

May 8, 2013

# Lions Gate Secondary Wastewater Treatment Plant

## Procurement / Integrated Resource Recovery Community Workshop

### *Summary*

#### **Issues, Comments, Questions and Metro Vancouver Responses**

*Wednesday, March 27, 2013, 6:30 – 9:00 p.m.*

*Alex Mahood Room, Capilano Rugby Club*

*305 Klahanie Court, West Vancouver, BC*



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## Meeting Summary

The meeting held March 27, 2013 provided a detailed public discussion on the Lions Gate Secondary Wastewater Treatment Plant (LGSWWTP) project procurement process and the possibilities for Integrated Resource Recovery at the plant.

### **Integrated Resource Recovery (IRR)**

- Laurie Ford, Senior Engineer, Wastewater Secondary Treatment Upgrades, Metro Vancouver presented:
  - advantages and disadvantages of processing food and yard waste
  - potential for an off-site energy centre to co-manage the processing of solids from liquid and solid waste streams
  - potential for biogas, effluent heat, reclaimed water, nutrient, and energy generation
- Rick Bitcon, AECOM, Project Manager for the Engineering Consulting team provided technical details on the IRR process by discussing high (dry) and low (wet) solid digestion processes, as well as the process for waste pulping and grit removal.
- Public feedback on the topic of IRR included:
  - the technical processes involved in IRR
  - energy neutrality of plant operations
  - the required footprint of the plant to handle IRR
  - reasons for engaging in IRR
  - odour control

### **Procurement Models**

- Fred Nenninger, Project Manager, Wastewater Secondary Treatment Upgrades, Metro Vancouver provided background on the LGSWWTP project and covered options for the project's procurement including:
  - Partnerships BC including its mandate, and partnership process
  - Value for Money analysis
  - P3 Canada process
  - Advantages and disadvantages of different procurement models including: Design-Bid-Build model (DBB); Design-Build (DB) model; Design-Build-Operate/Maintain (DBO/M) model; and the Design-Build-Finance-Operate/Maintain (DBFO/M) model.
- Public feedback on the topic of procurement models included:
  - flow of funding from outside agencies
  - the timeline for municipality contributions
  - risks associated with the project during its construction and operation
  - asset ownership
  - public transparency
- Participants were informed of future engagement and elected representative events:
  - Public: April 18 Community Workshop; April 24 Public Meeting at the Norgate Elementary School; LGPAC and CRF (meeting dates TBD).
  - Elected representatives: April 10 Utilities Committee workshop; April 17 workshop with all three North Shore Councils; April 20 presentation to the Council of Councils.

## 1. Opening Remarks

Jaspal Marwah, Policy Coordinator, Public Involvement Division, Metro Vancouver called the meeting to order at 6:40 p.m. and thanked the Lions Gate Public Advisory Committee (LGPAC) and Community Resource Forum (CRF) members for attending. Mr. Marwah introduced and welcomed Councillors Robin Hicks of the District of North Vancouver and Trish Panz from the District of West Vancouver, and noted both Councillors are also members of the Metro Vancouver Utilities Committee.

During previous discussions, LGPAC and CRF members of the had indicated their interest in the topics of Integrated Resource Recovery and project procurement and financing. This meeting will provide an opportunity for a detailed discussion on project procurement and integrated resource recovery. A similar session to address project financing will take place in the early fall.

## 2. Meeting Introduction

Marni Robinson, Facilitator, Context Ltd. led a roundtable of introductions and reviewed the agenda for the information session. She advised that the objectives of the meeting are:

- Review currently available details on technical and market issues related to Integrated Resource Recovery (IRR)
- Provide an overview of procurement models
- Provide participants with an opportunity to discuss these two core aspects of the project in more detail.

Ms. Robinson also advised participants that questions and comments would be welcomed throughout the presentations, rather than waiting for a Q&A session at the end of the presentations.

## 3. Integrated Resource Recovery (IRR)

Laurie Ford, Senior Engineer, Wastewater Secondary Treatment Upgrades, Metro Vancouver, commenced the presentation on IRR opportunities during which she discussed:

- Potential inputs to and potential products from the LGSWWTP
- Additional feedstock from food waste and yard waste and the advantages and disadvantages of each
- Potential off-site energy centre to co-manage solids from liquid waste and organics from solid waste streams.

Rick Bitcon, AECOM, Project Manager for the Engineering Consulting team, continued with the presentation and reviewed several processing technologies:

- High solids digestion process (dry system)
- Low solids digestion process (wet system)
- The reject rate is about 10% in the dry system as opposed to about 30% in the wet system
- BTA Pulper and Grit Removal System
- Toronto source separated organics facility.

Ms. Ford completed giving the presentation and reviewed potential products:

- Biogas generation potential
  - Electricity and heat from biogas
  - Biomethane potential
- Effluent heat potential
- Reclaimed water potential
- Nutrient generation potential
  - Nutrients from the liquid stream
  - Nutrients in solids stream
- Energy from solids stream.

#### **Break**

The Procurement Workshop recessed at 7:55 p.m. and resumed at 8:07 p.m.

## **4. Project Procurement**

Fred Nenner, Project Manager, Wastewater Secondary Treatment Upgrades, Metro Vancouver provided a presentation regarding procurement models and discussed:

- Background of the project
- Involvement of Partnerships BC
- Mandate and information regarding Partnerships BC
- Partnerships BC process
- Value for Money (VFM) process
- P3 Canada involvement
- Procurement models
- Traditional delivery model is the Design-Bid-Build (DBB) model
  - Pros and cons of DBB model
- Design-Build (DB) model
  - Pros and cons of DB model
- Design-Build-Operate/Maintain (DBO/M) model
  - Pros and cons of DBO/M model
- Design-Build-Finance-Operate/Maintain (DBFO/M) model
  - Pros and cons of DBFO/M model.

## **5. Wrap-Up**

Ms. Robinson summed up by highlighting some of the broad range of discussion that occurred during the meeting, such as:

- Who holds the risk associated with the project during its construction and operation?
- Who owns the asset?
- Why would we have IRR? – differing opinions on sustainability goals and economic goals
- Is energy neutrality a goal of the project and should it be?
- Interesting ideas around struvite recovery, sludge and green house gas credits.

## **6. Closing Remarks**

Mr. Marwah thanked the meeting attendees noting that the feedback, comments and questions are helpful to the project team. He also advised that the summary from the workshop will be posted to the web portal soon and will be sent to all the attendees as well as the other members of the LGPAC and the CRF.

Future opportunities for public engagement are:

- April 18 Community Workshop – first opportunity to see the three build scenarios
- April 24 Public Meeting at the Norgate Elementary School
- LGPAC and CRF meeting dates to be set in the near future following on from the public meeting.

There are also a number of events planned for elected representatives:

- April 10 Utilities Committee workshop
- April 17 workshop with all three North Shore Councils
- April 20 presentation to the Council of Councils.

The meeting concluded at approximately 9:10 p.m.

## 7. Issues, Comments, Questions

The following table summarizes MV’s responses to questions and concerns provided by attendees, throughout the meeting organized by topic:

Issue, Comment, Question	MV Response
<b>Integrated Resource Recovery</b>	
<b>High Solids Digestion Process</b>	
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. Metro Vancouver currently does this at the Annacis Island Wastewater Treatment Plant using select waste products, also called feedstocks, from industry that are put directly into the digesters to generate biogas.
Is the picture in your presentation where material from the North Shore is currently being sent?	The picture in the presentation is of the Harvest Power energy generation facility in Richmond. Source separated organic material from single-family residences on the North Shore is sent to composting at the Fraser Richmond Soil and Fibre facility, not the energy recovery facility.
Why are we thinking of processing solid waste if there’s no sewage involved?	We’re looking to integrate the two streams, liquid and solid waste. The technology has been in existence for 20 years and is just starting to be used in the North American marketplace. There are potential synergies with respect to the equipment that you would be using. For instance, you could potentially use the same co-generation engines.

Issue, Comment, Question	MV Response
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?	Yes, the energy from the anaerobic digestion process is from methane. There is a net energy gain. For 500 GJ of sewage sludge, you could extract 40-50% as biogas.
<b>High Solids Digestion Process</b>	
Does this involve thermophilic bacteria?	It can use thermophilic bacteria if it is operating at 55°C, or mesothermal if operating at 37°C.
Could you use less heat energy to generate the methane?	Using mesophilic digestion [37°C], you would have less heat input required and end up with a little more net energy, however they are very similar in terms of output.
Is there a solid component that you have to get rid of at the end of this process?	During anaerobic digestion, some of the food waste is converted into biogas, and the rest remains as a solid.
How do you contain the methane within the tunnels?	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. At the Harvest Power facility in Richmond, there is some methane generated in the tunnels, but it's the percolate (the liquid that is re-circulated through the solids) that goes to the digesters that are outside where most of the methane is generated.
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. Landfills typically have less, methane so sometimes the biogas doesn't burn because there's not enough energy in it. 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.
<b>Low Solids Digestion Process</b>	
Does this process include the sludge biosolids?	It is technically possible and has been done in Europe. Most of the work so far in North America has been in co-digestion, with specific waste from the commercial or industrial sector, from things like cheese waste and de-icing fluid from airports. As far as I'm aware there is nobody co-digesting source separated organics together with sludge in the same digester.
Where is the water introduced in this process?	The loop shown in this image is where the fluid is introduced. It is being done in Toronto. The dilution water comes from the adjacent dewatering process, is introduced into the process resulting in about 12% solids and 88% water.

Issue, Comment, Question	MV Response
<b>Low Solids Digestion Process</b>	
<p>Couldn't you garburate this type of waste somewhere and introduce it into a sewer where there is lots of water instead of trucking it in?</p>	<p>The trend has been away from garburators. The negative side is that material going into the sewers plugs them. Contamination by plastics, forks and things that cannot be digested is also a problem. The positive side is, except for contamination, the material is organic. Generally, the recommendation is to go with some sort of source separated organics collection scheme.</p>
<p><i>Note:</i>                  Following the meeting, the participant who asked the question clarified that it was in reference to commercial size machines such as a screw machine/BTA pulper, not residential garburators. Metro Vancouver's response to this clarification has been included.</p> <p><i>Could commercial machines be used as a kitchen waste collection point some miles away, depositing the material into the sewer system at that point where it will mix with the 70% water required for the digester as it is transported to the site by the normal sewer pipes for processing ?</i></p>	<p><i>Whether garburators are for domestic use or commercial, they introduce solids into the sewers instead of feeding them directly into the digester, which is where they are of benefit. In addition to the risk of solids settling out and plugging the sewers, by using this method the organic matter goes into the plant at the front end, which means the preliminary, primary, secondary and solids handling equipment and tanks need to be larger, and require more energy for operation. By introducing the food waste into the digester directly, we just need to increase the size of the digester and downstream solids handling and gas use equipment. Therefore, while introduction of a high volume of food waste into the sewer from an off-site point would help reduce truck traffic to the site, it would result in a number of other unwanted impacts.</i></p>
<p>For the North Shore, what would the industrial component to both the wet and dry processes be so that you could anticipate what is going to be present in your final product? Would this be primarily household sources?</p>	<p>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 as they have a lot of energy value. There wouldn't be a big food industry with wash-down product or waste product that would be a base load to underpin a major facility. There are places like Lethbridge where they have industry discharge into the municipal sewer system and they have a significant industrial load.</p>

Issue, Comment, Question	MV Response
<b>Low Solids Digestion Process</b>	
Is this a continuous ongoing process?	Yes, it is continuous. The food waste stream will have some seasonable variation but there will still be a base load. It may peak in the summer based on the impact of tourism. It would be different if we were talking about yard waste, which would occur in the spring and fall and nothing in the winter. We're not trying to target yard waste for its energy value because you can't digest it anaerobically so it will be relatively consistent over the course of the year.
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, not toxic contamination.
<b>BTA Pulper and Grit Removal System</b>	
How do you get rid of the contamination?	Toronto collects all source separated organics in bags and there is a debagging process. There is a grit system upstream that removes the light stream, such as plastics and the heavy stream, such as metals. 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 pea gravel.
<b>Biogas Generation Potential</b>	
Can you translate the gigajoule per day number to give it some perspective?	Statistics Canada reports that an average home in BC uses an average of about 100 GJ per year and 80% is used for space heating and hot water. That is equivalent to about 0.3 GJ/day per home. 270 GJ is equivalent to 1,240 homes per day of energy.
Would this LGSWWTP be almost net positive or energy neutral? Is it a formal target of the project to be energy neutral?	It's not a formal target but it's certainly a goal. We need to see how close we can get working out those numbers to see if it's actually viable.
Is there a separate plant planned as there's not enough space to do both processes on this site?	We're looking at doing it all on site as well as an alternative site for the solids processing. We're considering truck traffic, space requirements and odours.
Are we compromising odour control by adding biogas generation to the site?	Odour control and odour risk will be considered for doing this on the plant site and for processing at another site.

Issue, Comment, Question	MV Response
<b>Biogas Generation Potential</b>	
How much space will the actual sewage treatment plant occupy on the site?	We are in the process of determining the footprints of different technologies and looking at what it would take if we didn't do the solids processing on site. The scenarios that we're looking at currently can all be fit on the site. We are looking at more than one story to fit things like mechanical rooms, electrical rooms, and odour control. It's not typical of what you would see in North America but more typical of what you'd see in Asia or the UK, other places where space is at a premium.
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.
Have you looked at that 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.
The wastewater treatment plant brings in wastewater that provides a liquid stream and a solid stream. The wastewater solid stream will produce about 200 GJ/day. You would also have to bring in food waste and yard waste to get to that energy neutral state.	That is correct.
Does the measurement include boosting the hydrogen gas?	In the biogas, it's mostly methane and carbon dioxide. There will be trace amounts of hydrogen and other things but at very low energy content. The numbers quoted in the presentation don't include any of that trace.

Issue, Comment, Question	MV Response
<b>Project Procurement</b>	
<b>Introduction to Procurement Process</b>	
Public Private Partnership (P3) Canada is looking at contributing up to 25% of the capital investment of a project. What will Partnerships BC contribute?	The key difference is that Partnerships BC do not have a block of money that they're looking to distribute. The Build Canada Fund that was started in 2007 is fully allocated and ends in terms of project delivery in 2014. Last week, the federal government announced a new \$47 billion 10-year infrastructure program for Canada. I don't know how much of that would be available for projects like this but it is a significant block of infrastructure investment for Canada. The hope is that every province will also leverage their funds so that we have potential access to provincial and federal funding to help these large infrastructure projects. There's nothing formal out of Victoria at this point.
When do we have to get the money for this project?	On our timeline, we're going to start the design and construction process phase in 2014. The cash flow expenditures will be slow at the start because 2014 is the start of design. There will be tens of millions of dollars in design by 2015. By the time you get to construction from 2015/2016 to 2020, those are your big cash flow years. We will need funding by 2016 if we're going to meet the 2020 regulatory deadlines.
When, or if, you get the money from the federal and provincial government, when do the municipalities have to start paying? Will that be in 2016 as well? Or, can they wait until 2020 when the project is completed to come on board? So when you have to start paying depends on the model for the project that you come up with?	The municipalities start paying as soon as the debt payments begin. In some of the models that I'll be describing, they are structured so a lot of the risk during the design and construction got to a whole P3 partnership and you don't actually start paying until the plant is finished. They are taking all the risk and they're handling all the financing. If we finance it and we do a traditional procurement, we will need the money right away and we start making payments right away.

Issue, Comment, Question	MV Response
<b>Introduction to Procurement Process</b>	
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? In the past, I've always thought that they apply only to the sludge and the treatment facility itself.	The world is changing in terms of investments in infrastructure. We're trying to integrate this. We've always integrated the energy with biogas production and that's pretty traditional. We're hoping that our project is the full spectrum including potential if there's a business case for low-grade energy. There are two approaches to this. The business case to prove this and, if the business cases are proven, we need to find the right business models to implement it. We need to work out what a proper business model would be. Who would put up the money and who would obtain the benefits of those investments? It doesn't necessarily have to be Metro Vancouver for everything here. There's some complexity in how the project actually gets bundled together and presented to P3 Canada. Right now, my expectation is that they're open to complexity. They're giving grant money for water, wastewater and solid waste projects and this is all integrated. We've got an application, or a screening, in for our new waste-to-energy facility.
<b>Procurement Models</b>	
Do the procurement models include ownership?	Ownership is always with Metro Vancouver; P3 Canada does not provide any grant money to the private sector. The province hasn't privatized any of the projects that have been done in BC (highways and hospital projects). Those are all publicly owned under long-term (20, 30, 40 years) concession contracts; the province owns them all.
There are many P3s across the country owned by the private sector (Highway 407, Confederation Bridge) and it avoids one of the problems of separating ownership from the "finger pointing exercise". If you split ownership from the rest the responsibilities, it can lead to problems.	We will talk more about this as we walk through the models. P3 Canada is not really interested in Design Build(DB). They are really looking for DBO/M or Design Build Finance Operate/Maintain (DBFO/M) projects where there is a full transfer of risk to the appropriate party to assume the risk. The DBFO/M projects are the ones that are filtering to the top from the P3 Canada perspective.
Only the DBO/M and DBFO/M 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 DBB and DB isn't P3.

Issue, Comment, Question	MV Response
<b>Procurement Models</b>	
Does that mean that DBB, Construction Management at Risk (CM@R) and DB will not be considered?	The value for money analysis that is done will decide what will be considered or not. That's the exercise that we need to go through.
Will you be presenting all five procurement options to the public who attend the meeting?	We will be looking at all five choices. We're comparing our traditional DBB against what it looks like with DB, DBO/M and DBFO/M. We are trying to make the assessments of where's the best value. A lot of it has to do with how the risks are being transferred. As the risks shift, we're going from the traditional approach to all the way to the DBFO/M model, where the most risk gets transferred. The principle is that the risk is allocated to the party that can best manage the risk.
<b>Design-Bid-Build (DBB) Model</b>	
The owner is always the one that is responsible.	It's important to note that just because you use a different procurement model, there is no guarantee that your project will be 100% successful. There are failures and success stories in all these various models.
In DBB and DB, 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. Also, engineers have a tendency to gold plate and that happens more in this model because there is less checking done with public financing.	Comment noted.
<b>Design Build (DB) Model</b>	
The DB contractor only assumes design risk for the time to build it plus two years whereas in a P3, they take that risk for the life of the project. The price to build it is subject to competition but the price to operate and maintain it is not, unlike a P3.	Comment noted.
<b>Design-Build-Operate/Maintain (DBO/M) Model</b>	
The company that operates is not subject to FOI because they are private and the public does not have access to information on the operations. I've already experienced this with the incinerator plant that is on a similar contract.	Comment noted.

Issue, Comment, Question	MV Response
<b>Design-Build-Operate/Maintain (DBO/M) Model</b>	
The way to deal with this is to write into the contract what information is to be publicly available. That way they can't withhold anything, whereas under FOI, they can withhold things for certain reasons. That's not a real issue if the contract is properly written.	It's important to pay attention to how these contracts are set up and developed. It's contracting and there's some structure that the industry is used to, but contracts can be customized.
We've never been given access to the contracts as a citizen. The contracts have always been secret.	Comment noted.
I don't know about Metro Vancouver's contracts but you can go to the Partnerships BC website and every contract they've done is right there.	Comment noted.
You have to have a clear understanding of either availability or performance to be able to set those expectations up front so the operator can maintain it to the standards that you wish. If you don't have that, then you're subject to additional costs or changes later on in the life of the project.	From Metro Vancouver's perspective, during the risk and value for money analysis, we are the operating experts. We have an integrated system where we get economies of scale for many things. Our existing plant is remotely controlled 16 hours a day. Only one shift is at that existing Lions Gate plant and it's controlled from Annacis for most of the day. The new plant will probably be even more highly automated and be remotely controlled. You heard from the IRR presentation, the kind of technologies and the innovations that are being considered. There are some good examples where owners are hesitant to take the risk of some of those newer technologies. A good example is in Tuscon, where going to Public-Private Partnership (P3) with the operating and maintenance component, they received a proposal from a DBO/M consortium that used a very innovative technology on the primary treatment part of their plant that's been tried by those operators and designers in the industrial sector but never in the municipal sector. That was an edge and an innovation that saved tens of millions of dollars in terms of the plant capital investment.
Is there a union question when you move into operations? Will the public sector unions allow this?	We have a lot of expertise in-house and we need to determine where our staff can best be utilized and where we need new help. With some of the technology that we were discussing in the previous presentation, we don't have that in-house expertise. There would be learning curves for us as well in some of the new processes.

Issue, Comment, Question	MV Response
<b>Design-Build-Operate/Maintain (DBO/M) Model</b>	
What protection can be put in place in a P3 contract so that there's not a corporate veil around the consortium that cannot be pierced by the municipal government should their projections prove wrong and they can't make money from the deal and they walk away? How does the public get protected?	If things really go badly and the contractor walks away from the deal, that's a really bad outcome. But that's a really bad outcome that can happen from every single one of these models. There's no guarantee in any way that you procure.
There are a lot of ways to structure these deals so that you mitigate those kinds of risks, often through the use of insurance or performance bonds. Most of the deals being done now are a lot more sophisticated than they were initially.	There are a lot of successes in P3s. Looking at some of the studies, particularly from Australia because they done more there than they have in Canada, they're proving that the schedules and pricing is met more often with P3s.
<b>Design-Build-Finance Operate/Maintain (DBFO/M) Model</b>	
Is it possible to have a mixed model?	Yes, that's the objective of the value for money analysis. We're looking for what will work in each of these components for this build for this organization and the other organizations. We're evaluating what business model would be best for taxpayers, for society, and our corporation.
You have less control of the details but you have complete control of the performance. If I don't produce what the contract says I will produce, you will get me with liquidated damages and penalties, so you actually have better control of outputs and performance, which is the key to me as a taxpayer.	Comment noted.
I know Metro Vancouver does sewers, drains and water. The last model is how hospitals are being built these days. The Surrey Memorial Hospital was built using a DBFO/M model. The Port Mann Bridge was essentially a DBO/M where the financing was not part of it because the Province issued the bonds for it. There are lots of examples right here of how things have been done and how they worked well. There's lots of local expertise on how these things get put into practice for the public good.	Comment noted.

Issue, Comment, Question	MV Response
<b>Other Issues</b>	
What is the economic justification for proceeding with IRR processes? Is it for feel-good or legislative reasons, to save on tipping fees and landfill costs, sale of biogas to Fortis BC or other economic drivers?	We're doing that analysis right now. The mass balances were developed earlier in the week so we know how much sludge we're generating. We have some numbers that we're going to use for the source separated organics. We're going to look at the economics and the capital costs and see the results. The food waste is going to have to be dealt with one way or another. It will either go to the business-as-usual case of composting and ultimately to the topsoil market. You would consider something like this because, in comparison to the business as usual case, you are going to get the biogas to sell or to use. You will also have less product that will go to the topsoil market which will make it a more robust market as it might be saturated at the moment.
Would it 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 Metro Vancouver's key project goals.
We need to be considering all values, not just monetary ones.	Comment noted.
We need to be considering mainly the monetary values, not just the soft ones.	Comment noted.
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.
We need to be very careful about what we use the land for on the Norgate site. We need to save room for tertiary treatment and biosolids incineration.	Comment noted.
If you can dig a trench in from the harbour and have the stuff barged in, that might work. Otherwise, I can't see Norgate being the site for any of this stuff.	Comment noted.
I think you should have a target of being energy self-sufficient.	Comment noted.
<b>Other Issues</b>	
If it makes financial sense to be energy self-sufficient, then do it. And if it doesn't, I don't think you should. I think you should have a target of whatever makes economic sense and produces a reasonable rate of return for the ratepayer.	Comment noted.

<b>Issue, Comment, Question</b>	<b>MV Response</b>
<p>As you add extra processes and treatments to the plant, it requires extra equipment. In your business case and in your modelling, do you increase the maintenance and ongoing operational costs for those?</p>	<p>Yes, that has to be considered and that would come into the analysis. We will be looking at lifecycle costs.</p>
<p>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. It was developed from sustainable sediment recovery and applied to sludge. It was implemented in England last year. It sounds counterintuitive that freeze/thawing would be more energy efficient than heat drying but it actually makes sense because you use the heat that is released when you thaw it to dry again.</p>	<p>Comment noted.</p>

## **Attendance**

**LGPAC Members:** Christine Banham (Chair), John Croockewit, Blair East, John Hunter, Arlene King, David Knee, David Morton, Peter Thompson

**CRF Members:** Deborah Carlson, John Gilmore, Don Mavinic, Gunilla Öberg, Jon O’Riordan, Olga Schwartzkopf, John Shaw, Hamed Tahari

**Guests:** Robin Hicks, Trish Panz

**Metro Vancouver Resources:** Rick Bitcon (AECOM), Laurie Ford (MV), Marie Griggs (MV), Jaspal Marwah (MV), Fred Nenninger (MV).

**Process Facilitator:** Marni Robinson, Context Ltd.

**Recording Secretary:** Carol Lee, Raincoast Ventures Ltd.

## APPENDIX – Additional Comments

*After the meeting, an LGPAC member provided the following pros and cons in regards to procurement models presented and discussed at the meeting on March 27, 2013.*

### PROCUREMENT MODELS – PROS & CONS

#### DESIGN-BID-BUILD

Pros	Cons
<ul style="list-style-type: none"> <li>Control and oversight over entire project but this needs resources and management of a lot of detail</li> </ul>	<ul style="list-style-type: none"> <li>Public sector retains all risks of project excepting some short term guarantees and possibly late schedule penalties</li> </ul>
<ul style="list-style-type: none"> <li>Accepted model in which MV has experience</li> </ul>	<ul style="list-style-type: none"> <li>Separate procurement processes take longer – can't work phases in parallel</li> </ul>
<ul style="list-style-type: none"> <li>Competition for capital cost but not for operating &amp; maintenance costs unless third party O&amp;M</li> </ul>	<ul style="list-style-type: none"> <li>Cost overruns and schedule risks due to design flaws etc. are common</li> </ul>
<ul style="list-style-type: none"> <li>Usually lower transaction costs than Public-Private Partnership (P3)</li> </ul>	<ul style="list-style-type: none"> <li>Contractor has no on-going responsibility for operations or asset performance so contractor not driven to minimize full life cycle costs – parties' interests not aligned.</li> </ul>
	<ul style="list-style-type: none"> <li>Innovation discouraged by structure.</li> </ul>
	<ul style="list-style-type: none"> <li>Higher risk of unworkable projects.</li> </ul>
	<ul style="list-style-type: none"> <li>Schedule risk due to potential lack of contractor financial incentive</li> </ul>
	<ul style="list-style-type: none"> <li>Focus is on project inputs (details), not outputs (the key performance deliverables).</li> </ul>

**DESIGN-BUILD (DB)**

<b>Pros</b>	<b>Cons</b>
<ul style="list-style-type: none"> <li>DB Contractor assumes design risk but may be only a short-term guarantee</li> </ul>	<ul style="list-style-type: none"> <li>Schedule and some cost overrun risk borne by MV</li> </ul>
<ul style="list-style-type: none"> <li>Schedule can be accelerated – construction can commence before design is complete</li> </ul>	<ul style="list-style-type: none"> <li>Asset performance risk in operations retained by MV</li> </ul>
<ul style="list-style-type: none"> <li>Usually lower transaction costs than P3</li> </ul>	<ul style="list-style-type: none"> <li>Lacks drive to lowest full life cycle cost</li> </ul>
<ul style="list-style-type: none"> <li>Better certainty on price</li> </ul>	<ul style="list-style-type: none"> <li>Lacks drive to innovation</li> </ul>
<ul style="list-style-type: none"> <li>Capital cost subject to competition</li> </ul>	<ul style="list-style-type: none"> <li>Focus on inputs, not outputs</li> </ul>
	<ul style="list-style-type: none"> <li>Operating &amp; maintenance costs not subject to competition unless third party O&amp;M</li> </ul>

**DESIGN-BUILD-OPERATE/MAINTAIN (DBO/M)**

<b>Pros</b>	<b>Cons</b>
<ul style="list-style-type: none"> <li>DBO/M contractor assumes design, schedule, and life cycle capital and O&amp;M risk</li> </ul>	<ul style="list-style-type: none"> <li>Schedule risk held by Special Purpose Vehicle (SPV) unless fault of MV or a Facility Manager (FM)</li> </ul>
<ul style="list-style-type: none"> <li>Schedule can be accelerated</li> </ul>	<ul style="list-style-type: none"> <li>The SPV is responsible for asset performance for the term of the contract, other than events that are FM or the fault of MV. Should be a near 100% guarantee other than agree risk transfer to MV.</li> </ul>
<ul style="list-style-type: none"> <li>Better certainty on full life cycle costs – both capital and O&amp;M – parties' interests aligned</li> </ul>	<ul style="list-style-type: none"> <li>Higher transaction costs and need new skills in negotiating P3 contracts and doing P3 processes</li> </ul>
<ul style="list-style-type: none"> <li>Encourages innovation</li> </ul>	<ul style="list-style-type: none"> <li>Some risk of a poor P3 deal if not properly advised.</li> </ul>
<ul style="list-style-type: none"> <li>Contractor is held responsible for asset performance after substantial completion [In my experience contractor is held completely responsible barring force majeure or fault of MV</li> </ul>	
<ul style="list-style-type: none"> <li>Capital, and O&amp;M subject to competition</li> </ul>	
<ul style="list-style-type: none"> <li>Some trade-offs made between up-front capital and on-going operations optimized</li> </ul>	

**DESIGN-BUILD-FINANCE-OPERATE/MAINTAIN**

<b>Pros</b>	<b>Cons</b>
<ul style="list-style-type: none"> <li>• DBFO/M Contractor assumes design risk</li> </ul>	<ul style="list-style-type: none"> <li>• Private sector financing more expensive</li> </ul>
<ul style="list-style-type: none"> <li>• Schedule can be accelerated</li> </ul>	<ul style="list-style-type: none"> <li>• Higher transaction costs and need new skills in negotiating P3 contracts and doing P3 processes.</li> </ul>
<ul style="list-style-type: none"> <li>• Better certainty on price</li> </ul>	<ul style="list-style-type: none"> <li>• Some risk of a poor P3 deal if not properly advised</li> </ul>
<ul style="list-style-type: none"> <li>• "Contractor is held more responsible for asset performance after substantial completion (more "skin" in the game)</li> </ul>	
<ul style="list-style-type: none"> <li>• Price subject to competition</li> </ul>	
<ul style="list-style-type: none"> <li>• Optimal trade-offs made between up-front capital and on-going operations</li> </ul>	
<ul style="list-style-type: none"> <li>• Schedule risk borne by DBFO/M contractor due to "skin" in the game</li> </ul>	
<ul style="list-style-type: none"> <li>• Financing institutions provide another "sanity check" on the project</li> </ul>	