To: Utilities Committee

From: Marie Griggs, Manager, Public Involvement, Liquid Waste Services

Date: October 23, 2013 Meeting Date: November 7, 2013

Subject: **Engagement and Consultation Results: Project Definition Phase for Lions Gate Secondary Wastewater Treatment Plant**

RECOMMENDATION

That the GVS&DD Board receive for information the report titled "Engagement and Consultation Results: Project Definition Phase for Lions Gate Secondary Wastewater Treatment Plant" dated October 23, 2013.

PURPOSE

To summarize the engagement and consultation program and input received between February 7, 2012 and October 29, 2013 for the Lions Gate Secondary Wastewater Treatment Plant (LGSWWTP) Project Definition.

BACKGROUND

The engagement and consultation program (the program) for the LGSWWTP reflects Metro Vancouver's (MV) commitment to consult and communicate on major plans, projects, and initiatives as outlined in the *Integrated Liquid Waste and Resource Management Plan* (ILWRMP) approved by the BC Minister of Environment in 2011. Upgrading the Lions Gate wastewater plant to secondary treatment by 2020 is an ILWRMP action. MV will continue the program with affected communities during all phases of the new plant development which include: Phase 1 – Project Definition, Phase 2 – Design and Construction and Phase 3 – Decommissioning the Existing Plant.

During the development of the LGSWWTP Indicative Design, described in a separate report to the Board, members of the project team regularly provided information for and received feedback from the community. Community interests and concerns were reported to the team and the Utilities Committee for consideration at each stage of development.

DISCUSSION

The following sections describe the program objectives, and include audiences and their associated activities, and a summary of issues raised by the public.

OBJECTIVES

The program was established to involve a range of audiences including MV and local residents and businesses, key interest groups, MV members, government agencies and affected First Nations. Ninety-five (95) meetings and presentations occurred during the engagement and consultation period and have been summarized in Attachment 1. Objectives included providing information about the project, links to the ILWRMP, and the opportunities to provide input; working in collaboration with North Shore municipalities to promote collaborative community engagement; and providing specific input opportunities for local residents affected by the construction and operation of the new project.

PROGRAM COMPONENTS

Public

Opportunities for all MV residents to learn about and comment on the LGSWWTP Project Definition were provided through a MV project webpage, an email database, and two public meetings (April 24 and October 10, 2013). The first meeting (110 attendees) focused on the three build scenarios and the second (50 attendees) on the Indicative Design, project delivery, Value-for-Money analysis, and the engagement process. Both meetings had an open house component with presentations by the project team and input opportunities through forms, discussion, and keypads for real-time results.

Norgate Residents and Businesses

The Norgate community, including its residents and businesses, is the closest neighbourhood to the new plant. Early engagement was important for identifying potential community impacts of the plant function and design. In addition to the public meetings, Norgate residents were involved through: a meeting with the executive of Norgate Park Community Association to seek input on engagement methods; four Norgate residents were appointed to the Lions Gate Public Advisory Committee; an open house; a MV booth at a Norgate block party; and a residents' workshop on the consultation process and design strategies to address community impacts.

MV received feedback from Norgate businesses that they wanted separate forums for participation. Input opportunities included: three meetings; one-on-one meetings to address potential operational impacts of the LGSWWTP; individual meetings with large industrial businesses to explore integrated resource recovery opportunities; and, a door-to-door survey of local businesses (May 31, 2013). The results of the survey indicated that sixty-nine per cent (69%) of the 70 respondents were aware of the project, and the greatest interest and concerns were from businesses adjacent to the project site.

Lions Gate Public Advisory Committee (LGPAC)

The LGPAC is composed of 11 members and eight alternates representing the North Shore communities including local residents (Norgate); environmental (North Shore and regional) and business interests; and, non-affiliated residents. They provide advice to MV on the effects of planning and construction of the LGSWWTP. Members were appointed by MV in consultation with North Shore municipalities. At the end of the Project Definition phase, MV will review the terms of reference and may revise the membership for the next phase of the project.

Information and opportunities for input were provided to LGPAC through technical workshops and meetings. Members were invited to attend Community Workshops that were also open to members of the Community Resource Forum (CRF), described below. Two LGPAC representatives attended the Washington State Study Tour of four wastewater treatment plants (June 12-13, 2013). Four members from LGPAC received a tour of the existing Lions Gate Treatment Plant. The Chair and Vice-Chair of LGPAC made presentations to the Lions Gate Intergovernmental Advisory Committee (see description under MV Members and Committees) and provided presentations to the Utilities Committee at their regular meeting on October 3, 2013. Attachment 2 contains the LGPAC report on the Project Definition phase and is also summarized in the Public Input section of this report.

Community Resource Forum (CRF)

The CRF was formed to provide a venue for community representatives with a strong interest in the development of the LGSWWTP and to provide more in-depth information and opportunities for input. CRF members include representatives of community, environmental, business and academic organizations. Specific CRF workshops were held and members attended Community Workshops with the LGPAC (described above). CRF membership, currently at 37, is open to the public.

Metro Vancouver Members and Committees

Regular opportunities for input and presentations to representatives of member municipalities occurred through MV committees of the Board, advisory committees, and Mayors and Councils. Presentations were made quarterly to the MV Utilities Committee and at special workshops. Invitations to the workshops were provided to the MV Finance and Intergovernmental and Administration Committees. The quarterly reports were also presented to the Regional Engineers Advisory Committee. North Shore Mayors and Councils were updated through both individual presentations and workshops for all three councils. Two presentations were also made at the Council of Councils. The Lions Gate Intergovernmental Advisory Committee (LGIAC) with representation from senior staff of MV, the North Shore, Federal and Provincial agencies and the Squamish and Tsleil-Waututh Nations, met with MV monthly to receive updates and provide feedback as the project progressed, and several members attended the Washington State Study Tour. A progress update on the Project Definition was given to the Integrated Utilities Management Advisory Committee, established to advise on implementation on MV's three utility management plans (water, liquid and solid waste).

Provincial and Federal Agencies

Staff met regularly with the Ministry of Environment to provide updates and discuss terms of the Operational Certificate for the new plant, a requirement of the Project Definition. Four presentations were made to the Liquid Waste Management Plan Environmental Monitoring Committee (EMC) that includes representation from the Ministries of Environment and Agriculture, Vancouver Coastal Health Authority and Port Metro Vancouver.

First Nations

Both Squamish and Tsleil-Waututh Nations are represented on the LGIAC and have attended regular meetings. Meetings are also being held with Squamish Nation to discuss areas of mutual interest. During the engagement and consultation period, letters were sent to First Nations bands, councils, nations and treaty groups that have traditional territories that lie within, overlap with, or have interests within the project area, advising them of the project milestones and input opportunities.

Supporting Communication Activities

Activities to support the program included: databases of potentially affected and interested parties, a voluntary email list (51 members); thousands of invitations and notifications to interested and affected parties; advertisements in local newspapers; posters at community venues; MV project website and links to North Shore websites; hard copy and online feedback forms; media relations support; local businesses contacted through flyers (1,000), phone calls, and email; and a specialized web portal for LGPAC members.

Public Input

The Norgate community and other North Shore residents were the most active participants in the public meetings and on-line surveys: (86% of participants at the April public meeting and 75 % of participants at the October public meeting) and 58% of the respondents to October online survey. Regional interests focused primarily on cost-sharing and overall project costs.

Throughout the Project Definition phase, MV received public input via meetings described above and through a variety of tools including: verbal input, 49 online survey responses, 70 responses to the local business survey, 105 responses through feedback workbooks, 70 public consultation process survey forms, and over 600 pieces of correspondence.

Wherever possible, the project team incorporated community feedback into the Indicative Design. At the October 10th public meeting, a real-time survey found that 78% of respondents either agreed or strongly agreed that the Indicative Design responds to community values and 58% either agreed or strongly agreed that the Indicative Design addresses potential community impacts. During the meeting, in follow-up discussion with the participants, they indicated that the most significant outstanding issues related to construction impacts, cost for taxpayers, and ensuring odour control. The consultation process undertaken for the first phase was generally well-received and MV has committed to ongoing in-depth planning with the community prior to construction.

Lions Gate Public Advisory Committee Input

LGPAC has identified recommendations that support the Indicative Design and that reflect community priorities. Of particular importance is need for odour control, restricted truck traffic and mitigating the potential for noise impacts on the community. These priorities are addressed in the recommended Indicative Design for the treatment plant. The LGPAC was positive about the aesthetic design of the new treatment plant and has provided suggestions for enhancing the look and feel of the building. They strongly support the need for public education about source control and water use, both as a means to reduce the amount and type of contaminants flowing into the new treatment plant, and to help minimize treatment costs. An important area of concern is the anticipated cost of the new treatment plant and its potential impact on ratepayers. LGPAC is supportive of pursuing federal and provincial funding and of looking at options to reduce costs to the taxpayer. Overall, LGPAC supports the engagement process and the input they have had on the design of the new treatment plant. LGPAC members support continued engagement through the procurement and construction phases, an ongoing role for LGPAC and broader community engagement.

Summary of Key Public Issues

The following summary captures issues that emerged as the most significant for the public during the Project Definition phase and how they have been addressed. A detailed list of issues and MV responses from the Project Definition phase can be found in Attachment 3.

Odour – Odour remained the top issue and was shared by all audiences: for example, 67% of respondents to the real-time survey at the first public meeting and 61% of respondents to the local business survey. In response, MV made an early commitment to an effective odour control system. LGPAC members who attended the Study Tour reported to the community on the lack of odour at these plants which helped to alleviate community concerns. The level of odour control in the Indicative Design is generally accepted by the community with the caveat that this should be a non-negotiable component moving forward and not subject to changes in project funding or costs.

Air quality – Norgate residents expressed concern with the potential impact of plant emissions on air quality. In response, MV is installing an air quality monitoring station at the project site to collect baseline data, and will build it into the operating plant. Norgate residents have also requested a monitoring station in their community.

Traffic impacts – Traffic impacts (particularly trucks) were a concern for Norgate residents and businesses: this was the third issue of concern (8%) at the first public meeting and for one-third of the businesses surveyed (33%). Related issues are congestion, safety, and noise particularly at night. The Indicative Design addressed these issues through not bringing food waste on site and assurance that truck traffic would be restricted to daytime hours and 1-2 trips per day.

Aesthetics – The aesthetics of the plant were of particular interest to businesses adjacent to the site since many have on-site customers. Adequate landscaping, massing, and treatment were identified as

important design considerations, and the Indicative Design was generally well-received in addressing these issues.

Noise –The local community has historically had issues with noise from waterfront industrial activities. It is hoped that the treatment plant will block or absorb some of this noise. Addressing the potential for the plant to reflect noise into the community remains a future consideration. Additional concerns related to noise are activities associated with the construction phase such as pile driving.

Community amenity – There is interest and support from businesses and residents for the plant to provide community amenities such as public space at the foot of Pemberton, meeting rooms and a viewing area facing the port, as well as potential commercial use of the roof space (e.g. greenhouses). If substantial additional costs were required for these amenities, seeking additional funding sources such as private partnerships was supported. There were divergent opinions on how publically accessible the plant should be. The Indicative Design suggests the potential for an outdoor public space developed in cooperation with the District of North Vancouver as well as potential meeting space in the administration building.

Educational opportunities – Wastewater and water conservation education were consistently identified as a key opportunity. Suggestions ranged from a source control community education program to developing a centre in the plant through a community partnership as seen during the Washington State Study Tour. The Indicative Design includes potential space for educational opportunities.

Environmental impacts and long term planning – At the first public meeting environmental protection was the most supported project benefit (55%) with a focus on air and water quality. In the initial development of the project the opportunity for tertiary treatment was supported by environmental groups, the Tsleil-Waututh Nation and some community members. The business casing did not support the higher cost of tertiary treatment, but the Indicative Design allows for flexibility for upgrades to meet future higher environmental standards, and technological innovations, and responds to potential climate change and natural disaster impacts.

Cost *(cost sharing, allocation, amortization, project budget, cost recovery)* – Balancing good value to the community while keeping costs reasonable for the tax payer was an important community discussion. Ensuring that cost-effectiveness does not result in lower standards for some plant components, such as odour control, is also an ongoing concern. There was a desire by North Shore residents and the broader regional community to better understand how cost-sharing would be applied to the Lions Gate plant and future plant upgrades. How project delivery methods would impact the overall cost of the project and components of the plant such as accountability, innovation, and odour control standards was also raised for future discussions.

Integrated Resource Recovery *(IRR)* – There was strong interest across audiences from both an economical, environmental, and educational perspective. There is strong support for resource recovery management when economically and environmentally beneficial, and onsite demonstration opportunities such as a reclaimed water feature. Opportunities for nearby developments to utilize IRR from the site were also strongly supported. The Indicative Design contains several features that incorporate, or plans for, IRR opportunities.

Public health and safety – Concern was raised by some residents in Norgate around the use of chemicals such as chlorine and the potential for explosions on the site. To address this concern, MV explained that ultraviolet disinfection technology will be used and thereby will eliminate the safety concerns with use of chlorine.

Construction impacts – Norgate residents raised a number of potential community impacts that will be addressed during the Design and Construction phase, including the duration and intensity of pile driving and the cumulative impacts of traffic, noise and dust from the plant and other projects in or near the community.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

The engagement and consultation program for the LGSWWTP is undertaken through the Board approved Liquid Waste Services Public Involvement budget.

SUMMARY / CONCLUSION

This report outlines the activities and findings of the engagement and consultation program for the Project Definition phase of the LGSWWTP, which occurred between February 7, 2012 and October 29, 2013. The program involved a range of audiences including MV and local residents and businesses, key interest groups, MV members, government agencies and affected First Nations. Overall participants support the Indicative Design, with the understanding that engagement and consultation in the next phase will address cost, project delivery and short term construction impacts.

Attachments and References:

Attachment 1: Engagement and Consultation Events and Presentations, February 7, 2012 to October 29, 2013 (7956595)

Attachment 2: Lions Gate Public Advisory Committee report submitted to Metro Vancouver: Community Values and Interests for the Design of the Lions Gate Secondary Wastewater Treatment Plant (7964259)

Attachment 3: Issues, Comments, and Metro Vancouver Responses, Lions Gate Secondary Wastewater Treatment Plant, Project Definition Phase, February 27, 2012 to October 29, 2013 (7737583)

7961213

Table 1 - Public and Community Engagement and Consultation Events and Presentations, February 7, 2012 to October 29, 2013

Meeting / Event Type	Date	LGPAC	CRF	Norgate Residents	General Public	Norgate Businesses
Community Resource Forum	1-Nov-12		✓			
Community Resource Forum	23-May-13		✓			
Community Workshop	10-Sep-12	✓	✓			
Community Workshop	14-Nov-12	✓	✓	✓		✓
Norgate Open House	7-Mar-13	✓		✓		
Community Workshop	27-Mar-13	✓	✓			
Community Workshop	18-Apr-13	✓	✓			
Community Workshop	31-May-13	✓	✓			
Community Workshop	17-Sep-13	✓	✓			
LGPAC	10-Sep-12	✓				
LGPAC	30-Oct-12	✓				
LGPAC	26-Jun-12	✓				
LGPAC	6-Feb-13	✓				
LGPAC	9-Jul-13	✓				
LGPAC	10-Sep-13	✓				
LGPAC	7-Oct-13	✓				
LGPAC Tour - Existing LGWWTP	13-Aug-13	✓				
Local Business	18-Sep-13					✓
Local Businesses	4-Jun-13					✓
Norgate Community Association	7-Mar-12		✓	✓		
Norgate Residents' Block Party	10-Aug-13		✓	✓		
Norgate Residents' Workshop	4-Sep-13		✓	✓		
Public Meeting	24-Apr-13	✓	✓	✓	✓	✓
Public Meeting	10-Oct-13	✓	✓	✓	✓	✓
Number of Meetings by Invited Audience	All	**21**	**13**	**7**	**2**	**5**
Total Meeting and Events	**24**					

Community Resource Forum (CRF)
Lions Gate Public Advisory Committee (LGPAC)

7956595

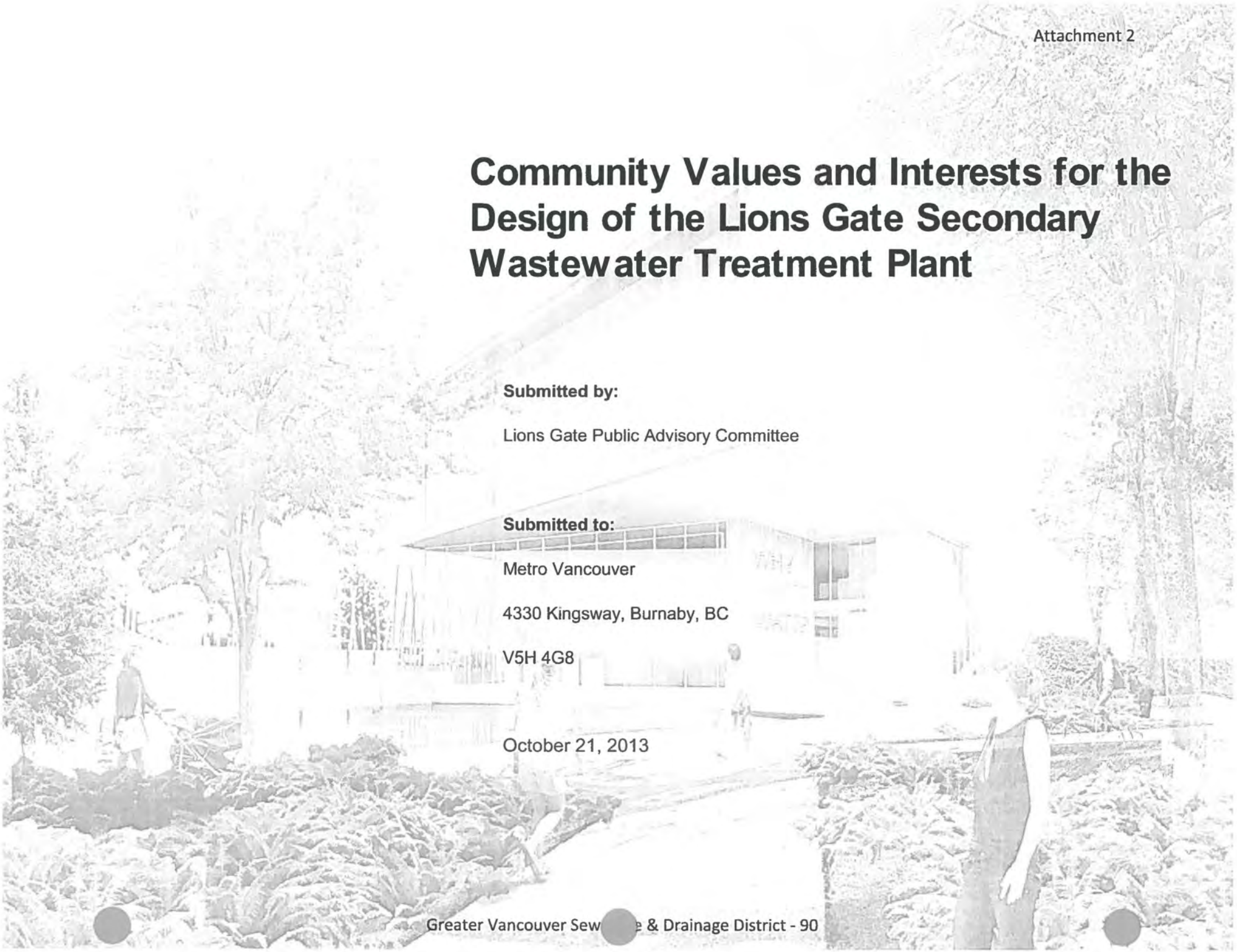
Table 2 - Intergovernmental Engagement and Consultation Events and Presentations, February 7, 2012 to October 29, 2013

Meeting / Event Type	Date	LGPAC	North Shore Councils	Utilities Committee	LGIAC	Finance Committee	IAC
Committee Workshop	10-Apr-13			✓		✓	✓
Committee Workshop	25-Jun-13			✓		✓	✓
Committee Workshop	24-Sep-13			✓		✓	✓
Council of Councils	20-Apr-13						
Council of Councils	19-Oct-13						
Environmental Monitoring Committee	16-May-13						
Environmental Monitoring Committee	20-Jun-13						
Environmental Monitoring Committee	18-Jul-13						
Environmental Monitoring Committee	17-Oct-13						
Integrative Design Process	15-Oct-12				✓		
Integrative Design Process	12-Dec-12				✓		
Integrative Design Process	12-Feb-13				✓		
Integrative Design Process	29-Apr-13				✓		
Integrative Design Process	1-Aug-13				✓		
Integrative Design Process	10-Sep-13				✓		
Integrated Utility Management Advisory Committee	26-Jul-13						
LGIAC	21-Sep-12				✓		
LGIAC	17-Oct-12				✓		
LGIAC	13-Nov-12				✓		
LGIAC	16-Nov-12				✓		
LGIAC	5-Dec-12				✓		
LGIAC	14-Jan-13				✓		
LGIAC	18-Feb-13				✓		
LGIAC	13-Mar-13				✓		
LGIAC	3-Apr-13				✓		
LGIAC	19-Apr-13				✓		
LGIAC	10-May-13				✓		
LGIAC	14-Jun-13				✓		
LGIAC	21-Jun-13				✓		
LGIAC	12-Jul-13	✓			✓		
LGIAC	16-Aug-13				✓		
LGIAC	11-Sep-13				✓		
LGIAC	18-Oct-13	✓			✓		
Ministry of Environment	22-Nov-12						
Ministry of Environment	14-Mar-13						
Ministry of Environment	19-Apr-13						
Ministry of Environment	16-May-13						
Ministry of Environment	21-Jun-13						
Ministry of Environment	19-Jul-13						
Ministry of Environment	13-Sep-13						
Ministry of Environment	29-Oct-13						
North Shore Council Presentation (City of North Vancouver)	7-Feb-12		✓				
North Shore Council Presentation (City of North Vancouver)	26-Nov-12		✓				
North Shore Council Presentation (District of North Vancouver)	6-Mar-12		✓				
North Shore Council Presentation (District of North Vancouver)	13-Nov-12		✓				
North Shore Council Presentation (District of North Vancouver)	29-Oct-13		✓				
North Shore Council Presentation (District of West Vancouver)	2-Apr-12		✓				
North Shore Council Presentation (District of West Vancouver)	19-Nov-12		✓				
North Shore Council Presentation (District of West Vancouver)	28-Oct-13		✓				
North Shore Councils' Workshop	17-Apr-13		✓				
North Shore Councils' Workshop	4-Jul-13		✓				
North Shore Councils' Workshop	3-Oct-13		✓				
Regional Engineers Advisory Committee	9-Mar-12						
Regional Engineers Advisory Committee	11-Oct-12						
Regional Engineers Advisory Committee	7-Dec-12						
Regional Engineers Advisory Committee	20-Mar-13						
Regional Engineers Advisory Committee	5-Apr-13						
Regional Engineers Advisory Committee	7-Jun-13						
Regional Engineers Advisory Committee	4-Oct-13						
Washington State Wastewater Treatment Plants Tour	12-Jun-13	✓		✓	✓		
Utilities Committee	15-Feb-12			✓			
Utilities Committee	9-May-12			✓			
Utilities Committee	12-Oct-12			✓			
Utilities Committee	14-Nov-12			✓			
Utilities Committee	4-Apr-13			✓			
Utilities Committee	2-May-13			✓			
Utilities Committee	6-Jun-13			✓			
Utilities Committee	4-Jul-13			✓			
Utilities Committee	5-Sep-13			✓			
Utilities Committee	3-Oct-13	✓		✓			
Waste Management Committee	12-Oct-11						
Number of Meetings by Invited Audience	All	**21**	**11**	**14**	**24**	**3**	**3**
Total Meeting and Events	**71**						

Lions Gate Intergovernmental Advisory Committee (LGIAC)
Lions Gate Public Advisory Committee (LGPAC)
Intergovernmental and Administration Committee (IAC)

7956595

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



Submitted by:

Lions Gate Public Advisory Committee

Submitted to:

Metro Vancouver

4330 Kingsway, Burnaby, BC

V5H 4G8

October 21, 2013

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1.0 EXECUTIVE SUMMARY

The Lions Gate Public Advisory Committee (LGPAC) was struck in June 2012 with the objective of providing advice to Metro Vancouver on the design of the Lions Gate Secondary Wastewater Treatment Plant (LGSWWTP). Following completion of Project Definition, the Terms of Reference for the LGPAC will be reviewed and the membership potentially revised for the committee to provide advice on the design and construction of the plant.

The committee was structured to represent a broad spectrum of interests: the nearby Norgate community, business interests on the North Shore, and environmental interests of the entire Lower Mainland. The community engagement was a process of discovering community values, of eliciting concerns from the interests represented, and balancing competing or divergent views. Our discussions and feedback during this engagement process helped Metro Vancouver shape the now proposed indicative design for the plant. The issues we explored are grouped into five major themes: community impacts, integration of the plant into the community, environmental concerns, project economics and the opportunity for education. This report reflects LGPAC's thoughts on the indicative design, and the possibilities for the LGSWWTP project. We highlight key issues, values, concerns and the goals of the community for the project:

Community Impacts and Integration:
The community (residents and businesses) has significant concerns about odour, air quality, traffic and noise from the proposed plant. Most LGPAC members are satisfied that Metro Vancouver is aware of the concerns regarding neighbourhood impacts and, based on information from Metro Vancouver staff, that the indicative design includes the necessary technology to meet a "no odour" standard, although some odour release may occasionally occur due to accidents or human error. There is strong interest in ensuring that these concerns are addressed beyond the conceptual design phase, and that the final design will not compromise any of the features intended to mitigate community impacts. Members view odour control, targeting a zero impact on the community environment as mandatory.

There are also concerns about disruption during the construction of the plant and LGPAC members recommend that Metro Vancouver engage directly with the local community to develop the construction plan.

The artist's renderings and the design concept for the building were generally well received. Integration of the plant into the community could be furthered by incorporating space in the building to further education about sewage treatment. LGPAC members were fully supportive of allowing room in the plant and on the site to accommodate future changes and expansion, and to accommodate educational opportunities. We are also

generally supportive of Metro Vancouver exploring revenue generating activities on site. However, some members of the committee did emphasize that the site is primarily for treating wastewater, and that this priority should not be compromised.

Environmental:
LGPAC members support designing the plant to the current regulated secondary treatment standard, and to build in flexibility for the future. This includes upgrades for a possible higher level of treatment as well as capacity upgrades. All members support using technologies that are energy efficient and that make use of Integrated Resource Recovery where technically and economically feasible. Most members support initiatives to employ technologies with a low Green House Gas emissions footprint, however one member viewed this as unnecessary.

Economic:
Metro Vancouver provided a high level review of financial modelling for three initial scenarios, and the indicative design was seen by LGPAC members to be cost effective and to represent best value for money. We note that the financial modelling used key assumptions (discount rate, amortization rate) that may differ from market based modelling and may differ still from the method Metro Vancouver may use to allocate costs. There are concerns about how the project costs will be allocated to rate-payers, and most members support or strongly support using market-based financial modelling to allocate costs to the taxpayer, while one member does not believe that a market based approach is appropriate for a publicly funded essential service such as sewage treatment. LGPAC members support pursuing all federal and provincial funding for the project. Many LGPAC members are strongly concerned about ratepayer impacts, and most support or strongly support a P3 delivery model. One member did not feel that the committee had enough information to make a recommendation on the delivery model.

Education:
LGPAC members see education regarding what goes into our sewers as being an essential strategy to improve environmental outcomes, both in the marine environment and on the land. LGPAC members are highly supportive of using the Lions Gate Secondary Wastewater Treatment Plant as a Centre of Excellence to raise awareness and educate the public. The educational component was also viewed as a way to integrate the plant into the community, and to prepare for a future that may include higher standards of sewage treatment.

LGPAC Member Support for Recommendations:
This report was prepared with the input of, and review by, all LGPAC members. The recommendations are broadly supported by the majority and, in many cases, all LGPAC members. Where some LGPAC members are not in support of a recommendation, their concerns have been noted as an "alternative view" in order to allow this report to stand. Appendix I presents a summary of the recommendations and the support of LGPAC members. The response by LGPAC members demonstrates the commitment to making the committee process constructive and effective in providing advice to Metro Vancouver on the indicative design for the LGSWWTP.

2.0 PURPOSE AND PREMISES OF THIS REPORT

To reflect community values and concerns regarding the design of a new secondary treatment plant to be located at the foot of Pemberton Avenue.

ASSUMPTIONS

The LGSWWTP effluent quality must be upgraded to meet a minimum secondary effluent quality as required under the federal Fisheries Act – Wastewater Systems Effluent Regulations (SOR/2012-139) specifically:

- is not acutely lethal
- average carbonaceous biochemical oxygen demand does not exceed 25 mg/L
- average concentration of suspended solids in the effluent does not exceed 25 mg/L
- if chlorine is used, the average concentration of total residual chlorine in the effluent does not exceed 0.02 mg/L
- maximum concentration of un-ionized ammonia in the effluent is less than 1.25 mg/L, expressed as nitrogen (N), at 15°C ± 1°C

The LGSWWTP cannot be upgraded on the existing site, as Metro Vancouver indicates that the current site will not be available for this purpose in the future.

The property located at the foot of Pemberton Avenue was purchased by Metro Vancouver as the location for the new LGSWWTP. Currently the site is zoned CD54, and is located in an area between heavy industrial and light industrial/commercial activities.

PROJECT DESCRIPTION

Metro Vancouver developed a number of scenarios utilizing an iterative design process. This process incorporated the input from several community, governmental and technical groups, including the Lions Gate Public Advisory Committee (LGPAC). While a formal, final decision about the indicative design has yet to be made, discussion and analysis has focused on this design. Comments presented in subsequent sections of this report are given with respect to the indicative design.

In summary, the indicative design consists of primary treatment followed by secondary treatment and anaerobic digesters and administrative activities housed in two-storey buildings. Sewage and biomass generated as a by-product of primary and secondary treatment will be the only substances treated at the new wastewater treatment plant. Treatment by-products will be grit and screened debris, digested primary and secondary biosolids, biogas (primarily methane and carbon dioxide) and treated water.

Movement of materials onto and off the site will be primarily by truck. It is estimated that two trucks per day will leave the plant to

transport digested and dewatered biosolids (also referred to as cake) to an off-site location for further processing and/or direct use. Several trucks per week will deliver supplies needed by the plant. Biogas produced on site will be scrubbed of sulphur, and the methane will be used for fuel on site with excess amounts flared off. Treated water will be discharged via a new pipeline to the existing marine outfall located underneath the Lions Gate Bridge.

The site will have three distinct areas. Tall (30+ metre high) concrete anaerobic digesters will be located at the west end of the property adjacent to Philip Avenue. The middle portion of the site will house a two-storey structure containing the secondary treatment process and administration building, with potential for commercial leasing of the rooftop. The eastern end of the property will be publicly accessible.

Additional aspects of the project confirmed by Metro Vancouver staff that would be of particular interest to the Norgate Park community include:

Odour control

The proposed odour control strategy involves enclosing all water surfaces and equipment areas to reduce the head space (volume of air) above the water surface. Air will be drawn through the head space to control the flow of foul air to the scrubbers, and through the suction effect (negative pressure created) minimize the potential release of foul air before it has been scrubbed and released to the atmosphere. In addition, all equipment will be within a closed building that is also under negative pressure.

Truck traffic

Truck traffic associated with plant operations will be delivery of supplies and pick-up of dewatered biosolids. Traffic flow will be unidirectional, with trucks entering off Pemberton Avenue, travel west on the south side of the site and exiting onto West 1st Avenue. Metro Vancouver staff agreed to schedule truck deliveries and digested solids pick-up to daytime hours only.

Noise abatement

All facilities, with the exception of the biosolids digesters, will be housed within acoustically insulated buildings. The biosolids dewatering and truck loading building will also be acoustically insulated. The entrance and exit from the dewatering building will be closed with doors, including when trucks are being loaded with biosolids.

3.0 COMMUNITY CONCERNS AND VALUES IDENTIFIED BY LGPAC

3.1 COMMUNITY CONCERNS

Impacts on the Norgate Park Community will occur during both the construction and operational phases of the plant. However, only operational phase (long term) impacts have been discussed in detail to date.

Odour control is a non-negotiable.

The following issues are primary concerns for the community during plant operations:

Noise containment and mitigation is a necessity.

Odour

The community considers utilization of odour control technology to prevent odour from leaving the plant boundaries to be mandatory. Based on observations from two LGPAC members on the Washington State study tour of wastewater treatment plants, it appears that odour control technologies and strategies can be put in place to ensure no foul air (odour) is released during normal operations. The odour control strategy described by Metro Vancouver for the indicative design appears to be similar to one or more of the treatment plants visited by LGPAC members on the field trip to Washington State, and therefore it is expected that odour can be effectively controlled at the Pemberton site. Based on information from Metro Vancouver staff, the indicative design includes the necessary technology to meet a "no odour" standard, and members view odour control, targeting a zero impact on the community environment as mandatory.

Emissions

There will be a number of emissions that could impact air quality. These emissions include exhausts from the co-generation system and flaring of the excess biogas that is not used by the co-generation system. The conceptual design appears to address the appropriate level of control of exhaust emissions. Metro Vancouver has committed to monitoring air quality at the project site, and LGPAC has identified the importance and need for air quality monitoring within the Norgate and adjacent communities, although this has yet to be confirmed by Metro Vancouver. The monitoring station will be installed a minimum of two years prior to construction in order to collect an adequate baseline dataset. The community would like to see regular reports on the monitoring and control of air quality and a process for the community to report incidences where emissions exceed accepted levels. Also, a protocol to address repeated failure to comply with air quality criteria is required.

Noise

The proposed site is in a commercial area, adjacent to a heavy industrial area and a rail yard, and rail and port activities generate noise intermittently throughout their 24/7 operations. Noise often carries over to nearby neighbourhoods, including Norgate, Lower Pemberton, and Pemberton Heights. In particular, Philip Avenue acts as a funnel directing noise from waterfront activities into the Norgate community. The treatment plant represents an opportunity to block or absorb some of this noise. The siting and the massing of the plant may provide a noise barrier. Potential impacts of the plant include sound reflection off the concrete massing at the west end of the property directed into the residential area via Philip Avenue. The design engineers have indicated that the surface of the concrete on the digesters and the biosolids dewatering building can be treated to mitigate sound reflection.

Plant operations themselves will be enclosed in acoustically insulated buildings and are not expected to impact on neighbouring businesses or communities.

Truck traffic

The primary concerns with truck traffic are the associated noise such as back-up beepers, idling and loading/unloading and possible congestion. Given the relatively low number of trucks per day (1 – 2) and Metro Vancouver's commitment to restrict truck traffic to day time hours only, the community's concern regarding this issue has been addressed.

Public health and safety

Protecting the health and safety of everyone on the plant site is important, as is ensuring nearby neighbours are not put at risk from plant operations. In particular, safe handling practices of chemicals and restricting unauthorized access to the site are important. Metro Vancouver staff have provided assurances that commercial grade hypochlorite solution (bleach) rather than chlorine gas will be used as a back-up disinfection system at the treatment plant.

Risk assessment and mitigation

A Hazard Identification (HAZID) study, Hazard and Operability (HAZOP) study, and general risk assessment of all proposed activities and mitigation measures for the various scenarios of each activity will need to be prepared to ensure all potential impacts are addressed and minimized.

Based on information from Metro Vancouver staff, LGPAC supports the indicative design with respect to addressing the identified neighborhood concerns. LGPAC recommends that the final design contain features that will be at least as effective in addressing these concerns.

Construction

To date, the construction plan for the plant has not been discussed with the LGPAC. The community will need to be consulted regarding construction to minimize impacts. The

following issues will be of concern to the community during construction.

- Vibration (e.g., pile driving, soil densification)
- Noise
- Dust
- Construction operating hours
- Road closures and traffic diversion
- Risk assessment and mitigation

Additional comments from the LGPAC regarding these issues are provided in Appendix III.

LGPAC recommends Metro Vancouver engage directly with the Norgate Community in advance of construction to develop a mutually satisfactory construction plan.

3.2 COMMUNITY INTEGRATION

How will the treatment plant fit into the area? In considering approaches to community integration, it is useful to review the neighbourhood context and the values supported by the community. We note the following fundamental features:

- The site is in an industrial and commercial area, and nearby a residential neighbourhood;
- The site is nearby a walking trail – the Spirit Trail – that traverses the entire North Shore through 3 municipalities and First Nations lands;
- The community supports prudent use of taxpayers' money for the construction and operation of the LGSWWTP project;
- The community is open to having some revenue-generating activities associated with the treatment plant provided that these are economically feasible;
- The LGPAC has identified education and awareness programs as an important and potential way to reduce our environmental impact and to defer future capital expansion of the plant;
- The LGPAC sees an opportunity for the plant to facilitate better integration between the industrial neighbours to the south of the site and the residential neighbours north of the site.

Public Education

The LGPAC views education programs as an essential strategy to support the achievement of many of the goals of the project, including community integration, improving the environment, and ultimately prudent use of taxpayers' money. The public education and awareness programs need to go beyond a basic introductory level of "where our sewage goes" to create an understanding of the importance of preventing chemicals (e.g., pharmaceuticals, herbicides, pesticides and endocrine disruptive compounds) and heavy metals (e.g., cadmium, chromium and cobalt used in in paint pigments and trace levels of arsenic, cadmium, chromium, lead and mercury in household cleaners) from being disposed to sewers, and that such prevention is valuable and provides environmental benefits. We also recommend educational programs on water use and wastewater management, and see opportunities to collaborate with local partners and to enhance other initiatives to recover or improve environmental conditions in the area.

The design of the plant, particularly the publicly accessible area, can support these community integration goals.

Aesthetics

In the indicative design, the measures proposed to reduce the perceived building height and massing appears to be effective. These include the landscaping and trees along the northwest of

the plant that will help break up the massive appearance of the structure. The terraced water feature (using water treated at the plant) and the glazing over of the secondary clarifier building were well received by the LGPAC both for the aesthetics and to support education goals.

"Metro Vancouver developed a number of possible scenarios including ideas for what the plant should look like. Some of them were large and obvious industrial structures, while others seemed to make the plant disappear. We think that the proposed indicative design is a good blend of two diverse views. There is gentle approachable landscaping that allows for human interaction at the east end of the site. The larger industrial-looking elements at the west end fit in to the industrial areas nearby, and having some of the processes visible as you go by the plant can be part of raising awareness about our total environmental footprint."

Public accessibility

Public access to the site will facilitate education opportunities. Being able to see the plant operations from street level and view industrial operations from the rooftop will also increase awareness. However, accessibility needs to be balanced with public safety, and public access will be restricted to the east end of the site away from heavy equipment and treatment operations. Many members of the community like the idea of using the rooftop of the operations and maintenance building as a viewing platform and interpretive pavilion. It was suggested by some members of LGPAC that the administrative building could be designed to have extra floors to attain a height that would be higher than the nearby Fibreco and Seaspan structures. This would allow a clear, unobstructed 360 degree view of the harbor and the mountains from a viewing gallery. The space in the building could accommodate education classrooms, community space or rentable space.

Potential to make it a destination

The water treatment plant will be close to the Spirit Trail. The plant site could be a point of interest along the Trail. The land immediately east of the plant site is owned by the District of North Vancouver. With long term plans to close the Pemberton Street rail crossing, there is a potential to develop the area into a community destination that ties into other spots along the Spirit Trail. One suggestion is to include an interpretive display for the MacKay Creek restoration project.

Incorporating other uses into the site

Suggestions have included establishing a research centre of excellence (e.g., water treatment using aquatic systems) in partnership with advanced education institutions, and an education facility for school groups and the general public. The LGPAC sees an opportunity to create a unique centre focusing on the Water Cycle from the origination point (fresh water collection on the North Shore Mountains) to the end point (treated water released into Burrard Inlet) as well as the distribution system and collection system. The views visible from the site (mountains, North Shore communities, ocean, city) are advantageous to deliver a fully integrated watershed and waste water education program. LGPAC members view this as a positive way to achieve project goals of community integration and environmental and social sustainability. We recommend that Metro Vancouver explore partnerships for such programs, and develop these along-side the design phase of the plant.

The location (industrial and commercial area) is also a unique vantage point to learn more about industries on the North Shore. The east end of the site could be used as a transition area where the industrial community can be integrated with the rest of the area. In partnership with the industrial companies along the waterfront, installations that provide a learning opportunity to the public about the industrial activities could be provided.

Flexible community building(s)/space was also suggested as a possible use for the administration building on the site. This would be a welcomed community amenity, as there is a shortage of publicly accessible meeting space in the area.

Use of roof space

The current approach of putting in a green roof, and building in the infrastructure for a wide range of potential businesses to use the roof is supported by the LGPAC. A substantial portion of the roof space (40,000 – 60,000 square feet) may be attractive for a rooftop greenhouse operator, possibly helping to generate cash revenues to offset project costs; it could also create local employment and educational opportunities. From an aesthetic point of view, a rooftop greenhouse could be screened to block night time light pollution originating from the greenhouse operation and industrial operations to the south. Further detail on future roof use would be developed once partners have come forward, but Metro Vancouver may wish to consider incorporating sufficient parking, loading and mechanical support at ground level in the design for the plant to accommodate rooftop greenhouse operations.

Futureproofing

Maintaining the ability to accommodate future technological and regulatory requirements is a high priority for the community. The siting and massing of the buildings and operations on the site should accommodate future changes and expansions.

3.3 ENVIRONMENTAL

STANDARD OF TREATMENT – WATER

Meeting the regulations in terms of effluent quality

The core purpose of the project is to build a plant that meets the required federal secondary treatment water quality standard (in effect now). It is also desirable to design the plant so that there would be enough flexibility to accommodate future regulatory requirements. Based on Metro Vancouver staff information, the proposed indicative design will meet the required secondary treatment standard.

To ensure that regulatory standards are being observed, we expect that there will be an established procedure to monitor effluent quality. We understand that it is a regulatory requirement that Metro Vancouver monitor the marine environment around the outfall and support a monitoring and reporting system.

Exceeding the regulations in terms of effluent quality

We discussed the merits of incorporating treatment technologies that would exceed the regulated requirements, such as tertiary treatment. In fact, the indicative design does incorporate a higher level of treatment for a small amount of the treated wastewater for use in the plant and water features in the landscaping on site. Metro Vancouver advises that the plant layout could accommodate a re-fitting of higher level treatment technologies if required. During the indicative design process, Metro Vancouver developed a scenario where all the effluent would have been treated to a highly polished level, and it was contemplated that the treated water would discharged at an estuary close to the plant site. While this was seen as a way to improve the marine environment, it would have been far more costly; most LGPAC members could not support the idea at this time. The potential to treat the wastewater to a higher water quality standard should be considered at the design stage allowing for potential future changes at a time when costs, technology or greater community values demand it.

STANDARD OF TREATMENT – BIOSOLIDS

The wastewater treatment plant will generate large quantities of waste bacteria that will contain both toxic chemicals and disease causing microorganisms. The amount of waste bacteria will be reduced on site through the use of anaerobic digesters. Digestion serves to reduce the mass of waste bacteria (biomass) and destroy disease causing microorganisms, as well as generating methane gas that can be used to generate heat and reduce the treatment plant power costs. The LGPAC members believe that onsite digestion is appropriate to reduce the mass of waste biosolids and to recover energy to minimize the overall cost of biomass disposal.

Some of the scenarios developed by Metro Vancouver contemplated co-digestion of organic waste (co-managing solids from the solid waste stream and the biosolids from the waste water stream). The co-digested waste would have augmented the fuel supply for energy production onsite, and would have been an example of "generate locally, treat locally" in an integrated waste management plan. Under such a scenario, there would have been neighbourhood impacts in the community through increased truck traffic and the potential for more frequent "odour events". Additionally, the site has a small footprint and it would have been challenging to achieve a good plant layout to accommodate a co-managed waste process and allow room onsite to accommodate anticipated capacity growth in the future. The indicative design does not contain any co-digestion of waste, and LGPAC supports Metro Vancouver's plans in this regard.

Strategies for Reducing the Treatment Load – both water and bio-solids

Some LGPAC members noted that treating effluent to a higher standard of treatment (i.e., secondary vs. primary) in effect moved the contaminants from one waste stream to another (from water to biosolids), and that there are some substances that cannot be removed at all. In many cases, it would be preferable to prevent difficult substances from entering the waste stream altogether, and to keep substances out of the liquid waste stream that could be better treated in the solid waste stream. We support the awareness programs that advise residents that materials such as medicines, endocrine disrupting compounds and grease should not be disposed of to the sewage system, and recommend that these programs be continued and expanded. Some members support the creation of enforceable codes of conduct to further reduce toxins in the effluent stream.

AIR EMISSIONS

Air Quality (NOx, SOx, particulates etc.)

Emissions of contaminants such as pathogens, hydrogen sulphide gas and volatile organic compounds should be minimized through appropriate treatment technology and/or use of scrubbers.

Air contaminant emission levels should be monitored on and off site.

Based on Metro Vancouver staff information, the proposed indicative design incorporates treatment technology and monitoring processes for air emissions.

Green House Gas (GHG) Emissions

The sewage treatment process produces methane, a green-house gas contributor. The processes in the indicative design will capture some of the methane for use as fuel in the plant, and some will be flared-off; both activities will contribute to GHG emissions. We recommend that Metro Vancouver

consider technologies and handling processes that will have a low GHG emissions footprint overall, especially large contributors such as methane, and consider implementing these processes, keeping in mind other project goals and requirements.

Odour-causing emissions

As noted in Section 3.1, the community (residents and businesses) has significant concerns about odour and air quality. The potential for unintended odour emissions is not desired. Based on information provided by Metro Vancouver, LGPAC, members view odour control, targeting a zero impact on the community environment as mandatory and support further work in the final design to address this issue.

POSSIBILITIES FOR HABITAT ENHANCEMENTS

The waterfront of Metro Vancouver is highly impacted by industrial and urban development. Some LGPAC members felt strongly that there should be no further degradation of the shoreline, and opportunities to recover or enhance shoreline habitat should be considered. An opportunity exists to enhance shoreline habitat in nearby MacKay Creek, and further enhancement of this area was contemplated in alternate scenarios and viewed positively by members subject to cost.

As noted above, the LGPAC members agree that the treatment plant should be designed to meet the federal secondary treatment standard (versus meeting a higher water quality standard), and that provision should be made to enable the effluent water quality to be upgraded in the future as the ability to reuse the reclaimed water increases. However, some LGPAC members also believe that an opportunity exists to provide a small-capacity water reclamation facility to demonstrate the reuse of reclaimed wastewater for onsite non-potable water uses (e.g., landscape irrigation and landscape irrigation operations).

Closing the wastewater loop

There is no such thing as "away" therefore we need to ensure that we reduce what is in our liquid waste stream and find opportunities to use and recycle where we can. In a time of growing environmental concerns, it is our responsibility to no longer ask nature to clean up what we have created. We can and should improve effluent quality through effective treatment and source control, and can reduce our total environmental footprint through integrated resource recovery of waste products.

The quality of our effluent is impacted by what we pour down the drain and we must take responsibility for reducing our chemical footprint.

Regardless of the target water quality standard, existing wastewater treatment technologies do not treat toxic contaminants in the waste stream, they merely segregate the contaminants from the water and place them in the solids stream. Heavy metals contained in paints and household

cleaning products do not get treated by wastewater treatment plants. Contaminants either pass through the treatment plant and into the marine environment, or they become attached to the waste biosolids making that a material of concern for environmental contamination of the land. The only long term effective means of preventing those contaminants from being released to the environment either on land or in the water is through source control and preventing their disposal to the sewer in the first place. The LGSWWTP facility, being a new build facility highly visible in the community, offers a good opportunity to facilitate community education and the need to change resident waste disposal habits.

We note that not all contaminants can be prevented from entering the liquid waste stream (consumed pharmaceuticals, for example) and for this reason a secondary treatment plant is necessary. However, to the extent that we can segregate the contaminants at the source and can educate users of the sewage system – and we are all users of the sewage system - we will be further ahead in closing the wastewater loop.

In addition to reducing what is in our liquid waste stream, we can find ways to reduce the energy it takes to treat our liquid waste and transform our waste products into resources. The sewage treatment process consumes energy, but it also generates by-products that can become resources. Members of LGPAC support integrated resource recovery opportunities wherever possible and practical. In addition, the door should be left open for future opportunities when the opportunity is right.

Sea level rise

Metro Vancouver staff identified that all critical operations for the secondary treatment plant need to be above the projected sea level rise projections over the next 100 years. The requirement for any design is that the plant be built to post-catastrophe standards, making it able to withstand anticipated sea level rise, storm surge, and tsunami and earthquake effects. Metro Vancouver staff advised that this includes building the plant and installing all major operations of the plant 6 metres above the reference level (approximately 3 metres above ground level at the site). This was an important point for LGPAC members concerned about the potential impact to the community. LGPAC supports Metro Vancouver's plans to protect against extreme weather, catastrophic events and anticipated sea level rise.

ENERGY

Demand Side Management (DSM)/Conservation

The treatment plant should be constructed and treatment technologies and design selected to include energy efficiency technologies where economically practical. Areas of particular focus should include pumps, mixers and aeration technologies as well as HVAC and lighting systems for the buildings.

Alternative Energy Production

The indicative design makes use of some of the heat and energy generated by the treatment process and provides for the energy needs of the plant itself and some surplus. As much energy as possible should be recovered for use at the plant and elsewhere in the community, if economically feasible. Energy recovery from biogas production and low-temperature ambient heat from treated sewage effluent should be considered for use as sources of energy and heat for district energy in the surrounding neighbourhoods, with associated costs to recover energy borne by the end user if proven to be economically justifiable.

Metro Vancouver may wish to investigate other energy producing opportunities for biosolids (e.g., pyrolysis) offsite. We note that the indicative design does not include onsite incineration of the biosolids, and that there was low support from the LGPAC for this option for a number of reasons, including concern about neighbourhood impacts and poor economics. Onsite incineration would have a higher energy demand (and resultant higher operating cost), increased GHG emissions, and possible difficulty finding a ready market or disposal area for the ash, hence Metro Vancouver staff felt that it was not a viable option at this site.

3.4 ECONOMICS

The LGSWWTP project is a major capital project, with capital costs for the project estimated up to $700 million dollars in 2018 dollars (when major construction is slated to start). LGPAC members have concerns about the additional burden on the property tax bill to pay for the project, and about making sure that we get good value for money. To many of our members good value means a project that is not overbuilt: a plant that delivers the required standard of treatment for wastewater and with sufficient, not excess, capacity. At the same time, we recognize that building in flexibility for the future is prudent, and that the design of the plant may need to be more than "bare basics" to ensure the social license to operate in our community and to achieve goals in social and environmental sustainability. Finding the balance will be very important and 'under building' could have a significant financial impact in the future. We strongly encourage Metro Vancouver to assess both short term costs/benefits and long term costs/benefits as they finalize the design of the plant.

Cost of Project, and Financial Modelling

Major elements of the cost over the estimated life of the project are capital costs, operations, maintenance, and financing costs, with the largest of these being capital costs – for all scenarios. Metro Vancouver estimates capital costs of the indicative design up to $700 million in 2018 dollars. Costing models were developed by Metro Vancouver staff for three scenarios, and the indicative design was the least expensive design based on a net present value basis. While this method is appropriate, some LGPAC members expressed concern about key assumptions used in the modeling, in particular the discount rate and amortization period. Getting the financial modeling right is important, as the results will feed into the annual property tax bill for ratepayers on the North Shore and throughout the Lower Mainland.

Metro Vancouver used a discount rate of 6% and an amortization period of 25 years in its financial modeling. Standard practices for financial modeling would indicate that the discount rate should be determined by the cost of funds for long term financing and that the amortization rate should be consistent with the expected life of the asset. Key factors for determining cost of funds are the credit rating or credit risk of the project/borrower, and the term selected. While the discount rate of 6% was chosen to make the project comparable to similar projects recently reviewed by Metro Vancouver, this figure is somewhat high, and likely the rate should be less than 5% (see paragraph below). The 25 year amortization rate used in the model is shorter than one would expect for the project life, but may be reasonable given the financing term (30 year bonds are issued by the federal government, 20 years by corporations).

Getting the key assumptions right is important, as choosing rates or amortization that are either too conservative or too aggressive can skew the net present value in an unrealistic manner; the risk is that a decision is made based on unrealistic figures.

Cost of funds/discount rate:

Based on recent market rates for Canada 30 year bonds (3.18%), MFABC recently issued 10 year bonds (3.78%) and the MFABC spread against Canada's, we can reasonably estimate cost of funds for the project at around 4.60% ~ 4.70%, and would indicate an appropriate discount rate of less than 5% versus the 6% used by Metro Vancouver.

Term for amortization: The average life of the project asset is reasonably 30 to 50 years. The concrete tanks could have a life of up to 100 years, while the equipment would have a shorter asset life. The first major capacity upgrade is expected by 2050; that is in 30 years after construction is completed, which is consistent with projected population growth on the North Shore. This may support using an amortization period of 30 years.

There are choices to be made on the project delivery method that could impact the credit risk component of the cost of funds; however, this need not add a great deal to the cost of funds as credit risk can be reduced through appropriate structuring of financial contracts and private public partnership concession agreements, and through choosing financing partners with strong credit profiles.

Metro Vancouver provided us with high level results from the financial modeling using three different project delivery models. The net present value costs of the project under all project delivery models were similar, and the statistical difference in the estimated cost was negligible and would not support choosing any one project delivery method on the basis of net present value alone. However, some of our members with financial expertise noted that there are other benefits to certain project delivery models which have not been fully explored in the financial modeling.

LGPAC members are generally supportive of the financial modeling of the indicative design, and are satisfied that proposed design does represent the best value for money of the scenarios developed and contemplated.

Ratepayer impacts:

We note that the financial model and assumptions used will have an impact on the costs to be allocated to local property tax payers, and that Metro Vancouver frequently uses set key figures for discounting (6%) and amortization (15 years) based on policy.

Some LGPAC members have expressed strong concern regarding ratepayer impacts of the unusually short amortization period for rate setting purposes, and would like to see rates in different amortization scenarios.

The LGPAC was not presented with any ratepayer analysis from Metro Vancouver; however, we do note that a 15 year amortization rate is not supported by the expected asset life (including anticipated capacity upgrades) of the LGSWWTP project and that a shortened amortization period may have a large ratepayer impact. For this purpose, we would prefer to see the costing for taxpayer purposes estimated with a financial model using cost of funds derived from actual market rates for

the discount rate, and a longer amortization rate (more closely matching the expected life of this particular asset). We are also aware that should the project delivery model be a P3, the financial cost modeling would have to use actual cost of funds for the discount rate and the term associated with the financing to avoid a large mismatch in cash flows.

Project Delivery Method, and cost impacts

As a large dollar infrastructure project, the project may be eligible for grants from the federal and provincial governments. Metro Vancouver indicates that accessing all eligible grants might reduce the capital costs of the project by two-thirds. This is a significant reduction in project costs, and one that cannot be ignored. Grant monies are in some cases available only if the project is delivered in a private-public partnership model (P3).

Apart from the availability of funding, the project delivery method can have a key impact on the risk of cost overruns P3s were described to the LGPAC as largely being a method to transfer risk (from the public sector to the private sector), but without any specific financial modelling. Some LGPAC members with experience in finance and infrastructure finance in particular noted that there is a demonstrated history of P3's being delivered on time and either on or under budget more often than projects that are not structured as P3's. LGPAC strongly suggests that Metro Vancouver may wish to determine the risk and mitigation strategy for cost and schedule overruns as a key factor in choosing its project delivery method. It was suggested by some members that, as part of this strategy, Metro Vancouver review comparable projects world-wide to assist in selecting the best procurement vehicle.

We recommend that Metro Vancouver pursue all provincial and federal funding available, including grant monies available under a P3 structure. Some of our members may be hesitant to support a P3 structure in concept, and we may not have had enough information to thoroughly discuss this issue. We note though that some of our members strongly believe that the benefit to local property tax ratepayers outweighs the likely risks or challenges associated with the P3 structure but that the challenges can be overcome, and that ratepayers cannot afford to avoid a P3 structure for ideological or philosophical reasons.

Futureproofing

Notwithstanding that the LGWWTP will be a long-lived asset with some components expected to be serviceable for more than 100 years, we do not expect the plant to remain unchanged for 100 years. Population on the North Shore will grow, treatment standards may be set higher, new technologies for treatment may be developed, and the bare minimums to ensure social license may change. Concepts that are today's "nice to have" may be tomorrow's "must have". The demands on the plant will change, and we recognize the value in anticipating and leaving room to accommodate the future, including space within the plant and around the plant site. Key considerations are capacity and technology.

Capacity: the proposed Indicative design is projected to have adequate capacity for an initial 30 years. This will accommodate anticipated population growth on the North Shore until 2050. LGPAC members were concerned that there was enough space on site reserved to accommodate more treatment equipment for a future expansion. Indicative plans appear to allow room for expansion. We note that in the future capacity requirements may be lower than currently projected and expansion of the plant could be delayed if water use is reduced. Ongoing education and awareness about reducing fresh water use, along with rebuilding the existing housing stock to current standards (low flow toilets, showers, taps, and water efficient dishwashers and laundry machines) along with a trend to housing densification (apartments) will further the goal of reducing fresh water use and reduce the load on the wastewater system. LGPAC members support education programs in water use reduction, as these can have a positive payback in reduced operating costs and delayed spending for capacity upgrades.

Technology:

The LGPAC believes that effluent water quality standards and treatment technologies will likely continue to increase with time and, therefore, the treatment technology selection and site development should include provisions for upgrading the wastewater treatment plant in the future. It is expected that improvements in water quality will likely be in the form of technologies designed to polish or further treat the effluent prior to discharge. Accordingly, the design, layout, and technology selection to be made now for the LGWWTP should attempt to reserve land area for future expansion of tankage as well as the introduction of polishing technologies.

"Education is not a nice-to-have add-on; education on water use and source control is a must have that will save the taxpayer hundreds of thousands in annual operating costs, and hundreds of millions in future capital costs."

Similar to how LGPAC members believe that education programs focused on water use reduction (i.e., how much is put in the sewer) can delay the need for capacity expansion, we strongly feel that education programs focused on source control (i.e. what is put into the sewer) may offer the highest cost benefit to improving the quality of the effluent compared to installing treatment technologies to polish the effluent to a higher quality, and in fact may delay the need to upgrade technologies for future higher standards.

Economics of Integrated Resource Recovery

Integrated Resource Recovery (IRR) is one of the goals that Metro Vancouver has committed to in its provincially approved Liquid Waste Management Plan. IRR can turn waste into resources, can have a positive effect in reducing waste management costs across multiple waste streams, and at times may be directly profitable. However, not all IRR activities make economic or environmental sense. While some of the LGPAC members support IRR fully as a way to recognize our responsibility to minimize our environmental footprint, most LGPAC members agreed that IRR activities at the LGWWTP must make economic sense and provide a true environmental benefit.

The IRR activities that we identified as most likely to make economic sense and provide an environmental benefit include:

- Methane gas capture for use as fuel in plant operations;
- Recovery of treated water for use in plant operations and landscaping maintenance onsite;
- Capture of heat from effluent for energy use.

There may be some benefit at a future date for exporting treated water and energy from the plant to users in the nearby community (such as District Heating and industrial users); however, there are some key challenges, including the lack of connective infrastructure and uncertain markets or cost advantage compared to conventional fresh water and energy.

We discussed phosphorus recovery and struvite crystal harvesting. The treatment technologies proposed in the indicative design would not support effective recovery of these substances at the LGWWTP, and we do not see it being cost effective to add additional technologies to remove these substances at this time. While phosphorus is a marketable commodity (used in making fertilizer), the treatment plant technologies as proposed in the indicative design will not have the capability to remove phosphorus, and therefore one would not expect to see high concentrations of phosphorus in the digested solids to make struvite formation feasible. Struvite harvesting can have a beneficial effect for maintenance costs (delays major maintenance) at plants using other technologies. Struvite harvesting is a demonstration project at the Annacis treatment plant.

The proposed indicative design incorporates IRR activities noted above that make economic and environmental sense. LGPAC acknowledges that the new treatment plant will have the capacity

for IRR activities, and we support such activities where economically feasible or where they are necessary to maintain the social license to operate.

Upgrade Costs

The LGPAC believes that effluent water quality standards will continue to increase with time and, therefore, the treatment technology selection and site development should include provisions for cost effectively upgrading the wastewater treatment plant in the future. It is expected that improvements in water quality will likely be in the form of technologies designed to polish or further treat the effluent prior to discharge, rather than the replacement of technologies. Accordingly, technology selection should attempt to reserve land area for future expansion of tankage as well as the introduction of polishing technologies.

LGPAC believes that Metro Vancouver should ensure that there is significant economic justification for implementing such technologies, again taking into consideration operating costs (labour, energy and chemicals) and capital costs, as well as environmental significance. For example, phosphorus removal in and of itself is not an appropriate treatment consideration due to the high phosphorus content in marine waters.

3.5 EDUCATION

Activities could include guided tours of our leading-edge wastewater treatment facility showcasing how wastewater is treated on the North Shore. Water from the treatment facility could be used in a demonstration hatchery for release to the Capilano River, although the temperature impact of the treated wastewater would need to be assessed for salmon rearing.

Complementing the BC education curriculum

A fun informative presentation and resource kit for teaching students about drinking water protection, quality and wastewater treatment can be developed to complement the BC Ministry of Education Curriculum's learning expectations for Social Studies and/or Science and Technology.

The focus would be on how each of us can change our daily habits to become better environmental citizens and improve the ability of the wastewater treatment system to protect our marine environment. A more comprehensive program could look at the full water cycle including our water source and fresh water treatment.

The elementary school program materials would teach children what should and shouldn't be dumped into the toilet, drain or catch basin and how their actions can negatively impact wastewater and stormwater systems, and ultimately the environment.

The children's program materials could include a series of lessons incorporating readings, activities, games, and take home tasks such as counting all of the locations within the home that could release chemicals into the environment. The educational materials for older children and adults would be more sophisticated, focusing on behavior change, water chemistry, biological impacts, and alternatives to washing painting equipment or the problems associated with discharging fats, oils and grease down the drain.

Online engagement

An online web site interface can be developed to provide access to the Education Centre resources including a searchable database on alternatives to using and disposing toxic chemicals such as pharmaceuticals, paints and other materials that may not be removed from the water at the wastewater treatment plant, and enabling users to learn more about conservation and environmental stewardship in the home. The website could also include a behind-the-scenes video tour of the wastewater treatment process.

This web site and other materials developed by the Centre will empower communities throughout the region to become more environmentally responsible.

In-person lessons

Classroom lessons could include providing an overview of how wastewater is generated, what it can contain, and how its treatment has changed (globally) with time. It could enable students to identify substances added to the wastewater in their home, school, and in the community and lead them to consider how the composition of the wastewater can impact different aspects of the receiving environment. Students would learn about how wastewater and storm water is collected and transported from homes, schools, and businesses through underground pipes in pipe networks. The lesson plan could include an experiment done to simulate the wastewater treatment process by using a synthetic wastewater to illustrate the problems treatment plant operators face. Students would learn about the different stages of wastewater treatment, what is removed and what is not, and in the process become better aware of what should not be disposed to the sewer.

4.0. COMMUNITY ENGAGEMENT PROCESS

LGPAC Effectiveness

The LGPAC has been structured formally to encourage balanced representation of views and perspectives from the local neighbourhood community, from business interests on the North Shore, environmental interests, and non-affiliated citizens from the North Shore outside of the immediate area of the new plant site. Our committee is composed of some highly respected and knowledgeable members with expertise and long term experience in engineering, environmental, finance, public policy and project development. Some of our members have specific expertise and experience in water and wastewater treatment infrastructure (see Appendix II for member biographies). It is worthwhile to note that while some of our members have professional designations and have worked with Metro Vancouver on other wastewater treatment projects, they have not been engaged in a professional capacity and all of our members are volunteers.

The process has been one of interactive and mutually informative learning. We first met in June 2012 and participated in approximately 11 meetings and workshops, as well as attending community events to explore requirements and possibilities for the project. With very few exceptions, Metro Vancouver, through its professional staff and consultants, provided us with ample information on the project, ranging from the background information as to why a new treatment plant was required to the possibilities of what a treatment plant could look like and how it could fit in or virtually disappear into the community. Metro Vancouver had the benefit of listening to feedback that we feel was informed and constructive. The process has been highly respectful, and Metro Vancouver staff were engaging and responsive to our requests for specific technical information and background material.

Metro Vancouver spared no effort in making sure that we had the information we needed to understand and develop meaningful comments and advice for this project. Two of our committee members accompanied the Metro Vancouver Utilities Committee on a tour of four sewage treatment plants in Washington State. This gave us a first-hand look at some newer plants to experience the effectiveness of a variety of odour control methods. It was a turning point in many ways, particularly in the area of odour control, community integration, and the possibilities for education.

The LGPAC has been part of a multi-faceted community engagement process during the project definition phase. We understand that Metro Vancouver staff engaged separately with the local business community, First Nations, and local governments. Throughout our community engagement process we also held joint meetings and workshops with members of the Community Resource Forum – individuals from the North Shore who had considerable expertise and perspectives that helped inform and shape our discussions.

LGPAC believes that the community engagement process and the structure of the LGPAC and its work plan enabled Metro Vancouver to engage constructively with representatives of the community, and complimented other engagement activities with industrial and

commercial stakeholders.

This helped to ensure that a full range of interests – community, engineering, environmental, financial, public policy and project development expertise – were addressed in the indicative design process.

Since our first meeting in June 2012 the engagement progressed from briefing sessions to candid peer-level discussions around treatment options, design opportunities, mitigation, environmental and community enhancement. It has been an effective process, and we hope that there will be an opportunity to create and/or maintain an ongoing community partnership through the final design, construction and operational phases of the Treatment Plant.

"This was a new process for community engagement. It was a learning process for everyone concerned – Metro Vancouver staff as much as those of us from the community."

"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."

5.0. OTHER ISSUES DISCUSSED BY THE COMMITTEE

A number of issues were discussed by the Committee that were outside the Committee's mandate but related to wastewater treatment on the North Shore. These issues are discussed in the following sections.

Plant Location

The decision to build a new plant on a new site versus upgrading the existing plant was questioned. Metro Vancouver explained that the land on which the current plant sits belongs to the Squamish Nation and is being returned to them as per the British Columbia Indian Cut-Off Lands Settlement Act. We were told that the agreement with the Squamish Nation returns the land to them once the use changed. The committee asked whether the conversion of the LGWWTP from primary to secondary treatment constituted a change in use and whether leasing the land from the Squamish Nation was considered. The response was the Squamish had other plans for the land and were not interested in leasing to Metro Vancouver. The majority of Committee members did not take issue with the new plant location. However, some members felt the response from Metro Vancouver and the handling of this issue were not fully transparent and that sufficient information was not provided. Some members also suggested that if land tenure could not be secured or renewal of lease was in question, then it would have been imprudent to make large capital spending on the existing site.

The Need for and Effectiveness of Secondary Treatment

The technical need for secondary sewage treatment was discussed extensively when the Committee was first struck. Some members of the Committee noted that historical monitoring has not detected any environmental impacts from the existing primary treatment facility discharge and opined that continued primary treatment is sufficient to ensure that effluent does not have a negative impact. Secondary treatment is designed to grow bacteria that consumes biodegradable material in the wastewater that would otherwise be consumed by bacteria in the environment. It is not designed to remove toxic organic and inorganic contaminants that may be of concern to the receiving environment, but instead indirectly results in some of these contaminants sticking to the bacteria that are generated by the process. It is therefore the opinion of some members that effluent quality from secondary treatment would not significantly benefit the marine environment as there is no detectable impact to improve; therefore, secondary treatment would be a waste of money. Several other members of the Committee strongly disagreed with this position. Everyone, however, acknowledged that the upgrade to secondary treatment was necessary because it was legislated. Committee members emphasized that secondary treatment does not mean that contaminants are removed from sewage such that land is as protected as the marine environment. A proportion of the contaminants will adhere to the biosolids when

they are separated from the liquid portion of sewage. However, any contaminants dissolved in the liquid portion, such as metals and pharmaceuticals, will remain and will ultimately be discharged into Vancouver Harbour via the marine outfall. Secondary treatment improves the disinfection efficiency and enables ultraviolet light to be considered as a possible means of disinfection.

Format of Data Received

While Metro Vancouver was responsive in providing data requested by the Committee, it was often not in the format the Committee would have preferred. The data provided was highly processed and aggregated. As a result, in many cases it was impossible to review the information in detail and develop a truly independent opinion.

Other Options for Sewage Handling

In the mid-2000s, Metro Vancouver considered a number of options for handling North Shore's sewage (reported in 2005). One of these options was pumping sewage to the Iona sewage treatment plant in Richmond. In the 2005 report, the cost estimate for constructing a pipeline to convey sewage to Iona was slightly higher than building a new sewage treatment plant on the North Shore. Also, it was concluded that repairs and maintenance of the pipeline would be more costly compared to an on-land system. Metro Vancouver concluded at the time that pumping sewage was not a cost effective option.

The committee discussed the option of constructing a pipeline and pumping to Iona, and recommended that Metro Vancouver update the cost estimate using today's costs to determine if the 2005 conclusion was still valid. Metro Vancouver did so and we were advised that the cost estimate was higher than the estimate for a new plant.

It was agreed that based on the updated costs prepared and presented by Metro Vancouver staff, pumping sewage to Iona is probably not a viable option.

APPENDIX I – SUMMARY OF LGPAC SUPPORT FOR RECOMMENDATIONS

Section 3.1: Community Impacts
Instructions: For each recommendation, please identify your level of support.

Recommendations	Strongly Support	Support	Don't Support
3.1a. LGPAC is satisfied that the proposed design addresses concern about neighbourhood impacts (odour, noise, truck traffic) and recommends that the final design contain features that will be at least as effective in addressing these concerns.	4	4	2
Alternative View: ***One LGPAC member did not support recommendation 3.1a on the basis that "we cannot conclude we are satisfied the concerns will be addressed based on a conceptual design. My point was that I can support 'LGPAC is satisfied that Metro Vancouver is well aware of the concern regarding neighbourhood impacts (odour, noise, truck traffic) and recommends that the final design ensure these issues are addressed as a priority'"*** ***Alternative View: (NOTE: this new wording has been added to the report)*** ***"The community (residents and businesses) have significant concerns about odour, air quality, traffic and noise from the proposed plant. Most LGPAC members are satisfied that Metro Vancouver is aware of the concerns regarding neighbourhood impacts, and that the indicative design includes the necessary technology to meet a "no odour" standard, although some odour release may occasionally occur due to accidents or human error. There is a strong interest in ensuring that these concerns are addressed beyond the conceptual design phase, and that the final design will not compromise any of the features intended to mitigate community impacts. Members view odour control, targeting a zero impact on the community environment is mandatory."***			
3.1b. LGPAC recommends that Metro Vancouver engage directly with the Norgate Community in advance to develop a mutually satisfactory construction plan.	10		

Section 3.2: Community Integration
Instructions: For each recommendation, please identify your level of support.

Recommendations	Strongly Support	Support	Don't Support
3.2a. LGPAC recommends that the building and the site be designed in a manner that raises awareness about sewage treatment, and supports educational initiatives.	6	4	
3.2b. LGPAC recommends that Metro Vancouver explore opportunities for revenue generating activities on-site.	4	5	1
Alternative View: ***One LGPAC member did not support recommendation 3.2b that the site be used for "revenue generating activities". The member stated that "the site should be dedicated and focused on its primary purpose, to provide a sustainable means of wastewater treatment and protecting the environment from adverse contaminants."***			
3.2c. LGPAC recommends that the site be designed to accommodate future changes and expansion.	6	4	

Section 3.3: Environmental
Instructions: For each recommendation, please identify your level of support.

Recommendations	Strongly Support	Support	Don't Support
3.3a. LGPAC recommends that the plant be built to meet the required secondary treatment standard but is flexible to accommodate potentially higher treatment standards.	5	5	
3.3b. LGPAC recommends that the Lions Gate treatment plant be used to treat only the sewage stream and not be used to treat any other waste streams.	3	7	
3.3c. LGPAC recommends that monitoring air emissions from the plant both on-site and in the adjacent community.	6	4	
3.3d. LGPAC recommends that Metro Vancouver consider technologies and handling processes that will have a low GHG	4	5	1

footprint.			
Alternative View: ***One member of LGPAC did not support recommendation 3.3d because "Metro already has a policy to reduce GHG emissions – so this is a meaningless recommendation".***			
3.3e. LGPAC strongly recommends that education programs to prevent contaminants from entering the sewer system be designed and implemented in the community.	8	2	
3.3f. LGPAC recommends integrated resource recovery activities at the plant where there is both an environmental benefit and economically feasible.	7	2	1
Alternative View: ***"IRR MUST BE BALANCED AGAINST ALL IMPACTS SUCH AS NOISE AND ODOR."***			
3.3g. LGPAC recommends using technologies and processes that are energy efficient, and make as much use of resource recycling as economically feasible and possible.	5	5	

Section 3.4: Economics
Instructions: For each recommendation, please identify your level of support.

Recommendations	**Strongly Support**	**Support**	**Don't Support**
3.4a. LGPAC supports Build Scenario B as the most cost effective and representing the best value for money among all scenarios considered.	2	8	
LGPAC Member Comment: ***"Scenario B and its requirements should be documented as it may change as the process continues."***			
3.4b. LGPAC recommends that Metro Vancouver pursue all federal and provincial funding available including grants available under a P3 structure, if a P3 model is deemed appropriate.	8	2	
3.4c. LGPAC recommends that Metro Vancouver seriously consider a P3 structure as a viable project delivery model to mitigate the potential for cost and schedule overruns.	4	4	2

Alternative View: ***One member of the Committee did not support this recommendation on the basis that:*** ***"We did not have a fulsome enough conversation with all the information on the table to make this recommendation. I do not support its inclusion. I feel that 3.4b covers the interest of the committee in looking into a P3 which is as far as we should go."***			
3.4d. LGPAC recommends that for the purpose of allocating cost of the project to ratepayers, that Metro Vancouver use market based financial modelling (i.e., discount rate and amortization rate).	5	4	1
Alternative View: ***One member of the Committee did not support this recommendation on the basis that:*** ***" I don't accept that "market based financial modeling is necessarily the most appropriate approach for a publically funded essential service"***			
3.4e. LGPAC recommends that educational programs be used as a way to reduce operating costs and to defer major capital projects at the plant in the future.	4	5	1
Alternative View: ***One member of the Committee did not support this recommendation on the basis that:*** ***"I disagree that educational programs can be used to reduce operating costs and defer major capital costs. The purpose of the educational program concept is to make people aware of contaminants being discharged to sewer that are not being treated and end up in the environment. I think this recommendation should be eliminated entirely as we have not established any basis to make the assertion that public education is capable of reducing capital and operating costs."***			

Section 3.5: Education
Instructions: For each recommendation, please identify your level of support.

Recommendations	Strongly Support	Support	Don't Support
3.5a. LGPAC strongly recommends that Metro Vancouver explore and support educational programs as described in Section 3.5 of the LGPAC report.	6	4	
3.5b. LGPAC recommends that Metro Vancouver consider establishing a unique center of excellence at or adjacent to the Lions Gate treatment plant for the purpose of raising awareness of water and sewage management and changing behaviours. .	6	4	

APPENDIX II – MEMBER BIOGRAPHIES

LOCAL COMMUNITY ASSOCIATION

Diana Sollner, M.A.Sc., P.Eng., Primary and Vice Chair

Tracy Tilscher, P.Eng., Primary

Arlene King, Alternate

David Knee, Alternate

ENVIRONMENTAL INTERESTS

Darlene Clarke, Primary (North Shore)

John Croockewit, P.Eng. Alternate (North Shore)

Adrian Rowland, P.Eng. Primary (North Shore)

Brian Walker, P.Eng., Alternate (North Shore)

Christianne Wilhelmson, M.Sc. Primary (Region)

David Lane, Alternate (Region)

BUSINESS INTERESTS

Christine Banham, Primary and Chair

John Hunter, P.Eng., Primary

Blair East, CA, Alternate

Dave Dunbar, Primary

Gonzalo Benitez, Alternate

NON-AFFILIATED CITIZENS

Jan Timmer, Primary

Peter Thompson, P.Eng.(ret), Primary

Troy Vassos, Ph.D., P.Eng., Primary

Diana Sollner, M.A.Sc., P.Eng.

Primary Member and Vice Chair

Representing Local Community Association

Diana is the Owner and Principal of GEM Services, an environmental engineering service provider to the mining industry, particularly to junior mining companies. Diana's areas of technical expertise include waste characterization, water quality prediction, waste and water management planning, mine closure planning and the integration of environmental data into the mine design process.

Diana has served as a Director for the Norgate Park Community Association, the residential community located adjacent to the project site, for the past seven years, and volunteers with various community organizations. In addition to her volunteer work, Diana was a member of the First Aid Ski Patrol Society for 17 years, serving as Mountain Supervisor, Vice President and acting President for about half that time.

Tracy Tilscher, P.Eng.

Primary Member

Representing Local Community Association

Tracy is the Principal of Juno Engineering, a consulting company that works with small businesses on operational efficiency, and Safecon Fire Protection, a life safety control system for residential and commercial customers. She is also a Professional Electrical Engineer with more than 25 years of experience in telecommunications, software development, and fire protection industries.

Tracy has served as a Director for the Norgate Park Community Association, a residential area located adjacent to the project site, for the past 11 years. Tracy brings extensive knowledge of the integrative design process and project management expertise, with a large focus on brainstorming and facilitation, as well as asset management strategies for large organizations and municipalities.

As a long-term resident of the Norgate community, Tracy will represent the concerns and interests of the residents and its local businesses.

Arlene S. King

Alternate Member

Representing Local Community Association

Arlene is retired from the credit and collections field, and has been living in the Norgate community, a residential area located adjacent to the project site, for the past 28 years. She has served as a Director for the Norgate Park Community Association, and has been a member of the association for five years.

Arlene is dedicated to keeping the Norgate community, which was built in the 1950's, before most of the surrounding industries came in, a family-friendly place. She seeks creative and sustainable solutions for the long-term social, environmental and financial well-being of the Norgate community.

David Knee

Alternate Member

Representing Local Community Association

David retired in 2001 with over 32 years' experience at FortisBC, an energy provider in British Columbia. He was also involved in the development of local zoning regulations for Norgate, the residential community located adjacent to the project site.

David has served as a Director for the Norgate Park Community Association for the past 25 years, and President for the past 20 years. As a long-standing resident of the Norgate community, David hopes to bring the perspectives of the community, and seeks well considered solutions to provide for the long-term well-being of the area. He wishes to provide his expertise to Metro Vancouver, so the new facility can be built using the latest technology to achieve an efficient, odour-free facility, with minimum impact on the surrounding areas.

Darlene Clarke

Primary Member

Representing Environmental Interests (North Shore)

Darlene is the Principal at DMC Associates, and over the last 30 years, has worked in progressively more senior roles in the environmental sustainability field. She has worked with Alberta's oil industry regulator, BC Hydro, through their Power Smart and alternative energy program, and the Vancouver Olympic Committee (VANOC). She currently owns a consulting company, which is focused on cleantech companies in the areas of sustainability and marketing.

Darlene is also a Director of Cool North Shore, a not-for-profit organization dedicated to spreading awareness and promoting action on climate change issues. In addition, she is on the board of a local community theatre group and the Regional Council for the Anglican Churches in North Vancouver.

John Croockewit, P.Eng.

Alternate Member

Representing Environmental Interests (North Shore)

John is a Professional Engineer in civil and water resource engineering. He is currently working as a hydrology and hydraulics project specialist at BC Hydro. His interests include the interdisciplinary components of a project and ensuring that the various aspects of a project work well together.

John has implemented environmental measures on a number of hydroelectric projects including minimum flows, bypass valves, flow ramping, fisheries compensation habitat, wildlife management, and is currently examining dissolved gas mitigation (for fish). He has examined wind and wave energy development opportunities, led a stream restoration program for the Steelhead Society, and has construction management experience on mineral processing plants, docks, and bridges.

John is also a Board Member of the Capilano Gateway Association, which is a volunteer community organization that fosters and encourages involvement in neighbourhood and community development.

Adrian Rowland, P.Eng.

Primary Member

Representing Environmental Interests (North Shore)

Adrian brings the perspectives of a multi-disciplinary civil engineer who seeks creative and well considered solutions to provide for the long-term environmental and economic health of the region's communities.

His career has spanned research, design, construction management, and infrastructure program planning, with an emphasis on the marine environment and coastal community infrastructure. Adrian's hope is to contribute his experiences in a supportive way to the Lions Gate Public Advisory Committee (LGPAC).

Adrian brings perspectives and insights based on education and experience in coastal zone projects and infrastructure management accumulated over 32 years with the Department of Fisheries and Oceans.

As a key initiator, he fostered the development of a Shoreline Protection Plan for the District of West Vancouver, which the community has embraced, and which has been recognized as an ongoing demonstration of progressive municipal coastal planning.

Brian Walker, P.Eng.

Alternate Member

Representing Environmental Interests (North Shore)

Brian is a Senior Consultant (semi-retired) at Dayton and Knight Ltd., Consulting Engineers. He provides consulting engineering services to municipal, provincial and federal governments in BC for water supply, wastewater treatment and disposal, solid waste management, and stormwater management. His primary focus has been on wastewater treatment and disposal including Liquid Waste Management Plans (LWMP), treatment plant design, and ocean outfall design. He has been a Technical Advisor to the Province for the development of Municipal Sewage Regulation, and provided provision review comments to the Minister of Environment on the Capital Regional District LWMP.

Brian is also a member of the District of West Vancouver's (DWV) Advisory Design Panel, Chair of the DWV Engineering Advisory Committee, and a member of the DWV Rogers Creek Working Group for the Upper Levels development.

Brian's interests in the LGSWWTP project include ensuring cost effective design, odour mitigation measures, beneficial use of effluent (reclaimed water) and beneficial use of biosolids.

Christianne Wilhelmson M.Sc.

Primary Member

Representing Environmental Interests (Region)

Christianne is the Executive Director at Georgia Strait Alliance (GSA), and has been with the GSA for nearly ten years, first as Clean Air and Water Program Coordinator, and currently as Executive Director. During this time, she had led GSA's efforts to reduce pollution of the Strait of Georgia from land-based sources, in particular municipal sewage. She also leads the organization's fundraising, government and media relations efforts, and their campaigns on protection of species at risk, as well as marine planning. She has worked in both the Capital Region of Victoria and Metro Vancouver to improve treatment levels (and advance timelines for higher levels of treatment), and to bring integrated resource management to both communities.

Christianne was a member of the Capital Regional District's Technical and Community Advisory Committee, advising the region on its plans for sewage treatment. She was also a member of the Core Advisory Group assisting the Canadian Council of Ministers of the Environment (CCME) and Environment Canada in its efforts to develop a national strategy on sewage treatment and new regulations under the Fisheries Act. Christianne was a member of Metro Vancouver's Integrated Liquid Waste and Resource Management Plan Reference Panel, which provided advice during the development of the plan. Currently, she is a member of the Regional District of Nanaimo's Liquid Waste Advisory Committee, as that region updates its Liquid Waste Management Plan.

Her pollution-related work has focused on raising awareness of the impacts of raw or undertreated sewage on the marine environment and on innovative approaches to managing sewage.

David Lane

Alternate Member

Representing Environmental Interests (Region)

David is the Executive Director for the T. Buck Suzuki Environmental Foundation. This foundation has been providing input into public consultations on sewage and source control in both Metro Vancouver and the Capital Regional District for more than ten years, and has co-sponsored several iterations of the National Sewage Report Card with the Georgia Strait Alliance and the Sierra Legal Defense Fund (now Ecojustice). The foundation has a Commercial Green Boating Program to educate those in the commercial fishing sector on pollution prevention and green boating practices, and the foundation was involved in consultations leading to the new Vessel Pollution Prevention Regulations.

David is also the Executive Director for the United Fisherman and Allied Workers Union and has worked on environmental issues relating to fish habitat protection including salmon farming, poor logging practices, pulp mill pollution, sewage pollution, hydroelectric developments and urbanization.

David was also a member of the Core Advisory Group to the Canadian Council of Environment Ministers Municipal Wastewater Effluent Committee in 2006-07.

Christine Banham

Primary Member and Chair

Representing Business Interests

Christine is the Senior Manager of Global Transaction Banking at Scotiabank, and has worked in policy departments at the Bank of Canada, Canada's central bank, and has enjoyed a 17 year career in finance with Scotiabank. Through her work experience she has developed knowledge in a broad range of industries, completed a number of financings, including those in infrastructure development, and has a well-developed professional network.

Christine is interested in community issues and policy development relating to land use, land planning and strategic planning. She is a West Vancouver citizen representative on the North Shore Waterfront Liaison Committee, a committee started by Port Metro Vancouver to bring together North Shore municipal, First Nation, industry, port, and community interests to facilitate two-way communication about port transportation, and operational issues on the North Shore. She was recently involved in Port 2050, the Port's long-term strategic planning process, and in the Port's land use planning workshops.

Christine has been an active volunteer for the District of West Vancouver. Her previous activities include Chair of the Working Group for Community Dialogue on Neighbourhood Character and Housing, Vice-Chair of the Pilot Program Working Group, Co-Chair of the Strategic Planning Working Group, Lower Caulfield Advisory Committee, and Financial Advisory Committee.

John Hunter, P.Eng.

Primary Member

Representing Business Interests

John is the President and CEO of J. Hunter and Associates Ltd. and is the senior consultant whose career spans more than 40 years in the energy and Public-Private Partnership (PPP) sectors advising companies on energy matters. He has a thorough knowledge of strategic planning, utility operations and business development, regulatory processes, budgeting, and capital projects. John led and advised on several billion dollars of successful PPPs, and is one of few people who have both led and advised on such projects, including Independent Power Projects.

In 1985, after 15 years in the non-utility energy sector, he was appointed Vice-President of Union Gas Ltd., responsible for all natural gas supply activities. He was also responsible for the marketing, management, and operation of Canada's largest natural gas storage operations.

John has advised governments on energy policy and projects. He is an expert on PPPs, Engineering Procurement and Construction (EPC), and utility contracts and procurement processes. John advised the BC Utility Commission on such subjects in the Duke Point hearings, and advised utilities, including BC Hydro, on the use of PPPs. Other projects he has worked on include the acquisition and disposition of significant power, oil and gas assets, advising Japanese banks on the financing of a major Mexican offshore gas project, advising two international consortia on $1.5 US billion of successful Mexican PPPs, and advising on district heating and energy from waste projects.

A. Blair East, CA

Alternate Member

Representing Business Interests

Blair is a Partner and Chartered Accountant (CA) at Manning Elliott LLP, Chartered Accountants and Business Advisors.

As a CA, Blair has volunteered for numerous BC committees and one national CA committee, the International Qualifications Appraisal Board, which reviewed reciprocity with foreign accounting designations. He became Chair at the time reciprocity was granted between Canada, United States, and Mexico accountants at a ceremony in Washington D.C.

He has also volunteered his time on two District of North Vancouver committees as a member and Chair in the past ten years. The first committee reviewed the purchasing policies and procedures of the District as a result of the financial irregularities relating to the Northland Golf Course, and prepared a report with recommendations to Council. The second committee reviewed the cost budget process and costing for the then-proposed Lynn Valley Town Centre, and prepared a report to Council.

As a North Shore resident for 23 years, businessman for more than 30 years, and as a previous member of two municipal committees, Blair has valuable experience and perspective to bring to the Lions Gate Secondary Wastewater Treatment Plant Public Advisory Committee.

Dave Dunbar

Primary Member

Representing Business Interests

Dave Dunbar joined Western Stevedoring in 1997 as Controller. He was later named Group Controller and further appointed Group Controller and Chief Financial Officer in 2011. Mr. Dunbar is a Certified General Accountant and a Fellow of the Association of Chartered Certified Accountants (UK). He also holds a Masters of Business Administration. Prior to joining Western, he spent several years with Cominco Ltd. at various locations including the start up and operation of the Snip gold mine in Northwestern British Columbia that was in production from 1991 – 1999.

He serves as the Corporate Secretary for Western and its subsidiaries – Associated Stevedoring Ltd., CVS Cruise Victoria, Tidal Harmony Holdings, Coast 2000 Terminals Ltd. and the joint venture Empire Grain Stevedoring Ltd.

He is active in the industry as a member of the British Columbia Maritime Employers Association Finance and Audit Committee, Director of the Waterfront Employers of BC, Director of the North Shore Waterfront Industrial Association and member of the British Columbia Wharf Operators research committee.

Gonzalo Benitez

Alternate Member

Representing Business Interests

Gonzalo is Vice President Finance and Administration, and a Certified General Accountant (CGA) at Neptune Bulk Terminals (Canada) Ltd. in North Vancouver. Neptune is currently undergoing a significant capital expansion and he is directly responsible for financing, project costing, accounting, risk management, and legal matters related to the expansion. He has worked with the company for nine years, and previously was a business unit Controller with General Electric Power Systems Division.

Gonzalo is a Director and Chair of the North Vancouver Chamber of Commerce, President of the Waterfront Employers of BC, a member of the Finance Committee of the BC Maritime Employers Association of BC, and is past President of the Vancouver Crisis and Suicide Prevention Centre. He has also held a number of volunteer positions with his children's sporting team associations and Cub Scout troops in Calgary, Alberta.

As a representative of business interests, Gonzalo is principally concerned about the costs that will be borne by businesses on the North Shore as well as any changes to environmental regulations that may arise as a result of the project.

Jan H. Timmer

Primary Member

Representing Non-Affiliated Citizens

Jan is the Principal of Jan H. Timmer Architecture Ltd., and is a Registered Architect, MAIBC.

Jan has a keen interest in sustainable and regenerative buildings and community development. He was the lead consultant and author of the University of British Columbia's (UBC) *Theological Neighbourhood Plan,* a unique collaborative process involving the lands and development interests of four churches and UBC. Last year he completed construction of the Sunridge senior's residence in the Township of Langley, which is currently being processed for, and aims at, a Leadership in Energy and Environmental Design (LEED) Gold certification. Jan has a long-standing interest in the District of North Vancouver (DNV) and the North Shore communities.

Jan was a young member of the Grosvenor Laing Planning team that developed a plan for the DNV in the early seventies, including the entire area east of the Seymour River to Deep Cove, using Ian McHarg's *"Design with Nature"* as the guide. Jan is also a member of the Western Residents Association in West Vancouver, and he was a volunteer planning consultant for the Maplewood Community Association in the DNV.

Peter J. Thompson, P.Eng. (ret.)

Primary Member

Representing Non-Affiliated Citizens

Peter is President of Bede Consulting Inc., a Business Information Systems Sector, and is a retired Professional Engineer, formerly with Wright Engineers Ltd. and BC Hydro.

Peter is a member of the Executive Committee, Edgemont and Upper Capilano Community Association, and former Co-Chair of the Steering Committee for the Development of the Upper Capilano Local Area Plan.

Peter is also a member of the District of North Vancouver's Community Monitoring and Advisory Committee (CMAC) for Metro Vancouver's Seymour-Capilano Water Utility Projects. The CMAC has reviewed and provided advice on mitigating community impacts for significant projects including the Cleveland Dam Seepage Control, Seymour-Capilano Filtration Plant, the Seymour-Capilano Twin Tunnels, Capilano Pump Station, and the energy recovery facility.

Troy Vassos, Ph.D., P.Eng.

Primary Member

Representing Non-Affiliated Citizens

Troy has a Ph.D. in environmental engineering with over 34 years of experience in industrial and municipal water and wastewater treatment process design, regulatory and standards development, technology performance verification, operations support and optimization and effluent disposal and reuse. He is an expert and advisor in the area of integrated water management including water conservation, stormwater management, rainwater harvesting, and water reclamation. Other areas of expertise include landfill management and leachate treatment, biomass to energy, composting, environmental & public health assessment, and environmental forensics.

Dr. Vassos is active in numerous provincial, national, and international technical and professional organizations, committees, and advisory boards, and has provided regulatory assistance to British Columbia and Alberta regarding water reuse. Troy represented Seattle Public Utilities on the value engineering team for the Seattle/King-County Brightwater membrane bioreactor wastewater treatment plant. He has chaired committees on behalf of the Natural Science and Engineering Research Council (NSERC), previously served on the BC Science Council, BC Innovations, and currently is a committee member for Alberta Innovates and the Canadian Standards Association.

APPENDIX III – DETAILED COMMENTS ON CONSTRUCTION PHASE COMMUNITY CONCERNS

1) Construction

i. Vibration (e.g. pile driving, soil densification)

- should be avoided or minimized through technology and/or construction technique selection;
- should not damage or adversely affect existing residential or commercial structures in the surrounding community;
- should only be allowed for a specific periods of the working weekday (e.g., 9 am – 5 pm) and not allowed during the night or on weekends, so as not to adversely affect the quality of life in the area.

ii. Noise control and abatement

- All noise levels must meet municipal noise regulation bylaws
- Noise during construction should be avoided or minimized through technology and/or construction technique selection
- should only be allowed for a specific periods of the working weekday (e.g., 9 am – 5 pm) and not allowed during the night or on weekends, so as not to adversely affect the quality of life in the area

iii. Dust

- Meet any municipal regulations for air emissions
- should be avoided or minimized through technology and/or construction technique selection
- should not adversely impact existing residential or commercial buildings in the surrounding community
- where applicable, consider using water (e.g., spray, wheel washers etc.) to reduce dust levels

iv. Construction Operating Hours

- Working hours should be in line with municipal regulations
- Should only be allowed during weekdays and reasonable working hours (e.g., 9 am – 5 pm) and not allowed during the night or on weekends, so as not to adversely affect the quality of life in the area

v. Road Closures

- Advance advertising of required road closures including alternative routes will reduce negative traffic impacts on local residents
- Where possible, simultaneous road closures in the neighbourhood should be avoided and all closures should be kept to the minimum required time
- Measures should be taken to ensure that traffic does not re-route intentionally or otherwise through

residential areas. Note this may require placing manned traffic access restrictions (residents and visitors only) at the entrance points to Norgate.

vi. Risk Assessment and Mitigation

- The Treatment Plant is located adjacent to the major industrial, and commercial enterprises, residential communities and business critical road and rail services. It is recommended that Metro communicate details of the risk assessment studies associated with the development and operation of the Treatment Plant and remedial plans including:
    - Seismic Assessments
    - Climate change impacts
    - Errant (unintended) odour emissions
    - Industrial accidents/incident including derailments, traffic accidents etc. within or adjacent to the Plant
- Development and construction of major projects cannot anticipate all eventualities. It is recommended that a liaison process be established for Metro to inform and consult with the Industrial, commercial and residential neighbours and enable timely community monitoring of the project.

Issues, Comments, and Metro Vancouver (MV) Responses
LGSWWTP Project Definition Phase, February 7, 2012 to October 29, 2013

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Online Public Survey Feedback	Community Integration	The site is at a very busy intersection and an at grade cross-walk will obviously need to have signal lights to ensure pedestrian safety.	Comment noted.
Community Workshop (CRF & LGPAC) November 14, 2012	Community Integration	This is a challenging neighbourhood context, there are many different interests, residential, commercial, industrial. It will be difficult to satisfy a diverse range of stakeholders.	Comment noted.
Community Workshop (CRF & LGPAC) November 14, 2012 & LGPAC Email Correspondence April 11, 2013 & Email correspondence May 1, 2013	Community Integration	How will property values be affected and addressed?	MV is working to make a facility that will be integrated into the community without negatively impacting property values.
Community Workshop (CRF & LGPAC) November 14, 2012 & Community Workshop (CRF & LGPAC) September 10, 2012 & CRF Meeting May 23, 2012 & Email Correspondences February 18, 2013, February 26, 2013, June 10, 2013 & Norgate Residents' Workshop September 4, 2013	Community Integration	The plant should be leveraged to provide amenities and education for the community and should improve the community by providing public gathering spaces and other assets.	The Indicative Design includes space that can be used for education/tour groups and community meeting space, as well as a public plaza that can be used for public gathering space.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Community Workshop (CRF & LGPAC) November 14, 2012 & CRF Meeting May 23, 2012	Community Integration	The project should be used to influence behaviour in the community by helping people to see this as a necessary public health amenity and to better understand source control. MV needs to help the community understand the benefits of the project beyond just complying with Federal regulations.	The incorporation of education on the importance of wastewater treatment to public health and welfare, and the impact of upstream product use and source control are messages that will be incorporated into the Metro Vancouver Source Control Program.
CRF Meeting May 23, 2012	Community Integration	The plant site is a unique location. To ensure the project provides maximum benefit to the community it would be helpful to perform a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of the location to understand its unique benefits.	Comment noted.
CRF Meeting November 1, 2012	Community Integration	Other projects are happening in the community so beware of community exhaustion with providing input.	Comment noted. MV has provided numerous opportunities for public input, some of which have been incorporated into existing community events (such as the Block Party on August 10th, 2013).
LGPAC Meeting October 30, 2012	Community Integration	Does LGPAC believe that community aspects are more important than financial aspects?	The MV Board will be interested in the advisory committee"s opinions to help them in their decisions.
Norgate Public Meeting April 24, 2013	Community Integration	Consider changing the name to the LGRROP - Lionsgate Resource Recovery Operations Plant to help change the perception of the process and the perception of the plant in the future.	Comment noted.
Email Correspondence February 26, 2013 & Public Meeting Feedback Form - April 29, 2013	Community Integration	Consider this an opportunity to create shared public space like Granville Market. More public space should be considered for all options.	The project team explored a number of possible public space uses during the Project Definition Phase.
Public Meeting Feedback Form - April 29, 2013	Community Integration	Public uses should be discouraged.	Comment noted.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Norgate Open House Feedback Form - March 7, 2013 & Norgate Residents" Workshop September 4, 2013	Community Integration	An all-weather field should be considered.	Incorporation of recreational space was considered during the Project Definition Phase.
LGPAC Meeting October 30, 2012	Community Integration	Regarding distributed treatment versus centralized treatment, could the education component for this site include a pilot?	There are no pilot projects of this type included in the Indicative Design as distributed treatment was not cost effective.
Community Workshop (CRF & LGPAC) September 10, 2012 & CRF Meeting May 23, 2012	Community Integration	What can we put into the process that transfers the waste into amenities that serve the community? Focus on waste as a resource.	The Indicative Design incorporates use of biogas, effluent heat, and reclaimed water as wastes converted to resources.
Norgate Block Party Aug 10, 2013 & LGPAC Meeting October 7, 2013 & Public Meeting October 10, 2013	Community Integration	Is there a risk of the plant exploding due to the use of chlorine or other hazardous materials?	No. Chlorine gas, commonly used for disinfection of municipal water and wastewater, will not be used at the plant. The Indicative Design for the new Lions Gate Secondary Wastewater Treatment Plant includes use of ultraviolet light and sodium hypochlorite (similar to household bleach) for disinfection of reclaimed water. All chemicals will be contained and handled properly so as not to present a risk to the public.
Community Workshop (CRF & LGPAC) November 14, 2012& Norgate Residents' Workshop September 4, 2013	Community Integration	Establish connections to the surrounding environment, i.e. views to waterfront/Burrard Inlet and the Spirit Trail. Look at the big picture, not just the site. Share information on plant operations, and monitor and share the treatment process inputs and outputs.	A rooftop viewing area on the top of the Operations and Maintenance Building, a vegetated public plaza at the east end of the site as a connection to the Spirit Trail have been incorporated into the Indicative Design. Awareness and education on what is happening at the plant, including use of biogas, effluent heat, and reclaimed water are to be incorporated as educational components at the facility.
LGPAC Meeting October 7, 2013	Community Integration	Rooftop access availability could be accessible to the community	The Indicative Design includes a rooftop viewing area on the top of the Operations and Maintenance Building.
Online Public Survey Feedback	Community Integration	Impact of property values are of concern as well as taxes and the negative impact generated from the media about this project; mayors have not addressed any of these issues.	Comment noted.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
LGPAC Meeting October 7, 2013	Community Integration	I would like to see a participatory aspect to the water feature, similar to some of the facilities in Washington State that we saw during the study tour where children could play in the water. The fact that it is clean enough to play in makes a statement.	Comment noted.
Norgate Residents" Workshop September 4, 2013	Community Integration	Are there discussions with education bodies (e.g., BCIT, UBC, school boards) in order for an education centre to be fully utilized and integrated within the community?	We have not talked with the different education bodies at this point. There is an education program within MV and there are many school tours of the facility that could be incorporated.
CRF Meeting May 23, 2012	Cost - Allocation	Who is responsible for the maintenance costs of sewage pipes?	MV is responsible for the large trunk sewers, pumping stations, and the treatment plant and charges a levy to the North Shore Sewerage Area primarily based on flows or a proxy of flows. The municipalities own and maintain the local sewerage system that feed the trunk sewers.
CRF Meeting November 1, 2012 & Email Correspondence May 17, 2013	Cost - Allocation	How will the project impact municipal taxpayers, both residential and business?	The impact will depend on the delivery model, the scale of the building, the potential for revenue generating opportunities, the level of senior government grants for the project and the Metro Vancouver cost sharing formula.
Norgate Community Open House March 7, 2013 & Public Meeting Feedback Form - April 29, 2013	Cost - Allocation	How will costs for the Lions Gate plant be shared amongst the North Shore municipalities and the rest of the Metro Vancouver region, including First Nations?	MV is in the process of reviewing the cost allocation formula that will be applied to this facility, and other projects going forward. The current formula is as follows: Tier I (Operating Cost and Capital Costs relating to basic infrastructure) paid 100% by the local sewerage area (participating municipalities) to which they relate, and Tier II (Capital Costs relating to treatment beyond primary) paid 30% by sewer area (participating municipalities) to which they relate and 70% allocated across the region as a whole.
Norgate Community Open House March 7, 2013	Cost - Allocation	Will the cost of the upgrades to the Iona plant be shared in the same way as the Lions Gate plant upgrades?	Once the cost allocation formula has been determined, it will apply to all future treatment plant upgrades, including Iona Island.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
LGPAC Email Correspondence May 17, 2013 & Structured Decision Making Workshop May 31, 2013 & CRF Meeting May 23, 2012 & Norgate Residents' Workshop September 4, 2013 & Norgate Community Open House March 7, 2013	Cost - Allocation	What is the status of potential funding from the federal or provincial government? What are the funding options for this project and when will they be dealt with during the process? What are the implications of not receiving funding?	The federal government has announced there will be funding available through a new Building Canada Fund; details are anticipated in early 2014. Federal / provincial cost sharing, if available, would significantly reduce the user rate increase associated with the treatment plant upgrade projects. MV is actively pursuing funding from the federal and provincial governments.
Email Correspondence February 26, 2013	Cost - Allocation	Lifetime costing and funding sources will be a critical component in the decisions related to project sizing and configuration.	Comment noted.
Email Correspondence March 6, 2013 & Email Correspondence April 17, 2013	Cost - Allocation	What are the requirements for the project to receive federal funding?	The application process and requirements are expected to be available in early 2014.
Telephone Call	Cost - Allocation	Are there conditions for sustainability objectives to be included for provincial funding of liquid and solid waste infrastructure?	There are currently no open funding programs with specific conditions.
IRR/Procurement Workshop March 27, 2013	Cost - Allocation	When do the municipalities have to start paying?	The municipalities start paying as soon as the debt payments begin under the specific design and construction delivery option selected.
Structured Decision Making Workshop May 31, 2013	Cost - Allocation	How does the project account for the risk of not receiving provincial or federal government funding?	Government grants would help offset rate impacts.
Community Feedback Form - May 7, 2013	Cost - Allocation	What are the possibilities for commercial partnerships? For example, large housing project or casino to pay for the project.	MV explored potential options as part of the Project Definition Phase, but it was determined that housing at this site was in conflict with the District of North Vancouver's Official Community Plan.
Email Correspondence Sept 20, 2012	Cost - Allocation	There is a need to focus on minimizing cost to the taxpayer through revenue generation on site.	The project team explored a number of revenue generating alternatives during the Project Definition, including using part of the site for private development.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Community Workshop (CRF & LGPAC) November 14, 2012	Cost - Allocation	The new facility should provide good value to the community, and help to make it a place people want to live while still having low impacts on rate payers.	MV is working to build a facility that will be integrated into the community and be affordable.
CRF Meeting May 23, 2012	Cost - Allocation	What are the annual tax costs/revenue associated with the IRR processes being considered?	The triple bottom line business case analysis identified the viable energy recovery and reclaimed water opportunities included in the indicative design.
E-mail Correspondence	Cost - Allocation	Why should other parts of the region pay for the costs to upgrade the North Shore plant?	Since the 1990s costs for secondary treatment have been shared regionally in accordance with a Metro Vancouver Cost Allocation Formula.
Online Public Survey Feedback	Cost - Allocation	Property taxes are of great importance including annual sewage tax.	Comment noted.
CRF Meeting November 1, 2012	Cost - Amortization	It is more acceptable for green buildings to have a longer amortization period (i.e., 25 to 30 years) because green buildings are more expensive to build. Would this apply to a treatment plant?	The cost allocation formula and the amortization period are MV Board policies and any changes require the approval of the Board.
CRF Meeting November 1, 2012	Cost - Amortization	The Chair of the former Integrated Liquid Waste and Resource Management Plan (ILWRMP) Reference Panel stated that its recommendation to utilize a 15-year amortization period was made in the context of assessing how the region could finance two treatment plants simultaneously. The primary recommendation was the consideration of balancing the costs and the intergenerational equity aspect.	Comment noted.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
LGPAC Email Correspondence June 11, 2013 & CRF Meeting May 23, 2012 & LGPAC Meeting May 24, 2013 & Public Meeting Feedback Form - April 29, 2013 & Email Correspondence March 8, 2013, June 3, 2013, June 11, 2013, June 28, 2013 and July 3, 2013, October 22, 2013	Cost - Amortization	Why does Metro Vancouver use a 15-year amortization period for the capital cost of the Project? The 15-year amortization period seems too short relative to the length of time the plant will exist. What is the difference to the bottom line if an amortization period is longer than 15 years or a P3 model is used?	The amortization approach for capital works financing based on a 15-year term has been in place since 1996. It has been re-affirmed by the Board as recently as 2010. MV"s long-range capital plan continues to identify significant investments required for the water, wastewater and solid waste infrastructure in the coming decade and beyond. Given this continuous need to invest in infrastructure, the shorter amortization approach has avoided the compounding of debt, deferral of debt payment to future generations and has minimized the interest payments associated with MV"s debt financing. MV continues to benefit from a AAA credit rating through the Municipal Finance Authority. The MV Board Finance Committee has the mandate to review and recommend the financial approach and strategy.
CRF Meeting November 1, 2012 & Public Meeting October 10, 2013	Cost - Project Budget	Has MV considered involving a community economist in the IDP to address how the project will impact the taxpayer? What are the bottom line costs of the project in relation to its expected benefits to the community and environment?	The actual impact on the individual rates for each municipality is dependant on the rate structure within each municipality, the final cost allocation formula, and the receipt of senior government funding.
CRF Meeting November 1, 2012 & Public Meeting October 10, 2013	Cost - Project Budget	Is the pipe retrofitting included in the $400 million cost?	The conveyance infrastructure is included in the project cost.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
CRF Meeting May 23, 2012 & LGPAC Email Correspondences April 22, 2013, June 11, 2013 & Public Meeting Feedback Form - April 29, 2013 & Community Feedback Form - May 7, 2013 & Community Workshop (CRF & LGPAC) May 31, 2013 & Norgate Community Open House March 7, 2013 & Norgate Residents' Workshop September 4, 2013 & LGPAC Meeting October 7, 2013 & & Public Meeting October 10, 2013	Cost - Project Budget	What are the assumptions used in the business case? What is the business case for Scenario B without the additional food waste feedstock?	See the documents presented at the June 25 Utilities Committee Workshop. The documents are available on Metro Vancouver's website at http://www.metrovancouver.org/boards/Utilities%20Committee/Utilities_Committee-June_25_2013-Special_Agenda.pdf.
LGPAC Email Correspondence June 11, 2013 & LGPAC Meeting May 24, 2013	Cost - Project Budget	What economic "hurdle rate" will MV use to determine if incremental investments are financially viable? Is full life cycle economics used to evaluate options? How will Metro Vancouver handle the rate of return on incremental investments issue such as Integrated Resource Recovery (IRR)?	Life cycle costs were considered in the evaluation of alternatives. A decision and assessment framework was created with evaluation criteria related to the four project objectives. The concepts and Build Scenarios were evaluated and compared using the criteria to identify trade-offs between alternatives in order to determine what the costs and benefits were of the different alternatives. If there were benefits with respect to greenhouse gases, energy generation, etc., those would be considered in addition to the cost.
Norgate Public Meeting April 24, 2013	Cost - Project Budget	Metro should consider simply using existing technologies where the „Value for Money" analysis is already proven to be economically viable, environmentally sound and socially acceptable	Comment noted.
Email Correspondence Sept 20, 2012	Cost - Project Budget	Taking a triple bottom line approach is necessary to the success of this project.	MV is using a triple bottom line approach in evaluation of alternatives.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Email Correspondence Sept 20, 2012	Cost - Project Budget	Approvals for funding models can be achieved if the bottom line is attractive and a business case can be made.	Comment noted.
IRR/Procurement Workshop March 27, 2013	Cost - Project Budget	When is the funding for this project required?	MV will need funding by 2015.
IRR/Procurement Workshop March 27, 2013	Cost - Project Budget	Would you increase the maintenance and ongoing operational costs for additional treatment and IRR processes?	Costs and avoided costs for additional treatment and processes were included in the evaluation.
Structured Decision Making Workshop May 31, 2013	Cost - Project Budget	What is the rate of return on the last increment of investment?	Wastewater treatment investments are made to benefit public health and the environment.
Public Meeting Feedback Form - April 29, 2013	Cost - Project Budget	Choose the most cost-effective design option.	Of the three Build Scenarios, the one selected for development into the Indicative Design had the lowest life cycle cost.
Community Workshop (CRF & LGPAC) September 10, 2012	Cost - Project Budget	The business case for IRR will need to be fully documented.	See the documents presented at the June 25 Utilities Committee Workshop. The documents are available on Metro Vancouver's website at http://www.metrovancouver.org/boards/Utilities%20Committee/Utilities_Committee-June_25_2013-Special_Agenda.pdf.
Community Workshop (CRF & LGPAC) September 10, 2012	Cost - Project Budget	Regarding the potentials for this project, the scope is bigger than originally thought: resource recovery, fall on effects, community resilience; looking at ways using resources as feedstocks, lowers our bills (from IRR perspective)	Comment noted.
LGPAC Meeting July 9, 2013	Cost - Project Budget	Based on the current project cost projections, is pumping sewage to Iona Island Wastewater Treatment Plant (IIWWTP) potentially a financially viable option?	The option for diverting wastewater from the North Shore to IIWWTP resulted in significantly greater cost. The diversion option also posed greater technical uncertainty than treatment on the North Shore.
CRF Meeting May 23, 2012	Cost - Project Budget	Consider the relationship between financing the Project and recovering resources.	All costs, avoided costs and revenue potential were considered in the analyses.
IRR/Procurement Workshop March 27, 2013	Cost - Project Budget	We need to be considering all values, not just monetary ones.	Evaluation criteria was based on all four project goals, not just monetary.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
IRR/Procurement Workshop March 27, 2013	Cost - Project Budget	I think you should have a target of whatever makes economic sense and produces a reasonable rate of return for the ratepayer.	Monetary costs are one of the key criteria for evaluation.
Community Workshop September 17, 2013	Cost - Project Budget	Separate the costing of non-industrial uses so that the costs of providing that access is clear and the public can comment on it.	Other community uses would rely on partnerships with MV and outside organizations, i.e. local municipalities. There may be a private sector partner that uses the space but does not add to the cost.
Structured Decision Making Workshop May 31, 2013	Cost Recovery	Regarding potential users of dried biosolids, are there cement plants in the region?	There are two cement plants. With the option of sending to cement kilns, we have assumed that there are other markets so there are other potential energy users of the dried biosolids product and you could use it for fertilizer benefits as well.
CRF Meeting November 1, 2012	Cost Recovery	What would the opportunities for future distribution of IRR resources include?	Future opportunities include offsetting or using reclaimed water to reduce the demand for drinking water and new developments having their own treatment plants to recycle their reclaimed water through toilet flushing, etc. in their own systems.
Local Business Meeting June 4, 2013	Design & Long-Term Planning	How will the plant operate when there is heavy rain? Is Annacis Island primary or secondary treatment? What if there are more people using more water on the North Shore – what will be the impact?	This will be a completely different plant than Annacis Island. This plant is being designed in consideration of future population and wet weather flows.
CRF Meeting May 23, 2012	Design & Long-Term Planning	Ensure that the ability to adapt to changing circumstances in the future is part of the design considerations.	The potential treatment migration pathway for changing circumstances has been considered and the technology selected provides "future proofing" options.
CRF Meeting November 1, 2012	Design & Long-Term Planning	The District of North Vancouver and other jurisdictions are identifying infiltration and inflows to individual property owners. This will present a complex picture of the growth pattern and the capacity of the plant. How will you manage this to ensure that the plant is not oversized?	Infiltration during wet weather events is an issue on the North Shore, and impacts the sizing of the wet weather capacity of the plant. Metro Vancouver is putting a ceiling on the amount of wet weather flows that will be treated at the plant, which requires the municipalities to work to reduce the amount of infiltration in the system.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
LGPAC Email Correspondence April 22, 2013 & LGPAC Meeting October 30, 2012 & Community Workshop September 17, 2013 & Public Meeting October 10, 2013 & LGPAC Email Correspondence October 22, 2013	Design & Long-Term Planning	Will the new site be able to accommodate additional capacity and higher treatment levels in the future?	The Indicative Design incorporates the flexibility to modify the process tanks from a process with relatively low mechanical intensity to one with a higher mechanical and chemical intensity using the same tankage in the future to accommodate higher capacity.
LGPAC Meeting October 30, 2012	Design & Long-Term Planning	Engineers often design for full capacity and then turn over plants to the operators to operate at only 50 per cent loading, which can cause issues. There are good reasons to build to scale and to later expand capacity.	The Indicative Design is based on sizing for the initial build and growth to 2050. Process changes beyond 2050 can be made to accommodate further growth or changing regulations.
LGPAC Meeting October 30, 2012 & Norgate Community Open House March 7, 2013 & LGPAC Meeting October 7, 2013 & Online Public Survey Feedback	Design & Long-Term Planning	What is being done to plan for the rising sea level, which is expected to go up quite significantly in the next 20-30 years? What about disaster management concerns? Why this site was considered appropriate in light of sea level rise predictions?	The structure will be designed to ensure full operation of the plant at the highest anticipated water level accounting for the highest tides, 100-year sea level rise and storm surge and wave run up including tsunamis effect. The structures will be designed to withstand earthquakes in accordance with the requirements defined in the National Building Code.
Email Correspondence May 21, 2013 & CRF Meeting May 23, 2012 & CRF Meeting August 9, 2013	Design & Long-Term Planning	Can we see a copy of the study or reports that deal with the safety of the new site as it relates to rising sea levels and/or earthquake-triggered tsunamis?	A series of documents are available on the Province of BC's website provide projections of sea level rise and guidelines for flood construction levels that influenced the Indicative Design. These documents are available at http://www.env.gov.bc.ca/cas/adaptation/sea_level.html. In addition, please see the District of North Vancouver's GeoWeb Hazards Mapping Application at http://www.geoweb.dnv.org/.
IRR/Procurement Workshop March 27, 2013	Design & Long-Term Planning	We need to save room for tertiary treatment and biosolids incineration.	Comment noted. The Indicative Design was built with the potential to upgrade to tertiary treatment in the future.
Structured Decision Making Workshop May 31, 2013	Design & Long-Term Planning	The issue of resilience in the future is important. If there is a drought and no snowpack, people are going to want to reuse water in a hurry.	Comment noted.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Community Workshop (CRF & LGPAC) September 10, 2012	Design & Long-Term Planning	Whole resource recovery, application of renewable energy, water reuse has not been achieved to date at MV.	Annacis Island and Iona Island WWTPs both use biogas to generate electricity and heat, and the existing Lions Gate WWTP uses biogas to operate 2 influent pumps and generate heat. More resource recovery is identified in the Indicative Design for the new LGSWWTP.
Community Workshop (CRF & LGPAC) September 10, 2012	Design & Long-Term Planning	Ensuring that the timing of the project is coordinated with Seaspan and the OCP is critical.	Comment noted.
Community Workshop (CRF & LGPAC) September 10, 2012	Design & Long-Term Planning	The long term feasibility of community assets needs to be considered. For example the greenhouse facility at Burns Bog went bankrupt. How can you get the long term commitment from the community to be sure assets will have the support they need?	Relative risk and contingency planning is necessary to determine what the level of certainty is and the impact if the market cannot support the asset. Partner projects won't proceed without a full business case and risk assessment.
LGPAC Meeting October 30, 2012	Design & Long-Term Planning	The District of North Vancouver (DNV) is advanced in its plans for the lower Capilano Marine Drive Village. Is discussion going on with DNV?	Metro Vancouver has participated in discussions regarding potential synergies between the new facility and the new Village Centre, in particular with respect to provision of heat for district energy.
LGPAC Meeting October 7, 2013 & Public Meeting October 10, 2013	Design & Long-Term Planning	In the event of a major catastrophe such as an earthquake and there is no electric or diesel power, what happens to the plant and the wastewater flow? Is the generator set for emergencies?	The building is a designed to post-disaster standard so it will survive a major event. There will be also be standby diesel power and cogeneration.
CRF Meeting November 1, 2012 & LGPAC Meeting October 30, 2012	Engagement & Consultation - First Nations	Does Metro Vancouver have a right-of-way for the sewer line through the Squamish Nation?	There are existing right-of-ways for sewers. Some of these will be re-purposed but we will likely have to build at least one new line.
Community Workshop (CRF & LGPAC) September 10, 2012 & Norgate Community Open House March 7, 2013, & Email correspondence May 17, 2013	Engagement & Consultation - First Nations	Is there a process to engage the Squamish Nation?	A Lions Gate Intergovernmental Advisory Committee, comprising representatives from MV, the 3 North Shore Municipalities, Squamish Nation, Tsleil-Waututh Nation, the Provincial and the Federal Governments was established and met regularly throughout the Project Definition phase to provide input and direction on the numerous technical, communication and approval issues associated with the project. MV is engaged in regular discussions with Squamish Nation.
Norgate Community Open House March 7, 2013	Engagement & Consultation - First Nations	Will discussions with Squamish Nation impact the timeline?	There will be on-going discussion with Squamish Nation after the Project Definition Phase is complete.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
LGPAC Meeting May 24, 2013 & LGPAC Email Correspondences April 11, 2013, April 17, 2013	Engagement & Consultation - First Nations	Is it possible to see the lease with the Squamish First Nations for the current site?	The lease with the Squamish First Nation cannot be shared publically at this time.
Email Correspondence April 17, 2013	Engagement & Consultation - Public	How is DNV Council involved in meetings / workshops about the plant?	There have been presentations to the DNV Council and several Joint Council Meetings for the 3 North Shore municipal councils during the Project Definition Phase.
Norgate Residents" Workshop September 4, 2013	Engagement & Consultation - Public	Are public contributions influencing the elected officials who make the final decision?	MV has been making regular presentations to the North Shore Councils about public input throughout the development of the Indicative Design. The public is able to attend the Council meetings where these presentations are made. Quarterly reports have been provided to the MV Utilities Committee about progress on the project. As part of the final report for the Indicative Design, all issues raised during the engagement and consultation process are being summarized and brought forward to the Utilities Committee for their review. The public may also attend the MV Utilities Committee as a delegation when the LGSWWTP appears on the agenda, so there are opportunities to advise elected officials directly of your concerns.
LGPAC Meeting June 26, 2012	Engagement and Consultation - LGPAC	Are the LGPAC Chair, Vice-Chair and all LGPAC members precluded from doing paid work for MV?	Yes, all LGPAC members are precluded from doing paid work for MV.
LGPAC Meeting June 26, 2012	Engagement and Consultation - LGPAC	What is the role of LGPAC members in nominating a member for Chair? Does the selection process require that individuals self-nominate?	The established process requires an individual to self-nominate in order to be considered for the role of Chair. MV will be selecting the Chair from the self-nominated individuals.
LGPAC Meeting June 26, 2012	Engagement and Consultation - LGPAC	Does the LGPAC Chair have the key facilitation role?	The Chair will be managing the discussion. During the recent Liquid Waste and Resource Management Plan process, the independent facilitator supported the Chair and interjected where appropriate. This was done at the request of the Chair, but clearly there is a role for the Chair in managing the discussion around the table.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
LGPAC Meeting June 26, 2012	Engagement and Consultation - LGPAC	The role of facilitation should be independent from the LGPAC Chair and Vice-Chair. The role of the Process Facilitator is a professional role and it will be valuable in establishing how the LGPAC will function, particularly in the early stages.	There is value in having a Chair who understands the issues. The Process Facilitator would be more arms-length and could assist at times that the Chair wished to participate in the discussion.
LGPAC Meeting June 26, 2012	Engagement and Consultation - LGPAC	How do LGPAC members add items to an LGPAC meeting agenda?	Draft agendas will be circulated and members will be requested to identify any additional agenda items.
LGPAC Meeting June 26, 2012	Engagement and Consultation - LGPAC	Is there an intention to develop consensus? If so, how will it be reached and communicated?	There is an intention but this cannot be guaranteed. There will be times when consensus is not reached and staff will be responsible for bringing forward generally what the LGPAC was comfortable with, and providing the comments and queries that were different from the rest of the members. It is assumed that consensus is reached if no one around the table during the point of discussion voices an objection or a contrary opinion. There is also a commitment to recording contrary points of view.
LGPAC Meeting June 26, 2012	Engagement and Consultation - LGPAC	Why are the alternate members excluded from being selected for the LGPAC Chair and Vice-Chair?	The alternates are excluded from being Chair and Vice-Chair because the primary members are expected to be in attendance at most of the meetings. The alternates are only expected to attend if the primary member is not available.
LGPAC Meeting June 26, 2012	Engagement and Consultation - LGPAC	Will all LGPAC alternate members receive the same information regarding meeting dates, etc. as the primary members?	Yes, all information will be provided to both primary and alternate members.
LGPAC Meeting June 26, 2012	Engagement and Consultation - LGPAC	Will comments be attributed in the summaries of the meetings?	No, there is no attribution of comments.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
LGPAC Email Correspondence April 11, 2013	Engagement and Consultation - LGPAC	Please provide a list of the various companies/consultants etc. hired and their roles on the LGSWWTP project.	Engineering Consultant Team: AECOM with CH2M Hill Architectural & Community Integration Team - Miller Hull in association with Space2Place Cost Consulting Services: BTY Group Business & Project Procurement Advisors: KPMG Expert Advisors: Maple Reinders (Constructability) Allan Russell (Project Procurement), George Tchobanoglous (Wastewater Treatment), Gordon Culp (Wastewater Treatment and Project Procurement).
LGPAC Email Correspondence April 11, 2013	Engagement and Consultation - LGPAC	What committees of MV or other bodies are involved in this project? What are the communication and liaison arrangements?	The Greater Vancouver Sewerage & Drainage District (GVS&DD) Board of Directors retains the authority for all approvals related to the upgrading to secondary treatment of the Lions Gate treatment plant. The Utilities Committee is the primary board sub-committee that reviews staff recommendations and provides a recommendation for approval to the Board of Directors. Throughout the Project Definition Phase, there have been 3 Special Workshops with the Utilities Committee and the Project Team, which also included members of the Finance and Intergovernmental and Administration Committees.
LGPAC Meeting June 26, 2012	Engagement and Consultation - LGPAC	Will the members of the LGPAC be able to attend the Integrated Design Process Workshops?	Technical staff will be present at LGPAC meetings and will consider input from LGPAC at the IDP workshops.
LGPAC Meeting June 26, 2012	Engagement and Consultation - LGPAC	Will there be field trips and working meetings in addition to the scheduled LGPAC meetings? Have they been considered yet or will suggestions from the LGPAC be entertained?	There will be field trips and suggestions from the LGPAC are welcome. Field trips or special meetings may occur between IDP Workshops.
CRF Meeting May 23, 2012	Engagement and Consultation - Public	Provide information on current and emerging wastewater treatment technologies.	For an overview of the processes used at MV's existing secondary wastewater treatment plants, see: http://www.metrovancouver.org/about/publications/Publications/WhenIFlushBrochure.pdf. For a report on emerging wastewater treatment technologies see: http://water.epa.gov/scitech/wastetech/upload/Emerging-Technologies-Report-2.pdf

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Community Workshop (CRF & LGPAC) November 14, 2012 , & CRF Meeting May 23, 2012 & Email Correspondence	Engagement and Consultation - Public	A transparent engagement process should be established to share and receive information with the community throughout the life of the project.	A project website has been established to share information with the public, including details on the engagement process. Please see the Lions Gate Wastewater Treatment Plant website at http://www.metrovancouver.org/services/wastewater/treatment/TreatmentPlants/LionsGate/Pages/default.aspx.
Community Workshop (CRF & LGPAC) September 10, 2012	Engagement and Consultation - Public	How are Port of Metro Vancouver and the municipalities involved in the process?	A Lions Gate Intergovernmental Advisory Committee, comprising representatives from MV, the 3 North Shore Municipalities, Squamish Nation, Tsleil-Waututh Nation, the Provincial and the Federal Governments was established and met regularly throughout the Project Definition phase to provide input and direction on the numerous technical, communication and approval issues associated with the project. MV staff met separately with Port Metro Vancouver regarding the project.
Community Workshop (CRF & LGPAC) September 10, 2012	Engagement and Consultation - Public	Will there be opportunities to visit the site? Would like to be guided by someone who has authority to be on the site.	A visit to the new site could be arranged if requested.
CRF Meeting May 23, 2012	Engagement and Consultation - Public	Communicate public meetings to the public through multiple channels including the Internet. Develop a strong process for gathering, managing and sharing information during the IDP, and clearly communicate it to the Forum and other stakeholders.	MV has used multiple means of engaging the community, including newspaper adds, flyers, an email listserv, and regular website updates. These have been used to communicate project information, solicit feedback, and to advertise upcoming public meetings.
CRF Meeting May 23, 2012	Engagement and Consultation - Public	Engage North Shore stewardship programs.	Comment noted.
CRF Meeting May 23, 2012	Engagement and Consultation - Public	Ensure the Project that has been presented to the community is what is built.	MV will endeavour to ensure that the final plant as built will match the design presented to the community.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
CRF Meeting May 23, 2012	Engagement and Consultation - Public	Integrate learning from the Drinking Water Plan process including getting more input from the public earlier in the process.	Comment noted.
CRF Meeting May 23, 2012	Engagement and Consultation - Public	Provide opportunities for Forum participants to discuss technology options being considered by consultants / Metro Vancouver including consideration of criteria, end results, indicators of success and best practices.	Forum participants were invited to participate in related workshops, such as the Project Delivery, Financing, and IRR workshop in March 2013 and the Decision Making Workshop in May 2013.
CRF Meeting May 23, 2012	Engagement and Consultation - Public	Provide opportunities for the Forum to provide input and participate in public meetings.	The Community Resource Forum is invited to all public meetings in addition to CRF-specific meetings.
CRF Meeting May 23, 2012	Engagement and Consultation - Public	Public meetings should not exceed two hours.	Comment noted.
CRF Meeting May 23, 2012	Engagement and Consultation - Public	Talk about the Project in non-technical terms, for example what it does rather than what it is, such as producing cleaner water and nutrients rather than secondary wastewater treatment plant.	MV placed significant emphasis on values and outcomes in describing both the Build Scenarios and the Indicative Design.
CRF Meeting May 23, 2012	Engagement and Consultation - Public	Use the early stage of the Project to build trust.	Comment noted.
CRF Meeting November 1, 2012	Engagement and Consultation - Public	It is too early in the process to generate sufficient interest from the general public. Requiring pre-registration at the public meeting, would help to determine the real level of public interest.	Comments regarding meeting timing and who should be involved are appreciated. It will be important to open the process to the broader community prior to seeking MV Board approval of the design concept, but the timing of meetings may be adjusted.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
CRF Meeting November 1, 2012	Engagement and Consultation - Public	MV should create a fact sheet similar to the one created for the Seymour filtration project.	Several summary and fact sheets were created throughout the Project Definition Phase and have been posted to the website and provided at community meetings and workshops.
LGPAC Meeting June 26, 2012	Engagement and Consultation - Public	How will information be shared amongst all the advisory committees involved in the Project?	Everything from the LGPAC, the Community Resource Forum and outputs from Integrated Design Process Workshops will be posted on the MV website.
Norgate Public Meeting April 24, 2013	Engagement and Consultation - Public	Some local property owners may not have received information about the new plant.	Communications have included public meetings, newspaper advertisements, website information, and targeted mailouts.
Email Correspondence	Engagement and Consultation - Public	Request that there be an opportunity for online public input that extends at least 30 days beyond the Public Meeting.	Comment noted.
Email Correspondence Sept 11, 2012	Engagement and Consultation - Public	What is the decision process for the project go-ahead? Can the DNV council veto the project?	MV"s Integrated Liquid Waste and Resource Management Plan, approved by the BC Minister of Environment in May, 2011, committed to upgrade of the Lions Gate Wastewater Treatment Plant on the identified site, by 2020. The project team will provide the Indicative Design to the Greater Vancouver Sewerage & Drainage District (GVS&DD) Board of Directors for approval to proceed to Design and Construction. Members of the DNV council are on the Board of Directors, and MV has been working with DNV throughout the Project Definition Phase.
IRR/Procurement Workshop March 27, 2013	Engagement and Consultation - Public	Will you be presenting to the public all procurement options currently under consideration?	The value for money analysis compared Design Bid Build against Design Build with a small finance component, and a full P3 (Design Build Finance Operate Maintain).
Structured Decision Making Workshop May 31, 2013	Engagement and Consultation - Public	It would be good to understand the decision-making process for the project and the criteria being used by the technical team in evaluating the options.	A decision and assessment framework was created with evaluation criteria related to the four project objectives. The concepts and Build Scenarios were evaluated and compared using the criteria to provide transparency, clarify trade-offs between alternatives, and break down numerous decisions into component parts. The ultimate approval of the Indicative Design will be made by the Greater Vancouver Sewerage and Drainage District (GVS&DD) Board of Directors.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Structured Decision Making Workshop May 31, 2013	Engagement and Consultation - Public	Regarding the importance of narrative in project design, in general, the story can be told of any technology. While the narrative is important, it should not dictate or direct what technology is being selected.	Comment noted.
Norgate Open House Feedback Form - March 7, 2013	Engagement and Consultation - Public	There needs to be less technical "engineer" speak. Practical neighbourhood questions need to be addressed in plain language within the presentations.	Comment noted.
Phone conversation - July 26, 2013	Engagement and Consultation - Public	The level of engagement and participation of DNV councillors is unclear to the public.	Presentations have been made by MV to all three North Shore Councils and three elected officials from the North Shore sit on MV's Utilities Committee.
Community Feedback Form - May 7, 2013	Engagement and Consultation - Public	The presentations about the plant build were quite technical and difficult for a layperson to understand.	Comment noted.
Online Public Feedback Survey	Engagement and Consultation - Public	Metro is using public feedback to avoid the question of what level of treatment should be used.	The treatment facility will provide secondary treatment, with the ability to upgrade in the future to a higher level of treatment if required.
Online Public Feedback Survey	Engagement and Consultation - Public	The process has had limited wide-spread public engagement and presented biased options.	Opportunities for public input have included the LGPAC, Community Resource Forum, online surveys, workbooks, two general public meetings, and several events specific to the Norgate community. Ultimately, members of the public closest to the site are (i.e. Norgate and surrounding North Shore communities) participate more as they are most directly impacted.
Online Public Feedback Survey	Engagement and Consultation - Public	Concerned that nothing will come from any input gathered by the public.	Input provided by the public has been received by the Technical Team and influenced the Indicative Design.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Online Public Feedback Survey	Engagement and Consultation - Public	Less focus on engagement and more on future regulations, nutrients, heat, water and energy recovery, removal of Persistent Organic Pollutants (PoPs) and endocrine disruptors.	The technical team has considered those issues throughout the Project Definition Phase.
Community Workshop (CRF & LGPAC) November 14, 2012 & Public Meeting October 10, 2013	Environmental Impacts	The plant should be built to minimize impacts on climate change. Minimize emissions and greenhouse gases.	One of the sustainability objectives is to minimize the Region"s contribution to climate change. Use of biogas to displace consumption of natural gas to heat the plant and as a potential district energy system source will contribute to reduced greenhouse gas emissions.
Email Correspondences May 14, 2013, July 10, 2013	Environmental Impacts	Will effluent standards from the plant be suitable to support salmon?	The effluent discharged from the facility will meet the federal and provincial requirements which consider requirements of aquatic life.
Email Correspondence July 10, 2013	Environmental Impacts	Restoring and regenerating a viable shoreline habitat at the edge and below portions of the building would be appropriate.	Comment noted.
Structured Decision Making Workshop May 31, 2013	Environmental Impacts	When you are talking about Greenhouse Gas (GHG) emissions, are you focusing just on CO2 or are you also considering NOx, SOx, ammonia, etc.?	We are just considering CO_2 equivalents under GHG emissions. NOx and SOx are considered under criteria air contaminants.
Structured Decision Making Workshop May 31, 2013	Environmental Impacts	Being able to tell the story on what species that will come back as a result of creating additional habitat would be very helpful.	Comment noted.
Structured Decision Making Workshop May 31, 2013	Environmental Impacts	Does NOx get taken into consideration in Criteria Air Contaminants or in GHG?	Nitrous oxide is a GHG while nitrogen dioxide is not. Nitrogen dioxide is a Criteria Air Contaminant, which has an air quality impact.
CRF Meeting November 1, 2012	Environmental Impacts	Are there only four deleterious substances that are required to be minimized or avoided? Are there not substances that are more poisonous that would kill fish?	The regulatory requirement is specific to four substances, which are carbonaceous biochemical oxygen demanding matter; suspended solids; total residual chlorine; and un-ionized ammonia. The effluent must not be acutely lethal to fish, as determined by a prescribed testing method.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
CRF Meeting November 1, 2012 & LGPAC Meeting July 9, 2013	Environmental Impacts	Have there been specific studies done on the Burrard effluent?	There have been extensive environmental studies of Burrard Inlet around the area of our discharges.
CRF Meeting November 1, 2012 & LGPAC Meeting July 9, 2013	Environmental Impacts	What is the effect of infiltration from groundwater to the system?	Infiltration increases the flow to the treatment plant. The Integrated Liquid Waste and Resource Management Plan (ILWRMP) has a number of actions to control and check the inflow and infiltration of rainwater.
LGPAC Meeting June 26, 2012	Environmental Impacts	Does the effluent discharge at the First Narrows occur at ebb tide only?	The discharge from the Lions Gate Treatment Plant into the First Narrows occurs 24/7.
Structured Decision Making Workshop May 31, 2013	Environmental Impacts	Is Metro Vancouver satisfied that the toxicity of the solids being produced is not going to be a problem?	Biosolids need to meet specific requirements in order to be used for land application. Our current biosolids management program is required to meet these criteria.
CRF Meeting November 1, 2012	Environmental Impacts	Have there been environmental studies done on the LGSWWTP? Is secondary treatment all that is required?	Based on the marine discharges in the region, including the discharges to the Fraser River, secondary treatment is protective of all those environments.
Norgate Block Party August 10, 2013	Environmental Impacts	Is there risk of environmental exposure to hazardous materials through transportation and processing related to the plant?	All chemicals that will be used in the treatment process will be handled in accordance with proper protocols and procedures, and proper separation and containment will be used.
LGPAC Meeting June 26, 2012	Environmental Impacts	Building a secondary treatment plant has no benefit to the environment. We need to understand the fundamental issues of what we can do from a treatment plant perspective, and determine whether it is more effective to educate people about what they're putting into the wastewater at source in order to change behaviour.	We have had environmental monitoring programs in place at the Iona and Lions Gate discharge for decades. The results indicate that there are no negative environmental impacts. Federal and provincial regulation establishes secondary treatment as the base level of treatment.
LGPAC Meeting October 7, 2013	Environmental Impacts	Air quality compared to fresh clean air.	The air quality with the new plant will be comparable to the current air quality.
Public Meeting October 10, 2013	Environmental Impacts	There have been reports that there is heavy contamination on the site. Can you comment on that and what you plan to do about it?	It is an old industrial site. It was a rail site that was purchased from BC Rail Properties with a certificate of compliance from the Ministry of Environment. BC Rail did a lot of clean up on the site. There are minor pockets of contamination that will have to be dealt with during site excavation if they are encountered.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Norgate Public Meeting April 24, 2013	Example Projects	Show examples of other plants will help the community understand what the reality of the project will look like and address misconceptions.	Several case studies have been placed on MV's website at http://www.metrovancouver.org/SERVICES/WASTEWATER/TREATMENT/TREATMENTPLANTS/LIONSGATE/Pages/CaseStudies.aspx
Community Workshop (CRF & LGPAC) September 10, 2012	Example Projects	Will this plant be totally different than the other secondary treatment plants built in the region?	The primary and secondary treatment processes used at Metro Vancouver's existing Wastewater Treatment Plants will be different than the LGSWWTP because the footprint for those processes is large and we are constrained for space at the new site.
CRF Meeting May 23, 2012	Example Projects	Cypress Creek Village is a successful community project with community input.	Comment noted.
CRF Meeting May 23, 2012 & CRF Meeting November 1, 2012	Example Projects	Identify innovative approaches / technologies for wastewater treatment from around the world to inform the process.	The technical team examined a wide range of approaches and technologies to develop the three build scenarios examined in the business case.
CRF Meeting November 1, 2012 & Norgate Community Open House March 7, 2013	Example Projects	It would be helpful to have a picture of the wastewater treatment plant that was recently built in Kelowna and in other locations.	Several case studies have been placed on MV's website at http://www.metrovancouver.org/SERVICES/WASTEWATER/TREATMENT/TREATMENTPLANTS/LIONSGATE/Pages/CaseStudies.aspx
Norgate Community Open House March 7, 2013 & LGPAC Meeting July 9, 2013 & Norgate Residents' Workshop September 4, 2013	Example Projects	Are the Washington plants of the same size and scope as is being proposed here?	Blaine is much smaller, Seattle is larger and Edmonds is about half the size of the plant being proposed here.
Norgate Community Open House March 7, 2013 & Public Meeting October 10, 2013	Example Projects	Are there any similar plants in BC?	In BC, an example is the plant in Kelowna. The plants in Kelowna, Penticton and Vernon are built in neighbourhoods.
Norgate Community Open House March 7, 2013 & Phone conversation	Example Projects	Are there examples of secondary treatment plants that do not have odours? Can people visit them?	There are four plants in Washington State that are quite modern and fairly new: a small sewage wastewater plant in Village of Blaine; Brightwater, a fairly large plant in Seattle; a plant in downtown Edmonds; and a plant in Olympia. Members of the Metro Vancouver Utilities Committee, the Lions Gate Public Advisory Committee, Tsleil-Waututh Nation, and Metro Vancouver staff visited these facilities in June.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Norgate Community Open House March 7, 2013	Example Projects	How close are the houses to the plants in Edmonds and Okanagan examples that you referred to?	The Edmonds plant has apartments right across the street from it. The plants in the Okanagan are near residential neighbourhoods.
Norgate Community Open House March 7, 2013	Example Projects	Who designed and built the Edmonds and Okanagan plants that you are referring to? What is the connection between these plants and the new plant we are discussing?	Typically, these plants are designed and engineered by engineering firms and owned and operated by municipalities. The connection is the concern about odour and noise that has been raised.
Norgate Community Open House March 7, 2013	Example Projects	There are pictures of treatment plants where they look just like an office building.	Modern treatment plants are built so that they integrate into the community. They don"t have the industrial look of traditional treatment plants. Perhaps you are referring to the plant in Blaine. That building does not look like a treatment plant and is integrated into their park with picnic tables all around it.
Email Correspondence May 17, 2013 & LGPAC Email Correspondences May 11, 2013 & June 4, 2013	Example Projects	Who is funding the new Victoria sewage plant and in what proportions? What issues has Capital Regional District (CRD) faced and how have they been resolved?	Please refer to this link: http://www.crd.bc.ca/wastewater/madeclear.htm
LGPAC Email Correspondence April 11, 2013	Example Projects	What other major cities in Canada have or are going to have secondary and/or tertiary treatment?	Many cities in Canada already have secondary or tertiary treatment. Approximately 850 facilities across Canada require upgrades under the new regulations.
IRR/Procurement Workshop March 27, 2013	Example Projects	Are there examples of wastewater treatment plants in North America that combine food waste and yard waste with biosolids that use re-generated energy to power the plant itself?	East Mud Bay in San Francisco is the first plant in North America to reach energy neutrality. They bring in a lot of materials, such as food waste, to achieve it.
IRR/Procurement Workshop March 27, 2013	Example Projects	Have you looked at East Mud Bay in San Francisco or used it as a case study?	Yes, we"ve been watching it for the last decade as they"ve progressed and improved their program to the point where they"ve reached energy neutrality.
Norgate Open House Feedback Form - March 7, 2013	Example Projects	Having information about the locations and websites of similar plants would be helpful.	Several case studies have been placed on MV's website at http://www.metrovancouver.org/SERVICES/WASTEWATER/TREATMENT/TREATMENTPLANTS/LIONSGATE/Pages/CaseStudies.aspx
Email Correspondence February 26, 2013	Example Projects	The Vancouver Community College (VCC) building provides a good example of a black water treatment installation and seawater climate control system.	Comment noted.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
CRF Meeting May 23, 2012	Example Projects	What costs were associated with the building of the Metro Vancouver Academy at Annacis Wastewater Treatment Plant	MV had received grants from the province and federal government to build the research facility.
LGPAC Email Correspondence April 11, 2013	Example Projects	Please provide available cost data from similar recent plants.	The capital costs for Pine Creek in Calgary Alberta was $329 M (2009 $) and Brightwater in Seattle Washington was $780M (2009 $).
Local Business Meeting September 18, 2013	Example Projects	How does the carbon get recharged in the odour control systems at the WA state sites ? Do they ship it off site or do they handle it on site?	The carbon is generally shipped off site for disposal.
Local Business Meeting September 18, 2013 & Norgate Residents" Workshop September 4, 2013	Example Projects	Are there any odour complaints at the WA state plants visited and if so, what process was being used to address them?	Only the one plant in Edmonds, WA had occasional odour complaints when they were cleaning out the large tanks. There were no complaints at any of the other three plants (Blaine, Seattle, Olympia).
Structured Decision Making Workshop May 31, 2013	Integrated Design Process	How does potential for public amenities differ from neighbourhood access?	The potential for public amenities is the provision of onsite public space.
Structured Decision Making Workshop May 31, 2013	Integrated Design Process	A scenario analysis should be done to look at issues that could have significant impact to the project proceeding as planned to assess the robustness of the plans.	Comment noted.
CRF Meeting May 23, 2012	Integrated Design Process	What is the incremental costs of using an Integrated Design Process (IDP)?	Using IDP will not cost more than traditional design approaches.
Structured Decision Making Workshop May 31, 2013	Integrated Design Process	The increase in Biochemical Oxygen Demand (BOD) in Scenario C is a positive environmental benefit. It is a question of whether the community wishes to spend a certain amount of dollars more for that benefit.	Comment noted.
Structured Decision Making Workshop May 31, 2013	Integrated Design Process	Does Scenario B have tankage included in the costing that would be used in future with new technology?	We would have deep tank activated sludge that would be used for that process. In the future, if upgrades are required these can be accommodated within the tanks.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Structured Decision Making Workshop May 31, 2013	Integrated Design Process	Are the off-site costs included in Scenario B?	Yes the off-site costs are included in Scenario B.
Structured Decision Making Workshop May 31, 2013	Integrated Design Process	You do not need phosphorus removal at all. The cost of that type of technology does not make sense.	Phosphorus removal is not a regulatory requirement. However, the Indicative Design has included space for a future struvite removal reactor in the event that the business case improves.
LGPAC Meeting October 30, 2012	Integrated Design Process	When assessing sustainability of the project, what themes under sustainability might be evaluated?	Sustainability themes include concepts such as: making better use of energy, and use of reclaimed water, and minimizing greenhouse gas emissions.
Structured Decision Making Workshop May 31, 2013	Integrated Design Process	Some liquid treatment options appear to exceed secondary treatment.	The Concepts meet secondary and Concepts 3 and 4 exceed secondary. However, we are looking at reclaimed water or a small portion of that secondary effluent that we could treat to a higher quality and use for some of these higher applications. That would be just a portion of the total flow (likely around 5%) that would require advanced treatment.
Structured Decision Making Workshop May 31, 2013	Integrated Design Process	Do the design concepts have different resilience with respect to seismic events?	In terms of seismic resilience, all concepts that were considered are the same.
CRF Meeting November 1, 2012	Integrated Design Process	When do you expect to break ground?	Construction is anticipated to commence in 2016.
LGPAC Meeting June 26, 2012	Integrated Design Process	Is a similar process going to be established for the Iona Secondary Wastewater Treatment Plant project or will it use the information derived from this process?	MV will embark on a process for the Iona upgrade with the City of Vancouver, Burnaby and Richmond. It will be a separate process because there are different communities, challenges, and considerations involved.
LGPAC Meeting October 30, 2012 & Email Correspondences April 11, 2013, May 13, 2013	Integrated Design Process	How will Metro Vancouver evaluate the different plant design options and come to a decision?	A decision and assessment framework was created with evaluation criteria related to the four project objectives. The concepts and Build Scenarios were evaluated and compared using the criteria to provide transparency, clarify trade-offs between alternatives, and break down numerous decisions into component parts. The ultimate approval of the Indicative Design will be made by the Greater Vancouver Sewerage and Drainage District (GVS&DD) Board of Directors.
Email Correspondences February 26, 2013, May 3, 2013, May 8, 2013	Integrated Design Process	I believe we should be evaluating against major features rather than build scenarios.	The major processes in the build scenarios (the liquid treatment train and the solids treatment train) were evaluated separately in order to determine the processes to include in the Indicative Design.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Email Correspondence April 15, 2013	Integrated Design Process	A process like Kepner Tregoe or equivalent would identify the absolute musts in terms of criteria to decide on a process and the key "wants" of the project and their relative importance.	Comment noted.
Structured Decision Making Workshop May 31, 2013	Integrated Design Process	Suggest that MV consider potential problem analysis as a formal part of this process. What can go wrong, what can we do to prevent it and what do we do if it does go wrong?	Comment noted.
CRF Meeting November 1, 2012	Integrated Design Process	Will source control be considered in the IDP?	There is a sewer use bylaw in the region that is explicit about discharges to sewers. There are also municipal bylaws and a regional industrial permit system that is quite prescriptive about what is allowed to be discharged to the public sewer system. All of this is intended to protect the interceptor system, the workers, the treatment plant, and the discharges to the environment.
Public Meeting Feedback Form - April 29, 2013	Integrated Design Process	How were the three build scenarios short-listed? What criteria were used?	There were evaluation criteria for the four project objectives and each of the concepts were analyzed and evaluated against these criteria.
CRF Meeting May 23, 2012	Integrated Design Process	Consider having a longer session with the Community Resource Forum on IRR.	A longer workshop focused on Project Delivery, Financing, and IRR was held on March 27th, 2013.
IRR/Procurement Workshop March 27, 2013	Integrated Design Process	There is still a fair amount of analysis that is yet to be done to determine if each of these technologies is going to work. Is there enough time to do all the analysis to make a decision by the end of the year?	The technical team is working on the calculations and all the analysis. The schedule is to complete the project definition work this year.
IRR/Procurement Workshop March 27, 2013	Integrated Design Process	Would the green waste that is mentioned is some design concepts be primarily from household sources?	On the North Shore the wet and dry sources are basically from households. Our current projections are also based on commercial businesses and products from grocery stores, restaurants, as well as any school and hospital food services.
Structured Decision Making Workshop May 31, 2013	IRR - Biogas/Biosolids	Is it legal to spread biosolids on farmers" fields in BC and is there any move to ban that?	MV is mainly using its biosolids for mine reclamation but it is legal to apply to farmers" fields. As long as the use meets regulatory requirements it is possible to apply biosolids to land.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Structured Decision Making Workshop May 31, 2013	IRR - Biogas/Biosolids	The testing done on the biosolids before it is applied is very limited and many environmental organizations do not support the application of biosolids to land because of pharmaceutical residue.	Comment noted.
CRF Meeting May 23, 2012	IRR - Biogas/Biosolids	Consider the possibility of integrating solid waste management in the plant design.	Co-management of solid waste organics with solids from the wastewater was considered as part of the Project Definition Phase.
Norgate Community Open House March 7, 2013	IRR - Biogas/Biosolids	What happened to the 2009 proposal by Fortis for biogas recovery from the existing plant?	It did not go ahead. It would have been short term given the planned decommissioning of the existing plant.
Telephone Call May 2, 2013, 11:30 a.m.	IRR - Biogas/Biosolids	Is MV looking at using waste heat from Industries in Maplewood area for District Energy System?	It is not part of MV"s project scope.
IRR/Procurement Workshop March 27, 2013	IRR - Biogas/Biosolids	Is the energy from the process in the form of methane? Do you need to apply energy to boost the system or to keep it going?	The energy from the anaerobic digestion process is from methane, which will be used to offset electricity and natural gas requirements.
IRR/Procurement Workshop March 27, 2013	IRR - Biogas/Biosolids	Could you use less heat energy to generate the methane during the high solids digestion process?	Using mesophilic digestion [37°C], you would have less heat input required, however they are very similar in terms of output.
IRR/Procurement Workshop March 27, 2013	IRR - Biogas/Biosolids	How do you contain the methane within the tunnels at the Harvest Power high solids digestion process?	There is a seal system that goes around the tunnel door to contain the methane. It"s a bladder type system that inflates when it is in service and a bulkhead system to close the door.
IRR/Procurement Workshop March 27, 2013	IRR - Biogas/Biosolids	Will it be necessary to modify the methane to make it usable, for example as it is at Burns Bog landfill?	The biogas generated from the High Solids Digestion process is about 60% methane and 40% carbon dioxide. The methane from this process could be used directly in co-generation, but it would need to be treated to put it into a pipeline.
IRR/Procurement Workshop March 27, 2013	IRR - Biogas/Biosolids	Does the low solids digestion process include the sludge biosolids?	We considered codigestion of food waste and wastewater solids in a wet digestion, or low solids digestion process; the low solids digestion process would be more applicable to food waste combined with yard waste.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Email Correspondence April 2, 2013 & IRR/Procurement Workshop March 27, 2013	IRR - Biogas/Biosolids	Could commercial garburators reduce the need for additional material for energy recovery as it relates to kitchen waste collection and meet the needs of the plant without additional truck activity?	Whether for domestic or commercial use, garburators introduce solids into the sewers. In addition to the risk of solids plugging the sewers, organic matter goes into the plant at the front end, which means equipment and tanks need to be larger, and require more energy. Food waste collection programs are now being implemented by all MV municipalities.
IRR/Procurement Workshop March 27, 2013	IRR - Biogas/Biosolids	The latest proven technology for biosolids is to use freeze/thaw cycles that are much more energy efficient than using heat to dry the biosolids.	Comment noted.
Community Workshop September 17, 2013	IRR - Biogas/Biosolids	Is the energy recovery envisioned similar to what they are doing in the South East False Creek (SEFC) Athletes" Village?	SEFC is using raw sewage and we would be looking at treated effluent; however the heat pump would be the same. It is similar to the Whistler Athletes" Village.
CRF Meeting May 23, 2012 & Community Workshop (CRF & LGPAC) November 14, 2012 & Email Correspondence June 11, 2013	IRR - Processes	Make resource recovery a primary part of the Project and consider IRR as a subtitle to the Project. It should be less of a priority than financial concerns.	Integrated Resource Recovery was one of the four project objectives driving the project.
LGPAC Email Correspondence June 11, 2013	IRR - Processes	What is the status and plan regarding the Integrated Resource Recovery proposal tabled by Fidelis in 2011?	The Integrated Resource Recovery Study for MV North Shore Communities, prepared by Fidelis Resource Group March 29, 2011, identified a number of potential opportunities for extracting valuable resources from the "waste" products available on the North Shore. The Project Definition Team, using that study as a starting point, is exploring which of these opportunities are viable and should be incorporated into the new facility. Potentials include biogas generation, electricity and heat recovery, and reclaimed water.
LGPAC Meeting October 30, 2012	IRR - Processes	Conclusions from the Stantec/Dayton Knight and Fidelis reports are premature and did not look at infrastructure, collection, and/or water reuse potential.	The Integrated Resource Recovery Study for MV North Shore Communities, prepared by Fidelis Resource Group March 29, 2011, identified a number of potential opportunities for extracting valuable resources from the "waste" products available on the North Shore. The Project Definition Team, using that study as a starting point, is exploring which of these opportunities are viable and should be incorporated into the new facility. Potentials include biogas generation, electricity and heat recovery, and reclaimed water.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
LGPAC Meeting May 24, 2013 & Structured Decision Making Workshop May 31, 2013	IRR - Processes	MV has a responsibility to point out that IRR options may be uneconomic even to the point of negative cash flow. Additionally, money might have more effect on GHGs if spent on something other than GHG reduction, likewise for money spent on Biological Oxygen Demand (BOD) loading reduction.	Comment noted.
IRR/Procurement Workshop March 27, 2013	IRR - Processes	Would this LGSWWTP be almost net positive or energy neutral? Is it a formal target of the project to be energy neutral?	The Indicative Design has included space for recovery of effluent heat for use in district heating. Use of effluent heat would result in the plant becoming energy neutral.
IRR/Procurement Workshop March 27, 2013	IRR - Processes	Would the plant also contribute to MV"s sustainability goals, part of which is to generate renewable energy?	It will generate renewable energy and contribute to environmental sustainability, which are both part of MV"s key project goals.
Structured Decision Making Workshop May 31, 2013	IRR - Processes	To go with the assumption that IRR has no economic value discounts the communities and countries around the world have based their wastewater systems on IRR and are using that.	MV believes that there is fundamental value in recovering materials and minimizing energy use if a project business case using financial, environmental and social criteria provides it to be advantageous.
CRF Meeting May 23, 2012	IRR - Processes	Regarding the development of IRR processes, consider research and the recovery of phosphorous from sewage systems as there is a shortage of nutrient supplies globally.	The Indicative Design includes space for a future struvite recovery system if the business case becomes viable.
CRF Meeting May 23, 2012	IRR - Processes	Consider the importance of ecological design and community resources such as carbon reduction/reuse, moving away from the old Roman design to a completely new model of treatment plant.	Comment noted.
IRR/Procurement Workshop March 27, 2013	IRR - Processes	I think you should have a target of being energy self-sufficient.	Comment noted.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Structured Decision Making Workshop May 31, 2013	IRR - Processes	How did Metro Vancouver calculate net energy use numbers for the build scenarios?	For each scenario MV calculated the total energy consumed, then subtracted energy that can be produced at the facility. The calculation includes electricity and thermal energy from biogas and heat recovery for a district energy system.
LGPAC Meeting July 9, 2013	IRR - Processes	What happens to the phosphorus being generated now? Is it in the form of struvite?	The existing treatment plant is not a biological phosphorus removal plant and that means there is little phosphorus to recover. Struvite can precipitate in the existing plant.
LGPAC Meeting October 30, 2012	IRR - Water	Additional attention should focus on the fact that the MV Integrated Liquid Waste and Resource Management Plan includes water reuse. Has MV started looking at potential opportunities for reclaimed water? (e.g., flushing toilets with reclaimed water in a 20-storey building).	The Indicative Design will include reclaimed water use for non-potable water use within the plant, a truck water filling station, and space for future expansion for additional reclaimed water use for adjacent industry if a business case is viable.
LGPAC Meeting October 30, 2012	IRR - Water	Is there a study/survey available online regarding water studies on potable water uses?	Potable water is drinking water, and has unlimited use.
LGPAC Meeting October 30, 2012	IRR - Water	The Stantec/Dayton Knight report did not specifically look at water reuse, but considered economic strategy of three versus two sites. If scale is an issue then there are some specific advantages in terms of piping – 90 per cent of the cost of the infrastructure is in the piping.	Comment noted. The treatment facility will be located on one site.
LGPAC Meeting October 30, 2012	IRR - Water	Vancouver Coastal Health is in favour of reclaimed water when done appropriately. Control is with the Ministry of Environment (MoE) through the wastewater regulation – a letter of authorization is needed. Permitting in the municipality is a key issue, so it is good to have municipalities involved.	Comment noted. With respect to municipal involvement, ten meetings and presentations with North Shore Councils have been held, and two more are expected in late October.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Email Correspondence February 18, 2013 & Local Business Meeting September 18, 2013	IRR - Water	Consider a water feature on the site fed by reclaimed water.	The Indicative Design includes a water feature that will be fed by reclaimed water and rainwater. The water used in the water features is tertiary treated water.
CRF Meeting May 23, 2012 & Community Workshop September 17, 2013 & Local Business Meeting September 18, 2013	IRR Biosolids/Biogas	Consider the North Shore"s unique advantages in terms of resource recovery, including opportunities to utilize the heat generated as the plant will be in a populated area. Will energy recovery be designed to tie into existing and new infrastructure in North Vancouver? Will there be a net energy benefit?	The density in the area of the new facility makes district energy using heat from the effluent a potentially viable option, and has therefore been incorporated into the Indicative Design. If the heat is utilized for a District Energy system, then it may be net energy positive relative to energy use at the facility.
Email Correspondence Sept 20, 2012	Procurement Model - P3	If revenue can be generated through this project then a P3 structure may be possible.	Comment noted.
CRF Meeting November 1, 2012	Procurement Model - P3	Traditionally, unions are against P3s, but they do admit that it may be useful to assist with financing some projects if it would not displace union jobs.	Comment noted.
IRR/Procurement Workshop March 27, 2013	Procurement Model - P3	Do you anticipate concerns from public sector unions if a situation arose where a private-sector company was responsible for plant maintenance?	A decision on procurement has not been made at this point.
CRF Meeting November 1, 2012	Procurement Model - P3	What do you estimate, in a Design Build process, will be the risk portion to be absorbed by the private partner to take into account that the design is not complete?	Design-build transfers responsibility for both design and construction to one contractor.
CRF Meeting November 1, 2012	Procurement Model - P3	With a Design Build, will a facility be more efficiently designed than if it is not a P3? Is there a potential that a strictly engineer-driven design will be over-designed to minimize the risk or liability to the designers? Will the costs be higher if it is not a P3?	On a net present value basis, the value for money analysis did not show that Metro Vancouver's costs would be lower if the project was a P3.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
LGPAC Meeting October 30, 2012	Procurement Model - P3	A member noted that the biggest savings in a P3 is operating because the frontend costs are design, optimization and build. If we are serious about a P3 then to get the best deal we should look at having a third party operating the facility.	Third party operation was one of the options considered in the value for money analysis.
LGPAC Meeting October 30, 2012	Procurement Model - P3	What are the financing options? Is a P3 suitable for a project this size?	Financing under a P3 model could include MV financing as well as equity and other financing by the P3 contractor.
LGPAC Meeting October 30, 2012	Procurement Model - P3	To what level do you complete the design in a Design Build process?	The consultant team will develop the concept design in the Project Definition Phase to about the 20% level. The Design and Construction Phase is the start of a new contracting process.
LGPAC Email Correspondence June 24, 2013 & LGPAC Meeting October 30, 2012	Procurement Model - P3	What is the status with regard to a P3 for the plant, and how would it be structured (e.g. DB, DBO, etc)? What are the pros and cons and cost implication of a P3 vs. a traditional procurement approach?	The provincial policy that has been established is that for projects receiving $50 million or more of provincial funding a Public Private Partnership (P3) will be considered the base case unless there is a compelling reason to do otherwise. Federal funding from the P3 Canada program is only available for projects using Public Private Partnerships. As part of the Project Definition Phase, work has been undertaken to assess the value of a P3 for the design and construction phase. A MV Board subcommittee will review the options available to procure for the design and construction phase. For more information on pros and cons of different procurement models, please see http://www.metrovancouver.org/services/wastewater/engagement/LionsGate/ResourceDocs/March27-2013-Presentation.pdf
IRR/Procurement Workshop March 27, 2013	Procurement Model - P3	What kind of funding might Partnerships BC contribute?	Partnerships BC does not have funds that they're looking to distribute, unlike P3 Canada.
IRR/Procurement Workshop March 27, 2013	Procurement Model - P3	Do the P3 Canada and Build Canada funds apply to the resource recovery components such as the digesters, heat pumps and potentially the district energy systems?	The project and all its components would be assessed through grant funding application process.
IRR/Procurement Workshop March 27, 2013	Procurement Model - P3	Do all the different procurement models include ownership?	Ownership is always with MV, regardless of the procurement model selected.

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IRR/Procurement Workshop March 27, 2013	Procurement Model - P3	Only the Design Build Operate/Maintain and Design Build Finance Operate/Maintain are true P3s. P3 is, by definition, a long-term relationship. The long-term operating and maintenance costs are the big factor, not the capital.	P3 Canada doesn"t look at anything but DBO/M and DBFO/M. They are not interested at all in traditional Design-Bid-Build and Design-Build isn"t P3.
IRR/Procurement Workshop March 27, 2013	Procurement Model - P3	In Design Bid Build and Design Build, you don"t have good control of cost and schedule. You very seldom get the lowest full lifecycle cost because the people who build it aren"t the same ones who maintain and operate it so they aren"t as careful about making sure that it"s the lowest long-term operating and maintenance cost and because there is less checking done with public financing.	Comment noted.
IRR/Procurement Workshop March 27, 2013	Procurement Model - P3	Regarding procurement models, there is concern that the company that operates the plant is not subject to Freedom of Information Requests because they are private and the public does not have access to information on the operations.	Comment noted.
IRR/Procurement Workshop March 27, 2013	Procurement Model - P3	It is possible to specify in a P3 contract what information is to be publicly available.	Comment noted.
IRR/Procurement Workshop March 27, 2013	Procurement Model - P3	What protection for the municipal government can be put in place in a P3 contract?	Contracts would include insurance requirements.
IRR/Procurement Workshop March 27, 2013	Procurement Model - P3	Insurance or performance bonds can mitigate those risks to municipal governments.	Comment noted.
Community Workshop (CRF & LGPAC) March 27, 2013	Procurement Model - P3	Does moving toward an indicative design limit P3 options?	Metro Vancouver would be required to create an indicative design for any process; the indicative design defines the project scope and need.

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IRR/Procurement Workshop March 27, 2013	Procurement Model - P3	Is it possible to have a mixed procurement model?	The project comprises three bundles: the treatment plant, conveyance piping and deconstruction of the existing plant. Each can have a different procurement model.
CRF Meeting May 23, 2012 & LGPAC Email Correspondences April 11, 2013, April 17, 2013	Project Rationale	Is there a need for the required upgrades to secondary treatment? What federal legislation requires upgrading and are there any exceptions? Is do nothing an option?	A Canada-wide Strategy for the Management of Municipal Wastewater Effluent was endorsed by the Canadian Council of Ministers of the Environment (CCME) in 2009, and the Wastewater Systems Effluent Regulation developed under the fisheries act. Upgrading is also a requirement under MV's Liquid Waste Management Plan, approved by the Minister of the Environment.
LGPAC Meeting June 26, 2012	Project Rationale	Has the option been considered to consolidate wastewater treatment from the North Shore into one plant on a very large existing site instead of trying to fit a plant on a small site on the North Shore? I believe there was an investigation into the possibility of pumping wastewater from the North Shore to the Iona Island Wastewater Treatment Plant for secondary treatment.	This was investigated in 2005 during the review of the Liquid Waste Management Plan. The results of the study were that there is limited land at Iona, it costs more to convey the wastewater to Iona, it costs more in terms of energy to pump wastewater to Iona and there are risks with crossing Burrard Inlet and the environmental impacts to Burrard Inlet. With all the negatives, Building a plant on the North Shore is the preferred way to proceed.
LGPAC Meeting June 26, 2012	Project Rationale	There is no scientific basis for proceeding with the Project. I would like to know if there's a risk that the Project could actually make things worse environmentally.	Metro Vancouver is required to upgrade to secondary treatment to meet regulations regardless of receiving environment conditions.
LGPAC Meeting May 24, 2013	Project Rationale	The team should consider applying Potential Problem Analysis to the two or three highest ranking alternatives. For example "market for district heat dries up"; "cement kilns in BC go out of business"; "regulations change to tertiary treatment" etc.	Comment noted.
Email Correspondence Sept 11, 2012	Project Rationale	Outline the risks with 'do nothing' and associated costs, clearly outlining assumptions and uncertainties.	Doing nothing is not an option, as Metro Vancouver is required to upgrade to secondary treatment.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
IRR/Procurement Workshop March 27, 2013	Project Rationale	If this plant is for wastewater treatment, why would MV consider processing solid waste at the plant?	Metro Vancouver considered codigestion of organics from the solid waste stream to determine if there were synergies in managing the two streams together, and if it would result in a reduced overall cost.
Community Workshop (CRF & LGPAC) November 14, 2012	Sensory Impacts - Aesthetics	The plant should be invisible or if exposed be beautiful.	These options have been explored during the Project Definition phase.
Email Correspondence February 18, 2013	Sensory Impacts - Aesthetics	Exposed walls should be covered by creeper plants to prevent graffiti.	MV is exploring different methods of graffiti prevention, including creeper plants and wall treatments (such as wax coatings).
Email Correspondence June 10, 2013	Sensory Impacts - Aesthetics	Consider planting trees along the north side of the property to create screening.	The Indicative Design includes vegetated green space along the north site of the property.
Business Meeting - Feedback Form - June 4, 2013	Sensory Impacts - Aesthetics	Green space and more businesses towards First Street would be desirable.	The Indicative Design includes vegetated green space along the north site of the property.
Norgate Residents" Workshop September 4, 2013	Sensory Impacts - Aesthetics	How tall are the digesters? How many storeys would they be equivalent to?	The ones at the far west end are about 27 metres above existing grade. The majority of the plant is 16 metres high, around four storeys.
Community Feedback Form - May 7, 2013 & Public Meeting Feedback Form - April 29, 2013 & Email Correspondence February 18, 2013	Sensory Impacts - Noise	Consider constructing noise barrier(s) to mitigate current noise impacts. Additional noise during construction is of also particular concern to Norgate residents.	The facility will run along the entire length of the site, and may act as a noise barrier to the railroad and train traffic itself. Metro Vancouver will work to mitigate noise during construction.
Phone call from a Norgate resident & Public Meeting October 10, 2013	Sensory Impacts - Noise	Regarding pile-driving, how long will it take from start to finish? Unanticipated delays could worsen the impact.	For a piled foundation, the duration will depend on the approach used for pile driving and on decisions regarding acceptable hours of operation. The community will be consulted further as part of the Construction Phase before decisions are made.
LGPAC Meeting October 7, 2013	Sensory Impacts - Noise	Where is the rooftop fan located?	In acoustically insulated rooms or enclosures.
LGPAC Meeting October 7, 2013 & Norgate Residents" Workshop September 4, 2013	Sensory Impacts - Noise	What kind of material is on the dewatering tanks and how would it behave from a noise reflection point of view? Can the facility be textured to minimize noise?	Concrete, and yes the project team is considering texturing and articulating the concrete in ways that would reduce noise impacts.
LGPAC Meeting October 7, 2013	Sensory Impacts - Noise	Potential for noise coming from any mechanical equipment.	All sources of noise in the rooms will be acoustically insulated to dampen noise.

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CRF Meeting May 23, 2012 & Public Meeting Feedback Form - April 29, 2013 & Business Meeting - Feedback Form - June 4, 2013 & Local Business Meeting June 4, 2013 & Public Meeting October 10, 2013	Sensory Impacts - Odour	Ensure the Project does not cause odours, noise or air pollution and provide mitigation opportunities for these concerns.	Odour control will be a priority in the design and operation of the plant. All air associated with the plant will be managed and treated using odour control and air treatment technology. This technology has been proven in plants sited in urban centres.
Norgate Community Open House March 7, 2013 & Email Correspondence February 26, 2013 & LGPAC Email Correspondence & Public Meeting Feedback Form - April 29, 2013 & Public Meeting October 10, 2013	Sensory Impacts - Odour	Provide more information on the odour control that will be used for the plant.	All of the tanks will be covered and enclosed in buildings. Air from the process will be treated in a two-stage odour control system and purified before being discharged.
Norgate Community Open House March 7, 2013	Sensory Impacts - Odour	How will odour and noise control be weighted in the decision making process?	The plants have been highly effective in avoiding odour complaints.
Norgate Community Open House March 7, 2013	Sensory Impacts - Odour	Is there any odour and noise impact data from the operational treatment plants in WA state or the Okanagan?	The plants have been highly effective in avoiding odour complaints.
Norgate Community Open House March 7, 2013	Sensory Impacts - Odour	What methodologies will be used to characterize and quantify noise and odours and where will they be located? How will it compare to the experience from the current Lions Gate sewage treatment plant? What are you going to do to ensure that there is no odour in the Norgate community, especially around the school and beyond?	The plant will be designed so air is put through scrubbing systems before it is discharged into the atmosphere. The scrubbed air can be monitored to ensure that the system is effective. The technology is well proven at other plants.
Norgate Community Open House March 7, 2013	Sensory Impacts - Odour	Will the plant have open tanks?	No, there will not be any open tanks.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
IRR/Procurement Workshop March 27, 2013	Sensory Impacts - Odour	Are we compromising odour control by adding biogas generation to the site?	Food waste will not be coming to the site for biogas generation, greatly reducing odour risk.
Local Business Meeting June 4, 2013	Sensory Impacts - Odour	In regard to odour control, both scenarios A and B have food waste coming to the site. How will you handle the odour issues associated with those materials?	The food waste from the North Shore is processed at a pulping facility where a lot of water is added. It is enclosed in tanker trucks for transport to this plant and is directly injected into the digester tanks so there is no odour. This option was not selected for the Indicative Design.
Local Business Meeting June 4, 2013 & Public Meeting October 10, 2013	Sensory Impacts - Odour	How is this site different from Annacis Island where odour is a concern for local retail businesses?	The Annacis Island plant was built without the same odour control considerations that Lions Gate will have. The existing plants all have open tanks.
Local Business Meeting June 4, 2013	Sensory Impacts - Odour	Does effluent have an odour when it is discharged?	No. The effluent does not have an offensive odour.
Structured Decision Making Workshop May 31, 2013 & LGPAC Meeting July 9, 2013	Sensory Impacts - Odour	Is there any difference between the design options in terms of odour?	There is a high level of odour control that is applied to all the alternatives. We would be committed to meeting the odour control requirements.
Structured Decision Making Workshop May 31, 2013	Sensory Impacts - Odour	How will chronic odour problems be dealt with? Who would be responsible for correcting the problem and bearing the cost?	The Indicative Design includes a two-stage scrubbing system for odorous air before it is discharged. This technology has been proven to avoid odour problems.
Norgate Open House Feedback Form - March 7, 2013 & Community Workshop September 17, 2013	Sensory Impacts - Odour	The community needs to be assured of odour and noise levels in order to be convinced.	Comment noted.
Norgate Community Open House March 7, 2013 & Phone conversation	Sensory Impacts - Odour	Can Metro Vancouver make a clear commitment that no odour will be created by the plant?	Odour control will be a priority in the design and operation of the plant. All air associated with the plant will be managed and treated using odour control and air treatment technology. This technology has been proven in plants sited in urban centres.
LGPAC Meeting October 7, 2013	Sensory Impacts - Odour	Is heat captured from the odour control system before it is exhausted into the atmosphere? Is that a possibility or not worth it?	No, most of the air that is extracted will be ambient temperature, so there is not a lot of heat energy available.
LGPAC Meeting October 7, 2013	Sensory Impacts - Odour	Will the plant be under negative pressure?	Most of the plant, including the odour sources, will be under negative pressure.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
E-mail Correspondence October 8, 2013	Sensory Impacts - Odour	Re: air emissions due to combustion - If the new plant is larger, people will probably think this means even more odours coming, more frequently because of the proximity of the plant to our neighbourhood.	Emissions from combustion which we are also addressing through the design are a separate issue from odours. The odour control approach for this facility will be much more comprehensive than that at the existing plant.
E-mail Correspondence October 8, 2013	Site Selection	Please review the potential for a floating sewage treatment plant, integrated with kinetic energy recovery for power generation (document attached).	Review underway.
LGPAC Meeting October 30, 2012 & CRF Meeting November 1, 2012 & Community Workshop September 17, 2013 & Local Business Meeting September 18, 2013	Site Selection	Will the outfall remain in the existing location?	MV will use the existing outfall which is on Port Metro Vancouver leased lands.
CRF Meeting November 1, 2012 & Email Correspondence & LGPAC Meeting October 30, 2012 & Norgate Community Open House March 7, 2013 & LGPAC Meeting June 26, 2012 & LGPAC Email Correspondences April 11, 2013, April 17, 2013	Site Selection	Why can't the plant remain in its current location?	The existing Lions Gate plant is located on lands being returned to Squamish Nation in accordance with the cut-off lands legislation.
LGPAC Meeting October 30, 2012	Site Selection	The Districts of North and West Vancouver and the City of North Vancouver do not seem to have been involved in considering economic impacts of site location(s).	Presentations have been made by MV to all three North Shore Councils and three elected officials from the North Shore sit on MV's Utilities Committee.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
IRR/Procurement Workshop March 27, 2013	Site Selection	It does not appear there is enough space to do both wastewater treatment and solids processing processes on this site.	Both liquid and solids processing on the site will be accommodated.
Community Workshop (CRF & LGPAC) November 14, 2012	Site Selection	This is a challenging site to put a wastewater treatment plant: it is small with drainage problems.	Comment noted.
Community Workshop (CRF & LGPAC) September 10, 2012	Site Selection	Who owns the small parcel of land to the east of the site?	That is the Right-of-Way for Pemberton Avenue, and is owned by the District of North Vancouver.
Norgate Community Open House March 7, 2013	Site Selection	How does MV currently get the primary waste to the existing plant?	There is a pipe to the plant now and the waste is piped there through the sewer system. As the new plant is further east, we will need to move West Vancouver and Squamish Nation wastewater to the new plant.
Norgate Community Open House March 7, 2013	Site Selection	Is the elevation of the new site the same as the current site?	The elevation is slightly higher.
Norgate Community Open House March 7, 2013 & Public Meeting October 10, 2013	Site Selection	Will the primary and secondary treatment plants be located in different places?	No. The existing primary treatment plant site is being decommissioned entirely. The new plant will include both primary and secondary treatment.
Telephone Call - Clark McKeen - May 31, 2013	Site Selection	Will the outfall option involve laying a pipe within the channel or will there be any implications to future filling of part of the finger? What will the impact be on the south area of the site?	The Indicative Design involves using the existing outfall, with no modifications to its configuration.
Email Correspondence April 22, 2013	Site Selection	Please clarify the cost and use/transportation of the second site mentioned in some design scenarios.	The second site was considered as a location to co-digest food waste organics with wastewater solids; material would be trucked to and from this site. This option was eliminated and is not part of the Indicative Design.
LGPAC Email Correspondence & LGPAC Meeting October 30, 2012	Site Selection	What are the pros and cons, and the cost implications of satellite plants? Are they an option?	Distributed treatment for the North Shore was reviewed during development of the Integrated Liquid Waste and Resource Management Plan. It was also assessed by Fidelis Resource Group as part of their North Shore Integrated Resource Recovery Study. A centralized treatment plant was recommended.
Email Correspondence February 18, 2013	Site Selection	The site is currently zoned CD55 not industrial. It will need to be rezoned in order to host a sewage treatment plant.	Metro Vancouver is working with the District of North Vancouver approvals on required.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
IRR/Procurement Workshop March 27, 2013	Site Selection	How much space will the actual sewage treatment plant occupy on the site?	The plant will occupy the majority of the site, with some space on the north side for a vegetated berm along West First Street. Metro Vancouver is working with the District of North Vancouver to include the Pemberton Right of Way for use as parking and open space adjacent to the site.
Structured Decision Making Workshop May 31, 2013	Site Selection	Are there alternatives that would not require going back to the existing outfall?	Build Scenario C included local discharge of a higher quality effluent to the Burrard Inlet instead of the existing outfall, but it was not selected.
Community Feedback Form - May 7, 2013	Site Selection	I would like to understand the location and siting of the pump station.	The location of the pump station to convey sewage from West Vancouver and Squamish Nation is still to be determined.
LGPAC Email Correspondence April 17, 2013 & Email Correspondence April 22, 2013	Site Selection	What other sites were considered for the plant?	No other sites were available when MV purchased the land from BC Rail Properties that would provide long-term secure tenure for the new plant.
Local Business Meeting September 18, 2013	Site Selection	Will Metro Vancouver be twinning the pipe that is coming in?	MV will likely re-purpose the interceptor that runs to the west to the current plant. MV will need a new effluent line to connect to the outfall.
Local Business Meeting June 4, 2013	Traffic Impacts	Some of the design options proposed include processing food waste. Where would the food waste be processed? Is 3-5 trucks per week or day realistic for all the food from the North Shore to be processed without having any effect on traffic or any disruption?	The Build Scenario that incorporated codigestion of food waste with wastewater solids on the treatment plant site assumed that that all of the trucks with the food waste would continue to go to the Second Narrows food waste and yard waste processing site. The food waste would get processed off-site. Only those materials in liquid tanker trucks, not garbage trucks, would bring pulp food waste to directly inject it into the digesters at this plant. The Indicative Design does not include this option.
Community Workshop (CRF & LGPAC) November 14, 2012 & IRR/Procurement Workshop March 27, 2013 & Email Correspondence April 2, 2013	Traffic Impacts	Trucking of material to and from the site should be kept to a minimum. If an option is selected that utilizes green/solid waste, could this be brought in by barge or pipe instead of by truck?	Comanagement of solid waste organics with solids from the wastewater was considered as part of the Project Definition Phase, which would have increased the truck traffic to and from the site. However, this was eliminated and is not part of the Indicative Design.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
Community Workshop (CRF & LGPAC) November 14, 2012 & Local Business Meeting September 18, 2013 & LGPAC Meeting October 7, 2013	Traffic Impacts	Consider utilizing port and railway access to move resources and minimize traffic impacts.	Comment noted.
Norgate Community Open House March 7, 2013 & Local Business Meeting June 4, 2013	Traffic Impacts	What truck traffic will be created by the wastewater treatment plant?	During operation, we anticipate that there will be approximately 1-2 trucks a day hauling biosolids off-site, another 1-2 per week delivering treatment chemicals, and small vehicle traffic for staff, contractors, deliveries, etc.
Local Business Meeting June 4, 2013	Traffic Impacts	Do you anticipate problems on 1st Street West with truck traffic? Will there be steps taken to slow the speed on 1st Street West?	There is minimal truck traffic associated with the plant. The question around speed is a question for the traffic authorities.
Local Business Meeting June 4, 2013	Traffic Impacts	What do you expect the construction traffic volume/impact to be?	During the design of the plant MV will continue the consultation process and will meet with the community to talk about concerns around construction. Clearly truck traffic during construction can have an impact and MV is aware of that concern.
Local Business Meeting June 4, 2013	Traffic Impacts	There is an overpass on the south side that shows a road closure. Are you closing that road?	As part of the construction of the Philip Avenue Overpass, Pemberton Avenue will only be open as an emergency entrance.
Local Business Meeting June 4, 2013	Traffic Impacts	How much effluent goes through the plant now? How much is at Second Narrows? How many tanker trucks go through West Vancouver and North Vancouver currently?	The volume of pulp food waste that would fill the digesters is approximately 30,000 gallons/day of pulp waste. Right now there are no trucks because we do not pulp and transport the food waste. Potentially it could be 3-5 trucks per day. This option was not selected and is not part of the Indicative Design.
Structured Decision Making Workshop May 31, 2013	Traffic Impacts	Are the numbers of truck volumes return journeys or just one way?	The number does not include the return trip so essentially it would be double the number indicated.
Norgate Residents" Workshop September 4, 2013	Traffic Impacts	If there is an education centre, how would it be integrated in terms of traffic control and parking?	MV does have to accommodate some parking on the site. If MV has access to the Pemberton right-of-way it can accommodate some parking. Currently, there is parallel parking along both sides of First Street.
LGPAC Email Correspondence June 22, 2013	Wastewater Treatment	What is the primary means of disinfecting water?	Ultraviolet (UV) is the primary disinfectant.

Source	Category	Issue, Comment, Question	Metro Vancouver Response
LGPAC Meeting October 30, 2012 & LGPAC Email Correspondence April 11, 2013	Wastewater Treatment	Could going to secondary treatment be 'worse' than staying at primary?	Secondary treatment has significantly higher removal rates for biochemical oxygen demand and suspended solids than primary treatment (better than 90 percent vs. 30 to 60 percent). Primary treatment only removes substances that settle or float. Dissolved substances are not removed in primary treatment, but are in secondary treatment. Secondary treatment is the regulatory baseline standard across Canada regardless of environmental conditions.
LGPAC Meeting October 7, 2013 & Norgate Residents' Workshop September 4, 2013	Wastewater Treatment	Will the new plant require pumping or will the liquid waste just flow to / from the plant?	MV is considering two options: a pump lift or a deeper gravity line.
Community Workshop (CRF & LGPAC) September 10, 2012	Wastewater Treatment	Secondary treatment does not fit with water reuse under current BC legislation – treatment would need to be tertiary.	Any effluent to be reused must undergo further treatment to meet reuse requirements.
Community Workshop (CRF & LGPAC) September 10, 2012	Wastewater Treatment	What is the current required level of wastewater treatment that now needs to be exceeded?	The current process at Lions Gate WWTP is primary, and it needs to be upgraded to secondary.
CRF Meeting May 23, 2012	Wastewater Treatment	Ensure the focus is not only on technology, but on technology as it used to impact desired outcomes.	All technologies and processes were analyzed with consideration of the outcome.
CRF Meeting November 1, 2012	Wastewater Treatment	At what point do the federal regulations apply to the quantities discharged at the treatment plant?	The regulations have minimum volumes associated with them. In this case, the volume is 5,000 cubic metres per day before the regulation applies. The current North Shore volume is 80,000 cubic metres per day.
CRF Meeting November 1, 2012	Wastewater Treatment	Does MV's chlorinated water exceed the secondary treatment criteria point? Would you be in violation of the regulations by discharging tap water into the ocean?	You would be in violation of the regulation if you discharged tap water in the quantities that are typically discharged for wastewater and if the chlorine residual exceeds 0.02 mg/L.
CRF Meeting November 1, 2012	Wastewater Treatment	If the discharge occurring today is still within safe limits, is the plant being built because of the secondary treatment baseline?	There have been extensive environmental studies of Burrard Inlet around the area of our discharges. Regardless of environmental factors, secondary treatment is now the baseline for Canada.

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CRF Meeting November 1, 2012	Wastewater Treatment	What is the optimal size of a new development project for individual treatment to make sense? Does it have to be the size of Dockside Green in Victoria?	This is dependent on the specific local business case.
LGPAC Meeting October 30, 2012	Wastewater Treatment	Some treatment processes can change compounds that result in unintended outcomes. This should be kept in mind when selecting the technology.	Comment noted.
LGPAC Meeting October 30, 2012	Wastewater Treatment	Engineers are very conservative and they make sure there is lots of capacity in place. It is prudent to take ideas such as small package plants into consideration and see how that impacts the design.	The size of the facility does not lend itself to cost effective use of a package plant.
LGPAC Meeting October 30, 2012	Wastewater Treatment	Has a decision been made on discharge objectives as to any reductions, or an exemption on ammonia?	The levels need to be met to comply with requirements relating to fish toxicity.
LGPAC Meeting October 30, 2012	Wastewater Treatment	What is meant by "just in time" in relation to the plant build?	"Just in time" would be an initial build that would be designed to serve the area for 15 years.
LGPAC Meeting October 30, 2012	Wastewater Treatment	Would you see using this plant as a pilot project? (e.g., to demonstrate a satellite system).	There are no pilot projects currently included in the Indicative Design.
Email Correspondence July 19, 2013	Wastewater Treatment	Has the volume of sewage been monitored on the watering days in the summer months to see what the increase in flow is on those days?	MV records wastewater flows at the treatment plant on a 24 hours per day, 7 days a week, 365 days per year, and we have data going back several years. Summer days have the lowest flows. Flow increases during rainwater days due to rainwater infiltration and inflow.
Email Correspondence July 19, 2013	Wastewater Treatment	How did they come up with the amount for the basic volume of sewage generated per day?	There are typical per capita volumes for sewage generation that were referenced and compared to the flow that is coming to the existing plant.
IRR/Procurement Workshop March 27, 2013	Wastewater Treatment	Please explain the term co-digestion.	Co-digestion means digesting sludge generated from the wastewater treatment process in conjunction with another type of waste product from offsite, such as food waste.
IRR/Procurement Workshop March 27, 2013	Wastewater Treatment	Does high solids digestion involve thermophilic bacteria?	It can use thermophilic bacteria if it is operating at 55°C, or mesothermal if operating at 37°C.

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IRR/Procurement Workshop March 27, 2013	Wastewater Treatment	Is there a solid component that you have to get rid of at the end of the high solids digestion process?	During anaerobic digestion, some of the food waste is converted into biogas, and the rest remains as a solid which would need to be managed.
IRR/Procurement Workshop March 27, 2013	Wastewater Treatment	Where is water introduced during the high solids treatment process?	For high solids digestion, the dilution water comes from the adjacent dewatering process, is introduced into the process resulting in about 12% solids and 88% water.
IRR/Procurement Workshop March 27, 2013	Wastewater Treatment	Is low solids digestion a continuous ongoing process?	It is continuous. The food waste stream will have some seasonable variation but there will still be a base load.
IRR/Procurement Workshop March 27, 2013	Wastewater Treatment	Is the sewage sludge component a continuous process? When you get enough contamination, do you need to shut down the entire system to restart it?	For clarification, when talking about contamination, we"re referring to plastics, forks and other things that cannot be digested.
IRR/Procurement Workshop March 27, 2013	Wastewater Treatment	How do you get rid of the contamination during the wastewater treatment process?	There is a grit system upstream that removes the light stream, such as plastics and the heavy stream. The heavy section settles to the bottom, the light section floats to the top and the organics section passes through. It is similar to the process at a wastewater plant where there is a screening process and a grit removal process that uses a similar principle to remove things like sand and gravel.
Structured Decision Making Workshop May 31, 2013	Wastewater Treatment	What is the assumption on the percentage of industrial use of the plant?	All options would be the same at about 10% of effluent treated.
Structured Decision Making Workshop May 31, 2013	Wastewater Treatment	Why is mesophilic being considered given that you have another treatment stage?	The reason that we would consider mesophilic is because there are benefits associated with the use of less energy because there is a lower heat requirement for the mesophilic digestion.
Community Workshop (CRF & LGPAC) March 27, 2013	Wastewater Treatment	Does the amount of struvite deposits in pipes increase due to secondary wastewater treatment?	Struvite formation potential is comparable and possibly marginally higher with secondary treatment.
Structured Decision Making Workshop May 31, 2013	Wastewater Treatment	In terms of the nutrient removal, what is the advantage of tertiary?	In terms of advance level treatment, tertiary removes things such as nitrogen from the stream. Nutrient removal is not an environmental requirement for coastal British Columbia.
LGPAC Meeting October 7, 2013	Wastewater Treatment	What will accommodate rainwater outflow from the long roof space?	The stormwater that falls onto the roof will be collected and used for plant operations, the water feature, or other uses.
Community Workshop September 17, 2013	Wastewater Treatment	Why are incineration and food waste not included in the design?	MV found that there is not an economic benefit to co-managing food waste on the site relative to handling the solids separately in a regional system.

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Community Workshop September 17, 2013	Wastewater Treatment	Will the design have the capacity with tertiary treatment to address pharmaceuticals and other chemicals in the water?	The issue of contaminants and the presence of chemicals in trace amounts is a question being reviewed by researchers and environmental agencies. There is no regulatory direction at this time regarding environmental risks and human health risks or the treatment processes and source control initiatives that would be required if risks are identified.