

Iona Island Wastewater Treatment Plant Projects

Alternative Approach

About Metro Vancouver

Metro Vancouver is a diverse organization that plans for and delivers regional utility services, including water, sewers and wastewater treatment, and solid waste management. It also monitors and regulates air quality, plans for urban growth, manages a regional parks system, provides affordable rental housing, and serves as a regional federation. The organization is a federation of 21 municipalities, one electoral area, and one treaty First Nation located in the region of the same name. The organization is made up of four separate legal entities, each governed by its own Board of Directors. Board directors are elected officials from member jurisdictions.

Metro Vancouver acknowledges that the region's residents live, work, and learn on the shared territories of many Indigenous peoples, including 10 local First Nations: q̓ic̓əy̓ (Katzie), q̓ʷɑ:n̓ƛ̓ən̓ (Kwantlen), kʷikʷəƛ̓əm (Kwikwetlem), máthxwi (Matsqui), xʷməθkʷəy̓əm (Musqueam), qiqéyt (Qayqayt), Semiahmoo, Sḵwx̱wú7mesh Úxwumixw (Squamish), scəw̓aθən məsteyəxʷ (Tsawwassen), and səlilwətaɬ (Tsleil-Waututh).

Metro Vancouver respects the diverse and distinct histories, languages and cultures of First Nations, Métis, and Inuit, which collectively enrich our lives and the region.

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Wastewater treatment infrastructure on Iona Island

Introduction

Metro Vancouver is planning upgrades to the Iona Island Wastewater Treatment Plant to meet provincial and federal regulatory requirements for secondary wastewater treatment, and to rehabilitate aging infrastructure. The upgrades will better enable the continued protection of public health and the environment in a growing region by improving the quality of treated wastewater released into the Salish Sea.

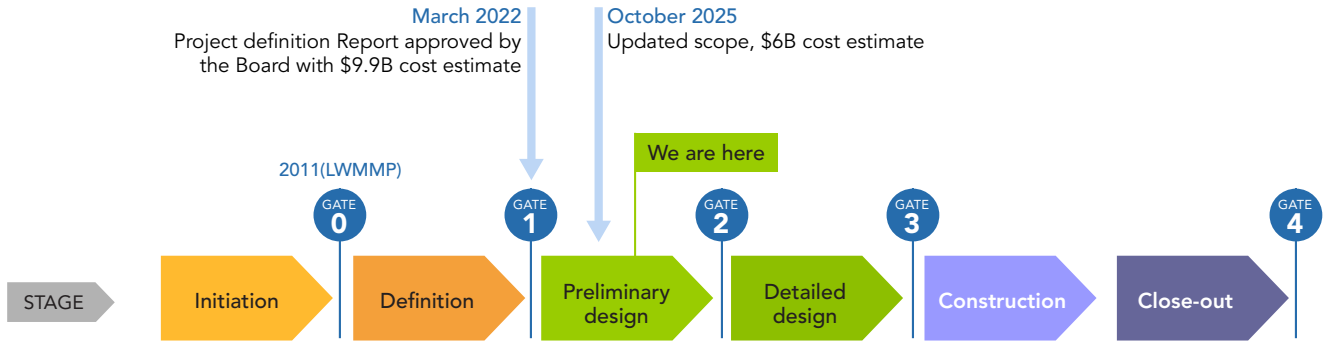
In March 2022, the Greater Vancouver Sewerage & Drainage District (GVS&DD) Board (the Board) approved the Project Definition Report (PDR) for the Iona Island Wastewater Treatment Plant Projects (Iona Projects) with an estimated cost of $9.9 billion and a target of meeting secondary compliance by 2035. Within the PDR, the recommended approach was to build entirely new liquid treatment components, while retaining the existing solids treatment infrastructure for use until 2051, and complementary environmental projects in a condensed timeline. In July 2024, the contract for preliminary design work was awarded and staff also began to explore options for the delivery of the Iona Projects in a more cost sustainable manner while prioritizing secondary treatment.

In October 2025, the Board endorsed an alternative approach to deliver the Iona Projects — one that mitigates impacts on rate payers while ensuring the upgrades would meet regulatory requirements as soon as possible. This background paper outlines the alternative approach for delivering the Iona Projects. As part of the alternative approach, Metro Vancouver will deliver only the most essential components needed to meet wastewater treatment regulations for secondary treatment. Other components previously envisioned in the conceptual design would be deferred to future projects.

Key terms in this report

- **Project Definition Report (PDR):** The report delivered at the end of the project definition phase includes a conceptual design together with a project schedule, budget, and recommended delivery strategy.
- **Membrane bioreactor:** The combination of a membrane process like microfiltration or ultrafiltration with a biological wastewater treatment process, the activated sludge process. It is now widely used for municipal and industrial wastewater treatment.
- **Preliminary design phase:** Further advances the design following approval of the Project Definition Report. Preliminary design is followed by detailed design.
- **Stage gate:** A process that provides decision makers with the opportunity to make informed decisions at key points through the development and implementation of the project.

Metro Vancouver's Stage Gate Process

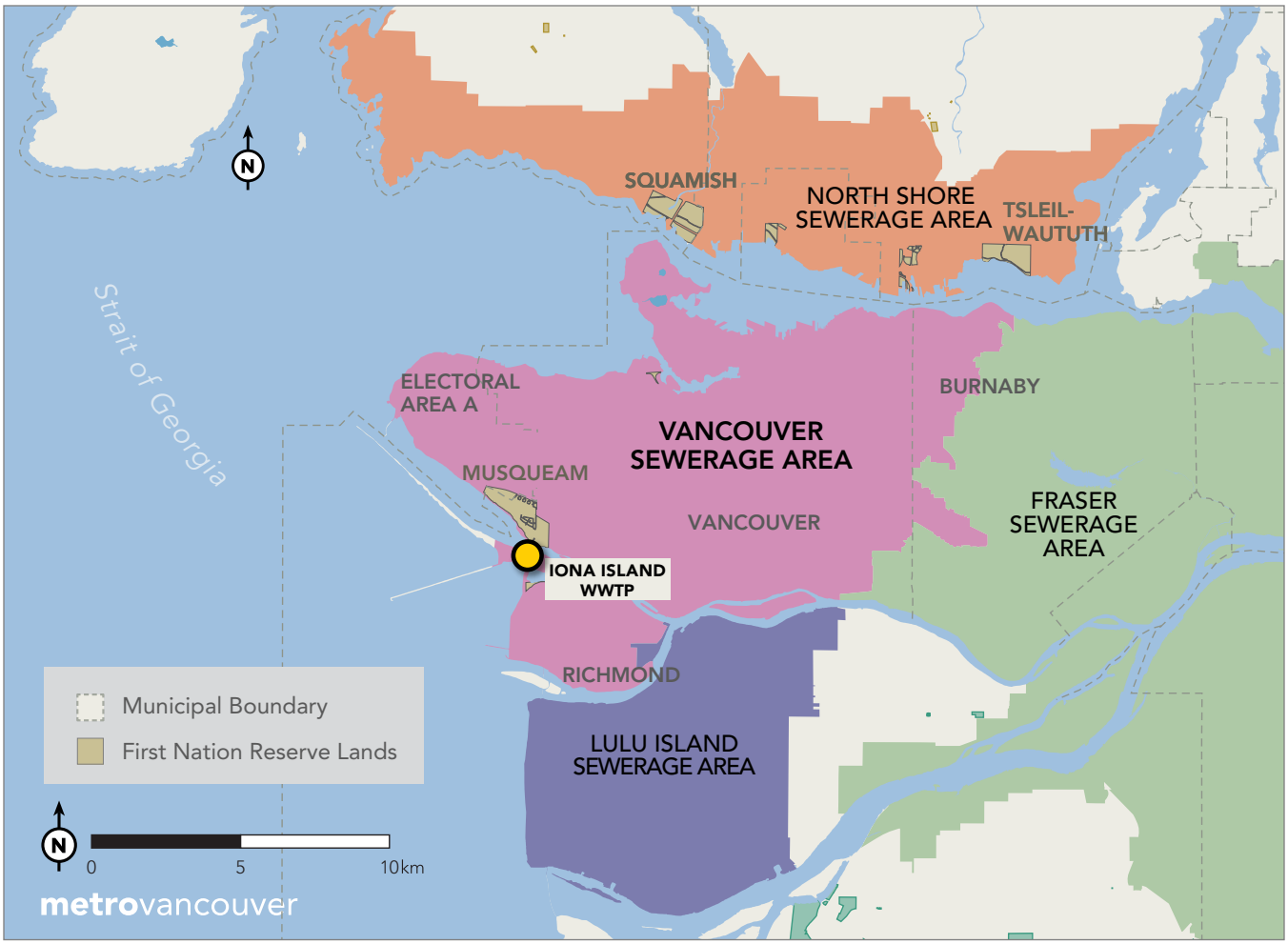


About the Iona Island Wastewater Treatment Plant

Iona Island Wastewater Treatment Plant

The Iona Island Wastewater Treatment Plant (the treatment plant) was commissioned in 1963 and as of 2025, serves approximately 880,000 residents. It is currently a primary treatment facility and is one of the last plants on the west coast of Canada and the United States to provide only primary level wastewater treatment. The plant serves residents in the Vancouver Sewerage Area, which includes Vancouver, parts of Burnaby and Richmond, the University Endowment Lands, and UBC. The facility processes about 200 billion litres of wastewater each year, which is approximately 40% of the region's wastewater.

Vancouver Sewerage Area: The Vancouver Sewerage Area treats wastewater from Burnaby, Richmond, Vancouver, Electoral Area A, and UBC.



Why We Treat Wastewater

We all create wastewater as part of our daily lives. Wastewater (or sewage) can contain a number of different pollutants and waste products, including soap, food scraps, human waste, oils, and other chemicals.

Treating wastewater removes substances that can harm human health, aquatic life, and the environment. If we don't remove pollutants from wastewater, they go directly into our rivers and oceans. This can threaten aquatic life, public health, and our ability to swim, boat, and fish in our local waters.

The treatment process removes suspended solids and reduces biochemical oxygen demand.

- Suspended solids in water block light and interfere with the growth of aquatic life.
- Organic materials in wastewater need oxygen to break down, using up oxygen needed by fish and other aquatic life. Biochemical oxygen demand is a measure of the oxygen consumed by wastewater, and a surrogate measurement for the carbon-based contaminants discharged to the environment.

Place

The Fraser River estuary, where xʷəyeyət (Iona Island) and the treatment plant are located, is British Columbia's largest and most threatened estuary. It is one of the most important salmon rivers in the world, providing critical rearing habitat for millions of juvenile salmon. It is also a stopover for millions of birds as they migrate along the Pacific Flyway and is home to a large variety of ecosystems, including the regionally and provincially rare coastal sand dune ecosystem.

The existing plant discharges treated effluent to the Salish Sea through a deep sea outfall. It is located in Richmond, BC, in close proximity to Musqueam 2 and 3 and the Vancouver International Airport (YVR), and is surrounded by Iona Beach Regional Park.

History

The current plant was designed in the 1950s to treat an average dry weather flow of 160 megalitres per day (ML/d). The plant was commissioned in 1963 and underwent multiple expansions and infrastructure upgrades from 1972 and beyond. Today, the plant treats an average flow of 496 ML/d — more than triple the original capacity.

Regulatory Requirements

Metro Vancouver's 2011 Liquid Waste Management Plan (approved by the provincial Minister of Environment), and federal Wastewater Systems Effluent Regulation, legislated in 2012, require that the plant be upgraded to secondary treatment by December 31, 2030.

Background

Project Definition and the Original Conceptual Design

The project definition phase was initiated in 2018, adopting a multi-disciplinary integrated design process (IDP) supported by public and First Nations engagement.

July 2020: Metro Vancouver's Board of Directors endorsed an initial design concept, which included tertiary level treatment for the new plant, resource recovery opportunities, integration with Iona Beach Regional Park, and a range of ecological projects. At that time, the focus shifted to updating the project schedule and cost estimates, which included a more detailed assessment of constructability, risk, and delivery strategy. This assessment identified several challenges, resulting in a revised anticipated project completion date with an updated cost estimate.

July 2021: The Board was provided information on the anticipated cost and schedule, as well as the work being undertaken to address the identified challenges. This work included value engineering and a comprehensive challenge review of the project definition by a team of independent global experts tasked with making recommendations to reduce costs and increase value.

November 2021: The Board endorsed a revised design concept — based on recommendations from the challenge review — that identified a potential capital cost savings of up to 10 per cent. The Board directed staff to finalize the project definition report for Board approval in March 2022 and to hold a special Board meeting to receive and fully consider project information.

February 2022: A Special Meeting of the GVS&DD Board was held to provide Board members and others with additional information about the projects.

March 2022: The Board approved the Project Definition Report and design concept for the Iona Projects with an estimated cost of $9.9 billion and a target of meeting secondary compliance by 2035.

Development of Alternative Approach

July 2024: The contract for preliminary design work was awarded to Fraser Delta Group. A key scope of work for the designer was to explore the phasing options of the Iona Projects components while prioritizing secondary treatment and assessing delivery strategies, cost sustainability, and associated risks. As part of this process, Metro Vancouver assessed options for reducing impacts on ratepayers while prioritizing meeting regulatory requirements for secondary wastewater treatment as soon as possible.

October 2025: The Board endorsed an alternative approach to deliver the Iona Projects to mitigate impacts on rate payers while ensuring the upgrades would meet regulatory requirements as soon as possible. Metro Vancouver will deliver only the most essential components needed to meet wastewater treatment regulations for secondary treatment. Other components previously envisioned in the conceptual design would be deferred to future projects.

Site Selection

A comprehensive study was done in 2008 and 2009 that evaluated options for future upgrading and expansion of the plant. This included both various scenarios for smaller distributed treatment facilities in the Vancouver Sewerage Area and other locations near xʷəyeyət (Iona Island) for a new centralized plant.

The recommendation from the study was to upgrade the treatment processes at the current treatment plant location.

Metro Vancouver also did a review in late 2020 of alternate sites for a consolidated treatment plant and confirmed the conclusions of the earlier study. xʷəyeyət (Iona Island) remains the recommended location for the plant from a cost, risk, and schedule perspective.

Alternative Approach

Overview

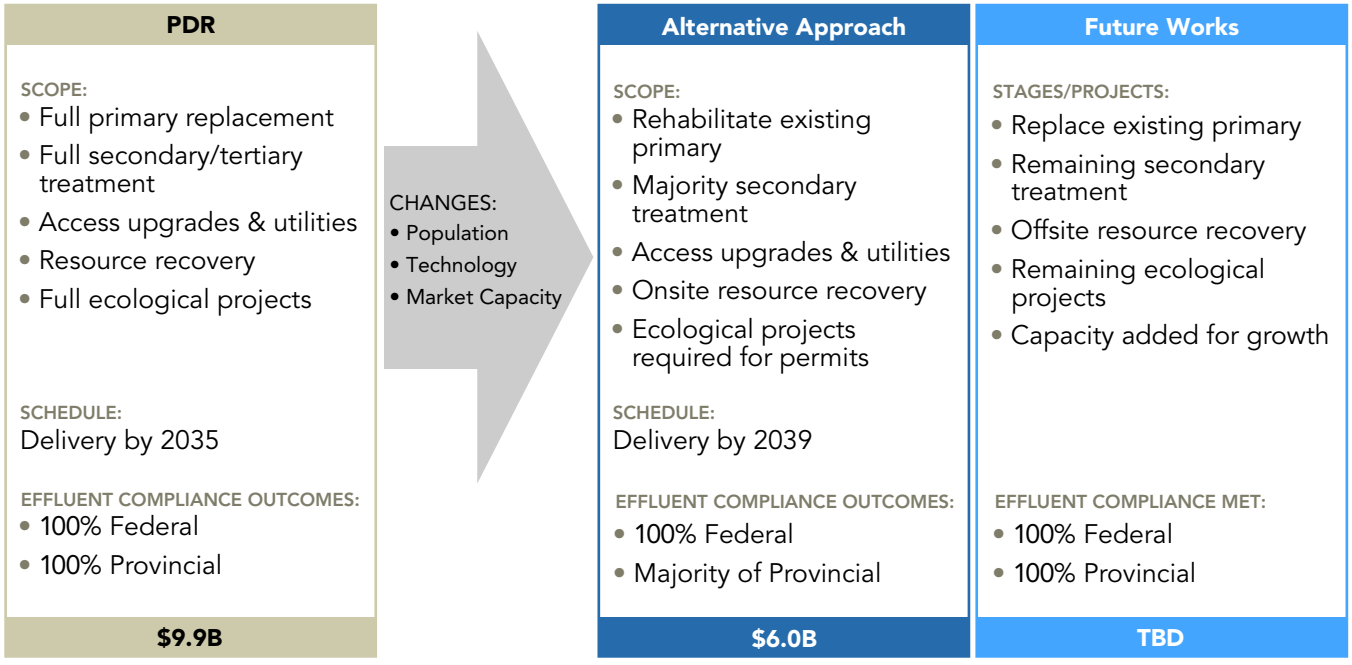
The original conceptual design for the Iona Island Wastewater Treatment Plant Projects was outlined in the Project Definition Report. That approach includes building a new wastewater treatment plant and complementary environmental projects within a condensed timeline to reach secondary treatment compliance by 2035. The anticipated completion date would be revised to approximately 2040 due to market and population changes and review of alternate approaches to deliver the Iona Projects.

With the alternative approach, the majority of the benefits of secondary treatment would be delivered by 2039 with a cost estimate of $6 billion. This would be done by rehabilitating the existing plant and reprioritizing other components not essential for secondary treatment. This approach rescopes and changes the sequence of the components outlined in the Project Definition Report so that secondary treatment is delivered earlier. Other components will be deferred as future projects.

In this approach, all components could still be delivered over time, but have added flexibility to adapt to changing environmental conditions, funding availability, population projections, and regulatory requirements. This approach also addresses concerns about annual costs for ratepayers in the short-term.

The alternative approach reduces the scope of the Iona Projects, enables cleaner water earlier, and helps mitigate impacts of annual sewerage rates on residents. These benefits will be achieved while still meeting federal requirements for secondary treatment of the region's wastewater as soon as possible.

Overview of Iona Projects as outlined in the Project Definition Report compared to alternative approach



Assessments Undertaken to Inform the Alternative Approach

To develop the alternative approach, staff were guided by two priorities for the assessment, as directed by the Board:

- Provide secondary treatment as soon as possible
- Mitigate annual cost impacts for ratepayers

To consider options available for an alternative approach for the Iona Projects, staff completed a technical assessment of whether it is feasible to change the sequence of work from what was outlined in the Project Definition Report. This was based on assessments of additional information since the approval of the Project Definition Report in March 2022.

Since the conceptual design was developed, there have been significant changes to population forecasts, technology, and construction market capacity. This opportunity to change the scope of the initial project was, in part, a result of selecting technology for secondary treatment, additional geotechnical work, and a further assessment of the existing primary plant.

Information considered during assessment for the alternative approach options included:

- The selection of membrane bioreactor technology, which will allow the Iona Island Wastewater Treatment Plant to provide phased secondary wastewater treatment and achieve secondary treatment effluent quality
- An assessment of the plant footprint based on membrane bioreactor technology, which indicated that all required new infrastructure can be built within GVS&DD land to meet revised population projections, so a land transfer would not be required between MVRD and GVS&DD
- Geotechnical test results that indicate shallower competent ground in some areas than previously understood
- An assessment of the existing primary plant, which indicates that it can be rehabilitated to extend its life
- The decreased capacity of the construction labour market because of competing projects
- Updated design modelling with population projections and other effluent modelling information

Actions taken to assess options:

- Assessed options for rehabilitating existing plant
- Updated design modelling for PDR population assumptions
- Considered decreased capacity in construction labour market
- Considered future adaptability for population projections

A technical expert review of the recommended alternative approach was completed by a team of independent global experts. The experts were tasked with identifying opportunities to accelerate the delivery of secondary treatment infrastructure and identify cost savings. Several opportunities related to process treatment, ground improvements, sea level rise strategies, and alternative project delivery methods were identified and form part of the recommendation.

As design progresses and new information becomes available, Metro Vancouver will continue to review and improve the approach to delivering the Iona Projects.

Components Included in the Alternative Approach

Following the Board's approval of the alternative approach, Metro Vancouver will proceed with a revised version of the Iona Projects as outlined below.

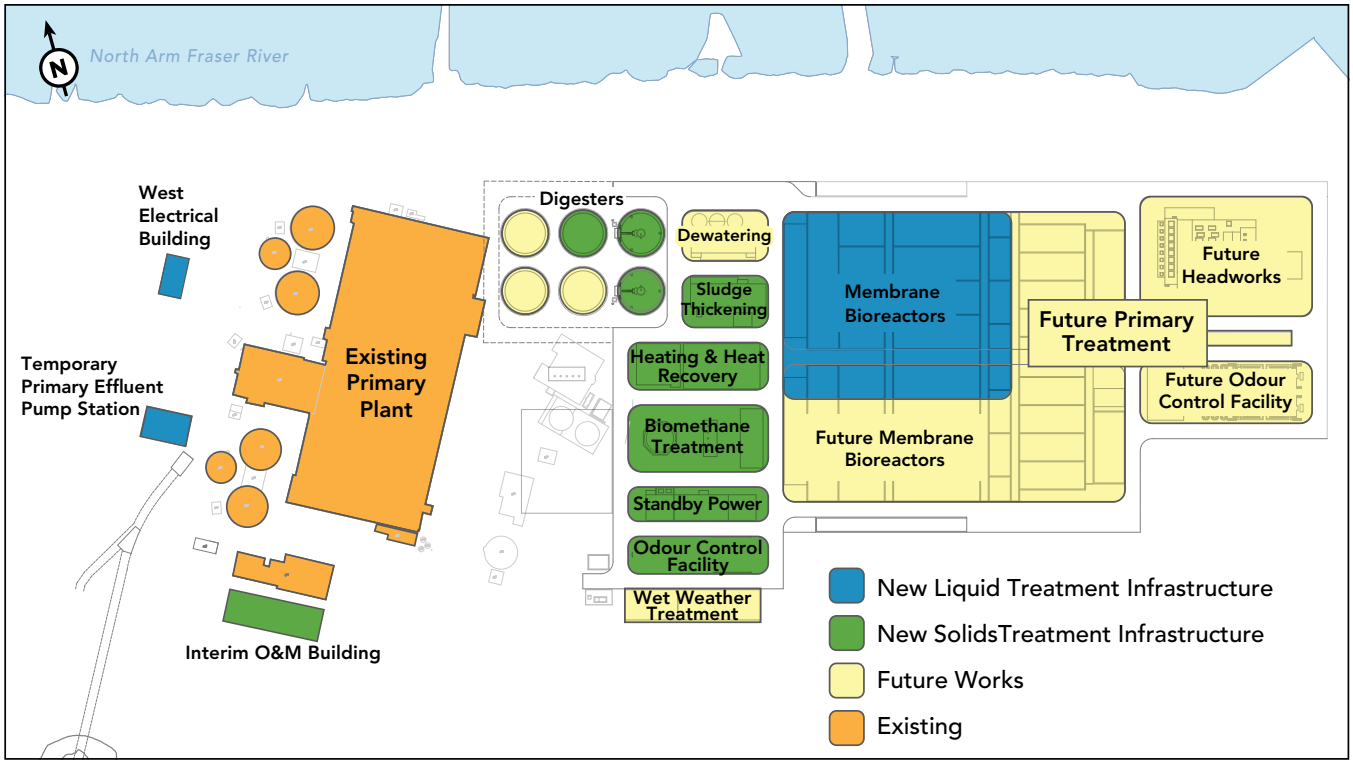
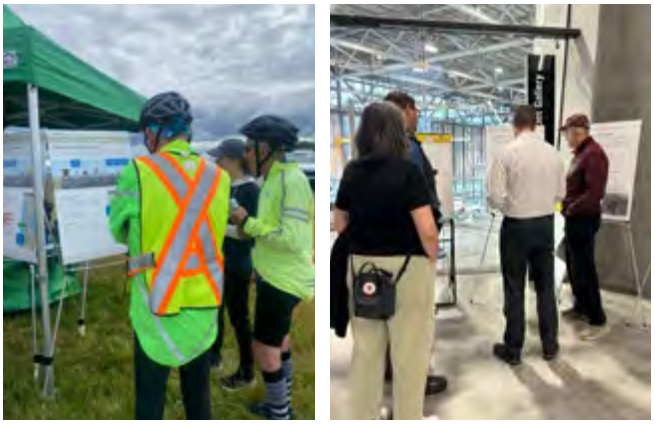


Figure 1: Site plan for the alternative approach, showing what would be delivered (in green) and components that would be future works

Early and Enabling Works

Early and enabling works projects are required to support the wastewater treatment plant upgrade construction and prepare the site. These include removal of the existing biosolids stockpiles, desludging of the current lagoons, access road upgrades along Ferguson Road and the causeway, a barge berth for materials transportation during construction, and utility upgrades for the upgraded plant and construction needs. In addition to being critical for the project schedule, these individual projects also have complex permitting, First Nations engagement needs, and stakeholder engagement needs. Many of these projects are already underway or complete.



Public engagement on early and enabling works projects, including causeway improvements (left) and barge berth (right).

Preliminary and Primary Treatment

The existing primary plant will be rehabilitated to extend the lifespan of the facility. The plant currently provides both preliminary and primary treatment.

Studies indicate that the lifespan of the primary plant could be extended to 2060 with rehabilitation and maintenance. Ongoing monitoring and assessment will determine when the primary plant will be replaced as part of a separate project in the future. Seismic risks would remain similar to the current level of seismic risk at Iona until the primary plant is replaced.

- Preliminary treatment includes the screening and pumping of raw untreated wastewater followed by removal of the grit that enters a wastewater treatment plant from the sewer system.
- Following preliminary treatment, wastewater enters the primary treatment facility. The purpose of the primary treatment is to remove organic carbon in the form of suspended solids.

Secondary Treatment

A new secondary treatment facility will be constructed downstream from the primary plant. The secondary treatment technology, membrane bioreactor, allows the facility to be constructed in modular sections with adaptability for population growth within the region. The technology selected for secondary treatment can provide effluent quality similar to tertiary filtration. This requires additional modules to be built in the future.

Delivering secondary treatment in modules will allow Metro Vancouver to do additional analysis to determine if further treatment modules are needed. As the service population increases, Metro Vancouver would install additional secondary treatment modules to enable the facility to continue to meet the secondary treatment standards in the future. Construction of the new infrastructure would be seismically resilient.

In 2024, Metro Vancouver selected membrane bioreactor technology for the plant.

Membrane bioreactor is a wastewater treatment process that combines a suspended growth bioreactor followed by ultrafiltration membranes. A bioreactor is a reactor that supports a biologically active environment where bacteria can grow and metabolize substances such as organic matter, nutrients, and pharmaceuticals and other contaminants of emerging concern within raw wastewater. The membranes act as a solid-liquid separation device that removes suspended solids, pathogens, and certain microplastics.





Pilot plant of membrane bioreactor technology for the wastewater treatment plant upgrades

Solids Treatment

Wastewater treatment plants include the treatment of both liquid wastewater and solid waste removed from the wastewater. New digesters need to be built to treat the additional solids removed from the liquid waste stream by upgrading from primary to secondary treatment.

A key planning decision has been to refurbish and reuse as much of the existing solids treatment infrastructure at the plant as possible to reduce costs and allow for future consideration of new technologies to expand or replace aging solids treatment process units, potentially involving integrating hydrothermal processing which is currently being pilot tested by Metro Vancouver.

Odour Control

Odour emissions from the new secondary treatment plant will be controlled using prevention, containment, treatment, and dispersion through upgraded odour control treatment systems. These measures will follow practices implemented in many other plants.

Ground Improvements

Ground improvements are required across all new infrastructure components to support the treatment plant upgrades because of challenging geotechnical conditions in the Fraser River Delta. In the alternative approach, less ground improvements are anticipated to be required than with the Project Definition Report approach. Ground improvements to meet seismic design considerations for the alternative approach include stone columns and an underground seismic barrier. Building and tank foundations will also include 40 to 80m-deep piles.

Onsite Resource Recovery Opportunities

Maximizing resource recovery and opportunities to reduce greenhouse gas emissions are key goals considered throughout the project definition phases. The conceptual design includes resource recovery opportunities that help support the region's carbon neutrality objectives, including:

- Reclaimed water from the plant will be used for on-site uses, reducing use of valuable potable water.
- Biosolids generated from the wastewater treatment processes could be used as a soil amendment for upland habitat restoration projects, with the potential to use biosolids and reclaimed water for on-site native plant propagation, if deemed feasible.
- Biogas produced in the digestion process would continue to be captured and used at the plant to generate heat and power for the plant operations.
- Biomethane (renewable natural gas), converted from biogas, could be sold to FortisBC and injected into the natural gas grid to avoid the consumption of other higher carbon fossil fuels.

The cost estimate includes resource recovery at the wastewater treatment plant itself and the space to support a future effluent pipeline distribution system that could be used for both district energy facilities and off-site reclaimed water reuse. Future opportunities and off-site infrastructure (e.g. district energy facilities) are not included in the project cost estimates.

Ecological Projects Required for Permits

Ecological projects that are required to obtain permits will be prioritized in the alternative approach.

Comparison of project components considered in the Project Definition Report approach compared to the alternative approach and what would be deferred to future work.

		Project Definition Report Approach	Alternative Approach	Future Works (2040-2050)
Preliminary & Primary Treatment	Non-Domestic Trucked Liquid Waste Station	●	●	
	Solids Handling	●	●	
	Primary Plant Rehabilitation	●	●	
	Domestic Trucked Liquid Waste Station	●		●
	Influent & Primary Sedimentation Tanks	●		●
	Wet Weather Cloth Media Filters and UV Disinfection	●		●
	Odour Control	●		●
	Primary Plant Rehabilitation		●	
Secondary Treatment	Membrane Bioreactors – 5 Trains	●	●	
	Odour Control	●	●	
	Solids Handling	●	●	
	Pilot Testing	●	●	
	Membrane Bioreactors – 3 Trains	●		●
	Odour Control – 3 Trains	●		●
	Solids Handling	●		●
	Advanced Pilot Testing	●		●
	Regional Lab & Welcome Centre	●		●
Access Upgrades & Utilities	Utilities and Road Improvements	●	●	
	Barge Berth	●	●	
	Permanent Operations and Maintenance Building	●		●

(Continued on next page)

		Project Definition Report Approach	Alternative Approach	Future Works (2040-2050)
Resource Recovery	Renewable Natural Gas	●	●	
	Offsite Heat Recovery and Effluent Water Reuse	●		●
Ecological Projects & Community Amenities	Ecological Projects Required for Permits	●	●	
	Other Ecological Projects	●		●
	Community Amenities	●		●
Bridging Infrastructure	Temporary Influent Sewer and Pump Station		●	
Cost Estimate		$6.4B	$3.5B	$2.9B
Escalation & Risk Reserve		$3.5B	$2.5B	
Total		$9.9B	$6.0B	

Table 1. Comparison of project components considered in the Project Definition Report approach compared to the alternative approach and what would be deferred to future work.

Future Work

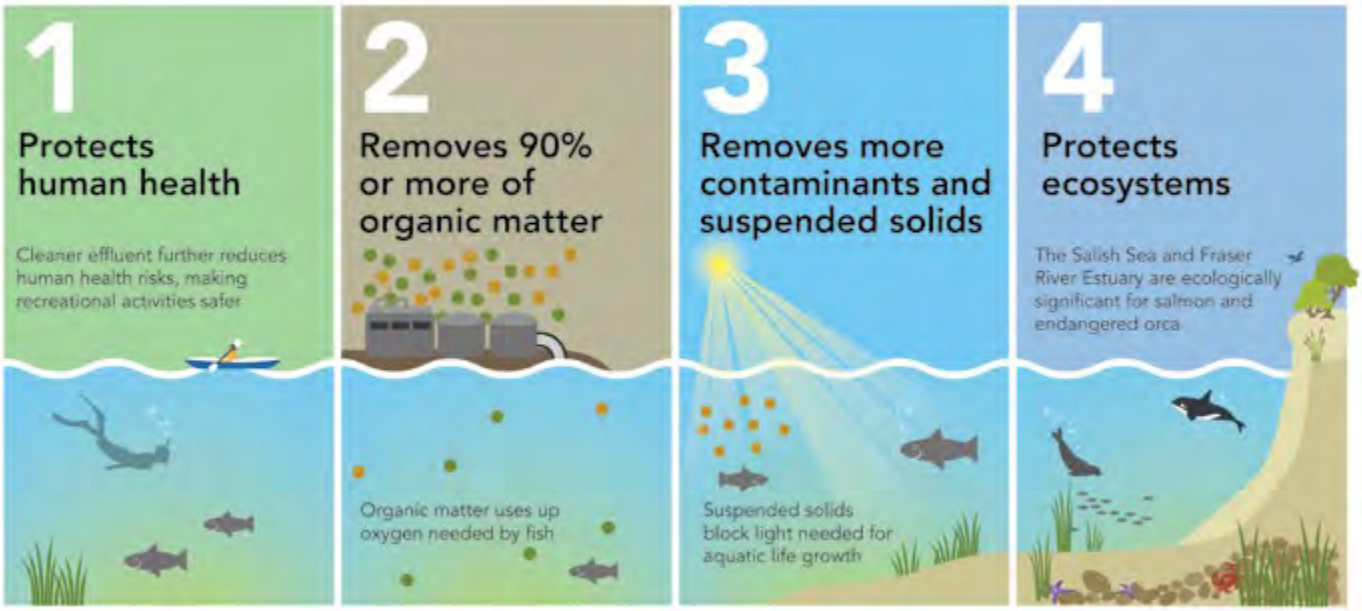
A number of components originally conceptualized in the PDR would be deferred as future work (as outlined in Table 1). Some of that work would be required to be completed, while some could be reconsidered by the Board at a later date.

A variety of scenarios may change the approach that Metro Vancouver wishes to take on these works in the future. They include:

- **Timing of need to replace existing primary plant:** Rehabilitation work will continue at the existing plant, as well as settlement monitoring and condition assessments. If any of this work triggers re-assessment of the replacement timeline for the primary plant, this package of work would be delivered through future detailed design and construction.
- **Delivery of complementary resource recovery, ecological projects, and community amenities:** Separate packages of work can be progressed at the appropriate time for these works.
- **VSA sewer separation:** While sewer separation in the Vancouver Sewerage Area (VSA) would not change the size or scale of the alternative approach, it may influence the size and cost of future projects.
- **Changes to population projections:** Changes in population growth would determine the timing of the next secondary treatment expansion
- **Provincial regulatory approach:** The provincial regulations have an additional requirement, above what is required by the federal regulations, related to the capacity of the secondary treatment process. Metro Vancouver would be able to achieve a portion of this requirement with the alternative approach. Metro Vancouver will engage in discussions with the province to seek special consideration to regulatory requirements for the timing and capacity of the MBR treatment process.

The deferred work will cost more in the long term due to escalation and can be determined as required.

Benefits of secondary wastewater treatment



Meeting Regulatory Requirements

Federal and provincial regulations require that the plant be upgraded to secondary treatment no later than December 31, 2030. Metro Vancouver is obligated to meet all legal and regulatory requirements, including those pertaining to wastewater treatment.

Regulations Guiding Wastewater Management

- Federal Wastewater Systems Effluent Regulations under the Fisheries Act
- Provincial Municipal Wastewater Regulations under the Environmental Management Act
- Metro Vancouver's Integrated Liquid Waste and Resource Management Plan (2011)

Throughout 2024 and 2025, Metro Vancouver conducted modelling, technology selection, and design work to refine the solution for meeting the secondary treatment requirements. The technology selected for the project provides a higher level of treatment, which would meet the effluent quality requirements when treating less of the flow than other technologies' conventional secondary treatment.

The alternative approach allows secondary treatment to be achieved sooner and will allow Metro Vancouver to meet all federal wastewater treatment requirements and the majority of provincial requirements by 2039. This approach is assessed as the fastest and most adaptable route to providing secondary treatment.

Provincial and federal regulations have similar requirements for effluent quality, but the provincial regulations focus on daily concentration limits, while the federal regulations focus on monthly average concentration limits. The project will meet the provincial and federal requirements for effluent quality with the alternative approach.

Where the regulations differ is that the provincial regulations also include a capacity requirement for secondary treatment, which stipulates the portion of flow that needs to receive secondary treatment (2x average dry weather flow (ADWF). The quantity requirement is understood to be based on older, less efficient technology that was available when the regulations were written, which required treatment of 2x ADWF in order to meet the quality requirements. At that time, plants needed secondary treatment capacity equal to twice the average dry weather flow to achieve the required effluent quality.

- **Quality requirement:** The upgraded plant's effluent will meet the quality requirements for both the federal and provincial regulations.
- **Quantity requirement:** The upgraded plant will not meet a specific provincial requirement for effluent quantity. There is no equivalent quantity requirement in the federal regulations. To meet the provincial quantity requirement, the plant would need to be able to treat twice its average dry weather flow through secondary treatment.

Our modelling shows that Metro Vancouver can meet the same effluent quality standards using newer treatment technology and less infrastructure. The technology selected for the project provides a higher level of treatment — instead of building capacity for twice the average dry weather flow, the plant is anticipated to only need capacity to treat 1.25 times that amount based on preliminary modelling.

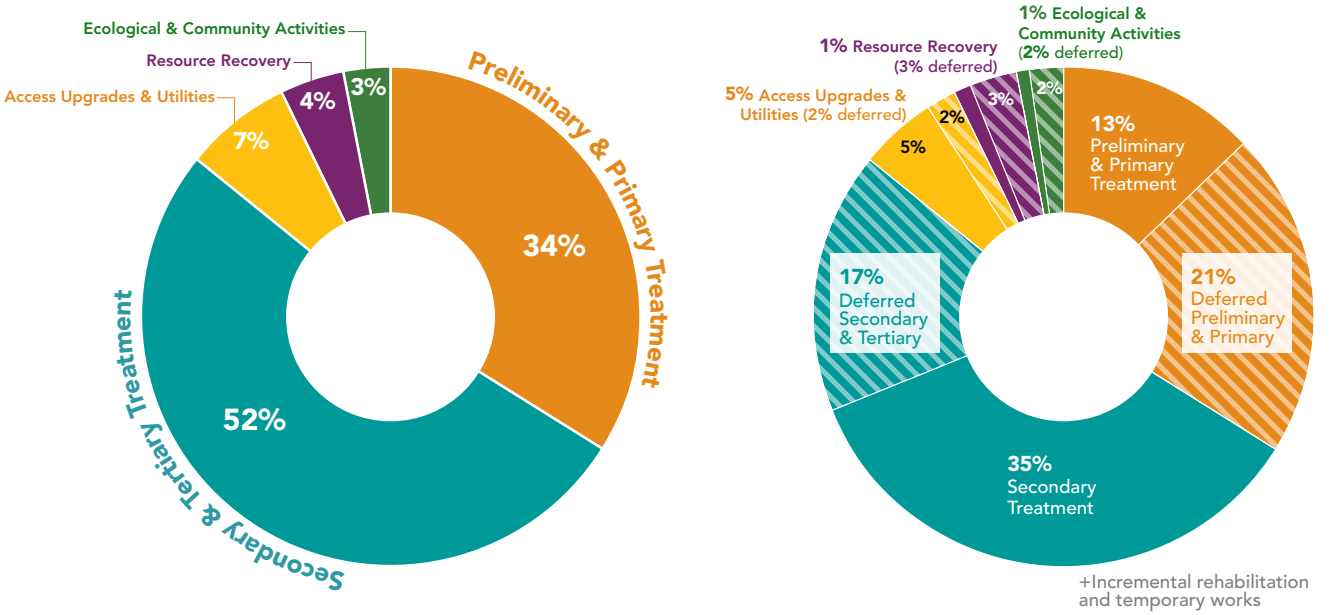
Metro Vancouver is also completing pilot testing of the secondary treatment system. This testing will further demonstrate how the technology performs at this site and the quality of effluent it will produce. Together, the modelling and pilot testing provide a high level of confidence in the final expected effluent quality.

Cost Estimate

The original approach as outlined in the Project Definition Report had a cost estimate of $9.9 billion. The alternative approach has a cost estimate of $6 billion. Figure 2 represents the categories of work in the project as outlined in the Project Definition Report, compared to what is removed.

Metro Vancouver's funding and financing objectives are to minimize the annual household impact (HHI) on regional ratepayers, promote fairness amongst the users paying for the facility, and to ensure that member jurisdictions are able to collect adequate financial resources to meet their own service requirements.

Figure 2: Percentage of total project cost by category of work, showing what is deferred in the alternative approach



PDR $6.4B
(+ $3.5B Escalation / Risk)
Costs shown in 2022$ / numbers are rounded

Alternative Approach $3.5B
(+ $2.5B Escalation / Risk / Incremental)
$2.9B Deferred (Light Shaded Areas)

The project cost estimates include risk and escalation and accounts for the anticipated completion date. The existing approved capital budget for the Iona Island Wastewater Treatment Plant Upgrade is $1.06 billion. To date, $125 million has been spent. In the Project Definition Report approach the cost was estimated at $6.4 billion in 2022 dollars, and included $3.5 billion in escalation and risk reserve. The alternative approach is estimated to be $3.5 billion in 2022 dollars, and accounts for $2.5 billion in escalation and risk reserve, as shown in Table 2.

Table 2: Cost estimates, showing cost of escalation and risk reserve

	Project Definition Report Approach	Alternative Approach
Completion Date	2035 (*now approximately 2040)	Achieves better effluent by 2036; Completion by 2039
Cost Estimate	$9.9 billion ($6.4 billion in 2022 dollars, including $3.5 billion in escalation and risk reserve)	$6 billion ($3.5 billion in 2022 dollars, including $2.5 billion in escalation and risk reserve)

Funding to Date

Metro Vancouver has sought equitable cost-sharing from the provincial and federal governments. They have contributed a third each ($250 million each) towards the initial $750 million over five years for the early and enabling works. Metro Vancouver has also received $500,000 in funding from the Province through the Active Transportation Grant Program for the Iona Island causeway improvements.

Significant engagement will continue with federal and provincial governments, and other funding authorities, to advocate for equitable cost-sharing. These include:

- Pursuing funding and grants from the Government of Canada and Province of BC
- Working with the Municipal Financing Authority (MFA) as our legislated borrower
- Explored funding opportunities with the Canada Infrastructure Bank (CIB)

Comparison of Benefits and Risks

The alternative approach comes with both benefits and risks, as does continuing with the Project Definition Report approach. Below, the risks and benefits of the two approaches are set side by side for comparison.

Comparison of benefits and risks between the Project Definition Report approach and the alternative approach

	Project Definition Report Approach	Alternative Approach
Benefits	• Achieves full regulatory compliance in single build • Replaces primary plant earlier which mitigates operational risk and reduces rehabilitation costs • Achieves earlier seismic and sea-level resilience for primary treatment • Includes full suite of complementary projects • Mitigates impacts of escalation: lower overall costs • Bridging infrastructure not required	• Achieves better effluent quality earlier (2036-2039) • Prioritizes compliance for effluent quality • Fully meets federal regulations • More affordable path for ratepayers to secondary treatment • Modular secondary treatment provides an adaptable approach to avoid over-building • Defers capital spend of $3.9B • Mitigates impact to ratepayers over next ten years
Risks	• Does not reflect reality of market capacity • Significant annual spend until 2040 and corresponding household impact (HHI) • Slower to achieve improvements to effluent quality (2040 vs. 2036) • Risk of over-building • Higher population growth than projected • Limited ability to adapt to Vancouver Sewerage Area initiatives (e.g. sewer separation, water metering, etc) • Potential for more constructability challenges	• Contingent on aligning provincial wastewater effluent regulations with federal wastewater effluent regulations • Requires existing primary plant to operate for longer • Extends exposure of primary plant to seismic and sea level rise risks • Costs of $200M for bridging infrastructure and additional rehabilitation of primary plant • Delivery of the original PDR scope would take longer and ultimately cost more

Accountability and Governance

Governance for Major Infrastructure Projects

Good governance enables the right people, to make the right decision, based on the right information, at the right time.

Delivering major infrastructure projects within the scope and schedule of a project definition requires significant discipline in the following areas:

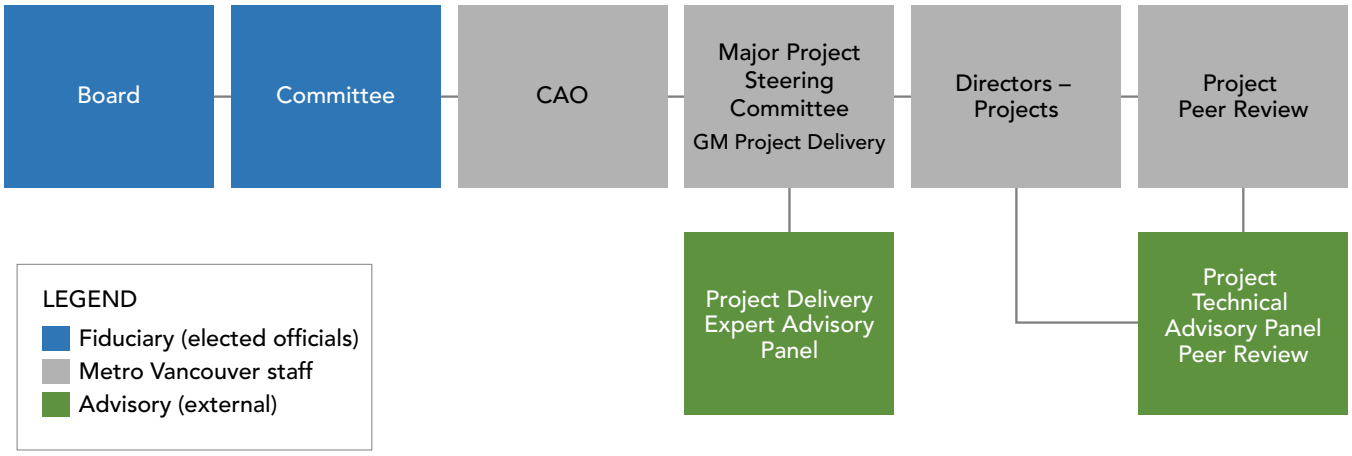
- Clarity of vision and unrelenting focus
- Unambiguous accountability and authority
- Extraordinary leadership with experienced and dedicated teams
- High performance culture based on trust and commitment
- High level of transparency
- Consistent political leadership and committed project governance
- Rigorous controls and risk management processes

Metro Vancouver Governance Initiatives

Metro Vancouver has processes to improve project delivery and allow for enhanced governance. Processes and frameworks include:

- *Project Management Framework* – Consists of processes, systems, and controls, anchored in project management best practices. (Project Delivery Best Practice Response – Capital Project Governance & Stage Gate Framework – Finance and Intergovernment Committee, May 3, 2021 – Section 5.3 of PDF)
- *Best Practice Cost Estimating Framework* – This framework includes a rigorous approach to addressing challenges in estimating future costs on large, complex, and lengthy major infrastructure projects, and provides more complete and realistic estimates which consider risk, contingency, and escalation of costs over time. (Project Delivery Best Practice Response – Project Estimating Framework – Finance and Intergovernment Committee – Nov 6, 2020 – Section 5.2 of PDF)
- *Stage Gate Approvals Process* – The stage gate process ensures decision makers have clear opportunities to make informed decisions at key points through the project lifecycle. (Project Delivery Best Practice Response – Capital Project Governance & Stage Gate Framework – Finance and Intergovernment Committee, May 3, 2021 – Section 5.3 of PDF)

Metro Vancouver Governance Model



Glossary

Biogas — A mixture of gases, primarily consisting of methane and carbon dioxide, produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste, or food waste. It is a renewable energy source.

Biomethane — Also known as renewable natural gas, biomethane is a biogas which has been upgraded to a quality similar to fossil natural gas and having a methane concentration of 90 per cent or greater. By upgrading the quality of methane-based biogas to that of natural gas, it becomes possible to distribute the gas to customers via the existing gas grid within existing appliances. Renewable natural gas is a subset of synthetic natural gas or substitute natural gas.

Biosolids — Nutrient-rich organic fertilizer and soil conditioner produced from the solids (food and poop) removed in wastewater treatment. Composting takes food and garden waste and through natural biological processes converts these materials into a soil amendment (a material added to a soil to improve its physical properties), or a nutrient rich soil conditioner.

Effluent — Treated wastewater discharged into a river or the sea.

Major infrastructure project — Major infrastructure projects are by definition very large and costly critical infrastructure investments (typically $1 billion or more), and may be found in all infrastructure sectors. They are usually complex, and almost always involve multiple stakeholders.

Membrane bioreactor — The combination of a membrane process like microfiltration or ultrafiltration with a biological wastewater treatment process, the activated sludge process. It is now widely used for municipal and industrial wastewater treatment.

Nitrogen — Nitrogen is a nutrient essential for the growth of all living organisms. However, excessive amounts of nutrients released to the environment by human activities can harm ecosystems and impact human health.

Project Management Framework — The project management framework consists of processes, systems, and controls, anchored in project management best practices.

Tertiary filtration — Tertiary filtration is a physical process that treats secondary treated wastewater through filters to remove additional suspended solids and organic matter.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SERVICES AND SOLUTIONS FOR A LIVABLE REGION