

**Phase I Environmental Site Assessment**

**Beausoleil First Nation**

**Neegan Burnside Ltd.  
15 Townline  
Orangeville ON L9W 3R4 CANADA**

**September 2017  
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## Executive Summary

Neegan Burnside Ltd., (Neegan Burnside) was retained by Beausoleil First Nation to complete a Phase I Environmental Site Assessment (ESA) to determine the environmental condition of the First Nation's lands (the "Site") as part of the land management transfer of administration process.

The Site covers an area of 5,537.91 hectares comprised of:

- Christian Island No. 30 (5,530.00 hectares) - Christian Island, Beckwith Island and Hope Island
- Christian Island No. 30A (7.91 hectares) - portion of the mainland at Cedar Point, in the village of Lafontaine, Township of Tiny.

The Phase I ESA was required to establish the environmental condition of the Site prior to transfer of management of the lands and resources from the Government of Canada to Beausoleil First Nation.

The Phase I Environmental Site Assessment was completed in accordance with the requirements of CSA document Z768-01. The scope of work included a records review, interviews and a Site visit to identify and report on actual and potential contamination.

The Phase I ESA identified actual and potential contamination at the following locations:

- Oil Sprayed Roads - Petroleum hydrocarbon oil has been sprayed on the roads in the community for the purpose of dust control. Documentation indicates 64,585 L of Essoflex 250 oil (manufactured by Imperial Oil) were sprayed on the roads in 2016 and 60,869 L of lubricating oil (manufactured by Safety Kleen) were sprayed on the roads on May 24, 2017;
- Existing Underground Storage Tanks (USTs) – An abandoned UST previously identified at the Constable's House (Alfred King's former house) is still underground. The Recreation Centre has one diesel UST (25,000 L).
- Potentially Existing UST - The 1997 report stated that a UST may exist at the former school. The location of the former school (now demolished) was verified by a community member to be behind the sheds next to the Health Centre;
- Existing Aboveground Storage Tanks (ASTs) – Potential soil contamination may exist in the vicinity of ASTs where diesel fuel, fuel oil and/or gasoline is stored and dispensed. Although minor soil staining was noted at several ASTs, there were no reports of significant spill volumes and no evidence of significant contamination; and
- Waste Dump Sites – Visible surface wastes were observed at several old landfill locations (North Cottage Landfill, South Cottage Landfill and the Garbage Trench).

Recommendations relating to the findings of the Phase I ESA are as follows:

- Soil and groundwater sampling is recommended to assess soil and groundwater quality in the vicinity of the roads where oil spraying to control dust has occurred;
- The existing UST at the Constable's residence must be removed in accordance with regulations listed in Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197).
- Sampling is recommended using the existing monitoring wells to assess groundwater quality in the vicinity of the fuel oil UST at the Constable's residence;
- Periodic sampling and analysis of groundwater using the existing monitoring wells in the vicinity of the old landfills is recommended to monitor groundwater quality;
- It is recommended that old empty rusty tanks that will no longer be used for fuel storage should be taken to the Active Landfill site; and
- Visible surface wastes that have been discarded in the North Cottage Landfill, South Cottage Landfill, at the Garbage Trench and behind the ball park such as auto parts, appliances, furniture and shingles, should be removed and transported to the Active Landfill for disposal.

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## **1.0 Introduction**

Neegan Burnside Ltd., (Neegan Burnside) was retained by Beausoleil First Nation to complete a Phase I Environmental Site Assessment (ESA) to determine the environmental condition of the First Nation's lands (the "Site") as part of the land management transfer of administration process.

The Phase I ESA was required to establish the environmental condition of the Site prior to transfer of management of the lands and resources from the Government of Canada to Beausoleil First Nation.

## **2.0 Site Description**

The Site covers an area of 5,537.9 hectares comprised of:

- 06199 Christian Island No. 30 (5,530.0 hectares) - Christian Island, Beckwith Island and Hope Island.
- 06200 Christian Island No. 30A (7.9 hectares) - portion of the mainland at Cedar Point, in the village of Lafontaine, Township of Tiny.

Land registration records for these areas from the Indian Lands Registry System (ILRS) are provided in Appendix A. Access to the islands is by boat in the late spring, summer and fall. Passengers, vehicles and goods are transported between Cedar Point and Christian Island by a ferry boat. A hovercraft is available for emergencies and winter travel when the ferry is not operating. During winter months, residents travel by snowmobile, air boat (scoot) or car across the ice.

### **2.1 Additions to Reserve**

The northeast portion of Hope Island is currently undergoing the Additions to Reserve process to add approximately 40 hectares to Beausoleil First Nation lands. This land was used for over 100 years by the Department of Fisheries and Oceans (DFO) for a lightstation with multiple structures. The lighthouse and boathouse were constructed in 1884. Coal, diesel fuel and fuel oil were used for heating and to generate power. The Hope Island Lightstation has not been staffed on a continuous basis since 1987.

A remediation program was conducted in 2004 to remove garbage and contaminated soil from the site. Waste materials and soil were transported off-site to a licensed landfill in Thorold. The site is currently occupied by the original wooden lighthouse with a newer navigation light, the Fog Alarm Building, the Generator Building, two residences, the boathouse, a helicopter pad and a wharf. The remainder of the site is a mix of woodland and swamp, and is essentially undeveloped. Plans for demolition of the Hope Island buildings are underway. The plan specifies that the navigation light and helicopter pad will be protected from demolition.

### **3.0 Scope of Investigation**

The objective of the Phase I Environmental Site Assessment (ESA) was to determine the environmental condition of the reserve lands of Beausoleil First Nation, prior to the transfer of management of the First Nation's lands and resources from the Government of Canada to Beausoleil First Nation.

The scope of work for this investigation was based on the CSA Standard Z768-01 for Phase I Environmental Site Assessments and the Terms of Reference (TOR) provided by Beausoleil First Nation.

The scope of work included a records review, interviews, and a Site visit to determine the existence of actual contamination and potential contamination at the Site.

### **4.0 Records Review**

#### **4.1 General**

##### **4.1.1 Phase I Study Area**

The study area for the Phase I ESA is comprised of the lands referred to as the Site and included a 250 m buffer for conducting the record search. Figure 1 shows the Site location and Figure 2 identifies the Site boundary and study area buffer.

##### **4.1.2 Fire Insurance Plans**

A search for Fire Insurance Plans (FIPs) of the Site was conducted through Opta Historical Environmental Services Enviroscan. There were no FIPs identified at the Site. The Opta Enviroscan report is provided in Appendix B.

##### **4.1.3 City Directory**

A City Directory search was completed through Environmental Risk Information Services (ERIS). The search results indicate the Site is not listed within the city directory archives. The City Directory search results are provided in Appendix C.

##### **4.1.4 Lands Registry**

Lands Registry information was obtained from the ILRS. Details for specific parcels were reviewed to determine historical land use. Land registration records for the Site are provided in Appendix A.

#### **4.1.5 Canada Lands Survey Records**

##### **4.1.5.1 Surveys of the Site**

Surveys of the Site were obtained from Canada Lands Survey Records (CLSR). The following three surveys outline the boundaries of the Site:

- Canada Lands Survey Records 102839. The Exterior Boundaries of Christian Island and Adjacent Small Islands. Christian Island Indian Reserve No. 30. 2014.
- Canada Lands Survey Records 103066. The Exterior Boundaries of Hope Island and Beckwith Island. Christian Island Indian Reserve No. 30. 2014.
- Canada Lands Survey Records 102246. The Exterior Boundaries of Christian Island Indian Reserve No. 30A. 2013.

The total combined area of the lands outlined on the three surveys above is 5537.9 ha. The surveys are provided in Appendix D.

##### **4.1.5.2 Plan of Additions to Reserve Lands**

Approximately 40 hectares (100 acres) of Additions to Reserve lands (Hope Island Lighthouse Site) are outlined on a plan of the Hope Island Light Reserve dated 1889 (Plan 4570 CLSR) that shows the location of the light house, oil house, dock and boathouse (Appendix E).

#### **4.1.6 Environmental Reports**

The following environmental reports and information were reviewed relating to the Site and the Additions to Reserve lands on Hope Island:

- 1997 Fenco MacLaren Inc. Detailed Site Assessment and Remedial Option Study Beausoleil First Nation. February 1997.
- 1997 Addendum to the Phase III Environmental Issues Inventory of Beausoleil First Nation. March 1997.
- 2002 Feherty and Associates Limited. Phase I Environmental Site Assessment (ESA) for Beausoleil First Nation. April 24, 2002.
- 2004 Decommissioning Consulting Services Limited. Remedial Program Hope Island Lightstation (LL857), Georgian Bay, Lake Huron, Ontario. October 2004.
- 2005 Neegan Burnside Engineering and Environmental Ltd. Phase II Environmental Site Assessment. Beausoleil First Nation. June 2005.
- 2017 Public Works and Government Services Canada. Hope Island Demolition Project. Specification Project Number R.078904.001. March 27, 2017.

These environmental reports identified historical land use and areas of potential environmental concern, as well as the results from soil and groundwater investigations and areas where remediation has been conducted. This background information was used to determine the environmental assessment work that has been completed to date.

## 4.2 Environmental Databases Search

A search of available federal, provincial and private environmental databases was conducted through Environmental Risk Information Services (ERIS) to identify records within the Study Area.

Records (including unplotable records) that were confirmed to be within the Study Area are summarized in the following sections. The ERIS database search results are provided in Appendix F.

### 4.2.1 Federal Government Source Databases

The following Federal Government Source Databases were included in the search:

- Contaminated Sites on Federal Land;
- Environmental Effects Monitoring;
- Environmental Issues Inventory System;
- Federal Convictions;
- Fisheries & Oceans Fuel Tanks;
- Indian & Northern Affairs Fuel Tanks;
- National Analysis of Trends in Emergencies System (NATES);
- National Defense & Canadian Forces Fuel Tanks;
- National Defense & Canadian Forces Spills;
- National Defense & Canadian Forces Waste Disposal Sites;
- National Environmental Emergencies System (NEES);
- National Polychlorinated Biphenyls (PCB) Inventory;
- National Pollutant Release Inventory;
- Parks Canada Fuel Storage Tanks; and
- Transport Canada Fuel Storage Tanks.

### 4.2.2 Provincial Government Source Databases

The following Provincial Government Source Databases were included in the search:

- Abandoned Aggregate Inventory;
- Abandoned Mine Information System;
- Aggregate Inventory;
- Borehole;
- Certificates of Approval (CA);
- Certificates of Property Use;
- Commercial Fuel Oil Tanks;
- Compliance and Convictions;
- Drill Hole Database;
- Environmental Activity and Sector Registry;

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- Environmental Compliance Approval;
- Environmental Registry;
- Fuel Storage Tank;
- Fuel Storage Tank – Historic;
- Inventory of Coal Gasification Plants and Coal Tar Sites;
- Inventory of PCB Storage Sites;
- Landfill Inventory Management Ontario;
- List of Technical Standards & Safety Authority (TSSA) Expired Facilities
- Mineral Occurrences;
- Ontario Oil and Gas Wells;
- Ontario Regulation 347 Waste Generators Summary;
- Ontario Regulation 347 Waste Receivers Summary;
- Ontario Spills;
- Orders;
- Permit to Take Water;
- Pesticide Register;
- Private and Retail Fuel Storage Tanks;
- Record of Site Condition;
- TSSA Historic Incidents;
- TSSA Incidents;
- TSSA Pipeline Incidents;
- TSSA Variances for Abandonment of Underground Storage Tanks;
- Waste Disposal Sites – Ministry of the Environment and Climate Change (MOECC) 1991 Historical Approval Inventory;
- Waste Disposal Sites – MOECC CA Inventory;
- Wastewater Discharger Registration Database; and
- Water Well Information System.

#### 4.2.3 Private Source Databases

The following Private Source Databases were included in the search:

- Anderson's Storage Tanks;
- Anderson's Waste Disposal Sites;
- Automobile Wrecking & Supplies;
- Canadian Mine Locations;
- Canadian Pulp and Paper;
- Chemical Register;
- ERIS Historical Searches;
- Oil and Gas Wells;
- Retail Fuel Storage Tanks; and
- Scott's Manufacturing Directory.

#### 4.2.4 Contaminated Sites on Federal Land (FCS)

The Ecolog ERIS report identified eight records in the Contaminated Sites on Federal Land (FCS) database relating to 6 locations as follows:

- FCS 00000866 coordinates correspond to the Christian Island Lighthouse;
- FCS 00006807 coordinates correspond to the location of the Public Works Yard;
- FCS 00013243 coordinates correspond to the Hope Island Lighthouse DFO site;
- FCS 05151001 coordinates correspond to the former Charcoal Plant;
- FCS 05151003 coordinates correspond to the North Cottage Landfill; and
- FCS 05151002 relates to the Christian Island Elementary School (coordinates corresponding to a location on Hope Island were inaccurate. The FCS database has been updated by INAC with coordinates for the school).

The Site Status for all six locations is noted as "Closed" with "No further action required." These records are not considered to be a significant environmental concern. Full FCS reports from the FCSI website are provided in Appendix G.

#### 4.2.5 Environmental Issues Inventory System (EIS)

Eight Environmental Issues Inventory System (EIS) records were identified based on information reported in fiscal years 1995/1996, 1996/1997 and 1997/1998. The EIS sites are listed below with brief notes relating to the environmental issues of concern:

- Christian Island School Site 3000102297 - USTs, remediation, file closed in 2000;
- South Cottage Landfill 30000125954 - active waste disposal site;
- Beausoleil Closed Landfill 3000012694 - inactive waste site, filed closed in 1999;
- North Cottage Landfill 3000012794 - active waste disposal site;
- Former Charcoal Plant 3000012894 - industrial waste (from historical activities);
- USTs at old Community Hall/School 3000038995 - USTs (2002 ESA report notes that USTs at the Community Hall were removed during upgrades to heating system);
- Surface Water Douglas Lake 3000039796 - water pollution reported at Site; and
- Beausoleil Active Landfill 3000012494 - active waste site (Public Works Yard).

As noted, the 2002 ESA report confirmed that USTs were removed from the Community Hall when the heating system was upgraded. The EIS locations were included in the recent Site visit to evaluate the current environmental condition of these sites.

#### 4.2.6 ERIS Historical Searches (EHS)

The ERIS database search report identified one record from the ERIS Historical Searches (EHS) database in the Study Area. The EHS record indicates a Complete Report was ordered for the Cedar Point Post Office in 2001. This record is not considered to be a significant environmental concern to the Site.

#### 4.2.7 Ontario Regulation 347 Waste Generators Summary (GEN)

Eight records were identified in the Ontario Regulation 347 Waste Generators Summary (GEN) database, for approvals dated 2010 to 2016 for pathological wastes as follows:

- One record is associated with ambulance services at Christian Island; and
- Seven records are listed under Health Canada at the Health Centre at 156 Mkade Kegwin Miikan (former address was 82A).

It is anticipated that a relatively small amount of waste would be generated from these health care services and activities. These records are not considered to be a significant environmental concern to the Site.

#### 4.2.8 Ontario Spills (SPL)

Three records were identified in the Ontario Spills (SPL) database as unplottable records associated with spills at Cedar Point:

- In 1989, 20 L of diesel and motor oil spilled from a damaged dump truck to the road. Notes indicate an environmental impact is not anticipated;
- In 1997, 9 L of hydraulic oil spilled onto the ground from a leaking hose on a brush cutter. Notes indicate the hydraulic oil spill was cleaned up;
- In 2011, 40 L of grey water spilled to the sand due to a tank imploding. The Spills Action Centre (SAC) conducted a primary assessment of the incident; and
- In 2012, 40 L of diesel fuel spilled from the Indian Maiden ferry boat to Georgian Bay. Notes indicate an environmental impact is not anticipated.

These spill incidents are not a significant environmental concern to the Site.

#### 4.2.9 TSSA Incidents (INC)

One record was identified in the TSSA Incidents (INC) database regarding a propane fire that occurred in 2014 at a house outside the Site boundary, located at 45 Melissa Lane.

#### 4.2.10 Water Well Information System (WWIS)

A total of 72 well records were identified in the Water Well Information System (WWIS) database (43 well records on Christian Island and 29 well records at Cedar Point). All of the well records appear to be associated with water supply wells. Well logs describe the stratigraphy as mainly sand, with clay, gravel and boulders.

#### 4.2.11 Unplottable Records

Records identified in the "Unplottable Reports" listed eight EIS records, seven GEN records and four SPL records associated with the Site. Unplottable records that were confirmed to be within the Study Area are included in the above sections.

### **4.3 Regulatory Agencies**

#### **4.3.1 Ministry of the Environment and Climate Change**

Ministry of the Environment and Climate Change (MOECC) databases were included in the ERIS database search. The ERIS search results are provided in Appendix F.

#### **4.3.2 Technical Standards & Safety Authority**

The Technical Standards and Safety Authority (TSSA) Fuel Safety Branch was contacted with a request to search the TSSA database for records associated with Beausoleil First Nation and the address of the Administration Office. The TSSA's response states "We have no record in our database of any fuel storage tanks at the subject address (addresses)". Correspondence can be viewed in Appendix H.

### **4.4 Physical Setting Sources**

#### **4.4.1 Aerial Photographs**

Aerial photographs of the Study Area were obtained from the National Air Photo Library and the Simcoe County aerial photographs collection. The series of aerial photographs from 1954 to 2016 were reviewed to determine land use and development changes over the 52 year period. Observations of site conditions and structures were limited by scale and image quality.

The majority of the Site remained forested and undeveloped through the review period. The clarity of more recent aerial images facilitated in locating various locations, buildings and aboveground storage tanks in the community. There were no new significant environmental concerns identified in the review of aerial photographs.

#### **4.4.2 Topography, Hydrology, Geology**

The topography of the islands range in elevation from 175 to approximately 245 m above sea level (asl). Hope Island and Beckwith Island are mainly forested. The majority of Christian Island is forested with cleared areas for residences, community buildings and infrastructure. There are several small wetland areas and two inland lakes (Jerry's Lake and Douglas Lake) on Christian Island.

The inferred direction of shallow groundwater flow varies and is anticipated to flow towards the nearest waterbody (wetland, inland lake or island shoreline). Static water levels generally range from 3 m to 9 m below ground surface (bgs).

A review of available mapping was undertaken to characterize the general surficial and bedrock geology of the area. Geological maps describe the surficial geology as coarse textured glaciolacustrine deposits of sand, gravel, silt and clay.

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Bedrock is described as limestone, dolostone, shale, arkose and sandstone of the Ottawa Group; Simcoe Group; Shadow Lake Formation.

#### 4.4.3 Fill Materials

Sand and topsoil have been used as cover material for many of the waste sites. The baseball diamond at the Ball Park behind the Recreation Centre is constructed over a former waste disposal site (EIS 3000012694) in the "eastern cell" where discarded vehicles are buried under sand and topsoil (1997 report). Additional sand and gravel from local sources was likely used to raise the grade when constructing the baseball diamond.

There are no significant environmental concerns with the use of local sand, gravel and topsoil as fill and waste cover material.

#### 4.4.4 Water Bodies and Areas of Natural Significance

The Site is within the Georgian Bay watershed. Lake Huron surrounds the Site. There are two inland lakes (Jerry's Lake and Douglas Lake) as well as several wetland areas.

Various databases maintained by the Ministry of Natural Resources (MNR) were reviewed, to determine if the Site is in an Area of Natural Significance, as defined in O. Reg. 153, as amended, as any of the following:

1. An area reserved or set apart as a provincial park or conservation reserve under the Provincial Parks and Conservation Reserves Act, 2006.
2. An area of natural and scientific interest (life science or earth science) identified by the Ministry of Natural Resources as having provincial significance.
3. A wetland identified by the Ministry of Natural Resources as having provincial significance.
4. An area designated by a municipality in its official plan as environmentally significant, however expressed, including designations of areas as environmentally sensitive, as being of environmental concern and as being ecologically significant.
5. An area designated as an escarpment natural area or an escarpment protection area by the Niagara Escarpment Plan under the Niagara Escarpment Planning and Development Act.
6. An area identified by the Ministry of Natural Resources as significant habitat of a threatened or endangered species.
7. An area which is habitat of a species that is classified under Section 7 of the Endangered Species Act, 2007 as a threatened or endangered species.

8. Property within an area designated as a natural core area or natural linkage area within the area to which the Oak Ridges Moraine Conservation Plan under the Oak Ridges Moraine Conservation Act, 2001 applies.
9. An area set apart as a wilderness area under the Wilderness Areas Act.

A regional ANSI defined by County of Simcoe relating to significantly wooded areas is identified over all of Hope Island, all of Beckwith Island and most of Christian Island. The Site is not subject to the ANSI policy outlined in the County of Simcoe Official Plan.

## **5.0 Site Visit**

A visual inspection of the Site and surrounding area was completed on May 30, 31 and June 1, 2017 by Kathleen Langstaff, Maeghan Willms and Laura DeCoste of Neegan Burnside. Weather conditions were warm, ranging from 12°C to 15°C with a cloudy sky.

Photographs were taken to document the environmental condition of the various locations during the Site Visit. Photographs are provided in Appendix I.

## **6.0 Interviews**

During the Site Visit, Neegan Burnside met with elders at the Seniors Centre to learn about the history of the Site and note any areas of potential environmental concern.

A community Open House was also held to provide an opportunity for community members to share their knowledge and concerns about the Site. Maps of the islands were provided to note locations where waste had been discarded. Several individuals were interviewed on a casual basis as we visited the various locations of concern.

Representatives from the Lands Department provided additional background information relating to the Hope Island Lighthouse lands as well as general community information.

## **7.0 Findings**

### **7.1 Water Sources**

The Water Treatment Plant located at 9 Mkade Kegwin Miikan was constructed in 1999. The water intake pipe extends southward from the plant into the lake to approximately 200 m from the shoreline. Watermains connect from the Water Treatment Plant to approximately 300 houses and community buildings in the south settlement area, as far west as Shki Miikan. A second Water Treatment Plant is located on the mainland at Cedar Point which provides water to approximately 20 buildings.

Buildings that are not connected to the water distribution system, obtain water from water supply wells and/or the lake.

## 7.2 Sewage Systems

The community does not have a community sewage treatment system. Wastewater treatment is accommodated by individual septic systems for all community buildings and residential units at Beausoleil First Nation. Septic tanks are pumped as needed and septic sludge is disposed of at a farm field (appears to be at Lot 24-1 and Lot 24-2 Concession 6, 2762 RSO) located northeast of Jerry's Lake.

## 7.3 Electricity

Electrical power service to Christian Island is provided through two 4,800 volt and one 16,000 volt single phase underwater cables. One power line runs from Cedar Point on the mainland to an area near the water plant on the island and also services the northern part of the Island. A second underwater cable was installed between the mainland and Lighthouse Point and services the southern tip of the island. Both of these power lines are extensions of distribution circuits on the mainland and are not dedicated feeders to Christian Island. The third cable connects to the settlement area west of the ferry dock.

## 7.4 Fuel Storage Tanks

The Storage Tank Systems for Petroleum Products and Allied Petroleum Product Regulations (SOR/2008-197) apply to storage tank systems containing petroleum products such as gasoline, diesel and home heating oil or allied petroleum products.

There are several locations in the community with fuel storage tanks containing fuel oil, diesel fuel, gasoline, waste oil and propane. Table 1 provides a summary of community buildings and bulk storage tank locations.

The following community storage tanks are registered with Environment Canada:

- Public Works Diesel Tank (35,000 L), EC #26966
- Public Works Diesel Tank (2,270 L), EC #26949
- Public Works Diesel Tank (2,270 L), EC #26952
- Public Works Diesel Tank (2,270 L), EC #26962
- EMS Emergency Diesel Tank (2,270 L), EC #26969
- Hovercraft Heating Diesel Tank (4,550 L), EC #26965
- Hovercraft Diesel Fuel Tank (4,550 L), EC #26964
- Rec Centre Underground Diesel Tank (25,000 L), EC #26948
- Scoot Premium Gas Fuel Tank (4,500 L), EC #26951
- Public Works Regular Gas Tank (4,500 L), EC #26950
- Cedar Point Used Oil Tank (2,270 L), EC #29531
- Cedar Point EMS Fuel Tank (2,200 L), EC #26971

#### 7.4.1 Aboveground Storage Tanks (AST)

During the Site visit, soil in the vicinity of ASTs was examined for evidence of contamination such as staining, odour and vegetation distress. Most of the ASTs observed during the Site visit that are currently in use, appeared to be in generally good condition, with minor amounts of rust. There was no evidence of significant spillage or significant soil staining in the vicinity of the ASTs that are in use.

An old rusty AST is being used to store waste oil at the Public Works Yard. It is recommended that a newer AST that's in better condition be used for storing waste oil.

A discarded AST was observed in the grassy area by the Communications Tower, behind the Public Works Yard. Several empty ASTs are discarded in the Public Works Yard.

It is recommended that old empty rusty tanks that will no longer be used should be taken to the Active Landfill site.

Fuels and waste oils should be stored, handled and dispensed in accordance with Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197).

#### 7.4.2 Underground Storage Tanks (UST)

The following USTs were identified at the Site:

- Constable's House – A fuel oil UST is at the side of house at 111 O'Gema Miikan (Alfred King's former house). This UST has been out of service since 1963. Two monitoring wells are situated in the vicinity of the UST.
- Recreation Centre – A diesel fuel UST (25,000 L) is at 100 O'Gema Miikan. The UST was installed in 2006 when the Recreation Centre was constructed.

The following USTs were reported to be removed:

- Four USTs were removed in 2013 from Bayshore Variety (confirmed by Mary Monague).
- Two fuel oil USTs and a pumphouse were removed from the school in 2009 and a new furnace with four propane tanks were installed.
- A fuel oil UST (2,450 L) was removed from behind the Library/Community Hall during upgrades to the heating system in approximately 2001. A fuel oil AST (2,275 L) and two monitoring wells are behind the Library/Community Hall.

The 1997 report stated that a UST may exist at the former school (demolished) that was situated behind the sheds next to the Health Centre. The former location of the school was verified by a community member during the Site visit in May/June 2017.

Table 1: Summary of Buildings, Facilities and Tank Locations

Building / Facility	Address	GPS Coordinates		Tank (Yes / No)	Fuel and Type of Tank
		Latitude	Longitude		
Administration Building	11 O'Gemaa Miikan, Christian Island	44.82091	-80.17474	Yes	2 propane ASTs
Daycare Centre	15 O'Gemaa Miikan, Christian Island	44.82121	-80.17508	Yes	1 propane AST
Tangibils Coffee Shop	20 O'Gemaa Miikan, Christian Island	44.82151	-80.17263	Yes	mini-mail propane ASTs (2)
Radio Station	22 O'Gemaa Miikan, Christian Island	44.82162	-80.17481	Yes	mini-mail propane ASTs (2)
Social Services	24 O'Gemaa Miikan, Christian Island	44.82575	-80.17692	Yes	mini-mail propane ASTs (2)
Bell Building & Tower	behind mini-mail (20-26 O'Gemaa Miikan)	44.82151	-80.17415	No	N/A
Rink / Event Centre	50 O'Gemaa Miikan (approximately)	44.82263	-80.17602	Yes	propane AST
Recreation Centre & Youth Centre	100 O'Gemaa Miikan, Christian Island	44.82592	-80.18327	Yes	1 diesel UST (25,000 L) and shared gasoline AST (4,500 L)
Anishabek Police Service	100 O'Gemaa Miikan, Christian Island	44.82581	-80.18358	Yes	shared gasoline AST (4,500 L) with baseball field
Baseball Field	100 O'Gemaa Miikan, Christian Island	44.82637	-80.18229	Yes	shared gasoline AST (4,500 L) with police
Constable's House	111 O'Gemaa Miikan, Christian Island	44.82541	-80.18475	Yes	1 fuel oil UST, still underground
Community Garden	159 O'Gemaa Miikan (at corner of Shki Miikan)	44.82796	-80.18968	No	N/A
Public Works Yard	166 O'Gemaa Miikan, Christian Island	44.82902	-80.19013	Yes	1 diesel AST (30,000 L), 4 diesel ASTs (2,270 L), 1 gasoline AST (2,270 L)
Seniors Centre	2 Jigbik Miikaans, Christian Island	44.82133	-80.17399	Yes	1 propane AST
Water Treatment Plant	9 Mkade Kegwin Miikan, Christian Island	44.82506	-80.15687	No	N/A
Old Charcoal Plant	9 Mkade Kegwin Miikan, Christian Island	44.82483	-80.15769	No	FCS 05151001 and EIS 3000012894
EMS Christian Island	114 Mkade Kegwin Miikan, Christian Island	44.82313	-80.17126	No	N/A
Christian Island Elementary School	119 Mkade Kegwin Miikan, Christian Island	44.82239	-80.17130	Yes	4 propane ASTs
School Before & After School Program	119 Mkade Kegwin Miikan, Christian Island	44.82233	-80.17031	No	N/A
St. Francis Xavier Catholic Church	100 Mkade Kegwin Miikan, Christian Island	44.82329	-80.16941	Yes	1 fuel oil AST (2,275 L)
Christian Island United Church	146 Mkade Kegwin Miikan, Christian Island	44.82219	-80.17528	Yes	1 diesel AST (10,000 L)
Community Hall / Library	150 Mkade Kegwin Miikan, Christian Island	44.82205	-80.17563	Yes	1 fuel oil AST (2,275 L)
Family Health Centre	156 Mkade Kegwin Miikan (labelled 82A)	44.82178	-80.17641	Yes	1 propane AST
Fire Hall	160 Mkade Kegwin Miikan (labelled 82B)	44.82159	-80.17674	No	N/A
Public Works gasoline tanks	208 Mkade Kegwin Miikan, Christian Island	44.81923	-80.18299	Yes	1 premium gasoline AST (4,500 L), 1 regular gasoline AST (4,500 L)
Hovercraft diesel tanks	235 Mkade Kegwin Miikan, Christian Island	44.81628	-80.18286	Yes	1 dyed diesel AST (4,550 L), 1 dyed furnace fuel (4,550 L)
Gravel Pit	520 Mkade Kegwin Miikan (approximately)	44.79296	-80.18847	No	N/A
Seniors Apartment Complex	20 Gaakan Miikaans, Christian Island	44.80896	-80.19592	Yes	2 fuel oil ASTs (2,270 L each)
Landfill Site/Waste Transfer and Recycle	160 Shki Miikan, Christian Island (80 on County mapping)	44.81783	-80.20078	No	N/A
Old Landfill Adjacent to Public Works Yard	166 O'Gemaa Miikan, Christian Island	44.82969	-80.18940	No	FCS 00006807 and EIS 3000012494
North Cottage Landfill - 1996 map	O'Gemaa Miikan near Jidamo Miikaans, Christian Island	44.85276	-80.20867	No	FCS 05151003 and EIS 3000012794
South Cottage Landfill	west side of Mkade Kegwin Miikan on south peninsula	44.79766	-80.19123	No	EIS 3000012594
Closed Landfill by Recreation Centre	100 O'Gemaa Miikan, Christian Island	44.82867	-80.18192	No	EIS 3000012694
Old Garbage Trench Trail	south of Douglas Lake, trail by 52 Mkade Kegwin Miikan	44.82444	-80.16258	No	garbage at 44.82556, -80.16313 and northward
Bayshore Variety, Restaurant and Gas	9 Jigbik Miikaans, Christian Island	44.82142	-80.17263	Yes	gas AST (9,090 L), 2 gas ASTs (10,000 L), 3 fuel oil ASTs (2,000 L) and propane
Fish Processing Building (abandoned)	O'Gemaa Miikan (north of Public Works Yard, east side)	44.83538	-80.20405	No	N/A
Septic Dumping Area	O'Gemaa Miikan (north of Public Works Yard, east side)	44.83817	-80.21093	No	N/A
Ferry Dock Used Oil Tank, Cedar Point	3 Dock Lane, Cedar Point	44.81077	-80.11971	Yes	1 used oil AST (2,270 L)
Ambulance EMS Diesel Tank, Cedar Point	7A Dock Lane, Cedar Point	44.80994	-80.11854	Yes	1 diesel AST (2,200 L)

## 7.5 Buildings/Structures

The majority of the island is forested with cleared areas for residences, community buildings and community infrastructure. There are approximately 300 buildings in the south settlement area on Christian Island and approximately 20 buildings on the mainland at Cedar Point.

There were no significant environmental concerns associated with the community buildings. Table 1 provides a summary of community buildings with street addresses.

## 7.6 Designated Substances

The more commonly encountered designated substances associated with older buildings are lead (paint), asbestos (insulation, tiles, shingles) and PCBs (lighting ballasts, transformers). Some of the older buildings in the community may contain designated substances in their construction materials.

There were no environmental concerns relating to designated substances identified during the Site visit.

## 7.7 Air or Odour Emission Sources

No air or odour emission sources were identified at any of areas of the Site.

## 7.8 Vegetation Distress and Staining

There was no evidence of significant vegetation distress observed during the Site visit. Minor soil staining was observed at the Public Works Yard by the diesel fuel dispensing pump, waste oil storage pails and waste oil storage trailer.

Significant staining was observed on the roads where oil has been sprayed for the purpose of dust control. Documentation was obtained from the companies that sprayed oil on the roads in 2016 and 2017 at Beausoleil First Nation indicating that:

- 35,165 L of Essoflex 250 oil was sprayed at Beausoleil First Nation on May 7, 2016.
- 29,420 L of Essoflex 250 oil was sprayed at Beausoleil First Nation on June 22, 2016.
- 60,869 L of RHT Base Oil was sprayed at Beausoleil First Nation on May 24, 2017.

Material Safety Data Sheets (MSDS) from the companies indicate the oils sprayed on the roads are petroleum hydrocarbon oil. Considering the sandy soil conditions of the island and close proximity to water bodies, the spraying of petroleum hydrocarbon oil onto the ground on multiple occasions is considered to be a potential environmental concern to soil and groundwater. Documents relating to the oil spraying are provided in Appendix J.

## 7.9 Waste Management

Household waste, recyclable cardboard, paper and containers are collected and taken to the Waste Transfer Station at Landfill Site #3, located at the northwest corner of Shki Miikan and Megyaakwa Miikan. There are bins at the Waste Transfer Station for garbage, cardboard, electronic waste and tires. Old propane tanks, pails of waste oil and old appliances are discarded in an area north of the bins. Pick up for large waste items, including vehicles, can be arranged with the Beausoleil First Nation Public Works.

## 7.10 Waste Sites

The table below summarizes waste sites identified in the Study Area.

**Table 2: Waste Site Locations and Descriptions**

Waste Site	Site Identification	Location	Description
Landfill Site #3 / Waste Transfer	Landfill Site #3	Shki Miikan at Megyaakwa Miikan	currently active landfill site and waste transfer station
Old Landfill Adjacent to Public Works Yard	FCS 00006807 EIS 3000012494	166 O'Gemaa Miikan, Christian Island	old Active/Marsden Mill landfill that closed in 1994
North Cottage Landfill	FCS 05151003 EIS 3000012794	near intersection of O'Gemaa Miikans and Jidamo Miikans	circular clearing at north end of Christian Island, also called Big Sand Bay landfill
South Cottage Landfill	EIS 3000012594	west side of Mkade Kegwin Miikan on south peninsula	landfill on south peninsula of Christian Island, also called Lighthouse Dump
Closed Landfill by Recreation Centre	EIS 3000012694	100 O'Gemaa Miikan, Christian Island	three waste cells northeast of Recreation Centre, also called Douglas Lake Landfill
Douglas Lake Garbage Trench		south of Douglas Lake	trench trail entrance is east of 52 Mkade Kegwin Miikan
Hope Island Lighthouse	FCS 00013243	northeast point of Hope Island	garbage from three waste sites and contaminated soil was removed in 2004

### 7.10.1 Active Landfill Site #3 (Lot 18, Concession 3, T176 CLSR)

Landfill Site #3 is a landfill and Waste Transfer Station located on a part of Lot 18, Concession 3, T176 CLSR at the northwest corner of Shki Miikan and Megyaakwa Miikan. This waste site is approximately 1.5 hectares in size and surrounded by a fence with an entrance gate at Shki Miikan. Previous reports referred to this waste site as the "Operating Landfill" (1997 report) and the "Active Landfill" (2002 report). Collection service is provided by Beausoleil First Nation for household waste and recyclable cardboard, paper and containers. There are bins at the Waste Transfer Station for garbage, cardboard, electronic waste and tires. Old propane tanks, pails of waste oil, scrap metal and appliances are discarded in an area north of the bins. Cottagers are encouraged to take old propane tanks to the mainland for recycling or disposal.

#### **7.10.2 Public Works & Old Landfill (Lot 18, Concession 6, T176 CLSR)**

An old landfill covering an area of approximately 1 hectare was on a part of Lot 18, Concession 6, T176 CLSR, adjacent to (behind/northeast of) the Public Works Yard at 166 O'Gemaa Miikan. This waste site has been referred to as the "Active Landfill" (1997 report) and the "Marsden Mill Landfill" (2002 report). A communications tower is situated on the former waste site. Federal reference numbers for this waste site are EIS 3000012494 and FCS 00006807.

#### **7.10.3 North Cottage Landfill (Lot 27, Concession 8, T176 CLSR)**

The North Cottage Landfill is at the north end of Christian Island on a part of Lot 27, Concession 8, T176 CLSR, near the intersection of O'Gemaa Miikan and Jidamo Miikans. This waste site is also referred to as the "Big Sand Bay Landfill" (2002 report). A trail on the south side of O'Gemaa Miikan leads to the 0.5 hectare circular waste site located approximately 90 m south of the road. A large log has been placed across the trail to block vehicles from entering the waste site. During the Site visit, shingles, appliances, lumber and domestic wastes were found discarded in the circular area. Federal reference numbers for this waste site are EIS 3000012794 and FCS 05151003 (coordinates on the FCSI website for this waste site location need to be corrected).

#### **7.10.4 South Cottage Landfill (Lot 10, Concession 1, T176 CLSR)**

The South Cottage Landfill is a 0.5 hectare clearing located on a part of Lot 10, Concession 1, T176 CLSR on the south peninsula, just south of the intersection of Mkade Kegwin Miikan and Shki Miikan. This site is also referred to as the "Closed Lighthouse Dump" (2002 report). Previous reports indicate abandoned vehicles at this waste site have been removed. A few piles of discarded shingles and household waste were observed during the Site visit, however, there were no significant environmental concerns. The Federal reference number for this waste site is EIS 3000012594.

#### **7.10.5 Closed Landfill (Lot 16, Concession 6, T176 CLSR)**

The old waste site near Douglas Lake, located on part of Lot 16, Concession 6, T176 CLSR, has been referred to as the "Closed Landfill" (1997 report) and the "Douglas Lake Landfill" (2002 report). The Federal reference number for this site is EIS 3000012694.

This waste site, located behind (northeast of) the Recreation Centre at 100 O'Gemaa Miikan, was the main dump for the island in the 1970s and 1980s. The site was divided into three waste cells (northern, western and eastern). The northern cell (0.5 hectares) is the oldest cell and was identified as a fill area. The western cell (0.5 hectares) was closed in the early-1990s, however waste dumping was still occurring in 1997. The baseball diamond behind the Recreation Centre is constructed on top of the eastern cell (1.5 hectares), where discarded vehicles were reported to be buried beneath the sand.

During the recent Site visit, an old abandoned vehicle and auto parts were observed in the woods between the baseball park and Douglas Lake. Local sand and gravel was likely used to raise the grade when constructing the park and baseball diamond.

#### **7.10.6 Old Garbage Trench**

The Garbage Trench waste site is a trench that was dug several years ago, that extends southward from the southeast shoreline of Douglas Lake. This trench has gradually been filled with waste. During the Site visit, piles of household garbage, discarded appliances, metal vehicle parts and furniture were observed in the trench and along the trail. Waste appears to be a mix of newly discarded items and partially buried old waste.

Dimensions of the trench are estimated to be 82 m long, between 1.8 m and 4.9 m wide and 1.2 m deep. Based on the approximate dimensions, the waste volume is estimated to be 208 cubic meters, with a mass of approximately 52 tonnes. The Phase II ESA (2005) sampling results indicated that at that time, the waste did not have any significant impact on the surrounding environment.

It is recommended that any visible surface waste such as appliances, auto parts and other debris should be removed and disposed of at the Active Landfill site.

#### **7.10.7 Hope Island Waste Sites**

In 2004, approximately 34 tonnes of garbage were removed from three waste dump areas at the Hope Island Lighthouse site. Heavy metal contaminated soils and soils underlying the waste dump areas were excavated and transported off-site for disposal at a licensed landfill in Thorold, Ontario. The remedial program report (2004) states that remediation was completed in the Fire Pit area and in the three waste dump areas, however the report notes that heavy metal contaminated soil remains in areas south and west of the lighthouse.

The demolition specifications include the removal and off-site disposal of designated substances and hazardous materials, as well as contaminated soils that become disturbed during the demolition work.

#### **7.11 Hope Island Lighthouse Site**

The northeast portion of Hope Island is currently undergoing the Additions to Reserve process to add approximately 40 hectares (100 acres) to Beausoleil First Nation lands. This land was used for over 100 years by the Department of Fisheries and Oceans (DFO) for a lightstation with multiple structures. The lighthouse and boathouse were constructed in 1884.

Coal, diesel fuel and fuel oil were used for heating and to generate power. Several ASTs for storing diesel fuel and fuel oil were formerly located inside the two residences

and in concrete cribs by the Fog Alarm Building. In 2004, approximately 34 tonnes of garbage were removed from three waste dump areas at the Hope Island Lighthouse site. Heavy metal contaminated soils and soils underlying the waste dump areas were excavated and transported off-site for disposal at a licensed landfill in Thorold, Ontario. The remedial program report states that remediation was completed in the Fire Pit area and in the three waste dump areas, however notes that heavy metal contaminated soil remains in areas south and west of the lighthouse.

The site is currently occupied by the original wooden lighthouse with a newer navigation light, the Fog Alarm Building, the Generator Building, two residences, the boathouse, a helicopter pad and a wharf. The remainder of the lightstation site is a mix of woodland and swamp, and is essentially undeveloped. The Hope Island Lightstation has not been staffed on a continuous basis since 1987. Plans for demolition of the buildings are underway. The demolition specifications include the removal and off-site disposal of designated substances and hazardous materials, as well as contaminated soils that become disturbed during the demolition work. The Navigation Light and Helicopter Pad will be protected from demolition.

## 7.12 Shipwrecks

A tanker known as the *Norman P. Clement*, owned by Chembarge Ltd. and used for carrying sulphuric acid, ran aground at Britt, Ontario on October 7th, 1968. While the ship was in Collingwood for repairs, an onboard explosion from gas fumes occurred which left the ship beyond economical repair. Caustic soda was pumped into the ship's hull to neutralize the remaining gas fumes. The damaged vessel was towed into the deep waters of Georgian Bay and then scuttled (deliberately sunk) in 110 m of water near Christian Island.

The *Norman P. Clement* shipwreck is not considered to be a significant environmental concern to the Site. References indicate that sulphuric acid was released from the hull during the explosion in Collingwood and the residual acid in the hull was neutralized with caustic soda before the tanker was towed and scuttled near Christian Island.

Four shipwrecks were identified in the Ontario Underwater Council's database:

- *Mapledawn* is a steel freighter with a cargo of barley that sank in 1924, just west of Christian Island near Quai des Roches.
- *Michigan* is a steel barge that was carrying a load of grain and sank in 1943 northwest of Hope Island.
- *Lottie Wolf* is a three masted schooner that struck a rock and sank in 1891 northeast of the Hope Island Lighthouse.
- *Marquette* is a schooner that sank in 1867, at a location just east of Hope Island.

These shipwrecks are not considered to be an environmental concern to the Site. References and details regarding these shipwrecks are provided in Appendix K.

## 8.0 Evaluation of Findings

### 8.1 Areas of Potential Environmental Concern

The Phase I ESA identified the following areas of potential environmental concern:

- Petroleum hydrocarbon oil has been sprayed on the roads in the community for the purpose of dust control. Documentation indicates 64,585 L of Essoflex 250 oil (manufactured by Imperial Oil) were sprayed on the roads in 2016 and 60,869 L of lubricating oil (manufactured by Safety Kleen) were sprayed on the roads on May 24, 2017. Considering the sandy soil conditions of the island and close proximity to water bodies, the spraying of petroleum hydrocarbon oil onto the ground on multiple occasions is considered to be a potential environmental concern to soil and groundwater quality;
- An abandoned UST previously identified at the Constable's House (Alfred King's former house) is still underground and is considered to be a potential environmental concern to soil and groundwater quality;
- The Recreation Centre has one diesel UST (25,000 L) which is considered to be a potential environmental concern to soil and groundwater quality;
- The 1997 report stated that a UST may exist at the former school. The location of the former school (now demolished) was verified by a community member to be behind the sheds next to the Health Centre. The existence of an old UST remaining underground is a potential environmental concern to soil and groundwater quality;
- Potential soil contamination may exist at the Public Works Yard in the vicinity of ASTs where bulk diesel fuel and gasoline is stored and dispensed and in the vicinity of waste oil storage containers; and
- Waste items have been discarded and remain at several old landfill locations (North Cottage Landfill, South Cottage Landfill and the Garbage Trench).

### 8.2 Contaminants of Potential Concern

The Phase I ESA identified the following contaminants of potential concern:

- Petroleum Hydrocarbons (PHC) including benzene, toluene, ethylbenzene and xylenes (BTEX) – associated with gasoline, diesel fuel, greases and oils;
- Volatile Organic Compounds (VOC) – associated with solvents and fuels; and
- Metals and Inorganics – associated with solid waste disposal sites (Waste Sites).

Depending on their condition, the existing groundwater monitoring wells that were installed for previous studies could possibly be used to assess groundwater quality in areas of potential environmental concern.

### 8.3 Locations Beyond Phase I Site Boundary

Five shipwrecks were identified near Christian Island and Hope Island at locations beyond the Site boundary. These shipwrecks are not considered to be a significant environmental concern to the Site.

The Hope Island Lighthouse lands (approximately 40 hectares) are beyond the Site boundary and are being considered for ATR. Plans for demolition of the remaining buildings at Hope Island are underway. The Navigation Light and Helicopter Pad will be protected from demolition. It is anticipated that once the demolition and off-site disposal of the building materials, debris and contaminated soil has been completed, there will be no significant environmental concerns associated with the ATR lands.

### 9.0 Conclusions

The Phase I Environmental Site Assessment was completed in accordance with the requirements of CSA document Z768-01. The scope of work included a records review, interviews and a Site visit to identify and report on actual and potential contamination.

The Phase I ESA identified actual and potential contamination at the following locations:

- Oil Sprayed Roads - Petroleum hydrocarbon oil has been sprayed on the roads in the community for the purpose of dust control. Documentation indicates 64,585 L of Essoflex 250 oil (manufactured by Imperial Oil) were sprayed on the roads in 2016 and 60,869 L of lubricating oil (manufactured by Safety Kleen) were sprayed on the roads on May 24, 2017;
- Existing Underground Storage Tanks (USTs) – An abandoned UST previously identified at the Constable's House (Alfred King's former house) is still underground. The Recreation Centre has one diesel UST (25,000 L).
- Potentially Existing UST - The 1997 report stated that a UST may exist at the former school. The location of the former school (now demolished) was verified by a community member to be behind the sheds next to the Health Centre;
- Minor soil staining was noted near the waste oil storage trailer at the Public Works Yard, however there did not appear to be any evidence of significant spillage;
- Existing Aboveground Storage Tanks (ASTs) – Potential soil contamination may exist in the vicinity of ASTs where diesel fuel, fuel oil and/or gasoline is stored and dispensed. Although soil staining was noted at several ASTs, there were no reports of significant spill volumes and no evidence of significant contamination; and
- Waste Dump Sites – Waste items have been discarded at several old landfill locations (North Cottage Landfill, South Cottage Landfill and the Garbage Trench).

## 10.0 Recommendations

Recommendations relating to the findings of the Phase I ESA are as follows:

- Soil and groundwater sampling is recommended to assess soil and groundwater quality in the vicinity of the roads where oil spraying to control dust has occurred;
- The existing UST at the Constable's residence must be removed in accordance with regulations listed in Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197).
- Sampling is recommended using the existing monitoring wells to assess groundwater quality in the vicinity of the fuel oil UST at the Constable's residence;
- Periodic sampling and analysis of groundwater using the existing monitoring wells in the vicinity of the old landfills is recommended to monitor groundwater quality;
- It is recommended that old empty rusty tanks that will no longer be used for fuel storage should be taken to the Active Landfill site; and
- Visible surface wastes that have been discarded in the North Cottage Landfill, South Cottage Landfill, at the Garbage Trench and behind the ball park, such as auto parts, appliances, furniture and shingles, should be removed and transported to the Active Landfill for disposal.

Table 3 provides a summary of the sites that were evaluated, site conditions and recommendations.

Cost Estimates for recommendations associated with soil sampling, groundwater sampling and tank removals are provided in the table in Appendix L.

Table 3: Site Conditions and Recommendations

Figure Set	Location	Site Reference	Site Conditions	Recommendations
4.1	Old Landfill near Public Works Yard	FCS00006807 EIS3000012494	An old landfill covering an area of approximately 1 hectare is adjacent to the Public Works Yard. A communications tower is on the former waste site.	FCSI states no further action required. Status closed. Periodic sampling of groundwater at the landfill using existing monitoring wells is recommended.
4.1	Public Works Yard		Soil was stained at the fuel dispensing area and waste oil storage areas at the Public Works Yard. There was no evidence of significant spillage.	Old empty rusty ASTs that will not be used for storing fuel or oil should be taken to the Active Landfill.
4.2	Former Charcoal Plant	FCS05151001 EIS3000012894	The Water Treatment Plant occupies the former kilns area. It appears that the contaminated soil noted in the 1997 report has been removed and/or significantly disturbed during the excavation and site development for construction of the water treatment plant.	FCSI states no further action required. Status closed. Periodic sampling and analysis of groundwater using existing monitoring wells is recommended.
4.3	Christian Island School	FCS05151002 EIS3000102297	Soil remediation at the school has been completed (1999). Two fuel oil USTs and a pump house were removed from the school in 2009 and a new furnace with four propane tanks were installed.	FCSI states no further action required. Status closed. No further environmental work is recommended.
4.4	North Cottage Landfill	FCS05151003 EIS3000012794	A large log has been placed across the trail to block vehicles from entering the waste site. Shingles, appliances, lumber and domestic wastes were found discarded in the circular area.	FCSI states no further action required. Status closed. Recommend transporting newly discarded visible wastes to the Active Landfill for disposal. Periodic sampling of groundwater in the vicinity of this landfill using existing monitoring wells is recommended.
4.5	South Cottage Landfill	EIS 3000012594	A few piles of discarded shingles and household waste were observed during the Site visit, however, there were no significant environmental concerns.	Recommend transporting newly discarded visible wastes to the Active Landfill for disposal. Periodic sampling of groundwater in vicinity of the landfill using existing monitoring wells is recommended.
4.6	Closed Douglas Lake Landfill	EIS 3000012694	The closed waste site near Douglas Lake is located behind (northeast of) the Recreation Centre. The site was divided into northern, western and eastern cells. The Ball Park is constructed on the former eastern cell.	Periodic sampling and analysis of groundwater in the vicinity of landfill using existing monitoring wells is recommended.
4.7	Recreation Centre and Ball Park		The Recreation Centre has one diesel UST (25,000 L). The baseball diamond at the Ball Park behind the Recreation Centre is constructed on a former waste disposal site (EIS 3000012694).	Periodic sampling and analysis of groundwater using existing monitoring wells is recommended.
4.8	Constable's Residence		An abandoned fuel oil UST previously identified at the Constable's House (Alfred King's former house) is still underground. Two groundwater monitoring wells are situated in the vicinity of the UST.	Recommend removal of UST from Constable's house, excavation of contaminated soil and confirmatory sampling. Recommend sampling and analysis of groundwater using existing monitoring wells.

Figure Set	Location	Site Reference	Current Conditions	Recommendations
4.9	Community Hall / Library	EIIS3000038995	The 2002 report noted that a fuel oil UST (2,450 L) was removed from behind the Library/Community Hall during upgrades to the heating system in approximately 2001. A fuel oil AST (2,275 L) and two monitoring wells remain behind the Community Hall/Library.	In the future, the existing monitoring wells near the AST behind the Community Hall/Library could be used for periodic groundwater monitoring.
4.10	Former School Site		The 1997 report stated that a UST may exist at the former school. The location of the former school (now demolished) was verified by a community member to be behind the sheds next to the Health Centre.	Recommend debris at the former school demolition site be examined in vicinity of visible piping to determine if UST remains underground at the former school site.
4.11	Old Sawmill Site		The Phase II ESA conducted in 2005 concluded that groundwater discharging in the sawmill area is not impacting surface water quality.	No further environmental work is recommended. When developing this area, any remaining buried waste should be removed and disposed of at the landfill.
4.12	Old Garbage Trench		Piles of visible household waste, discarded appliances, metal vehicle parts and furniture were observed – a mix of newly discarded waste and old partially buried waste.	Recommend removing visible surface waste, such as appliances, auto parts and piles of garbage from the garbage trench and trail and transporting these wastes to the Active Landfill for disposal.
4.13	Active Landfill Site #3		Household waste is dumped at the landfill. Pails of waste oil, scrap metal and old appliances are discarded in an area north of the bins.	Conduct annual monitoring of groundwater quality and water levels to assess potential impacts of the landfill on the surrounding environment.
4.14	Cedar Point Fuel Storage		There is one diesel AST and one waste oil AST at Cedar Point. There are no barriers to protect the ASTs from moving vehicles at Cedar Point. Bulk fuel is delivered to the ferry directly from a tanker truck at the Cedar Island Dock.	To prevent damage to the existing tanks in the parking lots at Cedar Point, the installation of barriers (bollards) is recommended to protect ASTs from moving vehicles.
4.15	Christian Island Lighthouse	FCS00000866	The lighthouse and dwelling were constructed in 1856. In 1924 the lamp was removed. An electric lamp was installed in the 1950s.	FCSI states no further action required. Status closed.
4.16	Hope Island Lighthouse	FCS00013243	The remedial program report states remediation of the Fire Pit area and three waste dump areas has been completed, noting that heavy metal contaminated soil remains in areas south and west of the lighthouse.	FCSI states no further action required. Status closed. The demolition specifications note the removal and disposal of designated substances and hazardous materials, as well as contaminated soils.
Photo 2, Photo 13 and Photo 17	Petroleum Hydrocarbon Oil Sprayed on Community Roads		Over 60,000 L of petroleum hydrocarbon oil were sprayed onto the community roads on May 24, 2017. The spraying of petroleum hydrocarbon oil onto the ground on multiple occasions is a potential environmental concern to soil and groundwater quality. Oil staining is visible on the roads in recent photographs and aerial photographs.	Soil and groundwater sampling in the vicinity of the roads is recommended to assess potential impacts to soil and groundwater quality from multiple applications of petroleum hydrocarbon oil sprayed onto the ground.

## 11.0 Qualifications of the Assessors

The following staff conducted the work presented herein:

### **Kathleen Langstaff, B.Sc., P.Geo., QP<sub>ESA</sub>**

Kathleen Langstaff is a Professional Geoscientist (P.Geo) with over 20 years of environmental project experience. Kathleen Langstaff has conducted numerous Phase I and Phase II Environmental Site Assessments (ESA) at a variety of sites involving potentially contaminated soil and groundwater in urban and remote areas of Canada. Kathleen's project work includes soil investigations, groundwater studies, drilling and test pit programs, tank removals, excavation of contaminated material and remediation. Kathleen has worked on projects throughout Canada, including over 30 First Nation and Inuit communities. These First Nation projects were predominantly Phase I ESA and Phase II ESA studies. Ms. Langstaff is a Qualified Person, Environmental Site Assessment (QP<sub>ESA</sub>) as per O. Reg. 153/04. For this project, Kathleen conducted the records review, Site visit, interviews and report preparation.

### **Maeghan Willms, B.Sc., EPt**

Maeghan Willms is an Environmental Scientist with experience in environmental investigations, sample collection and specialized monitoring. Ms. Willms has studied geology, chemistry and environmental law, and has a sound understanding of the requirements of CSA Standard Z768-01 or conducting Phase I and II Environmental Site Assessments. For this project, Maeghan assisted with the records review, interviews, the Site visit and report preparation.

### **James R. Walls, B.Sc., P.Geo., QP<sub>ESA</sub>**

James R. Walls is a Senior Project Manager and Geoscientist with over 20 years of geological and environmental experience. Mr. Walls is experienced at conducting environmental site assessment and remediation projects (Phase I, II and III) at a variety of sites involving contaminated soil and groundwater. He has conducted hundreds of individual environmental site assessment projects. His projects have involved the delineation of contamination, the analysis of remedial options, the development and oversight of remediation strategies and post-remedial assessments. His experience includes industrial sites contaminated with fuels, oils, chlorinated organics, PCBs and DNAPL chemicals. His projects have been conducted in urban and remote areas of northern Canada, South America and the Caribbean. Mr. Walls has over 20 years of experience working with landfills, including environmental assessment, siting, design, rehabilitation and closure. Mr. Walls has worked on projects throughout northern Canada including over 50 First Nation communities and 12 arctic Hamlets. Mr. Walls is a Qualified Person as per O. Reg. 153/04. For this project, Mr. Walls provided quality assurance/quality control review and project oversight.

**Neegan Burnside Limited**

Neegan Burnside Limited is a professional consulting engineering firm with majority aboriginal ownership, with a focus on and specializing in providing services to Aboriginal (i.e., First Nation, Metis and Inuit) clients and supporting agencies. Neegan Burnside has completed thousands of servicing projects for First Nation communities throughout Ontario, Manitoba and the rest of Canada. Services offered include planning, feasibility and design, inspection, contract administration, project management, asset management and operating and maintenance assistance. Fields of expertise include environmental assessments, water supply and distribution, sewage collection and treatment, solid waste management, roads, building sciences, site remediation, environmental and land management and economic development.

## 12.0 References and Supporting Documentation

- Canada Lands Survey Records Plan 4570. Plan of Hope Island Light Reserve, Georgian Bay. August 30, 1899.
- Canada Lands Survey Records 102246. Exterior Boundaries of Christian Island Indian Reserve No. 30A. R01475431. 2013.
- Canada Lands Survey Records 102839. Exterior Boundaries of Christian Island and Adjacent Small Islands. Christian Island Indian Reserve No. 30. R01475592. 2014.
- Canada Lands Survey Records 103066. Exterior Boundaries of Hope Island and Beckwith Island. Christian Island Indian Reserve No. 30. R01475667. 2014.
- Decommissioning Consulting Services Limited. Remedial Program Hope Island Lightstation (LL857), Georgian Bay, Lake Huron, Ontario. October 2004.
- Department of Marine and Fisheries. Sixteenth Annual Report. June 30, 1883.
- Feherty and Associates Limited. Phase I Environmental Site Assessment for Beausoleil First Nation. April 24, 2002.
- Fenco MacLaren Inc. Detailed Site Assessment and Remedial Option Study Beausoleil First Nation. February 1997.
- Addendum to the Phase III Environmental Issues Inventory of Beausoleil First Nation. March 1997.
- Fisher Environmental Laboratories. Certificate of Analysis. 13-6124-1 Dust Control Oil Sample. July 8, 2013.
- Great Lakes Vessels Online Index. Clement, Norman P. Registry and Rig Information.
- Aboriginal Affairs and Northern Development Canada. Education Facilities Progress Report. April 2008 to March 2013.
- Indigenous and Northern Affairs Canada. Indian Lands Registry System. Band-Reserve Report. Band: 141 - Beausoleil First Nation.
- Lake Huron Lore Marine Society. Vol. XXIV, No. 3. Page 7. May/June 2003.
- Ministry of the Environment and Climate Change. Email from Todd Fleet, District Engineer. London District Office. September 12, 2017.
- Neegan Burnside Engineering and Environmental Ltd. Beausoleil First Nation Capital Planning Study Interim Report. File FO-022416. May 2002.
- Neegan Burnside Engineering and Environmental Ltd. Beausoleil First Nation Capital Planning Study Final Report. File FO-022416. March 2006.

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Neegan Burnside Engineering and Environmental Ltd. Phase II Environmental Site Assessment. Beausoleil First Nation. June 2005.

Neegan Burnside Ltd. National Assessment of First Nations Water and Wastewater Systems. Beausoleil First Nation. 2010.

Ontario Geological Survey 2010. 1:50,000 scale. Surficial Geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release – Data 128 – Revised.

Ontario Geological Survey 2011. 1:250,000 scale. Bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release – Data 126 – Revision 1.

Ontario Underwater Council. Ontario Shipwrecks database, Google mapping.

Public Works and Government Services Canada. Hope Island Demolition Project. Specification Project Number R.078904.001. March 27, 2017.

R.J. Burnside & Associates Limited. Beausoleil First Nation Community Planning Study Phase 2. File F-1104. December 1996. Revised May 1997.

Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations. SOR/2008-197.

Toronto Telegram. Acid Ship to be Sunk. Newspaper article about Norman P. Clement shipwreck to be sunk in 360 feet of water off Christian Island. October 22, 1968.

Treasury Board of Canada Federal Contaminated Sites and Solid Waste Landfills Inventory Policy. 2000.

### **13.0 Limitations and Use of Report**

Neegan Burnside confirms that it has completed a Phase I ESA of Beausoleil First Nation and has made the findings and conclusions provided herein.

The conclusions in this report are professional opinions based upon visual observations of the Site conditions existing at the time of our assessment. This Phase I ESA report has been prepared in accordance with the requirements of CSA document Z768-01 and accepted environmental study and/or engineering practices. It should be noted that some of the information and resulting conclusions of a Phase I ESA are time sensitive. Neegan Burnside does not guarantee the accuracy and reliability of the information provided by other persons or agencies and does not claim responsibility for undisclosed or non-visible environmental concerns that may result in costs for environmental clean-up or remediation.

Any use of, reliance on, or decisions based on this report by a third party are the responsibility of such third parties. Neegan Burnside accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

