
City of Campbell River – Norm Wood Environmental Centre

Land Application Plan

April 2016

Prepared for:

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SYLVIS DOCUMENT #1062-16

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DECLARATION

SYLVIS has prepared a Land Application Plan (LAP) for the purpose of biosolids fertilization of agricultural land at the Norm Wood Environmental Centre (NVEC) in Campbell River, BC. This LAP is limited to the specific site, development, and design objectives for biosolids applications to be completed at the NVEC, utilizing biosolids meeting the quality requirements of the British Columbia (BC) *Organic Matter Recycling Regulation* (OMRR).

This LAP sets forth all the assumptions and limiting conditions imposed by the terms of our engagement affecting the analysis, opinions, and conclusions contained in the LAP. The entire LAP, including all conclusions and opinions, pertains only to the above-referenced property and is based on our present knowledge and information with respect to the current data for the property, as of April 19th, 2016. The findings in this LAP may be subject to change as a result of the passage of time.

This LAP provides information required by Schedules 7 and 13 of the OMRR, operations details, and monitoring protocols for the utilization of biosolids in fertilization activities at the NVEC. If there are any questions or comments regarding this LAP, please contact myself by phone at the number indicated on the cover page or by email (ldampier@sylvis.com).

This report is valid only if it bears the original signature and seal of the author.

I, Lesley Dampier, confirm by signature and seal below that the information contained in this LAP is true to the best of my knowledge.

Professional Seal

Signature 

Date April 21, 2016



LIST OF ABBREVIATIONS

List of general abbreviations used in this document:

ALR – Agricultural Land Reserve
BC – British Columbia
bgs – below ground surface
C:N – carbon to nitrogen ratio
DL – District Lot
GPS – global positioning system
LAP – Land Application Plan
MoE – Ministry of Environment
NWECC – Norm Wood Environmental Centre
OMRR – Organic Matter Recycling Regulation
PID – Parcel Identifier
SOUR – specific oxygen uptake rate
TKN – Total Kjeldahl Nitrogen
VAR – Vector Attraction Reduction
WWTP – Wastewater Treatment Plant

List of unit abbreviations used in this document:

° C – degrees Celsius
dt – dry tonne
dw – dry weight
dS – deciSiemens
g – gram
ha – hectare
kg – kilogram
m – metre
m³ – cubic metre
mg – milligram
mm – millimeter
MPN – most probable number
pH – potential hydrogen (acidity)

EXECUTIVE SUMMARY

Biosolids are the stabilized solid residuals produced by the wastewater treatment process. They are characterized by their typically high nutrient and organic matter content. These attributes lend themselves well the use to biosolids as an organic amendment in agricultural, silvicultural, and reclamation applications, as well as in fabrication of soils and soil amendments suitable for commercial and residential use.

This document is a Land Application Plan (LAP) for the use of biosolids produced at the City of Campbell River (the City) wastewater treatment plant (WWTP) at the Norm Wood Environmental Centre (NVEC). This LAP prescribes the utilization of biosolids for soil-building and fertilization of forage grasses and barley at the NVEC Field 2. This LAP provides the details of the intended application and satisfies the requirements of the British Columbia (BC) *Organic Matter Recycling Regulation* (OMRR), including information required by Schedules 7 and 13 of the OMRR.

Biosolids have been applied annually in liquid form to the land parcel detailed in this LAP (Field 2) since 2012 using a pivot irrigation system. Similar applications occurred on an adjacent parcel of land (Field 1) from 2003 to 2011. Applications in 2012-2015 on Field 2 occurred between June and September at an average application rate of 24.3 dry tonnes (dt) per hectare (ha).

Characterization of City biosolids intended for use at the NVEC has been completed and confirmed through sampling of biosolids in 2015 and 2016. City biosolids undergo an aerobic digestion treatment process in a storage lagoon adjacent to the NVEC and contain fecal coliform densities below Class B limits for biosolids as specified in Schedule 1, Part 7 of the OMRR. City biosolids contain trace element concentrations below Class A and Class B limits for biosolids as specified in Schedule 4 of the OMRR; City biosolids will be managed as a Class B product. Soil analyses were completed prior to biosolids applications, allowing for the calculation of an appropriate biosolids application rate.

City liquid biosolids will be applied to 10.5 ha of the NVEC Field 2 at an application rate of 18 dt/ha or 540 cubic meters per ha (m³/ha) based on the predicted agronomic nutrient uptake capabilities of the agricultural land in 2016. As this LAP is intended to cover applications for three years (2016-2018), in each year the application rate will be re-calculated based on the most recent biosolids and soil quality data. Land applications will be planned such that predicted post-application soil trace element concentrations are in compliance with the applicable OMRR soil limits. Records will be maintained of the dates and tonnages of biosolids applied.

The application site is a minimum of 50 m from the nearest watercourse, a small tributary of Casey Creek, and a minimum of 450 m from Casey Creek. Four groundwater wells are located at the perimeter of the application area, allowing for ongoing monitoring of groundwater; in the four years of biosolids applications at this site, no adverse effects of biosolids applications on groundwater have been detected.

A qualified professional will author an evaluation of biosolids fertilization activities based on application notes on an annual basis.

TABLE OF CONTENTS

1	THIS DOCUMENT AND THE ORGANIC MATTER RECYCLING REGULATION	1
2	LAND APPLICATION OBJECTIVES.....	1
3	LAND APPLICATION PLAN DURATION.....	2
4	SITE CHARACTERISTICS.....	2
4.1	Location and Access.....	3
4.2	Biosolids Applications History	3
4.3	Neighbouring Land and Uses.....	3
4.4	Climate	3
4.5	Soils and Soil Sampling	4
4.6	Hydrology	4
4.7	Vegetation	5
5	BIOSOLIDS CHARACTERISTICS	5
5.1	City of Campbell River Biosolids	5
5.1.1	Pathogen Reduction Process and Limits.....	6
5.1.2	Vector Attraction Reduction.....	6
5.1.3	Trace Elements and Nutrients	6
6	BIOSOLIDS TRANSPORTATION AND STORAGE	6
7	BIOSOLIDS APPLICATION	6
7.1	Pre-Application Soil Sampling.....	7
7.2	Site Preparation	7
7.3	Biosolids Application Areas.....	7
7.4	Application Schedule	7
7.5	Application Rate.....	8
7.6	Application Method	8
7.7	Application Log	9
7.8	Predicted Post-Application Soil Quality	9
8	SITE-SPECIFIC MANAGEMENT METHODS.....	9
8.1	Buffers	10
8.2	Signage	10

8.3	Odour Concerns	10
8.4	Previous Application Areas	11
8.5	Wildlife and Animal Grazing	11
8.6	Weather Considerations	11
8.7	Land Reserve Designation.....	11
8.8	Notification.....	11
9	POST-APPLICATION MONITORING.....	11
9.1	Soils.....	12
9.2	Surface Water.....	12
9.3	Groundwater.....	12
9.4	Vegetation	12
9.5	Biosolids	12
10	REPORTING AND RECORD-KEEPING	12
11	REFERENCES	12
	APPENDIX ONE – TABLES	14
	APPENDIX TWO – FIGURES.....	17
	APPENDIX THREE – PHOTOGRAPHS.....	19
	APPENDIX FOUR – AUTHORIZATIONS AND LAND TITLE.....	20
	APPENDIX FIVE – STATEMENT OF LIMITATIONS	29
	APPENDIX SIX – OMRR SCHEDULE 7	31
	APPENDIX SEVEN – OMRR SCHEDULE 13	36

APPENDIX ONE – TABLES

Table 1: Physicochemical parameters and nutrients concentrations for soils at the NVEC in 2015.	14
Table 2: Trace element and physicochemical quality for biosolids produced at the Norm Wood Environmental Centre WWTP in 2015.....	15
Table 3: Pre-application and predicted post-application soil concentrations at the Norm Wood Environmental Centre's Field 2.....	16

APPENDIX TWO – FIGURES

Figure 1: General overview of the City of Campbell River’s Norm Wood Environmental Centre and surrounding areas.....	17
Figure 2: Site map for City of Campbell River’s Norm Wood Environmental Centre depicting the proposed application area and surrounding features.....	18

APPENDIX THREE – PHOTOGRAPHS

Photograph 1: The Norm Wood Environmental Centre Field 2 in the City of Campbell River. (April, 2015)	19
Photograph 2: A poly-lined storage lagoon at the City of Campbell River’s Norm Wood Environmental Centre wastewater treatment plant. (April, 2015)	19
Photograph 3: An irrigation pivot used to land-apply liquid biosolids from the Norm Wood Environmental Centre. (April, 2015)	19

APPENDIX FOUR – AUTHORIZATIONS AND LAND TITLE

Part 1: Authorization from Discharger	21
Part 2: Land Title Certificates	22

1 THIS DOCUMENT AND THE ORGANIC MATTER RECYCLING REGULATION

This document is a Land Application Plan (LAP) prepared in accordance with the British Columbia (BC) *Organic Matter Recycling Regulation* (OMRR). This LAP provides background information and rationale for biosolids applications at the City of Campbell River's (the City) Norm Wood Environmental Centre (NVEC) as a fertilizer and soil conditioner to the area specified within this document (Field 2). The application will increase overall productivity and crop biomass on the agricultural land of Field 2 at the NVEC. This LAP provides information required by Schedules 7 and 13 of the OMRR as well as additional details of best management practices which will be followed. A qualified professional has evaluated all aspects of this beneficial use project to ensure that biosolids are used in a manner protective of public health and the environment.

This document contains seven Appendices: Tables, Figures, and Photographs are presented in Appendices One, Two, and Three, respectively; various authorizations and land title certificates are presented in Appendix Four; a Statement of Limitations on the work SYLVIS has completed in the preparation of this LAP is presented in Appendix Five; information requested in Schedule 7 of the OMRR is included in Appendix Six; and information requested in Schedule 13 of the OMRR is included in Appendix Seven.

2 LAND APPLICATION OBJECTIVES

Biosolids can be utilized for their value as a slow-release and complete nutrient source. While other amendments and chemical fertilizers provide plant-essential nutrients in available (soluble) form, the advantage of biosolids as a nutrient source is that a significant proportion of the nutrients are not readily available in mineralized/soluble forms but are bound within the organic matter matrix. The nutrients are made available slowly as organic matter decomposes over the growing season, releasing nutrients concurrent with a crop's nutrient demand. Estimates of the distribution of total nitrogen (N) in anaerobically digested biosolids is approximately 80% organically bound N and 20% inorganic N (Henry et al., 1999). Chemical fertilizers contain much higher proportions of mineralized, readily available nutrients that, if not utilized immediately by vegetation, may impact the environment due to their solubility and mobility. Furthermore, whereas many commercially available fertilizers may provide some (but not all) macronutrients (nitrogen, phosphorus, and potassium) and few micronutrients (sulfur, boron), biosolids contains a full suite of macro- and micronutrients.

The land parcel selected for biosolids applications consists of a 10.5-ha section of land at Field 2 to the south of the NVEC. This land, formerly a second-growth Douglas-fir forest, was cleared and leveled in 2012 with woody biomass incorporated into the soil. Biosolids application will provide nitrogen, which will help to stabilize the carbon-to-nitrogen (C:N) ratio of the soil.

Evaluation of the suitability of different perennial crops for the site is ongoing; the site continues to support a volunteer crop of forage grasses and barley. In addition to fertilizing this vegetation, biosolids applications will also irrigate the vegetation and condition the soil. In the future, it is the City's goal to produce a harvestable crop for use off-site as a feed or feedstock for alternate use.

In 2016, biosolids will be applied to the 10.5-ha application area in Field 2 using the irrigation pivot system at a rate of 18 dt/ha in liquid form. This application rate may be amended based on ongoing monitoring of the biosolids and will be reported in a year-end report provided to the discharger. As this LAP is intended to cover applications for three years (2016-2018), in each year the application rate will be re-calculated based on the most recent biosolids and soil quality data and land applications will be planned such that predicted post-application soil trace element concentrations are in compliance with the applicable OMRR soil limits. The final annual application volume will depend on biosolids availability and operational considerations.

3 LAND APPLICATION PLAN DURATION

This LAP has been prepared for biosolids applications occurring on Field 2 of the NVEC over a three-year period. A period of three years has been proposed as this is the calculated remaining site lifetime with respect to biosolids land applications as detailed in the *City of Campbell River 2015 Biosolids Land Application Compliance Report* (SYLVIS Document #1041-15). Based on a typical application rate, average biosolids trace element concentrations, and OMRR soil standards based on site-specific factors identified for this site (see Section 7.1), the site is estimated to be able to receive applications in 2016, 2017, and 2018 before any trace element in the soil reaches 75% of the OMRR soil limit.

Biosolids fertilization activities may begin after the 30-day notification period following submission of this LAP to the Ministry of the Environment (MoE). Land application will occur approximately from June to October of each year but may be adjusted based on site conditions. Should additional biosolids fertilization be planned after the stated term (2016-2018), the LAP will be updated and resubmitted.

4 SITE CHARACTERISTICS

The NVEC Field 2 is located on municipally-owned land. The City is the landowner and the primary contact person for the NVEC is Lorne Sandberg, who can be contacted at the number provided below.

- Address: 4000 North Island Highway, Campbell River, BC, V9H 0C2
- Email: lorne.sandberg@campbellriver.ca
- Phone: 250-286-4833

A letter confirming that the land application site owner authorizes the use of biosolids on their land is provided in Schedule 13, Appendix Seven.

On October 21st, 2015, Lesley Dampier, MSc, PAg of SYLVIS Environmental (SYLVIS) completed a site assessment prior to biosolids applications. The site assessment included a thorough visual inspection of the site to collect soil samples, identify suitable access, hydrological features, land use, and site boundaries. Ms. Dampier performed a similar site assessment in May of 2015.

The application area is a 10.5-ha mostly level (< 2% slope) expanse of cleared forest. Debris left over from land clearing was chipped and incorporated into the top 20 cm of the soil at the time of

land clearing in 2012. The incorporation of this woody debris into the surface soil horizon initially resulted in a very high (>80) C:N ratio. In soil with high C:N, suppression of nitrogen availability to plants can occur as decomposition by the soil microbial community preferentially takes up the available nitrogen. As nitrogen is added to the soil through biosolids applications, decomposition of the woody debris is facilitated while also enabling plant uptake of nitrogen. In the northwest portion of the area are the remnants of two decommissioned wetlands. These wetlands were assessed in 2010 and were deemed to be of low value due to degradation as a result of historical forestry operations and because they were not hydraulically connected to local water features. In exchange for increased protection of other nearby wetlands, the City decommissioned these two wetlands and incorporated them into the application area (Fleenor, 2008). Photograph 1 depicts a view of the site.

4.1 Location and Access

The NWECC is located at 4000 North Island Highway, Campbell River, BC (Figure 1 and Figure 2, Appendix Two). The land selected for biosolids fertilization (Field 2) is located within land owned by the City in a section of District Lot (DL) 52, Parcel Identifier (PID) 028-650-689.

The NWECC Field 2 is a 10.5-ha section of a cleared portion of land on the eastern side of DL 52 (Figure 2, Appendix Two). DL 52 is located adjacent to the community of North Campbell River, north of the Campbell River and the City of Campbell River.

Road access to the site is via the entrance to the NWECC off the North Island Highway. The entire application area is surrounded by a 2-metre (m) fence to restrict wildlife and public access. These features are depicted in Figure 2, Appendix Two.

4.2 Biosolids Applications History

Applications of City liquid biosolids occurred on NWECC Field 2 annually from 2012-2015, with 2012 being the first year biosolids were applied to this field.

4.3 Neighbouring Land and Uses

Immediately adjacent to the application area are forested lands under either City or private ownership. There are some hiking and equestrian trails located within these privately-owned parcels, one of which skirts the perimeter of the fence surrounding the application area. Adjacent to the land parcel on which the NWECC is located are various privately owned forested, commercial, and residential properties. The minimum distance from the application area to a commercial property is 135 m, while the minimum distance to a residential property is 320 m. Land-uses of neighbouring properties are depicted in Figure 2, Appendix Two.

4.4 Climate

Average annual temperature at the NWECC is 9 degrees Celsius (° C), with a summer average maximum of 23° C and a winter average minimum of 11° C. Annual precipitation is 1,490 mm, with an average of 76% received during the months of October to March inclusive. The site experiences 229 growing degree days per year (Environment Canada, 2016). The dry and warm

summer conditions result in vigorous growth of the grass and barley crop, which utilizes nutrients and water supplied by the liquid biosolids.

4.5 Soils and Soil Sampling

The soil in the northern portion of NVEC Field 2 is an imperfectly draining brown podzolic loamy sand while the soil in the southern portion of NVEC Field 2 is a rapidly draining brown podzolic gravelly loamy sand (Day et al., 1959).

Pre-application soil sampling was completed on October 21st, 2015 to characterize the areas where biosolids will be applied. Two composite samples, each consisting of eight equal volume sub-samples from a depth of 0 - 0.15 m were collected from proposed fertilization areas at the NVEC Field 2. The soil trace element concentrations were compared to trace element limits specified in the OMRR for Agricultural Land. Site-specific factors for the selection of appropriate OMRR soil limits are discussed in Section 7.1. All of the pre-application trace element concentrations in the soils are below the OMRR limits (Table 1, Appendix One).

4.6 Hydrology

A hydrogeological assessment has not been prepared for the NVEC Field 2 during the preparation of this LAP. Information on hydrology has been collected from relevant resources as identified below.

Due to the coarse texture of the soils found on site and their rapid drainage, ponded water on the soil surface does not occur except in small sections where cemented layers at depth give rise to seasonal perched water tables (Day et al., 1959). These areas have been identified and during previous years (2012 – 2015) biosolids applications to these areas were reduced in order to avoid ponding on the soil surface. Groundwater wells have been installed at four locations surrounding the application area. Based on groundwater elevation data collected by SYLVIS in 2015, the groundwater table is expected to be located anywhere from the soil surface to 1.5 m below ground surface (bgs), whereas during the dry summer season the groundwater table is located between 1 and >3.5 m bgs. Groundwater wells will be sampled prior to, during, and after the application season.

No surface water bodies are located within the application area. Two forested wetlands are located on either side of the application area outside the reach of the applications (Fleenor, 2008) and will be appropriately buffered. The wetland to the southwest of the application area feeds a tributary of Casey Creek, located to the west of the application area. As the application site is gently sloped to the northeast, groundwater flow is presumed not to flow towards this wetland. A ditch is located along the northwestern corner of the application site which drains towards the northeast. The nearest distance from the application area to surface water in the drainage ditch is 30 m.

The application site is located within the Salmon River watershed and not the nearby Campbell River watershed. There are no known aquifers under or near the application site (Ministry of Citizen's Services and Open Government, 2016).

There are no groundwater wells or surface water diversions located within 1,500 m of the application site. Six groundwater wells are located on the south side of Campbell River between 1,600 and 2,500 m from the application site. Four water diversions are located on Campbell River at least 1,700 m from the application area; none are for drinking water supply (Ministry of Citizen's Services and Open Government, 2016).

Biosolids applications will not occur in areas where groundwater occurs within 1 m of the soil surface. Depth to groundwater will be checked prior to applications and throughout the application season using the onsite groundwater wells, auger boreholes, and site features such as ditches. All biosolids applications will occur a minimum of 30 m from areas of high groundwater table and biosolids applications will be visually inspected to confirm adherence to this setback distance.

4.7 Vegetation

The NVEC Field 2 has been used since 2012 to produce a non-food crop. Perennial forage grass was seeded in the fall of 2012 and barley was seeded prior to applications in 2012 and 2013. Volunteer growth of both crops is sufficient to keep the site covered in vegetation throughout the year.

5 BIOSOLIDS CHARACTERISTICS

Biosolids used in this fertilization project will originate from the NVEC. Sampling and analysis of trace element, nutrient, and physicochemical quality for the City's biosolids was performed by NVEC staff throughout 2015 and early 2016. Three composite samples consisting of eight equal-volume sub-samples were collected from the NVEC for the purposes of confirming OMRR compliance and application rate calculation. Seven independent grab samples were collected from the NVEC for fecal coliform analysis. All data for biosolids are presented in Table 2, Appendix One.

All biosolids are sampled directly from each WWTP throughout the year. The previous year's biosolids data is used in the calculations of biosolids application rates for the first year of this LAP. Application rates will be updated during the term of this LAP based on ongoing sampling activities. WWTP details, treatment processes, and quality characteristics of each biosolids source are provided in the following sections.

5.1 City of Campbell River Biosolids

The NVEC, operated by the City, is located at 4000 North Island Highway, Campbell River, BC, V9H 0C2 on PID 028-650-689, DL 52. The NVEC serves a population of 38,000 and produces an average of 350 dt of biosolids per year at an average moisture content of 3.3%, giving an annual liquid biosolids volume of approximately 10,600 cubic metres (m³).

The primary contact at this facility is Lorne Sandberg, Wastewater Supervisor, Utilities Department, and he can be reached by the following:

- Email: lorne.sandberg@campbellriver.ca
- Phone: 250.286.4833

All biosolids analytical data presented in this document are from samples collected by City staff and SYLVIS and analyzed by independent, accredited, third-party laboratories; these data are presented in Table 2, Appendix One.

5.1.1 Pathogen Reduction Process and Limits

Stabilization and pathogen reduction of the City biosolids is accomplished through an aerobic digestion treatment process whereby the wastewater is agitated with air in an aerobic digester for a specified period of time, then transferred to a storage lagoon. Photograph 2 depicts the storage lagoon at the NVEC. A pathogen indicator species (fecal coliform) is analyzed on a regular basis and the geometric mean of seven samples collected in 2015 and 2016 is 6,000 Most Probable Number (MPN) per gram dry weight (g_{dw}), which is below the 2,000,000 MPN/ g_{dw} limit for Class B biosolids, as specified in Schedule 3 of the OMRR (Table 2, Appendix One).

5.1.2 Vector Attraction Reduction

City biosolids meet Vector Attraction Reduction (VAR) requirements as stipulated in Section 1 of the OMRR Schedule 2 through the treatment process described above. During 2015 and early 2016 the Specific Oxygen Uptake Ratio (SOUR) of City biosolids was 0.04 milligrams of O_2 per hour per gram ($mg\ O_2/hr/g$), well below the OMRR limit of 1.5 $mg\ O_2/hr/g$.

5.1.3 Trace Elements and Nutrients

City biosolids contain nutrients, organic matter, and trace elements at concentrations which are typical for municipalities of similar size and industrial development. The average trace element, nutrient and physicochemical concentrations in City biosolids for 2015 and early 2016 are presented in Table 2, Appendix One. All trace element concentrations in the City biosolids meet the Quality Criteria for Class B biosolids as stipulated by Schedule 4 of the OMRR.

6 BIOSOLIDS TRANSPORTATION AND STORAGE

Biosolids from the NVEC will be applied in liquid form using an irrigation pivot. Biosolids are stored in liquid form in a lagoon adjacent to the NVEC. Liquid biosolids will be pumped to the irrigation pivot at Field 2 and land-applied. Photograph 3 depicts the irrigation pivot at the NVEC Field 2. No transportation of biosolids offsite is required.

7 BIOSOLIDS APPLICATION

This LAP was authored to enable biosolids applications to the District Lots (DLs) identified in Section 4.1 of this document at the NVEC for three years (2016 to 2018 inclusive). The goal of biosolids applications is fertilization to improve the nutrient content and carbon-to-nitrogen ratio of the existing surface soil, as well as irrigation and fertilization of a crop of perennial forage grasses and barley.

7.1 Pre-Application Soil Sampling

Soil samples were taken from the NWEF Field 2 on October 21st, 2015. Mean trace element concentration results for pre-application soil samples are presented in Table 1, Appendix One. The concentrations are compared against regulated trace element soil standards for agricultural land (Column 2 in Schedules 9 and 10 of the OMRR). The following site-specific factors were considered for human health and environmental protection:

- Intake of contaminated soil
- Toxicity to soil invertebrates and plants
- Livestock ingesting soil and fodder;
- Major microbial functional impairment.

All of the pre-application soil trace element concentrations are below the applicable OMRR standards.

The soil in the northern portion of NWEF Field 2 is an imperfectly draining brown podzolic loamy sand (Day et al., 1959) with an average soil pH of 5.1 and electrical conductivity of 0.13 deciSiemens per metre (dS/m). The soil in the southern portion of NWEF Field 2 is a rapidly draining brown podzolic gravelly loamy sand with an average soil pH of 4.9 and electrical conductivity of 0.15 dS/m. These values are well within normal limits and pose no challenges for biosolids applications.

All soil samples were collected by SYLVIS and analyzed by independent, accredited, third-party laboratories. Data discussed in this section are presented in Table 1, Appendix One.

7.2 Site Preparation

The application area at the NWEF Field 2 consists of land which has previously been prepared (including land clearing, woody debris mulching and incorporation into soil, and land levelling). Minimal site preparation will be undertaken prior to applications in 2016. These preparations will include site inspection, GPS recording of surface water features and application reach in order to assure that mandatory buffers are respected.

7.3 Biosolids Application Areas

Biosolids land applications will occur on 10.5 ha of land at the NWEF Field 2. Please refer to Figure 1 and Figure 2, Appendix Two for general site location and LAP boundary.

7.4 Application Schedule

Fertilization using biosolids may begin after the 30-day notification period following submission of this LAP to the MoE during the growing season for a duration of three years (2016-2018). Biosolids applications are expected to take place approximately between June 1st and September 30th of each year, but may vary.

7.5 Application Rate

The calculated rates for biosolids application are based on the agronomic nutrient uptake of the vegetation growing at the application site, the current nutrient concentrations and bulk density of the soil, as well as the quantities of nutrients to be added through the application of biosolids. Nutrient mineralization from the biosolids is expected to release slightly diminishing annual quantities of nitrogen, phosphorus and other macro- and micronutrients throughout the five to seven years following applications.

Based on the biosolids quality at the time of authoring this LAP, the anticipated application rate in 2016 will be 18 dt/ha of NVEC liquid biosolids. This rate achieves an application rate of approximately 1,186 kg/ha of nitrogen, of which 30% (or 350 kg/ha) is expected to be available to plants and soil biota in the first year. An estimated 200 kg/ha of nitrogen is required for decomposition of woody debris which has persisted in the upper 20 cm of the soil following incorporation as a part of land clearing in 2012. This nitrogen will decrease the carbon-to-nitrogen ratio (C:N) and help decompose the woody debris.

The application rate may be re-assessed throughout the application season based on the nitrogen content of the biosolids. This ensures that any changes in biosolids nitrogen content does not affect the fertilization objectives described in the previous paragraph.

Any possible nutrient runoff at the NVEC Field 2 will be mitigated in several ways. All water features will be buffered by a minimum 30-m setback. The cover crop of grasses and barley reduce overland flow and the coarse-textured soil enables rapid infiltration of liquid biosolids into the root zone where they irrigate and fertilize the vegetation. In areas where the soil drains less rapidly, the application rate will be adjusted in order to avoid ponding of liquid biosolids on the soil surface. This practice has been employed successfully in previous years.

The trace element predictions for post-application soil quality have been calculated using the biosolids and soil trace element concentrations obtained from sampling and analyses in 2015 and 2016 (Table 2 and Table 3 in Appendix One) and are considered to be an accurate reflection of final concentrations.

The application rate will be confirmed by multiplying hours of pump operation by the known pumping rate to measure the total volume applied through the irrigation pivot.

For the purposes of research on vegetation and soil responses to biosolids fertilization, biosolids application rates may exceed agronomic rates in selected application areas. Applications will be calculated such that post-application soil trace element concentrations conform to applicable OMRR soil trace element limits.

7.6 Application Method

Biosolids applications will be completed in compliance with the OMRR. No biosolids will be applied within the buffers as per Section 8.1 of this document.

City liquid biosolids are stored in a poly-lined lagoon at the NVEC, approximately 500 m from the application site. Biosolids in the storage lagoon are homogenized to a consistent solids content

by recirculating and agitating them in the lagoon using a pump. During applications, the biosolids are pumped to Field 2 and applied using a 300-m irrigation pivot which swings through an arc of approximately 130°. Fresh water can be introduced to the liquid biosolids stream if required for operational efficiency and appropriate backflow protection is incorporated into this connection. Irrigation pivot output nozzles extend to within 1.5 m of the soil surface in order to minimize wind drift.

If necessary due to a shortened application season or irrigation system breakdown, additional biosolids may be applied using a tanker truck or tractor and tanker to the application area.

7.7 Application Log

An application log will be maintained that will include the date of applications, the quantity of biosolids applied, the specific application area, and the site management practices. The weather and any other applicable details will also be noted in the log, as per the requirements of the OMRR. The application log will assist the verification of applications by a Qualified Professional or designate.

7.8 Predicted Post-Application Soil Quality

Predicted post-application soil quality values for the NVEC Field 2 are presented in Table 3 in Appendix One. This table presents:

- Mean analytical results of the pre-application soil samples collected from the NVEC Field 2; and,
- Predicted post-application soil concentrations for direct applications of the biosolids based upon mass balance calculations incorporating the means of 2015 analyses of the biosolids, the biosolids application rate, and the pre-application soil samples.

Trace element concentrations in the post-application soils are compared to the same OMRR standards as with the pre-application soils. The site-specific selection factors for the soil limits are discussed in Section 7.1 of this document. Predicted trace element concentrations in the post-application soils are below the most stringent applicable standards specified in the OMRR for agricultural land (Table 3, Appendix One). As it is expected that this application area will be used for a subsequent application in 2017, pre-application soil sampling for 2017 operations will fulfill the role of post-application soil monitoring, as described in Section 9.1 of this document.

8 SITE-SPECIFIC MANAGEMENT METHODS

The land application of biosolids under this LAP will take into account the following management considerations. City Class B biosolids applied to the NVEC Field 2 will be managed as per Schedule 8, Article 1 of the OMRR.

8.1 Buffers

In accordance with Schedule 8 of the OMRR, the following buffers will be adhered to for both Class A and Class B biosolids during stockpiling and land application:

- a 30-m buffer will be maintained surrounding all water features and water wells;
- a 30 m buffer will be maintained surrounding properties and dwellings;
- a 20-m buffer will be maintained from major roads; and,
- a 10-m buffer will be maintained from minor public roads.

There are no major or minor public roads within 450 m of the application area. A private logging road is located along the western boundary of DL 52; although this road does not require any OMRR-specified buffering, applications will not occur within 30 m of this road. No active logging is known to be occurring in the lands adjacent to DL 52.

Public access is blocked to the application site: the only access to the fields is by way of the NWECC access off the North Island Highway. In addition, there is a 2-m high fence surrounding Field 1 and 2 at the NWECC.

A check of depth to groundwater, ensuring a 1-m separation from the soil surface, will be undertaken immediately before land application. Groundwater level will be assessed by inspection of groundwater wells, auger holes, and site features such as ditches.

8.2 Signage

Biosolids application signs will be posted at the NWECC Field 2 prior to application, specifically at the entrance points to the application areas. All signs will remain in place for at least 38 months after biosolids have been applied. As per Schedule 8 of the OMRR, the signs will identify:

- that biosolids derived from a WWTP have been applied to the site;
- that the public should avoid ingesting above-ground plant material from the site for 18 months;
- that the public should avoid ingesting below-ground plant material from the site for 38 months;
- that no dedicated domestic animal grazing will be undertaken on the site for a minimum of 60 days following applications; and
- contact persons for further information.

8.3 Odour Concerns

The transport and application of biosolids will be undertaken in an expeditious manner to mitigate the potential for odour. This includes conducting applications under favourable climatic conditions as practicable. Based on the wooded buffer areas which occur along the southern, western, and eastern boundaries of the site, the potential for odour detection by neighbouring properties is low and there have been no documented odour complaints since this program was initiated in 2003.

8.4 Previous Application Areas

As liquid biosolids applications in 2016-2018 will use the same irrigation pivot system as in previous years, the applications will occur on the same section of land as in 2012-2015. Application rates are designed to fulfill the annual nutrient requirements of site vegetation and the soil.

8.5 Wildlife and Animal Grazing

The application site does not occur within any range tenure and no cattle grazing will occur at the biosolids application site. The crop of barley and grass will be ploughed under in the early fall as a green manure. Elk and deer are present in the area, but are excluded from the application area by perimeter fence. Grazing of transient wildlife will not endanger the animal's health (Henry, 2005).

8.6 Weather Considerations

Biosolids applications will cease under conditions of inclement weather (e.g., intense rainfall) or at the discretion of the project manager. As applications are anticipated in spring to fall, and as required under OMRR, there will be no applications over snow or to frozen soil.

8.7 Land Reserve Designation

The biosolids application site at the NVEC Field 2 occurs within the Agricultural Land Reserve (ALR); as per the OMRR, the Agricultural Land Commission and local medical health officer will be notified of the LAP 30 days prior to the land application. The site is not classified as forest land reserve.

8.8 Notification

Public consultation is not a requirement of the OMRR and LAPs do not mandate consultation and communication. The NVEC Field 2 is located on municipally-owned land. However, notification of neighbours to the project is deemed appropriate and a best management practice. As mentioned in Section 4.3, the nearest neighbors to the NVEC Field 2 application site are a minimum of 135 m away through an expanse of dense second-growth forest, further buffering any potential noise or odour. Notification of biosolids applications will be provided to adjacent landowners in writing approximately 15 days prior to land application.

9 POST-APPLICATION MONITORING

Post-application monitoring is not a requirement of the OMRR as biosolids application rates are designed to be agronomic, with available nitrogen not exceeding annual crop and soil nutrient requirements. However, post-application monitoring is planned for soil, groundwater, surface water, but not for vegetation. Biosolids monitoring occurs throughout the year. The following subsections provide rationale for not conducting post-application monitoring.

9.1 Soils

Biosolids application rates are designed to be agronomic, with available nitrogen not exceeding annual soil and crop requirements; as such, post-application soil monitoring is not required.

As applications occur annually on the same parcel of land, soil sampling conducted prior to the next year's application serves as post-application monitoring; soil at the application site will be sampled in late 2016 following 2016 applications.

9.2 Surface Water

No surface water features are present within the application area. All surface water features, including wetlands adjacent to the application area, require 30-m application setbacks as depicted in Figure 2, Appendix One. Application rates are agronomic and restrictions on applications such as setback distances and application timing ensure no adverse impacts to surface water. Surface water will be sampled prior to, during, and following land applications as long as suitable sampling conditions are encountered.

9.3 Groundwater

Biosolids applications are not expected to impact groundwater quality in the vicinity of application areas. Groundwater will be sampled prior to, during, and following land applications from established groundwater wells around the application site.

9.4 Vegetation

Vegetation monitoring will not be undertaken as part of this LAP.

9.5 Biosolids

Biosolids to be utilized in this LAP have been sampled and reported on in this document. Biosolids monitoring is performed throughout the year and the results of this monitoring will inform the determination of the application rate throughout the lifetime of this LAP.

10 REPORTING AND RECORD-KEEPING

This LAP and associated sampling data will be kept by SYLVIS and by the registered owner of the site for at least 36 months following applications, as required by Schedule 6 of the OMRR.

Throughout biosolids applications, a qualified professional or designate will assist and supervise to ensure that biosolids are applied in accordance with the approved LAP. Written certification from the qualified professional in the form of a post-application compliance letter will be provided to the City annually following applications as per Part 3, Article 5 (3) of the OMRR.

11 REFERENCES

Day, J.H., L. Farstad, and D.G. Laird. 1959. Soil Survey of Southeast Vancouver Island and Gulf Islands. Research Branch, Canada Dept. of Agriculture.

- Environment Canada. 2016. Canadian Climate 1981-2010 Normals - Campbell River Airport. Available at http://climate.weather.gc.ca/climate_normals/results_1981_2010_e.html?stnID=145&lang=e&StationName=campbell%20river&SearchType=Contains&stnNameSubmit=go&dCode=1 (verified 25 March 2016).
- Fleenor, W. 2008. Reconnaissance Environmental Inventory – DL 52 – Potential Biosolids Application Site, Campbell River, BC. Current Environmental, Courtney, BC.
- Henry, C.L. 2005. Chapter 10: Effects of Biosolids Applications on Wildlife. *In* Understanding Biosolids. University of Washington, Bothell, WA.
- Henry, C., D.M. Sullivan, R. Rynk, K. Dorsey, and C.G. Cogger. 1999. Managing Nitrogen from Biosolids. Washington State Department of Ecology and Northwest Biosolids Management Association, WA.
- Ministry of Citizen's Services and Open Government. 2016. Connect - Geographic Services - DataBC. Available at <http://www.data.gov.bc.ca/dbc/geographic/connect/index.page> (verified 22 May 2015).

APPENDIX ONE – TABLES

Table 1: Physicochemical parameters and nutrients concentrations for soils at the NVEC in 2015.

Constituent	Minimum	Maximum	Average ^a	OMRR Soil Standard ^b	Units
Physiochemical Parameters					
Nitrate - N	62	70	66	-	mg/kg
Ammonium - N	2.6	5.9	4.3	-	mg/kg
Phosphorus (available)	110	160	135	-	mg/kg
Potassium (available)	95	97	96	-	mg/kg
Sulfate - S (available)	13	19	16	-	mg/kg
pH (1:2 Soil:Water)	4.7	4.8	4.8	-	pH
Electrical Conductivity	730	940	835	-	dS/m
Organic Matter	23.6	25.8	24.7	-	%
Cation Exchange Capacity	19	22	21	-	meq/100g
Trace Elements					
Arsenic	1.9	2.1	2.0	25	mg/kg
Cadmium	0.19	0.20	0.19	3	mg/kg
Chromium	17.0	20.0	18.5	50	mg/kg
Cobalt	8.0	8.5	8.2	40	mg/kg
Copper	74	84	79	150	mg/kg
Lead	8.1	10.3	9.2	350	mg/kg
Mercury	0.082	0.126	0.104	0.6	mg/kg
Molybdenum	1	1	1	5	mg/kg
Nickel	14	15	15	150	mg/kg
Selenium	0.6	0.6	0.6	2	mg/kg
Zinc	70.9	73.3	72.1	200	mg/kg

Note: Values were obtained from two samples, each comprised of eight equal volume subsamples, collected by SYLVIS on October 21, 2015. Samples were analyzed by Exova Laboratories in Surrey, BC.

- a When the value was reported as below detection limit, the detection limit was used in calculating the mean.
b The selection factors for these limits are discussed in Section 7.1.

Table 2: Trace element and physicochemical quality for biosolids produced at the Norm Wood Environmental Centre WWTP in 2015.

Constituent	City of Campbell River Biosolids ^a	Class A Biosolids Limits ^b	Class B Biosolids Limits ^c	Units
Physicochemical Parameters				
Total Nitrogen - TKN	6.70	-	-	%
Ammonium - N	2,313	-	-	µg/g
Nitrate - N	15.3	-	-	µg/g
Phosphorus (available)	752	-	-	µg/g
Potassium (available)	1,890	-	-	µg/g
Organic Matter	76.1	-	-	%
Total solids	3.3	-	-	%
Conductivity	466	-	-	dS m ⁻¹ @ 25° C
pH	6.7	-	-	pH units
Foreign Matter	NA ^d	1	1	% dry weight
Microbiology				
Fecal Coliforms	6,000 ^e	1,000	2,000,000	MPN / g
Trace Elements				
Arsenic	5.32	75	75	µg/g
Cadmium	3.57	20	20	µg/g
Chromium	23.0	-	1,060	µg/g
Cobalt	3.0	150	150	µg/g
Copper	1,092	-	2,200	µg/g
Lead	140	500	500	µg/g
Mercury	1.66	5	15	µg/g
Molybdenum	10.7	20	20	µg/g
Nickel	18	180	180	µg/g
Selenium	8.38	14	14	µg/g
Zinc	1,081	1,850	1,850	µg/g

- a Values represent the mean of three grab samples collected on March 12 and March 19, 2015 and February 4, 2016 by City staff. Samples were analyzed by Maxxam Laboratories in Vancouver, BC and Calgary, AB.
- b Limits specified in Trade Memorandum T-4-93 (September 1997), Standards for Metals in Fertilizers and Supplements.
- c Limits specified in OMRR for Class B biosolids, Schedule 4, Column 3.
- d Due to the use of an irrigation pivot for application of biosolids, where any foreign matter might cause a blockage, biosolids are macerated and pumped directly from the storage lagoon to the irrigation pivot.
- e Value represents the geometric mean of seven discrete grab samples, collected on March 19, May 20 (2 samples), May 27, and July 13 (2 samples), 2015 and February 4, 2016 by City staff. Samples were analyzed by Maxxam Laboratories in Vancouver, BC and Calgary, AB.

Table 3: Pre-application and predicted post-application soil concentrations at the Norm Wood Environmental Centre's Field 2.

Trace Element	Pre-application NVEC Field 2 ^a mean concentrations in soil	Mass of constituent to be applied through biosolids addition ^c	Predicted post-application concentrations in soil ^d	OMRR Soil Standard ^e
Units	mg/kg	kg/ha	mg/kg	mg/kg
Arsenic	2.00	0.09	2.04	25
Cadmium	0.19	0.06	0.22	3
Chromium	18.5	0.4	18.7	50
Cobalt	8.2	0.1	8.3	40
Copper	78.9	19.3	88.1	150
Lead	9.2	2.5	10.4	350
Mercury	0.104	0.029	0.118	1
Molybdenum	1.00	0.19	1.09	5
Nickel	14.5	0.3	14.7	150
Selenium	0.6	0.1	0.7	2
Zinc	72.1	19.1	81.2	200

Note: When the value was reported as below detection limit, the detection limit was used in calculating the mean.

- a Norm Wood Environmental Centre Field 2
- b Mass of constituent is based on an application rate of 18 dt/ha for the City of Campbell River biosolids.
- c Projected concentrations are calculated based on the pre-application soil concentrations (Table 1) and City of Campbell River biosolids concentrations (Table 2).
- d The selection factors for these limits are discussed in Section 7.1.

APPENDIX TWO – FIGURES

Figure 1: General overview of the City of Campbell River's Norm Wood Environmental Centre and surrounding areas.

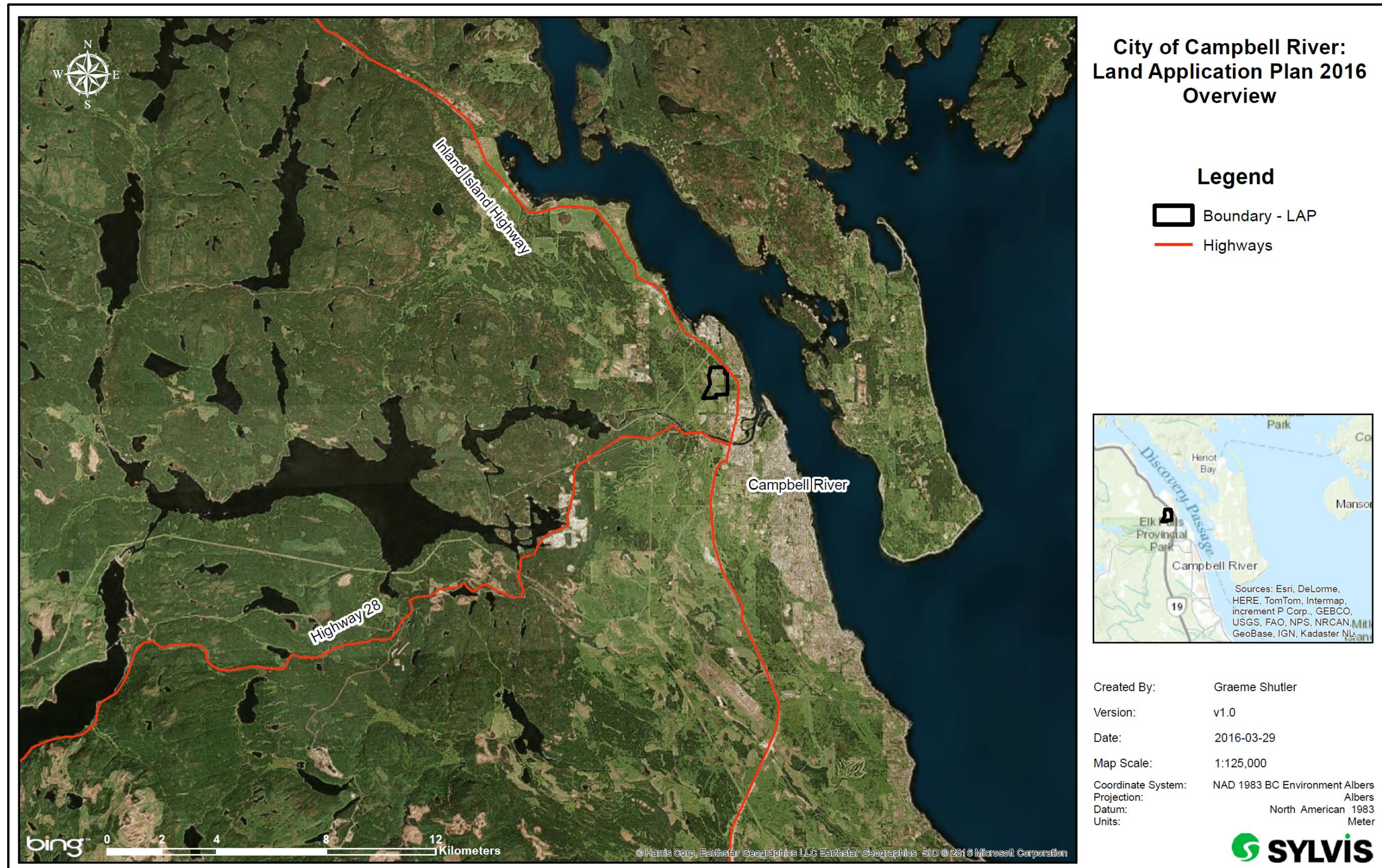
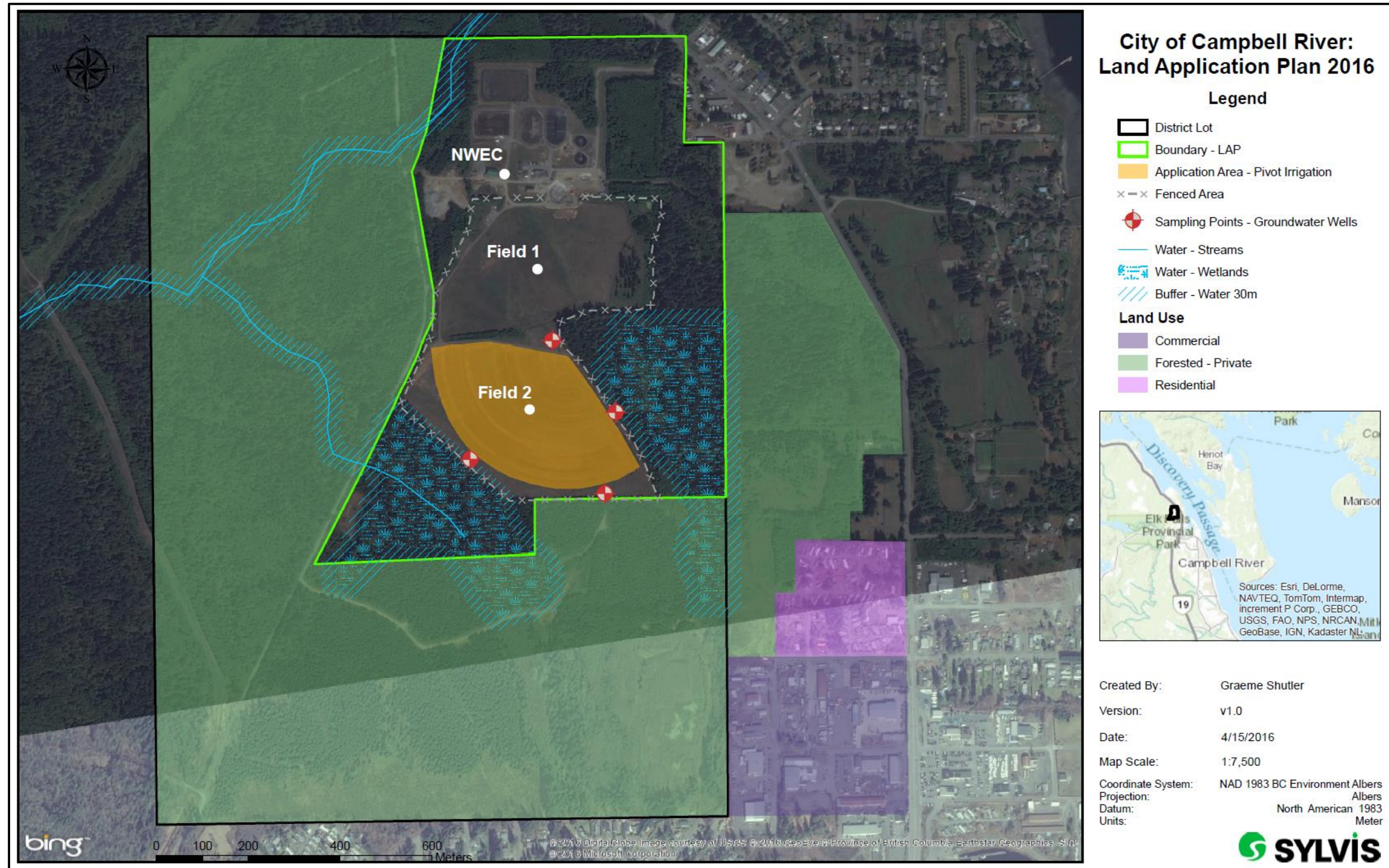


Figure 2: Site map for City of Campbell River's Norm Wood Environmental Centre depicting the proposed application area and surrounding features.



APPENDIX THREE – PHOTOGRAPHS



Photograph 1: The Norm Wood Environmental Centre Field 2 in the City of Campbell River. (April, 2015)



Photograph 2: A poly-lined storage lagoon at the City of Campbell River's Norm Wood Environmental Centre wastewater treatment plant. (April, 2015)



Photograph 3: An irrigation pivot used to land-apply liquid biosolids from the Norm Wood Environmental Centre. (April, 2015)

APPENDIX FOUR – AUTHORIZATIONS AND LAND TITLE

Part 1: Discharger Authorization

A letter is provided which 1) authorizes SYLVIS to act as the City's agent with regards to this LAP and 2) confirms that the City supports biosolids fertilization over its land.

Part 2: Confirmation of Land Ownership

Land title certificates are provided to certify that the City is the registered owner and has usage rights for land parcels included in this LAP.

PART 1: AUTHORIZATION FROM DISCHARGER



April 11, 2016

File: 5355-20/NWBM

SYLVIS Environmental
427 Seventh Street
New Westminster, B.C.
V3M 3L2

Attention: Mike Van Ham

Dear Mr. Van Ham:

Re: Discharger Authorization for the Application of Managed Organic Matter under the BC Organic Matter Recycling Regulation

Through this letter I authorize SYLVIS Environmental to act as an Agent on behalf of the City of Campbell River in discussions and activities surrounding the preparation, implementation, and reporting of a BC *Organic Matter Recycling Regulation* Land Application Plan (LAP) that SYLVIS Environmental will prepare. This authorization allows SYLVIS Environmental to act as our agent with stakeholders, regulatory agencies, and other entities in matters related to this LAP.

This LAP is required under the BC *Organic Matter Recycling Regulation* for the proposed land application of managed organic matter to land located at The Norm Wood Environmental Centre, 4000 North Island Highway, north of the Campbell River, BC. The legal descriptor of the site is:

- Lot A District Lots 52 and 120 Sayward District Plan EPP9665.

This letter also serves to provide written authorization from the City of Campbell River, being both the generator of the biosolids, as well as the registered owner of the land, acknowledging that the City of Campbell River is fully aware and sanctions the application of managed organic matter to the aforementioned property according to the most current Land Application Plan.

Any questions on this authorization for the land application of managed organic matter to the Norm Wood Environmental Center should be directed to myself.

Yours truly,

A handwritten signature in black ink, appearing to read "Lorne Sandberg", is written over a horizontal line.

Lorne Sandberg
Wastewater Supervisor
lorne.sandberg@campbellriver.ca

Operations Division

301 St. Ann's Road, Campbell River, B.C. V9W 4C7
Telephone: 250.286.5700; Fax: 250.286.5762

C:\Users\lsandberg\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\ZAWB4CM2\Discharger Authorization
2016.docx

PART 2: LAND TITLE CERTIFICATES

The Land Title Certificate presented below was obtained for the purposes of the 2015 Land Application Plan for the City of Campbell River (SYLVIS Document #1031-15). The document is included here for convenience and continuing ownership by the City of this land parcel was confirmed in April 2016.

TITLE SEARCH PRINT		2015-05-04, 20:10:01
File Reference:		Requestor: Christian Evans
CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN		
Title Issued Under	SECTION 98 LAND TITLE ACT	
Land Title District	VICTORIA	
Land Title Office	VICTORIA	
Title Number	CA2139622	
From Title Number	CA2139621 CA2139623	
Application Received	2011-08-11	
Application Entered	2011-08-19	
Registered Owner in Fee Simple		
Registered Owner/Mailing Address:	CITY OF CAMPBELL RIVER 301 ST. ANN'S ROAD CAMPBELL RIVER, BC V9W 4C7	
Taxation Authority	CITY OF CAMPBELL RIVER	
Description of Land		
Parcel Identifier:	028-650-689	
Legal Description:	LOT A DISTRICT LOTS 52 AND 120 SAYWARD DISTRICT PLAN EPP9665	
Legal Notations		
	HERETO IS ANNEXED RESTRICTIVE COVENANT CA1548593 OVER BLOCK A COAST DISTRICT PLAN 10719 (AS TO ALL EXCEPT PART FORMERLY LOT 1, VIP57724)	
	HERETO IS ANNEXED RESTRICTIVE COVENANT EF74148 INTER ALIA OVER LOT 1, PLAN VIP54479	
	HERETO IS ANNEXED EASEMENT EG125788 OVER THOSE PARTS OF CAMPBELL RIVER INDIAN RESERVE NO. 11, SAYWARD DISTRICT, LYING TO THE WEST AND NORTHWEST OF THE LINES BORDERED IN RED ON PLAN 1673R, EXCEPT THOSE PARTS IN PLANS 12883, 21743, 35318, 54523 AND VIP57205; AND LOT 1, PLAN 21743, EXCEPT PART IN PLAN VIP57205 (AS TO PART FORMERLY LOT 1, VIP57724 EXCEPT PART FORMERLY D.L. 120, SAYWARD DISTRICT)	
Title Number: CA2139622	TITLE SEARCH PRINT	Page 1 of 7

TITLE SEARCH PRINT

2015-05-04, 20:10:01

File Reference:

Requestor: Christian Evans

THIS CERTIFICATE OF TITLE MAY BE AFFECTED BY THE AGRICULTURAL LAND COMMISSION ACT; SEE AGRICULTURAL LAND RESERVE PLAN NO. 3, DEPOSITED MAY 29TH, 1974

HERETO IS ANNEXED RESTRICTIVE COVENANT P22204 (SEE DD P22203) OVER LOT A, PLAN 42194
AS TO PART FORMERLY D.L. 120, SAYWARD DISTRICT

HERETO IS ANNEXED EASEMENT P22203 OVER LOT A, PLAN 42194
AS TO PART FORMERLY D.L. 120, SAYWARD DISTRICT

HERETO (INTER ALIA) IS ANNEXED EASEMENT ED131403 OVER LOT 1, CAMPBELL RIVER INDIAN RESERVE #11, SAYWARD DISTRICT, PLAN 21743 AND THOSE PARTS OF CAMPBELL RIVER INDIAN RESERVE #11 SAYWARD DISTRICT, LYING TO THE WEST AND NORTH WEST OF THE LINES BORDERED IN RED ON PLAN 1673-R, EXCEPT THOSE PARTS IN PLANS 12883, 21743, AND 35318
AS TO PART FORMERLY D.L. 120, SAYWARD DISTRICT

HERETO IS ANNEXED RESTRICTIVE COVENANT ED131404 OVER LOT 1, CAMPBELL RIVER INDIAN RESERVE #11, SAYWARD DISTRICT PLAN 21743, AND THOSE PARTS OF CAMPBELL RIVER INDIAN RESERVE #11 SAYWARD DISTRICT LYING TO THE WEST AND NORTH WEST OF THE LINES BORDERED IN RED ON PLAN 1673R, EXCEPT THOSE PARTS IN PLANS 12883, 21743 AND 35318 (INTER ALIA)
AS TO PART FORMERLY D.L. 120, SAYWARD DISTRICT

HERETO IS ANNEXED EASEMENT EF74147 INTER ALIA OVER LOT 1, PLAN VIP54479

HERETO IS ANNEXED RESTRICTIVE COVENANT EG125789 OVER THOSE PARTS OF CAMPBELL RIVER INDIAN RESERVE NO. 11, SAYWARD DISTRICT, LYING TO THE WEST AND NORTHWEST OF THE LINES BORDERED IN RED ON PLAN 1673R, EXCEPT THOSE PARTS IN PLANS 12883, 21743, 35318, 54523, AND VIP57205; AND LOT 1, PLAN 21743, EXCEPT PART IN PLAN VIP57205 (AS TO ALL EXCEPT PART FORMERLY D.L. 120, SAYWARD DISTRICT)
DOMINANT TENEMENT IN RESPECT TO RESTRICTIVE COVENANT EG125789 CANCELLED AS TO LOTS A, B, AND C, PLAN VIP59470 BY EK35980

HERETO IS ANNEXED EASEMENT EG171215 OVER LOT 1, PLAN VIP57724
AS TO ALL EXCEPT PART FORMERLY LOT 1, VIP57724

HERETO IS ANNEXED RESTRICTIVE COVENANT EG171216 OVER LOT 1, PLAN VIP57724
AS TO ALL EXCEPT PART FORMERLY LOT 1, VIP57724

TITLE SEARCH PRINT

2015-05-04, 20:10:01

File Reference:

Requestor: Christian Evans

HERETO (INTER ALIA) IS ANNEXED RESTRICTIVE COVENANT EH102792 OVER THOSE PARTS OF CAMPBELL RIVER INDIAN RESERVE NO. 11, SAYWARD DISTRICT, LYING TO THE WEST AND NORTH WEST OF THE LINES BORDERED IN RED ON PLAN 1673R, EXCEPT THOSE PARTS IN PLANS 12883, 21743, 35318, 54523, VIP57205, VIP58923 AND VIP59470
(AS TO ALL EXCEPT PART FORMERLY LOT 1, VIP57724)

HERETO INTER ALIA IS ANNEXED EASEMENT EK140687 OVER:
THAT PART OF DISTRICT LOT 67, SAYWARD DISTRICT IN PLAN 1374RW;
THAT PART OF DISTRICT LOT 164, SAYWARD DISTRICT OUTLINED IN RED ON PLAN 1431R IN PLAN VIP64526;
THAT PART OF DISTRICT LOT 120 (DD 215778I), SAYWARD DISTRICT, EXCEPT PLANS 14946 AND VIP57724 IN VIP64527;
THAT PART OF DISTRICT LOT 2, SAYWARD DISTRICT, EXCEPT PLANS 19371, 42540, 50636, VIP64521, AND VIP64522 IN PLAN VIP64529;
THAT PART OF DISTRICT LOT 26, SAYWARD DISTRICT, EXCEPT PLANS 34604, AND 42540 IN PLAN VIP64528; AND
THAT PART OF DISTRICT LOT 52, SAYWARD DISTRICT OUTLINED IN RED ON PLAN 659RW IN PLAN VIP64530
(AS TO ALL EXCEPT PART FORMERLY LOT 1, VIP57724)

HERETO IS ANNEXED RESTRICTIVE COVENANT FB142081 OVER LOT 2, PLAN VIP64107; LOT 3, PLAN VIP64107 AND LOT 2, PLAN 42540, EXCEPT PLAN VIP64107
(AS TO ALL EXCEPT PART FORMERLY LOT 1, VIP57724)

NOTICE OF INTEREST, BUILDERS LIEN ACT (S.3(2)), SEE FB90322
FILED 2007-08-24
(AS TO PART FORMERLY LOT 1, PLAN VIP57724)

Charges, Liens and Interests

Nature:	UNDERSURFACE RIGHTS
Registration Number:	5896D
Registration Date and Time:	1903-09-01 15:00
Registered Owner:	LOUIS ROSENFELD
Remarks:	CB 16.143 AS TO ALL EXCEPT PART FORMERLY DISTRICT LOT 120, SAYWARD DISTRICT
Nature:	COAL TSN
Registration Number:	DF57613
Registration Date and Time:	1947-10-20
Remarks:	FORFEITED TO CROWN 18.10.48 DF 59465 AS TO ALL EXCEPT PART FORMERLY DISTRICT LOT 120, SAYWARD DISTRICT

TITLE SEARCH PRINT

2015-05-04, 20:10:01

File Reference:

Requestor: Christian Evans

Nature: RIGHT OF WAY
Registration Number: 165151G
Registration Date and Time: 1952-11-14 14:12
Registered Owner: BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
Remarks: INTER ALIA
AS TO PART FORMERLY DISTRICT LOT 120,
SAYWARD DISTRICT

Nature: RIGHT OF WAY
Registration Number: 184666G
Registration Date and Time: 1955-03-09 11:31
Registered Owner: BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
Remarks: AS TO ALL EXCEPT PART FORMERLY
DISTRICT LOT 120, SAYWARD DISTRICT

Nature: RESERVATION
Registration Number: 196849G
Registration Date and Time: 1956-05-28 10:00
Registered Owner: WEYERHAEUSER COMPANY LIMITED
INCORPORATION NO. A51955
Transfer Number: EX49514
Remarks: DD 257230I, SUBJECT TO 5896D
AS TO ALL EXCEPT PART FORMERLY
DISTRICT LOT 120, SAYWARD DISTRICT

Nature: UNDERSURFACE RIGHTS
Registration Number: EE12109
Registration Date and Time: 1991-02-14 16:27
Remarks: PURSUANT TO MINERAL LAND TAX ACT, S.B.C. 1979
CHAPTER 260 AND AMENDMENTS THERETO MINERALS
(EXCEPT GOLD AND SILVER) HEREIN, FORFEITED AND
VESTED IN CROWN
AS TO ALL EXCEPT PART FORMERLY DISTRICT LOT 120,
SAYWARD DISTRICT

TITLE SEARCH PRINT

2015-05-04, 20:10:01

File Reference:

Requestor: Christian Evans

Nature: EASEMENT
Registration Number: EG171215
Registration Date and Time: 1993-12-30 15:01
Remarks: APPURTENANT TO:
BLOCK B OF LOT 1504, SAYWARD DISTRICT;
BLOCK C OF LOT 1504, SAYWARD DISTRICT;
BLOCK D OF LOT 1504, SAYWARD DISTRICT;
DISTRICT LOT 109, SAYWARD DISTRICT, EXCEPT
PARCEL A (DD 285472I) AND THOSE PARTS IN PLANS
1373R, 16956, 19371, 50636, AND VIP54479;
LOT 1, PLAN 16956;
DISTRICT LOT 472, SAYWARD DISTRICT; LOT 1,
PLAN 16712; DISTRICT LOT 2, SAYWARD DISTRICT,
EXCEPT PLANS 19371, 50636, AND 42540; LOT 1,
PLAN 42540; DISTRICT LOT 26, SAYWARD DISTRICT,
EXCEPT PART IN PLANS 34604 AND 42540; LOT 1599,
SAYWARD DISTRICT; THAT PART OF DISTRICT LOT 52,
SAYWARD DISTRICT SHOWN OUTLINED IN RED ON PLAN
659RW; THAT PART OF DISTRICT LOT 67, SAYWARD
DISTRICT SHOWN OUTLINED IN RED ON PLAN
659RW; THAT PART OF DISTRICT LOT 67, SAYWARD
DISTRICT SHOWN OUTLINED IN RED ON PLAN 1374RW;
THAT PART OF DISTRICT LOT 151, SAYWARD DISTRICT
SHOWN OUTLINED IN RED ON PLAN 1433R; THAT PART
OF DISTRICT LOT 163, SAYWARD DISTRICT SHOWN
OUTLINED IN RED ON PLAN 1431R; DISTRICT LOT 164,
SAYWARD DISTRICT SHOWN OUTLINED IN RED ON PLAN
1431R; LOT 1, PLAN 13220; LOT A, PLAN
20538; DISTRICT LOT 120 (DD215778I),
SAYWARD DISTRICT, EXCEPT PARTS IN PLAN
14946 AND VIP57724; DISTRICT LOT 52,
SAYWARD DISTRICT, EXCEPT PART IN PLANS
659RW, 42194 AND VIP57724
DOMINANT TENEMENT CANCELLED AS TO PART IN
LOT 1, PLAN 13220 - EH49091 - 15.04.1994
K JACQUES PER DC.
(AS TO PART FORMERLY LOT 1, VIP57724)

TITLE SEARCH PRINT

2015-05-04, 20:10:01

File Reference:

Requestor: Christian Evans

Nature: RESTRICTIVE COVENANT
Registration Number: EG171216
Registration Date and Time: 1993-12-30 15:02
Remarks: APPURTENANT TO:
BLOCK B OF LOT 1504, SAYWARD DISTRICT;
BLOCK C OF LOT 1504, SAYWARD DISTRICT;
BLOCK D OF LOT 1504, SAYWARD DISTRICT;
DISTRICT LOT 109, SAYWARD DISTRICT, EXCEPT
PARCEL A (DD 285472I) AND THOSE PARTS IN PLANS
1373R, 16956, 19371, 50636, AND VIP54479;
LOT 1, PLAN 16956;
DISTRICT LOT 472, SAYWARD DISTRICT; LOT 1,
PLAN 16712; DISTRICT LOT 2, SAYWARD DISTRICT,
EXCEPT PLANS 19371, 50636, AND 42540; LOT 1,
PLAN 42540; DISTRICT LOT 26, SAYWARD DISTRICT,
EXCEPT PART IN PLANS 34604 AND 42540; LOT 1599,
SAYWARD DISTRICT; THAT PART OF DISTRICT LOT 52,
SAYWARD DISTRICT SHOWN OUTLINED IN RED ON PLAN
659RW; THAT PART OF DISTRICT LOT 67, SAYWARD
DISTRICT SHOWN OUTLINED IN RED ON PLAN
659RW; THAT PART OF DISTRICT LOT 67, SAYWARD
DISTRICT SHOWN OUTLINED IN RED ON PLAN 1374RW;
THAT PART OF DISTRICT LOT 151, SAYWARD DISTRICT
SHOWN OUTLINED IN RED ON PLAN 1433R; THAT PART
OF DISTRICT LOT 163, SAYWARD DISTRICT SHOWN
OUTLINED IN RED ON PLAN 1431R; DISTRICT LOT 164,
SAYWARD DISTRICT SHOWN OUTLINED IN RED ON PLAN
1431R; LOT 1, PLAN 13220; LOT A, PLAN
20538; DISTRICT LOT 120 (DD215778I),
SAYWARD DISTRICT, EXCEPT PARTS IN PLAN
14946 AND VIP57724; DISTRICT LOT 52,
SAYWARD DISTRICT, EXCEPT PART IN PLANS
659RW, 42194 AND VIP57724
DOMINANT TENEMENT CANCELLED AS TO PART IN
LOT 1, PLAN 13220 - EH49092 - 15.04.1994 -
K JACQUES PER DC.
(AS TO PART FORMERLY LOT 1, VIP57724)

Nature: EASEMENT
Registration Number: EH49093
Registration Date and Time: 1994-04-15 13:39
Remarks: APPURTENANT TO LOT 2, PLAN 42540.

Nature: RESTRICTIVE COVENANT
Registration Number: EH49094
Registration Date and Time: 1994-04-15 13:39
Remarks: APPURTENANT TO LOT 2, PLAN 42540.

TITLE SEARCH PRINT

2015-05-04, 20:10:01

File Reference:

Requestor: Christian Evans

Nature: EASEMENT
Registration Number: CA2182447
Registration Date and Time: 2011-09-09 09:24
Remarks: APPURTENANT TO DISTRICT LOT 52,
SAYWARD DISTRICT, EXCEPT PART IN
PLANS 659 RW, 42194, VIP57724 AND EPP9665

Nature: STATUTORY RIGHT OF WAY
Registration Number: CA3181397
Registration Date and Time: 2013-06-17 08:17
Registered Owner: BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

Nature: STATUTORY RIGHT OF WAY
Registration Number: CA3181398
Registration Date and Time: 2013-06-17 08:17
Registered Owner: TELUS COMMUNICATIONS INC.
INCORPORATION NO. A55547

Duplicate Indefeasible Title NONE OUTSTANDING

Transfers NONE

Pending Applications NONE

APPENDIX FIVE – STATEMENT OF LIMITATIONS

SYLVIS has prepared a Land Application Plan (LAP) for the purpose of biosolids applications to soil. This LAP will be limited to the specific site, development, and design objectives for fertilization of Norm Wood Environmental Centre managed by the City of Campbell River, (“Landowner”) accessed from 4000 North Island Highway, Campbell River, BC.

This LAP is intended for use by persons or companies familiar with biosolids and their management, real property such as the subject property, and persons or companies that are familiar with land use terminology, methodology, and reporting. Any questions about this LAP, its use, terms, scope, research, or the analytical methodology used should be directed to its author.

This LAP must not be used partially but only in the context in which it is presented. SYLVIS cannot monitor changes to their reports once they leave their office, nor can they prevent changes, additions or deletions in copies of their reports. SYLVIS recommends that people intending to rely on their report do so only after reading an original report in its entirety.

The Client and/or Landowner and regulators are the only parties who may rely on the opinions expressed in this LAP. As this LAP has been prepared exclusively for the City of Campbell River, no one else may rely on this LAP without the written consent of the author, which SYLVIS may not provide retroactively. SYLVIS expressly denies any legal liability for unauthorized reliance and for any other use.

No one other than the Landowner or biosolids Producer/Client may use or copy this LAP for any purpose without the written consent of SYLVIS. Exceptions exist when required by due process of law or if subject to confidential review by the British Columbia Ministry of Environment.

The analysis contained in this LAP and the basis for the opinions and estimates may rely upon written and verbal information obtained from a variety of sources that SYLVIS considers reliable. This LAP is not prepared for court purposes or for arbitration; as such, some of the information set out in this LAP may not be fully documented or confirmed by reference to primary sources. Information provided by the Landowner and/or Producer may not be verified with other parties unless so indicated in this LAP. Any information provided to SYLVIS by the Landowner and/or Producer is believed to be correct and reliable. General market and environmental information is derived from various public sources as well as from various individuals believed to be knowledgeable in these matters. It is recognized that information from others is believed to be correct, but accuracy cannot be guaranteed. The veracity of information provided to SYLVIS by others will be accepted unless SYLVIS has specific reason for doubt, in which case further confirmation is sought. Soil quality predictions are predicated upon laboratory analysis of the soil and biosolids, and that SYLVIS cannot assume responsibility for the accuracy of such analyses where the basis is third-party sources. SYLVIS has included plans and sketches for visual reference only and SYLVIS cannot assume responsibility for the accuracy of such illustrations where the basis was third-party sources.

SYLVIS will not complete technical investigations such as:

- Contaminated Site Assessments;

- Hydrogeological Assessments; and
- Terrain Stability Assessments.

SYLVIS will undertake no investigation with the BC Ministry of Environment or any other government regulatory agency except as expressly described in this LAP. The subject property must comply with such government regulations. Any non-compliance may affect this LAP. Confirming compliance could require further investigations.

Unless otherwise stated in this LAP, the existence of any contaminants or hazardous materials, which may or may not be present on the property, is not assessed. SYLVIS will neither source hazardous materials or contaminated land studies nor commission such a study. SYLVIS has no knowledge of the existence of such materials on or in the property. SYLVIS is not retained to detect such substances, the presence of which may materially affect the value of the property. No responsibility is assumed by SYLVIS for any such conditions, or for any specialized expertise or engineering knowledge required to discover them or to remove or eliminate them.

Attendance at any legal proceedings with respect to this LAP, and any fees and expenses for preparation and attendance are to be agreed upon in advance. However, neither this nor any other of these limiting conditions is an attempt to limit the use that might be made of this LAP should it properly become evidence in a judicial proceeding. In such a case it is the judicial body that will decide the use of this LAP that best serves the administration of justice.

APPENDIX SIX – OMRR SCHEDULE 7

This Appendix provides the information requested in Schedule 7 of the British Columbia *Organic Matter Recycling Regulation* (OMRR). The ordering of the headings reflects that of the OMRR.

1A. MANAGED ORGANIC MATTER PRODUCTION FACILITIES

Norm Wood Environmental Centre (NVEC) Wastewater Treatment Plant

Street Address: 4000 North Island Highway, Campbell River, BC

Legal Address: Lot A District Lots 52 And 120 Sayward District Plan EPP9665

1B. LOCAL CONTACTS FOR DISCHARGER

City of Campbell River

Lorne Sandberg, Wastewater Supervisor, Utilities Department

Address: 4000 North Island Highway, Campbell River, BC, V9H 0C2

Phone: 250-286-4833

Email: lorne.sandberg@campbellriver.ca

1C. LAND APPLICATION PLAN AUTHOR

SYLVIS Environmental

Lesley Dampier, PAg, Program Manager

Address: 427 Seventh Street, New Westminster, BC V3M 3L2

Phone: 1.800.778.1377

Facsimile: 604.777.9791

Email: ldampier@sylvis.com

1D. OWNER OF THE LAND APPLICATION SITE

The property is on municipal land. The City of Campbell River is the landowner and Lorne Sandberg, who is the primary contact for matters relating to this land parcel, can be contacted at the address and telephone number below.

Address: 4000 North Island Highway, Campbell River, BC, V9H 0C2

Phone: 250-286-4833

1E. ADDRESS AND LEGAL DESCRIPTION OF THE LAND APPLICATION SITE

Street Address: 4000 North Island Highway, Campbell River, BC

Legal Lot Description: Lot A District Lots 52 And 120 Sayward District Plan EPP9665

PID: 028-650-689

1F. LOCATION OF LAND APPLICATION SITE

Refer to Figure 1 and Figure 2 in Appendix Two of this document.

1G. AUTHORIZATION OF LAND APPLICATION SITE OWNER

The registered landowner supports the biosolids fertilization program (see Appendix Four, Part 1 of this document).

1H. LAND APPLICATION TIME PERIOD

Applications are scheduled to occur over a three-year period (2016-2018).

1I. STORAGE AND LEACHATE MANAGEMENT REQUIREMENTS

Biosolids storage areas will not be within 30 metres (m) of any water course or water source for domestic use.

1J. MANAGED ORGANIC MATTER TO BE LAND-APPLIED

Biosolids managed on site will be OMRR Class B biosolids originating from the NVEC. Biosolids data from 2015 and early 2016 are provided in the supporting documentation.

2A. FECAL COLIFORM DENSITY IN THE MANAGED ORGANIC MATTER

Norm Wood Environmental Centre

City biosolids adhere to Class B limits (< 2,000,000 MPN/g) based on the geometric mean of 6,000 MPN/g from seven discrete grab samples collected by NVEC staff throughout 2015 and 2016.

2B. VECTOR ATTRACTION REDUCTION PROCESS OR MANAGEMENT METHOD

Norm Wood Environmental Centre

Through aerobic digestion, City biosolids meet Class B time-temperature Vector Attraction Reduction (VAR) process requirements as stipulated in Section 1 of the OMRR Schedule 2. During 2015 and 2016 the Specific Oxygen Uptake Ratio (SOUR) of City biosolids was 0.04 milligrams of O₂ per hour per gram (mg O₂/hr/g), well below the OMRR limit of 1.5 mg O₂/hr/g.

2C. TOTAL SOLIDS CONTENT OF THE MANAGED ORGANIC MATTER

Norm Wood Environmental Centre

- Total solids: 3.3%.

This is the mean of three samples, each composed of eight equal volume sub-samples collected in 2015 and early 2016.

2D. TOTAL KJELDAHL NITROGEN CONCENTRATION IN THE MANAGED ORGANIC MATTER

Norm Wood Environmental Centre

- Total Kjeldahl Nitrogen: 6.7%

This is the mean of three samples, each composed of eight equal volume sub-samples collected in 2015 and early 2016.

2E. AMMONIUM AND NITRATE CONTENT OF THE MANAGED ORGANIC MATTER

Norm Wood Environmental Centre

- Ammonium: 2,313 µg/g
- Nitrate Nitrogen: 15.3 µg/g

These are the means of three samples, each composed of eight equal volume sub-samples collected in 2015 and early 2016.

2F. AVAILABLE PHOSPHORUS AND POTASSIUM IN THE MANAGED ORGANIC MATTER

Norm Wood Environmental Centre

- Available Phosphorus: 752 µg/g.
- Available Potassium: 1,890 µg/g.

These are the means of three samples, each composed of eight equal volume sub-samples collected in 2015 and 2016.

2G. LAND APPLICATION NUTRIENT GOALS

The goal for the agricultural land (Feld 2) at the NVEC is fertilization that will increase soil fertility and improve productivity through nutrient additions.

2H. TRACE ELEMENT CONCENTRATIONS IN PRE-APPLICATION SOIL

Pre-application soil sampling was conducted as per Section 4.5 of this document. Trace elements in the pre-application soil samples are all below the relevant limits stipulated in OMRR for Agricultural Land under the site-specific factors detailed in Section 7.1 (see Table 3, Appendix One of this document).

2I. PH AND ELECTRICAL CONDUCTIVITY OF SOIL PRE-APPLICATION

- pH: 4.8
- EC: 0.84 dS/m @ 25° C

Two composite samples, each consisting of eight equal volume sub-samples, were collected from within 0 – 0.15 m of the soil surface over the prospective application areas. The data presented here represent the mean concentrations of the two samples taken.

2J. TRACE ELEMENT CONCENTRATIONS IN MANAGED ORGANIC MATTER

Trace element concentrations in City biosolids are below all OMRR trace element limits for Class A and B biosolids (see Table 2, Appendix One of this document).

2K. PH AND ELECTRICAL CONDUCTIVITY IN MANAGED ORGANIC MATTER

Norm Wood Environmental Centre

- pH: 6.7
- EC: 0.47 dS/m @ 25° C

These are the means of three samples, each composed of eight equal volume sub-samples collected in 2015 and early 2016.

3A. PROJECTIONS OF THE POST-APPLICATION SOIL TRACE ELEMENT CONCENTRATIONS

This LAP contains calculated application rates to agricultural land for City biosolids. Accordingly, projected post-application soil trace element concentration calculations have been completed using City biosolids values.

All calculated post-application soil trace element concentrations are below the relevant limits stipulated in OMRR for Agricultural Land under the site-specific factors detailed in Section 7.1 (see Table 3, Appendix One of this document).

Predictions of post-application soil trace element concentrations will be calculated in each year (2016-2018) that land application is proposed and estimated concentrations will remain below applicable OMRR soil limits.

3B. POST-APPLICATION SOIL SAMPLING METHOD

Biosolids application rates will not exceed annual crop nutrient requirements. Post-application soil sampling is not required; however, since applications occur annually, pre-application soil samples for the subsequent year can also serve as post-application soil samples for the current year.

3C. SITE-SPECIFIC MANAGEMENT METHODS

Information signs will be posted at the entrances to all application areas at the NVEC. As the property is located on private land, access by the public is controlled.

30-metre (m) buffers will be in place surrounding water features and 20-m buffers will be established along property boundaries and major roads.

Liquid biosolids will be applied via an irrigation pivot 300-m irrigation pivot which swings through an arc of approximately 130°.

3D. MANAGEMENT METHODS FOR CLASS B BIOSOLIDS WITH FECAL COLIFORM DENSITIES >1,000 MPN/G

As per OMRR and the site-specific management methods discussed in the previous sections.

3E. MANAGEMENT METHODS FOR CLASS B BIOSOLIDS NOT ACHIEVING VAR REQUIREMENTS

Not applicable.

3F. MANAGEMENT METHODS FOR CLASS B COMPOST NOT ACHIEVING MATURITY REQUIREMENTS

Not applicable.

3G. APPLICATION RATES

Based on the biosolids quality at the time of authoring this LAP, the anticipated application rate in 2016 will be 18 dt/ha of NVEC liquid biosolids. The target application rate is based on the nutrient concentrations of the biosolids and requirements of the site. The application rate may be re-assessed throughout the application season based on the nitrogen content of the biosolids. This ensures that any changes in nitrogen content does not affect the fertilization objectives.

As this LAP is proposed over a three-year period (2016-2018), annual application rates will be recalculated each year based on the most recent soil and biosolids quality data.

For the purposes of research on vegetation and soil responses to biosolids fertilization, biosolids application rates may exceed agronomic rates in selected application areas. Applications will be calculated such that post-application soil trace element concentrations conform to applicable OMRR soil trace element limits.

3H. POST-APPLICATION MONITORING PLAN

Post-application monitoring is not required as the calculated biosolids application rates are based on annual vegetation nutrient requirements. However, groundwater will be sampled prior to, during, and following biosolids land applications. Soil samples will be collected prior to land applications, and as the applications occur on the same parcel of land each year, can serve as post-application samples.

APPENDIX SEVEN – OMRR SCHEDULE 13

This Appendix provides the information requested in Schedule 13 of the British Columbia *Organic Matter Recycling Regulation* (OMRR). The ordering of the headings reflects that of the OMRR.

A. NAME AND ADDRESS OF DISCHARGER

Norm Wood Environmental Centre (NVEC) Wastewater Treatment Plant

Street Address: 4000 North Island Highway, Campbell River, BC

Legal Address: Lot A District Lots 52 And 120 Sayward District Plan EPP9665

B. LOCAL CONTACT FOR DISCHARGER

City of Campbell River

Lorne Sandberg, Wastewater Supervisor, Utilities Department

Address: 4000 North Island Highway, Campbell River, BC, V9H 0C2

Phone: 250-286-4833

Email: lorne.sandberg@campbellriver.ca

C. ADDRESS AND LEGAL DESCRIPTION OF THE LAND APPLICATION SITE

Street Address: 4000 North Island Highway, Campbell River, BC

Legal Lot Description: Lot A District Lots 52 And 120 Sayward District Plan EPP9665

PID: 028-650-689

D. OWNER OF THE LAND APPLICATION SITE

The property is on private land. The City of Campbell River (the City) is the landowner and is the primary contact person for the NVEC, the mailing address for which is provided below.

Address: 4000 North Island Highway, Campbell River, BC, V9H 0C2

Phone: 250-286-4041

E. LAND APPLICATION SITE ON/WITHIN

- Agricultural Reserve Land
- Permitted Watershed
- Agricultural Land
- Not applicable

F. IF ON ALR OR AGRICULTURAL LAND, WILL IT PRODUCE

- edible crops with harvested parts above ground
- edible crops with harvested parts below ground
- tree crops
- livestock graze the site
- forage crops
- not applicable

G. PREVIOUS WASTE MANAGEMENT #

Not applicable.

H. TYPE OF MANAGED ORGANIC MATTER

Biosolids produced at the NVEC waste water treatment plant, operated by the City, comply with all OMRR Class B Quality Criteria and biosolids land applications will result in post-application soil trace element concentrations below the OMRR soil quality limits associated with the site-specific factors identified for this LAP.

I. LAND APPLICATION SCHEDULE

Applications are enabled for a three-year period (2016-2018) following the 30-day period after submission of this LAP to the BC Ministry of Environment. Applications are scheduled to occur between June and October of each year.

J. APPLICATION RATES

Based on the biosolids quality at the time of authoring this LAP, the anticipated application rate in 2016 will be 18 dt/ha of NVEC liquid biosolids. The target application rate is based on the nutrient concentrations of the biosolids and requirements of the site. The application rate may be re-assessed throughout the application season based on the nitrogen content of the biosolids. This ensures that any changes in nitrogen content does not affect the fertilization objectives.

As this LAP is proposed over a three-year period (2016-2018), annual application rates will be recalculated each year based on the most recent soil and biosolids quality data.

For the purposes of research on vegetation and soil responses to biosolids fertilization, biosolids application rates may exceed agronomic rates in selected application areas. Applications will be calculated such that post-application soil trace element concentrations conform to applicable OMRR soil trace element limits.

K. MAXIMUM CUMULATIVE TRACE ELEMENT ADDITION

Maximum cumulative trace element additions presented in the following table are based on a single application at the agronomic rate of 18 dt per hectare.

Arsenic	0.09	kg/ha	Mercury	0.03	kg/ha
Cadmium	0.06	kg/ha	Molybdenum	0.19	kg/ha
Chromium	0.41	kg/ha	Nickel	0.32	kg/ha
Cobalt	0.05	kg/ha	Selenium	0.15	kg/ha
Copper	19.34	kg/ha	Zinc	19.14	kg/ha
Lead	2.48	kg/ha			

Applications will be calculated such that post-application soil trace element concentrations conform to applicable OMRR soil trace element limits.

L. PRE-APPROVED SOIL STANDARDS

Not applicable.

M. ATTACHED MAP

Refer to Figure 1 and Figure 2 in Appendix Two of this document.

N. AUTHORIZATION OF LAND OWNER

The landowner has provided a letter authorizing the use of biosolids at NVEC Field 2. This authorization is presented in Part 2, Appendix Four of this document.