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REPORT TO SAANICH PENINSULA WASTEWATER COMMISSION
MEETING OF THURSDAY 16 FEBRUARY 2012

SUBJECT **BIOSOLIDS MANAGEMENT PROGRAM – UPDATE ON CALL FOR EXPRESSIONS OF INTEREST**

ISSUE

To provide an update on the Call for Expressions of Interest for the utilization of Class A biosolids or untreated sludge produced at the Saanich Peninsula wastewater treatment plant (SPWWTP).

BACKGROUND

At their meeting of 10 November 2011, the Sannich Peninsula Wastewater Commission (the Commission) received a staff report entitled "Biosolids Management Program – Options for Moving Forward" which is attached as Appendix A for background information.

Based on the information provided, the Commission directed staff to issue a Call for Expressions of Interest (EOI) for the utilization of Class A biosolids or untreated sludge produced at the SPWWTP and report back to the Commission with the results.

Appendix B provides the EOI advertisement and supporting information package available to all interested parties.

The communication plan for the EOI advertisements, publications and posting dates is provided in Appendix C.

SUMMARY

The Call for Expressions of Interest was issued on 30 January 2012 with a closing date of 16 March 2012. All submissions received prior to the closing date will be evaluated and summarized for presentation to the Commission on 19 April 2012.

RECOMMENDATION

That the Saanich Peninsula Wastewater Commission receive this report for information.

Ted Robbins, B.Sc., C.Tech.
Senior Manager, Water Management
Integrated Water Services

Dan Telford, P.Eng.
Senior Manager, Environmental Engineering
Environmental Sustainability

DT:jt
Attachments: 3

APPENDIX A

Making a difference...together

REPORT TO SAANICH PENINSULA WASTEWATER COMMISSION
MEETING OF THURSDAY 10 NOVEMBER 2011

SUBJECT **BIOSOLIDS MANAGEMENT PROGRAM – OPTIONS FOR MOVING FORWARD**

ISSUE

To provide information regarding biosolids management options for the Saanich Peninsula wastewater treatment plant (SPWWTP).

BACKGROUND

At their meeting of 13 July 2011, the Capital Regional District (CRD) Board passed the following motions:

1. That the CRD will harmonize current and long-term practices at all CRD-owned regional facilities and parks with the approved policies of the regional treatment strategy, including ending the production, storage and distribution of biosolids for land application at all CRD facilities and parks.

2. That the CRD does not support the application of biosolids on farmland in the CRD under any circumstances and let this policy be reflected in the upcoming Regional Sustainability Strategy.

This terminated the PenGrow residential program for 2011 and possibly the future, unless the Saanich Peninsula Wastewater Commission decides to relocate the PenGrow distribution from Hartland to another site.

In the long term, the Saanich Peninsula Liquid Waste Management Plan (SPLWMP) states that any biosolids management opportunities that become available through the CRD core area wastewater treatment project will be pursued.

As an interim solution, it was proposed that SPWWTP biosolids be beneficially used as a soil enhancement to the landfill capping material at Hartland landfill under a temporary exemption to the above CRD Board directive. Appendices A and B provide the staff reports presented to the Environmental Sustainability Committee (ESC) and to the Board for consideration of this proposal.

In receiving the staff reports at their meeting on 12 October 2011, the CRD Board referred this item back to staff for more information related to cost comparisons, details on monitoring and testing programs, what other municipalities are doing with their waste, what monitoring is being done at the Metro landfill and other environmental implications.

In order to respond to these questions, a Land Application Plan would need to be developed in consultation with the Ministry of Environment (MoE) at an estimated cost of approximately $25,000. Due to the uncertainty of whether or not ESC and the CRD Board would support the use of biosolids for landfill capping, there is a need to identify what other alternatives may exist.

ALTERNATIVES

The following alternative courses of action have been identified for consideration:

1. Prepare a Land Application Plan for biosolids to be beneficially used as a soil enhancement to the landfill capping material at Hartland landfill for approval by the MoE, ESC and CRD Board.

2. Retain a consultant to develop a revised biosolids management program confirming those partners that are actually viable for using the Saanich Peninsula sludge/biosolids. An RFP would then be issued to selected proponents to determine a preferred proponent to enter into a contract with.

3. Issue an invitation for "Expression of Interest" to identify all potential partners, companies and end users who may be interested in utilizing the sludge/biosolids. A terms of reference would be developed through consultation with the interested parties and an RFP would then be issued to selected proponents to determine a preferred proponent to enter into a contract with.

4. Amend Saanich Peninsula Liquid Waste Management Plan as per the motions passed by the CRD Board at their meeting on 13 July 2011 and harmonize the Saanich Peninsula biosolids management program with that of the Core Area. In the interim, Saanich Peninsula sludge would be landfilled at the Hartland landfill until the Core Area system is in service.

FINANCIAL IMPLICATIONS

The estimated costs and timelines to complete the options are as follows (for details see Appendix C). Option 2 would have significant impact on the 2012 biosolids management budget.

Option	Estimated Cost		Estimated Time to Complete
	Staff	Consultant	
1	$25,000	--	5 months
2	$60,000	$120,000	15 months
3	$40,000	--	8 months
4	$5,000	--	1 month

INTERGOVERNMENTAL IMPLICATIONS

The 13 July 2011 motions passed by the CRD Board ended the PenGrow residential program operating out of the Hartland landfill, thereby placing the CRD in non-compliance of its biosolids management commitments to the MoE under the SPLWMP. This requires an MoE approved amendment to the SPLWMP and implementation of an approved alternate use for the biosolids which does not include land application.

CONCLUSION

In consideration of the four options identified, it is uncertain whether the CRD Board will allow Option 1 to proceed even with an MoE approved Land Application Plan. Option 2 requires a significant expenditure and a long timeline to complete. Option 4 represents a deferral strategy which may not be acceptable to the MoE. Option 3 appears to be a reasonable option which adopts a proactive approach to dealing with the problem.

RECOMMENDATION

That the Saanich Peninsula Wastewater Commission direct staff to proceed with the invitation for "Expressions of Interest" to identify any potential partners, companies or end users that may be interested in utilizing Saanich Peninsula sludge/biosolids as set out in Option 3.

Ted Robbins, B.Sc., C.Tech.
Senior Manager, Water Management
Integrated Water Services

Dan Telford, P.Eng.
Senior Manager, Environmental Engineering
Environmental Sustainability

AL/DT:mer

Attachments: 3

APPENDIX A

Making a difference...together

Report #EEE 11-56

REPORT TO ENVIRONMENTAL SUSTAINABILITY COMMITTEE
MEETING OF WEDNESDAY 21 SEPTEMBER 2011

SUBJECT **SAANICH PENINSULA WASTEWATER TREATMENT PLANT BIOSOLIDS MANAGEMENT – BENEFICIAL USE OF BIOSOLIDS AT HARTLAND AS LANDFILL CAPPING**

ISSUE

To consider the beneficial use of biosolids at Hartland as a soil enhancement to the landfill capping material.

BACKGROUND

Under the Saanich Peninsula Liquid Waste Management Plan (SPLWMP), the Capital Regional District (CRD) and its participating Peninsula municipalities committed to implementing the Biosolids Management Plan, focusing on seeking opportunities to diversify biosolids beneficial use markets.

A home-use biosolids pilot program (PenGrow product) was implemented in 2006 to distribute PenGrow to the public from the Hartland landfill recycling area; however, in July 2011, the CRD Board passed a motion to end the production, storage and distribution of biosolids for land application at all CRD regional facilities and parks. This terminated the PenGrow residential program for 2011 and possibly the future, unless the Saanich Peninsula Wastewater Commission decides to relocate the operation to another site.

In the long term, the SPLWMP states that any biosolids management opportunities that become available through the CRD core area wastewater treatment project will be pursued. The core area project has identified a preferred strategy to use the biosolids as a fuel for a cement kiln and/or to power a waste-to-energy facility.

Over the interim, there is a need to identify alternatives to the management of biosolids produced from the Saanich Peninsula Wastewater Treatment Plant (SPWWTP). One such alternative would be to beneficially use the biosolids as a soil enhancement to the landfill capping material at the Hartland landfill.

ALTERNATIVES

That the Environmental Sustainability Committee recommend to the Board:

1. That the proposed beneficial use of biosolids as part of the landfill capping material be approved as an exemption under the Board's direction to not produce, store or distribute biosolids for land application at all CRD regional facilities and parks.

2. That the proposed beneficial use of biosolids be rejected.

ENVIRONMENTAL IMPLICATIONS

Hartland landfill is in the process of capping the Phase 2, Cell 1 area of approximately 3.5 hectares. This process will take about five years and typically requires soil with nutrients to grow vegetation (grasses) to stabilize the final cover layer on the landfill. A commonly accepted practice is to mix biosolids (as fertilizer) with soil to provide the nutrients required to sustain an agronomic crop of grasses. Metro Vancouver has successfully used its biosolids in this way to stimulate vegetation growth on two of its closed landfill sites.

The capping of the Phase 2, Cell 1 area with a soil/biosolids mixture containing 10% biosolids would result in the beneficial use of approximately 1,400 m^3 of biosolids per year.

A land application plan, approved by the Ministry of Environment, would be required prior to implementing the beneficial use of biosolids as part of the landfill capping material at Hartland. The land application plan would include the evaluation of the environmental implications and set monitoring requirements for the operation.

Appendix A provides the proposed table of contents for the Land Application Plan and additional information on two areas of particular interest, worker safety and bio-aerosol control.

INTERGOVERNMENT IMPLICATIONS

The current SPLWMP will need to be amended to include landfill capping as a beneficial use for the biosolids.

CONCLUSION

The PenGrow program ended in 2011 and all untreated sludge generated from the SPWWTP is currently being landfilled at Hartland. Beneficial use of the biosolids is needed to fulfill the SPLWMP commitment and one option would be to mix biosolids (as fertilizer) with soil to provide the nutrients required to sustain an agronomic crop of grasses for capping the Hartland landfill. Allowing the beneficial use of biosolids as part of the capping material would reduce the amount of chemical fertilizer needed and supports the commitment of the SPLWMP.

RECOMMENDATION

That the Environmental Sustainability Committee recommend to the Board:

That the proposed beneficial use of biosolids as part of the landfill capping material be approved as an exemption under the Board's direction to not produce, store or distribute biosolids for land application at all CRD regional facilities and parks.

Dan Telford, PEng
Senior Manager, Environmental Engineering

Larisa Hutcheson, PEng
General Manager, Environmental Sustainability
Concurrence

Kelly Daniels
CAO Concurrence

AL:jt

APPENDIX A

INFORMATION ON PROPOSED LAND APPLICATION PLAN FOR USING BIOSOLIDS AS LANDFILL CAPPING MATERIAL AT HARTLAND

Proposed Table of Contents

The proposed Table of Contents would include, but not be limited to, the following:

1. Introduction
2. Land Application Objectives
3. Site Characteristics
4. Amendment Material Characteristics
5. Amendment Rate
6. Management Considerations
7. Environmental Considerations
   - neighbours, site access and signage
   - wildlife and animal grazing
   - odour management
   - weather limitations
   - vegetation establishment
   - worker safety
   - bio-aerosols control
8. Monitoring
9. Contingency
10. Reporting

Two areas of particular interest relate to worker safety and bio-aerosol control. Preliminary consideration of these two areas of interest are as follows:

Worker Safety

Workers and contractors will be made aware of any potential risks associated with handling Class A biosolids. Appropriate protective equipment, hygiene stations and training will be provided.

To ensure that the safety practice is designed to meet the most stringent requirements, the *Guidance for Controlling Potential Risk to Workers Exposed to Class B Biosolids*, prepared by the Department of Health and Human Services, Centres for Disease Control and Prevention, National Institute for Occupational Safety and Health, will be followed.

Bio-aerosols Control

The biosolids from the SPWWTP are treated at a high temperature to produce a Class A pasteurized, lime stabilized material. These biosolids contain no fecal coliforms (pathogenic indicator) and have a solids content of over 45% which is similar to most soils. Unlike untreated liquid or semi-liquid sludge, which can be a source of bio-aerosols containing fecal coliforms, the Saanich Peninsula material is unlikely to be susceptible to aerosolization.

Any dust generated during mixing and handling of material will be controlled with the following strategies:

1. Mixing and handling activities will be limited to times when wind speed is less than 10 km/hr., based on the Hartland weather station which tracks wind speed and direction.
2. The current Hartland Operations dust control procedures will be used.
3. The final surface layer on the application area will consist of biosolids-free material.
4. The application area will be hydro-seeded within one week of the final application.

APPENDIX B

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Report #EEE 11-63

REPORT TO CAPITAL REGIONAL DISTRICT BOARD
MEETING OF WEDNESDAY 12 OCTOBER 2011

SUBJECT **SAANICH PENINSULA WASTEWATER TREATMENT PLANT BIOSOLIDS MANAGEMENT – SUPPLEMENTARY INFORMATION ON BIOSOLIDS USE FOR LANDFILL CAPPING AT HARTLAND**

ISSUE

To provide supplementary information regarding the proposed beneficial use of Saanich Peninsula wastewater treatment plant (SPWWTP) biosolids as a soil enhancement to the landfill capping material used at the Hartland landfill.

BACKGROUND

At its meeting of 21 September 2011, the Environmental Sustainability Committee requested that answers to the following questions be provided as supplementary information to the Board on 12 October 2011:

Q1: How much PenGrow biosolids product would be used in the capping material?

Approximately 1,400 m^3 of biosolids would be used annually; 700 m^3 each in the spring and fall seasons. This would be about half of the annual amount produced at the plant. The biosolids would be mixed at a ratio of 1:10 with soil and compost.

Q2: What is the volume that will be produced by the core area plant?

The core area plant's annual production will be approximately 23,360 m^3 of raw sludge, as compared to the SPWWTP annual production of approximately 3,000 m^3.

Q3: How long will biosolids be used in the landfill capping process?

The biosolids would be used in the capping of Phase 2 Cell 1, which should take approximately five years.

Q4: What is the long-term plan for Saanich Peninsula biosolids?

The long-term plan is to pursue harmonizing Saanich Peninsula biosolids management with that of the core area once the sewage treatment project has been put into operation.

Q5: What would be done to ensure contaminants don't reach the clean water system?

If the landfill capping option is exempted from the Board directive, the Land Application Plan will be prepared following Ministry of Environment (MOE) land application guidance. The Land Application Plan and an amendment to the Saanich Peninsula Liquid Waste Management Plan will then be submitted to the MOE for final approval before any implementation.

The surface water drainage system at Hartland operates separately from the solid waste leachate system, which collects leachate from the garbage and conveys it via pipeline to Macaulay Point for discharge out the outfall to the marine environment. The stormwater runoff from Phase 2 Cell 1 is

collected by the surface drainage system and conveyed via surface ditches to a collection/sedimentation pond which flows into a second sedimentation pond before being discharged into Heal Creek. The surface water discharged to Heal Creek is tested six times a year to meet the BC Approved Water Quality Guidelines and A Compendium of Working Water Quality Guidelines for British Columbia.

Q6: What are the effects of burying versus capping at Hartland?

The comprehensive identification and evaluation of any potential impacts on the receiving environment associated with the landfill capping option, including stormwater runoff to Heal Creek, would be done as part of the preparation of the Land Application Plan for review and approval by MOE.

Q7: What other alternatives are available for management of the biosolids produced by the Saanich Peninsula treatment plant?

Appendix A provides the Capital Regional District's commitments for biosolids management under the Saanich Peninsula Liquid Waste Management Plan.

Appendix B provides the motion approved by the Board at the 13 July 2011 meeting.

Appendix C identifies all other biosolids management alternatives (short and long term) available to the Saanich Peninsula with comments on their associated viability.

RECOMMENDATION

That the Board receive this report for information.

Dan Telford, PEng
Senior Manager, Environmental Engineering

Larisa Hutcheson, PEng
General Manager, Environmental Sustainability
Concurrence

Kelly Daniels
CAO Concurrence

DT:jt
Attachments: 3

SAANICH PENINSULA LIQUID WASTE MANAGEMENT PLAN
AMENDMENT NO. 3

4.4.3 Residuals Management:

The Capital Regional District (CRD) and its participating member municipalities commit to implementing the following Biosolids Management Plan:

Commitments

- pursue an effective and diversified program for the beneficial use of Class A biosolids that incorporates economically viable and long-term solutions
- mitigate nuisances associated with the production and application of biosolids including odour, noise, truck traffic and dust
- manage biosolids to ensure that detrimental effects to public health and the environment are avoided.

Biosolids Management Plan

The CRD has developed a "PenGrow" soil enhancer program that began as a pilot in 2008 at Hartland Landfill. Based on the success of this pilot program, it is planned to initially process about 300 tonnes of cured Class A biosolids and distribute it to the public at Hartland in bagged or bulk form. The plan is to then expand the "PenGrow" program to include processing and distributing the biosolids at the three Peninsula municipal public works yards.

The CRD plans to continue to seek opportunities to diversify biosolids beneficial use markets to include individual residences, commercial operations and farms.

In the long term, the CRD will ensure that the Saanich Peninsula biosolids management program will pursue any biosolids management opportunities that become available through the CRD's Core Area wastewater treatment project. There may be economies of scale savings to be achieved by managing the Core Area and Peninsula biosolids together.

As an interim plan, the CRD will continue to haul a portion of the sludge to Hartland landfill. The CRD's Solid Waste Management Plan allows for the disposal of raw sludge at this site as a controlled waste.

APPENDIX B

EXCERPT – CRD BOARD MINUTES
JULY 13, 2011

5.3 ENVIRONMENTAL SUSTAINABILITY COMMITTEE – May 25, 2011

1. Motion to Protect Local Farmland and to Harmonize Sewage Treatment Strategies within the CRD – Director Lucas

MOVED by Director Lucas, **SECONDED** by Director Derman,
Whereas the CRD is committed to developing regional sewage treatment strategies that have the lowest impact on both the environment and public health, and the highest resource recovery potential;

And Whereas the Core Area Liquid Waste Management Committee has passed a motion banning the land application of biosolids in order to address legitimate public health and environmental concerns about the accumulation and dispersal of Polycyclic Aromatic Hydrocarbons, heavy metals, pharmaceuticals, and other Emerging Compounds of Concern (ECCs) on our land, in our food, and in the regional water table;

And Whereas protecting the "integrity of rural communities" and "regional green and blue spaces", and managing "natural resources and environmental sustainability" are important and explicit goals and responsibilities of the CRD as outlined in the Regional Growth Strategy (http://tinyurl.com/65wdd8p), and "improving population health and regional food security" are noted as Priority Actions in the Capital Region Food and Health Action Plan (http://tinyurl.com/4xetqbz);

Be it so moved that the CRD will harmonize current and long-term practices at all CRD-owned regional facilities and parks with the approved policies of the regional treatment strategy, including ending the production, storage and distribution of biosolids for land application at all CRD facilities and parks; and

Be it further moved that the CRD does not support the application of biosolids on farmland in the CRD under any circumstances, and let this policy be reflected in the upcoming Regional Sustainability Strategy.

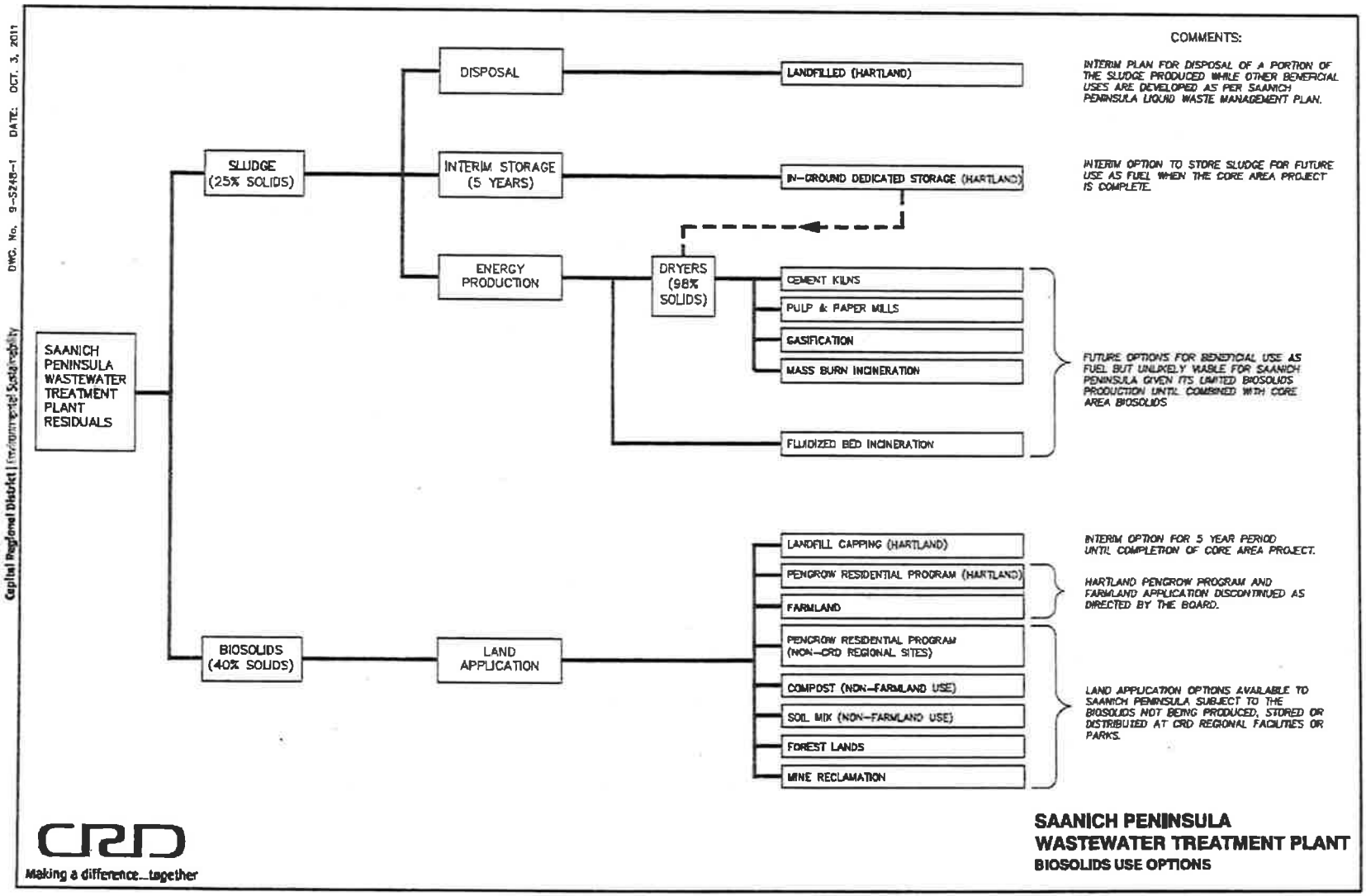
MOVED by Director Hendren, **SECONDED** by Director Hancock,
That the motion **be amended** by adding the following:
"That it be further moved that the pasteurized, lime-stabilized Class A biosolids material produced at the Saanich Peninsula Wastewater Treatment Plant may be beneficially used by Hartland Landfill operations to replace chemical fertilizers as the soil amendment blended with soil and compost for use as the final cover material in the closure of Phase 2 Cell 1, in full compliance with all environmental and health regulations."

Concerns were raised that the amendment creates an exception and that other exemptions may need to be considered.

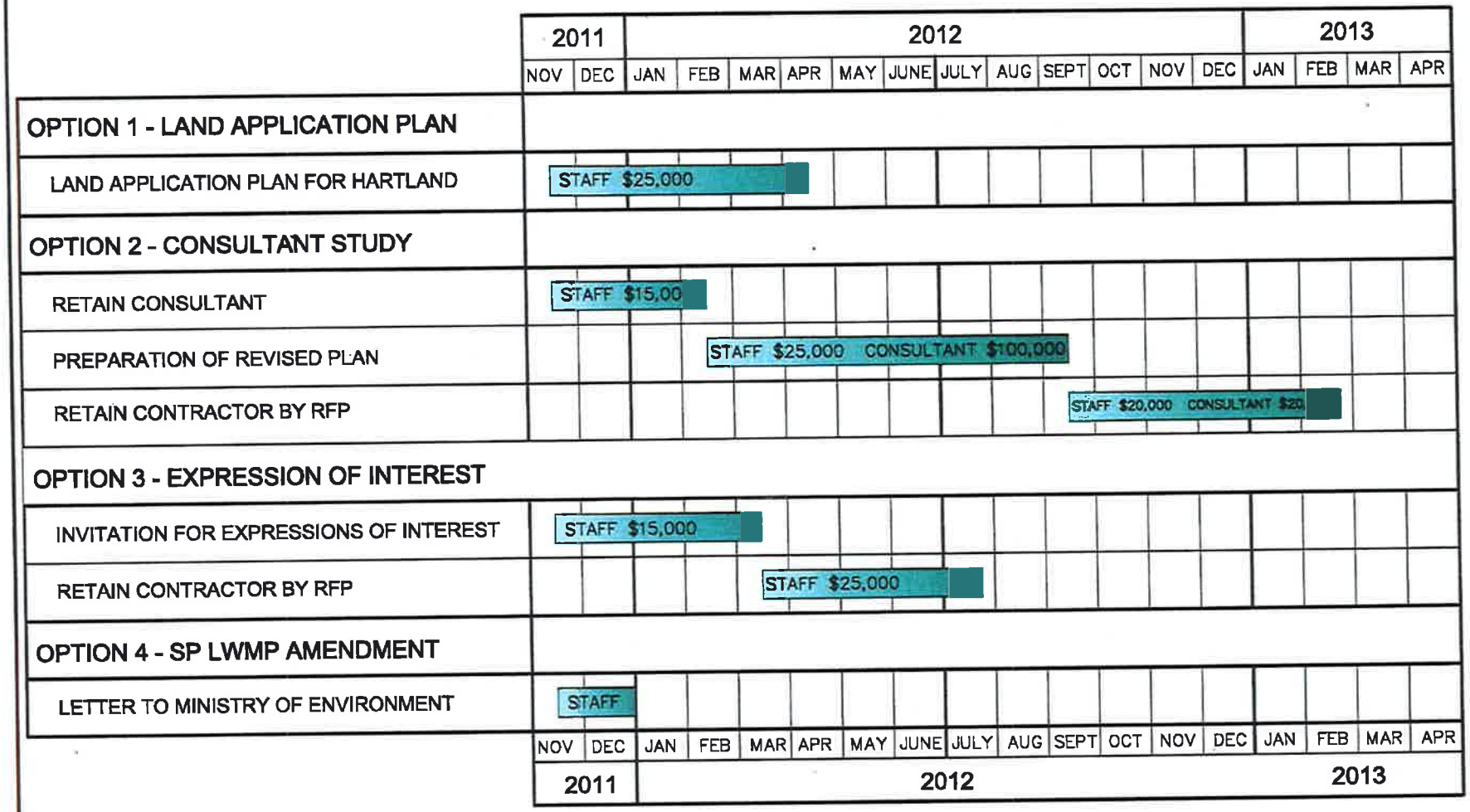
MOVED by Director Evans, **SECONDED** by Director Hill,
That the **amendment be referred** to the Environmental Sustainability Committee for consideration. **CARRIED**

MOVED by Director Hendren, **SECONDED** by Director Hill,
That consideration of the main motion be postponed until the Environmental Sustainability Committee reports on exemptions. **DEFEATED**
Hicks, Ranns, Evans, Seaton, Young, Brice, Causton and Wergeland IN FAVOUR

The question on the main motion was called. **CARRIED**
Evans, Seaton, Causton OPPOSED


Capital Regional District | Environmental Sustainability
DWG. No. 9-5248-1 DATE: OCT. 3, 2011
SAANICH PENINSULA WASTEWATER TREATMENT PLANT RESIDUALS
SLUDGE (25% SOLIDS)
BIOSOLIDS (40% SOLIDS)
DISPOSAL
INTERIM STORAGE (5 YEARS)
ENERGY PRODUCTION
LAND APPLICATION
DRYERS (98% SOLIDS)
LANDFILLED (HARTLAND)
IN-GROUND DEDICATED STORAGE (HARTLAND)
CEMENT KILNS
PULP & PAPER MILLS
GASIFICATION
MASS BURN INCINERATION
FLUIDIZED BED INCINERATION
LANDFILL CAPPING (HARTLAND)
PENGROW RESIDENTIAL PROGRAM (HARTLAND)
FARMLAND
PENGROW RESIDENTIAL PROGRAM (NON-CRD REGIONAL SITES)
COMPOST (NON-FARMLAND USE)
SOIL MIX (NON-FARMLAND USE)
FOREST LANDS
MINE RECLAMATION
COMMENTS:
INTERIM PLAN FOR DISPOSAL OF A PORTION OF THE SLUDGE PRODUCED WHILE OTHER BENEFICIAL USES ARE DEVELOPED AS PER SAANICH PENINSULA LIQUID WASTE MANAGEMENT PLAN.
INTERIM OPTION TO STORE SLUDGE FOR FUTURE USE AS FUEL WHEN THE CORE AREA PROJECT IS COMPLETE.
FUTURE OPTIONS FOR BENEFICIAL USE AS FUEL BUT UNLIKELY VIABLE FOR SAANICH PENINSULA GIVEN ITS LIMITED BIOSOLIDS PRODUCTION UNTIL COMBINED WITH CORE AREA BIOSOLIDS
INTERIM OPTION FOR 5 YEAR PERIOD UNTIL COMPLETION OF CORE AREA PROJECT.
HARTLAND PENGROW PROGRAM AND FARMLAND APPLICATION DISCONTINUED AS DIRECTED BY THE BOARD.
LAND APPLICATION OPTIONS AVAILABLE TO SAANICH PENINSULA SUBJECT TO THE BIOSOLIDS NOT BEING PRODUCED, STORED OR DISTRIBUTED AT CRD REGIONAL FACILITIES OR PARKS.
CRD
Making a difference...together
SAANICH PENINSULA WASTEWATER TREATMENT PLANT
BIOSOLIDS USE OPTIONS

910362



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BIOSOLIDS MANAGEMENT PLAN

OPTIONS FOR MOVING FORWARD
BUDGET & TIMELINE

APPENDIX C

APPENDIX B

Call for Expressions of Interest
Utilization of Class A Biosolids or Untreated Sludge
Produced at the Saanich Peninsula Wastewater Treatment Plant

The Capital Regional District (CRD) invites companies, organizations or individuals that may be interested in utilizing either the Class A Biosolids or the untreated sludge produced by the Saanich Peninsula Wastewater Treatment Plant to submit their credentials including relevant experience and a brief description of the proposed use of the available material. The purpose of this Call for Expressions of Interest is to select and invite those qualified parties that will best meet the needs of the CRD to submit detailed proposals for this utilization program.

Call for Expression of Interest documents may be viewed online at www.crd.bc.ca/biosolids and are also available at the CRD offices, 625 Fisgard St., Victoria, BC during regular business hours (Monday to Friday, 8:30 am to 4:30 pm).

Submission of Expressions of Interest should be made to the undersigned no later than 12 noon local time on March 16, 2012. A contract will not necessarily result from this Call for Expressions of Interest. For further information please contact Dan Telford at 250.360.3064 or e-mail dtelford@crd.bc.ca.

R. Daniel Telford, P.Eng.
Senior Manager, Environmental Engineering
Capital Regional District

Call for Expressions of Interest
Utilization of Class A Biosolids or Untreated Sludge
Produced at the Saanich Peninsula Wastewater Treatment Plant

Background and History

The Saanich Peninsula wastewater treatment plant (SPWWTP), which serves a semi-rural population of about 35,000, commenced operation in 2000 (see attached location map).

The treatment plant produces sludge and biosolids in four forms:

- primary and secondary blended sludge at approximately 1 to 2% solids content
- thickened sludge after the gravity belt thickener at approximately 5% solids content
- dewatered sludge after the rotary dewatering press at approximately 20 to 28% solids content
- heat pasteurized and lime stabilized Class A biosolids at approximately 40 to 50% solids content

The Class A biosolids is produced by an RDP en-vessel pasteurization process. The RDP process is a patented lime pasteurization process which utilizes electrical energy to provide most of the heat for pathogen reduction. Adding quicklime at a rate of 25 to 30% by weight, is primarily used to adjust the pH for vector attraction reduction.

Biosolids produced from the plant have been utilized in a variety of pilot applications, including farmland application in Qualicum, as final cover material at Hartland landfill and composted at West Coast Landfill Diversion in Duncan. For various reasons, these pilot projects have not resulted in viable long-term solutions to manage biosolids from the SPWWTP, with the result that in recent years about 95% of the biosolids has been disposed of at Hartland landfill at an average cost of about $112 per tonne.

In November 2004, the Capital Regional District (CRD) signed a four-year contract with Sylvis Environmental Inc. Under the contract, Sylvis used the biosolids for land reclamation and soil product fabrication at Lehigh Northwest Materials Ltd. producer's pit site at Colwood. Due to a change in long-term development plans at this former gravel pit, the contract was terminated in September 2007.

In June 2006, a beneficial use of biosolids program (PenGrow) was launched, serving three markets:

- residential
- residential/commercial
- municipal/public works

The program is operated under the BC Organic Matter Recycling Regulation (OMRR) which is enabled by the Province under the Environmental Management Act and the Health Act.

PenGrow Program

As a pilot program, the PenGrow product was cured at the CRD Hartland landfill facility and then distributed free to customers. Due to the limited space available for curing the material, the production of PenGrow was limited to about 180 tonnes per year, which represents only 5% of the 3,500 tonnes of residual solids produced annually. The program was well received by the general public with over 1,000 customers utilizing the product each year since 2008.

Recent CRD Decisions on Biosolids

The CRD is planning a new secondary wastewater treatment plant to serve the Core Area of Greater Victoria. The Core Area is made up of seven municipalities, including the two largest - Victoria and Saanich. As part of the planning, a Core Area Liquid Waste Management Plan was developed, as required by the Ministry of Environment, and approved which prohibits the land application of biosolids produced by the future treatment plant.

While the SPWWTP is located outside the Core Area and is not covered by the Core Area plan, the CRD Board at its meeting of 13 July 2011 passed the following motions which do have an impact on the management of sludge/biosolids at the SPWWTP, and in particular on the PenGrow Program, which used the CRD owned Hartland landfill property to cure and distribute the biosolids:

1. That the CRD will harmonize current and long-term practices at all CRD-owned regional facilities and parks with the approved policies of the regional treatment strategy, including ending the production, storage and distribution of biosolids for land application at all CRD facilities and parks.

2. That the CRD does not support the application of biosolids on farmland in the CRD under any circumstances and let this policy be reflected in the upcoming Regional Sustainability Strategy.

Wastewater treatment and related services on the Saanich Peninsula are operated under the "*Saanich Peninsula Liquid Waste Management Plan*" (SPLWMP). The CRD Board has delegated authority to the Saanich Peninsula Wastewater Commission for decisions related to operational and administrative actions, including the management of the SPLWMP.

Therefore, in order to find a suitable beneficial use for the biosolids, the Saanich Peninsula Wastewater Commission at their November 10, 2011 meeting directed staff to proceed with an invitation for "Expressions of Interest" to identify any potential parties, companies or end users that may be interested in utilizing Saanich Peninsula sludge/biosolids.

Saanich Peninsula Wastewater Treatment Process

The Saanich Peninsula wastewater treatment plant is a secondary treatment facility utilizing conventional activated sludge processing with two flow trains. The process components are as follows:

- 6mm bar screens
- primary clarifiers
- oxidation/aeration basins
- secondary clarifiers
- primary and secondary sludge blend tank
- gravity belt thickener
- rotary dewatering press
- RDP lime and heat pasteurization biosolids treatment process

List of Additional Information Provided

The following documents related to this Call for Expressions of Interest may be viewed online at www.crd.bc.ca/biosolids, where a link to these documents will be provided. The documents are also available at CRD offices at 625 Fisgard Street, Victoria, BC.

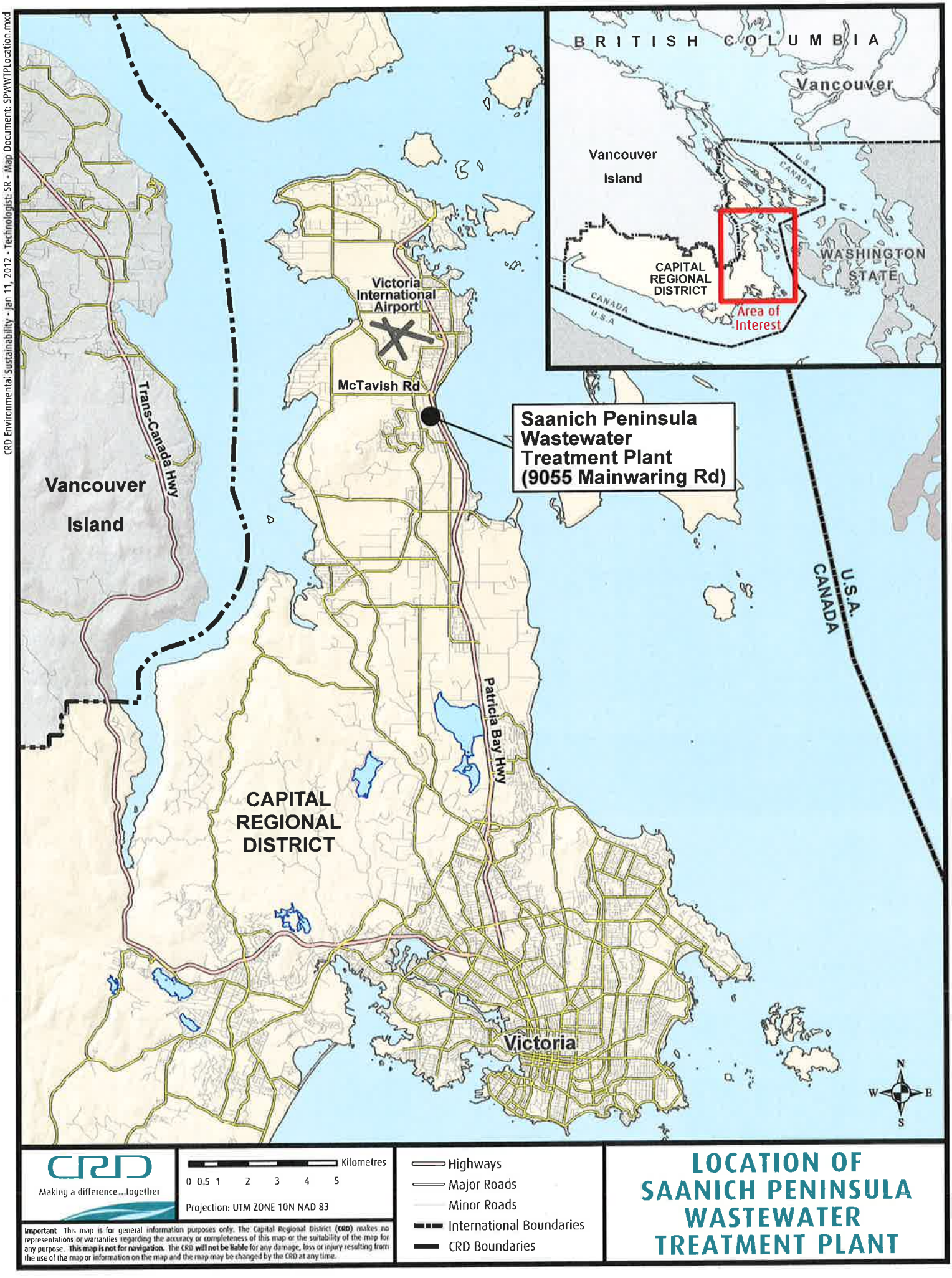
1. Saanich Peninsula Wastewater Treatment Plant, Location Map
2. Saanich Peninsula Wastewater Treatment Plant, Facility Description Pamphlet
3. PenGrow Product Brochure
4. Lab Results of Typical Sludge and Class A Biosolids
5. Saanich Peninsula Liquid Waste Management Plan
6. Core Area Wastewater Treatment Program, Biosolids Management Plan

Information to be Provided in Submission

Sufficient information should be provided in response to this Call for Expressions of Interest to enable the evaluation of submissions and develop a short-list of those to be invited to submit detailed proposals. The information should include the following:

- a description of the proposed use of the available Class A biosolids or untreated sludge produced at the Saanich Peninsula wastewater treatment plant
- a description of the organization's and/or individual's experience in managing biosolids, with details of project locations, quantity and quality of material, length of time in operation, markets for the product, and public relations and regulatory environment
- an indication of the respondent's local knowledge, including knowledge of the history of biosolids management in Greater Victoria and of potential opportunities for marketing the biosolids on Vancouver Island or at other locations
- resumes of key personnel who would be involved in the project with information on their role and extent of involvement

- contact information including mailing address, email addresses and telephone numbers of individuals that can be contacted if supplementary information is required


CRD Environmental Sustainability - Jan 11, 2012 - Technologist: SR - Map Document: SPWWTPLocation.mxd
BRITISH COLUMBIA
Vancouver
Vancouver Island
U.S.A.
CANADA
CAPITAL REGIONAL DISTRICT
WASHINGTON STATE
Area of Interest
Victoria International Airport
McTavish Rd
Saanich Peninsula Wastewater Treatment Plant (9055 Mainwaring Rd)
Trans-Canada Hwy
Vancouver Island
Patricia Bay Hwy
CAPITAL REGIONAL DISTRICT
U.S.A.
CANADA
Victoria
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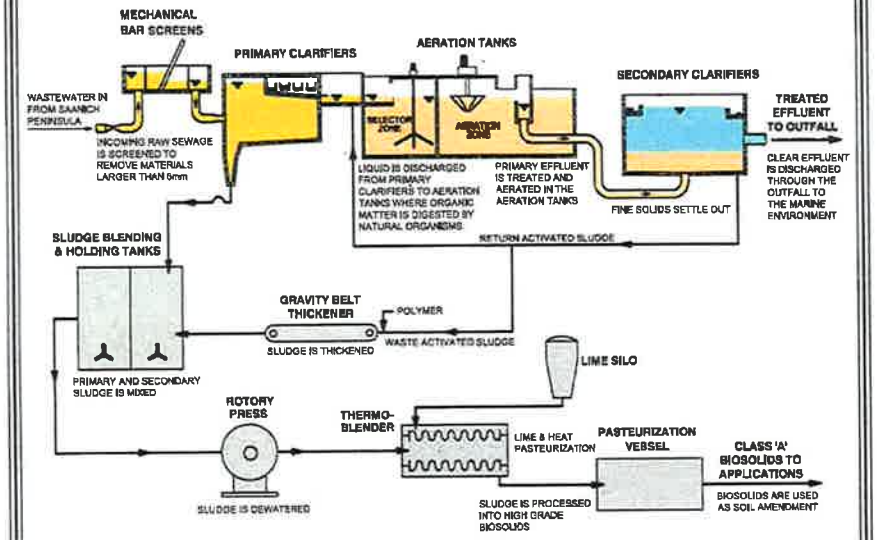
Making a difference...together
Kilometres
0 0.5 1 2 3 4 5
Projection: UTM ZONE 10N NAD 83
Important This map is for general information purposes only. The Capital Regional District (CRD) makes no representations or warranties regarding the accuracy or completeness of this map or the suitability of the map for any purpose. This map is not for navigation. The CRD will not be liable for any damage, loss or injury resulting from the use of the map or information on the map and the map may be changed by the CRD at any time.
Highways
Major Roads
Minor Roads
International Boundaries
CRD Boundaries
LOCATION OF SAANICH PENINSULA WASTEWATER TREATMENT PLANT



PROCESS FLOW DIAGRAM

TREATMENT PROCESS

DESIGN BASIS FOR THE TREATMENT PLANT:

• Influent flow	
– Average annual	18,150 m^3/day
– Maximum day	36,300 m^3/day
• Permitted final effluent	
– Biochemical oxygen demand	45 mg/L
– Total suspended solids	45 mg/L
• Current population served	Over 35,000
• Maximum population capacity	50,000
• Total project cost (includes pipelines, pump stations, treatment plant & outfall)	$33,000,000
• Treatment plant cost (included in the above)	$20,000,000

CAPITAL REGIONAL DISTRICT

SAANICH PENINSULA WASTEWATER TREATMENT PLANT

CRD

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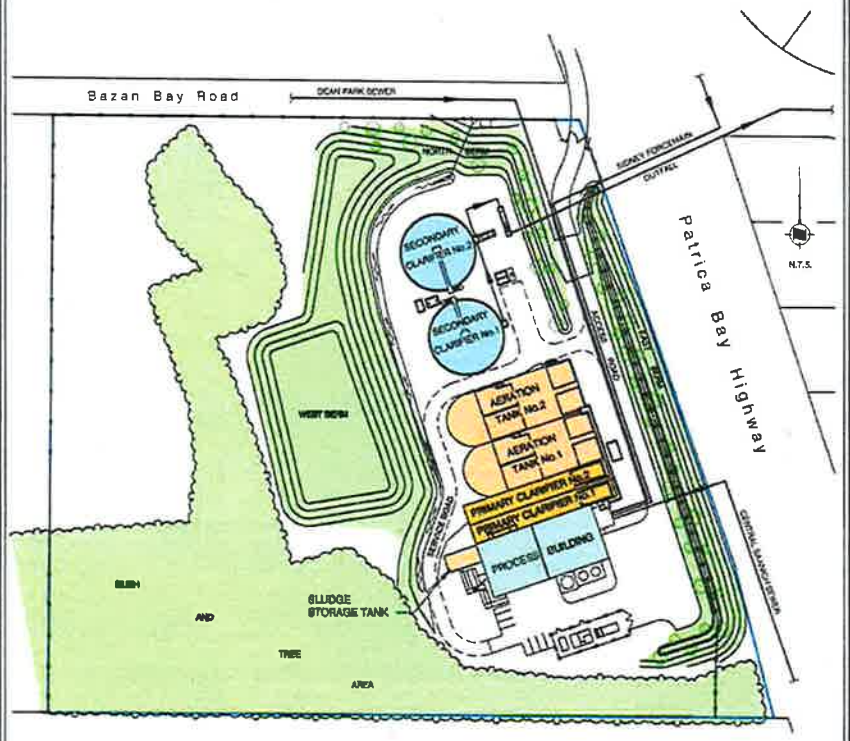

SITE PLAN

CAPITAL REGIONAL DISTRICT
SAANICH PENINSULA WASTEWATER TREATMENT PLANT

PROJECT DEVELOPMENT

- A 1991 study concluded that a new wastewater treatment plant was needed on the Saanich Peninsula to replace three older plants that were either out of permit or expensive to operate.
- The big question was: Where should the plant be located?
- After assessing eleven sites over a period of four years (1992 – 1996) the Bazan Bay Road site was selected and rezoned by North Saanich Council.
- An alternative access road to the site was constructed off Mainwaring Road.
- The project was approved by the Minister of Environment in November 1996, and with the receipt of a 50% Provincial Grant, the system design was commenced in 1997.
- Construction of the plant began in early 1998 and was completed within budget by the end of 1999.
- The plant began to treat sewage in early February 2000 and the transition to the new plant was complete by mid February.

LIQUID PROCESS CONSISTS OF THE FOLLOWING FOUR PROCESSES:

SCREENS

- The influent wastewater is passed through a 6mm traveling screen to remove bulk solids. The screenings are washed, compacted and removed for disposal to the landfill. The screened wastewater proceeds to primary clarifiers.

PRIMARY CLARIFIERS

- Wastewater enters two rectangular tanks. Solids that settle to the bottom of the tanks are removed to the solids blend tank and the liquid effluent proceeds to the aeration tanks.

AERATION TANKS

- Wastewater is treated in one of the two aeration tanks. Each tank biologically treats the sewage.

SECONDARY CLARIFIERS

- The final process takes place in the two secondary clarifiers. Solids that settle on the bottom of the tanks are either returned to the aeration tanks or to the gravity belt thickener. Final effluent leaving the secondary clarifiers is discharged out the 1.5 kilometre marine outfall.

SOLID PROCESS CONSISTS OF THE FOLLOWING THREE PROCESSES:

GRAVITY BELT THICKENER

- Secondary sludge is thickened on the gravity belt and then sent to the sludge blend tank.

DEWATERING PRESS

- Blended primary and secondary sludge is removed from the blend tank. Water is removed by the press. The solids are sent to the lime stabilization/pasteurization process.

LIME STABILIZATION / PASTEURIZATION

- In this final process, lime is added to the dewatered sludge and is heated to 70°C for 30 minutes. The end product is a posteurized biosolid which meets the USEPA 40 CFR Part 503 and Canadian regulatory criteria for pathogen and vector attraction reduction levels and can be used as an unrestricted soil conditioner.

PenGrow

All Natural Soil Enhancer

- The smart, safe approach to all of your gardening needs.
- PenGrow Soil Enhancer can be picked up at Hartland Landfill.

Before: poor soil and lawn.

After: lush soil and lawn.

Good for flower gardens.

Flowers after PenGrow application.

PenGrow

Manufactured by:

Saanich Peninsula Wastewater Treatment Plant
9055 Mainwaring Road
North Saanich, BC

For more information, contact:
CRD Hotline: 250.360.3030

CRD
Making a difference...together

PenGrow

Soil Enhancer

Feed the soil...not the plant

What is PenGrow?

It is an all-natural, biosolids base soil enhancer. It is similar to a high pH soil conditioner that you would apply to your lawn or garden. PenGrow is produced at the Saanich Peninsula wastewater treatment plant. The solids from the wastewater treatment process are pasteurized to destroy pathogens and lime is added to prevent bacteria from re-growing.

This is a safe product: it meets and exceeds the United States Environmental Protection Agency 40 CFR Part 503 and BC Organic Matter Recycling Regulation for heavy metals, pathogen and vector attraction reduction levels.

Its nutrients are released gradually over a long period of time. PenGrow is water insoluable. It does not dissolve in water. It slowly releases nutrients into the soil at a rate that the plants absorb.

Free samples.

Easy to apply.

Nutrients value

This product contains about 20 % lime (Calcium) and 50 % moisture. They have a pH of 12.5; contain 0.5% Phosphorus and approximately 2.5% Nitrogen on a dry weight basis.

How to apply

The product should be applied on your lawn by hand and raked in evenly. For flower beds and gardens, it is best to incorporate PenGrow into the soil. It is best to apply this product when the ground is dry. Do not apply if heavy rain is forecast. This product is alkaline in nature: do not apply to acid-loving plants such as rhododendrons and blueberries.

PenGrow prescribes to the old organic gardening motto "feed the soil, not the plant." Most fertilizers when applied, are not in a form that the plant can use. It takes the indigenous micro-flora and micro-fauna of the soil to break down the nutrients into a soluable form. PenGrow feeds and supports these microrganisms creating a warehouse of available nutrients that lasts long after the product is gone. It also rebuilds the tilth and humus (also known as topsoil) and provides needed minerals to the plant, something most chemical-based fertilizers do not do. Usually, only one application is required yearly.

Special handling instructions

This product contains lime, which is good for soil, but can irritate your skin. Treat this product like any other commercial fertilizer or liming agent, wear gloves when handling the material and wash your hands after use. If this product comes in contact with your eyes or mouth, rinse thoroughly with water.

Happy gardener — user of PenGrow since 2006.

PenGrow vs Chemical Fertilizers

Most high nitrogen chemical fertilizers are made from petroleum or natural gas products. Although these products are very fast acting, and show an instant greening of the grass, they are a water soluable fertilizer. There is a downfall to this type of fertilizer. Fertilizers with a fast release, water soluable nitrogen are prone to leaching of the nitrates into the ground water table. This causes future problems for the environment. These fertilizers require more frequent applications due to wash off from watering of lawns, rain, etc.

PenGrow on the other hand, is a product developed through an RDP EnVessel Pasteurization System. PenGrow is a soil enhancer which has a slower nitrogen release rate. This means the application will last a longer period of time. Because PenGrow contains a greater amount of water insoluable nitrogen, nitrates are much less likely to leach into the ground water table. When fertilizing your lawn with PenGrow, burning the grass is also much less likely. This is due to the slower time release that is experienced by fertilizing organically.

Saanich Peninsula Waste Water Treatment Plant
Sludge Report - 2005

Calculations Sheet

CRD Environmental Services - Environmental Programs

Regulated Parameters	Class A Biosolids Limits* (mg/kg)	Number of Data Points		Average **	Standard Deviation **	Coefficent of Variance **	Min	Max	Comments
		Total	< Detection						
Metals									
arsenic	75	7	5	n/a	n/a	n/a	0.566	<15	
cadmium	20	7		2.4	0.59	24%	2	3.7	
chromium	1060	7		14	2	17%	10	16.5	
cobalt	150	7	6	n/a	n/a	n/a	<2	<6	
copper	2200	7		435	75	17%	325	522	
lead	500	7	7	n/a	n/a	n/a	<50	<150	
mercury	5	7		0.67	0.27	40%	0.406	1.16	
molybdenum	20	7	5	n/a	n/a	n/a	<4	<12	
nickel	180	7		19.6	4	21%	14	26.4	
selenium	14	7	2	2.1	0.51	24%	<2	<4	
zinc	1850	7		242	40	16%	183	310	
Unregulated Parameters									
Conventionals									
pH (pH Units)	n/a	6		6.18	0.27	4%	5.92	6.59	
Measurement									
moisture (%)	n/a	7		76	3	4%	73.4	80.9	
Metals									
aluminum	n/a	7		4837	1106	23%	3810	6880	
antimony	n/a	7	7	n/a	n/a	n/a	<10	<30	
barium	n/a	7		160	39	24%	113	219	
beryllium	n/a	7	7	n/a	n/a	n/a	<0.5	<1.5	
bismuth	n/a	7	7	n/a	n/a	n/a	<20	<60	
calcium	n/a	7		10997	2153	20%	7760	14900	
iron	n/a	7		3154	1374	44%	2320	6110	
lithium	n/a	7	6	n/a	n/a	n/a	<2	<6	
magnesium	n/a	7		5293	2084	39%	3120	9290	
manganese	n/a	7		78	29	37%	57	138	
phosphorus	n/a	7		16800	3946	23%	12100	24400	
potassium	n/a	7		4387	1051	24%	3140	6110	
silver	n/a	7	3	3	1	40%	2	<6	
sodium	n/a	6		762	304	40%	450	1150	
strontium	n/a	7		69.8	22	31%	40.1	101	
thallium	n/a	7	7	n/a	n/a	n/a	<1	<50	
tin	n/a	7	1	12	4	29%	10	16	
titanium	n/a	7		23	4	15%	18	28	
vanadium	n/a	7	2	5	3	72%	2.4	11.3	

**From Organic Matter Recycling Regulation (February 5, 2002)*

***For this calculation, individual concentrations below the detection limit were replaced by a value of half the detection limit*

Saanich Peninsula Waste Water Treatment Plant
Sludge Report - 2005

Summary Sheet

CRD Environmental Services - Environmental Programs

Regulated Parameters	Class A Biosolids Limits (mg/kg)*	June 2005	July 2005	August 2005	September 2005	October 2005	November 2005	December 2005					
Metals													
arsenic	75	< 10	6.4	< 5	< 15	0.57	< 10	< 5					
cadmium	20	2.4	2.0	2.1	2.2	3.7	2.2	2.18					
chromium	1060	13.3	16.4	16.5	15.0	16.2	13.1	10.0					
cobalt	150	< 4	< 2	3.3	< 6	< 2	< 4	< 2					
copper	2200	476	485	459	464	522	325	335					
lead	500	< 100	< 50	< 50	< 150	< 50	< 100	< 50					
mercury	5	0.675	0.497	0.501	0.406	1.160	0.557	0.921					
molybdenum	20	< 8	< 4	< 4	< 12	4.2	< 8	4.3					
nickel	180	23	19.1	26.4	18	20.6	16	14					
selenium	14	2.4	2.3	< 2	2.5	2.36	< 4	2.2					
zinc	1850	241	255	232	260	310	213	183					
Unregulated Parameters													
Conventionals													
pH (pH Units)	n/a	6.6	6.0	6.1	6.4		6.1	5.9					
Measurement													
moisture (%)	n/a	76.8	73.7	75.8	77.1	73.6	73.4	80.9					
Metals													
aluminum	n/a	4620	4480	6880	4400	5770	3900	3810					
antimony	n/a	< 20	< 10	< 10	< 30	< 20	< 20	< 10					
barium	n/a	189	183	219	156	113	138	120					
beryllium	n/a	< 1.0	< 0.5	< 0.5	< 1.5	< 0.5	< 1.0	< 0.5					
bismuth	n/a	< 40	< 20	< 20	< 60	< 20	< 40	< 20					
calcium	n/a	11800	11200	9920	14900	10900	7760	10500					
iron	n/a	2850	2320	6110	3550	2400	2350	2500					
lithium	n/a	< 4	< 2	5.6	< 6	< 2	< 4	< 2					
magnesium	n/a	5340	4790	6280	9290	3290	3120	4940					
manganese	n/a	76.9	57.0	92.0	138.0	57.9	61.6	65.9					
phosphorus	n/a	18600	15300	16300	24400	14000	12100	16900					
potassium	n/a	5170	3460	4290	6110	3670	3140	4870					
silver	n/a	< 4	3.4	5.2	< 6	2.8	< 4	2.0					
sodium	n/a	750	1110	610	1150		450	500					
strontium	n/a	101	81	82	82	76	46	40					
thallium	n/a	< 1	< 1	< 1	< 1	< 50	< 1	< 1					
tin	n/a	16	16	10.7	< 15	16	10	10.4					
titanium	n/a	25.4	24.8	26.0	22.1	20.1	16.0	25.9					
vanadium	n/a	7	3	11	< 6	4	< 4	2					

**From Organic Matter Recycling Regulation (February 5, 2002)*

Saanich Peninsula Waste Water Treatment Plant
Biosolids Report - 2009

Sample Results

CRD Environmental Services - Scientific Programs

	Class A Biosolids Limits (mg/kg)*	04-Mar-09	06-Mar-09	10-Mar-09	11-Mar-09	12-Mar-09	09-Jun-09	10-Jun-09	11-Jun-09	11-Aug-09	12-Aug-09	13-Aug-09	22-Sep-09	23-Sep-09	25-Sep-09	29-Sep-09
Regulated Parameters																
Biologicals																
Fecal coliforms (MPN/100g)	1000	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Glicbodera rostochiensis (#/100 g	n/a	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metals																
Arsenic	75	< 10	< 15	< 10	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 12	< 10
Cadmium	20	< 1	< 1.5	< 1	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1
Cobalt	150	< 4	< 6	< 4	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 4
Lead	500	6.1	3.7	5.3	5.1	4.7	7.2	6.4	5.2	7.1	8	8.5	5.9	4.9	6.4	7.6
Mercury	5	0.156	0.087	0.154	0.178	0.155	0.27	0.245	0.249	0.186	0.208	0.26	0.222	0.114	0.171	0.218
Molybdenum	20	2.39	2.4	2.61	2.77	2.56	2.75	2.99	2.6	3.35	3.65	3.9	2.33	2.6	2.77	2.86
Nickel	180	< 10	< 15	< 10	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 10
Selenium	14	< 4	< 6	< 5	< 6	< 6	1.43	1.43	1.1	< 6	< 6	< 6	< 6	< 6	< 6	< 5
Zinc	1850	109	77.1	103	100	95.2	127	145	108	134	171	176	132	127	142	151
Unregulated Parameters																
Conventionals																
pH	n/a	12.3	12.3	12.3	12.3	12.2	12.25	12.25	12.26	12.34	12.31	12.3	12.26	12.27	12.19	12.18
Measurement																
Moisture	n/a	52.7	52.8	56.3	58.8	56.3	54.6	55.6	55.4	59.4	58	57.8	47.2	50.6	49.8	55.8
Metals																
Aluminum	n/a	2300	1810	1900	1780	1970	2100	2340	2320	1800	1860	2120	2150	1730	2200	2300
Antimony	n/a	< 20	< 30	< 20	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 20
Barium	n/a	33.9	21.3	31.7	30.9	25	54	57.4	50.9	39.5	52	51.2	40.3	34.8	44.1	55.9
Beryllium	n/a	< 1	< 1.5	< 1	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1
Bismuth	n/a	< 40	< 60	< 40	< 60	< 60	< 60	< 60	< 60	< 60	< 60	< 60	< 60	< 60	< 60	< 40
Calcium	n/a	323000	386000	337000	290000	331000	311000	288000	339000	321000	271000	255000	304000	310000	306000	249000
Chromium	n/a	< 4	< 6	< 4	< 6	< 6	7.7	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	6.3
Copper	n/a	197	156	209	210	187	236	254	229	248	305	310	176	175	200	227
Iron	n/a	1840	1400	1360	1260	1350	2190	1920	1520	1490	1610	1850	1750	1370	1840	1830
Lithium	n/a	< 4	< 6	< 4	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 4
Magnesium	n/a	2810	2910	2820	2410	2660	2560	2810	2810	2700	2470	2320	2490	2490	2490	2170
Manganese	n/a	68.4	55.5	64.8	60.5	58.2	68.7	71.9	68	50.4	58.7	52.4	42.8	40.7	44.5	45.4
Phosphorus, dissolved	n/a	3110	2900	3080	3950	2680	3010	2950	3040	3410	3010	3250	2120	2190	2200	2730
Phosphorus, total	n/a	4080	2830	4170	4160	3660	3810	4040	3420	3570	4140	4300	2879	2810	3050	3840
Potassium	n/a	1160	880	1280	1240	1200	730	790	810	830	900	950	645	< 600	650	850
Silver	n/a	< 4	< 6	< 4	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 4
Sodium	n/a	< 400	< 600	< 400	< 600	< 600	< 600	< 600	< 600	< 600	< 600	< 600	< 600	< 600	< 600	< 400
Strontium	n/a	681	775	693	607	675	709	681	761	781	678	858	735	746	764	634
Thallium	n/a	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tin	n/a	< 10	< 15	< 10	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 10
Titanium	n/a	13.2	14.6	11.9	14.5	14	17.2	18.3	16.8	22.2	18.5	17.8	9.3	9.1	9.4	8.1
Vanadium	n/a	< 4	< 6	< 4	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	8.7	< 6	< 6	6.6
Nutrients	n/a															
Nitrogen - ammonia	n/a	104	88	107	101	113	58.3	55.5	54.7	40.4	32.6	36.4	72.7	79.3	79.8	71.9
Nitrogen - nitrate	n/a	28.2	23.4	18.4	23	22.2	6.7	7.8	8.2	14.7	14.8	18.9	8.5	12.5	17.7	14
Nitrogen - total Kjeldahl	n/a	1.93	1.66	1.94	2.13	1.83	1.63	1.89	1.65	1.89	2.03	1.93	1.29	1.25	1.37	1.7
Nitrogen - total	n/a	1.78	1.7	2.14	2.3	2.15	1.77	2.12	1.8	1.32	1.48	1.27	1.4	1.25	1.34	1.43

*From Organic Matter Recycling Regulation (February 5, 2002)

Saanich Peninsula Waste Water Treatment Plant
Biosolids Report - 2009

Summary Stats

CRD Environmental Services - Scientific Programs

Regulated Parameters	Class A Biosolids Limits* (mg/kg)	Number of Data Points		Average **	Standard Deviation **	Coefficent of Variance **	Min	Max	Comments
		Total	< Detection						
Biologicals									
Fecal coliforms (MPN/100g)	1000	15	15	n/a	n/a	n/a	<20	<20	
Globodera rostochiensis (#/100 g)	n/a	15	15	n/a	n/a	n/a	nd	nd	
Metals									
Arsenic	75	15	15	n/a	n/a	n/a	<10	<15	
Cadmium	20	15	15	n/a	n/a	n/a	<1	<1.5	
Cobalt	150	15	15	n/a	n/a	n/a	<4	<8	
Lead	500	15		6.1	1.4	22%	3.7	8.5	
Mercury	5	15		0.19	0.05	28%	0.087	0.27	
Molybdenum	20	15		2.8	0.5	16%	2.33	3.9	
Nickel	180	15	15	n/a	n/a	n/a	<10	<15	
Selenium	14	15	12	n/a	n/a	n/a	1.1	<8	
Zinc	1850	15		126.5	28.1	22%	77.1	178	
Unregulated Parameters									
Conventionals									
pH	n/a	15		12.27	0.05	0%	12.18	12.34	
Measurement									
Moisture	n/a	15		54.7	3.5	6%	47.2	59.4	
Metals									
Aluminum	n/a	15		2045	221	11%	1730	2340	
Antimony	n/a	15	15	n/a	n/a	n/a	<20	<30	
Barium	n/a	15		41.5	11.7	28%	21.3	57.4	
Beryllium	n/a	15	15	n/a	n/a	n/a	<1	<1.5	
Bismuth	n/a	15	15	n/a	n/a	n/a	<40	<60	
Calcium	n/a	15		309733	34761	11%	249000	386000	
Chromium	n/a	15	13	n/a	n/a	n/a	<4	6.3	
Copper	n/a	15		221	45	20%	158	310	
Iron	n/a	15		1640	270	16%	1260	2190	
Lithium	n/a	15	15	n/a	n/a	n/a	<4	<6	
Magnesium	n/a	15		2575	207	8%	2170	2910	
Manganese	n/a	15		58.2	10.5	19%	40.7	71.9	
Phosphorus, dissolved	n/a	15		2922	481	16%	2120	3950	
Phosphorus, total	n/a	15		3637	533	15%	2810	4300	
Potassium	n/a	15	1	887	261	29%	<600	1280	
Silver	n/a	15	15	n/a	n/a	n/a	<4	<6	
Sodium	n/a	15	15	n/a	n/a	n/a	<400	<600	
Strontium	n/a	15		706	54	8%	607	791	
Thallium	n/a	15	15	n/a	n/a	n/a	<0.5	<0.5	
Tin	n/a	15	15	n/a	n/a	n/a	<10	<15	
Titanium	n/a	15		14.3	4.2	29%	8.1	22.2	
Vanadium	n/a	15	13	n/a	n/a	n/a	<4	6.7	
Nutrients									
Nitrogen - ammonia	n/a	15		72.9	26.2	36%	32.6	113	
Nitrogen - nitrate	n/a	15		15.6	6.2	40%	6.7	26.2	
Nitrogen - total Kjeldahl	n/a	15		1.74	0.27	15%	1.25	2.13	
Nitrogen - total	n/a	15		1.7	0.4	21%	1.25	2.3	

**From Organic Matter Recycling Regulation (February 5, 2002)*

***For this calculation, individual concentrations below the detection limit were replaced by a value of half the detection limit*

Saanich Peninsula Waste Water Treatment Plant
Biosolids Report - 2009

Sampled
March 4, 2009

Composite sample collected March 4. A grab sample was sent on March 6 for fecal coliform and golden nematode testing.

CRD Environmental Services - Scientific Programs

Regulated Parameters	Class A Biosolids Limits* (mg/kg dry wt.)	Result (mg/kg dry wt.)	Comments
Biologicals			
Fecal coliforms (MPN/100g)	1000	< 20	
Globodera rostochiensis (#/100 g)	n/a	nd	
Metals			
Arsenic	75	< 10	
Cadmium	20	< 1	
Cobalt	150	< 4	
Lead	500	6.1	
Mercury	5	0.158	
Molybdenum	20	2.39	
Nickel	180	< 10	
Selenium	14	< 4	
Zinc	1850	109	
Unregulated Parameters			
Conventionals			
pH	n/a	12.3	
Measurement			
Moisture	n/a	52.7	
Metals			
Aluminum	n/a	2300	
Antimony	n/a	< 20	
Barium	n/a	33.9	
Beryllium	n/a	< 1	
Bismuth	n/a	< 40	
Calcium	n/a	323000	
Chromium	n/a	< 4	
Copper	n/a	197	
Iron	n/a	1840	
Lithium	n/a	< 4	
Magnesium	n/a	2810	
Manganese	n/a	68.4	
Phosphorus, dissolved	n/a	3110	
Phosphorus, total	n/a	4080	
Potassium	n/a	1160	
Silver	n/a	< 4	
Sodium	n/a	< 400	
Strontium	n/a	681	
Thallium	n/a	< 0.5	
Tin	n/a	< 10	
Titanium	n/a	13.2	
Vanadium	n/a	< 4	
Nutrients			
Nitrogen - ammonia	n/a	104	
Nitrogen - nitrate	n/a	26.2	
Nitrogen - total Kjeldahl	n/a	1.93	
Nitrogen - total	n/a	1.78	

**From Organic Matter Recycling Regulation (February 5, 2002)*

ESIS Project #: 1072 *ESIS ID#: 2009-30-059*

Saanich Peninsula Waste Water Treatment Plant
Biosolids Report - 2009

Sampled
March 10, 2009

Composite sample collected March 10. A grab sample was sent on March 10 for fecal coliform and golden nematode testing.

CRD Environmental Services - Scientific Programs

Regulated Parameters	Class A Biosolids Limits* (mg/kg dry wt.)	Result (mg/kg dry wt.)	Comments
Biologicals			
Fecal coliforms (MPN/100g)	1000	< 20	
Globodera rostochiensis (#/100 g)	n/a	nd	
Metals			
Arsenic	75	< 10	
Cadmium	20	< 1	
Cobalt	150	< 4	
Lead	500	5.3	
Mercury	5	0.154	
Molybdenum	20	2.61	
Nickel	180	< 10	
Selenium	14	< 5	
Zinc	1850	103	
Unregulated Parameters			
Conventionals			
pH	n/a	12.3	
Measurement			
Moisture	n/a	56.3	
Metals			
Aluminum	n/a	1900	
Antimony	n/a	< 20	
Barium	n/a	31.7	
Beryllium	n/a	< 1	
Bismuth	n/a	< 40	
Calcium	n/a	337000	
Chromium	n/a	< 4	
Copper	n/a	206	
Iron	n/a	1380	
Lithium	n/a	< 4	
Magnesium	n/a	2820	
Manganese	n/a	64.8	
Phosphorus, dissolved	n/a	3080	
Phosphorus, total	n/a	4170	
Potassium	n/a	1280	
Silver	n/a	< 4	
Sodium	n/a	< 400	
Strontium	n/a	692	
Thallium	n/a	< 0.5	
Tin	n/a	< 10	
Titanium	n/a	11.9	
Vanadium	n/a	< 4	
Nutrients			
Nitrogen - ammonia	n/a	107	
Nitrogen - nitrate	n/a	18.4	
Nitrogen - total Kjeldahl	n/a	1.94	
Nitrogen - total	n/a	2.14	

*From Organic Matter Recycling Regulation (February 6, 2002)

ESIS Project #: 1072 ESIS ID#: 2009-30-001

Saanich Peninsula Waste Water Treatment Plant
Biosolids Report - 2009

Sampled
March 12, 2009

Composite sample collected March 12. A grab sample was sent on March 12 for fecal coliform and golden nematode testing.

CRD Environmental Services - Scientific Programs

Regulated Parameters	Class A Biosolids Limits* (mg/kg dry wt.)	Result (mg/kg dry wt.)	Comments
Biologicals			
Fecal coliforms (MPN/100g)	1000	< 20	
Globodera rostochiensis (#/100 g)	n/a	nd	
Metals			
Arsenic	75	< 15	
Cadmium	20	< 1.5	
Cobalt	1060	< 6	
Lead	150	4.7	
Mercury	2200	0.155	
Molybdenum	500	2.56	
Nickel	5	< 15	
Selenium	20	< 6	
Zinc	180	95.2	
Unregulated Parameters			
Conventionals			
pH	n/a	12.2	
Measurement			
Moisture	n/a	56.3	
Metals			
Aluminum	n/a	1970	
Antimony	n/a	< 30	
Barium	n/a	25	
Beryllium	n/a	< 1.5	
Bismuth	n/a	< 60	
Calcium	n/a	331000	
Chromium	n/a	< 6	
Copper	n/a	187	
Iron	n/a	1350	
Lithium	n/a	< 6	
Magnesium	n/a	2660	
Manganese	n/a	58.2	
Phosphorus, dissolved	n/a	2880	
Phosphorus, total	n/a	3660	
Potassium	n/a	1200	
Silver	n/a	< 6	
Sodium	n/a	< 600	
Strontium	n/a	675	
Thallium	n/a	< 0.5	
Tin	n/a	< 15	
Titanium	n/a	14	
Vanadium	n/a	< 6	
Nutrients			
Nitrogen - ammonia	n/a	113	
Nitrogen - nitrate	n/a	22.2	
Nitrogen - total Kjeldahl	n/a	1.83	
Nitrogen - total	n/a	2.15	

*From Organic Matter Recycling Regulation (February 8, 2002)

ESIS Project #: 1072 ESIS ID#: 2009-30-086

Saanich Peninsula Waste Water Treatment Plant
Biosolids Report - 2009

Sampled
June 10, 2009

Composite sample collected June 10. A grab sample was sent on June 10 for fecal coliform and golden nematode testing.

CRD Environmental Services - Scientific Programs

Regulated Parameters	Class A Biosolids Limits* (mg/kg dry wt.)	Result (mg/kg dry wt.)	Comments
Biologicals			
Fecal coliforms (MPN/100g)	1000	< 20	
Globodera rostochiensis (#/100 g)	n/a	nd	
Metals			
Arsenic	75	< 15	
Cadmium	20	< 1.5	
Cobalt	1060	< 6	
Lead	150	6.4	
Mercury	2200	0.245	
Molybdenum	500	2.99	
Nickel	5	< 15	
Selenium	20	1.43	
Zinc	180	146	
Unregulated Parameters			
Conventionals			
pH	n/a	12.25	
Measurement			
Moisture	n/a	55.6	
Metals			
Aluminum	n/a	2340	
Antimony	n/a	< 30	
Barium	n/a	57.4	
Beryllium	n/a	< 1.5	
Bismuth	n/a	< 60	
Calcium	n/a	298000	
Chromium	n/a	< 6	
Copper	n/a	254	
Iron	n/a	1920	
Lithium	n/a	< 6	
Magnesium	n/a	2510	
Manganese	n/a	71.9	
Phosphorus, dissolved	n/a	2950	
Phosphorus, total	n/a	4040	
Potassium	n/a	790	
Silver	n/a	< 6	
Sodium	n/a	< 600	
Strontium	n/a	681	
Thallium	n/a	< 0.5	
Tin	n/a	< 15	
Titanium	n/a	18.3	
Vanadium	n/a	< 6	
Nutrients			
Nitrogen - ammonia	n/a	55.6	
Nitrogen - nitrate	n/a	7.8	
Nitrogen - total Kjeldahl	n/a	1.89	
Nitrogen - total	n/a	2.12	

*From Organic Matter Recycling Regulation (February 5, 2002)

ESIS Project #: 1072 ESIS ID#: 2009-30-167

Saanich Peninsula Waste Water Treatment Plant
Biosolids Report - 2009

Sampled
August 11, 2009

Composite sample collected August 11. A grab sample was sent on August 11 for fecal coliform and golden nematode testing.

CRD Environmental Services - Scientific Programs

Regulated Parameters	Class A Biosolids Limits* (mg/kg dry wt.)	Result (mg/kg dry wt.)	Comments
Biologicals			
Fecal coliforms (MPN/100g)	1000	< 20	
Globodera rostochiensis (#/100 g)	n/a	nd	
Metals			
Arsenic	75	< 15	
Cadmium	20	< 1.5	
Cobalt	1060	< 6	
Lead	150	7.1	
Mercury	2200	0.186	
Molybdenum	500	3.35	
Nickel	5	< 15	
Selenium	20	< 6	
Zinc	180	134	
Unregulated Parameters			
Conventionals			
pH	n/a	12.34	
Measurement			
Moisture	n/a	59.4	
Metals			
Aluminum	n/a	1800	
Antimony	n/a	< 30	
Barium	n/a	39.5	
Beryllium	n/a	< 1.5	
Bismuth	n/a	< 60	
Calcium	n/a	321000	
Chromium	n/a	< 6	
Copper	n/a	248	
Iron	n/a	1490	
Lithium	n/a	< 6	
Magnesium	n/a	2700	
Manganese	n/a	50.4	
Phosphorus, dissolved	n/a	3410	
Phosphorus, total	n/a	3570	
Potassium	n/a	830	
Silver	n/a	< 6	
Sodium	n/a	< 600	
Strontium	n/a	791	
Thallium	n/a	< 0.5	
Tin	n/a	< 15	
Titanium	n/a	22.2	
Vanadium	n/a	< 6	
Nutrients			
Nitrogen - ammonia	n/a	40.4	
Nitrogen - nitrate	n/a	14.7	
Nitrogen - total Kjeldahl	n/a	1.89	
Nitrogen - total	n/a	1.32	

*From Organic Matter Recycling Regulation (February 5, 2002)

ESIS Project #: 1072 ESIS ID#: 2009-10-222

Saanich Peninsula Waste Water Treatment Plant
Biosolids Report - 2009

Sampled
August 13, 2009

Composite sample collected August 13. A grab sample was sent on August 13 for fecal coliform and golden nematode testing.

CRD Environmental Services - Scientific Programs

Regulated Parameters	Class A Biosolids Limits* (mg/kg dry wt.)	Result (mg/kg dry wt.)	Comments
Biologicals			
Fecal coliforms (MPN/100g)	1000	< 20	
Globodera rostochiensis (#/100 g)	n/a	nd	
Metals			
Arsenic	75	< 15	
Cadmium	20	< 1.5	
Cobalt	1060	< 6	
Lead	150	8.5	
Mercury	2200	0.26	
Molybdenum	500	3.9	
Nickel	5	< 15	
Selenium	20	< 6	
Zinc	180	176	
Unregulated Parameters			
Conventionals			
pH	n/a	12.3	
Measurement			
Moisture	n/a	57.8	
Metals			
Aluminum	n/a	2120	
Antimony	n/a	< 30	
Barium	n/a	51.2	
Beryllium	n/a	< 1.5	
Bismuth	n/a	< 60	
Calcium	n/a	255000	
Chromium	n/a	< 6	
Copper	n/a	310	
Iron	n/a	1850	
Lithium	n/a	< 6	
Magnesium	n/a	2320	
Manganese	n/a	52.4	
Phosphorus, dissolved	n/a	3250	
Phosphorus, total	n/a	4300	
Potassium	n/a	950	
Silver	n/a	< 6	
Sodium	n/a	< 600	
Strontium	n/a	658	
Thallium	n/a	< 0.5	
Tin	n/a	< 15	
Titanium	n/a	17.8	
Vanadium	n/a	< 6	
Nutrients			
Nitrogen - ammonia	n/a	36.4	
Nitrogen - nitrate	n/a	15.9	
Nitrogen - total Kjeldahl	n/a	1.93	
Nitrogen - total	n/a	1.27	

*From Organic Matter Recycling Regulation (February 5, 2002)

ESIS Project #: 1072 ESIS ID#: 2009-30-226

Saanich Peninsula Waste Water Treatment Plant
Biosolids Report - 2009

Sampled
September 23, 2009

Composite sample collected Sept. 23. A grab sample was sent on Sept. 23 for fecal coliform and golden nematode testing.

CRD Environmental Services - Scientific Programs

Regulated Parameters	Class A Biosolids Limits* (mg/kg dry wt.)	Result (mg/kg dry wt.)	Comments
Biologicals			
Fecal coliforms (MPN/100g)	1000	< 20	
Globodera rostochiensis (#/100 g)	n/a	nd	
Metals			
Arsenic	75	< 15	
Cadmium	20	< 1.5	
Cobalt	1060	< 6	
Lead	150	4.9	
Mercury	2200	0.114	
Molybdenum	600	2.6	
Nickel	5	< 15	
Selenium	20	< 6	
Zinc	180	127	
Unregulated Parameters			
Conventionals			
pH	n/a	12.27	
Measurement			
Moisture	n/a	50.6	
Metals			
Aluminum	n/a	1730	
Antimony	n/a	< 30	
Barium	n/a	34.8	
Beryllium	n/a	< 1.5	
Bismuth	n/a	< 60	
Calcium	n/a	310000	
Chromium	n/a	< 6	
Copper	n/a	175	
Iron	n/a	1370	
Lithium	n/a	< 6	
Magnesium	n/a	2490	
Manganese	n/a	40.7	
Phosphorus, dissolved	n/a	2190	
Phosphorus, total	n/a	2810	
Potassium	n/a	< 600	
Silver	n/a	< 6	
Sodium	n/a	< 600	
Strontium	n/a	746	
Thallium	n/a	< 0.5	
Tin	n/a	< 15	
Titanium	n/a	9.1	
Vanadium	n/a	< 6	
Nutrients			
Nitrogen - ammonia	n/a	79.3	
Nitrogen - nitrate	n/a	12.5	
Nitrogen - total Kjeldahl	n/a	1.25	
Nitrogen - total	n/a	1.25	

*From Organic Matter Recycling Regulation (February 5, 2002)

ESIS Project #: 1072 ESIS ID#: 2009-30-268

Saanich Peninsula Waste Water Treatment Plant
Biosolids Report - 2009

Sampled
September 29, 2009

Composite sample collected Sept. 29. A grab sample was sent on Sept. 29 for fecal coliform and golden nematode testing.

CRD Environmental Services - Scientific Programs

Regulated Parameters	Class A Biosolids Limits* (mg/kg dry wt.)	Result (mg/kg dry wt.)	Comments
Biologicals			
Fecal coliforms (MPN/100g)	1000	< 20	
Globodera rostochiensis (#/100 g)	n/a	nd	
Metals			
Arsenic	75	< 10	
Cadmium	20	< 1	
Cobalt	1060	< 4	
Lead	150	7.6	
Mercury	2200	0.218	
Molybdenum	500	2.86	
Nickel	5	< 10	
Selenium	20	< 5	
Zinc	180	151	
Unregulated Parameters			
Conventionals			
pH	n/a	12.18	
Measurement			
Moisture	n/a	55.8	
Metals			
Aluminum	n/a	2300	
Antimony	n/a	< 20	
Barium	n/a	55.9	
Beryllium	n/a	< 1	
Bismuth	n/a	< 40	
Calcium	n/a	249000	
Chromium	n/a	8.3	
Copper	n/a	227	
Iron	n/a	1830	
Lithium	n/a	< 4	
Magnesium	n/a	2170	
Manganese	n/a	45.4	
Phosphorus, dissolved	n/a	2730	
Phosphorus, total	n/a	3840	
Potassium	n/a	850	
Silver	n/a	< 4	
Sodium	n/a	< 400	
Strontium	n/a	634	
Thallium	n/a	< 0.5	
Tin	n/a	< 10	
Titanium	n/a	8.1	
Vanadium	n/a	6.6	
Nutrients			
Nitrogen - ammonia	n/a	71.9	
Nitrogen - nitrate	n/a	14	
Nitrogen - total Kjeldahl	n/a	1.7	
Nitrogen - total	n/a	1.43	

*From Organic Matter Recycling Regulation (February 5, 2002)

ESIS Project #: 1072 ESIS ID# 2009-30-275

MEDIA PLAN - Paid Media				Feb-12																										
				W	R	F	Sa	Su	M	T	W	R	F	Sa	Su	M	T	W	R	F	Sa	Su	M	T	W	R	F	Sa	Su	M	T	W
Newspaper& Magazine Advertising				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Supplier	Publication	Details	Insertions																													
Black Press	Driftwood	2 col x 7", BK	0																													
Black Press	Goldstream Gazette	2 col x 7", BK	0																													
Black Press	Saanich News	2 col x 7", BK	0																													
Black Press	Victoria News	2 col x 7", BK	0																													
Black Press	Peninsula News	2 col x 7", BK	0																													
Black Press	Sooke News	2 col x 7", BK	0																													
Black Press	Oak Bay News	2 col x 7", BK	0																													
Black Press	Campbell River	2 col x 7", BK	1															1														
Black Press	Comox Valley	2 col x 7", BK	1															1														
Black Press	Nanaimo News	2 col x 7", BK	1															1														
Black Press	Parksville Qualicum	2 col x 7", BK	1														1															
Black Press	Ladysmith Chronicle	2 col x 7", BK	1														1															
Black Press	Lake Cowichan Gazette	2 col x 7", BK	1															1														
Black Press	Cowichan News Leader (Duncan)	2 col x 7", BK	1															1														
Post Media Group	Times Colonist	2 col x 7", Colour	4							1			1					1								1						
Environmental Science Magazine	ESE Mag.	1/2 page, Colour	1	1																												
Post Media Group	National Post BC	2 col x 7", BK	2										1													1						
Post Media Group	National Post Alberta	2 col x 7", BK	2										1													1						
Post Media Group	National Post Toronto	2 col x 7", BK	2										1													1						
Post Media Group	Vancouver Sun	2 col x 7", BK	1										1																			

APPENDIX C