Abbotsford Mission
Water Sewer Commission

JAMES WWTP
Biosolids Dewatering Project

Submission
For
2009 UBCM Community Excellence Awards

Leadership & Innovation (Large Urban Municipality)
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Project Summary
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The City of Abbotsford and District of Mission have taken leadership in proceeding with the use of centrifuge for solids dewatering at the JAMES Plant. The centrifuge technology is proven for this application. The addition of second storey to an existing building to accommodate the equipment is an innovative solution to maximize the use of the existing Plant footprint. The use of centrifuge for solids dewatering reduces trucking needs and is estimated to reduce 3,107,500 of Greenhouse Gas emissions over the next 25 years. Environmental Excellence has been demonstrated in seven major areas in this Project including: (1) Climate Change Initiatives; (2) Green Building & Design; (3) Resource Recovery; (4) Ecological Footprint Reduction; (5) Sustainability Planning; (6) Official Community Plans; and (7) Environmental Monitoring.

For further information, please contact:

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Summary Report
(6-page with Graphics)
Project Background

The Joint Abbotsford Mission Environment System (JAMES) Wastewater Treatment Plant is co-owned by the City of Abbotsford and the District of Mission. Governance is provided through the Abbotsford/Mission Water and Sewer Commission (AMWSC), which is comprised of elected representatives and employees of the City of Abbotsford and the District of Mission. The City of Abbotsford is the operator of the JAMES Plant.

Constructed in 1981, the JAMES Plant is located south of Fraser River within the City of Abbotsford boundary. It serves its contributory area including Abbotsford, Mission, Sumas and part of Langley (Aldergrove and Gloucester). The liquid treatment processes of the JAMES Plant include screening, aerated grit removal, primary sedimentation, trickling filter/solids contact (TF/SC) process, secondary clarification, chlorination/dechlorination, and nitrification. Solids handling includes thickening of secondary sludge, pasteurization, stabilization (dual digestion) and solids dewatering. A soil biofilter system is used for the majority of the plant’s odour control and treatment. The treated effluent is discharged into a high current area of Fraser River.

Solids dewatering is currently undertaken by two Belt Filter presses with 2.0m belt width. Belt Filter Presses are continuous-feed dewatering devices that use the principles of chemical conditioning, gravity drainage, and mechanically applied pressure to dewater sludge. After dewatering, biosolids is then trucked to Highland Valley Copper Mine Site for use as the land reclamation program, or hauled to the Plant’s biosolids storage area to be produced into a topsoil called Val-E-Gro™. The solids content of the dewatered biosolids by the two Belt Filter presses was initially 20 to 21% dry weight, but decreased to 19% in 2006.

In 2006, the AMWSC realized a need to replace and upgrade the existing belt filter press because of the following reasons:

1. The presses were installed in 1993 and reached the end of their natural service life. Also, there was a decrease in solids content of the dewatered biosolids produced by the presses;

2. The presses cannot accommodate the projected growth (50%) in the Fraser Valley in the next 25 years. The JAMES Plant provides services to Abbotsford, Mission, Sumas, Gloucester and Aldergrove. The number of people served by the Plant is projected to increase from an equivalent population of 247,000 in 2006 to 453,000 by 2031.
To evaluate the available options for solids dewatering upgrade, three engineering studies were commissioned shortly afterwards:

- Update of Wastewater Master Plan, 2006
- Solids Dewatering Options Study, 2006
- Biosolids Handling Facility Assessment, 2007

The final recommendations were to use the centrifuge technology, and that a second storey be constructed over the existing building to accommodate the new centrifuges.

**Centrifuge Technology**

The centrifuge technology uses centrifugal forces under extremely high speeds to force the removal of water from the digested biosolids. Centrifuge technology has many benefits over the existing belt filter press dewatering technology:

- Centrifuges are capable of producing biosolids with higher solids content (drier) than Belt Filter presses thereby reducing the amount of material requiring transportation. Due to the drier cake, the cost of transporting the material for beneficial re-use at the Highland Copper Mine Site is reduced by a net amount of $35,000 per year. The drier cake results in a 33% reduction in overall tonnage that needs to be transported to the mine reclamation site. The net savings is 83 fewer round trips, based on 2006 data, and is expected to increase to 166 fewer round trips by 2031. This data has incorporated the expected 25-year growth rates for biosolids production. In total, the centrifuge technology would save an estimated 3,320 round trips (1,726,400 km) over the 25-year life cycle of the equipment. Each round trip uses 500 L of fuel; therefore, based on a conversion factor of 1.8 kg/km, the reduction in Greenhouse Gas (GHG) emissions is estimated to be 77,700 kg/year beginning in 2008, increasing to 155,400 kg/year in 2031. The overall GHG emissions could be 3,107,500 kg over the next 25 years, if the biosolids continue to be applied at the Highland Valley Copper Mine reclamation sites.

- The new centrifuge technology will increase reliability, operational performance, and capacity of the dewatering process to produce biosolids that exceed current environmental standards, can be effectively re-used, and meet permit requirements and the demands of the expected population growth in the region;

- A drier biosolids cake is easier to work with in the preparation of a soil compost medium. A drier cake also improves the public acceptability for re-use in landscaping and gardening applications;
• The use of centrifuges eliminates exposure to off-gasses that are produced using the existing belt filter press technology.

In 2007, the WSC seeks funding to replace and upgrade the capacity of sludge dewatering equipment at the JAMES Plant. The project received support from the Ministry of Environment and Agricultural Land Commission (Appendix 1), and received funding from the Canada-British Columbia Municipal Rural Infrastructure Fund in 2008.

The Biosolids Dewatering Project is nearing the end of its completion and the City of Abbotsford and District of Mission will soon see its benefits.

Environmental Excellence

The Biosolids Dewatering Project demonstrates environmental excellence in **SEVEN** major areas: (1) Climate Change Initiatives; (2) Green Building & Design; (3) Resource Recovery; (4) Ecological Footprint Reduction; (5) Sustainability Planning; (6) Official Community Plans; and (7) Environmental Monitoring.

(1) Climate Change Initiatives

The primary benefit of this project, in regards to climate change adaptation and mitigation, is the reduction of greenhouse gases (GHG) emission. As discussed previously, the Biosolids Dewatering Project will decrease the moisture content in the biosolids, which will reduce the amount of biosolids (wet weight) by approximately 30%. This reduces the frequency and the number of trips to transport biosolids from the Fraser Valley to Highland Valley Copper Mine, a 520 km round trip distance.

In 2009, it is estimated that 95% of the JAMES Plant Biosolids will be trucked to the BC interior mines for reclamation. This equates to 35,000 kilometers of reduced B-train diesel engine emissions.

(2) Green Building and Design

The JAMES Plant is located adjacent to the environmentally sensitive Fraser River. The Fraser River is one of the world’s most productive salmon river systems, supporting five salmon species and 65 other species of fish, including steelhead and giant sturgeon.
(2) Green Building and Design (Cont’d)

The addition of a second storey for the new Biosolids Building maximizes the use of the existing Plant footprint and minimizes the disturbance to the surrounding environment and helps to protect fish and wildlife habitat. The amount of impervious area (access around the building) did not change by the building expansion, and therefore the heat island effect and the stormwater runoff did not increase. Addition of a second storey also minimizes the amount of new building materials required for the upgrade.

The Building includes energy efficient light fixtures with motion sensors to provide lighting only when the space is occupied.

Foul air is extracted directly from the centrifuge equipment (instead of the whole room) and discharged to the existing odour control/treatment system. This reduces the energy demand, by not having to ventilate the entire room space at a high rate, which also minimizes the requirement to expand the existing odour control system.

The HVAC system is designed to minimize the amount of general ventilation, reduce heating loads through low temperature set points (e.g. 10 °C in winter) and provide free cooling in summer. The design approach reduces energy consumption and operating costs.

(3) Resource Recovery

The centrifuge technology will produce a drier biosolids cake that will be more amenable to the production of a commercial grade soil amendment product that can be used locally by the landscaping industry. The AMWSC is currently exploring this option and, if successful, this will further reduce and/or eliminate the need to transport the biosolids to the mine site. It will also provide a renewable resource that promotes local jobs and benefits local customers.

(4) Ecological Footprint Reduction

A sustainable community is one with clean water, air, and a healthy ecosystem. Upgrading to a centrifuge system supports ecological sustainability by providing sewage treatment that better protects public health and the environment. It also reduces the ecological footprint by reducing the amount of GHG emissions, through the reduction of the frequency of trips needed to transport biosolids cakes to Highland Valley Copper Mine.
Reducing in overall heavy trucking movements also beneficially impacts existing road systems and local (and regional) air quality by taking fewer trips, and minimizing wear and tear on the road systems.

(5) Sustainability Planning

This project supports economic sustainability of Mission and Abbotsford. Increased capacity and the ability for treatment facilities to meet a community’s needs means that increased commercial activity can be accommodated. Larger and more diverse industrial and commercial operations can be encouraged to set up businesses. This results in increased employment, more residential development, increased opportunities for retail and service organizations, a stimulated local economy and a healthy and sustainable community with an excellent quality of life.

(6) Official Community Plan

Both the City of Abbotsford and the District of Mission have Official Community Plans that support the following smart growth principles in relation to this project:

- Protecting agricultural lands by promoting denser growth within the urban core; and
- Utilizing smarter and cheaper infrastructure by reducing biosolids transportation costs, and providing better quality biosolids for soil production for use in local markets.

The improved technology will have a positive impact on the environment and supports the City of Abbotsford’s Charter of Sustainability (Appendix 2), a key part of the Official Community Plan. It is an impetus for responsible growth and development and ensures that sewage treatment operations are economically viable and well-managed.

(7) Environmental Monitoring

Throughout the course of the construction period, environmental monitoring has been undertaken to ensure there is no major disturbance to the environment. Construction photos are attached in Appendix 3.

Summary

The City of Abbotsford and District of Mission has taken leadership in proceeding with the use of centrifuge for solids dewatering at the JAMES Plant. The centrifuge technology is proven for this application. The addition of second storey to an existing building to accommodate the equipment is an original and innovative solution to maximize the use of the existing Plant footprint. The use of centrifuge for solids dewatering reduces trucking needs and is estimated to reduce 3,107,500 of Greenhouse Gas emissions over the next 25 years.
Environmental Excellence has been demonstrated in seven major areas in this Project including: (1) Climate Change Initiatives; (2) Green Building & Design; (3) Resource Recovery; (4) Ecological Footprint Reduction; (5) Sustainability Planning; (6) Official Community Plans; and (7) Environmental Monitoring.

This Project demonstrates originality by adding a second storey to the existing building to house the centrifuges, is relevant to current environmental issues especially climate change initiatives, and is an example to other municipalities who would like to achieve similar results.
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Appendices
APPENDIX 1

LETTERS OF SUPPORT FROM MINISTRY OF ENVIRONMENT AND AGRICULTURAL LAND COMMISSION REGARDING THE PROJECT
January 30, 2007

Mr. P. Blaker, P.Eng.
City of Abbotsford
32325 South Fraser Way
Abbotsford BC V2T 1W7

Dear Mr. Blaker:

Re: City of Abbotsford JAMES Wastewater Treatment Plant
Biosolids Dewatering Project – Letter of Support

The Ministry of Environment offers this letter of support to the City of Abbotsford’s application to the Municipal Rural Infrastructure Fund. We understand that the application is for the replacement/upgrade of the current biosolids dewatering belt filter presses to centrifuges at the JAMES Wastewater Treatment Plant.

It is recognized that centrifuges are capable of producing biosolids with higher solids content than belt filter presses thereby reducing the amount of material requiring transportation and disposal. The Ministry of Environment strongly supports the upgrade and improvement of technology where there is a benefit to the environment.

The Ministry of Environment encourages communities to take sustainability seriously and come up with innovative solutions to the management of waste and wastewater. We acknowledge the City of Abbotsford’s efforts in this area such as the land reclamation program where the City’s biosolids are used beneficially at the Highland Valley Copper Mine site.

We encourage the funding program to consider the City of Abbotsford’s application and confirm our support for the project. If you have any questions, please contact the undersigned at (604) 582-5272.

Sincerely,

[Signature]

Kevin Larsen, M.Sc., P.Eng.
Head, Government & Compliance
January 17, 2007

Phil Blaker, P. Eng.
Manager of Projects, Engineering Department
City of Abbotsford
32315 South Fraser Way
Abbotsford, BC V2T 1W7

Dear Mr. Blaker:

Re: JAMES Sewage Treatment Plant Project
Our File Ref: # MM-05865 & MM-33186

Reference is made to your letter of January 12, 2007 concerning a project proposal to upgrade dewatering equipment at the City’s JAMES sewage treatment plant. The sewage treatment plant is situated in the Agricultural Land Reserve (ALR) at the north end of Gladwin Road.

The proposal to replace existing equipment by installing new dewatering equipment on the second floor over the existing building is supported. The proposal is consistent with the 1978 approval granted by the Commission to establish the JAMES sewage treatment plant facility.

Please confirm that the equipment has been successfully installed by notifying the Commission in writing at the earliest opportunity following completion of the project.

Yours truly,

PROVINCIAL AGRICULTURAL LAND COMMISSION

Per: KB

Erik Karlsen, Chair

BU/eg
i05865m1.doc
APPENDIX 2

ABBOTSFORD CHARTER OF SUSTAINABILITY
PREAMBLE

The City of Abbotsford, in order to protect and enhance the unique and spectacular beauty of our City, recognizes that sustainable development requires a constant and equitable balancing of three major areas: Economic, Environmental and Social.

A strong and vibrant local economy is one of the core elements of a sustainable community. The citizens of Abbotsford must be able to provide for the basic necessities of adequate food and shelter for themselves and their families.

Each member of our community must share the stewardship of our numerous environmental treasures. Clean air, pure water and uncontaminated soil are crucial to the well being of the City’s entire economy and the health and quality of life of its citizens.

The City and its citizens create and foster a quality of life as reflected in the diverse expressions of the human spirit. We commit ourselves to creating a community with strong law enforcement coupled with equally strong community and civic leadership which works together towards eliminating poverty, ignorance and fear.
Principles for Sustainable Community Development

The City of Abbotsford defines sustainable development as that which strives to balance the Economic, Environmental and Social needs of the City in order to provide the highest possible quality of life for all its residents today, without compromising the ability of future generations to meet their needs.

In order to meet our ongoing and ever-changing challenges, the City of Abbotsford, Council and staff, will adhere to the following principles and work with all organizations, businesses and residents to assist them to do likewise:

**Responsible Growth**

1. Vigorously promote the creation of environmentally and socially responsible economic growth by creating policies and infrastructure that support profitable industrial, commercial, agricultural and residential activities.
2. Streamline policies and regulations directed at protecting and improving the quality of air, water, land, and other natural resources.
3. Focus on development that will maintain a vibrant local economy in order to sustain the conditions for continued growth, competitiveness and job creation that will provide a reasonable quality of life for all citizens of Abbotsford.
4. Provide people with choices about how and where they live, present the public with transportation choices, build neighborhoods and encourage healthy communities to flourish.

**Pollution Prevention and Resource Conservation**

1. Focus on proactive measures for pollution prevention and resource conservation.
2. Enable the “Three R’s” of waste management (Reduce, Reuse, Recycle) and composting.
3. Aggressively promote the efficient use of all renewable and non-renewable resources in order to reduce the demand for additional resource consumption, and support renewable, non-polluting energy infrastructure.
4. Discourage the development of facilities that will increase the level of harmful greenhouse gases and other toxic emissions in an already fragile air shed.

**Social Well-being**

1. Ensure that a broad range of social programs, cultural activities and recreational opportunities are reasonably accessible to all citizens.
2. Facilitate and encourage the development and sustainability of responsive community-based organizations.
3. Promote community caring and responsibility for individuals, families and community well being.
4. Commit to provide public information, education, advocacy and opportunities to participate in community decisions that affect the quality of life for all citizens.

**Shared Responsibility**

1. Consider the long-term economic, environmental and social consequences and benefits equally in all decision-making processes.
2. Continuously improve and enhance co-ordination and communication between city departments and citizens to ensure that sustainable development principles are applied with streamlined procedures across City operations and throughout the community.
3. Ensure that no one group or geographic area is unduly burdened by negative economic, environmental or social impacts.
4. Develop strategic alliances and partnerships with other jurisdictions, agencies, organizations and the private sector to advance sustainable development goals.
5. Foster an ethic of stewardship by urging all members of the community to assume personal responsibility for sustainability by adopting best management practices and by increasing their knowledge of economic, environmental and social issues.
APPENDIX 3

CONSTRUCTION SITE PHOTOS FOR ENVIRONMENTAL MONITORING REPORT
Overall construction site photo. Work includes steel building addition to the existing structure, and installation of two dewatering centrifuges (covered by tarps in the photo).

Catch basin in front of building with silt trap installed.
Catch basin sandbagged when machinery on site.

Absorbant oil sock as part of the spill kit. This sock would be installed around the spill and around the catch basin in case of an accident.
Granulate absorbent as part of the spill kit. Sorbitec FG is designed for cleaning up oil, hydraulic fluid, and industrial chemical spills.