



**metrovancouver**  
SERVICES AND SOLUTIONS FOR A LIVABLE REGION



# The Future of Flushing

## LIONS GATE SECONDARY WASTEWATER TREATMENT PLANT

Paul Dufault, M.Eng., P.Eng.

PROJECT MANGER – LGSWWTP

British Columbia Expropriation Association, October 28, 2016



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# Outline

- Metro Vancouver
- Defining the Project
- Allocation of Costs
- Selecting a Project Delivery Approach
- Senior Government Funding
- Procuring the Project



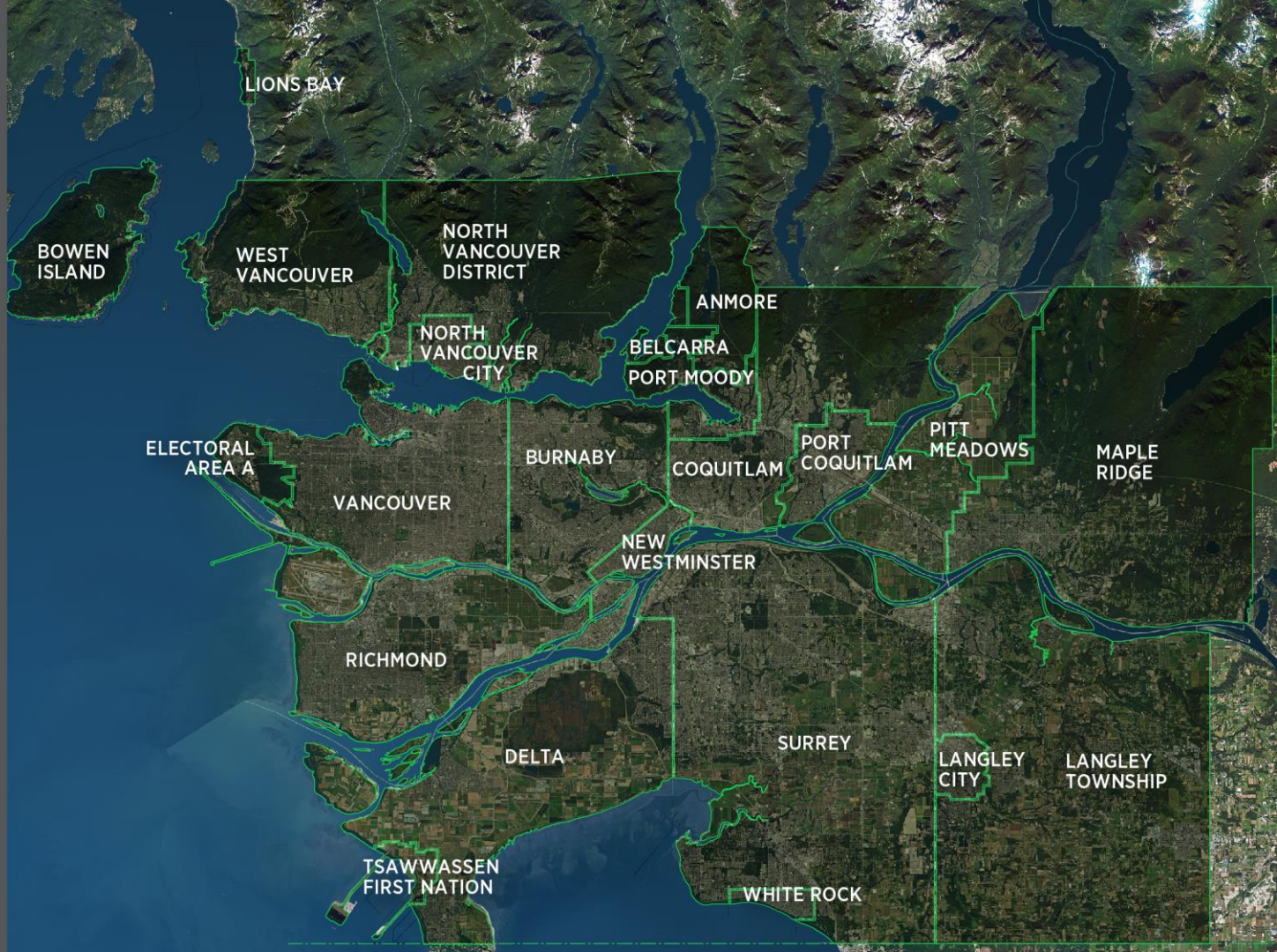
An aerial photograph of Metro Vancouver, showing the city's dense urban landscape, the Fraser River, and the surrounding mountains. The text "Metro Vancouver" is overlaid in white on a dark, semi-transparent rectangular background.

# Metro Vancouver

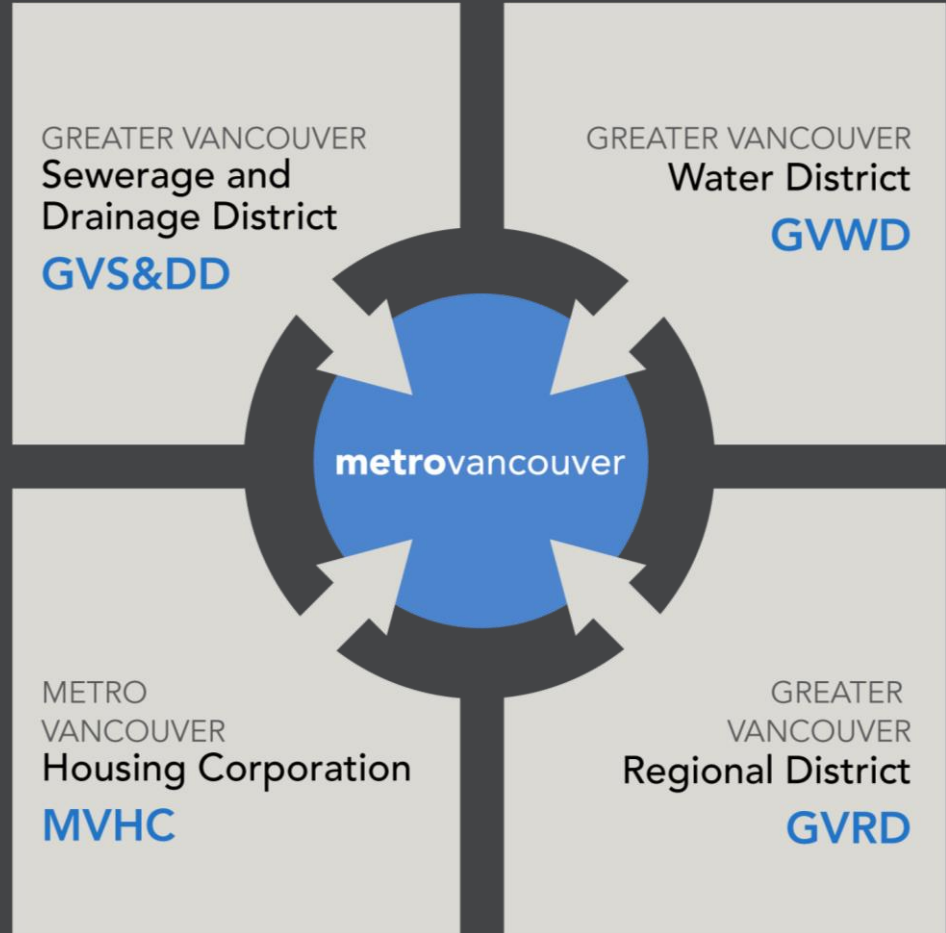


# Metro Vancouver

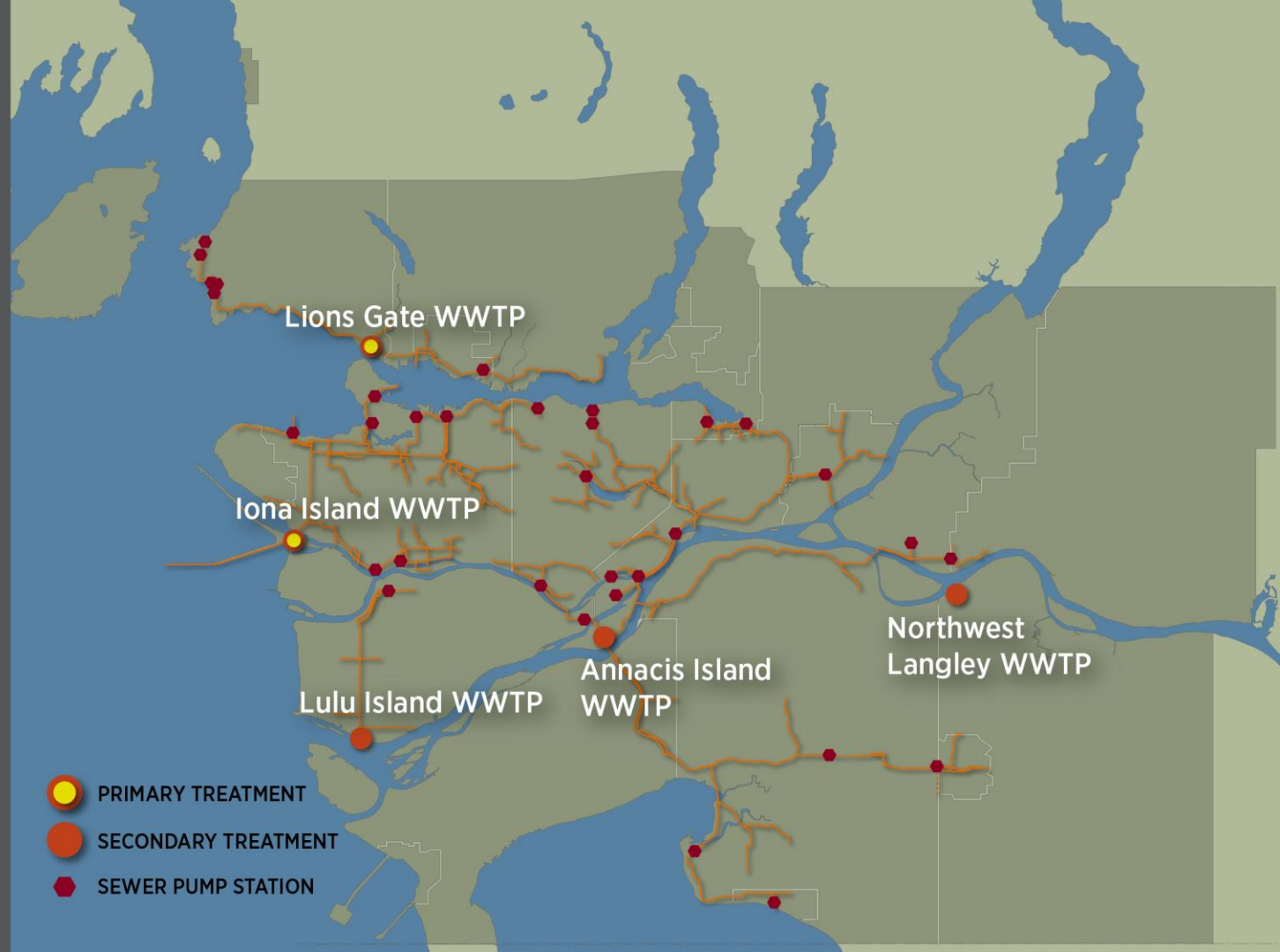
21 municipalities  
one Electoral Area  
and one Treaty First  
Nation working  
together for  
a livable region



# Metro Vancouver Services



# Metro Vancouver Waste Water Treatment Plants







Lions Gate Wastewater Treatment Plant - 1961



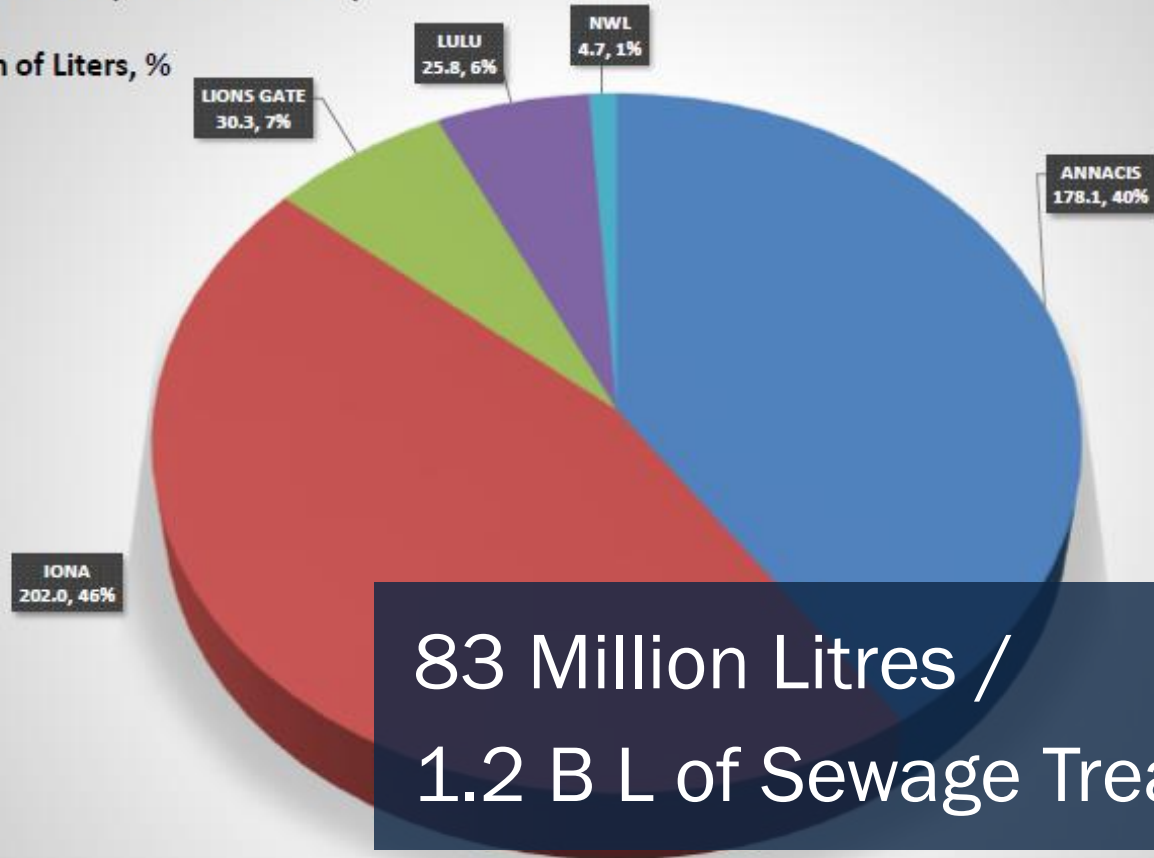


Lions Gate Wastewater Treatment Plant

TOTAL FLOW (440 Billion Liters)

2014

Billion of Liters, %



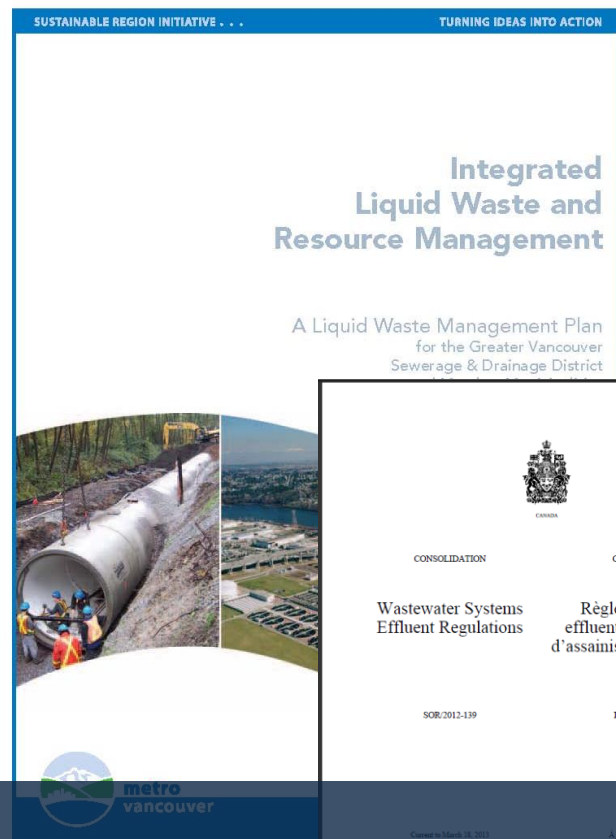
83 Million Litres /  
1.2 B L of Sewage Treated each day

WWTP Flow Distribution



# Regulatory Drivers

- Integrated Liquid Waste and Resource Management Plan – 2011
- Wastewater Systems Effluent Regulations - 2012



**SECONDARY TREATMENT**

**LIONS GATE WWTP BY DECEMBER 31, 2020**

**IONA ISLAND WWTP BY DECEMBER 31, 2030**



Existing Treatment  
Plant Site

Existing Outfall

New Treatment  
Plant Site

New Site





Spirit Trail

Norgate  
Residential  
Community

Light Industry/  
Commercial



Future  
Harbourside  
Development

Pemberton Ave  
Pocket Estuary

Railroad Tracks

Future Philip Ave  
Overpass



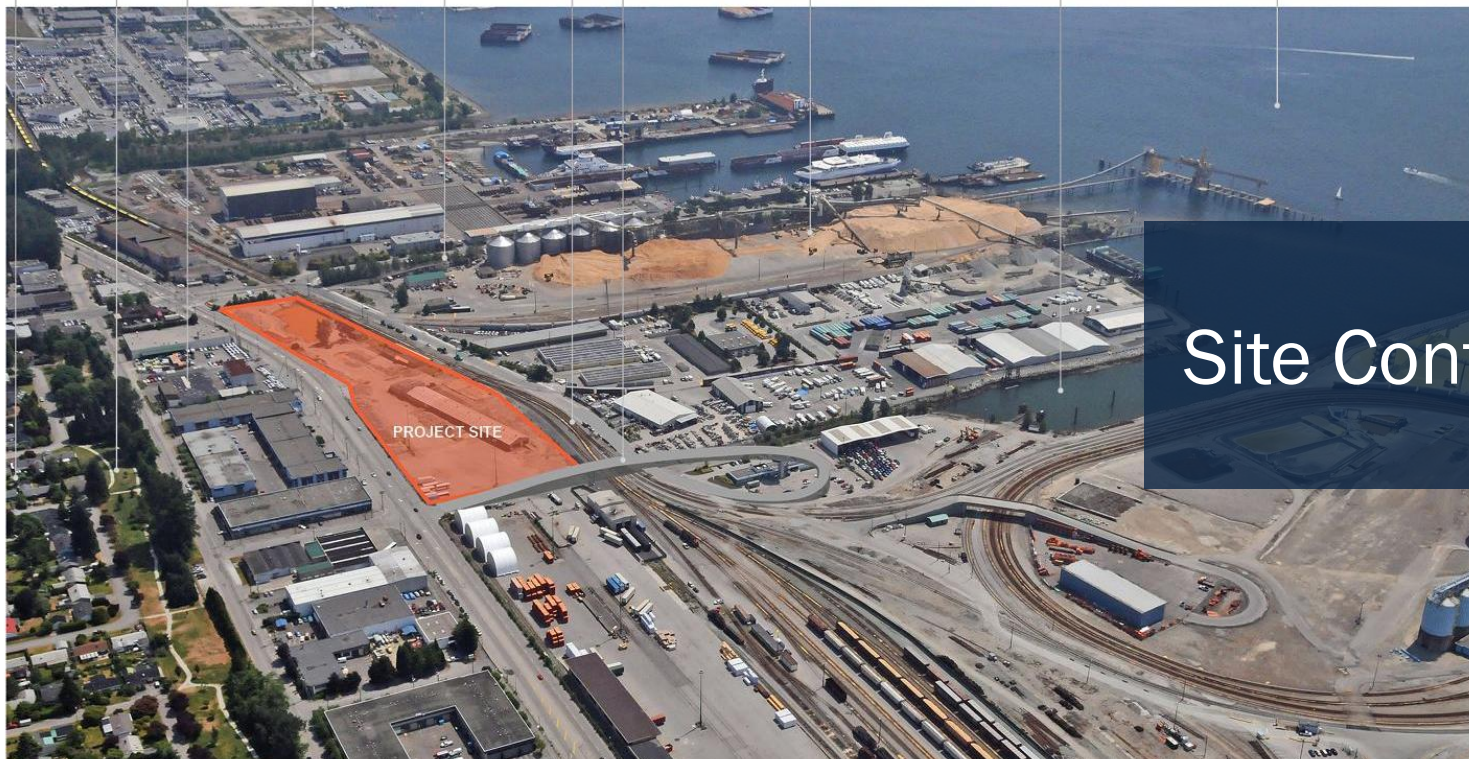
Heavy Industry



Philip Ave  
Pocket Estuary



Burrard Inlet



## Site Context



## Site Hazards





Integrative Design  
*Everyone Engaging Everything Early*

# COMMUNITY ENGAGEMENT

## WHO?

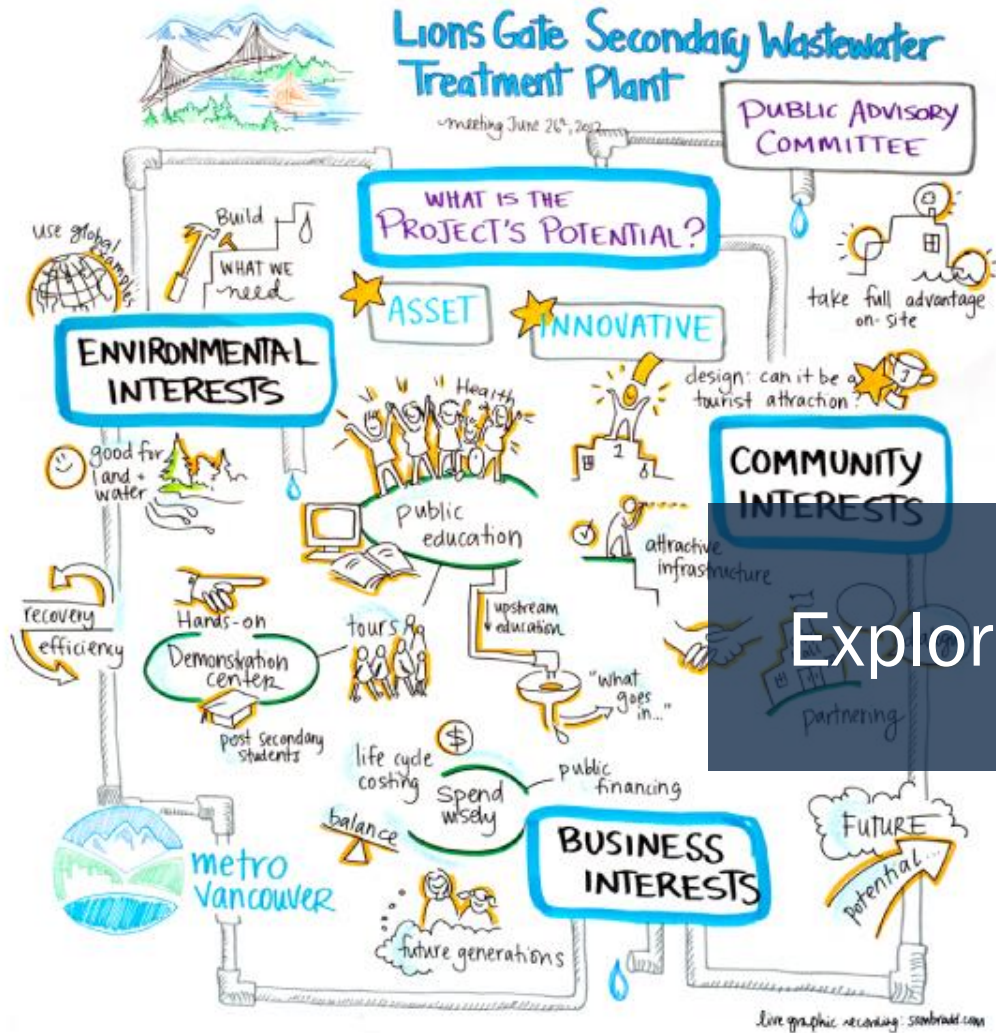
- Political Representatives
- Government staff
- First Nations
- Public

## HOW?

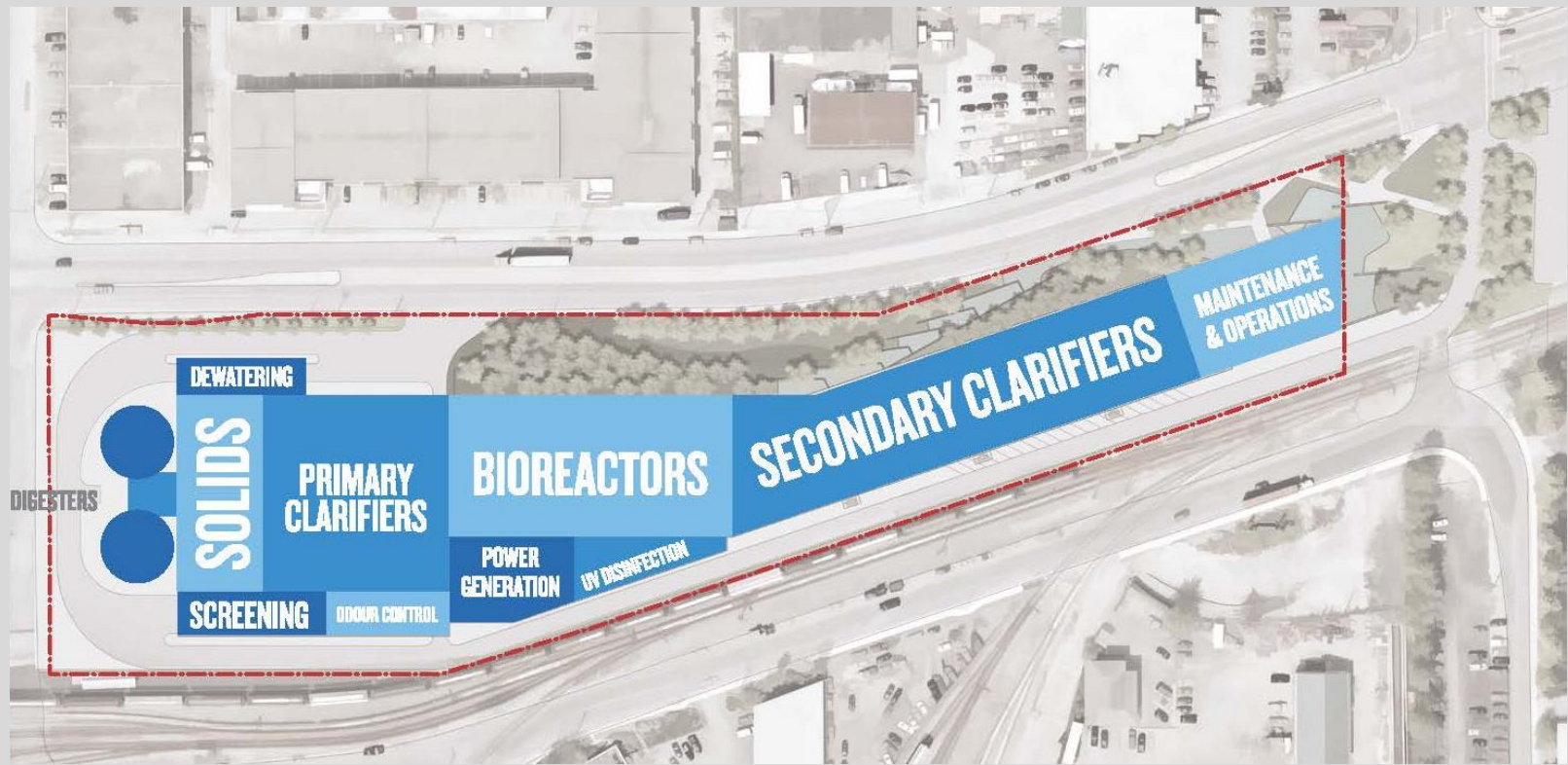
- Presentations
- Workshops
- Meetings
- One-on-One Consultations
- Community Events
- Social Media & Project Website







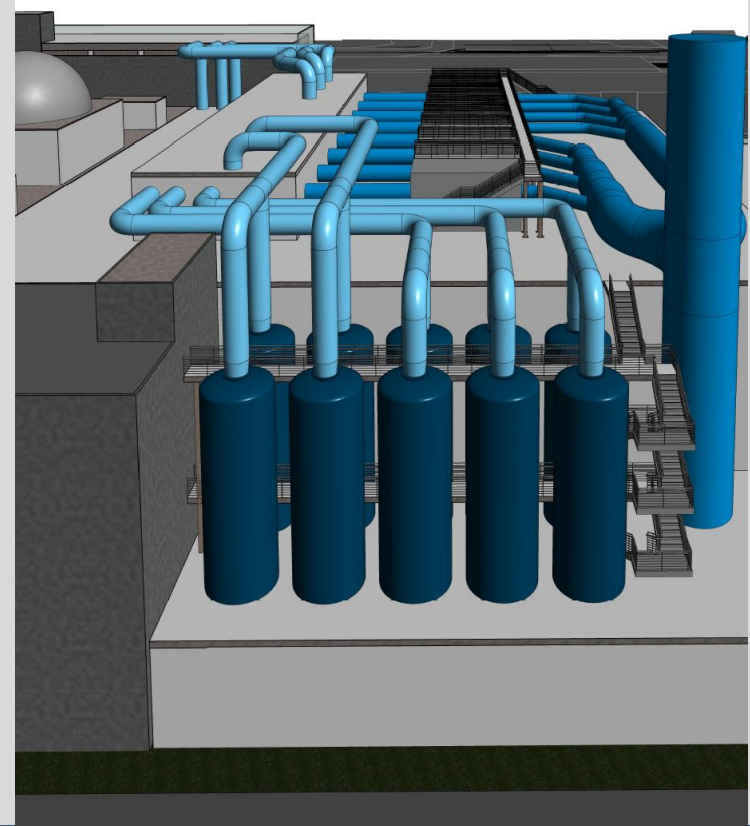
## Exploring Potential



Provides Secondary Treatment



- Meets regulatory requirements
- Low life-cycle costs relative to other wastewater treatment technologies
- Can be modified to adopt new technologies
- Robust odour control strategy

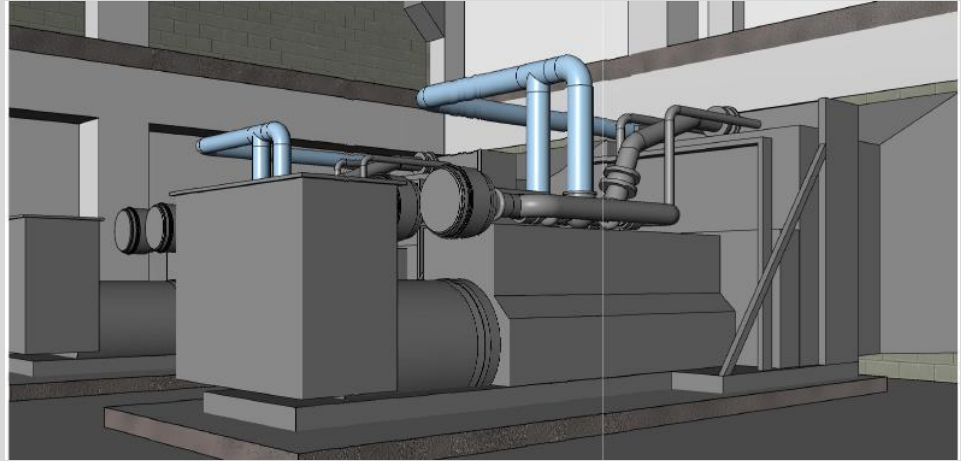


## Robust Systems

- On-site Power Generation

- Standby Diesel Power Generator
- Biogas - CoGeneration

SITE GRADE ELEVATION ~ EI. 3.0



All critical systems above the Flood Control Elevation of 6.0 m

Resilient

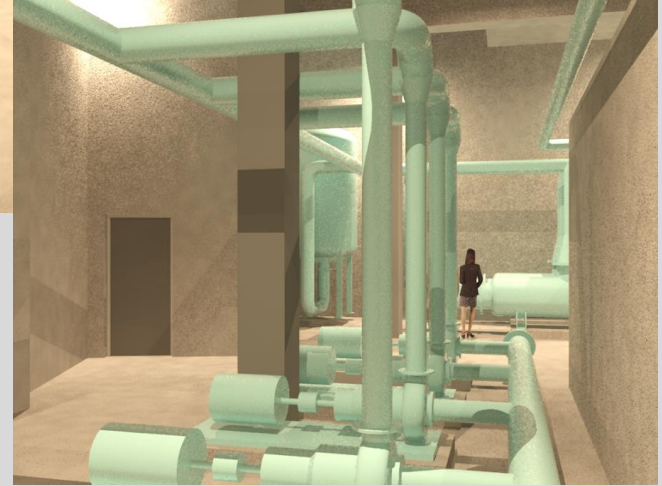
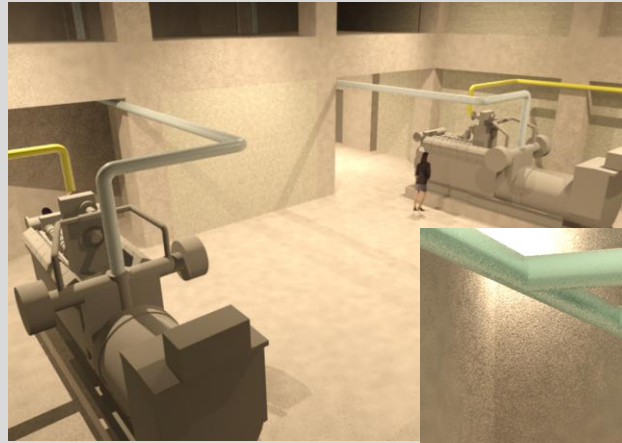


- Energy efficiency
- Water conservation and reuse
- On-site storm water management
- Construction waste reuse and recycling



## Sustainable Design

- On-site energy generation
- Reclaimed water
- Class A Biosolids
- Capability for future phosphorus recovery



## Recovers Resources



- Potential for partnering to provide effluent heat as part of a District Energy Systems
- With effluent heat recovery the facility is energy positive.



## Recovers Resources



# Community Integration



# Community Values and Interests for the Design of the Lions Gate Secondary Wastewater Treatment Plant

Submitted by:

Lions Gate Public Advisory Committee

Submitted to:

*“We had genuine discussion. Metro Vancouver gets it. This was consultation that was iterative and responsive. It has been a conversation that is respectful and allowed us to express a wide range of diverse opinions.”*

October 21, 2013

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# Program Budget

	LGSWWTP	Conveyance	Decommissioning	Total
Construction	\$ 375 M	\$ 33 M	\$ 10.7 M	\$ 418.7 M
Professional Fees	\$ 56 M	\$ 5 M	\$ 1.6 M	\$ 62.6 M
Management & Administration	\$ 19 M	\$ 2 M	\$ 0.6 M	\$ 21.6 M
Subtotal	\$ 450 M	\$ 40 M	\$ 12.9 M	\$ 502.9 M
Contingencies	\$ 100 M	\$ 13 M	\$ 2.6 M	\$ 115.6 M
Escalation	\$ 70 M	\$ 7 M	\$ 4.5 M	\$ 81.5 M
Total	\$ 620 M	\$ 60 M	\$ 20 M	\$ 700 M



# Project Definition Report & Indicative Design



SERVICES ▾ BOARDS ▾ MEDIA ROOM ▾ EVENTS ▾ DOING BUSINESS ▾ ABOUT US ▾

## About the Design

[Home](#) > [Services](#) > [Liquid Waste](#) > [Public Consultations](#) > [New Lion's Gate Wastewater Treatment Plant](#) > [About the Design](#)

### Indicative Design (complete)

The Project Definition phase culminated with a Project Definition Report which defines the scope of the project, establishes the project budget, and includes the Indicative Design. Project specifications will be developed, based on this report, for the three Design-Build-Finance teams that will be selected to prepare bids to design and construct the new plant.

The Project Definition Report is available at the bottom of this page.

 [Indicative Design Summary Report](#)

### ARTIST RENDERINGS



### RELATED LINKS

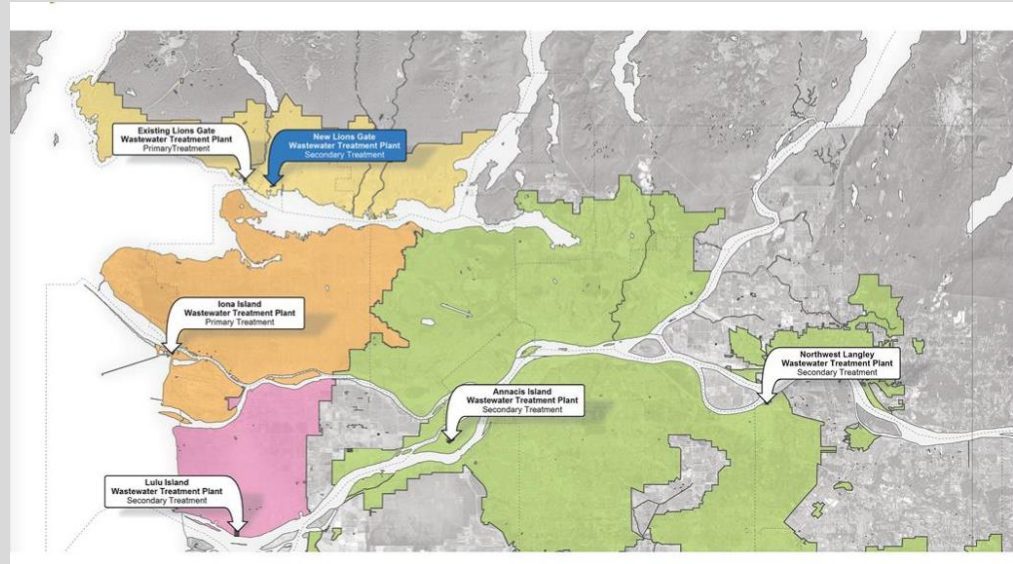
[Community Input](#)  
[Procurement & Funding](#)  
[Project Timeline](#)  
[Why build a new  
wastewater treatment  
plant?](#)

## LIONS GATE SECONDARY WASTEWATER TREATMENT PLANT INDICATIVE DESIGN SUMMARY REPORT

October 2013

# Cost Allocation

- Tier I
  - 100 % within the Service Area
- Tier II
  - 30% within the Service Area
  - 70% shared throughout the Region





# **Metro Vancouver Lions Gate Secondary Wastewater Treatment Project**

Procurement Options Analysis and  
Value for Money

January 2014

## **Project Procurement**

# Project Packages

## *Lions Gate Secondary Wastewater Treatment Plant*

- Single Construction Package

## *Conveyance between existing WWTP and new secondary wastewater treatment plant and outfall*

- Design-Bid-Build (DBB) Procurement

## *Decommission existing WWTP*

- Deconstruction and Site Clean Up - Request for Proposal



# Procurement Options

- Design Bid Build (DBB)
- Design Build (DB)
- Design Build Finance (DBF)
- Design Build Operate Maintain (DBOM)
- Design Build Finance Operate Maintain (DBFOM)



# Financial Modelling

## Risk-Adjusted Cashflow Net Present Value Results

	DBB	DB(f)	DBFOM
Procurement, Construction and Contract Management	\$ 504 M	\$ 476 M	\$ 474 M
Incremental Financing		\$ 0.2 M	\$ 29 M
Operations and Maintenance	\$ 101 M	\$ 101 M	\$ 99 M
Retained Risk Allocation	\$ 6.3 M	\$ 7.4 M	\$ 6.8 M
<b>Total Net Present Value</b>	<b>\$ 611 M</b>	<b>\$ 585 M</b>	<b>\$ 609 M</b>

- Based on a discount rate of 6%.

# Utilities Subcommittee Conclusions

- Anticipated difference in costs are within 5% of the total program costs.
- Primarily due to the efficiencies gained, the DBf procurement option, always results in the lowest NPV/ highest value for money.
- Operating the wastewater system as an integrated system provides significant value that includes the ability and flexibility to adapt to changing conditions over time without the added complexity of a contracted third party operator





# Partnerships BC Review

- Partnerships BC retained by the Province to review the Value for Money Report.
- Considered the overall magnitude of the risks relatively low than other reference projects and the private sector weighted cost of capital should be used as the discount rate.
- Agreed with a Design Build and finance approach but felt the level of construction financing should be increase.

DB(f) → DBF  
10% → 35%

# Funding Programs Available (2014/2015)

## New Building Canada Plan

- *10 year Program*
- *\$ 1.1 Billion for BC*
  - *10% allocated specifically for small communities*
- *Up to 33% Contribution (maximum federal commitment)*
- *Provincial participation expected*
- *P3 Screening required for projects > 100 M (Value for Money)*

## P3 Canada Fund

- *Additional 5 year program*
- *\$ 1.25 B for all of Canada*
- *Up to 25% Contribution*
- *No Provincial participation*
- *Must be a P3 Project (DBFOM)*

**Provincial Priority ?**

**Declined**

## LIONS GATE SECONDARY Wastewater Treatment Plant

As part of Metro Vancouver's responsibility to protect and enhance the natural environment, a new secondary wastewater treatment plant will be built on the North Shore.



## LIONS GATE SECONDARY WASTEWATER TREATMENT PLANT BUSINESS CASE

# Business Case Submission 2015

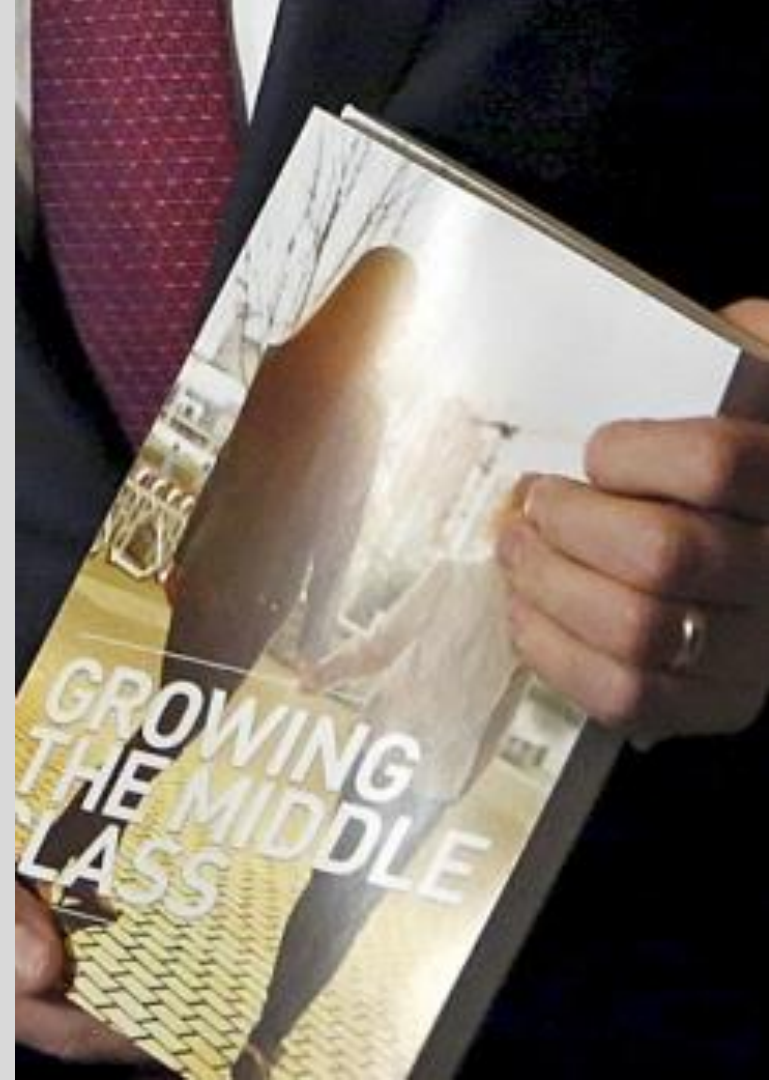


# GOVERNMENT OF CANADA BUDGET 2016

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*“Many communities have already identified projects that are ready for immediate investment by the federal government, including”:*

*“\$212 million to upgrade the Lions Gate Wastewater Treatment Plant to make it resilient to climate events. This facility provides primary treatment of wastewater for residents of the District of West Vancouver, the City of North Vancouver and the District of North Vancouver, .....”*



# DBF CONTRACT SCOPE

- Design & Construct
- Commissioning & Acceptance Testing
- *Operation & Maintenance during 1 Year Performance Period*
- Handover & Training
- Construction Period Financing

Milestone Payments (~ 30-40 %)



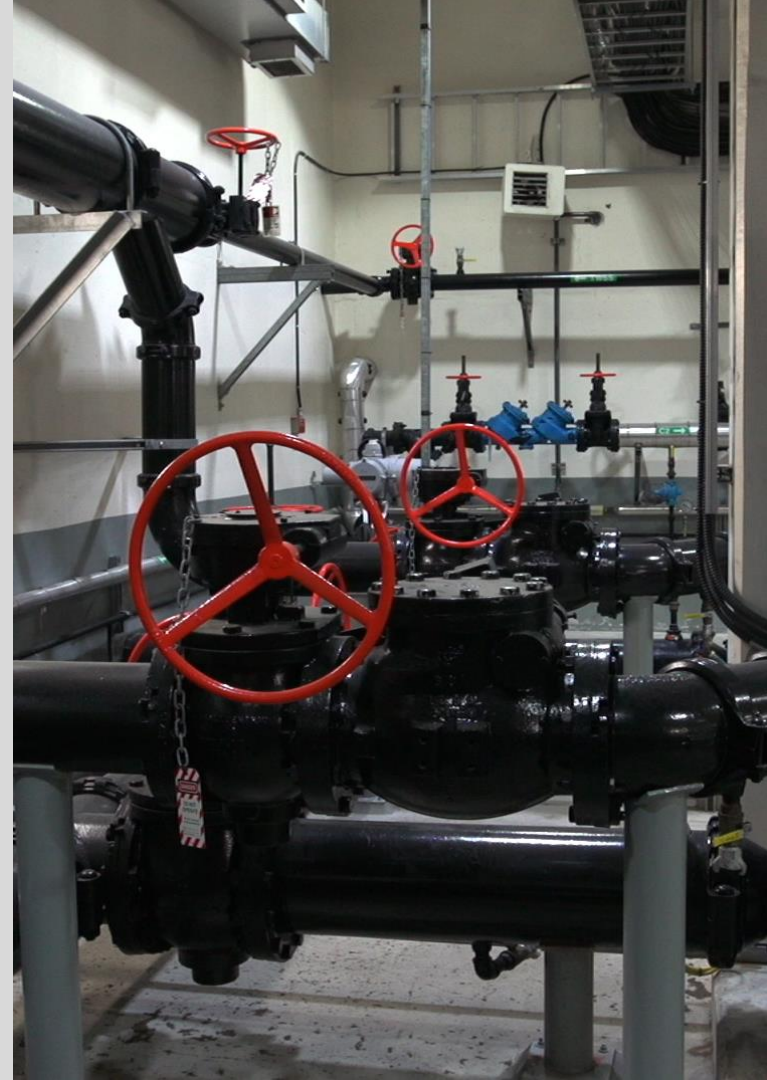
# RFQ STAGE

- Invite interested parties to submit Responses indicating their interest in, and qualifications for the Project.
- Shortlist of up to 3 Proponents will be invited to participate in the Request for Proposals stage.

SEPTEMBER

28

2015





# INVITED PROPONENTS

## ADApT Consortium

- Acciona, Dialogue, Amec Foster Wheeler, Tetra Tech

## PCL Partnership

- PCL Constructors Westcoast Inc, North American Construction/NAC Constructors

## First Narrows Partnerships

- CH2M Hill Canada, EllisDon Inc, Kenaidan Contracting Ltd.



# RFP SCHEDULE

- Issued – April 13, 2016
- Technical Submissions – November 29, 2016
- Financial Submissions – January 26, 2017
- Selection of a Preferred Proponent – February 2017
- Financial Close – April 30, 2017

Request for Proposal

**Greater Vancouver Sewerage and Drainage  
District**

**Lions Gate Secondary Wastewater Treatment  
Plant Project**

RFP #16-004

April 13, 2016







Questions?



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