-of-region waste and preventing unauthorized dumping.

- **Compliance and Monitoring:** Automated systems can integrate with SCADA (Supervisory Control and Data Acquisition) to provide continuous, real-time data on the volume of leachate or waste discharged, ensuring it meets regulatory requirements.
- **Automated Sampling:** Some facilities use automated, routine sampling to test the quality of the waste to ensure it meets acceptance criteria, reducing the need for manual testing of every load.
- **Billing and Reporting:** Data from these systems can be used to generate automatic reports for regulatory compliance and to automate the billing process for haulers.

Automated data collection benefits operations in the following ways:

- **Efficiency:** Reduces the need for manual, in-person handling of waste and speeds up the drop-off process for haulers.
- **Accuracy:** Eliminates human errors in calculating waste volumes and recording hauler information.
- **Transparency:** Provides a clear, auditable trail of all waste transactions, which is crucial for environmental compliance and operational auditing.

BC local governments that have implemented these processes include the following:

- **Metro Vancouver:** Uses specialized, digitized trucked liquid waste (TLW) forms for tracking, and operates dedicated reception facilities (Annacis Island, Iona Island, Northwest Langley) that require strict documentation and monitoring.
- **City of Chilliwack:** Uses new digital manifests to track volumes and ensure compliance, especially when dealing with capacity issues.
- **Regional District of Kitimat-Stikine (RDKS):** Requires TLW haulers to have valid permits and to submit monthly reports, which can be facilitated by automated, digital tracking.

Photo 1: Example of Automated Data Collection Kiosk

3.4.10 Connection and Discharge Equipment

The following equipment is typically used to empty the trucks at the receiving station:

- **Camlock Couplings/Hose Connections:** Secure, rapid-connection for hauler hoses to prevent spills.
- **Inlet Piping Manifold:** A durable piping system that directs waste from the truck to the treatment system.
- **Modulating Plug Valves/Shut-off Valves:** These control the flow rate, allowing operators to regulate the speed of discharge and prevent overflow.

3.4.11 Operating Hours, Throughput, and Queuing Management

The receiving station should be designed and operated to unload trucks efficiently while maintaining safe traffic flow, preventing spills, and avoiding congestion that increases illegal dumping risk or unsafe work practices.

Base operational parameters that should be finalized during detailed design and commissioning of the facility include:

- operating hours and seasonal adjustments
- maximum trucks per hour and per day
- maximum daily and weekly accepted volumes by waste category
- queuing capacity (on-site) and overflow procedures
- booking policy (scheduled, mixed scheduled/walk-in, or walk-in only)
- staff coverage requirements during open hours.

3.4.12 Queue Management Controls

The facility should implement at least two of the following queue controls, with final selection based on staffing and site constraints:

- scheduled time slots for haulers (required during peak season)
- pre-arrival manifest submission
- on-site automated check-in with real-time queue visibility
- Priority rules for urgent public health loads and essential service providers.

3.4.13 Operational Calculations

To effectively set rates and plan for capacity, the District should maintain a simple capacity/queue worksheet using the following minimum inputs:

- average unload time (min/truck)
- target maximum wait time (min)
- effective open receiving hours/day
- peaking factor (arrival clustering during peak season)
- average truck volume (m3/truck).

The intent of the worksheet is to translate forecast volume into practical receiving constraints (e.g., trucks/day) and to support staffing, safety controls, and customer service performance.

3.4.14 Screening and Solids Removal (Headworks)

The most common and efficient method to remove debris from the incoming septage is to screen the inflow using typically 6 mm or smaller openings and then wash the solids and convey them up a screw for dewatering. Because septage is often 10 to 50 times more concentrated than domestic sewage in terms of total suspended solids (TSS), effective screening is essential to prevent operational failure and equipment clogging.

3.4.14.1 Grinding and Conditioning

Dual-shafted grinders are used to break down heavy solids, rags, and plastics into smaller, manageable particles to prevent clogging pumps, and rock traps and tramp metal detectors are often placed before the grinder to remove heavy, inorganic materials (rocks, metal) that can damage the cutters. Many facilities use all-in-one or "plug-and-play" units, which combine the grinder, screen, and compactor into a single, compact system.

3.4.15 Compaction and De-watering

After screening, wash press compactor systems wash organics back into the waste stream and dewater/compact the remaining trash (plastics, wipes), reducing the volume and weight of the solids for landfill disposal, which are about 0.1 to 1.0% of the input volume entering the facility.

3.4.16 Solids Removal and Disposal

The generated screenings are highly variable depending on their source (e.g., commercial vs. residential). It should be noted that the waste type, for example, high fats, oils and grease (FOG) waste or industrial/commercial waste, can significantly increase the volume of screenings. The screened solids collected at the Dusty Road Septage Receiving Facility are currently accepted at the Sechelt Landfill. The photo below shows a typical solids disposal container and containment at the receiving station.

Photo 2: Septage Receiving Station and Screening Removal

3.5 Cleaning and Safety

Accommodating spillage in a septage receiving facility requires a combination of robust design, engineered containment, operational procedures, and safety equipment to protect workers and the environment. Key strategies include creating specialized, impervious unloading bays (see Photo 2), using automated, sealed, or quick-connect systems, and providing immediate, on-site washdown capabilities such as hose reel systems.

3.6 Health, Safety, and Environmental Compliance Program

The objective of the Health, Safety, and Environmental (HSE) program is to prevent harm to workers and the public, prevent releases to the environment, and ensure consistent compliance with applicable requirements and District bylaws.

3.6.1 Minimum HSE elements

The following should be maintained and implemented, at a minimum:

- a hazard identification and risk register specific to septage receiving and solids handling
- safe work procedures for receiving station activities, including hose connections, spill cleanup, and washdown
- confined space and hazardous atmosphere controls for any tanks or chambers
- Lockout/tagout integration for all mechanical and electrical equipment
- Personal Protection Equipment (PPE) requirements and hygiene controls, including handwashing and decontamination
- incident reporting and investigation procedures, including near-miss reporting
- housekeeping standards (daily and weekly) to reduce slip/trip, contamination, and odour risk.

3.6.2 Environmental Controls and Spill Prevention

To prevent impacts to the environment, engineered containment and operational controls are necessary, including:

- an impervious receiving pad and controlled drainage
- defined spill response equipment and locations
- immediate cleanup procedures and escalation triggers
- inspection and maintenance of all hose connections, camlocks, and valves.

3.6.3 Compliance Interface and Documentation

Controlled copies of applicable bylaws, acceptance criteria, and discharge requirements should be retained and maintained, as well as training records and operational logs sufficient to support internal and external audits.

3.6.4 Support and Safety Infrastructure

The following equipment is necessary to ensure the receiving of septage is handled in a sanitary, operationally and environmentally sound, and efficient manner:

- **Washdown/Hose Reel System:** High-pressure water for cleaning up spills and washing trucks.
- **Heated Enclosures/Structures:** In colder climates, these protect the equipment, valves, and pipes from freezing.
- **Odour Control System:** Systems (like carbon filters) to mitigate odour issues, which are common with high-strength septage.

If available, and to control costs, non-potable water could be considered for truck washing after each load is discharged into the station.

3.7 Processing

The processing of the screened septage focuses on additional solids removal using flocculation processes as described below, and ensuring the quality of the effluent is suitable for acceptance at the District's Water Resource Centre (WRC).

3.7.1 Inspection

In a septage receiving facility, an inspection chamber serves as a critical access point for maintenance, monitoring, and cleaning, allowing personnel to manage the high-strength waste without needing to enter the underground system. It is usually positioned at key, high-risk points such as pipe junctions, bends, or changes in pipe size.

3.7.2 Aeration

Aeration is a critical process designed to manage the high-strength organic loading, odours, and solids concentration typical of septage. It transforms the anaerobic, septic material into an aerobic, more stable, and manageable form as follows:

- **Odour Control:** Aeration reduces the production of pungent-smelling gases like hydrogen sulphide and methane.
- **Organic Breakdown:** By injecting oxygen, aerobic bacteria are stimulated to break down organic contaminants more efficiently than anaerobic bacteria.
- **Solid/Grease Management:** Aeration aids in reducing the sludge layer, minimizing solids that can plug systems.

The benefits of aerated systems include the following:

- **Reduced Plant Upsets:** By providing preliminary treatment (stabilization), aeration reduces the risk of overloading the main wastewater treatment plant.
- **Improved Efficiency:** Aerobic bacteria digest waste faster, reducing the overall time required for treatment.
- **Increased Capacity:** Proper aeration allows the system to handle larger volumes of waste without clogging or failing.

- **Reduced Operational Costs:** While aeration requires energy, it can reduce the need for chemicals to control odours and improve overall plant efficiency.

The conceptual design proposes a sulphur-resistant concrete tank, which accommodates a 24-hour hydraulic retention time depending on the ultimate design flows. The working volume would be 82 cubic metres. Additional allowances for freeboard and sludge accumulation bring the total proposed volume to approximately 115 cubic metres. An aeration mixing system was considered to avoid anaerobic conditions. This can be achieved using two alternating blowers, which have low maintenance requirements and can be operated in an energy-efficient on/off mode. To reduce odour control complexity, mechanical mixing using pumps could be implemented.

3.7.3 Polymer Dosing

Polymer dosing at a septage receiving facility is a critical process used to condition incoming high-strength waste, enhancing solid-liquid separation and reducing volume through dewatering. Because septage varies in concentration, precise dosing is essential to optimize flocculation, improve dewatering, and reduce hauling costs.

The following key aspects of polymer dosing systems should be considered:

- **Automatic Control & Monitoring:** Modern systems, such as the VEPAS (Venturi Emulsified Liquid Polymer Activation System), utilize SCADA integration and flow meters to automatically adjust dosages based on sludge flow and consistency.
- **Dosing Rates:** Typical dosage ranges for sludge conditioning are 2–11 kg/teDS (tonne of dry solids).
- **Optimization Techniques:** Jar testing is standard for determining the precise polymer type and dosage required to maximize performance and reduce chemical consumption.
- **Equipment:** Technologies include skid-mounted units for easy, compact installation, and specialized peristaltic pumps that provide high-accuracy, low-maintenance dosing compared to older, less efficient screw pumps.

The key benefits of automatic dosing include solids volume reduction, improved efficiency of solids separation, and reduced costs.

The following operational considerations include the following:

- **Preparation:** Polymer solutions are typically prepared at concentrations ranging from 0.05% to 1.0% for liquid and 0.05% to 0.5% for powder.
- **Temperature control:** Required for optimal efficacy. Maintaining temperatures within range for storage, handling and usage is required.
- **Safety & Maintenance:** Using peristaltic pumps helps avoid the high maintenance and leakage issues associated with traditional pumps handling viscous liquids.
- **AI Integration:** Some advanced systems now use artificial intelligence (AI) to analyze data and optimize dosages, offering up to 20% reduction in polymer usage.

3.7.4 Effluent Outflow

The filtrate from the dewatering bins is intended to drain into a discharge pipe that leads to a sewer main and then onto the WRC for final treatment and discharge to the environment. The flow of this outlet should be monitored for quantity and quality in order to ensure the facility is operating as intended and the WRC requirements are met.

3.8 Sampling, Monitoring, and QA/QC Program

Sampling and monitoring are required to demonstrate compliance with acceptance and discharge requirements, detect nonconforming loads early, support process optimization (e.g., polymer dosing and solids management), and provide credible data for long-term planning and rate-setting.

3.8.1 Program Governance

It is the Compliance Coordinator's role to implement and maintain the sampling and monitoring program, including parameters, frequency, locations, laboratories, chain-of-custody procedures, and data review requirements. An annual review of the program is essential after any major change in accepted waste types or operating conditions.

3.8.2 Sampling Locations

At a minimum, the program sampling locations should include:

- influent sampling representative of incoming loads, including different source types
- process tank sampling as applicable for operational control
- effluent/discharge sampling prior to discharge to the sewer system.

3.8.3 Sampling Approach

The program should include both scheduled sampling (baseline monitoring) and audit/random sampling for enforcement and data integrity.

3.8.4 Triggers and Responses

Numeric or categorical triggers should be determined, including the required action for:

- rejection of loads
- isolation or diversion procedures
- enhanced sampling frequency
- temporary changes to operating parameters (e.g., flow pacing)
- hauler-specific enforcement actions.

3.8.5 Data Integrity and QA/QC

Sampling should include standard QA/QC controls, including field duplicates, blanks where appropriate, chain-of-custody, and documented sample handling. Results should be reviewed by a qualified person, and any anomalies should be investigated and documented.

3.8.6 Reporting

A monthly compliance summary and a quarterly trend report should be produced for internal review, including management of exceedances, enforcement actions, and recommended operational changes.

3.9 Solids Management

Managing solids at a septage receiving facility is one of the highest cost drivers for the owner. As laid out in TM 4, the District's preferred dewatering method is using roll-off containers specifically designed to receive the sludge from the aeration tank (through a hose and camlock system) that continues to settle the solids and release as much liquid from the sludge as possible in a convenient transport manner before taking the solids off-site. The photo below provides an example showing the partitioned water flows through to be drained into the effluent outflow pipe. This method of solids management allows for contingency planning for capacity or shutdown issues, and if a secured beneficial use (e.g., composting) becomes unavailable.

Photo 3: Typical Roll-Off Container Sludge Dewatering Equipment

The key components of biosolids management include the following:

- **Pre-treatment & Screening:** Utilizing equipment that screens, grinds and ultimately separates the trash.
- **Dewatering:** Reducing the water content of sludge (often to around 15 - 25% solids) is crucial to lower transport costs and volume.
- **Stabilization & Treatment:** Techniques to reduce pathogens and "vector attraction" include composting (often producing Class A compost).

- **Beneficial Use & Disposal:** This can include land application (agricultural or forest), land reclamation or landfill disposal with the attributed environmental requirements (e.g., under the BC Organic Matter Recycling Regulation). Landfill disposal is the least preferred option, given that the material has a high moisture content and given the nutrient content of dewatered sludge, the material is much more beneficial as a fertilizer alternative.

It is essential to consider odour control during transportation, storage and processing of the solids, especially in neighbourhoods where residential and commercial uses are in proximity. It is also vital to ensure compliance with local government, provincial and federal regulations.

The following are operational considerations with respect to managing the solids produced at the facility:

- **Partnerships:** It is important to consider possible partnerships with other local governments and service providers early in the process of establishing a new septage receiving facility, especially if there is already a beneficial use facility available to accept the solids.
- **Automation:** Automated, enclosed systems for receiving and processing help control odour, increase efficiency, and optimize the sustainability of the facility.
- **System Capacity:** Regular review of treatment capacity and demand for end-products like compost is necessary for the long-term sustainability.

3.10 Maintenance, Asset Management, and Critical Spares

Maintenance at a septage receiving facility focuses on preventing asset decline and early replacement and protecting downstream wastewater treatment equipment. Key tasks include, but are not limited to, routine cleaning of screens, servicing grinders and pumps, managing rock traps, and calibrating automated unloading, billing, and odour control systems to ensure operational efficiency and compliance.

3.10.1 Maintenance Program

The objective of the maintenance program is to minimize unplanned downtime, control lifecycle costs, and maintain safe and compliant operations.

3.10.1.1 Maintenance Program Structure

Three layers of maintenance should be implemented at the facility, including:

- **Operator Care (daily/weekly):** inspection, cleaning, lubrication checks, housekeeping, and basic functional checks.
- **Preventive Maintenance (PM):** scheduled tasks by equipment class and manufacturer guidance, including calibration of meters/sensors and inspection of corrosion-prone elements.
- **Corrective Maintenance (CM):** prioritized response to failures, with root-cause review for recurring issues.

Typical key maintenance activities and components include the following:

- **Screening and Compaction Equipment:** Regularly cleaning and inspecting screen compactors prevents blinding (clogging) and removes debris like plastics, rags, and heavy solids.
- **Grinders and Pumps:** Routine maintenance of grinding units and pumps prevents wear from grit and ensures proper flow, preventing costly emergency repairs.
- **Rock Traps/Grit Removal:** Inspecting and cleaning grit chambers or rock traps to prevent damage to downstream pumps and equipment.
- **Automated Systems and Access Control:** Maintaining the electronic access panels, flow meters, and automated valves used by haulers for billing and odour control.
- **Hose and Valve Management:** Inspecting hoses, locking mechanisms, and valves to reduce the risk of spills and prevent unauthorized dumping.

The following are the operational best practices with respect to maintaining a facility and ensuring longevity of equipment:

- **Preventive Maintenance:** Implement a regular schedule for cleaning to remove FOG buildup.
- **System Inspections:** Inspecting for corrosion, especially in high-flow or high-solids areas, to ensure structural integrity.
- **Safety Protocols:** Ensuring proper ventilation and safety measures are in place before entering tanks to manage hazardous sewer gases.
- **Performance Monitoring:** Tracking data to optimize the speed of unloading and ensuring the system handles high-strength loads efficiently.

3.10.1.2 Asset Management and Documentation

A computerized maintenance management system (CMMS) or equivalent tracking tool should be used to record work orders, PM completion, CM actions, and costs. At a minimum, the system should track:

- asset ID
- task frequency
- labour hours
- parts used
- downtime
- contractor costs.

3.10.2 Critical Spares and Long-Lead Items

A critical spares list should be maintained and stocked to support continuity of operations, including, at a minimum:

- seals/gasket
- camlocks and hose components

- flow meter consumables
- screening/grinder wear parts
- polymer dosing pump spares
- blower components
- control system spares.

3.10.3 Performance targets

The District should adopt maintenance key performance indicators (KPI) such as: PM completion rate, unplanned downtime hours/month, and maintenance cost per m3 received, and should review trends quarterly.

3.11 Contingency Planning and Emergency Response

A site-specific emergency response plan (ERP) should be prepared before commissioning and include on-call contacts, notification triggers (internal and external), spill response actions, and communications protocols to haulers and the public.

Contingency planning is necessary to maintain essential service continuity while protecting public health, worker safety, and the environment during abnormal events.

3.11.1 Events Requiring Contingency Response

The following emergency response procedures should be maintained at a minimum for:

- receiving station equipment failure for the screen, grinder and flow meter
- loss of power or control system failure
- process upset (e.g., odour event, abnormal solids carryover)
- spill or release at the receiving pad
- temporary loss of solids hauling and/or disposal location
- extreme peak demand (queuing beyond capacity)
- nonconforming load events.

3.11.2 Continuity of Operations Planning

The following should be defined and maintained to manage operational downtime:

- maximum acceptable downtime before service disruption is declared
- temporary receiving restrictions (hours, waste types, service area priorities)
- pre-negotiated standby contracts for critical response (electrical, mechanical, vacuum services)
- alternative disposal/transfer arrangements if the facility is offline.

4. FACILITY CAPITAL

The following table outlines the primary cost elements, engineering, and contingency estimates for the new septage receiving facility concept. The details for these costs have been provided to the District under separate cover.

Table 3: Capital Class C Cost Estimate

Item	Septage Facility ($)
Access Roads and Pad Area	$0
Excluded from this scope of work. Assumed existing access conditions are adequate for the intended use.	
Earthworks	$500,000
Demolition & Cleanup, Clearing and Grubbing, Site Grading, Smoothing and Proof Rolling Surface	
Equipment Supply and Install	$1,083,818
Automated receiving equipment with flow metre, equalization tank, polymer dosing, dewatering containers, outflow	
Fabric Covered Building	$787,400
Fabric building on concrete foundation and slab with 1 rollup door	
Surface Water Control	$70,000
Drain and pipes and oil/water separator	
Fire Control	$100,000
Fire hydrant	
Electrical	$500,000
Electrical upgrade	
Sub-Total	$3,041,218
Engineering (estimated @ 15%)	$456,183
Contingency (estimated @ 35%)	$1,064,426
TOTAL CAPITAL COSTS (Class C estimate)	**$4,561,827**

Note: Quotations were received from suppliers that will be provided to the District under separate cover.

A 15% engineering cost is applied for design, tendering and construction management, as well as a 35% contingency to account for potential price escalations. The cost for land acquisition has not been included.

4.1 Procurement and Contracting Strategy

The procurement strategy should control cost escalation risk, secure long-lead equipment on schedule, and ensure operational readiness at commissioning.

4.1.1 Recommended Contracting Packages

The District should consider, at a minimum, the following procurement packages:

- civil/site works and containment systems

- mechanical equipment supply (receiving station, screening, blowers/mixing, polymer system, valves)
- electrical and controls (SCADA, access control, metering, instrumentation)
- specialty systems (odour control, washdown system)
- solids handling and haulage services (multi-year service contract)
- commissioning support and operator training.

4.1.2 Long-lead Equipment Management

Long-lead equipment should be determined early in the procurement process (e.g., receiving station equipment, major tanks, controls hardware), and a staged procurement plan that aligns with site selection, permitting, and design completion should be developed.

4.1.3 Operations Readiness Contracting

A commissioning and start-up support contract is recommended to reduce operational risk, including development of operation and maintenance manuals, training, startup monitoring support, and stabilization period support.

4.1.4 Funding

Funding this type of capital project is typically through borrowing if capital reserves have not been sufficiently accumulated, or through a combination of grants, reserves and borrowing. If the District has included this new facility in a Liquid Waste Management Plan, borrowing may not require the consent of the electors.

5. FACILITY OPERATING COSTS

The conceptual facility operating and maintenance costs have been developed based on the District's 2023 budget for the DRSRF and the estimated volume expected to be received at the new facility, as estimated in Technical Memorandum 2, Demand Forecast and Statement of Requirements.

5.1 Operating and Maintenance Expenses

The table below lists the expenditure items and the estimated budget starting in 2031. Comments are provided to show and explain how the costs were derived. Although these estimates may not reflect the actual new facility operations as accurately as they will once the District has some experience with the new facility, they do reflect the current level of service and effort needed to meet discharge to the WRC.

Not included in the table is the cost to replace the asset when it reaches it's lifespan. Instead of budgeting for a massive replacement expense in twenty years another option is to calculate the annual savings required (sinking fund) to have the replacement funding available using the following formula:

$$\text{Annual Amount} = \frac{\text{Future Replacement Cost}}{\text{Estimated Life}}$$

Table 4: Operating and Maintenance Expenses (Rounded up to the nearest $1,000)

Operating and Maintenance Cost Item	Annual Cost ($)(1)	Description/Comment
Wages	$ 101,000	Same level as current staffing
Overtime	$ 1,000	Same level as current staffing
Benefits	$ 23,000	Same level as current staffing
Training	$ 2,000	First year of Plant operation higher
Communications	$ 2,000	Ads, telephone, website, social media
Security Cameras	$ 1,000	
Contracted Services	$ 5,000	Repairs other than trades call out, waste removal, various other services for
Solids Management	$ 170,000	Polymer, Transport, Composting and Disposal (Cost provided by DoS)
Contract - Trades Callout	$ 5,000	Contracted trades: electrical, electronics, pipe fitters, etc
Equipment Maintenance - Pumps	$ 2,000	New pumps so could be less for new Plant
Road Maintenance	$ 1,000	Likely mostly asphalt at new Plant, but sweeping needed 2xYear
Supplies	$ 12,000	Not including polymer
Hydro	$ 36,000	
Utilities - Potable Water	$ 7,000	SCRD Treated Water ($212/quarter base rate + $4/m3)
Insurance - Property	$ 3,000	
Septage Fee & Sludge Disposal Refunds	$ 12,000	Fee refund under bylaw
Transfer to WRC (Plant Treatment Cost)	$ 24,000	Plant will be considered customer under the bylaw
Administration Cost	$ 20,000	When non-service employees do work for septage service
Total Annual Expenses	**$ 427,000**	

The following additional comments are provided:

- The annual cost for staffing may be low as it is based on current levels. The District will need to assess staffing levels during detailed design which may show a higher demand for certified personnel.

- Substantially more training costs will be needed once the new facility is operational and on an annual basis
- Solids management was separated out from Contrated Services and includes polymer, hauling and composting tipping fees. The value of this line item was provided by the District stating this is the cost in the 2026 budget.

Solids management is the main cost driver for the new facility. For future costs, it is recommended that the District plan for annual CPI increases and evaluate expenses annually.

5.2 Cost Allocation, Rate-Setting Principles, and Reserve Policy

5.2.1 Cost Allocation Intent

For a financially sustainable service, the District should explicitly allocate costs into:

- **Fixed costs (do not materially vary with annual volume):** staffing base coverage, insurance, software/SCADA support, routine compliance program overhead, and debt servicing (if applicable).
- **Variable costs (scale with throughput or solids generation):** polymer, solids hauling/disposal fees, utilities tied to load, consumables, and wear parts.

5.2.2 Rate-setting principles

The following principles are typically used for rate setting:

- full-cost recovery over the long-term, including lifecycle replacement contributions
- transparency with assumptions and scenario risks documented
- fairness, including cost causation aligned with charges by waste type and origin
- enforceability with billing tied to measured volumes and manifests
- adaptability, including annual review and mid-cycle adjustment triggers if costs or volumes shift materially.

5.2.3 Reserve Policy

The District should establish and maintain a septage receiving service reserve policy that includes:

- an annual lifecycle replacement contribution based on an asset replacement schedule
- a stabilization reserve to buffer low-volume years and cost spikes in solids management
- clear rules for reserve drawdown and replenishment
- annual public reporting of reserve balances and contribution levels.

5.3 Recovery Model and Fee Schedule Options

The objective of the cost recovery model is to ensure the septage receiving service is financially sustainable while maintaining fair, enforceable, and adaptable charges for users. Typical cost recovery options for operating a new septage receiving facility include taxation and user fees.

5.3.1 Cost Recovery Components

The District can recover costs through a combination of:

1. a base charge to recover fixed costs and reserve contributions
2. volume-based and category-based user fees (rates) to recover variable costs and manage behavioural incentives.

5.3.2 Setting Rates

For final rate setting, the following options should be evaluated.

- **Option A**: User-fee only (not preferred for long-term stability)
    - Recover all costs via measured volume ($/m3) with category multipliers
        - Pros: simple billing link to use
        - Cons: unstable if volumes decline (e.g., sewer conversions); higher risk of rate shocks
- **Option B:** Hybrid base + tipping fee (recommended)
    - Recover fixed costs + reserve contributions via a base charge (e.g., parcel-based within the service area and/or inter-jurisdictional contributions)
    - Recover variable costs via user fees by waste category
        - Pros: stable; aligns fixed vs variable cost causation; reduces rate shock risk.
        - Cons: requires service area definition, governance agreements, and annual roll maintenance.
- **Option C:** Tiered service-area model (recommended where out-of-jurisdiction demand is significant)
    - Base charge applied only to defined in-area beneficiaries
    - Out-of-area loads pay a higher category fee that includes a capacity and stability surcharge
        - Pros: protects local ratepayers; manageable policy lever
        - Cons: requires reliable source attribution enforcement

5.3.3 Fee Structure Elements

At a minimum, the following fee structure should be considered for inclusion in the District's fee bylaw:

- a standard septage fee per m3 (in-area)
- a differentiated fee for higher-risk categories (e.g., holding tank, commercial sources) if accepted
- an out-of-area surcharge (if applicable)
- a contamination surcharge (trash, prohibited indicators) based on documented enforcement triggers
- an administrative fee for unmanifested or non-compliant loads (or a prohibition).

5.3.4 Base Fee Setting Formulas

The following annual base rate setting formula is recommended.

A simple starting point for category fee rates includes the following:

Base septage tipping fee ($/m3) = CV / V

Category fee ($/m3) = (CV / V) × αcat

Let:

CF = total fixed annual cost ($/yr) including reserve contributions

CV = total variable annual cost ($/yr)

V = forecast accepted annual volume (m3/yr)

Vcat = forecast volume per category (m3/yr)

αcat = category multiplier to reflect variable cost intensity and risk

Then:

Base charge revenue target = CF

User fee revenue target = CV

5.3.5 Inter-Jurisdictional Contribution

Where a defined jurisdictional agreement exists, the contribution should be based on measurable drivers such as:

- proportion of volume by origin based on manifests
- number of serviced parcels by origin
- or a blended formula that includes a stability component.

5.3.6 Annual Review and Adjustment Triggers

The District should define triggers for mid-cycle fee review, for example, for:

- volume variance beyond a defined threshold
- solids disposal cost spikes
- major policy changes in accepted wastes
- new sewer conversion patterns.

5.3.7 Taxation

Since not all properties in the District require septage pumping services, taxation would typically be by parcel tax for only the properties not connected to sewer and that have improvements (home or business), similar to how the District collects parcel tax under Bylaw No. 559, 2017 for a specified sewer area. Typically, if parcel taxation is used, it would be considered a base fee since septic tanks are pumped out on an irregular basis (every five years has been assumed for the theoretical volume forecast) while holding tanks are pumped on a more frequent basis. General taxation is commonly not considered appropriate for properties that use holding tanks and septic tanks. The parcel tax rolls are normally reviewed annually to ensure that additional improved properties are added and properties have been connected to sewer.

Properties outside the District, particularly within the Sunshine Coast Regional District (SCRD) electoral areas and in Gibsons, could be included in a taxation cost recovery process through a formal agreement. The local government would have an option to collect parcel tax from properties in its jurisdiction for transfer to the District, especially if user fees were insufficient. New and increasing taxes are not normally palatable to property owners, but, not unlike pipe services (e.g., sewer and water), the properties requiring and having access to a service when and if needed should contribute at least nominally to the capital and fixed operating costs on an annual basis.

Based on data collected at the DRSRF in July 2022 from haulers stating their load source, the following graph was created. This figure indicates that septage received from SCRD properties amounted to more than the quantities received from the District.

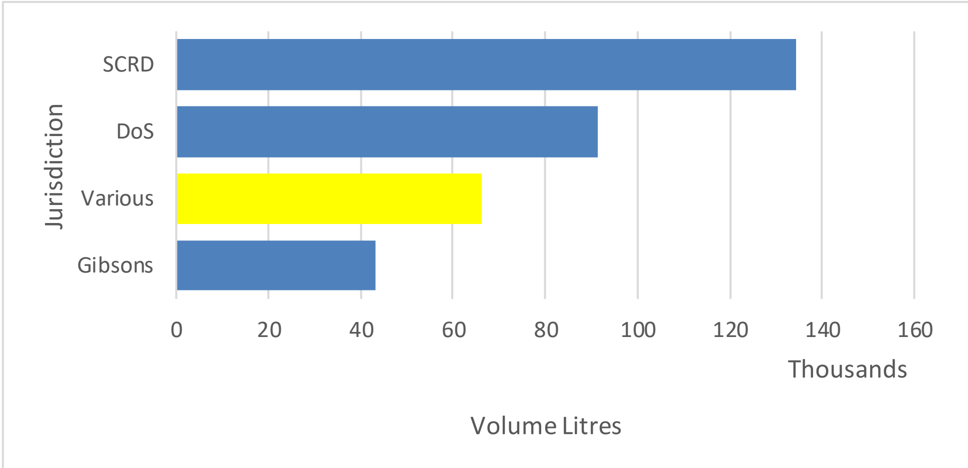

Figure 2: Septage Sources, July 2022

5.3.7.1 Other Jurisdictions

The Regional District of North Okanagan (RDNO) used a combination of parcel tax from municipalities and electoral areas and user fees that were almost 50/50 for their stand-alone septage receiving facility in Vernon, requiring annual evaluation as tipping fees fluctuated from year to year with haulers shopping for lower fees in neighbouring communities. Operating expenses for this facility were approximately $450,000 per year. The facility was decommissioned in 2019 (operated for almost 14 years), and the service was transferred to the City of Vernon after they built a trucked liquid waste receiving facility onto their wastewater treatment plant.

Specifying a service area (e.g., SCRD and municipal boundaries) that has detailed associated mapping, including current and planned development areas, would allow the District to monitor areas that may connect to public and private sewer in the future and potentially impact the financial sustainability of the service. Thorough communication with the service area local government partners would be required.

5.3.8 User Fees

Currently, the Sale of Goods and Services revenue is the only method used to recover costs for the District's septage receiving service. The District's 2024 Financial Plan shows that $393,612 for Sale of Goods and Services (user fees as per Bylaw 483-5, 2022) was collected for the DRSRF, and $210,977 was expended in 2023. The expenditures exclude the multi-annual costs associated with solids handling and disposal, captured as transfers to and from reserves. The Financial Plan also shows the revenues and expenses increasing over five years. As the DRSRF aged, higher maintenance and replacement costs were and are being incurred, making it difficult to recover the costs through user fees alone.

If the forecasted 2031 volume of 9,043 m^3/year from Technical Memorandum 2 is used, which is based on a theoretical forecast, and today's user fee of $121/$m^3$, the annual revenue is estimated to be about $1,100,000 for 2031. This theoretical volume is likely overly conservative in order to size the facility; however, it should not be used to project revenues, as the actual volume is likely to be less, and a significant factor of safety should be applied. The District's 2024 Financial Plan shows a projected revenue for 2028 (closest year available) of $453,835. This represents a 44% difference in revenue between projected and theoretical and should inform the factor of safety. The District will need to determine the best projected volume to use in order to forecast revenue from user fees that will provide confidence in the projections and address sustainability.

5.3.8.1 Other Jurisdictions

User fees in other jurisdictions are shown in the following table. The Regional District of Central Okanagan (RDCO), which has an agreement to use the Lake Country Wastewater Treatment Plant (WWTP), and the Regional District of Nanaimo (RDN) do not have separate fees for haulers delivering loads from outside the service area, for each truck load, or for holding tank waste, showing how variable user fees are by jurisdiction. Each jurisdiction requires haulers to be licensed or permitted to use their facilities in order to control and collect data.

Table 5: User Fee Comparison

Fee Type	RDNO Stand-Alone Facility (2017)	Lake Country/RDCO Attached to WWTP	RDN Attached to PS & WWTP
Per truck	$29.00	N/A	N/A
Septage per m^3 within the service area	$34.00	$47.27	$70.40
Septage per m^3 outside service area	$125.00	N/A	N/A
Holding tank per m^3 inside the service area	$7.50	N/A	$2.20
Holding tank per m^3 outside service area	$30.00	N/A	N/A

It should be noted that the District, as well as other jurisdictions, provide refunds and lower fees to property owners for holding tank waste.

Other jurisdictions use variable user fees to encourage/discourage specific practices and ensure haulers monitor and manage their loads appropriately. For example, based on random sampling, fees can be charged for certain types of excessive contamination (e.g., trash). Also, in some jurisdictions, temporary and permanent rate reductions are offered through an application process. With too many variable fees, there can be some difficulty projecting revenue since the individual user types can be sporadic.

6. SERVICE SUSTAINABILITY AND RECOMMENDATIONS

Service sustainability is dependent on several factors, namely the following:

- **Regular cost evaluation:** For new facilities where experience needs to accumulate, it is important to regularly evaluate the expenses incurred for all operating costs so that annual budgets can be adjusted, when necessary, especially for the highest cost drivers such as solids management and staffing.

- **Fixed cost recovery:** Costs such as borrowing and staffing that won't change annually, except possibly due to cost of living and inflation, are good candidates for cost recovery through taxation, which can provide a reliable level of revenue for long-term service planning.

- **Regular fee assessment:** Costs that are incurred primarily based on the quantity of septage throughput at the facility (e.g., polymer, solids management, water) are good candidates for user fees that can be evaluated regularly when or if users decline and increase annually. This regular fee assessment is essential to ensure that tipping fee levels are sustainable for the long term. The assessment should include moderating the risk of haulers leaving the region to seek lower fees elsewhere and/or illegally dumping. Hauler registration or licensing will allow the District to communicate regularly with the users, and collecting all users' information at the facility (e.g., number of loads, sources, etc.) will assist with the assessment.

- **Detailed service area information:** Regularly updating mapping, including potential conversions to sewer, is essential to plan for a decline in user fees and taxation. Sustainability of a stand-alone septage receiving facility is highly dependent on the number of properties requiring the service and adjusting the cost recovery in a balanced and proactive manner.

- **Bylaw evaluation:** Reviewing the septage receiving service bylaws regularly can also assist with implementing cost recovery and operational changes proactively. Increasing fees and taxation rates, adding requirements for more frequent tank pumping, and changing restrictions on out-of-region users or waste types, if operationally feasible, are examples of items that might impact the long-term sustainability of the service and could be changed through such an evaluation.

- **Comprehensive facility maintenance and repair:** To ensure the facility's sustainability, it is crucial to maintain a comprehensive maintenance and equipment replacement schedule as well as to promptly respond to all repairs. Regular facility inspections and cleaning are an essential part of ensuring the facility maintenance plan is effective, and the facility is operating in an optimal condition for the long term.

6.1.1 Financial Sensitivity Scenarios

Given the uncertainty in long-term volumes, influent characteristics, and service area demand, the District should evaluate the service model under a defined set of sensitivity scenarios. The intent is to prevent underfunding, avoid sudden rate shocks, and ensure reserve policies are adequate. The following scenarios are provided.

- **Scenario 1:** Baseline (TM2 planning basis)
    - Assumes planned accepted wastes and forecast volume basis used for the operating model.
    - Uses standard solids disposal pathway assumptions
- **Scenario 2**: Low volume / accelerated sewer conversions
    - Volume declines materially below baseline due to more properties connecting to sewer and fewer onsite systems
    - Fixed costs remain largely unchanged
- **Scenario 3**: Dewatering persists and intensifies
    - Delivered liquid volumes decline, but solids handling demand and enforcement effort increase
    - Increased probability of nonconforming loads without stronger acceptance controls
- **Scenario 4**: Expanded acceptance (conditional acceptance of additional high-risk wastes)
    - Higher variable costs (polymer, solids, maintenance) and higher compliance/sampling costs
    - Requires higher fee multipliers and stricter enforcement
- **Scenario 5**: Solids outlet disruption/cost spike
    - Temporary loss of preferred beneficial use outlet or major disposal cost increase
    - Requires stabilization reserve drawdown and/or temporary surcharge

6.1.1.1 Scenario Outputs

For each scenario listed above, the District should quantify:

- annual cost recovery requirement (fixed + variable)
- base charge level required (if used)
- tipping fee levels by waste category
- reserve adequacy (stabilization + lifecycle)
- and operational capacity/queue impacts (trucks/day and peak-hour constraints).

6.1.2 Performance Monitoring, KPIs, and Reporting

A performance monitoring program should be implemented to ensure the service remains safe, compliant, customer-oriented, and financially sustainable. The following KPIs are recommended at a minimum and should be tracked/monitored:

- Volume received (m3/month) by waste category and by origin

- Number of loads and average load size (m3/load)
- **Receiving performance:** average unload time, average wait time, peak queue length, and turning-away events
- **Compliance:** number of rejected/nonconforming loads; sampling exceedances; enforcement actions; odour complaints
- **Solids management**: screenings volume and solids hauled (tonnes/month), solids cost per m3 received
- **Chemical usage:** polymer consumption per m3 or per tonne solids (as applicable)
- **Reliability:** unplanned downtime hours/month; PM completion rate
- **Safety**: incidents and near misses (rate-based metrics).

6.1.2.1 Reporting

The following reporting should be undertaken at a minimum:

- Monthly internal dashboard (operations + finance)
- Quarterly trend report to management/Council as appropriate
- Annual public-facing summary aligned with rate setting and reserve reporting.

6.1.2.2 Continuous Improvement

KPIs should be reviewed quarterly with documented corrective actions, including updates to waste acceptance controls, staffing coverage, maintenance priorities, and fee policy triggers.

7. LIMITATIONS

This report has been prepared by Sperling Hansen Associates (SHA) on behalf of the District of Sechelt in accordance with generally accepted engineering practices to a level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions in British Columbia, subject to the time limits and financial and physical constraints applicable to the services.

The report, which specifically includes all tables and figures, is based on engineering analysis by SHA staff of data compiled during the course of the project. Except where specifically stated to the contrary, the information on which this study is based has been obtained from external sources. This external information has not been independently verified or otherwise examined by SHA to determine its accuracy and completeness. SHA has relied in good faith on this information and does not accept responsibility for any deficiency, misstatements or inaccuracies contained in the reports as a result of omissions, misinterpretation and/or fraudulent acts of the persons interviewed or contacted, or errors or omissions in the reviewed documentation.

The report is intended solely for the use of the District of Sechelt. Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, is the responsibility of such third parties. SHA does not accept any responsibility for other uses of the material contained herein nor for damages, if any, suffered by any third party because of decisions made or actions based on this report. Copying of this intellectual property for other purposes is not permitted.

The findings and conclusions of this report are valid only as of the date of this report. The interpretations presented in this report and the conclusions and recommendations that are drawn are based on information that was made available to SHA during the course of this project. Should additional new data become available in the future, Sperling Hansen Associates should be requested to re-evaluate the findings of this report and modify the conclusions and recommendations drawn, as required.

7.1.1 Use of Artificial Intelligence in Report Preparation

This report was prepared by Sperling Hansen Associates (SHA) in accordance with generally accepted engineering practices and applicable quality management requirements. In the preparation of this report, limited use was made of artificial intelligence (AI) tools to assist with drafting, formatting, and refinement of written content.

AI tools were used strictly as productivity aids and were not relied upon to conduct engineering analysis, interpret data, develop technical conclusions, or exercise professional judgment. All engineering assessments, assumptions, calculations, findings, and recommendations contained in this report were independently developed, reviewed, and verified by a Professional Engineer registered with Engineers and Geoscientists British Columbia (EGBC).

The responsible professional has exercised independent judgment in accordance with the Engineers and Geoscientists Act, the EGBC Code of Ethics, and EGBC Quality Management Guidelines. Consistent with EGBC guidance respecting the use of emerging technologies, SHA has maintained direct professional oversight of all report content and has applied appropriate review procedures to confirm technical accuracy and completeness.

The use of AI does not transfer or diminish professional responsibility. The undersigned professional retains full accountability for the contents of this report.

We appreciate the opportunity to work with the District of Sechelt on this project. Please do not hesitate to contact the undersigned if you have any questions.

Sincerely,

SPERLING HANSEN ASSOCIATES

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