Icona Anmore South

Archaeological Impact Assessment

Final Report

***HCA* Permit 2023-0305**

Submitted to:
Laurie Schmidt
Spring Anmore Properties Ltd.
#900-1111 West Hastings St.
Vancouver, BC V6E 2J3

Submitted by:
Inlailawatash Limited Partnership
3178 Alder Court
North Vancouver, BC V7H 3A8

xʷməθkʷəy̓əm (Musqueam) Heritage Research/Investigation Permit MIB-2023-114-AIA
Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) Archaeological Investigation Permit 23-0181
Stó:lō Heritage Investigation Permit 2023-107
kʷikʷəƛəm (Kwikwetlem) Heritage Investigation Permit KwHIP 2023-006
səlilwətaɬ (Tsleil-Waututh) Cultural Heritage Investigation Permit TWN-23185-23103

April 23, 2024
Inlailawatash File: 22-5-26

inlailawatash.ca

RESTORING OPPORTUNITY™

3178 Alder Court
North Vancouver
BC V7H 2V6

T 604 924.4169

Grant of License

Inlailawatash affirms that it is the copyright owner (or a copyright owner) of this permit report, and for good and valuable consideration irrevocably grants a non-exclusive license to the Province of British Columbia, for a term equal to the life of the copyright commencing on the date of execution below, to make copies of this report, including all appendices and photos, and to provide such copies to anyone, at the discretion of the Province, either at no charge or at the cost incurred by the Province in making and distributing the copies. All parties, except the party for whom the report was prepared, acknowledge that any use or interpretation of this report is at the sole risk and liability of the subsequent user.

Executed this April 23, 2024, by Sean P. Connaughton.

Signature on behalf of Copyright Owner

Sean P. Connaughton, PhD, RPA 17354 (he/him/his)
Inlailawatash Limited Partnership
HCA permit 2023-0305

Important Notice

This study identifies potential impacts to archaeological materials from proposed developments for Icona Properties at Anmore South in Anmore, B.C. It does not address potential impacts to traditional use activities and sites by this development. It is not the intent of this report to document First Nations' interests in the lands at this locality. The study was conducted without prejudice to First Nations' treaty negotiations, Aboriginal Rights, or Aboriginal Title.

Project: **Icona Anmore South AIA**	**Permit No.** **2023-0305**	**Project Officer:** **Kira Kristensen**
Permit Holder: Sean P. Connaughton, PhD Inlailawatash Limited Partnership 3178 Alder Court North Vancouver, BC, V7H 2V6 sconnaughon@inlailawatash.ca	**Lead Proponent:** Laurie Schmidt Spring Anmore Properties #900-1111 W Hastings Vancouver, BC, V6E 2J3 PH: 778-900-1323	**Development Type:** Proposed development of 150 acres at Anmore South within Anmore Village.
Report Author(s): Ailidh Hathway, Sean P. Connaughton, and Sarah Shaver		

Credits

Report Authors:	Ailidh Hathway, MA[1] Sean P. Connaughton, PhD[1] Sarah Shaver, MA[1]
Field Director:	Sean P. Connaughton[1]
Field Supervisor:	Ailidh Hathway[1]
Field Crew:	Ailidh Hathway[1] Emma Lowther[1] Darrell Guss[2] John Sisson[2] Wil George[2]
GIS Analyst:	Anne Sheridan, B.A., ADP GIS[1]
Editing and Technical Review:	Devin Forbes, BA[1] Emma Lowther, MA[1]

1. Inlailawatash Limited Partnership
2. səlilwətaɬ (Tsleil-Waututh)

Acknowledgements

We thank all those who contributed their time, energy, and experience throughout the duration of this project. We particularly acknowledge the First Nations communities — xʷməθkʷəy̓əm (Musqueam Indian Band), Sḵwx̱wú7mesh Úxwumixw (Squamish Nation), kʷikʷəƛəm (Kwikwetlem First Nation), Stó:lō, and səlilwətaɬ (Tsleil-Waututh Nation) — within whose traditional territories and areas of interest this assessment occurred. All the Nations supported and acknowledged the work either by issuing heritage permits to Inlailawatash Archaeology or by project acknowledgment and/or participation in the fieldwork with Inlailawatash.

Abbreviations

AIA	Archaeological Impact Assessment
AOA	Archaeological Overview Assessment
AOP	Area of (Archaeological) Potential
BP	before present
CRM	Cultural Resource Management
HCA	*Heritage Conservation Act*
PARL	Provincial Archaeological Report Library (on-line)
PFR	Preliminary Field Reconnaissance
RAAD	Remote Access to Archaeological Data (Archaeology Branch)
HIP	Heritage Inspection Permit
SAP	Site Alteration Permit
TUS	Traditional-Use Site

Executive Summary

This report summarizes an Archaeological Impact Assessment (AIA) conducted by Inlailawatash Limited Partnership (Inlailawatash) for the proposed development of the Ioco Lands in South Anmore, Anmore, British Columbia. This report provides a detailed assessment of archaeological fieldwork and recommendations regarding potential impacts to Indigenous heritage during the AIA.

Fieldwork was conducted over four days from October 3–6, 2023, by Inlailawatash Archaeologists Ailidh Hathway, Sean P. Connaughton, Emma Lowther, and səlilwətaɬ (Tsleil-Waututh) representatives Darrell Guss, John Sisson, and Wil George. Fieldwork involved pedestrian survey and subsurface archaeological testing.

The field crew excavated 13 shovel tests across three micro-landforms identified during the survey. All shovel tests were negative for archaeological materials, and no further archaeological assessment is recommended for the proposed area. However, even the most thorough field assessments may fail to identify all archaeological materials in a location described in this report. Given the possibility that low-density sites may remain undetected in the Project Area, it is recommended that a *Chance Find Procedure* (CFP) be implemented during all ground disturbing activities associated with the project. All personnel working on the Icona Anmore South Project should be made aware of the principal aspects of the *HCA*, specifically that all archaeological materials and sites are protected from disturbance, intentional or inadvertent, whether on private or public land, under significant penalty. If chance archaeological or heritage materials are encountered during ground disturbance activities, all impact activities must cease immediately and the Archaeology Branch and all First Nations with interests in the area must be notified.

Based on the results of this AIA it is recommended that:

1) No further archaeological investigations or monitoring are required for the Project Area
2) All ground disturbing works within the Project Area be conducted under a *Chance Find Procedure.*
3) Any changes in the current Project Area require review by professional archaeologists if work extends beyond the current Project Area boundaries. This may require, additional archaeological assessment by a professional archaeologist.

Table of Contents

List of Figures

List of Tables

1 INTRODUCTION

Inlailawatash Limited Partnership (Inlailawatash), on behalf of ICONA Properties conducted an Archaeological Impact Assessment of the IOCO Lands in South Anmore, British Columbia. The proposed development area is within the territories of interest of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), Stó:lō, kʷikʷəƛəm (Kwikwetlem), and səlilwətaɬ (Tsleil-Waututh) First Nations (Figure 1). This AIA was conducted under the *Heritage Conservation Act* Section 12.2 Heritage Inspection Permit 2023-0305, in addition to xʷməθkʷəy̓əm (Musqueam) Heritage Research/Investigation Permit MIB-2023-114-AIA, Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) Archaeological Investigation Permit 23-0181, Stó:lō Heritage Investigation Permit 2023-107, kʷikʷəƛəm Permit KwHIP 2023-006, and səlilwətaɬ (Tsleil-Waututh) Cultural Heritage Investigation Permit TWN-23185-23103.

Fieldwork for this AIA was conducted on October 3–6, 2023 by Inlailawatash archaeologists Ailidh Hathway, Emma Lowther, and Sean P. Connaughton, and səlilwətaɬ (Tsleil-Waututh) archaeologists Darrell Guss, John Sisson, and Wil George. The project's methods and results are detailed below.

The primary objectives of the AIA were to: (1) conduct a systematic and comprehensive surface survey of the Project Area; (2) conduct systematic shovel testing at all landforms determined to have archaeological potential within the Project Area; (3) clearly define the horizontal and vertical extent of archaeological materials if they exist within the Project Area; (4) determine archaeological site type and significance through preliminary investigations; and (5) recommend appropriate strategies for heritage management and site avoidance.

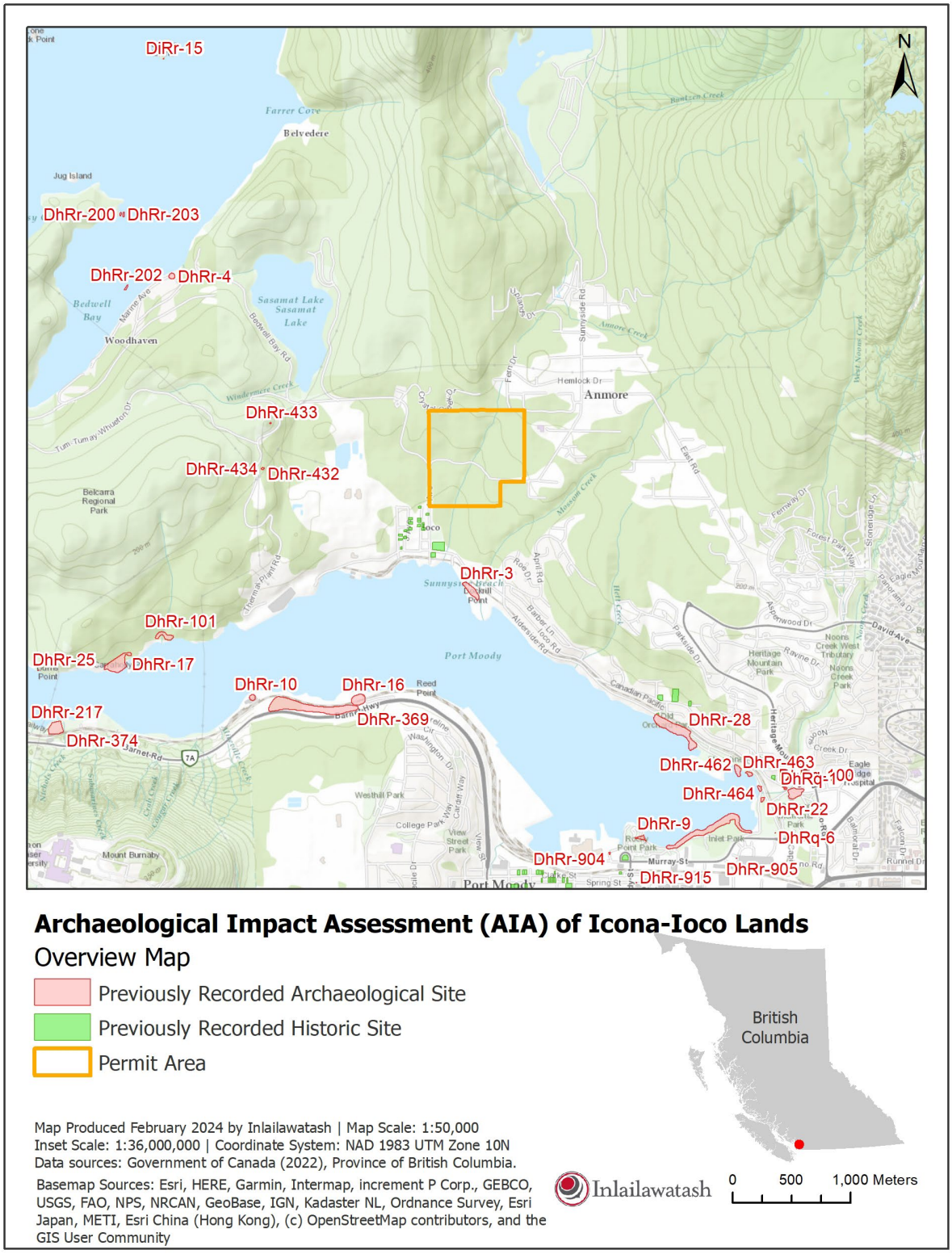

Figure 1. Permit Area (*HCA* 2023-0305) and nearby recorded archaeological sites.

1.1 Protection and Management of Archaeological Sites in British Columbia

BC Heritage Conservation Act

In British Columbia, most archaeological sites are attributable to settlement and resource use by First Nations people. If sites located within Provincial jurisdiction pre-date AD 1846, they are automatically protected from damage, desecration, alteration, or excavation by the *Heritage Conservation Act* (*HCA*) (RSBC 1996, Chap. 187). Some sites are protected through designation as "Provincial Heritage Sites" under Section 9 of the *HCA*. Post-1846 historical heritage sites can be protected by Ministerial Order, Designation by an Order-in-Council, or a municipal bylaw.

Sites automatically protected under the *HCA* include the following:

- Archaeological sites occupied or used before AD 1846;
- Rock art with historical or archaeological value;
- Burial places with historical or archaeological value;
- Heritage shipwrecks or aircraft wrecks (after a two-year abandonment); and
- Archaeological sites of unknown origin, with a reasonable possibility of having been occupied or used before AD 1846.

Protected sites may be located on Crown land or private land and may not be altered (changed in any manner) without a permit issued under Section 12 of the *HCA*. The *HCA* does not have jurisdiction on federal lands. The legal case of *Delgamuukw v. British Columbia* (3 S.C.R. 1010 1997) also has implications for the protection of areas with cultural value to Indigenous peoples (including archaeological sites) that may not otherwise be protected under the *HCA*. In this seminal ruling, the Supreme Court of Canada stated that Aboriginal Title is an inherent Aboriginal Right. Of note is the acceptance of Indigenous oral histories as evidence that can be held up in the court, which establishes inherent Indigenous rights to the land. By extension *Delgamuukw v. British Columbia* (1997) sets the framework for fiduciary responsibilities of the crown to consult and compensate Indigenous communities when Aboriginal Title is infringed upon.

To assist with the management of archaeological sites, the Archaeology Branch issued the *British Columbia Archaeological Impact Assessment Guidelines* (Archaeology Branch 1998). These *Guidelines* identify several kinds of archaeological assessments that may be undertaken in response to proposed developments, with the kind of assessment dependent on the stage of development design and the types of archaeological information required. The assessment described in this report is an AIA, as described in the *Guidelines*.

The Borden Grid system, devised by Dr. Charles E. Borden of the University of British Columbia, is a schema used throughout British Columbia and Canada to track, catalogue, and organize archaeological sites (Borden 1952). Archaeological sites are assigned a unique identifier, known

as a Borden number, which is composed of alternating upper- and lower-case letters, followed by a number issued in the chronological order that the site was registered. The alphabetical prefix of a Borden Number is dependent on which "Borden block" of the overarching Borden Grid that the site is located within. Borden blocks are based on latitude and longitude, with major Borden blocks (the upper-case letters in a Borden number) defined by 2 degrees latitude and 4 degrees longitude. Minor Borden blocks (the lower-case numbers in a Borden number) are defined by 10 minutes latitude and 10 minutes longitude. For example, a site with a Borden number AbAb-4 would be the fourth site recorded within the major Borden block AA, and minor Borden block bb. In British Columbia, the Inventory Section of the provincial Archaeology Branch is responsible for the issuance of Borden numbers for newly recorded archaeological sites.

1.2 First Nations Heritage Policy and Permitting Processes

Several First Nations in British Columbia have developed their own heritage policies and permits to manage their archaeological and heritage concerns. These permits are separate from the Provincial *HCA* permits, and although they are not required to meet Provincial regulatory standards, Inlailawatash respects the important First Nation oversight that these permits provide for the archaeology that is conducted within traditional territories. First Nations permits are generally issued with a set of cultural protocols or policies around the treatment of heritage resources, for which Ancestral Remains and spiritual places, are particularly sensitive. The permits allow for First Nations' comment and input into the study and its methods, and for engagement in any fieldwork.

Inlailawatash applied for heritage permits from Musqueam, Squamish, Stó:lō, Kwikwetlem, and Tsleil-Waututh Nations. Musqueam Heritage Research/Investigation Permit MIB-2023-114-AIA Squamish Archaeological Investigation Permit 23-0181, Stó:lō Heritage Investigation Permit 2023-107, Kwikwetlem Permit KwHIP 2023-006, and Tsleil-Waututh Nation Cultural Heritage Investigation Permit TWN-23185-23103 were issued to Inlailawatash Limited Partnership for an Archaeological Impact Assessment in the Project Area.

1.3 Reconciliation and Cultural Heritage

On November 28, 2019, the Government of British Columbia passed Bill 41, the *Declaration on the Rights of Indigenous Peoples Act* (*DRIPA*) (SBC 2019, c. 44). The new legislation requires the Province to embark on a process of legislative reform to ensure that provincial laws are consistent with the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). UNDRIP is comprised of 46 Articles that set a standard for the treatment of Indigenous peoples (United Nations 2007). Relevant to Canada, a late signatory in 2016, and cultural heritage, are the many articles within UNDRIP that call upon governments to resituate their relationship with Indigenous

ownership and power imbalances. Cultural heritage is present in at least 19 of the UNDRIP articles (Connaughton n.d.). UNDRIP helps form the basis of Indigenous self-governance and management of their own cultural heritage.

Additionally, the 94 Calls to Action under the Truth and Reconciliation Commission of Canada (TRC), recommend that reconciliation between Indigenous communities and Crown constitutional and legal orders must be resolved. Point 43 under the *94 Calls to Action* states:

> We call upon federal, provincial, territorial, and municipal governments to fully adopt and implement the United Nations Declaration on the Rights of Indigenous Peoples as the framework for reconciliation.

British Columbia appears to be working towards a path of reconciliation; however, progress is slow and Indigenous Cultural Heritage continues to be threatened. Nevertheless, the UNDRIP articles and TRC 94 Calls to Action have provided the foundation for recent assessments of heritage-related processes and legislation in Canada, all of which provide a path forward to assert Indigenous sovereignty and rights over Indigenous Cultural Heritage First Peoples' Cultural Council 2019, 2020; Indigenous Heritage Circle 2019; Truth and Reconciliation Commission 2012; United Nations 2007). The recent adoption of Bill 41 (*DRIPA*) into the provincial legislature and its application remains to be seen.

2 PROPOSED PROEJCT

The proposed Project Area consists of approximately 60.7 ha (150 acres) of land in the Village of Anmore in southwestern BC (see Figure 1). The land was previously owned by the Imperial Oil Corporation, and the developed lands in the Project Area include part of the Ioco Townsite Heritage Conservation Area, an early 20th century townsite purpose-built by Imperial Oil for refinery employees. Spring Anmore Properties Ltd. proposes to develop the property as a mixed-use (residential, commercial, and institutional) development. The anticipated ground-disturbances relating to the development of Anmore South may include tree clearing, terraforming, road development, sidewalk development and permanent structures (i.e., homes, buildings, recreational structures) as well as the installation of utilities (i.e., sewer system and water supply).

2.1 First Nations Representation and Engagement

Formal consultation with First Nations that have Indigenous interests in the *HCA* permit study area commenced when the Archaeology Branch distributed the proposed Section 12 Heritage Inspection Permit application to 15 First Nations for a 30-day review. Inlailawatash secured permits from the following Nations:

- xʷməθkʷəy̓əm (Musqueam) Indian Band
- Sḵwx̱wú7mesh Úxwumixw (Squamish Nation)
- Stó:lō Nation
- səlilwətaɬ (Tsleil-Waututh) First Nation
- kʷikʷəƛəm (Kwikwetlem) First Nation

Inlailawatash engaged with several local First Nations prior to formal Provincial consultation. This involved sending First Nations permit applications outlining the project, fieldwork scope, summary of known archaeological sites within the Project Area, proposed methods, and scheduling. Inlailawatash submitted five applications for First Nations cultural heritage permits and received permits from all five: xʷməθkʷəy̓əm (Musqueam) Heritage Research/Investigation Permit MIB-2023-114-AIA, Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) Archaeological Investigation Permit 23-0181, Stó:lō Heritage Investigation Permit 2023-107, kʷikʷəƛəm Permit KwHIP 2023-006, and səlilwətaɬ (Tsleil-Waututh) Cultural Heritage Investigation Permit TWN-23185-23103. Throughout the duration of this AIA Inlailawatash was supported by field representatives from səlilwətaɬ (Tsleil-Waututh). Daily summary reports were sent to Nations for review at the end of each field day.

3 PROJECT AREA

3.1 Physiographic Context

The topography, landforms, and geology within and adjacent to the Project Area provide insights into the possibility of how ancestral Coast Salish peoples used the physical environment. Southern British Columbia lies in the Western Cordillera region of North America, a region characterized by a complex system of mountains, plateaus, fjords, lakes, and alluvial valleys. The Port Moody area lies at the head of Burrard Inlet, also known as the Port Moody Arm. Burrard Inlet is part of the Georgia Depression that borders on the Coast Mountain and Cascade Mountain physiographic regions. The major lithostratigraphic units are classified as flat-lying sedimentary with a surficial geology comprised of marine shoreline and fluvial sand (Church and Ryder 2010). Eagle Mountain, the base of which is located approximately 3 km northeast from the Project Area, is a prominent geographical feature that rises 1,272 m above sea level overlooking Buntzen and Sasamat Lakes to the west, and the Port Moody Arm to the south. The bedrock in the area immediately surrounding Buntzen Lake and Sasamat Lake is mid-cretaceous quartz diorite and Mississippian undifferentiated metamorphic. No toolstone outcrops are known in these areas specifically, although there are several ochres, dacite, basalt, and obsidian sources within Sḵwx̱wú7mesh, səlilwətaɬ, and kʷikʷəƛəm territory (see Reimer 2014). Bedrock in the area

generally consists of coarse crystalline intrusive rocks such as granite, granodiorite, quartz diorite, and migmatite (Roddick 1965).

3.1.1 Geomorphology

While tectonic activity has formed the underlying geology of British Columbia, it is the effects of Pleistocene glaciation that have determined the topography of the landscape and surficial sediments. The scouring of the land by both glacial ice and glacial meltwater determined the type of sediments and landscape features present in the Lower Mainland. The sedimentary evidence of the last glaciation provides explanation for the character of the contemporary landscape, an important consideration for understanding human occupation. After deglaciation habitable environments for human occupation developed. The timing of deglaciation is around 13,000 – 11,000 years ago, placing the earliest approximate age for the oldest potential archaeological sites in the Lower Mainland at around this time (Armstrong 1990; Clague 1989).

At the peak of the last North American glaciation, called the Late Wisconsin, the Lower Mainland was covered by ice up to 2 km thick. The weight of glacial ice and its subsequent melting determined relative sea levels, which rose and fell between periods of glaciation and deglaciation. The sub-surface geology of the Burrard Peninsula consists of Quaternary sediments comprised of unconsolidated glacial marine gravels and sand, till, and alluvium (Armstrong 1990; Armstrong and Hicock 1976; Massey et al. 2005).

Coastal areas of the isostatically depressed Fraser Lowland were inundated during periods of deglaciation up to about 200 m above current sea level. The distribution of fossil shells indicate that the sea extended across the Fraser Lowland as far east as Abbotsford (Armstrong 1990:51; Williams and Roberts 1989:1660). Parts of the Burrard Peninsula and the Fraser River Delta with elevations 200 m above sea level and below, including the Project Area, would have at times been inundated by the fluctuating sea levels.

Between 8,800 and 7,900 years ago sea levels were up to 11 m below modern sea levels (Armstrong and Hicock 1976). Any human settlements represented by archaeological sites along the shoreline from this time are now underwater. Relative sea levels stabilized near modern levels by about 5,500 years ago (Armstrong 1981; Church and Ryder 2010; Clague 1989; Clague et al. 1982; Demarchi 2011; Fulton et al. 2004; Williams and Roberts 1989). The changes in sea level have influenced the location of archaeological sites such that some sites will now be submerged, others close to the shoreline are being eroded due to sea level rise, or other sites may be found far inland from current shorelines when sea levels were higher than today. Any sites found within the Project Area are most likely the result of cultural activities associated with

sea levels of the past 5,500 years. The Project Area is currently approximately 35 m above sea level in its southwest corner and approximately 160 m above sea level in its northeast corner.

3.1.2 Flora and Fauna

The Project Area is within the Coastal Western Hemlock Very Dry Maritime (CWHxm1) biogeoclimatic zone, one of the most productive zones in British Columbia for overall biomass (Jones and Annas 1978). The climate is typically mild and rainy with annual precipitation averaging around 1500 mm. Western hemlock is the dominant forest cover for this zone, and is typically accompanied by western redcedar, Douglas-fir, and Sitka spruce. Amabilis fir, grand fir, western white pine, and bigleaf maple are sometimes present in the southern portions of the zone. Ferns make up most of the understory and several moss species make up the ground cover (Pojar et al. 1991: 96-98). The Project Area has been partially deforested. The current flora of the area is a mix of native and non-native species.

Economically important animal species that would have been found in the Project Area in the past include large mammals such as black bear and mule deer. Birds including various waterfowl and eagle species would have been present. Within the Port Moody Arm of Burrard Inlet, many ecological niches exist such as tidal marsh, mudflats, freshwater lagoons, and freshwater creeks that flow into the inlet and support an array of littoral resources. Two freshwater creeks and their tributaries cross through the Project Area. Schoolhouse Creek North flows through the Project Area starting in the northeast and drains south southwest into Burrard Inlet. Doctor's Creek flows through the Project Area starting in the northwest and flows south southwest. Additionally, Mossom Creek runs in a southwest direction into Burrard Inlet east of the Project Area. These streams would have supported salmon populations as well as provided a source of fresh water to ancestral Coast Salish peoples living in the area. Schoolhouse Creek North continues to be a salmon bearing stream (Aquaterra Environmental Ltd. 2019). The pre-industrial shoreline and intertidal area would have been suitable habitat for a range of economically important shellfish (e.g., butter clam, horse clam, native Pacific oyster), resident fish, eelgrass and kelp beds, and a variety of waterfowl.

3.1.3 Summary of Physiographic Context

The pre-industrial landforms, hydrology, and ecological resources of the past suggest that the Project Area has potential for archaeological sites. First Nations people occupied villages and camps along the shores of Burrard Inlet where a variety of fish, shellfish, plant, and animal and sea mammal resources could have been easily harvested from the marine and freshwater creek environments. The Project Area has a highly favourable environmental setting for the location of

pre-Contact settlements that may be reflected archaeologically. However, urbanization has altered hydrology and the landscape, and may have also destroyed archaeological sites associated with resource collection activities and other cultural activities.

3.2 Archaeological Background

3.2.1 Archaeological Site Types

Locations with material remains that were produced by human activities in the past are called archaeological sites. In British Columbia most archaeological sites are attributed to the past activities of Indigenous peoples before European contact and are referred to as pre-Contact archaeological sites. There are also post-Contact sites, often called historic archaeological sites, that usually have structural remains and material culture associated with European technology. Known archaeological sites are recorded in the Provincial Heritage Register and maintained by the Archaeology Branch (Site Inventory Section), the government agency responsible for the management of archaeological resources under the *Heritage Conservation Act*.

Recorded archaeological sites with their geo-referenced location can be downloaded from the Provincial Heritage Register Inventory via the Remote Access to Archaeological Database (RAAD) system, an electronic database maintained by the Archaeology Branch. This system enables access to information about recorded sites within the local and regional study area. Archaeological sites are recorded in RAAD according to site type, which usually specifies the type of features and belongings (i.e., artifacts) known, the size of the site, its stratigraphy and sediments, and the types of traditional activities suspected to have taken place at the site. The types of sites found around the eastern end of Burrard Inlet include habitation sites (village sites and seasonal camps), cultural shell deposit sites, artifact scatters, burial places, trails, and historic shipwrecks and other historic remains (Table 1).

3.2.2 Regional Archaeological Background

The Project Area is situated within the Northwest Coast Culture Area defined by anthropologists, which is an immense coastal culture area that encompasses the west coast of North America from southeastern Alaska to Cape Mendocino in northern California. Archaeologists have defined a chronological sequence of pre-Contact cultural periods within this culture area for the south British Columbia coast based on site investigations in the Salish Sea and the Lower Fraser River delta. Summaries of the south coast regional culture history sequences have been prepared by Ames and Maschner (1999), Matson and Coupland (1995), and Mitchell (1990) and Moss (2011).

Researchers have noted continuities through time in reliance on marine and riverine resources, particularly salmon and other fishing, woodworking technology, ceremonialism, status, and the

acquisition of wealth. Based on diagnostic artifact types and technologies, as well as inferred economic, social, and other cultural traits, six distinct cultural chronological periods, variably referred to as "Phases" or "Cultures" are identified with associated time frames expressed in years before present (BP):

- Pebble Tool/Old Cordilleran (ca. 12,000 - 5,500/4,500 years BP)
- Charles (ca. 5,500/4,500 - 3,500 BP)
- Locarno Beach (ca. 3,500 - 2,500 BP)
- Marpole (ca. 2,500 - 1,200 BP)
- Gulf of Georgia/Developed Coast Salish (ca. 1,200 - 200 BP) and
- Historic or Ethnographic Period (ca. 200 BP to present)

Pebble Tool/Old Cordilleran Tradition (12,000 - 5,500 years BP)

The earliest culture tradition identified for the coast is called by various names including the Pebble Tool Tradition (Carlson 1990; Carlson and Della Bona 1996), the Old Cordilleran Tradition (Matson 1976, 1992), the Lithic Culture Type (Mitchell 1971), or the Protowestern Tradition (Ham 1982; McLaren 2017). This early tradition, which dates from approximately 12,000 to 5,500 BP is associated with a period of lower and/or fluctuating sea levels in the early Holocene. The artifact assemblages are dominated by flaked stone belongings, including cobble/pebble tools and leaf-shaped bifaces, along with rare bone and antler tools (Carlson 1990; Matson 1992).

In the Fraser River delta, the subsistence pattern is diversified towards deer and wapiti hunting, sea mammals (seals), fish (salmon, stickleback, sturgeon, eulachon, flatfish), and shellfish (Matson 1976, 1992). One of the important type-sites for the Fraser River delta is the Glenrose Cannery site (DgRr-6) (Matson 1976) where faunal remains have been found indicating this subsistence pattern.

Charles/St. Mungo Cultural Phase (5,500 to 3,300 BP)

This culture type has been defined based on three sites in the Fraser River delta: St. Mungo (DgRr-2), Glenrose Cannery (DgRr-6), and Crescent Beach (DgRr-1) (Matson and Coupland 1995). There is a continuation of some tool types from the previous period, but new types, including chipped stone scrapers, drills, stemmed bifaces, as well as ground slate, bone, and antler implements are introduced (Ham et al. 1986). The presence of adzes and wedges suggest a well-developed woodworking technology. Wet sites containing fish weirs, basketry, cordage, carved wood, and cedar bark clothing are also found during this period in the Fraser River delta (Eldridge 1991).

Locarno Beach Cultural Phase (3,500/3,300 to 2,500 BP)

Chipped stone tools predominate with a small proportion of large ground stone tools. Flaked stone tool types include shouldered and lanceolate points, microblades and cores; antler and bone tool types include bilaterally and unilaterally barbed points, one-piece and composite toggling harpoon heads, woodworking tools including abraders, grinding slabs, and wedges, and large faceted ground slate points and thick ground slate knives (Borden 1950; Burley 1980). Gulf Island Complex (GIC) implements such as labrets and "whatzits" are highly abraded stone objects distinctive to this period. Cordage, basketry, and other wood items have been recovered from wet sites in the Lower Mainland (Borden 1976; Bernick 1998). Faunal remains show a diversified resource utilization particularly for the fisheries (Inlailawatash 2019; Pierson 2011; Stiefel 1985).

Marpole Cultural Phase (2,500 to 1,200 BP)

Many artifact types from the Locarno period continue into Marpole; however, there is a decrease in the proportion of chipped stone tools and in increase in the refinement of ground stone tools. The non-toggling, barbed harpoon point is exclusive to the Marpole period. Native copper ornaments are present, along with cultural shell deposit burials containing grave inclusions such as shell or slate disc beads. Large-scale woodworking technology and large house outlines and post moulds suggest that the ethnographic pattern of heavy timber frame houses with cedar planks was well developed by this time. The artistic traditions were well-developed including the presence of seated human figurine bowls, decorated stone bowls, incised siltstone objects, and carved bone and antler objects with zoomorphic designs. The ability to harvest and preserve large quantities of surplus salmon for winter storage probably supported the development of large, ranked societies during this time (Mitchell 1971, 1990; Burley 1980).

Gulf of Georgia/Developed Coast Salish Cultural Phase (1,200 to 200 BP)

This culture is directly ancestral to the ethnographic Coast Salish culture. Belongings that define this culture archaeologically include small triangular flaked basalt points, thin ground slate points and knives, unilaterally barbed bone points, composite toggling harpoon heads, large well-made ground stone adzes, and net weights and anchor stones for netting technology. Salmon was a dietary staple, along with a varied use of many mammal, bird, fish, and plant resources. The resource economy was based on a seasonal round with the presence of large winter villages with heavy timber frame houses, large summer gathering settlements, and smaller seasonal harvesting camps (Mitchell 1990).

3.2.3 Previous Archaeological Research

Archaeological studies have been conducted within Burrard Inlet (Apland and Beattie 1972; Charlton 1972; Ham and Yip 1992; Lepofsky et al. 2007; Smith 1907; Stantec 2010; Struthers 1973; Yip and Gose 1979), illustrate a variety of site types. These include habitation sites (village sites and seasonal camps), cultural shell deposit sites, defensive sites (i.e., trenches/embankments), wetsites (water-logged), fish weirs, artifact scatters, rock art, burial places and mounds, petroforms, culturally modified trees (CMTs), trails, and historic features and artifacts. Human occupation within Burrard Inlet extends back to at least 3,000 years ago with continuous occupation into the Contact period (Morin 2015:223). Further archaeological investigations and dating of sites in the Inlet will eventually provide additional evidence illustrating a potentially broader temporal range of occupation in this area than is currently known.

Relative to the proposed Project Area (the Ioco townsite), no archaeological assessments have been undertaken. The only pre-Contact archaeological site recorded near the Project Area is DhRr-3 which is located approximately 130 m south of the proposed community development between Sunnyside and Mossom Creeks. Professor Charles Borden from the University of British Columbia first recorded DhRr-3 in 1946, noting that the upper deposits were levelled for the Sunnyside Creek Lodge, but that a large portion of the cultural shell deposit remained (Borden 1950). In 1978, Stephanie Yip and Peter Gose (1979) conducted a survey of Burrard Inlet and estimated that DhRr-3 originally occupied an area approximately 14,250 m^2, of which 94% was intact. However, it is impossible to know if there is any intact deposit left without subsurface testing. Yip and Gose (1979) suggested that DhRr-12 was part of DhRr-3, and that these two sites should be combined to form a single massive site along the shoreline at the outflow of Mossom Creek. They were unable to observe any cultural shell deposit east of the mouth of Mossom Creek because of the construction of seawalls and lawns. Current information on the Provincial Archaeological Inventory Database via the Remote Access to Archaeological Resources (RAAD) reflects that DhRr-12 was eventually encapsulated within DhRr-3, and thus the Borden number DhRr-12 is no longer used to identify this location.

3.2.4 Previously Recorded Sites

According to the available data through RAAD, there are no previously recorded archaeological sites within the proposed development area. At the east end of Burrard Inlet (east of Admiralty Point and the Barnet Marine Park), 16 archaeological sites have been recorded and are listed in Table 1. The closest site to the Project Area is DhRr-3, which is approximately 650 m to the south of the Project Area (see Figure 1). The number and variety of site types known for the eastern

portions of Burrard Inlet illustrates a landscape and marine inlet that has been intensely utilized over thousands of years (Morin et al. 2018). Many of these sites have been impacted through historic industrial activities and the urbanization of the lands surrounding Burrard Inlet.

Table 1. Archaeological Sites Surrounding Permit Area, Eastern End of Burrard Inlet.

Borden No.	Description	Reference
DhRq-1	Noons Creek site. Village site consisting of cultural shell deposit, burial, and habitation features.	Charlton 1971a, 1971b, 1972; Ham et al. 2011; Morin 2015
DhRq-6	Pocket of cultural shell deposit possibly destroyed by sewer line construction.	Ham et al. 1979
DhRr-3	Cultural shell deposit, most likely a campsite.	Ham et al. 1979
DhRr-9	Pidgeon Cove Site. Cultural shell deposit and burial site.	Ham et al. 1979
DhRr-10	Small lithic site most likely destroyed.	Ham et al. 1979
DhRr-16	Village site, part of Reed Point complex. Cultural shell deposit adjacent to the Reed Point Marina.	Ham et al. 1979; Morin 2015
DhRr-17	Carraholly Site. Village site consisting of cultural shell deposit and lithics.	Struthers 1973; Ham et al. 1979; Spafford et al. 1999; Morin et al. 2016; Morin 2015
DhRr-22	Noons Creek site (at mouth of creek). Cultural shell deposit and burial site, lithics and bone.	Morin et al. 2016; Ham et al. 1979; Cranny and Bunyan 1975
DhRr-24	Cultural shell deposit site.	Ham et al. 1979
DhRr-25	Cultural shell deposit site.	Ham et al. 1979
DhRr-28	Cultural shell deposit disturbed by residential developments.	Ham et al. 1979
DhRr-101	Cultural shell deposit site.	Spafford et al. 1999
DhR-218	Surface lithics on beach.	N/A
DhRr-369	Village site with defensive features consisting of built trenches, embankments, and hearths. Part of Reed Point complex.	Morin 2015; Morin et al. 2016; Connaughton and Homewood 2017
DhRr-373	Village site part of Reed Point complex.	Morin 2015
DhRr-374	Moderate-sized village site with occupation into the post-Contact period.	Morin et al. 2016

3.3 Ethnographic and Traditional Knowledge Background

3.3.1 Ethnographic Background

The Project Area is situated in territory occupied by the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh Úxwumixw (Squamish Nation), Stó:lō, səlilwətaɬ (Tsleil-Waututh), and kʷikʷəƛəm (Kwikwetlem) First Nations who are collectively part of the Central Coast Salish peoples, speakers of həńq̓əmiṅəṁ, halq'eméylem and Sḵwx̱wú7mesh Snichim (Squamish language) (Duff 1969; Suttles 1990; Thompson and Kinkade 1990). They are part of expansive social networks linking distant groups through kinship, language, trade, intermarriage, ceremonies, and stories (Barnett

1955; Bouchard and Kennedy 1991; Carlson, K. 2001; Hill-Tout 1903, 1978a, 1978b; Morin 2015; Suttles 1955, 1987, 1990).

At the time of European contact, First Nations had many villages and camps throughout Burrard Inlet (Tsleil-Waututh and Alexander 2001:61). Central Coast Salish peoples along the Inlet practiced lifeways, in the past, characteristic of the Northwest Coast Culture Area in general. Common cultural traits include a coastal settlement pattern; a diverse subsistence base and associated technologies with a focus on fishing for anadromous fish, but also shellfish collecting, sea mammal, game and bird hunting, and plant collecting; a complex storage economy particularly for the storage of surplus salmon; extensive wood-working and basketry technologies; a social/political organization with families, household, local groups and winter villages, and a worldview system that included shamanism, vision quests, and life-cycle and subsistence cycle celebrations and rituals (Barnett 1955; Suttles 1990).

Coast Salish use of the lands and waterways around Burrard Inlet have been documented in ethnographies compiled by Barnet (1944, 1955), Suttles (1987, 1990), and Morin (2015). Both before and immediately after contact with Europeans, rivers, lakes, and the inlet served as the primary corridors between these groups, though overland trails were also extensively utilized (Carlson 2001; Tsleil-Waututh and Alexander 2001:175). One such trail has been documented to exist within the Project Area (Morin 2015:228-230). The trail connects Burrard Inlet with Buntzen Lake to the north.

A wide range of activities brought groups and individuals to the Project Area and surrounding landscape. These activities included settlement, hunting, fishing, plant gathering and horticulture, stone quarrying, ceremonial activities, and trade and travel, that occurred from sea-level to mountain top. There is considerable information about ceremonial use of Buntzen Lake. Its place in the oral narratives suggest this was a very sacred place (Tsleil-Waututh Nation and Alexander 2001:112-114).

A first-hand account of travelling up Indian Arm near the shores of “Temenwos Lake” was recorded by W.W. Walkem (1914). Upon drawing near the lake, Walkem and his guide Big George heard a person howling to their guardian spirit. Temenwos is Chinook (Tamanous) for spirit power (Walkem 1914). There are also numerous narratives of how a Tsleil-Waututh hero killed the giant two-headed serpent in Indian Arm and watched it slither off to die in Buntzen Lake (Morin 2015). Sacred sites may not be observable through archaeological survey as they may not have left any tangible trace. Ethnography and traditional knowledge provide additional perspective to more fully understand how landscapes are imbued with meaning and serve to illuminate places where material culture is minimal.

3.3.2 First Nations Place Names and Indigenous Trails

One of the most powerful and direct links between ethnographic information and the physical landscape are place names. Indigenous place names have long been recognized as having inherent cultural value (see Basso 1996; Bierwert 1999; Carlson 2007). This cultural value can arise in many ways. For example, 1) place names may identify locations of specific importance to the culture in question; 2) place names may reflect aspects of the Indigenous ways of understanding and organizing local geography; and 3) place names may be associated with 'supernatural' events in the deep past (i.e., the time of transformers).

Place names reference places of historical or cultural events, topographical features such as mountains, islands, streams, and oceans, as well as settlement, procurement, or ceremonial places. These places, for example, might be camps, villages, seasonal resources harvesting areas, locations of battles, defensive sites, burials, and transformations. In short, place names provide information about the history of the landscape and how people interacted with their natural surroundings. See Table 2 below for a list of place names with their associated translations and locations around the Project Area. Figure 2 illustrates both placenames and Indigenous Trails near the Project Area.

Indigenous trails would have been important to navigate the coastal rainforest. While water travel would have often been the most practical means of transportation between points around the shore of the Inlet, land travel would have still been vital for resource procurement, communication, trade, and for travel (Carlson 2001; Morin 2015; Tsleil-Waututh and Alexander 2001). Multiple Indigenous trails are visible in and around the Project Area, linking village sites to one another and to resource procurement locations.

Despite all potential activities on the trails, many would not have left traces in the archaeological record and what might have been left has likely been obscured by the deforestation and urbanization of the landscape, including the building of roads which are often built directly overtop Indigenous trails. Nevertheless, trails illuminate the connection to places and spaces, such as villages and resources, and how the spatial relationships of sites may have influenced past land use.

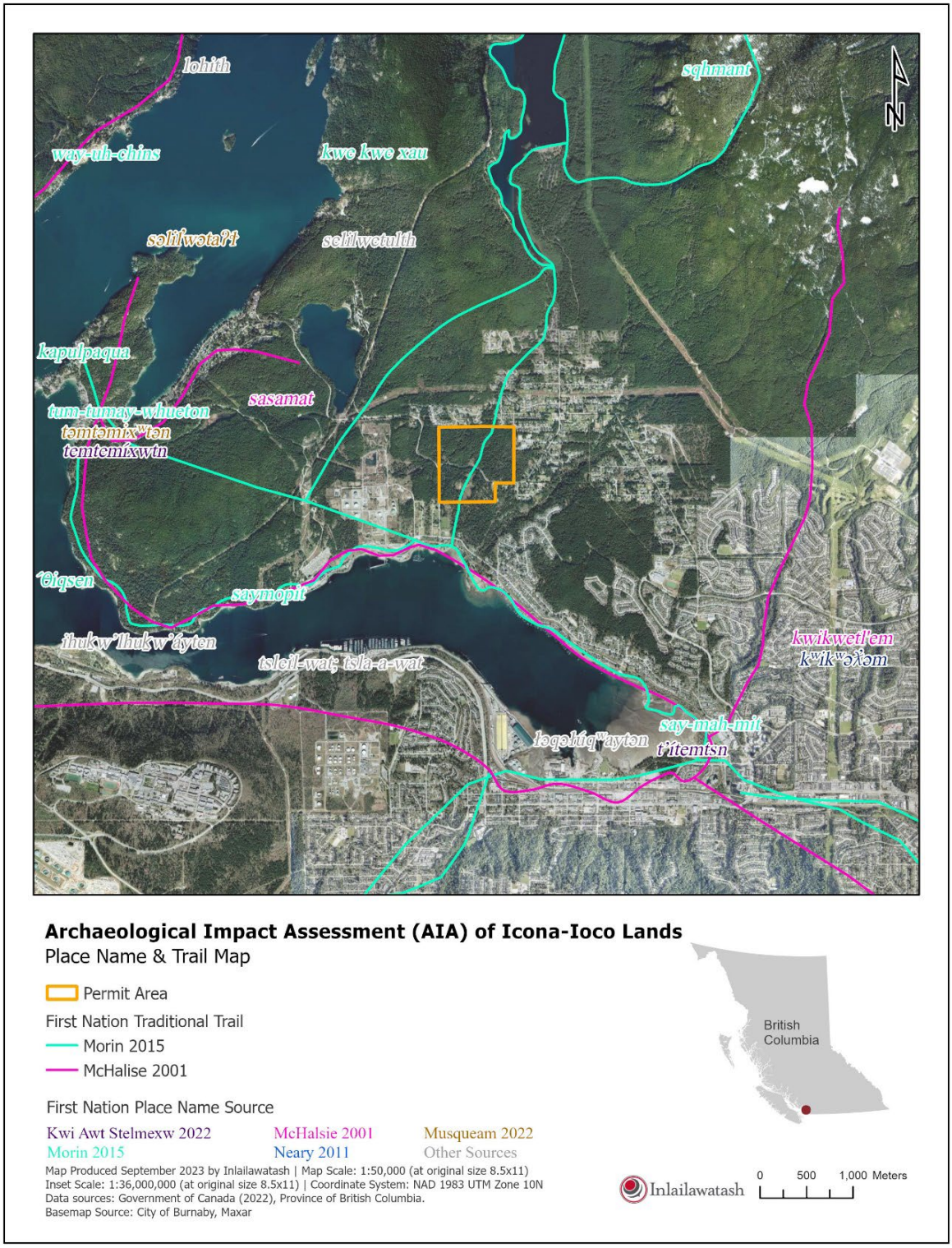

Figure 2. Place Names and Indigenous Trails in and around the Project Area.

Table 2. Place Names within 4 km of the Project Area.

Place Name	Translation	Location	Source
way-uh-chins	Currently unknown	Referring to area that is now known as the Sunshine neighbourhood of North Vancouver.	Morin 2015
say-mah-mit	Currently unknown	Referring to Noon's Creek; village at the head of Port Moody; the Port Moody Area.	Morin 2015
lhuḵw'lhuḵw'áyten	"Where the bark gets pealed"	Referring to approximately where is now Barnet Marine Park, location of historic Barnet Mill.	The Bill Reid Centre 2016
tum-tumay-whueton; təmtəmíxʷtən; temtemixwten	"land/earth," "much land/earth," "lots of land," and "the biggest place for all the people"	Referring to Belcarra (Location of DhRr-6), a large ancestral Tsleil-Waututh village.	Morin 2015:82; Musqueam 2022; Kwi Awt Stelmexw 2022
saymopit	Currently unknown	Referring to Caraholly Point.	Morin 2015
sasamat	n/a	Referring to Sasamat Lake.	McHalsie 2001
t'ítemtsn	Currently unknown	Referring to Port Moody/Pigeon Cove.	Kwi Awt Stelmexw 2022
sqhmant	Currently unknown	Referring to what is now known as the eastern Indian Arm/Shoemaker Mountain.	Morin 2015
selilwetulth; səliʔwətaʔɬ	"The whole area (place)"	Referring to what is now known as the head of the Indian Arm, the Indian River, and the area drained by it.	Matthews 1955; Musqueam 2022
ˊθiqsen	Currently unknown	Referring to Admiralty Point.	Morin 2015
kʷikʷəƛ̓əm; kwikwetl'em	Stinking of Something; "Smelly Fish Slime"; "stinking of something; smelly fish slime"; "small red fish", "red fish up the river".	Referring to the Coquitlam River and its drainage/watershed.	Kwikwetlem 2023, personal comm.; Neary 2011:74; McHalsie 2001

Place Name	Translation	Location	Source
kwe kwe xau	Currently unknown	Referring to the hill/mountain north of Belcarra which served as familial hunting ground (Tsleil-Waututh).	Morin 2015
kapulpaqua	Currently unknown	Referring to the entrance to the Indian Arm between Belcarra and Deep Cove.	Morin 2015
ɬəqəɬúqʷaytən	Arbutus tree	Referring to Gosse Point and/or Rocky Point.	Suttles 1996
Tsleil-wat; Tsla-a-wat	n/a	Referring to Burrard Inlet.	Morin 2013; Carter 1996

3.4 Historical and Ethnohistoric Review

The advent of logging, residential, and industrial development in the lower elevations of the Coast Mountains in the late 19th and early 20th centuries had a profound impact on forest resources and local First Nations communities. Clear-cut logging took place within and adjacent to the Project Area in the early 20th century for the Imperial Oil Company (IOCO) refinery (Figure 3).

Figure 3. Panorama of clear cut logging for the Imperial Oil Refinery [adapted from Major J.S. Matthews' photos July 1914]. [City of Vancouver Archives AM54-S4-: Out P449.3, Out P449.2, Out P449.1].

The area is perhaps most well-known for its proximity to the Imperial Oil (Ioco) Refinery and the former Ioco Townsite. The townsite runs directly west of the Project Area's southwestern boarder, and the refinery is approximately 450 m west of the Project Area. The Ioco Refinery was one of the first refineries in western Canada (POMO Museum 2023). Site clearing for the refinery in Anmore began in 1914 and operation began in 1915, at which point the refinery employed approximately 240 men and created 1000 barrels of oil a day (POMO Museum 2023. Initially, a

boarding facility aptly named the “Colony House” housed 50 men, and 17 small wood cabins housed engineers and supervisors who moved for work from Ontario (POMO Museum 2023). Conditions at the refinery were “harsh and dangerous”, and with no road many workers had to travel by boat from Vancouver and Port Moody (POMO Museum 2023). By 1919, 75% of refinery workers lived in makeshift shacks between the shore and the railway tracks (Figure 4), and their dependency on oil lamps combined with lack of running water were constant sources of danger (POMO Museum 2023).

Figure 4. Shacks at the Imperial Oil Refinery before the Ioco Townsite, ca. 1915. [POMO Port Moody Museum, https://www.pomo.museum/ioco-chapter-2].

Plans were soon drawn for a townsite adjacent to the refinery. In December 1920 land was surveyed, and the future townsite was registered in the New Westminster Land Registry Office on January 25th, 1921 (POMO Museum 2023). The first fifteen houses at the townsite were cottages from the refinery that were towed to the Ioco Townsite in 1921 where they were erected on lots of approximately 490 m^3 (POMO Museum 2023) (Figure 5). Between 1921 and 1924, 83 houses were built or moved to the Townsite, all with indoor plumbing and electricity (POMO Museum 2023) (Figure 6). After construction, along with the 83 houses, the town consisted of two churches, a community hall, a general store, a four-roomed schoolhouse, a lawn bowling green and club house, tennis courts, baseball diamonds, and a horseshoe pitch (POMO Museum 2023). Ioco Townsite “flourished” from 1925 through 1958 (POMO Museum 2023).

Figure 5. Construction of houses at what became the Ioco Townsite, ca. 1921. [POMO Port Moody Museum, 2023 https://www.pomo.museum/ioco-chapter-4].

Figure 6. View of Ioco Townsite, ca. 1921-1930. [POMO Port Moody Museum, 2023, https://www.pomo.museum/ioco-chapter-4].

The second half of the century saw change for the Townsite. Gradual improvement of Ioco Road and the wider availability of cars post World War II caused the community to disperse (POMO Museum 2023). As part of the agreements between Imperial Oil and their employees who lived in the Townsite, the company had right of first refusal on any sale of Ioco buildings (POMO Museum 2023). Imperial Oil began exercising said right in the mid-1950s and purchased and disposed of houses as they came onto the market with the goal of creating a buffer zone between the refinery and any encroaching urban development (POMO Museum 2023). In the 1960s, a dozen houses were moved 2 km north from the Townsite to a new private subdivision in Anmore, and the refinery manager's house was shipped to Port McNeal (POMO Museum 2023). The City of Port Moody began annexing Ioco, and the town was officially annexed in 1993 (POMO Museum 2023). In 1995, Imperial Oil closed the Townsite's connection to the refinery and handed Ioco to their real estate division (POMO Museum 2023). Ioco was designated as a Heritage Conservation Area by Port Moody in 2002, and in January of 2015 the Brilliant Circle Group, now Gilic Incorporated, purchased the western 232 acres of Ioco from Imperial Oil (POMO Museum 2023).

3.4.1 Expected Site Types Based on Cultural Overview

Activities that the First Nations living in the area surrounding Burrard Inlet engaged in that may be reflected in the archaeological record of the Project Area include: habitation (e.g., cultural shell deposits, house depressions, and burials), resource procurement (e.g., hunting, fishing, and shellfish and plant gathering), transportation and trade (e.g., trails), and ceremonial activities (e.g., rock art).

Historic Tsleil-Waututh trails have been recorded in the Project Area. Trails connected the shoreline to inland areas such as Sasamat and Buntzen Lakes where freshwater and sub-alpine resources not available along the shoreline could be procured. A trail connecting Burrard Inlet to Buntzen Lake following Sunnyside Creek west of Mossom Creek has been identified within the project area (Morin 2015:229). Temporary encampments and rock shelters are often associated with trails (Ritchie and Sellers 2015).

Based on the background overview of ethnographic activities, known archaeological sites, place name sites, and the environmental context of the Project Area, these types of archaeological sites might be expected to exist in the Project Area:

1. Habitation sites/cultural shell deposits/lithic scatters/hearths/house depressions
2. Hunting camps/lithic scatters/hearths/cultural depressions
3. Plant gathering camps/lithic scatters/hearths/cultural depressions
4. Culturally Modified Trees (CMTs)
5. Rock art on boulders or rock outcrops
6. Burial mounds/burials
7. Trails

3.4.2 Evaluation of Site Potential

Results of the desktop study (AOA) conducted in 2018 indicate potential for archaeological materials to be present in the Project Area. This is supported by the presence and abundance of known archaeological sites nearby. An extensive ethnographic record describes the intensive land use that was carried out by Indigenous peoples in and around the Project Area and Burrard Inlet. The historic record indicates that the Project Area at least partially escaped the major effects of industrialization and urbanization for the region and that this would have prevented substantial site destruction. From the results of this desktop analysis, it can be concluded that there is no part of the study area which can be considered to have no potential for archaeological materials.

4 METHODS OF THE ARCHAEOLOGICAL IMPACT ASSESSMENT

4.1 Inventory

The AIA field program was conducted over four days and divided into two components: (1) pedestrian survey and (2) subsurface testing. Pedestrian survey of the Project Area was conducted between October 3–4, 2023. The goal of the survey component was to identify landforms with archaeological potential (i.e., AOPs) to be shovel tested. The survey consisted of two to four people walking in transects of 3–40 m across the Project Area. The size of the transects varied depending on the terrain, visibility, and in-field determinations of archaeological potential of the area. For example, where the visibility was greater and the archaeological potential lower (sloped, open forested area), the crew was spaced at larger intervals.

Throughout the survey, the crew inspected intact ground surfaces, ground disturbances, eroded banks, and tree throws. All exposures were examined for the identification of archaeological materials, paleosols, and culturally sterile sediments. These observations, amongst others, contributed to determining archaeological potential. The crew made in-field decisions regarding any observed landforms (e.g., micro terraces, terraces, knolls, etc.) based on the characteristics of the terrain and vegetation to identify areas with archaeological potential to be shovel tested.

Particular attention was placed on areas near watercourses (i.e., Schoolhouse Creek North and Doctor's Creek).

4.2 Site Evaluation

Landforms determined to have archaeological potential were shovel tested (STAs) between October 5–6, 2023. The field crew systematically excavated shovel tests to a minimum size of 35 cm by 35 cm and to a depth of 70 cm, unless sterile sediments were reached shallower, or bedrock, boulders, or large tree roots were encountered.

The landforms identified and shovel tested (Shovel Test Areas) are described below in Section 5.2.

5 RESOURCE INVENTORY – RESULTS

5.1 Survey Results

The survey covered 92% of the Project Area. Some areas were inaccessible due to the presence of dense Himalayan blackberry and/or dense vegetation and deadfall (Figure 7). The survey results are divided into sections and are described below: Northeast, Southeast, Northwest, and Southwest.

5.1.1 Northeast

The northeast portion of the Project Area is forested with undulating and sloping terrain. In general, the terrain slopes down to the south and the vegetation ranges from dense in the south to more open in the north and near the creek. Schoolhouse Creek North is located in the very west of this section of the Project Area and runs through a small ravine with steep banks, becoming less prominent in the south. There are mountain bike trails and jumps that cross over the creek in the north. Additionally, historic logging of the area is evidenced by large old growth western redcedar stumps and overgrown logging roads. The vegetation in this area primarily consists of medium to large western hemlock, western redcedar, Douglas-fir and some bigleaf maple with an understory of salmonberry, various fern species, salal, huckleberry, holly. The ground cover primarily consisted of moss, leaf litter, and deadfall. The middle of this area had a high density of deadfall, making it difficult to traverse. Sediment exposures visible in tree throws throughout the area show reddish yellow sand with 10% subrounded to subangular gravel and cobbles as well as silty grey clay closer to low lying wet area. No AOPs were observed or recorded in the northeast section of the Project Area.

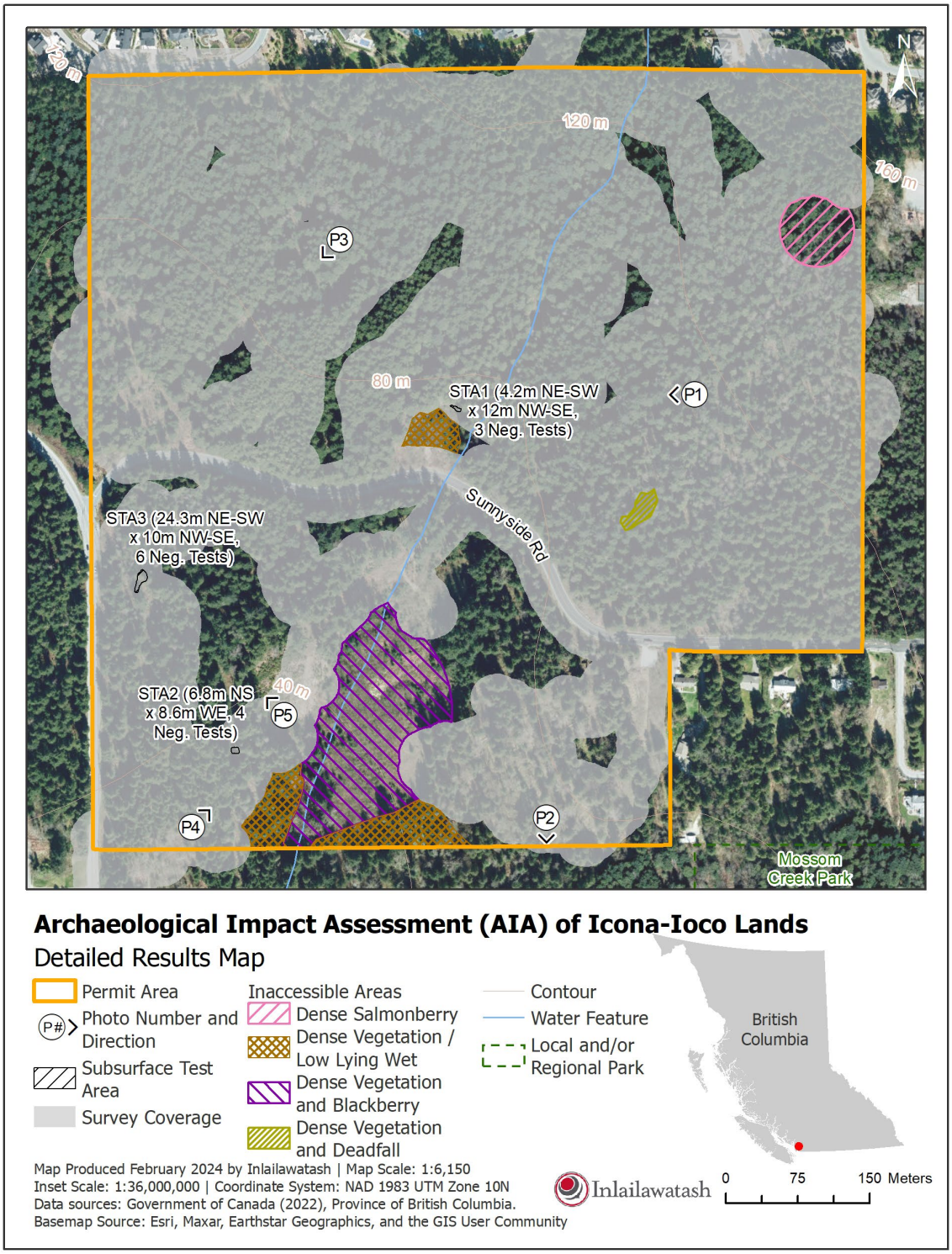

Figure 7. Results map displaying the survey coverage as well as the location of the Shovel Test Areas.

Figure 8. Example of dense understory, undulating terrain, and deadfall observed in areas throughout the northeast quadrant of the Project Area. The terrain is sloping to the southwest. Photo looking west (P1, October 3, 2023).

5.1.2 Southeast

The southeast portion of the Project Area is a forested area with dense understory (Figure 9). The canopy is primarily composed of medium to large western redcedar, western hemlock, with some bigleaf maple and alder in areas closer to the road and previously disturbed areas (logging road, recently cut path). The understory is primarily composed of salmonberry, Himalayan blackberry, sword fern, spiney wood fern, holly, with some English Ivy, horsetail, and sparse trailing blackberry as well as osoberry. In low lying wet areas scattered throughout, skunk cabbage and devil's club are present. The terrain generally slopes down to the southwest with a gentler slope closer to Sunnyside Road. This area has been historically logged as evidenced by the large old growth cedar stumps and overgrown logging roads. A gravel parking area is located in the northwest of this section by Sunnyside Road, which has likely been leveled, and a path had been cleared of vegetation for geotechnical drilling running south along the project boundary. Dense patches of Himalayan blackberry rendered some sections of this are inaccessible (see Figure 7). No AOPs were observed or recorded.

Figure 9. Looking south in the southeast quandrant of the Project Area. Emma Lowther (ILP) is standing mid slope (P2, October 3, 2023).

5.1.3 Northwest

The northwest section of the Project Area is densely forested in the south (closest to Sunnyside Road) and opens further north, where the visibility ranges from 20–40 m (Figure 10). In general, the terrain is undulating and has a moderate slope to the south and southwest becoming gentler in the very north near Crystal Creek Drive. The boundary in the northwest of the Project Area is demarcated by a concrete retaining wall that separates Crystal Creek Drive. The terrain in the southwest of the northwest section of the Project Area is low lying and waterlogged. The vegetation consists of western hemlock, western redcedar, Douglas-fir, with salmonberry, spiny wood fern, huckleberry, deer fern, and various moss species. Throughout the area there are sporadic patches of low-lying wet areas with dense vine maple, ferns, and skunk cabbage. This area has been historically logged as evidenced by the large old growth cedar stumps and overgrown logging roads. Additionally, there is a network of mountain bike trails located near the creek. One landform was identified in the northwest section of the Project Area as having archaeological potential and was shovel tested (STA 1) (see Figure 7).

Figure 10. Example of open forested area with a moderate slope to the southwest in the northwest quandrant of the Project Area. Photo looking southwest (P3, October 4, 2023).

5.1.4 Southwest

The southwest portion of the Project Area is a forested area with many low-lying wet areas and two creeks that pass through running north to south. The forest in this area is generally open with visibility ranging from 10–40 m, except for in low-lying wet areas and near the creeks where the understory is thick (Figure 11). The forest canopy is primarily comprised of western hemlock, Douglas-fir and western redcedar with some bigleaf maple, while the understory is made up of various fern species, salal, salmonberry, and huckleberry, with some holly and trailing blackberry. Additionally, in low-lying wet areas, skunk cabbage, vine maple, and salmonberry, are prominent. The ground cover in this area is composed of various species of moss, particularly in the open forested areas, and leaf litter. The terrain is generally undulating and gently slopes down to the south from Sunnyside Road. This area has been historically logged as evidenced by the large old growth cedar stumps and overgrown logging roads. An old gun range is located in the middle of the southern section of the Project Area and was subject to ground disturbance by an excavator in the past. This area was likely leveled when it was cleared and ground surface exposures

revealed a reddish yellow gravel. The vegetation is very dense, and the area could only be accessed in the west, where it is less dense (Figure 12). The vegetation is composed of western redcedar, western hemlock, and Douglas-fir saplings, as well as very tall spiny wood fern, Himalayan blackberry, foxglove, and various moss species. The gun range was determined to have minimal archaeological potential due to the previous disturbance and ground levelling. Two landforms in the southwest section of the Project Area were identified as having archaeological potential and were shovel tested (STA 2 and STA 3) (see Figure 7).

Figure 11. Example of open forested area with young trees and undulating sloping terrain. Photo looking northeast (P4, October 4, 2023).

Figure 12. Photo looking northwest of a small section of the area cleared for the gun range that is now covered with young conifers. This photo was taken in an area where the vegetation was sparse enough to be accessed (P5, October 4, 2023).

5.2 Subsurface results

Three landforms with archaeological potential were identified and subsequently shovel tested (STA 1, STA 2, STA 3) (Figure 7). All three are small, micro-terraces adjacent to streams. No archaeological materials were identified. In total, 13 shovel tests were employed resulting in 13 negative tests. Location, sediments, and stratigraphic descriptions for each shovel test were recorded and are included in Appendix A. Detailed maps of each Shovel Test Area are included in Appendix B. Table 3 provides the total number of shovel tests per landform (Shovel Test Area), the approximate area of each landform, the number of positive tests, and the average depth of shovel testing at each landform.

Table 3. Landforms Tested during the AIA.

Landform	Approx. Area of Landform (m^2)	No. of Shovel Tests	No. of Positive Shovel Tests	Avg. Depth of Shovel Test (cm below surface)
1	33.9	3	0	71.3
2	47.5	4	0	58.8
3	149.5	6	0	64.5
TOTALS	230.9	13	0	64.9

5.2.1 STA 1

STA 1 is in the very east of the northwest quadrant of the Project Area (Figure 7). STA 1 is a very small micro-bench overlooking Schoolhouse Creek North and a low-lying wet area to the southwest. The micro-bench is relatively linear, following the edge of the drop off in a WNW by ESE orientation. It is 12 m long and 4 m wide at its widest point in the centre and elevated approximately 8 m above the low-lying wet area. The terrain within the landform is level and flat and is terminated at the northeast and the northwest by a hump that initiates the start of the 10° slope to the NNE. The landform is terminated at the southwest by a 50 ° drop to the WSW down to the low-lying wet area with dense vegetation by Schoolhouse Creek North, and at the southeast by hummocky terrain, dense vegetation, and a 12° slope to the SE. Three shovel tests were employed across the landform all negative for archaeological materials (Appendices A, B; Figures 13, 14).

Figure 13. Looking WNW along the landform that forms STA 1. The location of ST1 is in foreground, ST2 located at the pin flag in the centre, and Emma Lowther is standing by ST3 at the end of the landform (October 5, 2023).

Figure 14. STA 1, Shovel Test 1 (October 5, 2023).

5.2.2 STA 2

STA 2 is located in the southwest quadrant of the Project Area (Figure 7). It is an approximately oval shaped level flat dry area in a bend of Schoolhouse Creek North. STA2 is approximately 8.6 m long (E-W) and 6.8 m wide (N-S) and is elevated 0.5 m above the creek bed. The landform is terminated in the west by Schoolhouse Creek North that curves around the landform starting from the north, in the north by a hummocky slope of 10^{o} (the creek is on the other side of this slope), in the east by a slight dip down to a flattened area (perhaps on old creek channel) that then slopes up towards the gun club, and in the south by a slight dip down to hummocky terrain. The vegetation within this STA includes salmonberry as well as a few hemlock trees with various ferns, mosses, and deadfall covering the ground. Four shovel tests were employed across the landform all negative for archaeological materials (Appendices A, B; Figures 15, 16).

Figure 15. View of STA 2 from the opposite bank of Schoolhouse Creek North, looking east (October 5, 2023).

Figure 16. STA 2, Shovel Test 1 (October 5, 2023).

5.2.3 STA 3

STA 3 is located in the northwest corner of the southwest quadrant, approximately 30 m from 1st Avenue (Figure 7). AOP 3 is a micro-bench located on the west side of Doctor's Creek. The landform is linear following the creek in a NNE-SSW orientation and widens in the north. It is approximately 24.3 m long (NE-SW) and 10 m wide (NW-SE) at its widest point. The landform is terminated to the east by a 30–40° slope down to the creek, in the north by a dip in the landscape that turns into undulating terrain, in the west by undulating terrain that gently slopes upwards towards First Ave, and in the south by undulating and poorly drained terrain. The vegetation in this area includes western hemlock, Douglas-fir, western redcedar, standing dead alder, salmonberry, sword fern, spiney wood fern, vine maple, various species of mosses, and deadfall. Additionally, there is a large western redcedar just outside the AOP on the edge of the landform by the creek. Six shovel tests were employed across the landform all negative for archaeological materials (Appendices A, B; Figures 17, 18).

Figure 17. View looking NNW along the landform that forms STA 3. Emma Lowther is excavating ST1 in the foreground, with Sean P. Connaughton at ST3 in the middle, and John Sisson excavating ST3 in the background (October 5, 2023).

Figure 18. STA 3, Shovel Test 1 (October 5, 2023).

6 RESOURCE EVALUATION

No new archaeological materials were identified during the AIA fieldwork program for the IOCO Lands in South Anmore. There is confidence that the archaeological assessment for each landform was thorough and sufficient, and that additional sites are unlikely to be identified with further survey and shovel testing within those discrete areas. Nevertheless, the possibility remains that yet undetected archaeological sites within the areas assessed could possibly exist due to the inherent limitations of all archaeological sampling methods, including shovel testing.

7 IMPACT IDENTIFICATION AND ASSESSMENT

No impacts to pre-1846 archaeological sites were identified during this AIA. All tested landforms resulted in negative data for archaeological materials.

8 EVALUATION OF RESEARCH

This section of the report presents an evaluation of the suitability of the site survey techniques employed based on known site types and densities of archaeological features within the larger study area of Burrard Inlet. Using the density of known sites, landform areas, and shovel test spacing, the probability of site identification using this shovel testing strategy was established. Quantitative analysis using the Site Identifier Confidence Calculator (provided by the Archaeology Branch) was used to evaluate the effectiveness of shovel testing methods at each test location based on their expected artifact density of 4.8 artifacts per m^2.

The summary of the probability for encountered subsurface archaeological materials based on 4.8 artifacts per m^2 in clusters of 100 m^2, 200 m^2, and 500 m^2, shown as percentages, are presented in Table 4. This table reflects the adequate number of shovel tests required per area as determined by the Site Identifier Confidence Calculator (provided by the Archaeology Branch). Because the probability of encountering artifacts varies according to site size and artifact density, this was mitigated through intensive shovel testing (i.e., less than 5 m offset spacing) for each identified AOP.

Table 4. Survey method assessments for all shovel test areas within the Project Area.

STA No.	No. of STs*	Tested Area (m^2)**	100 m^2	200 m^2	500 m^2	Avg Test Spacing (m)
1	3	33.9	93%	93%	93%	3.4
2	4	47.5	97%	97%	97%	3.4
3	6	149.5	95%	100%	100%	5.0

*Shovel Test Size is 0.123 m^2; **The area calculated does not account for areas that could not be tested (e.g., stumps, fallen logs, boulders, etc.).

8.1 Evaluation Assessment

The proposed development project will consist of ground disturbances to an area impacted by the construction and maintenance of future residential green neighborhood. The pedestrian survey resulted in no surface finds of archaeological materials and did not identify any new sites within the Project Area. The areas that were inaccessible for pedestrian survey (Figure 7) are deemed low potential due to the characteristics of the surrounding area (e.g., steep slope, undulating terrain, distant from water source, vegetation indicative of low-lying wet areas) and/or the presence of standing ground water. Additionally, the old gun range was determined to have low potential for archaeological materials due to past ground disturbance, levelling, and removal of soils/sediments, based on in-field observations. Shovel testing within three discrete landforms did not identify any new sites or any archaeological material.

The primary objectives of the AIA were met for this project and involved the following tasks: (1) a systematic and comprehensive surface survey of the entire Project Area that is documented in this report; (2) a systematic shovel testing program at three landforms that were determined to have archaeological potential within the Project Area; (3) a clear determination of the horizontal and vertical extent of archaeological materials and sedimentary profiles through shovel testing of the landforms; and (4) recommendations for appropriate strategies for site management and avoidance. Based on the size of the Project Area and proximity to known sites the pedestrian survey and shovel testing program was suitable to the project and returned reliable results. In this regard, the project was successful in not impacting any archaeological materials.

9 IMPACT MANAGEMENT RECOMMENDATIONS

The *Heritage Conservation Act (HCA)* protects both recorded and unrecorded archaeological sites that are believed to date prior to 1846.

All shovel tests were negative for archaeological materials, and no further archaeological assessment is recommended for the proposed area. However, even the most thorough field assessments may fail to identify all archaeological materials in a location described in this report. Given the possibility that low-density sites may remain undetected in the Project Area, it is recommended that a *Chance Find Procedure* (CFP) be implemented during all ground disturbing activities associated with the project. All personnel working on the Icona Anmore South Project should be made aware of the principal aspects of the *HCA*, specifically that all archaeological materials and sites are protected from disturbance, intentional or inadvertent, whether on private or public land, under significant penalty. If chance archaeological or heritage materials are encountered during ground disturbance activities, all impact activities must cease

immediately and the Archaeology Branch and all First Nations with interests in the area must be notified.

Based on the results of this AIA it is recommended that:

1) No further archaeological investigations or monitoring are required for the Project Area.
2) All ground disturbing works within the Project Area be conducted under a *Chance Find Procedure.*
3) Any changes in the current Project Area require review by professional archaeologists if work extends beyond the current Project Area boundaries. This may require additional archaeological assessment by a professional archaeologist.

10 REFERENCES CITED

Ames, K. M., and H. D. G. Maschner. 1999. *Peoples of the Northwest Coast: Their Archaeology and Prehistory.* Thames and Hudson, London.

Apland, B. and O. Beattie. 1972. Salvage Archaeology at the Barnet Site, DhRr-16. Report on file at the Archaeology Branch, Victoria. HCA permit 1972-17.

Aquaterra Environmental Ltd. 2019. Ioco Lands – Development Phase 1 Anmore Reserve Watercourse Assessment: Detailed Riparian Areas Assessment Methodology. Available at https://anmore.com/wp-content/uploads/2019/11/Attachment-6-Detailed-RAR-Assessment.pdf

Archaeology Branch. 1998. British Columbia Archaeological Impact Assessment Guidelines. Archaeology Planning and Assessment Section, Ministry of Sustainable Resource Management, Victoria.

Armitage, D. 2001. *Burrard Inlet A History*. Harbour Publishing, Madeira Park, BC.

Armstrong, J. E. 1981. Post-Vashon Wisconsin Glaciation, Fraser Lowland, British Columbia. *Geological Survey Bulletin* 322. Geological Survey of Canada, Ottawa.

Armstrong, J.E. 1990. *Vancouver Geology*. Cordilleran Section, Geological Association of Canada, Vancouver.

Armstrong, J. E. and S. R. Hicock. 1976. Map 1486A, Surficial Geology, Vancouver, BC 1:40:000 scale map. Geological Survey of Canada, Department of Energy, Mines, and Resources, Ottawa.

Barnett, H. G. 1955. *The Coast Salish of British Columbia*. University of Oregon Monographs, Studies in Anthropology No 4. University of Oregon Press, Eugene.

Basso, K. 1996. *Wisdom Sits in Places: Landscape and Language Among the Western Apache.* Albuquerque, University of New Mexico Press.

Bernick, K. 1998. *Hidden Dimensions. The Cultural Significance of Wetland Archaeology*, edited by K. Bernick. UBC Press, Vancouver.

Bierwert, C. 1999. *Brushed by Cedar, Living by the River: Coast Salish Figures of Power.* University of Arizona Press, Tucson.

Borden, C. 1950. Preliminary Report on the Archaeological Investigations in the Fraser Delta. *Anthropology in British Columbia*, 1:13–27.

Borden, C. 1952. A Uniform Site Designation Scheme for Canada. *Anthropology in British Columbia*, no 3: 44-48.

Borden, C. 1976. A Water-Saturated Site on the Southern Mainland Coast of British Columbia. In *The Excavation of Waterlogged Sites (Wet Sites) on the Northwest Coast of North America*, edited by Dale Croes, pp. 233-260. National Museum of Canada, Ottawa.

Bouchard, R., and D. Kennedy. 1991. Tsawwassen Ethnography and Ethnohistory. In *Archaeological Investigations at Tsawwassen, BC*, Volume 1, pp. 97-170. Arcas Consulting Archeologist Ltd. *HCA* permits 1989-41 and 1990-2. Report on file with the Archaeology Branch, Victoria.

Burley, D. V. 1980. *Marpole: Anthropological Reconstructions of a Prehistoric Northwest Coast Culture Type*. Archaeology Press, Simon Fraser University, Burnaby.

Carlson, K. (editor). 2001. *A Stó:lō Coast Salish Historical Atlas*. Stó:lō Heritage Trust, Douglas & McIntyre, Vancouver.

Carlson, K. 2007. Precedent and Aboriginal Response to Global Incursions: Small Pox and Identity Reformation among the Coast Salish. *Journal of the Canadian Historical Association* 18(2): 165-201.

Carlson, R. L. 1990. Cultural Antecedents. In *Handbook of North American Indians, Volume 7, Northwest Coast,* edited by W. Suttles, pp. 60-69. Smithsonian Institution Press, Washington, DC.

Carlson, R. L. and L. Della Bona (editors). 1996. *Early Human Occupation in British Columbia*. UBC Press, Vancouver.

Charlton, A.S. 1971a. Noons Creek and Belcarra: A Preliminary Report on Excavations near Port Moody. Report on file Archaeology Branch, Victoria. HCA permit 1971-22.

Charlton, A.S. 1971b. Preliminary Report on the Excavations at Noons Creek, DhRq 1. Report on file Archaeology Branch, Victoria. HCA permit 1971-22.

Charlton, A.S. 1972. Noons Creek and Belcarra: A Preliminary Report on Excavations Near Port Moody. In *Salvage '71: Reports on Salvage Archaeology Undertaken in British Columbia in 1971*, edited by R.L. Carlson. Department of Archaeology Publication No. 1, Simon Fraser University, Burnaby.

Church, M. and J. M. Ryder. 2010. The Physiography of British Columbia, Chapter 2. In *Compendium of Forest Hydrology and Geomorphology in British Columbia*, edited by R. Pike, T. Redding, R. Moore, R. Winkler and K. Bladon. British Columbia Ministry of Forests and Range, Land Management Handbook 66: 17-45.

Clague, J. J. (compiler). 1989. The Quaternary Geology of the Canadian Cordillera. *In Quaternary Geology of Canada and Greenland*, edited by R. J. Fulton, Geological Survey of Canada, Vol 1: 17-96, Ottawa.

Clague, J. J., J. Harper, R. Hebda, and D. Howes. 1982. Late Quaternary Sea Levels and Crustal Movements, Coastal British Columbia. *Canadian Journal of Earth Sciences* 19:597-618.

Connaughton, S.P. n.d. *Disrupting CRM: restoring human values into archaeological practice*. In press at UBC Press, Vancouver.

Connaughton S. P. and W. Homewood. 2017. Suncor White Willow: Archaeological Impact Assessment Final Report. Report on file at Inlailawatash Limited Partnership, North Vancouver.

Cranny, M., and D. Bunyan. 1975. Report on the Archaeological Survey of the North Side of the Fraser River, 1975. *HCA* Permit 1975-0006. Report on file Archaeology Branch, Victoria.

Delgamuukw v. British Columbia, (1997) 3 S.C.R. 1010.

Demarchi, D. A. 2011. The British Columbia Ecoregion Classification, third edition. Ministry of Environment, Victoria. Available at https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/ecosystems/broad-ecosystem/an_introduction_to_the_ecoregions_of_british_columbia.pdf accessed February 25, 2021.

Drew, R. 2017 *Townsite Tales: The History of Ioco, Anmore Valley, & North Shore of Port Moody Arm.* Ralph Drew, Belcarra.

Duff, W. 1969. *The Indian History of British Columbia: Volume 1, The Impact of the White Man*. Anthropology in BC, Memoir No. 5, Royal British Columbia Museum, Victoria.

Eldridge, M. 1991. The Glenrose Cannery Wet Component: A Significance Assessment. Report on file Archaeology Branch, Victoria.

Fulton, R. J., J. M. Ryder, and S. Tsang. 2004. The Quaternary Glacial Record of British Columbia, Canada. *In Quaternary Glaciation: Extent and Chronology, Part II: North America*, edited by J. Ehlers and P. L. Gibbard. Devel. Quaternary Science, pp. 39-50. Elsevier, Amsterdam.

Ham, L. 1979. The Evaluation of Archaeological Sites in the Greater Vancouver Regional District, Proposals for Management Part I. *HCA* Permit 1978-0006. Report on file Archaeology Branch, Victoria.

Ham, L. 1982. Seasonality of Shell Midden Layers and Subsistence Activities at the Crescent Beach Site (DgRr 1). PhD dissertation, Department of Anthropology and Sociology, University of British Columbia, Vancouver.

Ham, L. 1988. An Archaeological Resource Review of the University Endowment Lands, Vancouver, British Columbia. Permit 1988-0006A. Report on file with the Ministry of Forests, Lands and Natural Resource Operations, Victoria, BC. *HCA* Permit 1988-0006a.

Ham L. C., A. J. Yip, L. V. Kullar, and D. L. Cannon. 1986. The 1982/83 Archaeological Excavations at the St. Mungo Site (DgRr-2), North Delta, British Columbia, Volumes I and II. Report on file with the Ministry of Forests, Lands, and Natural Resource Operations, Victoria, BC. *HCA* Permit 1982-0021.

Hamm, S., J. Hall, S. Kaltenrieder, B. Wigen, and A. Hickock. 2011. 2010-0280: Noons Creek Bridge Replacement Archaeological Monitoring and Data Recovery at DhRq-1, the Noons Creek Site. Report on File Archaeology Branch, Victoria.

Heritage Conservation Act. RSBC 1996, Chapter 187.

Hill-Tout, C. 1903. *Totemism: A Consideration of its Origin and Import.* J. Hope & Sons, Ottawa.

Hill-Tout, C. 1978a. *The Salish People, Volume II: The Squamish and the Lillooet*, edited by R.Maud. Talonbooks, Vancouver.

Hill-Tout, C. 1978b. *The Salish People, Volume III: The Mainland Halkomelem*, edited by R. Maud. Talonbooks, Vancouver.

Inlailawatash Limited Partnership. 2019. Locarno Beach Site (DhRt-6) Stump Removal Incident Site Alteration. *HCA* SAP permit 2018-0037. Authored by C. Carlson, S.P. Connaughton, W.

Homewood, and I. Sellers. Report submitted to the Vancouver Board of Parks and Recreation, on file at the Archaeology Branch, Victoria.

Jones, R. L., and R. Annas. 1978. Vegetation. In *The Soil Landscapes of British Columbia*, edited by K.W.G. Valentine, P. N. Sproat, T. D. Baker, and L. M. Lavkulich, pp. 35-45. BC Ministry of Environment, Victoria.

Kwi Awt Stelmexw. 2022. Squamish Atlas. http://squamishatlas.com/

Lepofsky, D., T. Trost, and J. Morin. 2007. Coast Salish Interaction: A View from the Inlets. *Canadian Journal of Archaeology* 31(2):190-223.

Massey N. W. D., D. G. MacIntyre, P. J. Desjardins, and R. T. Cooney. 2005. Geology of British Columbia Geoscience Map 2005-3: South Sheet. British Columbia Geological Survey, Ministry of Energy, Mines and Petroleum Resources Mining and Minerals Division.

Matson, R. G. 1976. *The Glenrose Cannery Site*. National Museum of Man Mercury Series, paper no. 52. Archaeological Survey of Canada, Ottawa.

Matson, R. G. 1992. The Evolution of Northwest Coast Subsistence. In *Long-term Subsistence Change in Prehistoric North America.* Research in Economic Anthropology, Supplement 6, edited by D. R. Croes, R. A. Hawkins, and B. L. Isaacs, pp. 367 - 428. JAI Press, Connecticut.

Matson, R. G., and G. Coupland. 1995. *The Prehistory of the Northwest Coast*. Academic Press, New York.

Matthews, Major J. S. 1955. *Conversations with Khahtsahlano, 1932-1954*. Vancouver City Hall, Vancouver.

McHalsie, A. S. 2001. Halq'eméylem Place Names in Stó:lō Territory. In *A Stó:lō Coast Salish Historical Atlas*, edited by K. T. Carlson, pp. 134 – 153. Douglas & McIntyre, Vancouver.

McLaren, D. 2017. The Occupational History of the Stave Watershed. In *Archaeology of the Lower Fraser River Region*, edited by M. K. Rousseau, pp. 149 - 158. Archaeology Press, Simon Fraser University, Burnaby, BC.

Mitchell, D. H. 1971. Archaeology of the Gulf of Georgia area, a natural region and its culture type. *Syesis* 4(1):1-228.

Mitchell, D. 1990. Prehistory of the Coasts of Southern British Columbia and Northern Washington. In *Handbook of North American Indians, vol 7, Northwest Coast*, edited by W.C. Sturtevant, pp. 340-358. Smithsonian Institution, Washington DC.

Morin, J. 2015. Tsleil-Waututh Nation's History, Culture and Aboriginal Interests in Eastern Burrard Inlet. Prepared for Gowlings, Lafleur, Henderson LLP. Submitted to the National Energy Board.

Morin, J., R. Muir and M. Ritchie. 2016. Archaeological Investigations at Port Moody (Reed Point, Shoreline Park, Old Orchard Park, and Slaughterhouse Creek). HCA Permit 2014-344. Report on file Archaeology Branch, Victoria.

Morin, J., D. Lepofsky, M. Ritchie, M. Porčić, and K. Edinborough. 2018. Assessing continuity in the ancestral territory of the Tsleil-Waututh-Coast Salish, southwest British Columbia, Canada. *Journal of Anthropological Archaeology* 51: 77-87.

Moss, M. 2011. *Northwest Coast: Archaeology as Deep History.* SAA Press Current Perspectives Series.

Musqueam Indian Band. 2022. Musqueam Our History. https://www.musqueam.bc.ca/our-story/our-territory/place-names-map/ accessed September 28, 2023.

Neary, K. 2011. Cultural Heritage Sites Literature Review: Kwantlen Territory Knowledge Project. Prepared for Kwantlen First Nation. On file with Inlailawatash, North Vancouver.

Pierson, N. 2011. Bridging Troubled Waters: Zooarchaeology and Marine Conservation on Burrard Inlet, Southwest British Columbia. Master of Arts thesis, Department of Archaeology, Simon Fraser University, Burnaby.

POMO Museum. 2023. *Ioco Townsite Community Memories.* https://www.pomo.museum/ioco-memories

Reimer, R. 2014. The Nch'kay (Mount Garibaldi) Obsidian Source and its Local to Regional Archaeological Distribution. *International Obsidian Studies Bulletin* 50:10-17.

Ritchie, M. and I. Sellers. 2015. *Eagle Mountain Pipeline Project: Archaeological Impact Assessment Final Report*. HCA Permit 2014-0188. Report on file Archaeology Branch, Victoria.

Roddick, J.A. 1965. *Vancouver North, Coquitlam and Pitt Lake Map Areas, British Columbia*. Geological Survey of Canada, Memoir 335.

Smith, H. I. 1907. Archaeology of the Gulf of Georgia and Puget Sound. In *Memoirs of the American Museum of Natural History Volume II, Part VI: The Jesup North Pacific Expedition*, pp. 303-441, edited by F. Boas. Leiden E.J. Brill Ltd., New York.

Spafford, J., P. Merchant, M. Rousseau, R. Reimer and M. Will. 1999. An Archaeological Impact Assessment for Lots B, C and D of District Lot 225, Plan 18341 NWD, Near Carraholly on Burrard Inlet, *B.C.* Report on file Archaeology Branch, Victoria.

Stantec Consulting Ltd. 2010. Noons Creek Bridge Replacement Archaeological Monitoring and Data Recovery at DhRq-1, the Noons Creek Project. HCA Permit 2010-0280. Report on file with the Archaeology Branch, Victoria.

Stiefel, S. K. 1985. The Subsistence Economy of the Locarno Beach Culture (3300 – 2400 BP). Unpublished MA Thesis, Department of Anthropology and Sociology, University of British Columbia, Vancouver.

Struthers, A. 1973. Preliminary Report DhRr-17. HCA Permit 1973-20. Report on file Archaeology Branch, Victoria.

Suttles, W.P. 1955. *Katzie Ethnographic Notes*. British Columbia Provincial Museum, Anthropology in British Columbia Memoir No. 2, Victoria.

Suttles, W.P. 1968. Coping with abundance: Subsistence on the Northwest Coast. In *Man the Hunter*, edited by R. B. Lee and I. Devore, pp. 56-68. Aldine Atherton, Chicago.

Suttles, W.P. 1987. *Coast Salish Essays*. Talon Books, Vancouver.

Suttles, W.P. 1990. Central Coast Salish. In *Handbook of North American Indians, Vol 7, Northwest Coast*, edited by W. Suttles, pp. 453-475. Smithsonian Institution, Washington DC.

Suttles, W. 1996. Linguistic Evidence for Burrard Inlet as Former Halkomelem Territory. In *Thirty-First International Conference on Salish and Neighboring Languages*, pp. 283-296. ICSNL, Vancouver.

Thompson, L. C., and M. D. Kinkade. 1990. Languages. In *Handbook of North American Indians,* volume 7, *Northwest Coast,* edited by W. Suttles, pp. 30-51. Smithsonian Institute, Washington DC.

Truth and Reconciliation Commission of Canada. 2012. Truth and Reconciliation Commission of Canada: Calls to Action. http://trc.ca/assets/pdf/Calls_to_Action_English2.pdf

Tsleil-Waututh Nation and D. Alexander. 2001. Tsleil-Waututh First Nation Eco-Cultural Resource Guide for Burrard Inlet and Indian Arm. Report on file Tsleil-Waututh Nation, North Vancouver, BC.

Walkem, W. W. 1914. *Stories of Early British Columbia.* https://dx.doi.org/10.14288/1.0347209

Williams, H. F. L., and M. C. Roberts. 1989. Holocene sea-level change and delta growth: Fraser River delta, British Columbia. *Canadian Journal of Earth Sciences* 26: 1657-1666.

Yip, S. K., and P. Gose. 1979. The Evaluation of Archaeological Resources of the Greater Vancouver Regional District (Fraser Valley Planning Study): Proposals for Management, Part II. Report on file with Ministry of Forests, Lands, and Natural Resource Operations, Victoria, BC. *HCA* Permit 1978-0006.

Appendix A. Shovel Test Log by Shovel Test Location

Table A1. Shovel test log for STA (average depth of shovel test was 71.3 cmbs).

ST Location	ST No.	Max Depth (cmbs)	Reason Terminated	Result	Sediment Description
STA1	1	65	Sterile Sediment	Negative	0-22 cmbs brown sandy loam with roots and littermat, 22-32 cmbs brown-orange silt loam with 70% subrounded pebbles and gravel well sorted, 32-65 cmbs light brown silt very compact with 70% subrounded pebbles and 1% cobbles well sorted
STA1	2	73	Sterile Sediment	Negative	0-22 cmbs brown sandy loam with roots and littermat, some ash, 22-45 cmbs brown-orange silt loam approximately 10% subrounded pebbles, 45-73 cmbs light brown silt, compact, well sorted, with 60-70% rounded pebbles and gravels
STA1	3	76	Sterile Sediment	Negative	0-15 cmbs brown sandy loam with organic debris and roots (mostly salal), 15-20 cmbs brown-orange silt loam approximately 10% subrounded gravel well sorted, 20-76 cmbs light brown silt, compact and well sorted, 60% rounded pebbles and gravels, increasingly large rocks at base of ST

Table A2. Shovel test log for STA2 (average depth of shovel test was 58.8 cmbs).

ST Location	ST No.	Max Depth (cmbs)	Reason Terminated	Result	Sediment Description
STA2	1	64	Sterile Sediment	Negative	0-8 cmbs dark brown organic loam with some grey mixed with ash, 8-33 cmbs reddish-brown silty loam with roots, 33-57 cmbs orange-light brown medium sand with silt and 40% subrounded pebbles, 57-64 cmbs grey coarse sand with 60% subrounded pebbles and cobbles
STA2	2	73	Sterile Sediment	Negative	0-18 cmbs dark brown moist organic loam and roots, 18-44 cmbs moist reddish-brown silty loam with 40% subrounded pebbles, 44-73 cmbs moist orange-grey sand with 60% subrounded pebbles
STA2	3	44	Sterile Sediment	Negative	0-6 cmbs dark brown organic loam with roots, 6-22 cmbs reddish brown silty loam, 22-44 cmbs grey coarse sand with 60% subrounded pebbles and some cobbles
STA2	4	54	Sterile Sediment	Negative	0-9 cmbs dark brown loam with organics, 9-14 cmbs grey silt with 5% rounded gravel, 14-54 cmbs reddish-brown silt with coarse sand and 40% rounded to subrounded cobbles and gravels

Table A3. Shovel test log for STA3 (average depth of shovel test was 64.5 cmbs).

ST Location	ST No.	Max Depth (cmbs)	Reason Terminated	Result	Sediment Description
STA3	1	63	Sterile Sediment	Negative	0-14 cmbs brown loam with some ash and organic, 14-35 cmbs reddish-brown silt loam with 5% subrounded pebbles, 35-63 cmbs grey-brown silt loam with 5% subrounded pebbles
STA3	2	50	Sterile Sediment	Negative	0-7 cmbs brown loam with organics/roots, 7-22 cmbs reddish-brown silt loam with 5% subrounded pebbles, 22-50 cmbs grey-brown silt loam with 5% subrounded pebbles, last 12 cm very compact
STA3	3	66	Sterile Sediment	Negative	0-7 cmbs brown loam with organics/roots, 7-32 cmbs reddish-brown silt loam with 5% subrounded pebbles, 32-66 cmbs grey-brown silt loam with 5% subrounded pebbles, gets more compact towards bottom
STA3	4	65	Sterile Sediment	Negative	0-14 cmbs brown loam with some organics/roots, 14-38 cmbs reddish-brown silt loam with 5% subrounded pebbles, 38-65 light brown-grey silt loam with 5% subrounded pebbles, compact at lower deposits

ST Location	ST No.	Max Depth (cmbs)	Reason Terminated	Result	Sediment Description
STA3	5	67	Sterile Sediment	Negative	0-12 cmbs brown loam with some organics/roots, 12-33 cmbs reddish-brown silt loam with 5% subrounded pebbles, 33-67 cmbs light brown-grey silt loam with 5% subrounded pebbles
STA3	6	76	Sterile Sediment	Negative	0-10 cmbs brown loam organic with roots, 10-35 cmbs reddish-brown silt loam with 5% subrounded pebbles, 35-76 cmbs light brown silt loam with 5% subrounded pebbles

Appendix B. Maps of Shovel Test Areas (STAs)

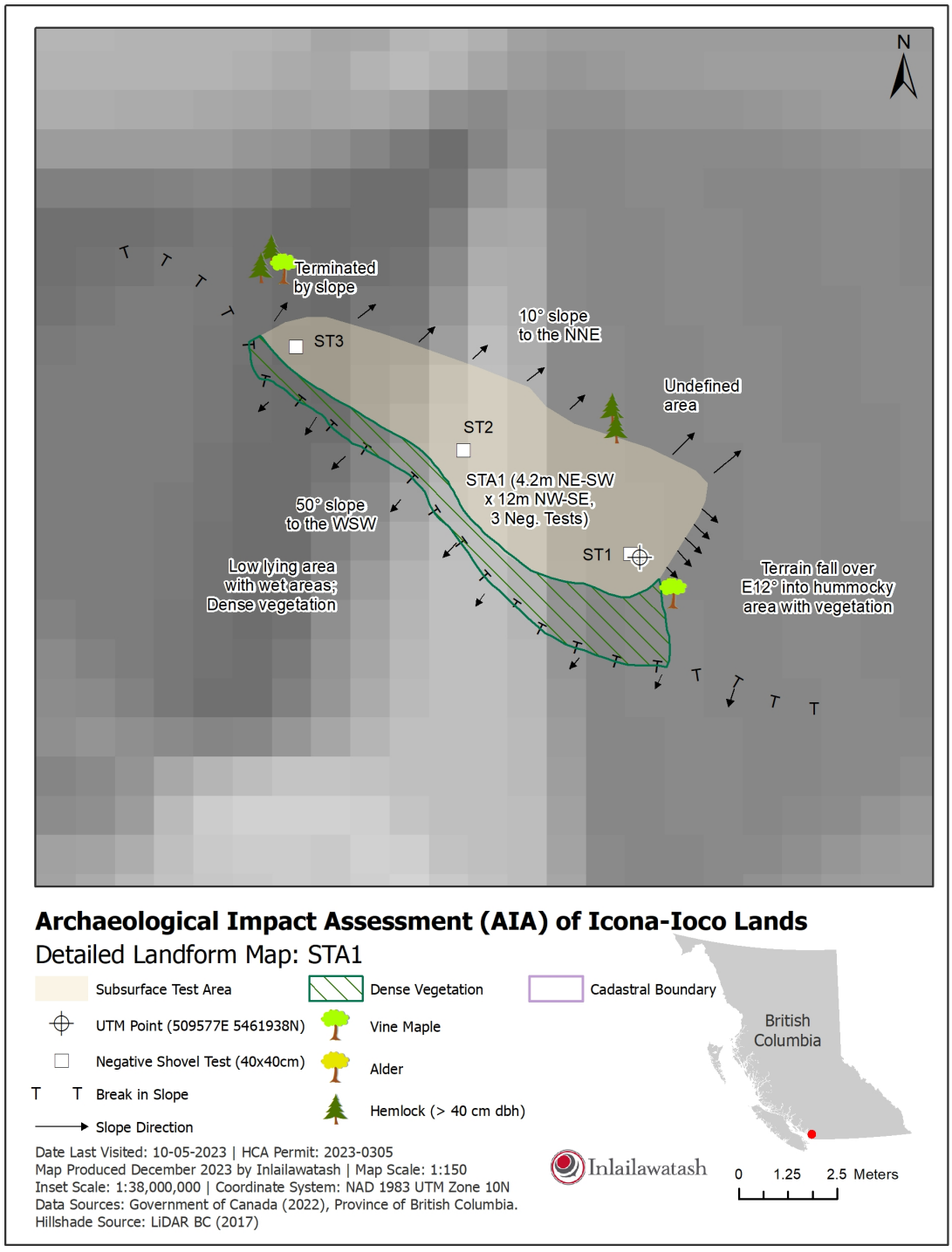

Figure B1. Map of Shovel Test Area 1 (STA 1).

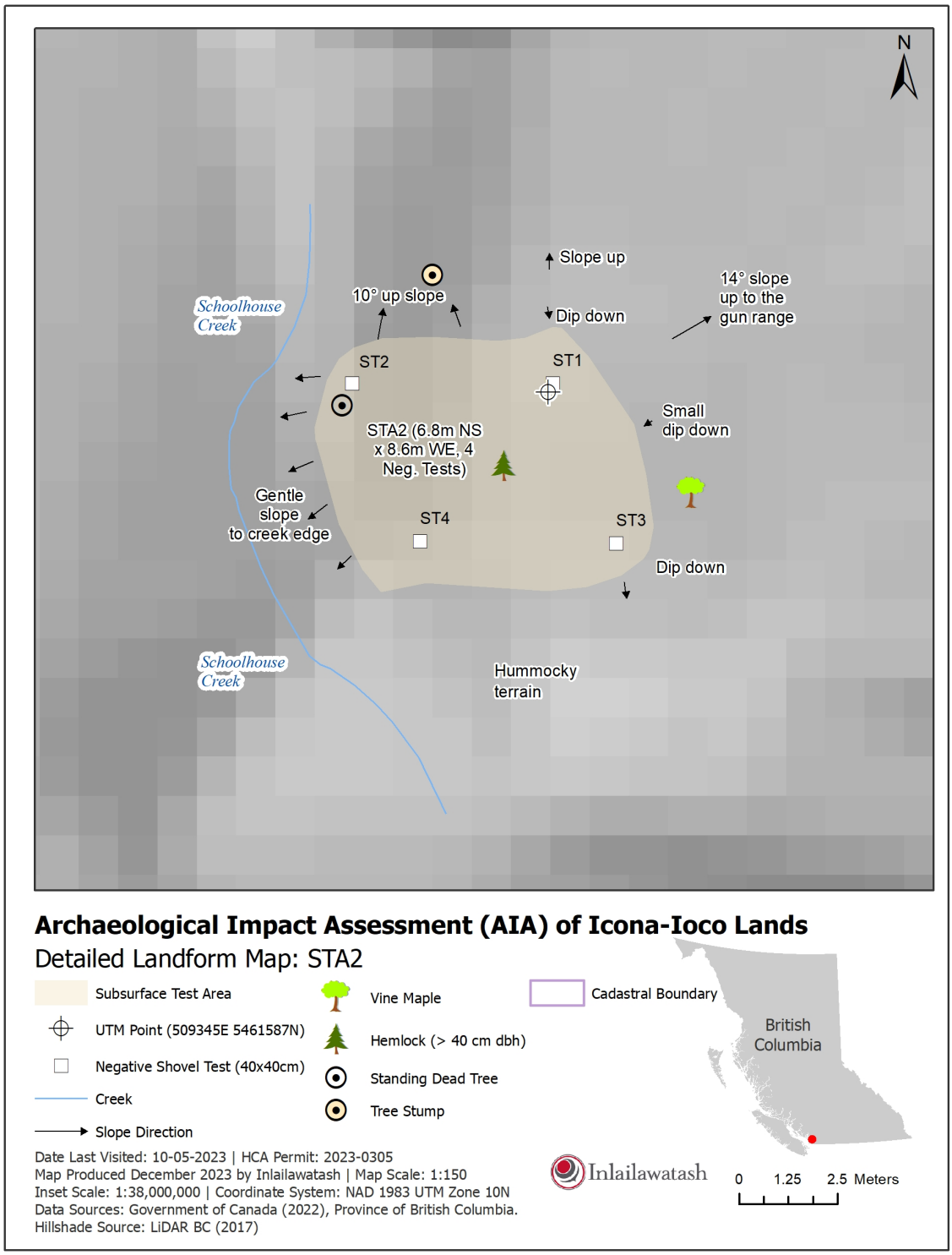

Figure B2. Map of Shovel Test Area 2 (STA 2).

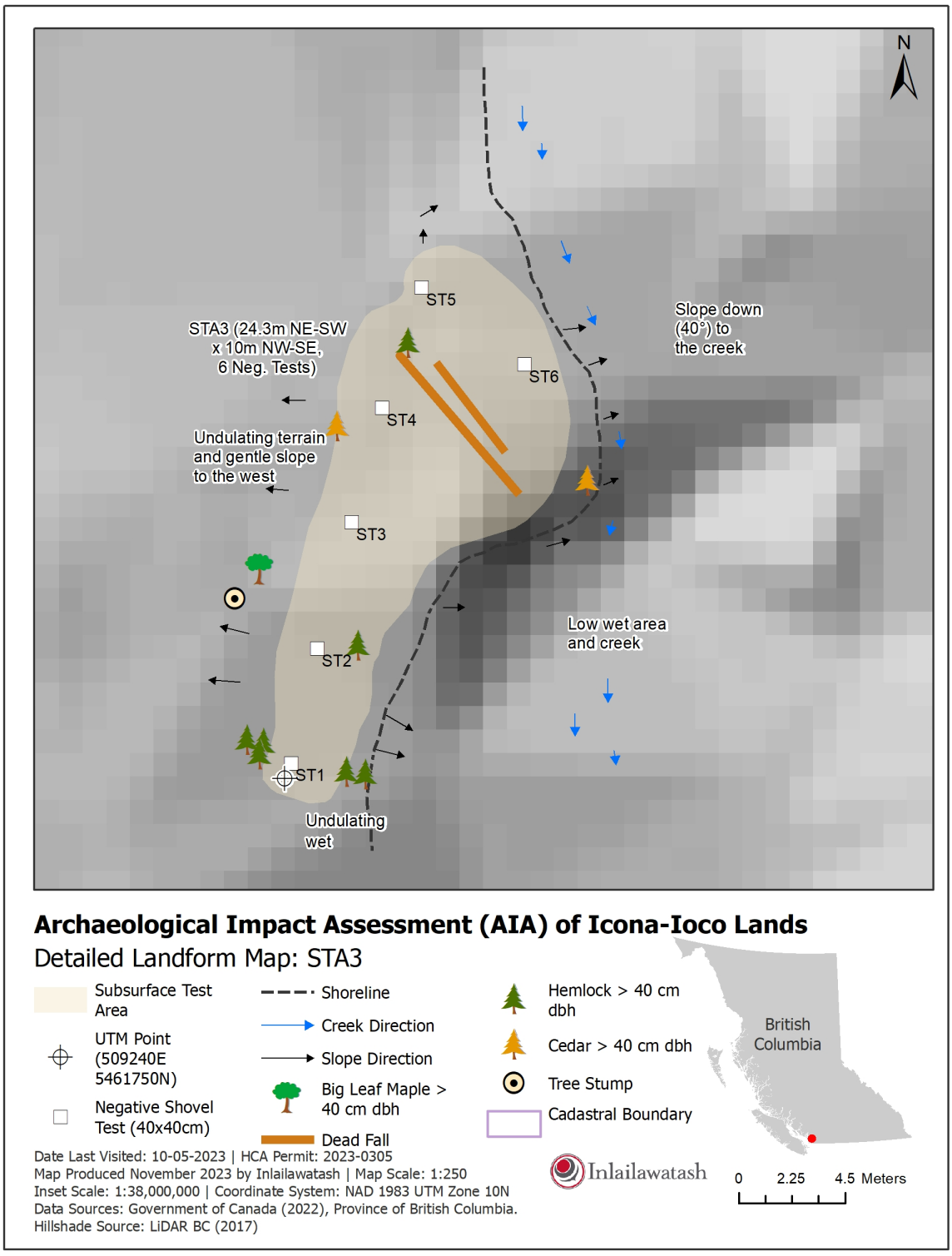

Figure B3. Map of Shovel Test Area 3 (STA 3).