# GREATER VANCOUVER SEWERAGE AND DRAINAGE DISTRICT (GVS&DD)

## BOARD OF DIRECTORS

**BOARD MEETING**
**Friday, May 23, 2025**
**9:00 am**
**28th Floor Boardroom, 4515 Central Boulevard, Burnaby, British Columbia**

**A G E N D A**

**A. ADOPTION OF THE AGENDA**

**1. May 23, 2025 Meeting Agenda**
That the GVS&DD Board adopt the agenda for its meeting scheduled for May 23, 2025 as circulated.

**B. ADOPTION OF THE MINUTES**

**1. April 25, 2025 Meeting Minutes** *pg. 4*
That the GVS&DD Board adopt the minutes for its meeting held April 25, 2025 as circulated.

**C. DELEGATIONS**

**D. INVITED PRESENTATIONS**

## E. CONSENT AGENDA

*Note: Directors may adopt in one motion all recommendations appearing on the Consent Agenda or, prior to the vote, request that an item be removed from the Consent Agenda for debate or discussion, voting in opposition to a recommendation, or declaring a conflict of interest with an item.*

### 1. LIQUID WASTE COMMITTEE REPORTS

### 1.1 2025 Update on Liquid Waste Sustainability Innovation Fund Projects *pg. 9*

**Executive Summary**

This report provides an update on eight projects that were approved for funding under the Liquid Waste Sustainability Innovation Fund (SIF) that are currently in progress or have been completed or discontinued since the last update to the designated Standing Committee. Projects funded by SIF support regional sustainability and continuously improve service delivery by allowing Metro Vancouver to explore and implement innovative approaches and respond to emerging issues and evolving best practices. The projects outlined in this report advance these objectives through: improving the efficiency and resilience of infrastructure, enhancing resource recovery from wastewater, producing low-carbon fuels that reduce greenhouse gas emissions, and protecting the environment. The projects are:

- High Efficiency Aeration Demonstration (discontinued)
- Intelligent Water Systems – Making Use of Sensors and Big Data Analytics (complete)
- Hydrothermal Processing – Biofuel Demonstration Facility (in progress)
- Advanced Resource Recovery from Sludge – Industrial Research Chair (in progress)
- Multiphase Composite Coating for Concrete Sewers (in progress)
- Handheld Wastewater Microbial DNA Monitor (complete)
- Biorock – Innovative Building Material (in progress)
- Hydrogen System Integration at LIWWTP (in progress).

**Recommendation**

That the GVS&DD Board receive for information the report dated April 14, 2025, titled "2025 Update on Liquid Waste Sustainability Innovation Fund Projects".

**F. ITEMS REMOVED FROM THE CONSENT AGENDA**

**G. REPORTS NOT INCLUDED IN CONSENT AGENDA**

**H. MOTIONS FOR WHICH NOTICE HAS BEEN GIVEN**

**I. OTHER BUSINESS**

**1. GVS&DD Board Committee Information Items and Delegation Summaries** *pg. 27*

**J. RESOLUTION TO CLOSE MEETING**

*Note: The Board must state by resolution the basis under section 90 of the Community Charter on which the meeting is being closed. If a member wishes to add an item, the basis must be included below.*

That the GVS&DD Board close its meeting scheduled for May 23, 2025 pursuant to section 226 (1) (a) of the *Local Government Act* and the *Community Charter* provisions as follows:

90 (1) A part of a council meeting may be closed to the public if the subject matter being considered relates to or is one or more of the following:
(g) litigation or potential litigation affecting the municipality; and

(2) A part of a council meeting must be closed to the public if the subject matter being considered relates to one or more of the following:
(b) the consideration of information received and held in confidence relating to negotiations between the municipality and a provincial government or the federal government or both, or between a provincial government or the federal government or both and a third party.

**K. ADJOURNMENT**

That the GVS&DD Board adjourn its meeting of May 23, 2025.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

**GREATER VANCOUVER SEWERAGE AND DRAINAGE DISTRICT**
**BOARD OF DIRECTORS**

Minutes of the Regular Meeting of the Greater Vancouver Sewerage and Drainage District (GVS&DD) Board of Directors held at 10:15 am on Friday, April 25, 2025, in the 28th Floor Boardroom, 4515 Central Boulevard, Burnaby, British Columbia.

**MEMBERS PRESENT:**

Burnaby, Chair, Director Mike Hurley
Anmore, Vice Chair, Director John McEwen
Burnaby, Director Pietro Calendino
Burnaby, Director Sav Dhaliwal*
Coquitlam, Director Craig Hodge
Coquitlam, Director Teri Towner
Delta, Director Rod Binder
Delta, Director Dylan Kruger
Electoral Area A, Director Jen McCutcheon
Langley City, Director Paul Albrecht
Langley Township, Director Steve Ferguson
Langley Township, Director Eric Woodward
Maple Ridge, Director Dan Ruimy
New Westminster, Director Nadine Nakagawa
North Vancouver City, Director Linda Buchanan
North Vancouver District, Director Lisa Muri
Pitt Meadows, Director Nicole MacDonald
Port Coquitlam, Director Brad West
Port Moody, Director Meghan Lahti
Richmond, Director Chak Au*
Richmond, Director Malcolm Brodie
Richmond, Director Bill McNulty
Surrey, Director Harry Bains
Surrey, Director Doug Elford
Surrey, Director Gordon Hepner
Surrey, Director Pardeep Kooner
Surrey, Director Brenda Locke
Surrey, Director Rob Stutt
Vancouver, Director Rebecca Bligh*
Vancouver, Director Lisa Dominato
Vancouver, Director Sarah Kirby-Yung
Vancouver, Director Mike Klassen
Vancouver, Director Lenny Zhou*
West Vancouver, Director Mark Sager
White Rock, Director Megan Knight
Commissioner Jerry W. Dobrovolny
(Non-voting member)

* denotes electronic meeting participation as authorized by the *Procedure Bylaw*

**MEMBERS ABSENT:**

Vancouver, Director Peter Meiszner
Vancouver, Director Ken Sim

**STAFF PRESENT:**

Dorothy Shermer, Corporate Officer
Catherine Grosson, Legislative Services Coordinator, Board and Information Services

## A. ADOPTION OF THE AGENDA

### 1. April 25, 2025 Meeting Agenda

**It was MOVED and SECONDED**
That the GVS&DD Board adopt the agenda for its meeting scheduled for April 25, 2025 with the following amendment:

- Remove item H1 – Notice of Motion – Director Muri.

**CARRIED**

## B. ADOPTION OF THE MINUTES

### 1. March 28, 2025 Meeting Minutes

**It was MOVED and SECONDED**
That the GVS&DD Board adopt the minutes for its meeting held March 28, 2025 as circulated.

**CARRIED**

### 2. April 9, 2025 Special Joint Meeting Minutes

**It was MOVED and SECONDED**
That the GVS&DD Board adopt the minutes for its special joint meeting held April 9, 2025 as circulated.

**CARRIED**

## C. DELEGATIONS

No items presented.

## D. INVITED PRESENTATIONS

No items presented.

## E. CONSENT AGENDA

**It was MOVED and SECONDED**
That the GVS&DD Board adopt the recommendations presented in the following items as presented in the April 25, 2025 GVS&DD Consent Agenda:

1.1 Appointment of Enforcement Officer
2.1 2024 Annual Financial Results and Audited Financial Statements

**CARRIED**
Director Woodward was absent for the vote.

The items and recommendations referred to above are as follows:

**1.1 Appointment of Enforcement Officer**
Report dated March 3, 2025, from Nicole MacDonald, Program Manager, Solid Waste Regulation, Environmental Regulation and Enforcement, requesting that the GVS&DD Board appoint a Metro Vancouver employee as a Board-designated officer.

*Recommendation*
That the GVS&DD Board pursuant to the *Greater Vancouver Sewerage and Drainage District Municipal Solid Waste and Recyclable Material Regulatory Bylaw No. 181*, 1996 and the *Environmental Management Act* appoint Metro Vancouver employee Gabriel de Andrade Fazioni as an officer.

*Adopted on Consent*

**2.1 2024 Annual Financial Results and Audited Financial Statements**
Report dated April 15, 2025 from Harji Varn, Chief Financial Officer / General Manager, Financial Services, providing information on Metro Vancouver's 2024 Annual Financial Results and presenting, for approval, the Audited 2024 Financial Statements for the MVRD, MVHC, GVWD, and GVS&DD.

*Recommendation*
That the GVS&DD Board approve the Audited 2024 Financial Statements for the Greater Vancouver Sewerage and Drainage District.

*Adopted on Consent*

## F. ITEMS REMOVED FROM THE CONSENT AGENDA

No items presented.

## G. REPORTS NOT INCLUDED IN CONSENT AGENDA

**1.1 GVS&DD Notice of Bylaw Violation Enforcement and Dispute Adjudication Amendment Bylaw No. 387, 2025 (Tipping Fee Bylaw Provisions)**
Report dated March 18, 2025, from Paul Henderson, General Manager, Solid Waste Services, seeking GVS&DD Board adoption of *Greater Vancouver Sewerage and Drainage District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amendment Bylaw No. 387, 2025.*

**It was MOVED and SECONDED**
That the GVS&DD Board give first, second, and third reading to *Greater Vancouver Sewerage and Drainage District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amendment Bylaw No. 387, 2025.*

**CARRIED**

**It was MOVED and SECONDED**
That the GVS&DD Board adopt *Greater Vancouver Sewerage and Drainage District Notice of Bylaw Violation Enforcement and Dispute Adjudication Amendment Bylaw No. 387, 2025*.

**CARRIED**

## H. MOTIONS FOR WHICH NOTICE HAS BEEN GIVEN

No items presented.

## I. OTHER BUSINESS

### 1. GVS&DD Board Committee Information Items and Delegation Summaries

## J. RESOLUTION TO CLOSE MEETING

**It was MOVED and SECONDED**
That the GVS&DD Board close its meeting scheduled for April 25, 2025 pursuant to section 226 (1) (a) of the *Local Government Act* and the *Community Charter* provisions as follows:

90 (1) A part of a council meeting may be closed to the public if the subject matter being considered relates to or is one or more of the following:
- (a) personal information about an identifiable individual who holds or is being considered for a position as an officer, employee or agent of the municipality or another position appointed by the municipality;
- (e) the acquisition, disposition or expropriation of land or improvements, if the council considers that disclosure could reasonably be expected to harm the interests of the municipality;
- (g) litigation or potential litigation affecting the municipality; and

(2) A part of a council meeting must be closed to the public if the subject matter being considered relates to one or more of the following:
- (b) the consideration of information received and held in confidence relating to negotiations between the municipality and a provincial government or the federal government or both, or between a provincial government or the federal government or both and a third party.

**CARRIED**

## K. ADJOURNMENT

**It was MOVED and SECONDED**
That the GVS&DD Board adjourn its meeting of April 25, 2025.

**CARRIED**
(Time: 10:17 am)

CERTIFIED CORRECT

Dorothy Shermer, Corporate Officer

Mike Hurley, Chair

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Liquid Waste Committee

From: Lillian Zaremba, Program Manager, Liquid Waste Services

Date: April 14, 2025 Meeting Date: May 14, 2025

Subject: **2025 Update on Liquid Waste Sustainability Innovation Fund Projects**

**RECOMMENDATION**

That the GVS&DD Board receive for information the report dated April 14, 2025, titled "2025 Update on Liquid Waste Sustainability Innovation Fund Projects".

**EXECUTIVE SUMMARY**

This report provides an update on eight projects that were approved for funding under the Liquid Waste Sustainability Innovation Fund (SIF) that are currently in progress or have been completed or discontinued since the last update to the designated Standing Committee. Projects funded by SIF support regional sustainability and continuously improve service delivery by allowing Metro Vancouver to explore and implement innovative approaches and respond to emerging issues and evolving best practices. The projects outlined in this report advance these objectives through: improving the efficiency and resilience of infrastructure, enhancing resource recovery from wastewater, producing low-carbon fuels that reduce greenhouse gas emissions, and protecting the environment. The projects are:

- High Efficiency Aeration Demonstration (discontinued)
- Intelligent Water Systems – Making Use of Sensors and Big Data Analytics (complete)
- Hydrothermal Processing – Biofuel Demonstration Facility (in progress)
- Advanced Resource Recovery from Sludge – Industrial Research Chair (in progress)
- Multiphase Composite Coating for Concrete Sewers (in progress)
- Handheld Wastewater Microbial DNA Monitor (complete)
- Biorock – Innovative Building Material (in progress)
- Hydrogen System Integration at LIWWTP (in progress).

**PURPOSE**

To provide an update on projects funded under the Liquid Waste Sustainability Innovation Fund that are currently in progress or have been completed or discontinued since the last annual update.

**BACKGROUND**

The Sustainability Innovation Fund program (Reference 1) supports regional sustainability and drives continuous improvement in the delivery of Metro Vancouver services by reducing emissions, protecting the environment, and advancing resilience. The Regional District, Water, and Liquid Waste Sustainability Innovation Funds have been in place since October 29, 2004, when the GVRD, GVWD, and GVS&DD Boards, respectively, approved their creation. In 2014, policies to guide and manage the Sustainability Innovation Funds were adopted by the respective Boards, with amendments in 2016 and 2021. The Policies require that the designated Standing Committee be kept updated on the deliverables, outcomes, and measurable benefits of the projects that have received funding. Projects funded wholly or in part by the Sustainability Innovation Fund program have been undertaken by Metro Vancouver in coordination with project partners since 2015. At its February 21, 2025 meeting, the MVRD Board re-affirmed support for the Sustainability Innovation Fund program.

Annually, Metro Vancouver staff submit applications for project funding, which are approved by the respective Standing Committees and Boards. The amount dispersed from the Sustainability Innovation Funds in any year is at the discretion of the respective Boards and depends on the merit of proposals submitted. Additionally, many projects amplify the financial contributions from the Sustainability Innovation Fund by leveraging external funding through partnerships, such as with the region's academic institutions.

The Liquid Waste Committee is responsible for reviewing Liquid Waste Sustainability Innovation Fund applications that fall within the Terms of Reference of the Committee and for making recommendations to the GVS&DD Board, and also receives updates on in progress or recently completed projects. The GVS&DD Board is responsible for overseeing the Liquid Waste Sustainability Innovation Fund and for reviewing and approving funding for projects from the Liquid Waste function.

**STATUS OF LIQUID WASTE SUSTAINABILITY INNOVATION PROJECTS – 2025 UPDATE**

From 2015 to present, the Fund has made contributions to a total of 16 projects. Of these, 8 projects have been completed, 3 have been discontinued, and 5 are in progress.

This report provides an update on the eight Liquid Waste projects that are in progress or that have not yet been reported as complete or discontinued. Table 1 provides budgetary information and project status, and further details of each project can be found in Attachment 1.

**Table 1. Summary of Liquid Waste Sustainability Innovation Fund Projects – 2025 Update**

| Project | Total Funding Approved | Estimated Spent (as of Mar. 31, 2025) | Status |
|---|---|---|---|
| **2017 Approval Year** | | | |
| High Efficiency Aeration Demonstration | $750,000 | $467,200 | Discontinued |
| **2018 Approval Year** | | | |
| Intelligent Water Systems – Making Use of Sensors and Big Data Analytics | $200,000 | $184,600 | **Complete** |
| Hydrothermal Processing – Biofuel Demonstration Facility | 2018: $8,250,000<br>2021: $6,130,000 | $14,380,000 | In Progress |
| **2019 Approval Year** | | | |
| Advanced Resource Recovery from Sludge – Industrial Research Chair | $2,985,000 | $1,602,300 | In Progress |
| Multiphase Composite Coating for Concrete Sewers | $620,000 | $294,700 | In Progress |
| **2020 Approval Year** | | | |
| Handheld Wastewater Microbial DNA Monitor | $330,000 | $292,900 | **Complete** |
| **2022 Approval Year** | | | |
| Biorock – Innovative Building Material | $270,000 | $0 | In Progress |
| **2023 Approval Year** | | | |
| Hydrogen System Integration at LIWWTP | $625,000 | $136,100 | In Progress |
| **TOTAL** | $20,160,000 | $17,360,000 | |

Several of the projects are pilots that bridge laboratory-scale research and commercial-scale implementation. Technologies that prove successful at the pilot stage could generate millions of dollars in revenue if implemented at full-scale, with a combined lifecycle benefit of over $80 million from selling green energy and BC Low Carbon Fuel Standard credits.

**ALTERNATIVES**

This is an information report. No alternatives are presented.

**FINANCIAL IMPLICATIONS**

The projects summarized in this report received funding from the Liquid Waste Sustainability Innovation Fund as approved by the GVS&DD Board between 2017 and 2023. (No applications were submitted in 2024.) Disbursals of funds were made in accordance with the Policy that governs the use and management of the Fund. Table 1 above outlines the estimated amount spent to March 31, 2025 for each project.

As of December 31, 2024, the estimated reserve balance of the Liquid Waste Sustainability Innovation Fund was $8.1 million. Of this, approximately $2.5 million in Board-approved funding is committed to be spent on currently in-progress projects across Liquid Waste Services. Any unspent funds from completed or discontinued projects are maintained in the Liquid Waste Sustainability Innovation Fund reserve.

## CONCLUSION

This report provides an update on eight projects funded under the Liquid Waste Sustainability Innovation Fund between 2017 and 2023 that are currently in progress or have been completed or discontinued since the last update to the designated Standing Committee. The results and findings from these projects will be used to drive continuous improvement in the delivery of Metro Vancouver's services.

## ATTACHMENTS

1. "2025 Status Update on Current Liquid Waste Sustainability Innovation Fund Projects", dated April 9, 2025.
2. Presentation re: "2025 Update on Liquid Waste Sustainability Innovation Fund Projects".

## REFERENCE

1. Metro Vancouver. (2025). *Sustainability Innovation Fund*. Retrieved from https://metrovancouver.org/about-us/sustainability-innovation-fund. Last accessed April 10, 2025.

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# 2025 Status Update on Current Liquid Waste Sustainability Innovation Fund Projects

## 2017 APPROVAL YEAR

**High Efficiency Aeration Demonstration**
Status: Discontinued
Years: 2017 – 2024

Overview
In wastewater treatment, aeration introduces air into wastewater to provide oxygen to microbes that degrade organic matter. Aeration is energy-intensive – it can consume more than one-half of the energy required by a wastewater treatment plant (WWTP). This project was intended to pilot test the Perlemax Fluidic Oscillator, a new device with the ability to improve aeration energy efficiency by 25%.

Project partners were the District of Columbia Water and Sewer Authority (DC Water), who contributed the use of a test tank at their Blue Plains Advanced Wastewater Treatment Plant, and the Water Research Foundation (WRF), who coordinated third-party validation by an independent panel of experts.

Outcomes to Date
- DC Water modified its aeration tank for testing the oscillator.
- The Perlemax Fluidic Oscillator was built, delivered and installed at DC Water's facility.
- Perlemax was unable to commission the system within a timeframe that met seasonal and budget constraints, so Metro Vancouver decided to terminate the project. No testing was completed.
- Staff have reviewed the conditions that led to the project's termination, with the intent of applying the lessons learned to ensure success of future projects.

## 2018 APPROVAL YEAR

**Intelligent Water Systems – Making Use of Sensors and Big Data Analytics**
Status: Complete
Years: 2018 – 2023

Overview
Utilities including Metro Vancouver and its member jurisdictions monitor and collect large amounts of data in their wastewater systems. As increasing numbers of less expensive sensors are deployed, the volume of data increases exponentially. The purpose of this project was to provide tools for utilities to manage this wave of "Big Data" to help run the wastewater system with more efficiency, reliability, and resilience.

The project partner was the Water Research Foundation (WRF), who retained a consultant to carry out the work.

Outcomes to Date

- The end product was the Intelligent Water Infrastructure Systems Engineering (iWISE) framework, which provides a step-wise approach to help utilities transform data into insights that drive decisions.
- Each of these steps can be implemented when a utility is ready in their journey to become a utility of the future: define and understand intelligent water systems; identify and categorize physical and digital systems; develop strategic and implementation plans; develop a data-driven decision support system; and develop an organizational support system.

**Hydrothermal Processing – Biofuel Demonstration Facility**
Status: In Progress
Years: 2018 –

Overview
Metro Vancouver is constructing the world's first continuous flow hydrothermal processing (HTP) demonstration facility using wastewater sludge as a feedstock, at Annacis Island Wastewater Treatment Plant (WWTP).

HTP is a new technology that solves two environmental challenges: managing increasing quantities of wastewater solids and reducing greenhouse gas (GHG) emissions. HTP uses heat and pressure to convert sludge into biocrude oil, which can then be further refined into low-carbon transportation fuels. Compared to traditional wastewater solids management, HTP offers several benefits: lower capital and operating costs, smaller footprint, lower lifecycle greenhouse gas emissions, access to a different market than biosolids, and destruction of compounds of environmental concern (CECs).

An additional $5 million in funding has been leveraged from project partner Parkland and the Province of BC for this project.

Outcomes to Date

- Completed detailed design of the hydrothermal processing unit and associated infrastructure to integrate it with the Annacis Island WWTP.
- Began fabrication of the hydrothermal processing unit and tendered the civil works.

Next Steps
A third-party operator will be procured. Construction will be completed in 2026 and the facility will operate until early 2028. Project partner Parkland will test and co-process the biocrude at its Burnaby refinery. The demonstration will allow Metro Vancouver to evaluate the long-term performance and business case of HTP before subsequent scale-up for permanent implementation at its WWTPs.

## 2019 APPROVAL YEAR

**Advanced Resource Recovery from Sludge**
Status: In Progress
Years: 2019 –

Overview
Advancing the recovery of resources from wastewater to produce value-added outputs for use by other industries can help build a stronger circular economy. The project goals are to (i) assess options for recycling the HTP aqueous effluent back to the WWTP, explore the potential for recovering nitrogen and phosphorus from HTP by-products, evaluate the destruction of CECs in HTP; and (ii) develop a bioreactor that can augment production of biomethane from sludge.

The project partners are UBC School of Engineering and the Natural Sciences and Engineering Research Council.

An additional $1.83 million in funding has been leveraged from external agencies for this project.

Outcomes to Date
(i)
- Tested several treatment processes for the HTP aqueous stream and identified several promising options, as well as their limitations.
- Investigated options to recover nutrients from HTP byproducts – namely ammonia from the aqueous stream and phosphorus from the solid precipitate – in forms that could be beneficially used as fertilizer.
- Explored the fate of CECs in HTP.
- Disseminated research results in eighteen journal articles and eleven conference presentations.

(ii)
- The UBC team's prototyping guided the transition of the bioreactor project from lab scale to pilot scale. An engineering consultant completed preliminary design for a pilot-scale bioreactor to be tested at Lulu Island WWTP.

Next Steps
(i) Research will be conducted on adding fats, oils, and grease (FOG) to the wastewater sludge feedstock for HTP. The results of UBC's research will inform the operation of the HTP demonstration facility at Annacis Island WWTP, as well as informing integration of HTP into WWTPs in future full-scale implementation. The research will also inform pathways for recovering nutrients from HTP by-products that can contribute to the business case for full-scale HTP.

(ii) The pilot-scale bioreactor will be constructed and the pilot test results will be evaluated to determine the increase in biomethane production. The business case will be updated to inform whether to proceed with full-scale implementation at a Metro Vancouver WWTP.

**Multiphase Composite Coating (MCC) for Concrete Sewers**
Status: In Progress
Years: 2019 –

Overview
This project is field testing and validating the performance of a new coating material developed by UBC with the potential to protect both new and existing concrete sewer pipes from biological corrosion. This new coating could dramatically extend the service life of sewer networks and avoid significant repair and replacement costs.

The project partners are UBC Department of Civil Engineering, Metro Testing & Engineering, and Avestec.

An additional $648,000 in funding has been leveraged from external agencies for this project.

Outcomes to Date
- Development and optimization of the coating is essentially complete, including reducing the carbon footprint, enhancing performance, and improving sprayability.
- Significant laboratory testing was completed by UBC on material characteristics that allow the coating to be sprayed effectively, increasing its potential for commercial viability.
- A field test of the coating on a Metro Vancouver sewer chamber improved the understanding of how various additives impact the coating durability.
- Design of the robotic spray system is expected to be completed in 2025. Design of the "crawler" – a vehicle to operate and transport the robotic sprayer – is complete.

Next Steps
Design and fabrication of the robotic spray system will be completed, followed by a trial of the system on a new pre-cast sewer pipe in 2026. Information gathered during trials will be used to enhance the system for field deployment.

## 2020 APPROVAL YEAR

**Handheld Wastewater Microbial DNA Monitor**
Status: Complete
Years: 2020 – 2024

Overview
The goal of this project is to adapt a DNA sequencer to test the microbes in wastewater samples taken from treatment processes, which will provide quantitative results to support existing visual assessments of microbes. Combined with artificial intelligence tools, this system could provide early warning of treatment process upsets, allowing time to take corrective action and prevent process failure, to improve efficiency, reliability and resilience of wastewater treatment.

The project partner is UBC Department of Civil Engineering.

Outcomes to Date

- UBC researchers developed a high-throughput approach to identify and quantify microbial communities, which was validated using samples collected from Annacis Island WWTP.
- DNA extraction and sequencing preparation was automated using robots.
- The team created a cloud-based platform for analyzing samples along with a species-level database of the microbial communities in Annacis Island WWTP, which were combined into an artificial intelligence platform.
- The digital tools developed in the project can be integrated with a commercially available portable DNA sequencing device to provide rapid analysis for wastewater process control.

## 2022 APPROVAL YEAR

**Biorock – Innovative Building Material for Shoreline Protection, Carbon Sequestration, and Habitat Creation**

Status: In Progress
Years: 2022 –

Overview

Biorock uses electric currents and naturally occurring ingredients in sea water to accumulate concrete-like material on a submerged metal frame, constructing underwater marine structures that grow and strengthen over time.

The purpose of this project is to explore the feasibility of Biorock for shore protection and habitat creation near our coastal infrastructure.

Outcomes to Date

- A UBC Sustainability Scholar completed research on living breakwater design, aquatic species and habitat needs. The end product was a series of conceptual designs with various features for increasing ecosystem diversity, density and resilience when using Biorock in local waters, which will be used to inform the design of a Biorock pilot.
- Procurement of consultants is in progress for two scopes, (i) coastal engineering for site assessment and preliminary structural design and (ii) electrical control design.

Next Steps

Consultants will confirm the feasibility and complete the design of a Biorock pilot including a cost estimate. A positive assessment will result in submission of a separate Sustainability Innovation Fund application for fabrication, installation, and monitoring of a Biorock pilot to demonstrate its performance in local waters.

## 2023 APPROVAL YEAR

**Hydrogen System Integration at Lulu Island WWTP (Phase 1)**
Status: In Progress
Years: 2023 –

Overview
The purpose of this project is to evaluate the technical feasibility of integrating a hydrogen system at the Lulu Island Wastewater Treatment Plant (WWTP). The system includes producing green hydrogen from wastewater by-products, injecting hydrogen into wastewater digestion processes to increase renewable natural gas (RNG), and potential sale of hydrogen to off-site users.

Outcomes to Date
- Developed conceptual designs for producing hydrogen from ammonia found in wastewater treatment by-products, evaluated options for hydrogen use, and evaluated the business case.
- A vendor conducted a trial using centrate from Lulu Island WWTP with their technology that successfully recovered ammonia and produced hydrogen. The results informed the business case.
- The evaluation concluded that use of hydrogen in heavy-duty trucking is preferred over injecting hydrogen into digesters to create RNG.

Next Steps
Consultants will complete project definition for a pilot test of the ammonia to hydrogen system, followed by detailed design.

Lulu Island Pilot Digestion Optimization Facility

# Liquid Waste Sustainability Innovation Fund Projects

## 2025 UPDATE

Lillian Zaremba
Program Manager, Liquid Waste Services

Liquid Waste Committee Meeting – May 14, 2025
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## THE SUSTAINABILITY INNOVATION FUNDS (SIF)

History

- 2004 - Reserve set up to fund projects “based on the principles of sustainability”
- 2014 - Related board policies adopted
- 2015 - Approval of project funding began

Circular Economy / Resource Recovery

Emissions Reduction

Environmental Protection



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## SIF OBJECTIVE

Support innovations in regional sustainability & drive continuous improvement in the delivery of Metro Vancouver services

- **Innovation:** new approaches in service delivery
- **Sustainability:** protecting the environment, reducing emissions advancing resilience
- **Continuous Improvement:** evolving best practices in service delivery

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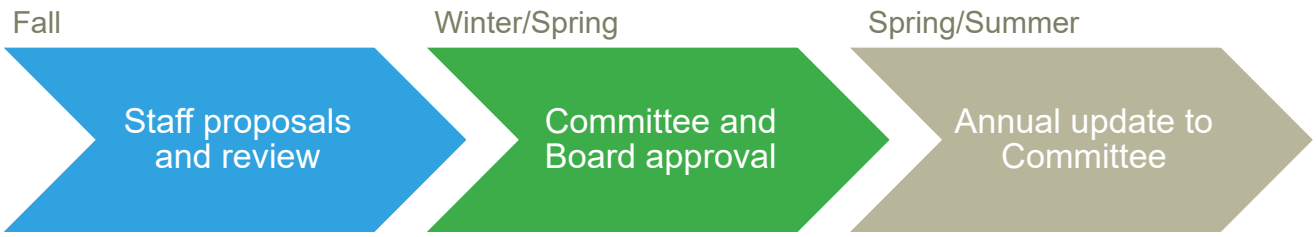
## ANNUAL SIF PROCESS




1. Staff-level committees review proposals
2. Senior management provides internal approval
3. Standing Committee recommends proposals to Board
4. Board provides final approval
5. Staff provide update on previously funded projects

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## 2015-2024 SIF PROJECTS AND FUNDING

| SIF | Approved Projects | Completed Projects | Approved Project Funding - End of 2024* | Remaining Fund Balance - End of 2024* |
|---|---|---|---|---|
| Liquid Waste | 16 | 8 | $23.1 M | $8.1 M |
| Regional District | 54 | 28 | $13.7 M | $10.7 M |
| Water Services | 32 | 12 | $11.0 M | $15.7 M |

**Values are rounded estimates*

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## INTELLIGENT WATER SYSTEMS

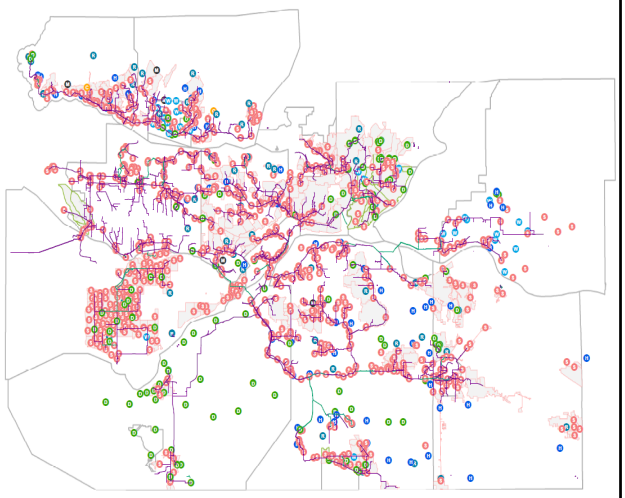
Complete

Purpose:

- Leverage big data and artificial intelligence for decision tools

Outcomes:

- Step-wise approach to use data to manage the wastewater collection system more efficiently



Sensor locations in Metro Vancouver sewers.

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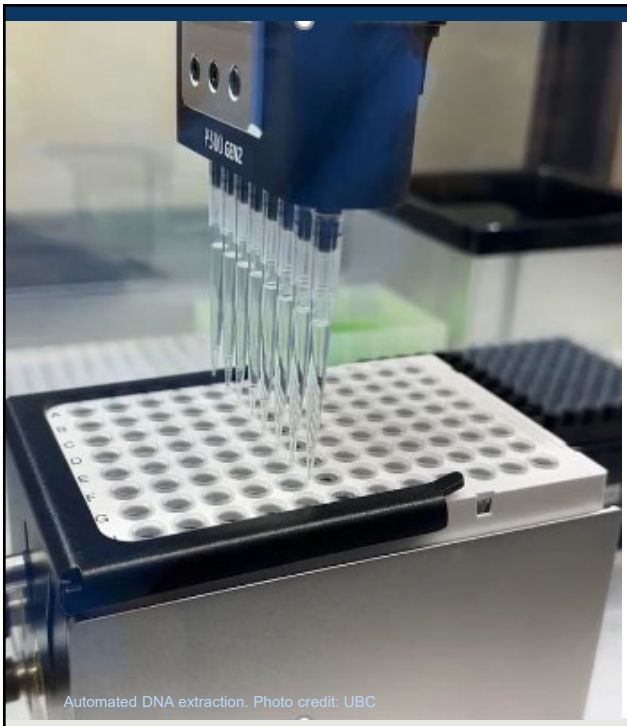

Automated DNA extraction. Photo credit: UBC

## OTHER PROJECTS

Discontinued

High-efficiency aeration demonstration

Complete

Handheld wastewater microbial DNA monitor

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Field trial of multiphase composite coating. Photo credit: UBC

## MULTI-PHASE COMPOSITE COATING FOR SEWERS

In progress

Purpose:

- Protect concrete sewers from corrosion to extend their life

Progress:

- Field trial complete
- Improved spraying effectiveness
- Developed robotic sprayer

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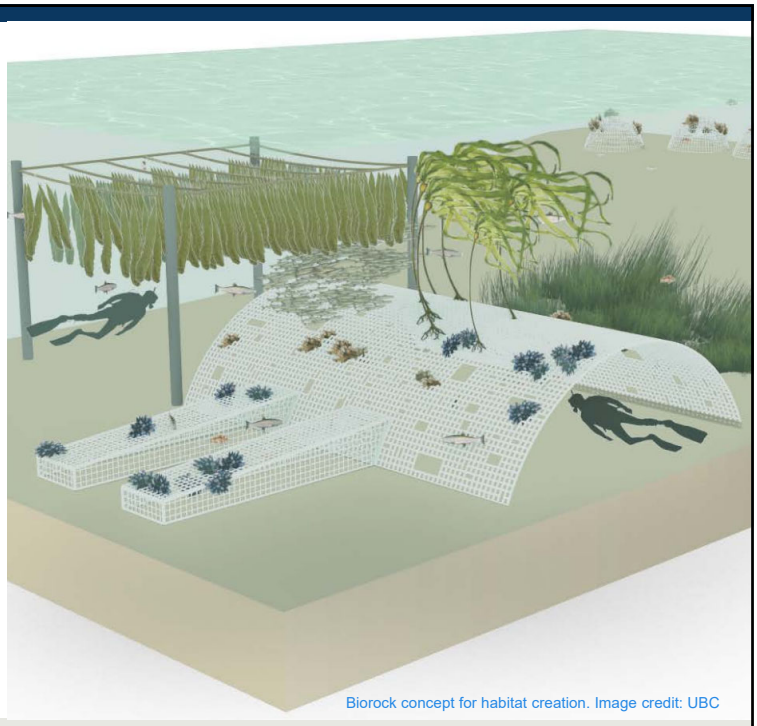
## BIOROCK – INNOVATIVE BUILDING MATERIAL

In progress

Purpose:

- shoreline protection
- carbon sequestration
- habitat creation



Biorock concept for habitat creation. Image credit: UBC

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# HYDROTHERMAL PROCESSING

In progress

Purpose: Manage wastewater solids and create low-carbon transportation fuels

Progress: Fabrication underway


Wastewater sludge | Biocrude | Low-carbon fuel



# OTHER PROJECTS

In progress

Advanced resource recovery from sludge

In progress

Hydrogen system at Lulu Island Wastewater Treatment Plant


UBC Bioreactor Technology Group lab. Photo credit: UBC

Rendering of robotic sprayer for Multi-Composite Coating. Image courtesy of UBC.

Thank you

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

# COMMITTEE INFORMATION ITEMS AND DELEGATION SUMMARIES

Greater Vancouver Sewerage and Drainage District
Board Meeting Date – May 23, 2025

This information item, listing recent information received by committee, is provided for the GVS&DD Board's information. Please access a complete PDF package here.

**Liquid Waste Committee – May 14, 2025**

*Delegations:*
No delegations presented

*Information Items:*
E1 Food Sector Grease Interceptor bylaw Enforcement
E3 2025 Adult Toilet Training Campaign Launch