TLA-O-QUI-AHT FIRST NATION ESOWISTA INDIAN RESERVE #3
EXPANSION LAND TRANSFER
ENVIRONMENTAL SCREENING DOCUMENT

Prepared for:
PUBLIC WORKS AND GOVERNMENT SERVICES
INDIAN AND NORTHERN AFFAIRS CLIENT SERVICES
14th Floor, 1138 Melville Street
Vancouver, BC
V6E 4S3

Prepared by:
KEYSTONE ENVIRONMENTAL LTD.
320 - 4400 Dominion Street
Burnaby, BC
V5G 4M7

Project No. 8812
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LETTER OF TRANSMITTAL

KEYSTONE ENVIRONMENTAL

Keystone Environmental Ltd.
Suite 320 4400 Dominion St.
Burnaby BC V5G 4G3
Telephone 604 430 0671
Facsimile 604 430 0672
keyinfo@keystoneenviro.com
www.keystoneenviro.com

July 10th, 2006

Public Works and Government Services
Indian and Northern Affairs Client Services
14th Floor, 1138 Melville Street
Vancouver, BC
V6E 4S3

Attention: Kevin Vollmer, P.Eng.

Dear Sir:

Re: Environmental Screening Document
Tla-o-qui-aht First Nation Esowista Indian Reserve #3 Expansion
Land Transfer

This report is respectfully submitted to Public Work and Government Services Canada – Indian and Northern Affairs Services by Keystone Environmental Ltd.

We appreciate the opportunity to have assisted in this matter and if there are any questions, please do not hesitate to contact the undersigned.

Keystone Environmental Ltd.

per: Chris Lee, M.Sc., R.P.Bio.
Environmental Scientist

per: Craig S. Patterson, B.Sc., BIT.
Environmental Scientist

per: Bruce Mattock, R.P.Bio.
Project Manager/Senior Biologist

EXECUTIVE SUMMARY

In 2003, the Tla-o-qui-aht First Nations (TFN), Indian and Northern Affairs Canada (INAC) and Parks Canada developed a Memorandum of Understanding (MOU) that outlines the conditions for removing 86.4 hectares of land ("expansion lands") from Pacific Rim National Park Reserve (PRNPR) to expand the residential capacity of the Esowista Indian Reserve (IR #3). Over the years, population growth within the existing Esowista IR #3 lands has resulted in overcrowding, less than desirable living conditions, locating houses in less than ideal locations, and infrastructure issues including sewage disposal and water quality concerns. In June 2003, the three parties signed the MOU, reaching an agreement on the proposed 86.4 ha expansion land option and framework for developing the community that best meets the needs of the TFN and the PRNPR. In March 2004, the Minister of the Environment tabled before Parliament amendments to the *Canada National Parks Act* thereby allowing the removal of lands from PRNPR for the purpose of Indian Reserve expansion. INAC is currently in the process of facilitating the transfer of the 86.4 ha expansion lands to the Esowista IR #3 under INAC's Additions to Reserve Policy. This transfer of the expansion lands triggers a *Canadian Environmental Assessment Act* (CEAA) environmental screening review.

The objective of this CEAA screening document is to provide INAC with the information required by CEAA to evaluate the project and make determinations regarding the land transfer. The basis of this assessment includes considerations associated with the purpose of the land transfer, which is the future development of the expansion lands. The conceptual community design that was used in Parks Canada's Strategic Environmental Assessment (2003) will also be used in this assessment as it was the basis for selecting the 86.4 ha expansion land option. However, because this assessment is based on a preliminary conceptual design and that any future community plans will likely be different, this assessment will provide insight to environmental issues and constraints that will have to be addressed in any future detailed development proposals, independent of plan design. When detailed project development proposals are made available, they will be assessed for impacts pursuant to the CEAA.

The findings of the CEAA screening assessment include the identification of Valued Ecosystem Components (VEC) that may be affected by the project. VECs are those attributes in the environment that are of particular importance due to their physical, ecological, resource harvesting, social and economic significance. The identification of VECs is both objective and subjective. Therefore, the selection of VECs was determined through the project consultation process with the RA and expert authorities, stakeholders, background research and site assessments and are summarized in the following table.

Environmental Assessment Summary Table

VECs	Project Activity	Environmental Effects	Mitigation Measures	References
Vegetation	Esowista expansions and proposed community development.	Vegetation removal Invasive Species	Avoid disturbing sensitive habitats such as old growth forest and open bog vegetation, and leave a vegetative buffer (~10 m) around these important vegetative communities. Re-plant exposed soils with local seed mix.	Site survey, review of site environmental reports and database searches.
Wildlife and wildlife habitat	Esowista expansions and proposed community development.	Land clearing, habitat loss and removal of potential nesting sites.	Should not occur during the sensitive breeding period between April 1 and July 31. Retention areas such as bogs or ponds, should be clearly delineated with flagging tape. Disturbed areas should be re-seeded with native seed mixes or planted with native shrubs. Retain undisturbed buffers around sensitive habitats.	Section 35 of the Wildlife Act
Fish and Fish Habitat	Esowista expansions and proposed community development.	Potential impacts to on-site and surrounding watercourses.	Avoid or minimize bridging the wide gully areas of Esowista Creek. Provide 30 m streamside setbacks for fish bearing waters and 15 m setbacks for non fish bearing waters. Minimize disturbances to riparian areas. Re-plant impacted riparian areas with native vegetative species.	Fisheries Act
Surface water Hydrology	Esowista expansions and proposed community development.	Potential impacts to surface water flow and quality.	Avoid disturbance to and provide buffer areas around open bogs and ponds. Develop a stormwater management plan which maintains the current hydrologic regime to Esowista Creek and its tributaries after development. Minimize vegetative and soil disturbance to promote ground absorption. Minimize impermeable surface areas. Development stormwater detention ponds, if necessary, which will provide habitat for amphibians and other wildlife.	Surface water Hydrology Land Development Guidelines & BMPs B.C. Stormwater Planning Guidebook
Archaeology	Esowista expansions and proposed community development.	Disturbance of potential archaeological sites.	Conduct archaeological surveys and assessment studies prior to development activities on the project site, particularly on undisturbed, well-drained terrain on the southern portion of the site.	PRNPR Archaeological Resource Management Programme, Sept. 2004.

Based on findings of feasibility study and commitments under the MOU, the community expansion will apply practical, sustainable community development practices to planning design and upgrading, and construction of the existing community and its expansion.

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AFA	American Forestry Association
APEC	Area of Potential Concern
AST	Aboveground Storage Tank
BC	British Columbia
BMPs	Best Management Practices
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CBH	Circumference at Breast Height
CDC	British Columbia Conservation Data Centre
CEAA	Canadian Environmental Assessment Act
CMN	Community Mapping Network
COPC	Constituent of Potential Concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWHvh1	Southern Very Wet Hypermaritime Coastal Western Hemlock Variant
CWS	Canadian Wildlife Service
DFO	Fisheries and Oceans Canada
EC	Environment Canada
ESA	Environmental Site Assessment
FA	Federal Authority
FISS	Fisheries Information Summary System
INAC	Indian and Northern Affairs Canada
IR	Indian Reserve
MOE	British Columbia Ministry of Environment
MOF	British Columbia Ministry of Forests
MOU	Memorandum of Understanding
MWLAP	British Columbia Ministry of Water, Land and Air Protection
PDA	Personal Data Assistant
PHC	Petroleum Hydrocarbons
PRNPR	Pacific Rim National Park Reserve
PWGSC	Public Works and Government Services Canada
RA	Responsible Authority
SARA	Species at Risk Act
SAR	Species at Risk
SEA	Parks Canada Strategic Environmental Assessment
SHIM	Sensitive Habitat Inventory Mapping
TFN	Tla-o-qui-aht First Nations
UST	Underground Storage Tank
VECs	Valued Ecosystem Components

TLA-O-QUI-AHT FIRST NATION ESOWISTA INDIAN RESERVE #3
EXPANSION LAND TRANSFER
ENVIRONMENTAL SCREENING DOCUMENT

1. INTRODUCTION

In 2003, the Tla-o-qui-aht First Nations (TFN), Indian and Northern Affairs Canada (INAC) and Parks Canada developed a Memorandum of Understanding (MOU) that outlines the conditions for removing 86.4 ha of land ("expansion lands") from Pacific Rim National Park Reserve (PRNPR) to expand the residential capacity of the Esowista Indian Reserve (IR #3). During the development of the MOU, Parks Canada completed a Strategic Environmental Assessment (SEA) (Parks Canada, 2003), which examined the environmental implications related to federal policy, plan and program proposal. The assessment looked at various land use options and focused on identifying an appropriate parcel of land which satisfies the development needs of the TFN and maintains the environmental integrity of the surrounding National Park ecosystem. The three parties signed the MOU in June 2003 reaching an agreement on the proposed 86.4 ha expansion land option and framework for developing the community that best meets the needs of the TFN and the PRNPR. In March 2004, the Minister of the Environment (MOE) tabled before Parliament amendments to the *Canada National Parks Act* thereby allowing the removal of lands from PRNPR for the purpose of Indian Reserve expansion. INAC is now facilitating the transfer of the 86.4 ha expansion lands to the Esowista IR #3 under INAC's Additions to Reserve Policy. This transfer of the expansion lands triggers a *Canadian Environmental Assessment Act* (CEAA) environmental screening review.

In accordance to the MOU and CEAA, INAC is a federal Responsible Authority (RA) and is responsible to ensure that a CEAA screening review is conducted for the land transfer of the expansion lands. Pursuant to CEAA, the proposed land transfer triggers a screening level environmental assessment. The CEAA trigger includes Section 5(1) (c) where a federal authority has the administration of federal lands and sells, leases or otherwise disposes of those lands or any interest in those lands, or transfers the administration and control of those lands or interest to Her Majesty in right of a province for the purpose of the project to be carried out in whole or in part. Parks Canada will also maintain involvement with the project as a Federal Authority (FA) with interests in the project.

The objective of this screening document is to provide INAC with the information required by CEAA to evaluate the project and make determinations regarding the land transfer. The actual land transfer has considerable socio-economic implications to the TFN, but on its own has limited environmental implications. Therefore, in order to assess the environmental implications of the land transfer, the basis of this assessment has been expanded to include considerations associated with the purpose of the land transfer, which is the future development of the expansion lands. The conceptual community design that was used in Parks Canada SEA will also be used in this assessment as it was the basis for selecting the 86.4 ha expansion land option. However, because this assessment is based on a preliminary conceptual design and that any future community plans will likely be different, this assessment will provide insight to environmental issues that will have to be addressed in any future detailed development proposals and will also identify environmental constraints associated with community development on the property, independent of plan design. As such, when detailed project development proposals are made available, they will be assessed for impacts pursuant to the CEAA.

1.1. BACKGROUND AND PROJECT RATIONALE

The TFN traditional territory once stretched from Clayoquot Sound, south to include much of the area surrounding Kennedy Lake. The TFN has eleven Indian Reserves located near Tofino on the west coast of Vancouver Island. One of the community reserves is Esowista IR #3 which is located seven kilometres south of the District of Tofino and is surrounded by PRNPR lands (Figure 1). The current IR #3 occupies approximately 8.3 ha of land at the north end of Long Beach, east of Schooner Cove. When the PRNPR was created in 1970, Esowista was changing from a seasonal fishing camp to a permanent residential community consisting of four homes. It was recognized by the Government of Canada that a larger site would eventually be required to meet the needs of the Esowista community.

Over the years, population growth has strained the capacity of Esowista IR #3 including overcrowding, less than desirable living conditions, locating houses in less than ideal locations, and infrastructure concerns with sewage disposal and water quality. Currently, there are 37 houses and approximately 315 people living in the village and it has now reached resident capacity.

In order to assess the current and future residential needs of the community, the TFN retained David Nairne and Associates to conduct the Esowista Expansion Feasibility Study (2003), which included community development plans, population predictions,

housing lot requirements, community buildings and infrastructure requirements for a model community. Based on findings of feasibility study and commitments under the MOU, the community expansion will apply practical, sustainable community development practices to planning design and upgrading, and construction of the existing community and its expansion.

The transfer of the expansion lands to Esowista IR #3 will provide the TFN with the opportunity to address acute overcrowding in Esowista, allow for infrastructure improvements to remedy sewage and water quality concerns, and support the development of a model community that will exist in harmony with the PRNPR.

1.2. OBJECTIVE OF THE CEAA SCREENING REVIEW

The objective of the screening document is to provide INAC and other relevant government agencies with the information required by RAs and FAs to reach a conclusion pursuant to CEAA. Specifically, the report describes the scope of the project and intends to identify potential environmental impacts and provide mitigation measures to prevent or compensate for any anticipated adverse environmental impacts. The RAs will consider the implementation of appropriate mitigation and/or compensation measures and conclude whether the project activities are likely to result in significant adverse environmental effects. This information allows the respective RAs to decide if the project can proceed or if modifications to the project are required to avoid adverse environmental impacts.

In addition, CEAA provides for public consultation with stakeholders, First Nations and other regulatory agencies to provide them with the opportunity to express their comments and concerns with the proposed project under review. CEAA related documents and reports are also public documents available for all stakeholders, First Nations and the general public to review.

CEAA also requires consideration of the potential for effects from accidents and malfunctions, cumulative environmental effects and any need for environmental monitoring or follow-up.

1.3. PROJECT TEAM AND RESPONSIBILITIES

As the transfer of the expansion lands is under INAC's jurisdiction, INAC was required under CEAA to be an RA for the project. Parks Canada will also maintain involvement with the project as a FA with interests in the project and will provide expert advice to the RA. Public Works and Government Services Canada (PWGSC) is facilitating the completion of the CEAA screening on behalf of INAC. This CEAA screening level environmental assessment was completed by Keystone Environmental Ltd. (Keystone) in association with Gebauer & Associates Ltd. The TFN was instrumental in providing project related information for the environmental assessment document.

1.4. STUDY LIMITATIONS

Findings presented in this report are based upon: (i) information and existing environmental reports provided by TFN, INAC, Parks Canada and PWGSC, (ii) information collected from literature searches and background searches, (iii) one bio-physical site assessment conducted on site, (iv) consultation with RA and FA and (v) discussions with TFN and the public.

Consequently, while findings and conclusions documented in this report have been prepared in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession practicing under similar circumstances in the area at the time of the performance of the work, this report is not intended, nor is it able, to provide a totally comprehensive review of past or present site environmental conditions. This report is intended to provide information to reduce, but not necessarily eliminate, uncertainty regarding the potential for risks associated with the Esowista IR #3 Expansion Land Transfer Project.

This Screening Document has been prepared solely for the use of PWGSC, INAC, TFN, and federal agencies providing expert advice for this project, pursuant to the agreement between Keystone Environmental Ltd. and Public Works and Government Services Canada. Any use which other parties make of this report, or any reliance on or decisions made based on it, are the responsibility of such parties. Keystone Environmental Ltd. accepts no responsibility for damages, if any, suffered by other parties as a result of decisions made or actions based on this report.

2. PROJECT DESCRIPTION

The purpose of the project description is to provide the project information needed to identify environmental issues and concerns (scoping) and to provide a basis for the environmental impact evaluation and mitigation of environmental effects. CEAA also requires that all relevant aspects or undertakings that are proposed to complete and operate the physical works be described in the environmental assessment.

The following sections describe the project location and the conceptual design used for the bases of the assessment.

2.1. PROJECT LOCATION

The project site is currently referenced as the Tla-o-qui-aht First Nation Esowista Indian Reserve #3 – Parcel 1. It is located south of Highway 4 in the Long Beach Unit of PRNPR, near the end of Pipeline Road, District of Tofino, British Columbia (Figure 1). The site is approximately 86 ha in area and currently vegetated and vacant.

The majority of the surrounding properties are undeveloped and vegetated, with the exception of a golf course and Tofino Airport located northeast and east of the site across Highway 4. The existing Esowista village is located approximately 300 m east of the southern portion of the expansion lands beyond a vegetated and undeveloped area. Marine areas are located approximately 400 m south of the site beyond vegetated and undeveloped areas, with Schooner Cove located directly to the south and Wickaninnish Bay located to the southeast.

The following summarizes the project site.

Civic Address:	Tla-o-qui-aht First Nation Esowista Reserve (I.R. No. 3) Parcel 1
Parcel Identifier:	n/a
Legal Description:	n/a
Current Registered Owners:	Her Majesty the Queen in Right of Canada as Represented by Parks Canada
Current Zoning:	Park – Pacific Rim National Park Reserve
Site Area:	86 hectares (approximate)
Site Latitude:	49º 04’ 25.0”
Site Longitude:	125º 47’ 33.0”

2.2. SCOPE OF PROJECT

The primary focus of this project is the transfer of the proposed expansion lands into the Esowista IR #3, under the INAC Additions to Reserve Policy. In addition, as previously mentioned in the introduction, a preliminary environmental assessment will be conducted based on the conceptual design used previously in the development of the expansion land option. The conceptual design and proposed expansion lands are shown in Figure 4.

Requirements made by the TFN to be implemented in the expansion community design were listed in the project feasibility study (David Nairne and Associates, 2003). A conceptual community design included projected housing and lot requirements, community buildings and infrastructure for a projected 710 people over the next 25 years, as well as a stream crossing bridge (i.e., north arm of Esowista Creek) to accommodate a road access to the new residential area. The objective was to develop a model community plan to minimize the footprint and impacts of the community on the surrounding areas. Although the conceptual plan is likely to change, it included concerns emphasized by the TFN during the expansion planning process to include community facilities to meet the needs of existing and future residents. These facilities required to make Esowista a complete community included:

- 160 residential buildings;
- a new health centre;
- administration space to complement the main office at Opitsaht;
- a community hall to accommodate meetings and indoor sporting events;
- both youth and elder drop-in centres;
- a traditional long house;
- a community library;
- a fire hall and community policing station;
- outdoor playing fields and hard surfaced areas to accommodate various sporting activities;
- small playgrounds designed for younger children;
- community gardens; and
- recreational trails connecting housing neighbourhoods to facilities, Esowista IR #3, Long Beach and Schooner Cove.

3. PREVIOUS STUDIES AND INFORMATION

The current baseline conditions of the site and surrounding area were assessed by reviewing previous environmental reports, conducting database searches, requesting information and visiting the site. The purpose of the baseline search was to identify potential concerns and issues that may require further investigation and to collect pertinent bio-physical information to identify potential sensitive ecosystem components that may be affected by the project works.

3.1. INFORMATION AND DATABASE SEARCHES

The following sections describe the findings of the database searches.

3.1.1. *Species At Risk Act (SARA)*

The Public Registry of the Species at Risk Act (SARA) (www.sararegistry.gc.ca) was accessed to collect information on species at risk (SAR) that may occur in British Columbia and to determine their current status under the Act (Table 2). Only species placed on Schedule 1 of the Act receive full regulatory protection. A related web page (www.speciesatrisk.gc.ca), maintained by the Canadian Wildlife Service (CWS), provides lay-person information for species legally designated by SARA. Search tools permit the user to find information on species' biology, population and distribution, habitats, threats, protection, and recovery efforts.

Federally listed species are designated as being Extinct (X), Extirpated (EX), Endangered (E), Threatened (T), Special Concern (SC), Data Deficient (DD), or Not At Risk (NAR). An **Extinct** wildlife species no longer exists, while an **Extirpated** wildlife species no longer exists in the wild in Canada, but occurs elsewhere. An **Endangered** species is facing imminent extirpation or extinction, a **Threatened** species is likely to become endangered if limiting factors are not reversed and a species of **Special Concern** may become threatened or endangered because of a combination of biological characteristics and identified threats. A wildlife species designated as **Data Deficient** indicates that there is inadequate information to make a direct, or indirect, assessment of its risk of extinction, while a **Not At Risk** species has been evaluated and found to be not at risk of extinction given the current circumstances. Identification of a Schedule I listed species on-site would require a SARA Permit application followed by an assessment to determine potential impacts and provide recommendations for measures to avoid or reduce adverse effects as well as plans to monitor the potential impacts of the project.

3.1.2. *Committee on the Status of Endangered Wildlife in Canada (COSEWIC)*

The webpage of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (http://www.cosewic.gc.ca) was accessed to determine the status of species not necessarily placed on Schedule 1 of the SARA and to review status reports and other information. For example, COSEWIC provides a status report for the Threatened Dromedary Jumping Slug (*Hemphillia dromedarius*) (COSEWIC, 2003), which describes information on the species' distribution, habitat preferences and biology.

3.1.3. *Conservation Data Center (CDC) Search*

The Conservation Data Centre (CDC) rare element occurrence webpage (http://srmapps.gov.bc.ca/apps/eswp/) was accessed regarding records of rare wildlife, plants, and ecosystems on or adjacent to the Esowista subject property (CDC, 2005a). The website also provides a list of all of the potential rare species and ecosystems occurring within the South Island Forest District (CDC, 2005b). This list was carefully reviewed to determine additional species that might occur on the property but were not present in the CDC rare element database.

The CDC tracking system includes red and blue-listed species or ecosystems. The red-list includes any indigenous elements considered to be extirpated, endangered or threatened in British Columbia, but do occur elsewhere. Endangered elements are facing imminent extirpation or extinction, whereas threatened elements are likely to become endangered if limiting factors are not reversed. Species on the Blue-List are elements considered to be vulnerable or particularly sensitive to human activities or natural events.

A search for rare plant and animal species was conducted within a narrow band between Tofino and Ucluelet and from the coastline to the southwest end of Kennedy Lake. Sixteen records were found including species such as the Threatened Dromedary Jumping-Slug, the blue-listed California Wax-Myrtle (*Myrica californica*), and the Red-Listed Common Water Shrew (*Sorex palustris* ssp. *brooksi*). A summary of these records is provided in Appendix B.

3.1.4. *Other Wildlife Databases*

A review of the Fisheries and Oceans Canada (DFO) and BC Ministry of Environment (MOE), Fisheries Information Summary System (FISS) and FishWizard (http://www-heb.pac.dfo-mpo.gc.ca/maps/maps-data_e.htm) were reviewed to identify information on watercourses and fish species presence on and around the site. The databases identified an unnamed stream (watershed code 930-268300) as located on the eastern edge of the site and containing coho salmon (*Oncorhynchus kisutch*) and cutthroat trout (*Oncorhynchus clarki*)[1]. The stream originates east of the site at the Tofino Airport and flows 1.42 km through the current Esowista village into Wickaninnish Bay. Watercourses identified on surrounding properties included two unnamed streams (watershed codes 930-269500 and 930-269500-02300) located approximately 700 m west of the site flowing south into Schooner Cove. Stream reports for both of the watercourses west of the site did not indicate fish presence. A watercourse (watershed code 930-290000) was listed as South Bay #2 Creek, and located approximately 380 m north of the site, flowing northwest into Browning Passage. A stream report for the creek indicated that coho salmon were present.

A DFO Mapster (http://www-heb.pac.dfo-mpo.gc.ca/maps/maps-data_e.htm) on-line mapping database identified a dry and indefinite watercourse originating from the northeast corner of the site, adjacent to Highway 4, and flowing southeast through Esowista village and into Wickaninnish Bay. A wetland was indicated on the northern portion of the site adjacent to the west of the watercourse. Another watercourse corresponding to the stream listed by the FishWizard database as 903-268300, was identified as dry and indefinite and as being a tributary of the watercourse originating at the northeast corner of the site. A watercourse was identified as a definite stream adjacent to the southeast edge of the Esowista village, originating at the Tofino Aiport and flowing south into Wickaninnish Bay. No stream or fish presence reports were available for the watercourse located adjacent to the village.

The on-line Community Mapping Network (CMN) was searched to identify recorded enhancement and restoration projects, sensitive habitats or species of concern located on-site or on surrounding properties. The database identified a wetland located at the northern portion of the site and a watercourse on the eastern edge of the site, corresponding with similar ecosystem identified by the FishWizard database. Watercourses and wetlands on surrounding properties corresponded to those identified by FishWizard. With the exception of shore zone segments of eelgrass indicated

[1] Referred to locally as Esowista Creek.

along the edges of Schooner Cove and Wickaninnish Bay, no other sensitive habitats or species of concern were identified on-site or on surrounding properties.

The Sensitive Habitat Inventory Mapping (SHIM) website (http://www.shim.bc.ca) was queried. Specifically, quality assured nesting locations, as well as bird, raptor, songbird and waterfowl databases were searched but did not return any results in the vicinity of the project area.

3.2. REPORTS

The following reports were reviewed during this environmental assessment.

- A Phase 1 Environmental Site Assessment, dated February 2006, and Phase 2 Environmental Site Assessments, dated June 2006, were prepared by Keystone and are summarized in the following sections.
- Pacific Rim National Park Reserve: Archaeological Resource Management Programme, prepared by Sumpter *et al*, September 2004.
- Tla-o-qui-aht First Nations, Esowista Expansion Feasibility Study, prepared by David Nairne and Associates, September 2003.
- Strategic environmental assessment of the proposal for the reversion of lands from Pacific Rim National Park Reserve of Canada to British Columbia for transfer to Indian and Northern Affairs Canada to allow for expansion of the Tla-o-qui-aht First Nation Esowista Reserve (I.R. No.3), prepared by Parks Canada, May 2003.
- Sustainable Ecosystem Management in Clayoquot Sound, Planning and Practices, prepared by the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound, April 1995.

3.3. PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

Keystone prepared a Phase 1 Environmental Site Assessment (ESA), dated February 2006, to identify potential areas of environmental concern on-site. The Phase 1 ESA revealed the following information pertinent to the site and adjacent properties.

Site History

The northern portion of the site was occupied by single-family residence(s) from the late 1900s to the early 1980s. In the 1960s, a six to eight room single-storey motel and adjoining outbuildings were constructed along the northeast border of the site adjacent to Highway 4 and removed from the site in the early 1970s. Between the 1960s and

the 1970s, a service station was reported to have been located on the site, adjacent and west of the motel. Between the 1950s and the 1970s, portions of the site appeared to have been cleared and cultivated for use as agricultural or pasture land. Between the mid 1970s and early 1980s, numerous unpaved, unvegetated areas and a gravel road network were observed on-site, corresponding to an overflow campground area that operated on-site during that period. The southern portion of the site appeared to have been vacant and vegetated from the early 1900s, or earlier, to the present.

Adjacent Properties History

From the 1950s, or earlier, properties to the west and south of the site were undeveloped and forested. Numerous single-family residences were constructed north of the site, across Highway 4, in the 1950s and 1960s. These residences were subsequently removed in the mid 1970s and the early 1980s. Areas further north of the site, appeared to have been logged in the 1950s and 1960s. The Tofino Airport has been located east of the site, across Highway 4, from at least the 1950s to the present. Aerial photographs revealed a sand/gravel road network to the west of the site, which was reportedly used by the Armed Forces during and after World War II. It was reported that personnel barracks, bunkers, spotlights and artillery were located at varying intervals along the road. In the late 1960s, preliminary construction for the current TFN reserve had begun to the southeast of the site. In the 1970s, a parking lot for park access had been constructed southeast of the site. In the late 1980s, a golf course had been constructed northeast of the site, across Highway 4. Currently, areas to the west and south of the site are undeveloped. North and east of the site are delineated by Highway 4. Northeast and east of Highway 4 are a golf course and the Tofino Airport, respectively. Southwest of the site is the PRNPR Parking Area and TFN IR #3.

Areas of Potential Environmental Concern (APEC)

The investigation revealed the following areas of potential environmental concern (APECs) on-site including:

- former campground and single-family residences - imported roadbase / fill material of unknown quality and quantity;
- suspected former service station (potential Underground Storage Tanks [USTs]); and
- former single-family residences (potential for heating oil USTs).

The investigation revealed the following APECs off-site including:

- former Canadian Armed Forces activities; and
- former single-family residences (potential for heating oil USTs).

It was concluded that there was a potential for constituents of concern to be present in site soil and/or groundwater, and further investigation was warranted.

The Keystone Phase I ESA report is included in Appendix C1.

3.4. PHASE 2 ENVIRONMENTAL SITE ASSESSMENT

Keystone conducted a Phase 2 ESA on March 28th and 29th, 2006 to fill a data gap identified during the CEAA Screening review following a review of the Phase 1 ESA, which identified potential on-site APECs. The Phase 2 ESA investigated for Constituents of Potential Concern (COPCs) associated with the potential presence of heating oil and gasoline USTs and road base/fill material. The following was reported.

Heating oil USTs Associated with Former Residences

A magnetic locator and electromagnetic survey located numerous miscellaneous metal debris objects but no USTs were discovered. A remnant Aboveground Storage Tank (AST) was observed in the area of a former residence at the northern edge of the site. A soil sample collected below the AST stand was below applicable guidelines. Remaining soil samples collected along the northern portion of the site were also below applicable guidelines for Petroleum Hydrocarbons (PHCs) and is therefore concluded that there is a low potential that heating oil USTs and associated COPCs are present on-site at levels of concern. A depression containing two 48 gal (182 L) drums was observed in proximity to a former residence. A surface water sample was collected in the vicinity of the drums and results were below the detection limits for PHC C_{10}-C_{16} and C_{34}-C_{50} and slightly above the detection limits for C_{16}-C_{34}. The soil sample was non-detect for analyzed constituents.

Former Service Station

A magnetic locator and electromagnetic survey conducted in the area of the former service station did not detect the presence of USTs or pump islands. Interviews with individuals familiar with the site indicated that a former service station was not present on-site or on adjacent sites, contradictory to a previous interview in the Phase 1 ESA. Samples collected in the formerly cleared areas considered to have been occupied were below applicable guidelines for PHCs and Benzene, Toluene, Ethylbenzene and Xylene (BTEX). It was concluded that a service station and associated fuelling activities likely did not occur on-site.

Fill Material

Within the former campground area and former residential area to the north, nine and four testpits were advanced, respectively. PHC and metals results were below applicable guidelines with the exception of two testpits in the campground area and one testpit in the former residential area. Within the campground area, copper marginally exceeded the CCME guidelines at two locations. However, the background concentration for copper on Vancouver Island (150 μg/g) suggests the elevated values are consistent with background concentrations for the area. Within the area of the former residence, copper and zinc marginally exceeded the CCME guidelines.

The report concluded that constituents of concern were present in fill material at concentrations exceeding the CCME criteria at one test pit located in a former residential area at the northern edge of the site, and further investigation was warranted. As metal debris and refuse were noted in some excavated areas along the northern portion of the site, there was the potential for constituents of concern to be present in localized areas where refuse is buried on-site, and further investigation may be required during potential future development.

The Keystone Phase 2 ESA is included in Appendix C2.

4. ENVIRONMENTAL SETTING

The existing baseline conditions were assessed by reviewing previous environmental reports, conducting database searches, requesting information and visiting the site. The purpose of the baseline search was to identify potential concerns and issues that might require further investigation and to collect pertinent bio-physical information to identify potential sensitive ecosystem components that might be affected by project works and undertakings.

4.1. PHYSICAL ENVIRONMENT

4.1.1. *Topography*

Regional topography is varied, with areas located north of the site across Highway 4 sloping gradually down towards the north and northwest into Browning Passage. Remaining areas surrounding the site have a gradual gradient directed to the south towards Schooner Cove and Wickaninnish Bay. Locally, the project site is generally

flat and characterized by bog areas. The existing drainage regime consists of two drainage patterns; the northern and eastern portions of the site are directed east into Esowista Creek flowing south into Wickaninnish Bay, and the southwestern portion of the site is directed southwest into Schooner Cove.

4.1.2. *Climate Conditions*

Temperatures in the project area are strongly influenced by the marine climate, producing moderate temperatures of relatively mild winters and cool summers. Precipitation is prolonged and extreme during the winter, as a succession of frontal storms move onto the coast. Although there is no noticeable dry season, the prevailing high pressure systems and decreased frequency of storms result in relatively dry summer months (Scientific Panel for Sustainable Forest Practices in Clayoquot Sound, 1995).

The following climate information is based on data collected by Environment Canada at the Tofino A* (airport) weather station (49^{o} 4'N, 122^{o} 46'W; 24.10 m elevation) between 1971 and 2000.

Daily Mean Temperature	9.8 ^{o}C
Monthly Maximum	August, 14.8 ^{o}C
Monthly Minimum	December, 4.7 ^{o}C
Precipitation	3305.9 mm/year
Highest Monthly Avg.	November, 474.9 mm
Lowest Monthly Avg.	July 76.8 mm

4.1.3. *Land and Soils*

A geotechnical investigation of the site consisting of hand augured test-pits was conducted on-site in 2002 by Piteau Associates (David Nairne and Associates, 2003). Although the test-pitting program was limited, the surficial soils on-site were reported to be homogeneous. Exceptions to this were a thick layer (>1 m) of peat (reported to be likely over sand) in the bog area, and a 1 – 1.5 m fill area on the northeast portion of the bog extending 300 m from Highway 4 (former campground). Site soils consisted of:

- a thin (<0.1 m) surface layer of organic material;
- a layer of loose fine silty sand, mottled grey silty sand to red stained fine sand, from 0.3 – 0.6 m deep; and
- brown medium grained, some mottled grey-brown compacted sand to depth.

4.2. BIOLOGICAL RESOURCES

A field reconnaissance of the study area was conducted between December 19th and 21st, 2005. The study area was traversed by foot, and information on plant species occurrence and composition, wildlife presence, and habitat types was collected. Unique habitats were delineated in the field and were later mapped with the aid of aerial photograph interpretation. Wildlife was identified by visual observation, calls, tracks, feeding sign, feces and other sign.

On December 19th and 20th, 2005, a watercourse assessment was conducted on the expansion lands. Substantial rainfall was recorded prior to, and during the site assessment, making potential watercourses obvious. Using a Trimble Pro XRS Back-pack GPS unit coupled to a real-time, hand-held mapping/data-logger Personal Data Assistant (PDA), the perimeter of the site was traversed by foot and watercourse information, including location and flow direction were recorded. Subsequently, using a digitized map of previously reported on-site watercourses (Parks Canada, 2003), watercourses were ground-truthed using the GPS unit and hand-held PDA. Additionally, watercourses not present on existing site maps were ground-truthed. As well, unique site characteristics were recorded into the data-logger (Figure 2). In general, the previously reported watercourses and ground-truthing were in agreement.

On December 20th, two baited gee-minnow traps were placed in both the northern (Watershed Code: 930-268300) and western tributaries (Watershed Code: n/a) of Esowista Creek (refer to Figure 2 for trap locations) and left for a 24-h period. On December 21st, minnow traps were recovered and assessed for fish presence, the results of which are outlined below:

Trap ID	Trap Contents
Esowista Creek - north arm (930-268300)	
Trap-01	Empty
Trap-02	Empty
Esowista Creek – south arm (n/a)	
Trap-03	Empty
Trap-04	Empty

Although no fish were collected within the fish traps on-site, a brief, qualitative assessment at the mouth of the creek suggests that the large woody debris dam (on the existing Esowista reserve) may prevent salmon from returning to the creek system.

4.2.1. *Terrestrial Habitat*

Overview

The Esowista site falls within the Southern Very Wet Hypermaritime Coastal Western Hemlock Variant (CWHvh1) biogeoclimatic zone (Green and Klinka, 1994). The CWHvh1 is restricted to a narrow band on the western coast of Vancouver Island from Port Renfrew to the northern tip of the island. Common vegetation on zonal sites include Western Hemlock (*Tsuga heterophylla*), Western Red Cedar (*Thuja plicata*), Salal (*Gaultheria shallon*), Red Huckleberry (*Vaccinium parvifolium*), Deer Fern (*Blechnum spicant*), Step Moss (*Hylocomium spendens*) and Lanky Moss (*Rhytidiadelphis loreus*) (Green and Klinka, 1994). Evergreen Huckleberry (*Vaccinium ovatum*) is common on drier and wetter sites and is a good indicator of the CWHvh1. Very wet bog areas are dominated by Lodgepole (Shore) Pine (*Pinus contorta*), Labrador-Tea (*Ledum groenlandicum*), sedges (*Carex* spp.) and Skunk Cabbage (*Lysichitum americanum*).

Landscape mapping identified nine habitat classes in 16 polygons within the study area (Figure 2). The habitat classes, including Open Bog, Pine Dominated Forest, Tall Shrubland, Young Coniferous Forest, Old-growth Coniferous Forest, Riparian Forest, Deciduous Woodland, Disturbed Mixed Forest and Disturbed Shrubland, are described in detail below.

Open Bog

Open Bog habitats are delineated by Polygons 8, 9 and 12 on Figure 2. The largest open bog (Polygon 12) is located in the northern portion of the study area (Photo A). Dominant vegetation includes various sphagnum species (Appendix D), stunted Shore Pine, Western Hemlock and Western Red Cedar, Labrador-Tea, Crowberry, Bracken Fern, Western Bog-Laurel, Bog Blueberry, Bog Cranberry, Three-leaved Goldthread, sedges and occasional Skunk Cabbage in wet depressions. A single Sweet Gale plant was also observed. The edges of the bog are characterized by Shore Pine of increasing vigor and size as they approach the boundaries of the Pine Dominated Forest – Open Bog habitat. Polygon 8 has a similar plant species composition to Polygon 12 and a similar transition to Pine Dominated Forest – Open Bog habitat on its western margin (Photo B). On the northern boundary, the Pine Dominated Forest habitat class in transition areas is narrow. Old-growth Coniferous Forest is present immediately to the north of this transition zone. Polygon 9 is unique in that open wetland portions are not only dominated by sphagnum but also Silverweed, and sedges including Pale Sedge (Photo C).

Pine Dominated Forest

Polygon 10 delineates a large area of Pine Dominated Forest habitat in the study area (Photos D and E). Forests are old-growth or mature and dominated by Shore Pine in most areas, with lesser numbers of Western Red Cedar and Western Hemlock. Some portions were burned in a forest fire, a very rare event on the west coast, approximately 80 to 100 years ago (Parks Canada, 2003). Tree species composition varies considerably, but Shore Pine is consistently dominant. Understorey shrub and herb species include Evergreen Huckleberry, Salal, Red Huckleberry, Labrador-Tea, False Azalea, Running Clubmoss, Deer Fern and Bracken Fern. Sphagnum and Slough Sedge are present in open areas in the forest with better light penetration.

Tall Shrubland

Polygons 2, 3 and 6 delineate a large area in the centre of the study area that was cleared in the 1940s and 1950s to meet flight way safety requirements (i.e., open approaches) for the Tofino Airport (Parks Canada, 2003). Since that time, coniferous tree species including primarily Western Red Cedar and Western Hemlock have become re-established. Because of the open nature of the area and excellent light penetration, a prolific and dense growth of shrub species such as Evergreen Huckleberry and Salal is evident. Bracken Fern, Deer Fern, Twinflower and Bunchberry are common herb species. The late timing of the field survey did not permit identification of many other herbaceous species.

Young Coniferous Forest

A small patch of young coniferous forest dominated by Western Red Cedar, Western Hemlock, Amabilis Fir and Sitka Spruce is present along the proposed connector road to the existing Esowista community (Polygon 1). Because of the dense forest canopy, understorey shrub (Salal) and herb (Deer Fern) growth is sparse.

Old-growth Cedar-Hemlock Forest

The study area is not within the sensitive spruce-dominated fringe forests; however, a few small stands of cedar and hemlock-dominated old-growth forest are present within the site. The most significant stand (Polygon 7) is intersected by the western tributary of Esowista Creek (Photo F). Understorey shrub vegetation is dense and dominated by Evergreen Huckleberry, Salal, Red Huckleberry, Deer Fern, False Lily-of-the-Valley, Foamflower, cedar and hemlock saplings, and numerous moss species such as Step Moss and Lanky Moss. Polygon 11 delineates a small area of old-growth forest in close proximity to the upper reaches of the western tributary of Esowista Creek (Photo G). Dominant vegetation is similar to that described for Polygon 7. One noteworthy characteristic of this forest is the high incidence of large cedar snags (Photo H) which are important nesting, foraging and roosting areas for

woodpeckers, chickadees and bats. Polygon 13 is another small area of old-growth cedar-hemlock forest which represents an eastern extension of a more contiguous block to the west of the study area.

Old-growth forests on the study site are of high ecological value. Rare and endangered species such as Dromedary Jumping-Slug and Marbled Murrelet (*Brachyramphus marmoratus*) may inhabit these areas.

Riparian Forest

Forests along the north tributary of Esowista Creek were delineated (Polygon 4) because of their unique composition relative to the adjacent Tall Shrubland habitats (i.e., Polygon 3 and 6). Similar riparian habitats are likely to occur along the western tributary of Esowista Creek, but these were not delineated because of the uniform old-growth condition of adjacent habitats.

Dominant tree species in the Riparian Forest include Western Red Cedar, Western Hemlock and Red Alder. Understorey vegetation is well established and consists of Salal, Western Yew, Red Huckleberry, Salmonberry, Swordfern, Deer Fern, False Lily-of-the-Valley, Horsetail, and young hemlock and cedar saplings (Photo I). Licorice Fern is evident on the trunks of deciduous trees and on fallen logs and numerous mosses and liverworts (e.g., Ring Pellia) cover the forest floor, tree trunks and fallen logs.

Coarse woody debris, consisting of many large fallen trees, is very abundant within the stand (Photo I). Diverse ground cover provides excellent habitat for small mammals as well as predators such as Ermine (*Mustela erminea*) and Marten (*Martes americana*).

A potential red-listed Northern Goshawk (*Accipiter gentilis* ssp. *laingii*) plucking station was found within this polygon (Photo J). Other potential rare or endangered species inhabiting riparian forests include the blue-listed and Special Concern Red-legged Frog (*Rana aurora*) and the Threatened Dromedary Jumping-Slug.

Deciduous Forest

A Red Alder dominated forest is present in a few areas within the study area (Photo K). Polygon 5 is along the north tributary of Esowista Creek on the west side of the highway and Polygon 16 is present in the north central end of the study area. Understorey vegetation is characterized by dense stands of Salmonberry, Swordfern, Slough Sedge, and cedar and hemlock saplings. Deciduous woodland areas were likely previously disturbed sites in which alder became established.

Disturbed Mixed Forest

A large portion of the northeastern end of the study area, delineated as Polygon 14 was previously utilized by several residences, a small motel and a potential gas station. Localized clearing, gravel fill areas, and other activities have resulted in a wide diversity of habitats. Red Alder dominated stands are present on old gravel pad areas (Photo L). Salmonberry, Deer Fern, Slough Sedge and a number of other shrub and herb species are present on these sites. Areas outside the gravel pads are dominated by young coniferous stands of Western Hemlock, Western Red Cedar, Sitka Spruce and Douglas-fir. Small pocket wetlands and bog areas are also present. These areas have typical wetland species including Labrador-Tea, Crowberry, Reed Canary Grass, Common Rush, Slough Sedge, Bracken Fern and sphagnum.

Disturbed Shrubland

The Disturbed Shrubland habitat (Polygon 15) is located within the Disturbed Mixed Forest. The area has also been previously disturbed, but has a more open nature with stunted trees and several sedge dominated wetlands (Photo M). Dominant tree and shrub species include Shore Pine, Western Hemlock and Western Red Cedar. Shrub species are similar to those described for other habitats on the site. Common species include Bracken Fern (prolific in some areas), Slough Sedge, Silverweed, and Common Rush. In one small open wetland (Photo M), a number of unique plant species were identified including Scotch Heather, Slender Bog-Orchid, King Gentian and Tapered Rush. Scotch Broom, a troublesome invasive species, is established in a disturbed area near the highway.

Rare and Endangered Plant Species

The CDC webpage provides records of several rare plants that have been recorded in coastal areas between Tofino and Ucluelet (Appendix B). One species, the blue-listed California Wax-Myrtle is quite common and can often be found overgrowing gardens in the area (J. McIntosh, Parks Canada, pers. comm., 2006; Klinkenberg, 2004; Webb, 2005). No rare plants were observed during the site visit and rare plants are unlikely to occur given the absence of unique habitats (e.g., rock outcrops, upland areas of sandy shorelines, vernal pools) where many rare plants are found (Appendix B).

The Red-listed and Endangered Seaside Centipede Lichen (*Heterodermia sitchensis*) is only known to grow on Sitka Spruce boughs in the spruce fringe forest (John McIntosh, Parks Canada, pers. comm., 2006). Host Sitka Spruce are located in the lower canopy of old-growth hemlock forests in sheltered locations where the climate is highly oceanic and markedly humid (CWS, 2005). The two known locations within PRNPR are the Ucluth Peninsula, located at the north end of Ucluelet, and Schooner

Cove, the first known location in the world (Parks Canada, 2003; CWS, 2005). A number of other sites are known along the west coast of Vancouver Island (Webb, 2005).

Parks Canada (2003) indicates that the rare fungus (*Steriopsis humphryii*) is known to occur locally in the spruce fringe habitat, but no additional information on this species was found.

Rare and Endangered Ecosystems

None of the ecosystem types within the study area are blue or red-listed by the CDC (CDC, 2005b). Most of the rare and endangered ecosystem types listed by CDC have an old-growth Sitka Spruce component. Old-growth Sitka Spruce is not present within the Esowista study area.

4.2.2. *Wildlife*

Because of the winter timing of the field reconnaissance, only resident wildlife were identified. During the migratory and summer breeding period, many more species are likely to occur in the area.

Birds

Only 11 bird species were identified on the three December 2005 field days. Species and numbers seen on each day are summarized in Table 1.

Other resident songbird species that likely occur within the study area include Hairy Woodpecker (*Picoides villosus*), Brown Creeper (*Certhia americana*), Song Sparrow (*Melospiza melodia*), Dark-eyed Junco (*Junco hyemalis*) and Red Crossbill (*Loxia curvirostra*). Birds likely to occur only during the breeding season include Rufous Hummingbird (*Selasphorus rufus*), Pacific-slope Flycatcher (*Empidonax difficilis*), Swainson's Thrush (*Catharus ustulatus*), Hermit Thrush (*Catharus guttatus*), American Robin (*Turdus migratorius*), Orange-crowned Warbler (*Vermivora celata*) and Townsend's Warbler (*Dendroica townsendi*).

The only sign of a raptor observed during the site reconnaissance was a plucking station where a Steller's Jay had been plucked and eaten. Either the red-listed Northern Goshawk or the Cooper's Hawk (*Accipiter cooperi*) are possible species utilizing the site. Other raptor species that may occur on the site include Red-tailed Hawk (*Buteo jamaicensis* – may nest), American Kestrel (*Falco sparverius* – mainly during migration), Merlin (*Falco columbarius* – may nest), and Peregrine Falcon (*Falco peregrinus* – mainly during migration) (Campbell *et al*., 1990).

Table 1: Bird species identified during the December 19th to 21st, 2005 field survey of the Esowista IR #3 Expansion Lands.

		December 2005		
Common Name	**Scientific Name**	**19**	**20**	**21**
BIRDS				
Chestnut-backed Chickadee	*Poecile rufescens*		1	
Fox Sparrow	*Passerella iliaca*		11	
Golden-crowned Kinglet	*Regulus satrapa*		5	1
Northern Flicker	*Colaptes auratus*		1	
Northern Goshawk	*Accipiter gentilis*		pluck stn	
Northwestern Crow	*Corvus caurinus*			3
Red-breasted Sapsucker	*Sphyrapicus ruber*	sign	sign	
Sharp-shinned Hawk	*Accipiter striatus*		1	
Steller's Jay	*Cyanocitta stelleri*		feathers	
Varied Thrush	*Ixoreus naevius*	1		
Winter Wren	*Troglodytes troglodytes*	1	2	1

Several owl species may occur on the site including Great Horned Owl (*Bubo virginianus* – may nest) and the Blue-Listed Northern Pygmy-Owl (*Glaucidium gnoma* – breeding status uncertain) (Campbell *et al.*, 1990).

Mammals

The sign of several large mammals was observed during the site reconnaissance. Several Black Bear (*Ursus americanus*) scats were observed, particularly in bog areas (scats with remains of Bog Cranberry), and one cedar snag with a large cavity had visible claw marks. Bears are regularly seen in the Esowista area by Park staff and visitors, and a number of winter den sites (in hollow trees) have been found in the spruce fringe forest (B. Hansen, Parks Canada, pers. comm., 2006). Bear-human conflicts occur each year at Esowista and the Airport (Parks Canada, 2003).

Wolves (*Canis lupus*) also appear to be present on the site on a regular basis since several scats were noted. According to Bob Hansen (Parks Canada, pers. comm., 2006), wolves have been relatively infrequent in the area for the last one to two years, but are likely to increase use of the area in the near future as a result of increased access to residential food refuse. Two years ago, a wolf pack was visiting the Esowista site approximately every two weeks. Black-tailed Deer (*Odocoileus hemionus* ssp. *columbianus*) are common throughout the area with pellet groups, tracks and antler rubs being noted on many occasions during the field survey. Deer are an important prey species for wolves and cougars that are regular visitors to the Esowista area. Another large mammal known to occur in the area is Cougar (*Felis*

concolor). Although no sign was observed during the field survey, conversations with local Park staff indicate that they are regularly seen in the area.

The number of small to medium-sized mammalian species on Vancouver Island is very low compared to similar habitats in mainland areas. Potential species occurring on the Esowista site include California Myotis (*Myotis californicus*), Little Brown Myotis (*Myotis lucifugus*), Long-legged Myotis (*Myotis volans*), Yuma Myotis (*Myotis yumanensis*), Townsend's Big-eared Bat (*Plecotus townsendi*), Dusky Shrew (*Sorex monticolus*), Red Squirrel (*Tamiasciurus hudsonicus*), Keen's Mouse (*Peromyscus keeni*), Deer Mouse (*Peromyscus maniculatus*), and Marten (McTaggart-Cowan and Guiguet, 1965; Nagorsen and Brigham, 1993; Nagorsen, 1996; Nagorsen, 2005).

Species such as Mink (*Mustela vison*) and River Otter (*Lontra canadensis*) are regular inhabitants of shoreline and aquatic areas on Vancouver Island but are not expected to occur regularly within the study area.

Amphibians

Only two amphibian species were observed during the site reconnaissance of the Esowista site. An adult Red-legged Frog (Blue-Listed; Special Concern) was found and photographed along Esowista Creek (Photo N) and a Pacific Treefrog (*Hyla regilla*) was heard calling on one occasion. Red-legged Frog and Pacific Treefrog breeding areas and movement corridors are being studied by a local naturalist from Ucluelet. A number of breeding locations and movement corridors have been identified in close proximity to the Esowista site (Barb Beasley, pers. comm., 2006; Beasley, 2004) (Figure 5). Between fall 2000 and spring 2004, SPLAT surveys found a cumulative number of 20 Red-legged Frog and 29 Pacific Treefrog carcasses along the section of highway to the north of the Esowista site (Appendix E, 12-14 km from Tofino). Additional information on Red-legged Frogs in the area is provided below under section 'Rare and Endangered Wildlife Species'.

Northwestern Salamander (*Ambystoma gracile*) is known to occur in the area with several breeding sites identified in ditches, wetlands and golf course ponds nearby (Barb Beasley, pers. comm., 2006; Figure 5) and a cumulative number of 14 carcasses found during SPLAT surveys (Appendix E, 12-14 km from Tofino). Amphibian species observed adjacent to the Esowista site on road-kill surveys include Roughskin Newt (*Taricha granulose*; Appendix E, one carcass), Clouded Salamander (*Aneides ferreus*), and Western Red-backed Salamander (*Plethodon vehiulum*; Appendix E, four carcasses). Other species that may occur include Western Toad (*Bufo boreas* – listed as Special Concern federally; see Rare and Endangered Species below) and

Long-toed Salamander (*Ambystoma macrodactylum*), (Gregory and Campbell, 1984; Corkran and Thoms, 1996; Webb, 2005).

Reptiles

Although no reptiles were observed during the December 2005 survey, all three species of garter snake may occur: Common (*Thamnophis sirtalis*), Northwestern (*T. ordinoid*es), and Western Terrestrial (*T. elegans*) (Gregory and Campbell, 1984; St. John, 2002).

Rare and Endangered Wildlife Species

A search of the CDC web-based database and a review of the rare element tracking list for the South Island Forest District identified several rare and endangered wildlife species with the potential to occur in the study area (Table 2).

4.2.3. *Aquatic Habitat*

The mouth of Esowista Creek is located along the southern border of the existing Esowista Reserve, opening into Wickaninnish Bay / Schooner Cove (Figure 2). The mouth is largely obstructed by a drift wood log jam, which may prevent fish passage. From the mouth, Esowista Creek travels through a one metre diameter by five metre long circular culvert located beneath a gravel access road, prior to continuing in a northwesterly direction up the adjoining slope. In the vicinity of the western border of the existing Esowista Reserve, a small tributary branches off the Esowista Creek mainstem, travelling southwest for approximately 200 m and terminating approximately 200 m from the eastern border of the site. Approximately 250 m southeast of the site (in the vicinity of the Schooner Trail), the Esowista Creek mainstem forks into a northern and western tributary (Figure 2).

Esowista Creek – Northern Tributary

The northern tributary of Esowista Creek (Watershed code: 930-268300) splits into two channels approximately 75 m northwest of the southeastern border of the site (Figure 2), which are discussed in detail below.

Table 2: Potential rare and endangered wildlife species occurring in the Esowista study area. Potential for occurrence is High (H), Medium (M), and Low (L).

Common and Scientific Names	Status[1]	Potential Occurrence	Comments on Status[3]
Mammals			
Common Water Shrew *Sorex palustris* ssp. *brooksi*	Red	Low	Two individuals were captured in pitfall traps at lower Lost Shoe Creek, located south of Kennedy Lake – the only record for the west coast of Vancouver Island (See Appendix B; Webb, 2005); unlikely to occur within the Esowista study area.
Ermine *Mustela erminea* ssp. *anguinae*	Blue	Low	Widespread, but at low densities across Vancouver Island; has not been recorded in PRNPR for 20-25 years (Webb, 2005); unlikely to occur within the Esowista study area.
Roosevelt Elk *Cervus elaphus* ssp. *roosevelti*	Blue	Low	Elk have been rarely observed in PRNPR; they are considered to be transient visitors (Webb, 2005), and are unlikely to occur within the Esowista site.
Townsend's Big-eared Bat *Corynorhinus townsendii*	Blue	Low	Status of this species on the west coast of Vancouver Island is not well understood; although no records in Nagorsen and Brigham (1993) in the Tofino area, may occasionally occur over the site.
Birds			
Band-tailed Pigeon *Patagioenas fasciata*	Blue	High	Campbell *et al.* (1990) reports many records in the Tofino area and breeding has been confirmed (Webb, 2005); expected to occur regularly and may nest within the site.
Marbled Murrelet *Brachyramphus marmoratus*	Red; Threatened	Low	Murrelets are expected to nest in suitable habitats in PRNPR (Webb, 2005) but typically nest further inland than the study area (Webb, 2005; J. McIntosh, Parks Canada, pers. comm., 2006); moss-covered branches in old-growth cedar-hemlock forest on the site are suitable for nesting.
Northern Goshawk *Accipiter gentilis* ssp. *laingi*	Red; Threatened	High	Nesting birds are expected to occur in PRNPR at low densities since one or two sightings are reported each year (Webb, 2005); a plucking station (Steller's Jay remains) found along the north tributary of Esowista Creek may be from this species.

Northern Pygmy-Owl *Glaucidium gnoma* ssp. *swarthi*	Blue	Low	Most pygmy-owl records are from the east side of Vancouver island; however, some nesting may occur on the west coast of the island (Webb, 2005).
Peregrine Falcon *Falco peregrinus* ssp. *anatum*	Red; Threatened	Low	Migrating birds are regularly seen in PRNPR (Webb, 2005); may occasionally occur over the site, but foraging opportunities are limited.
Peregrine Falcon *Falco peregrinus* ssp. *pealei*	Blue; Special Concern	Low	Known to nest on the west coast of Vancouver Island (Webb, 2005); may occasionally forage over the site, but foraging opportunities are limited.
Pine Grosbeak *Pinicola enucleator* ssp. *carlottae*	Blue	Low	Has only been recorded on a few occasions on the west coast of Vancouver Island where it appears to be a casual visitor (Campbell *et al*. 2001; Webb, 2005); may occasionally occur on the site.
Western Screech-Owl *Otus kennicottii* ssp. *kennicottii*	Blue; Special Concern	High	Reported on a year-round basis in PRNPR. A hotspot for sightings is at the Tofino Airport area (Webb, 2005), and therefore, individuals are likely to occur and possibly nest within the Esowista study area.
Amphibians			
Red-legged Frog *Rana aurora*	Blue; Special Concern	High	Red-legged Frogs are widespread on Vancouver Island and surveys by Barb Beasley have identified several breeding areas and highway crossing areas in close proximity to the study area; several other records were reported by Webb (2005) and one adult was captured and photographed during the December 2005 field visit.
Western Toad *Bufo boreas*	Special Concern	Moderate	The status of Western Toad in PRNPR is not well known; only a handful of sightings have been reported over the last few decades; Western Toads were not recorded on SPLAT surveys (see Appendix E); this species may occasionally breed in ponds and ephemeral wetlands in the area.
Invertebrates			
Dromedary Jumping-Slug *Hemphillia glandulosa*	Red; Threatened	High	This species has been reported in several occasions in old-growth cedar-hemlock forests in the Tofino area (see Appendix B; Webb 2005); old-growth habitats on the study area likely support this species.

[1] Provincially rare and endangered species are rated as being either Blue or Red; federally listed species are listed as being Endangered, Threatened or Special Concern (COSEWIC), but not all of these species are currently on Schedule 1 of the Species at Risk Act.

[2] Additional references include = Nagorsen and Brigham (1993); Corkran and Thoms (1996); Cannings *et al*. (1999); Fraser *et al*. (1999); COSEWIC 2003; Nagorsen (2005).

Channel 1

The northernmost channel (Channel 1) consists of a sinuous channel and appears to be largely restricted from lateral migration by valley walls (Photo O), continuing off-site to the east (Keystone GPS Point 13 – Figure 2). The channel is characterized by both small and large woody debris, distributed evenly throughout the length of the channel (Photo P). Channel morphology consists of predominantly of low-density riffle-pools. Channel banks are classified as "sloping", with a gradual or shallow slope of $<45^{o}$ and becoming less en-trenched towards the northern portion of the site (Photo Q). Wetted channel width was approximately two metres and water depth was approximately 45 cm. The northern portion of the channel appears to have been historically logged. Width between top-of-ravine banks averaged approximately 50 m (**source:** GPS). Channel morphology consisted of riffles and relatively shallow pools. Bank texture was comprised of fines (<0.2 cm) consisting of organic clays of medium plasticity and organic silts. Habitat conducive to salmonid spawning habitat, such as gravel and small cobble, was not observed. During the site visit, the surface water and bank substrate was heavily stained with tannins. Debris jams were observed at points of restricted flow along the southern portion of the channel.

Channel 2

The northern tributary - Channel 2 was not observed in historical reports or available maps and is located predominantly to the southwest of Channel 1 (Keystone GPS Point 14 – Figure 2). Relative to the Northern Tributary – Channel 1, the channel is relatively straight and appears to be frequently confined (Photo R), allowing occasional lateral migration but primarily restricted by adjacent valley walls (Photo S). Channel morphology consists of predominantly of low-density riffle-pools. Channel banks are generally classified as "sloping", with a gradual or shallow slope of $<45^{o}$ but contains areas of steep, vertical ($>45^{o}$) banks, which are concentrated at the centre of the channel. The channel receives run-off from various groundwater-to-surface water discharges observed along the southern bank. Width between top-of-ravine banks was gauged at approximately 30 m (field-estimate) and could not be substantiated via GPS due to canopy density. Bank texture was comprised of fines (<0.2 cm) consisting of organic clays of medium plasticity and organic silts. Habitat conducive to salmonid spawning habitat was not observed. During the site visit, the surface water and bank substrate was heavily stained with tannins. Elevation increases markedly in the vicinity of the channel headwaters, adjoining with a bog area to the west.

Esowista Creek – Western Tributary

The western tributary of Esowista Creek (Watershed code: n/a) consists of a sinuous channel with an average width of 64.0 m between top-of-ravine banks (**source:** GPS). The channel is largely unconfined, with little to no restriction from lateral migration as the base of the valley is relatively wide (Photo T), but becoming increasingly incized to the northwest. Channel banks are classified as "sloping", with a gradual or shallow slope of $<45^{o}$. Channel morphology consists of low-density riffle-pools, and to a lesser extent, cascade pools. The reach is characterized by both small and large woody debris, distributed evenly throughout the length of the reach, but increasing in density towards the southern portion of the branch. Debris jams, characteristic of aggrading channel were also observed at points of restricted flow along the channel, concentrated towards the eastern portion of the site. The channel gradually becomes less distinct towards the west of the site and appeared to originate in an elevated area in the vicinity of the western border of the site (Point 12 – Figure 2). Bank texture was comprised of fines (<0.2 cm) consisting of organic clays of medium plasticity and organic silts. Habitat conducive to salmonid spawning habitat was not observed. During the site visit, the surface water and bank substrate was heavily stained with tannins.

4.3. LAND USE

4.3.1. *Historic Land Use*

A review of the 2006 Phase 1 ESA conducted by Keystone indicated that the north and northeastern portions of the site (Lot 840T) have been developed for various land use practices since the early 1900s, while the south and southwestern portions of the site have remained relatively vegetated and undeveloped. The following is a summary of historical land use activities on the northern and northeastern portions of the site.

- The site was known locally by the First Nations as the "burnt lands" in the early 1900s, as portions had been extensively logged and there was evidence of slash burning.
- A homestead was constructed circa 1909.
- In the 1940s, a motel was constructed along the northeast edge of the site adjacent to Highway 4. During the 1960s, an eight-unit motel, service station and adjoining outbuildings were constructed, and by the early 1970s the buildings were removed.

- Between the 1950s and the 1970s, portions of the site appeared to have been cleared and cultivated for use as agricultural or pasture land.
- Between the mid 1970s and early 1980s, the northeastern portion of the site was used as a Parks Canada over-flow campground, consisting of unvegetated areas with 160 camping plots and a network of gravel roads.

4.3.2. *Natural Resources*

Natural resources at this site exist mainly in the form of remnant, tight grained wood on the ground that may be salvageable for fencing, siding and other exterior needs. Much of the standing wood that is upgradient from areas considered to be bog represents potential value for creating a natural look and feel landscaping. No other potential or actual natural resource has been identified at this site.

4.3.3. *Cultural Resources*

Preliminary information has been assembled and analyzed by Eugene Martin, Tla-o-qui-aht First Nations' Cultural Surveyor. Due to the high level of disturbance to the area, much of the site is considered desecrated. Those cultural areas that have been used in recent years are located in water ways, but have since been largely abandoned due to the upcoming development. There has been an expression of interest from one member to maintain a yet to be selected area for cultural training. Selection will be based upon the most suitable areas available following the development of phase one construction.

4.3.4. *Archaeology*

An archaeological overview of the property was conducted on-site to identify known archaeological values and concerns prior to land transfer and to determine future cultural heritage data recovery potential. Results of this overview were included in a Parks Canada report titled *2003-04 Pacific Rim National Park Reserve: Archaeological Resource Management Programme*, and dated September 2004. The investigation consisted of a review of existing archaeological site inventory data, land registry records, environmental information, and ground-truthing transects through undisturbed areas at the southern and western portions of the project area. The following is a summary the report's findings.

- Extensive land clearing, burning, and logging, coupled with past commercial land development, park staff housing, and recent overflow campground

development have historically impacted the northern and eastern portions of the project site.

- Historic pre-emption of the project site and surrounding area date back to 1909, corresponding to Euro-Canadian settlers.
- The assessment reported no evidence of historic homesteading activity (fence lines, ditching, cellar excavations, structures) or Nuu-chah-nulth cultural sites.
- Past land use disturbances, together with the distance of the property from the present shore, were felt to diminish the likelihood of finding evidence for intact traditional Nuu-chah-nulth cultural sites.
- The report suggested that additional archaeological surveys and assessment studies be conducted prior to development activities on the project site, particularly on undisturbed, well-drained terrain.
- It was concluded that the western and southern portions of the property hold moderate potential for the recovery of extant cultural features affiliated with early 20th century homesteading and possible mid-20th century army use.

A request for historical land-use information was made with Mr. Ian Sumpter, Assistant Archaeologist with Parks Canada, in the 2006 Phase 1 ESA conducted by Keystone. Mr. Sumpter reported that with the exception of a circa 1909 homestead and slash-burning activities on-site, the northeastern portion of the site had a low potential for archaeological history, due to the wet, "marsh-like" grounds. He added that the western portion of the site should be evaluated further to ascertain the potential archaeological history.

A request was made to Mr. John McMurdo of the Archaeology and Registry Services Branch, BC Ministry of Sustainable Resource Management for the presence of archaeological sites in the vicinity of the project site. The results of Mr. McMurdo's search indicated three sites of archaeological significance within 300 m of the project site boundaries (DgSk-53, DgSk-6 and DgSk-73). No records of archaeological significance were available for the project site. The following is a summary of records identified on adjacent properties.

- Archaeological sites associated with records DgSk-53 and DgSk-6 extend from the shore of Esowista IR #3 to approximately 300 m east of the project site. Record DgSk-53 is described as a shell midden identified in 1983. Record DgSk-6 is lists various types of historic refuse, shell midden, and miscellaneous artefacts identified in 1979 and 1983.
- Archaeological site DgSk-73 is located approximately 70 m south of the site, just north of an abandoned army road. The record is for a collapsed house built circa 1940 and associated with the occupation of the area by the Canadian Army.

5. CONSULTATION PROCESS

The TFN began the process to address their future community needs in 2000 which led to a successful negotiation of a MOU between the First Nations, INAC and Parks Canada for the proposed expansion lands. Throughout this community development process, the TFN and Federal Agencies have met with the Village of Tofino and Alberni-Clayoquot Regional District to discuss opportunities to work together in terms of infrastructure upgrades, such as water supply and sewage disposal. The TFN have also informed many of the local environmental organizations of their community expansion plans. Some of the environmental groups the TFN have consulted include: Friends of Clayoquot Sound, Greenpeace, Western Canada Wilderness Committee, Sierra Legal Defence and the Natural Resource Defence Council. Many of these groups have voiced their support for the TFN expansion plan.

In addition, during the development of the MOU a meeting was held at the Western Canada Wilderness Committee's Vancouver office on May 22, 2003. The meeting was attended by Federal Agencies, TFN and Environmental Non-Government Agencies, including:

- Tla-o-qui-aht First Nations;
- Parks Canada;
- Indian and Northern Affairs Canada;
- District of Tofino;
- Friends of Clayoquot Sound;
- Sierra Club;
- Western Canada Wilderness Committee;
- Greenpeace;
- Green Party – Adrian Carr;
- Canadian Parks and Wilderness Society;
- David Narine and Associates; and
- Powers Environmental Consulting.

Meeting details were not available for review and subsequent inclusion into the report.

Due to the fact that the TFN expansion project is already well known to the local public, locals stakeholders, Federal Agencies and First Nations through previous consultation, INAC and Parks Canada agreed that further public consultation for this environmental review was not necessary, but further public consultation would occurring during the community development stage.

6. SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The scope of this assessment was determined in consultation with PWGSC, INAC and Parks Canada. As previously mentioned in the introduction, this environmental screening is primarily focused on a land transfer and since the purpose of the land transfer is to expand the Esowista community, the potential environmental effects from a conceptual development plan were also included in this review. As such, the spatial boundaries of the assessment are primarily limited to the 86.4 ha footprint of the expansion lands. However, considerations were also given to areas surrounding the property that might be affected by the conceptual community development, such as the Highway bordering the site and infrastructure alignments to Tofino and the airport. The temporal boundaries include the current environmental setting and the conceptual community design implications in the near future.

7. IMPACT AND EFFECTS ASSESSMENT

An important step in the screening process is to identify the Valued Ecosystem Components (VECs) that may be affected by the project. VECs are those attributes in the environment that are of particular importance due to their physical, ecological, resource harvesting, social and economic significance. The identification of VECs is both objective and subjective. Therefore, the selection of VECs was determined through the project consultation process with the RA and expert authorities, stakeholders, background research and site assessments.

The identification of VECs was based on the following, but not limited to:

- rarity or uniqueness of a species (red listed), or habitat that supports such species or is restricted in range;
- vulnerability of a species or habitat to disturbances;
- ecosystem function, areas of high productivity, areas of particular critical function (i.e. spawning area) or feeding area;
- social importance; and
- compliance with legal requirements (i.e. *Migratory Bird Convention Act, Fisheries Act*).

The relative significance of the environmental effect on each VEC was evaluated with the following (CEAA, 2005) criteria.

- Magnitude – the effects of the impact on the community (low, medium or high impact).

- Spatial extent – area/volume covered, distribution (immediate, local or regional area).
- Timing – impacts from all phases of the project (construction, operation, decommissioning) must be assessed and impacts will occur over different time scales - immediate, delayed, continuous.
- Duration of impacts – short term, long term, intermittent, continuous.
- Reversibility/irreversibility – once the impact has been stopped is the environmental effect reversible to a pre-existing situation or irreversible.

In determining whether the environmental impacts are adverse, the following factors were considered (CEAA, 2005), but not limited to:

- loss of rare or endangered habitat;
- reduction in biological diversity;
- loss of critical or productive habitat;
- residual contamination; and
- unsafe conditions.

The following sections will describe the criteria used to select VECs and evaluate the project interactions and residual effects. Accidents and malfunctions are considered in these sections as well.

7.1. WILDLIFE

7.1.1. *Impacts*

Overview of Impacts

Expansion of the Esowista Reserve into the study area will have considerable impacts on local flora and fauna, although impacts to rare habitats (i.e., spruce fringe forest), flora (i.e., Seaside Centipede Lichen), and fauna (i.e., Dromedary Jumping-Slug) will be mostly avoided.

Impacts to Birds

Habitat loss will result in a significant impact to local breeding bird populations. Birds currently breeding in old-growth and mature Pine Dominated Forest, and other habitats on the site (Figure 2) likely include species such as Hermit Thrush, Pacific-slope Flycatcher, Fox Sparrow, Chestnut-backed Chickadee, and Winter Wren. Given that development will eventually involve approximately 160 residences, a substantial portion of the study area will be altered (Figure 4). Opportunities for breeding on the

site will be reduced resulting in a localized decline in breeding bird populations. The magnitude of these habitat losses is considered to be high, the spatial extent is local and the timing is continuous with the development likely to occur over a number of decades. Since the town site is likely to be inhabited for many years, the habitat loss is considered to be irreversible. The overall impacts to local breeding bird populations are considered to be high. This impact will not be realized on a regional basis since all birds expected to nest within the study area are common elsewhere in the region and suitable habitat is abundant. The residual effects of the habitat loss on a regional basis is considered to be minimal.

Construction and long-term residential activity within the town site will result in some sensory disturbance to birds nesting and utilizing undisturbed adjacent habitats. Most small birds readily habituate to human noise and activity, and therefore, the reduced habitat effectiveness from sensory disturbance is considered to be low. Some larger bird species such as Peregrine Falcon and Northern Goshawk are more susceptible to sensory disturbance, but since these species are expected to occur very infrequently on the site, the impacts are considered to be low (MWLAP, 2004).

Increased number and frequency of road use both locally and regionally will result in an increase in bird / vehicle collisions, and a significant number of bird collisions with residence windows are to be expected. In addition, an anticipated influx of pets, particularly cats, into residential areas will also take its toll on local breeding bird populations. The impacts of road, window and cat-related bird mortality are considered to be of high magnitude, local and regional spatial extent, long term and irreversible, resulting in a local impact of high significance and a regional impact of low significance.

Impacts to Mammals

As with small birds, the significance of localized impacts of habitat loss are considered to be high for small mammals such as Deer Mouse and Red Squirrel. Again, these species are common in the area and abundant habitat is available to support them elsewhere in the region. The significance of the habitat loss on a regional basis is considered to be low.

For predators such as wolves, bears and cougars, the study area likely consists of a very small overall component of their overall hunting territories; therefore the impacts are considered to be of low magnitude, and limited spatial extent. The overall significance of habitat loss on hunting areas of predators on a local and regional level is considered to be low.

Black bears are known to den in the spruce fringe forest in PRNPR (B. Hansen, Parks Canada, pers. comm., 2006). Since this habitat will not be directly impacted by residential development within the Esowista town site, potential impacts on denning habitat are considered to be low.

As with small birds, small mammals are susceptible to road-related mortality and particularly cat-related mortality. The significance of these impacts is considered to be of high magnitude locally and of low magnitude regionally.

With an increase in human population comes an increased potential for problem animals such as bears. Bears that become accustomed to garbage and other food wastes will become habituated to the town site and will eventually need to be destroyed or relocated for human safety reasons. Bears inhabiting populated areas create problems each year at the Tofino Airport and at the existing Esowista town site (B. Hansen, Parks Canada, pers. comm., 2006). Each bear mortality represents an impact of moderate significance.

Destruction of wolves and cougars may also be required if human safety is at risk. A wolf was destroyed on Nettle Island in Barkley Sound after becoming habituated to food availability at the reserve (B. Hansen, Parks Canada, pers. comm., 2006).

The potential impact of sensory disturbance on small mammals is not of concern. The impact on large mammals such as deer, and in particular predators including wolves and cougars, may be significant on a local level. On a regional basis, sensory disturbance associated with the residential development on predators is considered to be small because of the considerable amount of available habitat with abundant prey populations nearby. Deer may actually utilize the town site as a refuge from predators resulting in a localized increase in deer populations.

Impacts to Amphibians

Habitat loss will result in a significant local impact to amphibian populations. A number of amphibian species including Northwestern Salamander, Pacific Treefrog, Long-toed Salamander and the Blue-Listed Red-legged Frog (Special Concern – federally listed) are known to occur in the area (Beasley, 2004) or were observed during the site visit. Small ponds, such as those identified in the northern portions of the study area, may be used for breeding. The projected size and occupancy of the development (i.e. ~160 residences) is anticipated to result in significant impacts to the amphibian populations via substantial alteration of the study area (Figure 4) and chronic anthropogenic impacts (e.g. recreational activities in creeks and bogs). As a result, opportunities for amphibian breeding on the site will be reduced resulting in a

localized decline in amphibian populations. The magnitude of these habitat losses is considered to be high, the spatial extent is local, and the timing is continuous. Therefore, the overall impacts to local amphibian populations are could be high. This impact will not be realized on a regional basis since amphibians within the study area are common elsewhere in the region and suitable habitat is available. The significance of the habitat loss on a regional basis is considered to be low.

Amphibians are not considered to be particularly susceptible to sensory disturbance; therefore, impacts from sensory disturbance are projected to be low.

Increased numbers of road use both locally and regionally will result in a significant increase in amphibian/ vehicle collisions. Road-related mortality of Red-legged Frog, Pacific Treefrog, Northwestern Salamander and Long-toed Salamander is already considered to be an issue along the existing highway, and efforts are in place to mitigate loss of amphibians attempting to cross the highway (Beasley, 2004). The impacts of road-related amphibian mortality are considered to be of high magnitude, long term and permanent, resulting in potential local and regional impacts of high significance. To mitigate potential impacts, Best Management Practices (BMPs) for Amphibians and Reptiles in Urban and Rural Environments in British Columbia (WLAP, 2004) should be reviewed and incorporated into proposed development community plans. Additionally, elevated road beds may act as barriers to amphibian migration and dispersal, resulting in potential impacts of moderate significance.

Impacts to Rare and Endangered Wildlife Species

The expansion land option will have considerably lower impacts to rare and endangered species than other options assessed, primarily because the sensitive spruce fringe forest is left intact. Species such as the Seaside Centipede Lichen, Dromedary Jumping-Slug and a rare fungus (*Steriopsis humphryii*), which are known or expected to inhabit the spruce fringe forest, should not be greatly impacted. Disturbance of old-growth cedar-hemlock forests (Polygons 7, 11 and 13, Figure 2) may impact rare species (e.g., Dromedary Jumping-Slug) expected to inhabit these areas. Since the spatial extent of old-growth cedar-hemlock forest within the study area is small, the overall impact to local populations of species such as Dromedary Jumping-Slug is considered to be moderate.

Potential impacts of the proposed expansion and subdivision layout, as presented in Figure 4 on rare and endangered species is summarized in Table 3.

7.1.2. *Mitigation Measures*

General Measures

- To avoid undue impacts to nesting and breeding wildlife, vegetation removal or alteration should not occur during the sensitive breeding period between April 1 and July 31. Disturbance or destruction of nesting or breeding wildlife contravenes Section 35 of the Wildlife Act. If land-clearing is necessary within this window, proceed only once an on-site survey is conducted immediately prior to land-clearing activities to ensure that nesting or breeding wildlife impacts are assessed.
- If active nests or living areas of raptors, or Red- and Blue-Listed plant or wildlife species are found within the proposed disturbance area, a management plan should be developed that protects the location while it is active or occupied.
- Prior to any land-clearing activities, retention areas such as bogs or ponds, should be clearly delineated with flagging tape or other means to prevent inadvertent disturbance of these areas.
- All disturbed areas should be re-seeded with native seed mixes or planted with native shrubs as soon as possible after disturbance to prevent the establishment invasive species. Seed mixes and shrub species should be approved by Parks Canada.
- Once detailed project designs are made available for EA review, the project description should be circulated to applicable responsible federal authorities to determine the requirement for additional RAs and to allow for additional input, inquiries and expert advice from FAs.

Table 3: Potential impacts of the Esowista village expansion on rare and endangered wildlife species. Impact criteria such as magnitude, duration and frequency were considered.

Common Name	Status[1]	Potential Impact	Comments on Potential Impacts
Plants			
Seaside Centipede Lichen	Red; Endangered	Nil	Only known to occur on boughs of Sitka Spruce within the spruce fringe forest, a forest type that is not found within the study area.
Mammals			
Common Water Shrew	Red	Low	Only record in area is Lost Shoe Creek outside PRNPR and is unlikely to occur in study area.
Ermine	Blue	Low	Not reported for more than 20 years and may no longer occur in area.
Roosevelt Elk	Blue	Nil	Rarely reported in PRNPR and very unlikely to occur in study area.
Townsend's Big-eared Bat	Blue	Low	Not known whether occurs in area; additional buildings would provide better roosting areas for this species.
Birds			
Band-tailed Pigeon	Blue	Moderate	Some loss of foraging areas (i.e., berry-producing shrubs) and nesting areas (i.e., mature coniferous forests) would occur.
Marbled Murrelet	Red; Threatened	Low	Uncertain whether nesting occurs in old-growth fringe forest and very little old-growth is within study area.
Northern Goshawk	Red; Threatened	Moderate	Some loss of foraging areas would occur; loss of suitable nesting habitats (i.e., old-growth forests) is limited.
Northern Pygmy-Owl	Blue	Low	Unlikely to occur in the area; only recorded sporadically in PRNPR.
Peregrine Falcon	Red; Threatened	Low	Unlikely to forage over the site.
Peregrine Falcon	Blue; Special Concern	Low	Unlikely to forage over the site.
Pine Grosbeak	Blue	Low	Recorded only sporadically on west coast and unlikely to occur on study site.
Western Screech-Owl	Blue; Special Concern	Moderate	Has been reported in the Airport area and may currently forage or nest within the study area; expansion would result in habitat loss.

Amphibians			
Red-legged Frog	Blue; Special Concern	High	Forests used during non-breeding season would be lost or disturbed; potential for road-related mortality increases significantly in the area.
Western Toad	Special Concern	Low	Few animals reported in PRNPR and no carcasses identified on SPLAT surveys between 2000 and 2004; low likelihood of occurrence in study area.
Invertebrates			
Dromedary Jumping-Slug	Red; Threatened	Moderate	Removal of old-growth cedar-hemlock forest will remove potential living habitats; overall area of old-growth habitat loss is relatively low.

Habitat Loss

- The most sensitive habitats within the study area are, in order of sensitivity, are the cedar-hemlock old-growth forest (Polygons 7, 11 and 13), open bogs (Polygons 8, 9 and 12), Riparian Forest (Polygon 4), and old-growth and mature Pine Dominated Forest (Polygon 10). Retain the former three habitats and make an effort to maximize retention of the latter habitat (Pine Dominated Forest).
- To maintain the integrity of the cedar-hemlock old-growth and open bog areas, retain a minimum undisturbed 25 m buffer undisturbed vegetated buffer.
- To avoid impacts to riparian habitats along Esowista Creek and tributaries, do not construct buildings within 30 m from the top of bank.
- Minimize the width of town site roads to minimize direct habitat loss.
- Use bridges to cross Esowista tributaries to minimize impacts to riparian vegetation and fish habitat.
- Discourage the development of additional trails from the town site to shoreline or other areas. Trails increase sensory disturbance to wildlife, have the potential to impact the spruce fringe forest at the south end of the study site, and act as a conduit for predators moving into the area.
- If veteran trees or snags are located adjacent to proposed development areas and are deemed a safety hazard, top trees at five metres to create wildlife snags (e.g., stubs). If complete removal is necessary, explore options for creating snags in adjacent habitats used recognized protocols.
- Attempt to retain all pocket wetlands within the development along with a minimum 10 m vegetated buffer to provide breeding habitat for amphibians. Ponds in the nearby golf course are important breeding areas for several amphibian species (B. Beasley, pers. comm., 2006). Consider creating ponds, possibly part of the storm water retention system on site, to provide additional breeding habitat.

Sensory Disturbance

- Minimize construction and road-building activities during the critical breeding bird and wildlife period.
- If active raptor nests are found, implement buffer zones to reduce sensory disturbance until chicks have fledged.

Mortality

- Install large bottomless culverts (one to two metres in diameter) to permit wildlife movement (e.g., small mammals and amphibians) below roads in critical or strategic areas to minimize road-related mortality.

- Install fences or other barriers adjacent to underpasses/wildlife movement corridors to direct animals to underpasses. Provide vegetative screening adjacent to underpasses as security cover for wildlife.
- Post speed limits within the Esowista town site to reduce road-related wildlife mortality.
- Post animal crossing signs within the Esowista town site and along the highway where important crossing areas have been identified.
- Implement an effective garbage management system (including educational programs) within the reserve to avoid attracting scavengers such as Black Bear to the town site. Assess the viability and impact of fencing the town site to reduce encroachment of bears, wolves and cougars into the residential areas.

Disruption of Movement Corridors

- Use bridges to cross Esowista tributaries to maintain wildlife movement through riparian areas.
- Install large bottomless culverts (one to two metres in diameter) to permit wildlife movement (e.g., small mammals and amphibians) below roads in critical or strategic areas. Researchers have determined that wildlife actively utilize culverts (Yanes *et al.*, 1995; Clevenger and Waltho, 1999; *Ibid*, 2000). Ensure that gravels or dense natural substrates are placed in the culvert bottoms to provide a natural footing surface. Plants vegetation around the culvert openings to provide cover for wildlife.
- Install roadside barriers in conjunction with culverts to direct amphibians and small mammals to underpasses.

7.1.3. *Residual Effects*

Potential residual impacts might be associated with:

1. loss of old-growth Forest Bog and Old-growth Cedar-Hemlock Forest habitats;
2. localized habitat losses resulting in reduced diversity and abundance of small birds, mammals and amphibians;
3. increased potential for road-related amphibian mortality;
4. sensory disturbance to large predators (e.g., bear, wolf, and cougar); and
5. potential for destruction of problem wildlife such as bears.

7.2. VEGETATION

Vegetative habitats and plants will be directly impacted by residential development of the proposed Esowista town site. However, plant species identified within the study area are common to the area and similar habitats are widespread. In addition, vegetation in the northern portion of the property has been previously impacted by logging and human impacts. Although local impacts will occur, impacts on a regional level are considered to be of low significance. No loss of rare and endangered plant species is anticipated.

Mitigation measures should include avoiding the disturbance of sensitive habitats such as old growth forest and open bog vegetation, and leave a vegetative buffer (~10 m) around these important vegetative communities.

With the development of a model community concept and avoidance of sensitive habitats, residual effects should be negligible

7.3. FRESHWATER HABITAT

The concept community plan shows several roads crossing Esowista Creek and its tributaries. Roads crossing the lower reaches of Esowista Creek and its tributary will require substantial bridges to cross the approximately 60 m gullies. The installation of such bridges would also result in significant impacts to the riparian areas. Road crossings on the western portion of the property will likely result in less fish habitat disturbance since the creek ravines are narrower. There are also several housing clusters shown on the conceptual design over the southern Esowista tributary, which will have to be re-designed.

7.3.1. *Mitigation Measures*

The following mitigation measure may be implemented to minimize the impacts to fish and fish habitat.

- Avoid or minimize bridging the wide gully areas of Esowista Creek.
- Provide 30 m streamside setbacks for fish bearing waters and 15 m setbacks for non fish bearing waters.
- Minimize disturbances to riparian areas.
- Implement BMPs to prevent sedimentation and erosional impacts when working in the vicinity of the watercourses.
- Re-planting in disturbed riparian areas.

7.3.2. *Residual Effects*

Residual effects will be minimized and habitat loss will likely be compensated, as works conducted near fish habitat will require approval from DFO and these works will also likely require a CEAA screening to assess the potential environmental effects.

7.4. HYDROLOGY

It is recognized that drainage is one of the most significant challenges at the site due to the flat topography and high annual rainfall (David Nairne and Associates, 2003). The open bogs and extensive sphagnum moss areas act as a buffer, preventing stormwater surges to local watercourses. It is unknown how the community development will affect the hydrology of the site, but basic mitigation measures include the following:

- avoid disturbance to and provide buffer areas around open bogs and ponds;
- develop a stormwater management plan which maintains the current hydrologic regime to Esowista Creek and its tributaries after development;
- minimize vegetative disturbance to promote ground absorption;
- minimize impermeable surface areas; and
- development of stormwater detention ponds, if necessary, which will provide habitat for amphibians and other wildlife.

7.5. ARCHAEOLOGICAL RESOURCES

There are no records of archaeological sites present within the site boundary. However, based on the relatively recent historical settlements, and history of First Nations presence within the project area, there is a potential for archaeological sites of significance to be present. As noted in a previous archaeological resource management plan for the PRNPR (Sumpter, *et al.*, 2004), it is suggested that additional archaeological surveys and assessment studies be conducted prior to development activities on the project site, particularly on undisturbed, well-drained terrain on the southern portion of the site.

7.6. SURROUNDING LAND USE

There is an agreement in place that the Schooner Cover Trail will not be disturbed and continued access will be provide for the public.

The conceptual plan contains two road access points from the expansion lands to the highway. It is assumed that a traffic assessment and intersection design will be completed as the number of cars will significantly increase by the time the development is complete.

7.7. OTHER CONSIDERATIONS

This assessment is based on a conceptual community design and the actual community design will likely be somewhat different. However, it should be recognized that any future development plans (e.g. proposed construction and operation of the community, a long house, community centre, playing fields, etc.) are physical works and projects as defined in the CEAA and will therefore trigger a CEAA screening review prior to the development. This would involve more detailed site surveys to assess more specific potential environmental effects associated with the proposed development. This requirement for further assessment is a mitigation measure ensuring that the land transfer and future development will not result in significant adverse environmental effects.

8. CUMULATIVE ENVIRONMENTAL EFFECTS ASSESSMENT

Cumulative environmental effects result from the interaction of residual effects from the proposed project in combination with those of the past, present and future projects. The transfer of expansion lands to Esowista IR #3 land will inevitably result in the development of the land. However, since this assessment is based on conceptual design it is considered that a cumulative effects assessment on a conceptual design is not warranted as the project design is going to change.

Key VECs that will inevitably be affected by the future development will likely include vegetation, surface water hydrology, wildlife and wildlife habitat, and socio-economic components. The residual effects to these valued ecosystem components should be considered in future cumulative effects assessment

The following projects were identified and could be included in a future cumulative effects assessment.

- District of Tofino future residential developments.
- Existing Esowista Village development.
- Future Alberni-Clayoquot Regional District developments, such as airport expansion, camp ground or golf course expansion.
- Tofino Sewage Treatment Facility upgrade.
- Kennedy Lake Bulk Water Supply Project.

9. ENVIRONMENTAL CONSTRAINTS

It was requested that potential environmental constraints, which would place restrictions on future community development plans on the site, be identified. The following environmental constraints were identified.

- Avoid disturbing old growth forest areas.
- Avoid disturbing open bog areas.
- Provide for adequate streamside setbacks, which can be determined with Riparian Areas Regulation, once development plans are drafted.
- Avoid crossing Esowista Creek and tributaries where there are wide gullies. A clear span bridge will likely be required to cross the gullies and a detailed environmental report, providing biophysical information, habitat impacts and habitat compensation plans will be required by DFO for project approval. There are watercourse channel on the west side of the property that will be easies to cross and result in less of an environmental impact.

Based on the Phase I and Phase II Environmental Site Assessments, constraints from a contaminated sites perspective is considered minimal.

10. ENVIRONMENTAL MONITORING AND FOLLOW-UP

Follow-up to the Esowista land transfer and future community development will be conducted during the CEAA screening reviews for the proposed development, as required by CEAA. However, VECs identified herein will likely require additional study and the following studies may be included in future comments.

1. In the spring (April to May), a more comprehensive survey of amphibian distribution and abundance on the study area should be conducted. A dedicated effort should be made to identify any small ponds or ephemeral wetlands that are

used for breeding by amphibians such as Red-legged Frog, Northwestern Salamander and Pacific Tree Frog. The resulting data will aid in directing project design and developing effective mitigation options.

2. Once culverts / underpasses are in place, the success of wildlife movement should be documented for at least two seasons post-construction.
3. An early summer survey (first two weeks of June) should be conducted to determine whether breeding raptors are present on-site and to determine breeding bird diversity, abundance and local distribution.
4. If breeding raptors are located on the study site, nest success should be monitored prior to and during development of the town site.
5. An archaeological study on the southern portion of the property that has not been previously disturbed.
6. A spring / summer plant survey is recommended to determine presence / absence of potential rare vascular plants at the site.

11. SUMMARY

11.1. SUMMARY TABLE

Table 4. Environmental Assessment Summary Table.

VECs	Project Activity	Environmental Effects	Mitigation Measures	References
Vegetation	Esowista expansions and proposed community development.	Vegetation removal Invasive Species	Avoid disturbing sensitive habitats such as old growth forest and open bog vegetation, and leave a vegetative buffer (~10 m) around these important vegetative communities. Re-plant exposed soils with local seed mix.	Site survey, review of site environmental reports and database searches.
Wildlife and wildlife habitat	Esowista expansions and proposed community development.	Land clearing, habitat loss and removal of potential nesting sites.	Should not occur during the sensitive breeding period between April 1 and July 31. Retention areas such as bogs or ponds, should be clearly delineated with flagging tape. Disturbed areas should be re-seeded with native seed mixes or planted with native shrubs. Retain undisturbed buffers around sensitive habitats.	Section 35 of the Wildlife Act
Fish and Fish Habitat	Esowista expansions	Potential impacts to on-site and	Avoid or minimize bridging the wide gully	Fisheries Act

	and proposed community development.	surrounding watercourses.	areas of Esowista Creek. Provide 30 m streamside setbacks for fish bearing waters and 15 m setbacks for non fish bearing waters. Minimize disturbances to riparian areas. Re-plant impacted riparian areas with native vegetative species.	
Surface water Hydrology	Esowista expansions and proposed community development.	Potential impacts to surface water flow and quality.	Avoid disturbance to and provide buffer areas around open bogs and ponds. Develop a stormwater management plan which maintains the current hydrologic regime to Esowista Creek and its tributaries after development. Minimize vegetative and soil disturbance to promote ground absorption. Minimize impermeable surface areas. Development stormwater detention ponds, if necessary, which will provide habitat for amphibians and other wildlife.	Surface water Hydrology Land Development Guidelines & BMPs B.C. Stormwater Planning Guidebook
Archaeology	Esowista expansions and proposed community development.	Disturbance of potential archaeological sites.	Conduct archaeological surveys and assessment studies prior to development activities on the project site, particularly on undisturbed, well-drained terrain on the southern portion of the site.	PRNPR Archaeological Resource Management Programme, Sept. 2004.

11.2. DECISION RECORD

Based on the proposed development of a model community (minimizing the footprint and effects of the development on the surrounding areas), the implementation of the mitigation measures identified in this assessment and adherence to federal regulations and General Instructions, the proposed Esowista Indian Reserve #3 Expansion Land Transfer is not likely to cause significant adverse environmental effects. It is recommended that this project proceed in concert with the implementation of the mitigation measures and follow-up program identified in this assessment report.

12. CONTACTS

Barb Beasley, Ucluelet Resident
(250) 726-2536

Barney Wiliams Jr., TFN Chief Councillor

Bob Hansen, Wildlife Biologist, Parks Canada
(250) 726-7165, ext 227

Bruce Mattock, Keystone Environmental Ltd,
(604) 430-0671

Don MacKinnon, TFN Project Engineer
(250) 725-3350

Eli Enns, TFN Project Coordinator
(250) 725-3350

Ian Sumpter, Assistant Archaeologist, Parks Canada
(250) 363-0578

John McIntosh, Terrestrial Ecologist, Parks Canada
(250) 726-7165, ext 236

John McMurdo, Archaeology and Registry Services Branch, BC Ministry of Sustainable Resource Management
(250) 952-4175

Kevin Vollmer, Public Work and Government Services Canada
(604) 666-5244

Martin Gebauer, Gebauer & Associates Ltd.
(604) 261-2716

Pippa Shepherd, Species at Risk Coordinator, Parks Canada
(604) 666-7378

Ray Martin, TFN Council
(250) 725-2147

Sheila Jackson Craig, Indian and Northern Affairs Canada
(604) 666-7973

Steve Oates, Parks Canada
604 666-0286

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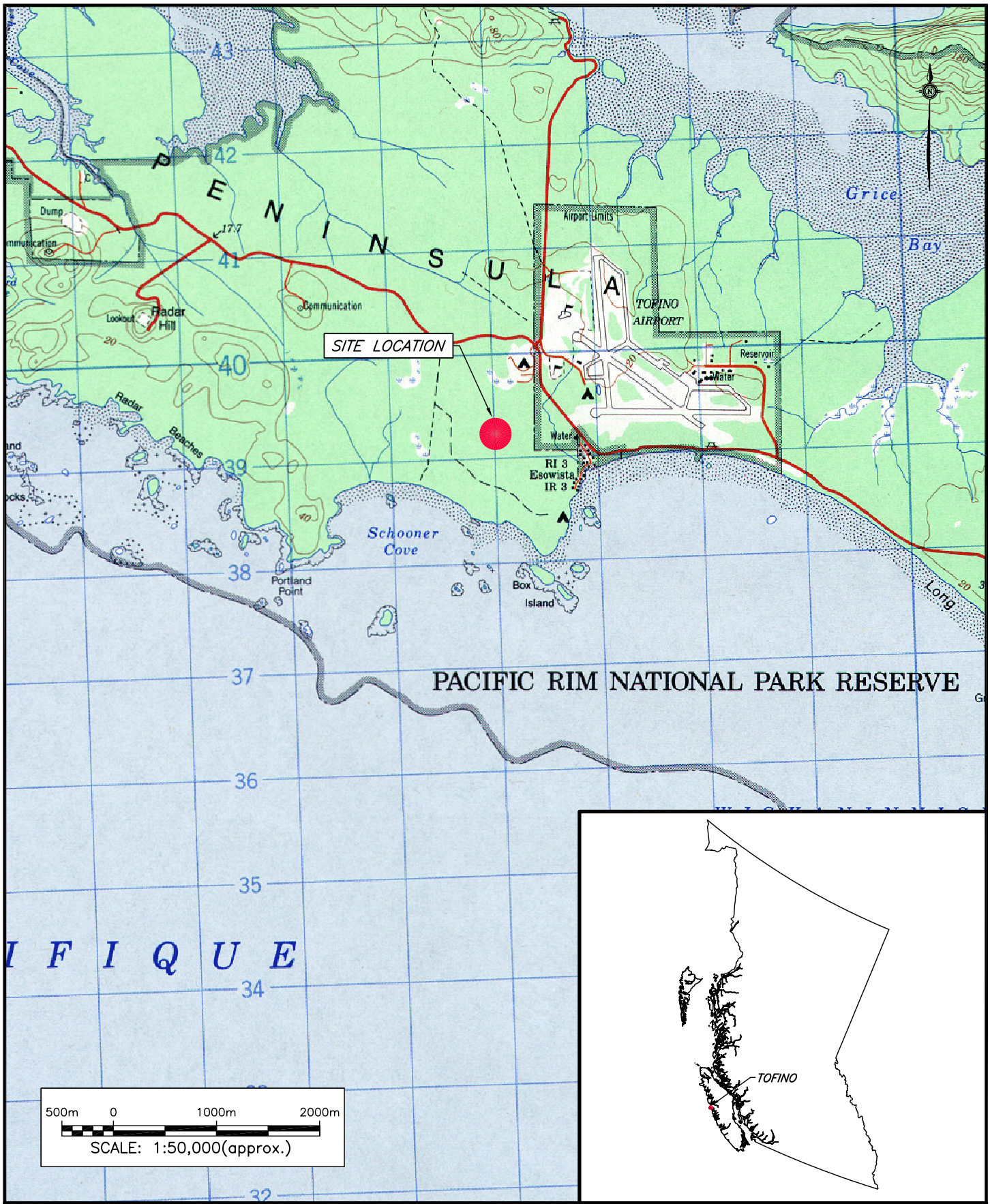
FIGURES



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KEYSTONE ENVIRONMENTAL

Esowista Reserve
Tofino, B C
PWGSC

REVISION No.	DATE	PROJECT No.
00	June 2006	8812-01

Figure 1
Location Plan

LEGEND

- SITE
- GPS OUTLINE OF SITE
- CREEKS
- KEYSTONE GPS POINTS
- GEBAUER & ASSOCIATES GPS POINTS
- DISTURBED AREA

NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY.
LOT BOUNDARIES AND FEATURES ARE APPROXIMATE.

50m 0 250m

SCALE: 1:7500(approx.)

KEYSTONE ENVIRONMENTAL

Esowista Reserve
Tofino, B C
PWGSC

REVISION No.	DATE	PROJECT No.
00	June 2006	8812-01

Figure 3
Disturbed Area

PLOT SCALE: 1:1 DRAWN BY: MS CADD FILE No. 8812\Figs\Fig2-4-Areas-R0.dwg/Layout2

WP	EASTING	NORTHING	DESCRIPTION
1	295976	5439009	–SMALL WET MEADOW DOMINATED BY PALE SEDGE
2	296107	5440222	–SMALL BOG/WETLAND
3	296115	5439992	–SWEET GALE PLANT
4	296201	5440234	–SMALL WETLAND WITH DISTINCT SEDGE/RUSH COMMUNITY
5	296103	5439010	–CEDAR SNAG WITH CAVITY AND BEAR SIGN
6	295709	5439410	–OLD–GROWTH FOREST AREA WITH LARGE CEDAR SNAGS
7	295722	5439517	–TRANSITION BETWEEN CEDAR FOREST AND PINE BOG FOREST TO NORTH
8	295721	5439624	–DISTINCT GAME TRAIL
9	295739	5440036	–BEGINNING OF SMALL CEDAR FOREST ENCROACHING FROM WEST
10	295744	5440148	–BACK TO PINE DOMINATED FOREST TO NORTH
11	295981.90	5439009.31	–CENTRE OF GRASS/SEDGE DOMINATED AREA
12	295736.82	5440072.63	–WATER COURSE ORIGIN – WEST BOUNDARY
13	296480.18	5439753.93	–WATER COURSE CROSSING FROM NORTH BOUNDARY
14	296380.81	5439638.52	–FORK TO BOG 2
15	296485.08	5439499.89	–SURFACE WATER DISCHARGE FROM CLAY FLATS OFF SITE
16	296486.794	5439452.835	–GEE TRAP #1
17	296513.96	5439404.70	–GEE TRAP #2
18	296613.01	5439227.89	–GEE TRAP #3
19	296575.151	5439253.105	–GEE TRAP #4

TRAIL

TRAIL & ROAD

CENTRE PARKING

TOB SOUTH OF SOUTH WATERCOURSE

LEGEND

- SITE
- GPS OUTLINE OF SITE
- CREEKS
- KEYSTONE GPS POINTS
- GEBAUER & ASSOCIATES GPS POINTS
- 1 POLYGON ID
- OPEN BOG
- PINE DOMINATED FOREST
- TALL SHRUBLAND
- YOUNG CONIFEROUS FOREST
- OLD GROWTH CONIFERIOUS FOREST
- RIPARIAN FOREST
- DECIDUOUS FOREST
- DISTURBED MIXED FOREST
- DISTURBED SHRUBLAND

KEYSTONE ENVIRONMENTAL

NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. LOT BOUNDARIES AND FEATURES ARE APPROXIMATE.

50m 0 250m

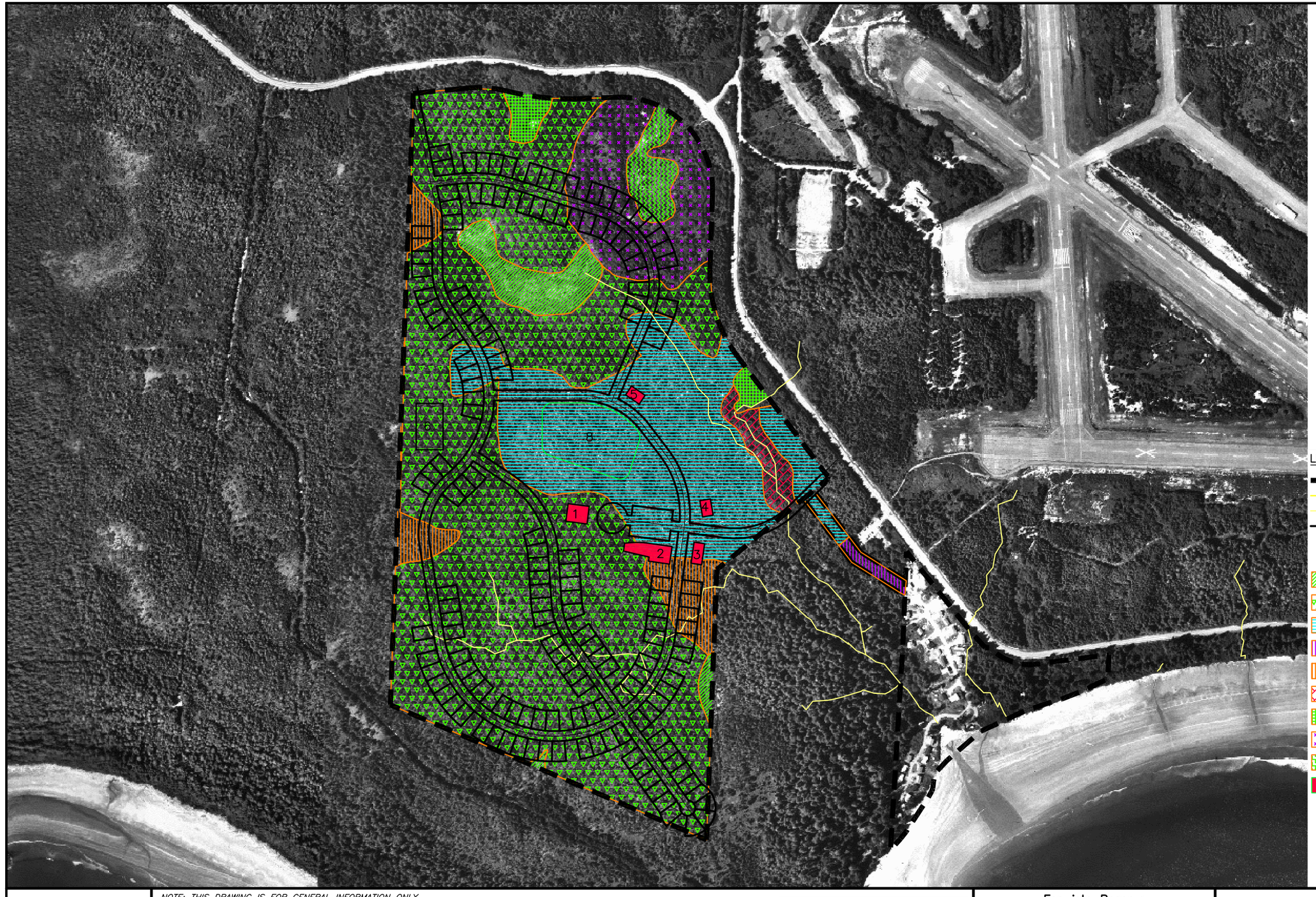
SCALE: 1:7500(approx.)

Esowista Reserve
Tofino, B C
PWGSC

REVISION No.	DATE	PROJECT No.
00	June 2006	8812–01

Figure 2
Site Visit & Ground Truthing Classification Results

PLOT SCALE: 1:1 DRAWN BY: MS CADD FILE No. 8812\Figs\Fig2–4–Areas–R0.dwg/Layout1



LEGEND

- SITE
- GPS OUTLINE OF SITE
- CREEKS
- PROPOSED LOT BOUNDARIES
- KEYSTONE GPS POINTS
- GEBAUER & ASSOCIATES GPS POINTS
- OPEN BOG
- PINE DOMINATED FOREST
- TALL SHRUBLAND
- YOUNG CONIFEROUS FOREST
- OLD GROWTH CONIFERIOUS FOREST
- RIPARIAN FOREST
- DECIDUOUS FOREST
- DISTURBED MIXED FOREST
- DISTURBED SHRUBLAND
- COMMUNITY BUILDINGS

1. LONGHOUSE
2. MULTI–PURPOSE COMMUNITY CENTRE
3. ELDERS CENTRE
4. YOUTH CENTRE
5. COMMUNITY COMMERCIAL
6. PUBLIC WORKS YARD
7. COMMUNITY CEMETERY (SITE TO BE DETERMINED)
8. PLAY FIELDS

KEYSTONE ENVIRONMENTAL

NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. LOT BOUNDARIES AND FEATURES ARE APPROXIMATE.

50m 0 250m

SCALE: 1:7500(approx.)

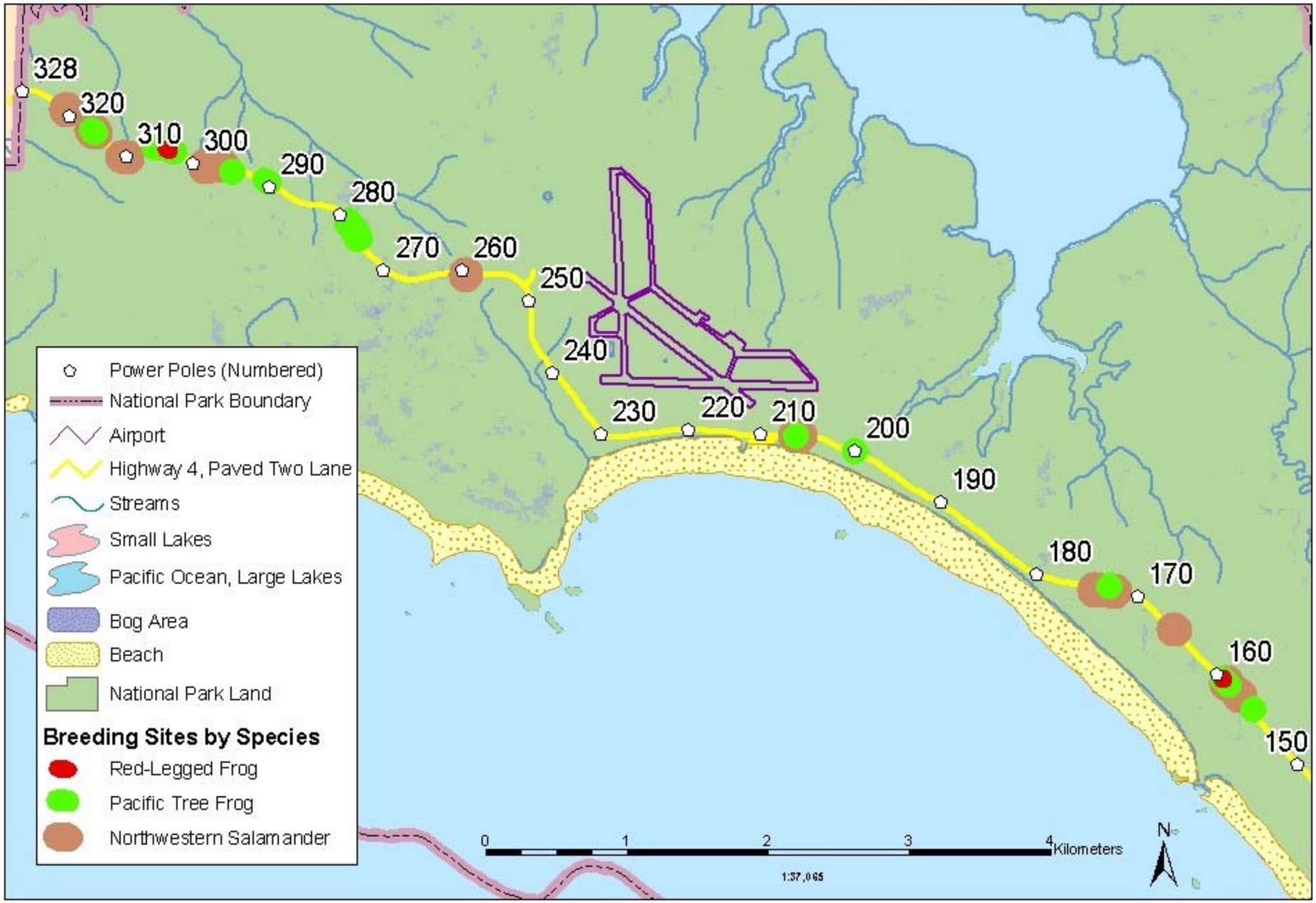
Esowista Reserve
Tofino, B C
PWGSC

REVISION No.	DATE	PROJECT No.
00	June 2006	8812–01

Figure 4
Proposed Lots

PLOT SCALE: 1:1 DRAWN BY: MS CADD FILE No. 8812\Figs\Fig2–4–Areas–R0.dwg/Layout3

Amphibian Breeding Sites ~ Distribution of Species
Pacific Rim National Park Reserve



APPENDIX A

PHOTOGRAPHIC DOCUMENTATION

Photo A: Polygon 12 – Open Bog

Photo B: Polygon 8 – Open Bog

Photo C: Polygon 9 – Open Bog

Photo D: Polygon 10 – Pine Dominated Forest

Photo E: Polygon 10 – Pine Dominated Forest

Photo F: Polygon 7 – Old-Growth Cedar-Hemlock Forest

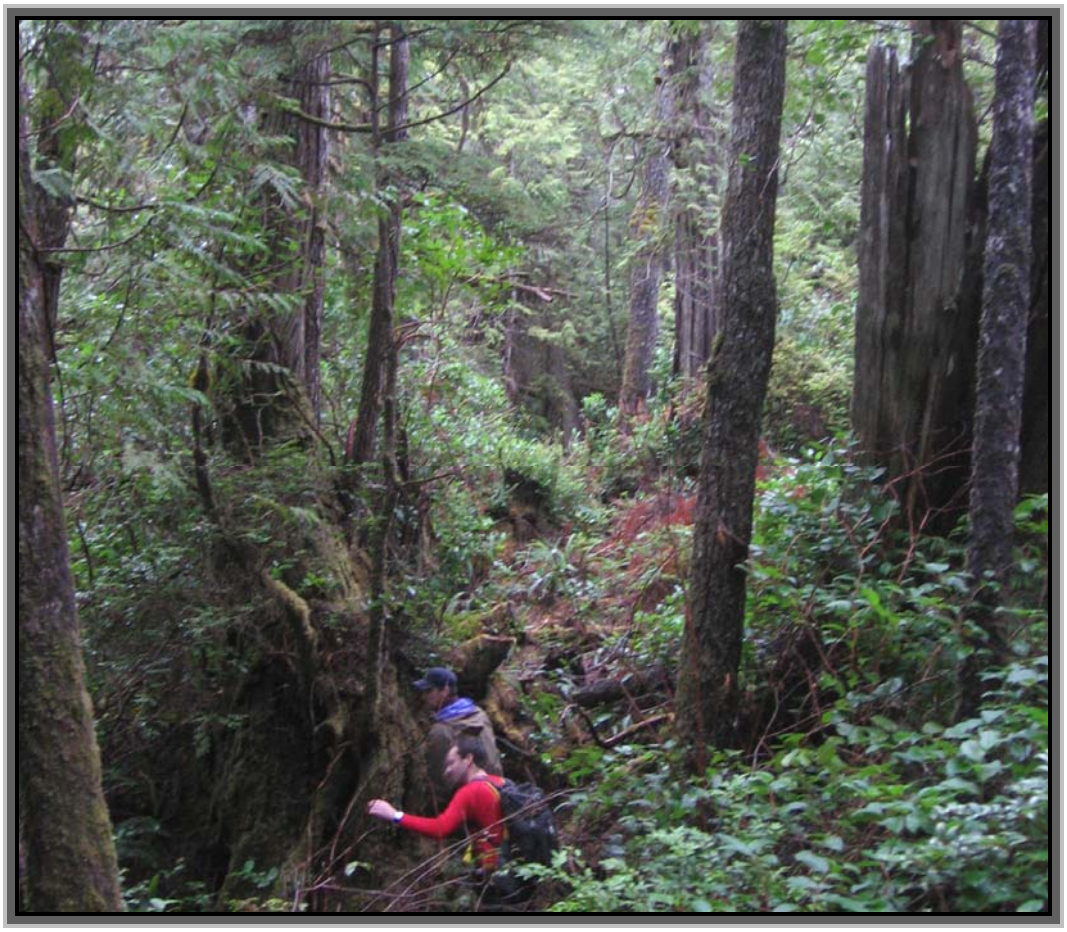


Photo G: Polygon 11 – Old-Growth Cedar-Hemlock Forest

Photo H: Polygon 11 – Old-Growth Cedar-Hemlock Forest

Photo I: Polygon 4 - Riparian Forest

Photo J: Polygon 4 – Riparian Forest

Photo K: Polygon 16 – Deciduous Woodland

Photo L: Polygon 14 – Disturbed Mixed Forest

Photo M: Polygon 15 – Disturbed Shrubland

Photo N: Red-legged Frog

Photo O: Northern Branch – Reach 1 watercourse and valley looking northwest

Photo P: Northern Branch – Reach 1 watercourse

Photo Q: Northern Branch – Reach 1 near Highway 4 looking northeast

Photo R: Northern Branch – Reach 2 watercourse

Photo S: Northern Branch – Reach 2 watercourse and valley looking northwest

Photo T: Southern Reach watercourse and valley looking west

APPENDIX B

BRITISH COLUMBIA
CONSERVATION DATA CENTRE SEARCH RESULTS

Common Name	Scientific Name	BC Status	SARA Status[1]	Location Details
PLANTS				
California Wax-Myrtle	*Myrica californica*	Blue		At Schooner Cove.
California Wax-Myrtle	*Myrica californica*	Blue		1.5 km S of Ucluelet; a single tree growing out of old stump at roadside.
California Wax-Myrtle	*Myrica californica*	Blue		Along beach edge at Long Beach.
California Wax-Myrtle	*Myrica californica*	Blue		3.2 km S of Tofino; on face of rock outcrop above sandy beach; forming front edge of forest for about 1 km.
California Wax-Myrtle	*Myrica californica*	Blue		1.6 km S of Tofino; in forest fringe with Oval-leaved Blueberry, Salal and Western Red Cedar.
California Wax-Myrtle	*Myrica californica*	Blue		Bay north of Cox Bay; abundant in vegetation front at top of sand beach with driftwood.
California Wax-Myrtle	*Myrica californica*	Blue		At Amphitrite Point.
Lance-leaved Figwort	*Scrophularia lanceolata*	Blue		On Frank Island in Cox Bay; crevices in rocks.
Paintbrush Owl-Clover	*Castilleja ambigua* ssp. *ambigua*	Red		Indian Island in Tofino Inlet; 70-80 plants growing on rocky islet along N shore of Indian Island.
Tracy's Romanzoffia	*Romanzoffia tracyi*	Blue		At Long Beach in mossy mat on rock ledges of small island.
Western Pearlwort	*Sagina decumbens* ssp. *occidentalis*	Blue		At Ucluelet.
Western St. John's Wort	*Hypericum scouleri* ssp. *nortoniae*	Blue		S shore of Kennedy Lake on gravelly beach.
RECORD TREE				
Western Hemlock	*Tsuga hetrophylla*			At Quisitis Point; tree is on headland although inland from coastal bluffs; in 1986 size was 8.13 CBH, 54.9 m tall, 20.12 m average crown spread, and 517 AFA points.

MAMMALS				
Common Water Shrew	*Sorex palustris* ssp. *brooksi*	Red		Lower Lost Shoe Creek; two captured in pitfall traps approximately 145 m apart in 1997.
INVERTEBRATES				
Dromedary Jumping-Slug	*Hemphillia dromedarius*	Red	TH	Rainforest "A" trail north of highway and ~400 m west of the landfill access road; three (2004) and two (2003) slugs found in cedar-hemlock old-growth forest beside boardwalk; vegetation includes Western Red Cedar, Western Hemlock, Salal, Red Huckleberry, Evergreen Huckleberry and Deer Fern; moortype soil with thin layer of needles and decaying wood.
Dromedary Jumping-Slug	*Hemphillia dromedarius*	Red	TH	Goldmine Trail ~ 1,540 m SE along Highway 4 from access road to Wickaninnish Visitor Centre; one (2004) and two (2003) slugs found in old-growth cedar-hemlock forest; vegetation includes Western Red Cedar, Western Hemlock, Amabilis Fir; Salal, Red Huckleberry, and Deer Fern; moortype soil with thin layer of needles and decaying wood.

[1] TH = Threatened

APPENDIX C1

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

REPORT OF FINDINGS
PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

Tla-o-qui-aht First Nation (TFN) Esowista Reserve (I.R. No. 3) Parcel 1
Long Beach Unit of Pacific Rim National Park Reserve,
Tofino, BC

Prepared for:
PUBLIC WORKS & GOVERNMENT SERVICES CANADA
Indian and Northern Affairs Canada Client Services Division
14th Floor 1138 Melville Street
Vancouver, BC
V6E 4S3

Prepared by:
KEYSTONE ENVIRONMENTAL LTD.
Suite 320, 4400 Dominion Street,
Burnaby, BC
V5G 4M7

Project No. 8812-01
February 2006

LETTER OF TRANSMITTAL

KEYSTONE ENVIRONMENTAL

Keystone Environmental Ltd.
Suite 320 4400 Dominion St.
Burnaby BC V5G 4G3
Telephone 604 430 0671
Facsimile 604 430 0672
keyinfo@keystoneenviro.com
www.keystoneenviro.com

February 9th, 2006

Public Works and Government Services Canada (PWGSC)
600 1138 Melville Street
Vancouver, BC, V6E 4S3

Attention: Mr. Kevin Vollmer, Civil Engineer

Dear Sir:

Re: Report of Findings – Phase I Environmental Site Assessment
Tla-o-qui-aht First Nation Esowista Reserve (I.R. No. 3) – Parcel 1
Long Beach Unit of Pacific Rim National Park Reserve,
Tofino, BC

This report is respectfully submitted to PWGSC by Keystone Environmental Ltd.

We appreciate the opportunity to have assisted in this matter and if there are any questions, to contact the undersigned.

Keystone Environmental Ltd.

per: Bruce Mattock, B.Sc., R.P. Bio.
Project Manager / Senior Environmental Biologist

per: Chris Lee, M.Sc., R.P. Bio.
Junior Biologist

EXECUTIVE SUMMARY

A KEYSTONE ENVIRONMENTAL™ Phase I Environmental Site Assessment was conducted for Public Works and Government Services Canada (PWGSC), located within the Long Beach Unit of Pacific Rim National Park Reserve, Tofino, BC, and referenced as Tla-o-qui-aht First Nation (TFN) Esowista Reserve (I.R. No. 3) – Parcel 1 (the "Site"). The Site is currently vegetated and undeveloped. The Site covers approximately 84 hectares in area and is bordered to the north and east by Highway 4, beyond which is the Tofino Airport, and to the south and east by Pacific Rim National Park Reserve Lands.

A review of available historic information revealed that the northern portion of the Site was occupied by single-family residence(s) from the late 1900s to the early 1980s. In the 1960s, a 6-8 room single-storey motel and adjoining outbuildings were constructed along the northeast border of the Site adjacent to Highway 4 in the 1960s and were removed from the Site in the early 1970s. Between the 1960s and the 1970s, a service station was reported to have been located on the Site, adjacent and west of the motel. Between the 1950s and the 1970s, portions of the Site appeared to have been cleared and cultivated for use as agricultural or pasture land. Between the mid 1970s and early 1980s, numerous unpaved, unvegetated areas and a gravel road network were observed on-Site, corresponding to an overflow campground area that operated on-Site during that period. The southern portion of the Site appeared to have been vacant and vegetated from the early 1900s, or earlier, to present. Currently, the Site is undeveloped, vacant and vegetated.

The investigation revealed the following areas of potential environmental concern (APECs) including:

- Imported roadbase / fill material of unknown quality and quantity;
- Former service station on-Site (potential Underground Storage Tank(s) [USTs]);
- Former on-Site and off-site residences (potential for heating oil USTs); and
- Former Canadian Armed Forces Activities (off-site).

<u>Roadbase / Fill Material</u>

During the Site visit, non-native roadbase / structural fill material, consisting of gravel, cobble and fines was observed on the northern and northeastern portions of the Site and covering an area of approximately 8 hectares. This area corresponds to former residences, cleared, unvegetated areas and unpaved road networks previously used as an overflow campground, which were observed in the 1970s and 1980s historical aerial photographs. The origin, quality and/or quantity of fill material could not be determined. Based on Site visit observations and historical aerial photographs, there is considered to be a potential for constituents of concern associated with roadbase / fill material to be present in the Site soil and/or groundwater at levels of concern.

Former Service Station

It was reported by Mr. Victor Kimola, former resident of the Site, that a service station had been present on the Site adjacent and east of the on-Site motel, located along the northeastern border of the Site. The service station was reported to have been present on-Site for between 2-5 years between the 1960s and the 1970s. Mr. Peter Whyte, Manager of Resource Conservation for Parks Canada (Pacific Rim National Park) was queried to verify the historical presence of a service station on-site. Following a review of available reports and files pertinent to the site, Mr. Whyte concluded that a former on-site service station was unlikely as no documentation alluding to its presence was available. As a result of varying information and a lack of available records, there remains a moderate potential for constituents of concern associated with the alleged former service station to be present in Site soil and/or groundwater at levels of concern.

Former Single-Family Residences

Historical aerial photographs revealed between four and six on-Site residences along the northern, northeastern and eastern borders of the Site (adjacent to Highway 4) from at least the 1950s, or earlier to between the mid 1970s and early 1980s. It was reported by Victor Kimola, former Site resident, that the on-Site motel and adjoining buildings were heated via electric baseboard heater and/or wood furnace. It could not be determined how other single-family residences on-Site were heated; however, it is possible that they utilized wood, propane, electricity or heating oil stored on-Site in ASTs or USTs. ASTs were not observed during the Site visit and were likely removed demolition / removal of the residences. However, there remains a potential that USTs may still be present on-Site. Therefore, there is considered to be a potential for constituents of concern associated with USTs to be present in the Site soil and/or groundwater at levels of concern.

From the 1950s, or earlier, properties to the west and south of the Site were undeveloped and forested. Numerous single-family residences were constructed north of the Site, across Highway 4, in the 1950s and 1960s. These residences were subsequently removed in the mid 1970s and the early 1980s. Areas further north of the Site, appeared to have been logged in the 1950s and 1960s. The Tofino Airport has been located east of the Site, across Highway 4, from at least the 1950s to the present. Aerial photographs revealed a sand/gravel road network to the west of the Site, which was reportedly used by the Armed Forces during and after World War II. It was reported that personnel barracks, bunkers, spotlights and artillery were located at varying intervals along the road. In the late 1960s, preliminary construction for the current Tla-o-qui-aht First Nation reserve had begun to the southeast of the Site. In the 1970s, a parking lot for park access had been constructed southeast of the Site. In the late 1980s, a golf course had been constructed northeast of the Site, across Highway 4. Currently, areas to the west and south of the Site are undeveloped. North and east of the Site are delineated by Highway 4. Northeast and east of Highway 4 are a golf course and the Tofino Airport, respectively. Southwest of the Site is the Pacific Rim National Park Reserve Parking Area and Tla-o-qui-aht Esowista Reserve (I.R. No. 3).

Former Single-Family Residences (off-site)

From the mid 1950s to the 1970s, between one and five single-family residences were present adjacent and north of the Site (~ 25 metres), across Highway 4. It is unknown how the residences were heated during this period; however, it is possible that they utilized wood, propane, electricity or heating oil stored on-Site in ASTs or USTs. Based on the distance from the Site, there is considered to be a low potential for constituents of concern associated with heating oil storage tanks to be present in the Site soil and/or groundwater at levels of concern.

Former Canadian Armed Forces Activities (off-site)

Aerial photographs revealed an unpaved sand/gravel road running west and south of the Site (at a distance of between 50-300 metres from the Site), terminating proximate to Schooner Cove. Interviews with persons familiar with the Site and surrounding area revealed the road had been utilized by the Canadian Armed Forces (currently referenced as the Department of National Defence [DND] / Canadian Forces) during the World War II era. It was reported that numerous personnel barracks, bunkers, artillery emplacement and spotlights were located at various intervals along the road. DND did not have documentation available pertaining to the land use or duration of use for the area of interest. Therefore, it could not be determined how the personnel barracks were heated during this time. Similarly, artillery type and ammunition volumes were not available. Additionally, no reports were available suggesting the surrounding areas were used for target ranges. Based on the cross- to down-gradient distance from the Site, there is considered to be a low potential that constituents of concern associated with former Canadian Armed Forces activities have impacted the Site soil and/or groundwater at levels of concern.

It is concluded therefore, that there is a potential for constituents of concern to be present in the Site soil and/or groundwater at concentrations in excess of applicable standards provided in the British Columbia *Contaminated Sites Regulation* (CSR), and that further investigation is warranted.

In summary, potential areas of concern identified during the Phase I Environmental Site Assessment, associated with previous on-Site activities, as shown on Figure 1, and the respective constituents of potential concern associated with each activity are presented in Table 1.

Table 1. Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Potentially Affected Media	Potential Constituent of Concern	Recommendations
On-Site			
Former Campground / Single-Family Residences (Roadbase / Fill Material)	Soil and Groundwater	Metals / Hydrocarbons	Further Investigation is Warranted
Former Service Station (UST[s])	Soil and Groundwater	Hydrocarbons	Further Investigation is Warranted
Former Single-Family Residences (UST[s])	Soil and Groundwater	Hydrocarbons	Further Investigation is Warranted
Off-Site			
Former Single-Family Residences (UST[s])	Soil and Groundwater	Hydrocarbons	Further Investigation is Not Warranted
Former Canadian Armed Forces Activities (UST[s]/ammunition)	Soil and Groundwater	Metals / Hydrocarbons	Further Investigation is Not Warranted

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PHASE I ENVIRONMENTAL SITE ASSESSMENT

Tla-o-qui-aht First Nation (TFN) Esowista Reserve (I.R. No. 3) Parcel 1

Long Beach Unit of Pacific Rim National Park Reserve, Tofino, BC

1. INTRODUCTION

This report presents the findings of a KEYSTONE ENVIRONMENTAL™ Phase I Environmental Site Assessment prepared at the request of Public Works and Government Services Canada (PWGSC). The property is currently referenced as the Tla-o-qui-aht First Nation Esowista Reserve (I.R. No. 3) – Parcel 1 (the "Site"), located within the Long Beach Unit of Pacific Rim National Park Reserve, Tofino, BC.

This PSI 1 was conducted to determine whether there is a potential for constituents of concern to be present in the soil and/or groundwater at the Site at concentrations greater than the applicable standards specified in the Canadian Council for the Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG), defaulting to the British Columbia *Contaminated Sites Regulation* (CSR) where CEQG values are not available. It is understood that the investigation is being conducted as a prerequisite to the accompanying Canadian Environmental Assessment Act (CEAA) Screening Report.

1.1. Site Identification

Civic Address:	Tla-o-qui-aht First Nation Esowista Reserve (I.R. No. 3) Parcel 1
Parcel Identifier:	n/a
Legal Description:	n/a
Current Registered Owners:	Parks Canada
Current Zoning:	Park – Pacific Rim National Park Reserve
Site Area:	84 hectares (approximate)
Site Latitude:	49º 04’ 25.0”
Site Longitude:	125º 47’ 33.0”

Latitude and longitude was determined from a Department of Energy, Mines and Resources 92 G/7 topographical map, dated 1989.

1.2. Scope of Work

The scope of work for this study included the following tasks:

- a review of available historic records such as aerial photographs, a groundwater well search, historic climate data, and a search of the British Columbia Ministry of Environment (MOE) Site Registry;
- a Site reconnaissance to observe Site conditions which may indicate the potential presence of contamination, and to prepare a photographic record;
- a review of documents and reports relating to waste management and Site contamination as available; and
- interviews with individuals knowledgeable about the Site.

1.3. Study Limitations

Findings presented in this report are based upon (i) a limited visual review of accessible areas of the on-Site grounds, (ii) interviews with available personnel familiar with Site activities, and (iii) a review of available Site, environmental agency and historic archive records. No sampling and analysis of wastes, water, soil, groundwater, or air was conducted as part of this review. Consequently, while findings and conclusions documented in this report have been prepared in a manner consistent with that level of care and skill normally exercised by other members of the environmental science and engineering profession practicing under similar circumstances in the area at the time of the performance of the work, this report is not intended nor is it able to provide a totally comprehensive review of past or present Site environmental conditions. This report is intended to provide information to reduce, but not necessarily eliminate, uncertainty regarding the potential for contamination of a property. Where this potential has been identified, the further reduction of uncertainty requires the performance of a Preliminary Site Investigation, Stage 2.

This report has been prepared solely for the internal use of the Tla-o-qui-aht First Nations, Public Works and Government Services Canada (PWGSC) and Indian and Northern Affairs Canada (INAC) and pursuant to the agreement between Keystone Environmental Ltd. and PWGSC. Any use which other parties make of this report, or any reliance on or decisions made based on it, are the responsibility of such parties. Keystone Environmental Ltd. accepts no responsibility for damages, if any, suffered by other parties as a result of decisions made or actions based on this report.

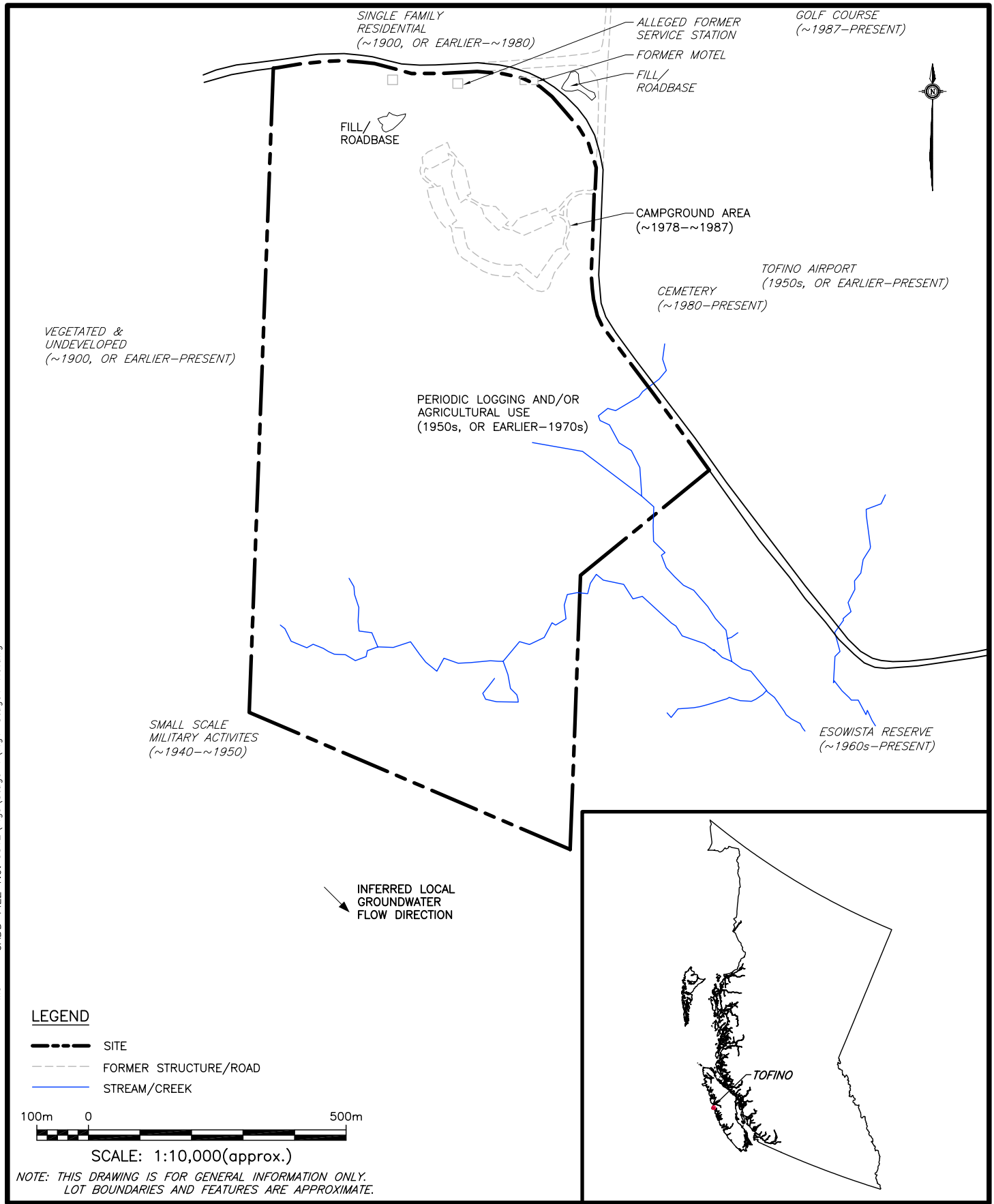
2. SITE DESCRIPTION

The Site measures approximately 84 hectares in area and is located adjacent and south of Highway 4[1] in the Long Beach Unit of Pacific Rim National Park Reserve near the end of Pipeline Road, in Tofino, British Columbia as shown on Figure 1. The Site is currently vacant and vegetated. North of the Site is Highway 4 beyond which are vacant and undeveloped (vegetated) Pacific Rim National Park reserve lands. East of the Site is Highway 4 beyond which is the Tofino Airport (Tofino Airport Lands). South and west of the Site are vacant and undeveloped (vegetated) Pacific Rim National Park reserve lands.

The local surficial geology of the area was determined by consulting the Geological Survey of Canada Map 1:15,000,000 (1969). The stratigraphy of the Site consists of tertiary sediments of Cenozoic age. The unit is comprised of granite and allied plutonic rocks, as well as glacial outwash and silty fine sand (Dayton & Knight, 1971).

Over the long term groundwater is expected to follow regional topography flowing from areas of higher elevation to areas of lower elevation. Local groundwater flow direction may vary as a result of local conditions such as topography, geology and the presence of drainage channels and buried utilities, and is subject to confirmation with field measurements. Regionally, the gradient is slopes gradually to the south, towards Wickaninnish Bay, located approximately 400 metres southeast of the Site. Locally, topography varies and includes flat marsh areas located in the vicinity of the northern and southern borders of the site, and relatively steep ravine areas in the centre portions of the site. Therefore, it is anticipated that the local groundwater flow direction is variable and indeterminate and that the Site may be impacted from adjacent and surrounding properties. The closest off-site surface waterbody is the Pacific Ocean (Wickaninnish Bay), located approximately 400 metres southeast of the Site.

[1] Also referenced as the Pacific Rim Highway



NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. LOT BOUNDARIES AND FEATURES ARE APPROXIMATE.

DRAWN BY: MS CADD FILE No. 8812\Figs\Stage 1\Fig1-Stage1-R0.dwg

PLOT SCALE: 1:1

KEYSTONE ENVIRONMENTAL

Esowista Reserve
Tofino, B C
PWGSC

REVISION No.	DATE	PROJECT No.
00	Feb. 2006	8812-01

Figure 1
Location, Site & Surrounding Land Use Plan

3. RECORDS REVIEW

Various documents were reviewed and interviews conducted for information concerning past uses of, and activities at the Site. A list of references is included at the end of this report. The documents reviewed for information concerning historic land use included aerial photographs, an MOE Site Registry search, a water well search, and historic climate data. Historical street directories, fire insurance maps, land use maps and a land title were not available for the Site or surrounding area.

3.1. Aerial Photographs

Aerial photographs (Appendix C) dated 1954, 1959, 1966, 1970, 1972, 1981 and 1987 reviewed for information concerning historic features and land use at the Site and neighbouring areas. The following is a summary of the observations made during the aerial photograph review:

1954 and 1959

- In the 1954 aerial photographs, single-family residences were observed on the northeast border of the Site and the eastern border of the Site, adjacent to Highway 4. The remainder of the Site was vacant and undeveloped. The northern and eastern portions of the Site appeared to have been logged and secondary growth was observed. The western and southern portions of the Site were densely vegetated.
- To the east of the Site was Highway 4, beyond which was the Tofino Airport. North of the Site was Highway 4, beyond which was predominantly undeveloped and vegetated apart from a single-family residence adjacent to Highway 4. Evidence of logging, similar to the Site, was observed to the north of the highway. West and south of the Site was undeveloped and vegetated; however, an unpaved access road was observed paralleling the western border of the Site and ending at Schooner Cove, to

the south of the Site. It is anticipated that this road served as a monitoring / observation point for previous military activities in the area.[2]

1966

- In the 1966 aerial photograph, four single-family residences and associated outbuildings were observed on the Site. Specifically, a single-family residence and garage were observed on the northwest corner of the Site, proximate to Highway 4. A second single-family residence was observed approximately 50 metres east of the first residence. A third single-family residence and three associated outbuildings were observed approximately 50 metres east of the second residence[3]. A fourth single-family residence and garage were located on the northeast corner of the Site. An unpaved access road originating from Highway 4 to the east of the Site bisected the site (traveling west) before turning northward and terminating in an unpaved field area. Evidence of recent logging (stumpage, slash debris) was observed on the eastern half of the Site. The remainder of the Site remained unchanged relative to the 1959 aerial photographs.
- In the 1966 aerial photographs, preliminary construction (land clearing and initial building construction) of the First Nation's reserve (I.R. #3) was observed to the southeast of the Site. Two additional single-family residences had been constructed north of Highway 4.

1970 and 1972

- In the 1970 aerial photographs, two additional single-family residences had been constructed on-Site; along the eastern border of the Site proximate to Highway 4 and between the second and third single-family residences observed in the 1966 aerial photograph, located along the northern border of the Site. An outbuilding had been constructed adjacent and east of the single-family residence located on the northeast

[2] Corroborated from former site resident, Mr. Victor Kimola
[3] Mr. Victor Kimola stated a service station was located on-site in the vicinity of this residence/outbuildings between the 1960s and 1970s for between 2-5 years.

corner of the property[4]. In the 1972 aerial photographs, the on-Site buildings along the northern and eastern borders of the Site had been removed. The buildings located at the northeast corner of the Site were still present.

- In the 1970 aerial photographs, two additional buildings had been constructed adjacent and north of Highway 4. Three buildings were located in the current parking lot area to the southeast of the Site[5]. In the 1972 aerial photographs, the three buildings within the parking lot had been removed. Single-family residences to the north of the Site, across Highway 4 had been removed in the 1972 aerial photographs.

1981 and 1987

- In the 1981 aerial photographs, remaining on-Site buildings had been removed. A circular, unpaved, unvegetated area (~ 400 m^2) was located proximate to the northern boundary with an unpaved access road originating from Highway 4. A second unpaved, unvegetated area (~1,000 m^2) was located on the northeast corner of the Site, with an unpaved access road originating from Highway 4. An unpaved gravel road network was observed on the eastern portion of the Site. No permanent structures were observed on the Site. In the 1987 aerial photograph, Highway 4 had been re-aligned to its current configuration, occupying the northeast corner of the Site formerly occupied by one of the on-Site buildings.
- With the exception of nominal changes to vegetation, the Site remained relatively unchanged relative to the 1972 aerial photographs. In the 1987 aerial photographs, a golf course (Long Beach Golf Course) had been constructed northeast of the Site, across Highway 4.

[4] The 2003-04 Pacific Rim National Park Reserve: Archaeological Resource Management Programme Report (see Historical Reports section) refers to this building as an 8 unit motel with associated single-family residential buildings.
[5] currently occupied by the parking lot for park access

3.2. MOE Site Registry Search

An on-line search of the MOE Site Registry was conducted to determine if it contained information regarding soil and/or groundwater contamination for sites within a 500 metre radius search of 49º 04' 25.0" North by 125º 47' 33.0" West, the approximate latitude and longitude entered for the centre of the Site. No sites were listed within the search radius. A copy of the search result is provided in Appendix A.

3.3. Groundwater Well Search

A groundwater well search was performed through the MOE Water Well On-line Database for wells in the area of the Site. Six groundwater wells were reported within 1.5 kilometres of the Site. Well installation ranged from the early 1950s to the early 1970s, and are owned by INAC, the B.C. Ministry of Transportation (MOT) and Parks Canada. However, well class, subclass and type were unavailable in the detailed well reports for the wells within the search area. The search results are included in Appendix B.

3.4. Climatic Normals

The following climate information is based on data collected by Environment Canada at the Tofino A* weather station (49^{o} 4'N, 122^{o} 46'W; 24.10 metres elevation) between 1971 and 2000.

Daily Mean Temperature	9.8 ^{o}C
Monthly Maximum	August, 14.8 ^{o}C
Monthly Minimum	December, 4.7 ^{o}C
Precipitation	3305.9 mm/year
Highest Monthly Avg.	November, 474.9 mm
Lowest Monthly Avg.	July 76.8 mm

3.5. Previous Environmental Reports

Reviews of available reports pertinent to the Site are summarized below. Additional reports, including Preliminary Site Investigations and Impact Assessments for Radar Hill, Combers Beach and McLean Point (Keystone, 1994) were reviewed but did not reveal any relevant site information.

3.5.1. 2003-04 Pacific Rim National Park Reserve: Archaeological Resource Management Programme, Parks Canada, September 2004

An archaeological overview of the property was conducted to identify known archaeological values and concerns prior to land transfer and to determine future cultural heritage data recovery potential. The following was reported:

- Extensive land clearing, burning, and logging, coupled with past commercial land development, park staff housing, and recent overflow campground development have historically impacted the area, particularly in the northern and eastern portions of the property.

- Historic pre-emptions of these lands date back to 1909, corresponding to Euro-Canadian settlers.

- The investigation consisting of a review of existing archaeological site inventory data, land registry records, and environmental information for the project area. Following a review of the background information, a two-person field survey team carried out a series of foot transects (with GPS) throughout the south and western portions of the property, with a focus on examining undisturbed areas.

- The assessment reported no evidence of historic homesteading activity (fence lines, ditching, cellar excavations, structures) or Nuu-chah-nulth cultural sites were observed during the field survey. Past land use disturbances, together with the distance of the property from the present shore, were felt to diminish the likelihood of finding evidence for intact traditional Nuu-chah-nulth cultural sites.

Additional archaeological surveys and assessment studies were suggested prior to development, particularly on undisturbed, well-drained terrain. Areas in the western and southern portions of the property hold moderate potential for the recovery of extant cultural features affiliated with early 20th century homesteading and possible mid-20th century army use. The report is included in Appendix E.

3.5.2. Land Registry - Pine Ridge Homestead – Lot 840T (Parks Canada)

- Land registry records indicate a pre-emption in 1909.
- In 1970, the site was occupied by 2 residences and an 8 unit motel (the Pineridge Motel), in addition to 1-2 other residences.
- The motel served as a Park staff residence until 1977-78 when it was sold and moved to Tofino.
- It is possible that this 160 acre lot was occupied almost continuously from 1909.
- 1940 aerial photos show some cultural activity in excess of land clearing. It was deemed difficult to pinpoint a structure.
- Almost all of the lot was burned – in fact the region was known as the Burnt Lands.
- A portion of the Site in the 1940 photos seemed to be intensively cultivated, corresponding closely to the later motel area. The motel area itself was largely destroyed when the highway corner in the lot was realigned in 1985.

- In 1978, an overflow campground was constructed on the lot. This 160 site camping area consisted of gravel roads and parking areas.
- It is concluded that there is little likelihood of finding an old homestead on the Site. Cultural evidence may be discovered, but it was deemed difficult to differentiate potential homestead(s) with possible WWII army structures and post-war residences.

A copy of the Lot 840T Land Registry is included in Appendix F.

3.5.3. Parks Canada. 2003. Strategic Environmental Assessment (SEA) For the Reversion of Lands from Pacific Rim National Park Reserve of Canada for an Addition to Esowista Reserve (I.R. No. 3), May 2003.

- Memorandum of Understanding (MOU) between Parks Canada, Tla-o-qui-aht First Nation (TFN) and INAC that outlines conditions for excisement of 84 ha from Pacific Rim National Park Reserve through a legislative amendment to the Canada National Parks Act. This action will allow a residential area to be added to Esowista Reserve under INAC's Additions to Reserve Policy.
- The SEA was completed in preparation for the signing of the MOU.
- 4 houses at current Esowista reserve in 1970 and currently there are 37 houses. TFN currently need additional land to address their severe housing shortage. Expansion proposed to meet residential needs for next 50 years (land requirements established through a Community Needs Assessment and Analysis, David Nairne and Associates, 2001).
- Esowista expansion area (Site) has likely seen temporary settlement for past 4000 years
- Northern section had been partly burned by fire ~80-100 years ago.
- Clay layers below glacial outwash and silty fine sand, promote standing surface water.

- Proposed trails leading from residential to beaches may encourage wildlife movement into community.

Parks Legislation and policy

- National Parks Policy and Cultural Resource Management Policy are operational policy components relevant to the MOU.
- Canada National Parks Act (2000) identifies maintenance or restoration of ecological integrity through protection of natural resources and processes as first priority of Minister when considering park management.
- MOU states transferred land will be Indian Reserve in future (160 lots, cultural, rec. and community facilities, convenience store, clinic, cemetery, public works yard, etc.)
- Park identified as one of the most ecologically stressed national parks due to forestry, human disturbance, urbanization, commercial/sport fishing and the threat of ocean spills.
- Parks Canada recommends the bog be preserved as a unique ecosystem and is important to First Nation's culture

4. SITE RECONNAISSANCE

On December 19th, 2005, Keystone Environmental Ltd. visited the Site. The purpose of the visit was to observe operations and conditions at the Site, as well as neighbouring properties, to determine the potential for contamination at the Site, and to prepare photographic documentation. The Site is currently unoccupied, undeveloped and vegetated Selected photographs taken during the Site reconnaissance are included in Appendix D.

4.1. Grounds Survey

The following observations were made during the grounds survey.

- The Site is comprised of approximately 84 hectares and is delineated by a 1-2 metre wide cut-line perimeter trail with various survey markers.
- In general, the Site slopes toward the south.
- The Site is at grade with properties to the north, east, south and west.
- The Site is currently undeveloped and vegetated. Vegetation type varies across the Site and includes marsh/bog areas along the northern and southern boundaries of the Site, and old-growth forest and ravine/watercourse areas throughout the centre portion of the Site.
- An unnamed watercourse[6] confluences adjacent and southeast of the Site. On-Site, the watercourse exists as numerous indeterminate, ephemeral feeder channels and two defined reaches, the first of which travels west to east along the southern portion of the Site, and the second traveling south proximate to the eastern border of the Site. Additional surface water input sources were observed adjacent and west of the Site, and north of the Site, across Highway 4.
- The central northern border of the Site is occupied by a former trailer / campground area. A dilapidated service shed or water well housing is still present on the Site; evidence of electrical hook-up (an electrical meter) and hydropoles, as well as a hot-water tank were observed in the vicinity of the shed. No other buildings were observed on the Site.
- The substrate at the former trailer / campground area was comprised of non-native roadbase or structural fill-type material, consisting of gravel, cobble and fines (approximately 8 hectares).
- Drainage is by infiltration as well as runoff to the adjacent vegetated areas and to on-Site watercourses.

[6] Referenced as DFO Watercourse ID: 903-268300 and as Esowista Creek in the SEA (2005) document.

- No aboveground storage tanks (ASTs) or evidence of underground storage tanks (USTs) such as vent pipes were observed on-Site.
- No transformers were observed in the vicinity of the Site.
- Hydrocarbon stains, indicative of releases or spills of constituents of concern that could potentially have impacted the underlying soil and/or groundwater, were not observed on the Site.
- No monitoring wells or drinking water wells were observed on-Site.
- Fill material has been transported on-Site in preparation for construction of two commercial buildings.
- Stressed vegetation that would indicate potential groundwater and/or soil contamination was not viewed on-Site.
- Groundwater monitoring wells or drinking water wells were not observed on-Site.

4.2. Special Attention Substances

As no permanent buildings were observed on-Site, it is not anticipated that special attention substances such as polychlorinated biphenyls (PCB), asbestos, mercury, lead or urea formaldehyde foam insulation (UFFI) are present on-Site.

4.3. Current Use - Adjacent and Up-Gradient Properties

The following observations were made in the vicinity of the Site.

- The area immediately to the north of the Site is bordered by Highway 4 (Pacific Rim Highway) beyond which are Pacific Rim National Park Reserve Lands (undeveloped and vegetated).
- The area immediately to the east of the Site are bordered by Highway 4 beyond which is the Tofino Airport (Tofino Airport Lands)
- To the west and south of the Site are Pacific Rim National Park Reserve Lands.

5. INTERVIEWS

Interviews are summarized in below:

An interview was conducted on January 16th, 2006 with the former project manager for the Esowista Expansion Project, Mr. Don Mackinnon, P.Eng. The following was reported:

- A former motel, owned by the Kimola family, occupied the northeastern portion site in the 1970s. It was suggested to contact Mr. Victor Kimola for additional information with respect to past uses of the site.
- The northern portion of the Site was utilized as an overflow campground in the 1970s, however, specifics were unavailable.

An interview was conducted on January 17th, 2006 with Mr. Ian Sumpter, Assistant Archaeologist, Parks Canada. The following was reported:

- Mr. Sumpter reported that the northeastern portion of the Site had a low potential for archaeological history, due to the wet, "marsh-like" grounds.
- The western portion of the Site should be evaluated further to ascertain potential archaeological history.
- Portions of the Site had been extensively logged and there was evidence of slash burning (early 1900s).
- The Site was known locally by the First Nations community as the "burnt lands" in the early 1900s.
- A homestead(s) was constructed on the Site circa 1909.
- In the 1940s, a motel was constructed on-Site. In the 1960s, the buildings were moved off-Site.
- In the 1970s, Parks Canada used the Site as an over-flow camp-ground, consisting of 160 camping plots and a network of gravel roads.

An interview was conducted on January 17th, 2006 with Ms. Toni Comtois, Real Estate Division of the Department of National Defence (DND). The following was reported:

- The Site is classified as a "Legacy Site", indicating that is of past-use and is not currently active.
- The Real Estate Division is not responsible for property records, and a request was forwarded to Ms. Rima Ammouri of the Research Section of DND.

An interview was conducted on January 19th, 2006 with Mr. Victor Kimola, son of the former motel operator on-Site. The following was reported:

- A one-storey motel was constructed in the northeast corner of the Site in the early 1960s and was comprised of 6-8 rooms with an adjoining duplex building. In the 1970s, the motel was sold and shipped off-site.
- Numerous single-family houses were also constructed on-Site and in the vicinity of the motel adjacent to Highway 4. In the 1970s, when the area was designated as a park, some of the houses were moved off-site, whereas others were demolished.
- The motel was heated via electric baseboard heating and some of the homes were heated via wood burner.
- Some of the single-family houses may have been heated via heating oil.
- A gas-station was present on-Site approximately 75-100 metres west of the motel and was present on-Site for 2-5 years between the 1960s and the 1970s. It could not be determined whether or not underground storage tanks (USTs) or aboveground storage tanks (ASTs) were used to dispense fuel.
- Areas adjacent and south of the motel were grazing pasture for cattle, owned by the Kimola family.
- A sand and gravel road adjacent and west and south of the Site was locally referred to as "Pacific Heights Road" and was used by the Armed Forces during and after World War II. At various intervals along the road were personnel barracks, bunkers, spotlights and artillery.

An interview was conducted on February 2nd, 2006 with Ms. Rima Ammouri, Research Section of the Department of National Defence (DND). The following was reported:
A search of available historical information was conducted by Ms. Ammouri and her staff.

- Very little information was available for the Site, as it was transferred to Transport Canada in the late 1950s.
- Available information suggested that the Site was used primarily as a radio station in conjunction with the airport to the east.

An interview was conducted with Mr. Peter Whyte, Manager of Resource Conservation for the Pacific Rim National Park Reserve. The following was reported:

- Mr. Whyte reviewed all available files and reports with respect to the Site and could not find any mention of a former service station occupying the site.
- Mr. Whyte contacted a CEAA officer that occupied the Site during the time in question and he was unaware of a service station on-Site during the period reported by Mr. Victor Kimola.

6. SUMMARY, DISCUSSION AND CONCLUSIONS

6.1. Potential On-Site Sources of Contamination

The Site measures approximately 84 hectares in area and is located adjacent and south of Highway 4 in the Long Beach Unit of Pacific Rim National Park Reserve near the end of Pipeline Road, in Tofino, British Columbia.

A review of available historic information revealed that the northern portion of the Site was occupied by single-family residence(s)[7] from the late 1900s to the early 1980s. In the 1960s, a 6-8 room single-storey motel and adjoining outbuildings were constructed along the northeast border of the Site adjacent to Highway 4 in the 1960s and were removed from the Site in the early 1970s. Between the 1960s and the 1970s, a service station was reported to have been located on the Site, adjacent and west of the motel. Between the 1950s and the 1970s, portions of the Site appeared to have been cleared and cultivated for use as agricultural or pasture land. Between the mid 1970s and early 1980s, numerous unpaved, unvegetated areas and a gravel road network were observed on-Site, corresponding to an overflow campground area that operated on-Site during that period. The southern portion of the Site appeared to have been vacant and vegetated from the early 1900s, or earlier, to present. Currently, the Site is undeveloped, vacant and vegetated.

The investigation revealed the following areas of potential environmental concern (APECs) including:

- Imported roadbase / fill material of unknown quality and quantity;
- Former service station on-Site (potential Underground Storage Tank[s] USTs); and
- Former residences on-Site (potential for heating oil USTs).

In the following sections, each of the identified APECs are discussed and an opinion presented with respect to whether there is a potential for constituents of concern (COCs) to be present.

[7] Referred to as “homesteads” in historical reports

6.1.1. Roadbase / Fill Material

During the Site visit, non-native roadbase / structural fill material, consisting of gravel, cobble and fines was observed on the northern and northeastern portions of the Site and covering an area of approximately 8 hectares. This area corresponds to former residences, cleared, unvegetated areas and unpaved road networks previously used as an overflow campground, which were observed in the 1970s and 1980s historical aerial photographs. The origin, quality and/or quantity of fill material could not be determined. Based on Site visit observations and historical aerial photographs, there is considered to be a potential for constituents of concern associated with roadbase / fill material to be present in the Site soil and/or groundwater at levels of concern.

6.1.2. Former Service Station

Former Service Station

It was reported by Mr. Victor Kimola, former resident of the Site, that a service station had been present on the Site adjacent and east of the on-Site motel, located along the northeastern border of the Site. The service station was reported to have been present on-Site for between 2-5 years between the 1960s and the 1970s. Mr. Peter Whyte, Manager of Resource Conservation for Parks Canada (Pacific Rim National Park) was queried to verify the historical presence of a service station on-site. Following a review of available reports and files pertinent to the site, Mr. Whyte concluded that a former on-site service station was unlikely as no documentation alluding to its presence was available. As a result of varying information and a lack of available records, there remains a moderate potential for constituents of concern associated with the alleged former service station to be present in Site soil and/or groundwater at levels of concern.

6.1.3. Former Single-Family Residences

Historical aerial photographs revealed between four and six on-Site residences along the northern, northeastern and eastern borders of the Site (adjacent to Highway 4) from at least the 1950s, or earlier to between the mid 1970s and early 1980s. It was reported by Victor Kimola, former Site resident, that the on-Site motel and adjoining buildings were heated via electric baseboard heater and/or wood furnace. It could not be determined how other single-family residences on-Site were heated; however, it is possible that they utilized wood, propane, electricity or heating oil stored on-Site in ASTs or USTs. ASTs were not observed during the Site visit and were likely removed demolition / removal of the residences. However, there remains a potential that USTs may still be present on-Site. Therefore, there is considered to be a potential for constituents of concern associated with USTs to be present in the Site soil and/or groundwater at levels of concern.

6.2. Potential Off-Site Sources of Contamination

From the 1950s, or earlier, properties to the west and south of the Site were undeveloped and forested. Numerous single-family residences were constructed north of the Site, across Highway 4, in the 1950s and 1960s. These residences were subsequently removed in the 1970s and the early 1980s. Areas further north, appeared to have been logged in the 1950s and 1960s. The Tofino Airport has been located east of the Site, across Highway 4, from at least the 1950s to the present. Aerial photographs revealed a sand/gravel road network to the west of the Site, which was used by the Armed Forces during and after World War II. It was reported that personnel barracks, bunkers, spotlights and artillery were located at varying intervals along the road. In the late 1960s, preliminary construction for the current Tla-o-qui-aht First Nation reserve had begun to the southeast of the Site. In the 1970s, a parking lot for park access had been constructed southeast of the Site. In the late 1980s, a golf course (Long Beach Golf Course) had been constructed northeast of the Site, across Highway 4. Currently, areas to the west and south of the Site

are undeveloped. North and east of the Site are delineated by Highway 4. Northeast and east of Highway 4 are a golf course and the Tofino Airport, respectively. Southwest of the Site is the Pacific Rim National Park Reserve Parking Area and Tla-o-qui-aht Esowista Reserve (I.R. No. 3).

6.2.1. Former Single-Family Residences (off-site)

From the mid 1950s to the 1970s, between one and five single-family residences were present adjacent and north of the Site (~ 25 metres), across Highway 4. It is unknown how the residences were heated during this period; however, it is possible that they utilized wood, propane, electricity or heating oil stored on-Site in ASTs or USTs. Based on the distance from the Site, there is considered to be a low potential for constituents of concern associated with heating oil storage tanks to be present in the Site soil and/or groundwater at levels of concern.

6.2.2. Former Canadian Armed Forces Activities

Aerial photographs revealed an unpaved sand/gravel road running west and south of the Site (at a distance of between 50-300 metres from the Site), terminating proximate to Schooner Cove. Interviews with persons familiar with the Site and surrounding area revealed the road had been utilized by the Canadian Armed Forces (currently referenced as the Department of National Defence [DND] / Canadian Forces) during the World War II era. It was reported that numerous personnel barracks, bunkers, artillery emplacement and spotlights were located at various intervals along the road. DND did not have documentation available pertaining to the land use or duration of use for the area of interest. Therefore, it could not be determined how the personnel barracks were heated during this time. Similarly, artillery type and ammunition volumes were not available. Additionally, no reports were available suggesting the surrounding areas were used for

target ranges. Based on the cross- to down-gradient distance from the Site, there is considered to be a low potential that constituents of concern associated with former Canadian Armed Forces activities have impacted the Site soil and/or groundwater at levels of concern.

7. NCS SITE CLASSIFICATION SUMMARY

The National Classification System (NCS) minimum data requirements were met, the output of which resulted in a Site classification score of 49.1 (total) ± 12.8 (estimated score). The large estimated score is a result of a high degree of uncertainty due to a lack of historical data / records for the Site. The limited data and records are the due primarily to the remoteness of the Site and relatively small indigenous residential population in the vicinity of the Site. The classification score resulted in a Class 3 (Action May Be Required) designation, suggesting that based on available information, the Site is not a high concern. However, additional investigation may be conducted to confirm the Site classification, and some degree of action may be required.

8. CONCLUSIONS & RECOMMENDATIONS

It is concluded therefore, that there is a potential for constituents of concern to be present in the Site soil and/or groundwater at concentrations in excess of applicable standards provided in the British Columbia *Contaminated Sites Regulation* (CSR), and that further investigation is warranted.

In summary, potential areas of concern identified during the Phase I Environmental Site Assessment, associated with past off-site activities, as shown on Figure 1, and the respective constituents of potential concern associated with each activity are presented in Table 1.

Table 1. Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Potentially Affected Media	Potential Constituent of Concern	Recommendations
On-Site			
Former Campground / Single-Family Residences (Roadbase / Fill Material)	Soil and Groundwater	Metals / Hydrocarbons	Further Investigation is Warranted
Former Service Station (UST[s])	Soil and Groundwater	Hydrocarbons	Further Investigation is Warranted
Former Single-Family Residences (UST[s])	Soil and Groundwater	Hydrocarbons	Further Investigation is Warranted
Off-Site			
Former Single-Family Residences (UST[s])	Soil and Groundwater	Hydrocarbons	Further Investigation is Not Warranted
Former Canadian Armed Forces Activities (UST[s]/ammunition)	Soil and Groundwater	Metals / Hydrocarbons	Further Investigation is Not Warranted

9. REFERENCES

1) Aerial photographs dated:

1954: BC1855 – 71, 72;
1959: 47618;
1966: BC5174 – 102;
1970: BC7237 – 111, 112, 113;
1972: BC548 – 080, 081;
1981: BC81074 – 238, 239, 240; and
1987: BC87046 – 252, 253.

2) Geological Survey of Canada Map 1:15,000,000 (1969).

3) Dayton & Knight Ltd, Consulting Engineers. 1971. Long Beach Segment – Pacific Rim National Park: Physical Inventory and Service Feasibility Studies, Appendix G, Air photo and ground reconnaissance study, Volume 4. Vancouver, B.C.

4) Keystone Environmental Ltd. (1994). Environmental Impact Assessment – Radar Hill, Combers Beach and McLean's Point Investigation and Remediation Objectives – Pacific Rim National Park.

5) Keystone Environmental Ltd. (1994). Report of Findings – Investigation, Assessment and Remediation of Contaminated Sites. Pacific Rim National Park.

6) Parks Canada (2004). 2003-04 Pacific Rim National Park Reserve: Archaeological Resource Management Programme.

7) Parks Canada. Land Registry – Pine Ridge Homestead – Lot 840T

8) Groundwater Well Search obtained online via the Ministry of the Environment (MOE).(http://www.env.gov.bc.ca/wat/)

9) Meteorological Service of Canada, Environment Canada – Canadian Climate Normals 1971 – 2000.
(http://www.msc-smc.ec.gc.ca/climate/climate_normals/index_e.cfm).

10) British Columbia Ministry of Water, Lands and Air Protection (MWLAP) Site Registry.
(http://www.bconline.gov.bc.ca)

11) Interviews with persons having knowledge of the Site and surrounding areas.

APPENDIX A
MOE SITE REGISTRY SEARCH RESULTS

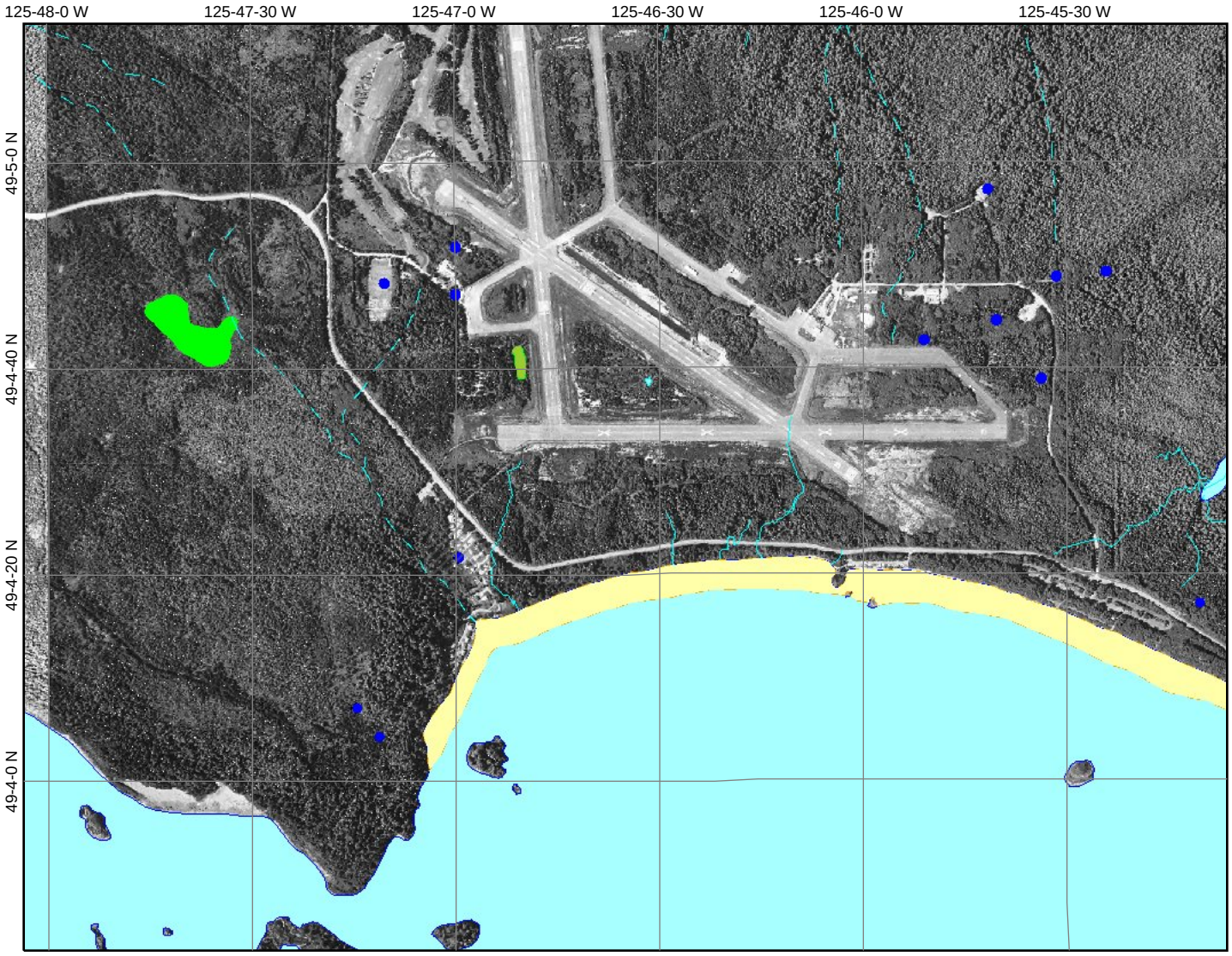
Area Nil Search

As of JAN 01, 2006, no records from the B.C. Environment Site Registry fall within 0.5 kilometers of coordinates
Latitude 49 degrees, 04 minutes, 25.0 seconds, and
Longitude 125 degrees, 47 minutes, 33.0 seconds.

Sites may be revealed by searching with alternate search methods. For example, a site not revealed in an Area search may be revealed by searching with another piece of information such as PID, PIN, address or Crown Lands File Number

APPENDIX B
GROUNDWATER WELL SEARCH RESULTS

Internet Mapping Framework



0 550 1100 1650 m.

Map center: 49° 4' 28" N, 125° 46' 35" W

Legend

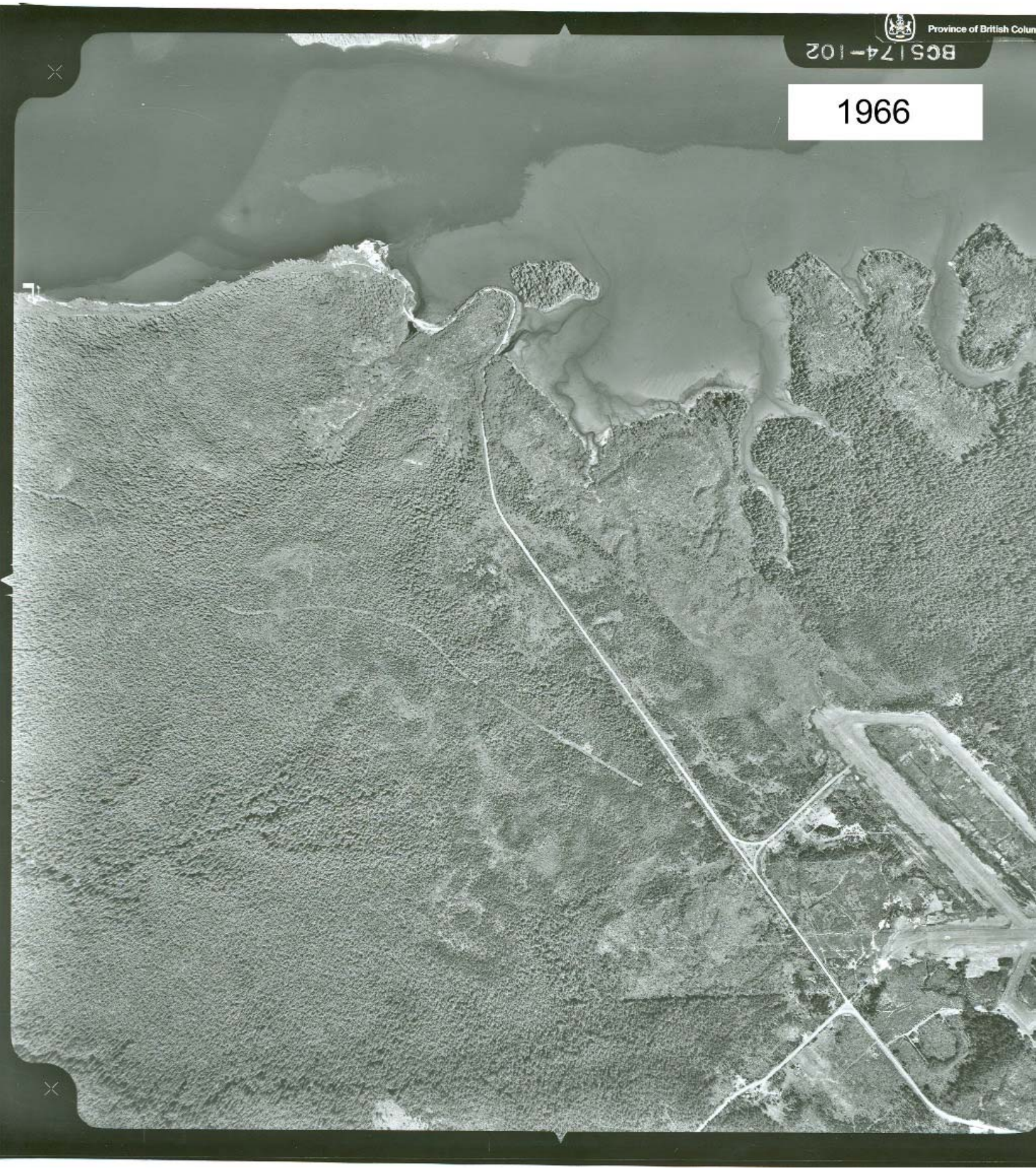
- Well Lithologies
- Abandoned Well Use
- Commercial and Industrial Well Use
- Community Water Supply Well Use
- Domestic Well Use
- Irrigation Well Use
- Municipal Well Use
- Observation Well Use
- Other Well Use
- Test Well Use
- Unknown Well Use
- Water Utility Well Use
- Drilled Water Wells
- Driven Water Wells
- Dug Water Wells
- Jetted Water Wells
- Other Water Wells
- Springs
- Unknown Water Wells
- Active Observation Wells
- Abandoned Observation Wells
- Well Capture Zones
- Water Wells
- Water - Points (TRIM)
- Rapids
- Dam
- Flooded Land - Inundated

N

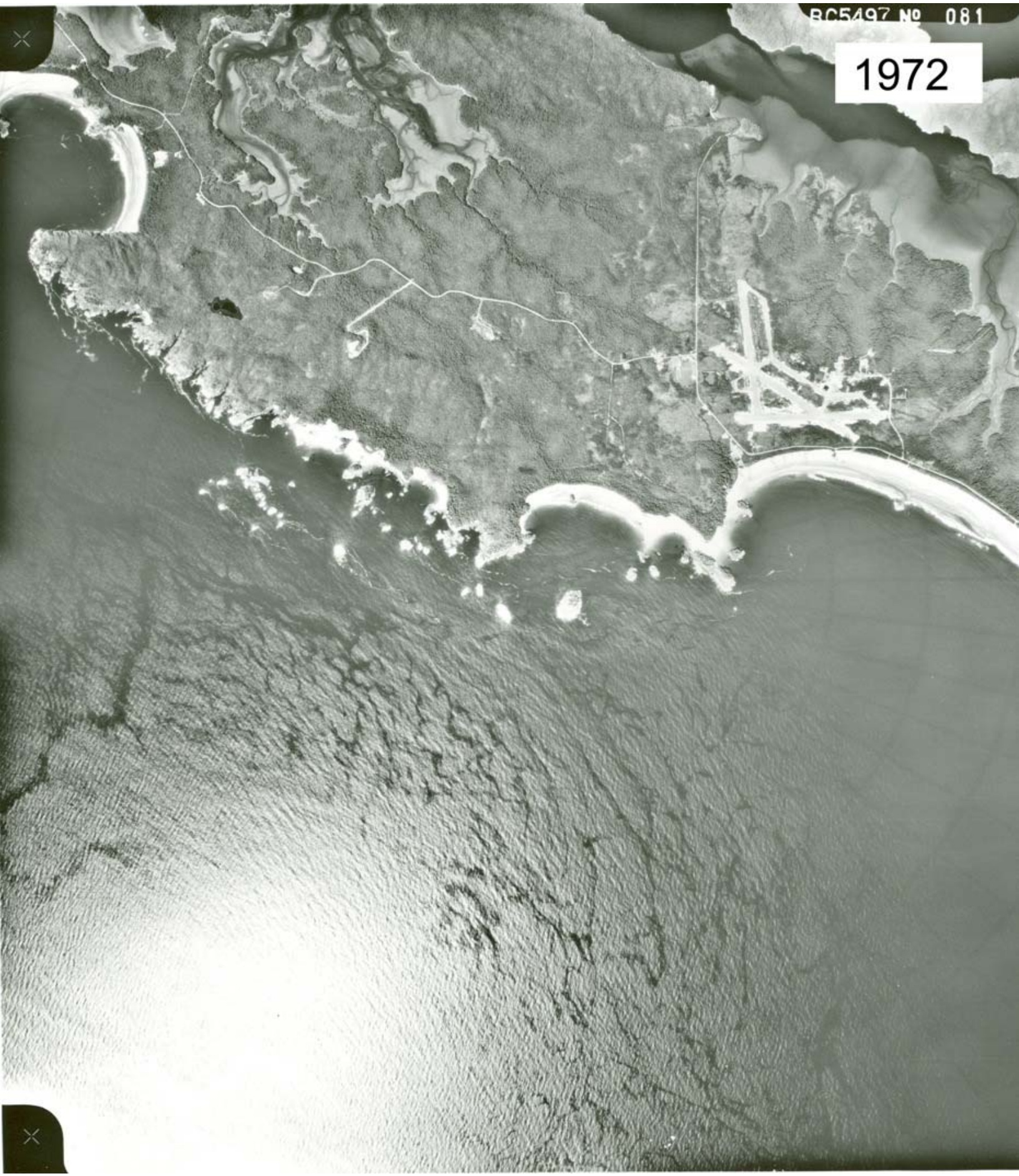
Scale: 1:19,408

APPENDIX C
AERIAL PHOTOGRAPHS

1954


Province of British Colum
BC5174-102
1966


1970


BC5497 № 081
1972


1981


Province of British Columbia
15BC 87046 № 253
1987

APPENDIX D
PHOTOGRAPHIC DOCUMENTATION

Picture 1: Shed / shack (out-building associated with a former single-faimly residence) located on northern border of the Site

Picture 2: Hot-water tank in vicinity of make-shift shed / shack

Picture 3: Former camp-site overflow area looking south

Picture 4: Clearing in northern portion of the Site in vicinity of former single-family residence.

Picture 5: Northern portion of the Site, looking south from northern portion of the Site.

Picture 6: Centre portion of the Site, looking north

Picture 7: Watercourse traveling south at the centre of the Site.

Picture 8: Clearing within the southern portion of the Site looking north

APPENDIX E

PACIFIC RIM NATIONAL PARK RESERVE: ARCHAEOLOGICAL RESOURCE MANAGEMENT PROGRAMME

2003-04 PACIFIC RIM NATIONAL PARK RESERVE: ARCHAEOLOGICAL RESOURCE MANAGEMENT PROGRAMME

Prepared By:
Ian D. Sumpter and Daryl W. Fedje
Cultural Resource Services,
Western Canada Service Centre, Parks Canada Agency
Victoria, B.C.

And

Arlene Armstrong
Pacific Rim National Park Reserve of Canada
Ucluelet, BC

September 2004

RESTRICTED CIRCULATION

bed frame, a radio, battery, bathtub, and sink. Immediately east of the rear of the house is ~50 m of fencing, comprising split cedar posts spaced about 4 to 8 m apart. A small collapsed structure, a possible privy, measuring 2 m square was found on the west side of the fence, approximately 40 m northeast of the house.

In 2001 efforts were placed on finding two Logan family residences situated on Lot 527, between the Holliday house and the west boundary of the Clo-oose Reserve - the 1913 David Logan House and the ~1918-1920 William Logan (3rd residence) on Lot 527 A ground survey of a ~400 m long by a 100-m-wide area on the north side of the trail did not locate additional structures, however sections of the telegraph line were observed. *(Note: the 1913 David Logan residence/store was located on the south side of the trail in 2004)*

In 2003, the Holliday residence was only briefly examined. Photographs were taken in order to document the slow decay of this building (Fig. 14).

Literary references indicate that the homeowner, Dan Holliday, worked as a linesman on the trail during the 1920s and 1930s (Wells 1988:30). He married David Logan's daughter, Sarah (Chad) Martin. The house (referred to as Feature 2 at site 341T) was built by the couple circa 1920 and was later abandoned around 1954 (R. Holliday, pers. Comm. 1993).

Present Threat(s): moderate natural decay, public assess, possible relic-collecting
Future Threat(s): continued structural deterioration and potential for the removal of surface artifacts and structural debris.
Recommendations: The area surrounding the collapsed Holliday residence should be fenced off to restrict visitor access for public safety purposes and to minimise the chances for the looting of artifacts and the removal of building materials. Material culture on site judged to possess moderate to high historic/interpretive potential should be collected by park staff for protection and conservation. Non-intrusive signage should be considered to inform the public of the building's history, values, and safety concerns.

2.0 Archaeological Overview – Esowista Reserve Land Transfer

Description of Proposed Development:
This project involves the transfer of 84 ha of park land to the Tla-o-qui-aht First Nation for the purposes of expanding the existing Esowista Indian Reserve 3 land base. An archaeological overview of the property was conducted to identify known archaeological values and concerns prior to land transfer and to determine future cultural heritage data recovery potential.

Nature and Extent of Disturbance:
Significant ground disturbance can be expected throughout the proposed land transfer area in response to residential construction, the installation of sewage, water, and power utilities, and landscaping. Extensive land clearing, burning, and logging, coupled with past commercial land development, park staff housing, and recent overflow campground development have historically impacted the area, particularly in the northern and eastern portions of the property (~50% of project area). Historic land pre-emptions of these lands date back to 1908

Method of Field Investigation(s):
Pre-field activities included a review of existing archaeological site inventory data, land registry records, and environmental information for the project area. A two-person field survey team carried out a series of foot transects (with GPS) throughout the south and western portions of the property with a focus on examining undisturbed areas (Fig. 16). X

X 2 days - June 03

Soil exposures and the sediments in the bases of uprooted trees were inspected for evidence of archaeological food remains (shell, bone) and past cooking activity (charcoal, fire-broken rock). No soil probing was conducted as the potential for buried evidence of traditional Nuu-chah-nulth cultural sites was judged to be low. This parcel is positioned 300+ metres from the present shore. Instead, emphasis was placed on the locating culturally modified trees and signs of early to mid 20th century land use activity.

Assessment Results:
Land records indicate that historic pre-emptions of these lands by Euro-Canadian settlers date back to 1908. A section of fence-line associated with one homestead, site 840T, has been recorded in the north-west corner of the study area (south-west corner of Lot 210).

No evidence for historic homesteading activity (fence lines, ditching, cellar excavations, structures) or Nuu-chah-nulth cultural sites was observed during the field survey. Past land use disturbances, together with the distance of this property from the present shore, were felt to diminish the likelihood of finding evidence for intact traditional Nuu-chah-nulth cultural sites.

Project Recommendations:
Additional archaeological surveys and assessment studies should be carried out on undisturbed, well-drained terrain in this parcel before future land development takes place. Areas in the western and southern portions of the property hold moderate potential for the recovery of extant cultural features affiliated with early 20th century homesteading and possible mid-20th century Army land-use. Site 1125T, a former Army residence on Lot 93, is immediately south of the property.

Furthermore, present and traditional Tla-o-qui-aht environmental knowledge of these lands is lacking - as such we suggest that local Tla-o-qui-aht band members, particularly elders, on Esowista I.R. 3 be consulted with respect to their knowledge of resource harvesting/processing and other cultural practices for this area prior to commencing future development. The importance of family harvesting places and ecologically related knowledge may represent significant Indigenous heritage protection issues for those Tla-o-qui-aht living at Esowista.

It is recommended that Parks Canada forward a letter to Indian and Northern Affairs Canada upon transfer of the lands to the Tla-o-qui-aht First Nation highlighting the above findings and potential resource management concerns.

3.0 Nuu-chah-nulth Trail Welcoming Pole, Quisitis I.R. 9
Description of Proposed Development:
This proposed project calls for the placement of a carved Welcoming Figure pole at the head of the Nuu-chah-nulth Trail on Quisitis I.R. 9 at the south end of Long Beach by the Ucluelet First Nation and the park. This section of trail crosses known Ucluelet heritage site 311T (DgSk-1).

Nature and Extent of Disturbance:
The cedar pole will be stand on a small, flat-topped concrete pedestal/footing. The concrete foundation will fill an 80-cm-deep shovel test hole, 65 cm square on each side. Key selection factors for locating the pole included visibility, proximity to standing spruce, avoidance of roots, and the presence of significant cultural deposits associated with village midden Site 311T (DgSk-1). The pole location was reviewed and approved by Maureen Touchie and band member Gordon Taylor on June 11th.

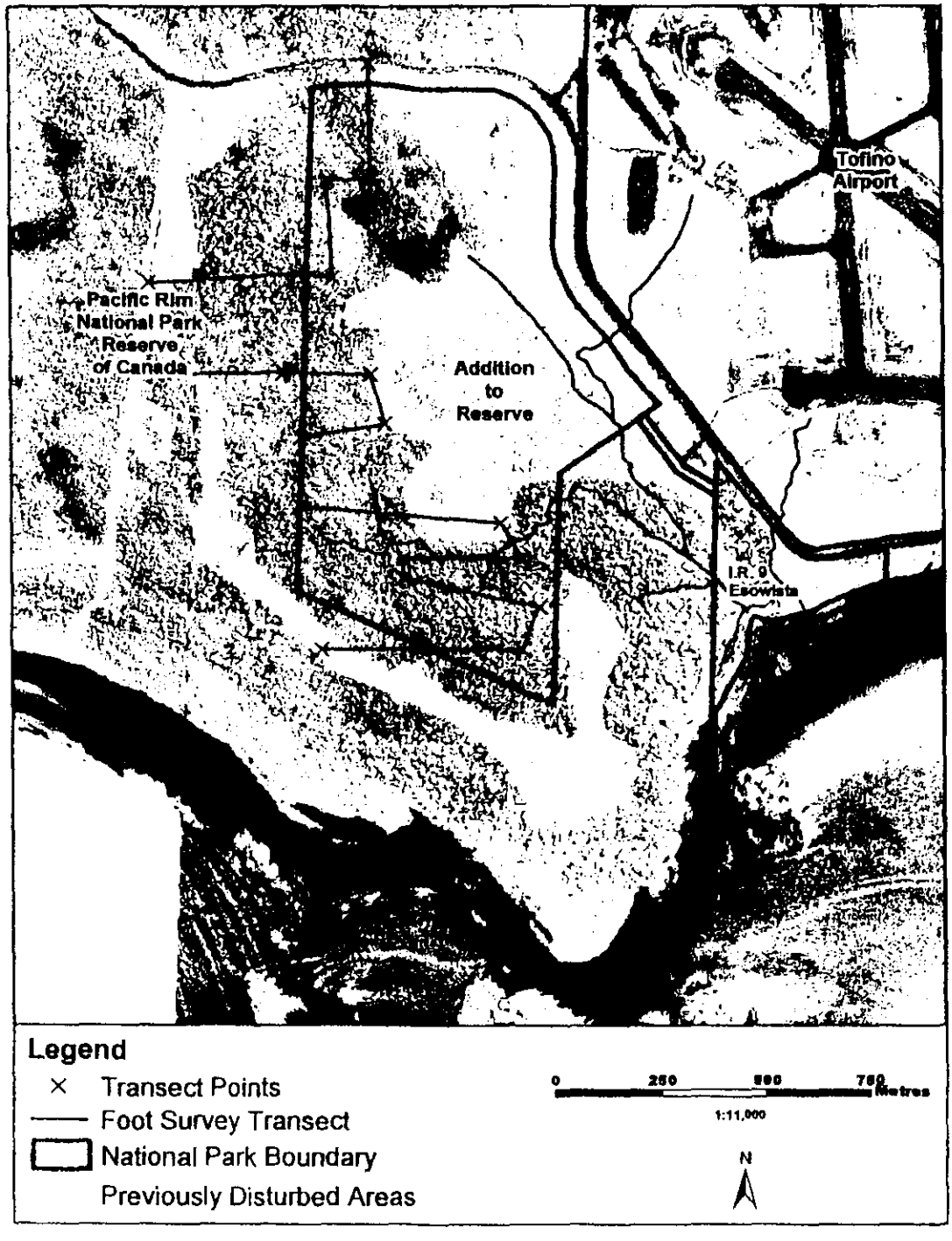
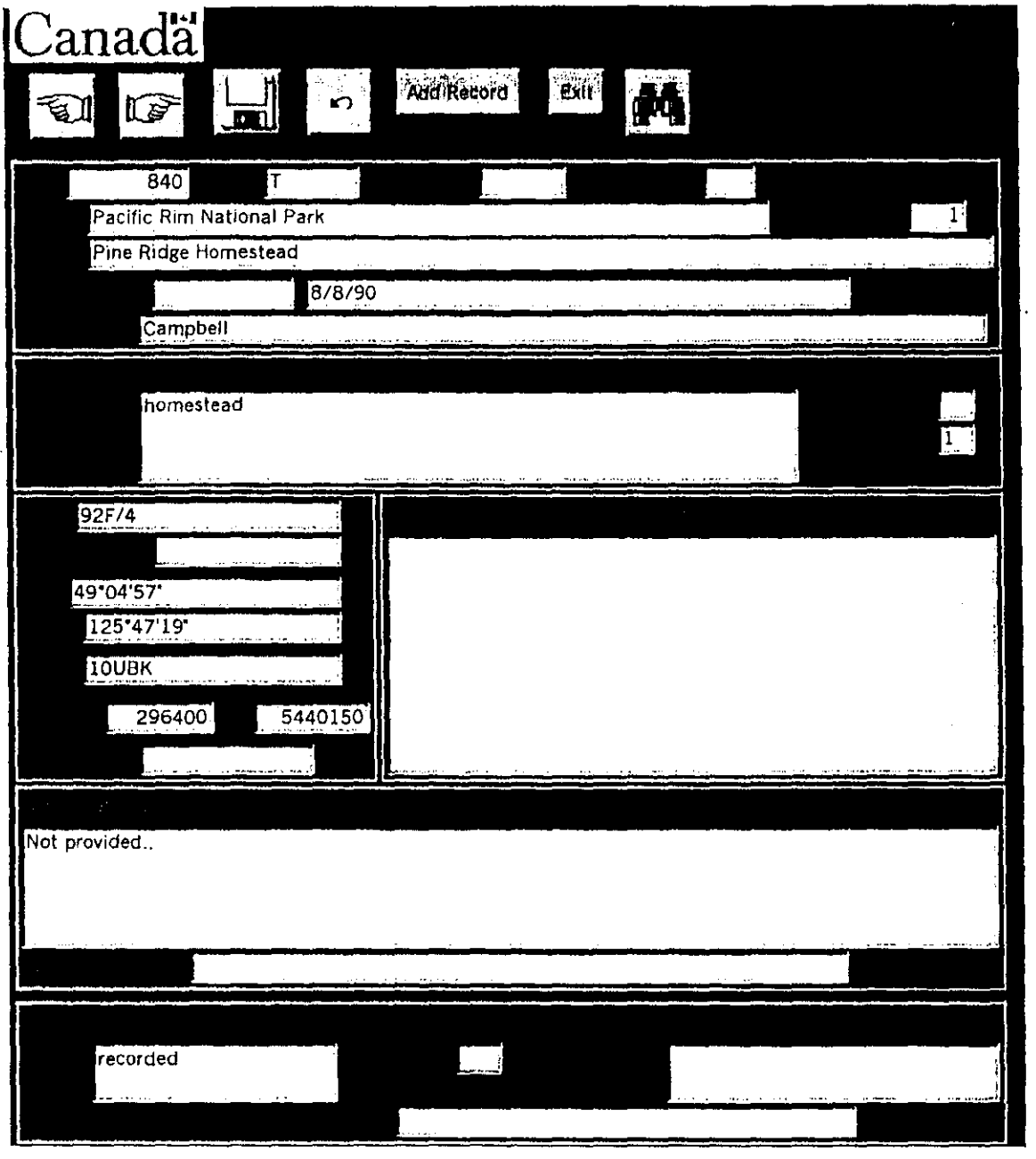


Figure 16. Ortho-mosaic of proposed Esowista land transfer study area and locations of foot survey transects.

APPENDIX F

LAND REGISTRY – LOT 840T – PARKS CANADA


Canada
Add Record
Exit
840
T
Pacific Rim National Park
1
Pine Ridge Homestead
8/8/90
Campbell
homestead
1
92F/4
49°04'57"
125°47'19"
10UBK
296400
5440150
Not provided..
recorded

840T

PINE RIDGE HOMESTEAD

Land registry records indicate a pre-emption in 1909 by Harry Seahaum. In 1970 the recorder knew the site as 2 residences and a 8 unit motel (the Pineridge Motel) owned by Paul Kimola, plus 1 - 2 other residences. The motel served as a Park staff residence until 1977-78 when it was sold and moved to Tofino. It is possible this 160 acre lot was occupied almost continuously from 1909.

1940 aerial photos show some cultural activity in excess of land clearing. It is difficult to pinpoint a structure. Almost all of the lot was burned - in fact the region was known as the Burnt Lands. A site on the 1940 photos seems to be intensively cultivated - it corresponds closely to the later motel site. The motel site itself was largely destroyed when the highway corner in the lot was realigned in 1985. Also in 1978 an overflow campground was constructed on this lot. This 160 site camping area consists of gravel roads and parking areas. Other potential sites in the 1940 aerial photo were later occupied by residences, particularly on the north side of the highway.

Therefore there is little likelihood of finding an old homestead here. I expect to find cultural evidence, but to confuse the homestead issue are possible WWII army structures and post war residences. In the S.W. corner of the lot the recorder recalls an old fence line. It may be part of the old homestead. A search of the lot will relocate this fence.

Conclusion - lot is heavily altered by cultural activity and there may be little evidence of old structures.

APPENDIX G
NCS EVALUATION

National Classification System Process Checklist

✓ **USER'S GUIDE REVIEWED**

✓ **MINIMUM DATA REQUIREMENTS MET**

- ✓ Description of site location
- ✓ Type of contaminants or materials likely to be present at site (and/or description of historical activities)
- ✓ Approximate size of site and quantity of contaminants
- ✓ Approximate depth to water table
- ✓ Geologic map or survey information (soil, overburden, and bedrock information)
- ✓ Annual rainfall data (can be inferred from rainfall map of Canada)
- ✓ Surface cover information
- ✓ Proximity to surface water
- ✓ Topographic information
- ✓ Flood potential of site
- ✓ Proximity to drinking water supply
- ✓ Uses of adjacent water resources
- ✓ Land use information (on-site and surrounding)

✓ **FACILITY/SITE DESCRIPTION COMPLETED**

✓ **SITE CLASSIFICATION WORKSHEET COMPLETED**

✓ **REFERENCES ATTACHED/CITED**

✓ **EVALUATION FORM COMPLETED**

✓ Detailed Form _____ Short Form

✓ **SCORE SHEET COMPLETED**

✓ **SITE CLASSIFICATION**

Class: ____ 1 ____ 2 X 3 ____ N ____ I

Score: 49.1 (Total) ± 12.8 (Estimated Score)

____ **SITE INFORMATION ENTERED ON NCS COMPUTERIZED VERSION**

Site Identification: _____

FACILITY/SITE DESCRIPTION

Document site information as completely as possible:

Site No.: _____ *Site Name:* Tla-o-qui-aht First Nation Esowista I.R #3, Parcel 1, Expansion Land Transfer. *Province/Territory:* British Columbia.

Custodian Dept.: Parks Canada *Facility Name:* _____ *Site Operator/Manager:* Parks Canada

Type of Site: _____ *Site Owner:* Parks Canada

Zone: _____ *UTM Coordinates:* 2 9 6 3 7 0.9 *Easting* *Latitude:* 49 deg. 04 min. 25.0 sec.

5 4 3 9 2 5 0 *Northing* *Longitude:* 125 deg. 47 min. 33.0 sec.

Location: Highway #4 (Pacific Rim Hwy), adjacent & west of Tofino Airport *Legal Land Description:* n/a

Address Tla-o-qui-aht First Nation Esowista Reserve (I.R#3), Parcel 1 *Provincial Parcel No.:* n/a

Brief Description of Site: ~86 hectare site located in Pacific Rim National Park Reserve. Northern portion previously occupied by single-family residences, motel & suspected service station. Centre portion - overflow campground.

Site Land Use: *Current:* Undeveloped & Vegetated *Proposed:* 160 residential lots as expansion to Esowista I.R. #3 (Reserve)

Comments:

Summary of Site Classification Information:

Completed Evaluation Form: X *Detailed* ___ *Short*

Site Score: 49.1 *Total* ±12.75 *Estimated Score*

Class: (1, 2, 3, N, or I) 3 *Risk:* Action May be Required

Notes: High degree of uncertainty re: potential site contamination due to a lack of historical data/records & remoteness of site. Additional uncertainty reduction may result in Class 3 → Class N.

Contact Name: Chris Lee

Position: Environmental Scientist / Biologist

Address: 320-4400 Dominion St.,

City: Burnaby *Prov./Terr.:* B.C. *Postal Code:* V5G-4M7

Phone No.: 604-430-0671 *Fax No.:* 604-430-0672

Site Classified by above X *or* _____

Degree of Familiarity with Site: ___ *Very familiar* _____ *Moderately familiar* _____ *Indirectly familiar* _____ *Unfamiliar*

Visited site: X *Yes* _____ *No*

Position: _____ *Phone No.:* _____

Address: _____

City: _____ *Prov./Terr.:* _____ *Postal Code:* _____ *Date of Completed Classification:* _____

Site Identification: _____

SITE CLASSIFICATION WORKSHEET

(Instructions: Document site information, assign score, provide rationale behind score and indicate source of information in the spaces provided.)

I. CONTAMINANT(S) CHARACTERISTICS — SCORE

A. • Degree of Hazard

List possible contaminants and estimated concentrations: Medium & Low concern contaminants; potential USTs from former residences & alleged service station. Potential metals from imported roadbase/fill material

Scoring Rationale & Information Source: No historical records to confirm presence of potential contamination — 7.5 (?)

B. • Contaminant Quantity

Estimated or measured areal volume of contaminated zone: Potential UST areas limited to small footprints along northern border of site, however, fill/roadbase occupies larger area along northern & central portions of the site b/t 2-10 ha

Scoring Rationale & Information Source: see above — 6

C. • Physical State of Contaminant

Does the site contain:
a) Predominantly liquids/gases
b) Primarily sludges
c) Primarily solids Potential metals w/in fill material

Scoring Rationale & Information Source: Relative to potential metals in fill/roadbase, potential heating oil/petroleum hydrocarbons (liquid) likely less volume — 3

• Special Considerations

Document any other important contaminant characteristics not addressed above:

Scoring Rationale & Information Source:

Site Identification:_____

SITE CLASSIFICATION WORKSHEET - cont'd

II. EXPOSURE PATHWAYS **SCORE**

A. Groundwater

1. • Known Groundwater Contamination

Document information on known groundwater contamination: _____

Scoring Rationale & Information Source: Due to watercourses & bog/marsh areas on-site, potential contamination, if present, has high probability of groundwater contact Source: Phase 1 - ESA [ ]

2.a • Engineered Subsurface Containment

Document engineered systems protecting groundwater: _____

Scoring Rationale & Information Source: vegetated & undeveloped - no engineered containment Source: Phase 1 - ESA [4]

2.b • Thickness of Confining Layer Over Aquifer(s) of Concern

Document local geological conditions: _____

Identify water-bearing zones used for water supply: _____

Scoring Rationale & Information Source: No soil / aquifer info available for site [0.75] (?)

2.c • Hydraulic Conductivity of the Confining Layer

Estimate hydraulic conductivity of any confining layer: Phase 1 - ESA: "tertiary sediments of Cenozoic Age. The unit is comprised of granite & allied plutonic rocks, as well as glacial outwash & silty fine sand." Also observed silty clays in watercourses / bog areas

Scoring Rationale & Information Source: - see above [1]

Site Identification: _____

II. EXPOSURE PATHWAYS (cont'd) **SCORE**

A. Groundwater (cont'd)

2.d • Annual Rainfall

Document rainfall data: ~ 3305.9 mm/year

Scoring Rationale & Information Source: Environment Canada - Tofino A* weather station [1]

2.e • Hydraulic Conductivity of Aquifer(s) of Concern

Estimate hydraulic conductivity of relevant aquifer(s):

Scoring Rationale & Information Source: Based on Phase 1 ESA reported surficial geology [2.5]

3. • Special Considerations

Document any other important ground water issues not addressed above:

Scoring Rationale & Information Source: [ ]

Site Identification:

SITE CLASSIFICATION WORKSHEET - cont'd

II. EXPOSURE PATHWAYS (cont'd) **SCORE**

B. Surface Water

1. • Observed or Measured Contamination

Document information on surface water contamination: No observed or measured surface water contamination. If present, contamination is anticipated to be sub-surface.

Scoring Rationale & Information Source: See above - source: Phase 1: ESA [0]

2.a • Surface Containment

Review and document engineered or natural systems protecting surface water: Numerous watercourses & bogs/marshes on-site

Scoring Rationale & Information Source: Forested & undeveloped - no containment [5]

2.b • Distance to Perennial Surface Water

Estimate distance from site to nearest stream or other water body: Site contains numerous watercourses & bogs/marshes

Scoring Rationale & Information Source: See above - source: Phase 1: ESA [3]

2.c • Topography

Document terrain conditions: Overall slopes gradually to the south. Perimeter areas relatively flat. Center portions contain valleys & ravines w/ watercourses

Document position of contaminants (are they above ground or buried?) In areas of potential contaminants, slope is relatively flat & contaminants, if present, are anticipated to be sub-surface

Scoring Rationale & Information Source: See above - source: Phase 1: ESA [0]

Site Identification: _____

SITE CLASSIFICATION WORKSHEET - cont'd

II. EXPOSURE PATHWAYS (cont'd) **SCORE**

B. Surface Water (cont'd)

2.d • Run-off Potential

Document geological and rainfall conditions: Environment Canada (1971-2000) - 3305.9 mm/year

Scoring Rationale & Information Source: See above [1]

2.e • Flood Potential

Estimate flood frequency of nearby water courses or water bodies: Localized bog/marsh areas, likely subject to periodic flooding but majority of site, particularly in vicinity of suspected contamination, has low flood potential.

Scoring Rationale & Information Source: Phase 1 : ESA [01]

3. • Special Considerations

Document any other important surface water conditions not addressed above:

Scoring Rationale & Information Source: [ ]

Site Identification: _____

SITE CLASSIFICATION WORKSHEET - cont'd

II. EXPOSURE PATHWAYS (cont'd) **SCORE**

C. Direct Contact

1. • Known Contamination Off-site:

Document reports of off-site contamination due to contact with contaminated soil, dust, air, etc.: Potential off-site contamination (USTs from former single family residences) & Army/Military Activities, but no historical / analytical data to confirm presence/absence

Scoring Rationale & Information Source: Phase 1 - ESA ☐

2.a • Airborne Emissions

Document incidents or complaints about fumes, gases, dust, odours, etc.: _____

Scoring Rationale & Information Source: Off-site contamination, if present, likely localized & predominantly sub-surface - low potential for vapours (measurable) on-site. Potential for contaminated dust. Restricted to site 2.5 (?)

2.b • Accessibility of Site

Review and document avenues of site access by humans and animals: Relatively remote site but portions used by hikers etc. Site access largely restricted by terrain & vegetation density

Scoring Rationale & Information Source: _____ 3

2.c • Hazardous Soil Gas Migration

Review potential for hazardous soil gas production and migration from site: _____

Scoring Rationale & Information Source: None identified. Source: Phase 1 - ESA 0

3. • Special Considerations

Document any other conditions whereby humans/animals could contact contamination: _____

Scoring Rationale & Information Source: _____ ☐

Site Identification: _____

SITE CLASSIFICATION WORKSHEET - cont'd

III. RECEPTORS **SCORE**

A. Human and Animal Uses

1. • Known Adverse Impact on Humans or Domestic Animals

Record known or suspected adverse effects on humans or domestic animals: _____

Scoring Rationale & Information Source: _____ ☐

2.a.i • Known Contamination of Drinking Water Supply

Record known or suspected incidents of contamination of drinking water: Water wells identified w/in 1.5 km of site, but predominantly east & cross-to-up-gradient of the site (Tofino Airport Lands). Drinking water not known to be contaminated

Scoring Rationale & Information Source: Phase 1 - ESA ☐

2.a.ii.°• Distance to Nearest Drinking Water Supply(s)

Identify nearest drinking water well and measure distance to site: A drinking water well located ~200 m cross-to-downgradient of the site @ existing Esowista I.R #3.

Scoring Rationale & Information Source: Ministry of Environment Waterwell On-line Database 5

2.a.ii.°°•Availability of Alternate Drinking Water Supply

Document availabiilty of alternate sources of drinking water and ease of implementation: Unknown whether alternative water supply exists, however, based on remoteness of site, it is unlikely that an alternative drinking water supply is readily available

Scoring Rationale & Information Source: Phase 2 - ESA site visit 1.5 (?)

Site Identification: _____

III. RECEPTORS (cont'd) **SCORE**

A. Human and Animal Uses (cont'd)

2.b.i • Known Impact on Used Water Resource

Record information on water resource that is or is potentially affected by site contamination: water not known to be used for recreational, commercial, agricultural purposes.

Scoring Rationale & Information Source: Phase 1 - ESA

2.b.ii.°• Proximity of Water Resources to Site

Locate and measure nearest water resource areas to site:

Scoring Rationale & Information Source: Phase 1 - ESA 0.5

2.b.ii.°°• Water Uses

Record uses of nearby water resources: If site re-development (Esowisten Expansion) occurs as scheduled, site may be used (frequent) for additional residential water requirements

Scoring Rationale & Information Source: Future Use Scenario - Phase 1 - ESA 0.5

Site Identification:_____

SITE CLASSIFICATION WORKSHEET - cont'd

III. RECEPTORS (cont'd) **SCORE**

A. Human and Animal Uses (cont'd)

2.c.i • Known Contamination of Land Used by Humans

Record land use type (current or proposed) and level of contamination for land known to be contaminated due to site: Limited historical information for surrounding properties (other than aerial photos & interviews). Potential for off-site contamination, but not known.

Scoring Rationale & Information Source: Phase 1 - ESA

2.c.ii • Land Use at and Adjacent to the Site

Document land uses (current and proposed) for up to 5 km from the site: Future - use on-site (proposed) ⇒ residential. Existing residential SE of site & parkland south & East of site

	N	E	S	W
0 - <300 m				
300 m - <1 km				
1 km - 5 km				

Scoring Rationale & Information Source: Phase 1 - ESA 5

3. • Special Considerations

Document any other important human or animal use information, including details of air contamination if known:

Scoring Rationale & Information Source:

Site Identification:

SITE CLASSIFICATION WORKSHEET - cont'd

III. RECEPTORS (cont'd) **SCORE**

B. Environment

1. • Known Adverse Impact(s) on Sensitive Environment

Record known impact(s) on any sensitive biological environment at and/or around the site: No known sensitive provincially listed ecosystems on-site; however, during the site visit a provincially blue-listed species (Special Concern) (Red-legged frog) was observed in the center portion of the site. However, based on lack of available information re: potential contamination, it cannot be stated w/ certainty that there is a strongly suspected adverse impact on sensitive environment.

Scoring Rationale & Information Source: B.C. Conservation Data Centre (CDC) - Search Results & Federal Species at Risk (SAR) results

2.a • Distance from Site to Nearest Sensitive Environment

Document location, distance, type and details of any nearby sensitive environments or habitats: Red-listed (Endangered) seaside centipede lichen known to exist in Schooner Cove area (Spruce Fringe habitat), adjacent & south of site. However, distance b/t suspected contaminated areas & spruce fringe habitat >500 m

Scoring Rationale & Information Source: CEAA Screening Review - Esowista IR #3 Expansion — 6

2.b • Groundwater

Measure distance to major recharge or discharge area: Groundwater to surface water discharge observed in center portion of site (ravine areas), >500 m from suspected contaminated areas.

Scoring Rationale & Information Source: Phase 2 - ESA : site visit — 4

3. • Special Considerations

Document any other important impacts on the environment not addressed above:

Scoring Rationale & Information Source:

Site Identification:

Site Identification: _____

DETAILED EVALUATION FORM

Before completing this form, review instructions in text (Section 3.0).

I **CONTAMINANTS CHARACTERISTICS** (Maximum Total Score is 33)
Complete **Sections A, B, C,** and **Special Considerations**
If answer is an estimate, circle the question mark (?) beside your score;
if **not** an estimate circle the checkmark (✓)(see Subsection 3.7.1 in text).

Factors		Scoring Guideline	Site Score	Totals
A	**Degree of Hazard** (max. 14)			
	• High concern contaminants - high concentration	14		
	• High concern contaminants - low concentration	11		
	• Medium concern contaminants - high concentration	8		
	• Medium concern contaminants - low concentration	5		
	• Low concern contaminants	3	7.5 (?)✓	7.5 Section A max. 14
B	**Contaminant Quantity** (area or volume of site contamination) (max. 10)			
	• >10 ha or 1000 m^3 or drums of liquid	10		
	• 2 to 10 ha or 100 to 1000 m^3	6		
	• <2 ha or 100 m^3	2	6 ?(✓)	6 Section B max. 10
C	**Physical State of Contaminants** (max. 9)			
	• Liquid/gas	9		
	• Sludge	7		
	• Solid	3	3 ?(✓)	3 Section C max. 9
Special Considerations				
	Discretionary addition or subtraction to this category score (Contaminant Characteristics) by up to 6 points based on technical judgment of the user. (Special considerations scores must not cause total score for this category to exceed the maximum (33) or be lower than the minimum (0) allowable.)			
	DETAILED RATIONALE MUST BE DOCUMENTED	-6 to +6	___ ✓	___ max. 6

				Total "✓"	Total "?"	Total "✓"+"?"
I	**Total Site Score for CONTAMINANT CHARACTERISTICS**	Add:	Section A	0	7.5	7.5
			Section B	6	0	6
			Section C	3	0	3
			Special Considerations			
			TOTAL	9	7.5	9 + 7.5
						max. 33

Site Identification: _____

Site Identification: _____

DETAILED EVALUATION FORM (Cont'd.)

II EXPOSURE PATHWAYS (Maximum Total Score is 33)
Complete Sections A, B, and C.

A Groundwater (Maximum Score is 11)
Score **Section 1 (Known)** OR **2 (Potential)**, and **Section 3.**
If answer is an estimate, circle the question mark (?) beside your score;
if **not** an estimate circle the checkmark (✓).

Factors	Scoring Guideline	Site Score	Totals
1 Known Contamination of Groundwater at or beyond the Property Boundary (measured contamination of, or known contact with, groundwater (max. 11)			
• Groundwater significantly exceeds CDWG (by >2x) or known contact of contaminants with groundwater;	11		
• Between 1 and 2x CDWG or probable contact with groundwater	6		
• Meets Canadian Drinking Water Guidelines	0	___ ✓	
If impact on groundwater is not known, complete 2			Section 1 max. 11
OR 2 Potential for Groundwater Contamination (max. 11)			
a) Engineered subsurface containment (max. 4)			
• No containment	4		
• Partial containment	2		
• Full containment	0	4 ? ✓	
b) Thickness of confining layer over aquifer (max. 1.5)			
• 3 m or less	1.5		
• 3 to 10 m	1		
• >10 m	0	0.75 ? ✓	
c) Hydraulic conductivity of the confining layer (max. 1.5)			
• $>10^{-4}$ cm/sec	1.5		
• 10^{-4} to 10^{-6} cm/sec	1		
• $<10^{-6}$ cm/sec	0.5	1 ? ✓	
d) Annual rainfall (max. 1)			
• >1,000 mm	1		
• 600 mm	0.6		
• 400 mm	0.4		
• 200 mm	0.2	1 ? ✓	
e) Hydraulic conductivity of aquifer(s) of concern (max. 3)			
• $>10^{-2}$ cm/sec	3		
• 10^{-2} to 10^{-4} cm/sec	1.5		
• $<10^{-4}$ cm/sec	0.5	1.5 ? ✓	Section 2 max. 11

3	**Special Considerations** Discretionary addition or subtraction to this sub-category score (Groundwater Pathway) by up to 4 points based on technical judgment of the user. (Special considerations scores must not cause total score for this category to exceed the maximum (11) or be lower than the minimum (0) allowable.) DETAILED RATIONALE MUST BE DOCUMENTED		-4 to +4	___	✓	___ Section 3 max. 4

				Total "✓"	Total "?"	Total "✓"+"?"
A	**Groundwater Total**	Add:	Section 1 or 2	7.5	0.75	7.5 ± 0.75
			Section 3	___	___	___
			TOTAL	7.5	0.75	7.5 ± 0.75 max. 11

Site Identification: _____

Site Identification: _____

DETAILED EVALUATION FORM (Cont'd.)

II EXPOSURE PATHWAYS (Cont'd.)

B Surface Water (Maximum Score is 11)
Score **Section 1 (Known)** OR **2 (Potential)**, and **Section 3.**

Factors		Scoring Guideline	Site Score	Totals
1	**Observed or Measured Contamination of Water/Effluent Discharged from Site** (max. 11)			
	• Known or strongly suspected to exceed CWQG by >2x	11		
	• Known or strongly suspected to be between 1 and 2x CWQG	6		
	• Meets Canadian Water Quality Guidelines	0	___ ✓	
	If impact on surface water is not known, complete 2			___ Section 1 max. 11
OR 2	**Potential for Surface Water Contamination** (max. 11)			
	a) Surface containment (max. 5)			
	• No containment	5		
	• Partial containment	3		
	• Full containment	0.5	5 ?✓	
	b) Distance to perennial surface water (max. 3)			
	• 0 to <100 m	3		
	• 100 - 300 m	2		
	• >300 m	0.5	3 ?✓	
	c) Topography (max. 1.5)			
	• Contaminants above ground level and slope is steep	1.5		
	• Contaminants at or below ground level and slope is steep	1.2		
	• Contaminants above ground level and slope is flat	0.8		
	• Contaminants at or below ground level and slope is flat	0	0 ?✓	
	d) Run-off potential (see nomograph at end of Appendix D) (max. 1)			
	• >1000 mm rainfall and low permeability surface material	1		
	• 500-1000 mm rainfall and moderately permeable surface material	0.6		
	• <500 mm rainfall and highly permeable surface material	0.2	1 ?✓	
	e) Flood potential (max. 0.5)			
	• 1 in 2 years	0.5		
	• 1 in 10 years	0.3		
	• 1 in 50 years	0.1	0.1 ?✓	___ Section 2 max. 11

3	**Special Considerations** Discretionary addition or subtraction to this sub-category score (Surface Water Pathway) by up to 4 points based on the technical judgment of the user. (Special considerations scores must not cause the total score for this sub-category to exceed the maximum (11) or be lower than the minimum (0) allowable.) DETAILED RATIONALE MUST BE DOCUMENTED		-4 to +4	____	✓	____ Section 3 max. 4

				Total "✓"	Total "?"	Total "✓"+"?"
B	**Surface Water Total**	Add:	Section 1 or 2	9.1	0	9.1
			Section 3	____	____	____
			TOTAL	9.1	0	9.1 max. 11

Site Identification: _____

Site Identification: _____

DETAILED EVALUATION FORM (Cont'd.)

II EXPOSURE PATHWAYS (Cont'd.)

C Direct Contact (Maximum Score is 11)

Score **Section 1 (Known)** OR **2 (Potential)**, and **Section 3**

Factors		Scoring Guideline	Site Score	Totals
1	**Known Contamination of Media Off-site** (max. 11)			
	• Known contamination of media (soil, sediment, air) off-site due to direct contact with contaminated soil, dust, air, etc. (vector transported should also be considered)	11		
	• Strongly suspected contamination of media (soil, sediment, air) off-site	6		
	• No contamination of media off-site	0	___ ✓	Section 1 max. 11
	If impact due to direct contact is not known, complete 2			
OR 2	**Potential for Direct Human and/or Animal Contact** (max. 11)			
	a) Airborne Emissions (gases, vapours, contaminated dust, etc.) (max. 5)			
	• Known or suspected airborne emissions impacting on neighbouring properties (see User's Guide)	5		
	• Airborne emissions generally restricted to site	3		
	• No airborne emissions	0	2.5 (?)✓	
	b) Accessibility of Site (Ability to Contact Materials) (max. 4)			
	• Limited barriers to prevent site access; contaminants not covered	4		
	• Moderate accessibility or no intervening barriers; contaminants are covered	3		
	• Controlled access or remote location and contaminants are covered	0	3 ?(✓)	
	c) Hazardous soil gas migration from the site (max. 2)			
	• Contaminants are putrescible and soil permeability is high	2		
	• Site contaminants are putrescible but soil permeability is low, and/or groundwater is <2 m from surface	1		
	• No putrescible contaminants at the site	0	0 ?(✓)	Section 2 max. 11
3	**Special Considerations**			
	Discretionary addition or subtraction to this sub-category score (Direct Contact Pathway) by up to 4 points based on the technical judgment of the user. (Special consideration scores must not cause the total score for this sub-category to exceed the maximum (11) or be lower than the minimum (0) allowable.)			
	DETAILED RATIONALE MUST BE DOCUMENTED	-4 to +4	___ ✓	Section 3 max. 4

				Total "✓"	Total "?"	Total "✓"+"?"
C	**Direct Contact Total**	Add:	Section 1 or 2	3.0	2.5	3.0 ± 2.5
			Section 3			
			TOTAL	3.0	2.5	3.0 ± 2.5 (max. 11)

II	**Total Site Score for EXPOSURE PATHWAYS**	Add:	**A Groundwater**	7.5	0.75	7.5 ± 0.75
			B Surface Water	9.1	0.0	9.1
			C Direct Contact	3.0	2.5	3.0 ± 2.5
			TOTAL	19.6	3.25	19.6 ± 3.25 (max. 33)

Site Identification: _____

Site Identification: _____

DETAILED EVALUATION FORM (Cont'd.)

III **RECEPTORS** (Maximum Total Score is 34)
Complete Sections A and B.

A **Human and Animal Uses** (Maximum score is 18)
Score **Section 1 (Known)** OR **2 (Potential)**, and **Section 3.**
If answer is an estimate, circle the question mark (?) beside your score; if **not** an estimate circle the checkmark (✓).

Factors	Scoring Guideline	Site Score	Totals
1 Known Impact on Humans or Animals (max. 18)			
Known adverse impact on humans or domestic animals as a result of the contaminated site (see User's Guide)			
• Known adverse effect on humans or domestic animals	18		
• Strongly suspected adverse effect on humans or domestic animals	15	___ ✓	___ Section 1 max. 18 ↓ Class 1
If adverse effect on humans is not known, complete **2**			
OR 2 Potential for Impact on Humans or Animals (max. 18)			
a) Drinking Water Supply (max. 9) (groundwater or surface water; private, commercial or municipal supply) Complete **Section i) (Known) OR ii) (Potential)**			
i) Known impact on drinking water supply (max. 9) (see User's Guide) Drinking water supply is known to be adversely affected as a result of site contamination			
• Known contamination of drinking water supply (to levels exceeding CDWG)	9		
• Strongly suspected contamination of drinking water supply	7		
• Drinking water supply is known not to be contaminated	0	___ ✓	
If impact on drinking water is not known, complete **ii)**			
ii) Potential for impact on drinking water supply (max. 9)			
■ Proximity to drinking water supply (max. 6)			
• 0 to <100 m	6		
• 100 to <300 m	5		
• 300 m to <1 km	4		
• 1 to 5 km	3	5 ? ✓	
■ "Availability" of alternate drinking water supply (max. 3)			
• Alternate drinking water supply is not available	3		
• Alternate drinking water supply difficult to obtain	2		
• Alternate drinking water supply available	0.5	1.5 ? ✓	

Factors	Scoring Guideline	Site Score	Totals

b) Other Water Resources (max. 4)
(groundwater or surface water)

Complete **i) (Known) OR ii) (Potential)**

i) Known impact on water resources (max. 4) (see User's Guide)
Water resources (used for recreational purposes, commercial food preparation, livestock watering, irrigation and other food chain uses) is known to be adversely affected as a result of site contamination

	Scoring Guideline	Site Score
• Water resource is known to be contaminated above CWQG	4	
• Water resource is strongly suspected to be contaminated above CWQG	3	
• Water resource is known not to be contaminated	0	___ ✓

If impact on water resource is not known, complete **ii)**

ii) Potential for impact on water resources (max. 4)

■ Proximity to water resources used for activities listed above (max. 2)

	Scoring Guideline	Site Score
• 0 to <100 m	2	
• 100 to <300 m	1.5	
• 300 m to <1 km	1	
• 1 to 5 km	0.5	0.5 ? ✓

■ Use of water resources (max. 2)
If multiple uses, give highest score automatically
(use following table)

Water Use	Frequency of Use: Frequent	Frequency of Use: Occasional
Recreational (swimming, fishing, etc.)	2	1
Commercial food preparation	1.5	0.8
Livestock watering	1	0.5
Irrigation	1	0.5
Other domestic or food chain uses	0.5	0.3
Not currently used but likely future use	0.5	0.2

0.5 ? ✓

Site Identification: _____

DETAILED EVALUATION FORM (Cont'd.)

III RECEPTORS (Cont'd.)

A Human and Animal Use (Cont'd.)

Factors	Scoring Guideline	Site Score	Totals
c) Direct Human Exposure (max. 5)			
Complete **i) (Known) OR ii) (Potential)**			
i) Known contamination of land used by humans (max. 5) (see User's Guide)			
• Known contamination of land used for agricultural or residential/parkland/school purposes above AG or R/P EQC values.	5		
• Known contamination of land used for commercial or industrial purposes above C/I EQC values.	3.5		
• Land is known not be contaminated	0	___ ✓	
If impact on used land is not known, complete ii)			
ii) Potential human exposure through land use (give highest score to worst case scenario) (max. 5)			
■ Use of land at and surrounding site. Determine use(s) of land at and surrounding site and assign score using following table:			

	Distance from Site		
Land Use	0-<300 m	300 m-<1 km	1 km-5 km
Residential	(5)	4.5	3
Agricultural	5	4	2.5
Parkland/School	4	3	1.5
Commercial/Industrial	3	1	0.5

5 ? (✓)

Section 2 max. 18

3 Special Considerations

Discretionary addition or subtraction to this sub-category (Impact on Human and Animal Receptors) by up to 5 points based on the technical judgment of the user. (Special considerations score must not cause the total score for this sub-category to exceed the maximum (18) or be lower than the minimum (0) allowable.)

DETAILED RATIONALE MUST BE DOCUMENTED | -5 to +5 | ___ ✓

Section 3 max. 5

				Total "✓"	Total "?"	Total "✓"+"?"
A	**Total Human and Animal Receptors**	Add:	Section 1 or 2	10.5	2.0	10.5 ± 2.0
			Section 3			
			TOTAL	10.5	2.0	10.5 ± 2.0 (max. 18)

Site Identification: _____

Site Identification: _____

DETAILED EVALUATION FORM (Cont'd.)

III RECEPTORS (Cont'd.)

B Environmental Receptors (Maximum Score is 16)
Score **Section 1 (Known)** OR **2 (Potential)**, and **Section 3**

Factors		Scoring Guideline	Site Score	Totals
1	**Known Adverse Impact on the Environment as a Result of the Contaminated Site** (max. 16)			
	• Known adverse impact on sensitive environment	16		
	• Evidence of stress on aquatic species, or vegetative stress on trees, crops or plant life located on properties neighbouring the site	14		
	• Strongly suspected adverse impact on sensitive environment	12	___ ✓	
	If impact on the environment is not known, complete 2.			___ Section 1 max. 16
OR 2	**Potential for Impact on Sensitive Environments** (max. 16)			
	a) Distance from the site to the nearest sensitive environment (max. 10) (e.g., sensitive aquatic environment, nature preserve, habitat for endangered species, sensitive forest reserves, national parks or forests, etc.)			
	• 0 to <500 m	10		
	• 500 m to <2 km	6		
	• 2 to <5 km	2		
	• 5 to 10 km	0.5	6 ? ✓	
	b) Groundwater (max. 6) Distance to an important or susceptible groundwater resource (e.g. recharge area)			
	• 0 to <500 m	6		
	• 500 m to <2 km	~~3~~ 4		
	• 2 to <5 km	2		
	• 5 to 10 km	1	4 ? ✓	___ Section 2 max. 16
3	**Special Considerations**			
	Discretionary addition or subtraction to this sub-category (Environmental Receptors) by up to 5 points based on the technical judgment of the user. (Special considerations score must not cause total score for this sub-category to exceed the maximum (16) or be lower than the minimum (0) allowable.)			
	DETAILED RATIONALE MUST BE DOCUMENTED	-5 to +5	___ ✓	___ Section 3 max. 5

					Total "✓"	Total "?"	Total "✓"+"?"
B	**Total Environmental Receptors**		Add:	Section 1 or 2	10.0	0.0	10.0 ± 0.0
				Section 3			
				TOTAL	10.0	0.0	10.0 ± 0.0
							max. 16
III	**Total Site Score for RECEPTORS**	Add:	**A**	**Human and Animal Use**	10.5	2.0	10.5 ± 2.0
			B	**Environmental Receptors**	10.0	0.0	10.0 ± 0.0
				TOTAL	20.5	2.0	20.5 ± 2.0
							max. 34

Site Identification: _____

APPENDIX C2

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT

KEYSTONE
ENVIRONMENTAL

Keystone Environmental Ltd.
Suite 320 4400 Dominion St.
Burnaby BC V5G 4M7
Telephone 604 430 0671
Facsimile 604 430 0672
keyinfo@keystoneenviro.com

File #8812-02 (1.0)

June 26, 2006

Public Works and Government Services Canada
Indian and Northern Affairs Canada
14th Floor, 1138 Melville Street
Vancouver, BC
V6E 4S3

Attention: Ms. Paula Santos, P.Eng.

Dear Sirs/Mesdames:

Re: Report of Findings, Phase II Environmental Site Assessment
Tla-o-qui-aht First Nation Esowista Indian Reserve #3, Parcel 1
Tofino, B.C.

This letter report presents the findings of a KEYSTONE ENVIRONMENTAL™ Phase II Environmental Site Assessment (Phase II ESA) prepared at the request of Public Works and Government Services Canada (PWGSC) on behalf of Indian and Northern Affairs Canada (INAC) for a property referenced as Parcel 1, Tla-o-qui-aht First Nation Esowista Indian Reserve #3 (the "site"). The site is located approximately seven kilometres south of Tofino within the Long Beach Unit of Pacific Rim National Park. The investigation was performed subsequent to a Phase I Environmental Site Assessment (Phase I ESA) conducted by Keystone Environmental Ltd. in December, 2005. This Phase II ESA was conducted on March 28th and 29th, 2006. It is understood that the investigation is being conducted to fill a data gap identified in the Canadian Environmental Assessment Act (CEAA) Screening Report. The location of the site is presented on Figure 1.

1. Background

Keystone Environmental Ltd. (Keystone) prepared a Phase I Environmental Site Assessment for the site. This study revealed that the northern portion of the site was occupied by single-family residence(s) from circa 1910 to the early 1980s. In the 1960s, a six to eight room single-storey motel and adjoining outbuildings were constructed along

the northeast border of the site adjacent to Highway 4 and were removed from the site in the early 1970s. Between the 1960s and the 1970s, a service station was reported to have been located on the site, adjacent to and west of the motel. Between the 1950s and the 1970s, portions of the site appeared to have been cleared and cultivated for use as agricultural or pasture land. Between the mid 1970s and early 1980s, numerous unpaved, unvegetated areas and a gravel road network were observed on-site, corresponding to an overflow campground area that operated on-site during that period. The southern portion of the site appeared to have been vacant and vegetated from the early 1900s, or earlier, to present. Currently, the site is undeveloped, vacant and vegetated.

The Phase I ESA revealed the following on-site areas of potential environmental concern (APECs).

- Former residences located along the northern edge of the site (potential for heating oil underground storage tank(s) [USTs]).
- A former service station located at the northeast corner of the site (potential USTs).[1]
- Imported road base/fill material of unknown quality and quantity located on approximately eight hectares at the northern portion of the site; associated with former residences, cleared areas and previous campground roadbase network.

2. Study Limitations

Findings presented in this report are based upon (i), a visual review of accessible areas of the Site and surrounding grounds, (ii), interviews with available personnel familiar with the Site, (iii), a review of available Site and historic archive records, and (iv), the results of a field investigation including soil sample analyses. Geologic observations and analytical results reflect conditions encountered at a specific test location. Site conditions (geologic, hydrogeologic, and chemical characterization) may vary from that extrapolated from the data collected during this investigation. Consequently, while findings and conclusions documented in this report have been prepared in a manner consistent with that level of care and skill normally exercised by other members of the environmental science and engineering profession practicing under similar circumstances in the area at

[1] An interview was conducted during the Phase 1 ESA with the son of the former motel operator, who reported that a service station was present on-site for two to five years between the 1960s and 1970s. Interviews conducted during the Phase 2 ESA on March 29, 2006, with a former on-site resident Mr. Matt Williams and long-time Tofino resident Mr. Ken Gibson, indicated that a service station was not located on-site. The Phase 2 ESA investigative program remained unchanged in the unlikely event that a former service station was present on-site.

the time of the performance of the work, this report is not intended nor is it able to provide a totally comprehensive review of present or past site environmental conditions.

This report has been prepared solely for the internal use of the Tla-o-qui-aht First Nations, Public Works and Government Services Canada (PWGSC) and Indian and Northern Affairs Canada (INAC) and pursuant to the agreement between Keystone Environmental Ltd. and PWGSC. Any use which other parties make of this report, or any reliance on or decisions made based on it, are the responsibility of such parties. Keystone Environmental Ltd. accepts no responsibility for damages, if any, suffered by other parties as a result of decisions made or actions based on this report.

3. Investigative Program

The Phase II ESA was conducted on March 28th and 29th, 2006 to investigate for the presence of heating oil and gasoline USTs, and if constituents of concern associated with fill material and potential USTs are present in the site soil at concentrations greater than the applicable standards as outlined in the Canadian Council for Ministers of the Environment (CCME) Canadian Council for the Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG).

The scope of work for the PSI 2 consisted of the following tasks.

- Conducting a utility search through BC One Call and through other utility owners.
- Performing a ground penetrating radar (GPR) survey, and electro-frequency survey and magnetic locator on-site to investigate for the potential presence of underground utilities and/or USTs.
- Using a mini-excavator to advance up to 14 test pits in the former campground and residential areas, and up to 8 test pits in the area of the former service station.
- Collecting soil samples from the up to 22 test pit locations.
- Analyzing one soil sample from each testpit/borehole with samples being submitted based on field screening methods and observations.
- Documenting the results of the investigation in a letter report with recommendations for further investigation or remediation, if necessary.

The following table presents the areas of potential environmental concern, constituents of potential concern, and the corresponding investigative measures.

Areas of Potential Environmental Concern (APECs)	Potential Constituents Of Concern (PCOCs)	Investigation
	Soil	
Heating oil USTs associated with former residences	PHC Fractions F2-F4	GPR/Magnetic locator/ Electro-frequency survey
Former Service Station	PHC Fractions F1-F4 and BTEX	GPR/Magnetic locator/ Electro-frequency survey and up to 8 test pits
Road Base / Fill Material and Residential Area	Metals, PHC Fractions F2-F4	Up to 14 test pits

PHC – Petroleum hydrocarbons
BTEX – Benzene, Toluene, Ethylbenzene and Xylene

3.1 Magnetic Locator and Electro-Frequency Survey

A utility locator, Interproject Systems Inc. (IPS), was contracted to identify potential locations of underground utilities and/or USTs prior to the commencement of testpitting. A visual inspection of the Site was also performed to identify the presence of overhead utilities.

3.2 Test Pitting and Soil Sampling

The on-site testpitting was performed by R. Amos Excavating & Construction Ltd. (RAECL) using a mini-track rig excavator on March 28th and 29th, 2006. The revegetation of the site initially prevented the excavator from accessing the proposed testpit locations. RAECL contracted a tree faller, who provided access to testpit locations by removing immature alder trees and shrubs. No mature trees or sensitive species (including cedar trees) were disturbed.

Testpits TP06-1 to TP06-9 were advanced in the gravel fill road network of the former campground (Figure 2) to investigate areas of potential environmental concern. The testpits were excavated through fill material to a maximum depth of approximately 1.5 metres below grade until native soil was reached. Visual and olfactory evidence of contamination was recorded.

Testpits TP06-10 to TP06-18 were advanced in the former residential areas along the northern portion of the site to investigate areas of potential environmental concern. The testpits were excavated to determine potential metal anomalies identified by IPS during the electromagnetic survey and to identify potential fill material present. Soil samples collected in the area of the former residences were screened for the potential presence of organic vapours. Approximately 125 ml of soil from each sample was placed in a ZiplockTM bag for soil headspace vapour measurement using a Gastec (Model 1238ME). Visual and olfactory evidence of contamination was also recorded.

Keystone personnel observed the testpitting and collected soil samples. Soil samples were selected for analyses based on field observations, organic vapour measurements, and aesthetic considerations. In areas where fill material was present, soil samples were collected from within the fill layer on the wall of the excavation. The soil was placed in laboratory supplied sample jars and placed in a cooler. Each sample was collected wearing new nitrile glove to minimize the potential for cross-contamination. The samples analyzed were those suspected to contain the highest concentration of potential constituents of concern.

Soil samples from the former campground road network (TP06-1 to TP06-9), and from areas at the northern portion of the site where fill material was observed (TP06-17) were submitted to the laboratory (CanTest Ltd. in Burnaby, B.C.) for analysis of metals and petroleum hydrocarbon (PHC) fractions F2-F4. Soil samples collected from the northern portion of the site that were in areas potentially occupied by a former service station were submitted to the laboratory for analysis of BTEX (Benzene, Toluene, Ethylbenzene and Xylene) and PHC fractions F1-F4 (TP06-112), and PHC fractions F2-F4 (TP06-12 and TP06-15 to TP06-17). Soil samples located on the northwestern portion of the site, in former residential areas and not anticipated to be occupied by former fuelling facilities, were sampled for PHC fractions F2-F4 (TP06-10, TP06-13, TP06-14 and TP06-18). All soil samples were submitted to the laboratory for analysis under chain of custody.

3.3 Surface Water Sampling

Surface water sampling was conducted by Keystone personnel on March 29th, 2006 in a water-filled depression containing two 205 L metal drums in the former residential area

[2] TP06-11 was located beneath a potential above-ground storage tank foundation and stand.

at the northern portion of the site. As the contents of the drums and purpose of the depression were unknown, a water sample was collected and submitted under chain of custody to a laboratory for analysis of petroleum hydrocarbons C10-C50. Visual hydrocarbon sheens and olfactory evidence of contamination were recorded.

4. Investigative Results

4.1 Applicable Standards

Analytical results were compared to the standards specified in the Canadian Council for Ministers of the Environment (CCME) Canadian Council for the Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG), defaulting to the British Columbia *Contaminated Sites Regulation* (CSR) where CEQG values are not available.

4.2 Surficial Geology

4.2.1 Regional Geology

The local surficial geology of the area was determined by consulting the Geological Survey of Canada Map 1:15,000,000 (1969). The stratigraphy of the Site consists of tertiary sediments of Cenozoic age. The unit is comprised of granite and allied plutonic rocks, as well as glacial outwash and silty fine sand.

4.2.2 Site Geology

The stratigraphy at the Site as intersected in each of the testpits consisted of the following:

TP06-1 to TP06-9
A 0.3 to 0.7 m thick fill layer was found below the ground surface consisting of loose, grey sandy-gravel, with cobbles. The fill layer was located above a dense native brown-gray clay layer extending to the terminus of the test pits.

TP06-10 to TP06-16 and TP06-18
A 0.2 to 0.4 m thick soil layer was observed below the ground surface comprised of loose, dark-brown, native organic material. The organic soil layer was located above a

dense, native brown clay layer to the terminus of the test pits.

TP06-17
A 0.8 m thick fill layer was observed below the ground surface comprised of loose, dark-brown, sandy-gravel fill material, with asphalt and brick debris, and boulders present. The fill and debris layer was located over native, brown clay to the terminus of the test pit.

The maximum soil headspace vapour concentration in the fill material was at TP06-15 (3.3 ppm) at a depth of 0.12 m below grade. This vapour concentration is not considered to be an elevated reading.

4.3 Magnetic Locator and Electro-frequency Survey Results

Based on the dense vegetation and organic debris present on-site in the area of the former residences, IPS was unable to use a GPR. A magnetic locator and electro-frequency survey was performed on March 28th, 2006, which along with visual observations identified the presence of the following suspect UST locations. The test pits which were advanced in these areas are indicated in parentheses.

- Metal supports and wooden platform (TP06-11)
- Two 48 gallon metal drums in a ponded depression observed from the ground surface (TP06-12 and SW06-1)
- Metal pipe protruding from ground surface (TP06-13)
- Buried metal anomaly and suspect UST (TP06-14)

4.4 Field Observations

The following observations were noted during the field survey and the excavation works.

- TP06-1 to TP06-7 and TP06-9 consisted of fill material consisted with the road base throughout the former campground road network. Odours and stains were not detected or observed within fill material.
- TP06-8 was located within a depression, approximately 3.5 x 2.5 m in area. Three other depressions of similar size were located in proximity to TP06-8. Some woody debris was included in the sandy, gravel/cobble fill material present. No septic

systems were located on-site during the period the campground was present. There is considered a high probability that the depressions were previous out-house locations, based on the size of the depressions and locations in proximity to each other. Odours and stains were not detected or observed within fill material.

- TP06-10 was located approximately 10 m from Highway 4 and adjacent to a mixed cobble and concrete foundation measuring 1.2 x 2.1 m in area. The excavation did not reveal the presence of fill material. Based on the proximity to the highway, the foundation was likely associated with a former road sign, rather than a heating oil or fuelling storage area. No odours or stains were detected or observed within the excavation.
- TP06-11 was located beneath what appeared to be a metal above-ground storage tank (AST) stand supported by a sheet of plywood over four concrete footings. No fill material was observed within the excavation and remains of the former AST were not observed. No odours or stains were detected or observed within the excavation.
- Surface water (SW06-1) was collected in a water-filled depression containing two, 205 L metal drums located within the former residential area at the northern portion of the site. The ponded depression covered an area of 1.8 x 1.1 m, and was approximately 0.8 m deep. Portions of the depression's walls were lined with bricks below the ground surface. Based on the size of the ponded area and the bricks present, there is the potential for it to have been an abandoned out-house or water well associated with a former residence. The two metal drums were in poor condition, rusted and filled with water. No hydrocarbon sheens were observed on the water surface and no odours were noted.
- TP06-12 was located 1.5 m south and down-gradient of a water-filled depression containing two, 205 L metal drums. No fill material was observed, and no odours or stains were detected within the excavation.
- TP06-13 was located beneath a metal pipe (approximately 1 m in length and 0.07 m diameter) that protruded from the ground surface on the northern edge of the site in the area of a former residence. No fill material was observed in the excavation and no evidence of a UST was noted. A metal object was identified on the ground surface in proximity to the pipe that may have been a lid for a septic tank. No odours or stains were detected or observed within the excavation.
- TP06-14 contained a buried hot-water tank, stove and partial concrete foundation located approximately 0.9 m below the ground surface. Material excavated surrounding the buried refuse appeared to be native organic material, and no other fill material was observed. No odours or stains were detected or observed within the

excavation.

- The stratigraphy at TP06-15, TP06-16 and TP06-18 consisted of a dark, native organic material over a dense clay layer. Debris recovered from the excavations included a plastic water pipe and a metal woodstove stand pipe from TP06-16. A portion of a residential foundation was located at grade adjacent to TP06-18. No odours or stains were detected or observed within the excavations.
- TP06-17 was advanced in a former residential area where asphalt debris was observed on the ground surface. The excavation contained asphalt and brick debris, and granular fill material. No odours or stains were detected or observed within the excavation.

No evidence of a former service station, such as fill pipes, USTs or pump islands were identified along the northern edge of the site. A previous site resident Mr. Matt Williams reported that there was no history of a service station on-site. He indicated the closest service station was located west of the site near the Pacific Rim National Park, Parks Warden office. This was confirmed by Mr. Ken Gibson, a long-time Tofino resident.

4.5 Soil and Surface Water Characterization

The soil analytical results are summarized on Tables 1, 2 and 3. Analytical results for one surface water sample collected is provided in Table 4. The laboratory analytical reports are attached and summarized for each test pit location on Figure 3.

Soil analytical results indicate that the metals, BTEX and PHC were detected at concentrations less than the CCME residential land use standards, with the exception of copper at TP06-3, TP06-8 and TP06-17, which exceeded the CCME guideline in soil (63 ug/g). The concentrations found were 64, 64 and 166 ug/g respectively. The CCME guideline for zinc in soil (200 ug/g) was also exceeded at TP06-17, where a concentration of 216 ug/g was found.

Analytical results for a surface water sample (SW06-1) collected in a ponded depression containing two metal drums was analyzed for PHC (C10-50). The CCME drinking water criteria does not provide guidelines for PHC in water. Analytical results of PHC concentrations at SW06-1 were below detection limits, with the exception of PHC (C16-34) found to be present at 300 ug/L marginally greater than the 250 ug/L detection limit.

5. Discussion and Conclusions

A Phase I ESA concluded that constituents of potential environmental concern may be present in the site soil due to the presence of potential heating oil USTs and associated residual hydrocarbons to be located in areas occupied by former residences, a former potential service station, and fill material on-site. A discussion of each of these APECS is provided below.

5.1 Heating oil USTs Associated with Former Residences

Prior to the commencement of testpitting, a magnetic locator and electromagnetic survey was conducted to determine the presence of any USTs that may have been located near former residences that existed along the northern edge of the site. Underground anomalies indicative of a potential heating oil USTs uncovered miscellaneous metal debris during the test pitting but no USTs were discovered. Remnants of a former AST was noted in the areas of a former residence at the northern edge of the site. A soil sample collected beneath the AST stand (TP06-11) did not detect PHC above the CCME residential guidelines. All other soil samples collected along the northern portion of the site did not contain PHC concentrations above CCME residential guidelines. Therefore, there is considered to be a low potential for heating oil USTs and associated constituents of concern to be present on-site at levels of concern.

A surface water sample was collected from a depression which contained two metal drums south of one of the former residences and was analyzed for PHC. CCME guidelines do not exist for PHC, however, the analytical results were either below or slightly above detection limits. A soil sample collected 1.5 m down-gradient of the depression (TP06-12) did not contain CCME PHC guidelines for soil and no staining or odours were observed. Therefore, it is concluded that the drums have not impacted the ponded surface water and surrounding soil.

5.2 Former Service Station

A magnetic locator and electromagnetic survey was conducted in the area where a former service station was suspected to have been present. No evidence of the presence of USTs or pump islands were found during this survey.

Interviews with individuals familiar with the site indicated that a former service station

was not present on-site or on adjacent properties. This was confirmed by analytical results for BETX and PHC for soil samples collected in formerly cleared areas considered to have been occupied by a service station. Therefore, it is not anticipated that a service station and fuelling activities were present on-site.

5.3 Fill Material

During the Phase I ESA, there was considered to be a potential for fill material of unknown quality to be present within the former campground and the former residential area to the north. As a result several test pits were advanced in these areas.

Soil analytical results indicate that petroleum hydrocarbons and metals were detected at concentrations less than CCME residential land use guidelines with the exception of two test pits in the campground area and one test pit in the former residential area.

The soil analytical results obtained for the campground area indicate that copper was present at concentrations marginally in excess of the CCME guideline at two locations. However soils data available from the Ministry of Environment3 indicates that the background concentration for copper on Vancouver Island is 150 ug/g. Therefore, it is concluded that the minor elevated levels of copper in soil present at TP06-3 and TP06-8 are consistent with background concentrations for the area.

Within the former residential area fill was observed to be present at TP06-17. Soil analytical results indicate that PHC and metals were detected at concentrations less than the CCME residential land use standards with the exception of copper (166 ug/g) and zinc (216 ug/g) in soil. TP06-17 was located on a former residential property along the northern edge of the site, and contained asphalt and brick debris. Based on the metal exceedances present, there is a potential for exceedances to be present in surrounding soils. Therefore, it is recommended further investigation be conducted to delineate the extent of the metal exceedances present.

5.4 Conclusion

It was concluded therefore, that constituents of concern are present in fill material at concentrations exceeding the CCME criteria at one test pit located in a former residential

[3] Protocol 4 for Contaminated Sites, Determining Background Soil Quality, October, 1999.

area at the northern edge of the site, and further investigation is warranted. As metal debris and refuse were noted in some excavated areas along the northern portion of the site, there is the potential for constituents of concern to be present in localized areas where refuse is buried on-site, and further investigation may be required during potential future development.

We trust this is the information you require at this time. Please contact us should you have any questions.

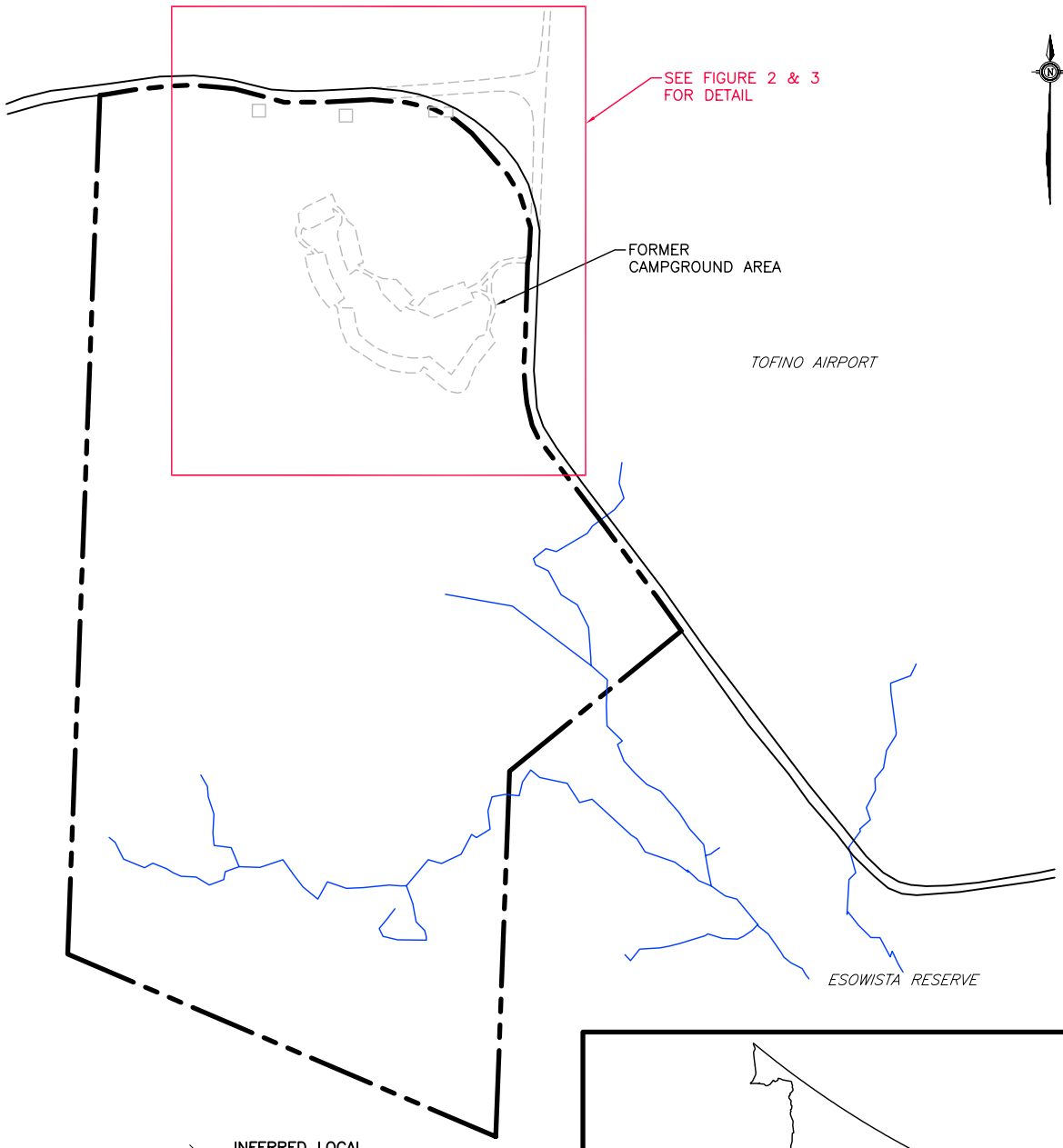
Yours truly,
Keystone Environmental Ltd.

Per: Craig S. Patterson, B.Sc., BIT
Environmental Scientist

Per: Kenneth A. Evans, P.Eng.
Principal

Attachments:

- Figure 1 – Location and Site Plan
- Figure 2 – Sample Location Plan
- Figure 3 – Analytical Results
- Table 1 – Soil Analytical Results – Metals
- Table 2 – Soil Analytical Results – BTEX, VPH
- Table 3 – Soil Analytical Results – Metals
- Table 4 – Water Analytical Results – PHC (F1-F4)
- CanTest Ltd. Analytical Reports



LEGEND

SITE

FORMER STRUCTURE/ROAD

STREAM/CREEK

100m 0 500m

SCALE: 1:10,000(approx.)

NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. LOT BOUNDARIES AND FEATURES ARE APPROXIMATE.

DRAWN BY: MS CADD FILE No. 8812\Ph2\Figs\Fig1-Site Plan-R0.dwg

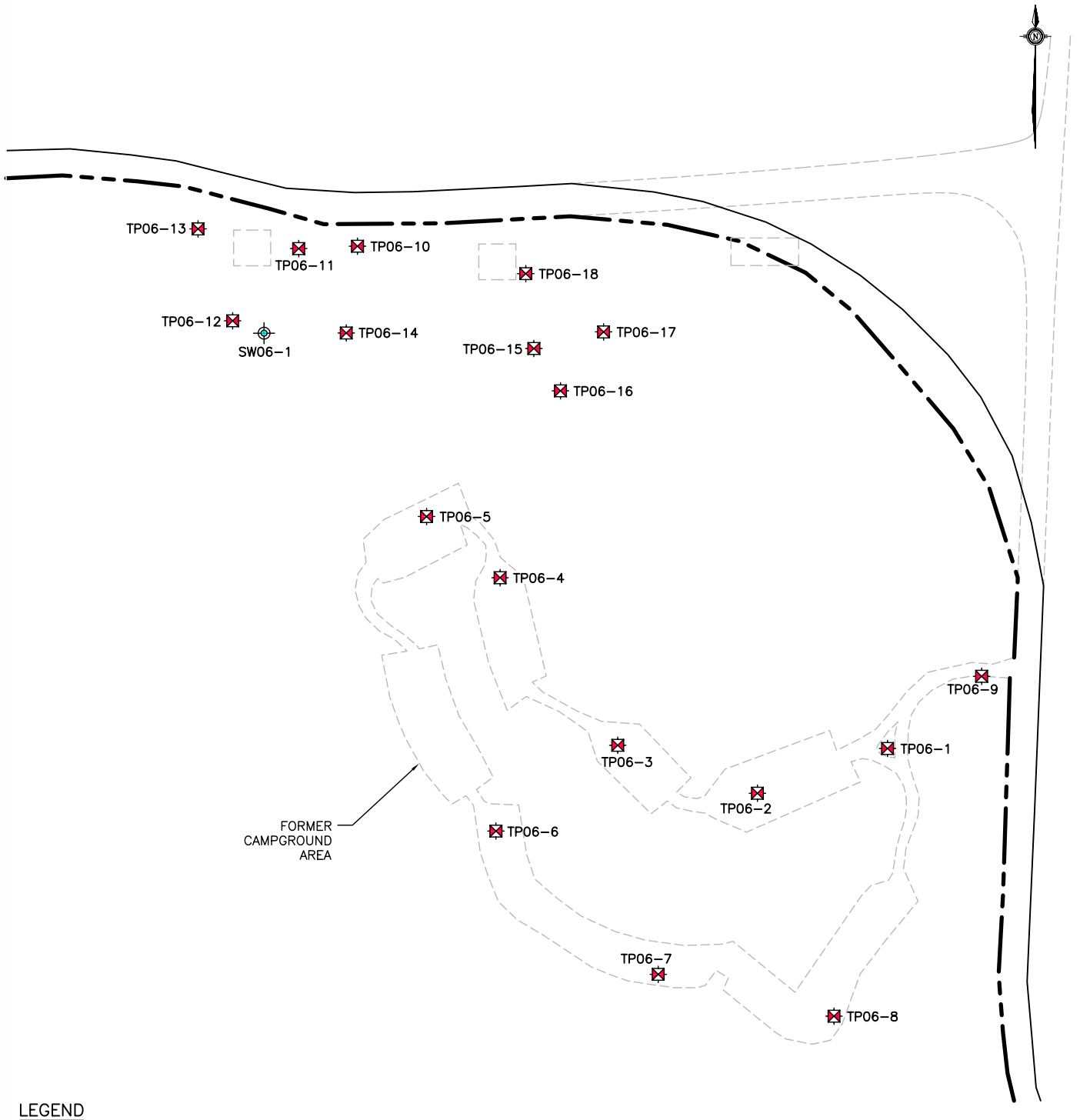
PLOT SCALE: 1:1

KEYSTONE ENVIRONMENTAL

Esowista Reserve
Tofino, B C
PWGSC

REVISION No.	DATE	PROJECT No.
00	May 2006	8812-02

Figure 1
Location & Site Plan



NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. LOT BOUNDARIES AND FEATURES ARE APPROXIMATE.

DRAWN BY: MS/DK CADD FILE No. 8812\Ph2\Figs\Fig2-Sample Location Plan-R0.dwg

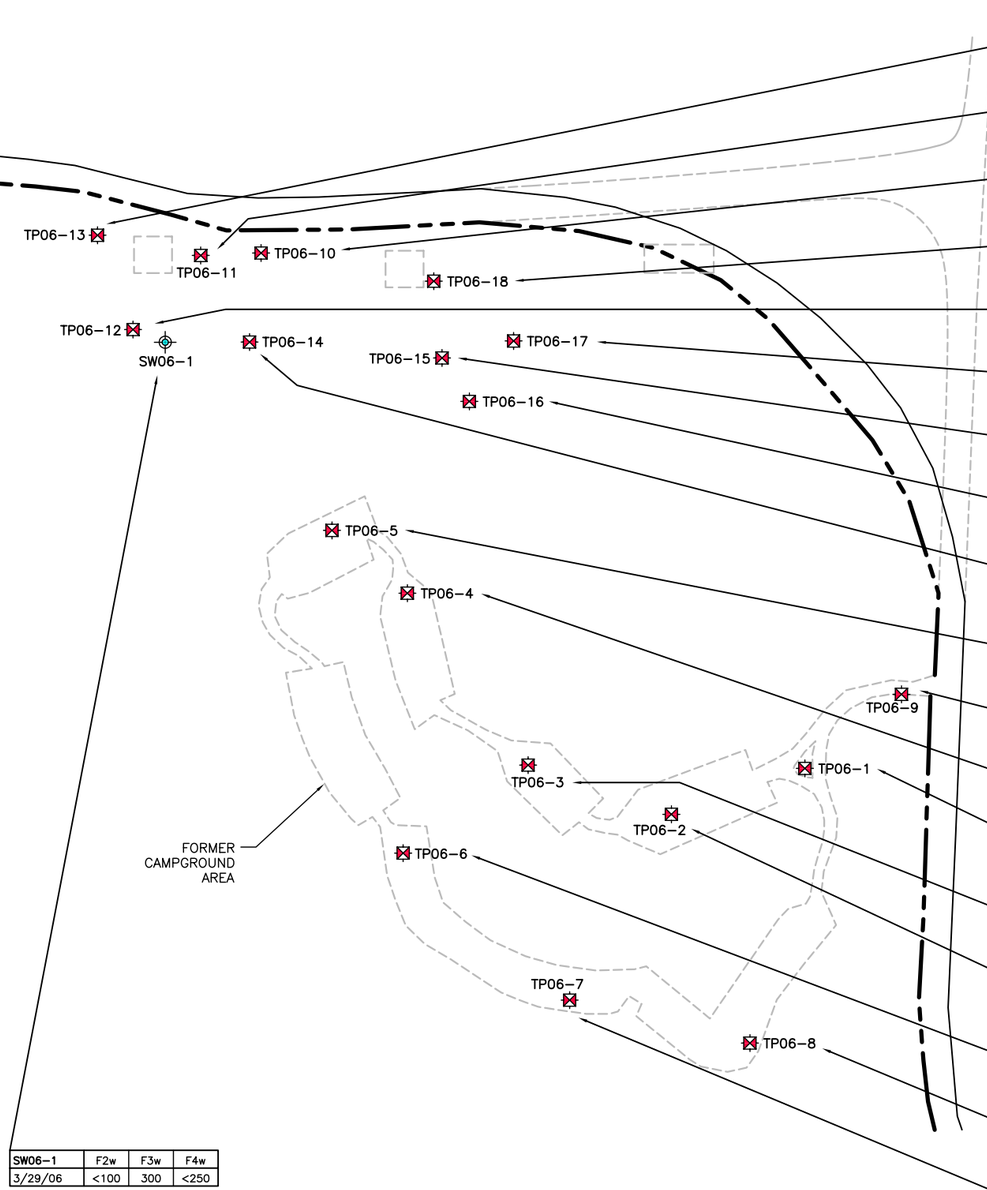
PLOT SCALE: 1:1

KEYSTONE ENVIRONMENTAL

Esowista Reserve
Tofino, B C
PWGSC

REVISION No.	DATE	PROJECT No.
00	May 2006	8812-02

Figure 2
Sample Location Plan



SW06-1	F2w	F3w	F4w
3/29/06	<100	300	<250

TP06-13	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.24	–	–	<80	<250	<250	–	–	–	–

TP06-11	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.18	<25	<25	<80	<250	<250	<PL/RL	–	–	–

TP06-10	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.5	–	–	<80	<250	<250	–	–	–	<PL/RL

TP06-18	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.19	–	–	<80	<250	<250	–	–	–	–

TP06-12	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.75	–	–	<80	<250	<250	<RDL	<100	<100	–

TP06-17	F1	F1–	F2	F3	F4	BETX	VH	VPH	Copper	Zinc	Other Metals
0.4	–	–	<80	<250	<250	<RDL	<100	<100	166	216	<PL/RL

TP06-15	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.23	–	–	<80	<250	<250	<RDL	<100	<100	–

TP06-16	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.27	–	–	<80	<250	<250	<RDL	<100	<100	–

TP06-14	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.45	–	–	<80	<250	<250	–	–	–	–

TP06-5	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.34	–	–	<80	<250	<250	–	–	–	<PL/RL

TP06-9	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.36	–	–	<80	<250	<250	–	–	–	<PL/RL

TP06-4	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.17	–	–	<80	<250	<250	–	–	–	<PL/RL

TP06-1	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.22	–	–	<80	<250	<250	–	–	–	<PL/RL

TP06-3	F1	F1–	F2	F3	F4	BETX	VH	VPH	Copper	Other Metals
0.18	–	–	<80	<250	<250	–	–	–	64	<PL/RL

TP06-2	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.35	–	–	<80	<250	<250	–	–	–	<PL/RL

TP06-6	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.32	–	–	<80	<250	<250	–	–	–	<PL/RL

TP06-8	F1	F1–	F2	F3	F4	BETX	VH	VPH	Copper	Other Metals
0.49	–	–	<80	<250	<250	–	–	–	64	<PL/RL

TP06-7	F1	F1–	F2	F3	F4	BETX	VH	VPH	Metals
0.17	–	–	<80	<250	<250	–	–	–	<PL/RL

LEGEND

	SITE
	FORMER STRUCTURE/ROAD
	KEYSTONE TESTPIT
	KEYSTONE SURFACE WATER SAMPLE
F1	F1 (C6–C10) UNCORRECTED
F1–	F1 MINUS BTEX (C6–C10)
F2	F2 UNCORRECTED (C10–C16)
F3	F3 UNCORRECTED (C16–C34)
F4	F4 (C34–C50)
F2w	HYDROCARBONS (C10–C16) IN WATER
F3w	HYDROCARBONS (C16–C34) IN WATER
F4w	HYDROCARBONS (C34–C50) IN WATER
BETX	BENZENE, ETHYLBENZENE, TOLUENE & XYLENE
VH	VOLATILE HYDROCARBONS
VPH	VOLATILE PETROLEUM HYDROCARBONS
<	LESS THAN
RDL	REPORTED DETECTION LIMIT
–	NOT ANALYZED
PL	URBAN PARK LAND USE STANDARD
RL	RESIDENTIAL LAND USE STANDARD
CCME	CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT, INTERIM CANADIAN ENVIRONMENTAL QUALITY CRITERIA FOR CONTAMINATED SITES, SEPT. 1991

SAMPLE I.D. — *ANALYTE*

MW06-1	LEPH
1.5	<250

DEPTH (SOIL) / *DATE (GROUNDWATER)* — *RESULTS*

NOTES:
1. Soil Sample values are presented as Micrograms per gram (µg/g) [parts per million (ppm)].
2. Groundwater Sample values are presented as Micrograms per Litre (µg/L) [parts per billion (ppb)].
3. Soil Sample Exceeding CCME (PL/RL) Standard in RED.
4. Groundwater Samples do not apply to CCME Aquatic Parameters.

KEYSTONE ENVIRONMENTAL

NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. LOT BOUNDARIES AND FEATURES ARE APPROXIMATE.

50m 0 100m

SCALE: 1:3000(approx.)

Esowista Reserve
Tofino, B C
PWGSC

REVISION No.	DATE	PROJECT No.
00	May 2006	8812–02

Figure 3
Soil & Surface Water Analytical Results

PLOT SCALE: 1:1 DRAWN BY: MS/DK CADD FILE No. 8812\Ph2\Figs\Fig3–Soil & SW Analytical–R0.dwg

Table 1 (1 of 1)
Soil Analytical Results
Petroleum Hydrocarbons (F1-F4)
PWGSC / INAC
Tofino (8812-02)
Tofino

Sample ID	**RDL**	**Duplicate**	**TP06-1**	**TP06-10**	**TP06-11**	**TP06-12**	**TP06-13**	**TP06-14**	**TP06-15**	**TP06-16**	**TP06-17**	**PHC CWS PL/RL Coarse**
Lab Sample ID		603300349	603300331	603300340	603300341	603300342	603300343	603300344	603300345	603300346	603300347	
Sample Depth (m)		**n/a**	**0.22**	**0.5**	**0.18**	**0.75**	**0.24**	**0.45**	**0.23**	**0.27**	**0.4**	
Date Sampled		**28-Mar-06**	**28-Mar-06**	**29-Mar-06**	**29-Mar-06**	**29-Mar-06**	**29-Mar-06**	**29-Mar-06**	**29-Mar-06**	**29-Mar-06**	**29-Mar-06**	
F1 (C6-C10) uncorrected	25	-	-	-	<25	-	-	-	-	-	-	30c
F1 minus BTEX (C6-C10)	25	-	-	-	<25	-	-	-	-	-	-	n/s
F2 uncorrected (C10-C16)	80	<80	<80	<80	<80	<80	<80	<80	<80	<80	<80	150c
F2-napth (C10-C16)	-	-	-	-	-	-	-	-	-	-	-	n/s
F3 uncorrected (C16-C34)	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	400
F3-pah (C16-C34)	-	-	-	-	-	-	-	-	-	-	-	n/s
F4 (C34-C50)	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	2800

Sample ID	**RDL**	**TP06-18**	**TP06-2**	**TP06-3**	**TP06-4**	**TP06-5**	**TP06-6**	**TP06-7**	**TP06-8**	**TP06-9**	**PHC CWS PL/RL Coarse**
Lab Sample ID		603300348	603300332	603300333	603300334	603300335	603300336	603300337	603300338	603300339	
Sample Depth (m)		**0.19**	**0.35**	**0.18**	**0.17**	**0.34**	**0.32**	**0.17**	**0.49**	**0.36**	
Date Sampled		**29-Mar-06**	**28-Mar-06**	**28-Mar-06**	**28-Mar-06**	**28-Mar-06**	**28-Mar-06**	**28-Mar-06**	**29-Mar-06**	**29-Mar-06**	
F1 (C6-C10) uncorrected	25	-	-	-	-	-	-	-	-	-	30c
F1 minus BTEX (C6-C10)	25	-	-	-	-	-	-	-	-	-	n/s
F2 uncorrected (C10-C16)	80	<80	<80	<80	<80	<80	<80	<80	<80	<80	150c
F2-napth (C10-C16)	-	-	-	-	-	-	-	-	-	-	n/s
F3 uncorrected (C16-C34)	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	400
F3-pah (C16-C34)	-	-	-	-	-	-	-	-	-	-	n/s
F4 (C34-C50)	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	2800

NOTES:
Sample results reported as micrograms per gram (µg/g) [parts per million (ppm)]

RDL	Reported Detection Limit
PHC CWS	Canada Wide Standards for Petroleum Hydrocarbons
PL/RL	Urban Park/Residential Land Use Standard
n/s	No standard for this constituent
<	Less than reported detection limit
-	Not analyzed
Bold	Exceeds CCME (PL/RL) standard for this sample

Table 2 (1 of 1)
Soil Analytical Results
Benzene Toluene Ethylbenzene Xylenes Volatile Organic Compounds (BTEX) and Volatile Petroleum Hydrocarbons uncorrected for BTEX (VH) and corrected for (VPH)
PWGSC / INAC
Tofino (8812-02)
Tofino

Sample ID	**RDL**	**TP06-11**	**TP06-12**	**TP06-15**	**TP06-16**	**TP06-17**	**CCME**
Lab Sample ID		603300341	603300342	603300345	603300346	603300347	
Sample Depth (m)		**0.18**	**0.75**	**0.23**	**0.27**	**0.4**	
Date Sampled		**29-Mar-06**	**29-Mar-06**	**29-Mar-06**	**29-Mar-06**	**29-Mar-06**	**PLRL**
Benzene	0.01	<0.01	<0.04	<0.04	<0.04	<0.04	0.5
Ethylbenzene	0.01	<0.01	<0.5	<0.5	<0.5	<0.5	1.2
Toluene	0.01	0.13	<0.5	<0.5	<0.5	<0.5	0.8
Xylenes	0.01	<0.01	<0.5	<0.5	<0.5	<0.5	1
Styrene	0.5	-	<0.5	<0.5	<0.5	<0.5	n/s
VH	100	-	<100	<100	<100	<100	n/s
VPH	100	-	<100	<100	<100	<100	n/s
MTBE	-	-	-	-	-	-	n/s

NOTES:
Sample results reported as micrograms per gram (µg/g) [parts per million (ppm)]

RDL	Reported Detection Limit
CCME	Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines, 1999, updated October, 2005
PL/RL	Urban Park/Residential Land Use Standard
n/s	No standard for this constituent
<	Less than reported detection limit
-	Not analyzed
Bold	Exceeds CCME (PL/RL) standard for this sample

Table 3 (1 of 1)
Soil Analytical Results
Metals
PWGSC / INAC
Tofino (8812-02)
Tofino

Sample ID	**RDL**	**Duplicate**	**TP06-1**	**TP06-10**	**TP06-17**	**TP06-2**	**TP06-3**	**TP06-4**	**TP06-5**	**TP06-6**	**TP06-7**	**TP06-8**	**TP06-9**	**CCME**
Lab Sample ID		603300349	603300331	603300340	603300347	603300332	603300333	603300334	603300335	603300336	603300337	603300338	603300339	
Sample Depth (m)		**n/a**	**0.22**	**0.5**	**0.4**	**0.35**	**0.18**	**0.17**	**0.34**	**0.32**	**0.17**	**0.49**	**0.36**	
Date Sampled		**28-Mar-06**	**28-Mar-06**	**29-Mar-06**	**29-Mar-06**	**28-Mar-06**	**28-Mar-06**	**28-Mar-06**	**28-Mar-06**	**28-Mar-06**	**28-Mar-06**	**29-Mar-06**	**29-Mar-06**	**PLRL**
Antimony	0.1	0.9	1	<0.1	0.8	0.9	1	1	0.9	0.9	0.7	0.9	0.8	n/s
Arsenic	0.1	5.6	6.2	1	4.6	6.1	6.7	6.3	5.9	5.3	5.1	6.6	6.2	12
Barium	1	49	39	12	57	34	37	34	40	53	44	42	39	500
Beryllium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	n/s
Cadmium	0.2	0.2	<0.2	<0.2	0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	10
Chromium	2	35	30	11	29	30	35	32	32	35	38	36	32	64
Cobalt	1	17	15	1	10	16	17	16	16	15	16	18	16	n/s
Copper	1	59	56	5	**166**	55	**64**	60	55	52	54	**64**	56	63
Lead	0.2	5.6	7.3	6.6	67.6	5.7	5.6	5.9	5	5.8	4.8	5.9	4.7	140
Mercury	0.01	0.08	0.09	0.07	0.08	0.08	0.1	0.11	0.08	0.07	0.09	0.09	0.61	6.6
Molybdenum	0.1	0.5	0.5	0.3	0.6	0.5	0.6	0.5	0.6	0.5	0.5	0.5	0.5	n/s
Nickel	2	33	31	3	21	32	33	31	33	31	33	38	31	50
Selenium	0.2	<0.2	<0.2	0.3	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	n/s
Silver	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	n/s
Tin	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	n/s
Vanadium	1	93	86	29	72	78	88	83	82	79	87	91	81	130
Zinc	1	68	65	10	**216**	62	66	62	64	62	66	77	62	200
Aluminum	10	22800	20100	7680	18000	20100	23300	21900	21200	19600	21700	24200	21200	n/s
Bismuth	-	-	-	-	-	-	-	-	-	-	-	-	-	n/s
Boron	1	5	6	3	4	6	6	6	5	5	5	5	5	n/s
Calcium	1	3030	2430	721	4230	2780	2930	2920	3000	3100	3040	3070	3540	n/s
Iron	2	37000	33900	6460	26800	33500	34900	34400	35200	33200	34900	38100	34100	n/s
Magnesium	1	12400	10300	989	7800	10200	11000	10300	11200	10900	12000	12500	11000	n/s
Manganese	1	1050	902	42	636	910	1040	904	1110	970	645	1040	875	n/s
Phosphorus	-	-	-	-	-	-	-	-	-	-	-	-	-	n/s
Phosphorus_P	20	678	658	131	709	680	691	699	658	661	665	732	741	n/s
Potassium	10	365	375	124	295	334	383	359	330	442	395	424	384	n/s
Sodium	5	125	271	88	132	176	134	168	125	134	134	121	136	n/s
Strontium	1	7	7	4	15	9	8	7	8	8	9	7	8	n/s
Tellurium	-	-	-	-	-	-	-	-	-	-	-	-	-	n/s
Thallium	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1
Titanium	1	670	569	528	557	582	655	629	594	426	641	628	651	n/s
Zirconium	1	3	3	1	2	3	3	3	3	2	3	3	3	n/s

NOTES:
Sample results reported as micrograms per gram (µg/g) [parts per million (ppm)]

RDL	Reported Detection Limit
CCME	Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines, 1999, updated October, 2005
PL/RL	Urban Park/Residential Land Use Standard
n/s	No standard for this constituent
<	Less than reported detection limit
-	Not analyzed
Bold	Exceeds CCME (PL/RL) standard for this sample

Table 4 (1 of 1)
Water Analytical Results
Petroleum Hydrocarbons (F1-F4)
PWGSC / INAC
Tofino (8812-02)
Tofino

Sample ID Lab Sample ID **Date Sampled**	**RDL**	**SW06-1** 603310146 **29-Mar-06**	**CCME** **(AWfw)**	**CCME** **(AWm)**	**CCME** **DW(IMac)**
Petroleum Hydrocarbons C10-16	100	<	n/s	n/s	n/s
Petroleum Hydrocarbons C16-34	250	300	n/s	n/s	n/s
Petroleum Hydrocarbons C34-50	250	<	n/s	n/s	n/s

NOTES:

All concentrations in micrograms per litre (µg/L)

RDL	Reported Detection Limit
CCME	Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines, 1999, updated October 2005.
AW(fw)	Fresh water Aquatic Life Criteria (CCME)
AW(m)	Marine water Aquatic Life Criteria (CCME)
DW	Drinking Water Standard CCME (Criteria)
IMAC	Interim maximum acceptable concentration
AO	Aesthetic objectives
n/a	No standard for this constituent
<	Less than method detection limit
-	Not analyzed
Bold	Exceeds CCME (AW) criteria for this sample
Underline	Exceeds CCME (DW) criteria for this sample

APPENDIX D

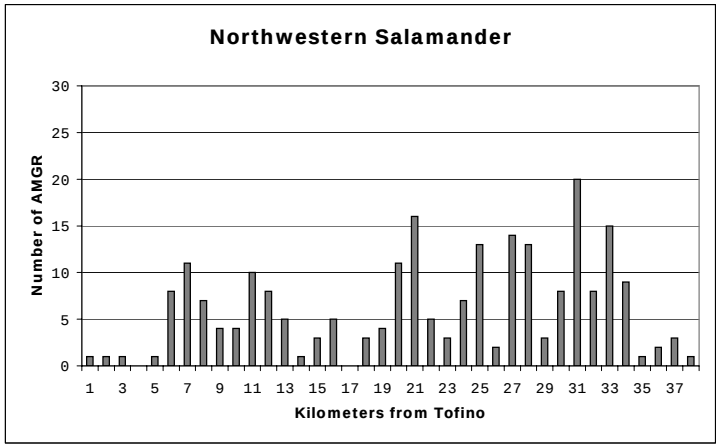
PLANT SPECIES IDENTIFIED DURING A DECEMBER 19TH TO 21ST, 2005 FIELD SURVEY OF THE ESOWISTA IR #3 EXPANSION LANDS

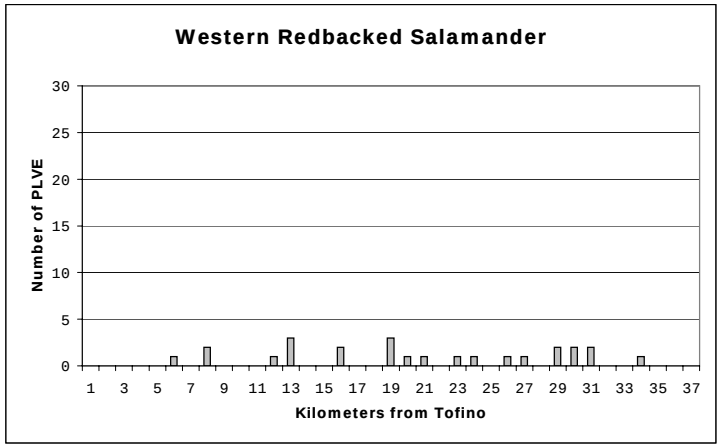
Common Name	Scientific Name
TREES	
Douglas-fir	*Pseudotsuga menziesii*
Lodgepole (Shore) Pine	*Pinus contorta* ssp. *contorta*
Red Alder	*Alnus rubra*
Sitka Spruce	*Picea sitchensis*
Western Hemlock	*Tsuga heterophylla*
Western Red Cedar	*Thuja plicata*
Western Yew	*Taxus brevifolia*
SHRUBS	
Crowberry	*Empetrum nigrum*
Bog Blueberry	*Vaccinium uliginosum*
Bog Cranberry	*Oxycoccus oxycoccus*
Bog-Rosemary	*Andromeda polifolia*
Evergreen Blackberry	*Rubus laciniatus*
Evergreen Huckleberry	*Vaccinium ovatum*
False Azalea	*Menziesia ferruginea*
Labrador Tea	*Ledum groenlandicum*
Red Huckleberry	*Vaccinium parvifolium*
Salal	*Gaultheria shallon*
Salmonberry	*Rubus spectabilis*
Scotch Broom	*Cytisus scoparius*
Scotch Heather	*Callune vulgaris*
Sweet Gale	*Myrica gale*
Twinflower	*Linnaea borealis*
Western Bog-Laurel	*Kalmia microphylla*
Western Tea-Berry	*Gaultheria ovatifolia*
HERBS	
Bracken Fern	*Pteridium aquilinum*
Bunchberry	*Cornus canadensis*
Common Horsetail	*Equisetum arvense*
Common Rush	*Juncus effusus*
Deer Fern	*Blechnum spicant*
False Lily-of-the-Valley	*Maianthemum dilatatum*
Foamflower	*Tiarella trifoliata*
Grass spp.	*Graminae* spp.
King Gentian	*Gentiana sceptrum*
Licorice Fern	*Polypodium glycyrrhiza*
Pale Sedge	*Carex livida*
Reed Canary Grass	*Phalaris arundinacea*
Silverweed	*Potentilla anserina*
Skunk Cabbage	*Lysichiton americanum*

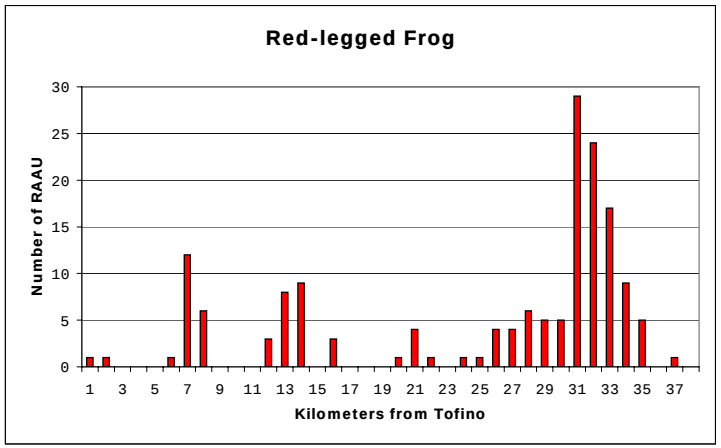
Slender Bog-Orchid	*Platanthera stricta*
Slough Sedge	*Carex obnupta*
Small-flowered Bulrush	*Scirpus microcarpus*
Small-flowered Wood-rush	*Luzula parviflora*
Spreading Rush	*Juncus supiniformis*
Swordfern	*Polystichum munitum*
Tapered Rush	*Juncus acuminatus*
Three-leaved Goldthread	*Coptis trifolia*
LICHENS AND MOSSES	
Black Fish Hook Moss	*Campylopus atrovirens*
Brown-stemmed Bog Moss	*Sphagnum lindbergii*
Coastal Leafy Moss	*Plagiomnium insigne*
Common Christmas-Tree	*Sphaerophorus globosus*
Common Haircap Moss	*Polytrichum commune*
False Pixie Cup	*Cladonia chlorophaea*
Frog Pelt	*Peltigera neopolydactyla*
Juniper Haircap Moss	*Polytrichum juniperinum*
Lanky Moss	*Rhytidiadelphus loreus*
Large Leafy Moss	*Rhizomnium glabrescens*
Lipstick Cladonia	*Cladonia macilenta*
Oregon Beaked Moss	*Kindbergia oregana*
Reindeer Lichen spp.	*Cladina* spp.
Ring Pellia	*Pellia neesiana*
Running Clubmoss	*Lycopodium clavatum*
Small Red Peat Moss	*Sphagnum capillifolium*
Step Moss	*Hylocomium splendens*
Waxy-leaved Cotton-Moss	*Plagiothecium undulatum*

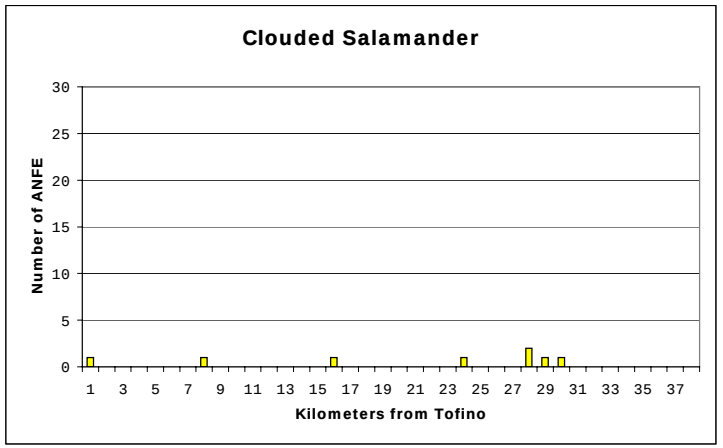
APPENDIX E

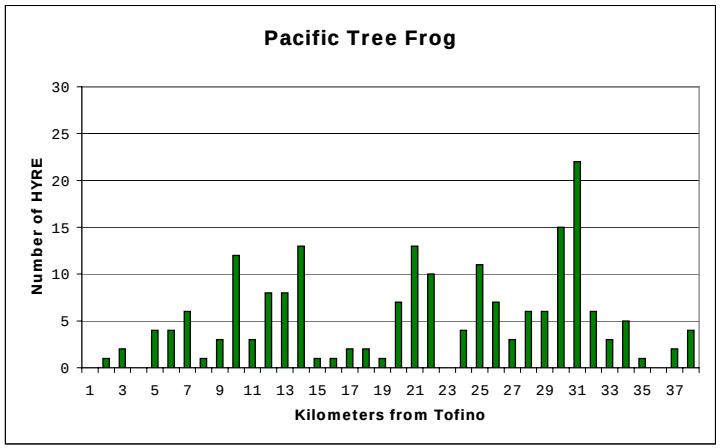
AMPHIBIAN SPLAT SURVEY RESULTS

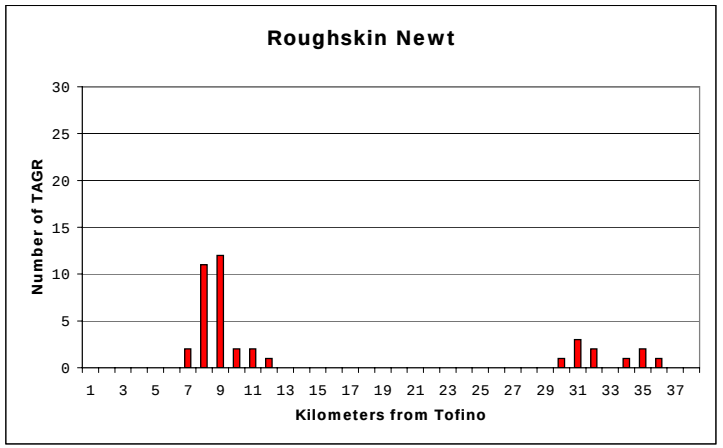












Appendix E: The number of individuals of each species found within each kilometer between Tofino and Ucluelet during the night searches (N=57) conducted from the fall 2000 to spring 2004. The starting point (0 km) for the surveys was at the Tofino Co-op Gas Station and the finish was at the Ucluelet Petrocan Station.