



City of
Richmond

Report to Development Permit Panel

To: Development Permit Panel

Date: September 6, 2023

From: Wayne Craig
Director of Development

File: DP 21-945828

Re: **Application by Greater Vancouver Sewerage and Drainage District for a
Development Permit at 900 and 1000 Ferguson Road**

Staff Recommendation

That a Development Permit be issued at 900 and 1000 Ferguson Road to facilitate upgrades through construction of secondary and tertiary treatment structures and related components for the existing wastewater treatment plant on a site designated Environmentally Sensitive Area.

Wayne Craig
Director of Development

WC:bb
Att. 10

Staff Report

Origin

Greater Vancouver Sewerage and Drainage District (GVS&DD) has applied to the City of Richmond for an Environmentally Sensitive Area (ESA) Development Permit (DP) to allow the construction and incorporation of secondary and tertiary treatment facilities and related components into the existing wastewater treatment facility located at 900 and 1000 Ferguson Road. As the entire site is currently designated as an ESA, a ESA DP is required prior to Building Permit approval.

The subject site currently contains the Iona Island Wastewater Treatment Plant (IIWWTP) that provides primary sewage and Stormwater treatment for the City of Vancouver and the University Endowment Lands as well as portions of the Cities of Richmond and Burnaby.

The Province has mandated that the IIWWTP be upgraded to include secondary and tertiary treatment, and the purpose of this ESA Development Permit is to facilitate near and long term upgrades that would be undertaken by Metro Vancouver in order to bring the wastewater treatment plant to the specifications and operational capacities mandated by the Province. The total proposed project footprint is 23.9 ha (59 acres) with area of 20.96 ha (52 acres) of the project footprint situated within the designated ESA.

In compensation for disturbing 21 ha (52 acres) of ESA to upgrade the wastewater treatment facility, GVS&DD has committed to plant and to rehabilitate the ecology of the island within an area of 26.2 ha (65 acres). The proposed ecologically-significant planting and rehabilitation would be undertaken at a compensation ratio of 1.1:1 to the permanent impacts from the project footprint.

Background

Three previous ESA DPs have been issued in the recent past for this site:

- An ESA DP was issued in 2015 to allow the expansion of the IIWWTP through a 550 m² (5,920 ft²) screening and de-grit building, a 20 m (66 ft) diameter thickener, a 25 m² (269 ft²) thickener pump station and four 36 m² (388 ft²) digester mixing pump buildings with the ESA at 1000 Ferguson Road (DP 14-676361). The project committed to a minimum 3,300 m² (35,521 ft²) of landscape restoration (a ratio of 0.5:1 to the project footprint);
- An ESA DP was issued in 2018 to permit construction of facilities to divert sewage from the lagoons, including a temporary dewatering building and storage tanks, a truck loading building for removing biosolids to off-site locations, and an outdoor control facility (DP 18-820582). The project included a commitment from GVS&DD to provide 13,666 m² (147,100 ft²) of landscape restoration within the adjacent Metro Vancouver park at a ratio of 1:1 to the project footprint) as well as an additional 1,275 m² (13,724 ft²) of native landscaping within the site; and
- An ESA DP was issued in 2020 to permit the construction of a concrete dewatering pad and associated uses on-site (DP 19-850320). The project included a commitment from GVS&DD to undertake invasive species removal and enhancement of 3,000 m²

(32,392 ft²) of ESA on-site equivalent to an ESA compensation ratio of 1:1 to the project footprint.

A portion of the proposed project footprint includes 2.12ha (5.24 acres) of ESA compensation that were secured as part of the previous ESA DPs (DP 14-676361, DP 18-820582, DP 19-850320). These areas have been identified as part of the current application to be raised and developed to accommodate the necessary infrastructure for the secondary and tertiary systems, which were not fully conceptualized at the time that the previous ESA DPs were considered and issued. The amount of ESA compensation from previously approved ESA DPs has been incorporated in the overall ESA compensation package for this application and discussed further below in the report.

Development Information

The subject site is currently occupied by a series of buildings and structures associated with the existing Wastewater Treatment Plant operations.

Please refer to attached Development Application Data Sheet (Attachment 2) for a comparison of the proposed development data with the relevant Bylaw requirements.

Development surrounding the subject site is as follows:

- To the north, North Arm of the Fraser River;
- To the east, Iona Beach Regional Park (Canfor Point), managed by Metro Vancouver;
- To the south, Iona Island causeway; and,
- To the west, Iona Beach, Iona Jetty and the North Arm Jetty.

With the exception of the Iona and North Arm Jetties, Iona Island is entirely designated as “Conservation” in Richmond’s Official Community Plan, and zoned “School & Institutional Use (SI)” under Zoning Bylaw 8500.

Staff Comments

The proposed scheme attached to this report has satisfactorily addressed the Environmentally Sensitive Area (ESA) issues and other staff comments identified as part of the review of the subject Development Permit application. In addition, it complies with the intent of the applicable sections of the Official Community Plan and is generally in compliance with the School and Institutional (SI) use. No variances are being sought through this ESA Development Permit application.

Advisory Design Panel Comments

As the scope of this Development Permit does not involve any building design components, the application has not been reviewed by the Advisory Design Panel.

Analysis

Site Planning

- The IIWWTP currently provides primary sewage treatment, which involves the removal of primary sludge and anaerobic digestion prior to storage in sludge lagoons. The treatment

effluent is discharged to the Strait of Georgia, while the treated biosolids are stockpiled on-site following lagoon stabilization.

- GVS&DD is working towards upgrading the entire sewage treatment plant in order to provide secondary and tertiary waste treatment as mandated by the Provincial. GVS&DD has indicated that the secondary and tertiary installation and commissioning may occur by 2035.
- The proposed scope of project footprint for all wastewater treatment upgrades and increased capacity would be 23.9 ha (59 acres). An area of 21 ha (52 acres) of the project footprint would be located within lands designated as Environmentally Sensitive Area (ESA) under the City's OCP.
- The project area was selected for the construction and upgrades because of proximity to the existing wastewater treatment facilities and lack of alternative sites to provide additional wastewater treatment capacity to meet current and future needs of the nearby served region.
- GVS&DD would be undertaking works in several stages within the project footprint area, including site clearing and removal of bushes, shrubs, a number of trees, performing site grade improvements and importation of pre-load construction materials, site grading and installing various components and pieces of infrastructure.
- The site will continue to be accessed via Ferguson Road.
- The anticipated timeline for the works ascribed to the project footprint area would commence in 2024 and are expected to be near complete by 2035 upon finalization of the new buildings' design, placement and scope within the project footprint area.
- Staff collaborated with the applicant in order to identify areas for long term ecological restoration and enhancement within the ESA and outside the project footprint area. This approach meets the City's objectives of ESA restoration and enhancement of natural habitats and to achieve an ecological net gain in terms of quality of future habitats on Iona Island. The proposed development would occur incrementally and is expected to be complete by 2035. The majority of ecological restoration and enhancement would be completed between 2034-2036 when most of the site disturbance for construction of new buildings would be expected to be completed; and one area of ESA compensation, which will be discussed further below, is targeted to be built in 2025.

ESA Environmental Inventory

- The project footprint area is within the designated "Shoreline" ESA and "Freshwater Wetland" ESA, and partially located in the non-ESA natural areas within the Iona Island Regional Park.
- The biophysical inventory submitted by AECOM/Jacobs (completed in 2023) notes that the project footprint has been heavily disturbed in the past as it contains existing wastewater treatment infrastructure and existing plant area, sludge lagoons (located along the western portion of the project footprint), a biosolids area, and vegetated lands along the southern portions of the site. Field assessment found no rare plants or species-at risk within the project footprint or its immediate surroundings. The following ecological traits and potential were observed:
 - The sludge lagoon area, which is mostly located outside the project footprint, provides valuable stopover habitat for migrating bird species. This area is not suitable for native vegetation and landscaping in the future;
 - The existing plant area contains a number of mature trees and bald eagle nests;

- The biosolids area contains a number of pooled water with high suspended sediment loads and does neither constitute a high ecological value at present nor a viable candidate for future suitability for high ecological functions; and
- The southern vegetated portion of the project footprint is heavily modified and contains reduced habitat value similar to the existing biosolids area in terms of ecological vigour and potential. This area is further comprised of non-native invasive plant species.

Tree Inventory

The applicant has submitted a Certified Arborist's report which identifies tree species within the project footprint area, assesses trees' structure and conditions, and provides recommendations on tree retention or removal. The report highlights 306 bylaw-sized trees.

Tree Retention

- 125 trees are proposed to be retained and protected on-site and includes 13 significant trees (i.e. 92cm DBH or larger). The arborist has noted that the following trees would not be expected to be impacted due to the wastewater treatment upgrades and would require protection associated with the tree management plan in Attachment 3:
 - Trees 9946 to 9948, 15602, 15603, 15606, 15607, 15616 to 15620, 15659, 15660, 15674, 15676, 15678, 15680, 15724 to 15739, 15741, 15749 to 15760, 15763, 15764, 15781, 15784, 15790, 15798 to 15803, 15805, 15806, 15809 to 15811, 15855 to 15858, 15860 to 15880, 15944, 15952 to 15969, 15974, 15975, 16001 to 16005, 17800, 17801, 17804 to 17808, 17815, 17867 to 17871, 157623, 15615-1, 15783-1.
- The retained trees would be further protected through arborist supervision using low impact methods during works associated with the wastewater treatment upgrades.
- Prior to Council's consideration of the Development Permit, the applicant shall provide a letter of undertaking from a Certified Arborist for supervision of any on-site works conducted within the tree protection zone of the trees to be retained.

Tree Removal

- 181 trees are proposed to be removed and includes 12 significant trees (i.e. 92cm DBH or larger). 61 of trees are assessed as having either poor health or are dead/dying, while the remaining trees' health was assessed as moderate. Two significant trees are assessed as having poor health and one is proposed to be removed and one to be retained. These trees need to be removed as they are within the project footprint area and their retention would hinder proposed works related to the wastewater treatment plant upgrades.
- The replacement ratio required under the City's Tree Protection Bylaw No. 8057 would require a replacement ratio of 2:1 and 3:1 for significant trees. The required replacement trees are to be of the minimum sizes as noted in the City of Richmond's Tree Protection Bylaw No. 8057, as amended, and identified below:

No. of Replacement Trees	Minimum Caliper of Deciduous Replacement Tree	Minimum Height of Coniferous Replacement Tree
374	8 cm	4 m

- The applicant proposes to incorporate a minimum of 374 replacement trees into the overall future ESA restoration and compensation plan areas. The replacement trees would be expected to be planted in all designated ESA compensation areas except in the area in the east of Iona Island. The replacement trees would comprise a mix of both deciduous and coniferous species native to the immediate region and listed below:

Scientific Name	Common Name
Trees	
<i>Betula papyrifera</i>	Paper birch
<i>Crataegus douglasii</i>	Black hawthorn
<i>Malus fusca</i>	Pacific crab apple
<i>Picea sitchensis</i>	Sitka spruce
<i>Pinus contorta</i>	Shorepine
<i>Populus trichocarpa</i>	Black cottonwood
<i>Prunus emarginata</i>	Bitter cherry
<i>Salix</i> sp.	Willow species
<i>Thuja plicata</i>	Western red cedar

- The high level details of the ESA compensation plan and associated strategy will be discussed further in this report under the Proposed Compensation Strategy section. Staff are supportive of the replacement trees approach as all bylaw-sized trees are within the ESA. The prescribed ESA restoration enhancement and strategy would take into account the need for both bylaw-sized replacement trees and non-bylaw sized species in order to aim for a higher quality ecological habitat on-site, in line with the OCP policy to improve the City’s ecological network and green infrastructure.

The applicant has provided a letter committing to incorporating the required 374 replacement tree planting into the compensation areas consistent the City’s Tree Protection Bylaw (Attachment 4).

Mitigation Strategy

- The project footprint is mostly in an area with limited sensitive habitat value due to previous disturbance and activities supporting the existing wastewater treatment facility operations.
- The applicant’s Qualified Environmental Professional (QEP) has identified a set of measures to mitigate for the future upgrades pertaining to the secondary and tertiary wastewater treatment components.
- The mitigation strategy will be based on both site specific management practices and general management practices, to be undertaken by the applicant’s QEP and subject to potential refinement pending approval from senior environmental regulators in the Provincial and the Federal Government.

Site-specific management practices would include the following measures:

- Water quality management objectives to limit discharge of sediment and other deleterious substances into the aquatic environment;
- Development and implementation of a waste and spill management plan;
- Placement of workspace disturbance outside intertidal and subtidal areas, except when required for instream infrastructure works, in order to minimize impact to fish habitats;
- Development of fish mitigation and monitoring plans for instream activities in the adjacent Fraser River and McDonald Slough areas with input and approval from the applicant's QEP;
- Employment of practices to limit the spread of invasive vegetation and plant species on-site and prevention of storage and stockpiling of construction-related material near or within established tree protection zones for trees identified to be retained;
- Development of long term wetland management objectives to limit adverse effects of construction on wetland habitats near the project site and to reduce permanent loss of any wetland function within the project footprint area;
- A raptor nest management plan will be implemented as per the requirements and legislation through the BC Wildlife Act, ensuring prohibition, injury, or destruction of bald eagle and ban owl nest sites within the project footprint.

General management practices would include the following measures during construction activities:

- All identified sensitive resources within the project footprint will be demarcated and delineated prior to construction activities;
- In the event of discovery of wildlife features during site clearing, work will be suspended in the vicinity and a site-specific mitigation plan will be devised and implemented through input from the applicant's QEP;
- Erosion and sediment control measures would be undertaken to prevent lease of sediment, debris and deleterious substances into nearby bodies of water;
- Preventing water from flowing into Iona Beach Regional Park outside of the project footprint or into other sensitive environmental areas such as riparian areas and maintaining a 30 m setback from such areas wherever possible;
- Regular monitoring of the quality of water discharges from the work site and maintaining records of obtained results in order to implement additional protective measures should results indicate possible negative impacts to nearby ecologically sensitive areas and features;
- Management and disposal of solid waste generated during site construction works through proper methods such as on-site garbage collection and recycling of appropriate material and transportation of waste material to authorized transfer, landfill or recycling site and with authorization from appropriate regulatory agencies, as required;
- Implementation of an Environmental Management Plan (EMP) to dispose of land clearing and construction waste in accordance with the intent of the provincial Environmental Management Act (EMA) and in conjunction with the applicable Metro Vancouver bylaw requirements;
- Implementation of practices to dispose of any potential hazardous waste from construction activities in accordance with the EMA, the Special Waste Regulation, and other regulation(s) as applicable; and

- Undertaking of regularly scheduled inspections of all hazardous materials and equipment containing hazardous materials for signs of leakage and to prevent spill of such material into the site and to prepare a site-specific Emergency Response Plan (ERP) if such event does occur on-site during construction.

The applicant has provided a letter committing to the implementation of the Mitigation Strategy generally described above (Attachment 4).

Proposed Compensation and Landscape Restoration

- To compensate for impacts to 20.96 ha (52 acres) of ESA within the project footprint, in addition to the 2.12 ha (5.24 acres) of area previously identified for compensation, GVS&DD proposes to provide ESA compensation and habitat restoration in an area totalling 26.2 ha (65 acres) in Iona Island within the areas owned and managed by GVS&DD and Metro Vancouver.
- Compensation and habitat restoration is proposed to occur within 5 designated areas and represents a compensation ratio of approximately 1.1:1.

The following table identifies the amount of area impacted by the proposed development and the proposed compensation.

Area of Disturbance or Compensated Area	Approximate Area (ha)
Development Permit Area Overlapping IJWWTP Project Footprint	
Shoreline ESA	1.37
Wetland ESA	19.59
Total Footprint	20.96
Previous Compensation	
Compensation for DP 14-676361	0.33*
Compensation for DP 16-820582	1.37
Compensation for DP 19-850320	0.30
Landscape work associated with DP 16-820582	0.12
Total of previous compensation commitments	2.12
Total Area to be Compensated	23.08
Proposed Compensation Areas	
Area #1 North edge	3.22
Area #2 East island	15.47
Area #3 South edge	2.30
Area #4 Cottonwood forest	2.88
Area #5 Area west of new IJWWTP	2.25
Total Compensated Area	26.12
<i>Difference (between total footprint and total required compensation)</i>	<i>-3.04</i>

- Staff are supportive of the applicant's proposal to include the previous ESA compensation requirements into this application as this application would cover ESA disturbance due to all associated upgrades to the wastewater treatment plant, as a whole, up to and including to final project's completion.
- The GVS&DD project team has identified that they would not be able to complete previously committed ESA compensation, as these areas may be impacted or disturbed due to upgrades-related activities.

- GVS&DD has noted Compensation Area #4 (Cottonwood Forest) would have a tentative construction target of 2025 and that all compensation areas would be built between 2034 and 2036, and completed by 2036.

Table 1: Area of ESA Compensation and High Level Summary of Strategy

Compensation Area and General Location in Iona Island	Total Area of Compensation	Strategy
Area #1 North Edge	3.2 ha (8 acres)	Riparian forest planting and restoration.
Area #2 East Island	15.5 ha (38 acres)	Invasive species removal and planting a mix of native trees, shrubs and grassland patches.
Area #3 South Edge	2.30 ha (6 acres)	Riparian forest planting and fencing to demarcate tidal marshland nearby.
Area #4 Cottonwood Forest Northwest	2.9 ha (7 acres)	Invasive species removal and fencing and other protective measures for sensitive habitat features including an existing bird banding centre.
Area #5 Northwest of New Facility	2.3ha (6 acres)	Conversion of the existing sludge lagoon to riparian forest habitat.
Total Compensation Area	26.2 ha (65 acres)	

The areas designated for compensation and restoration of ecologically significant habitats are made up of a mix of riparian forest and shrub grassland, coupled with native as well as non-native vegetation. Restoration within the designated areas will include the following strategies:

- Protection of existing ecologically valuable assets and known wildlife habitat features;
- Invasive species management;
- Infill planting with native species as identified in Plan #8 with a targeted planting density of 2,000 shrubs and perennial plants per hectare as well as 500 trees per hectare (corresponding to 0.2 shrubs per m² and 0.5 trees per m²;
- Removal of unsuitable fill material;
- Enhancing habitat elements to create long-term physical conditions to support wildlife including bald eagles and other raptors;
- Using habitat protection fencing where necessary to demarcate pedestrian footpaths; and
- Considering other habitat elements, depending on future determination of suitability by the applicant’s QEP, including raptor perch trees, bird nest boxes and bat roost boxes.

Compensation strategy for each designated area is as follows:

- Compensation Area 1 (North Edge): Installation of fence line along the north edge of the new facility and planting of riparian forest species north of the fence line and the high water mark along the north arm of the Fraser River. A gravel path will be installed in this area to link the site to Iona Beach Regional Park.
- Compensation Area 2 (East Island): Restoration works to be undertaken through removal of invasive plants and seeding with native plants in place of the removal. The native planting will incorporate a mix of riparian species and grassland species and fencing will be installed to exclude the planted areas from disturbance.
- Compensation Area 3 (South Edge): This area will be disturbed by construction works and will be graded and then planted with riparian forest species from the south of the newly upgraded IWWTP and the existing tidal marsh. The area will be fenced from the IWWTP.
- Compensation Area 4 (Cottonwood Forest): This area will be enhanced through removal of invasive species such as the Himalayan Blackberry. The existing trail system in the area will be upgraded to a wider gravel pathway with sections of habitat protection fencing in order to keep users of the regional park off. An existing bird banding centre run by the WildResearch Organization will be retained along with the majority of the bird netting stations.
- Compensation Area 5 (West of IWWTP): The two existing sludge lagoons will be converted into a riparian forest habitat after decommissioning of the said lagoons. The new forest habitat is envisioned to grow to an extent that would help screen view of the IWWTP from the adjacent Iona Beach Regional Park.
- GVS&DD has indicated that some areas such as ESA Compensation Areas# 2 and 4 may incorporate higher planting densities.
- The proposed approach will result in a higher quality habitat on Iona Island than present habitat conditions.

The applicant has provided a letter committing to carrying out the proposed restoration and compensation works by 2036 and as generally described above and in this Development Permit.

Monitoring and Maintenance

- To ensure the proposed enhancements' optimal survivability, the applicant's QEP has recommended a conceptual monitoring strategy. The strategy would be based on annual 5-year monitoring plans, coupled with multi-season site visits.
- A more detailed and specific monitoring program would be established toward the end of the construction period (approximately 2029) by the project QEP and subject to additional technical input by a technical advisory group which will be convened by Metro Vancouver in order to oversee the design and implementation of ecological enhancement and restoration.

The applicant has provided a letter committing to carrying out the monitoring and maintenance of the ESA restoration and compensation works for a minimum of 5 years, with monitoring plans submitted annually to the City for information purposes (Attachment 4).

Heritage: Power and Administration Buildings

- The existing Power and Administration Buildings on Iona Island, and located within the project footprint for this project, are included in the City's Heritage Registry.

- The structures were constructed in 1963 and their form and character are examples of modernist-style architecture of the mid-20th century for institutional buildings. The Statement of Significance for those assets (Attachment 5).
- GVS&DD staff have provided information (Attachment 6) that the two buildings are not viable candidates for retention for the following reasons:
 - the site is expected to be raised by 3.7 m (12 ft) in order to meet the projected rise in sea levels and to render the site more resilient to the effects and impacts of climate change.
 - the buildings would be vacated and not used in an operational capacity as they do not meet the seismic criteria and standards under the BC Building Code. Any pursuit of seismic improvement initiatives for the said buildings would result in major modifications to the buildings' form and character.
 - Relocation of the buildings elsewhere would not be possible as they are cast-in-place concrete structures.
- In lieu of the challenges noted, Metro Vancouver (GVS&DD) has committed to pursuing alternative methods to commemorate the heritage value of the buildings as outlined in Attachment 6 and generally include:
 - documentation and collection of photographs, 360 degree virtual tours, 3D and laser scanning of the existing buildings
 - preserving historical plans and archives
 - incorporating design elements from the buildings into the new buildings and structures as part of the overall plant upgrades
 - salvaging of building materials prior to demolition and incorporating the said material into a Welcome Centre on-site.

Prior to Council's consideration of issuance of the Development Permit, the applicant is required to register a legal agreement on title prohibiting demolition of the buildings until such time a comprehensive heritage commemoration and interpretation plan, prepared by a qualified heritage professional, has been prepared and submitted to staff and reviewed by the *Richmond Heritage Commission* to the satisfaction of the Director of Policy Planning, Director of Development and Director of Building Approval. This requirement is detailed in Attachment 7.

Engineering Comments

A Servicing Agreement will not be required for this development. Utility connections and frontage improvements will be addressed at the time of Building Permit.

Ministry of Environment Release

The Ministry of Environment (MOE) has communicated that the City of Richmond may approve this development permit pursuant to the *Local Government Act* (section 557(2)(b)(i)) as a site investigation is not required under section 40.1(2) or section 41 of the *Environmental Management Act* (EMA). The release from site investigation encompasses all works related to the upgrade of the wastewater treatment plant.

Financial Impacts

The application results in insignificant Operational Budget Impact (OBI) for off-site City infrastructure (such as road works, waterworks, storm sewers, sanitary sewers, street lights, street trees and traffic signals). Any possible future off-site infrastructural upgrades will be addressed at the time of Building Permit.

Conclusions

As the proposed development would meet applicable policies and Development Permit Guidelines, staff recommend that the Development Permit be endorsed, and issuance by Council be recommended.



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Planner 2

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Attachments:

Attachment 1: Location Map

Attachment 2: Development Application Data Sheet

Attachment 3: Tree Management Plan

Attachment 4: Letter of Commitment to Undertake Ecological Enhancement and Restoration

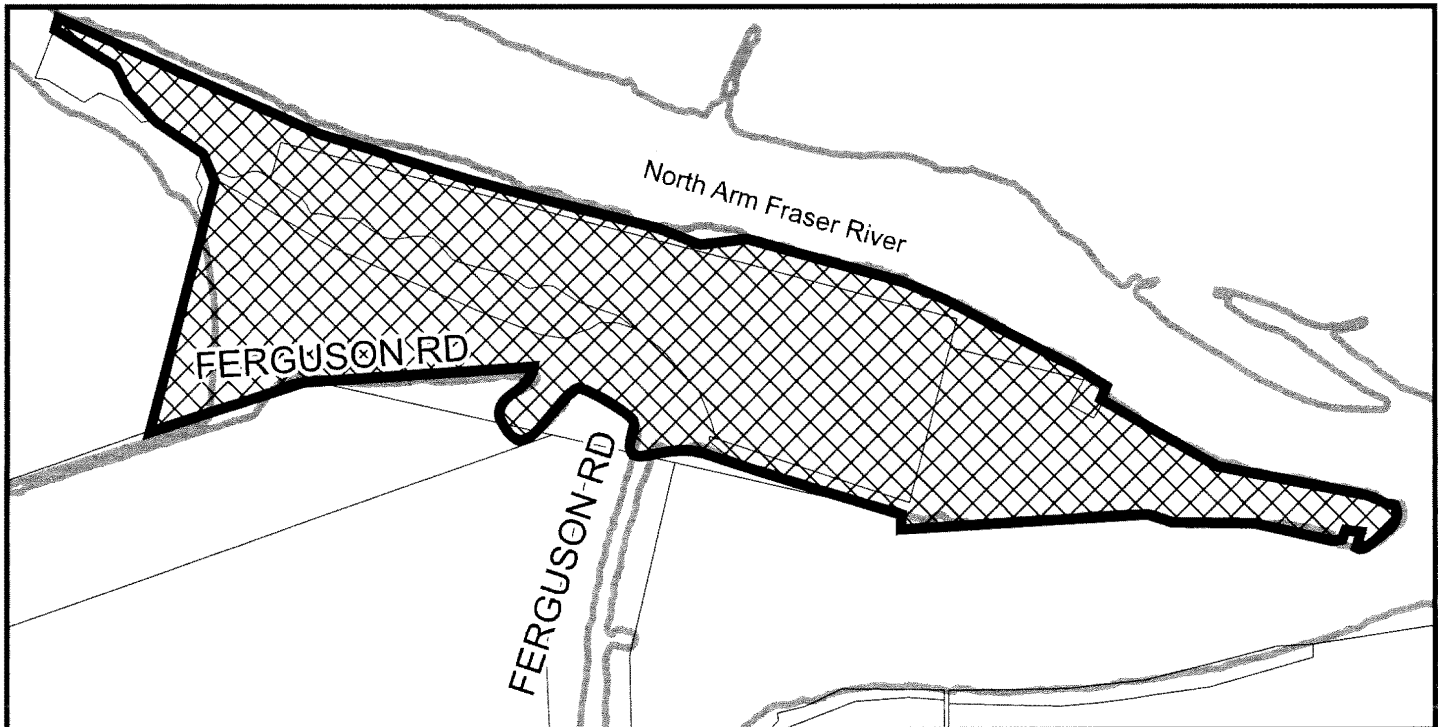
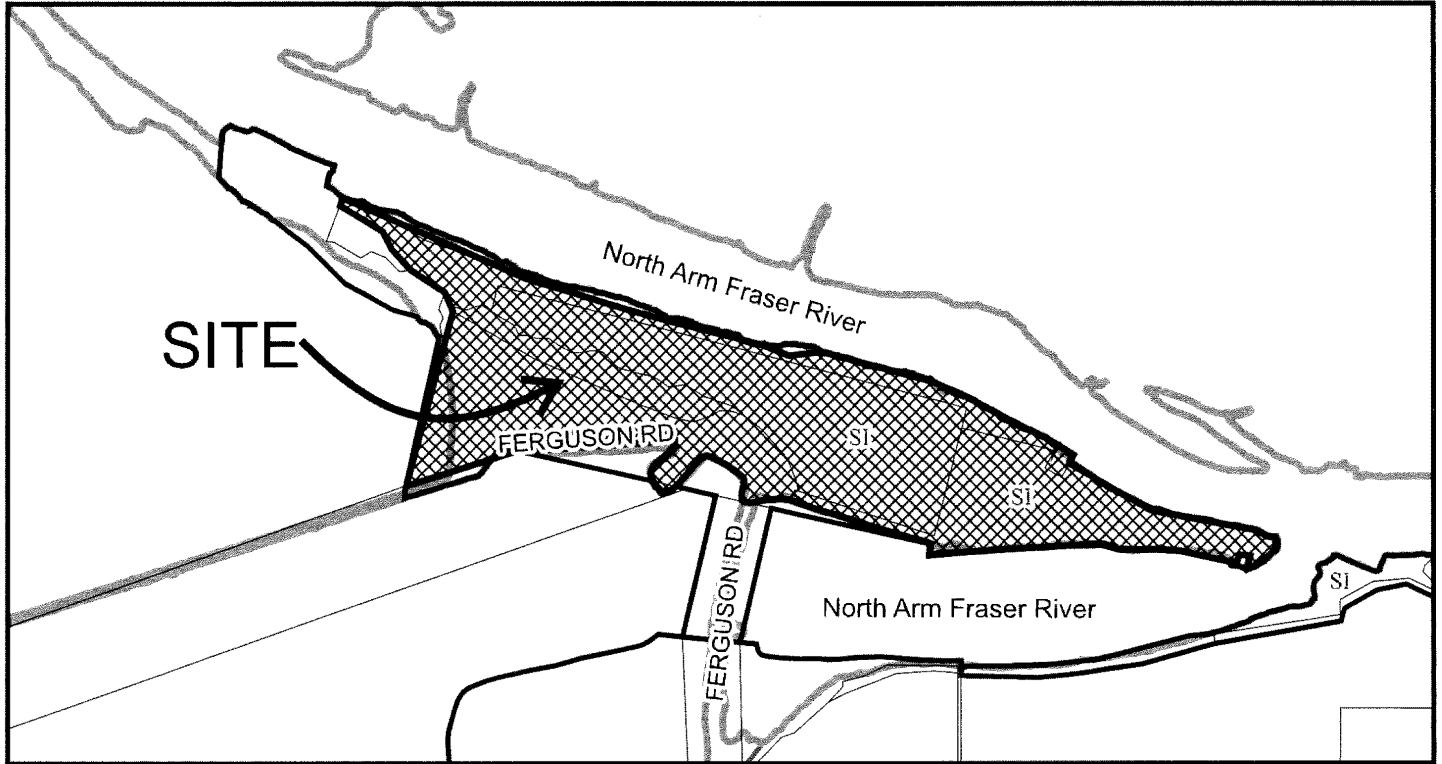
Attachment 5: The Statement of Significance for the Power and Administration Buildings

Attachment 6: Letter Proposing Strategies for Preserving Heritage Values of Existing Buildings

Attachment 7: Development Permit Considerations



City of
Richmond



DP 21-945828
SCHEDULE "A"

Original Date: 01/17/21

Revision Date: 08/29/2023

Note: Dimensions are in METRES



DP 2021945828

Attachment 2

Address: 1000 Ferguson Road

Greater Vancouver Sewerage and Drainage

Greater Vancouver Sewerage and

Applicant: District

Owner: Drainage District

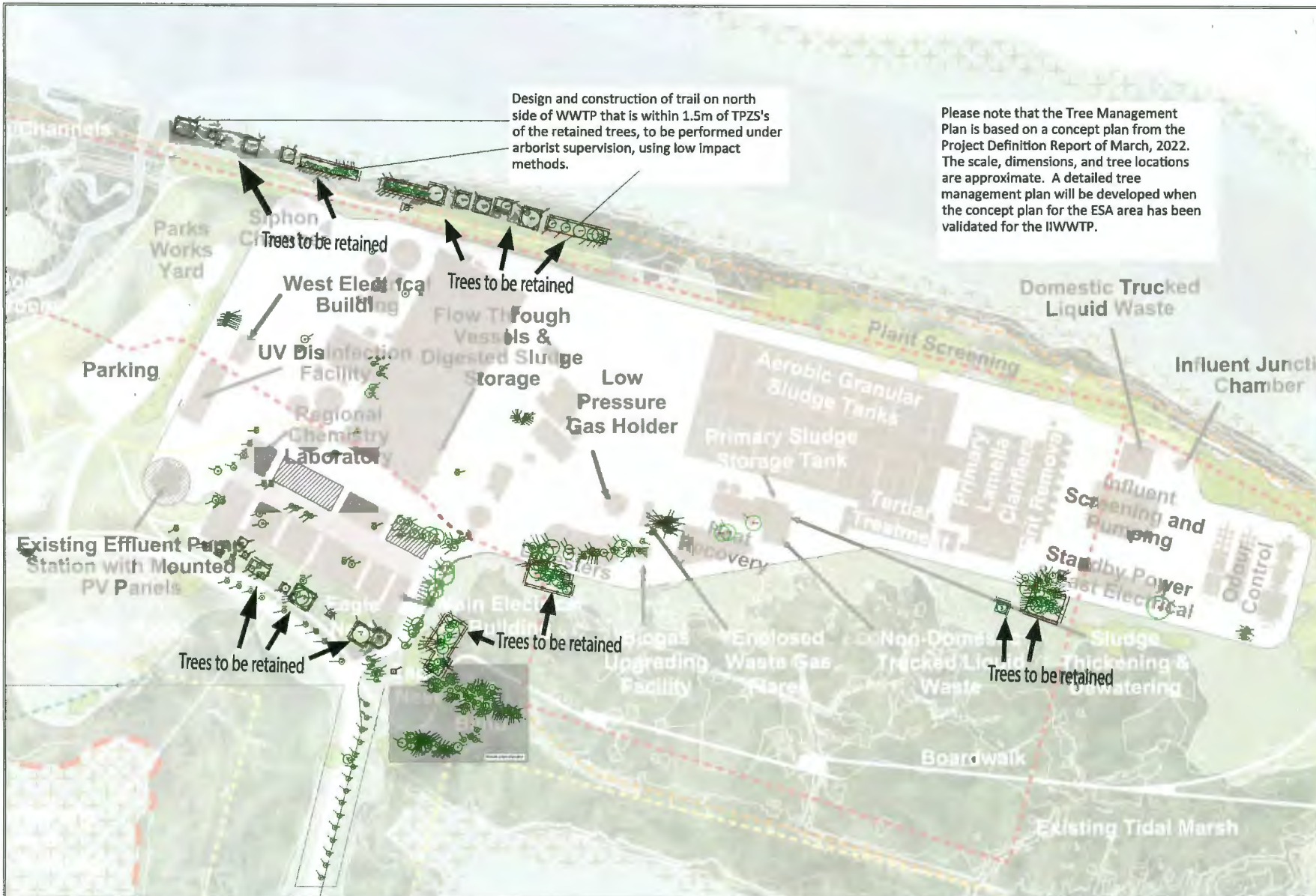
Planning Area: Sea Island

Floor Area Gross: N/A

Floor Area Net: N/A

	Existing	Proposed
Site Area:	23.9 Ha	No change
Land Uses:	Waste water treatment facility	No change
OCP Designation:	Conservation	No change
Zoning:	School and Institutional Use (SI)	No change
Number of Units:	0	No change

	Bylaw Requirement	Proposed	Variance
Floor Area Ratio:	No maximum	Consistent with zone	none permitted
Lot Coverage:	No maximum	Consistent with zone	none
Setback – Front Yard:	Min. 6.0 m	Consistent with zone	none
Setback – Side Yard:	Min. 3.0 m	Consistent with zone	none
Setback – Rear Yard:	Min. 3.0 m	Consistent with zone	none
Height (m):	Max. 12.0 m within 10 m of a residential zone, otherwise no minimum	Consistent with zone	none
Lot Size:	No minimum	Consistent with zone	none
Total off-street Spaces:	None	TBD	none



- LEGEND**
- CRITICAL ROOT ZONE
 - - - NO-BUILD ZONE
 - TREE PROTECTION ZONE AND FENCE
 - SURVEYED TREE TO BE RETAINED (MUST BE SURVEYED)
 - UN-SURVEYED TREE TO BE RETAINED (MUST BE SURVEYED)
 - SURVEYED TREE TO BE REMOVED (MUST BE SURVEYED)
 - ✖ UN-SURVEYED TREE TO BE REMOVED (MUST BE SURVEYED)

- NOTES**
1. The location of un-surveyed trees on this plan is approximate. Their location and ownership cannot be confirmed without being surveyed by a Registered BC Land Surveyor.
 2. All tree protection fencing must be built to the relevant municipal bylaw specifications. The dimensions shown are from the outer edge of the stem of the tree.
 3. The tree protection zones shown is a graphical representation of the critical root zone, measured from the outer edge of the stem of the tree. (The trees diameter was added to the graphical tree protection circles to accommodate the survey point being in the center of the tree)
 4. No work is permitted within the Tree Protection Zone with the exception of swales. Swale construction is only permitted under the direct supervision of an arborist.
 5. The 1.5m area No-Build Zone does not allow for any building foundation wall encroachment. Excavation is permitted within this area under the direct supervision of an arborist.
 6. Drainage works such as lawn basins, associated piping or services are permitted within the No-Build Zone under the direct supervision of an arborist.
 7. This plan is based on a topographic and tree location survey provided by the owner's Registered British Columbia Land Surveyor (BCLS) and layout drawings provide by the owner's Engineer (P. Eng).
 8. This plan is provided for context only, and is not certified as to the accuracy of the location of features or dimensions that are shown on this plan. Please refer to the original survey plan and engineering plans.

- REFERENCE DRAWINGS**
1. Base Survey by Binnie
 2. Concept Plan provided by Metro Vancouver



3555 COMMERCIAL STREET
VANCOUVER BC | V5N 4E8
T 604.733.4886

Drawing title: Iona Island Treatment Plant Project ESA DP Preliminary Tree Management Plan
Project address: IONA ISLAND WWTP SECONDARY TREATMENT FACILITY
Client: Binnie

Drawing No: 001
Date: 2023/03/30
Drawn by: MIA-ND
Page Size: ANSI D (22"x34")

Page #
1 of 1

August 30, 2023

File: SE-02-01-20032-50

Wayne Craig, Director of Development
Planning & Development
City of Richmond
6911 No. 3 Road
Richmond, British Columbia V6Y 2C1
VIA EMAIL: WCraig@richmond.ca

Dear Mr.Craig:

**Metro Vancouver - Iona Island Wastewater Treatment Plant Project City of Richmond
Environmentally Sensitive Area Development Permit Application**

Metro Vancouver is upgrading the existing Iona Island Wastewater Treatment Plant (IIWWTP) to include secondary and tertiary treatment (the Project) to meet provincial and federal regulations. Metro Vancouver applied to the City of Richmond in November 2021 for a Type 3 Environmentally Sensitive Area (ESA) Development Permit (DP) for the following properties owned or leased by Metro Vancouver:

- 900 Ferguson Road – Iona Beach Regional Park; and
- 1000 Ferguson Road – Iona Wastewater Treatment Plant.

The attached documentation has been amended to incorporate comments based of the City's review of the latest submission package submitted in 2023.

City staff have said they are open to considering a deferral for previous compensation and landscaping commitments, and these areas have been incorporated into the updated compensation area calculations. These commitments include compensation under DP 14-676361 (already built but within the area that will be disturbed by the new IIWWTP), DP 18-820582 and additional landscape works associated with this DP (not yet built), and DP 19-850320 (not yet built). Metro Vancouver will compensate for these past DP commitments as part of the compensation calculations for this ESA DP Application.

As a result of the new IIWWTP design, the location of some compensation projects that were previously approved by the City will be disturbed by the planned construction workspaces. Therefore, in addition to the compensation proposed for this DP Application, Metro Vancouver is requesting to

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change the location of the approved compensation projects for DP 14-676361, DP 18-820582, DP 19-850320. The attached Environmental Report details the new location and scope of the proposed new compensation projects.

Information provided in this ESA DP Application is subject to refinement throughout the duration of the Project as the Project Design is advanced. Updates will be provided to the City of Richmond on a regular basis, as required, throughout the life of the Project.

Timely approval of this ESA DP is needed to ensure that critical early and enabling works required for plant construction can progress. This application outlines the Project’s general principles and standards, and provides information being considered during the ongoing design process to result in a Project that has a balance of ecological and economical elements that Metro Vancouver is committed to providing to its stakeholders, the public, and the environment of Iona Island.

Metro Vancouver has engaged qualified professionals to prepare the materials to support the ESA DP application, including the following companies:

- Jacobs Engineering Group (Environmental Report);
- space2place landscape architects (Landscape planning and compensation project design);
- McElhanney Ltd. (Traffic Impact Assessment);
- Kerr Wood Leidal with Matson Peck and Topliss (High Water Mark Survey); and,
- Target Land Surveying (Iona Island composite sketch plan and Barge Berth sketch plan).

The following table provides a list of the ESA DP requirements and the status of each item.

Item	Status
<p>Letter outlining the proposal in full (design rationale)</p>	<p>Attached (content within the Metro Vancouver Iona Island Wastewater Treatment Plant Project City of Richmond Environmentally Sensitive Area Development Permit Application Environmental Report).</p>

	Item	Status
Environmental Report	<p>Due to Project’s complexity, the City will require an Environmental Report (see 2012 City of Richmond ESA Management Strategy) and be in general conformance with the BC government publication “Develop with Care”. At a minimum, the report will contain:</p> <ul style="list-style-type: none"> • a preliminary bio-inventory (site survey); • a detailed inventory and conservation evaluation including an assessment and recommendations regarding mitigation and compensation for lost ESA area; and, • an environmental monitoring program, if applicable. 	<p>The report includes a Table of Concordance between the ESA DP Application and Terms of Reference for Professional Reporting for ESA DP Applications.</p>
Landscape Plan	<p>Provide a map that illustrates impacts to the ESA, and the proposed mitigation, compensation and restoration strategy</p>	<p>Preliminary landscape designs provided in Section 5 of the Environmental Report.</p>
Arborist Report	<p>An arborist report will be required if tree removal will be taking place in or adjacent to the DP boundary</p>	<p>An Arboriculture Assessment and Update, a preliminary Arboricultural Inventory and Report and a Pre-Design Island Wide Tree Management Plan has been completed (App B of Site Survey Report).</p>
Site Survey Plan	<p>A site survey plan prepared by a registered BC Land Surveyor including all items indicated in the attached Bulletin entitled Survey and Site Plan Guidelines (DEVAPPS-01).</p>	<p>Site Survey Plan has been completed (attached).</p>

Metro Vancouver is committed to providing the ecological enhancement and restoration as noted in the Environmental Report report updated in 2023. In addition, MV is committed to ongoing, regular engagement with the City of Richmond, and to disclosing the latest information throughout the Project’s design and development. As such, Metro Vancouver proposes the following commitments to the City of Richmond:

Ecological Enhancement and Restoration

- Commitment to carrying out the proposed restoration and compensation works generally consistent with the Restoration and Compensation Plan prepared by AECOM/Jacobs dated July 12, 2023;
- Completion of the restoration and compensation works by 2036;

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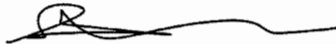
- Monitoring and maintenance for a minimum of five years post completion with monitoring plans submitted to the City for information purposes;
- Incorporation of the required replacement tree planting and minimum replacement tree sizes consistent with the City's Tree Protection Bylaw; and
- Implementation of the Mitigation Strategy as per Section 4 of the Environmental Report.

Engagement

- Monthly meeting, with updates on the following:
 - Construction process information;
 - Ecological project refinements;
 - Design progression;
 - Potential partnership opportunities;
- Providing information and updates on federal and provincial government permit applications.

Please do not hesitate to contact me should you have any questions with respect to the attached information.

Sincerely,



Sabrina Scalena
Program Manager, Major Projects, Regulatory Strategy - Project Delivery
Sabrina.Scalena@MetroVancouver.org
(+1) 604-218-6679

SS/NS/cg

cc: Winnie Shi, Director, Iona Island Wastewater Treatment Plant
Nelson Szeto, Project Manager, Iona Island Wastewater Treatment Plant

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Iona Treatment Plant

General Information

Type of Resource: Building
Also Known As: Greater Vancouver Sewage Treatment Plant
Address: 1000 Ferguson Road
Neighbourhood (Planning Area Name): Sea Island
Construction Date: 1963
Current Owner: Provincial Government
Designated: No



Statement of Significance

Description of Heritage Site: The Greater Vancouver Sewage Treatment Plant occupies most of Iona Island, and consists of a complex of administrative buildings, sludge lagoons, digesters, wastewater treatment plant and a composting site located at the end of a long driveway. The primary administration and power building is concrete and modern, with horizontal massing and large areas of glazing. The north-eastern edge of the island is dedicated to a regional park and marshland.

Statement of Heritage Values: The Iona Wastewater Treatment Plant has historical significance as it represents the emergence of Richmond's importance as a member of the Greater Vancouver Regional District. Scientific value is illustrated by the plant in the early awareness of the issues of environmental protection.

Aesthetically, the Treatment Plant is an important heritage resource as a local representation of the industrial architectural style of the 1960s. The administration and power building is a good example of 1960s modernism, and the building exhibits a graceful and powerful built form.

Character Defining Elements: Key elements that define the heritage character of the site include:

- The power and administration building is a very fine example of 1960's modernism, illustrated by its rectangular box shape, symmetrical horizontal massing, materials such as brick and extensive glazing, and details such as visible steel cross bracing on the exterior.
- Details of the power portion of the building which has an elegant clerestory with peaked windows and natural lighting.
- The unusual triangular design of the roof.
- The presence of the 15 pre-aeration and sedimentation tanks arranged in a grid.
- Its location on Iona Island and access by causeway from Sea Island.
- Its symbolism as part of early environmental awareness of the 1960's.
- The presence of the regional park nearby.

History

History: In September of 1957, the Greater Vancouver Sewerage and Drainage District applied to the Pollution Control Board for a permit to construct a primary sewage treatment plant on Richmond's Iona Island (in the north Arm of the Fraser River). (A primary plant physically separates solids from wastewater and reduces the oxygen demanding material by 30-40 % and the total amount of solids by 50 %. What is left is called 'effluent'.)

The plant would be the destination of both sanitary and storm water runoff sewage from Vancouver (not Richmond), all of which would either be discharged as effluent into the waters of Sturgeon Bank or stored permanently as sewage sludge on site. The District did not require permission from the Township of Richmond for these plans.

Since the 1890's, Vancouver sewers had always been combined sewers which carried both storm water and sanitary sewage in the same pipe. With changes in attitudes towards sewage, Vancouver began designing changes to its sewage system. Large interceptor sewers would be constructed to cut off wastewater flows that discharged into local

waters during dry weather periods. These new sewer lines would redirect the sanitary and some of the storm water runoff to a new treatment plant. The Greater Vancouver Sewerage and Drainage District felt that Iona Island was the best location for the new plant.

Fearing a high level of pollution on surrounding beaches and resenting the potential expropriation of Richmond lands, Richmond let it be known that they did not want sewage effluent anywhere on the Sturgeon Banks, nor did they want a primary sewage treatment plant or sludge lagoons on Iona Island.

Despite formal appeals and objections by the municipality of Richmond, the Pollution-control Board issued a permit (Permit # 23) to the Greater Vancouver Sewerage and Drainage District in April 1958 with a number of conditions attached. These ranged from indicating the type of effluent line to be used, to the maintenance of the water quality level at Iona Beach. (Order-In-Council No. 2167 Dated September 22, 1958. Greater Vancouver Sewerage and Drainage District, Richmond Archives)

Refusing to accept the Pollution Control Board's decision, Richmond appealed to the Provincial Government and requested that the Greater Vancouver Sewerage and Drainage District Act be amended to prohibit Vancouver and Burnaby from expropriating land outside its district in order to build sewage and drainage facilities, without representation from the affected municipality. The appeal was denied and the terms of the earlier Permit # 23 of the Pollution-control Board were confirmed with the addition of further provisos.

After it had been determined that the treatment plant was going ahead despite the concerns and opposition of the Municipality, Richmond felt it imperative to preserve and develop the Iona Beach area as a public amenity. To that end, the Richmond Council began inviting members of the Vancouver Board of Parks and Public Recreation, Lower Mainland Regional Planning Board, and Vancouver City Council to tour the area and participate in its development. In 1959, Richmond requested that a reserve be put on Iona Island for the purpose of public recreation.

The Iona Treatment Plant was put out to tender on September 21, 1960 and included 5 volumes of plans with a total of 599 drawings. The project was expected to cost over 8 million (1960) dollars. The project began in 1962 and the Plant opened in 1963. During this time, the Highbury Street tunnel was underway and the contract for the building of the 4 1/4 mile outfall channel, a 2 1/2 mile shielding jetty and a causeway had just been signed.

Controversy regarding the Plant continued through the 1960's and included concern over the access road to the island, pollution levels in the water, and at one point, notification by the municipality of Richmond in July of 1961 that a building permit was required for the work on Iona Island; but, that municipal inspectors would not carry out site inspections.

Richmond remained vigilant regarding the environmental impact of the treatment plant on Iona Island and the surrounding waters. After an examination of the area in December 1969, it was found that coliform counts, general turbidity and sludge accumulation were at levels higher than what the original permit required. Richmond considered taking legal action; but, chose instead to register a strong protest to the Pollution Control Board. It is possible that levels were high due to the time of year. Effluent was only chlorinated between May 01 and September 30 to kill bacteria that could create health risks to local swimmers.

Promotion of the recreational plans for Iona Beach continued through the 1960's and 1970's. The Greater Vancouver Regional District studied Iona Beach in 1979 as a possible site for a new regional park; but, found that it was not suitable: "While Iona Island is not considered to be the most suitable location for a Regional Park at this time, it is felt that the future potential of this site must not be overlooked. Present methods of sewage treatment make this location undesirable as a park for families with small children. However, modernization of sewage treatment processing seems inevitable, which would, in turn, eliminate some of the problems that presently exist with this location as a park." (Letter dated October 3, 1979. "The Municipality of Richmond, The Advisory Planning Committee, Subject: Greater Vancouver Regional District - Regional Park, Iona Island or A Suitable Alternative." MR SE 41, Series Health, Location 5615, Richmond Archives.)

Shortly after the above conclusions were made, the GVRD commissioned a feasibility study of the area. In November 1983, S & S Consultants submitted their conclusions in "Iona Deep Sea Outfall Feasibility Study". As a result, a jetty was built in 1986 to allow for deep sea drainage. It is 7 kilometres long, of which 4 km is above water and 3km is underwater. The underwater portion reaches 200 metres in depth and allows the effluent to discharge naturally along the bottom of the bay. Because of the extra power required to get the effluent out this far, a new pump station was built. Until this point, the Plant had been entirely self-sufficient in regards to power. All power was derived from the methane gas that is produced by the digest tanks. Since 1986, some power is obtained from BC Hydro to augment the methane power source.

In 1989, the GVRD approved Iona Beach as a regional park. Today, Iona Beach is a beautiful recreational spot which appeals to a variety of different interests. Bicyclists enjoy the long, flat ride out to the beach. Birders enjoy the variety of birds and the easy viewing. Dog owners relish the long expanse of marsh and sand. Families can spend hours playing on the beach, especially when the tide is out. Walkers can explore the 4 kilometre jetty or walk the

beach itself. The marsh to the west of the Plant was restored in 1990 by the Vancouver Historical Society, Environment Canada's Partner Fund and by many community volunteers. Birds that once stopped coming to the area are now returning. Flora and fauna that were lost due to infill are now thriving.

Information on all the plants is available from the GVRD and from their web-site. As well, tours continue to be available to the general public and to schools. Some of the best correspondence comes from the children's thank you letters.

Wrote one schoolgirl after her class toured the plant: "I hate the smell of the sewers, but enjoyed the trip. Every time I flush the toilet I'll think of you and all the men who work there." (Press Release from the Greater Vancouver Regional District, dated Dec 29, 1971, p. 2. File 5227 - 1 Iona Island, 1957-79, 5615, MR SE 41 Health, Richmond Archives).

Project Delivery
Tel. 604 512-5209

August 30, 2023

Babak Behnia, Planner
Joshua Reis, Project Manager
Policy Planning Department
City of Richmond
6911 No. 3 Road
Richmond, BC V6Y 2C1
VIA EMAIL: bbehnia@richmond.ca
jreis@richmond.ca

Dear Babak Behnia and Joshua Reis:

Re: Iona Island Wastewater Treatment Plant Upgrades – Existing Registered Heritage Buildings

We are writing to provide a proposed commitment of alternatives to the retention of the existing administration and power buildings identified as having heritage value by the City of Richmond. Metro Vancouver's is committed to preserving the legacy of these buildings to strengthen the community's sense of place and unique identity.

Metro Vancouver was informed by City Staff regarding the registered heritage status of the existing administration and power buildings in December 2022. Both buildings are listed on the City's Heritage Register.

Subsequently we met with City Staff and presented the challenges related to retention of the existing buildings including:

- The site will be raised by 12 feet to meet sea level rise and climate resiliency challenges resulting in significant accessibility challenges;
- Both buildings will be vacated and do not meet the BC Building Code's seismic criteria for post-disaster occupancy. Seismic improvements will diminish the form and character of the buildings to meet the required seismic performance criteria; and,
- These buildings are cast-in-place concrete structures which cannot be relocated.

Noting the challenges, Metro Vancouver is proposing to demolish these buildings, however is committed to commemorating and preserving the existing buildings through the following proposed alternative methods:

- Documentation, including photographs, 360 virtual tours, 3D / Laser scanning of the existing buildings;
- Researching, collecting, and preserving historical plans, photographs, and archive documents;
- Design elements from the existing buildings may be incorporated to influence the design of the new buildings;
- Completion of material inventory to determine material salvage potential;
- Salvage of materials prior to demolition, with select materials incorporated into the new buildings as aesthetic and/or educational features (if possible);
- Select machinery and building information can be presented in the new Welcome Centre which will be a part of the proposed buildings.

Metro Vancouver is in the process of procuring a treatment plant designer and will advance the conceptual design to preliminary design by 2026. As part of their scope of work it is critical that they understand the site constraints and whether they can proceed to incorporate the demolition of the existing administration and power building into the upgraded plant.

Metro Vancouver requests that as part of the ESA DP Council decision that a recommendation from staff be included to support the proposed alternatives as outlined in this letter.

Please feel free to reach out to me for any further discussions.

Sincerely,



Nelson Szeto, P.Eng.
Project Manager, Project Delivery IWWTP, Metro Vancouver

NS/WS/cg

cc: Sabrina Scalena, Program Manager, Permitting & Regulatory, Metro Vancouver
Emma Webster, Senior Policy Analyst, Project Delivery IWWTP, Metro Vancouver



City of
Richmond

Development Permit Considerations

Development Applications Department
6911 No. 3 Road, Richmond, BC V6Y 2C1

Address: 900 and 1000 Ferguson Rd

File No.: DP 21-945828

Prior to approval of the Development Permit, the developer is required to complete the following:

1. A Letter of Commitment to undertake ecological restoration and enhancement works on-site as prescribed in the Environmental Impact Assessment Report prepared the applicant's QEP and within the timeline described therein.
2. Submission of a Contract entered into between the applicant and a Certified Arborist for supervision of any on-site works conducted within the tree protection zone of the trees to be retained. The Contract should include the scope of work to be undertaken, including: the proposed number of site monitoring inspections, and a provision for the Arborist to submit a post-construction assessment report to the City for review.
3. Registration of a restrictive covenant and/or alternative legal agreement on title, prohibiting demolition of the administration and power buildings, until such time that the developer, at the developer's sole cost, has submitted a comprehensive heritage commemoration and interpretation plan, prepared by a qualified heritage professional, together with an architect and/or other qualified professionals, subject to review by the Richmond Heritage Commission, to the satisfaction of the Director of Policy Planning, Director of Development and Director of Building Approvals.

Prior to Building Permit Issuance, the developer must complete the following requirements:

4. The applicant is required to obtain a Building Permit for any construction hoarding associated with the proposed development. If construction hoarding is required to temporarily occupy a street, or any part thereof, or occupy the air space above a street or any part thereof, additional City approvals and associated fees may be required as part of the Building Permit. For further information on the Building Permit, please contact Building Approvals Department at 604-276-4285.
5. Submission of a Construction Parking and Traffic Management Plan to the Transportation Department. Management Plan shall include location for parking for services, deliveries, workers, loading, application for any lane closures, and proper construction traffic controls as per Traffic Control Manual for works on Roadways (by Ministry of Transportation) and MMCD Traffic Regulation Section 01570.
6. Obtain a Building Permit (BP) for any construction hoarding. If construction hoarding is required to temporarily occupy a public street, the air space above a public street, or any part thereof, additional City approvals and associated fees may be required as part of the Building Permit. For additional information, contact the Building Approvals Department at 604-276-4285.

Note:

- Applicants for all City Permits are required to comply at all times with the conditions of the Provincial *Wildlife Act* and Federal *Migratory Birds Convention Act*, which contains prohibitions on the removal or disturbance of both birds and their nests. Issuance of Municipal permits does not give an individual authority to contravene these legislations. The City of Richmond recommends that where significant trees or vegetation exists on site, the services of a Qualified Environmental Professional (QEP) be secured to perform a survey and ensure that development activities are in compliance with all relevant legislation.

Signed _____

Date _____



No. DP 21-945828

To the Holder: Greater Vancouver Sewerage and Drainage District

Property Address: 900 and 1000 Ferguson Road

Address: Metrotower III, 4515 Central Boulevard, Burnaby, BC V5H 0C6

1. This Development Permit is issued subject to compliance with all of the Bylaws of the City applicable thereto, except as specifically varied or supplemented by this Permit.
2. This Development Permit applies to and only to those lands shown cross-hatched on the attached Schedule "A" and any and all buildings, structures and other development thereon.
3. If the Holder does not commence the construction permitted by this Permit within 24 months of the date of this Permit, this Permit shall lapse and the security shall be returned in full.
4. The land described herein shall be developed generally in accordance with the terms and conditions and provisions of this Permit and any plans and specifications attached to this Permit which shall form a part hereof.

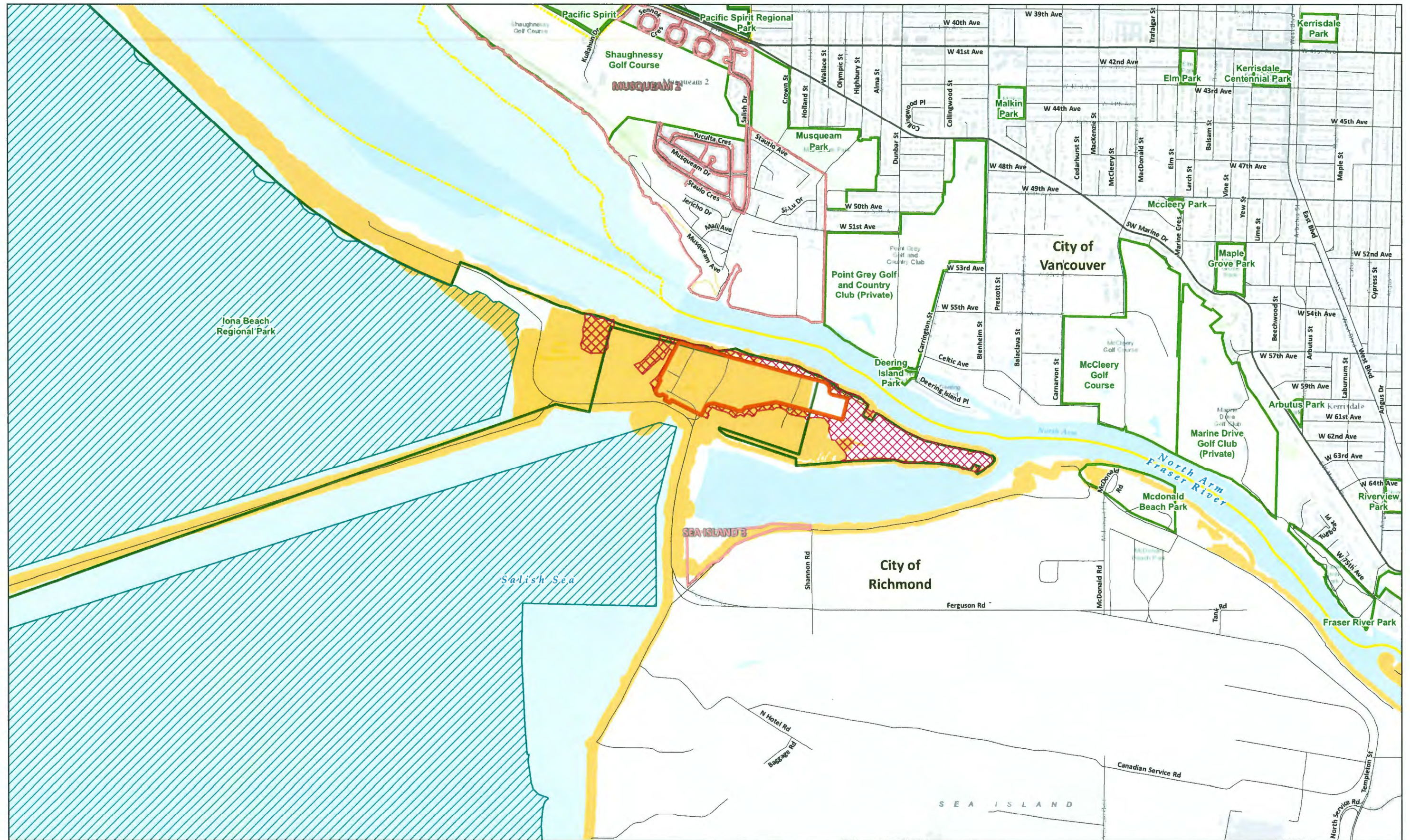
This Permit is not a Building Permit.

AUTHORIZING RESOLUTION NO.
DAY OF

ISSUED BY THE COUNCIL THE

DELIVERED THIS DAY OF

MAYOR



UTM Zone 10 North, NAD 1983.
 ESAs: City of Richmond OCP, Nov. 19, 2012; Wildlife Management Area: BC MPLNRO 2021; Indian Reserves: Government of Canada 2020; Roads: BC FLNRO Digital Road Atlas, 2010; Hydrography: BC MPLNRO 2008; Municipal Boundaries: BC Ministry of Municipal Affairs and Housing, 2016; Provincial Parks: BC FLNRO, 2008; Iona IWWTP Project Components: SpaceOP Inc. Design Inc., July 7, 2020; SEE: Metro/Vancouver 2014; Base Map Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, Mapbox Contributors, and the GIS User Community.

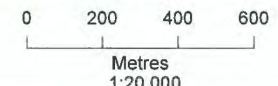


Figure 1
 ESA DP Area and Project Footprint
 Iona Island Wastewater Treatment Plant Project
 Metro Vancouver

5.1 Areas Included in Compensation Calculation

The calculated compensation area is based on the post-construction footprint of the new IWWTP, as delineated by the perimeter fence line shown on Figure 5-1 and Figure 5-2. Much of this area is previously disturbed for the existing IWWTP and associated biosolids stockpiles.

Table 5-1 documents the calculated DP area that will be occupied by the new IWWTP within the fence line, based on the indicative design; this corresponds to an area of about 20.96 ha. The table also lists the areas associated with compensation and landscape commitments under previous DPs (DP 14-676361, DP 18-820582, DP 19-850320) that Metro Vancouver will add to the total area to be compensated as part of this ESA DP Application; these total impacted areas are overlaid with the indicative design concept for the new IWWTP and shown on Figure 5-2.

The total area that has been determined to require compensation for this DP Application is 23.08 ha. This includes the impacted areas associated with the new IWWTP (20.96 ha), as well as the reallocation of compensation from previously approved DPs and associated landscape works on Iona Island, as agreed to previously by the City of Richmond (which totals 2.12 ha). Five compensation areas have been designated, listed in Table 5-1 and shown on Figure 5-1 and Figure 5-2; these collectively total 26.12 ha. The difference between the total footprint and the total required compensation is a net gain of 3.04 ha. Section 5.2 provides an overview of the different compensation areas.

Table 5-1. Approximate Area of Disturbance and Compensation for the New IWWTP and Reallocation of Compensation from Approved DP Applications

Area of Disturbance or Compensated Area	Approximate Area (ha)
Development Permit Area Overlapping IWWTP Project Footprint	
Shoreline ESA	1.37
Wetland ESA	19.59
Total Footprint	20.96
Previous Compensation	
Compensation for DP 14-676361	0.33 ^a
Compensation for DP 18-820582	1.37
Compensation for DP 19-850320	0.30
Landscape work associated with DP 18-820582	0.12
Total of previous compensation commitments	2.12
Total Area to be Compensated	23.08
Proposed Compensation Areas	
Area #1 North edge	3.22
Area #2 East island	15.47
Area #3 South edge	2.30
Area #4 Cottonwood forest	2.88
Area #5 Area west of new IWWTP	2.25
Total Compensated Area	26.12
<i>Difference (between total footprint and total required compensation)</i>	<i>+3.04</i>




^a DP 14 staff report indicates 0.33 ha of restoration planting was designated, with plants distributed over an area of 4.3 ha (City of Richmond 2015c).

Anticipated Plant Density of 2,000 shrubs and perennials per hectare, and 500 trees per hectare (corresponding to 0.2 shrubs per m² and 0.05 trees per m²)

Figure 5-1. Impacted and Compensation Areas for the New Iona Island Wastewater Treatment Plant



LEGEND

-  PROPOSED COMPENSATION AREA FOR CURRENT ESA DP
-  PREVIOUS COMPENSATION AREA COMMITMENTS
-  DP AREA (FOOTPRINT OF NEW IIWWTP)

N
0 20 100 500 m



CHECK PRINT

THIS DRAWING HAS NOT BEEN APPROVED, AND MAY CONTAIN ERRORS AND OMISSIONS.

Issue	Date	Desn	Drn	Chkd	Appd	Description
2023 07 09	SP					ISSUED FOR CITY OF RICHMOND ESA DP APPLICATION
2021 09 09	SP	SM	SP	JC		ISSUED FOR FINAL INDICATIVE DESIGN

GREATER VANCOUVER SEWERAGE AND DRAINAGE DISTRICT

Design: SM/SP/JC
 Drawn: SM
 Checked: SP
 Approved: JC
 Manager: SP

**IONA ISLAND WWTP
SECONDARY TREATMENT FACILITY
INDICATIVE DESIGN**

FOOTPRINT OF NEW IIWWTP AND
PROPOSED COMPENSATION AREAS

SCALE:
DISTRICT FILE
S-####
DRAWING NUMBER
5-1



SUPERSEDES PRINTS OF THIS DOCUMENT CODE WITH LETTERS PREVIOUS TO →


Notes: Overlaid on an aerial photograph with existing conditions

Figure 5-2. Impacted and Compensation Areas for the New Iona Island Wastewater Treatment Plant



LEGEND

 PROPOSED COMPENSATION AREA FOR CURRENT ESA DP
 DP AREA (FOOTPRINT OF NEW IIWWTP)

N

 0 20 100 500 m



CHECK PRINT
 THIS DRAWING HAS NOT BEEN APPROVED, AND MAY CONTAIN ERRORS AND OMISSIONS.

Issue	Date	Desn	Dr'n	Chkd	Appd	Description
2023.07.08	SP					ISSUED FOR CITY OF RICHMOND ESA DP APPLICATION
2021.09.08	SP	SM	SP	JC		ISSUED FOR FINAL INDICATIVE DESIGN

GREATER VANCOUVER SEWERAGE AND DRAINAGE DISTRICT

Design: SM/SP/JC
 Drawn: SM
 Checked: SP
 JC
 Approved: SP
 Manager:

**IONA ISLAND WWTP
 SECONDARY TREATMENT FACILITY
 INDICATIVE DESIGN**

IIWWTP INDICATIVE DESIGN AND PROPOSED COMPENSATION AREAS

SCALE:
 DISTRICT FILE S-###
 DRAWING NUMBER 5-2

SUPERSEDES PRINTS OF THIS DOCUMENT CODE WITH LETTERS PREVIOUS TO →

Notes: Overlaid on the Indicative Design drawing

5.2 Compensation and Other Ecological Restoration Projects on Iona Island

This section describes the compensation and other ER projects on Iona Island.

5.2.1 General Restoration Strategies for All Compensation Areas

The designated compensation areas are a mix of riparian forest and shrub grassland, with different proportions of native versus invasive species. Restoration within these areas will include the following strategies:

- Protection of existing ecological values and specific habitat elements, such as known wildlife habitat features (such as, otter latrines, beaver lodges, raptor nest, wildlife trees)
- Invasive species management
- Infill planting with native species
- Removing unsuitable fill material (such as, hog fuel, concrete rubble) where present
- Adding large woody debris (LWD), such as nurse logs and root wads
- Regrading, amending soil, and creating microtopography-based habitat elements such as, seasonal ponds, hummocks, where necessary, to achieve desirable physical conditions to support target species
- Using habitat protection fencing in selected and strategic areas where compensation and restoration areas are adjacent to busy footpaths.
- Considering other habitat elements, depending on suitability, including raptor perch trees, bird nest boxes, and bat roost boxes.

Table 5-2 lists a selection of vegetation species to be used for compensation planting.

Five compensation areas have been identified to meet the City of Richmond's requirements for compensating the footprint of the new IIWWTP. These are described briefly in the following subsections.

5.2.2 Compensation Area #1: North Edge

This compensation area will enhance the zone between the north fence line of the new IIWWTP and the existing riparian habitat along the Fraser River north arm (upland of the high water mark). Part of this area will initially be disturbed by the construction of the new IIWWTP, but after construction this area will have a forested riparian slope established between the new grade of the IIWWTP fence line and existing grades. This area will incorporate a gravel path that links the west and west parts of Iona Beach Regional Park.

5.2.3 Compensation Area #2: East Island

The indicative design of the east part of Iona Island is currently characterized by a mix of invasive plant thickets (mostly scotch broom) with large patches of native trees and shrubs. The restoration works in this area will focus on removing invasive species, supplemental planting with native species, and creating high quality riparian forest and shrub grassland habitat patches. Areas dominated by invasive species will require sod stripping to remove species like Himalayan blackberry and scotch broom. The top layer of soil will require disposal offsite or will be buried in deep trenches onsite (per previous coastal sand restoration work on the island) (Metro Vancouver 2021c). This part of the island will also feature a gravel trail, with sections of exclusion fencing to keep park users on the trail and to protect sensitive species.

Table 5-2. Key species for planting in all compensation areas

Scientific Name	Common Name
Trees	
<i>Betula papyrifera</i>	Paper birch
<i>Crataegus douglasii</i>	Black hawthorn
<i>Malus fusca</i>	Pacific crab apple
<i>Picea sitchensis</i>	Sitka spruce
<i>Pinus contorta</i>	Shorepine
<i>Populus trichocarpa</i>	Black cottonwood
<i>Prunus emarginata</i>	Bitter cherry
<i>Salix</i> sp.	Willow species
<i>Thuja plicata</i>	Western red cedar
Shrubs	
<i>Cornus sericea</i>	Red-osier dogwood
<i>Lonicera involucrata</i>	Black twinberry
<i>Mahonia aquifolium</i>	Tall Oregon grape
<i>Mahonia nervosa</i>	Dull Oregon-grape
<i>Oemleria cerasiformis</i>	Osoberry
<i>Physocarpus capitatus</i>	Pacific ninebark
<i>Ribes sanguineum</i>	Red flowering currant
<i>Rosa nutkana</i>	Nootka rose
<i>Sambucus racemosa</i>	Red elderberry
<i>Spiraea douglasii</i>	Hardhack
<i>Symphoricarpos albus</i>	Common snowberry
Herbaceous Plants	
<i>Achillea millefolium</i>	Yarrow
<i>Allium cernuum</i>	Nodding onion
<i>Aster subspicatus</i>	Douglas aster
<i>Cerastium</i> sp.	Chickweed
<i>Epilobium angustifolium</i>	Fireweed
<i>Festuca rubra</i>	Red fescue
<i>Fragaria chiloensis</i>	Pacific coast strawberry
<i>Gaillardia aristata</i>	Blanket flower
<i>Grindelia stricta</i>	Gumweed
<i>Lathyrus japonicus</i>	Beach pea
<i>Leymus mollis</i>	Dune wildrye
<i>Lomatium nudicaule</i>	Barestem desert-parsley
<i>Lupinus littoralis</i>	Douglas seashore lupine
<i>Urtica dioica</i>	Stinging nettle

5.2.4 Compensation Area #3: South Edge

This compensation area will enhance the zone between the south edge of the new IWWTP and the existing tidal marsh (upland of the high water mark). Part of this area will initially be disturbed by the construction of the new IWWTP, but after construction this area will encompass a new riparian forest slope between the new grade of the IWWTP fence line and the existing grades upland of the tidal marsh. The forested slope will help to screen views of the new IWWTP from park users to the south, and will provide a forested habitat linkage to the east side of the island.

5.2.5 Compensation Area #4: Cottonwood forest

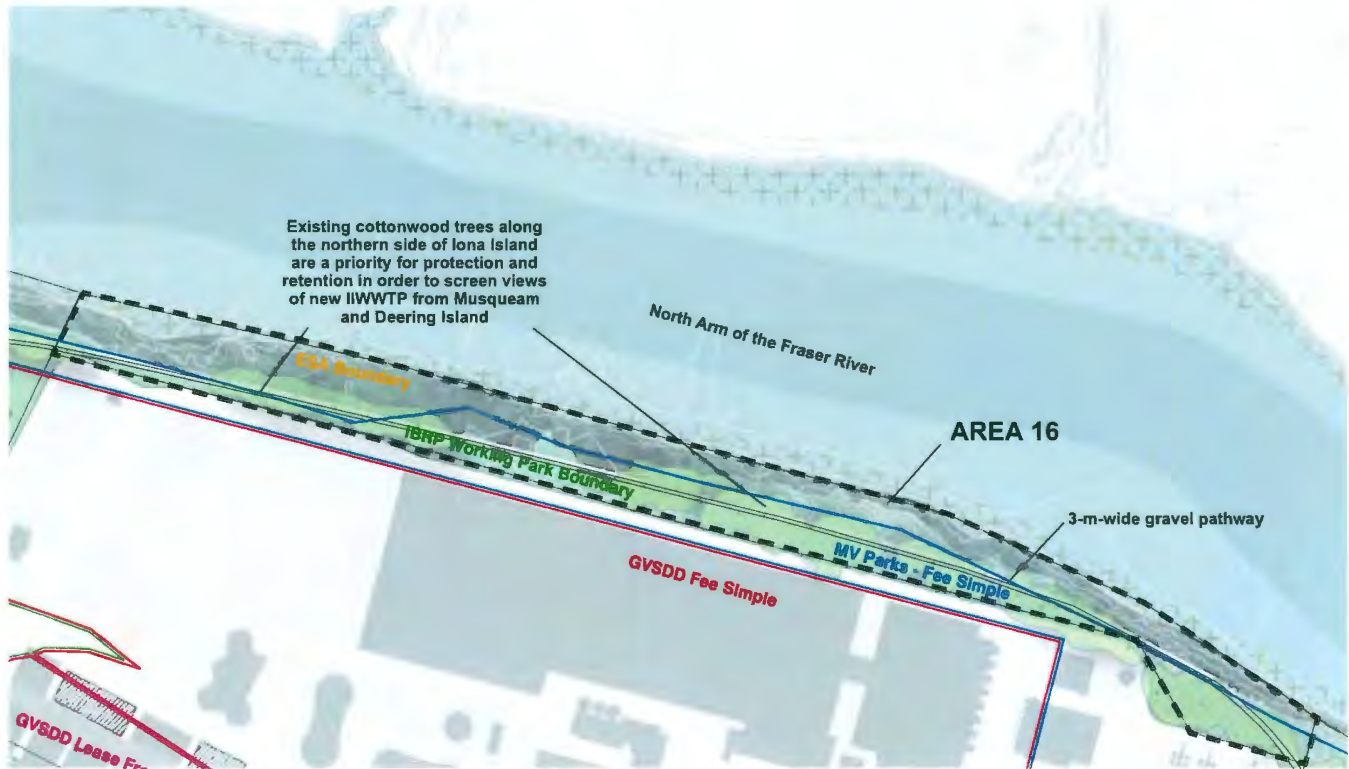
This area of existing cottonwood forest will be enhanced to remove the extensive invasive species present, such as Himalayan blackberry. An existing narrow trail system will be upgraded to a wider gravel path with sections of habitat protection fencing to keep park users on the trail and protect sensitive species. An existing bird banding centre run by the volunteer-based WildResearch organization will be retained, along with the majority of their bird netting stations.

5.2.6 Compensation Area #5: Area west of the new IWWTP

This area is currently occupied by two of the existing sludge lagoons, and it will be converted to riparian forest after the sludge lagoons are decommissioned. The new forest will help to screen the view of the new IWWTP from the adjacent Iona Beach Regional Park.

RIPARIAN FOREST - EAST

PROJECT PORTFOLIO E | TARGET CONSTRUCTION START: 2034



Area 16 seeks to protect and enhance the existing riparian forest along the north edge of the new IWWTP, both for its ecological value and for screening views of the existing and new IWWTP facilities from across the river. This riparian forest provides a critical riparian corridor between Area 15 and Area 12; it supports diverse upland wildlife species (passerines, raptors, small mammals) and provides important habitat complexity and shading along the North Arm of the Fraser River.

Although it is a narrow strip of land, this area is intended to preserve as much of the existing vegetation as possible while meeting the necessary grades of the WWTP's north perimeter road.

The preservation of the existing trees and planting of new ones will be critical for the relationship of the plant to its neighbours, both on Musqueam lands and on Deering Island, as this vegetation will perform the bulk of the screening for the new IWWTP for views from the north.

Traversing Area 16 will be a 3-m-wide gravel path, which will be an important circulation link between the west side and east side of the island, thereby allowing park users to experience a long looping trail around the entire island.

The work in this area will be integrated with construction of the north edge of the new IWWTP, targeted to take place in 2034.

SITE ELEMENTS + DESIGN ASSUMPTIONS:

- **TRAILS:** 3-m-wide gravel pathway above the mean high water mark and split rail exclusion fencing where needed to protect sensitive species.
- **GRADING:** This area will require a sensitive approach to grading in order to retain the existing trees and meet the new grades of the adjacent road. This area will be part of the Plant Perimeter Screening Strategy that involves a steel security fence and vegetation for visual screening.
- **PLANTING:** New planting areas may benefit from soil amendment with Nutrifor; assume 150 mm mixed into planting holes. Planting is intended to be done in two phases:
 1. Prior to IWWTP construction new riparian trees can be planted outside of anticipated areas of disturbance to improve this edge for visual screening. It may be appropriate to install tree protection on the upslope side of the existing and new trees as an extra measure of protection.
 2. Additional planting of shrubs can be done in conjunction with IWWTP construction.



Tidal marsh along the north side of Iona Island (Photo: Nick Page, used with permission)



Band of riparian forest along north (right) edge of new IWWTP with pedestrian path



Trail precedent from Surrey Bend Regional Park (Photo: Jeff Cutler, space2place)

HABITAT TYPES:

- Riparian Forest

RECOMMENDED PLANT SPECIES:

- Black cottonwood (*Populus trichocarpa*)
- Black hawthorn (*Crataegus douglasii*)
- Black twinberry (*Lonicera involucrata*)
- Common snowberry (*Symphoricarpos albus*)
- Pacific crab apple (*Malus fusca*)
- Dull Oregon-grape (*Mahonia nervosa*)
- Hardhack (*Spiraea douglasii*)
- Nootka rose (*Rosa nutkana*)
- Paper birch (*Betula papyrifera*)
- Red elderberry (*Sambucus racemosa*)
- Red-osier dogwood (*Cornus sericea*)
- Indian-plum (*Oemleria cerasiformis*)
- Willow species (*Salix sp.*)

SYNERGIES WITH OTHER SITEWORKS:

- Native riparian vegetation within the footprint of site preparation for the new IWWTP can potentially be salvaged and planted in this area.
- Opportunity to use treated biosolids from IWWTP as part of restoration planting (that is, as Nutrifor soil amendment)

ESTIMATED QUANTITIES AND AREAS:

Refer to Ecology and Park Budget Technical Memorandum (attached to Basis of Cost Estimate in Appendix 43) for quantity and area assumptions.

TENURE CONSIDERATIONS:

- Metro Vancouver Regional Parks - fee simple
- Within Iona Beach Regional Park boundaries
- Provincial foreshore
- Designated Environmentally Sensitive Area by City of Richmond

RELATED PROJECTS:

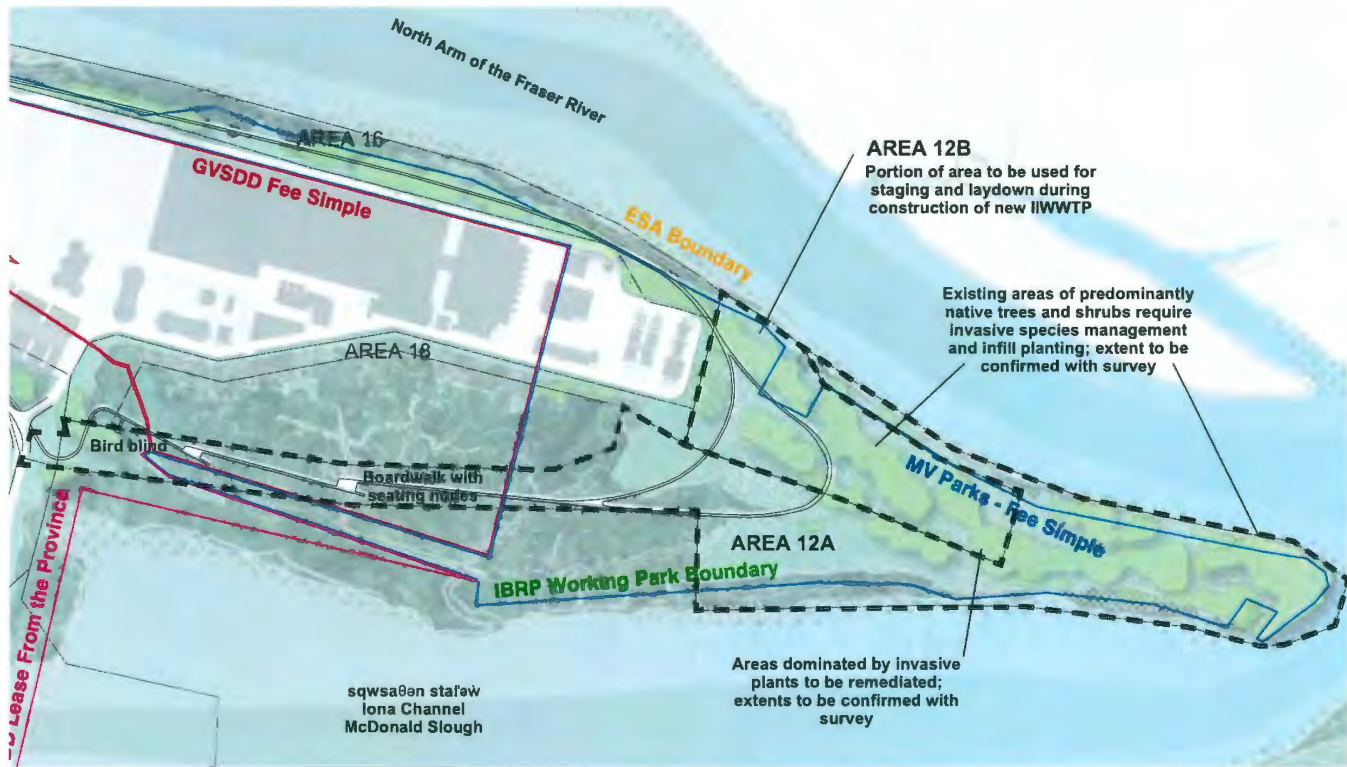
Portfolio E projects:

- Area 12A/B, East island habitat restoration + park elements
- Area 15, Riparian forest - central
- Area 18, South interface of WWTP with tidal marsh
- Area 20A/B, Coastal sand ecosystem restoration work

EAST ISLAND HABITAT RESTORATION + PARK ELEMENTS

Corresponding To Area# 2

PROJECT PORTFOLIO E | TARGET CONSTRUCTION START: 12A IN 2034, 12B IN 2035



The east island enhancements in Area 12 focus on invasive species removal, supplemental planting with native species, and expansion of the cottonwood forest to increase the area’s ecological values for a diversity of species. This area is envisioned as being one of several potential places for Musqueam (xʷməθkʷəy̓əm) teaching and cultural practices, and therefore the detailed design requires additional discussions with Musqueam.

This area aims to preserve the native forest and shrub grassland, manage invasive species, and infill plant with native species, to be informed by discussions with Musqueam. Areas dominated by invasive species will require sod stripping to remove species like blackberry and broom. The top layer of soil will require disposal off-site or buried in deep trenches on site (as per previous coastal sand restoration work on the island).

There is an opportunity to combine the earthworks that are required for invasive species management with temporary use as pre-load for the new IWWTP; the feasibility of this is to be explored in the next phase.

The revegetation strategies for Area 12 will aim to support many native bird and mammal species and as such, it incorporates physical habitat elements such as nesting boxes for target birds (for example, barn owls, tree swallows), raptor perch sites, bat roosting boxes, large woody debris (for example, root wads), and snags.

Area 12 will also feature some park amenities such as an accessible timber boardwalk through the existing tidal wetlands north of McDonald Slough. This boardwalk will include two larger platforms for seating and teaching, as well as a bird blind structure that can accommodate a small group of people to observe birds and other wildlife while minimizing disturbance. Further to the east, the

boardwalk will transition to a gravel path, with sections of exclusion fencing to keep park users on the trail and to protect sensitive species. There is also wharf to be reconstructed for construction of the new IWWTP.

The subarea denoted as 12B in the diagram above is anticipated to be used for construction laydown and staging during construction of the new IWWTP, and is to be restored after staging is completed (target of 2035).

SITE ELEMENTS + DESIGN ASSUMPTIONS:

- **BOARDWALKS:** Accessible timber boardwalk, 1.8 m-wide, without handrail (with kick edging) that will also include two larger platforms for seating and teaching. Refer to Metro Vancouver Regional Parks design guidelines (Metro Vancouver 2016d)
- **BIRD BLIND:** Timber structure that can accommodate small group of people (up to 10) to observe birds and other wildlife while reducing disturbance.
- **BOAT WHARF (TEMPORARY):** Existing wharf to be reinstated for construction of new IWWTP.
- **TRAILS:** 3 m-wide gravel pathways throughout the upland area with split rail exclusion fencing to keep people on trail for the protection of sensitive species.

HABITAT TYPES:

- Riparian Forest
- Shrub-grassland

RECOMMENDED PLANT SPECIES:

- Riparian forest areas:
- Refer to plant list under Area 15



Rendering of new riparian forest east of the new IWWTP, looking west



Bird blind precedent at Garvan Woodland Gardens (Photo: Nadia Montes, used with permission)



The proposed view along the southern intertidal marsh boardwalk.

Shrub grassland areas:

Shrubs

- Pacific crab apple (*Malus fusca*)
- Tall Oregon-grape (*Mahonia aquifolium*)
- Black twinberry (*Lonicera involucrata*)
- Red flowering currant (*Ribes sanguineum*)
- Nootka rose (*Rosa nutkana*)
- Red elderberry (*Sambucus racemosa*)
- Pacific ninebark (*Physocarpus capitatus*)
- Black hawthorn (*Crataegus douglasii*)
- Bitter cherry (*Prunus emarginata*)

Herbaceous plants

- Red fescue (*Festuca rubra*)
- Dune wildrye (*Leymus mollis*)
- Yarrow (*Achillea millefolium*)
- Douglas seashore lupine (*Lupinus littoralis*)
- Chickweed (*Cerastium sp*)
- Barestem desert-parsley (*Lomatium nudicaule*)
- Nodding onion (*Allium cernuum*)
- Douglas' aster (*Aster subspicatus*)
- Fireweed (*Epilobium angustifolium*)
- Stinging nettle (*Urtica dioica*)

Additional species to be determined through discussions with Musqueam

SYNERGIES WITH OTHER SITEWORKS:

- Opportunity to use treated biosolids from IWWTP as part of restoration planting (that is, as Nutrifor soil amendment)

ESTIMATED QUANTITIES AND AREAS:

Refer to Ecology and Park Budget Technical Memorandum (attached to Basis of Cost Estimate in Appendix 43) for quantity and area assumptions.

TENURE CONSIDERATIONS:

- Metro Vancouver Regional Parks - Fee simple
- Within Iona Beach Regional Park boundaries
- GVSDD - Fee simple
- GVSDD - lease from Province
- Portion of land designated as Environmental Sensitive Area by City of Richmond

INFORMATION NEEDS AND NEXT STEPS:

- **EARTHWORKS:** Explore feasibility of borrowing material from invasive species management areas for preload of new IWWTP
- **WILDLIFE SURVEYS / MONITORING:** Monitoring studies are recommended pre/during/post construction.
- **SITE SURVEY:** Confirm species and plant communities present, and extent of invasive species removal work needed.
- **FURTHER DISCUSSIONS:** Additional collaboration with Metro Vancouver Regional Parks and Musqueam to develop design opportunities in this area

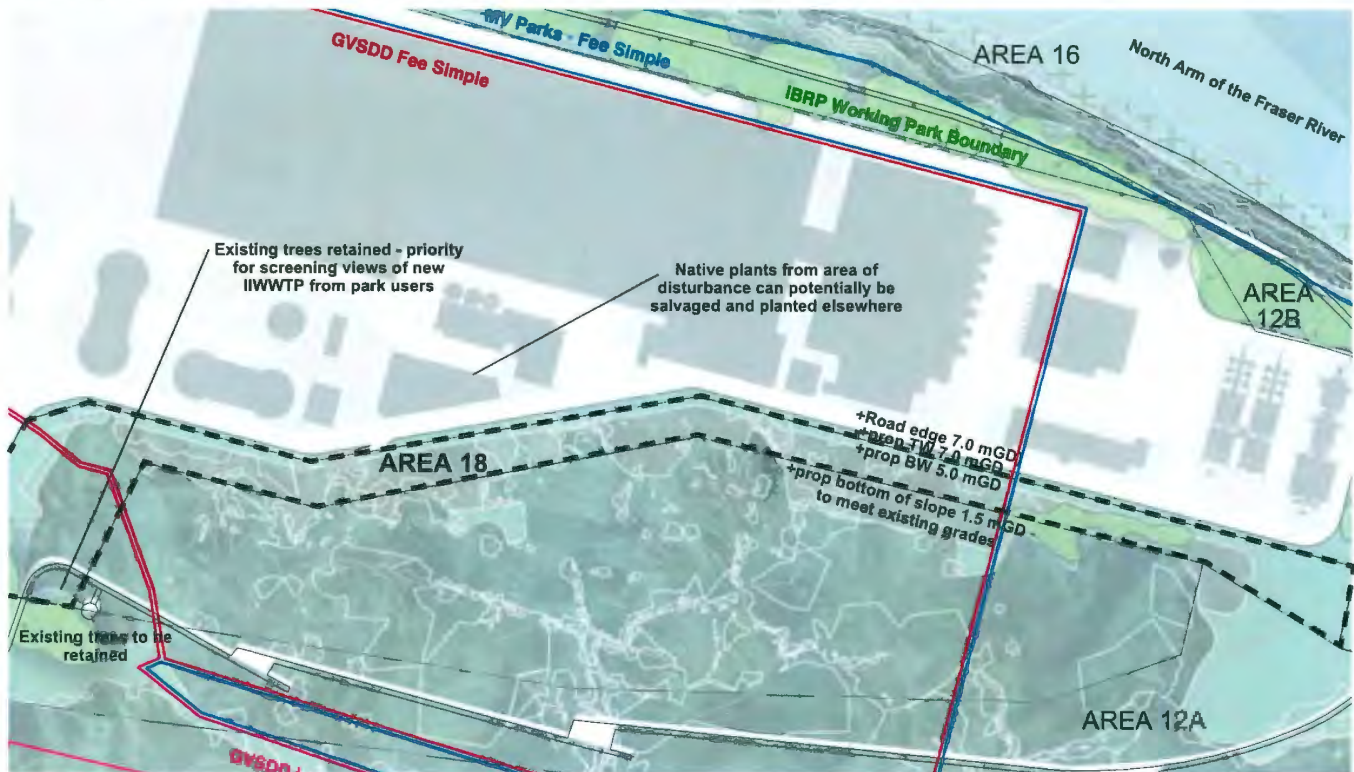
RELATED PROJECTS:

Portfolio E projects:

- Area 15, Riparian forest - central
- Area 16, Riparian forest - east
- Area 18, South interface of WWTP with tidal marsh
- Area 20A/B, Coastal sand ecosystem restoration work

SOUTH INTERFACE OF WWTP WITH TIDAL MARSH

PROJECT PORTFOLIO E | TARGET CONSTRUCTION START: 2034



Area 18 encompasses the south interface between the new IWWTP and the adjacent tidal wetlands to the south.

The road on the south side of the new treatment plant is planned to be built to a Flood Construction Level of 7 mGD. This will require a large grade change between the road edge and the existing tidal marsh (approx 1.5 mgD); the grade change is proposed to be achieved with a combination of retaining wall and planted slope. The aim is to minimize encroachment to the tidal wetland while having new trees planted on the slope to screen views of the new IWWTP plant from the south; this screening will be particularly important for views from park users along the new boardwalk south of the new IWWTP.

The slope is to be constructed out of a mix of sand, gravel and organic matter with riparian planting on the slope. It is anticipated that the fill material could be sourced from excavations elsewhere on site.

The tidal marsh at the base of the slope (between the foot of the slope and the edge of the construction footprint) is a focus area of protection and rehabilitation. Native wetland plants that are in the area of disturbance may be able to be salvaged prior to construction and used for habitat rehabilitation elsewhere.

The work in this area will be integrated with construction of the south edge of the new IWWTP, targeted to take place in 2034.

SITE ELEMENTS + DESIGN ASSUMPTIONS:

- GRADING:
 - South perimeter road to be approx. 7 mGD (CGVD28) and existing edge of wetland is around 1.5 mGD at ground level (to be confirmed). Grade change of approx. 5 to 6 m to be achieved by a combination of retaining wall and berm, such as a 2 m-high retaining wall and 3.5 m-high berm. Footprint of berm to extend approx 10 m from retaining wall for achieving a typical 30% slope (or less, where possible, to minimize impacts to the tidal marsh).
 - Berm material to be structural fill with organic layer at surface
- PLANTING: Berm is intended to be planted with riparian forest trees and shrubs.
- FENCING: Black security fence along top of wall



Perspective showing south side of new IWWTP with planted slope



Nearby Musqueam Marsh, north of Iona Island (Photo: Nick Page, used with permission)



Rendering showing view of the new IWWTP from the south; the planted slope of Area 18 (perimeter screening strategy "E") of Area 18 is along the east half of the plant. Not visible in this rendering is the steel screen fence (perimeter screening strategy "B") for this area, and the short retaining wall to help make up the grade change.

HABITAT TYPES:

- Riparian forest

RECOMMENDED PLANT SPECIES:

- Black cottonwood (*Populus trichocarpa*)
- Black hawthorn (*Crataegus douglasii*)
- Black twinberry (*Lonicera involucrata*)
- Common snowberry (*Symphoricarpos albus*)
- Pacific crab apple (*Malus fusca*)
- Dull Oregon-grape (*Mahonia nervosa*)
- Hardhack (*Spiraea douglasii*)
- Nootka rose (*Rosa nutkana*)
- Paper birch (*Betula papyrifera*)
- Red elderberry (*Sambucus racemosa*)
- Red-osier dogwood (*Cornus sericea*)
- Indian-plum (*Oemleria cerasiformis*)
- Willow species (*Salix sp.*)
- Note that native wetland plants may be able to be salvaged in this prior to construction and used for planting elsewhere on site.

SYNERGIES WITH OTHER SITEWORKS:

- There is potential to use the fill from the preload of the new IWWTP construction to build up the berms in this area.
- Native wetland plants to be salvaged prior to construction in this area and used for rehabilitation planting.

ESTIMATED QUANTITIES AND AREAS:

Refer to Ecology and Park Budget Technical Memorandum (attached to Basis of Cost Estimate in Appendix 43) for quantity and area assumptions.

TENURE CONSIDERATIONS:

- Adjacent to Iona Beach Regional Park boundaries
- GVSDD fee simple
- Designated Environmentally Sensitive Area by City of Richmond

INFORMATION NEEDS AND NEXT STEPS:

- The north boundary of the tidal wetland will require more precise delineation as part of permitting applications and habitat compensation discussions with regulators.

RELATED PROJECTS:

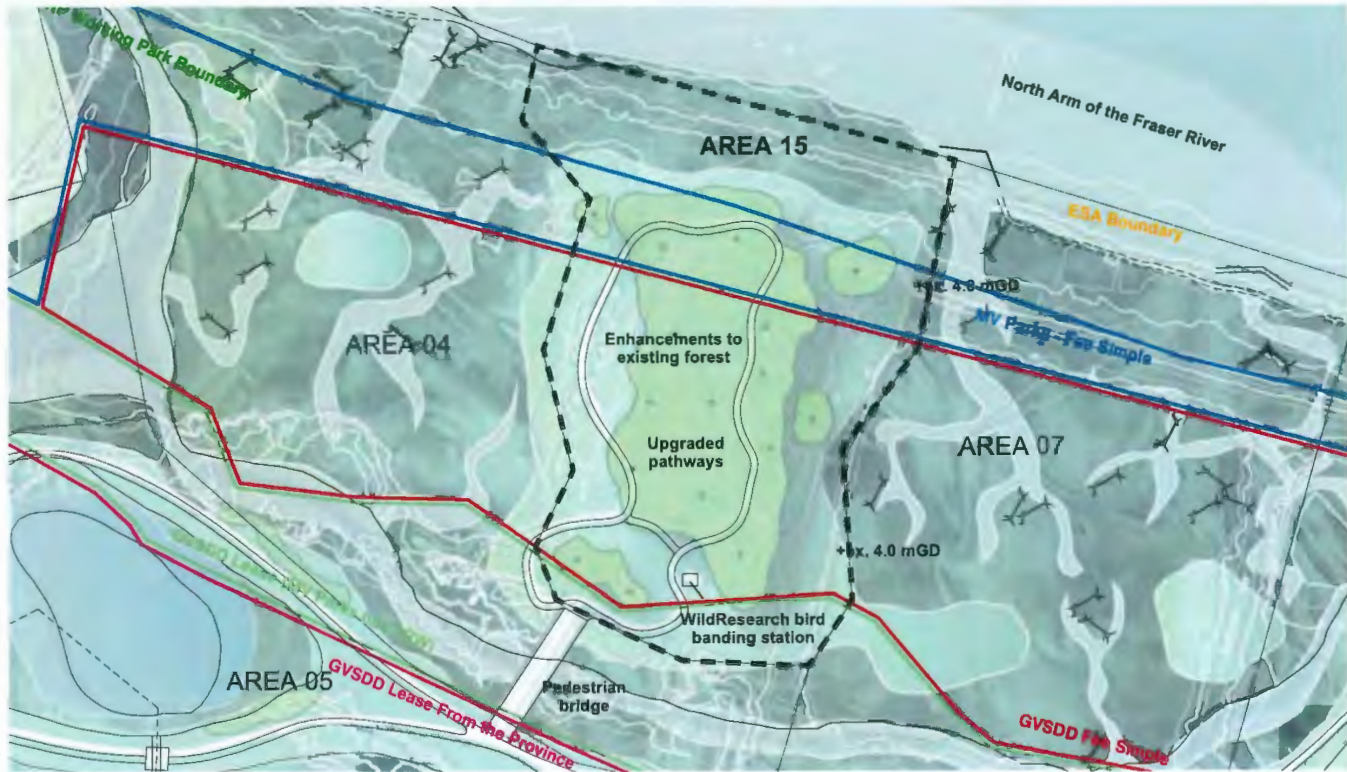
Portfolio E projects:

- Area 12, East island habitat restoration + park elements
- Area 15, Riparian forest - east
- Area 16, Riparian forest - east
- Area 20, Coastal sand ecosystem restoration work

Anticipated Plant Density of 2,000 shrubs and perennials per hectare, and 500 trees per hectare (corresponding to 0.2 shrubs per m² and 0.05 trees per m²)

RIPARIAN FOREST - CENTRAL

PROJECT PORTFOLIO E | TARGET CONSTRUCTION START: 2025



Area 15 protects the large patch of existing black cottonwood forest in the middle of Iona Island, while the adjacent north freshwater pond and north sludge lagoons will be converted to tidal marsh (Areas 04 and 07, respectively). This upland area plays an important ecological role for wildlife, supporting passerines, aerial insectivores, raptors, bats, other small mammals, amphibians and reptiles.

The existing forest in Area 15 currently has a narrow trail system within it, and a small bird banding station managed by a volunteer-based bird research group, WildResearch. The volunteers undertake bird monitoring and banding and have a number of mist net survey sites within and adjacent to the riparian forest; it is the intent to preserve the majority of these sites (minimum of 7 per birding research guidelines) and shift the locations of others, pending further discussions with WildResearch and Metro Vancouver Regional Parks during the next phase of work.

The existing trail will be upgraded to a 3-m-wide gravel path with sections of exclusion fencing to keep park users on the trail and protect sensitive species. This trail system will connect to the banding station and a future pedestrian bridge described in Area 04, which will be built over the tidal channels and connects to the rest of the park once Area 07 is completed (2035).

This area will also require invasive species management and infill planting with native trees and shrubs to enhance its ecological health. This work is planned to take place in 2025.

SITE ELEMENTS + DESIGN ASSUMPTIONS:

- **BRIDGE:** A pedestrian bridge over the south tidal channel in Area 04 will be implemented to access Area 15; see details under Area 04.
- **TRAILS:** A 3-m-wide gravel path loop with split rail exclusion fencing to keep park users on the trail and protect sensitive species. Refer to Metro Vancouver Regional parks standard details.
- **PLANTING:** New planting areas may benefit from soil amendment with Nutrifor; assume 150 mm mixed into planting holes.

HABITAT TYPES:

- Riparian Forest

RECOMMENDED PLANT SPECIES:

- Black cottonwood (*Populus trichocarpa*)
- Black hawthorn (*Crataegus douglasii*)
- Black twinberry (*Lonicera involucrata*)
- Common snowberry (*Symphoricarpos albus*)
- Pacific crab apple (*Malus fusca*)
- Dull Oregon-grape (*Mahonia nervosa*)
- Hardhack (*Spiraea douglasii*)
- Nootka rose (*Rosa nutkana*)
- Paper birch (*Betula papyrifera*)
- Red elderberry (*Sambucus racemosa*)
- Red-osier dogwood (*Cornus sericea*)
- Indian-plum (*Oemleria cerasiformis*)
- Willow species (*Salix sp.*)



Purple finch at Iona Island Bird Observatory (Photo: mele avery, CC by 2.0, <https://flic.kr/p/doJpLf>)



Existing riparian cottonwood forest in Area 15 (Photo: Jeff Cutler, space2place)



Rendering of existing cottonwood forest in Area 15, surrounded by newly created tidal marsh (Area 07 in foreground), looking west

SYNERGIES WITH OTHER SITEWORKS:

- Opportunity to use treated biosolids from IWWTP as part of restoration planting (that is, as Nutrifor soil amendment)

ESTIMATED QUANTITIES AND AREAS:

- Refer to Ecology and Park Budget Technical Memorandum (attached to Basis of Cost Estimate in Appendix 43) for quantity and area assumptions.

TENURE CONSIDERATIONS:

- METRO VANCOUVER Regional Parks - fee simple
- Within Iona Beach Regional Park boundaries
- GVSDD - fee simple
- GVSDD lease from Province - Parks SRW
- Provincial foreshore
- Designated Environmentally Sensitive Area by City of Richmond

INFORMATION NEEDS AND NEXT STEPS:

- **BIRD MONITORING:** This project area requires bird monitoring studies pre/during/post construction.
- **BAT SURVEYS:** Baseline bat surveys will be undertaken to confirm species presence, distribution and key habitat requirements.
- **FURTHER DISCUSSIONS:** Additional conversations between Metro Vancouver Regional Parks, WildResearch and other groups who use the area to be had during the development of the Iona Beach Regional Park management plan, and during detailed design.

RELATED PROJECTS:

Portfolio E projects:

- Area 12, East island habitat restoration + park elements
- Area 16, Riparian forest - east
- Area 18, South interface of WWTP with tidal marsh
- Area 20, Coastal sand ecosystem restoration work

Also see Project Areas 04, 05, 06 and 07 as these project areas abut Area 15.



Picnic shelter precedent at Surrey Bend Regional Park (Photo: Matthew Woodruff, Local Practice, photo used with permission)



A perspective view showing the character of the knolls and paths.



Rendering of the central amenity area and new freshwater wetland to the left

RECOMMENDED PLANT SPECIES:

Herbaceous plants:

- Red fescue (*Festuca rubra*); 15 to 120 cm tall
- Dune wildrye (*Leymus mollis*); 50 to 150 cm tall
- Yarrow (*Achillea millefolium*); 10 to 100 cm tall
- Douglas seashore lupine (*Lupinus littoralis*); low ground cover
- Chickweed (*Cerastium sp*); 5 to 50 cm tall
- Barestem desert-parsley (*Lomatium nudicaule*); 20 to 90 cm tall
- Nodding onion (*Allium cernuum*); 10 to 50 cm tall
- Douglas' aster (*Aster subspicatus*); 10 to 100 cm tall
- Beach pea (*Lathyrus japonicus*); 10 to 150 cm long (trailing)
- Blanket flower (*Gaillardia aristata*); 20 to 70 cm tall
- Gumweed (*Grindelia stricta*); 15 to 80 cm tall
- Pacific coast strawberry (*Fragaria chiloensis*); 4 to 20 cm tall

Shrubs:

- Common snowberry (*Symphoricarpos albus*)
- Dull Oregon-grape (*Mahonia nervosa*)
- Nootka rose (*Rosa nutkana*)
- Red-osier dogwood (*Cornus sericea*) (dwarf variety)
- Black twinberry (*Lonicera involucrata*)
- Red flowering currant (*Ribes sanguineum*)
- Indian-plum (*Oemleria cerasiformis*)
- Pacific ninebark (*Physocarpus capitatus*)
- Tall Oregon grape (*Mahonia aquifolium*)

Trees:

- Pacific crab apple (*Malus fusca*)
- Black cottonwood (*Populus trichocarpa*)
- Black hawthorn (*Crataegus douglasii*)
- Shorepine (*Pinus contorta*)

SYNERGIES WITH OTHER SITEWORKS:

- Freshwater wetland recharged with high quality effluent from the new IWWTP.
- Opportunity to use Nutrifor soil amendment

ESTIMATED QUANTITIES AND AREAS:

Refer to Ecology and Park Budget Technical Memorandum (attached to Basis of Cost Estimate in Appendix 43) for quantity and area assumptions.

TENURE CONSIDERATIONS:

- GVSDD Fee simple
- GVSDD lease from Province, portion with Metro Vancouver Regional Parks SRW
- Designated Environmentally Sensitive Area by City of Richmond

INFORMATION NEEDS AND NEXT STEPS:

- **EFFLUENT STUDIES:** Additional investigations are needed to determine the ideal water quality parameters and volumes of the treated effluent going into the new freshwater wetlands.
- **GREEN ROOF + GEESE DETERRENENTS:** Additional development of the green roof and at grade planting in a way that deters geese.
- **RAPTOR PROTECTION PLAN** required to guide works around the existing eagle nest.

RELATED PROJECTS:

Portfolio D projects:

- Area 05, South pond enhancements + park enhancements
- Area 06 Southwest Lagoon Conversion to Freshwater Wetland + Lookout Tower