

# Silverberry Landfill Capacity Expansion Project Summary

08-088-20W6M

Submitted under:

*Canadian Environmental Assessment Act, 2012*

Submitted by:

Tervita Corporation

February 2016





# 1.0 General Information and Contacts

## 1.1 - Nature of Designated Project and Proposed Location

Tervita Corporation (Tervita) owns and operates the Silverberry Secure landfill (the Facility) which is approximately 50km north of Fort St John, British Columbia (BC). The Facility was originally constructed in 2003 and currently consists of seven landfill cells with one to be developed under the existing approval, for a total approved capacity of 6,000,000 tonnes. The Facility is constructed on privately owned land at 08-088-20W6M. Only solid, non-secure (non-hazardous) and select secure (hazardous) oilfield, forestry and industrial wastes are accepted for disposal at the landfill (see Section 2.0). The Facility currently holds approval PR 17150 from the BC Ministry of Environment (MoE) and approval PAC WD02-01 from the BC Environmental Assessment Office (EAO).

Tervita is seeking an amendment to PR 17150 and PAC WD02-01 to replace depleted landfill capacity, which will provide for an estimated additional 30 year lifespan of the Facility. The proposed capacity replacement project (the Project) consists of seven new cells with 6,000,000 tonnes of capacity constructed in a staged approach over time on freehold lands currently owned by Tervita. The Project will not increase the input capacity at the Facility but rather increase the total capacity.

Similar to the existing Facility footprint, the proposed Project is on privately owned land of which a majority has been previously cleared and cultivated. The Project is located immediately east of the current landfill footprint on 08-088-20W6M. This land was subject to an Environmental Impact Assessment as part of the original application for both the MoE and EAO approvals. The Project area and associated components are shown in the Detailed Site Plan.



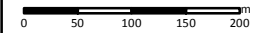
October 2015

**DETAILED SITE PLAN**  
**TERVITA SILVERBERRY**  
**SECURE LANDFILL**  
**CAPACITY REPLACEMENT**

661198

- Access/Resource Road
- Proposed Capacity Replacement
- Proposed Cell Block
- Existing Cell Block
- Soil Stockpile

SCALE: 1:7,000



(All Locations Approximate)



UTM Zone 10N  
 Imagery: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Roads: IHS Inc. 2015.

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

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## **1.2 - Proponent Information**

The name of the designated project is the "Silverberry Capacity Replacement Project." The proponent information is as follows:

### **The name of the proponent and associated address:**

Tervita Corporation  
500, 140-10<sup>th</sup> Avenue SE  
Calgary, AB, T2G 0R1

### **The Chief Executive Officer of Tervita:**

Chris Synek  
Chief Executive Officer  
[csynek@tervita.com](mailto:csynek@tervita.com)  
D: (403) 231-1139

### **The Principal Contact Person for the Project:**

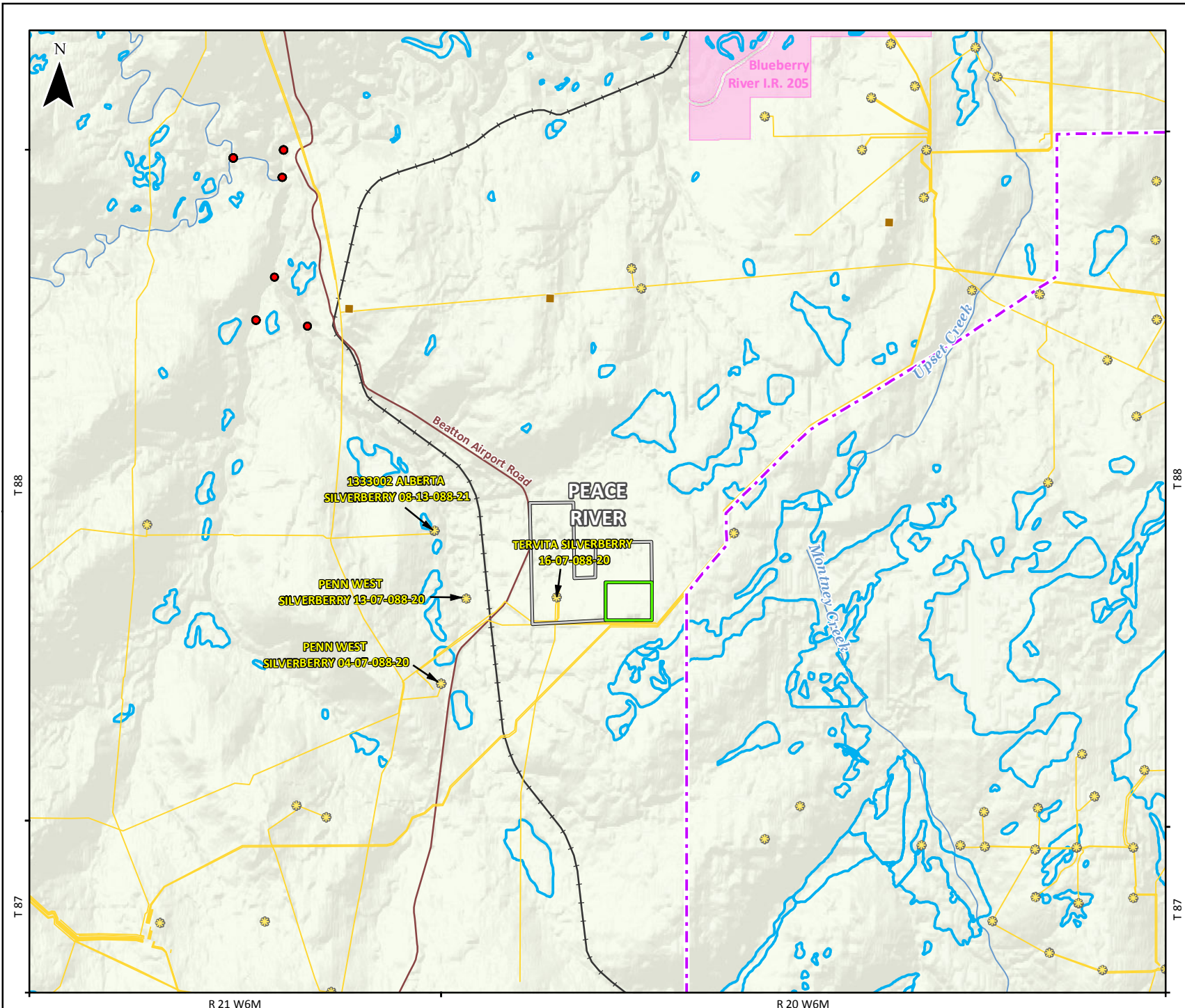
Peter Nelson  
Advisor, Environment & Regulatory  
[pnelson@tervita.com](mailto:pnelson@tervita.com)  
D: (403) 234-4875

## **1.3 - Consultation with Other Parties Including Aboriginal Groups**

In working with the EAO, consultation activities have been separated into a Public Consultation Plan and a First Nations Consultation Plan.

### **Public Consultation Plan**

The Public Consultation Plan will utilize a 3.2km radius for consultation and 5km radius for notification to identify key stakeholder groups. Elected local municipal leaders will also be notified. Immediate residences, as well as the location of the designated Project relative to existing features are shown in the Regional Overview Map.



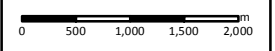
October 2015

**REGIONAL OVERVIEW**  
**TERVITA SILVERBERRY**  
**SECURE LANDFILL**  
**CAPACITY REPLACEMENT**

661198

- Proposed Lateral Expansion
- Existing Silverberry Landfill
- Energy Facilities
- Known Fish Observation
- Residence
- Existing Pipeline
- Road
- Railway
- Watercourse
- Transmission Line
- City/Town/Village
- Indian Reserve/  
First Nation Settlement
- Water Body
- Wetland

SCALE: 1:70,000



(All Locations Approximate)



UTM Zone 10N  
Hillshade: TERA Environmental Consultants 2008; Energy Facilities and pipeline: IHS Inc. 2015; Fish Observation: BC MOE 2011; Residence: CH2M 2015; Roads: NRCAN 2014; Railway: NRCAN 2012; Hydrology: NRCAN 2007-2011; Transmission Line: BC Hydro 2011; City/Town: IHS Inc. 2014; Indian Reserve: Government of Canada 2015; Wetland: BC Forests, Lands and Natural Resource Operations 2008.

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## **Information Package**

Tervita will hand-deliver project specific information to residents within 3.2km, as well as to elected local municipal leaders. Packages will be mailed to other identified stakeholders between 3.2km and 5km and will also be available at scheduled information session(s) and on Tervita's website. Information provided in the public consultation package will contain, at a minimum, the following:

- A Project overview;
- Map of location and footprint;
- Proposed scheduling;
- Environmental considerations;
- Safety considerations; and
- Tervita contacts.

## **Information Session(s)**

Tervita will schedule and host at least two formal public information sessions (Open Houses) at a location within reasonable distance from the Project, noting the closest feasible area is Buick, BC. Tervita project management employees and subject-matter experts will be in attendance to provide information, address questions and record public comment. The information sessions will be advertised in the local newspaper(s), while notifications will be sent via direct mail to residents, occupants, landowners and other interested parties (stakeholders) within the designated notification radius. Tervita will capture questions and comments along with the associated follow up/answers. Feedback forms will be available at the information sessions for participants to request additional material or who prefer written correspondence.

Tervita's objective is to work with potentially affected stakeholders and interested parties to identify adverse effects related to Tervita's Project activities. Tervita's objectives also include:

- Commencing consultation early in the Amendment planning process;
- Identifying how stakeholders and interested parties wish to be consulted and allowing flexibility in the manner and form of notification and consultation (e.g., in-person meetings, working groups, brochures, letters, phone calls, emails, mail and/or websites);
- Ensuring stakeholders and interested parties have an accurate understanding of the Amendment and are given the opportunity to provide their feedback;
- Communicating in plain language;
- Allowing sufficient time to review Amendment materials;
- Adequately responding to concerns raised; and
- Seek to avoid, address, mitigate or otherwise manage impacts identified through the consultation process in a timely manner.

## **First Nations Consultation Plan**

Since July 2014, Tervita has been involved in preliminary discussions with identified First Nations as Tervita has worked to develop an understanding of issues, concerns and interests related to Project activities. Tervita will continue to consult with identified BC



Treaty 8 First Nations. The Treaty 8 First Nations communities identified by the EAO are identified below:

- Blueberry River First Nations; and
- Doig River First Nation.

While not specified by the EAO, Tervita has and will continue to communicate with, inform and notify the following additional Treaty 8 First Nations:

- Halfway River First Nation;
- West Moberly First Nation;
- Saulteau First Nation;
- Prophet River First Nations;
- McLeod Lake Indian Band; and
- Fort Nelson First Nation.

#### **1.4 - Regulatory Requirements of Other Jurisdictions**

The Facility currently operates under the following permits:

- MoE permit: PR 17150 (as amended February, 2012); and
- EAO permit: PAC WD02-01 (July 15, 2002).

The Project is subject to an Environmental Assessment as per the BC *Environmental Management Act* - Reviewable Project Regulations. A project description was submitted to the EAO in February 2014, with the EAO acknowledging that the project was reviewable.

#### **1.5 - Presence of Environmental Study**

The designated project will not be taking place in a federally sanctioned region that has been the subject of an environmental study as confirmed verbally with the Canadian Environmental Assessment Agency (CEAA) on August 10, 2015.



## 2.0 Project Information

### 2.1 - General Description under Regulations Designating Physical Activities

In 2002, Tervita (formally CCS Inc.) was issued approvals from the EAO and MoE. The EAO issued PAC WD02-01 and MoE issued PR 17150 for the construction and operation of the Facility. Tervita is seeking to amend PAC WD02-01 and PR 17150 to incorporate an additional area approximately the same size as the original 25-hectare landfill, which would provide for an estimated additional 30 year lifespan of the Facility. The designated Project is deemed to fall under an activity listed in the CEAA Regulations Designating a Physical Activity as per Section 2.2 of this Project Description.

### 2.2 - Provisions in the Schedule to the Regulations Designating Physical Activities

As per previous communications and as deemed in a formal letter sent by CEAA August 6, 2015, Paragraph 30 of the *Act*, applies to Tervita's Project, as it has been deemed reviewable since *"The construction, operation, decommissioning and abandonment of [the] Facility is used exclusively for the treatment, disposal or recycling of hazardous waste, or an expansion of a Facility that would result in an increase in its production capacity of more than 50%"*.

Tervita acknowledges CEAA's interpretation of Paragraph 30. Tervita is pleased to provide the following information on the operations of the landfill as context for CEAA in the review of the Project. The Silverberry landfill is not used exclusively as a hazardous waste facility. As seen in Table 2-1, a significant portion of the waste is non-hazardous, (non-hazardous by both provincial and federal standards).





**Table 2-1: 2014 Tervita Silverberry Hazardous and Non-Hazardous Waste Volumes**

| Substance                                  | Total Volume (Tonnes) | Non-Hazardous Volume (%) | Hazardous Volume (%) | Applicable Provincial Hazardous Criteria  | Applicable Federal Hazardous Criteria  |
|--|-----------------------|--------------------------|----------------------|---|--|
| Catalyst Non-Sulphur                       | 343.25                | 100.00                   | 0.00                 | N/A   | N/A  |
| Catalyst Sulphur                           | 69.11                 | 100.00                   | 0.00                 | N/A   | N/A  |
| Cement                                     | 2,019.14              | 100.00                   | 0.00                 | N/A   | N/A  |
| Construction & Demo Material               | 184.40                | 31.05                    | 68.95                | -Waste oil >3% content<br>-Leachable Benzene, Toluene, Ethylbenzene, and or Xylenes (BTEX)<br>-Flash Point < 60.5°C | -TDG substance, solids containing flammable liquids, Class 4.1<br>-Substances with Toluene, Ethylbenzene and Xylene greater than or equal to 100 mg/kg<br>-Substances with Benzene producing a leachate in concentration greater than or equal to 0.5 mg/L |
| Contaminated Soil (Chemical/Solvent)       | 610.64                | 45.33                    | 54.67                | -Waste oil >3% content<br>-Leachable Benzene, Toluene, Ethylbenzene, and or Xylenes (BTEX)<br>-Flash Point < 60.5°C | -TDG substance, solids containing flammable liquids, Class 4.1<br>-Substances with Toluene, Ethylbenzene and Xylene greater than or equal to 100 mg/kg<br>-Substances with Benzene producing a leachate in concentration greater than or equal to 0.5 mg/L |
| Contaminated Soil ( Crude Oil/ Condensate) | 28,432.98             |                          |                      |   |  |
| Contaminated Soil (Mercury/ Metals)        | 6,931.11              |                          |                      |   |  |
| Contaminated Soil (Pesticide / Herbicide)  | 0.00                  |                          |                      |   |  |
| Contaminated Soil (Produced / Salt Water)  | 35,230.80             |                          |                      |   |  |
| Contaminated Soils (Refined Fuels / Oils)  | 16,735.90             |                          |                      |   |  |
| Contaminated Soils (Sulphur)               | 205.44                |                          |                      |   |  |
| Dessicant                                  | 4.17                  | 100.00                   | 0.00                 | N/A   | N/A  |
| Frac Sand ( Non- Radioactive)              | 154.03                | 100.00                   | 0.00                 | N/A   | N/A  |
| Incinerator Ash/ Buffer                    | 6,518.82              | 98.36                    | 1.64                 | -Wood incinerator ash > pH 8  | -TDG substance, corrosive solids, Class 8  |
| Sand Produced                              | 38.21                 | 100.00                   | 0.00                 | N/A   | N/A  |
| Flare Pit Material                         | 29,530.04             | 100.00                   | 0.00                 | N/A   | N/A  |
| Hydrocarbon Contaminated Material          | 11,432.67             | 100.00                   | 0.00                 | N/A   | N/A  |
| Lime Sludge                                | 238.02                | 100.00                   | 0.00                 | N/A   | N/A  |
| Contaminated Process Material (Pad Waste)  | 6,172.69              | 100.00                   | 0.00                 | N/A   | N/A  |
| Sulphur                                    | 1,252.75              | 69.28                    | 30.72                | -Waste oil >3% content<br>-Leachable Benzene, Toluene, Ethylbenzene, and or Xylenes (BTEX)<br>-Flash Point < 60.5°C | -TDG substance, solids containing flammable liquids, Class 4.1<br>-Substances with Toluene, Ethylbenzene and Xylene greater than or equal to 100 mg/kg<br>-Substances with Benzene producing a leachate in concentration greater than or equal to 0.5 mg/L |
| Misc. Waste Industrial                     | 37,690.38             | 100.00                   | 0.00                 | N/A   | N/A  |
| Drilling Waste Hydrocarbons                | 273,564.65            | 20.36                    | 79.64                | -Waste oil >3% content<br>-Leachable Benzene, Toluene, Ethylbenzene, and or Xylenes (BTEX)<br>-Flash Point < 60.5°C | -TDG substance, solids containing flammable liquids, Class 4.1<br>-Substances with Toluene, Ethylbenzene and Xylene greater than or equal to 100 mg/kg<br>-Substances with Benzene producing a leachate in concentration greater than or equal to 0.5 mg/L |
| Drilling Waste Gel Chemical                | 17,355.56             |                          |                      |   |  |
| Drilling Waste Advanced Chemical           | 49,559.34             |                          |                      |   |  |
| NORM                                       | 16,775.32             | 5.73                     | 94.27                | -Waste oil >3% content<br>-Leachable Benzene, Toluene, Ethylbenzene, and or Xylenes (BTEX)<br>-Flash Point < 60.5°C | -TDG substance, solids containing flammable liquids, Class 4.1<br>-Substances with Toluene, Ethylbenzene and Xylene greater than or equal to 100 mg/kg<br>-Substances with Benzene producing a leachate in concentration greater than or equal to 0.5 mg/L |
| Liner Disposal                             | 1,348.42              | 100.00                   | 0.00                 | N/A   | N/A  |
| <b>Total:</b>                              | <b>542,397.84</b>     | <b>38.09</b>             | <b>61.91</b>         | <b>N/A</b>  | <b>N/A</b>   |



Only solid, non-hazardous and select hazardous oilfield, forestry and industrial wastes are accepted for disposal at the landfill. In determining the breakdown of hazardous versus non-hazardous waste, Tervita reviewed both Provincial and Federal criteria. In 2014, approximately 40% of the waste accepted into the landfill was non-hazardous. Of the remaining 60% of waste streams which have the potential to be hazardous, only a portion were deemed hazardous.

Federally, hazardous waste is determined using the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*. Resultantly, only the following waste streams accepted at the Facility have the potential (depending on concentrations) to be hazardous:

- Contaminated Soils (Crude Oil / Condensate);
- Contaminated Soils (Refined Fuels / Oils);
- Flare Pit Material;
- Hydrocarbon Contaminated Material;
- Drilling Waste Hydrocarbons; and
- Incinerator Ash/Buffer.

The waste streams listed above consist of approximately 60% of the waste accepted at the Facility, of which only a portion meets the criteria for hazardous waste. The ability of the Facility to accept hazardous wastes is very limited when compared to other Secure landfills in Alberta.

### **2.3 - Components Associated with the Designated Project**

There will be no new buildings or structures added to the Facility as part of the Project. Existing structures include a scale, a scalehouse, a quonset and a fuel tank for refueling equipment. The Project will replace the Facility capacity with an additional 6,000,000 tonnes of volume and increase the Facility's lifespan to support regional economic activity.

The design of the capacity replacement is comprised of six cells of varying sizes. Cell construction is staged over time, as one is filled the next is built. As each cell is developed, the liner and leachate collection systems will be tied together to provide a continuous liner system under the entire expansion area. This will allow development of the expansion area as one contiguous fill mass, rather than individual pockets, which is common landfill construction practice. Additionally, the design of the capacity replacement provides for a 50m wide secure buffer zone on the property owned by Tervita, surrounding the active area of the landfill.

### **Construction**

Construction of the first cell is scheduled to start as soon as practicable following the receipt of Project approvals and seasonal limitations. The current estimate is for construction to start in summer 2017. The construction period for the initial cell will be approximately two months, starting with major earthworks, proceeding through liner installation and finishing with the leachate collection system installation.



The construction labor force will consist of project engineers, liner installation specialists, and contractors for general earthwork. The total labor force will vary from 5-20 persons at any time, depending on the stage of construction. There will be no construction camp onsite. Construction personnel will likely be accommodated in Fort St. John, BC.

## **Operations**

Waste will arrive at the site on trucks owned and operated by third party oilfield companies. There will be no increase in traffic volume as a result of the landfill expansion. Only solid, non-secure (non-hazardous) and select secure (hazardous) oilfield, forestry and industrial wastes are accepted for disposal at the landfill. Third-party food wastes or other readily biodegradable wastes are not permitted for disposal at the Facility. Gases resulting from the decomposition of landfilled wastes are not expected due to the nature of the solid wastes. The Facility utilizes specific waste acceptance procedures prior to accepting and processing all incoming waste to ensure only approved wastes are accepted.

Hydrocarbon odors may be present at times in the vicinity of the active landfilling area, but are not expected to be detectable at the Facility property boundaries. Emissions are negligible and are only attributed to onsite heavy machinery.

Landfill leachate will be collected and stored within engineered lined ponds and trucked off-site for disposal in injection wells. A third party provides trucking service while Tervita owns and operates the injection wells and sites. The water injection wells are permitted by the BC Oil and Gas Commission (OGC) and the BC MoE for disposal of non-hazardous waste. There will be no change to injection sites or wells as a result of the landfill expansion as the existing site(s) have the capacity to handle. Leachate volumes are expected to remain consistent as landfill cells are progressively capped in order to reduce the generation of leachate.



## Closure

An updated closure plan was submitted for review to the MoE in March, 2015. Closure costs for the Facility were updated in 2015 and the appropriate surety provided to the Province of BC. As a requirement of the MoE permit, Tervita has to update closure costs for the Facility annually and adjust financial security. At the end of its operational life, the Facility will be decommissioned and post closure activities will commence. Post closure activities will be completed for a minimum of 25 years upon Facility closure.

### 2.4 - Emissions, Discharges and Waste

The emissions, discharges and waste that will be generated as a result of construction and operation are summarized in Table 2-2.

**Table 2-2: Facility Generated Emissions, Discharge and Waste**

| Waste Type   | Source   | Phase                      | Location   |
|--|--|----------------------------|--|
| Air Emissions (SO <sub>x</sub> , NO <sub>x</sub> and Particulate Matter) | Construction equipment emissions while building landfill and dust from roads | Construction and Operation | Throughout landfill roadways and expansion                               |
| Liquid Discharge   | Surface water collection   | Construction and Operation | Stormwater pond  |
| Leachate   | Water that comes into contact with waste in the landfill                     | Operation                  | Un-capped landfill cells stored within a lined leachate containment pond |
| Used Oil   | From equipment at landfill   | Construction and Operation | Used oil tank  |
| Municipal Solid Waste  | Day to day landfill operations   | Construction and Operation | Operational Buildings  |

### 2.4 - Project Schedule

It is anticipated that the final cell of the existing Facility footprint will be constructed and filled to capacity by 2018. Tervita estimates that all amendments will be in place by spring 2017 with construction to commence in summer 2017. A schedule is outlined in Table 2-3.



**Table 2-3: Project Schedule**

| <b>Phase of Project</b>            | <b>Activities</b>  | <b>Date</b>      |
|------------------------------------|--|------------------|
| EAO and MoE permits obtained       | Permitting   | Spring 2017      |
| Equipment mobilized to site        | Transportation   | Spring 2017      |
| Construction of landfill expansion | Land clearing, excavating, grading, stockpiling of excavated material, compaction and liner installation | Summer-Fall 2017 |
| Demobilization of equipment        | Transportation   | Fall 2017        |
| Landfill operation                 | Excavating, grading, and compaction  | 2017-2047        |
| Closure or future expansion        | See section 2.3  | 2047             |



## 3.0 Project Location

### 3.1 - Facility Coordinates

The Facility is located at Latitude 56.626814 and Longitude -121.157348.

#### Site Map/Plans

The conceptual capacity replacement is illustrated in the Detailed Site Plan and shows a total of six proposed cells. In 1963, the land was purchased from the Ministry of Crown Lands (Province of BC 1963). Between 1970 and 1972, the south part of Block A, Section 8 and Block B, Section 7 was cleared. The Archeological Overview Assessment completed in 2002 deemed the area to have low archeological potential.

The Project Overview Map and Treaty 8 Territory Map illustrates the location of residences, Federal lands and instances of settlement land. There are no Federal lands in the vicinity except for the Blueberry First Nations reserve. The Project is within the Treaty 8 First Nations Territory as per the Treaty 8 Territory Overview.











October 2015

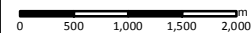
### PROJECT OVERVIEW

#### TERVITA SILVERBERRY SECURE LANDFILL CAPACITY REPLACEMENT

661198

-  Proposed Lateral Expansion
-  Existing Silverberry Landfill
-  Residence
-  Road
-  Railway
-  Watercourse
-  Indian Reserve/ First Nation Settlement
-  Crown Land Tenure

SCALE: 1:70,000



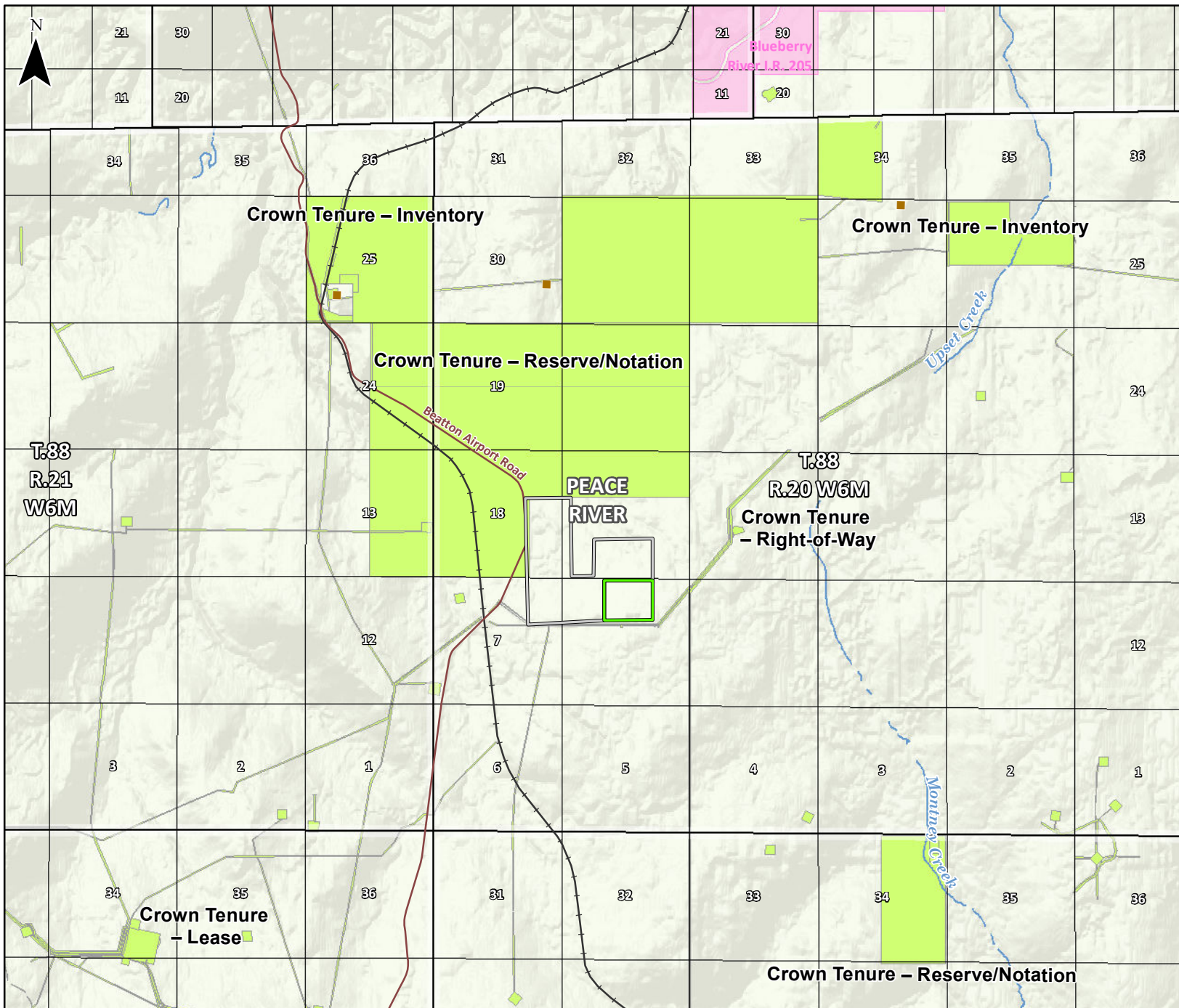
(All Locations Approximate)



UTM Zone 10N  
 Imagery: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aergrid, IGN, IGP, swisstopo, and the GIS User Community; Roads: NRCAN 2014; Railway: NRCAN 2012; Watercourse: NRCAN 2007-2011; Indian Reserve: Government of Canada 2015; Crownland Tenure: BC MFLNRO 2008; Residence: CH2M 2015.

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EARTH MATTERS

October 2015

### TREATY 8 TERRITORY TERVITA SILVERBERRY LANDFILL AMENDMENT APPLICATION PROJECT

661198

- Project Area
- Highway
- Railway
- City/Town/Village
- Provincial Boundary
- Treaty 8 Territory
- Water Body

SCALE: 1:4,000,000



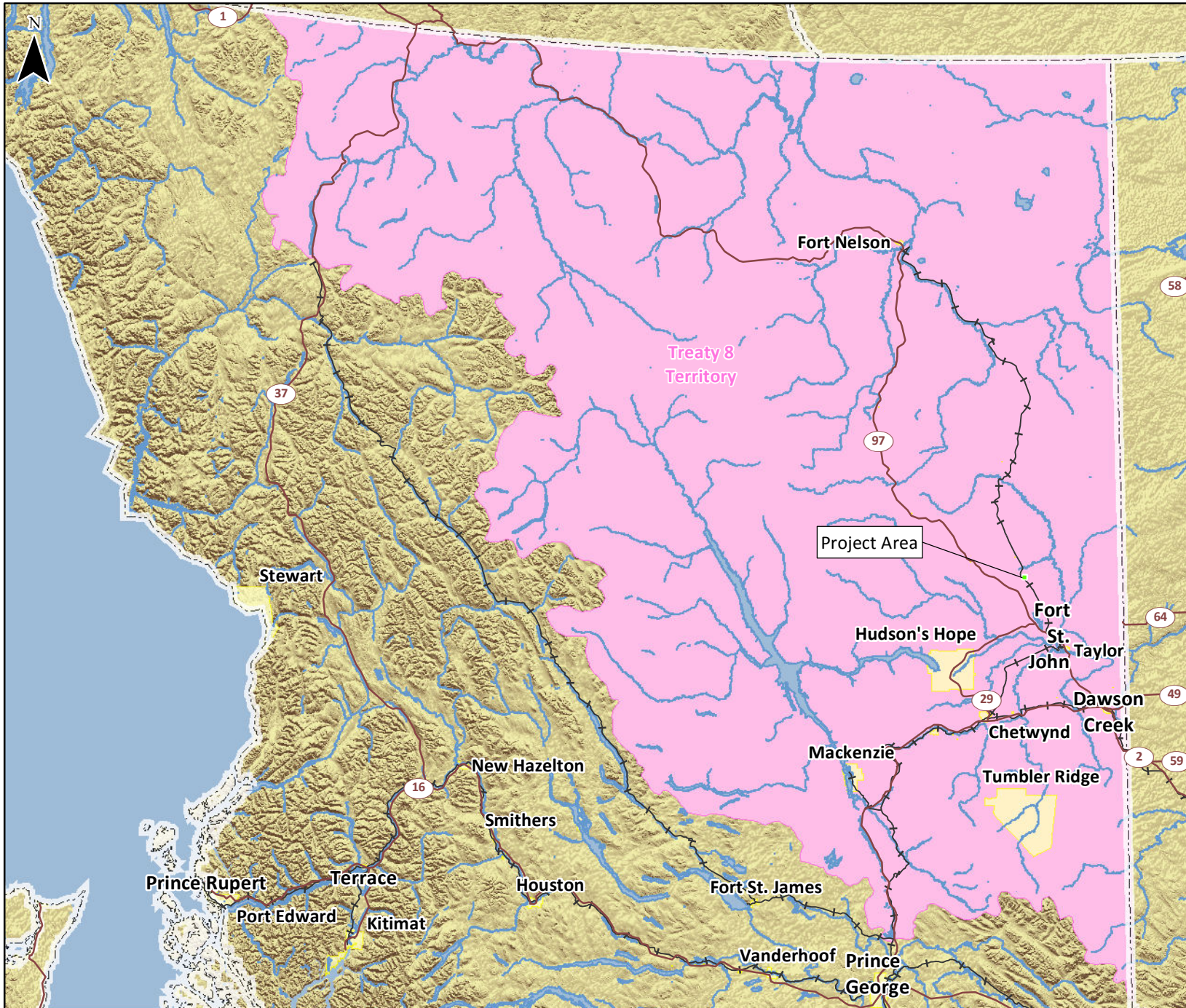
(All Locations Approximate)

## CH2MHILL.

UTM Zone 10N  
Hillshade: TERA Environmental Consultants 2008; Roads and Provincial Boundary: ESRI 2005; Railways: USNIMA 2000; Municipalities: IHS Inc. 2014; Hydrography: IHS Inc. 2004; Treaty Territory: Digitized from BC Gov Map 2007.

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### **3.2 - Zoning Designation of land**

The legal land location of the Facility is 08-088-20W6M. The existing landfill and the Project are located on privately owned land. The property was rezoned from Public Use to Oil and Gas Production to accommodate the construction of a secure landfill. There are four main land and resources uses that occur within a 5km radius of the Facility – agriculture, forestry, oil and gas exploration and development, and trapping.

### **3.3 - Land/Water use plans near project site**

The Project falls within the Fort Nelson Land and Resource Management Study area, but is not within any of the designated Resource Management Zones (Protected Zone, Special Management Zone, General Management Zone, or Enhanced Resource Development Area). The closest Resource Management Zone is the Enhanced Resource Development Zone which is approximately 100km northwest of the Facility.

### **3.4 - Impact on Aboriginal Traditional Land Use**

The designated project area will not access, occupy, explore or develop land or resources currently being used for traditional purposes by regional Aboriginal peoples. The Archeological Overview Assessment completed in 2002 deemed the area to have low archeological potential. The current Facility is fenced to Provincial regulations. The Project is on private land, and once constructed, it will also be fenced to the same standard as the current Facility.



## **4.0 Federal Funding**

### **4.1 - Financial Support from Federal Authorities**

Tervita expects no financial support from Federal authorities.

### **4.2 - Federal Lands Used Under Designated Project**

No Federal lands will be used for the purpose of the designated project.

### **4.3 - List Federal Permits, Licenses or Other Required Authorizations**

No Federal permits, licenses or authorizations will be required.



## **5.0 Environmental Effects**

### **5.1 - Physical and Biological Setting**

#### **Air Quality / Odor**

The only source of emissions generation is from the excavators and bulldozers used to process waste at the Facility. There are no residents or neighbors near the Facility. Tervita believes there is no need to mitigate this source at this time.

During periods of low precipitation, the Facility will use water collected in runoff controls (i.e. ponds) to water roads for dust control. As there are no residents or neighbors near the Facility, concerns related to dust are not anticipated.

The proposed disposition of wastes in a landfill will store the carbon in the waste fill and result in negligible release of carbon dioxide to the atmosphere. Given the total volume of waste to be landfilled over the life of the Project and expected carbon content of the waste, there will be a significant net reduction of carbon dioxide released to the atmosphere. By direct landfilling materials, the carbon is being sequestered, thereby decreasing overall greenhouse gas emissions.

#### **Wildlife / Animal Mortalities**

No significant habitat loss or alteration will occur on the Project site (a large majority of the site was previously utilized for agriculture prior to the Facility being constructed). Any potential impacts from the proposed Project on wildlife resources are likely to be highest in the far east corner of the property, where there is a small treed area that is to be cleared. Prior to the removal of the trees, a wildlife survey will be completed to assess and help develop mitigations as required for potential wildlife impact(s). The wildlife survey will include a bird survey to identify potential and resulting effects to migratory birds.

Given the Project area is primarily cultivated land adjacent to the current operating landfill footprint, there is little expected impact on wildlife habitat and habitat effectiveness. Tervita will take into consideration when wildlife are most vulnerable (i.e. nesting or fledgling season) prior to any tree removal activities.

#### **Fisheries and Surface Water**

The closest naturally occurring fish-bearing watercourse is over 1.2km north of the Project footprint, and no permanent or defined drainage networks exists between the proposed Project and the identified watercourse. Pathways to surface water exist when Tervita discharges collected and tested water from the surface water control network. Tervita discharges surface water via a controlled release to the soil (ground) in proximity to the surface water pond on the northern boundary of the Facility. Tervita will take care not to discharge to saturated soil to minimize the potential of infiltration to nearby surface water bodies.



The potential impact of the proposed Project on fish populations is disturbance to or contamination of food sources in drainages upstream of fish-bearing habitat. The risk of disturbance and contamination is low due to the proximity of the water bodies.

There are several engineered surface water bodies designed to manage runoff at the Facility. Seasonal surface water drainage from the proposed Project (i.e., snow melt and rainfall) will be controlled by ditches, berms, and ponds. Surface drainage flows northwest from the Facility, toward a surface water pond. All surface water within the Facility footprint is directed and contained onsite. Engineered onsite surface controls do not contain fish and are not considered suitable habitat.

Considering the characteristics of the natural environment as previously described, and the scope of the Project operations and Project design, no potential impacts to aquatic resources in the area are anticipated.

## **Groundwater**

Potential impacts to the groundwater at the Facility and the surrounding area are contamination of groundwater from landfill operations. The landfill is designed with liners, leak detection and leachate collection systems that meet or exceed all applicable requirements.

Tervita maintains a Groundwater Monitoring Program that samples onsite groundwater wells and leachate collection points four times annually (spring, summer, fall, and winter). The objectives of the Groundwater Monitoring Program are to meet the requirements of the Facility's MoE permit, to provide long-term monitoring of groundwater conditions at the landfill, and to assess whether there are any effects on groundwater due to the landfill operations.

Regular groundwater monitoring has been conducted at the landfill before and after site commissioning. Review of the leak detection sample data indicates that the current leachate collection and containment system(s) are operating properly.

## **Soils**

The soils in the region are dominated by Orthic Gray, Orthic Dark, Gleyed Gray and Gleyed Dark Gray Luvisols. The Orthic Gray Luvisols have a thin grayish Ae horizon, a transitional AB or B4 horizon and a slowly pervious Bt horizon. The Dark Gray Luvisol is similar to the Orthic profile except for the presence of an Ah horizon greater than 5cm thick. The Bt horizon in these soils slows downward water movement, which often results in a perched water table, during spring break up or after lengthy rainfall events. Color change from the A to B horizons is generally poor.

## **Vegetation**

The proposed Project footprint will primarily be on cultivated land. There is a small treed area to the east of the Facility and approximately 0.016km<sup>2</sup> of vegetation will be removed. Upon Facility closure, reclamation activities will be completed with the capped landfill cells seeded with an approved regional seed mixture.



An Ecological assessment was completed and indicated that the treed area contains young aspen-rose-creamy peavine. One moist, shrubby area was observed at the eastern side of the study area composed of willows, alder and bluejoint reedgrass. No invasive plant species or rare plant species were documented.

## **Terrain**

The topography of the site is sloped from the southeast to northwest at approximately 45 horizontal to 1 vertical (45:1). Approximately 30m of vertical relief is present within the proposed landfill site.

## **Noise**

There will be vehicle noise generated by both construction and operational phases of the Project. Truck traffic, heavy equipment, back-up beepers, and speaker systems are typical noises generated from Facility activities. These noise sources may be temporarily increased during times of construction, however during normal Facility operations it is not expected to increase from current noise conditions.

The noise generation will occur regularly during the daylight hours where vehicular traffic is at its peak; however, such noises are generally of a volume that would not normally be noticeable outside the boundaries of the Facility. The closest seasonal neighbor is approximately 2.5km away. No significant noise impacts are anticipated from the Facility.

## **Economic and Social**

The socio-economic effects resulting from the Project will be regionally positive. The Facility and the community will continue to benefit through regular, full-time employment in Facility operations, as well as an increased number of jobs during construction phases of the Project.

The landfill provides the oil and gas industry with an economically viable and environmentally responsible waste management solution in northeastern BC. The existence of competitive disposal facilities in the area increases the economic viability of BC oil and gas within the North American market, encourages further development leading to increased royalty revenues for the Crown, and enhances employment and economic opportunities within the region extending from Fort Nelson to Fort St. John.

The Facility will continue to provide permanent and contract employment positions throughout the construction, operation, maintenance, expansion, and closure phases over the lifetime of the Facility. The Facility currently employs 10 people to manage day to day operations. During the addition of new landfill cells, up to 20 additional employees are expected to be onsite throughout the construction phases.



## **Cultural and Heritage**

Impacts to cultural and heritage issues as a result of the Project are not anticipated. In 1963, the land was purchased from the Ministry of Crown Lands. Between 1970 and 1972, the south part of Block A, Section 8 and Block B, Section 7 was cleared. The Archeological Overview Assessment completed in 2002 deemed the area to have low archeological potential.



## 5.2 - Potential Impact to Fish and Fish Habitat, Marine Plants and Migratory Birds

Topics related to fish, fish habitat and marine plants are of minimal concern due to the location of the proposed development as no pathways exist between the proposed Project location and adverse effects to fish or natural fish habitat. Given the Project area is primarily cultivated land adjacent to the current operating landfill footprint, there is little expected impact on wildlife habitat and habitat effectiveness. On the east edge of the proposed footprint, there is a stand of young aspen and alders that are going to be mulched (approximately 0.016km<sup>2</sup>). The removal of the trees will result in reduced habitat effectiveness in the immediate area; however, mitigation measures such as timing of mulching will be reviewed prior to removal of trees.

Peace Forest District lands surrounding the Project may provide habitat for wildlife species, including mammals, birds and amphibians. Boreal forests, including coniferous, deciduous and mixed wood stands, may provide nesting and foraging habitat for birds (e.g., songbirds and raptors), as well as thermal and security cover for mammals (e.g., moose). Seasonally and permanently wet areas may provide nesting habitat for waterfowl and riparian birds, breeding habitat for amphibians, and foraging habitat for mammals. The BC Conservation Data Centre, identified 47 potentially occurring species at risk in the Peace Forest District (which includes the Project Area), including 42 species on the provincial red and blue lists, and 15 species listed as Threatened, Endangered or Special Concern on Schedule 1 of the *Species At Risk Act* (SARA), and 20 migratory bird species. Recent wildlife fieldwork identified 4 mammal species, 23 bird species (of which 21 are migratory and 19 are not at risk) and 1 amphibian species within the Project Area. As per Table 5-1, three species of conservation concern were observed including Canada warbler (Blue listed in BC, designated as Threatened on the SARA (Schedule 1), common nighthawk (designated as Threatened on SARA Schedule 1), and western toad (Blue listed in BC, designated as Special Concern on SARA Schedule 1). The Project footprint is dominated by an agricultural hayfield that is unlikely to provide suitable nesting or breeding habitat. However, construction related noise is likely to be heard several hundred meters away before dissipating to levels below ambient noise, which will likely result in sensory-related disturbance to bird species in the forested portion of the Project footprint, or in nearby habitats. Noise-related sensory disturbance could induce nest abandonment, or interfere with mating rituals. Mitigation measures will include: restrict clearing outside of known fledging times and performing pre-construction surveys for active migratory bird nests within the Project Footprint.



**Table 5-1: Species Observed During Field Work**

| <b>Birds</b>                  |                          |                        |
|-------------------------------|--------------------------|------------------------|
| <b>Species</b>                | <b>Migratory Species</b> | <b>Special Status</b>  |
| American redstart             | Yes                      | N/A                    |
| American robin                | Yes                      | N/A                    |
| Black-and-white warbler       | Yes                      | N/A                    |
| Black-capped chickadee        | No                       | N/A                    |
| Canada warbler                | Yes                      | SARA (Threatened)      |
| Chipping sparrow              | Yes                      | N/A                    |
| Clay-colored sparrow          | Yes                      | N/A                    |
| Common nighthawk              | Yes                      | SARA (Threatened)      |
| Golden-crowned kinglet        | Yes                      | N/A                    |
| Hermit thrush                 | Yes                      | N/A                    |
| House sparrow                 | No                       | N/A                    |
| Lazuli bunting                | Yes                      | N/A                    |
| Northern harrier              | Yes                      | N/A                    |
| Red-breasted nuthatch         | Yes                      | N/A                    |
| <i>Red-eyed vireo</i>         | Yes                      | N/A                    |
| <i>Ruby-crowned kinglet</i>   | Yes                      | N/A                    |
| <i>Savannah sparrow</i>       | Yes                      | N/A                    |
| <i>Swainson's thrush</i>      | Yes                      | N/A                    |
| <i>Townsend's solitaire</i>   | Yes                      | N/A                    |
| <i>White-throated sparrow</i> | Yes                      | N/A                    |
| <i>Wilson's warbler</i>       | Yes                      | N/A                    |
| <i>Winter wren</i>            | Yes                      | N/A                    |
| <i>Yellow-rumped warbler</i>  | Yes                      | N/A                    |
| <b>Mammals</b>                |                          |                        |
| <i>Deer species</i>           | N/A                      | N/A                    |
| <i>Elk</i>                    | N/A                      | N/A                    |
| <i>Moose</i>                  | N/A                      | N/A                    |
| <i>Red squirrel</i>           | N/A                      | N/A                    |
| <b>Amphibians</b>             |                          |                        |
| <i>Western toad</i>           | N/A                      | SARA (Special Concern) |





### **5.3 - Changes to the Environment on Federal Lands, Provinces or Outside Canada**

There will be no changes to the environment on Federal lands or any other province, besides BC. The Project is being reviewed by the EAO.

### **5.4 - Effects on Aboriginal Peoples**

Environmental effects of the Project will be contained onsite and will have minimal effects to the Aboriginal peoples. Ongoing consultation in the form of project updates will be completed with Aboriginal Peoples as the Project progresses. Potential environmental effects related to Aboriginal peoples have been identified through the Canadian Environmental Assessment Act 2012 (CEAA 2012), Section 5(1)(c). Environmental effects on Aboriginal people include:

- Health conditions;
- Socio-economic conditions;
- Physical and cultural heritage;
- Current use of lands and resources; and
- Historical/archaeological.

#### **Health Effects**

Health may be affected through air, surface water and groundwater pathways. Impacts to these pathways are expected to be limited to the Facility footprint.

The regional study area for air quality will encompass a 5.0km radius extending outwards from the proposed Project Footprint boundary, including associated physical works and activities. Heavy equipment will produce emissions which will be increased during construction but remain the same as they are now during operations. Perception of odour and dust from construction equipment and wind erosion can affect quality of life; however, due to the nature of the landfill materials, landfill gas generation will be minimal. Dust from construction material handling and earth grading can affect terrestrial vegetation. Tervita limits the impact of dust through watering site roads and waste, revegetation of soil stockpiles and limiting the speed limit onsite. Implementing the above measures will limit dust impacts to Tervita's property boundary.

There is potential for contamination of surface water by the proposed Project due to stormwater runoff. Runoff that has come into contact with waste will be handled as leachate and segregated to ensure it is handled and disposed of properly. There are berms around the outside landfill boundary to stop the run-on of clean surface water and limit potential contamination. Ditching around the inside of the landfill boundary collects surface water within the footprint and directs the water to an engineered surface water pond. Surface water from the pond is tested for criteria laid out in the BC HWR prior to discharge to ensure contaminants are not released to the environment. Surface water quantity is not expected to be a concern as no changes to surface water quantity have been observed at the existing landfill. Construction and operation may introduce groundwater contamination. Groundwater contamination may affect downstream surface water, aquatic habitat or



drinking water through migration of leachate through the soil to groundwater or aquifers. The landfill liner system is designed to prevent contamination of groundwater. Silverberry is built to Secure Landfill specifications as laid out in the BC HWR. The composite primary liner system is a 1.5 mm thick HDPE primary liner with a 0.6 m thick Compacted Clay Liner (CCL) immediately below the HDPE. This is underlain by a leak detection system and a secondary 0.6 m thick CCL. Liner materials may vary from each cell development noting that design requirements of the HWR will be met. Information from previous site investigations and data collection efforts (i.e., annual groundwater monitoring program) will be completed on a scheduled basis to ensure the groundwater is not being contaminated.

### **Socio-economic Effects**

The socio-economic effects resulting from the Project will be positive for the Aboriginal communities in the area as the Facility and the communities will continue to benefit through potential opportunity in full-time employment in Facility operations, or work during construction phases of the Project.

### **Physical and Cultural Heritage Effects**

Impacts to cultural and physical heritage as a result of the Project are not anticipated. There is a small treed area to the east of the Facility and approximately 0.016km<sup>2</sup> of vegetation will be removed. The project on cultivated land and the removal of vegetation will not alter the landscape in such a manner that it will effect physical and cultural heritage or alter the current land and resources for traditional purposes. Tervita has initiated consultation with local Aboriginal trappers and any concerns will be addressed.

### **Current use of lands and resources**

The current lands of the proposed footprint is owned by Tervita is not used for any traditional purposes. Except for the vegetation onsite (0.016km<sup>2</sup>), the proposed footprint is cultivated and hayed yearly.

Through meetings with the community, it was confirmed verbally that trapping was active in the 1970s near the project area. However, due to development in the area, active trapping by local first nations has not been conducted in the area for approximately 30 years.



## **6.0 Proponent Engagement and Consultation with Aboriginal Groups**

### **6.1 - List of Aboriginal Groups Potentially Interested / Affected by Designated Project**

Since July 2014, Tervita has been involved in preliminary discussions with the identified First Nations and has worked to develop an understanding of issues, concerns and interest related to Tervita's activities. Tervita will continue to consult with identified BC Treaty 8 First Nations. Specifically, the Treaty 8 First Nations communities identified by the EAO are:

- Blueberry River First Nations (BRFN); and
- Doig River First Nation (DRFN).

While not specified by the EAO, Tervita has and will continue to communicate with, inform and notify the following Treaty 8 First Nations:

- Halfway River First Nation (HRFN);
- West Moberly First Nation (WMFN);
- Sauteau First Nation (SFN);
- Prophet River First Nations (PRFN);
- McLeod Lake Indian Band (MLIB); and
- Fort Nelson First Nation (FNFN).

The Project land is not currently and historically has not been used for traditional purposes by Aboriginal groups or peoples. A previous Archeological Overview Assessment was completed in 2002 deemed the area to have low archeological potential.

### **6.2 - Engagement and Consultation Activities with Aboriginal groups**

Tervita has provided Project information through pre-consultation communications with all identified Treaty 8 First Nations. During preliminary discussions, questions were raised with regards to general operations, odor control, groundwater/surface water quality, wildlife management and an increase in truck traffic during construction. All questions were addressed through personal communication in which operations, standard operating practices as well as best management practices were discussed. Tervita will continue ongoing communications with the various Communities.

It was previously determined that the Project area would be subject to review under the Archaeology Branch of the BC Ministry of Forests, Lands and Natural Resource Operations (*Heritage Conservation Act*). An Archaeological Impact Assessment was completed and it was determined that no archaeological resources have been found on the Project Footprint. The proposed Project has a low probability of affecting archaeological sites and historic sites through direct disturbance.



### **6.3 - Consultation and Notification Plan**

Consultation and information gathering will be to the satisfaction of the EAO and the MoE. Consultation will be conducted with the DRFN and BRFN in accordance with the EAO. Tervita will address all pertinent concerns with these First Nations. A Project Description has been given to SFN, WMFN and PRFN. Tervita is exceeding EAO requirements by engaging the above First Nations to ensure positive relations by way of regular Project updates.



# 7.0 Consultation with the Public and Others

## 7.1 - Key Comments, Concerns and Response Expressed to date by Stakeholders

The Public Consultation Plan will utilize a 3.2km radius for consultation and 5km radius for notification to identify key stakeholder groups as well as to elected local municipal leaders. The stakeholder group, methods and timing of consultation and notification activities are outlined below in Table 7-1. Consultation completed with the public to date has not resulted in any concerns. As consultation is ongoing, any new information will be recorded, updated and communicated.

**Table 7-1: Public Consultation Schedule**

| Phase   | Stakeholders   | Activities  |
|---|--|---|
| 1) Initial Consultation<br><br>July 1, 2015 – Ongoing | <ul style="list-style-type: none"> <li>• Municipal Government</li> <li>• Residence, occupants and landowners (3.2km)</li> <li>• Residence, occupants and landowners (5.0km)</li> <li>• Industry</li> <li>• Regulators</li> <li>• General Local Public</li> </ul> | <ul style="list-style-type: none"> <li>• Introduce the Amendment</li> <li>• Share conceptual drawings and Amendment materials</li> <li>• Request stakeholder feedback</li> <li>• Facility tours</li> <li>• Identify potential adverse effects and develop measures to avoid, reduce, mitigate or otherwise manage such effects</li> </ul> |



**Table 7-1: Public Consultation Schedule (continued)**

| Phase  | Stakeholders   | Activities   |
|--|--|--|
| 2) Consultation during Amendment process<br><br>August 6, 2015 – July 31, 2016 | <ul style="list-style-type: none"> <li>• Municipal Government</li> <li>• Residence, occupants and landowners (3.2km)</li> <li>• Residence, occupants and landowners (5.0km)</li> <li>• Industry</li> <li>• Regulators</li> <li>• General Local Public</li> </ul> | <ul style="list-style-type: none"> <li>• Ongoing information sharing and Amendment updates for all stakeholders</li> <li>• Discuss consultation protocols with stakeholders and interested parties</li> <li>• Open house meetings and information sharing sessions with public stakeholders and interested parties</li> <li>• Identify potential adverse effects and develop measures to avoid, reduce, mitigate or otherwise manage such effects</li> </ul> |
| 3) Post-Amendment Consultation<br><br>July 31, 2016                            | <ul style="list-style-type: none"> <li>• Municipal Government</li> <li>• Residence, occupants and landowners (3.2km)</li> <li>• Residence, occupants and landowners (5.0km)</li> <li>• Industry</li> <li>• Regulators</li> <li>• General Local Public</li> </ul> | <ul style="list-style-type: none"> <li>• Assess and evaluate mitigation strategies</li> <li>• Continued communication and stakeholder engagement</li> <li>• Identify potential adverse effects and develop measures to avoid, reduce, mitigate or otherwise manage such effects</li> </ul>   |