



'Namgis First Nation

Update of 2011 Phase I Environmental Site Assessment (ESA)

Alert Bay I.R. No. 1

Alert Bay I.R. No. 1A

Nimpkish I.R. No. 2

Phase 1 Environmental Site Assessment

Ches-la-Kee I.R. No. 3

Ar-Cee-Wy-Ee I.R. No. 4

Osaw-Las I.R. No. 5

Ksui-La-Das I.R. No. 6

Kuldekduma I.R. No. 7

Prepared for: 'Namgis First Nation, Alert Bay, BC

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ACRONYMS & ABBREVIATIONS

APEC	Area of Potential Environmental Concern
AST	Aboveground Storage Tank
BCAWQGAW	BC Approved Water Quality Guidelines
BCWWQG	British Columbia Working Water Quality Guidelines BCWWQG
BC	British Columbia
BC MOE	British Columbia Ministry of Environment
CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Act
CEPA	Canadian Environmental Protection Act
CEQG	Canadian Environmental Quality Guidelines
CMHC	Canada Mortgage and Housing Corporation
CSA	Canadian Standards Association
CSR	Contaminated Sites Regulation
CWS	Canada Wide Standards
EMA	Environmental Management Act
EPH	Extractable petroleum hydrocarbons
ESA	Environmental Site Assessment
FCSI	Federal contaminated Sites Inventory
F1	Fraction 1 (also F2, F3 and F4)
HEPH	Heavy Extractable Petroleum Hydrocarbons
HWR	Hazardous Waste Regulation
INAC	Indigenous and Northern Affairs Canada
LEPH	Light Extractable Petroleum Hydrocarbons
m	Metres
NCSCS	National Classification System for Contaminated Sites
NRCAN	Natural Resources Canada
PAH	Polycyclic (or Polynuclear) aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PCOP	Potential Contaminant of Concern
COPC	Contaminant of Potential Concern
UST	Underground Storage Tank
TDGA	Transportation of Dangerous Goods Act
NFN	'Namgis First Nation
UTM	Universal Transverse Mercator

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1 INTRODUCTION

1.1 Project Background

BC Ecosphere Management Ltd. (BC Ecosphere) was retained by the 'Namgis First Nation (NFN) and Indigenous and Northern Affairs Canada to (i) update the 2011 Phase I ESA completed by Stantec in 2011 for Alert Bay I.R. No. 1, Alert Bay I.R. No. 1A, Nimpkish I.R. No. 2, and (ii) conduct a Phase I ESA of Ches-la-Kee I.R. No. 3 Ar-Cee-Wy-Ee, I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 and Kuldeksuma I.R. No. 7. The objective of the Phase 1 ESA was to establish the environmental condition of these Reserve lands and specifically to identify areas of potential or known contamination that may represent a risk or liability to 'Namgis First Nation. This Phase I ESA does not include the 12-acre parcel of land set aside by INAC as a home for people from surrounding Kwakwaka'wakw First Nations. The general area and location of the 'Namgis First Nation Reserves are presented in Figure 1.

Under the FNLMA agreement process, Canada has undertaken to identify the environmental condition of NFN reserve lands. The first step in identifying if any contamination may be present on NFN lands is to conduct a Phase 1 Environmental Site Assessment (Phase 1 ESA). The following report documents investigation methodologies and presents the results of an Update to a 2011 Phase 1 ESA for Alert Bay I.R. No. 1, Alert Bay I.R. No. 1A, Nimpkish I.R. No. 2 and a Phase I ESA for Ches-la-Kee I.R. No. 3 Ar-Cee-Wy-Ee, I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 and Kuldeksuma I.R. No. 7. An open house to solicit potential environmental concerns was initially scheduled for January 20, 2017 but was re-scheduled and occurred on February 9, 2017. Site inspections on Nimpkish River Reserves was conducted on December 14 and 15, 2016 and Alert Bay I.R. No. 1, Alert Bay I.R. No. 1A and Nimpkish I.R. No. 2 on January 19 and 20, 2017.

1.2 Project Objective

The objective of the Phase 1 ESA was to identify past and present land use that may have resulted in the contamination of 'Namgis First Nation lands and which may require further investigation, remediation and/or risk management in accordance with applicable Federal contaminated sites management regimes. The object of the Updated Phase I ESA was to identify land uses that have occurred since 2011 that may have resulted in the contamination of 'Namgis First Nation lands and which may require further investigation, remediation and/or risk management in accordance with applicable Federal contaminated sites management regimes.

1.3 Scope of Work

The scope of work was based on a BC Ecosphere proposal dated October 10, 2016 in response to a request for proposal/statement of work received from INAC on behalf of 'Namgis First Nation.

Investigation methodologies used during the environmental assessment were generally based on guidance by the Canada Mortgage and Housing Corporation (CMHC) Phase 1 Environmental Site

Assessment Criteria (CMHC 1994), Canadian Standards Association (CSA) Standard Z768-01 and Terms of Reference provided by INAC.

As per the Terms of Reference provided by INAC, the environmental assessment was limited to land within reserve boundaries as shown on the attached figures at the end of this report. Inspections completed by BC Ecosphere staff were limited to portions of reserve land that were readily accessible and were either previously or currently developed. Inspections were also focused on areas where historic records and/or where NFN members identified the potential presence of environmental concerns.

Assessment of adjacent land use was based on observations made from reserve land and/or interpretation of historic records reviewed as part of this Phase 1 ESA. No soil, sediment, surface water or groundwater sampling was carried out during the investigation and no destructive sampling of building envelope(s) were performed to investigate the potential presence of hazardous building materials.

1.3.1 Phase I ESA: Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee, I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 and Kuldekduma I.R. No. 7

Although procedures adopted for the Phase 1 ESA were also similar to those used to conduct a Stage 1 Preliminary Site Assessment (PSI) under Section 58 of the British Columbia Contaminated Sites Regulation (CSR), there was no intent to satisfy Provincial Ministry of Environment requirements. Tasks completed to meet the Phase I ESA objectives, included the following:

- **Historic Research and Records Review:** This included review of readily available historic records from 'Namgis First Nation, INAC, BC Ministry of Environment, BC Groundwater Wells Database, Environment Canada, Health Canada, Natural Resources Canada, Regional District of Mount Waddington along with historical aerial photographs.
- **Site Reconnaissance:** A visual inspection of NFN lands and adjacent properties was conducted to establish current site conditions on and adjacent to the Reserve(s). The reconnaissance was used to identify items such as surface staining (oil staining, surface depressions, fill areas), stressed vegetation, evidence of aboveground storage tanks (AST's) and underground storage tanks (UST's), effluent discharges (air and water), waste management practices, and location of chemical storage areas (i.e. including fuels, oils, preserved wood, herbicides, pesticides, etc.). A site visit to the Kuterra Aquaculture facility on Ches-la-Kee I.R. No. 3 was conducted. At the direction of the 'Namgis First Nation, BC Ecosphere was advised that the site visits to Ksui-La-Das I.R. No. 6 and Kuldekduma I.R. No. 7 were not required.
- **Identification of Concerns:** Areas of Potential Environmental Concern (APEC) where contamination was suspected and/or Areas of Environmental Concern (AEC) where contamination was known to exist were identified based on the records review, interviews with 'Namgis First

Nation members and site inspection/reconnaissance.

- **Report Preparation:** A final report was prepared to compile historic information, document methodologies utilized during the investigation, summarize the results of the investigation and provide recommendations for additional work, as required.

As per the Terms of Reference provided by INAC, the environmental assessment was limited to land within reserve boundaries as shown on the attached figures at the end of this report. Inspections completed by BC Ecosphere staff were limited to portions of reserve land that were readily accessible and were either previously or currently developed. Inspections were also focused on areas where historic records and/or where NFN members identified the potential presence of environmental concerns.

Assessment of adjacent land use was based on observations made from reserve land and/or interpretation of historic records reviewed as part of this Phase 1 ESA. No soil, sediment, surface water or groundwater sampling was carried out during the investigation and no destructive sampling of building envelope(s) were performed to investigate the potential presence of hazardous building materials.

1.3.2 Update to 2011 Phase I ESA: Alert Bay I.R. No. 1, Alert Bay I.R. No. 1A and Nimpkish I.R. No. 2

- **Historic Research and Records Review:** This included review of readily available historic records from 'Namgis First Nation, INAC, BC Ministry of Environment, BC Groundwater Wells Database, Environment Canada, Health Canada, Natural Resources Canada, Village of Alert Bay along with historical aerial photographs of any reports or documents for these three (3) Reserve lands since 2011. Specifically, research efforts were made to review and document the status of the recommended follow-up environmental site assessment investigations, if any, on the APECs identified in the 2011 Phase I ESA.
- **Site Reconnaissance:** A visual inspection of NFN lands assessed in 2011 and adjacent properties was conducted to establish current site conditions on and adjacent to the Reserve(s). The reconnaissance was used to determine if land use and or activities on the lands had changed from 2011. The reconnaissance was also used to identify whether items such as surface staining (oil staining, surface depressions, fill areas), stressed vegetation, evidence of aboveground storage tanks (AST's) and underground storage tanks (UST's), effluent discharges (air and water), waste management practices, and location of chemical storage areas (i.e. including fuels, oils, preserved wood, herbicides, pesticides, etc.) subsequent to 2011 were found on these Reserve lands. In the absence of consent for access from property holders, some sites were not visited but were viewed from accessible properties, adjoining roadways and community facilities.

- **Identification of Concerns:** Areas of Potential Environmental Concern (APEC), which were identified in the 2011 Phase I ESA where contamination was suspected and/or Areas of Environmental Concern (AEC) where contamination was known to exist, were identified based on the records review, interviews with 'Namgis First Nation members and site inspection/reconnaissance.
- **Report Preparation:** A final report was prepared to compile historic information, document methodologies utilized during the investigation, summarize the results of the investigation and provide recommendations for additional work, as required.

2 SITE DESCRIPTION

2.1 General Description

The 'Namgis First Nation (NFN) includes Alert Bay I.R. No. 1, Alert Bay I.R. No. 1A, Nimpkish I.R. No. 2, Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 and Kuldekduma I.R. No. 7. The main community of the NFN is located on Alert Bay I.R. No. 1 and Alert Bay I.R. No. 1A, which primarily occupies the northern half of Cormorant Island. Nimpkish I.R. No. 2 is not occupied at this time. The Village of Alert Bay borders Alert Bay I.R. No. 1 to the south, and Nimpkish I.R. No. 2 is bordered on three sides by the Village of Alert Bay and on the west by Broughton Strait.

Ches-la-Kee I.R. No. 3 occupies both banks of the Nimpkish River at its mouth to Broughton Strait, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5 are further westward down the Nimpkish River. Ksui-La-Das I.R. No. 6 and Kuldekduma I.R. No. 7 are on small islands east of Cormorant Island. The Reserves locations are shown in Figures 1 through 4. General information for each Reserve is summarized in the following table:

Item	Description
General Location Alert Bay I.R. No. 1	Alert Bay I.R. 1A is located on the west side of Cormorant Island and is currently occupied by forested lands, a cemetery, residential buildings, and commercial buildings including a service station, hospital, health centre and cultural centre.
Alert Bay I.R. No. 1A	Alert Bay I.R. 1 is located near the central south side of the Cormorant Island and is currently occupied by forested lands, residential buildings, a church, community hall, and commercial buildings.
Nimpkish I.R. No. 2	Nimpkish I.R. 2 is located approximately 40 m north of the intersection of Fir Street and Birch Road, near the east side of Cormorant Island and is currently occupied by a cemetery and a portion of a slipway and a former nurses residence building

Item	Description	
	associated with the former St. George's Hospital.	
Ches-la-Kee I.R. No. 3	Ches-la-Kee I.R. No. 3 is located on both side of the mouth of the Nimpkish River where it empties to the Broughton Strait	
Ar-Cee-Wy-Ee I.R. No. 4	Ar-Cee-Wy-Ee I.R. No. 4 is located on the left bank of the Nimpkish River 3 miles south of mouth of Broughton Strait	
Osaw-Las I.R. No. 5	Osaw-Las I.R. No. 50 is located on the right bank of the Nimpkish River, north of Nimpkish Lake.	
Ksui-La-Das I.R. No. 6	Ksui-La-Das I.R. No. 6 is located on Ksuiladas Island southerly island of the Plumper Group northwest of Hanson Island..	
Kuldekduma I.R. No. 7	Kuldekduma I.R. No. 7 I is located on Kuldekduma Island most northerly of the Peace Group, west of Hanson Island.	
General Land Use		
Alert Bay I.R. No. 1	Residential	
Alert Bay I.R. No. 1A	Residential	
General Land Use (cont'd.)		
Nimpkish I.R. No. 2	Unoccupied	
Ches-la-Kee I.R. No. 3	Land-based Aquaculture Farm	
Ar-Cee-Wy-Ee I.R. No. 4	Unoccupied	
Osaw-Las I.R. No. 5	Unoccupied	
Ksui-La-Das I.R. No. 6	Unoccupied	
Kuldekduma I.R. No. 7	Unoccupied	
Legal Description	Rupert District: On east shore of Alert Bay, Cormorant Island,	
Alert Bay I.R. No. 1	Broughton Strait. 74.60 ha.	
Alert Bay I.R. No. 1A	Rupert District: Part of Lot 1957, west portion of Cormorant Island, Broughton Strait. 161.60 ha.	
Nimpkish I.R. No. 2	Rupert District: On Cormorant Island east Shore of Alert Bay south of Alert Bay I.R. No. 1 2.70	
Ches-la-Kee I.R. No. 3	Rupert District: At mouth of the Nimpkish River on Broughton Strait. 118.20 ha.	
Ar-Cee-Wy-Ee I.R. No. 4	Rupert District: On left bank of the Nimpkish River 3 miles south of mouth of Broughton Strait. 16.70 ha.	
Osaw-Las I.R. No. 5	Rupert District: On right bank of the Nimpkish River, north of Nimpkish Lake 20.40 ha.	
Ksui-La-Das I.R. No. 6	Rupert District: Lot 392, on Ksuiladas Island southerly island of the Plumper Group northwest of Hanson Island. 25.80 ha.	
Kuldekduma I.R. No. 7	Rupert District: Lot 931, on Kuldekduma Island most northerly of the Peace Group, west of Hanson Island. 22 ha.	
UTM Coordinates (10U)	Easting	Northing
Alert Bay I.R. No. 1	646717.23	5606422.54
Alert Bay I.R. No. 1A	645505.77	5606854.64

Item	Description	
UTM Coordinates (10U) cont'd.		
Nimpkish I.R. No. 2	646703.65	5605388.43
Ches-la-Kee I.R. No. 3	642732.76	5604161.90
Ar-Cee-Wy-Ee I.R. No. 4	641241.25	5601392.00
Osaw-Las I.R. No. 5	641121.71	5599169.07
Ksui-La-Das I.R. No. 6	655852.18	5606342.07
Kuldekduma I.R. No. 7	652650.52	5606187.68

The registered population of the Namgis First Nation as of February 2017 was 1,882 with 924 of 'Namgis First Nation members residing on Reserve. The total number of dwellings was recorded as 210, with 180 of those having been constructed over 10 years ago, 25 constructed within the past 10 years. It is also noted that according to the 2011 Census, 70 dwellings required minor repairs and 55 required major repairs (INAC Community Profile).

Alert Bay I.R. No. 1A is predominantly forested on its western half. Land use in the remaining portion of Alert Bay I.R. No. 1 includes a hospital, health centre, works yard, gas station, small sawmill, light-industry facility, the Big House, a cemetery, residences and the community's water reservoir tank. The Kwakwaka'wakw First Nations' 12 acre Whe-La-La-U community is within Alert Bay I.R. No. 1A. Alert Bay I.R. No. 1 is largely residential and also includes the administration centre, an elementary school, a community hall, Cormorant Island's waste water treatment plant and small pockets of forested areas. The former nurses residence of the now demolished St. George's Hospital, a cemetery and a small portion of a marine slipway occupy Nimpkish I.R. No. 2.

Ches-la-Kee I.R. No. 3 is primarily unoccupied and forested except for a small land-based aquaculture facility that occupies a portion of the Reserve's southwest corner. It has been logged and now has a second growth, mid-seral stage forest over most of it. Highway 19 transits its southwest corner.

Ar-Cee-Wy-Ee I.R. No. 4 is in a natural forested state with an abundance of mature and over mature hemlock stands with lots of blowdowns and dwarf Mistletoe. It was most likely used by 'Namgis people in the past as a fishing station. Archaeological resources may be found on Ar-Cee-Wy-Ee I.R. No. 4.

Similar to Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5 is largely in a natural state with an abundance of mature and over mature hemlock except for an old rail Right-of-Way that is entirely overgrown with red alder and barely discernible. It also was most likely used by 'Namgis people in the past as a fishing station and archaeological resources may be found on Ar-Cee-Wy-Ee I.R. No. 4.

Ksui-La-Das I.R. No. 6 and Kuldekduma I.R. No. 7 are unoccupied but occasionally used by 'Namgis

First Nation members for recreational, ceremonial and traditional use purposes.

2.2 Physical Setting

Physical information includes general climate, regional topography, surficial geology and regional hydrology. A summary of this information is provided in the following table:

Item	Description
Climate	
	Based on the Environment Canada Climate Normals for 1971-2000 (EC 2010), the mean annual precipitation at Alert Bay is 1591.5 mm, of which 1526.6 mm falls as rain. The heaviest precipitation occurs during the months of October through March. The daily average temperature at the Alert Bay station is 8.5 °C, with the highest average temperature of 14.3 °C occurring in August and the lowest average temperature of 3.5 °C occurring in January (see Appendix A).
Topography	
Alert Bay I.R. No. 1	Rises from the shores of Broughton Strait to a higher curved ridge along its northern edge.
Alert Bay I.R. No. 1A	Rises from the shores of Broughton Strait to a higher area in its western portion.
Nimpkish I.R. No. 2	On the southwest coastal fringe of Cormorant Island.
Ches-la-Kee I.R. No. 3	From the riverine fringe along the Nimpkish River rises northward on its northern portion and southward on its southern portion. Average elevation: 11 meters (36 feet)
Ar-Cee-Wy-Ee I.R. No. 4	From the riverine fringe rises northward. Average elevation: 11 meters (36 feet)
Osaw-Las I.R. No. 5	From the riverine fringe, rises on a steep slope southward. Average elevation: 11 meters (36 feet)
Ksui-La-Das I.R. No. 6	Rises somewhat in its north and western half Average elevation: 38 meters (125 feet)
Kuldekduma I.R. No. 7	Rises somewhat in its western half. Average elevation is 34 meters (112 feet)
Surficial Geology	
Alert Bay I.R. No. 1	Gravelly, rocky soil over strata of compacted sand with no surface bedrock, which is unique to the region.
Alert Bay I.R. No. 1A	Gravelly, rocky soil over strata of compacted sand with no surface bedrock, which is unique to the region.
Nimpkish I.R. No. 2	Gravelly, rocky soil over strata of compacted sand with no surface bedrock, which is unique to the region.
Ches-la-Kee I.R. No. 3	Consists primarily of terraced and inter-bedded fluvial sand arid gravel deposits up to 50 m thick.
Ar-Cee-Wy-Ee I.R. No. 4	Consists primarily of terraced and inter-bedded fluvial sand arid gravel deposits up to 50 m thick with some rocky outcrops.
Osaw-Las I.R. No. 5	Consists primarily of terraced and inter-bedded fluvial sand arid gravel deposits up to 50 m thick. Some slumping of slopes on the Reserve was observed.

Item	Description
Surficial Geology cont'd.	
Ksui-La-Das I.R. No. 6	No surficial geology data available. No site visit to observe.
Kuldekuma I.R. No. 7	No surficial geology data available. No site visit to observe.
Surficial Soils	
Alert Bay I.R. No. 1	The native surficial soils consist of alluvial, marine and glacial deposits.
Alert Bay I.R. No. 1A	The native surficial soils consist of alluvial, marine and glacial deposits.
Nimpkish I.R. No. 2	The native surficial soils consist of alluvial, marine and glacial deposits.
Ches-la-Kee I.R. No. 3	Soils generally consist of poorly sorted gravels, sand and silt. The soil texture consists of an organic material that is decomposing. The soils are highly permeable.
Ar-Cee-Wy-Ee I.R. No. 4	Soils generally consist of poorly sorted gravels, sand and silt. The soil texture consists of an organic material that is decomposing. The soils are highly permeable.
Osaw-Las I.R. No. 5	Soils generally consist of poorly sorted gravels, sand and silt. The soil texture consists of an organic material that is decomposing. The soils are highly permeable.
Ksui-La-Das I.R. No. 6	No surficial soils data available. No site visit to observe.
Kuldekuma I.R. No. 7	No surficial soils data available. No site visit to observe.
Hydrology and Surface Water Bodies	
Alert Bay I.R. No. 1	Based on the topography, regional surface drainage (anticipated shallow groundwater flow direction) appears to be toward the Broughton Strait. No other major water bodies were observed.
Alert Bay I.R. No. 1A	Based on the topography, regional surface drainage (anticipated shallow groundwater flow direction) appears to be toward the Broughton Strait. No other major water bodies were observed.
Nimpkish I.R. No. 2	Based on the topography, regional surface drainage (anticipated shallow groundwater flow direction) appears to be toward the Broughton Strait. No other major water bodies were observed.
Ches-la-Kee I.R. No. 3	Few small ephemeral streams on its northern portion flowing into the Nimpkish River.
Ar-Cee-Wy-Ee I.R. No. 4	No surface water bodies were observed.
Osaw-Las I.R. No. 5	Some small ephemeral creek flowing from west to east was observed at the toe of the southern slope on the Reserve. .
Ksui-La-Das I.R. No. 6	No surface water bodies were evident from air photo interpretation.
Kuldekuma I.R. No. 7	No surface water bodies were observed.
Hydrogeology and Groundwater Flow Direction	
Alert Bay I.R. No. 1	Much of Cormorant Island is underlain by a sand and gravel aquifer, some of which is capped with a silt and clay aquitard. The eastern and western extents of the Nimpkish aquifer are not well established
Alert Bay I.R. No. 1A	As per Alert Bay I.R. No. 1 above.
Nimpkish I.R. No. 2	As per Alert Bay I.R. No. 1 above.

Item	Description
Hydrogeology and Groundwater Flow Direction cont'd.	
Ches-la-Kee I.R. No. 3	There are two aquifers in the vicinity of the I.R. No. 3: Aquifer #763, which is a bedrock aquifer; and Aquifer #764, which is an overburden aquifer comprised of sands and gravels. The productivity of Aquifer #763 is classified as Low, while the productivity of Aquifer #764 is classified as Moderate. The variation in observed groundwater depths due to tidal fluctuations ranges from 0.25 to 1.0 m. The range of groundwater flow and direction is 4-9 m/day toward the east and southeast. Groundwater generally flows away from the River, suggesting the surface water is recharging the aquifer at this location during the wet season when River levels are high. It is likely that the groundwater gradient is reversed during periods of the tidal cycle in the dry season as the aquifer discharges to the River (Thurber 2010).
Ar-Cee-Wy-Ee I.R. No. 4	There are two aquifers in the vicinity of the I.R. No. 3: Aquifer #763, which is a bedrock aquifer; and Aquifer #764, which is an overburden aquifer comprised of sands and gravels. The productivity of Aquifer #763 is classified as Low, while the productivity of Aquifer #764 is classified as Moderate. Groundwater generally flows away from the River, suggesting the surface water is recharging the aquifer at this location during the wet season when River levels are high. It is likely that the groundwater gradient is reversed during periods of the tidal cycle in the dry season as the aquifer discharges to the River.
Osaw-Las I.R. No. 5	There are two aquifers in the vicinity of the I.R. No. 3: Aquifer #763, which is a bedrock aquifer; and Aquifer #764, which is an overburden aquifer comprised of sands and gravels. The productivity of Aquifer #763 is classified as Low, while the productivity of Aquifer #764 is classified as Moderate. Groundwater generally flows away from the River, suggesting the surface water is recharging the aquifer at this location during the wet season when River levels are high. It is likely that the groundwater gradient is reversed during periods of the tidal cycle in the dry season as the aquifer discharges to the River .
Ksui-La-Das I.R. No. 6	No groundwater information is available for this Reserve.
Kuldekuma I.R. No. 7	No groundwater information is available for this Reserve.
Groundwater Use	
Alert Bay I.R. No. 1	Potable water comes from two established wells pumping from the aquifer. Well 66-1 (New Well) and Well 91-2 (Standby Well) Well Rates at 6.7 & 6.3 L/s respectively (see Appendix B). The Nimpkish aquifer appears to be vey productive and capable of yielding more than the estimated 34,200m ³ being extracted from the two production wells. Chemical analysis showed water being relatively fresh with low electrical conductivity (EC). This result is consistent with a well-flushed aquifer and not salt-water intrusion.
Alert Bay I.R. No. 1A	As per Alert Bay I.R. No. 1 above.
Nimpkish I.R. No. 2	As per Alert Bay I.R. No. 1 above.

Item	Description
Groundwater Use cont'd.	
Ches-la-Kee I.R. No. 3	Three (3) groundwater production wells on the property, as well as two (2) geothermal wells (see Appendix B). There are three registered wells located approximately 400 to 500 m southwest of the site belonging to the Gwa'ni Hatchery located within 1.5 km of the site. No water wells are registered on the Ministry of Environment Groundwater Wells Database in the vicinity of Springhill Road.
Ar-Cee-Wy-Ee I.R. No. 4	There are no established groundwater wells on I.R. No. 4.
Osaw-Las I.R. No. 5	There are no established groundwater wells on I.R. No. 5.
Ksui-La-Das I.R. No. 6	There are no established groundwater wells on I.R. No. 6.
Kuldekuma I.R. No. 7	There are no established groundwater wells on I.R. No. 7.
Flood Potential	
Alert Bay I.R. No. 1	Low
Alert Bay I.R. No. 1A	Low
Nimpkish I.R. No. 2	Low
Ches-la-Kee I.R. No. 3	Moderate for some portion of the Reserve.
Ar-Cee-Wy-Ee I.R. No. 4	Moderate for some portion of the Reserve.
Osaw-Las I.R. No. 5	Moderate for some portion of the Reserve.
Ksui-La-Das I.R. No. 6	Low
Kuldekuma I.R. No. 7	Low

Apart from windborne deposition, physical relocation of contaminated soil or vapour migration, the principle means by which contaminant transport will occur from one property to another is through groundwater flow. Without groundwater elevations from monitoring wells, the most common approach is to infer that the flow direction will simply follow local and/or regional topography, i.e. groundwater will flow downhill, at 90 degrees to land contours. Regionally this would be in a similar direction as creeks and rivers flow, and more locally toward creeks, rivers, ponds, lakes or the sea. Once you know or infer the flow direction it is a simple matter of measuring the distance of the potential source of off-site contamination to the reserve boundary and indicating if it is upgradient, x-gradient or downgradient. A property is thus generally at greatest risk from upgradient sources rather than those located perpendicular (cross gradient) or downgradient (subject to influence by underground utilities, underlying bedrock slope, etc.) of the site.

In order to identify if adjacent land use or historic events have the potential to influence conditions on the subject property, only those properties that are located within 300m of property boundaries are considered further (as per BC Technical Guidance Document #10, Appendix 1). Site-specific conditions, such as the presence of surface water bodies (typically representing a barrier to groundwater migration), are also taken into consideration. Other factors taken into account include:

- The size and nature of the source (i.e. residential, commercial or industrial scale);
- The potential presence of dense non-aqueous phase liquids. These contaminants are constrained vertically by the presense of a water table and can migrate against the apparent or inferred groundwater table following underlying geological stratigraphy;
- Depth to groundwater and sub-surface soil permeability, and

- Utilities, which may act as subsurface interceptor trenches (i.e. barriers) or facilitate contaminant migration rate and re-direction.

Generally, and subject to a review of various site specific conditions (such as those noted above), non industrial sources of contamination located more than 200m upgradient, 100m cross gradient or 50m downgradient of the applicable property boundaries are not considered to pose a substantial risk. The relative nature of the gravelly, rocky soil over strata of compacted sand with no surface bedrock, that are likely to be encountered on Alert Bay No. 1 suggest that the migration potential for contaminants in the dissolved phase (if present) would be relatively high. Based on anticipated groundwater flow direction and site-specific conditions, there is an adjacent land use that has the greatest potential to impact the environmental conditions of Alert Bay No. 1. The Village of Alert Bay has created a biocell at the corner of Gatu Road and Hemlock St. immediately adjoining and upgradient of Alert Bay I.R. No. 1.

3.0 REGULATORY CONTEXT

There are no specific regulatory requirements for conducting a Phase 1 ESA on Federal land, only guidance, as outlined in Section 1.3 of this report. Within the Provincial domain, site investigations must be conducted in accordance with the requirements of the Contaminated Sites Regulation, particularly if a statutory instrument, such as a Certificate of Compliance (CoC) is required.

Environmental acts, regulations and guidelines that are applicable on reserve land include, but are not limited to, the following.

- Canadian Environmental Protection Act (CEPA);
- Fisheries Act;
- Species at Risk Act (SARA);
- Transportation of Dangerous Goods Act (TDGA);
- Indian Reserve Waste Disposal Regulations;
- Canadian Council of Ministers of the Environment (CCME)
- Canadian Environmental Quality Guidelines (CEQG);
- CCME Canada Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (PHC CWS);
- Health Canada (HC) Canadian Drinking Water Guidelines; and,
- Federal Contaminated Sites Action Plan (FCSAP) Interim Groundwater Quality guidelines.

Provincial legislation associated with the management of contaminated land that may be applicable in the absence of Federal guidance or may be required to assess disposal options for contaminated material during future remediation or risk management; include the following:

- Environmental Management Act (EMA);
- Contaminated Sites Regulation (CSR);
- Hazardous Waste Regulation (HWR);
- British Columbia Approved Water Quality Guidelines (BCAWQG); and,
- British Columbia Working Water Quality Guidelines (BCWWQG).

Both Federal guidelines and Provincial standards provide assessment criteria based on the nature of land use, i.e. agricultural, parkland, residential, commercial or industrial, and water use, i.e. freshwater and/or marine/estuarine. Consequently, applicable community land use plans should be referenced to identify which guidelines or standards should be adopted to assess future investigation findings (if required). In the absence of suitable land use plans, NFN should use residential land use criteria as a precautionary measure to protect existing and allow for future changes in land use.

In addition to the nature of land use, the selection of applicable Federal and/or Provincial soil and groundwater guidelines or standards is also influenced by a number of site-specific factors, such as, use and distance of groundwater and surface water on or downgradient of the area under investigation. The following standards or guidelines may be applicable; dependent on specific site conditions encountered at the investigation site and/or based on future land use requirements:

Soil Assessment

- Soil ingestion (CWS, CEQG & CSR);
- Soil where groundwater may be used as drinking water (CWS, CEQG & CSR);
- Ecological protection and toxicity to soil invertebrates and plants (CWS CEQG & CSR);
- Soil where groundwater may be used as drinking water (CWS CEQG & CSR);
- Soil where groundwater may impact freshwater aquatic life (CWS, CEQG & CSR);
- Soil where groundwater may be used for irrigation and/or livestock watering (CWS & CSR);
- Soil disposal with BC (HWR).

Groundwater Assessment

- Groundwater that discharges to a surface water body used by aquatic life (CSR & FCSAP GWQG);
- Groundwater used for irrigation or livestock watering (CSR & FCSAP GWQG);
- Groundwater used as drinking water (CSR & HC);
- No Water Use standards (CSR).

Surface Water Assessment

- Surface water for freshwater aquatic life (including CEQG, BCAWQG & BCWWQG).

Soil Vapour Assessment

- "Federal Contaminated Site Risk Assessment in Canada, Part VII: Guidance for Soil Vapour Intrusion Assessment at Contaminated Sites", Health Canada and FCSAP provides risk assessment guidance specific to vapour intrusion exposure pathway.

The BC CSR also specifies methodologies for conducting site investigations and soil vapour assessment in the presence of 'detectable' concentrations of volatile organic compounds (CSR - Schedule 11).

4.0 HISTORIC RECORDS REVIEW

The following information is based on a review of historic records and information provided by community members.

4.1 Historical Land Use

Alert Bay I.R. No. 1A has historically been used for residential, agriculture, commercial, and industrial purposes. The western portion of the Alert Bay I.R. No. 1A has been undeveloped and/or used for forestry activities (logging) since at least the early 1950s. The majority of eastern portion of the Site has been used for residential and agriculture purposes from at least to the early 1950s to the late 1960s. From the late 1960s to the present, the majority of the Site has been used for residential purposes. A landfill formerly occupied Alert Bay I.R. No.1A, west of the Big House, from at least the late 1960s to the early 2000s. A clearing located west of the on-site cemetery, formerly a gravel pit, has been and is presently used for burning wastes (construction materials). Stantec reported in the 2001 Phase I ESA that soil from the former off-site BA (British American Petroleum) Dock was reported to have been re-located here, however, it was not observed during the Stantec or the recent site visit. A sawmill operation formerly occupied Alert Bay I.R. No. 1A near the southern shoreline, in the 1960s. A small sawmill operation currently occupies the same location. 'Namgis First Nation's Public Works yard has occupied Alert Bay I.R. No.1 near the southern shoreline since the late 1970s. An air hangar building has occupied a site southwest of the Public Works yard since at least the late 1950s. Since 2009, a gas station has occupied Alert Bay I.R. No. 1A to the east of the former and recently demolished and remediated St. Michael's residential school site. Stantec's 2011 Phase I ESA reported that in 2009, two former heating oil USTs were reported to have been removed from a commercial building located near the former residential school. No confirmation sampling was reported to Stantec regarding the decommissioning of these USTs. Two gravel pits occupy the Alert Bay I.R. No. 1A, north of the health centre buildings and near the west side of the Alert Bay I.R. No.1A

Alert Bay I.R. No. 1 has historically been used primarily for residential purposes since at least the early 1950s. The western portion of the Alert Bay I.R. No. 1 (shoreline) has been used for residential purposes since at least the early 1950s with some commercial activities (tourist shop and a now-closed restaurant). Prior to 1970, forestry occurred on large section of the eastern portion (inland) of Alert Bay I.R. No. 1 but from the late 1970s to the mid 1990s, there was increased residential use in the eastern portion of the Bay I.R. No. 1A. An off-Reserve church has occupied a lot within Alert Bay I.R. No. 1 for approximately one century. Four former ASTs, associated with the adjacent BA Dock, may have been located on this site or north of the Church site

The former St. George Hospital once occupied the northern portion of Nimpkish I.R. No. 2. The nurses' residence of the hospital still remains on the site. A former residence of the chief medical officer in the northwest corner of the site was demolished years ago and since 2011 other residences for other medical staff on the eastern border of the site have also been demolished. A cemetery and cultural site (totem poles) occupies the southern portion of Nimpkish I.R. No. 2. A ship slipway has occupied a portion of the Reserve's southeast since at least the early 1950s.

The ancestral villages of the 'Namgis First Nation were found on the banks of the Nimpkish River at the sites of Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5. They were occupied up until the fishing industry flourished at Alert Bay at which time these village sites were abandoned. Since then, there is no indication that logging has occurred on these Reserve lands though it is likely that these lands have been used as fishing stations by the 'Namgis people as well as for some ceremonial and recreational purposes. A rail bed to transport logs to tidewater was reported to have been constructed on Osaw-Las I.R. No. 5 but it is unclear if there was ever any rails installed and the line used for log transport

4.2 Village of Alert Bay Information

Regional Districts and local Municipalities do not maintain property information for Reserve lands. However, the Village of Alert Bay municipal lands border Alert Bay I.R. No. 1 to the south and around the church site on Front St. on three sides. In addition, 'Namgis First Nation and the Village of Alert Bay share municipal water supply and sewerage systems. The following reports were provided by the Village of Alert Bay with respect to the biocell that it is operating abutting and immediately up gradient of Alert Bay I.R. No. 1:

Stage 2 Preliminary Site Investigation and Detailed Site Investigation - Historical Biocell Redevelopment Area, Lot 1, Section 53, Cormorant Island, Rupert District, Plan 23755 Except that part in the Plan 27442, Cormorant Island, Alert Bay, BC. Terrawest Environmental Inc., Nanaimo, BC. January 2013.

(Excerpt from the Executive Summary) The Corporation of the Village of Alert Bay retained TerraWest Environmental Inc. to complete a Stage 2 Preliminary Site Investigation (PSI) and Detailed Site Investigation (DSI) of a land parcel Lot 1 Section 53. Cormorant Island, Rupert District, Plan 23755 Except that part in Plan 27442 (PID: 003-1 49-617) located in the Village of Alert Bay, BC. This site is found at the corner of Gatu Rd. and Hemlock St. and abuts Alert Bay I.R. No. 1 on the west. The current titleholder for the parcel is the Corporation of the Village of Alert Bay. The PSI and DSI were limited to the northwest portion of the Site containing a historic hydrocarbon contaminated soil biocell, as this was the area with the greatest potential to undergo future redevelopment.

Based on results of the Stage 2 PSI and DSI, Terrawest concluded that the Site is contaminated and that contamination at the Site is confined to the Biocell. Borehole soils from the outside perimeter of the Biocell reported trace to non-detectable values for all test parameters and have confirmed that contaminated soil has not breached the confines of the Biocell. Results of stockpile sampling of soil within the Biocell indicate that approximately 75% or 750m³ of the Biocell soils remain contaminated as per CSR-RL criteria for hydrocarbons. One sample nominally exceeded the CSR criteria for arsenic in soil. Values for petroleum hydrocarbons were highly elevated in the western portion of the Biocell, while approximately 250m³ of soil along the eastern boundary was reported at trace to undetectable levels for all tested parameters, below CSR criteria.

The Biocell depths and boundaries were clearly delineated during Site works with the Biocell liner functioning as a visual indicator of vertical and lateral extents. The Biocell is approximately 40m long from north to south, 20m wide from east to west and 1-1.5m deep with depths increasing slightly from east to west. The base liner of the Biocell appeared intact and in good condition with no visual signs of damage; the cover of the Biocell was not intact and was only visible along the boundaries of the Biocell.

Borehole soils observed along the entire perimeter of the Biocell were comprised of 'clean' coarse grain sands, gravels, some silt and cobble and had no characteristics of observable contamination based on both analytical data and field observations. Boreholes were drilled to a maximum depth of approximately 1.0 mbgs with no indication of groundwater at depth. Subsequent groundwater monitoring wells were installed at borehole locations and groundwater was not encountered at that time. Shallow surface water in the form of a perched table was found at the base of the Biocell atop the liner and is assumed surface water infiltration. Analytical results for this water indicate values approaching the CSR standard for LEPHs at 487 ug/L whereas the CSR criteria are 500 ug/L. The perched table is contained, but will be subject to further exposure to the contaminated soil within the Biocell and therefore we do not consider this solitary sample to be an accurate characterization of the water contained in the Biocell. It would be prudent for due diligence to assume that this perched water table is subject to contamination.

Vapour calculations indicated seventeen (17) samples exceed CSR Schedule 11 soil vapour criteria for Benzene, Xylene, Naphthalene and VPHs. This lends to the potential for human exposure in the immediate 100m vicinity of the Biocell and warrants the installation of a fenced closure with appropriate signage indicating that the Site is contaminated.



TerraWest concluded that the Site is contaminated in the media of soil and soil vapour and assumes the perched water table contained in the Biocell is subject to contamination. This conclusion warrants subsequent follow up remediation works and preparation of a Remediation Plan to bring the Site into

regulatory compliance to facilitate the Clients future plans to redevelop the Site for recreational purposes and to fulfill the requirement of the Brownfield Renewal Works.

Remediation Plan Historical Biocell Redevelopment Area, Lot 1, Section 53, Cormorant Island, Rupert District, Plan 23755 Except that part in the Plan 27442, Cormorant Island, Alert Bay, BC. Terrawest Environmental Inc., Nanaimo, BC. January 2013.

TerraWest concluded that the Site is contaminated in the media of soil and soil vapour and assumed the perched water table contained in the Biocell is subject to contamination. The estimated volume and mass of contaminated soil requiring remediation is 750m³ or 1350 metric tonnes.

Segregation and physical agitation would be the most cost effective method as part of two potential remedial options (Options 2 & 3). This would encourage the hydrocarbons to oxidize into non-threatening organic substances. The following is a synopsis of the remedial measure that could be taken at the Site:

Remediation Option 1:	Off Site Disposal to Contaminated Soil Facility
Contaminated Media:	Soil and potential implications to perched water
Management	Ex-situ remediation, removal of approximately 750m ³ [1350 tonnes) of soil for disposal at the Seven Mile landfill near Port McNeill with confirmation testing of excavation area post removal
Water Management:	Waste water to be stockpiled and sampled; disposed of at appropriate facility or discharged to environment based on data
Schedule:	Estimated two weeks once initiated.
Remediation Option 2:	Relocation and Remediation at Alert Bay Landfill
Contaminated Media:	Soil and potential implications to perched groundwater water
Management:	Ex-situ remediation. Removal of approximately 750m ³ of Soil to new biocell at Alert Bay Landfill with confirmation testing of remaining soils at Site, ongoing stockpile sampling and confirmation testing of new biocell
Volume:	750m ³ (1350 tonnes)
Water Management:	Waste water to be stockpiled and sampled; disposed of at appropriate facility or discharged to environment based on data
Schedule:	Estimated two months for Site completion with confirmation of remediation reporting; two years to completion with confirmation of remediation reporting for new biocell
Remediation Option 3:	In Situ Remediation
Contaminated Media:	Soil and potential implications to perched groundwater.

Management:	Soil and potential implications to perched groundwater In-situ remediation, with ongoing stockpile testing and confirmation testing of Soils at Site.
Volume:	750m ³ (1350 tonnes)
Water Management:	Waste water to be stockpiled and sampled; disposed of at appropriate facility or discharged to environment based on data.
Schedule:	Two years to completion with confirmation of remediation reporting.

4.3 Street Directory Search

There are no street directories. for any of the 'Namgis First Nation Reserves.

4.4 Historical Aerial Photograph Review

Air Photographs from 1949, 1952, 1964, 1977, 1981, 1987, 1992, 1989 and 1996 were obtained from the Geographic Information Center, University of British Columbia (UBC), and reviewed for information regarding historic land use on or adjacent to NFN lands. Copies of the air photographs are provided in Appendix C. A summary of significant features identified on the historic air photographs are provided in the following table:

Year	Aerial Orthophotograph ID	Review Results
Nimpkish River Reserves - Ches-la-Kee I.R. No. 3 Ar-Cee-Wy-Ee I.R. No. 4 Osaw-Las I.R. No. 5		
1949	BC 1670: 106 - 108	IR 3 No highway, Logging /trails in southern and northern portions of IR No development except clearing to north of IR 4 Railway bed shown in IR 5
1952	BC5222: 29 - 30	3 reserve airphoto - no highway, logging surrounding reserves, railway bed IR 5
1964	BC 5264:55 - 57	Island Highway in Place, regenerating soreset stands on IR 3, No Development on IR 4, logging to east of IR 4 stands regenerating to north of IR 4, Railway Bed IR 5
1977	BC77114: 176 - 177	IR 3 Subdivision to South of IR 3 developed; regenerating stands IR 3 to south and north. Minor Clearing by Nimpkish River in IR 3 IR 4&5 same as previous air photos
1981	BC81077: 197-201 BC81077: 225 - 230 BC81077: 269 - 274 BC81077: 309 - 312	IR 3 subdivision and clearing to south IR 4 no development, regenerating forest stands outside IR IR 5 Railway Bed left to naturally regenerating forest and brush cover taking over old grade.
1987	BC87030 177 - 179	Small rectangular Clearing in IR 4 Port McNeill development shown
1996	BCB96037: 92 - 93 BCB96037: 97 - 98	Increased development in Pt. McNeill, IR 5 Railway bed consumed by vegetation IR 4 clearing regenerating

Year	Aerial Orthophotograph ID	Review Results
Ksui-La-Das I.R. No. 6 & Kuldekuma I.R. No. 7		
1926	BC2636: 105 - 108	IR 6 3 Small Clearings IR 7 No development
1932	BC5096: 212	No development or land use activity.
1964	BC 5264:55 - 57	No development or land use activity.
1972	BC7205: 140 - 143	IR 6 3 Clearings Growing In IR 7 No development or land use activity.
1979	BC79203: 102 - 105	No development or land use activity.
1985	BC85098:182	No development or land use activity.
1986	BC86076: 235 - 236	No development or land use activity.
1987	BC87037: 187 - 189	No development or land use activity.
2004	BCC06038: 239 - 240	No development or land use activity.
2004	BC1224: 111 - 113	No development or land use activity.

4.5 Historic Land Title Search.

The Reserves currently fall under Federal jurisdiction, consequently it was not considered necessary to conduct an historic land title search.

4.6 BC Ministry of Environment (MoE) Records

Contaminated Site Registry

The BC Ministry of Environment (MoE) maintains a database called the BC MoE Site Registry that contains environmental information pertaining to contaminated or potentially contaminated sites. BC Ecosphere conducted a BC Online Site Registry 500 metre. An area search of the Alert Bay I.R. No. 1, Alert Bay I.R. No. 1A and Nimpkish I.R. No. 2 was made of any records since 2011. An area search of all records for Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 and Kuldekuma I.R. No. 7 was made.

It should be noted that the information on the Site Registry has been filed in accordance with the provisions of the Environmental Management Act. While the information is believed to be reliable, the province of British Columbia makes no warranties as to the accuracy or completeness. Therefore, persons using this information do so at their own risk.

There were nine (9) MoE Site Registry reports recorded in the Stantec's 2011 Phase I Environmental Site Assessment (see Appendix C). Of these nine (9) sites, two (2), i.e., Site: 1912 and Site ID: 3310, were considered by Stantec to be potential environmental concern to 'Namgis First Nation's Cormorant Island Reserves. Site 1912 is a site on Front St. surrounded by Alert Bay I.R. No. 1, where a

Payless gas station, Alert Bay Auto Ltd., and a Petro Canada tank farm were located. The site is not with the Reserve. The status of the site in 2011 was listed as "Under Assessment". The tank farm has been decommissioned and removed as well as the gas station. The auto repair facility still remains and is in operation. Site 3310 is the former location of a Shell Oil bulk plant facility, which was located at 256 Birch Road approximately 75m east of Nimpkish I.R. No. 2. The status of the site in 2011 was listed as "Under Assessment". The bulk plant has been decommissioned and removed and the site sits vacant.

The BC Online Site Registry was queried for any sites at Alert Bay dated since 2011. Five (5) sites were reported, i.e., Site ID: 90001 – 90005. All of these records dealt with the former BC Hydro Diesel Generation Station that was located at 257 Fir Street. and Birch Road and adjacent and/or nearby properties. All 19001 – 19005 site records noted that Certificate of Completion had been issued for these properties and as such these sites can be considered closed/and or subject to monitoring although this is not recorded in the reports.

The BC Online Site Registry was queried for any sites at Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5 and Nimpkish River and Nimpkish Heights. No reports were identified in BC Online's BC MoE Site Registry for these Reserve lands and/or nearby place names.

Report of BC Ministry of Environment's Ecocat: The Ecological Reports Catalogue

Ecocat identified nineteen (19) reports for Alert Bay, thirty-five (35) for Nimpkish River (see Appendix D). No Ecocat reports were listed for Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 and Kuldekuma I.R. No. 7, *per se*. The 19 reports for Alert Bay dealt with the Alert Bay Airstrip (1), eleven (11) records for well/water supply information for the Village of Alert Bay and seven (7) for streams on Cormorant Island. The 35 records for the Nimpkish River dealt primarily with fish populations in the River and/or Nimpkish Lake (22), deer studies (3), Ecological Reserve consideration (2), stream classification (3), stream fertilization (3) and Timber Forest Licence (2).

4.7 First Nations Health Authority (FNHA) Records

There were no Health Canada and/or First Nations Health Authority records identified. 'Namgis First Nation advised that their water sampling results continually indicated their groundwater-supplied potable water supply was safe

4.8 Environment Canada Records

Environment Canada, Environmental Enforcement no longer provides historic documentation or reports for First Nation Reserves.

4.9 National Pollutant Release Inventory (NPRI)

There are no NPRI records for the 'Namgis Reserves. The closest NPRI site is the Polaris Materials Corporation's Orca Sand and Gravel Ltd operation north of Port McNeill. (see Appendix E)

4.10 Federal Contaminated Sites Inventory (FCSI)

Thirteen (13) sites listed in the FCSI for the 'Namgis First Nation Reserves in Alert Bay. (see Appendix F). These are:

Site 0002587:	Appears to be the site of the Tank Reservoir Alert Bay I.R. No. 1A
Site 00000642:	Site within Whe-La-La-U
Site 00025928:	DLC Burn Site Alert Bay I.R. No. 1A
Site 00025927:	Old Landfill Alert Bay I.R. No. 1A
Site 00025848:	106 Broughton St. Alert Bay I.R. No. 1
Site 00025849:	St. George Hospital Incinerator/Soil Remediation Nimpkish I.R. No. 2
Site 00025929:	Public Works Yard Alert Bay I.R. No. 1A
Site 00025930:	Sawmill
Site 00025931:	Vehicle Repair
Site 00025932:	20 Front St. AST
Site 00025933:	Marine Slipway Nimpkish I.R. No. 2
Site 00025934:	AST Hill and Broughton.
Site 00025935:	Marine Slipway Nimpkish I.R. No. 2

There were no sites listed for Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 and Kuldekduma I.R. No. 7.

4.11 Indigenous and Northern Affairs Canada (INAC) Reports

Indigenous and Northern Affairs Canada Integrated Environmental Management System (IEMS) Summary- 'Namgis First Nation

There are thirteen (13) post 2011 (i.e., date of the Stantec Phase I ESA) files found in INAC's Integrated Environmental Management Systems (IEMS) for 'Namgis First Nations as follows:

Doc. No.	Document Type	Document Title
1809142	Limited Phase 2 ESA	Limited Phase 2 Environmental Site Assessment - St. Michael's Former Residential School - Alert Bay IR 1A, BC (Stantec)
2655530	Proposal - Phase 2 ESA	Proposal - Phase 2 Environmental Site Assessment - Alert Bay IR1, Alert Bay IR1A, and Nimpkish IR2 - Alert Bay, BC (Stantec)

Doc. No.	Document Type	Document Title
2655547	Phase 2 ESA	Draft - Phase 2 Environmental Site Assessment - Alert Bay IR1, Alert Bay IR1A, and Nimpkish IR2 - Alert Bay, BC (Stantec)
2926254	Award Letter - Remediation	Award Letter - Contaminated Soil Removal and Backfill - Namgis First Nation - St. Michael's Former Residential School - Alert Bay, BC (Stantec)
2926256	Award Letter - Remediation	Award Letter - Hazardous Building Materials Abatement and Demolition - Namgis First Nation - St. Michael's Former Residential School - Alert Bay, BC (Stantec)
2874872	Proposal - Phase 3 ESA	Proposal for the Delineation of Soil Contamination and Hazardous Building Material - Namgis First Nation - St. Michael's Former Residential School - Alert Bay, British Columbia (Stantec)
2874876	Pre-Demolition Hazardous Materials Assessment	Pre-Demolition Hazardous Materials Assessment - St. Michael's Former Residential School - Alert Bay, BC (Stantec)
2871548	Supplemental Soil Investigation	Supplemental Soil Investigation - St. Michael's Former Residential School - Alert Bay IR1A (Stantec)
2894999	Management Plan	Management Plan - Remediation of St. Michael's Former Residential School, Alert Bay IR1A, BC (Stantec)
2878995	Change Order	Change Order #1 - Tender Development for the Hazardous Building Material Abatement, Demolition, Remediation and Restoration of the St. Michael's Former Residential School, Alert Bay, BC (Stantec)
2920812	Change Order	Change Order #2 - Proposal for Environmental Field Services During St. Michael's Demolition and Remediation Project (Stantec)
3008025	Remediation Report	Confirmation of Remediation - St. Michael's Former Residential School - Alert Bay IR1A, BC (Stantec)
3071862	Proposal - Phase 3 ESA	Proposal - Phase 3 Environmental Site Assessment - Alert Bay IR1A, Alert Bay IR1, and Nimpkish IR2 - Alert Bay, BC (Stantec)

The pertinent ones subject to an updated review of Stantec's 2011 Phase I ESA are:

- Limited Phase 2 Environmental Site Assessment - St. Michael's Former Residential School - Alert Bay IR 1A, BC (Stantec)
- Draft - Phase 2 Environmental Site Assessment - Alert Bay IR 1, Alert Bay IR 1A, and Nimpkish IR 2 - Alert Bay, BC (Stantec)
- Supplemental Soil Investigation - St. Michael's Former Residential School - Alert Bay IR 1A (Stantec)
- Pre-Demolition Hazardous Materials Assessment - St. Michael's Former Residential School - Alert Bay, BC (Stantec)
- Confirmation of Remediation - St. Michael's Former Residential School - Alert Bay IR 1A, BC (Stantec)

4.11 Indigenous and Northern Affairs Canada (INAC) Reports

4.11.1 Alert Bay I.R. No. 1, Alert Bay I.R. No. 1A and Nimpkish I.R. No. 2

FINAL NAMGIS FIRST NATION Phase I Environmental Site Assessment Alert Bay I.R. 1, Alert Bay I.R. 1A, and Nimpkish I.R. 2 Cormorant Island, Alert Bay, BC. February 22, 2011

Stantec conducted a Phase I Environmental Site Assessment (Phase I ESA) of the properties located at Alert Bay I.R. 1A, Alert Bay I.R. 1, and Nimpkish I.R. 2 in Alert Bay, on Cormorant Island, British Columbia, Alert Bay I.R. Stantec's 2011 Phase I ESA reviewed the following INAC reports:

- Draft Assessment of Former Residential School in Preparation for Demolition, Alert Bay Reserve 1A, BC, prepared for Namgis First Nation, prepared by Norecol Dames & Moore, dated February 1998.
- Phase I Report, Inventory of Underground Storage Tank Systems, Vancouver Island East Area, Namgis First Nation, prepared for First Nation's Emergency Services Society (FNESS) of British Columbia, prepared by Gartner Lee Limited, dated April 1999.
- Asbestos Abatement at Former Residential School, Alert Bay Reserve 1A, prepared for Namgis First Nation, prepared by Norecol Dames & Moore, dated June 23, 1999.
- Phase II Report Supplement - Namgis First Nation, Alert Bay IR #1 and IR #1A, Vancouver Island East Area, Alert Bay, BC, prepared for First Nations' Emergency Services Society of British Columbia, prepared by Pottinger Gaherty Environmental Consultants Ltd. (PGL), dated June 30, 2003.
- Phase II Fuel Tank Removal Workplan/Design Report, prepared for First Nations' Emergency Services Society of British Columbia, Namgis First Nation Reserves, Project Review Committee (Department of Indian Affairs and Northern Development and Public Works and Government Services Canada), prepared by Pottinger Gaherty Environmental Consultants Ltd., dated November 2003.
- Namgis First Nation Phase III Fuel Tank Removal Completion Report, FNESS UST/AST Removal/Replacement Program, Vancouver Island East Area, BC, prepared for First Nations' Emergency Services Society of BC, prepared by Pottinger Gaherty Environmental Consultants Ltd., dated May 2006.
- Asset Condition Report, Namgis Band Buildings, prepared for INAC, prepared by SCM Risk Management Services Inc., 2008/2009. Namgis First Nation Fuel Station Detailed Project

The Stantec 2011 Phase I ESA identified the following as areas potential environmental concerns (APECs) to the Reserve lands of the 'Namgis First Nation:

On-Reserve

- **APEC 1-A:** Former On-Site Landfill. A landfill formerly occupied a site on Alert Bay I.R. No. 1A, west of the Big House, from at least the late 1960s to the early 2000s.

- **APEC 1-B: Current On-Site Waste and Burn Pile.** An clearing used for burning wastes (construction materials) and possible disposal of municipal and/or hazardous wastes was located on Alert Bay I.R. No. 1A west of the on-site cemetery. This clearing has occupied the Site since the early 1970s and was formerly a gravel pit. Soil from the former off-site BA Dock was reported to have been re-located in this area..
- **APEC 1-C: Former and Current On-Site Sawmill Operation.** A former sawmill operation from the 1960s and a current sawmill operation near the southern shoreline of Alert Bay I.R. No. 1A where treated logs and a burned debris pile were observed.
- **APEC 1-D: Current On-Site Public Works Yard.** A Public Works yard has occupied a site on Alert Bay I.R. No. 1A , near the southern shoreline, since the late 1970s. Waste oil is stored in buckets in the Public Works yard building. Some staining was observed near the storage area.
- **APEC 1-E: Former On-Site USTs.** Two former heating oil USTs were reported to have been removed approximately 2 years ago, from a commercial building located near the former residential school. No confirmation sampling was reported to Stantec regarding the decommissioning of these USTs.
- **APEC 1-F Former On-Site Vehicle Maintenance.** Vehicle maintenance activities (oil changes) were reported to formerly occur at a single residential dwelling, located southwest of the Namgis First Nation band office.
- **APEC 1-G: Former On-Site Soil Disposal:** Soil from the foreshore was reported to have been disposed of north of the fields near the Big House. Approximately 25 cubic metres of soil from the former off-site B.A. Dock was reported to have been disposed near this location as well.
- **APEC 2-B: Current On-Site Staining.** Some staining was observed in a grassy area located at a residential dwelling, located at 20 Front Street. This was reported to be from a fuel oil AST (approximately 750 L) that was decommissioned in the early 1980s, located approximately 30 m north of the staining.
- **APEC 3: On-Site Ship Slipway.** A ship slipway has occupied the southwest corner of Nimpkish I.R. No. 2 , since at least the early 1950s.
- **APEC 4: Current On-Site ASTs.** Approximately ten residential dwellings were reported to have fuel oil ASTs on-site, however these ASTs were not observed, as their locations could not be confirmed at the time of the site visit.
- **Not reported as on-site APEC in the Phase II ESA: Former On-Site Residential School.** A former residential school has occupied Alert Bay I.R. No. 1 , near the southern shoreline, since the late 1920s. Layers of peeling exterior paint were observed on the former residential school that may contain lead and could impact surrounding soils and/or groundwater. A 2010 report, confirms that there is asbestos containing materials present in vinyl floor tiles, drywall joint compound, a gasket, plaster, pipe insulation, mechanical insulation, and roofing material of the building.

Off-Reserve

- **APEC 5-B: Former Off-Site Soil and Tank Disposal.** Soil from the Nimpkish shipyard, near the Net Loft, and an old diesel tank were reported to have been disposed of east of the Site, in a ditch. No evidence of the tank was observed during the site visit. Fill was observed during the site visit

and in historical aerial photographs. The source of the fill disposed in this area is unknown, as the Nimpkish shipyard was remediated and soils were removed and disposed of off of Cormorant Island.

- **APEC 5-C: Former Off-Site Shell Bulk Plant:** A Shell bulk plant was formerly located to the east of the Site, from at least the early 1950s to the 1980s. Former Off-Site Shipyard. A shipyard was located to the south of Nimpkish I.R. 2, and was formerly in operation from at least the early 1950s to the 1980s/1990s. Included as APEC 5-C in Phase II ESA.
- **Not reported as on-site APEC in the Phase II ESA Former Off-Site ASTs and Fuel Lines.** Four former ASTs, associated with the adjacent BA Dock, may have been located on-site or north of the Site, from at least the 1940s to the mid 1970s. It was reported that the fill lines were located to the west of the Church and aligned with the B.A. Dock.

Phase II Environmental Site Assessment Alert Bay I.R. 1A, Alert Bay I.R. 1, and Nimpkish I.R. 2, Alert Bay, BC Stantec Consulting Ltd. Burnaby, BC March 31, 2014

Phase II ESA findings of the Phase I ESA identified APECs were:

- **APEC 1-A Former Landfill:** All soil, groundwater, and soil vapour samples analyzed for petroleum hydrocarbons, PAHs, and/or VOCs were below the applicable standards/guidelines. Soil and groundwater samples submitted for metals were below the applicable standards/guidelines except for soil concentrations of arsenic, copper, lead, and zinc above CCME CL SQG and/or BC CSR CL standards; and groundwater concentrations of dissolved iron and manganese above Health Canada and BC CSR DW standards. Metal exceedences in the soil and groundwater are presumably associated with the debris located in the landfill.
- **APEC 1-B Burn Pile:** Soil concentrations of hydrocarbons, and metals were below the applicable standards/guidelines with the exception of copper and zinc in one soil sample above the CCME CL SQG.
- **APEC 1-C Sawmill:** Soil and groundwater concentrations of petroleum hydrocarbon, PAH, and total phenols were less than applicable standards/guidelines. Soil and groundwater concentrations for metal parameters tested were below the applicable guidelines/standards except for groundwater concentrations of dissolved iron and manganese greater than the Health Canada and/or BC CSR DW standards; and concentrations of dissolved cadmium above the CCME AW guidelines for long-term exposure.
- **APEC 1-D Public Works Yard:** Soil and groundwater concentrations of petroleum hydrocarbon and PAHs were less than the applicable standards/guidelines. Soil and groundwater concentrations for metal parameters tested were below the applicable guidelines/standards except for groundwater concentrations of dissolved iron and manganese above Health Canada DW guidelines and/or and BC CSR DW standards; and concentration of dissolved cadmium above

CCME AW guidelines for long-term exposure.

- **APEC 1-E Former On-Site UST**: Soil and groundwater concentrations of hydrocarbon and PAHs were less than analytical detection limits. Soil and groundwater concentrations for metal parameters tested were below the applicable guidelines/standards except for groundwater concentrations of dissolved manganese above Health Canada DW guidelines, which is based on an aesthetic objective. BC CSR has developed a health-based guideline for manganese of 550 µg/L. Concentrations in water were below this health-based guideline.
- **APEC 1-F Former On-Site Vehicle Maintenance**: All soil and groundwater concentrations of petroleum hydrocarbons, PAHs and metals were less than the applicable standards/guidelines except of soil concentrations of copper in one sample above the CCME CL SQG.
- **APEC 1-G Former On-Site Soil Disposal Near Fields**: All soil sample concentrations for petroleum hydrocarbons PAHs and metals were less than the applicable standards/guidelines.
- **APEC 2-B Current On-Site Staining**: All parameters tested were below the applicable BC CSR standards. Soil samples collected from the north excavation sidewall and the delineation sample west of the excavation exceeded CCME's PHC F2-F3 and F4 guidelines respectively. Furthermore, the sample collected south of the residential building exceeded CCME's Index of Additive Cancer Risk (IACR) value for the protection of human health.
- **APEC 3-A On-Site Ship Slipway**: All sediment samples submitted for analysis were greater than the applicable standards/guidelines for select metals and/or PAH parameters. Contaminants are associated with historical ship repair and the wastes generated during the repair.
- **APEC 4-A Current On-Site ASTS**: The soil sample collected from beneath the AST at 106 Broughton Street exceeded CCME RL guidelines and/or BC CSR RL standards for concentrations of hydrocarbons and select metals (arsenic, copper, lead, and zinc). The soil sample collected from beneath the AST at 03 Front Street exceeded CCME RL guidelines and/or BC CSR RL standards for concentrations of hydrocarbons and select metals (copper, lead, and zinc).
- **APEC 5-A (ormer Off-Site UST west of Church**: All soil sample concentrations for hydrocarbons, PAHs, and metals were less than the applicable standards/guidelines
- **APEC 5-B Former Off-Site Soil And Tank Disposal**: All soil sample concentrations for hydrocarbons, PAHs, and metals were less than the applicable standards/guidelines.
- **APEC 5-C Former Off-Site Shell Bulk Plant And Former Off-Site Shipyard**: Soil and groundwater sample concentrations for hydrocarbons, PAHs, and/or metals were less than the applicable standards/guidelines except for groundwater concentration of dissolved cadmium

which was above CCME AW guidelines for long-term exposure; and groundwater concentration of dissolved manganese was above Health Canada DW guidelines, which is based on an aesthetic objective. BC CSR has developed a health-based guideline for manganese of 550 µg/L. Concentrations in water were below this health-based guideline.

Phase II ESA Recommendations

Seven (7) APECs contained soil and/or groundwater concentrations for metal parameters above the applicable guidelines and/or standards. These are”

- APEC 1-A: Former Landfill = AEC 2
- APEC 1-B: Burn Pile = AEC 1,
- APEC 1-C: Sawmill = AEC 4
- APEC 1-D: Public Works Yard = AEC 3,
- APEC 1-E: Former On-Site UST= AEC 5,
- APEC 1-F: Former On-Site Vehicle Maintenance = AEC 8, and
- APEC 5-C: Former Off-Site Shell Bulk Plant and Former Off-Site Shipyard.

Stantec recommended screening human health and ecological level risk assessments (SLRA) be completed for the seven Areas of Environmental Concern to evaluate whether identified on-site contamination poses acceptable or unacceptable risks to on-site receptors.

Stantec also noted the following in its’ Phase II ESA concluding statements:

- Soil samples collected in proximity to the residential dwelling located at 20 Front Street (APEC 2-B) showed residual hydrocarbon contamination following the remediation completed during the Preliminary Site Investigation. Stantec recommended supplemental investigation to determine the extent of remaining contamination at this location.
- Remediation of the hydrocarbon-contaminated soil at the residential dwellings located at 106 Broughton Street and 03 Front Street (APEC 4-B) should occur. Furthermore, secondary containment should be installed beneath these ASTs to prevent future leaks.
- Contaminants present on the ship slipway (APEC 3-A) are associated with historical ship repair and the wastes generated during the repair and should be remediated to reduce risk to human health and the environment. Stantec recommended a supplemental Phase II ESA investigation in the slipway to delineate the extent of the contaminants, followed by remediation.
- All soil samples collected from the former on-site soil disposal near the Big House fields (APEC 1-G) and the former off-site soil and tank disposal (APEC 5-B) showed that the concentration of the tested parameters were less than the applicable standards/guidelines. Therefore, no further investigation is required at these locations at this time.

Limited Phase II Environmental Sites Assessment St. Michaels’s Former Residential School, Alert Bay, IR 1A, BC Final Report

Limited Phase II ESA Findings:

- Based on hydrocarbon analytical results, concentrations of benzene, toluene, and ethylbenzene

were greater than the applicable CCME SQG CL and RL guidelines in three locations. Concentrations of naphthalene and phenanthrene were greater than the applicable CCME SQG CL and RL guidelines in three locations. Eleven soil samples contained pH levels outside the applicable pH range in the CCME SQG CL and RL guidelines. In all cases, the soil pH was slightly less than the lower guideline limit of pH 6.

- With respect to trace metals impacts, eighteen soil sample locations contained concentrations of trace metals (barium, copper, lead, and/or zinc) that were greater than the CCME SQG CL and/or RL guidelines and/or CSR CL standards. The CCME guidelines used for the site took into consideration that the potential future use of the Site may be for residential purposes.
- All other parameters analyzed in soil were less than the applicable CCME SQG guidelines, CCME CWS standard and CSR standards.
- With regard to lead-based paint on the St Michael's structure, one of two exterior paint samples from the former residential school contained leachable lead at a concentration greater than the BC Hazardous Waste Regulation standard.
- Based on these soil results, the St Michael's school site is classified as a Contaminated Site. The sites impacted by trace metals (barium, copper, lead and zinc) and petroleum hydrocarbons Impacts to soil resulting from leaching of lead-based paint are potentially occurring.
- The St Michael's structure was observed to be in poor structural condition. The exterior of the former residential school was observed to have layers of peeling exterior paint, which may be contributing to lead concentrations in surrounding soils. From a safety perspective, it was noted that bricks appear to be falling from the building facades. The building is no longer maintained, difficult to secure, and appears to be degrading rapidly with multiple leaks in the roof and absence of heat.
- As the site is defined as contaminated, demolition of the structure and/or future redevelopment of the site will require further investigation of soils and/or groundwater impacts, which are believed to be in the upper soils at the site and typically fill materials. The depth of impacted soil or the potential for groundwater impacts were not assessed as part of this scope of work. Contaminated soil present on the site will have to be removed at the time of demolition and redevelopment of the site in order to meet the CCME SQG guidelines for commercial or residential land use.
- Work on lead-based paint can cause worker exposure to lead fumes or lead dust. Suitable precautions and approved contractors should be used for all activities, which may disturb suspected and/or confirmed hazardous materials. In addition, these wastes may require special disposal if classified as hazardous waste.

***Supplemental Soil Investigation St. Michael's Former Residential School, Alert Bay I.R. 1A, BC.
Stantec Consulting Ltd. November 26, 2014***

Stantec concluded that based on current and historic soil results, the St. Michael's school property is

impacted by trace metals (barium, copper, lead, selenium, and zinc), petroleum hydrocarbons (benzene and toluene) and PAHs (naphthalene and phenanthrene) greater than the applicable CCME guidelines. Contaminants are present in the surficial soils to a maximum depth of 1.6 m, which are typically fill materials. Based on the options evaluation above, Stantec recommended that the impacted soil be excavated at the time of the site building demolition and transported to a licensed handling facility off-Site in order to eliminate all associated risks and to meet the guidelines/standards for commercial and/or residential land use.

Pre-Demolition Hazardous Building Materials Assessment St. Michael's Former Residential School Alert Bay British Columbia. Stantec Consulting Ltd. November 26, 2014

The hazardous building materials considered during this assessment included asbestos containing materials (ACMs), lead including lead-containing paints (LCPs), polychlorinated biphenyls (PCBs) in equipment and paint, microbiological (mould moisture or rodent waste) affected building materials, mercury, ozone depleting substances (ODS), silica, urea formaldehyde foam insulation (UFFI), and equipment containing radioactive materials.

Based on Stantec's visual assessment and the laboratory analyses performed on the samples collected, as well as a review of previous reports or sampling records/ reports, hazardous building materials were identified to be present.

A summary of our findings is presented below. Recommendations pertaining to the handling, removal, transportation and disposal of identified hazardous building materials are provided in the body of this report.

Hazardous Material	Findings
Asbestos	<p>The following ACMs were identified through this assessment and through updating of information provided in previous reports:</p> <ul style="list-style-type: none"> • Boiler insulation (in good condition with localized damage). • Pipe fitting insulation • Gaskets inside flanges throughout the boiler room • Heat shields inside incandescent light fixtures throughout • Vinyl floor tile throughout, various sizes and styles (starting to delaminate in some locations) • Drywall joint compound on the third floor (present in the hallways around stairwell and in some rooms). • Woven gaskets at ends of the boiler • Floor tile mastic in the third floor west bathroom • Plaster skim coat throughout the basement (in good condition with localized damage) • Block canvas wrap on mechanical pipe throughout the east basement • Cement wall panel throughout the third floor west bathroom (in good condition with localized damage) • Roof flashing mastic applied to concrete edging at the south roof parapet

	<ul style="list-style-type: none"> • Roof flashing mastic applied to metal flashing around the entire roof parapet • Flooring material (tar-like) present in the third floor east room • Exterior window frame caulking (various types) • Mortar seal applied to the west wall of the north wing (six linear feet of seal on a former penetration) <p>These materials were observed to be in good condition except where otherwise noted.</p> <p>Presumed asbestos-containing materials (PACMs) were observed to be present in the form of:</p> <ul style="list-style-type: none"> • Concealed roofing materials • Fire rated doors <p>These materials were observed to be in good condition. These materials were not sampled to preserve their integrity. Sampling of these materials was not part of the scope of work as determined by Stantec's understanding of the project. As the materials are known to have been manufactured with asbestos, they should be presumed to be asbestos-containing unless proven otherwise by laboratory analysis.</p>
Lead	<p>Paint on surfaces throughout the subject building should be considered lead-containing. Lead may also be present in the following materials:</p> <ul style="list-style-type: none"> • Lead-acid batteries used in emergency lighting • Older electrical wiring materials and sheathing • Solder used on domestic water lines • Solder used in bell fittings for cast iron pipes • Solder used in electrical equipment • Ceramic tile glaze • Vent and pipe flashings
Polychlorinated Biphenyls (PCBs)	<p>Based on the construction date of the subject building, PCBs may be present in ballasts inside approximately 2,000 fluorescent light fixtures present throughout. PCBs may also be present in plastics, molded rubber parts, applied dried paints, coatings or sealants, caulking, adhesives, paper, sound deadening materials insulation or felt and fabric products such as gaskets.</p>
Mould	<p>Suspect mould and/or moisture-impacted materials were observed as follows:</p> <ul style="list-style-type: none"> • Suspected mould on ceiling tiles in various locations throughout • Identified/suspected mould on plaster and drywall in various locations throughout • Suspected mould on pipe wrap and other materials in various locations throughout
Mercury	<p>Mercury vapour is expected to be present in the fluorescent light tubes observed throughout the subject building.</p> <p>Mercury may also be present in paints and adhesives.</p>
Ozone-Depleting Substance (ODS)	<p>Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.</p>

Silica	Silica is expected to be present in vinyl floor tiles, ceiling tiles, concrete, cement and masonry block and interior wall finishes observed in various locations.
Urea Formaldehyde Foam Insulation (UFFI)	Evidence of the application of UFFI was not observed to be present.
Equipment Containing Radioactive Materials	No equipment suspected to contain radioactive materials was observed to be present.

Hazardous Building Materials Abatement and Demolition Closure Report St Michael’s Former Residential School Alert Bat British Columbia. Stantec Consulting Ltd. Burnaby, BC. March 30, 2015.

Hazardous Building Materials Abatement

Stantec concluded that based on its observations made throughout the project activities within the subject building as well as our observations of site conditions as of February 26, 2015, identified hazardous building materials had been removed from the subject building to the extent required by applicable regulations to allow for demolition of the subject building. Through issuing the North Wing Clearance and the Whole Building Clearance documents, demolition activities were authorized to proceed with the following limitations:

- Provisions for protection of workers and work areas from exposure to lead, mould and silica were to be implemented during demolition;
- If additional suspected hazardous building materials are uncovered during demolition activities (e.g., previously concealed materials, sub-surface materials), these materials should be considered as hazardous and handled as such, unless proven otherwise, through analytical testing.

Building Demolition

Stantec conducted monitoring of activities associated with demolition of the North Wing from February 23 through February 27, 2015 and demolition of the remainder of the subject building between February 28 through March 23, 2015. In general, demolition work was observed to be conducted in accordance with the requirements of the following:

- The Canada Labor Code
- The current version of BC Reg. 296/97 particularly as it pertains to mould and silica.
- The Lead Guideline
- The project specifications.

Building demolition was complete and building-related debris removed from the site as of March 22, 2015. Excavation activities associated with removal of contaminated soils was conducted and reported under a separate cover.

***Confirmation of Remediation St. Michael's Former Residential School, Alert Bay I.R. 1A, BC.
Stantec Consulting Ltd. Burnaby BC April 2015***

The environmental remediation occurred from February 2 to April 21, 2015. The following is a summary of remediation tasks:

- 358.63 tonnes of CL+ and 5185.41 tonnes of RL+ soil was excavated and transported for disposal at the 7 Mile Landfill in Port McNeill, BC.
- The maximum depth of the investigation was approximately 2.5 meters below ground surface.
- Based on historical information for the site, confirmatory laboratory analysis consisted of one or more of the following parameters: petroleum hydrocarbon fractions F1-F4 plus benzene, toluene, ethylbenzene, xylene, volatile petroleum hydrocarbons, light and heavy extractable hydrocarbons, methyltertbutyl, ether, polycyclic aromatic hydrocarbons and/or total metals.
- Collecting and submitting four backfill soil samples for laboratory analysis of total metals.
- Analysis of all excavation limit and backfill samples resulted in reported concentrations of all analyzed parameters less than the applicable standards.

Upon completion of the remedial excavation, the area was back filled and compacted to grade. A hydroseed mixture was applied to prevent run off and soil erosion. A gravel parking area approximately 17 m by 28 m was constructed on the southern portion of the site.

4.11.2 Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 and Kuldekuma I.R. No. 7

Environmental Assessment Document – Updated. 'Namgis Land Based Atlantic Salmon Recirculating Aquaculture System Pilot Project. Hemmera Envirochem Inc. Vancouver, BC. November 2011.

Hemmera Envirochem conducted an environmental impact assessment of a proposed 'Namgis Land-Based Atlantic Salmon Recirculating Aquaculture System Pilot Project. The project is a pilot plant facility to demonstrate the technological and commercial viability of producing Atlantic salmon in a land-based, closed containment, recirculating aquaculture facility. The facility was constructed on the 'Namgis First Nation's Ches-la-Kees I.R. No. 3 on North Vancouver Island, 5 km south of Port McNeill, British Columbia. Project components included the aquaculture facility building, groundwater well(s), water line and treatment, effluent treatment, water line and discharge to ground, civil engineering works and other building and structures over a cleared footprint of approximately 3.2 ha.

The factors considered in this environmental assessment document were intended to meet the CEAA screening-level assessment. Based on potential impacts that were identified and mitigation proposed, Hemmera Envirochem expects residual impacts to be:

- Not significant for air quality, vegetation, wildlife, and archaeological resources; and
- None expected for groundwater elevation, flow and quality at nearby receptors, Nimpkish River surface water flow or quality, fish and fish habitat, species at risk, communities, land use and traditional use.

No significant impacts on the Project are expected as a result of effects of the environment (such as flooding and seismic activity) on the Project. No significant cumulative effects are expected from the project to effect of other proposed or existing projects

Hemmera concluded that the Project is not expected to result in any significant environmental or socio-economic impacts.

'Namgis/Kuterra Closed Containment Project, Independent Environmental Monitor (IEM) Final Report for Tides Canada. Mike Berry, ALBY Systems Ltd. for the Pacific Salmon Foundation. July 16, 2015

ALBY Systems concluded that:

“Overall, the goals of the Independent EMP (IEMP) have been met or exceeded, with some of the proposed objectives having been adapted to reflect the environmental impact realities encountered, now that the pilot facility has completed a full production cycle”. The following table summarizes the recommendations that are contained in this report:

Issue	Discussion	Recommendation
Water Quality Parameters	Current list of water quality parameters contains items that are not critical to fish production or environmental impact monitoring	Reduce number of WQ parameters as per Table 2 above. Initiate annual virus screening of liquid effluent as discussed above
Liquid Effluent Disinfection	Liquid effluent chlorination/de-chlorination not essential given results of effluent virus testing	Discontinue liquid effluent disinfection but ensure that disinfection works remain on standby
Infiltration Basin Performance	Infiltration basin substrates are becoming plugged with waste solids causing ponding	Consider deeper raking (turning over) of gravel/cobble substrate in infiltration basins
Sludge Sampling	Sludge sampling/testing is currently sporadic. Sampling should be done regularly to ensure that the actual dry weights are available to regulators if required	Conduct sludge sampling and testing until consistent/stable results are obtained
Site Biosecurity	Security at entry gate and around well heads could be improved, especially if expansion of the facility is being considered	Consider installing a remote controlled gate with video surveillance. Consider fencing around well-head electrical control boxes
Mortalities storage and handling on site	Morts should not be stored in the lab, quarantine or grow-out areas	Consider installation of more freezer(s) that are away from the lab and fish culture areas

Issue	Discussion	Recommendation
Bulk Chemical Storage	Bulk chemicals (e.g. NaOH) are currently stored in the mechanical room where there is a risk of un-contained spillage/leakage.	Recommend a separate chemical storage unit with temperature control.
Smolt Screening	The current list of potential pathogens that are being tested for includes some that may not be essential	Reduce smolt screening requirements as in 6. above if fish are from a known source and screening records are provided by supplier.
Other:	Off-site groundwater monitoring	Consider developing additional and deeper off-site groundwater monitoring wells, especially if expansion takes place
	Purge and pump by-pass flows discharging into emergency overflow pit	Re-direct occasional high-volume flows directly to infiltration basins to avoid salt intrusion into geothermal/drinking water wells
	Sludge Handling	Investigate alternate systems for sludge disposal including possible drying/bagging

“Additional monitoring of potential impacts such as Groundwater Impacts, Surface Water Drainage & Control, Odor and Noise and Waste Management, which were brought forward as concerns during the Public Information Sessions, has also taken place throughout the duration of the IEMP.”

No INAC reports were found for Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 and Kuldekduma I.R. No. 7.

Summary of Potential Concerns from Review of INAC Reports

Alert Bay I.R. No. 1	<p>2014 Phase II ESA 2014 recommended completing screening level human health and ecological level risk assessments (SLRA) to evaluate whether identified on-site contamination poses acceptable or unacceptable risks to on-site receptors for:</p> <ul style="list-style-type: none"> • Former On-Site UST (APEC 1-E), and • Former On-Site Vehicle Maintenance (APEC 1-F). <p>Also recommended:</p> <ul style="list-style-type: none"> • Supplemental investigation in proximity to the dwelling located at 20 Front Street (APEC 2-B) to determine the extent of remaining contamination at this location, and • Remediation of the hydrocarbon-contaminated soil at 106 Broughton Street and 03 Front Street (APEC 4-B). Furthermore, secondary containment should be installed beneath these ASTs to prevent future leaks.
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Alert Bay I.R. No. 1A	<p>Stantec recommended screening human health and ecological level risk assessments (SLRA) be completed to evaluate whether identified on-site contamination poses acceptable or unacceptable risks to on-site receptors for:</p> <ul style="list-style-type: none"> • Former Landfill (APEC 1-A) • Burn Pile (APEC 1-B) • Sawmill (APEC 1-C) • Public Works Yard (APEC 1-D)
Nimpkish I.R. No. 2	<ul style="list-style-type: none"> • Former Off-Site Shell Bulk Plant and Former Off-Site Shipyard (APEC 5-C) <p>Stantec also noted the following:</p> <ul style="list-style-type: none"> • Contaminants present on the ship slipway (APEC 3-A) are associated with historical ship repair and the wastes generated during the repair and should be remediated to reduce risk to human health and the environment. Stantec recommended a supplemental Phase II ESA investigation in the slipway to delineate the extent of the contaminants, followed by remediation.
Ches-la-Kee I.R. No. 3	None identified.
Ar-Cee-Wy-Ee I.R. No. 4	None identified.
Osaw-Las I.R. No. 5	None identified.
Ksui-La-Das I.R. No. 6	None identified.
Kuldekduma I.R. No. 7	None identified.

4.12 'Namgis First Nation Records

'Namgis First Nation did not provide any environmental records for review as part of the Phase I Environmental Site Assessment

4.13 Natural Resources Canada (NRCAN)

Maps and Reserve boundaries were identified using maps presented on the NRCAN web site. The accuracy of the maps has not been confirmed.

4.14 City Directories Fire Insurance Maps

No fire insurance maps were identified for any of the Reserves.

4.13 Site Services and Utilities

Water Supply

Potable water to the 'Namgis First Nations' Cormorant Island Reserves is provided by a community

groundwater well than is pumped to a large tank reservoir. 'Namgis First Nation reports that the quality of the water is excellent and no chemical treatment of the groundwater supply is used. Potable water on Ches-la-Kee I.R. 3 is syphoned from a production well. No potable water supply is found on Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 or Kuldekduma I.R. No. 7.

Sanitary

'Namgis First Nation's Cormorant Island Reserves as well as the Village of Alert Bay sewerage collection system is connected to a secondary treatment waste water treatment plant located on Alert Bay I.R. No. 1, and operated and maintained by 'Namgis First Nation. Treated wastewater is discharged from the wastewater treatment plant via a marine outfall to the waters of Cormorant Channel.

There are three (3) septic systems on Ches-la-Kee I.R. No. 3 associated with the fish farm, one is for fish blood from harvesting fish, one is for solids and the remaining one is a septic tank for domestic use. No sewage facilities of any type are found on Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 or Kuldekduma I.R. No. 7.

Stormwater Management

Storm water is allowed to infiltrate into the ground surface or is re-directed away from buildings and roads via surface water ditches or land contouring. There are no stormwater management systems on Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 or Kuldekduma I.R. No. 7.

Waste Management

The 'Namgis First Nation has a "Garbage Collection Agreement" with the Village of Alert Bay, which is renewable annually. Residential, commercial and recycling waste are collected and transported off Island to the Mount Waddington Regional District's 7 mile Landfill and Recycling Facility.

Propane and Hydro

Cormorant Island is not serviced by natural gas. BC Hydro provides power to Cormorant Island via submarine cable. Many buildings have propane tanks.

4.16 Nature and History of Adjacent Land Use

The nature and history of adjacent land use was compiled from a review of historic records, such as air photographs, and information provided during interviews. Land use located adjacent to each of the reserves is summarized in the following table:

Reserve	Historic Adjacent Land Use
Alert Bay IR 1A	
North	Broughton Strait
East	Alert Bay I.R. No. 1 - Residential
South	Broughton Strait
West	Broughton Strait
Alert Bay I.R. No. 1	
North	Cormorant Channel
East	Cormorant Channel
South	Broughton Strait
West	Alert Bay I.R. No. 1A
Nimpkish I.R. No. 2	
North	Residential
East	Residence and vacant land (former site of Shell Bulk plant)
South	Former Shipyard
West	Broughton Strait
Ches-la-Kee I.R. No. 3	
North	Rural Residential/Forestry
East	Broughton Strait
South	Rural Residential
West	Rural Residential/Forestry
Ar-Cee-Wy-Ee I.R. No. 4	
North	Provincial Crown land - Forested
East	Nimpkish River
South	Lower Nimpkish River Park
West	Lower Nimpkish River Park
Osaw-Las I.R. No. 5	
North	Provincial Crown land - Forested
East	Provincial Crown land - Forested
South	Provincial Crown land - Forested
West	Nimpkish River

Reserve	Historic Adjacent Land Use
Ksui-La-Das I.R. No. 6	Surrounded by marine waters
Kuldekduma I.R. No. 7	Surrounded by marine waters

5.0 INTERVIEW SUMMARY

A PowerPoint presentation was made at a Community Meeting on February 9, 2017, to outline the purpose of the Phase 1 ESA and to facilitate gathering of information regarding current and historic development and land use on NFN Reserve lands. The community presentation contained numerous photographic examples of potential environmental issues commonly encountered on First Nation lands to encourage participation and stimulate information sharing during the presentation. Figures of the Reserve lands were available for participants to locate any areas of environmental concern. Over 20 persons attended the event including administration staff, elders, and community members. John Burton, Kuterra Fish Plant Manager, Brian Svanvik, 'Namgis First Nation GIS Specialist, Verna Ambers, A/Band Administrator and Diane Alfred (resident and Project Intern) provided pertinent and beneficial environmental information of the Reserve lands.

After discussions with the attendees at the Community Meeting and interviews with members of the 'Namgis First Nation administration, the following environmental information was presented (in no particular order):

- The Cemetery at the end of Wood St. - Occasionally when the groundwater table is high after several days of rain, the runoff from the cemetery area smells really foul and an irritant to breathing.
- Biocell of the Village of Alert Bay – Village of Alert Bay is operating a biocell abutting Alert Bay I.R. No. 1 at the corner of Gatu Rd. and East Hemlock St.
- Auto repair shop on Front Street (i.e., off-Reserve) has two (2) ASTs, the condition of which is suspect.
- Former Petro Canada bulk plant behind the Church. Pipes from the former plant have been observed and community has not been given any information that the bulk plant was fully decommissioned.
- The fuel from the buried UST at 20 Front St. has been pumped out and the soil along the roadway where an oily sheen has been observed in the past was excavated and the contaminated soil was removed. The fate of the excavated soil was not known.
- Diane Alfred advised of a property on Atli St. whose resident has reported many times that an unknown liquid contaminant surfaces in his backyard and has an offensive odour as well as a sheen to it.

- Spoke with Justin Beadle Chief Administrative Officer for the Village of Alert Bay. He advised that the Village was operating a biocell and that all reports that the Village had would be forwarded to BC Ecosphere for review.

6.0 SITE RECONNAISSANCE

Mr. Tim Powers and Chris Pretty of BC Ecosphere Management Ltd. conducted the site reconnaissance component of the Phase 1 ESA for the three Nimpkish River Reserves during in mid-December and 'Namgis First Nation's Alert Bay Reserves January 19/20 and February 8/9, 2017. At the direction of the 'Namgis First Nation administration, site visits to Ksui-La-Das I.R. No. 6 and Kuldeksuma I.R. No. 7 were deemed unnecessary.

Diane Alfred, Project Intern, accompanied the Assessors on the reconnaissance of the Alert Bay Reserves for the Update of the 2011 Phase I ESA. The site reconnaissance focused on visual clues of potential sources of contamination (i.e. aboveground and/or underground storage tanks (ASTs/USTs), stained or odorous soils (i.e., the ground was saturated from days of rain, which preceded the site reconnaissance making observations for stained soils difficult), stressed vegetation, hazardously stored materials etc.). A visual inspection of adjacent properties was also completed at this time to assess the overall risk potential to the subject property as a result of any current, or possibly historic, activities on these sites. No interior investigations were conducted.

Summary of Site Reconnaissance

The following table represents a summary of site observations and/or site conditions that may represent potential environmental concerns on NFN lands or may be relevant during future investigations.

Summary of Site Observations/Conditions	
Septic Systems	No septic systems were observed on 'Namgis First Nation Reserve lands
Drinking Water	There are two (2) water wells on Alert Bay No. 1A. These community wells are pumped to a tank reservoir on the upland forested western part of Alert Bay I.R. No. 1A. Drinking well water is available on Ches-la-Kee I.R. No. 3. No safe drinking water supply is found on Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 or Kuldeksuma I.R. No. 7.

Summary of Site Observations/Conditions	
Indications of Environmental Investigations and/or Remediation.	After the 2015 demolition and remediation of the former St. Michael's school site, the surface vegetation is taking hold at the site. At 20 Front St., fresh gravel was observed along the Front St. frontage where Namgis First Nation Public Works Dept. has reportedly excavated and removed the soils from the ditch at the fence. (Fate of excavated soils is unknown). Also at-grade monitoring well was observed in the Front St. roadway downgradient of the site. Groundwater monitoring well stickups observed at aerodrome hanger site. No groundwater wells or any other indications of environmental investigations and/or remediation were observed on Alert Bay I.R. No. 1, Alert Bay I.R. No. 1A, Nimpkish I.R. No. 2, Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5.
USTs and ASTs	Previous report had noted 10 residential ASTs on Alert Bay I.R. No. 1 and/or Alert Bay I.R. No. 1A. Accompanied by Diane Alfred, ASTs were observed: (i) at a residence on Charlotte St., (ii) at a residence at Hill and Broughton Sts, (iii) at a residence at 103 Front Street, (iv) at a residence at the northwest corner of Gatu Rd. and E. Hemlock St., (v) three (3) ASTs were also observed at the Works Yard, and (vi) a large AST at the community gas station. The AST at the gas station and those at the Public Works Yard are all Environment Canada registered tanks, are properly designed and sited, and no staining was observed at these AST sites. Two AST were observed at the auto repair facility on Front St. (off-Reserve). No USTs or ASTs were observed at Nimpkish I.R. No. 2, Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5.
Oil/Water Separators	The 'Namgis First Nation Gas Station has an oily water separator.
Sumps, Pits and Lagoons	No sumps, pits or lagoons were observed on Alert Bay I.R. No. 1, Alert Bay I.R. No. 1A, Nimpkish I.R. No. 2, Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5.
Staining and Stressed Vegetation	Difficult to ascertain staining due to rain and wet ground. Some staining observed at small area (i.e., 1m ²) of Public Works yard. Potentially stressed vegetation was observed at the property on Atli St. in the area where the resident reports that a liquid contaminate occasionally surfaces and ponds in his backyard. No stain soils and/or stressed vegetation was observed at Nimpkish I.R. No. 2, Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5.
Hazardous Material and Waste Management	Containers of fuel, lubricants and oil were observed at the sawmill, the hanger and the public works yard. Hazardous materials were observed at the Kuterra Fish Plant stored indoors but not in an proper hazardous materials storage cabinet. No hazardous materials or waste was observed at Nimpkish I.R. No. 2, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5.

Summary of Site Observations/Conditions	
Waste Water Treatment	The Cormorant Island wastewater treatment plant on Alert Bay I.R. No. 1 was visited. No odorous substances were experienced during the site visit. The wastewater treatment facilities at the Kuterra Fish Plant on Ches-la-Kee I.R. No. 3 appear to be operating in accordance with operating procedures (see Appendix. No odours were evident. There are no wastewater treatment facilities on Nimpkish I.R. No. 2, Ar-Cee-Wy-Ee I.R. No. 4 or Osaw-Las I.R. No. 5.
Fill Materials	There were suspect fill materials and asphalt observed at the DLC waste site at the end of Wood St. on Alert Bay No. 1A. A few soil piles and broken asphalt was observed on Nimpkish I.R. No. 2. No fill materials were observed on Alert Bay I.R. No. 1, Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4 or Osaw-Las I.R. No. 5,
Methane	Buried wood waste can generate methane as it decomposes. The sawmill on Alert Bay I.R. No. 1A had a relatively small amount of wood waste on the site but it did not appear to be buried.
Asbestos Containing Materials (ACM)	<p>Many of the buildings on NFN lands were constructed after the early to mid 1970's or have been renovated since this period. Consequently these buildings are unlikely to contain friable forms of asbestos. Asbestos containing materials such as vinyl and tile flooring materials and cement board may be present in some of the older buildings, however, most have probably been more recently renovated or refurbished and therefore the likelihood of finding large quantities of ACM is considered to be low with the exception of the former nurses' residence on Nimpkish I.R. No. 2. Prior observations during site inspections in 2010 noted evidence of ACMs and that they were likely present in this building.</p> <p>Asbestos surveys should be completed prior to renovation or demolition of any building, particularly those constructed prior to the early 1980's, so that ACM's may be identified and removed in accordance with applicable regulations prior to being disturbed. If vermiculite insulation is identified in any of the building attics, this material should be tested for asbestos content prior to any disturbance.</p> <p>Asbestos containing materials (ACM's) within buildings are unlikely to adversely impact the environmental condition of NFN land unless demolition materials have been buried on reserve..</p>

Summary of Site Observations/Conditions	
Polychlorinated Biphenyls (PCBs)	No PCB containing equipment was identified or reported on any of the Reserves. Electrical transformers located within the community are owned and operated by BC Hydro. Fluorescent lamp ballast within older buildings that pre-date the 1980's may contain PCBs. These electrical fittings are unlikely to adversely impact the environmental condition of NFN lands. Where present, PCB lamp ballasts should be segregated for appropriate disposal in accordance with applicable federal guidance.
Chlorofluorocarbons (CFCs)	No large sources of CFCs were identified on any of 'Namgis First Nation Reserve lands.
Urea Formaldehyde Foam Insulation (UFFI)	No evidence of UFFI was observed within the buildings and no injection holes were observed in exterior building envelopes.
Lead and Mercury Containing Materials	<p>Although the amount of lead in paint was limited to 0.5% by weight in 1976 and to less than 0.06% in the early 90's, lead may still be present in some paints, particularly older exterior paints. This may be the case at the former nurses' residence where small quantities of lead may also be encountered as solder on electrical equipment and domestic water pipes.</p> <p>Although no sources of mercury were identified or reported on the Reserves, small quantities of lead and mercury may be associated with building demolition materials in the DLC dumpsite on Alert Bay I.R. No. 1A..</p>
Radon Gas	No obvious sources of radioactive materials were observed or reported on any of the reserves. Smoke detectors within buildings may contain small quantities of radioisotopes.
Preservatives	No large-scale or widespread use of pesticides (including herbicides) and wood preservatives. i.e., pentachlorophenol, creosote or CCA treated) was identified (or reported) on 'Namgis First Nation lands. There were however a large amount of creosote treated wood pilings at the deteriorating pier and former fish plant marine structures within the water lots fronting Alert Bay I.R. No. 1A and Alert Bay I.R. No. 1 along Front St. There were also creosote wood materials observed around the sawmill site on Alert Bay I.R. No. 1A and creosote treated pilings were also observed on the in the foreshore and waters off the southeast corner of Ches-la-Kee I.R. No. 3.
Pesticides, Herbicides and Fungicides	No large utility Rights-of-Ways are found on the Reserve lands of the 'Namgis First Nation and therefore there presence on Reserve lands is considered to be low.
Mining and Acid Generating Rocks	No mining related activities or mining related sources of acid generating rocks were identified on the Reserve.

7.0 PHASE 1 ESA: CHES-LA-KEE I.R. NO. 3, AR-CEE-WY-EE I.R. NO. 4, OSAW-LAS I.R. NO. 5, KSUI-LA-DAS I.R. NO. 6 & KULDEKDUMA I.R. NO. 7 - SUMMARY OF AREAS OF POTENTIAL ENVIRONMENTAL CONCERNS

“Area(s) of potential environmental concern” means the area on, in or under a Phase I Environmental Site Assessment (ESA) site where one or more contaminants are potentially present, as determined through the Phase I ESA, including through (a) identification of past or present uses on, in or under the site, and (b) identification of potentially contaminating activity(s). Potential Contaminants of Concern (PCOCs) means, (a) one or more contaminants found on, in or under a property at a concentration that exceeds the applicable federal environmental quality guidelines for the environmental media found on the site.

The ancestral villages of the 'Namgis First Nation were found on the banks of the Nimpkish River at sites on the Ches-la-Kee I.R. No. 3, Ar-Cee-Wy-Ee I.R. No. 4, Osaw-Las I.R. No. 5. They were occupied up until the fishing industry flourished at Alert Bay at which time these village sites were abandoned and since then are occasionally used as fishing stations, and/or for recreational and ceremonial endeavours. While there is evidence that logging once occurred on Ches-la-Kee I.R. No. 3, there is no evidence that logging occurred on Ar-Cee-Wy-Ee I.R. No. 4 or Osaw-Las I.R. No. 5. A rail line to transport logs to tidewater was constructed on Osaw-Las I.R. No. 5 but it was decommissioned at an undetermined date. A land-based aquaculture plant occupies a small area in the southwest corner of Ches-la-Kee I.R. No. 3.

Based on the findings of the Phase 1 ESA, **there are no APECs identified on the Reserve lands of Ches-la-Kee I.R. No. 3 Ar-Cee-Wy-Ee, I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 and Kuldekduma I.R. No. 7 (See Table 1).** A separate environmental report on the Kuterra Aquaculture facility is found in Appendix J.

8.0 UPDATED PHASE 1 ESA: ALERT BAY NO. 1, ALERT BAY I.R. NO. 1A AND NIMPKISH I.R. NO. 2 - SUMMARY OF FINDINGS

Alert Bay I.R. No. 1A has historically been used for residential, agriculture, commercial, and industrial purposes. The western portion of the Alert Bay I.R. No. 1A has been undeveloped and/or used for forestry activities (logging) since at least the early 1950s. The majority of eastern portion of the Site has been used for residential and agriculture purposes from at least to the early 1950s to the late 1960s. Alert Bay I.R. No. 1 has historically been used primarily for residential purposes since at least the early 1950s. The western portion of the Alert Bay I.R. No. 1 (shoreline) has been used for residential purposes since at least the early 1950s with some commercial activities (tourist shop and a now-closed restaurant) . Prior to 1970, forestry occurred on large section of the eastern portion (inland) of Alert Bay I.R. No. 1 but from the late 1970s to the mid 1990s, there was increased residential use in the eastern portion of the Bay I.R. No. 1A.

Nimpkish I.R. No. 2 was the site of the former St. George Hospital, a cemetery and more recently a collection of totem poles. A now dilapidated ship slipway has occupied the southeast corner of Nimpkish I.R. No.2 since at least the early 1950s.

Approximately 1000 persons reside on Alert Bay No. 1 and Alert Bay I.R. No. 1A. In 2011, there were 205 dwellings on Alert Bay No. 1 and Alert Bay No. 1A, of which 155 were older than 10 years. For the most part, the dwellings on Alert Bay No. 1 and Alert Bay No. 1A are in good condition.

The non-First Nations Village of Alert Bay Land borders Alert Bay I.R. No. 1 on its southern and southern eastern borders. The lands of the Village of Alert Bay lands abutting Alert Bay I.R. No. 1 largely consist of a vegetated strip except for the Village's biocell, which abuts a small segment of Alert Bay I.R. No. 1 on its southern border. There is also an off-Reserve section of land along Front St., though it may not be within the boundaries of the Village of Alert Bay, where the former Anglican Church commonage was located that also housed on the slopes behind it a former Petro Canada bulk plant and also presently this parcel has a commercial auto repair facility. With the exception of the biocell and the auto repair facility, adjacent and nearby land uses of the Village of Alert Bay are unlikely to have impacted the environmental condition of reserve lands.

8.1 STATUS OF 2011 PHASE I ESA AREAS OF POTENTIAL ENVIRONMENTAL CONCERN (APEC's)

Based on the update of the 2011 Phase I ESA for Alert Bay I.R. No. 1, Alert Bay I.R. No. 1A and Nimpkish I.R. No. 2, the following is the status of the Areas of Potential Environmental Concern (APEC) as identified in Stantec's 2011 Phase I ESA (see Figure 4, Appendix I -Table 2):

Alert Bay I.R. No. 1A

APEC 1-A (Former Landfill):

The follow-up Phase II ESA conducted in 2014, confirmed soil and groundwater contamination were found at the site (AEC 2). A Screening Level Risk Assessment was recommended but was not completed.

APEC 1-B (Burn Pile):

The follow-up Phase II ESA conducted in 2014, confirmed soil contamination was found at the site (AEC 1). A Screening Level Risk Assessment was recommended but was not completed.

APEC 1-C (Sawmill):

The follow-up Phase II ESA conducted in 2014, confirmed groundwater contamination was found at the site (AEC 4). A Screening Level Risk Assessment was recommended but was not completed.

APEC 1-D (Public Works Yard):

The follow-up Phase II ESA conducted in 2014, confirmed groundwater contamination was found at the site (AEC 3). A Screening Level Risk Assessment was recommended but was not completed.

APEC 1-E (Former On- Site USTs near present day gas station):

The follow-up Phase II ESA conducted in 2014, confirmed groundwater contamination was found at the site (AEC 5). A Screening Level Risk Assessment was recommended but was not completed.

APEC 1-F (Former On- Site Vehicle Maintenance):

The follow-up Phase II ESA conducted in 2014, confirmed soil contamination was found at the site (AEC 8). Delineation of the soil contamination was recommended followed by a Screening Level Risk Assessment. Delineation of the contamination and/or the Screening Level Risk Assessment was not completed. It is understood that the contaminated soil was excavated and disposed of at an approved facility but there were no records provided to attest to this understanding.

APEC 1-G (Former On- Site Soil Disposal near fields):

No soil or groundwater contamination was found. No further investigations were undertaken.

Alert Bay I.R. No. 1

APEC 2-B (20 Front St., Current On- Site Staining):

The follow-up Phase II ESA conducted in 2014 confirmed soil and groundwater contamination were found at the site of a residential underground fuel storage tank (UST) (AEC 5). The UST was removed by the 'Namgis First Nation. Soil samples from the UST excavation and a sample downslope of the UST indicated soil contamination, and a sample south of the UST excavation exceeded CCME's Index of Additive Cancer Risk (IACR) value for protection of human health. 'Namgis First Nation excavated an undetermined amount of contaminated soil from the east road shoulder of 20 Front St. but no delineation of the soil contamination, as recommended by Stantec, was undertaken.

APEC 4-A (Current On-Site ASTs 03 Front St. & 106 Broughton):

The follow-up Phase II ESA conducted in 2014 confirmed soil contamination (metals) beneath the above ground fuel storage tank (AST) at 106 Broughton St. (AEC 6) The Phase II ESA also confirmed soil contamination (metals and hydrocarbons) beneath the AST at 3 Front St. Remediation, i.e., excavation and off-site disposal, of the two sites was recommended as well as provision of secondary containment under the ASTs.

Nimpkish I.R. No. 2

APEC 3-A (On-Site Ship Slipway):

The follow-up Phase II ESA conducted in 2014 confirmed that all sediment samples were greater than the applicable guidelines for select metals and/or PAH parameters (AEC 7). Delineation of the sediments by a Phase III ESA investigation was recommended.

Off Reserve APECs

APEC 5-A (Former Off-Site UST west of Church) Alert Bay I.R. No. 1A:

The follow-up Phase II ESA conducted in 2014 found concentrations of tested parameters were less than the applicable standards/guidelines. No further investigation was recommended.

APEC 5-B (Former Off-Site Soil and Tank Disposal) Alert Bay I.R. No. 1:

The follow-up Phase II ESA conducted in 2014 found concentrations of tested parameters were less than the applicable standards/guidelines. No further investigation was recommended.

APEC 5-C (Former Off-Site Shell Bulk Plant) Nimpkish I.R. No. 2:

The follow-up Phase II ESA conducted in 2014 confirmed that groundwater concentration of dissolved cadmium was above CCME AW guidelines for long-term exposure; and groundwater concentration of dissolved manganese were above Health Canada DW guidelines (aesthetics). For BC CSR 's health-based guideline, concentrations in water were below guideline.

No APEC assigned (Former Off-Site ASTs and Fuel) Alert Bay I.R. 1:

See APEC 5-A above. No Phase II ESA investigation undertaken or reported.

No APEC assigned (Former Off- Site Shipyard) Alert Bay I.R. No. 1:

See APEC 5-A above. No Phase II ESA investigation undertaken or reported.

8.2 New (2017) Areas of Potential Environmental Concern

Based on interviews with community members and the 2017 site reconnaissance, the following Areas of Potential Environmental Concern (APECs) were identified (see Figure 5, & Appendix I - Table 3):

APEC 1 Cemetery on Wood St., Alert Bay I.R. No. 1A: 'Namgis First Nation community members reported that on the occasion of high groundwater and surface flow emanating from the cemetery, a particular offensive odour can be smelt downgradient of the cemetery where groundwater and/or surface water runoff collects in a stormwater drainage ditch.

APEC 2: Suspect Subsurface Contaminated Soils and Surface Poned Water, Alert Bay I.R. No. 1: Residence on northeast side of Atli St., Alert Bay I.R. No. 1. Input was expressed by a community member and the property's resident about a contaminated liquid that occasionally ponds in his backyard. Signs of stressed vegetation was observed in the ponded area.

APEC 3: Aboveground Fuel Storage Tanks (ASTs) various locations on Alert Bay I.R. No. 1 & Alert Bay I.R. No. 1A. Previous reports had identified up to 10 ASTs being found on Alert Bay I.R. No. 1 & Alert Bay I.R. No. 1A. During the site reconnaissance, ASTs at a residence at Charlotte St., a residence at the corner of Gatu Rd. and East Hemlock St., the community

gas station and three (3) at the Public Works Yard were also observed. The ASTs at the above-noted residences need to be more closely inspected as well as an AST inventory completed to identify and assess the quality all home heating ASTs still remaining in the community.

APEC 4: Nurses' Residence, Former St. George's Hospital, and Nimpkish I.R. No. 2. Due to observations and the age of the building and the state of repair, this building likely has hazardous building materials including ACMs, lead (pipe solder, paint, etc.), light ballast, etc.. A Hazardous Building Materials Assessment should be completed of this building.

APEC 5: Aerodrome Hanger, on Alert Bay I.R. No. 1A. During site reconnaissance, improper outdoor storage of hazardous materials and waste, vehicle parts, rusty vehicles, etc. were observed.

Off-Reserve Area of Potential Environmental Concern (APEC's)

APEC 6: Biocell Village of Alert Bay. A large biocell site was observed on a portion of a lot abutting Alert Bay I.R. No. 1 in its southeast corner. The site is on a larger property held by the Village of Alert Bay, which adjoins the south end of Alert Bay I.R. No. 1. At least five (5) monitoring wells up-gradient, cross-gradient and down-gradient were identified. The biocell was not identified in the BC MoE's Site Registry records. INAC should request from the Village of Alert Bay the extent and status of the groundwater monitoring program, the planned schedule of monitoring events and any groundwater quality results to date.

APEC 7: ASTs and Auto Repair Shop, Front St. Two (2) ASTs, which would appear to be in non-compliance with (i) the UCL design Code for these tanks and their use, (ii) provincial standards for fuel and dangerous good storage and handling. There is a small risk of cross-gradient contamination of Alert Bay I.R. No. 1 but a greater risk through surface water runoff and groundwater migration to Alert Bay and Broughton Strait's marine ecology. This site was identified in 2011 Phase I ESA as Off-Reserve APEC 5-A.

8.2 Area of Environmental Concern (AEC)

Area(s) of environmental concern" (AEC) means the area on, in or under a Phase I Environmental Site Assessment (ESA) APEC site, where one or more contaminants are present, as determined through the Phase II ESA, including sampling of the environmental media and analyzing sample results to assess whether the contaminants exceed federal environmental quality guidelines for the lands present or future use. The following AECs were identified from records review and/or site reconnaissance (see Figure 6 & Appendix - Table 2) I :

Alert Bay I.R. No. 1A

- AEC 1: DLC Waste Disposal, Burning and Suspect Fill/Soil Materials:** Stantec's 2014 Phase II ESA identified the site at the western end of Wood St. where demolition, landscaping and construction (DLC) waste are disposed of and/or burned as well as presence of soil/fill piles as an Area of Environmental Concern (AEC) Soil concentrations of copper and zinc were above the CCME CL SQG. Completion of a Screening Level Risk Assessment was recommended but not completed. The site is also on the Federal Contaminated Sites Inventory (FSCI). The site reconnaissance confirmed that at least the site should be considered an APEC.
- AEC 2: Former Community Landfill:** Stantec's 2014 Phase II ESA found metals exceeding federal environmental quality guidelines in soil and groundwater at this site north of the Big House, and recommended a Screening Level Risk Assessment be completed. This was not conducted. The site is also on the Federal Contaminated Sites Inventory (FSCI).
- AEC 3: Public Works Yard:** While the Stantec 2014 Phase II ESA found no exceedances of federal environmental quality guidelines for metals and hydrocarbons in soil at the site, there were exceedances in the groundwater of metals (i.e., dissolved iron, cadmium and manganese). The Phase II ESA recommended a Screening Level Risk Assessment but it was never conducted. Also some minor soil staining and improper storage of hazardous waste materials were observed during the 2017 site reconnaissance. The site is also on the Federal Contaminated Sites Inventory (FSCI).
- AEC 4: Sawmill:** While the Stantec 2014 Phase II ESA found no exceedances of federal environmental quality guidelines for metals and hydrocarbons in soil at the site, there were exceedances in the groundwater of metals (i.e., dissolved iron and manganese). The Phase II ESA recommended a Screening Level Risk Assessment but it was never conducted. Also some minor soil staining and improper storage of hazardous waste materials were observed during the 2017 site reconnaissance. The site is also on the Federal Contaminated Sites Inventory (FSCI).
- AEC 8: Vehicle Repair and Maintenance** at a residence at the northwest corner of Broughton St. and Boundary Rd. The Phase II ESA recommended a Screening Level Risk Assessment of this site but it was never conducted. It is reported that some hydrocarbon-contaminated soil was removed from this site in 2014. There was no documentation provided by INAC or the 'Namgis First Nation to confirm this report. Documentation should be located and or created to affirm this site's remediation. The site reconnaissance observed that vehicle repairs and maintenance would appear to no longer be undertaken on the site. The site is also on the Federal Contaminated Sites Inventory (FSCI).

AEC 10: UST Remediated Site near Existing Reserve Gas Station. This site was identified as an APEC in the 2011 Phase I ESA (see APEC 1-E). A UST was located near the present gas station found on Alert Bay I.R. No. 1A. The 2014 Phase II ESA confirmed that groundwater concentrations of dissolved manganese were above Health Canada DW guidelines (aesthetics). For BC CSR 's health-based guideline, concentrations in water were below the BC guideline. The Phase II ESA recommended completion of a Screening Level Risk Assessment.

Alert Bay I.R. No. 1

AEC 5: Underground Fuel Storage Tank, 20 Front St.: The 'Namgis First Nation Public Works Dept. advised that the fuel tank at this residence had been emptied and removed, and contaminated soils was excavated and removed to an identified disposal facility. Confirmatory sampling of the site especially the soils between the house and the roadway have not been investigated. The 2014 Phase II ESA recommended supplemental investigation to determine the extent of remaining contamination at this location. There is a monitoring well on Front St. that should be re-sampled.

AEC 6: Aboveground Fuel Storage Tanks (ASTs) 2 Locations: The Phase II ESA specifically noted ASTs at 106 Broughton St., 03 Front St. as APECs. The 2014 Phase II ESA recommended (i) remediation of the hydrocarbon-contaminated soil at the residential dwellings located at 106 Broughton Street and 03 Front Street (APEC 4-B), and (ii) secondary containment beneath these ASTs to prevent future leaks. These recommendations were not undertaken or, if completed, not recorded as such.

Nimpkish I.R. No. 2

AEC 7: Marine Slipway, Nimpkish I.R. No. 2. The 2014 Phase II ESA found that contaminants present on the ship slipway (APEC 3-A) are associated with historical ship repair and the wastes generated during repairs. The Phase II ESA recommended that site should be remediated to reduce risk to human health and the environment. A supplemental Phase II ESA investigation to delineate the extent of the contaminants was also recommended, with remediation to follow. The supplemental environmental investigation did not occur. The site is also on the Federal Contaminated Sites Inventory (FSCI).

AEC 9: The Former St. George's Hospital medical waste incinerator site and hydrocarbon remediation site is still listed on the Federal Contaminated Sites Inventory (FSCI). . The Assessor is aware that in association with an Addition to Reserve process for I.R. No. 2, these sites were remediated (i.e., excavation and off-site disposal) prior to 2011 Phase I ESA. No records of this remediation activity was provided by INAC or the 'Namgis First Nation. These records should be located and provided to the 'Namgis First Nation for their files.

There are no AECs identified on the Reserve lands of Ches-la-Kee I.R. No. 3 Ar-Cee-Wy-Ee, I.R. No. 4, Osaw-Las I.R. No. 5, Ksui-La-Das I.R. No. 6 and Kuldekduma I.R. No. 7.

9.0 RECOMMENDATIONS

Most of the APECs will require a Phase II ESA investigation involving sample collection and analysis to determine if potential contaminants of concern (PCOC's) are present within the identified APEC's at sufficient concentrations to pose a potential risk to human health and/or ecological receptors. In determining the scope of work for the Phase II ESA, a few APECs and AECs may, however, be removed upon consideration of additional information not found during the Phase I ESA. A summary of APEC and AEC locations, descriptions, PCOC's and recommendations for further assessment are presented in Tables in Appendix I.

In addition to further investigation of the APECs and the AECs 's, BC Ecosphere also recommends the following:

- Undertake an AST Inventory in the community of tanks both in use or no longer in use, and integrate this information into the 'Namgis First Nation's land management system. Those ASTs in use should be inspected for structural integrity and observed for evidence of leakage or spillage to the ground. Tanks no longer in use should be emptied, if not already, and all fuel lines and the tank decommissioned and disposed of in accordance with federal requirements and the relevant Code of Practice.
- Develop and implement a Solid Waste Management Plan, which addresses, in the short term, the removal of all existing DLC waste solid waste from the community, and in the long-term, a plan, process and resources to avoid the recurrence of environmentally unsafe solid waste practices on 'Namgis First Nation Reserve lands.
- Develop a Soil Management Policy, Plan and Procedure for the acceptance, deposition and placement of fill on 'Namgis First Nation Reserve lands.
- Former Petro Canada bulk plant behind the Church. Pipes from the former plant have been observed and community has not been given any information that the bulk plant was fully decommissioned. Efforts should be made to determine the closure status of the site with BC MoE and/or Petro Canada.