BRITISH COLUMBIA
The Best Place on Earth

Ministry of Energy and Mines
BC Geological Survey

ASSESSMENT REPORT
TITLE PAGE AND SUMMARY

TITLE OF REPORT [type of survey(s)]	TOTAL COST
Mapping, Whole rock Geochemical Sampling and Preliminary Environmental Baseline Study	$87,914.36

AUTHOR(S) Rory Krocker SIGNATURE(S) Rory Krocker

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S) YEAR OF WORK 2014

STATEMENT OF WORK - CASH PAYMENT EVENT NUMBER(S)/DATE(S) 5543536 2015/feb/20

PROPERTY NAME Lara Property

CLAIM NAME(S) (on which work was done) 37953, 37941, 35529, 40494

COMMODITIES SOUGHT Copper, Lead, Zinc, Silver, Gold

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN 092B 129

MINING DIVISION Victoria NTS 92B/13 [Duncan] and 92C/16 [Cowichan Lake]

LATITUDE 48 ° 52 ' 52 " LONGITUDE 123 ° 54 ' 18 " (at centre of work)

OWNER(S)

1) Treasury Metals Inc. 2)

MAILING ADDRESS

The Exchange Tower, 130 King Street West, Suite 3680
P.O. Box 949, Toronto, Ontario, M5X 1B1

OPERATOR(S) [who paid for the work]

1) Treasury Metals Inc. 2)

MAILING ADDRESS

The Exchange Tower, 130 King Street West, Suite 3680
P.O. Box 99, Toronto, Ontario, M5X 1B1

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):

Sicker Group, Nanaimo Group, Kuroko-type exhalite massive sulphide deposits, VMS deposits, polymetallic mineralization, zoned and stratabound, rhyolitic, rhyodacitic,
Myra Formation, McLaughlin Ridge Formation, Fourth Lake Formation, Nitnat Formation, Duck Lake Formation, St. Mary's Formaiton, Buttle Lake Group, Fulford fault, Cowichan Uplift,
northerly dipping west-northwest striking rhyolitic to andesite rocks, bedding genrally dips 60 to 75 degrees north, volcaniclastic sediments,
massive tuffites, lithic tuffites, laminated tuffaceous sandstone, siltstone, rhyolite, argillite, breccias, lapilli tuffs, heterolithic, mafic to intermediate,

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS This report referenced a previous report titled "Independent Technical Report and Mineral Resource Estimation" prepared by Caracle Creek International Consulting (report number unknown).

(OVER)

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)		37953, 37941, 35529, 40494	$46,640.52
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for ...)			
Soil			
Silt			
Rock		40494 (38 samples)	$2,428.44
Other			
DRILLING (total metres; number of holes, size)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling/assaying			
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale, area)			
PREPARATORY/PHYSICAL			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/trail			
Trench (metres)			
Underground dev. (metres)			
Other Environmental Baseline Study (including Treasury field Assistance)		Lara Property	$38,845.40
		TOTAL COST	$87,914.36

ASSESSMENT REPORT:

BC Geological Survey
Assessment Report
35428

MAPPING, WHOLE ROCK GEOCHEMICAL SAMPLING AND PRELIMINARY ENVIRONMENTAL BASELINE STUDY

LARA POLYMETALLIC PROPERTY

VICTORIA MINING DIVISION
48^{o} 53’ N AND 123^{o} 52’ W
NTS SHEET 092B/13
BRITISH COLUMBIA, CANADA

TREASURY METALS INC.
130 KING STREET WEST, SUITE 3680
PO BOX 99, THE EXCHANGE TOWER
TORONTO, ONTARIO, CANADA M5X 1B1

Dec 20th, 2014

Prepared By:

Rory Krocker, B.Sc.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

APPENDIX A SGS Assay Certificates
APPENDIX B EDI Environmental Dynamics Inc. Property Preliminary Environmental Baseline Study

1.0 INTRODUCTION AND TERMS OF REFERENCE

1.1 Introduction

The Lara Property, located in the southern portion of Vancouver Island, lies about 75 km north of Victoria, ~15 km northwest of Duncan and ~12 km west of the Village of Chemainus, British Columbia, Canada. Situated in the Victoria Mining Division, the Property is centred at approximately 48°52'52" N and 123°54'18" W.

The Property comprises 59 mineral claims (6392.02 ha) held 100% by Treasury Metals Inc., with eight (8) of the mineral claims subject to a 1% Net Smelter Return Royalty ("NSR") to Bluerock Resources Ltd.

The Property hosts the Lara copper-lead-zinc-gold-silver deposit ("Lara Deposit") which comprises two main sulphide zones referred to as the Coronation and Coronation Extension zones. Critical intersections of sulphide mineralization in diamond drill core are currently stored in sheltered core racks on the Property.

During the course of the exploration program, a total of much of the property was traversed to verify rock types at various key outcrop locations and collect whole rock geochemical samples (38 in total) and initiate an environmental baseline study. A total of $87,914.36 was spent during the course of this work.

1.2 Terms of Reference and Units

The Metric System is the primary system of measure and length used in this Report and is generally expressed in kilometres (km), metres (m) and centimetres (cm); volume is expressed as cubic metres (m^3), mass expressed as metric tonnes (t), area as hectares (ha), and gold and silver concentrations as grams per tonne (g/t). Conversions from the Metric System to the Imperial System are provided below and quoted where practical. Many of the geologic publications and more recent documents now use the Metric System but older documents almost exclusively refer to the Imperial System. Metals and minerals acronyms in this report conform to mineral industry accepted usage and the reader is directed to www.maden.hacettepe.edu.tr/dmmrt/index.html for a glossary.

Conversion factors utilized in this report include:

- 1 troy ounce/ton = 34.285714 grams/tonne
- 1 gram/tonne = 0.029167 troy ounces/ton
- 1 troy ounce = 31.103477 grams
- 1 gram = 0.032151 troy ounces

The term gram/tonne or g/t is expressed as "gram per tonne" where 1 gram/tonne = 1 ppm (part per million) = 1000 ppb (part per billion). The mineral industry accepted terms Au g/t and g/t Au are substituted for "grams gold per metric tonne" or "g Au/t". Other abbreviations include ppb = parts per

billion; ppm = parts per million; oz/t = troy ounce per short ton; Moz = million ounces; Mt = million tonne; t = tonne (1000 kilograms); SG = specific gravity; lb/t = pound/ton; and, st = short ton (2000 pounds).
Dollars are expressed in Canadian currency (CAD$) unless otherwise noted. Zinc (Zn), copper (Cu) and lead (Pb) are reported in US$ per pound (US$/lb) or US$ per metric tonne (US$/t). Gold (Au) and silver (Ag) are stated in US$ per troy ounce (US$/oz). Where quoted, Universal Transverse Mercator (UTM) coordinates are provided in the datum of Canada, NAD83 Zone 10 North.

2.0 PROPERTY DESCRIPTION AND LOCATION

2.1 Location

The Lara Property, located in the southern part of Vancouver Island, lies approximately 75 km north of Victoria, 15 km northwest of Duncan and 12 km west of the Village of Chemainus, British Columbia, Canada (Figures 2-1 and 2-2). The Property, situated in the Victoria Mining Division, is centered at 48°52'52" N and 123°54'18" W (NAD83 Zone 10 North: 5414789mN and 433651mE) and is covered by the 1:50 000 National Topographic Series (“NTS”) map sheet 92B/13 [Duncan] and 92C/16 [Cowichan Lake].

2.2 Description and Ownership

The Lara Property is 100% held by Treasury Metals Inc. and comprises 47 mineral claims covering 8649.99 hectares (Table 2–1; Figure 2–4). Eight (8) mineral claims, previously held by Bluerock Resources Ltd., are subject to a 1% NSR as per a *Mineral Property Purchase and Sale Agreement* dated May 25th,

3.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

3.1 Access

A network of logging roads and rough drill trails extend to most areas on the Property (Figure 2-3). Vehicle access to the Property is via the Chemainus River Logging Trunk Road (MacMillan Bloedel) for 12 km from Highway No. 1 at Chemainus. From the Chemainus River Road, the Property is accessed by a network of secondary logging and forestry roads, at Mile 10, Mile 12 and C-7 to the power line service road to reach the different parts of the claim group. The B.C. Hydro Right of Way (a cleared power line right-of-way) cuts across the Property (northwest to southeast). Although these roads provide access, they go through rough terrain and steep grades. The northern and northeastern sections of the Property

Figure 2–1. Location of Lara Polymetallic Property on Vancouver Island, British Columbia, Canada.

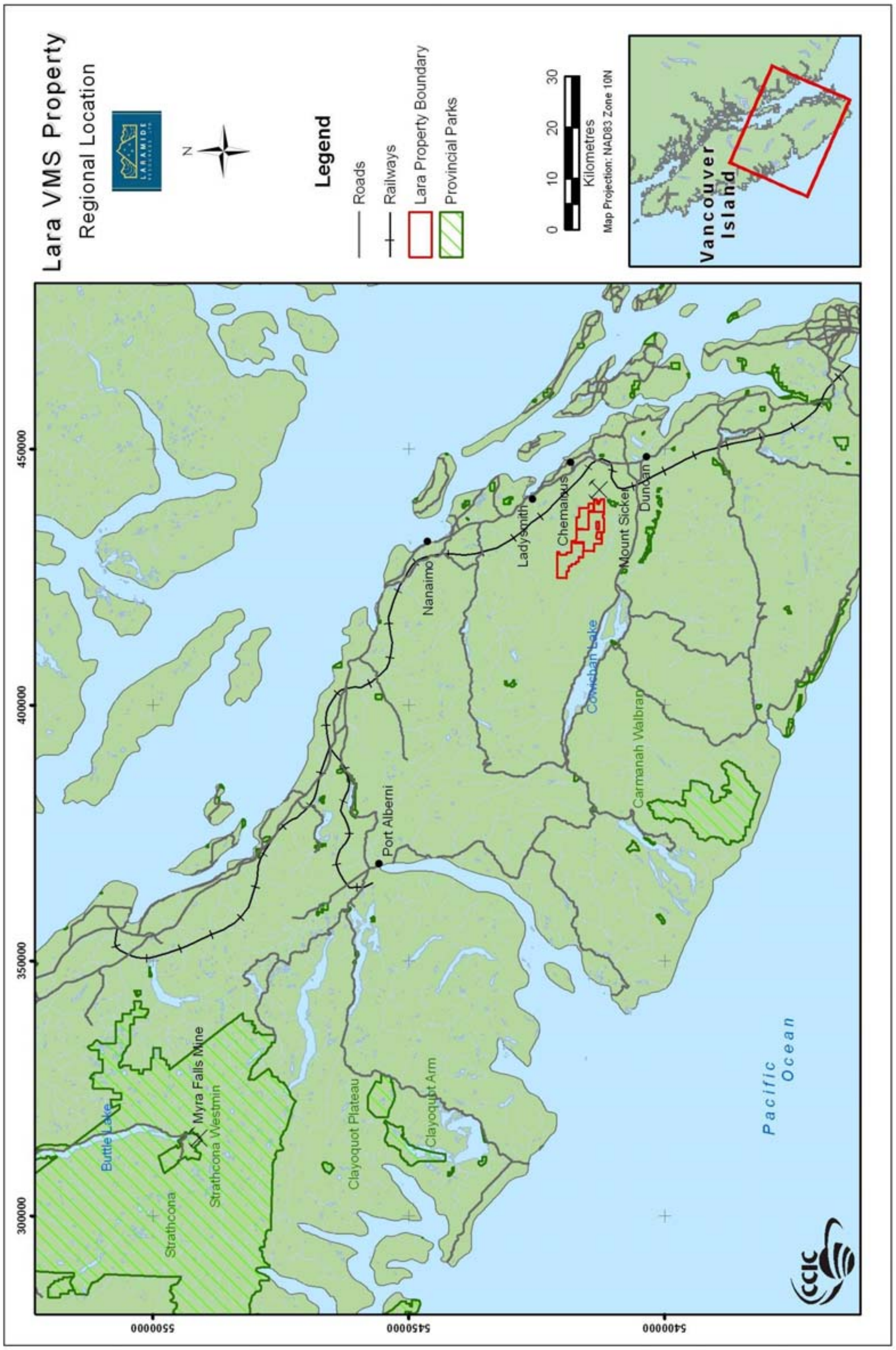


Figure 2–2. Regional map of Southern Vancouver Island showing the location of Treasury mineral claims that comprise the Lara Property (refer to Table 4–1).

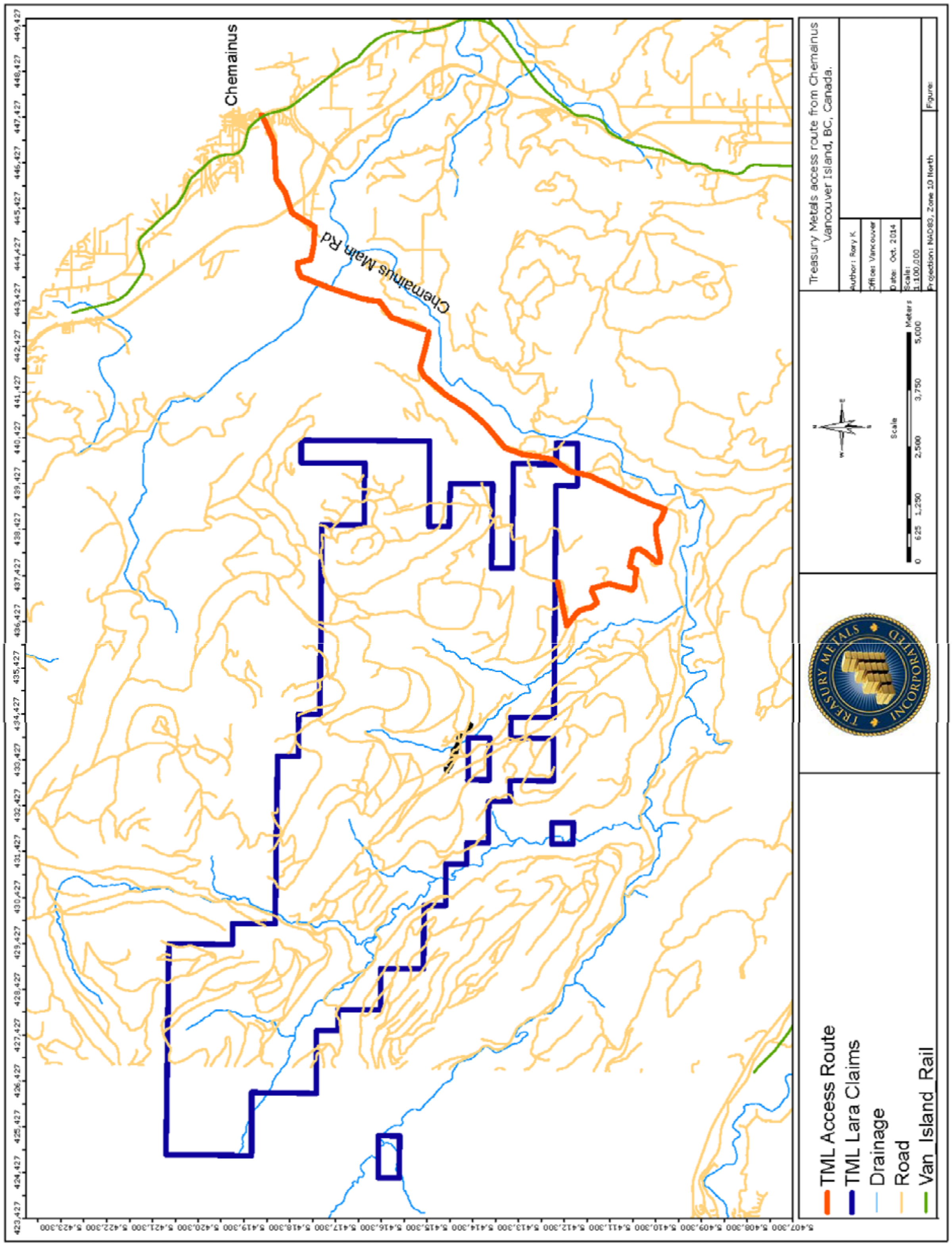


Figure 2–3. Location of and access to Lara Polymetallic Property on southeastern Vancouver Island, BC, Canada.

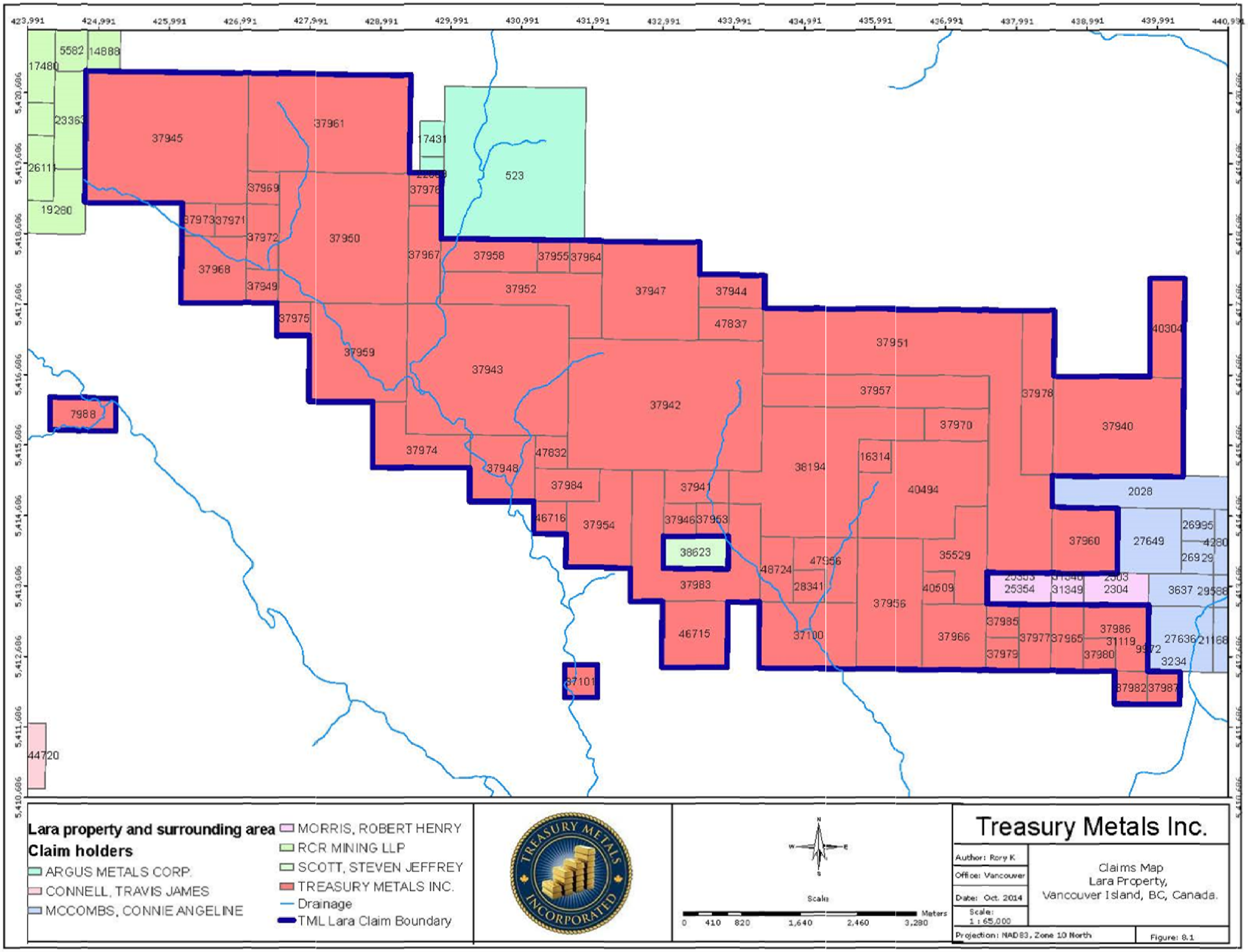


Figure 2-4. Treasury Metals Claims Map

Table 2–1. Mineral claims comprising the Lara Property, British Columbia, Canada as of Dec, 2014, including dollar amounts of assessment work required.

Tenure #	***Claim Name***	***Hectares***	***Work Required ($/ha)***	***Required Work (1 year)***	***NTS***	***Issue Date***	***Expiry Date***	***Owner***
847125	LARA1	254.7953	$10.00	$2,547.95	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847136	LARA NORTH-NW	42.4833	$10.00	$424.83	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847138	LARA VICTORIOUS 2	509.7031	$10.00	$5,097.03	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847139		424.7203	$10.00	$4,247.20	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847140		42.4642	$10.00	$424.64	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847142	LARA	424.3747	$10.00	$4,243.75	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847144		191.0873	$10.00	$1,910.87	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847149	LARA	84.9643	$10.00	$849.64	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847150	LARA10	21.2321	$10.00	$212.32	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847151	LARA	339.6519	$10.00	$3,396.52	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847153		530.9208	$10.00	$5,309.21	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847154		127.3923	$10.00	$1,273.92	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847155	LARA	21.2432	$10.00	$212.43	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847157	LARA VICTORIOUS 3	106.2189	$10.00	$1,062.19	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847159	LARA11	21.23	$10.00	$212.30	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847160		169.9758	$10.00	$1,699.76	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847161	LARA	148.6568	$10.00	$1,486.57	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847163	LARA13	63.6903	$10.00	$636.90	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847164	LARA	191.1179	$10.00	$1,911.18	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847165		84.9648	$10.00	$849.65	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847166	PART OF 9	318.3061	$10.00	$3,183.06	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847169		21.23	$10.00	$212.30	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847172	LARA14	42.4946	$10.00	$424.95	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847173	LARA	84.9939	$10.00	$849.94	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847174	ANITA WEST	63.6886	$10.00	$636.89	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847175	LARA16	84.9178	$10.00	$849.18	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847176	LARA	21.2241	$10.00	$212.24	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847177	PART OF 3?	42.4764	$10.00	$424.76	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847178	LARA17	21.2261	$10.00	$212.26	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847179	LARA	21.2224	$10.00	$212.22	092C	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847180	LARA17	42.4566	$10.00	$424.57	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847181		84.9596	$10.00	$849.60	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847182	LARA	21.2337	$10.00	$212.34	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847186	LARA19	21.2245	$10.00	$212.25	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847187	LARA	42.4968	$10.00	$424.97	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847190	LARA22	106.1827	$10.00	$1,061.83	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847192	LARA24	21.2492	$10.00	$212.49	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847195	LARA26	21.2484	$10.00	$212.48	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847201		21.2504	$10.00	$212.50	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847211	LARA 2	191.2038	$10.00	$1,912.04	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847212	LARA WEST	42.4836	$10.00	$424.84	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847214	LARA 6	21.2477	$10.00	$212.48	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847215	LARA 7	63.74	$10.00	$637.40	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847216	LARA 8	21.2503	$10.00	$212.50	092B	2011/feb/22	**22-Feb-2015**	TREASURY METALS INC.
847702	LARA	318.6068	$10.00	$3,186.07	092B	2011/mar/01	**22-Feb-2015**	TREASURY METALS INC.
952308		42.4673	$5.00	$212.34	092B	2012/feb/23	**23-Feb-2015**	TREASURY METALS INC.

Tenure #	*Claim Name*	*Hectares*	*Work Required ($/ha)*	*Required Work (1 year)*	*NTS*	*Issue Date*	*Expiry Date*	*Owner*
952305		21.2401	$10.00	$212.40	092B	2012/feb/23	**25-Feb-2015**	TREASURY METALS INC.
1017186	LARA 32	84.9949	$5.00	$424.97	092B	2013/feb/25	**25-Feb-2015**	TREASURY METALS INC.
1017187	LARA 33	21.2435	$5.00	$106.22	092B	2013/feb/25	**25-Feb-2015**	TREASURY METALS INC.
953119		63.7356	$5.00	$318.68	092B	2012/feb/27	**27-Feb-2015**	TREASURY METALS INC.
1026481	LARA 2	21.2462	$5.00	$106.23	092B	2014/mar/04	**04-Mar-2015**	TREASURY METALS INC.
1018429		21.2399	$5.00	$106.20	092B	2013/apr/10	**10-Apr-2015**	TREASURY METALS INC.
847143	LARAW	21.2432	$10.00	$212.43	092B	2011/feb/22	**22-Apr-2015**	TREASURY METALS INC.
984049		212.4139	$10.00	$2,124.14	092B	2012/may/06	**06-May-2015**	TREASURY METALS INC.
984803		84.978	$10.00	$849.78	092B	2012/may/08	**08-May-2015**	TREASURY METALS INC.
847147		21.2461	$5.00	$106.23	092B	2011/feb/22	**10-May-2015**	TREASURY METALS INC.
1022074		42.491	$5.00	$212.46	092B	2013/sep/04	**04-Sep-2015**	TREASURY METALS INC.
844322	TML 2011 A	127.4916	$10.00	$1,274.92	092B	2011/jan/24	**24-Jan-2016**	TREASURY METALS INC.
1033859		42.49	$5.00	$212.45	092B	2015/feb/03	**03-Feb-2016**	TREASURY METALS INC.
59	**mineral claims**	**6392.0227**		**$62,114.45**				

*subject to 1% NSR held by Bluerock Resources Ltd.

in particular are difficult because the terrain is steep and broken by numerous gullies: access to these areas is limited to an existing grid between the access roads. The Trans Canada Highway (Highway No. 1) provides access to these roads from Chemainus and Victoria. This route also provides the best access for heavy equipment to the Property.

3.2 Climate and Vegetation

The climate in the Duncan – Port Alberni area is a typical continental climate with moderating influences of the Pacific air throughout the year. The area lies within a rain shadow leeward of the coastal mountains. In summer there is intense surface heating and convective showers, and in the winter there are frequent outbreaks of Arctic air. The mean annual temperature and precipitation varies to some extent within the region, depending on the location's elevation and proximity to salt water. At sea level snow fall is infrequent, although it increases with elevation. The January mean temperatures are also moderated with an average temperature of 2.7°C (37˚F). Duncan has a July mean maximum of 25.2°C (77.4˚F) and a July mean minimum of 11.6°C (52.9˚F). However, precipitation (with the most falling between October and March) varies from 96.1 cm (37.85 in) in Cowichan Bay, 109.2 cm (41.04 in) in Duncan, and 117.6 cm (46.28 in) in Chemainus. Vegetation is dominated by dense mixed forest of pine, spruce, cedar, alder, poplar and local low lying swamps and marshes.

3.3 Physiography

The Property straddles the southern flank of the Coronation Mountains which include both Mount Brenton and Mount Hall. Total relief on the Property is on the order of 1,000 metres ranging from 200 m above sea level ("ASL") near the Chemainus River at the southeast end of the claims to about 1,200 m near the top of Mount Brenton and on the high hills to the northwest. Elevation on the Property generally increases towards the north and west with the lowest point in the southeast at 174 m. The topography is gentle to

steep where creeks have deeply incised the terrain. Outcrop is abundant along creek valleys and roads, but in general there exists extensive thick deposits of glacial overburden and little outcrop. The entire Property lies in a heavily forested area, although there has been extensive logging activity for the past 40 years and most of the tree cover is second or even third growth. Much of the Property has been logged by clear-cutting methods over the past 40 years with present vegetation consisting of secondary growths of spruce, balsam, fir and cedar with thick undergrowth cover (Archibald, 1999; Peatfield and Walker, 1994; Roscoe, 1988).

3.4 Infrastructure and Local Resources

The Property, located between Victoria (population 325,000) and Nanaimo (population 78,700), lies within the southern part of Vancouver Island which also supports most of the population base of the island. Services include hospital, medical and dental facilities, pharmacy, restaurants, grocery stores, hotels, service stations and major automobile dealerships, small airports, banks, building supply centers and other small businesses. The regional government of the Cowichan Valley Regional District (includes the towns of Cowichan (population 2,830), Ladysmith (population 8,000) and the City of Duncan (population 5,500), Chemainus, and Nanaimo support the service needs of the local communities.

A British Columbia hydro line crosses the Lara Property and is a source of power for any development on the Property (Peatfield and Walker, 1994). The Myra Falls Operating Facility, the milling site for the Buttle Lake/Myra Falls mine (operated by NVI, a subsidiary of Breakwater Inc.) is a potential facility for the processing of future ore of the Lara mine and is located 140 km due north (300 km by road) of the centre of the Lara Property (Roberts, 2007).

4.0 PROPERTY HISTORY

The original claims on the Lara Property were staked by Treasury in 1981. The original Lara Property encompassed the Coronation Zone, Coronation Extension, Randy North and the “262” mineralized zones (*see* Figure 7-1). The Property boundaries were expanded in 1992 when Treasury acquired claims within the northwest and northeast blocks of Chemainus claims from Falconbridge. The new group of claims includes the northernmost mineralized zones; Anita, Silver Creek, “126” and Sharon zones (*see* Figure 7-1). The Chemainus Property option agreement between Falconbridge and Treasury executed in June 1992 resulted in the addition of approximately 3,725 ha. Exploration of the two properties prior to their amalgamation was carried out separately with different operators, the Chemainus Property having the longer history of exploration work. Several operators were involved in the exploration of these properties. For clarity, the historic group names will be retained for much of this report: the Lara Property makes up the central portion of the final Property boundary comprising mostly of mineral legacy claims (Figure 2–3) and the Chemainus Property is made up of mineral cell claims to the northeast and west.

Abermin Resources Ltd. carried out the exploration programs after the first claims on the Lara Property were staked in 1981. Minnova Inc. purchased the Abermin interests in 1988 and took over as operator of the exploration programs. Nucanolan Resources Ltd. entered into an option agreement with Treasury in 1998 to conduct exploration programs on the Lara Property.

Interest in the area of the Chemainus Property, in particular west of the Chemainus River began when rights to the Esquimalt and Nanaimo Railway Land Grant were surrendered back to the Crown and became available for staking. In 1903, an adit was excavated near a copper showing in the area of the Sharon Zone – it was dominated by pyrite with minor chalcopyrite. In 1915, a 50-foot shaft was sunk near the Anita Zone and revealed a chalcopyrite-bearing pyrrhotite lens in schist. In the 1960's, exploration accelerated with increasing number of geological mapping and geophysical surveys: Cominco working in the west and Imperial Oil Resources working in the east. The subsequent operators and their interests in the properties are outlined in Tables 4–1 and 4–2.

Table 4-1. Summary of property ownership on the original Lara Property (Archibald, 1999; Treasury, 2007).

Year	Company	Property
1981	Treasury	Treasury staked claims for Lara Property [Coronation Trend area] south and east of Chemainus Property
1982-88	Abermin	Abermin [originally Aberford Resources] entered into a Joint Venture agreement with Treasury
1987	Abermin	The Lara Property is owned 65% by Abermin Corporation and 35% by Treasury: Abermin is the operator
1988-91	Minnova	Minnova Inc. purchased Abermin's interest (65% ownership in 1988) and acquired exclusive exploration rights to the Lara Property
1992	Falconbridge	Chemainus Property option agreement between Falconbridge and Treasury was finalized; work done on Property by Minnova under option with Falconbridge
1998	Nucanolan	Nucanolan Resources Ltd. under option to Treasury becomes operator of Lara Property exploration programs with the right to earn 50% interest in the Property in consideration of an annual payment and exploration of development work
2006	Treasury	Treasury acquired 8 mineral claims, from Bluerock, for $125,000 and a 1% NSR to be held by Bluerock

Table 4-2. Summary of property ownership on the original Chemainus Property (Stewart, 1991).

Year	Company	Property
1966-67	Cominco Ltd.	base metal rights were optioned from Canadian Pacific Oil and Gas Limited (controlled E&N Railway Land grant).
1976	Imperial Oil Ltd	staked mineral claims on the southern flank of Mt. Brenton and Silver Creek Zone area as Brent and Holyoak claims
1977-83	Esso Minerals	original Chemainus Property [Chemainus NW and NE blocks] includes Anita, Randy, Silver Creek, 126 and Sharon zones
1983	Esso Minerals	conducted exploration program for Kidd Creek Mines
1984	Kidd Creek	Kidd Creek Mines Ltd entered into a Joint venture agreement with Esso
1989	Falconbridge	Falconbridge purchased Esso's interest
1992	Falconbridge	Chemainus Property option agreement between Falconbridge and Treasury was finalized; work done on Property by Minnova under option with Falconbridge

4.1 Exploration History

Exploration and prospecting on Vancouver Island began in 1862 with small-scale placer gold mining on China Creek near Port Alberni. By the 1890s more gold mining took place along the Alberni Inlet at China Creek and Mineral Creek and several gold veins were found. Exploration for gold continued over the years with peaks in 1930s and 1960s (Massey and Friday 1989). In 1865, the John Buttle expedition was the first to explore the Buttle Lake area (Chong, 2005); and the Price Ellison Expedition arrived in 1910. The Strathcona Park Act was legislated in 1911 and the first claims in the Buttle Lake area were staked on 1918. Further south, the first claim to be staked in the Big Sicker Mountain area was in 1895 (MINFILE, 1997); the Lenora and Tyee mines were discovered in 1897 and production began in 1898 and lasted until 1909. The Tyee, Lenora and Richard deposits of the Mt. Sicker mine were eventually amalgamated into the Twin J mine which operated intermittently between 1942 and 1952.

Following the discovery of the HW polymetallic massive sulphide orebody at Buttle Lake (1979), nearly all areas of Sicker Group outcrop in the Alberni-Nanaimo Lakes and the Duncan area have been staked. Polymetallic massive sulphide deposits have been a major target within the Sicker Group since the development of the Myra Falls mine at Buttle Lake (1960’s), and extensive drilling has occurred since then. Deposits associated with felsic volcanic rocks continue to be discovered within the McLaughlin Ridge Formation of the Cowichan uplift (Massey and Friday 1989).

Table 4-3. Exploration history of the Lara Property (Archibald, 1999; Peatfield and Walker, 1994).

Year	Company	Exploration Activity
1981-83	Abermin	Geological mapping, geophysical and geochemical surveys and backhoe trenching
1984	Abermin	12 diamond drill holes, 1,346 metres; backhoe trenching. Discovery of Coronation Zone - intersected true thickness of 7.95 m of 0.68% Cu, 0.45% Pb, 3.01% Zn, 67.54 g/t Ag, 3.46 g/t Au;
1985	Abermin	61 diamond drill holes, 7,437 m Discovery of Coronation Extension - intersected over 3.08 m of 1.16% Cu, 2.53% Pb, 9.22% Zn, 8.6 g/t Ag, 0.213 oz/Au
1986	Abermin	Discovery of Randy north - over a true width of 3.51 metres returned 3.04% Cu, 43.01% Zn, 8.3% Pb, 513.6 g/t Ag, 24.58 g/t Au 75 Diamond drill holes, 11,339 m; Mineralogical testing by CANMET
1987	Abermin	Delineate Coronation Trend, Randy North Zone 83 Diamond drill holes, 15,038 m Metallurgical testing by Coastech Research Inc
1988	Minnova	1988-91, Minnova under option for exclusive exploration rights to Lara Property Underground exploration program Diamond drilling (surface included); Metallurgical testing from Coronation Trend Trenching (770 m of ramping and drifting in Coronation Zone)
1989	Minnova	Exploration program to delineate extent of Coronation Trend, geological work, lithological sampling, line-cutting, geophysical surveys (EM and IP) 43 Diamond drill holes, 10,328 m; Reclamation and closure plan prepared
1990	Minnova	Exploration program by Minnova, focussed on the 262 Felsic volcanic rocks which define the structural hangingwall to the Coronation Trend 49 Diamond drill holes, 11,167 m
1992	Falconbridge	option agreement between Falconbridge and Treasury was completed (executed); work done on Property by Minnova under option with Falconbridge

1998	Nucanolan	Coronation Trend area, exploration program with 12 drill holes (2,559 m)

Exploration work includes geophysical work, geochemistry and geological mapping (and prospecting), as well as diamond drilling. The geophysical surveys were determined to be mostly ineffective due to terrain conditions, low chargeability contrast of the rock units and poor conductivity of the zinc-rich massive sulphides (Wells and Kapusta, 1990). However, magnetometer and VLF-electromagnetic surveys were useful in delineating zones along strike of conductivity of the sulphide mineralization for locating drilling locations (Archibald, 1999). Geochemical data tends to be inconclusive due to the thick overburden cover in many areas; some degree of oxidation and weathering; and a lack of corroboration by visual identification or drilling as to the continuity of the underlying sulphide zones (Wells and Kapusta, 1990). Drilling was the most effective exploration tool for the Lara project area primarily due to these accessibility and challenges to interpreting the geophysical data in the area (Peatfield and Walker, 1994).

Table 4-4. Exploration history of the Chemainus Property (Archibald, 1999; Stewart, 1991).

Year	Company	Exploration Activity
1903	unknown	Sharon “copper” Zone was discovered (Sharon Copper Mine Limited 1963)
1915	unknown	Anita occurrence discovery and 50-foot shaft excavated
1966-67	Cominco	Geological mapping and IP survey on claims in the northwest
1977-83	Esso	Covers Anita, Randy North, Silver Creek, 126 and Sharon zones. Exploration program included airborne EM survey, Genie-EM survey, drilling, soil sampling
1984	Kidd Creek	Joint Venture Esso Minerals and Kidd Creek: geophysical surveys
1985-90	Falconbridge	Falconbridge operated geophysical (IP, VLF, Magnetic) surveys; drilling in 1988 and onwards; Property purchased by Falconbridge from Esso
1990	Falconbridge	Drilling, testing anomalies, VLF and EM
1992	Falconbridge	option agreement between Falconbridge and Treasury was completed; work done on Property by Minnova under option with Falconbridge

4.1.1. Underground Exploration

In 1988, an underground exploration program tested the continuity of the Coronation Zone, evaluated rock conditions for mining cost estimates and provided a bulk sample for metallurgical tests. The program included ramping (from the footwall side) and crosscutting to access the high-grade mineralized zone and was followed by geological mapping (1:100 and 1:50 scales) and sampling (muck; test hole, diamond drilling (NQ size) and chip-channel) (Harris, 1988).

The results of the program confirm the presence of several potentially economic, continuous pods of zinc and gold rich mineralization along the Coronation Trend. Zinc and gold provide the gross metal value of the deposit with lesser silver, copper and lead. The dominant mineralization style is not massive, but consists of a structurally complicated mixture of sulphide bands, laminae, stringers and isolated massive pods in a siliceous, somewhat fragmental rhyolitic host rock. Reverse and normal faulting has juxtaposed the differing mineralization modes within this zone. Remobilization of primary sulphide into new modes of occurrence appears to determine the final morphology of the deposit. The presence of gold and silver not tied to any particular mineralization type or host rock also indicates secondary mineralization.

The underground mapping program delineated four major structural-mineralogical domains in the Coronation Zone that differ with respect to grade, structural setting, mineralization styles and implications for future mine design. The eastern section showed the discontinuous and poddy character of the high-grade mineralization and therefore the disadvantages to widely spaced drilling. This complex high-grade mineralized and multi-directionally faulted zone transitions to a thinner structurally simpler low- to medium-grade section to the west. The mineralization was a mixed sequence of banded, to poddy semi-massive material containing boudinaged pods and bands of massive pyrite. The western section contained mineralization that approached significant grades and widths. It consisted mainly of pyrite (85%) with locally enriched sphalerite and chalcopyrite banded and brecciated zones. The entire zone was strongly sericitized and appeared shattered and brecciated (Harris, 1988).

4.2 Historical Drilling

Drilling primarily focused on delineating the mineralization extent of the Coronation Trend. A total of 490 diamond drill holes, totalling ~101,686 metres, have been reported as completed on the Property (Table 4-5). Twenty-four (24) of these drill holes, totalling 473.20 m, were completed from underground by Minnova (Peatfield and Walker, 1994). The most recent drilling was by Nucanolan, who in 1998 completed 12 drill holes totalling 2,559 m (Archibald, 1999). **There has been no diamond drilling on the Property since 1998**.

Table 4-5. Summary of historical drilling programs on Lara Property.

Company	No. of Holes	Length (m)
Abermin		
1984	12	1,346
1985	61	7,437
1986	75	11,339
1987	83	15,038
Minnova		
1988	24	473
1989	43	10,328
1990	49	11,123
Falconbridge		
1977 to 1990	131	42,043
Nucanolan		
1998	12	2,559
Total:	490	101,686

4.3 Historical Resource Estimates

The historical estimates of resources were calculated by several operators and consultants. They were determined on the basis of best intersections from diamond drill core and using various cut-off grades and values (Table 4-6).

Treasury Metals Inc. considers all of the historical resource estimates to be non-compliant with National Instrument 43-101 standards and as such they should not be relied upon.

The inventory files of the British Columbia government (MINFILE 092B 129) report the Lara Deposit as 528,839 tonnes grading 5.87% Zn, 1.22% Pb, 1.01% Cu, 100.09 g/t Ag and 4.73 g/t Au which has a reported source of the "George Cross News Letter No. 188, September 29, 1992".

Table 4-6. Historical resource estimates for the Lara Deposit in the Coronation Trend.

DATE	COMPANY	RESOURCE ESTIMATE
1986	Abermin	Reserves to the end of 1986: estimated at 837,332 tonnes, grading 0.61% Cu, 3.59% Zn, 0.81% Pb, 3.26 g/t Au (0.085 opt Au), 89.49 g/t Ag (2.61 opt Ag) (Bailes et al., 1987)
1988	Abermin	Probable Reserve: 199,000 tons grading 0.72% Cu, 0.89% Pb, 4.68% Zn, 2.90 opt Ag and 0.110 opt Au. Possible Reserve : 272,000 tons grading 0.75% Cu, 0.95% Pb, 4.15% Zn, 2.17 opt Ag and 0.10 opt Au. Reserves estimated using $US80 cut-off grade, minimum width of 2m and average thickness of 3 m (Roscoe and Postle, 1988)
1989	Minnova	Reported 324,100 tonnes grading 0.91% Cu, 6.01% Zn, 1.26% Pb, 111.07 g/t Ag and 4.70 g/t Au Resource estimated using cut-off of $50 NSR over 2.0 metre (NSR = $101.67 per tonne) (Wells and Kapusta, 1990a)
1997	Treasury	Resource: 580,000 tons averaging 1.01% Cu, 1.22% Pb, 5.87% Zn, 2.92 opt Ag, 0.138 opt Au averaging 8.3 feet thick (Nucanolan, 1998 ; Peatfield and Walker, 1994)
1998	Nucanolan	Resource: 583,000 tons averaging 1.01% Cu, 1.22% Pb, 5.87% Zn, 2.92 opt Ag and 0.138 opt Au over an average thickness of 8.3 feet (Archibald, 1999; Nucanolan Resources Ltd., 1998)

4.4 Historical Production

To the best of the authors' knowledge that has not been any historical production on the Property.

4.5 Recent Exploration Work

In 2007, Laramide Resources Ltd., of which Treasury Metals Inc. is a spin-off company, completed 500.1 line-km of airborne geophysical AeroTEM lines were flown of which 477.8 line-km were on Laramide controlled claims. This work encompassed the entire claim package owned by Laramide. Drill core sampling, totalling 78 samples, occurred within a few meters of a core storage facility on the Property (on claim 260344) but the drill holes that were sampled we originally drilled on claims 260344, 260342 and

512327. A NI43-101 compliant resource calculation was completed as part of the 2007 exploration work (Table 4-7).

Table 4-7. Coronation Trend Mineral Resource Estimate.

1% Zn Block Cut-off

Category	Tonnes	Zn (%)	Ag (g/t)	Cu (%)	Pb (%)	Au (g/t)
Indicated	1,146,700	3.01	32.97	1.05	0.58	1.97
Inferred	669,600	2.26	32.99	0.90	0.44	1.90

2% Zn Block Cut-off

Category	Tonnes	Zn (%)	Ag (g/t)	Cu (%)	Pb (%)	Au (g/t)
Indicated	428,600	5.65	47.04	2.25	1.18	2.39
Inferred	207,900	3.99	37.57	1.73	0.84	2.30

3% Zn Block Cut-off

Category	Tonnes	Zn (%)	Ag (g/t)	Cu (%)	Pb (%)	Au (g/t)
Indicated	189,600	9.74	60.85	4.44	2.23	3.07
Inferred	91,100	6.15	40.79	3.15	1.45	2.50

5.0 GEOLOGICAL SETTING

5.1 Regional Geology

Vancouver Island lies wholly within the Insular Superterrane of the Canadian Cordillera that makes up one of the five tectonic belts produced by the collisions and accretions along the Canadian northwest edge of North America (Lithoprobe, 2007). The island is dominated by rocks of the Wrangellia Terrane, that consist of three volcano-sedimentary cycles: the oldest volcanic cycle is made up of the volcanic rocks of the Upper Palaeozoic Sicker Group which are conformably overlain by the limestone rocks of the Buttle Lake Group; the second cycle is made up of the tholeiitic volcanic rocks of the Karmutsen Formation of the Vancouver Group which are overlain by the limestone of the Quatsino Formation; and the third cycle is made up of the volcanic rocks of the Lower Jurassic Bonanza Group (Figure 5–1). These cycles have been intruded by mafic sills of the Mount Hall Gabbro (coeval with the overlying Karmutsen Formation) and subsequently intruded by various granodioritic stocks. The sedimentary rocks of the Cretaceous Nanaimo Group unconformabley overlie these older sequences (Massey, 1992).

Regional-scale warping of the Vancouver Island rocks produced the 3 major geanticlinal uplifts cored by Sicker Group rocks, including the Cowichan (Horne Lake – Cowichan), Buttle and Nanoose uplifts. The oldest rocks of Wrangellia lie at the top of an imbricated stack of northeast-dipping thrust sheets and are Late Silurian to Early Permian arc sequences (Green, Scoates and Weis, 2005). The Sicker and Buttle Lake groups, the main target for volcanogenic massive sulphide deposits, are primarily exposed in the Cowichan Lake area, at the southeastern extent of the Cowichan uplift (BCMEMPR, 2007a) (Figure 5–2).

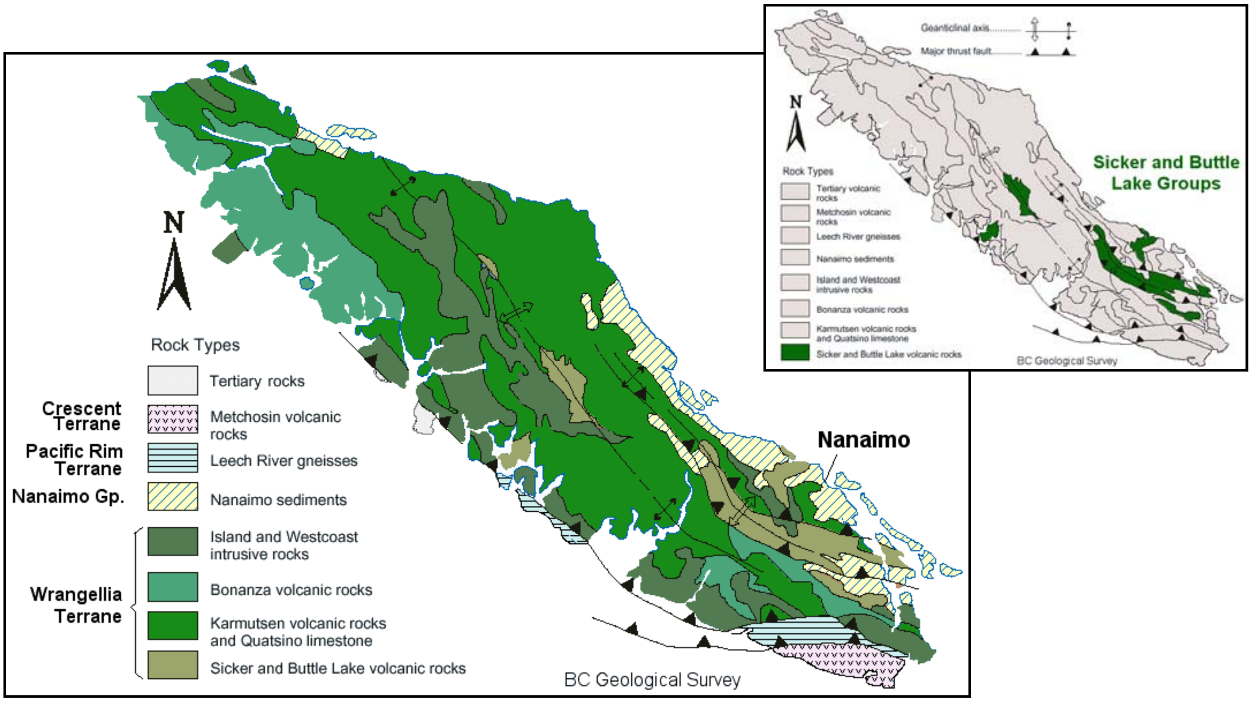


Figure 5–1. Geology of Vancouver Island showing major geological features, structures and components of the Insular Superterrane of the Wrangellia Terrane (after Earle, 2004).

Vancouver Island has undergone at least six periods of deformation (Massey and Friday, 1987) giving rise to a broad antiform structure with a west-northwesterly axis, with younger units towards the west and plunging from 5° to 15° to the west-northwest to east-southeast. The schistosity and cleavage is moderate to steeply dipping to the northeast. Large-scale west to northwesterly trending thrust faults cut the Cowichan-Horne Lake uplift into multiple slices (Figure 5–2). These in turn these are transected by northeast trending block faults. The over-thrusting of these faults pushed the older units up over the younger. Two major fault zones are recognized. The Cameron River fault runs southeast along the Cameron River valley, and joins the Fulford fault. The Fulford fault is a regional west-northwest trending fault that dips at about 47° and crosscuts bedding in the volcanic rocks (McLaughlin Ridge Formation) at a shallow angle The thrusts (where exposed) are high-angle reverse faults which dip between 45° and 90° to the east or northeast, generally place older rocks over younger and become listric at mid-crustal depths. The metamorphic grade in the area is generally low, but increases with the age and structural position of the rocks (Massey and Friday, 1989; MINFILE, 1990a).

The surficial geology and stratigraphy of the southern Vancouver Island have been studied in the area, and the glacial events established by Blyth and Rutter (1993). The surficial geology of area is characterized by glaciomarine drift, beach materials, till and/or glaciofluvial/fluvial sand and gravel in the low-lying (200-300 metres) coastal areas. Higher elevations (from 600 to 900 m ASL) are covered by till or colluviated till, glaciofluvial sand and gravel and more recent colluvium. Diamicton deposits are found in low-lying areas of Ladysmith (up to 12 m of massive, indurated and clay-rich). Chemainus is draped by 1 to 2 metres of silty diamicton directly on bedrock or over silty clay unit and in upland areas overlying glaciofluvial sand and gravel. Sand and gravel deposits are found west of Victoria and in the Chemainus area, throughout the lower and upper Cowichan Valley (area east of Cowichan Lake). Convoluted, interbedded sand, gravel and diamicton combined with pitted, kame and kettle topography occurs just south of Duncan. Economic aggregate deposits have been established at Metchosin, Lanford, Goldstream, Duncan and parts of the Cowichan Valley. The mountainous inland areas appear to have been completely covered by ice. Surficial materials consist of colluviated diamicton over bedrock. Exposures of well-indurated clay-rich diamicton or sandy diamicton occur locally in valley basins. These diamictons are usually overlain by recent fluvial sands, gravels and lacustrine silts and clays.

5.2 District Geology

The Sicker Group is a package of volcanic and volcaniclastic rocks that forms the exposed basement on Vancouver Island (Massey 1992). The Kuroko-type exhalite massive sulphide deposits (zoned and strata-bound) occur in this group of rocks with the largest ore deposits located in the Lynx and Myra properties and adjacent mineral showings at Buttle Lake. The mineralization is related to the rhyolitic or rhyodacitic volcanic rocks of the Myra Formation and its equivalent in the lower section of McLaughlin Ridge of the Lara Property area. The significant rock types are rhyolite and mixed breccias, quartz porphyries and fine-grained rhyolite (Massey and Friday, 1989).

The rocks of the Sicker Group comprise a bimodal assemblage of felsic and mafic metavolcanic rocks which range from fine tuffs to coarse fragmental units along with massive flows and apparently intrusive rocks, interbedded, cherty to argillaceous and sulphidic sediment horizons are a minor but significant component of the stratigraphy. Mafic volcanic and volcaniclastic rocks are intimately interlayered with felsic units and intermixed as heterolithic clasts. Mafic rocks dominate an upper volcanic package which is variably hematitic (purple and green) and contains beds and lenses of jasper, green to grey chert and carbonaceous black chert and argillite. This upper sequence flanks the felsic-rich stratigraphy near both sides of the Property and is capped, at least in places, by the thickest and richest lenses of iron formation known in the Sicker Group. The iron formation includes jasper, grey chert and massive magnetite and is locally anomalous in gold and base metals (Peatfield and Walker, 1994; Massey et al., 2005a).

The metamorphic grade in the area is generally low, but increases with the age and structural position of the rocks. The sediments of the Sicker Group rocks are un-metamorphosed except in areas of intense shearing where chlorite and sericite have developed along foliation planes. The Sicker Group volcanic rocks show the effects of greenschist metamorphism. Intermediate to mafic rocks have chloritic schistose matrices with epidote alteration of feldspars and uralitization of pyroxenes. Granodiorite stocks and plutons only show sporadic development of contact metamorphic aureoles around their perimeters (Massey and Friday 1989).

The Sicker Group rocks have been affected by several intrusive events: Tyee intrusions are the oldest and emplaced concurrently with deposition and extrusion of the Myra Formation. Diabase and gabbro are younger than Tyee Intrusions and were injected as dikes and sills probably in conjunction with extrusions of the Karmutsen basalt Island intrusions are result of Early Jurassic plutonism and formed elongate bodies of granodiorite, diorite and minor agmatite in Sicker Group and younger rocks (Massey and Friday, 1988).

The Sicker Group volcanic rocks are overlain by the sedimentary rocks of the Buttle Lake Group. The rocks can be found in fault contact with the lower volcanic units of the Sicker Group or more commonly in unconformable contact with the volcanic rocks. The Buttle Lake Group is dominated by epiclastic and limestone sedimentary package. The base is made up of a sequence of radiolarian ribbon cherts, laminated cherts and cherty tuffs within thin argillite interbeds that pass upwards into sandstone-siltstone-argillite intercalations of the Fourth Lake Formation. Minor though significant volcanic rocks are found interbedded with the sediments on the northeast limb of the Cowichan uplift. On the north slopes of Coronation Mountain, the rocks comprise hornfelsed, amygdaloidal diabasic flows and interbedded cherty tuffs and sediments. The Fourth Lake Formation is overlain by the Mount Mark Formation which is composed of massive and laminated crinoidal calcarenites with chert and argillite interbeds. However, this unit is absent north of the Cowichan River, where the Fourth Lake Formation is unconformably overlain by the Nanaimo Group sediments. The Fourth Lake Formation is intruded by the thick mafic sills and dikes of the Mount Hall Gabbro. The intrusions are coeval with the Karmutsen Formation of the Vancouver Group that overlies the Buttle Group sedimentary rocks. The Mount Hall Gabbro rocks are characterized by medium- to coarse-grained diabase, gabbro and leucogabbro with minor diorite and glomeroporphyritic feldspar gabbro (Massey, 1992).

5.3 Local Geology

The Lara Property area is underlain primarily by the McLaughlin Ridge Formation, the uppermost unit of the Sicker Group which has been thrust over the younger rocks of the Fourth Lake Formation and the Nanaimo Group by the Fulford fault; this is referred to as the Cowichan Uplift. The McLaughlin Ridge Formation, which hosts the VMS deposits, consists of northerly dipping, west-northwest striking rhyolitic to andesitic rocks. Bedding generally dips steeply at 60° to 75° north, although dips of between 30° and 45° north are common (MINFILE, 1990a; Massey et al. 2005a). The principal stratigraphic units of the Eastern Belt of the Cowichan Uplift are presented in Table 5–1 and Figure 5–2 (Massey, 1992).

The McLaughlin Ridge Formation is a sequence of volcaniclastic sediments dominated by thickly bedded, massive tuffites and lithic tuffites with interbedded laminated tuffaceous sandstone, siltstone and argillite. Associated breccias and lapilli tuffs are usually heterolithic and include aphyric and porphyritic (feldspar, pyroxene, hornblende) lithologies, commonly mafic to intermediate in composition; felsic tuffs are rare.

In the region east (Duncan area) of the Lara Property, the tuffaceous sediments thin out and the strata is dominated by volcanic rocks with only minor tuffaceous sediments. The volcanic rocks are predominantly intermediate to felsic pyroclastic rocks, commonly feldspar-crystal lapilli tuffs and heterolithic lapilli tuffs and breccias. A thick package of quartz- crystal, quartz-feldspar-crystal and fine dust tuffs is developed in the Chipman Creek-Mount Sicker area and is host to the massive sulphides. This package thins to the west where it intercalates with andesitic lapilli tuffs and breccias. It appears to be stratigraphically high within the formation. A distinctive maroon schistose heterolithic breccia and lapilli tuff forms the uppermost unit within the McLaughlin Ridge Formation and is seen in the southern claims of the Lara Property (Figure 5-3).

The McLaughlin Ridge Formation is correlative to the Myra Formation of the Buttle Lake uplift (Massey and Friday, 1989; Massey, 1992). The unit is 450 metres thick and its components have been subdivided into four discrete structural packages which are believed to be fault bounded. A number of quartz-feldspar porphyry dikes that are coeval with the felsic volcanic rocks of the McLaughlin Ridge Formation. Each volcanic series is referred to as a member. The members are separated by “break” sequences which are dominated by near vertical mafic intrusions emplaced along faults. All four member sequences host polymetallic mineralization (Roscoe, 1988).

Table 5-1. Stratigraphy of the Buttle Lake and Sicker Groups underlying the Lara Property area (after Massey 1992).

Formation	Type
Buttle Lake Group	Sedimentary rocks
St. Mary’s Formation	Sandstone, conglomerate
Mount Mark Formation	Massive and laminated crinoidal calcarenites, chert and argillite interbeds
Fourth Lake Formation	Cherts grade into tuffs, argillite to turbiditic sandstone, siltstone, argillite
Sicker Group	Volcanic rocks
McLaughlin Ridge Formation	Heterogeneous sequence of mafic to felsic volcanic rocks and volcaniclastic sediments
Nitinat Formation	Pyroxene-feldspar-porphyritic basalt and basaltic andesite rocks
Duck Lake Formation	Pillowed, amygdaloidal basalts with minor chert and cherty tuffs

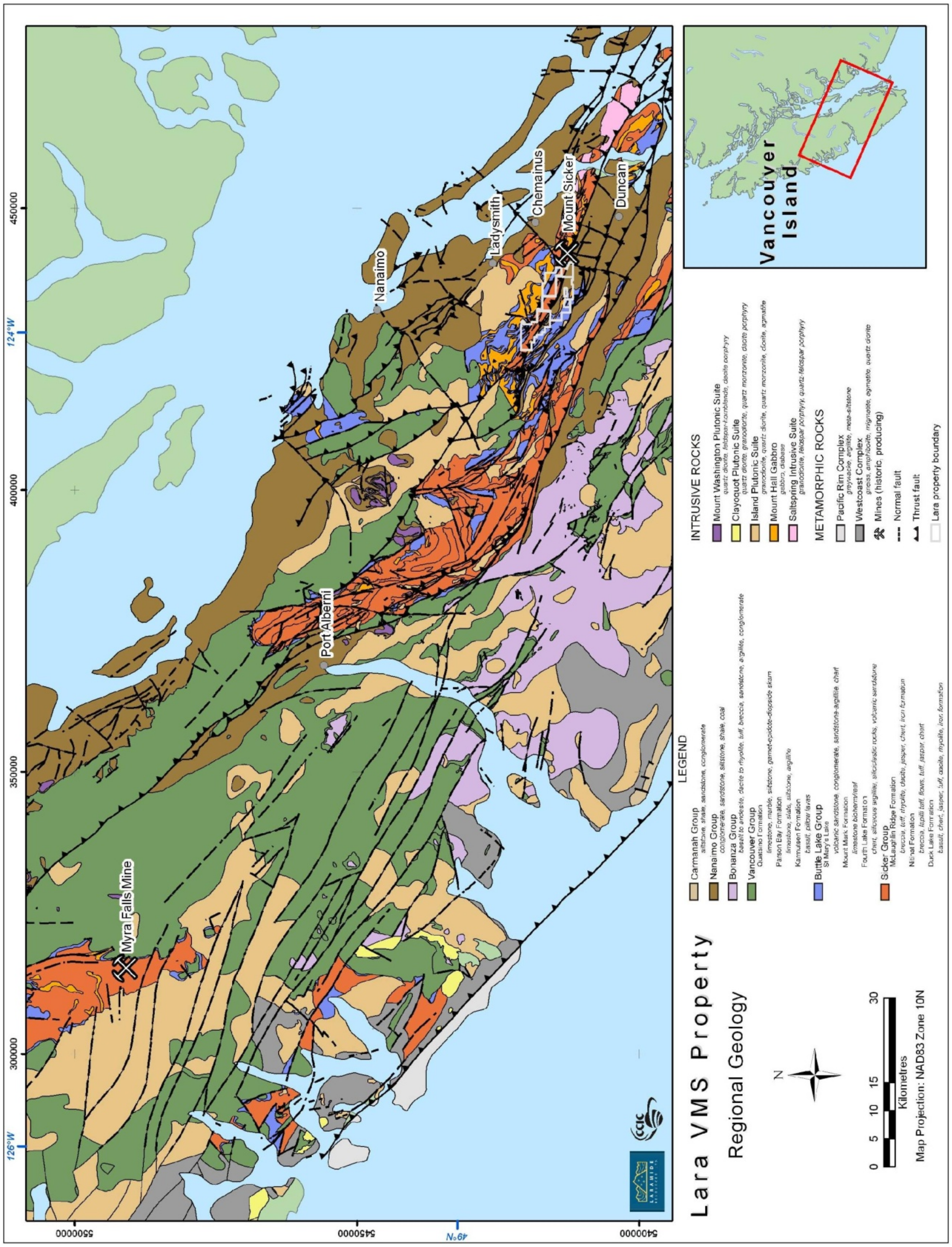


Figure 5–2 Regional geology of the south central portion of Vancouver Island, British Columbia (after Massey et al. 2005a).

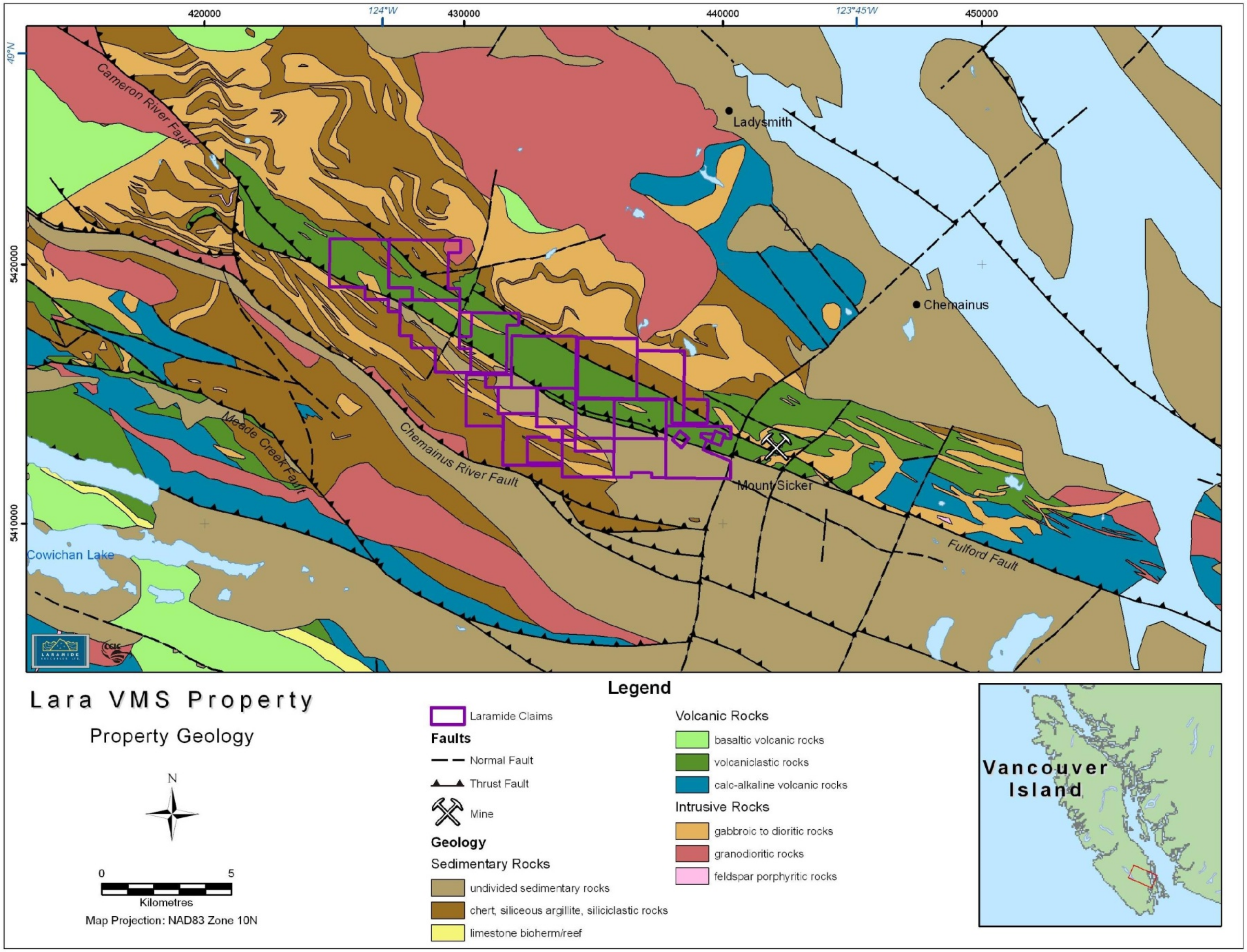


Figure 5–3. Bedrock geology underlying the Lara Property (south Vancouver Island, B.C.) after Massey et al. 2005a.

6.0 DEPOSIT TYPE

6.1 Volcanogenic Massive Sulphide

Franklin et. al. (2005) defined volcanogenic massive sulphide deposits as stratabound accumulations of sulphide minerals that precipitated at or near the sea floor. All VMS deposits occur in terrains dominated by volcanic rocks, although individual deposits may be hosted by volcanic or sedimentary rocks that form part of the overall volcanic complex (Franklin, 1996). VMS deposits primarily occur in subaqueous, rift related environments (i.e. oceanic, fore-arc, back-arc, continental margins or continental) and hosted by bi-modal mafic-felsic successions, where the felsic volcanic rocks have specific geochemical characteristics and are referred to as FI, FII, FIII, and FIV (Hart et. al., 2004) based on the REE classification scheme of Lesher et al. (1986).

A typical VMS deposit (Figure 6–1) consists of a concordant synvolcanic lens or body of massive sulphides that stratigraphically overlies a cross cutting, discordant zone of intense alteration and stockwork veining. The discordant alteration and stockwork-veining zone is interpreted to be the channel-way or conduit for hydrothermal fluids that precipitated massive sulphides at or near the seafloor. A heat source, such as a subvolcanic intrusion is required to induce the water-rock reactions that result in metal leaching from the surrounding rocks and create the hydrothermal convection system (Höy, 1991; Franklin et. al., 2005).

The massive sulphide body is generally in sharp contact with the overlying sedimentary or volcanic stratigraphy (hangingwall stratigraphy), while the massive sulphide body may be in sharp or gradational contact with the underlying stringer and alteration zone (footwall stratigraphy) (Höy, 1991).

Most VMS deposits, including Achaean VMS deposits, are surrounded by alteration zones, which are spatially much larger than the deposits themselves. A number of zones of alteration are commonly recognized; the footwall alteration pipe, alteration within the ore zone, a large semi-conformable zone beneath the ore zone and alteration of the hanging wall. Figure 6–1 is a synthesis of alteration zones associated with Zn-Cu-Pb (minor Au, Ag) deposits that formed in bimodal mafic-felsic volcanic sequences. The core of the alteration pipe can be up to 2 km in diameter and is reflected mineralogically by a strong chloritic core surrounded by sericitic and chloritic alteration. Chemically, the alteration pipe zone in Figure 6–1 is represented by additions of Si, K, Mg and Fe and depletions in Ca and Na. According to Franklin (1996), alteration zones adjacent to the main alteration pipe are not well defined. He also noted that Na depletions are laterally extensive, but are confined only to a few hundred metres vertically in this type of deposit. Virtually all alteration pipes are characterized by Na depletion and the resulting alkali depletion common to many alteration zones is manifested as abundant aluminosilicate minerals (Franklin 1999; Höy, 1991).

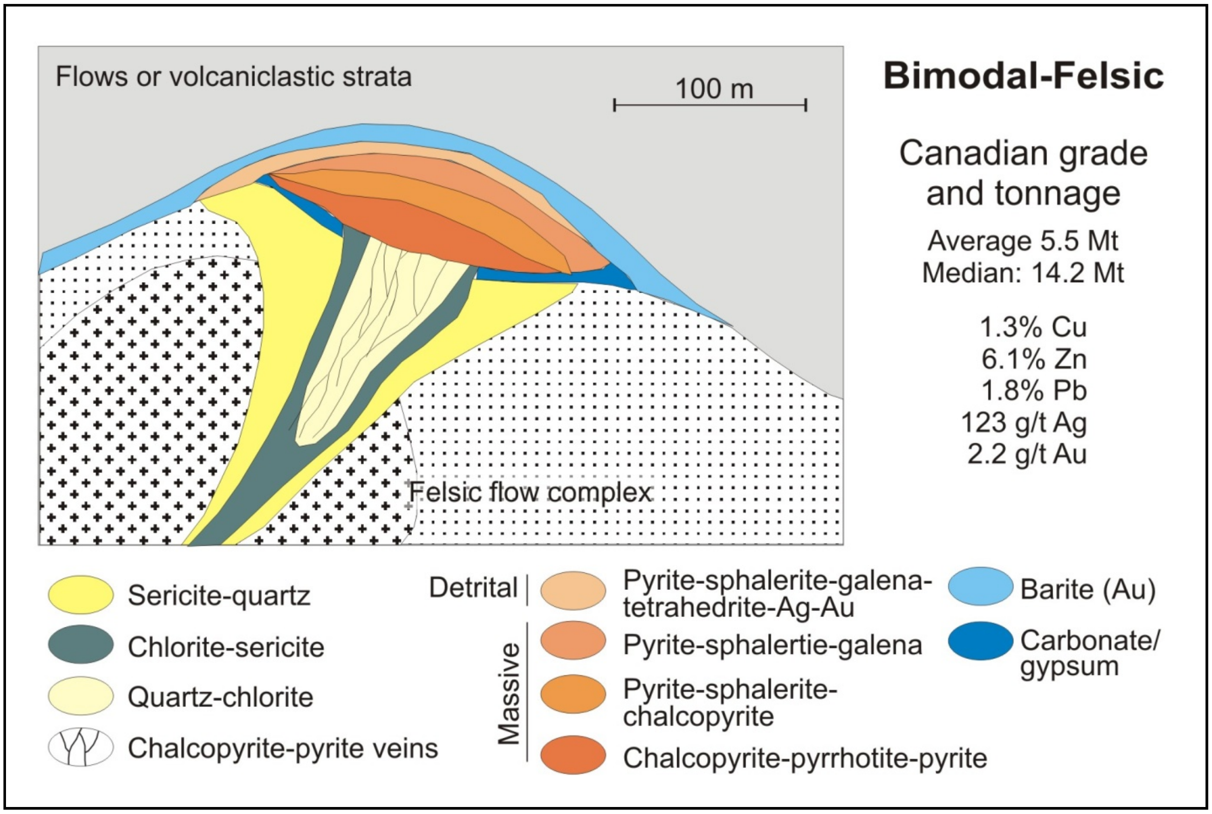


Figure 6–1. Idealized characteristics of a bimodal-felsic VMS deposit (after Galley, et. al., 2007).

The Property has previously been classified as a VMS deposit because of the apparent stratabound nature of the mineralized zone. However, the Property also has affinities to epithermal deposits and the reported conformable nature of the mineralized zone could be due to the development of preferred mineralization along zones of structural weakness. The most common deposit types in the area are porphyry deposits, polymetallic base metal veins and the subvolcanic Cu-Ag-Au (As-Sb) deposit type. These and other deposit types are described by the British Columbia Mineral Deposit Profiles (www.em.gov.bc.ca/mining/Geolsurv/MetallicMinerals/MineralDepositProfiles/).

7.0 MINERALIZATION

The polymetallic, VMS deposits on Vancouver Island are hosted in the structural uplifts of the Palaeozoic Sicker Group: the Myra Falls deposit within the Buttle Lake uplift, while the Lara and Mt. Sicker mine workings are located in the Horne Lake-Cowichan uplift. The felsic volcanic rocks of the McLaughlin Ridge Formation (Horne Lake-Cowichan uplift) and the Myra Formation (Buttle Lake uplift) host the deposits of Cu, Pb, Zn, Ag and Au within several stratigraphic levels (Crick, 2003; Massey, 1992).

The mineralized zones on the Lara Property were identified from drilling and extrapolating geological units along strike. The interpretive work by various exploration companies involved primarily comparison studies to the Buttle Lake/Myra Falls up strike deposits and the Mt. Sicker deposit down strike (Archibald, 1999). Seven zones, located at various stratigraphic levels were delineated on the Lara Property: Anita, Coronation Trend, Randy North, 262, Silver Creek, 126 and the Sharon zones (from west to east).

The deposit type on the Lara Property is classified as Kuroko-type massive sulphides consisting of volcanic-hosted, stratiform accumulations of copper, lead, zinc, silver and gold. The zones are described in Table 9–1 and their locations within Treasury's registered claim boundaries (superimposed on bedrock geology) are illustrated in Figure 7–1.

Table 7-1. Mineralized zones within the Lara Property.

Ore Zone	Discovery	Type of Mineralization	Description
Anita	1915	main	Anita tuff; exhalative
Randy North	1986		pyrite horizon within alteration zone (Na depletion, Zn enrichment
Coronation Trend	1984 and 1985	main	massive sulphide, banded/laminated and stringer facies in altered rhyolite-tuff sequence: hanging wall represents alteration zone (Na depletion, Zn enrichment
Silver Creek			stringer zone in mafic tuff host
262	1989	Sub-parallel	unaltered felsic rocks host semi-massive to massive sulphides at shallow depths; distal exhalite
126	1990		stringer-style mineralization
Sharon Copper	1903		stringer zone in mafic tuff host not within Lara Property

The most important of these zones is the Coronation Trend which is made up of the Coronation Zone, the Coronation Extension and the Hanging Wall deposit. Together the deposits of the Coronation mineralized trend make up most of the reserve and the historic resource calculations of the Lara Property. Of the mineralized zones tested, the Coronation Trend and Anita appear to be on a similar trend; whereas the "262" Zone may be a sub-parallel structure. The Randy North, Silver Creek, "126" and Sharon zones appear to be on a more northerly trend as part of the northern limb of a synclinal structure (Archibald, 1999; Wells and Kapusta, 1990a).

The package of rocks hosting the Lara deposits consists of an andesitic sequence referred to as the "Green volcaniclastic Sequence" overlying rhyolite which hosts to the massive sulphide ore. The rhyolite has been subdivided into two units which are referred to as the "Rhyolite Sequence" and the "Footwall Sequence", the latter underlying the lowermost sulphide sequence. Numerous minor faults occurring in

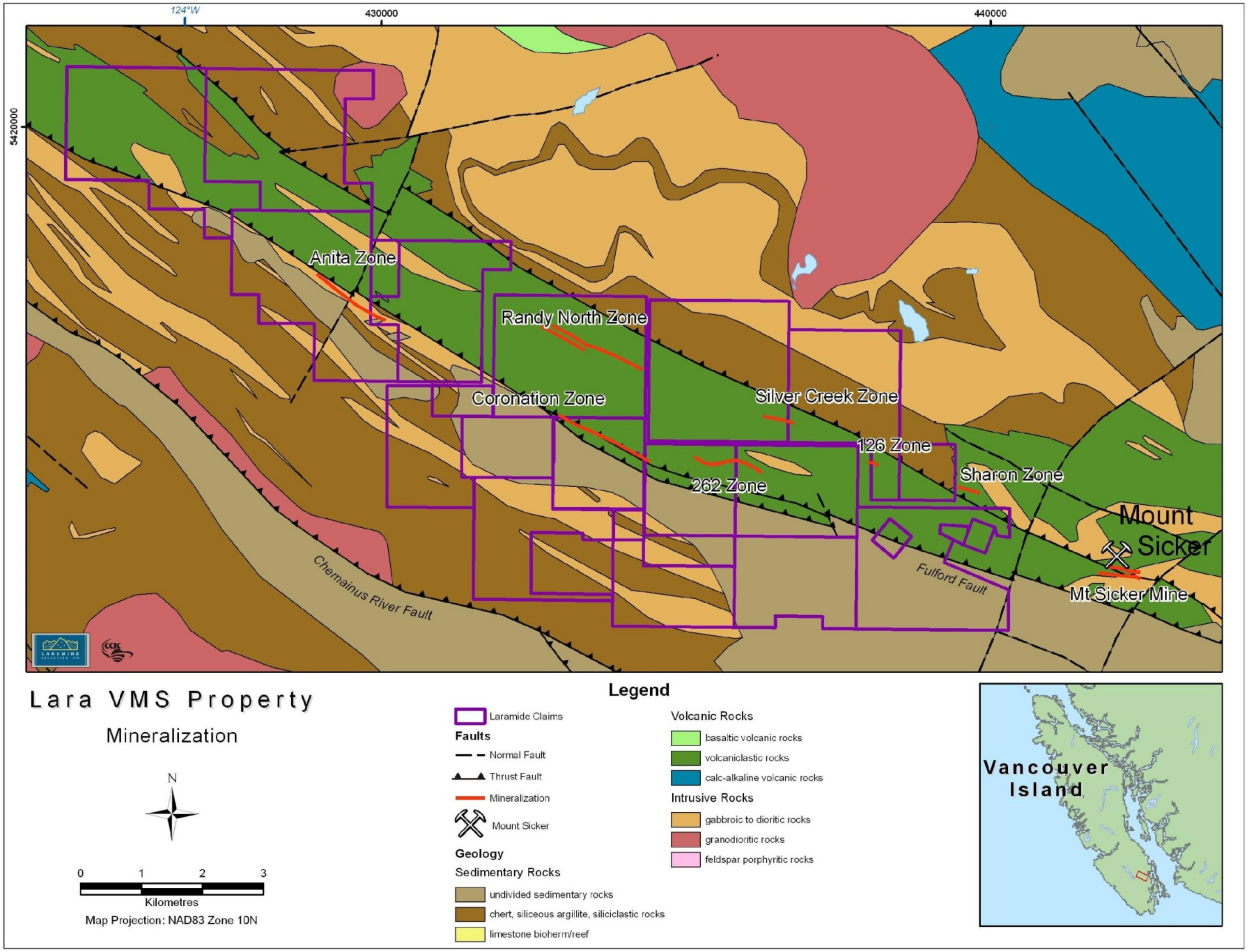


Figure 7–1 Location of mineralized zones within mineral claims of Lara Property, Vancouver Island, BC, Canada.

three or four directions have been observed on the Property resulting in displacement and gaps of the mineralized stratigraphy (MINFILE 1990a; Roscoe and Postle, 1988).

The mineralized zones are characterized by rapid facies changes and abrupt fault displacements. Mineralization that has been discovered above and below the Coronation Trend stratigraphy is likely repeated on the Property either by regional folds or faults.

VMS mineralization on the Property is characterized by hydrothermal alteration of the rhyolite host that is typical of VMS deposits. The mineralized zones are characterized by strong sodium depletion, enrichment in potassium (sericitization) and zinc, silicification and pyritization. The lithogeochemical surveys defined two areas of hydrothermal alteration: the Randy Zone with a strike extent of at least six kilometres where the pyritic cherts are interpreted as a distal exhalite; and the structural hanging wall east of the Coronation Zone (Peatfield and Walker, 1994; Wells and Kapusta, 1990a). The geological reconnaissance work by Nucanolan in 1998 (Archibald, 1999) suggests that the structural controls existing in the area and the alteration mineralization indicate secondary mineralization via hydrothermal processes. The original features of the host sedimentary rock appear to be upgraded or influenced by the cross-cutting fault structures and possibly by the late stage mafic or diorite intrusions.

7.1 Coronation Trend

The Coronation Trend consists of several stratiform massive sulphide lenses within an envelope of banded or laminated sulphides. The Trend is made up of three zones: the original discovery of the Coronation Zone, the Coronation Extension Zone (east and stratigraphically above the Coronation Zone) and the Hanging Wall Zone which consists of stringer mineralization that is also stratigraphically above the Coronation Zone (Roscoe and Postle, 1988). Although classified as massive sulphides, the predominant facies actually consists of bands, laminae and stringers of sulphide minerals in a strongly silicified rhyolite host (intercalated with siliceous and tuffaceous debris). The Coronation sulphide mineralization strikes west-northwest, dips to the northeast at 60° and exhibits variation in thickness from 3 to 16 metres, averaging about 6 metres (Crick, 2003; MINFILE, 1990a). The distribution of mineralization along the Coronation Trend is influenced by a strong linear structural fabric which plunges at a low angle to the east (Roscoe and Postle, 1988).

The Coronation Zone is hosted by the southern Rhyolite Sequence (one of the 4 members of the McLaughlin Ridge Formation) and which consists of coarse grained rhyolite crystal tuff and ash tuff. Black argillite beds and buff coloured mudstones occur at the boundaries of pyritic units and enclose the polymetallic zones. The Footwall Sequence underlying the Member 1 Rhyolite consists of coarse-grained quartz porphyries and feldspar porphyries. These appear to form domal structures which not only controlled palaeotopography and basin configuration but may have played a role in focussing mineralizing fluids. Only a few diamond drill holes have penetrated the Footwall Sequence and these have intersected another similar rhyolite porphyry package which is mineralized and has potential. The Member 1 Rhyolite is in fault contact with the overlying Green Volcaniclastic Sequence consisting of a 250 m thick unit of dacite to andesite fragmental rocks, minor argillite and quartz feldspar porphyry dykes (Roscoe and Postle, 1988). The footwall sequence is dominantly quartz porphyritic massive rhyolitic rocks up to 40 m thick (Crick, 2003) and is clearly from a distinct stratigraphic level compared to the above. These rocks are texturally variable but are distinguishable by the presence of abundant large quartz eyes. Feldspar porphyry dykes, rhyolite dykes, rhyolite breccia and mudstone and argillite beds are also present (MINFILE, 1990a).

Mineralogical studies carried out on drill core samples in 1989 (Peatfield and Walker, 1994) show that the mineralogy of the Coronation Trend is complex. The minerals include sphalerite, pyrite, chalcopyrite, galena and tetrahedrite [$(Cu, Ag, Zn, Fe)_{12}As_4S_{13}$], with small amounts of bornite, rutile and arsenopyrite and locally abundant barite. Tetrahedrite appears to be the preferred host for gold whereas pyrite shows very few included gold grains, but gold and silver are found dispersed in tennantite [$(Cu, Ag, Zn, Fe)_{12}As_4S_{13}$]. Gangue consists mostly of quartz and calcite with lesser amounts of muscovite, feldspar, and barium-bearing feldspar (Peatfield and Walker, 1994; MINFILE, 1990a).

The predominant facies of the Coronation deposits is the banded and laminated facies which consist of sulphide laminae and bands up to a few cm thick in a siliceous host. The host rock varies from a silicified rhyolite to a very fine-grained siliceous mass with various amounts of felsic tuffaceous debris. The mineralization is broadly conformable, however, crosscutting features are common within the conformable zones. Crosscutting mineralization varies from occasional sulphide stringers to well-developed breccia zones with sulphides in the matrix. Sulphides also occur disseminated in the rhyolite host. Primary textures are masked by pronounced cataclastic overprint. Although these features to some extent mask the primary depositional style, the overall stratiform character of the facies is demonstrated by the presence of sedimentary units which enclose and occur within the deposit, and which can be correlated over considerable distances. The banded and laminated facies varies up to 16 metres true thickness. Although not as high grade as the massive sulphide facies, laminated and banded sulphides can achieve significant grade (MINFILE, 1990a). One massive sulphide lens exposed by trenching in the Coronation Zone graded **24.58 g/t Au, 513.6 g/t Ag, 3.04% Cu, 43.01% Zn and 8.30% Pb over 3.51 m**.

7.2 "126" Zone

Diamond drill hole data indicates stringer style mineralization with long intersection of alteration and scattered mineralization at the "126" Zone. This zone consists of chalcopyrite in quartz veins hosted by chloritic volcanic flows/tuffs, which overlie a thick sequence of felsic volcanic rocks (Peatfield and Walker, 1994). Drilling indicates the presence of a gabbro intrusion (Peatfield and Walker, 1994). This zone is located in an area of deep overburden therefore geophysical and geochemical data cannot be interpreted.

7.3 Anita Zone

The Anita Zone encompasses the area of the original Anita showing, where a 50-foot shaft was excavated in 1915. The original Anita showing, which occurs along the Anita Horizon, consists of quartz lenses in schist traceable for at least 60 metres in an easterly direction. The "vein" is up to 4.5 metres wide and carries chalcopyrite and pyrite. The schist zone is a pyritic, sodium-depleted felsic tuff/lapilli (quartz-phyric sericite schist) unit also known as the Anita active tuff. Mineralization occurs in massive sulphides and as pyrite, sphalerite and chalcopyrite occurring as sparse veinlets, stringers and as polymetallic bands in barite-enriched pyritic zones known as the Anita Horizon. A major thrust fault occurs immediately north of the Anita active tuff (MINFILE, 1990b; Stewart, 1991).

The best mineralization within the Anita active tuff occurs along the Anita Horizon that is generally located within 15 metres north of the Anita felsic tuff-mafic tuffaceous sediment contact. The horizon can be traced discontinuously along a 3.3 km strike length and is made up of a 1 to 10 metre wide zone of disseminated to massive pyrite in foliation-parallel bands or beds up to 0.5 metres thick with traces to a few percent of associated chalcopyrite and sphalerite (Stewart, 1991).

The western end of the Coronation Zone of the Lara deposit occurs about 1.5 kilometres southeasterly (120°) from the eastern end of the Anita Horizon. The two deposits are almost along strike from each other but significant differences in their settings suggest that the horizons are not identical but significant differences in their settings indicate different positions in stratigraphy. Diamond drilling and geophysical (IP) evidence indicate that there is very little potential for near surface massive sulphide ore body. (MINFILE, 1990b; Stewart, 1991).

7.4 Randy (North) Zone

The Randy Zone is a pyrite horizon that is accompanied by weak base metal concentrations in rhyolite volcaniclastic rocks. There is a very strong alteration trend (sodium depletion) over a 200 metre thickness and it lies down section from a well-defined oxide iron formation. The zone consists of 3 to 6 zinc-rich weakly polymetallic horizons over a stratigraphic thickness of about 150 metres. These horizons consist of laminated light brown sphalerite and pyrite with subordinate chalcopyrite and trace tetrahedrite hosted by a strongly schistose quartz-eye rhyolite tuff (sericite-quartz schist). The Randy Zone area is largely underlain by felsic volcanic rocks (MINFILE 1990c). The rhyolite sequence composed predominantly of quart-eye porphyry and feldspar porphyry rhyolite, rhyolite tuffs, and minor lapilli tuff, andesite and argillite. The upper contact of this sequence is marked by an argillite bed underlain by quartz-eye (Roscoe and Postle, 1988).

7.5 Sharon Copper – Silver Creek Trend

The Sharon Copper Zone is a chlorite-pyrite-chalcopyrite stringer zone exposed on surface and in drill core that is hosted in predominantly mafic tuffs approximately 10 m north of a large distinct unit of quartz phyric felsic tuff (coarse quartz eye sericite schist). A large gabbro body apparently truncates the favourable stratigraphy at depth. Most of the original rock textures and structures are obscured by late shearing and extensive faulting. The sulphides are hosted by extremely sheared chlorite-sericite schist, and appear to be concentrated in two 10-metre wide horizons forming the core of an antiform. The sulphides are re-crystallized after deformation but appear to have undergone some later shearing. Underground development includes 3 parallel adits 46 metres, 1.5 metres and 11 metres in length.

Similar results occur in the Silver Creek area where drilling and trenching located mineralization near surface that was cut off by a gently dipping gabbro. Drilling to date (1991) has not traced the mineralization below the gabbro (MINFILE 1990c; Stewart, 1991).

7.6 "262" Zone

Drilling in 1990 by Minnova tested the felsic sequence at variable depths over a strike length of 6.5 km. The "262" Zone felsic volcanic rocks host a distal exhalite composed of pyritic cherts, ashes, and thin, copper-rich, semi-massive to massive sulphides and occurs within 40 m of the contact between the felsic and the underlying andesite rocks. The best development of exhalative sulphides, cherts and stringer mineralization is found in shallow, near surface holes. At depth, there is a fine-grained, siliceous felsic ash that is depleted in base metals and hosted in unaltered felsic rocks, suggesting that this zone has limited opportunity for development (Wells and Kapusta, 1991).

8.0 EXPLORATION

Work in 2014 consisted of historical data compilation and review, reconnaissance property field review, geological field mapping, collection of rock samples, and the completion of the preliminary phase of an environmental baseline study. Work was conducted from September 10 to December 17, 2014. The main focus of the work program was to compile data, explore for additional volcanogenic massive sulphide horizons on the Property beyond the known mineralized zones and establish a baseline for ongoing environmental work.

8.1 Reconnaissance data and property review

In September 2014, Treasury Metals initiated work on the Lara Property. Initial work consisted of historical data compilation and review.

Data compilation for this project is an ongoing and lengthy process. There has been decades of historical work conducted on the property by a variety of different companies and joint ventures. The data collected by these various companies is in a variety of formats. Much of the data is photocopied with very little digital data. Treasury spent several months compiling and digitizing data. It should be noted that many more months of data compilation and digitization will be required to have a complete digital data set but it will be necessary for future modelling, exploration and resource estimates.

8.2 Reconnaissance field review

Access roads to the property consist of dense network of historical and recently constructed logging roads (Fig 2.3). Surface rights and logging roads throughout the property are owned and maintained by Island Timberlands and TimberWest. These two companies still actively log the area and new roads are continuously being constructed. Access to the property is gated and permission must be obtained from both companies. This process took several weeks, many emails, phone calls and several office visits to acquire the permits and accounts for about 5 days of work.

After receiving permission to access the property and obtaining a key to the gate Treasury began a reconnaissance property review. This included locating areas of historical significance including: exposures of know mineralization including the Coronation Zone, locating the portal to the historical underground workings, locating the shed which houses some of the core with significant assay results, ground-truthing the location of some historical drill holes, becoming familiar with the vast network of logging roads and searching for recently created logging roads in areas of interest, investigating the blast pits made for material to create the logging roads because they expose rock, and ultimately choosing areas to map and take outcrop samples from (Table 8.1).

Several recently created blast pits for road construction were found. A recently constructed road exposed a long cliff face near the Silver Creek mineralized zone which was previously unseen. Favorable rock types and significant mineralization was seen here (See "New Mineralized Zone?" Fig. 8.3) and deemed a prospective area to map and sample.

Table 8.1 Property Reconnaissance stastions

ID	Easting	Northing	Comment
Schist Pit	436619	5415145	Blasted pit used for road construction.
Basalt Pit	437515	5414006	Blasted pit used for road construction comprised of basalt.
Core Shack	433187	5414183	Core shack filled with historical core, shack walls have been removed, shelves are rotting and leaning, boxes rotting, it will fall down soon.
Randy?	432749	5416823	Possible exposure of Randy Zone.
Old Portal	433576	5414736	Old portal to underground workings, flooded.
Trench	433561	5414800	
High Grade Outcrop	433478	5414834	Trenched outcrop of massive sulphide high grade ore from the Coronation Zone.
Coronation turn	435809	5409783	Turn here at fork in the road to reach Coronation Zone.
DDH 85-36	433510	5414859	Diamond drill hole collar location for hole 85-36.

New Mineralized Zone?	436503	5415442	New exposure created by logging road construction. Multiple units exposed including several felsic volcanics, mafic dykes, shales, chlorite schists. Abundant F2 folds & F1 isoclinal folds. Very good mineralization in one Felsic unit, several cms of massive py, cpy, possible new mineralized zone. To be mapped and sampled.

8.3 Structural and Geological Mapping

The field program included the mapping and sampling of several blast pits created for logging road construction, outcrops, and focused on the cliff exposure created by a recently created logging road in the vicinity just north of the Silver Creek mineralized zone (Fig. 8.3).

A total of 24 stations were mapped 22 of them were of the cliff exposure (Table 8.2). The cliff exposure is approximately 325 m long with 80% rock exposure and trends at a 30 degree azimuth just north of and perpendicular to the Silver Creek mineralized zone (Fig. 8.4).

Station RK-9 is comprised of a significantly altered Rhyolite containing a rusty area surrounding a lens of semi-massive sulphides which pinches and swells 3 to 15 cm wide (Fig. 8.1 and 8.2). The semi-massive sulphides consist largely of pyrite with significant amounts of sphalerite, minor chalcopyrite, possible arsenopyrite and represent a prospective ore zone. This prospective zone is offset from the previously defined Silver Creek zone and represents a potential parallel zone to the north. There are historical drill holes in the area and upon completion of a digital data set a spatial comparison should be completed to see if this unit has been previously intersected in drill core. Assay number 123213 was taken directly from this zone and returned values of 0.68% Zn, 0.11% Cu, 0.704 g/t Au, and 17.7 g/t Ag. This is the most significant assay of all the samples.

Fig. 8.1 and 8.2 Semi-massive sulphide zone, mapping station RK-9, north of Silver Creek Zone.

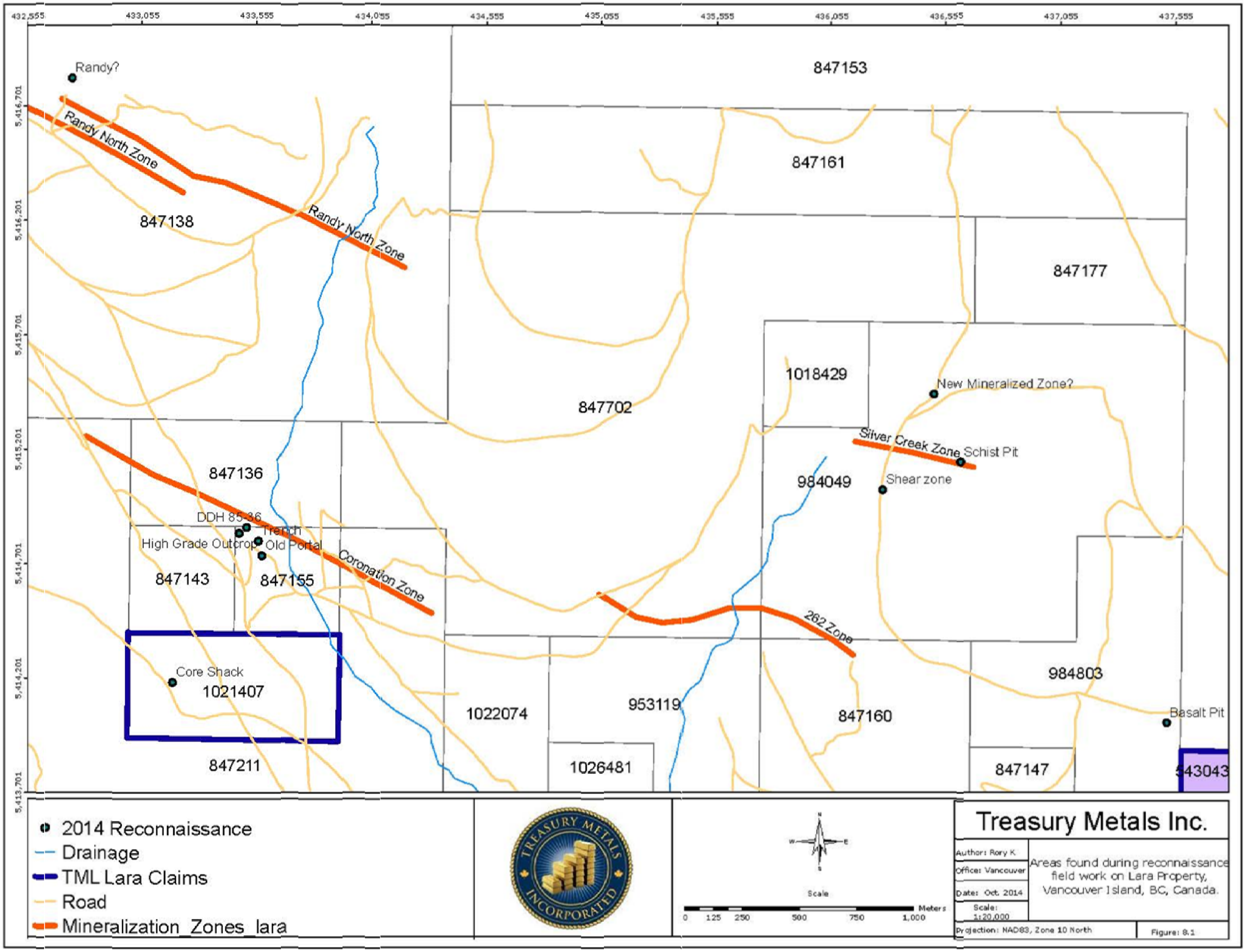


Figure 8.3 Reconnaissance field visit stations including currently defined mineralized zones.

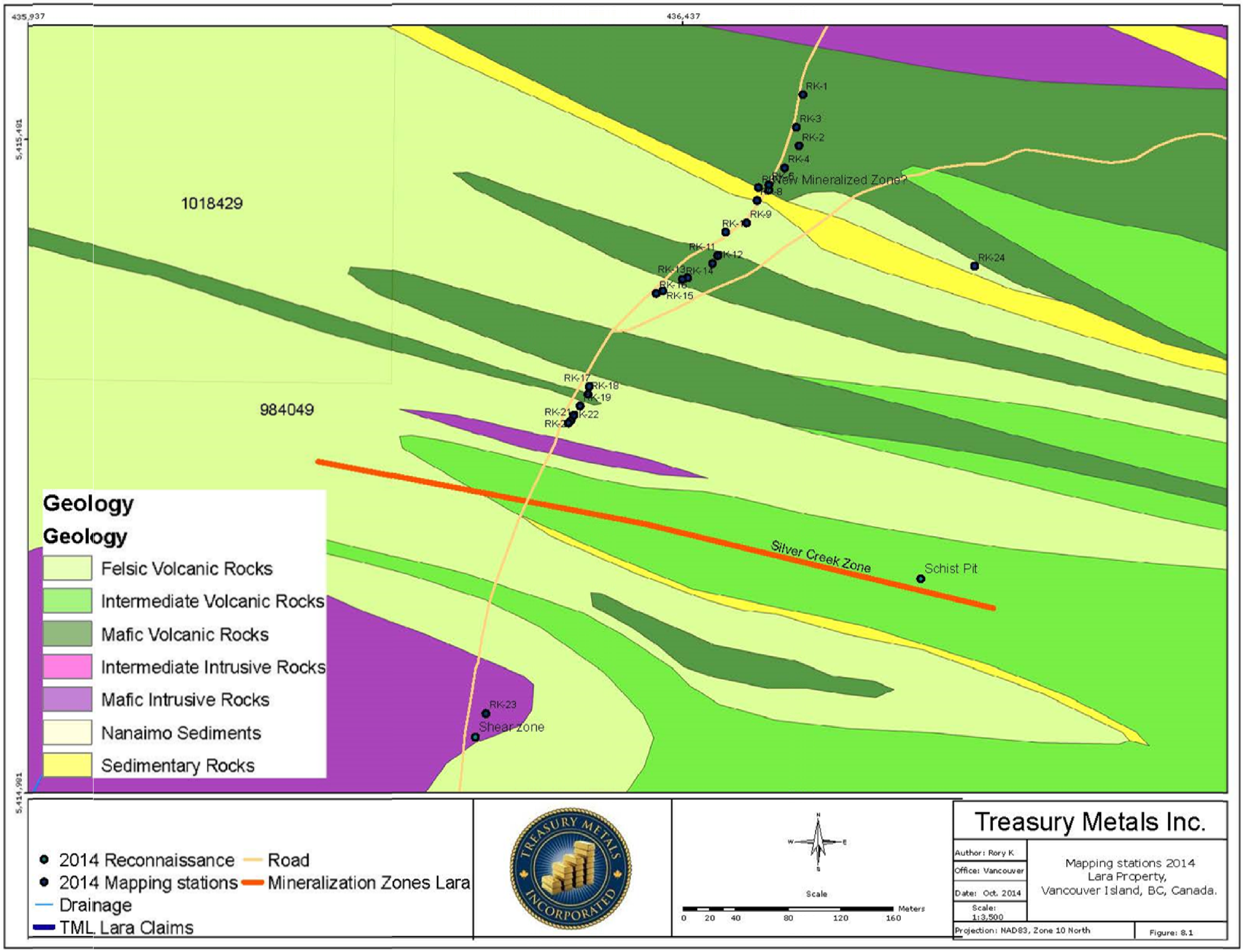


Fig. 8.4 2014 Mapping stations showing geology and known Silver Creek Mineralized Zone

Table 8.2 Mapping Station from 2014 program. Coordinates are in UTM Datum NAD 83 Zone 10 N.

Station	Sample	Colour	UTM East	UTM North	Elev	Comments
RK-1	123201	Med-dark green	436529	5415515	809	15 m long roadside exposure. Strongly schistose mafic volcanic. Schistose layers are locally distorted and "wavy". Med-dark green, strong chlorite content, phylitic with a greasy feel. There is a 1 m interval which is strongly sericitized where a possible fault crosscuts the unit at 95/70N.
RK-2	123202 to 123206	Med-dark green	436526	5415476	811	Long roadside exposure of med - dark green, strongly schistose, mafic volcanic rock crosscut by two mafic intrusives (RK-3 & RK-4). Pervasive chlorite with local strongly sericite and epidote alteration. Schistosity 130/78S. Local stringer type quartz carbonate veins associated with very rusty intervals, possible fault/shear zones. Fault adjacent to RK-4 at Az 105/90.
RK-3	123203	Dark green	436524	5415490	810	Dark green maffic instrusive, massive, 1-3 mm carbonate porphyry.
RK-4	No	Dark green	436515	5415459	814	Dark green maffic instrusive, massive, strong chlorite.
RK-5	123207		436503	5415446	817	Strongly schistose and sericitized mafic volcanic between masssive volcanic instrusive and gabbo units. Az 135/76S. 1-2% py, 1-2% cpy.
RK-6	No	Med-dark green	436503	5415446	818	Gabbro? 1-2 m wide, massive, med grained, med-dark green.
RK-7	No	Black	436495	5415444	826	Black, fine grained, schistose slatey sediments. Az 140/88S. Ajacent to strongly altered and mineralized rhyolite?
RK-8	123208 to 123211	White	436494	5415434	827	~12 m wide interval of strongly sericite altered, strongly schistose, int - fel volcanic, Rhyolite? Unit is probably ~ 30 m wide but middle portion has been slumped over and covered for 8 - 10 m, with the same unit on the other (south) side. Schistosity 182/84S. Several small 0.4 - 0.8 mafic (gabbro?) sills. The unit is well mineralized with 1-2% py and local 1-2% cpy. Several faults crosscut the unit, 2 - 5 cm wide Az 182? dip 30N plunge 22NW (see pictures).
RK-9	123212 to 123216	White	436486	5415417	813	Strongly silicified & sericitized rhyolite. Probable continuation of RK-8 seperated by slumped area. Schistose Az 130/82S. Very rusty area with a lens of semi-massive pyrite which pinches and swells 3 - 15 cm. Possible new ore zone?
RK-10	123217	White to Green	436470	5415410	804	Gradual transition from "Rhyolite" to mafic - chlorite schist suggesting possible same protolith and varying alteration? Strongly schistose Az 130/82S. There is a fault at the southern end of the outcrop, possible thrust fault dipping 22S and plunging 22W. There is a possible "U" shape on the rock face suggesting this may be a strike slip fault.

RK-11	123218	White	436464	5415392	807	Strongly sericitized and schistose rhyolite? (or altered) at contact with RK-10 mafic vol and fault, schistosity Az 136/80S.
RK-12	123219		436460	5415386	807	Mafic volcanic schist, strong chlorite, strongly silicified, 2-3% py.
RK-13	123220 to 123221	light - med green	436441	5415375	806	Continuation of RK-12 after slumped area. Strongly schistose mafic volcanic, light to medium green, chlorite and sericite altered.
RK-14	123222 to 123224		436437	5415374	800	Int-fel volocanic, strong sericite alteration, 2-3% py, 4-5% black sphalerite stringers??, schistose Az 125/84S.
RK-15	No	Green	436422	5415365	803	Gabbro or mafic intrusive, strong chlorite, weak schistosity, calcite or feldspar porphyry.
RK-16	123225 to 123228	pale grn to white	436417	5415363	795	Int-fel volcanic, rhyolite? Quartz eyes, schistose, pale green to white, strongly sericitized and silicified, potential fuchsite?, rusty shear with massive sulphide stringers near south end, possibly silver creek zone?
RK-17	123229 to 123230	White to green	436366	5415292	794	Int-fel volcanic, strong sericite, moderate chlorite, strongly schistose Az 108/84S.
RK-18	No	Med-dark green	436365	5415286	797	4-5 m wide metased? Weak schistosity, med-dark green, at contact with felsic volcanic rhyolite unit.
RK-19	123231 to 123232		436359	5415277	796	Felsic volcanic unit, 1-5 mm wide quartz eyes, very strongly silicified, weak to moderate chlorite, trace - 1% local pyrite.
RK-20	123233	Med-dark green	436354	5415270	797	Mafic volcanic unit between two felsic volcanic units, med-dark green, schistose.
RK-21	123234	Beige	436352	5415266	797	Felsic volcanics, 4-5 m wide, qtz eyes, beige, very strongly silicified, trace - 1% py.
RK-22	123235	Green	436350	5415264	798	Mafic volcanic, schistose Az 112/90, strong chlorite, weak sericite alteration.
RK-23	123236	Greyish	436287	5415042	785	Small 5 m long exposure where the road splits and veers up. Beige weathered, greyish fresh surface, strongly silicified, massive, sediments? (nanaimo?), trace sulphides.
RK-24	123237	White	436660	5415384	865	Small 1x1 m exposure on the side of the road, white, schistose felsic volcanic rhyolite? Strongly silicified and sericitized.

8.4 Assays

A total of 37 samples were collected for assay from outcrop during the 2014 program (Fig 8-5). Samples were individually bagged and dropped off at SGS Canada Inc. Mineral Services located at 3260 Production Way, Burnaby, BC, Canada by a Treasury Metals geologist (the author). Samples were weighed, crushed to 75% passing 2 mm mesh, split 250 g. All samples were subject to two analytical methods. The first a multi-element (33 elements), Multi-acid (4-acid) digestion, with an ICP-AES finish. The second a whole rock Lithologic package with a Lithium Metaborate fusion digestion and an ICP-AES finish. Assay results for the 2014 program can be found in Appendix A.

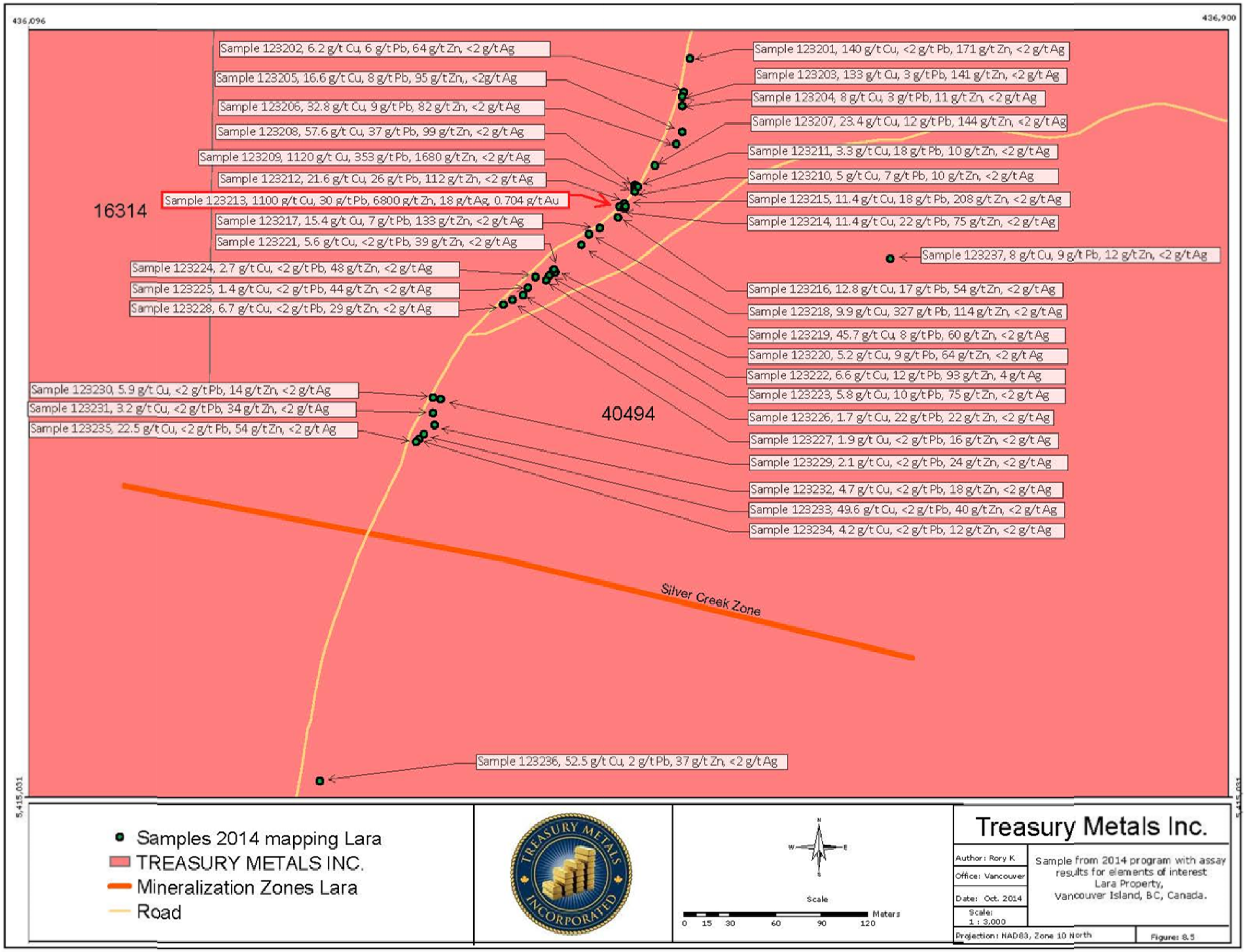


Fig. 8-5 Map showing the location of samples taken during the 2014 mapping campaign. Includes assay results of elements of interest.

9.0 ENVIRONMENTAL BASELINE STUDY

9.1 EDI Environmental Dynamics Inc. Preliminary Environmental Baseline Study

Environmental Dynamics Inc. (EDI) was retained by Treasury Metals Inc. to conduct preliminary baseline environmental data collection and document a baseline description of the existing biophysical environment based on the requirements of Section 10.1.4(2) of the Health, Safety and Reclamation Code for Mines in BC. The report is designed to help guide mitigation of exploration activities, aid in the development of more detailed studies to support the application for a bulk sample permit as well as provide a basic foundation for an environmental assessment. Baseline information to describe present use and condition of the land and watercourses includes the following components:

- Land ownership
- Land capability and present land uses
- Climate
- Air quality
- Surface water quality
- Hydrology
- Fisheries and aquatic resources
- Ecological communities and vegetation
- Wildlife

The final report prepared by EDI is attached in Appendix B

10.0 CONCLUSIONS

It has been suggested that the Sicker Group rocks on the Lara Property are represented by a regional scale anticlinal structure. This would suggest that the same multiple VMS mineralized horizons that host the Coronation and Anita Zones are likely duplicated to the north of the Randy, Silver Creek and 126 Zones. The presence of the small mineralized zone mapped out and sampled during the 2014 campaign support this idea as it represents a mineralized horizon north of the defined Silver Creek Zone. It is recommended that follow up work to search for secondary and tertiary mineralized horizons to the Randy, Silver Creek and 126 zones be one of the focuses in future exploration.

It is further recommended that environmental baseline work continue as required to support any potential future extraction of ore on the Lara Property and to ensure that Treasury Metals remains responsible Stuarts of the land.

11.0 SUMMARY OF EXPLORATION EXPENSES

Table 15–1. Summary of exploration expenses.

Work Category/Contractor	Details	Dates	No.	Units	*Unit Cost	Amount
Accomodation, Food, and Travel						
Hotel	Krocker, Wetherup	Oct. – Dec. 2014				$ 5,034.54
Meals	Krocker, Wetherup	Oct. – Dec. 2014				$ 1,649.01
Flights	Krocker	Oct. – Dec. 2014				$ 2,297.50
Fuel		Oct. – Dec. 2014				$ 873.95
Ferry/Taxi Fares						$ 577.30
Field Labour						
Management (Krocker)	Mapping and sampling	Oct. – Nov. 2014	27.0	days	$ 519.00	$ 14,013.00
Field Assistant (Wetherup)	Reconnaissance guide	Oct. - 2014	8.0	days	$823.90	$ 6,591.20
Equipment Rental						
Truck	Truck rental Driving Force	Sept. – Dec. 2014	3.0	month	$1799.67	$ 5399.01
Geochemical Analysis						
Geo Labs (SGS)	Whole rock samples	Dec. 2014	37.0	samples		$ 2428.44
Field Expenses and supplies						
Field and office supplies						$ 863.01
Report Writing						
Management (Krocker)	Writing and data comp.	Sep. – Dec. 2014	28.0	days	$519.00	$ 14,532.00
EDI Environmental assessment						
Field work and report		Oct. to Dec 2014				$ 33,655.40
				Total		**$ 87,914.36**

12.0 STATEMENT OF QUALIFICATIONS

I, Rory Krocker, residing at 523 Ash Street, Winnipeg Beach, Manitoba, do hereby certify that:

1. I am employed as a consultant with Treasury Metals Inc.
2. I hold the following academic qualificaitons: B.Sc. Geology (2007), University of Manitoba.
3. I am a member in good standing of the Association of Professional Engineers and Geoscientists of Manitoba (APEGM, Member #32356).
4. I have work as a geoscientist in the mineral exploration industry for 8 years.
5. I am responsible for the preparation of the Technical Report titled "Assessment Report, Mapping, Whole Rock Geochemical Sampling and Preliminary Environmental Baseline Study, Lara Polymetallic Property". I am also responsible for and was directly involved in the mapping and data collection associated with this report.

Dated this 2nd day of February, 2016

Rory Krocker, B.Sc.

13.0 REFERENCES

Aeroquest International Ltd. (2007) Report on a Helicopter-Borne AeroTEM System Electromagnetic, Radiometric & Magnetic Survey. Aeroquest Job # 08022, Lara Project, Vancouver Island, British Columbia, NTS 092B13, 092C16. For Treasury Metals Inc., 38 pp, with data DVD.

Archibald, J.C. (1999) Summary Report on the Treasury Property Diamond Drill Program, Lara VMS Project, Vancouver Island, B.C., 103 pp.

Bailes, R.J., Blackadar, D.W. and Kapusta, J.D. (1987) The Lara Polymetallic massive Sulphide Deposit. Vancouver Island, British Columbia. Abermin Corporation, 31 pp.

B.C. MEMPR (2006) Legacy Claim Conversion to Cell Claim *in* Information Update, Number 13, revision date November 26, 2006; British Columbia Ministry of Energy, Mines and Petroleum Resources, online http://www.em.gov.bc.ca/mining/titles/infoupdate/default.htm [accessed October 1, 2007].

B.C. MEMPR (2007) Geology of Vancouver Island; British Columbia Ministry of Energy, Mines and Petroleum Resources online at http://www.em.gov.bc.ca/Mining/Geolsurv/GeologyBC/default.htm [accessed October 1, 2007].

B.C. MEMPR (2007) Mineral Titles Online; British Columbia Ministry of Energy, Mines and Petroleum Resources; online at http://www.mtonline.gov.bc.ca/ [accessed October 1, 2007].

Belik, G. and Associates Ltd. (1981) Trenching, geophysical and geochemical report on the Mt. Sicker Property; Victoria Mining Division, British Columbia (NTS 92B/13W) for Treasury Metals Inc., 49 pp.

Blyth, H.E. and Rutter, N.W. (1993) Quaternary Geology of Southeastern Vancouver Island and Gulf Islands (92B/5, 6, 11, 13 and 14); *in* Geological Fieldwork 1992, British Columbia Ministry of Energy, Mines and Petroleum Resources, Paper 1993-1, p. 209-220.

Breakwater Resources Ltd. (2004) NVI Mining Ltd., A Wholly-owned subsidiary of Breakwater Resources Ltd. Myra Falls Operation; Vancouver Island, British Columbia, NI-43101 Technical Report. July 30, 2004 by Torben Jensen, 54 pp.

Breakwater Resources Ltd. (2007a) 2006 Annual Report, www.breakwater.ca [accessed September 26, 2007].

Breakwater Resources Ltd. (2007b) Operations: Myra Falls. www.breakwater.ca/operations/myra.cfm [accessed October 1, 2007].

Broughton, L.J. (1987) Exploratory Metallurgical Testwork, Report No. 1; Prepare for Abermin Corporation, Lara Property by Coastech Research Inc., 39 pp.

Earle, Steven (2004) The Geology and Geological History of Vancouver Island; a Powerpoint Presentation, accessed online at http://web.mala.bc.ca/geoscape/ [accessed October 1, 2007].

Chong, A., Becherer, M., Sawyer, R., Wasteneys, H., Baldwin, R., Bakker, F. and McWIlliams, I. (2005) Massive Sulphide Deposits at Myra Falls Operations, Vancouver Island, British Columbia *in* GAC Field Trip Guide (Part 1) Cordilleran Round-Up Field Trip, January 2005, Geological Association of Canada Geofile 2005-20; B.C. Ministry of Energy, Mines and Petroleum Resources, GeoFile 2006-07, 42 pp.

Crick, D. B. (2003) Vancouver Island Opportunities - Junior Custom Feed Exploration Unpublished report to Treasury Metals Inc.

Franklin, J. M. (1996) Volcanic-Associated Massive Sulphide Base Metals; Geology of Canadian Mineral Deposit Types, (ed.) O.R. Eckstrand, W. D. Sinclair and R. I. Thorpe; Geological Survey of Canada, no. 8, p.158-183.

Franklin, J. M. (1999). Systematic Analysis of Lithogeochemical Data in**.** Exploration Tools for Volcanogenic Massive Sulphide Deposits short course sponsored by Mineral Deposits Research Unit, University of British Columbia.

Franklin, J. M., Gibson, H. L., Jonasson, I. R., and Galley, A. G. (2005) Volcanogenic Massive Sulphides; Economic Geology 100th Anniversary Volume p. 523-560.

Galley, A.G., Hannington, M.D., and Jonasson, I.R. (2007) Volcanogenic Massive Sulphide Deposits *in* Goodfellow, W.D., ed. Mineral Deposits of Canada: A Synthesis of Major Deposit-Types, District Metallogeny, The Evolution of Geological Provinces, and Exploration Methods: Geological Association of Canada, Mineral Deposits Division, Special Publication No. 5, p. 141-161.

Harris, M.W. (1989) Observations on the Geology, Structure and Mineralization of the Coronation Zone Polymetallic Horizon Lara Project, 1988 Underground Exploration Program. 112 pp.

Hart, T. R., Gibson, H. L. and Lesher, C.M. (2004) Trace Element Geochemistry and Petrogenesis of Felsic Volcanic Rocks Associated with Volcanogenic Massive Cu-Zn-Pb Sulfide Deposits; Economic Geology, v.99, p. 1003-1013.

Höy, T. (1991) Volcanogenic Massive Sulphide Deposits in British Columbia; Ore Deposits, Tectonics and Metallogeny in the Canadian Cordillera, W.J. McMillan, Coordinator, British Columbia Ministry of Energy, Mines and Petroleum Resources, Paper 1991-4, p. 89-123.

Kapusta, J.D. (1991) 1990 Diamond Drilling Report on the Lara Group II: Solly, T.L., Jennie, Ugly, Wimp, Nero, Face and Plant claims, B.C. Ministry of Energy, Mines and Petroleum Resources, Assessment File #20980, 50 pp.

Treasury Resources Inc (2007). 2006 Annual Report, available online at www.Treasury.com.

Lesher, C. M., Goodwin, A. M., Campbell, I. H., Gorton, M. P. (1986) Rare element geochemistry of ore-associated and barren, felsic metavolcanic rocks in the Superior Province Canada; Canadian Journal of Earth Sciences, v.23, p. 222-237.

Lithoprobe Geoscience Project (2007) http://www.lithoprobe.ca/media/studies/terrane.asp [accessed October 1, 2007].

Long, S. D. (2003): Assay Quality Assurance-Quality Control Program for Drilling Projects at the Pre-Feasibility to Feasibility Level (3rd Ed.). Amec Mining Consulting Group.

Massey, N.W.D. and Friday, S.J. (1989) Geology of the Alberni-Nanaimo Lakes Area, Vancouver Island (92F/1W, 92F/2E and part of 92F/7); *in* Geological Fieldwork 1988; B.C. Ministry of Energy, Mines and Petroleum Resources, Paper 1989-1, p. 61-74.

Massey, N.W.D. (1992) Geology and Mineral Resources of the Duncan Sheet, Vancouver Island (92B/13); British Columbia Ministry of Energy, Mines and Petroleum Resources, Paper 1992-4, 124 pp.

Massey, N.W.D., MacIntyre, D.G., Desjardins, P.J., and Cooney, R.T. (2005a) Geology of British Columbia, B.C. Ministry of Energy, Mines and Petroleum Resources, Geoscience Map 2005-3, (3 sheets), scale 1:1 000 000.

Massey, N.W.D., MacIntyre, D.G., Desjardins, P.J. and Cooney, R.T. (2005b) Digital Map of British Columbia: Tile NM9 Mid Coast, B.C. Ministry of Energy and Mines, GeoFile 2005-2, scale 1:250,000.

Massey, N.W.D., MacIntyre, D.G., Desjardins, P.J. and Cooney, R.T. (2005c) Digital Geology Map of British Columbia: Tile NM10 Southwest British Columbia, B.C. Ministry of Energy and Mines, GeoFile 2005-3, scale 1:250,000.

MINFILE (1990a) Lara, Coronation, 262, Coronation Extension, NTS 092B13W (1990/08/10), MinFile Number 092B-129; British Columbia Ministry of Energy, Mines and Petroleum Resources, MINFILE data.

MINFILE (1990b) Anita NTS 092B 13W (1990/10/13), Minfile Number 092B-037; British Columbia Ministry of Energy, Mines and Petroleum Resources, MINFILE data.

MINFILE (1990c). Sharon Copper NTS NTS 092B 13W (1990/08/02), Minfile Number 092B-040; British Columbia Ministry of Energy, Mines and Petroleum Resources, MINFILE data.

MINFILE (1997) Mount Sicker Mine: Lenora (L.35G), Twin J Mine, Mount Sicker, Lenora-Tyee, Tyee, Richard III, barite Ore, NTS092B13W (1997/04/30), MinFile Number 092B-001; British Columbia Ministry of Energy, Mines and Petroleum Resources, MINFILE data.

Mortensen, J. (2006) Stratigraphic and Paleotectonic Studies of the middle Paleozoic Sicker Group, Poster presented at Roundup 2006; Association for Mineral Exploration in British Columbia

Nucanolan Resources Ltd. (1998) Update on the Lara Project in British Columbia, Press Release December 11, 1998.

Peatfield, G. R. and Walker, R.R. (1994) Review of Technical Reports and Field Observations with a Re-interpretation of Geological Relationships on the Cowichan Uplift Polymetallic Mineral Property, Treasury Resources Summary Report; Victoria Mining Divisions, British Columbia (NTS 93B/13W; 93 C/16E.

Roberts, S.A. (2007) Lara Project Order of Magnitude Study, Vancouver Island, BC for Treasury Resources Limited, Unpublished report by Watts, Griffis and McQuat Limited, Toronto, Canada, 46 pp.

Roscoe, W. (1988) Report on the Lara Project, Vancouver Island, B.C. for Treasury Resources. Roscoe Postle Associates Inc., Toronto, Ontario, 46 pp.

Roscoe and Postle Associates (1988) Report on the Lara Project, Vancouver Island, British Columbia, for Treasury Metals Inc.

Spitz, G. and Darling, R. (1978) Major and Minor Element Lithogeochemical Anomalies Surrounding the Louvern Copper Deposit, Val d'Or, Quebec, Canadian Journal of Earth Sciences, 15, 7, 1161-1169.

Stewart, R. (1991) Project 116: Project Summary of Chemainus Property (NTS 92B/13 and 92C/16), Falconbridge Ltd.

Wells, G.S. and Kapusta, J.D. (1990a) 1989 Exploration Program, Lara Property, Victoria Mining Division (NTS 92B/13W), Minnova Inc.

Wells, G.S. (1990b) Summary Report, Mount Sicker Property: 1983-1990. Minnova Inc.

Wells, G.S. and Kapusta, J.D. (1991) 1990 Exploration Program, Lara Property, Victoria Mining Division (NTS 92B/13W), Minnova Inc.

Appendix A

SGS Assay Certificates

Certificate of Analysis

Work Order : VC143493

[Report File No.: 0000009713]

To: RORY KROCKER
TREASURY METALS INC
130 KING ST W SUITE 3680
BOX 99
TORONTO ON M5X 1B1

Date: Dec 05, 2014

P.O. No.	:	123201-123237
Project No.	:	-
No. Of Samples	:	37
Date Submitted	:	Oct 29, 2014
Report Comprises	:	Pages 1 to 8 (Inclusive of Cover Sheet)

Distribution of unused material:

Active files:

Comments:

Differing results between GE_ICP40B and GO_ICP95A have been confirmed.

Certified By : ______________________

Cam Chiang
Assistant Operations Manager

SGS Minerals Services Geochemistry Vancouver conforms to the requirements of ISO/IEC 17025 for specific tests as listed on their scope of accreditation which can be found at http://www.scc.ca/en/search/palcan/sgs

Report Footer:

L.N.R.	= Listed not received	I.S.	= Insufficient Sample
n.a.	= Not applicable	--	= No result

*INF = Composition of this sample makes detection impossible by this method

M after a result denotes ppb to ppm conversion, % denotes ppm to % conversion

Methods marked with an asterisk (e.g. *NAA08V) were subcontracted
Elements marked with the **@** symbol (e.g. @Cu) denote assays performed using accredited test methods

Final : VC143493 Order: 123201-123237

Report File No.: 0000009713

Element	WtKg	Ag@	Al@	As@	Ba@	Be@	Bi@	Ca@
Method	G_WGH79	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B
Det.Lim.	0.01	2	0.01	3	1	0.5	5	0.01
Units	kg	ppm	%	ppm	ppm	ppm	ppm	%
123201	1.745	<2	7.32	3	104	<0.5	6	3.53
123202	2.760	<2	7.43	4	1510	0.6	<5	0.15
123203	1.985	<2	6.96	24	37	<0.5	6	7.32
123204	1.970	<2	6.48	5	1470	<0.5	<5	0.08
123205	2.000	<2	9.62	7	407	<0.5	<5	0.51
123206	1.585	<2	7.82	5	507	<0.5	<5	5.29
123207	1.600	<2	6.38	48	666	0.8	<5	4.92
123208	2.170	<2	3.73	122	474	<0.5	<5	0.35
123209	1.475	2	4.58	24	997	<0.5	<5	0.27
123210	1.735	<2	5.94	6	956	<0.5	<5	0.04
123211	1.825	<2	5.52	9	1370	<0.5	<5	0.05
123212	1.795	<2	4.76	22	786	0.5	<5	1.31
123213	2.945	18	1.91	339	79	<0.5	7	0.02
123214	1.635	<2	6.10	15	1030	0.7	<5	2.13
123215	1.875	<2	5.61	27	763	<0.5	<5	1.38
123216	1.615	<2	5.34	19	582	<0.5	<5	1.16
123217	1.825	<2	8.78	18	239	<0.5	<5	0.16
123218	1.700	<2	5.58	11	486	0.5	<5	0.03
123219	2.210	<2	5.65	6	219	<0.5	<5	8.21
123220	2.670	<2	6.99	22	781	0.7	<5	2.98
123221	1.935	<2	6.27	12	1130	0.6	<5	1.20
123222	2.915	4	7.23	100	997	0.7	<5	1.03
123223	2.155	<2	7.83	199	786	0.9	<5	0.08
123224	1.625	<2	7.90	7	1050	1.1	<5	0.30
123225	1.775	<2	6.09	<3	895	0.7	<5	0.23
123226	1.265	<2	6.17	<3	800	0.8	<5	1.00
123227	1.540	<2	5.92	<3	955	0.7	<5	1.09
123228	2.305	<2	5.57	7	646	0.5	<5	0.14
123229	1.245	<2	5.46	<3	750	0.8	<5	1.83
123230	1.935	<2	4.73	<3	767	1.0	<5	1.30
123231	1.620	<2	5.74	3	950	0.7	<5	1.60
123232	1.730	<2	5.93	3	786	0.8	<5	0.05
123233	1.425	<2	8.28	6	875	1.9	<5	1.53
123234	2.015	<2	4.65	5	712	0.5	<5	1.90
123235	1.920	<2	8.50	4	1180	1.7	<5	1.77
123236	3.005	<2	7.08	34	239	0.5	<5	2.42
123237	1.915	<2	6.17	14	787	0.6	<5	0.24

Element	Cd@	Co@	Cr@	Cu@	Fe@	K@	La@	Li@
Method	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B
Det.Lim.	1	1	1	0.5	0.01	0.01	0.5	1
Units	ppm	ppm	ppm	ppm	%	%	ppm	ppm
123201	8	54	12	140	11.8	0.44	2.5	14
123202	2	4	4	6.2	2.84	1.67	11.1	13
123203	5	38	297	133	7.97	0.01	5.6	5
123204	<1	2	8	8.0	0.88	2.38	9.6	2
123205	4	23	7	16.6	6.69	0.78	4.6	22
123206	4	31	10	32.8	6.59	0.78	3.4	17
123207	3	8	13	23.4	4.73	1.42	10.1	10
123208	2	5	16	57.6	2.75	1.34	6.9	1
123209	13	3	13	1120	1.97	1.58	5.7	2
123210	<1	<1	5	5.0	0.86	2.20	10.9	1
123211	<1	<1	8	3.3	0.38	2.18	8.4	<1
123212	2	4	6	21.6	1.82	1.72	9.0	3
123213	17	<1	16	1100	9.99	0.67	2.3	<1
123214	1	3	8	11.4	1.83	2.22	12.7	4
123215	1	3	9	11.4	1.91	2.15	9.3	3
123216	2	4	9	12.8	1.89	1.63	7.7	6
123217	6	24	16	15.4	7.48	0.81	2.8	26
123218	<1	<1	7	9.9	1.04	1.60	8.8	5
123219	5	22	18	45.7	6.17	0.80	4.9	12
123220	2	6	6	5.2	2.90	1.34	10.5	11
123221	<1	4	6	5.6	1.69	2.01	11.8	5
123222	3	7	7	6.6	3.76	2.05	12.2	8
123223	3	11	7	5.8	3.92	2.08	13.2	11
123224	2	5	8	2.7	2.21	1.08	11.8	5
123225	<1	3	8	1.4	1.41	1.16	13.3	11
123226	<1	<1	5	1.7	1.24	2.62	11.1	1
123227	<1	<1	7	1.9	1.11	2.73	13.2	2
123228	2	2	8	6.7	2.67	1.13	9.7	<1
123229	<1	1	8	2.1	0.97	2.21	11.7	2
123230	<1	2	7	5.9	1.10	2.05	11.9	<1
123231	1	2	6	3.2	1.42	2.17	13.8	2
123232	<1	3	8	4.7	1.25	1.68	13.5	<1
123233	3	17	10	49.6	4.08	1.63	34.0	8
123234	1	2	16	4.2	1.16	0.94	15.4	<1
123235	2	7	6	22.5	3.09	2.19	27.1	4
123236	4	29	22	52.5	4.45	0.56	7.5	11
123237	1	2	8	8.9	1.30	1.67	12.1	6

Element	Mg@	Mn@	Mo@	Na@	Ni@	P@	Pb@	S@
Method	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B
Det.Lim.	0.01	2	1	0.01	1	0.01	2	0.01
Units	%	ppm	ppm	%	ppm	%	ppm	%
123201	2.97	1400	<1	0.48	20	0.06	<2	<0.01
123202	0.61	641	<1	0.76	2	0.05	6	<0.01
123203	4.37	1340	<1	1.01	110	0.05	3	<0.01
123204	0.19	129	<1	0.34	4	0.02	3	0.04
123205	2.83	1120	<1	2.26	7	0.08	8	<0.01
123206	1.98	886	<1	0.70	12	0.05	9	0.13
123207	2.47	1750	<1	0.34	7	0.13	12	2.43
123208	0.13	99	<1	0.13	10	0.15	37	2.67
123209	0.19	191	2	0.17	3	0.02	353	1.86
123210	0.04	33	<1	0.28	2	0.03	7	0.15
123211	0.05	39	<1	0.19	2	<0.01	18	<0.01
123212	0.63	894	<1	0.15	2	0.02	26	1.36
123213	0.05	288	8	0.07	5	<0.01	30	>5.00
123214	1.06	1480	<1	0.22	3	0.02	22	0.81
123215	0.72	1150	<1	0.19	2	0.02	18	1.24
123216	0.21	885	<1	0.27	4	0.02	17	0.57
123217	1.64	693	<1	1.02	21	0.06	7	0.02
123218	0.18	56	1	0.55	2	0.01	327	0.02
123219	2.69	1610	<1	0.93	12	0.03	8	0.23
123220	1.26	1590	<1	1.38	7	0.06	9	1.01
123221	0.51	521	<1	0.57	2	0.01	<2	0.44
123222	0.65	1150	<1	0.74	3	0.06	12	0.73
123223	0.70	284	2	0.68	7	0.07	10	0.93
123224	0.76	324	<1	3.59	2	0.07	<2	0.02
123225	1.16	113	<1	1.73	3	0.01	<2	<0.01
123226	0.29	214	<1	1.30	2	0.01	22	0.06
123227	0.30	166	<1	0.79	2	0.01	<2	0.01
123228	0.07	169	1	2.52	3	<0.01	<2	0.68
123229	0.35	474	<1	0.70	2	0.01	<2	<0.01
123230	0.15	364	<1	0.54	2	0.01	<2	0.37
123231	0.29	419	<1	0.72	3	0.01	<2	<0.01
123232	0.15	340	<1	2.04	3	0.01	<2	<0.01
123233	1.24	522	<1	3.22	6	0.12	<2	0.17
123234	0.46	500	1	2.40	4	0.01	<2	0.10
123235	0.72	753	<1	2.66	2	0.11	<2	<0.01
123236	2.05	526	1	1.55	24	0.03	2	0.38
123237	0.09	63	<1	0.49	3	0.01	12	0.04

SGS

Final : VC143493 Order: 123201-123237

Report File No.: 0000009713

Element	Sb@	Sc@	Sn@	Sr@	Ti@	V@	W@	Y@
Method	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B	GE_ICP40B
Det.Lim.	5	0.5	10	0.5	0.01	2	10	0.5
Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
123201	<5	26.9	<10	95.4	0.23	254	<10	6.0
123202	<5	8.2	<10	122	0.13	42	<10	9.9
123203	<5	39.1	<10	196	0.75	308	<10	19.1
123204	<5	3.6	<10	48.7	0.09	33	<10	6.9
123205	<5	21.6	<10	231	0.29	243	<10	7.1
123206	<5	30.6	<10	112	0.41	303	<10	5.5
123207	<5	8.1	<10	150	0.12	67	<10	7.9
123208	<5	3.2	<10	23.7	0.05	38	<10	4.4
123209	<5	3.2	<10	34.0	0.04	25	<10	4.4
123210	<5	2.4	<10	57.6	0.09	19	<10	5.7
123211	<5	3.8	<10	38.9	0.10	31	<10	4.2
123212	<5	3.0	<10	38.0	0.06	21	<10	4.5
123213	53	0.9	<10	10.2	0.02	9	<10	1.8
123214	<5	3.7	<10	50.3	0.09	27	<10	6.9
123215	<5	3.5	<10	42.7	0.08	22	<10	6.7
123216	<5	3.4	<10	43.5	0.06	23	<10	6.1
123217	<5	21.8	<10	116	0.20	233	<10	4.2
123218	<5	2.3	<10	50.1	0.04	16	<10	4.4
123219	<5	21.7	<10	122	0.17	183	<10	4.3
123220	<5	6.9	<10	108	0.14	38	<10	11.4
123221	<5	2.4	<10	69.3	0.05	16	<10	6.5
123222	<5	7.7	<10	76.9	0.16	39	<10	10.6
123223	<5	9.3	<10	87.7	0.17	50	<10	10.9
123224	<5	8.4	<10	102	0.21	42	<10	12.1
123225	<5	2.6	<10	215	0.07	20	<10	11.2
123226	<5	2.4	<10	110	0.09	13	<10	4.8
123227	<5	1.9	<10	84.4	0.08	11	<10	5.1
123228	<5	1.3	<10	156	0.06	13	<10	5.2
123229	<5	2.0	<10	106	0.07	9	<10	8.0
123230	<5	1.6	<10	105	0.07	9	<10	5.3
123231	<5	2.6	<10	81.5	0.08	14	<10	6.2
123232	<5	2.0	<10	79.1	0.07	13	<10	6.9
123233	<5	8.3	<10	228	0.14	95	<10	11.4
123234	<5	1.5	<10	186	0.04	11	<10	5.9
123235	<5	4.5	<10	196	0.15	51	<10	9.4
123236	<5	18.4	<10	333	0.22	132	<10	12.8
123237	<5	2.6	<10	70.8	0.08	18	<10	6.2

Element	Zn@	Zr@	Al2O3	Ba	CaO	Cr2O3	Fe2O3	K2O
Method	GE_ICP40B	GE_ICP40B	GO_ICP95A	GO_ICP95A	GO_ICP95A	GO_ICP95A	GO_ICP95A	GO_ICP95A
Det.Lim.	1	0.5	0.01	0.001	0.01	0.01	0.01	0.01
Units	ppm	ppm	%	%	%	%	%	%
123201	151	8.7	15.1	0.013	5.83	<0.01	19.0	0.63
123202	63	78.3	15.9	0.179	0.27	<0.01	4.29	2.36
123203	124	48.8	13.5	0.005	12.0	0.06	12.5	0.03
123204	14	66.1	13.9	0.180	0.14	<0.01	1.37	3.46
123205	100	19.9	19.4	0.046	0.87	<0.01	10.4	1.04
123206	79	23.9	15.9	0.062	8.63	<0.01	10.6	1.05
123207	117	64.0	12.9	0.080	7.93	<0.01	7.56	1.90
123208	92	34.9	7.68	0.165	0.58	<0.01	4.13	1.88
123209	1480	39.7	9.98	0.149	0.45	<0.01	2.92	2.33
123210	5	62.7	12.8	0.116	0.08	<0.01	1.36	3.14
123211	6	55.6	11.3	0.161	0.09	<0.01	0.63	2.96
123212	44	43.6	10.0	0.097	2.21	<0.01	2.89	2.44
123213	1290	17.7	4.64	0.053	0.05	<0.01	16.4	0.92
123214	53	59.8	13.4	0.130	3.66	<0.01	2.97	3.14
123215	128	55.8	12.4	0.095	2.31	<0.01	3.08	3.07
123216	41	51.4	10.9	0.070	1.87	<0.01	2.92	2.20
123217	109	30.0	19.2	0.029	0.28	<0.01	12.6	1.14
123218	79	43.8	11.8	0.059	0.05	<0.01	1.64	2.22
123219	46	16.2	11.6	0.027	14.0	<0.01	10.1	1.08
123220	50	71.2	14.4	0.094	4.85	<0.01	4.75	1.80
123221	29	51.3	13.6	0.140	2.08	<0.01	2.73	2.85
123222	77	76.6	15.4	0.123	1.78	<0.01	6.39	2.84
123223	55	93.9	16.5	0.095	0.14	<0.01	6.46	2.88
123224	36	103	17.2	0.129	0.49	<0.01	3.48	1.53
123225	35	59.2	12.5	0.105	0.38	<0.01	2.16	1.61
123226	16	48.1	13.3	0.096	1.69	<0.01	1.96	3.62
123227	12	45.7	12.7	0.117	1.81	<0.01	1.78	3.76
123228	4	64.9	12.1	0.077	0.22	<0.01	4.02	1.66
123229	16	50.0	11.7	0.095	3.10	<0.01	1.60	3.14
123230	5	39.5	10.0	0.095	2.22	<0.01	1.80	2.95
123231	21	55.4	12.2	0.119	2.66	<0.01	2.31	3.04
123232	12	54.9	12.0	0.090	0.09	<0.01	1.88	2.45
123233	33	116	16.7	0.099	2.46	<0.01	6.40	2.32
123234	5	34.6	9.82	0.082	3.16	<0.01	1.78	1.41
123235	45	69.2	16.3	0.124	2.57	<0.01	4.64	2.74
123236	30	29.0	14.1	0.025	3.79	<0.01	6.87	0.73
123237	11	59.6	13.3	0.088	0.39	<0.01	1.98	2.30

Element	MgO	MnO	Na2O	Nb	P2O5	SiO2	Sr	TiO2
Method	GO_ICP95A	GO_ICP95A	GO_ICP95A	GO_ICP95A	GO_ICP95A	GO_ICP95A	GO_ICP95A	GO_ICP95A
Det.Lim.	0.01	0.01	0.01	0.001	0.01	0.01	0.001	0.01
Units	%	%	%	%	%	%	%	%
123201	5.39	0.22	0.78	0.003	0.19	43.1	0.009	0.57
123202	1.16	0.10	1.25	<0.001	0.14	73.3	0.011	0.42
123203	7.98	0.20	1.52	0.004	0.16	48.6	0.021	1.39
123204	0.37	0.02	0.60	<0.001	0.05	76.2	0.005	0.27
123205	4.83	0.16	3.57	0.003	0.21	54.6	0.025	0.59
123206	3.69	0.13	1.11	0.003	0.14	48.4	0.013	0.80
123207	4.44	0.27	0.55	0.001	0.36	52.9	0.015	0.35
123208	0.25	0.02	0.23	<0.001	0.41	81.1	0.002	0.20
123209	0.39	0.03	0.31	<0.001	0.04	81.7	0.003	0.17
123210	0.08	<0.01	0.48	<0.001	0.09	81.9	0.005	0.20
123211	0.10	<0.01	0.30	<0.001	<0.01	82.7	0.002	0.24
123212	1.22	0.13	0.25	<0.001	0.05	78.6	0.003	0.18
123213	0.11	0.04	0.11	<0.001	0.03	73.5	<0.001	0.08
123214	2.08	0.24	0.36	<0.001	0.06	71.6	0.002	0.24
123215	1.42	0.17	0.33	<0.001	0.05	79.0	0.003	0.21
123216	0.41	0.13	0.43	<0.001	0.04	76.4	0.003	0.20
123217	3.13	0.10	1.63	0.003	0.15	60.7	0.012	0.64
123218	0.35	<0.01	0.89	<0.001	0.03	81.9	0.005	0.15
123219	5.05	0.24	1.41	0.002	0.10	37.7	0.013	0.50
123220	2.33	0.24	2.13	<0.001	0.18	63.9	0.010	0.40
123221	1.01	0.08	0.95	<0.001	0.03	74.0	0.007	0.16
123222	1.26	0.17	1.20	<0.001	0.16	67.9	0.007	0.44
123223	1.33	0.04	1.09	0.001	0.18	69.8	0.009	0.46
123224	1.47	0.05	5.83	<0.001	0.20	70.7	0.009	0.49
123225	2.12	0.02	2.70	<0.001	0.04	75.2	0.022	0.17
123226	0.57	0.03	2.10	<0.001	0.03	76.7	0.012	0.17
123227	0.60	0.03	1.29	<0.001	0.03	80.1	0.008	0.17
123228	0.14	0.02	3.78	<0.001	<0.01	76.9	0.019	0.15
123229	0.72	0.07	1.16	<0.001	0.03	76.3	0.013	0.15
123230	0.28	0.06	0.92	<0.001	0.03	80.1	0.011	0.13
123231	0.59	0.06	1.17	<0.001	0.04	78.3	0.007	0.18
123232	0.25	0.05	3.31	<0.001	0.03	76.9	0.007	0.16
123233	2.21	0.08	5.23	0.002	0.33	59.0	0.027	0.42
123234	0.90	0.07	3.99	<0.001	0.02	74.2	0.022	0.13
123235	1.23	0.11	3.90	0.001	0.24	62.6	0.022	0.34
123236	3.69	0.07	2.33	0.002	0.07	64.1	0.035	0.41
123237	0.18	<0.01	0.80	<0.001	0.04	81.2	0.009	0.20

Element	Y	Zn	Zr	LOI	Cu@	Zn@	@Au	Ag
Method	GO_ICP95A	GO_ICP95A	GO_ICP95A	G_PHY01K	GO_ICP90Q	GO_ICP90Q	GE_FAA313	GE_AAS21E
Det.Lim.	0.001	5	0.001	0.01	0.01	0.01	5	0.3
Units	%	ppm	%	%	%	%	ppb	g/t
123201	0.002	171	0.004	8.69	N.A.	N.A.	N.A.	N.A.
123202	0.002	64	0.013	2.82	N.A.	N.A.	N.A.	N.A.
123203	0.002	141	0.009	2.32	N.A.	N.A.	N.A.	N.A.
123204	0.001	11	0.012	2.04	N.A.	N.A.	N.A.	N.A.
123205	0.002	95	0.005	4.27	N.A.	N.A.	N.A.	N.A.
123206	0.002	82	0.004	9.61	N.A.	N.A.	N.A.	N.A.
123207	0.002	133	0.010	8.47	N.A.	N.A.	N.A.	N.A.
123208	0.001	99	0.006	2.68	N.A.	N.A.	N.A.	N.A.
123209	<0.001	1680	0.007	2.61	N.A.	N.A.	N.A.	N.A.
123210	0.001	10	0.010	1.92	N.A.	N.A.	N.A.	N.A.
123211	<0.001	10	0.010	1.55	N.A.	N.A.	N.A.	N.A.
123212	<0.001	112	0.009	3.53	N.A.	N.A.	N.A.	N.A.
123213	<0.001	6800	0.004	7.72	0.11	0.64	704	17.7
123214	0.001	75	0.012	4.39	N.A.	N.A.	N.A.	N.A.
123215	<0.001	208	0.011	3.69	N.A.	N.A.	N.A.	N.A.
123216	0.001	54	0.010	2.89	N.A.	N.A.	N.A.	N.A.
123217	0.002	133	0.007	4.20	N.A.	N.A.	N.A.	N.A.
123218	<0.001	114	0.008	1.88	N.A.	N.A.	N.A.	N.A.
123219	0.002	60	0.004	19.4	N.A.	N.A.	N.A.	N.A.
123220	0.002	64	0.013	6.97	N.A.	N.A.	N.A.	N.A.
123221	0.001	39	0.010	3.73	N.A.	N.A.	N.A.	N.A.
123222	0.003	93	0.014	3.50	N.A.	N.A.	N.A.	N.A.
123223	0.003	75	0.015	3.75	N.A.	N.A.	N.A.	N.A.
123224	0.003	48	0.016	1.67	N.A.	N.A.	N.A.	N.A.
123225	0.002	44	0.011	1.75	N.A.	N.A.	N.A.	N.A.
123226	0.001	22	0.011	2.30	N.A.	N.A.	N.A.	N.A.
123227	0.001	16	0.010	2.52	N.A.	N.A.	N.A.	N.A.
123228	<0.001	29	0.011	1.85	N.A.	N.A.	N.A.	N.A.
123229	0.001	24	0.010	3.53	N.A.	N.A.	N.A.	N.A.
123230	<0.001	14	0.008	2.38	N.A.	N.A.	N.A.	N.A.
123231	0.001	34	0.011	3.24	N.A.	N.A.	N.A.	N.A.
123232	<0.001	18	0.010	1.30	N.A.	N.A.	N.A.	N.A.
123233	0.002	40	0.018	3.56	N.A.	N.A.	N.A.	N.A.
123234	0.001	12	0.008	3.86	N.A.	N.A.	N.A.	N.A.
123235	0.002	54	0.013	4.03	N.A.	N.A.	N.A.	N.A.
123236	0.001	37	0.009	2.76	N.A.	N.A.	N.A.	N.A.
123237	0.001	12	0.011	2.03	N.A.	N.A.	N.A.	N.A.

Appendix B

EDI Environmental Dynamics Inc.

Property Preliminary Environmental Baseline Study

TREASURY METALS –LARA POLYMETALLIC PROPERTY PRELIMINARY ENVIRONMENTAL BASELINE STUDY

DYNAMIC PEOPLE PRACTICAL SCIENCE EFFECTIVE RESULTS

PREPARED FOR

TREASURY METALS INC.
130 KING STREET WEST, SUITE 3680
P.O. BOX 99
TORONTO, ON
M5X 1B1

PREPARED BY

EDI ENVIRONMENTAL DYNAMICS INC.
208A 2520 BOWEN ROAD
NANAIMO, BC
V9T 3L3

EDI CONTACT: IAN REDDEN

EDI PROJECT NO.: 14-N-0435

DATE: FEBRUARY 20, 2015

COVER PHOTO: COPPER CANYON, CHEMAINUS RIVER

20 YEARS

EDI ENVIRONMENTAL DYNAMICS INC.

This page is intentionally blank.

AUTHORSHIP

This report was prepared by EDI Environmental Dynamics Inc. EDI staff who contributed to this report included:

Andy Smith, M.Sc. .... Primary Author

Jackie Churchill, M.Sc., R.P. Bio. .... Primary Author

Nicole Frederickson, RB Tech. .... Primary Author

Rob VanSchubert, R.P.Bio. .... Secondary Author

Ian Redden, B.Sc., R.P. Bio. .... Senior Review

This page is intentionally blank.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AQMS	Air Quality Management System
ASL	Above Sea Level
BC	British Columbia
BCWQG	*BC Water Quality Guidelines*
BEC	Biogeoclimatic Ecosystem Classification
BGC	Biogeoclimatic
CAAQS	Canadian Ambient Air Quality Standards
EA	Canadian Council of Ministers of the Environment
CDC	British Columbia Conservation Data Centre
ClO_2	Chlorine dioxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWH	Coastal Western Hemlock (biogeoclimatic zone)
CWHmm2	Coastal Western Hemlock Montane Moist Maritime (biogeoclimatic variant)
CWHxm1	Coastal Western Hemlock Eastern Very Dry Maritime (biogeoclimatic variant)
CWHxm2	Coastal Western Hemlock Western Very Dry Maritime (biogeoclimatic variant)
EAO	Environmental Assessment Office
EDI	Environmental Dynamics Inc.
EMS	Environmental Monitoring System
e-PIC	Electronic Project Information Centre
FIDQ	Fisheries Inventory Data Queries
GPS	Global Positioning System
ha	Hectare
HCl	Hydrogen chloride
H_2S	Hydrogen sulfide
IAAQO	Interim Ambient Air Quality Objectives
LEC	Listed Ecological Communities
MoFR	Ministry of Forests and Range
MH	Mountain Hemlock (biogeoclimatic zone)
MHmm1	Mountain Hemlock Windward Moist Maritime (biogeoclimatic variant)
MoE	Ministry of Environment
NO_2	Nitrogen dioxide
NOx	Mono-nitrogen oxides
OGMA	Old Growth Management Area
PCDD/DF	Polychlorinated dibenzodioxins and dibenzofurans
$PM_{2.5/10}$	Fine particulate matter
ppb	Parts-per-billion
RDL	Reportable Detection Limit
SARA	*Species at Risk Act*
SEI	Sensitive Ecosystem Inventory
SO_2	Sulfur dioxide
TEM	Terrestrial Ecosystem Mapping
TRS	Total Reduced Sulfur
TSP	Total Suspended Particulate Matter
VRI	Vegetation Resource Inventory
UWR	Ungulate Winter Range
WHA	Wildlife Habitat Area
WSC	Watershed Code

This page is intentionally blank.

1 INTRODUCTION

Environmental Dynamics Inc. (EDI) was retained by Treasury Metals Inc. to conduct preliminary baseline environmental data collection for the Lara Polymetallic Property tenure held by Treasury Metals Inc. This report documents a baseline description of the existing biophysical environment and has been designed based on the requirements of Section 10.1.4(2) of the Health, Safety and Reclamation Code for Mines in BC. This report will help to guide mitigation of exploration activities, aid in the development of more detailed studies to support the application for a bulk sample permit as well as provide a basic foundation for an environmental assessment. Baseline information to describe present use and condition of the land and watercourses includes the following components:

- Land ownership
- Land capability and present land uses
- Climate
- Air quality
- Surface water quality
- Hydrology
- Fisheries and aquatic resources
- Ecological communities and vegetation
- Wildlife

1.1 STUDY AREA

The Lara Property is located in the Chemainus River Valley approximately 8 km west of the town of Chemainus and covers an area of approximately 9,633 ha (APPENDIX A – Map 1). It is located in the greater Chemainus River watershed which contains the Chipman Creek (7,895 ha) and Solly Creek (2,857 ha) watersheds as well as the Banon Creek community watershed (3,447 ha). The upper watershed of the Chemainus River, locally known as Copper Canyon, has a long history of mineral exploration and features numerous claims due to its rich mineral content. The Lara Property consists of 47 mineral claims on the north side of the river and is known to contain copper-lead-zinc-gold-silver within the Coronation and Coronation Extension sulphide zones.

The Project area lies within privately managed forest lands primarily owned by Timberwest and Island Timberlands LP. It is located within the Coastal Western Hemlock (CWH) and Mountain Hemlock (MH) biogeoclimatic (BGC) zones and includes the Eastern Very Dry Maritime Variant (CWHxm1), the Western Very Dry Maritime Variant (CWHxm2), the Montane Moist Maritime (CWHmm2) and the Windward Moist Maritime variant (MHmm1). Notable waterbodies within or adjacent to the Lara Property include the Chemainus River, Chipman Creek, Solly Creek, Humbird Creek, Silver and Holy Oak Lakes and their associated outlet streams. In addition to both lakes being fish bearing, Holy Oak is also a community watershed which is used to supplement drinking water to the Municipality of North Cowichan's Banon Creek water supply between June 15 and October 15 annually. Access to the area is via the Chemainus River mainline forestry road which is controlled by the private forest companies at a gatehouse at the start of the road. Access is restricted on weekdays and open to the public through a sign-in process at the gatehouse on the weekends.

The area of interest for each project component was established to best represent the scale of potential impacts or influence of future mining operations. However, delineation of precise study area boundaries was not possible given the early stage of exploration across most of the Lara Property claims. For example land tenure and terrestrial vegetation studies focused primarily on claim boundaries whereas climate, air quality, water quality, hydrology, fisheries and aquatic resources as well as some wildlife species are discussed at a watershed level or regional scale.

2 METHODS

2.1 REVIEW OF EXISTING INFORMATION

Background information including maps, reports and data pertaining to the study area and adjacent watersheds were obtained from a wide variety of sources. These include sources for information on wildlife, species at risk, fish abundance and distribution, protected areas, First Nations, mineral rights, ecological values, land-use planning, terrain, atmospheric and hydrologic data, land and water use rights, land tenure, recreation values and previous research conducted within the watersheds.

Relevant documents were obtained through searches of numerous online and in house libraries and databases of provincial and federal agencies. GIS coverages, including land tenure information, were obtained through the provincial Geographic Services (DataBC 2015). The following online coverages were used to obtain background information on climate, air quality, surface water quality and hydrology:

- BC Air Quality (Province of BC 2015);
- Canadian Ambient Air Quality Standards (CCME 2015);
- Climate (Government of Canada 2015);
- Ecological Reports Catalogue (MoE 2015a);
- Project Information Centre (e-PIC) (EAO 2015); and,
- Wateroffice (Government of Canada 2014).

Timberwest and Island Timberlands conduct environmental assessment work on their private lands but this information is not normally publicly available. Information sharing agreements are typically required with other stakeholders before the companies will release privately owned data. These agreements were not obtained prior to preparation of this report. As a result, our background searches were limited to government databases and other sources of public information.

2.1.1 FISHERIES AND AQUATIC RESOURCES

The components of the aquatic environment that were assessed by this preliminary baseline report are surface water quality, sediment, hydrology and fish and fish habitat. Prior to commencing field assessments, the following online indexes, mapping tools, and databases were queried to search for existing information regarding aquatic ecosystem characterization within the Lara Property and the greater Chemainus River watershed:

- BC Fish Stocking Reports (Freshwater Fisheries Society 2015);
- British Columbia Species and Ecosystem Explorer (CDC 2015);
- Ecological Reports Catalogue (MoE 2015a);
- Fisheries Inventory Data Queries (FIDQ) (MoE 2015b);

- Geographic Services (DataBC 2015); and,
- Habitat Wizard (MoE 2015c).

2.1.2 TERRESTRIAL RESOURCES

The components of the terrestrial environment that were assessed by this preliminary baseline report are ecological communities, rare plants, invasive species and wildlife and wildlife habitat. Existing information regarding plant and animal species presence in the Lara Property and adjacent watersheds were compiled and reviewed prior to the initiation of the field sampling program. Terrestrial ecosystems such as Old Growth Management Areas (OGMA) were identified. Information pertaining to critical wildlife habitat such as Wildlife Habitat Areas (WHA) and Ungulate Winter Ranges (UWR) was also reviewed. Relevant documents and data were obtained through various sources and included searches of the following online indexes, mapping tools, and databases:

- Ecological Reports Catalogue (MoE 2015a);
- British Columbia Species and Ecosystem Explorer (CDC 2015); and,
- Geographic Services (DataBC 2015).

2.1.2.1 Determination of Potential Candidate Species and Ecological Communities

The BC Conservation Data Centre (CDC) Species and Ecosystem Explorer (CDC 2015) was queried for rare species and ecological communities that may occur within the region including species on the provincial red and blue lists as well as species included in the Species at Risk Act (SARA) and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) list. The search terms for species were as follows:

- Vancouver Island Ministry of Environment (MoE)Region;
- South Island Forest District
- Cowichan Valley Regional District;
- CWH and MH BGC zones; and,
- Agriculture, Alpine/Tundra, Anthropogenic, Forest, Grassland/Shrub, Lakes, Other Unique Habitats, Riparian, Rock/Sparsley Vegetated Rock, Springs, Stream/River, Subterranean and Wetland habitat types.

The search terms for ecological communities were as follows:

- Nanaimo Lowland Ecosection;
- Vancouver Island MoE Region;
- South Island Forest District;
- Cowichan Valley Regional District;
- CWHmm2, CWHxm1, CWHxm2, MHmm1 BGC variants;

- Ecosystem Realm-Groups: Terrestrial – Alpine, Terrestrial – Flood, Terrestrial – Forest, Terrestrial – Grassland, Terrestrial – Hydrogenic, Terrestrial - Subalpine (shrub), Wetland - Mineral and Wetland - Peatland

The CDC query produced a candidate list of 50 plants and 61 animal species, as well as 35 ecological communities. These lists were further refined based on known habitat associations and distributions to include only species with potential to occur in the area (Appendix B - Tables B1, B2 and B3).

2.2 FIELD METHODS

Aquatic and terrestrial field sampling programs were conducted to confirm preliminary baseline conditions within the Lara Property mineral claim and to fill data gaps in existing information.

2.2.1 FISHERIES AND AQUATIC RESOURCES

Components of the aquatic sampling program included surface water quality and sediment sampling, hydrometrics and fish and fish habitat assessments. Methods for each discipline are described below.

2.2.1.1 Surface Water Quality

Four surface water quality sampling locations were established within the Lara Property on Chipman Creek and Solly Creek (Table 1, APPENDIX A – Map 3).

Table 1. Locations of surface water quality sampling sites within the Lara Property

Study Area	Site Id	Description	UTM (10 U)
Chipman Creek	CHI WQ DS	320 m upstream of the Chemainus River confluence	432022 mE 5410636 mN
Chipman Creek	CHI WQ US	1000 m upstream of the Chemainus River confluence	429850 mE 5417905 mN
Solly Creek	SOL WQ DS	150 m upstream from the Chemainus River confluence	436735 mE 5409790 mN
Solly Creek	SOL WQ US	6400 m upstream from the Chemainus River confluence	433659 mE 5414728 mN

Water quality sampling consisted of both *in-situ* and laboratory analysis (Table 2). The sampling program was conducted using procedures based on the *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (MoE 2012). *In-situ* and laboratory water quality sampling took place at all sites on November 28, 2014.

Table 2. Summary of water quality variables measured in waterbodies within the Lara Property.

Variable	Sample Analysis
Acidity (mg/L)	Lab
Temperature (°C)	In situ
Dissolved Oxygen (mg/L)	In situ
Chloride (µg/L)	Lab
Colour (CU)	Lab
Fluoride (µg/L)	Lab
Bromide (µg/L)	Lab
Sulphate (µg/L)	Lab
Redox Potential (ORP Eh)	Lab
Total organic carbon (mg/L)	Lab
Dissolved organic carbon (mg/L)	Lab
pH (pH units)	In situ
Specific conductance (µS/cm)	In situ
Turbidity (NTU)	In situ
Total dissolved solids	In situ/Lab
Total suspended solids (mg/L)	In situ/Lab
Total alkalinity (mg/L)	Lab
Total phosphorus (mg/L)	Lab
Dissolved Orthophosphorus (mg/L)	Lab
Ammonia (mg/L)	Lab
Nitrate as N (mg/L)	Lab
Nitrite as N (mg/L)	Lab
Total Nitrogen (mg/L)	Lab
Total Hardness (mg/L)	Lab
Total metals (µg/L)	Lab
Dissolved metals (µg/L)	Lab

Field sampling of water quality was conducted by a two person crew. Sampling methodology was consistent with procedures outlined in the *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (MoE 2012), the *British Columbia Field Sampling Manual* (Clark 2003) and *Ambient Fresh Water and Effluent Sampling Manual* (RISC 2003). Water quality samples were taken from fast flowing riffle sites. Fixatives, provided by the laboratory, were added as required for specific samples. The bottled samples were stored in a cooler, kept cold with icepacks and couriered to Maxxam laboratories in Burnaby for analysis within 24 hours of the time of collection. *In situ* field variables were measured at the time of laboratory water sample collection using a WTW multi-parameter meter and a Hannah HI 98128 meter. The probes for the meters were placed in flowing water and allowed to stabilize before the readings were taken.

A quality assurance and quality control (QA/QC) program was developed to ensure the integrity of the results, which consisted of one field blank and one duplicate.

2.2.1.2 Sediment Sampling

Sediment sampling was conducted at two sites, each of which corresponded to the downstream surface water quality sampling locations on Chipman Creek and Solly Creek (Table 3, APPENDIX A - Map 3). Sediment sampling was conducted to provide baseline information on sediment chemistry in the Chipman and Solly Creek watersheds. Samples were collected in shallow water using a large spoon to gently scoop fine sediment. Sampling methodology was consistent with procedures outlined in the *British Columbia Field Sampling Manual* (Clark 2003) and the *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (MoE 2012). Sampling conditions were documented for each site and observations regarding sediment characteristics (i.e., texture, colour, odour, presence of biota, presence of detritus, and the depth of sediment sampled) were recorded. Sediments collected from each sample were homogenized and transferred into pre-labeled glass or plastic bottles (depending on analysis) provided by the laboratory. Jars were filled to capacity and contained no headspace. Collected samples were stored in a cooler, kept cold with icepacks, couriered to Maxxam laboratories in Burnaby, and analyzed for total recoverable metals (including mercury), nutrients, total organic carbon, total sulphur, PAH and particle size distribution. In accordance with the *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (MoE 2012) the fine sediment fraction (<63 µm) was analyzed for metals.

Table 3. Locations of stream sediment sampling sites within the Lara Property.

Study Area	Site	UTM (10 U)
Chipman Creek	CHI D/S	E. 432022 N. 5410636
Solly Creek	SOL D/S	E. 436735 N 5409790

2.2.1.3 Hydrology

Hydrometric monitoring stations were established in Solly Creek and Chipman Creek on October 10, 2014: (APPENDIX A – Map 2). Both stations are located in close proximity to the Chemainus mainline logging road for easy access. Each station is equipped with a Solinst Levellogger Edge in a steel stilling well and a Solinst Barologger Edge in a PVC enclosure attached to a tree on the adjacent bank (see photos below). Two permanent benchmarks were installed in bedrock or large boulders at each site for hydrometric leveling surveys to be completed during each site visit.

Instantaneous discharge measurements were collected in both streams on October 10, 2014 using a Swoffer 2100 current meter. A site visit was completed to download the dataloggers and conduct additional discharge measurements using a Swoffer meter and salt dilution tracer tests on December 17, 2014.

2.2.1.4 Fish and Fish Habitat

Fish presence/absence surveys were conducted on major watercourses within the Lara Property mineral claim to fill data gaps in existing fish distribution information. Fish sampling was conducted on a total of 9 streams within the Lara Property mineral claim, and included streams within the Chipman Creek, Solly Creek, Humbird Creek and Holyoak watersheds.

Detailed stream assessments were conducted at 16 sites on a total of 11 different streams between November 12 and November 14, 2014. Field assessments involved ground-truthing and/or documenting known or potential fish barriers or points of difficulty to upstream fish migration. Locations of barriers and/or potential points of difficulty for upstream were added or adjusted as necessary (APPENDIX A – Map 3). Biophysical data (i.e., bank characteristics, confinement, vegetation structure, channel width, gradient, depth, bed material and cover) were then collected at representative sites within each stream. Data were recorded on RISC 1:20,000 Fish and Fish Habitat Inventory Standards Site Cards (RISC 2001) and Fish Collection Forms.

Electrofishing was utilized as the primary method to determine fish presence/absence and distribution, with supplementary information provided through minnow trapping.

All electrofishing utilized a Smith-Root Inc. backpack electrofisher model 12A-POW. The electrofisher settings were set at an electrical potential of 500 to 600 V, a frequency of 60 Hz, and a maximum pulse width of 6 ms.

Minnow trapping was conducted with Gee-style minnow traps with 6.4 mm mesh and baited using preserved salmon roe. Detailed information regarding the sampling dates, locations, conditions, and effort for electrofishing and minnow trapping can be found in APPENDIX D. Captured fish were identified to species, enumerated, and measured for fork length.

Due to the difficulty in differentiating between steelhead/rainbow trout (*Oncorhynchus mykiss*) and cutthroat trout (*Oncorhynchus clarki*) with fork lengths less than 50 mm under field conditions (McPhail 1997), fry (<50 mm length) from these taxa were sometimes collectively identified as trout.

2.2.2 TERRESTRIAL RESOURCES

Terrestrial field methods consisted of multi-focus field plots and encounter transects. Encounter transects were conducted on foot or by vehicle to assess the general nature of the study area while field plots included more detailed information collection. The objective of terrestrial field studies was to both determine the general characteristics of the study area and to identify any potential occurrences of focal ecological communities, at-risk plant or animal species or their habitat. In all cases, the priority was to assess as much of the study area as possible. In order to complete this objective, some sites with poor access such as Coronation Peak were not assessed in the field. This approach allowed a broader area to be assessed. All terrestrial field assessments were designed at the presence / not-detected survey level. That is, non-detection was not considered to be confirmation of absence of a species or ecological community.

2.2.2.1 Ecological Communities

Ecological communities were assessed in the field mainly using encounter transects with field plots where necessary. Encounter transects included photographs, GPS waypoints and field notes of general ecological conditions while field plots included the collection of species and vegetation structure characteristics. The latter can be considered consistent with terrestrial ecosystem mapping (TEM) visual field confirmation plots.

High-value sites with potential for red- or blue-listed ecological community occurrence were identified prior to field assessment and were the focus of field assessment. Any OGMAs, WHAs or UWRs within or adjacent to the Lara Property claims were also considered high-value sites and were assessed where practicable.

2.2.2.2 Vegetation

The focus of vegetation field studies was to characterize general vegetation conditions across the study area and to identify any occurrences of red- or blue-listed plant species where possible. This was mainly accomplished with encounter transects on foot but also included field plots. Areas of previously confirmed occurrences of listed plant species were the primary foci of rare plant searches but they also included sites outside these areas. Only indicator plant species or listed plant species, when encountered, were recorded. Where listed plant species were encountered, more detailed information was collected such as all indicator moss, herb, shrub and tree species, percent cover for each structural layer, structural stage, typical height and diameter of dominant tree layer, slope and aspect. Due to the season, some annual herbs could not be identified.

2.2.2.3 Wildlife

Wildlife field studies mainly consisted of encounter transects to identify suitable habitat for focal species and any sign that may be evident such as trails, beds or markings. Focal taxa or species were those with well-defined habitat associations or evident habitat features such as Roosevelt elk (*Cervus elaphus*), blacktailed deer (*Odocoileus hemionus*), black bear (*Ursus americanus*), marbled murrelet (*Brachyramphus marmoratus*), northern goshawk (*Accipter gentilis laingii*), amphibians and cavity-nesting birds.

3 RESULTS

3.1 LAND USE AND TENURE

The project lies within the traditional territory of several First Nations in the Hul'qumi'num Treaty Group which includes the following Nations: Cowichan Tribes, Chemainus (Stz'uminus) First Nation, Lyackson First Nation, Penelakut Tribe, Halalt First Nation and Lake Cowichan First Nation. The Snuneymuxw First Nation, which is not included in the treaty group, also indicate that the property lies within their traditional area.

The Lara Property consists of 47 mineral claims on the north side of the Chemainus River within privately managed forest lands primarily owned by Timberwest and Island Timberlands LP. Some Crown land is also present. Notable waterbodies within or adjacent to the Lara Property include the Chemainus River, Chipman Creek, Silver and Holy Oak Lakes and their associated outlet streams. In addition to both lakes being fish bearing, Holy Oak is also a community watershed which is used to supplement drinking water to the Municipality of North Cowichan's Banon Creek water supply between June 15 and October 15 annually. Further details on aquatic and fish resources are provided in Sections 3.1.4 to 3.1.6 and 3.2.1. Access to the area is via the Chemainus River mainline forestry road which is controlled by Island Timberlands at a gatehouse at the start of the road. There is a BC Hydro line right-of-way which runs approximately north to south throughout the Lara property. Based on observations of the vegetation there appears to be a Christmas tree lease on the right of way although this could not be confirmed. An additional non-recreational activity in the property includes the repeater station located on Mount Brenton which is owned and maintained by the Cowichan Valley Amateur Radio Society. During the field surveys several individuals harvesting salal and tree bows/limbs for commercial sale were noted along the Holyoak Lake access road. Some sections of the property lie within the area for registered trapline #TR0105T317.

The area is also well used for outdoor recreation. While access is restricted on the weekdays it is open to public use on the weekends. The public is required to sign-in at the gatehouse which is manned by a private security firm on the weekends. Overnight use of the area is not permitted. The Mid-Island Sno-blazers snowmobile club and other snowmobile enthusiasts frequent the Holyoak Lake area in the winter due to its typically abundant snowpack. There is a rough snow-mobile shelter located in a clearing near the lake. Other winter activities observed at the lake include ice-fishing during periods when the ice cover is sufficient (I. Redden, personal observation). A cross country ski lodge was present near the outlet of Silver Lake until sometime in the 1980s at which time it was burned down. Other activity includes fishing at both Silver and Holyoak lakes when the lakes are ice-free. A small, rough cabin is present along the shore of Silver Lake and cab only be accessed by foot. Fishing is also common in the Chemainus River and in lower Solly and Chipman Creeks along the Chemainus mainline logging road. The area is closed to ATV use however they have been known to access from other road networks thus avoiding the main access gate on the Chemainus Mainline. During the fall months the area is popular for hunting of deer, grouse and bear (which can also be hunted in the spring).

There are three OGMAs within the Lara Property (APPENDIX A – Map 4). In addition, one WHA for marbled murrelet (*Brachyramphus marmoratus*) as well as five UWR areas for black-tailed deer (*Odocoileus hemionus*) are situated within the Lara Property (APPENDIX A – Map 5). Another marbled murrelet WHA as well as two UWR for Roosevelt elk (*Cervus elaphus*) exist adjacent to the Chemainus River, approximately 1 km east and 1.5 km south of the Property, respectively. Chemainus River Provincial Park is located approximately 500m to the south of the Lara property. Further details on terrestrial vegetation and wildlife resources are provided in Sections 3.1.7 and 3.2.2.

3.2 CLIMATE

The Cowichan Lake Forestry weather station located near Cowichan Lake BC (177 m ASL), approximately 13 km southwest of Lara Property, provides historical context for weather statistics in the region (Government of Canada 2015). However, it should be noted that portions of the Lara Property exceed elevations of 1,000 m and variations in climate can be expected based on elevational differences. Based on the 1981 – 2010 climate normal, average annual precipitation at the weather station is 2,210 mm, including 2,207 mm of rain and 97 cm of snow (Figure 1). During some winters several feet of snow can accumulate at Holyoak Lake. August is the warmest month with a mean daily temperature of 18.2°C and mean daily maximum of 24.7°C, while December is the coldest with a mean daily temperature of 2.9°C and average daily minimum of 0.4°C. July is the driest month with an average of 36.6 mm precipitation while November has the highest at 390 mm (Government of Canada 2015).

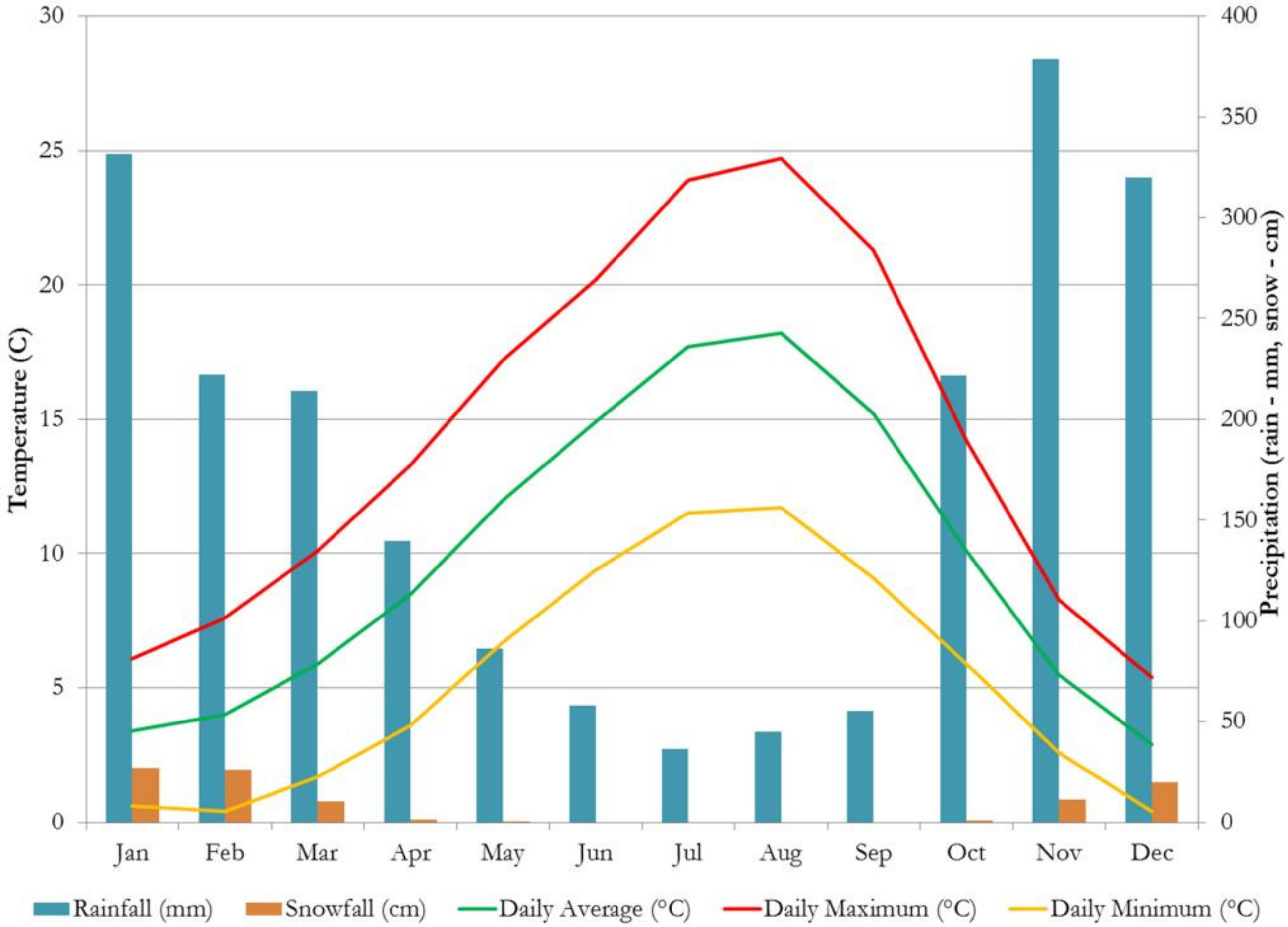


Figure 1. Climate normals for Cowichan Lake Forestry weather station (1981-2010) (Source: Government of Canada 2015).

3.3 AIR QUALITY

Canadian Ambient Air Quality Standards (CAAQS) are the standards for air quality management across Canada under the Air Quality Management System (AQMS). Currently, standards have been developed for fine particulate matter ($PM_{2.5}$) and ozone. The CAAQS for $PM_{2.5}$ and ozone were established as objectives under the Canadian Environmental Protection Act 1999, in May 2013 and replace the Canada-wide Standards for Particulate Matter and Ozone (Table 4, CCME 2014). CAAQS for nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) are under development but not expected to be finalized until late 2015 at the earliest.

Table 4. Fine Particulate Matter (PM2.5) and Ozone CAAQS (Source: CCME 2014).

Pollutant	Averaging time	Standards (concentration)		Metric
		2015	2020	
$PM_{2.5}$	24-hour (calendar day)	28 µg/m³	27 µg/m³	The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations
$PM_{2.5}$	annual (calendar year)	10.0 µg/m³	8.8 µg/m³	The 3-year average of the annual average concentrations
Ozone	8-hour	63 ppb	62 ppb	The 3-year average of the annual 4th- highest daily maximum 8-hour average concentrations.

In absence of federal standards for NO_2 and SO_2, the provincial government has established new standards for NO_2 and SO_2, using objectives that reflect the current state of science, interim ambient air quality objectives (IAAQOs) (Table 5). These standards replace previous provincial and national objectives used in BC (MoE 2014).

Table 5. Summary of new provincial IAAQOs for NO2 and SO2 (Source: MoE 2014).

Criteria	Averaging period	Level	Metric
NO_2	1-hour	100 ppb	Daily 1-hour maximum, annual 98th percentile value, over one year
SO_2	1-hour	75 ppb	Daily 1-hour maximum, annual 98th percentile value, over one year

Furthermore, under AQMS air quality is managed locally in air zones within each province and territory to ensure proactive measures are taken to protect air quality in accordance with the principles of continuous improvement and keeping clean areas clean (Table 6, CCME 2014).

The Lara property is located within the Georgia Basin airshed. This airshed is part of the Georgia Basin/Puget Sound airshed which straddles the border of Canada and the United States, along the west coast. Canadian and U.S. government agencies are taking numerous actions to reduce air pollution and its impacts in this region, under the Georgia Basin/Puget Sound International Airshed Strategy (Province of BC 2015).

Table 6. Air Management Threshold Values and Actions (Source: CCME 2014).

Management Level	Management Actions	Air Management Threshold Values					
		Ozone (ppb)		$PM_{2.5}$ Annual (µg/m³)		$PM_{2.5}$ 24 hr (µg/m³)	
		2015	2020	2015	2020	2015	2020
Red	Actions for Achieving Air Zone CAAQS						
	Threshold	63	62	10.0	8.8	28	27
Orange	Actions for Preventing CAAQS Exceedance						
	Threshold	56		6.4		19	
Yellow	Actions for Preventing Air Quality Deterioration						
	Threshold	50		4.0		10	
Green	Actions for Keeping Clean Areas Clean						

The primary targets influencing the air quality of the Lara property are the sawmills and industrial operations along the Trans-Canada Highway near the head of the Chemainus Forestry Road (6 km from the study area), and the Crofton Pulp Mill (13 km to the south-east of the study area). Fugitive dust from local logging roads may also influence air quality to some degree.

Existing information on regional air quality was obtained from two studies based on the Crofton Pulp Mill. It should be noted that guidelines and standards referred to in these reports were based on those available at the time of reporting and may not meet current standards. A summary of the results of each of these studies is presented below:

- *Baseline Air Quality Modelling and Human Health Risk Assessment Current Day Emission from NorskeCanada Crofton Division -Volume I: Air Quality Modeling and Volume II: Human Health Risk Assessment* – Jacques Whitford Limited 2004
    - Concentrations of PM_{10} and total reduced sulfur (TRS) routinely monitored at the three monitoring stations indicated that no chronic or acute adverse health effects are expected as a result of exposure to measured concentrations.
    - Of the numerous substances modeled the majority had concentrations that were either below guidelines or toxicity reference values applicable to individual substances.
    - Hydrogen chloride (HCl), mono-nitrogen oxides (NOx), and SO_2 had concentrations at some receptors that exceeded health based guidelines. Further examination of each of these compounds revealed that it is unlikely that exposure to any of these substances in the local air shed would result in adverse health effects. However, adverse effects could not be entirely ruled out for SO_2.
    - Modelled concentrations of hydrogen sulfide (H_2S) near field to the Crofton Division exceeded health based toxicity reference values. Further examination of the areas of exceedance indicates that the model is likely overestimating H_2S concentrations. However, adverse acute and chronic health effects from exposure to H_2S for residents living close to the mill could not be ruled out.

  - Dispersion model predicts ambient H_2S can occur up to 20-30 km to the south of the mill.

- *Air Quality Modelling of the Catalyst Paper Crofton Pulp Mill* – RWDI AIR Inc. 2009

  - Modelling of the mill emissions showed that the air quality is frequently impacted by TRS concentrations exceeding BC air quality objectives. In the immediate area around the mill, exceedances of the 24-hour TRS Level A objective are predicted to occur for over 60% of the days of the year. In Crofton, the 24-hour Level A exceedances are predicted to comprise between 10% and 40% of the days of the year, and most of the outlying regions around Crofton are predicted to have exceedance frequencies greater than 10% of the days of the year.
  - Model results indicate that the study area may be impacted occasionally by chlorine dioxide (ClO_2) ambient concentrations exceeding the Alberta one-hour air quality objective of 28 μg/m. Maximum levels predicted for the Crofton area are over five times higher than the objective (>160 μg/m), and exceedances occur approximately 1% to 4% of the time in the Crofton area. Since ClO_2 breaks down very quickly when exposed to sunlight, most of the exceedances would occur at night. Note that the modelling for ClO_2 was based on the maximum continuous emission monitoring data, which exceeded the permitted emission limits.
  - Modelling of total suspended particulate matter (TSP) emissions from the mill showed that most of the impact is from point sources rather than fugitive sources. Maximum predicted concentrations are less than the 150 μg/m BC Level A TSP objective, even when the calculated background level of 23 μg/m is added to the modelled results.
  - Modelling of ambient air concentrations of polychlorinated dibenzodioxins and dibenzofurans (PCDD/DFs) from mill emissions resulted in maximum predicted values that are relatively low. For the half-hour and 24-hour averaging periods, the maximum concentrations of PCDD/DFs were predicted in the Crofton area, at the Tsussie Indian Reserve and on Maple Mountain, at levels approximately 1.3% of the Ontario half-hour guideline and 0.5% of the Ontario 24-hour guideline.

Based on the windrose for the Crofton Pulp Mill and vicinity included in Jacques Whitford 2004 and RWDI AIR 2009, winds tend to blow from the Crofton Mill to the west and south-southeast, at times towards the Lara Property (Figure 2).

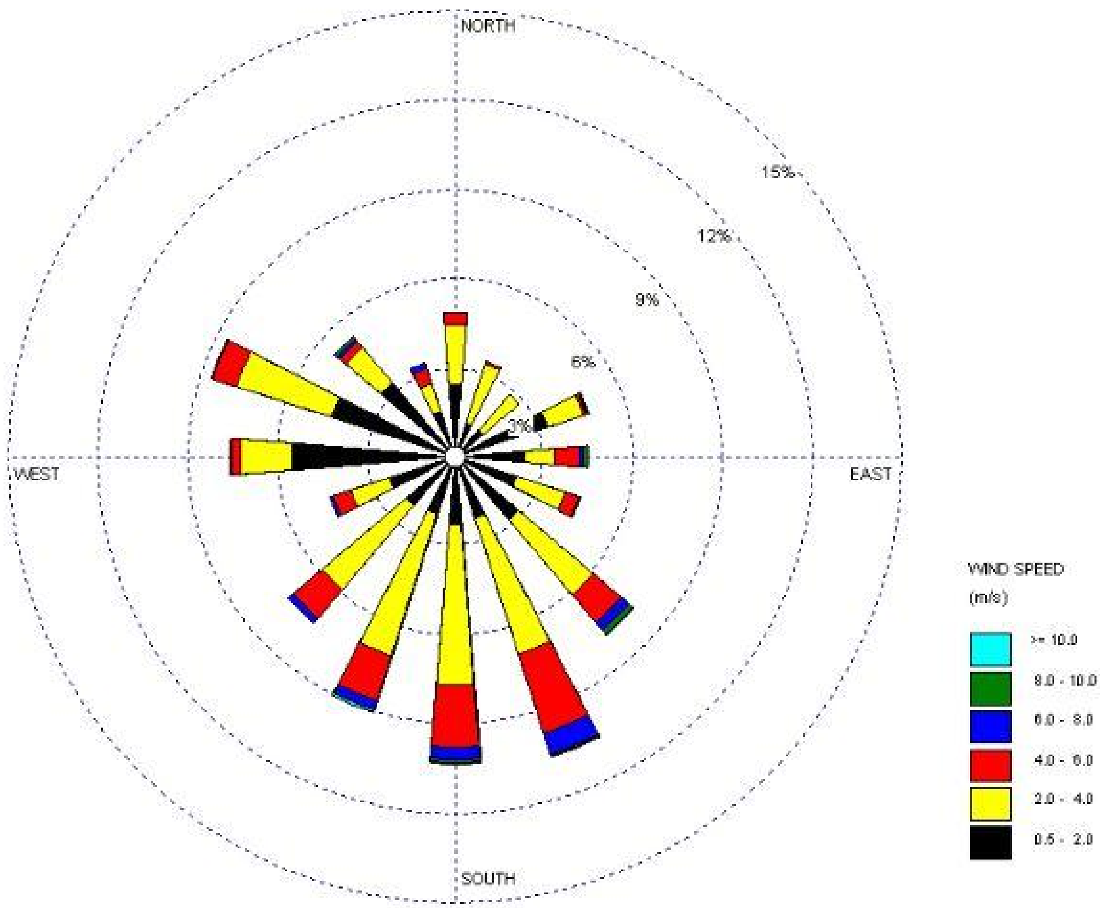


Figure 2. Wind Rose at the Crofton Pulp Mill based on CALMET Output (Source: RWDI AIR 2009.

3.4 FISHERIES AND AQUATIC RESOURCES

3.4.1 SURFACE WATER QUALITY

3.4.1.1 Desktop Analysis

Water quality data were unavailable for the majority of the creeks within the watersheds adjacent to the Lara Property. Long-term water quality data is also lacking for Chemainus River for most elements however a set of data does exist from the provincial Environmental Monitoring System (EMS), which includes spot measurements taken near Highway #1 at various times of the year from 1986 through 2001 (Hatfield 2007, Table 7).

Table 7. Summary of available water quality data for Chemainus River from provincial EMS records (1986 to 2001).

Parameter	Minimum	Maximum	Average
pH	6.4	7.7	7.2
Alkalinity (mg/L)	9.7	28.6	15.4
Total Phosphorus (mg/L)	0.003	0.1	0.029
Ammonia (mg/L)	0.005	0.01	0.0057
Nitrate + Nitrite Dissolved (mg/L)	0.02	0.19	0.0771

Furthermore, the Banon Creek Reservoir is known to experience water quality problems, particularly in winter months when suspended matter (organic and silt particles) is carried into the reservoir during heavy rain events, increasing turbidity levels in the reservoir (EAO 2009). Detailed water quality data may be available from the Municipality of North Cowichan for the Banon Creek Reservoir.

With respect to the Lara Property, a water quality sampling program was conducted from September 1988 to May 1995 in relation to an underground exploration program. Sampling occurred at a range of sites including the adit, upper and lower Solly Creek, the monitoring pond and ore pile and included results for total metals, pH, dissolved anions and dissolved metals.

3.4.1.2 Field Results

Water quality in Solly and Chipman Creek remained relatively consistent between upstream and downstream sites (Table 8). Most of the parameters were well within applicable water quality guidelines and many were at or below minimum detectable limits. Duplicate samples have been omitted from the summary as no issues were identified in the QA/QC program. Results for each water quality parameter, including comparison to regional norms, are discussed in the paragraphs below. Full water quality analytical results are provided in APPENDIX E.

Surface waters were cold and clear with average temperatures of 6.1ºC to 6.5ºC on November 28, 2014. Water samples taken at all locations had low concentrations of total suspended solids (Appendix D) and very low turbidity (≤ 1 NTU).

In-situ dissolved oxygen measurements were relatively consistent across all sites and sampling locations and ranged from 11.9 to 12.3 mg/L (Table 8) The *BC Water Quality Guidelines* (BCWQGs) recommend an instantaneous minimum of 9 mg/L for buried embryo/alevin life stages and 5 mg/L for all other life stages of fish (MOE 1997b).

Average pH values were near neutral for *in situ* and laboratory measurements for both Chipman Creek and Solly Creek (7.0 and 6.9 respectively) (Table 8). A pH of 6.5 is the lowest recommended pH value for the protection of aquatic life (MoE 2010).

Specific conductivity for the Chipman Creek and Solly Creek watersheds are in the 16 –24 μS/cm range; values that are moderately low relative to other coastal BC streams, which have average values of around 100 μS/cm (RISC 1998), and very low relative to interior BC streams, which can have conductivities up to 500 μS/cm (RISC 1998). Low ion/salt concentrations, as indicated by the low conductivity measurements, are indicative of the low values observed for alkalinity, hardness and nutrient concentrations in both watercourses.

Table 8. Summary of in-situ water quality sampling results for Chipman Creek and Solly Creek, collected on November 28, 2014.

Parameter	Site			
	CHI-DS	CHI-US	SOL-DS	SOL-US
Dissolved Oxygen (mg/L)	12.22	11.92	12.35	12.15
Dissolved Oxygen (%)	104.8	103.2	104.5	105.1
pH	6.882	7.072	6.805	6.995
Temperature (°C)	6.9	6.2	6.7	5.5
BP (Mbar)	211	202	212	202
Conductivity (μs/cm) (compensated)	23.7	22.8	18	16.4
TDS (mg/L)	24	23	18	16
Salinity (sal)	0	0	0	0

Laboratory results indicated that total alkalinity (as $CaCO_3$) ranged from 7.15 mg/L to 8.11 mg/L for samples collected in Chipman Creek and 4.42 mg/L to 6.19 mg/L for Solly Creek samples (APPENDIX E). Alkalinity is the measurement of waters' ability to neutralize acids. Alkalinity values in coastal areas of British Columbia typically range from 0 to 10 mg/L (RISC 1998). Alkalinity in the 0 to 10 mg/L range, as observed for Chipman and Solly Creeks, indicates a high sensitivity to acid inputs due to a low buffering capacity (RISC 1998).

Laboratory measurements of nutrients indicate that the sites are oligotrophic (i.e., have low productivity) with phosphorus likely the primary limiting nutrient. Concentrations of biologically available phosphorus (measured as orthophosphate) for Solly Creek and Chipman Creek ranged from <0.001 to 0.0019 mg/L respectively, while concentrations of biologically available nitrogen (ammonia plus nitrate) ranged from 0.086 to 0.0.089 mg/L and 0.116 to 0.123 mg/L respectively (APPENDIX E). Ratios of bio-available nitrogen to phosphorus of greater than 10 indicate that phosphorus limits primary production (Horne and Goldman 1994). Waterbodies with total phosphorus concentrations of less than 0.010 mg/L are considered oligotrophic (RISC 1998).

Total metals concentrations were at levels within applicable water quality guidelines and many were present below analytical detection limits (APPENDIX E). Total hardness (as $CaCO_3$), a measure of the concentration of divalent metals ions (mostly Ca^{2+} and Mg^{2+}), ranged from 5.88 to 9.66 mg/L. Waters with total hardness less than 60 mg/L are considered soft (RISC 1998). Water hardness can reduce the toxicity of some metals.

3.4.2 SEDIMENT

Sediment samples were collected by EDI on November 28, 2014 at both downstream water quality sampling locations in Chipman Creek and Solly Creek (APPENDIX A -Map 3). A summary of the sediment sampling results is provided below (Table 9) while detailed laboratory results are presented in Appendix D. Duplicate samples have been omitted from the summary results as no concerns were identified in the QA/QC program.

Lab analyses show total metal concentrations were primarily within the applicable provincial working guidelines for sediments (MoE 2006) though guidelines are not available for many metals. For certain metals the provincial guidelines are based on the Canadian Interim Sediment Quality Guidelines (ISQG) and Probable Effect Levels (PEL) (CCME 2001). The PEL is defined as the level above which adverse effects are expected to occur frequently.

Table 9. Summary of sediment metals analysis for Chipman Creek and Solly Creek, collected on November 28, 2014.

Parameter	Units	RDL	Guidelines[a] (ug/g)	SOL D/S 1	SOL D/S 2	CHI D/S 1	CHI D/S 2
Total Aluminum (Al)	mg/kg	100	None	23900	22800	21500	21700
Total Antimony (Sb)	mg/kg	0.10	None	0.58	0.62	0.34	0.34
Total Arsenic (As)	mg/kg	0.50	5.9 ISQG[b] 42 PEL[c]	**20.5**	**18.0**	**6.07**	**6.30**
Total Barium (Ba)	mg/kg	0.10	None	182	176	138	141
Total Beryllium (Be)	mg/kg	0.40	None	0.42	0.43	<0.40	0.41
Total Bismuth (Bi)	mg/kg	0.10	None	0.13	0.12	<0.10	<0.10
Total Cadmium (Cd)	mg/kg	0.050	0.6 ISQG 3.5 PEL	0.277	0.292	0.216	0.205
Total Calcium (Ca)	mg/kg	100	None	5530	6250	6240	6000
Total Chromium (Cr)	mg/kg	1.0	37.3 ISQG 90 PEL	153	104	107	143
Total Cobalt (Co)	mg/kg	0.30	None	21.8	21.1	19.4	18.8
Total Copper (Cu)	mg/kg	0.50	35.7 ISQG 197 PEL	**77.4**	**75.4**	**71.5**	**71.3**
Total Iron (Fe)	mg/kg	100	<21,200[d] <43,766[e]	41900	42300	**51200**	**48900**
Total Lead (Pb)	mg/kg	0.10	35 ISQG 91 PEL	7.78	8.64	4.92	4.97
Total Lithium (Li)	mg/kg	5.0	None	18.1	17.6	17.1	17.0
Total Magnesium (Mg)	mg/kg	100	None	10000	9610	10100	9750
Total Manganese (Mn)	mg/kg	0.20	460[d] 1100 [e]	**882**	**794**	**695**	**680**
Total Mercury (Hg)	mg/kg	0.050	0.170 ISQG 0.486 PEL	0.080	0.088	<0.050	0.056
Total Molybdenum (Mo)	mg/kg	0.10	None	7.49	3.57	1.92	2.01

Parameter	Units	RDL	Guidelines[a] (ug/g)	SOL D/S 1	SOL D/S 2	CHI D/S 1	CHI D/S 2
Total Nickel (Ni)	mg/kg	0.80	16[d] to 75[e]	**103**	**69.9**	**50.2**	**76.8**
Total Phosphorus (P)	mg/kg	10	None	915	897	843	837
Total Potassium (K)	mg/kg	100	None	675	655	665	640
Total Selenium (Se)	mg/kg	0.50	2	0.63	0.63	<0.50	<0.50
Total Silver (Ag)	mg/kg	0.050	0.5[f]	0.089	0.107	0.062	0.088
Total Sodium (Na)	mg/kg	100	None	233	244	232	224
Total Strontium (Sr)	mg/kg	0.10	None	30.2	31.6	32.6	32.6
Total Thallium (Tl)	mg/kg	0.050	None	<0.050	<0.050	<0.050	<0.050
Total Tin (Sn)	mg/kg	0.10	None	0.55	0.79	0.52	0.57
Total Titanium (Ti)	mg/kg	1.0	None	1090	1220	1550	1470
Total Uranium (U)	mg/kg	0.050	None	0.417	0.411	0.471	0.465
Total Vanadium (V)	mg/kg	2.0	None	97.5	108	159	149
Total Zinc (Zn)	mg/kg	1.0	123 ISQG 315 PEL	92.9	90.2	66.0	65.6
Total Zirconium (Zr)	mg/kg	0.50	None	2.01	2.05	2.07	2.05

[a] Based on the British Columbia *Working Sediment Quality Guidelines* (MoE 2006). Expressed in ug/g. No conversion required between Mg/kg and ug/g. [b] Interim Sediment Quality Guideline - CCME. [c] Probable Effect Level - CCME. [d] Lowest effect level based on screening level concentration (MOE 2006) [e] Severe effect level based on screening level concentration (MOE 2006). [f] Ontario guideline

Total Arsenic concentrations measured in Solly Creek were above the ISQG, but were well below the PEL. In relation, arsenic concentrations in Chipman Creek were relatively low and only slightly exceeded the ISQG. Total copper exceeded the ISQG in all samples collected in both Solly and Chipman Creek, but remained well below the PEL. Manganese levels in both Chipman Creek and Solly Creek exceeded the Severe Effects Level, which is the maximum concentration of substances that protect only a specified fraction of individuals from lethal effects based on screening level concentrations. Total Nickel exceeded the Severe Effect Level in both Chipman and Solly Creeks.

It is not uncommon to observed elevated metal concentrations from sediments in highly mineralized areas. These values likely characterize natural baseline conditions in these watersheds, and probably do not represent contamination or pollution.

3.4.3 HYDROLOGY

3.4.3.1 Desktop Analysis

Hydrologic data is available for the Chemainus River, which has a stream length of 62 km and watershed area of 378 km^2 (Hatfield 2007), using data from a long-term Water Survey of Canada station located on the Chemainus River near Westholme (08HA001). This station has discharge records for the years 1914 to 1917 and 1952 to 2015. Figure 3 depicts mean monthly discharges of 19.0m^3/s (Government of Canada 2014). The hydrograph is influenced mainly by winter rainfall events and dry summers, with a base flow period extending from July to September (Kay and Blecic 1996).

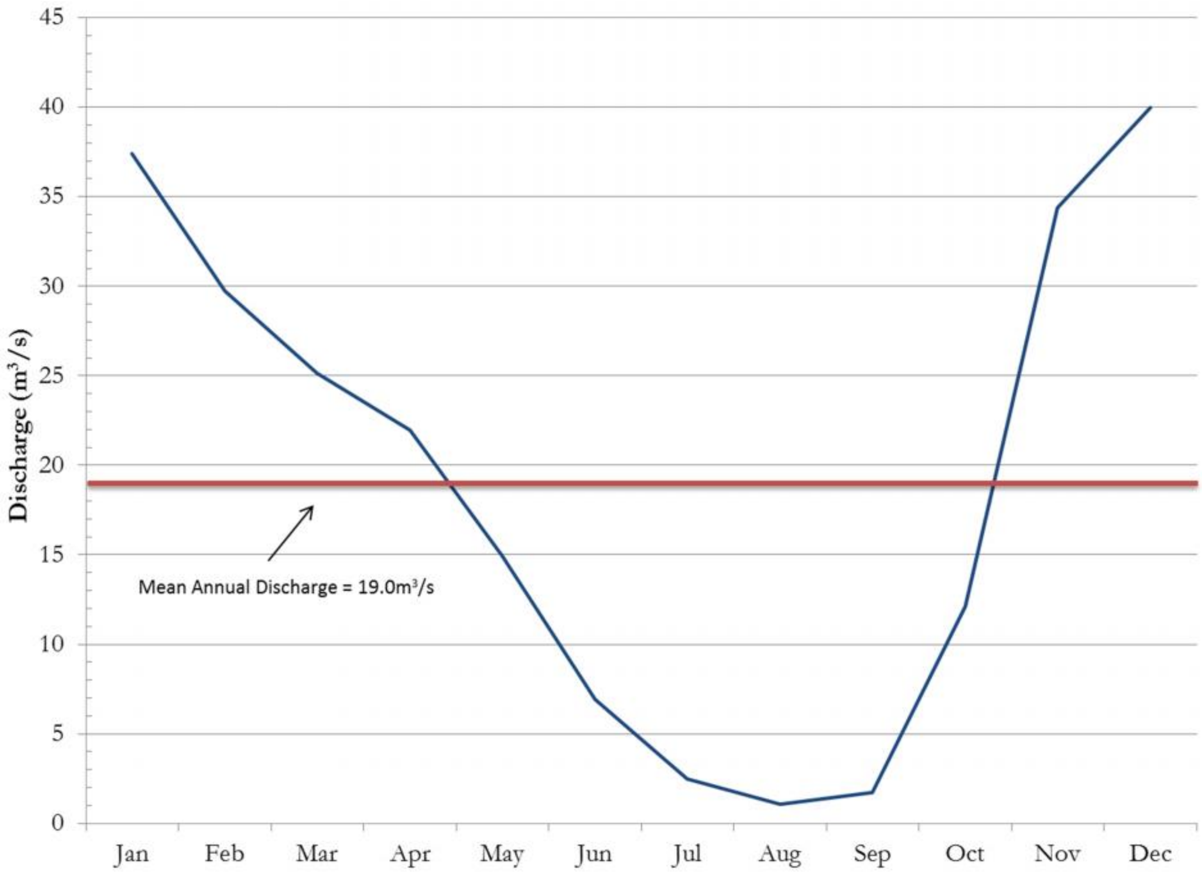


Figure 3. Mean monthly discharge for the Chemainus River based on long-term Water Survey of Canada station data (1914-1917 and 1952-2012).

3.4.3.2 Field Results

As previously discussed hydrometric stations were installed on Solly and Chipman Creeks for this project on October 14, 2014 and re-visited and downloaded on December 17, 2014. Instantaneous discharge was measured during both site visits and is discussed for each station below. Several storm events were captured on the stage records between the two dates.

3.4.3.2.1 Solly Creek

The station at Solly Creek was found to be in good condition and the stage data were successfully downloaded from the logging equipment on December 17, 2014 (Figure 4). Discharge was measured using a current meter (Swoffer 2100) on October 10, 2014 and using a current meter and the salt-dilution method on December 17, 2014 (Table 10). The two methods provided similar results. A preliminary rating curve was developed (Figure 5).

Table 10. Instantaneous discharge measurements at Solly Creek.

Date	Time	Stage (m)	Method *	Discharge (m^3/s)
10-Oct-14	11:45	0.52	CM	0.02
17-Dec-14	14:00	0.82	CM	1.02
17-Dec-14	14:00	0.82	SD	1.06

** CM – Current Meter, SD – Salt Dilution*

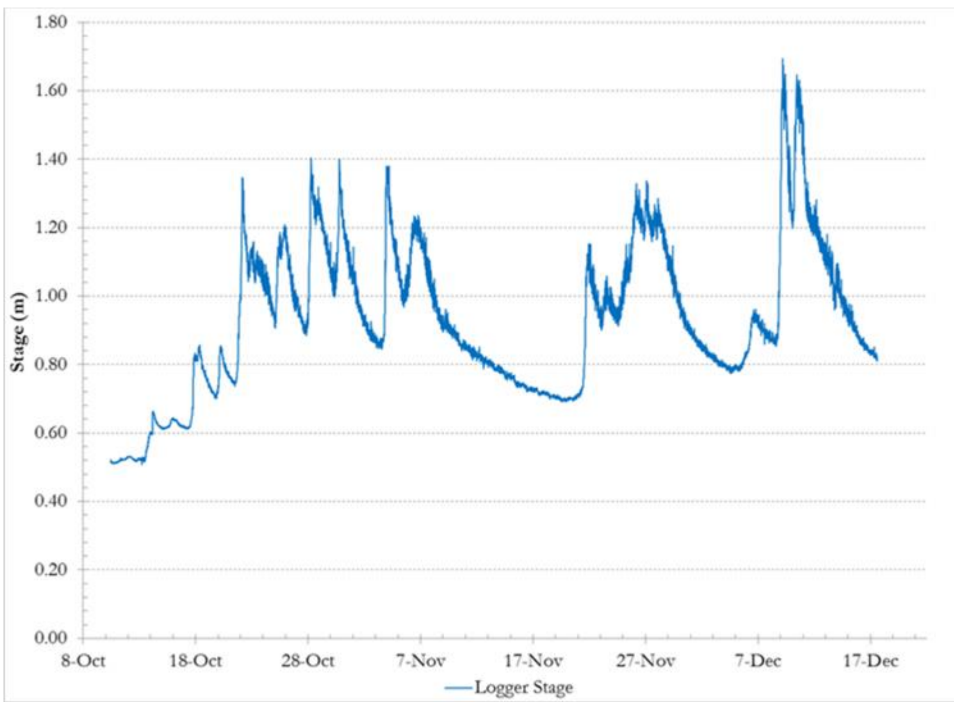


Figure 4. Compensated stage data from the Solly Creek Hydrometric station collected between October 10, 2014 and December 17, 2014.

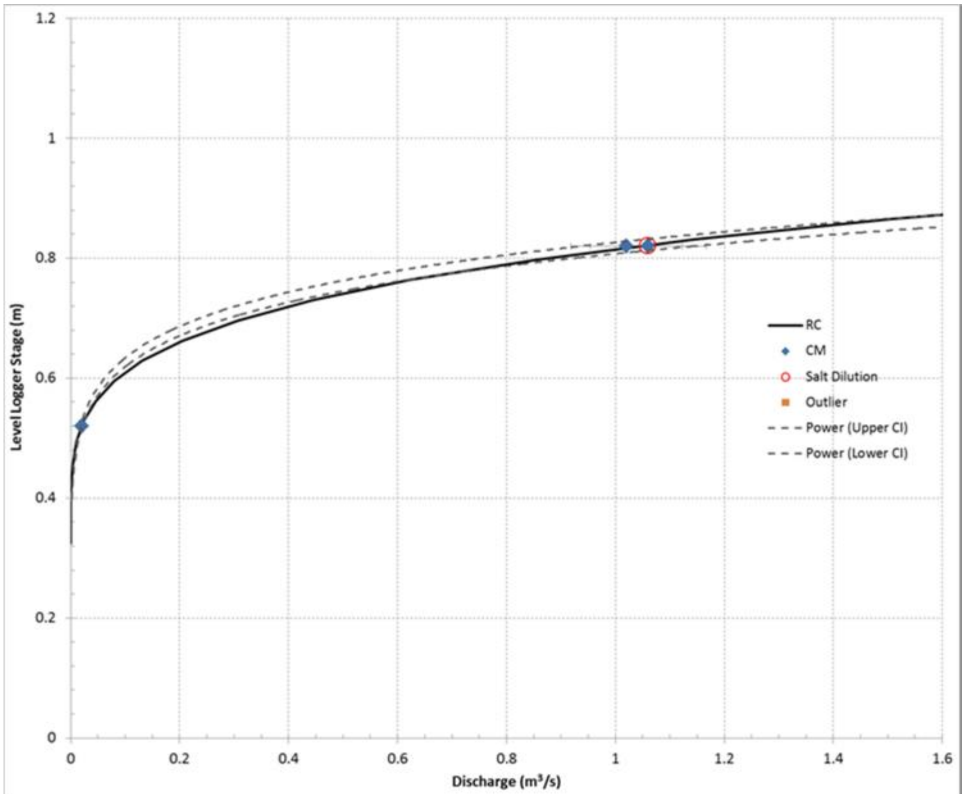


Figure 5. Preliminary rating curve for Solly Creek.

3.4.3.2.2 Chipman Creek

The station at Chipman Creek was found to be in good condition and the stage data was successfully downloaded from the logging equipment on December 17, 2014. Discharge was measured using a current meter on October 10, 2014 and using both a current meter and the salt dilution method on December 17, 2014 (Table 11). The data from the salt dilution indicated that there was likely insufficient mixing of the salt to accurately determine discharge. Therefore only the discharge meter results are presented. The stage record at high flows appears to have higher than expected variability, indicating that the pool where the logger is located may be turbulent at flood flows (Figure 6). This should continue to be monitored following future downloads. A preliminary rating curve was developed for Chipman Creek (Figure 7).

Table 11. Discharge measurements at Chipman Creek.

Date	Time	Stage (m)	Method *	Discharge (m^3/s)
10-Oct-14	16:00	0.47	CM	0.07
17-Dec-14	12:00	0.88	CM	4.05

** CM – Current Meter, SD – Salt Dilution*

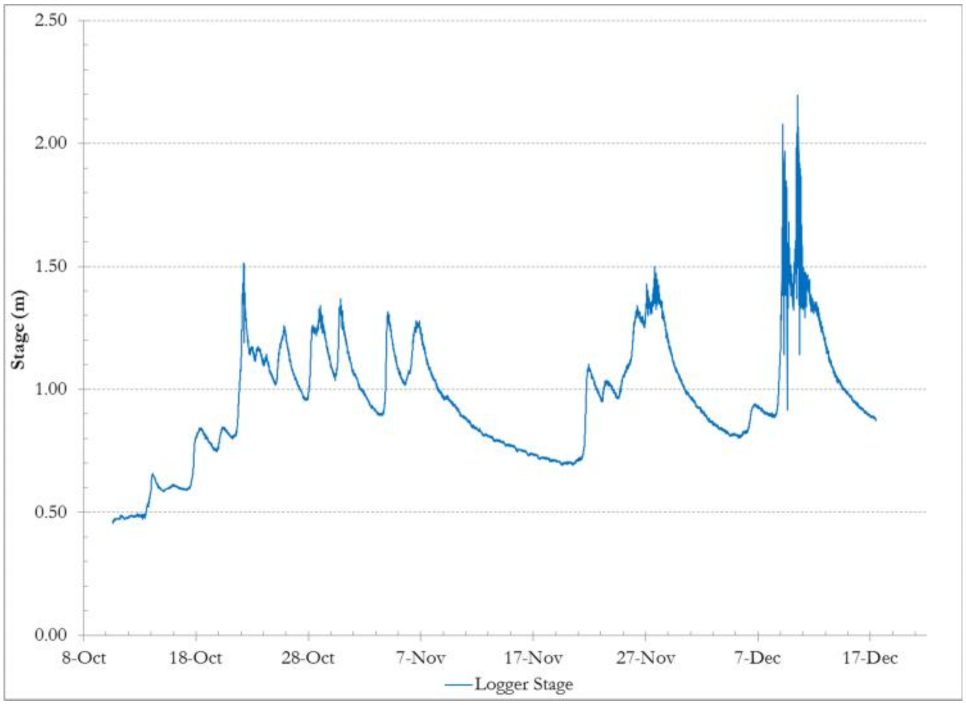


Figure 6. Compensated stage data from the Chipman Creek hydrometric station.

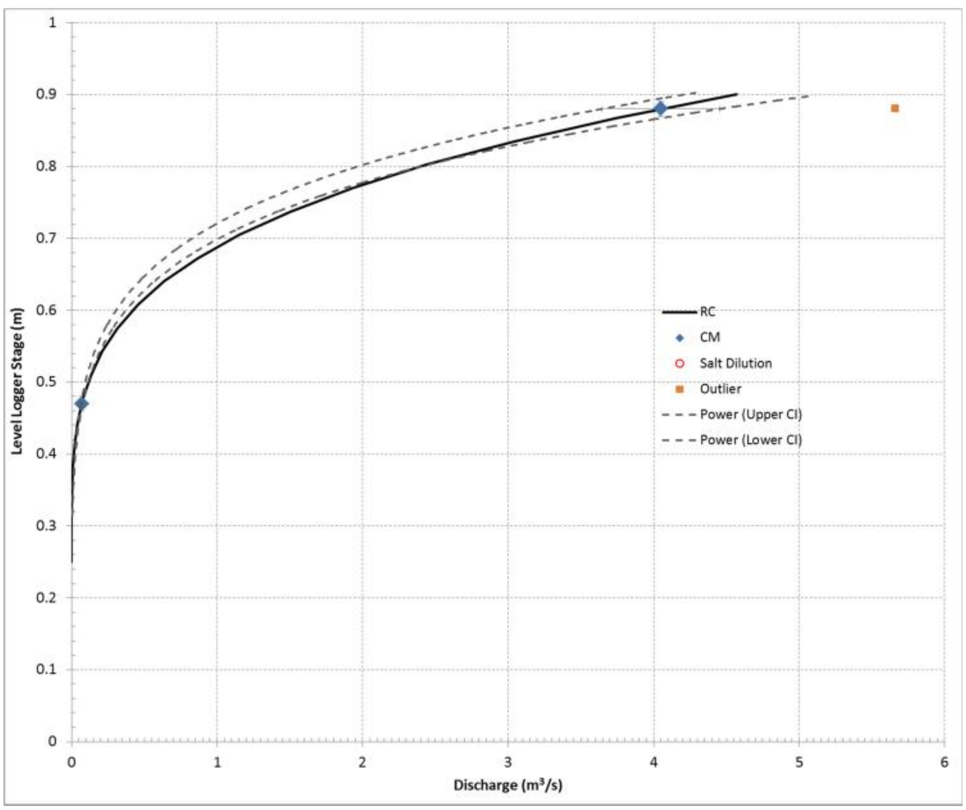


Figure 7. Preliminary Rating Curve for Chipman Creek.

3.4.4 FISH AND FISH HABITAT

The Lara Property claims are drained by several watersheds that flow into the middle reaches of the Chemainus River (APPENDIX A - Maps 2 and 3). Tributary watersheds included in our study area for fish and fish habitat include Holyoak Creek (which includes Holyoak Lake), Humbird Creek, Solly Creek (which includes Silver Lake), and Chipman Creek. Information on fish species composition, distribution and habitat characteristics in the Chemainus River and its tributary watersheds is presented in the following sections.

3.4.4.1 Fish Distribution

The Chemainus River (Watershed Code (WSC) 920-303500) contains a total of seven different fish species including:

- coho salmon (*Oncorhynchus kisutch*)
- Chinook salmon (*Oncorhynchus tshawytscha*)
- pink salmon (*Oncorhynchus gorbuscha*)
- chum salmon (*Oncorhynchus keta)*
- rainbow/steelhead trout (*Oncorhynchus mykiss*)
- cutthroat trout (*Oncorhynchus clarkii*)
- Dolly Varden (*Salvelinus malma*)

Fish distribution and species composition in the Chemainus River and its tributaries is highly influenced by naturally-occurring fish passage obstructions such as waterfalls and cascades, many of which have been documented in previous studies of the watershed. For example, a 2.5 m high falls located on the Chemainus River approximately 1.1 km downstream from the confluence with Holyoak Creek represents the upper limit of Pacific salmon distribution (MoE 2015b, MoE 2015c). However, cutthroat trout and Dolly Varden have been recorded upstream of this feature. In addition, adult steelhead are able to navigate this lower barrier and migrate into the middle and upper reaches of the river. In fact, steelhead is the only species previously recorded in the tributary streams draining the Lara Property claims.

Holyoak Creek

No historical fish records could be found for Holyoak Creek (WSC: 920-303500-26900), although Holyoak Lake is periodically stocked with yearling rainbow trout by Freshwater Fisheries Society of BC. A total of 1,500 rainbow trout were released into Holyoak Lake in 2013.

Holyoak Lake has a surface area of 20.66 ha, a maximum depth of 10 m and a mean depth of 5 m (MoE 2015a, MoE 2015c). The lake acts as a catchment basin for runoff from Mount Brenton to the west and Brenton Lake to the east and is used as a storage reservoir for the North Cowichan Municipality water supply. Both ends of the lake have been dammed. The outlet (Holyoak Creek) historically located on the south end of the lake has been cut off by an earthen dam. In comparison, the outlet at the north end of the lake has been diverted through a dam and control structure and flows into West Banon Creek during drier months to supplement runoff flows (Reitsma 2012). Both dams act as a barrier to fish migration into Holyoak Lake and downstream out of the lake. In addition, rearing and spawning habitat is limited downstream of the West Banon Creek outlet (Webber 1984).

Table 12. Fish passage obstructions within and downstream of the Lara Property.

Waterbody	Location (UTM)			Type	Height (m)	Comment
Chemainus River	10	442559	5414995	Falls	2.5	Upper limit of Pacific salmon distribution
Humbird Creek				Cascade	2.5	
Humbird Creek				Log jam		
Solly Creek				Falls	5	
Chipman Creek				Falls	25	Series of 3 cascades ranging from 5 to 8 m each
Watson Creek				Falls	2.5	

Humbird Creek

Steelhead trout is the only species that has been previously documented in Humbird Creek. Fish distribution in Humbird Creek appears to be obstructed by a 2.5 m high bedrock cascade located approximately 2.1 km upstream from the mouth (Table 12, APPENDIX A -Map 3, APPENDIX B - Photo 9). A second obstruction consisting of a large log jam was observed approximately 75 m downstream of the cascade. It is not known whether there are additional fish passage barriers downstream of this location that further limit fish distribution in Humbird Creek.

Fish sampling was conducted in November 2014 upstream of the cascade (Appendix A -Map 3). No fish were captured or observed but additional sampling would have to be conducted to conclusively determine fish absence.

Solly Creek

Steelhead trout and rainbow trout are the only species that have been previously recorded in the Solly Creek watershed (WSC:920-303500-40800). Previous records report the presence of a 5 m high falls located approximately 1.6 km upstream from the confluence with the Chemainus River (MoE 2015b, MoE 2015c). This feature obstructs upstream fish passage and represents the upper limit of steelhead distribution.

A reconnaissance survey conducted in 1984 found rainbow trout inhabiting Silver Lake. Silver Lake has a surface area of 9.15 ha, a maximum depth of 1.5 m and a mean depth of 0.5 m. There are no stocking records for Silver Lake, indicating that these fish are a resident population isolated by the barrier on Solly Creek. Fish sampling conducted by EDI on Solly Creek near the mouth of Silver Creek (site SOL-02) also resulted in the capture of rainbow trout. The resident rainbow trout are expected to downstream seed from the lake and thus be distributed throughout Silver Creek (Appendix A - Map 3). Fish distribution in the upper reaches of Solly Creek has not yet been confirmed although no fish were captures at the sampling site located near the upper road crossing (site SOL0-01; Appendix A – Map 3).

Chipman Creek

Steelhead trout is the only species that has been previously documented in Chipman Creek (WSC: 920-303500-51200). A 10 m high falls located at the confluence with Chipman Creek and Hayne Creek was historically recorded (MoE 2015b, MoE 2015c) as the upper limit of steelhead distribution in this system. This feature was ground-truthed by EDI in November 2014. Our assessment revealed that this barrier was better described as a series of three consecutive falls, each ranging in height from 5 to 8 m, with a total combined height of approximately 25 m (Photo 1). The location of the feature was adjusted about 200 m upstream of the original reported location (Table 12) and upstream of Hayne Creek. GIS map interpretation and field investigations did not identify any additional barriers downstream from this point (Appendix A - Map 3).

Photo 1. View looking upstream at the 25 m barrier falls, located on Chipman Creek approximately 6.5 km upstream of the confluence with the Chemainus River.

One additional site on Chipman Creek upstream of the barrier was surveyed by EDI for fish presence and fish habitat characterization (Appendix A -Map 3). This sample site was situated approximately 2 km upstream of the falls where the Watson mainline crosses Chipman Creek. A total of 81 seconds of electrofishing at this site resulted in the capture of four trout with fork lengths ranging from 50 mm to 98 mm.

Sampling on lower Hayne Creek (site HAY-01), just upstream of the confluence with Chipman Creek produced captures of trout. Sample sites established by EDI on upper Hayne Creek (site HAY-02) and on Tucker Creek failed to capture fish, although there is insufficient evidence at this point to conclusively determine fish absence at these locations.

Several sample sites were also established in the Watson Creek watershed. Rainbow trout were captured in the lower reaches of Watson Creek (Site WAT 01) and Sowerby Creek (site SOW-01). A 2.5 m high bedrock falls was recorded on Watson Creek about 5 km upstream from the stream mouth (site WAT-03; Table 12, APPENDIX B- Photo 3). This feature may act as a barrier to upstream fish migration. No fish were captured at two separate sample sites that were established upstream of the falls.

3.4.4.2 Fish Habitats

The middle reaches of the Chemainus River in the vicinity of the Lara Property claims provide high quality habitats for steelhead trout, resident rainbow trout, cutthroat trout and Dolly Varden. Photos of representative habitat sites sampled during this project are presented in Appendix D.

Historical and ongoing pressures on the land base from forestry activity, urbanization, agriculture and mining have created extensive bedload movements, sedimentation of fish habitat, and low summer flows that impact fish production. Many southern BC steelhead populations have also been subject to a regime of low marine survival since the late 1990's and current adult returns are about 20-25% of those of the preceding period (MFLNRO 2014). The Chemainus River has been estimated to have the capacity to support 500 to 600 steelhead adults per year. Recent escapement estimates for Chemainus River steelhead are typically less than 50 individuals for both the winter and summer runs. Although steelhead trout are not provincially or federally listed as a species of conservation concern in BC, the Chemainus River steelhead appear to follow similar populations trends observed in other areas of the region.

Watershed restoration efforts from 2004 to 2006 resulted in the placement of rearing habitat complexing structures in the Chemainus River mainstem. Clusters of rock-ballasted large woody debris were placed near the mouth of Humbird Creek and Chipman Creek to develop habitats thought to limit steelhead production and to mitigate for habitat lost during past forest harvesting.

Less is known about the productive capacity and status of fish habitats in the tributary streams within the study area (note that information held by the two private forestry landowners was not available at the time of reporting). As a result, our biophysical and fish habitat assessments focused on various sites within the tributary watersheds where knowledge on fish distribution or fish habitat could be expanded. A total of 19 sample sites on 11 drainages were assessed between November 12 and November 14, 2014. Channel dimensions, stream morphology and fish habitat quality at each site are summarized in Table 13. Although fish distribution was restricted in a number of tributaries by major obstructions as described in Section 3.4.4.1, resident rainbow trout populations upstream of barriers were observed in the Solly Creek and Chipman Creek watersheds. In general, all sample sites contained high quality habitats for resident salmonids. Stream temperatures were cold, although sampling during mid-summer base flow conditions would provide a better indication of potential water temperature limitations. Suspended sediment concentrations were very low, dissolved oxygen was near saturation and all other water chemistry parameters were conducive to supporting fish. Physical habitat units appeared to be stable, dominated by moderately steep riffle-pool and cascade-pool sequences. A diversity of cover types were typically present and spawning gravels suitably sized for resident adults was observed at most sites. In fact, the relatively high proportion of young-of-year fish in the catch indicates that recruitment of young fish into these populations is occurring successfully. Morphological disturbance indicators such as sediment wedges, eroding streambanks, avulsions, elevated bars or degraded streambeds were not observed.

Table 13. Channel characteristics for each site assessed on watercourses within the Lara Property.

Site ID	Waterbody	Morphology	W_b (m)	W_w (m)	Substrate		Gradient (%)	Cover total (N,T,M,A)	Habitat Quality		
					Dominant	Sub-dom			Rearing	Spawning	Migration
CHE TRIB 01	Chemainus River unnamed tributary	RP	1.7	1.5	LC	LG	8	M	good; small pools and UC banks	potential resident spawning habitat	no barriers to upstream migration at this point
CHI-01	Chipman Creek		24	18	B	LC	1	A			
CHI-02	Chipman Creek	RP	10	8.0	B	LC	1-2	A	good	potential	US of barrier falls
HAY-01	Hayne Creek	RP	4.3	3.8	B	LG	5	A	good boulder cover, low gradient to Chipman Creek	potential resident spawning habitat	no barriers to upstream migration at this point
HAY-02	Hayne Creek	RP	4.0	4.0	B	LC	11 US; 18 DS				
HOL-01	Holyoak Creek		0.9	0.8	GR	F					No surface connection to lake.
HOL-02	Holyoak Creek		0.8						poor	poor	poor
HUM-01	Humbird Creek	RP	5.0	4.0	B	SC	8.5				potential barriers
SOL-01	Solly Creek	RP	7.0	6.0	LC	BO	4.5	M	moderate	low	
SOL-02	Solly Creek	RP	4.5	4.5	LC	B	4		good	gravel patches	potential barriers
SOW-01	Sowerby Creek	RP	3.5	2.5	C	G	5	A	good	potential	
TUC-01	Tucker Creek	RP	2.5	2.0	SC	LG	6	A	several good pools with LWD cover	limited; some patches of	Culvert at road

Site ID	Waterbody	Morphology	W_b (m)	W_w (m)	Substrate		Gradient (%)	Cover total (N,T,M,A)	Habitat Quality		
					Dominant	Sub-dom			Rearing	Spawning	Migration
										gravel	
WAT - 01	Watson Creek	RP	12	9.0	LC	B	3	A	good		no barriers observed
WAT-02	Watson Creek	RP	8.5	5.0	R	G	3	A	potential	potential resident spawning habitat	
WAT-03	Watson Creek	RP	8.0	4.3	R	LG	2.5	M	good	potential	potential barrier
WAT-TRIB-01	Watson Creek Unnamed Tributary 1	RP	6.8	4.9	LC	B	5	M	good		potential barrier downstream
WAT-TRIB-02	Watson Creek Unnamed Tributary 2	RP						A			

Stream channel characteristics are defined based on Reconnaissance (1:20,000) Fish and Habitat Inventory Standards and Procedures (RISC 2001) and the Fish Habitat Assessment Procedures (Johnston and Slaney 1996). For channel morphology CP=cascade-pool, and SP=step-pool; and RP=riffle pool channel type; w_b= channel width,W_w= wetted width; for bed material G=gravel, C=cobble, B=boulder, and R = bedrock; and For cover total:None: no cover of this type exists at the site (e.g., shallow bedrock gorge); Trace: a small amount of cover (less than 3 to 5%) (e.g., shallow bedrock gorge with a few boulders to provide a bit of cover); Moderate: cover accounts for between 5 to 20% of the site; Abundant: more than 20% of the site is considered covered

3.4.4.3 Life History

A total of 2,751 seconds of electrofishing was conducted during our assessments and resulted in the direct capture of 19 individual fish. Several other fish were observed but not captured while sampling. Summaries of sampling conditions and catch are presented in Appendix C (Tables C-1 and C-2). Despite the relatively small sample size associated with this study, several observations on life history were evident.

Resident trout were the only fish species captured and the catch was dominated by young age classes. Visually differentiating between juvenile rainbow trout and steelhead trout is not usually possible, since they are the same species. Morphometric differences between the two life forms do not become evident until adulthood when steelhead return from the ocean to spawn. However, the trout that we captured in Solly Creek and Chipman Creek came from sites located above natural barriers that permanently obstruct anadromous steelhead migration. As a result, these fish represent isolated populations of resident trout that spend their entire lives in small freshwater streams. Fish from these populations by their nature do not migrate long distances, often completing their entire life cycle within a section of stream no more than a few hundred metres in length.

Although cutthroat trout is a different species from rainbow trout, the two species share many physical traits. As a result, it is difficult to distinguish very small individuals in the field. The convention for young-of-year trout is to initially identify them as "Trout" if there is no conclusive evidence for species identification. To date, rainbow trout is the only species conclusively identified in the upper Solly and Chipman Creek watersheds. Therefore it seems likely that the young-of-year fish in our catch were rainbow trout. Genetic analysis can be conducted on fish tissue samples to verify this assumption at a later date.

3.5 TERRESTRIAL RESOURCES

Three field days were spent assessing terrestrial resources on November 12, 13 and 25, 2014. The focus was to complete generalized field assessments and to identify potential occurrences of high-value focal species or ecological communities.

A total of 45 field plots, including ecosystem field verification, wildlife and wildlife habitat observations and rare plant searches, were completed across the study area (APPENDIX A -Maps 4 and 5). Results of the desktop analysis and field observations are described below.

3.5.1 ECOLOGICAL COMMUNITIES

3.5.1.1 Biogeoclimatic Classification

British Columbia's landscape is divided into a systematic classification based on broad geoclimatic relationships with 10 Ecoprovinces, 46 Ecoregions and 116 Ecosections defined (Demarchi 2011). The Lara Property lies within the Georgian Depression Ecoprovince, Eastern Vancouver Island Ecoregion and

Nanaimo Lowlands Ecosection. BC is further classified into 17 biogeoclimatic zones based on the Biogeoclimatic Ecosystem Classification system (BEC; MoFR 2015). The Lara Property spans two different biogeoclimatic zones: the Coastal Western Hemlock (CWH) zone and the Mountain Hemlock (MH) zone (APPENDIX A – Map 4).

The CWH zone occurs on Vancouver Island and on the westward side of the Coastal Mountains along the entire British Columbia coast from sea level to 900 – 1,050 m; it is the most extensive biogeoclimatic unit in the Vancouver Forest Region (Meidinger and Pojar 1991) (now known as the Coast Region).The CWH is characterized by cool summers and mild winters with less than 15% of total precipitation occurring as snow. The most common tree species include western hemlock (*Tsuga heterophylla*), western redcedar (*Thuja plicata*), Douglas-fir (*Psuedotsuga menziesii*) on drier sites and amabilis fir (*Abies amabilis*) and yellow cedar (*Chamaecyparis nootkatensis*) on wetter and higher elevation sites. The CWH typically has a sparse herb layer and the predominance of several moss species, including step moss (*Hylocomium splendens)* and lanky moss (*Rhytidadelphus loreus)* (Green and Klinka 1994).

The MH zone occurs primarily on the Insular Mountains of Vancouver Island and the Queen Charlotte Islands and along the Coast Mountains of the mainland at elevations of 800 and 1000 m with an upper limit between 1100 and 1350 m; this zone is located above the CWH zone (Meidinger and Pojar 1991).The MH is characterized by cool, short summers, and wet, long and cool winters, with heavy snow cover for several months of the year. Mean annual precipitation generally ranges from 1700 to 5000 mm, of which 20% to 70% falls as snow. The most common tree species include mountain hemlock (*Tsuga mertensiana*), amabilis fir and yellow cedar with other species including western hemlock and western redcedar occurring at lower elevations. Douglas-fir and western white pine (*Pinus monticola*) occur at lower elevations in the south and lodgepole pine (*Pinus contorta*) on very dry sites. The understory predominantly consists of Alaskan blueberry (*Vaccinium alaskaense*), oval-leaved blueberry (*Vaccinium ovalifolium*) and pipecleaner moss (*Rhytidiopsis robusta*) (Meidinger and Pojar 1991).

Three CWH variants occur within the Lara Property including the Eastern Very Dry Maritime Variant (CWHxm1), the Western Very Dry Maritime Variant (CWHxm2) and the Montane Moist Maritime (CWHmm2). Within the MH with only the Windward Moist Maritime variant (MHmm1) occurs within the Lara Property. Of the 9633 ha within the study area, the CWHmm2 and CWHxm1 cover the majority of the area at 39% and 34%, respectively. The MHmm1 represents 20% of the area with the remaining 7% characterized by the CWHxm1.

The CWHxm1 and CWHxm2 are found at lower elevations from sea level to approximately 700 m along the east side of Vancouver Island and inland along major valleys. These variants are represented by warm, dry summers and moist, mild winters with relatively little snowfall and a growing season water deficit (Green and Klinka 1994). Zonal forests (those with average conditions for the variant) are dominated by Douglas-fir with western hemlock and minor amounts of western redcedar; major understory species include salal (*Gaultheria shallon*), dull Oregon-grape (*Mahonia nervosa*), red huckleberry (*Vaccinium parvifolium*), step moss and Oregon beaked-moss (*Eurhynchium oreganum*) (Green and Klinka 1994).

The CWHmm2 occurs above the CWHxm2 from approximately 700 to 1100 m elevation (Green and Klinka 1994). It has relatively cooler temperatures, shorter growing seasons and less snowfall than the CWHxm2 but is also characterized as having a growing season water deficit due to the rainshadow effect of the Vancouver Island Mountains (Green and Klinka 1994). Zonal forests are dominated by western hemlock, amabalis fir, Douglas-fir and minor amounts of yellow cedar and mountain hemlock, especially on higher elevation and wetter sites (Green and Klinka 1994). Common understory species include Alaska blueberry (*Vaccinium alaskanse*), salal, oval-leaved blueberry (*Vaccinium ovalifolium*) and black huckleberry (*Vaccinium membranaceum*); the moss layer is well developed with pipecleaner moss (*Rhytidiopsis robusta*), lanky moss and step moss (Green and Klinka 1994).

The MHmm1 occurs above the CWHmm2 from approximately 1100 m to 1350 m (Green and Klinka 1994). It has long, wet, cold winters and short, cool moist summers (Green and Klinka 1994). Vegetation is strongly influenced by local topography due to its effect on the timing and pattern of snowmelt. Zonal forests are dominated by amabalis fir and mountain hemlock with minor amounts of yellow cedar (Green and Klinka 1994). Common understory species include Alaska blueberry, oval-leaved blueberry and pipecleaner moss (Green and Klinka 1994).

3.5.1.2 Ecosystem Mapping

Existing terrestrial ecosystem mapping (TEM) occurs for 5,303 ha or 55% of the Lara Property. It consists of two projects including the Chemainus River and Mt. Coronation TEM, which were mapped at a scale of 1:20,000 along the western portion of the Property (DataBC 2015, APPENDIX A – Map 4).

The majority of the TEM mapped area (68%) is dominated by zonal forests, with dry and wet and/or most forests representing 15% and 13%, respectively (Table 14). Floodplain forests were mapped over 2% of the area while forested fluctuating water sites, forested swamps and water dominated ecosystem all occurred over less than 1% (Table 14).

Table 14. Area of ecosystem types for the TEM mapped portion of the Lara Property.

Ecosystem Type	Ecosystem Unit – Site Series/MapCode (BGC Unit)	Area (ha)	% of Total TEM Mapped Area
Zonal Forests	01/AP (CWHmm2), 01/HK (CWHxm), 01/MB (MHmm1)	3595.9	68%
Dry Forest	02/DS (CWHmm2), 02/DC (CWHxm), 02/MM (MHmm1), 03/HS (CWHmm2), 03/DS (CWHxm), 04/RS (CWHmm2)	815.9	15%
Wet and/or Rich Forest	05/AF (CWHmm2), 05/RS – (CWHxm), 07/YG (CWHmm2), 07/RF (CWHxm), 08/AS (CWHmm2)	681.1	13%
Fluctuating Water Table Forest	15/CS (CWHxm)	2.1	<1%
Floodplain Forest	08/SS, 09/CD (CWHxm)	100.3	2%
Forested Swamp	12 (Ws53)/RC (CWHxm)	5.2	<1%

Non-Forested	00/KL, 00/RP, 00/SF	30.9	1%
Non-Vegetated	00/ES, 00/GB, 00/RO, 00/MI	71.1	1%
Water	00/OW, 00/RI	0.6	<1%
Total		**5303.1**	**100%**

The majority (60%) of the TEM mapped area is represented by the young forest structural stage, with the pole sapling stage comprising 32%. Only 1% of the area consists of old forests (Table 15).

Table 15. Area of structural stages for the TEM mapped portion of the Lara Property.

Structural Stage Code	Stage	Area (ha)	% of Total TEM Mapped Area
1	Non-vegetated/ sparse/cryptogam	71.1	1%
2	Herb	24.0	<1%
3	Shrub/Herb	271.4	5%
4	Pole/Sapling	1718.6	32%
5	Young Forest	3175.9	60%
6	Mature Forest	0.0	0%
7	Old Forest	26.7	1%
Not Applicable	-	15.2	<1%
Total		**5303.1**	**100%**

Existing Vegetation Resources Inventory (VRI) occurs for 2,502 ha or 26% of the Lara Property. The VRI mapping occurs in the southwest portion of the study area (DataBC 2015, APPENDIX A – Map 4). Table 16 depicts the area by projected age class for the VRI mapped portion of the Lara Property. The majority (70%) of the area is represented by age class 4 which represents young forested ecosystems. Only 8% of the VRI mapped area consists of mature or old forests (Table 16).

Table 16. Area of age classes for the VRI mapped portion of the Lara Property.

Age Class	Age Range (Years)	Area (ha)	% of Total VRI Mapped Area
1	1-20	145.2	6%
2	21-40	32.2	1%
3	41-60	259.4	10%
4	61-80	1752.4	70%
5	81-100	130.6	5%
6	101-120	54.1	2%

7	121-140	0.7	<1%
8	141-250	4.1	<1%
9	251+	0.0	0%
Not Applicable	-	123.3	5%
Total		**2501.9**	**100%**

Although no Sensitive Ecosystem Inventory (SEI) polygons are located in the Lara Property, there are a number of adjacent polygons which can provide a context for the general area (APPENDIX A – Map 4). A total of 10 SEI polygons, excluding disturbed areas as reclassified in 2004 (AXYS 2005) are located within 1 km of the Property. The majority of these polygons are riparian including sparsely vegetated areas, pole/sapling, young and mature forests. One woodland forest polygon was identified as well as one polygon containing a mix of coniferous old forest and terrestrial herbaceous ecosystems (MoE 2015a, DataBC 2015).

3.5.1.3 Listed Ecological Communities

Based on background research a total of 35 red- or blue-listed ecological communities were identified as potentially occurring within the study area (Table B-21). Of these 15 are red-listed and 20 are blue-listed (CDC 2015). The existing TEM mapping indicates 15 of the site series mapped within the Project area could have the potential to develop into red- or blue-listed ecological communities (Table 17).

Table 17. Area of age classes for the VRI mapped portion of the Lara Property

BGC Units	Sites Series Mapped with Red-Listed Potential	Sites Series Mapped with Blue-Listed Potential
CWHmm2	-	01, 02, 03, 04, 07, 08
CWHxm	01, 02, 08	03, 05, 07, 09, 12, 15
MHmm2	-	-

Much of the study area is in relatively early stages of succession with little old forest observed during field assessments, with the exception of high elevation areas. No red- or blue-listed ecological communities (LECs) were observed.

The likelihood of red- or blue-listed ecological communities was interpreted based on a combination of desktop orthophotograph interpretation and field verification. Table 18 shows a summary of likelihood interpretations for each LEC. The ecosystem unit association shows the TEM site series within which each LEC can be found, typically at a climax successional stage. In the example of forested ecosystem units, LECs generally do not develop until the old forest stage (>250 years).

Table 18. Ecosystem units that have potential for red- or blue-listed ecological communities within each biogeoclimatic variant (i.e., CWHxm1, etc.), along with likelihood of occurrence interpretations. Wb = wetland bog; Wf = wetland fen; Wm = wetland m.

Ecosystem Unit Association	CWHxm1	CWHxm2	CWHmm2	MHmm1	Likelihood of occurrence
01	Red	-	Blue	-	Low due to limited old forest at low to mid-elevation
02	Red	Red	Blue	-	High on low to mid-elevation dry ridges
03	Blue	Blue	Blue	-	Low due to limited old forest at low to mid-elevation
04	Blue	Blue	Blue	-	Low due to limited old forest at low to mid-elevation
05	Blue	Blue	-	-	Low due to limited old forest at low to mid-elevation
06	Red	Red	Red	-	Moderate in riparian areas of streams and rivers at low to mid-elevation
07	Blue	Blue	Blue	-	Moderate in riparian areas of streams and rivers at low to mid-elevation
08	Red	Red	Blue	-	Low due to limited old forest on floodplains of large streams and rivers
09	Blue	Blue	-	-	Low due to limited old forest on floodplains of large streams and rivers
10	Blue	-	-	-	Low due to limited old forest on floodplains of large streams and rivers
11	Blue	Blue	-	-	Low at wetlands[1]
12	Blue	Blue	-	-	Low at wetlands[1]
13	Red	Red	-	-	Low due to limited old forest
14	Red	Red	-	-	Low at wetlands[1]
15	Blue	Blue	-	-	Low at wetlands[1]
00 - arbutus / hairy manzanita	Red	-	-	-	High on low-elevation rocky bluffs
00 - Douglas-fir / dull Oregon grape	Red	-	-	-	Low due to limited old forest at low elevation
00 - Roemer's fescue - junegrass	Red	-	-	-	Low due to limited or absent grassland at low elevation

Ecosystem Unit Association	CWHxm1	CWHxm2	CWHmm2	MHmm1	Likelihood of occurrence
00 - tremling aspen / Pacific crabapple / slough sedge	Red	-	Red	-	Low at wetlands[1]
00 - Wallace's selaginella / reindeer lichens	Blue	Blue	-	-	High on south-facing bluffs at low to mid-elevation
Wb50	Blue	Blue	-	-	Low at wetlands[1]
Wf52	Red	Red	Red	-	Moderate at wetlands[1]
Wf53	Red	Red	Red	-	Moderate at wetlands[1]
Wm05	Blue	-	-	-	Low at wetlands[1]
Wm06	Blue	-	-	-	Low at wetlands[1]
Wm50	Blue	-	-	-	Moderate at wetlands[1]
Wm51	-	Red	-	-	Moderate at wetlands[1]

[1]Silver Lake, head of Banon Creek and headwaters of tributary to Chipman Creek

As shown, most LECs have a low probability of occurrence due to the small amounts of old forest found in the study area. The absence of LECs could not be confirmed because the study area was not mapped or field sampled in its entirety. The highest probability of LEC occurrences was identified in remnant old forest patches, wetlands and dry bluffs and ridges.

Most primary forest has been logged in approximately the last 100 years; the resulting forest cover varies from recent clearcuts to mature forest. Remnant old forest patches mainly occur at or near ridge tops on Coronation Mountain or east of Holyoak Lake (**Error! Reference source not found.**). Some dry rock bluffs have not been logged (**Error! Reference source not found.**), perhaps due to operational constraints. These areas have high potential for LECs such as Douglas-fir - lodgepole pine / grey rock-moss and arbutus / hairy manzanita that occur on dry ridgetops or south-facing rocky bluffs with thin soil, little moisture and poor nutrients (**Error! Reference source not found.**, **Error! Reference source not found.** and **Error! Reference source not found.**).

Wetlands were observed at Silver Lake, at the head of Banon Creek and at the headwaters of two tributaries to Chipman Creek. These sites were not surveyed in the field but desktop orthophotograph interpretation suggests they are not Wm05, Wm06 or bog wetlands. Wf52, Wf53, Wm50 and Wm51 wetlands, which are associated with LECs, could not be excluded; as a result, there is considered to be a moderate likelihood that LECs occur within these wetland units.

Photo 2. Old forest stand east of Holyoak Lake in the Mountain Hemlock zone (MHmm1).

Photo 3. Remnant old forest stand at low elevation above Chemainus River.

Photo 4. An example of south-facing rocky bluffs with high potential for the occurrence of red- or blue-listed ecological communities.

Photo 5. An example of south-facing rocky bluffs with high potential for the occurrence of red- or blue-listed ecological communities.

3.5.1.4 Old Growth Management Areas

There are three OGMAs that occur within the Lara Property (APPENDIX A – Map 4). In total these OGMAs cover approximately 506 ha, ranging from 94 to 209 ha in size. Within the study area the OGMAs occur adjacent to Silver and Solly Creeks as well as in between Humbird Creek and the Chemainus River, accounting for a total area of approximately 274 ha, ranging from 31 to 163 ha (DataBC 2015).

3.5.1.5 Rare Plants

The CDC query produced a candidate list of 50 plant species (CDC 2015). This list was further refined to a total of 44 species, including 20 red-listed and 24 blue-listed, based on known habitat associations and distributions to include only species with potential to occur in the area (Appendix B – Table B-1).

Furthermore, six occurrences of three blue-listed plant species have previously confirmed occurrences within or directly adjacent to the study area, with several others confirmed in the region (Appendix A – Map 4). These included four occurrence of dwarf bramble (*Rubus lasiococcus*), one occurrence of California-tea (*Rupertia physodes*) and one occurrence of Howell's violet (*Viola howellii*). The dwarf bramble observations were made in a variety of habitats including old forests, wet meadows in forest openings and a newly harvested slope and occurred in the northern and central portions of the Lara Property. The California-tea occurrence was associated with roadsides, ditches and rock outcrops in the southern portion of the study area. The Howell's violet observation occurred in the MHmm1 near the eastern study area boundary near Holyoak Lake in a peat-moss dominated bog (DataBC 2015).

Rare plant searches were completed at all 45 terrestrial sample sites; however, surveys were completed outside the recommended sampling season and cannot be considered exhaustive. Dwarf bramble was confirmed at two locations in the vicinity of Holyoak Lake where it had previously been identified (APPENDIX A -Map 4). The two populations each had 25 – 35 plants within an area of about 1 m^2. The first was in a small opening within a young forest stand and was growing with common species such as bunchberry (*Cornus canadensis),* alpine wintergreen *(Galtheria humifusa),* one-sided wintergreen *(Orthelia secunda),* oval-leaved blueberry, racomitrium moss *(Racomitium canescens)* and juniper haircap moss (*Polytrichum juniperum)* (Photo 6). The second population was in a small opening between a road and a pole/sapling stand. Common species such as red alder (*Alnus rubra*), willows (*Salix* spp.*)*, fireweed *(Epilobium angustifolium)* and running club-moss *(Lycopodium clavatum)* were also growing on the site.

Photo 6. Dwarf bramble (*Ribes lasiococcus*) with three-lobed leaves growing alongside alpine wintergreen (*Gaultheria humifusa*) and racomitrium moss (*Racomitrium canescens*).

3.5.1.6 Invasive Species

Based on the desktop analysis a total of 35 known invasive plant sites are associated with the roads and BC Hydro right-of-way located within the southern portion of Lara Property (APPENDIX A – Map 4). Ten invasive plant species were identified at these sites and include bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), common tansy (*Tanacetum vulgare*), curled dock (*Rumex crispus*), groundsel (*Senecio vulgaris*), oxeye daisy (*Leucanthemum vulgare*), Saint John's wort (*Hypericum perforata*), scotch broom (*Cytisus scoparius*), sheep sorel (*Rumex acetosella*) and tansy ragwort (*Senecio jacobaea*) (DataBC 2015).

Several invasive species were observed outside of the study area during field assessments along the Chemainus mainline, including Himalayan blackberry (*Rubus armeniacus*), Scotch broom and English ivy (*Hedera helix*).

3.5.1.7 Wildlife

The CDC query produced a candidate list of 61 animal species (CDC 2015). This list was further refined to a total of 55 species, based on known habitat associations and distributions to include only species with potential to occur in the area. Of these species 21 were red-listed, 32 were blue-listed, 31 were listed with COSEWIC and 27 included in SARA (Appendix B, Table B-2).

Furthermore, four occurrences of four listed animal species, including two gastropods, one insect and one mammal, have previously confirmed occurrences within or adjacent to the study area (APPENDIX A – Map 5). These included an occurrence of dromedary jumping-slug (*Hemphillia dromedarius*), warty jumping-slug (*Hemphillia glandulosa*), Boisduval's blue butterfly, *blackmorei* subspecies (*Plebejus icarioides blackmorei*) and ermine, *anguinae* subspecies (*Mustela erminea anguinae*). The dromedary jumping-slug (red-listed) and warty jumping-slug (blue-listed) observations were made in old growth coniferous forest patches south of Holyoak Lake in the MHmm1. Two dromedary-jumping slugs were identified while three warty jumping slugs were observed. The Boisduval's blue butterfly, *blackmorei* subspecies (blue-listed) occurrence was located over three areas within 2.5 km of each other in clearcuts with plentiful lupines (*Lupinus spp.*). Over 500 females were observed west of Holyoak Lake and on the west slope of Mount Brenton and 50 females along Mt. Brenton Road south of Holyoak Lake. The ermine, *anguinae* subspecies (blue-listed) observation occurred near Cowichan Lake and is therefore not considered within or directly adjacent to the Lara Property (DataBC 2015).

One masked (non-public) element occurrence also overlapped the project area. It was confirmed with the CDC that this occurrence is not within or immediately adjacent to the study area, therefore no further review and discussion of this undisclosed feature is necessary. A request was submitted to the CDC to determine the species which the account was for however a response was not provided at the time of report preparation.

In addition, one WHA for marbled murrelet (1-0333) with a total area of 221 ha occurs within the Lara Property, located between Humbird Creek and the Chemainus River (APPENDIX A – Map 5). This WHA accounts for 24 ha within the study area. Another marbled murrelet WHA exists adjacent to the Chemainus River, approximately 1 km east of the Property (DataBC 2015). Marbled murrelets are a small seabird that nests on large limbs of conifer trees in old forest stands. The WHA within the Property was assessed in the field and was observed to currently lack suitable habitat for marbled murrelet nesting since it consisted of young and mature canopy trees, rather than old forest. Though the WHA is capable of developing into suitable nesting habitat, it will likely take many decades. The WHA was likely established in this area due to the limited quantity of suitable nesting habitat in the region. It is unlikely, though not impossible, that marbled murrelets would be found nesting within the Lara Property claims, due to the limited number and size of old forest patches.

There are also five UWR areas for black-tailed deer which exist within and adjacent to the study area (14857610, 14857611, 14857612, 14857613 and 15042802) with a total area of 354 ha (APPENDIX A – Map 5). These UWR account for 295 ha within the Lara Property. The majority occur in between Humbird Creek, Holyoak Creek and the Chemainus River. Furthermore, two UWR for Roosevelt elk occur adjacent to the Chemainus River, approximately 1.5 km south of the Property (DataBC 2015).

Several animal species or their sign were observed during field studies, including pileated woodpecker (*Dryocopus pileatus*), pine siskin (*Spinus pinus*), chestnut-backed chickadee (*Poecile atricapillus*), hairy woodpecker (*Pcoides villosus*), common raven (*Corvus corax*), bald eagle (*Heliaeetus leucocephalus*) and Roosevelt elk. It is expected that animal diversity would be much higher during the summer.

Several well-worn deer, and possibly elk, trails were observed on a ridge above the Copper Canyon on the Chemainus River (Photo 9). This area may also be used as for bedding by black-tailed deer. With the exception of this area, very little sign of black-tailed deer was observed within the study area. Suitable habitat, however, likely occurs on south-facing slopes with rocky bluffs and relatively open canopies.

Four Roosevelt elk were observed near the confluence of Solly Creek and the Chemainus River on November 13 (Photo 7). Suitable habitat for elk was mostly observed on the floodplain and terraces of the Chemainus River within riparian and lowland forest (Photo 8). The two Roosevelt elk UWR, totaling approximately 142 ha, are located within this forest type adjacent to the Chemainus River (APPENDIX A - Map 5). It is likely elk use this habitat predominantly in the winter while they migrate to higher elevation habitat, such as Coronation Peak in the summer. Spring and fall may be spent in either of these habitats, depending on conditions, or in mid-slope forests. Potentially highly suitable summer habitat was identified through orthophotograph interpretation on the slopes and ridges of Coronation Peak. These areas had relatively open canopies and strong potential for suitable summer forage species as well as very few active roads. Field assessment of these areas was not completed due to poor access.

Throughout the Lara Property claims, some stands of mature forest are beginning to develop into suitable nesting habitat for northern goshawk (*Accipter gentilis laingii*) (Photo 10). This species nests and forages in mature and old forest stands with relatively closed canopies and relatively open understories. As mentioned, some stands are starting to develop these characteristics, though many often have dense cover of salal that impedes foraging for prey (typically small mammals).

Snags for cavity-nesting birds such as woodpeckers and small owls were relatively rare within the study area, with the exception of developing mature forest and remnant old forest stands. Where they did occur, foraging by woodpeckers was often evident and several potential nesting cavities for small owls such as northern pygmy-owls (*Glaucidium gnoma swarthii*), northern saw-whet owls (*Aegolius acadicus*) or western screech owls (*Megascops kennicottii*) were observed (Photo 11).

Suitable habitat for amphibians within the study area was mostly limited to moist lowland forest, streams, lakes and wetlands. Within the Lara Property claims, this was mainly limited to Silver Lake, the head of Banon Creek and headwaters of two tributaries to Chipman Creek. These areas were identified through desktop orthophotograph interpretation but few were assessed in the field due to poor access. Photo 12 shows an example of suitable habitat for amphibians in a small lake east of Holyoak Lake.

Photo 7. Four Roosevelt elk observed near the confluence of Solly Creek and the Chemainus River.

Photo 8. Suitable Roosevelt elk (*Cervus elaphus*) habitat in mature riparian floodplain forest adjacent to the Chemainus River.

Photo 9. Well-used deer trails and potential bedding area above Chemainus River.

Photo 10. Potentially suitable northern goshawk (*Accipter gentilis laingii*) habitat in mature forest in Chipman Creek watershed.

Photo 11. Potential nesting cavity in snag (centre-left) in remnant old forest patch above Chemainus River.

Photo 12. An example of suitable amphibian habitat in small lake east of Holyoak Lake.

4 DATA GAP ANALYSIS

The review of existing environmental information augmented by our field studies have identified a number of data gaps that would require addressing should the client decide to proceed with development of the mineral resources on the Lara Property claims.

4.1 FISHERIES AND AQUATIC RESOURCES

In general, the main gaps with respect to fisheries and aquatic resources include:

- Confirm fish distribution, relative abundance and life history within watercourses potentially affected by advanced exploration activities;
- Continue maintenance of hydrometric monitoring stations and consider expanding hydrometric network as needed based on development activities; and,
- Annual water quality and sediment sampling to meet requirements outlined in *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators*.

4.2 TERRESTRIAL RESOURCES

4.2.1 ECOLOGICAL COMMUNITIES

Ecological communities are defined by existing abiotic and biotic conditions, including elements such as soil parent material, soil moisture and nutrient regimes, slope, aspect, proximity to water, landscape position, vegetation communities, disturbance history and forest structure. In turn, they are important determinants in the plant and animal species that may occur there. Further, some ecological communities are considered at risk and are included on the Provincial red or blue list. For these reasons, it is important to define the type, location and scale of the ecological communities that occur within and adjacent to a development area.

Terrestrial Ecosystem Mapping (TEM) is a standard tool used to map ecological communities across a landscape. As noted, existing TEM covers a small portion of the Lara Property claims. If this project is brought to development, it is important that the remainder of claim area plus a buffer (to account for indirect effects) is completed. This will serve to identify any red- or blue-listed ecological communities, serve as a base for wildlife habitat modelling and identify areas with a higher likelihood of the occurrence of focal species. While listed ecological communities have no legal protection in BC, identification of their occurrences and avoidance where practicable helps to facilitate the permitting process.

4.2.2 VEGETATION

Several blue-listed plant species are known to occur within the study area and others have potential. As with ecological communities, there is no Provincial legislation or regulation protecting listed plant species; however, identifying occurrences and avoiding or mitigating where practicable helps to facilitate the permitting process. If this project is brought to development, a thorough rare plant survey with the development of an avoidance / mitigation plan is recommended as a component of further studies.

4.2.3 WILDLIFE

Several regulatory and policy instruments apply to wildlife and wildlife habitat at both the federal and Provincial level, including the *Species at Risk Act*, the *Migratory Birds Convention Act, 1994* and the BC *Wildlife Act*. Further, the BC *Forest and Range Practices Act* establishes measures for the management of certain designated UWR, WHA and OGMA. Finally, the *Recovery Strategy for the Marbled Murrelet (Brachyramphus marmoratus) in Canada* (Proposed; Environment Canada 2014) includes population status and recovery objectives for marbled murrelet in BC. As part of the proposed recovery strategy, critical habitat has been partially identified in BC and includes nesting habitat in old coniferous forest.

If the project is developed, several studies regarding wildlife and their habitat would be required for permitting. For projects of this nature, wildlife habitat modelling with field verification forms the base for the assessment of potential effects to wildlife and wildlife habitat since it helps to identify the likelihood of occurrence of a species and potential direct and indirect effects to their habitat. Species with well-established habitat associations such as northern goshawk (*Accipter gentilis laingii*), marbled murrelet and western screech-owl, *kennicottiii* subspecies (*Megascops kennicottii kennicottii*) are good candidates for wildlife habitat modelling.

Where practical, field studies of focal species are also recommended. This would be based on a further assessment habitat availability, the likelihood of occurrence and the efficiency of field surveys (some species are cost-prohibitive to survey due to very low detection rates; in these cases, it is more expedient to assume presence of the species and design appropriate mitigation measures). Some species that may require field studies include northern goshawk, northern pygmy-owl, *swarthi* subspecies (*Glaucidium gnoma swarthi*), western screech owl, *kennicottii* subspecies, red-legged frog (*Rana aurora*), western toad (*Anaxyrus boreas*) and Roosevelt elk, among others. Field studies may focus on detecting presence of individuals, such as with northern goshawk and the two owl species, which are generally surveyed using call-playback, or may focus on habitat elements that are critical for a particular life stage. For example, aquatic habitat is required for breeding for several amphibian species and would be the focus for determining potential effects on these species.

5 STATEMENT OF LIMITATIONS

This report was prepared exclusively for Treasury Metals Inc. by EDI Environmental Dynamics Inc. The quality of information, conclusions and estimates contained herein is consistent with the level of effort expended and is based on: i) information available at the time of preparation; ii) data collected by EDI Environmental Dynamics Inc. and/or supplied by outside sources; and iii) the assumptions, conditions and qualifications set forth in this report. This report is intended to be used by Treasury Metals Inc. only. Any other use or reliance on this report by any third party is at that party's sole risk.

6 REFERENCES

6.1 LITERATURE CITED

AXYS Environmental Consulting Ltd. 2005. Redigitizing of Sensitive Ecosystems Inventory Polygons to Exclude Disturbed Area – Summary Report.

CCME (Canadian Council of Ministers of the Environment). 2001. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life. Available at http://ceqg-rcqe.ccme.ca/. (Accessed February 2013).

CCME (Canadian Council of Ministers of the Environment). 2014. Canadian Ambient Air Quality Standards (CAAQS). Available at: http://www.ccme.ca/en/current_priorities/air/caaqs.html. Accessed February 2015.

CDC (BC Conservation Data Centre). 2014. Conservation Data Centre. British Columbia Species and Ecosystem Explorer. Available at: http://a100.gov.bc.ca/pub/eswp/. Accessed February 2015.

Clark, M.J.R. (Editor). 2003. British Columbia field sampling manual. Water, Air, and Climate Change Branch, Ministry of Water, Land, and Air Protection. Victoria, BC.

DataBC. 2015. Geographic Services. http://www.data.gov.bc.ca/dbc/geographic/index.page? Accessed February 2015.

Demarchi, D.A. 2011. The British Columbia Ecoregion Classification. Third Edition. Ecosystem Information Section, Ministry of Environment, Victoria, BC.

EAO (BC Environmental Assessment Office). 2015. Project Information Centre (e-PIC). Available at: http://www.eao.gov.bc.ca/. Accessed February 2015.

EAO (BC Environmental Assessment Office). 2009. Chemainus Wells Project Assessment Report.

Freshwater Fisheries Society of BC. 2015. Stocking Reports. Available at: http://www.gofishbc.com/stockingreports/default.htm. Accessed February 2015.

Government of Canada. 2015. Climate. Available at: http://climate.weather.gc.ca/. Accessed February 2015.

Government of Canada. 2014. Wateroffice. Available at: http://wateroffice.ec.gc.ca/. Accessed February 2015.

Green, R.N. and K. Klinka. 1994. A Field Guide to Site Identification and Interpretation for the Vancouver Forest Region. Ministry of Forests Research Program, Victoria, B.C. 293 pp.

Hatfield, T. 2007. Impact Assessment of Chemainus River Flow in Relation to the District of North Cowichan Proposed Chemainus Well Project – Draft. Solander Ecological Research.

Jacques Whitford Limited. 2004. Baseline Air Quality Modelling and Human Health Risk Assessment Current Day Emission from NorskeCanada Crofton Division -Volume I: Air Quality Modeling and Volume II: Human Health Risk Assessment.

Kay, J. and B. Blecic. 1996. Chemainus River Water Allocation Plan. Vancouver Island Region, Ministry of Environment, Lands and Parks.

McPhail, J.D. 2007. The Freshwater Fishes of British Columbia. The University of Alberta Press, Edmonton, AB.

MFLNRO (Ministry of Forests, Lands, and Natural Resource Operations). 2014. Draft Provincial Framework for Steelhead Management in British Columbia. BC Ministry of Forests, Lands, and Natural Resource Operations; Fish, Wildlife and Habitat Management Branch, Victoria, BC.

Ministry of Environment (MoE). 1997b. Ambient Water Quality Criteria for Dissolved Oxygen. BC Environment, Water Management Branch.

Ministry of Environment (MoE). 2006. A compendium of Working Water Quality Guidelines for British Columbia. Working Guidelines for the Sediments. Available at http://www.env.gov.bc.ca/wat/wq/BCguidelines/working.html#table2. (Accessed February 2015)

Ministry of Environment (MoE). 2010. Approved water quality guidelines. In: Water Quality Guideline (Criteria) Reports. Available at http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html (Accessed February 2015).

MoE (BC Ministry of Environment) 2012. Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators. Available at: http://www2.gov.bc.ca/gov/DownloadAsset?assetId=E49A49E800814C8FB2D6868B7F119AD6. Accessed November 2014.

MoE (BC Ministry of Environment). 2015a. EcoCat: The Ecological Reports Catalogue. Available at: http://www.env.gov.bc.ca/ecocat/. Accessed February 2015.

MoE (BC Ministry of Environment). 2015b. Fisheries Inventory Data Queries. Available at: http://www.env.gov.bc.ca/fish/fidq/queries.html. Accessed February 2015.

MoE (BC Ministry of Environment). 2015c. Habitat Wizard. Available at: http://www.env.gov.bc.ca/habwiz/. Accessed February 2015.

MoE (BC Ministry of Environment). 2014. Guidance on Application of Provincial Interim Air Quality Objectives for NO_2 and SO_2.

MoFR (BC Ministry of Forests and Range. 2015. Biogeoclimatic Ecosystem Classification Program: BECWeb. Available at: http://www.for.gov.bc.ca/hre/becweb/. Accessed February 2015.

Meidinger, D. and J. Pojar. 199. Ecosystems of British Columbia. Special Report Series 6. Ministry of Forests.

Province of BC. 2015. BC Air Quality. Available at: http://www.bcairquality.ca. Accessed February 2015.

Reitsma, C. 2012. Chemainus Water System Water Quality Report. Report prepared for the Regional Public Health Engineer, Central Vancouver Island Health Region. Nanaimo, BC.

Resource Information Standards Committee (RISC). 1998. Guidelines for Interpreting Water Quality Data. Available at http://www.for.gov.bc.ca/hts/risc/pubs/aquatic/interp/intrptoc.htm (Accessed February 2015).

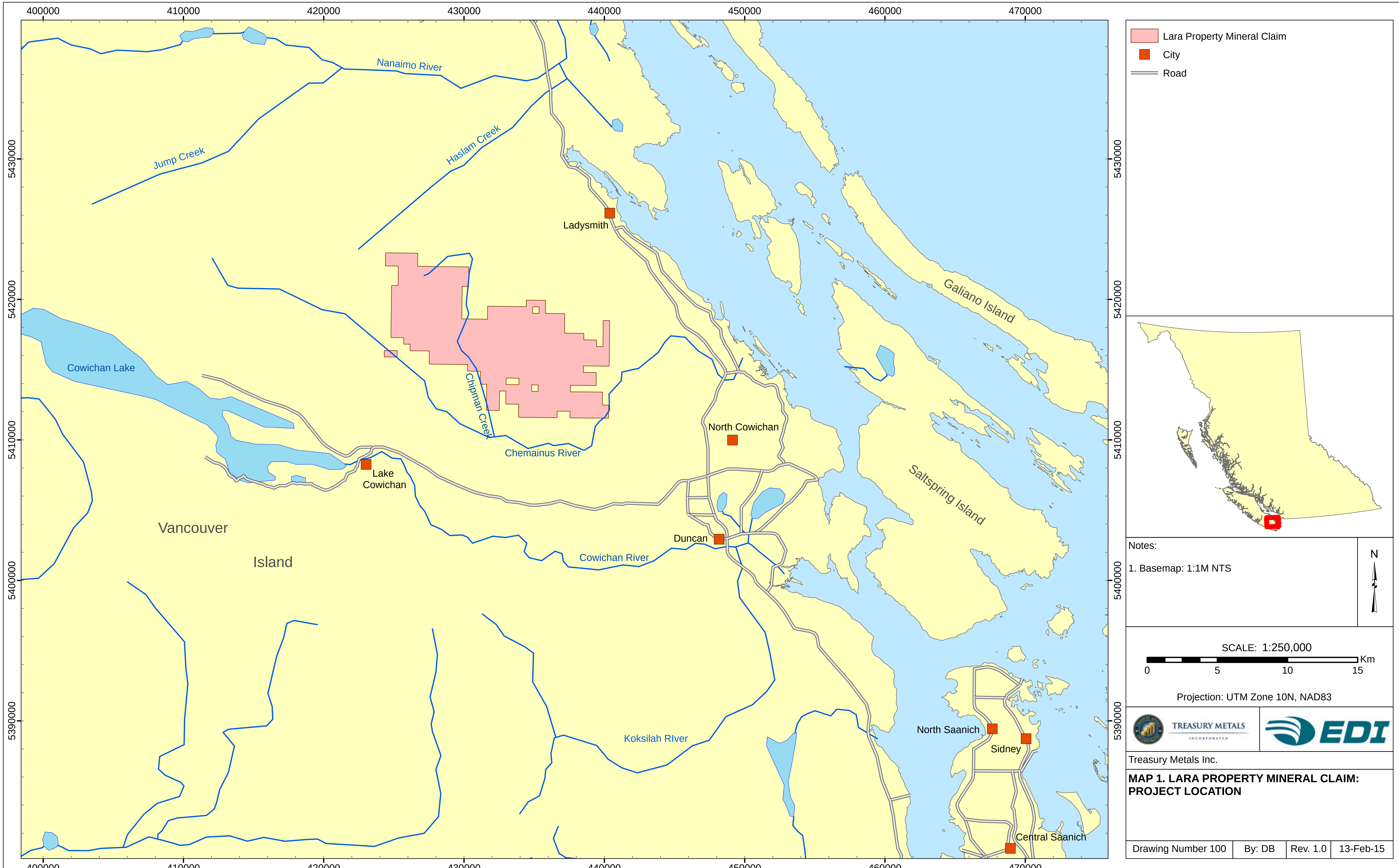
RISC (Resources Inventory Standards Committee) 2001. Reconnaissance (1:20 000) Fish and Fish Habitat Inventory: Standards and Procedures. Version 2.0. Prepared by the BC Fisheries Information Services Branch for the Resource Inventory Committee. 170 pp.

RISC (Resources Inventory Standards Committee). 2003. Ambient Fresh Water and Effluent Sampling Manual. BC Ministry of Environment, Lands, and Parks, Resource Information Standards

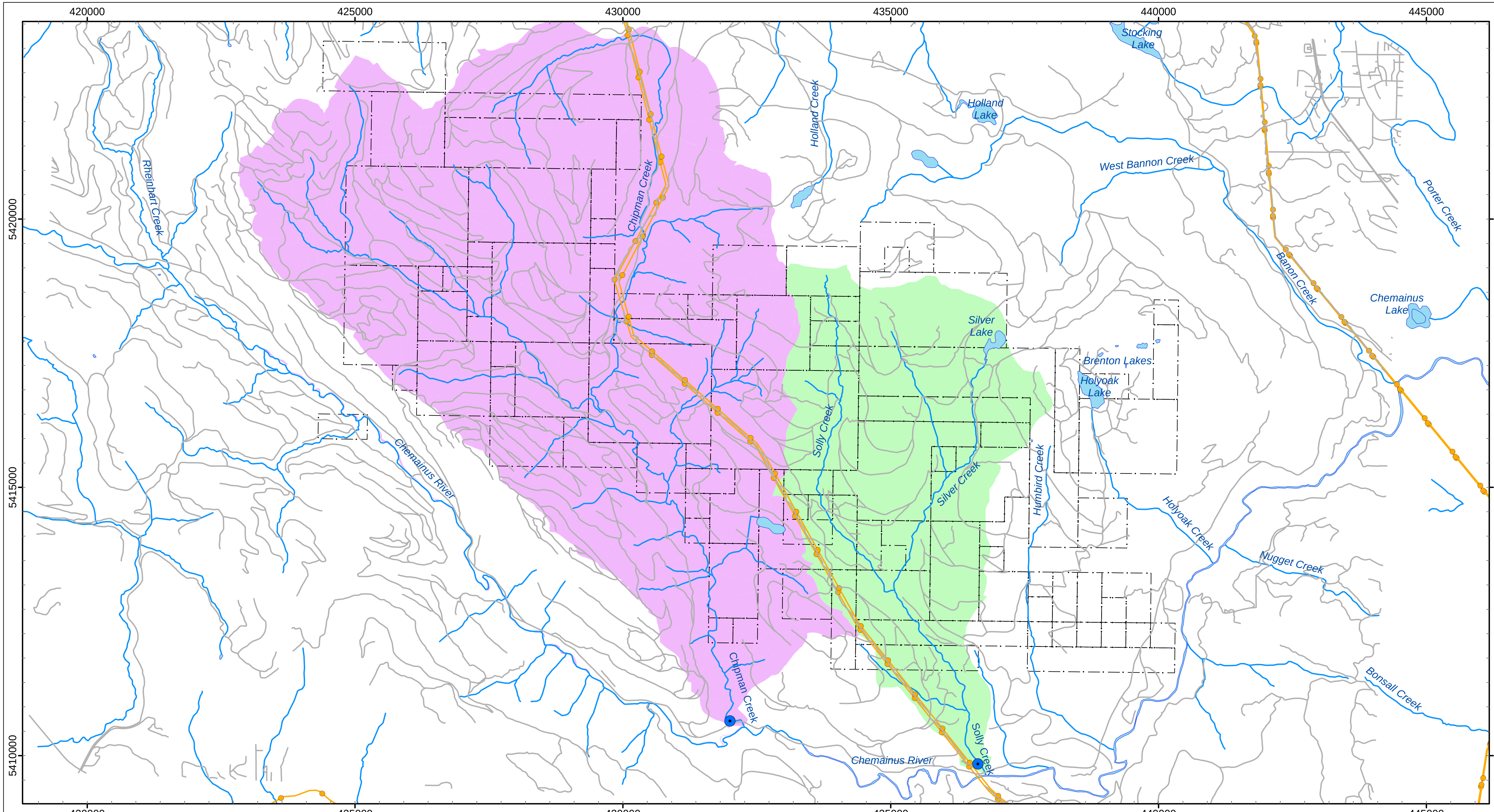
RWDI AIR Inc. 2009. Air Quality Modelling of the Catalyst Paper Crofton Pulp Mill.

Webber, T.N. 1984. A Reconnaissance Survey of Holyoak Lake. Report prepared for Fisheries Branch Ministry of Environment.

APPENDIX A. MAPS



Lara Property Mineral Claim
City
Road
Nanaimo River
Jump Creek
Haslam Creek
Ladysmith
Galiano Island
Cowichan Lake
Chipman Creek
North Cowichan
Chemainus River
Lake Cowichan
Saltspring Island
Vancouver Island
Duncan
Cowichan River
Koksilah River
North Saanich
Sidney
Central Saanich
400000
410000
420000
430000
440000
450000
460000
470000
5430000
5420000
5410000
5400000
5390000
Notes:
1. Basemap: 1:1M NTS
N
SCALE: 1:250,000
0 5 10 15 Km
Projection: UTM Zone 10N, NAD83
TREASURY METALS INCORPORATED
EDI
Treasury Metals Inc.
MAP 1. LARA PROPERTY MINERAL CLAIM: PROJECT LOCATION
Drawing Number 100
By: DB
Rev. 1.0
13-Feb-15



Legend		Watershed Area	
●	Hydrometric Station		
—●—	BC Hydro Transmission Line	■	Chipman Creek
⌐ ¬	Lara Property Mineral Claim	■	Solly Creek
—	Road		

Notes:

1. Basemap: 1:50k WSA

N / W / E / S

N - Grid North

SCALE: 1:70,000

0 0.5 1 2 3 km

Projection: UTM Zone 10 N, NAD 83

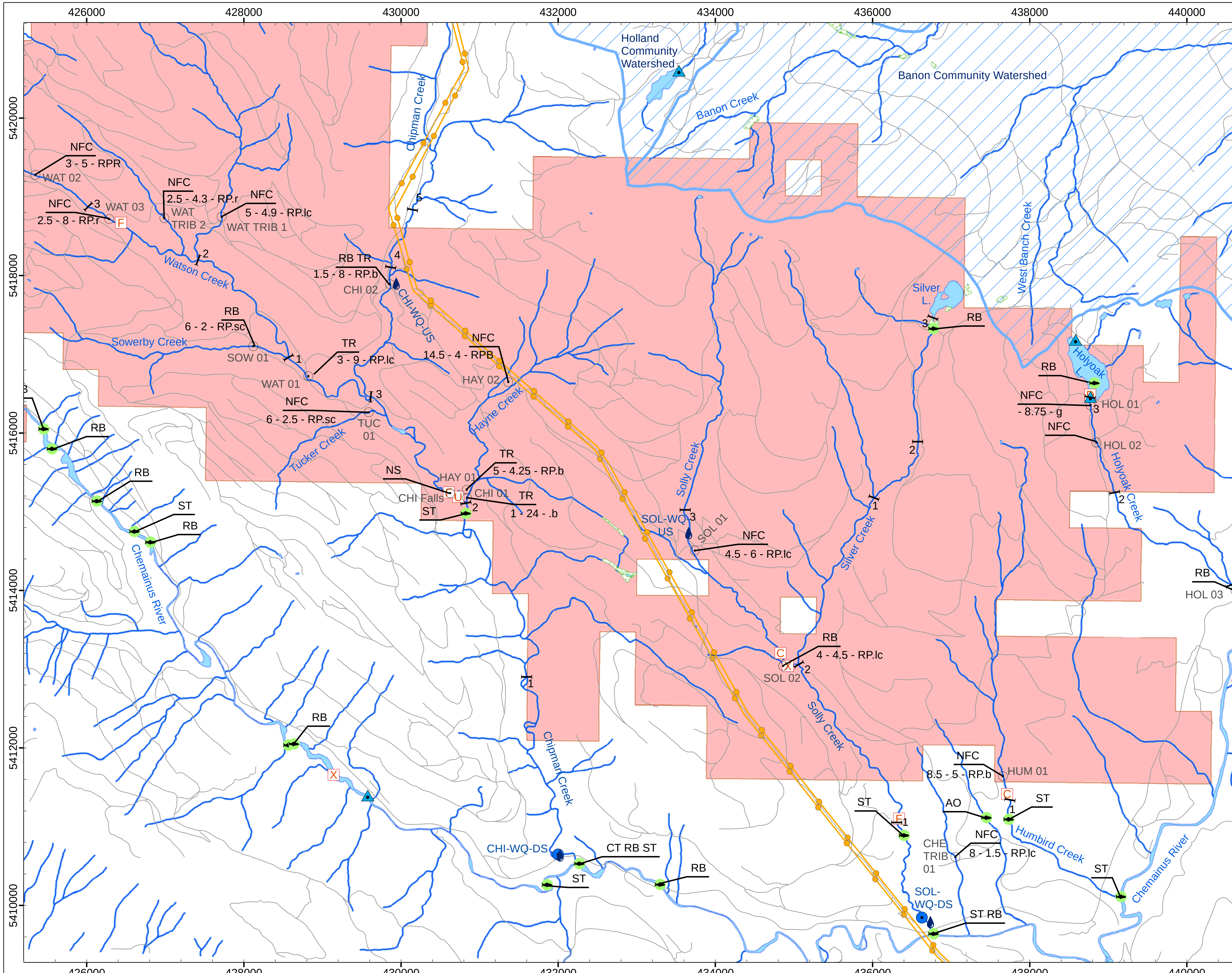
TREASURY METALS INCORPORATED

EDI

Treasury Metals Inc.

MAP 2: LARA PROPERTY MINERAL CLAIM: HYDROMETRIC STATION CATCHMENT AREAS

Drawing No. 202	Rev. 1.1	By: DB	13-Feb-14



Lara Property Mineral Claim
EDI Sample Site
Water Quality Site
Hydrometric Station
FISS Fish Observation Point
Water Licence POD
Community Watershed
Road
BC Hydro Transmission Line

Fish Barrier

- F Falls
- C Cascade
- D Dam
- X Log Jam
- U Undefined

Sample SIte Labels

Sample Site Name — Fish Species Captured / Gradient - Channel Width - Channel morphology.Dominant Substrate

Notes:

1. Hydrography: 1:20k FWA
2. Roads: DRA

N

SCALE: 1:50,000

0 1 2 3 Km

Projection: UTM Zone 10N, NAD83

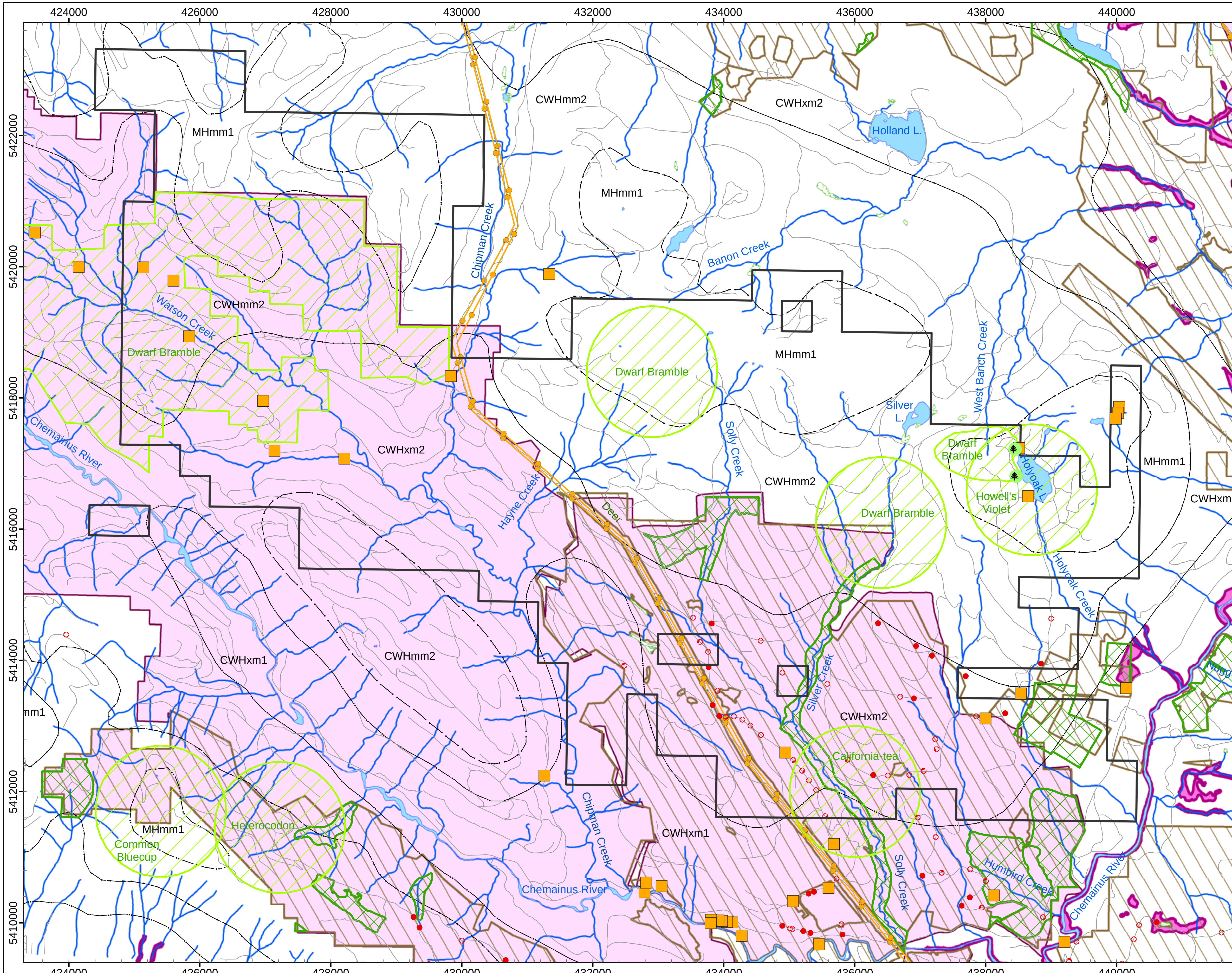
TREASURY METALS INCORPORATED

EDI

Treasury Metals Inc.

MAP 3: LARA PROPERTY MINERAL CLAIM: AQUATIC SAMPLING AND FISH DISTRIBUTION

Drawing Number 203	By: DB	Rev. 1.0	13-Feb-15



Lara Property Mineral Claim
OGMA - Non-Legal
Biogeoclimatic Zone
Non-Masked Sensitive Occurrences
SEI Extent
TEM Extent
VRI Extent
Invasive Plant Site
Terrestrial Field Plot
Dwarf Bramble Obs.
Road
BC Hydro Transmission Line

Notes:

1. Hydrography: 1:20k FWA
2. Roads: DRA

N

SCALE: 1:60,000

0 1 2 3 4 Km

Projection: UTM Zone 10N, NAD83

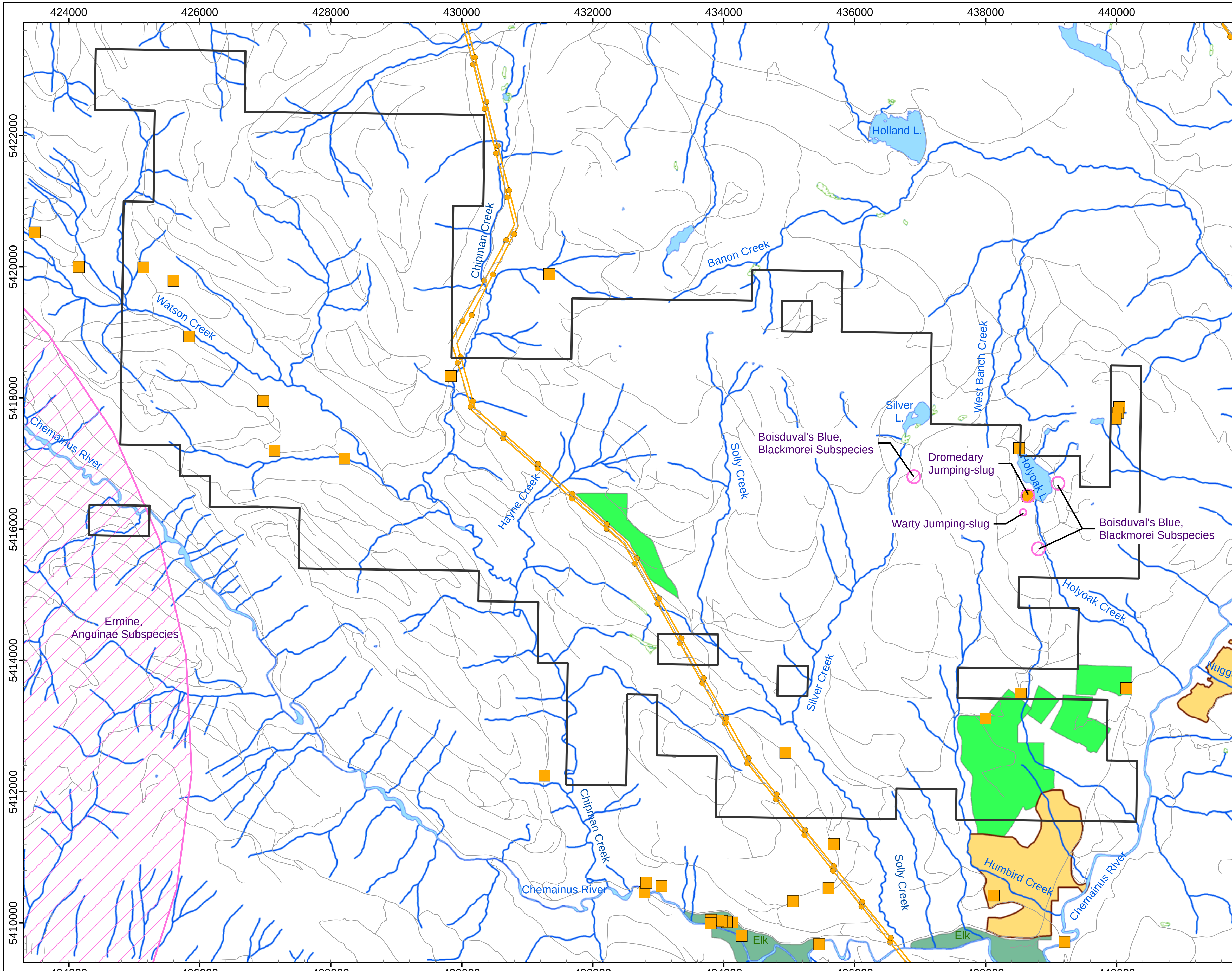
TREASURY METALS INCORPORATED

EDI

Treasury Metals Inc.

MAP 4: LARA PROPERTY MINERAL CLAIM: VEGETATION FEATURES

Drawing Number 401	By: DB	Rev. 1.0	13-Feb-15



- Lara Property Mineral Claim
- Terrestrial Field Plot
- Marbled Murrelet Wildlife Habitat Area

Ungulate Winter Range

- Deer
- Elk
- Non-Masked Sensitive Occurrence
- Road
- BC Hydro Transmission Line

Notes:

1. Hydrography: 1:20k FWA
2. Roads: DRA

N

SCALE: 1:60,000

0 1 2 3 4 Km

Projection: UTM Zone 10N, NAD83

TREASURY METALS INCORPORATED

EDI

Treasury Metals Inc.

MAP 5: LARA PROPERTY MINERAL CLAIM: WILDLIFE FEATURES

Drawing Number 402	By: DB	Rev. 1.0	13-Feb-15

APPENDIX B. POTENTIAL RARE PLANTS, ANIMALS AND ECOSYSTEMS WITHIN THE PROJECT AREA

Table B-19. Rare plant species potentially present within the project area.

Scientific Name	English Name	COSEWIC[1]	BC List	GOERT[2]	SARA[3]	BGC[4] Unit	Habitat Subtype
Allium amplectens	slimleaf onion		Blue	Y		CWHxm	Vernal Pools/Seasonal Seeps; Rock/Sparsely Vegetated Rock; Meadow; Garry Oak Woodland; Garry Oak Coastal Bluffs
Allium crenulatum	Olympic onion		Red			CWHxm; MHmm	Cliff; Rock/Sparsely Vegetated Rock; Talus
Anemone drummondii var. *drummondii*	alpine anemone		Blue			MHmm	Rock/Sparsely Vegetated Rock; Tundra; Meadow
Balsamorhiza deltoidea	deltoid balsamroot	E (Apr 2009)	Red	Y	1-E (Jun 2003)	CWHxm	Rock/Sparsely Vegetated Rock; Grassland; Mixed Forest (deciduous/coniferous mix); Sand Dune; Beach
Bidens amplissima	Vancouver Island beggarticks	SC (Nov 2001)	Blue		1-SC (Jun 2003)	CWHxm	Estuary; Marsh; Beach; Mudflats - Intertidal
Carex feta	green-sheathed sedge		Blue	Y		CWHxm	Marsh; Vernal Pools/Seasonal Seeps; Meadow; Urban/Suburban/Rural; Riparian Herbaceous
Carex interrupta	green-fruited sedge		Red			CWHxm	Stream/River; Riparian Herbaceous; Gravel Bar
Ceratophyllum echinatum	spring hornwort		Blue			CWHxm	Lake; Pond/Open Water
Clarkia purpurea ssp. *quadrivulnera*	wine-cup clarkia		Red	Y		CWHxm	Meadow
Claytonia washingtoniana	Washington springbeauty		Red			CWHxm	Cliff; Talus; Conifer Forest - Dry; Mixed Forest (deciduous/coniferous mix)
Cyperus squarrosus	awned cyperus		Blue			CWHxm	Bog; Fen; Swamp; Marsh; Vernal Pools/Seasonal Seeps
Eucephalus paucicapitatus	Olympic mountain aster		Blue			MHmm	Rock/Sparsely Vegetated Rock; Talus; Conifer Forest - Mesic (average); Krummholtz; Alpine/Subalpine Meadow
Fraxinus latifolia	Oregon ash		Red			CWHxm	Estuary; Swamp; Stream/River

Scientific Name	English Name	COSEWIC[1]	BC List	GOERT[2]	SARA[3]	BGC[4] Unit	Habitat Subtype
Githopsis specularioides	common bluecup		Red	Y		CWHmm; CWHxm; MHmm	Vernal Pools/Seasonal Seeps; Rock/Sparsely Vegetated Rock; Grassland
Glyceria leptostachya	slender-spiked mannagrass		Blue			CWHxm	Bog; Fen; Swamp; Marsh; Lake; Pond/Open Water; Mudflats - Intertidal
Heterocodon rariflorum	heterocodon		Blue	Y		CDFmm; CWHxm	Vernal Pools/Seasonal Seeps; Conifer Forest - Mesic (average); Conifer Forest - Moist/wet
Hosackia pinnata	bog bird's-foot lotus	E (May 2004)	Red	Y	1-E (Jul 2005)	CWHmm	Vernal Pools/Seasonal Seeps; Meadow; Grassland; Riparian Herbaceous; Garry Oak Vernal Pool
Idahoa scapigera	scalepod		Red	Y		CWHxm	Vernal Pools/Seasonal Seeps; Rock/Sparsely Vegetated Rock; Meadow; Sagebrush Steppe
Isoetes nuttallii	Nuttall's quillwort		Blue	Y		CWHxm	Vernal Pools/Seasonal Seeps; Stream/River; Rock/Sparsely Vegetated Rock; Meadow; Conifer Forest - Dry; Garry Oak Woodland; Garry Oak Vernal Pool; Garry Oak Maritime Meadow
Limnanthes macounii	Macoun's meadow-foam	T (Nov 2004)	Red	Y	1-T (Aug 2006)	CWHxm	Meadow; Deciduous/Broadleaf Forest; Garry Oak Vernal Pool; Garry Oak Maritime Meadow
Lupinus lepidus	prairie lupine	E (Apr 2009)	Red	Y	1-E (Jun 2003)	CWHmm; CWHxm	Rock/Sparsely Vegetated Rock; Meadow; Garry Oak Maritime Meadow
Meconella oregana	white meconella	E (May 2005)	Red	Y	1-E (Aug 2006)	CWHxm	Rock/Sparsely Vegetated Rock; Deciduous/Broadleaf Forest
Mitellastra caulescens	leafy mitrewort		Blue			CWHxm; MHmm	Riparian Forest; Cliff; Rock/Sparsely Vegetated Rock; Talus; Conifer Forest - Mesic (average); Conifer Forest - Moist/wet; Mixed Forest (deciduous/coniferous mix)
Myriophyllum quitense	waterwort water-milfoil		Blue			CWHxm	Lake; Pond/Open Water
Navarretia intertexta	needle-leaved navarretia		Red	Y		CWHxm	Vernal Pools/Seasonal Seeps; Meadow
Orobanche pinorum	pine broomrape		Red			CWHmm; CWHxm	Conifer Forest - Mesic (average); Conifer Forest - Moist/wet

Scientific Name	English Name	COSEWIC[1]	BC List	GOERT[2]	SARA[3]	BGC[4] Unit	Habitat Subtype
Orthocarpus imbricatus	mountain owl-clover		Red			MHmm	Cliff; Rock/Sparsely Vegetated Rock; Talus; Meadow; Grassland
Packera macounii	Macoun's groundsel		Blue			CWHmm; CWHxm	Rock/Sparsely Vegetated Rock; Grassland; Conifer Forest - Dry
Piperia candida	white-lip rein orchid		Red	Y		CDFmm	Conifer Forest - Dry
Pleuropogon refractus	nodding semaphoregrass		Blue			CWHxm; MHmm	Riparian Forest; Conifer Forest - Moist/wet; Mixed Forest (deciduous/coniferous mix)
Polygonum paronychia	black knotweed		Blue			CWHxm	Sand Dune; Beach
Prosartes smithii	Smith's fairybells		Blue			CWHmm; CWHxm	Riparian Forest; Deciduous/Broadleaf Forest; Conifer Forest - Moist/wet; Mixed Forest (deciduous/coniferous mix)
Rubus lasiococcus	dwarf bramble		Blue			CWHmm; CWHxm; MHmm	Conifer Forest - Mesic (average); Conifer Forest - Moist/wet
Rubus nivalis	snow bramble		Blue			CWHmm; CWHxm; MHmm	Conifer Forest - Mesic (average); Conifer Forest - Moist/wet
Rupertia physodes	California-tea		Blue	Y		CWHmm; CWHxm; MHmm	Deciduous/Broadleaf Forest; Garry Oak Woodland
Sanicula bipinnatifida	purple sanicle	T (May 2001)	Red	Y	1-T (Jun 2003)	CWHxm	Rock/Sparsely Vegetated Rock; Deciduous/Broadleaf Forest; Garry Oak Woodland; Garry Oak Maritime Meadow
Sericocarpus rigidus	white-top aster	SC (Apr 2009)	Red	Y	1-SC (Jun 2003)	CWHxm	Rock/Sparsely Vegetated Rock; Meadow; Mixed Forest (deciduous/coniferous mix); Garry Oak Woodland
Sidalcea hendersonii	Henderson's checker-mallow		Blue			CWHxm	Estuary; Marsh

Scientific Name	English Name	COSEWIC[1]	BC List	GOERT[2]	SARA[3]	BGC[4] Unit	Habitat Subtype
Toxicodendron diversilobum	poison oak		Blue	Y		CWHxm	Cliff; Rock/Sparsely Vegetated Rock; Deciduous/Broadleaf Forest; Conifer Forest - Dry; Garry Oak Woodland
Trifolium cyathiferum	cup clover		Red	Y		CWHmm; CWHxm	Vernal Pools/Seasonal Seeps; Riparian Forest; Riparian Shrub
Viola howellii	Howell's violet		Blue	Y		CWHmm; CWHxm; MHmm	Rock/Sparsely Vegetated Rock; Meadow; Conifer Forest - Moist/wet
Viola praemorsa ssp. *praemorsa*	yellow montane violet	E (Nov 2007)	Red	Y	1-E (Jun 2003)	CWHxm	Pasture/Old Field; Meadow
Woodwardia fimbriata	giant chain fern		Blue			CWHxm	Stream/River; Rock/Sparsely Vegetated Rock
Yabea microcarpa	California hedge-parsley		Blue	Y		CWHxm	Vernal Pools/Seasonal Seeps; Rock/Sparsely Vegetated Rock; Meadow; Grassland; Deciduous/Broadleaf Forest; Conifer Forest - Dry; Garry Oak Woodland

[1]Committee on the Status of Endangered Wildlife in Canada; [2]Garry Oak Ecosystems Recovery Team; [3]Species at Risk Act; [4]Biogeoclimatic

Table B-20. Rare animal species potentially present within the project area.

Scientific Name	English Name	COSEWIC[1]	BC List	Identified Wildlife	GOERT[2]	MBCA[3]	SARA[4]	BGC[5] Zone	Habitat type
Invertebrates									
Callophrys eryphon sheltonensis	Western Pine Elfin, *sheltonensis* subspecies		Blue					CWH	Bog, Natural Shrub
Callophrys johnsoni	Johnson's Hairstreak		Red	Y (Jun 2006)				CWH	Conifer Forest
Callophrys mossii mossii	Moss' Elfin, *mossii* subspecies		Blue		Y			CWH	Cliff, Rock/Sparsely Vegetated Rock, Talus, Grassland, Shrub, Deciduous/Broadleaf Forest
Cercyonis pegala incana	Common Wood-nymph, *incana* subspecies		Red		Y			CWH	Cliff, Dry Conifer Forest, Grassland
Coenonympha tullia insulana	Common Ringlet, *insulana* subspecies		Red		Y			CWH	Meadow, Grassland, Shrub, Conifer, Deciduous or Mixed Forest
Danaus plexippus	Monarch	SC (Apr 2010)	Blue				1-SC (Jun 2003)	CWH	Meadow, Grassland
Epitheca canis	Beaverpond Baskettail		Blue					CWH	Wetland, Stream, River, Open Water, Riparian Herbaceous
Erynnis propertius	Propertius Duskywing		Red		Y			CWH; MH	Meadow, Mixed Forest, Garry Oak Woodland
Erythemis collocata	Western Pondhawk		Blue		Y			CWH	Wetland, Open Water

Scientific Name	English Name	COSEWIC[1]	BC List	Identified Wildlife	GOERT[2]	MBCA[3]	SARA[4]	BGC[5] Zone	Habitat type
Euphydryas editha taylori	Edith's Checkerspot, *taylori* subspecies	E (May 2011)	Red		Y		1-E (Jun 2003)	CWH	Vernal Pools, Meadow, Grassland
Euphyes vestris	Dun Skipper	T (Apr 2013)	Red		Y		1-T (Jun 2003)	CWH; MH	Vernal Pools, Meadow
Hesperia colorado oregonia	Western Branded Skipper, *oregonia* subspecies	E (Nov 2013)	Red		Y			CWH	Grassland, Decidous Forest
Pachydiplax longipennis	Blue Dasher		Blue		Y			CWH	Wetland, Riparian Forest, Stream, River, Cliff, Open Water
Plebejus icarioides blackmorei	Boisduval's Blue, *blackmorei* subspecies		Blue		Y			CWH; MH	Meadow, Grassland
Plebejus saepiolus insulanus	Greenish Blue, *insulanus* subspecies	E (May 2012)	Red		Y		1-E (Jun 2003)	CWH	Riparian Herbaceous, Shrub or Forest, Meadow, Grassland, Deciduous Forest
Speyeria zerene bremnerii	Zerene Fritillary, *bremnerii* subspecies		Red		Y			CWH	Meadow, Grassland, Deciduous Forest
Sympetrum vicinum	Autumn Meadowhawk		Blue		Y			CWH	Riparian Herbaceous or Shrub., Stream, River, Mixed Forest, Open Water
Allogona townsendiana	Oregon Forestsnail	E (Apr 2013)	Red				1-E (Jan 2005)	CWH	Mixed Forest

Scientific Name	English Name	COSEWIC[1]	BC List	Identified Wildlife	GOERT[2]	MBCA[3]	SARA[4]	BGC[5] Zone	Habitat type
Carychium occidentale	Western Thorn		Blue					CWH	Mixed Forest
Hemphillia dromedarius	Dromedary Jumping-slug	T (May 2014)	Red				1-T (Jan 2005)	CWH	Moist to wet Conifer Forest
Hemphillia glandulosa	Warty Jumping-slug	SC (Apr 2013)	Blue				1-SC (Jan 2005)	CWH	Riparian Forest, Deciduous, Conifer or Mixed Forest
Monadenia fidelis	Pacific Sideband		Blue					CWH	Deciduous, Conifer or Mixed Forest
Nearctula sp. 1	Threaded Vertigo	SC (Apr 2010)	Red				1-SC (Jul 2012)	CWH	Deciduous or Mixed Forest
Pristiloma johnsoni	Broadwhorl Tightcoil		Blue					CWH; MH	Talus, Deciduous, Conifer or Mixed Forest
Prophysaon coeruleum	Blue-grey Taildropper	E (Apr 2006)	Red		Y		1-E (Dec 2007)	CWH	Moist to wet Conifer Forest, Mixed Forest
Birds									
Accipiter gentilis laingi	Northern Goshawk, *laingi* subspecies	T (Apr 2013)	Red	Y (May 2004)			1-T (Jun 2003)	CWH; MH	Riparian forest, Conifer or mixed forest
Ardea herodias fannini	Great Blue Heron, *fannini* subspecies	SC (Mar 2008)	Blue	Y (May 2004)	Y		1-SC (Feb 2010)	CWH	Stream, River, Wetland, Open water, Mixed, Deciduous or Conifer forest

Scientific Name	English Name	COSEWIC[1]	BC List	Identified Wildlife	GOERT[2]	MBCA[3]	SARA[4]	BGC[5] Zone	Habitat type
Asio flammeus	Short-eared Owl	SC (Mar 2008)	Blue	Y (May 2004)	Y		1-SC (Jul 2012)	CWH	Marsh, Grassland, Riparian herbaceous, Sub-alpine, Alpine
Brachyramphus marmoratus	Marbled Murrelet	T (May 2012)	Blue	Y (May 2004)		Y	1-T (Jun 2003)	CWH; MH	Old Conifer forest
Butorides virescens	Green Heron		Blue			Y		CWH	Stream, River, Wetland, Open water
Chordeiles minor	Common Nighthawk	T (Apr 2007)	Yellow			Y	1-T (Feb 2010)	CWH	Wetland, Rock, Talus, Sparsely vegetated, Grassland, Forest
Contopus cooperi	Olive-sided Flycatcher	T (Nov 2007)	Blue			Y	1-T (Feb 2010)	CWH; MH	Wetland, Open water, Conifer or Mixed forest
Dendragapus fuliginosus	Sooty Grouse		Blue					CWH; MH	Riparian forest, Conifer forest, Shrub
Falco peregrinus anatum	Peregrine Falcon, *anatum* subspecies	SC (Apr 2007)	Red		Y		1-SC (Jun 2012)	CWH	Wetland, Open water, Cliff, Rock, Talus, Meadow, Sparsely vegetated rock, Riparian herbaceous
Falco peregrinus pealei	Peregrine Falcon, *pealei* subspecies	SC (Apr 2007)	Blue				1-SC (Jun 2003)	CWH	Wetland, Open water, Cliff, Rock, Talus, Meadow, Sparsely vegetated rock, Riparian herbaceous
Glaucidium gnoma swarthi	Northern Pygmy-Owl, *swarthi* subspecies		Blue	Y (Jun 2006)	Y			CWH; MH	Wetland, Riparian forest, Conifer, Mixed or Deciduous forest,

Scientific Name	English Name	COSEWIC[1]	BC List	Identified Wildlife	GOERT[2]	MBCA[3]	SARA[4]	BGC[5] Zone	Habitat type
Hirundo rustica	Barn Swallow	T (May 2011)	Blue			Y		CWH; MH	Forages in all habitats but requires structures such as buildings or bridges for nesting
Lagopus leucura saxatilis	White-tailed Ptarmigan, *saxatilis* subspecies		Blue	Y (Jun 2006)				CMA; MH	Alpine, sub-alpine
Megascops kennicottii kennicottii	Western Screech-Owl, *kennicottii* subspecies	T (May 2012)	Blue		Y		1-SC (Jan 2005)	CWH	Riparian forest, Mixed forest
Patagioenas fasciata	Band-tailed Pigeon	SC (Nov 2008)	Blue		Y	Y	1-SC (Feb 2011)	CWH	Conifer, Mixed or Deciduous forest, Riparian forest, Shrub
Pooecetes gramineus affinis	Vesper Sparrow, *affinis* subspecies	E (Apr 2006)	Red		Y		1-E (Dec 2007)	CWH	Grassland
Progne subis	Purple Martin		Blue		Y	Y		CWH	Conifer, Mixed or Deciduous forest, Riparian forest, Shrub but requires nest boxes for nesting
Herptiles									
Anaxyrus boreas	Western Toad	SC (Nov 2012)	Blue				1-SC (Jan 2005)	CWH	Wetland, Forest, Stream, River, Open water
Aneides vagrans	Wandering Salamander	SC (May 2014)	Blue					CWH	Riparian forest, Moist forest, Talus, Shrub

Scientific Name	English Name	COSEWIC[1]	BC List	Identified Wildlife	GOERT[2]	MBCA[3]	SARA[4]	BGC[5] Zone	Habitat type
Rana aurora	Northern Red-legged Frog	SC (Nov 2004)	Blue	Y (May 2004)			1-SC (Jan 2005)	CWH; MH	Wetland, Riparian herbaceous, shrub or forest, Deciduous forest, Stream, River, Lake, Meadow, Open water
Chrysemys picta	Painted Turtle	E/SC (Apr 2006)	No Status				1	CWH; MH	Wetland, Riparian herbaceous, shrub or forest, Deciduous forest, Stream, River, Lake, Meadow, Open water
Chrysemys picta pop. 1	Painted Turtle - Pacific Coast Population	E (Apr 2006)	Red				1-E (Dec 2007)	CWH; MH	Wetland, Riparian herbaceous, shrub or forest, Deciduous forest, Stream, River, Lake, Meadow, Open water
Contia tenuis	Sharp-tailed Snake	E (Nov 2009)	Red		Y		1-E (Jun 2003)	CWH	Caves, Rock/Sparsely Vegetated Rock, Talus, Meadow, Dry Conifer Forest, Garry Oak Coastal Bluffs
Mammals									
Cervus elaphus roosevelti	Roosevelt Elk		Blue		Y			CWH; MH	All habitats except open water
Corynorhinus townsendii	Townsend's Big-eared Bat		Blue		Y			CWH	Forages in all habitats but requires natural cavities or caves for nesting and roosting
Gulo gulo vancouverensis	Wolverine, *vancouverensis* subspecies	SC (May 2014)	Red	Y (May 2004)				CWH; MH	All habitats in alpine and sub-alpine

Scientific Name	English Name	COSEWIC[1]	BC List	Identified Wildlife	GOERT[2]	MBCA[3]	SARA[4]	BGC[5] Zone	Habitat type
Marmota vancouverensis	Vancouver Island Marmot	E (Mar 2008)	Red	Y (May 2004)			1-E (Jun 2003)	CMA; MH	Meadow, Sparsely vegetated rock, avalanche chutes in alpine and sub-alpine
Mustela erminea anguinae	Ermine, *anguinae* subspecies		Blue		Y			CWH; MH	Riparian forest, shrub or herbaceous, Shrub, Talus, Meadow, Conifer, Mixed or Deciduous forest
Myotis keenii	Keen's Myotis	DD (Nov 2003)	Blue	Y (May 2004)			3 (Mar 2005)	CWH; MH	Forages in all habitats but requires natural cavities or caves for nesting and roosting
Sorex palustris brooksi	American Water Shrew, *brooksi* subspecies		Red	Y (Jun 2006)				CWH	Wetland, Riparian herbaceous, shrub or forest, Deciduous forest, Stream, River, Lake, Meadow, Open water

[1]Committee on the Status of Endangered Wildlife in Canada; [2]Garry Oak Ecosystems Recovery Team; [3] Migratory Birds Convention Act; [4]Species at Risk Act; [5]Biogeoclimatic

Table B-21. Red- and blue-listed ecological communities potentially present within the project area.

Scientific Name	English Name	BC List	Biogeoclimatic Units	Ecosystem Group
Abies amabilis - Thuja plicata / Rubus spectabilis Moist Maritime 2	amabilis fir - western redcedar / salmonberry Moist Maritime 2	Blue	CWHmm2/08	Terrestrial - Forest: Coniferous - moist/wet
Arbutus menziesii / Arctostaphylos columbiana	arbutus / hairy manzanita	Red	CWHxm1/00	Terrestrial - Forest: Broadleaf - dry
Carex lasiocarpa - Rhynchospora alba	slender sedge - white beak-rush	Red	CWHmm2/Wf53;CWHxm1/Wf53;CWHxm2/Wf53	Wetland - Peatland: Wetland Fen (Wf)
Carex sitchensis - Oenanthe sarmentosa	Sitka sedge - Pacific water-parsley	Blue	CWHxm1/Wm50	Wetland - Mineral: Wetland Marsh (Wm)
Dulichium arundinaceum Herbaceous Vegetation	three-way sedge	Red	CWHxm2/Wm51	Wetland - Mineral: Wetland Marsh (Wm)
Festuca roemeri - Koeleria macrantha	Roemer's fescue - junegrass	Red	CWHxm1/00	Terrestrial - Grassland: Grassland (Gg)
Myrica gale / Carex sitchensis	sweet gale / Sitka sedge	Red	CWHmm2/Wf52;CWHxm1/Wf52;CWHxm2/Wf52	Wetland - Peatland: Wetland Fen (Wf)
Picea sitchensis / Rubus spectabilis Very Dry Maritime	Sitka spruce / salmonberry Very Dry Maritime	Red	CWHxm1/08;CWHxm2/08	Terrestrial - Flood: Flood (Highbench);Terrestrial - Forest: Mixed - moist/wet
Pinus contorta / Sphagnum spp. *Very Dry Maritime*	lodgepole pine / peat-mosses Very Dry Maritime	Blue	CWHxm1/11;CWHxm2/11	Wetland - Peatland: Wetland Bog (Wb)
Populus tremuloides / Malus fusca / Carex obnupta	trembling aspen / Pacific crab apple / slough sedge	Red	CDFmm/00;CWHxm1	Wetland - Mineral: Wetland Swamp (Ws)

Scientific Name	English Name	BC List	Biogeoclimatic Units	Ecosystem Group
Populus trichocarpa - Alnus rubra / Rubus spectabilis	black cottonwood - red alder / salmonberry	Blue	CWHxm1/09;CWHxm2/09	Terrestrial - Flood: Flood Midbench (Fm);Terrestrial - Forest: Broadleaf - moist/wet
Populus trichocarpa / Salix sitchensis	black cottonwood / Sitka willow	Blue	CWHxm1/10;CWHxm2/10	Terrestrial - Flood: Flood Midbench (Fm);Terrestrial - Forest: Broadleaf - moist/wet
Pseudotsuga menziesii / Mahonia nervosa	Douglas-fir / dull Oregon-grape	Red	CWHxm1	Terrestrial - Forest: Coniferous - mesic
Pseudotsuga menziesii - Pinus contorta / Cladina spp.	Douglas-fir - lodgepole pine / reindeer lichens	Red	CWHxm2/02	Terrestrial - Forest: Coniferous - dry
Pseudotsuga menziesii - Pinus contorta / Racomitrium canescens	Douglas-fir - lodgepole pine / grey rock-moss	Red	CWHxm1/02	Terrestrial - Forest: Coniferous - dry
Pseudotsuga menziesii / Polystichum munitum	Douglas-fir / sword fern	Blue	CWHxm1/04;CWHxm2/04	Terrestrial - Forest: Coniferous - dry
Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon Dry Maritime	Douglas-fir - western hemlock / salal Dry Maritime	Blue	CWHxm1/03;CWHxm2/03	Terrestrial - Forest: Coniferous - dry
Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon Moist Maritime	Douglas-fir - western hemlock / salal Moist Maritime	Blue	CWHmm2/02	Terrestrial - Forest: Coniferous - dry

Scientific Name	English Name	BC List	Biogeoclimatic Units	Ecosystem Group
Rhododendron groenlandicum / Kalmia microphylla / Sphagnum spp.	Labrador-tea / western bog-laurel / peat-mosses	Blue	CWHxm1/Wb50;CWHxm2/Wb50	Wetland - Peatland: Wetland Bog (Wb)
Schoenoplectus acutus Deep Marsh	hard-stemmed bulrush Deep Marsh	Blue	CWHxm1/Wm06	Wetland - Mineral: Wetland Marsh (Wm)
Selaginella wallacei / Cladina spp.	Wallace's selaginella / reindeer lichens	Blue	CWHxm1;CWHxm2	Terrestrial - Grassland: Grassland (Gg);Terrestrial - Rock: Rock Outcrop (Ro)
Thuja plicata / Carex obnupta	western redcedar / slough sedge	Blue	CWHxm1/15;CWHxm2/15	Wetland - Mineral: Wetland Swamp (Ws)
Thuja plicata / Lonicera involucrata	western redcedar / black twinberry	Red	CWHxm1/14;CWHxm2/14	Terrestrial - Forest: Coniferous - moist/wet
Thuja plicata - Picea sitchensis / Lysichiton americanus	western redcedar - Sitka spruce / skunk cabbage	Blue	CWHxm1/12;CWHxm2/12	Wetland - Mineral: Wetland Swamp (Ws)
Thuja plicata / Polystichum munitum Very Dry Maritime	western redcedar / sword fern Very Dry Maritime	Blue	CWHxm1/05;CWHxm2/05	Terrestrial - Forest: Coniferous - mesic
Thuja plicata / Rubus spectabilis	western redcedar / salmonberry	Red	CWHxm1/13;CWHxm2/13	Terrestrial - Forest: Coniferous - moist/wet
Thuja plicata / Tiarella trifoliata Very Dry Maritime	western redcedar / three-leaved foamflower Very Dry Maritime	Blue	CWHxm1/07;CWHxm2/07	Terrestrial - Forest: Coniferous - moist/wet

Scientific Name	English Name	BC List	Biogeoclimatic Units	Ecosystem Group
Thuja plicata - Tsuga heterophylla / Polystichum munitum	western redcedar - western hemlock / sword fern	Blue	CWHmm2/04	Terrestrial - Forest: Coniferous - dry
Thuja plicata - Xanthocyparis nootkatensis / Coptis aspleniifolia Moist Maritime 2	western redcedar - yellow-cedar / spleenwort-leaved goldthread Moist Maritime 2	Blue	CWHmm2/07	Terrestrial - Forest: Coniferous - moist/wet
Tsuga heterophylla - Abies amabilis / Blechnum spicant Moist Maritime	western hemlock - amabilis fir / deer fern Moist Maritime	Red	CWHmm2/06	Terrestrial - Forest: Coniferous - moist/wet
Tsuga heterophylla - Abies amabilis / Rhytidiopsis robusta	western hemlock - amabilis fir / pipecleaner moss	Blue	CWHmm2/01	Terrestrial - Forest: Coniferous - mesic
Tsuga heterophylla - Pseudotsuga menziesii / Eurhynchium oreganum	western hemlock - Douglas-fir / Oregon beaked-moss	Red	CWHxm2/01	Terrestrial - Forest: Coniferous - mesic
Tsuga heterophylla - Thuja plicata / Blechnum spicant	western hemlock - western redcedar / deer fern	Red	CWHxm1/06;CWHxm2/06	Terrestrial - Forest: Coniferous - moist/wet
Tsuga heterophylla - Thuja plicata / Gaultheria shallon Moist Maritime 2	western hemlock - western redcedar / salal Moist Maritime 2	Blue	CWHmm2/03	Terrestrial - Forest: Coniferous - dry
Typha latifolia Marsh	common cattail Marsh	Blue	CWHxm1/Wm05;CWHxm2/Wm05	Wetland - Mineral: Wetland Marsh (Wm)

APPENDIX C. AQUATIC SAMPLING PHOTOS

Photo B-1. An upstream view of Chipman Creek showing the beginning of the confined canyon section immediately downstream of the 25 m falls on November 12, 2014.

Photo B-13. A downstream view of Chipman Creek taken immediately downstream of the bridge crossing at Site CHI02, on November 12, 2014.

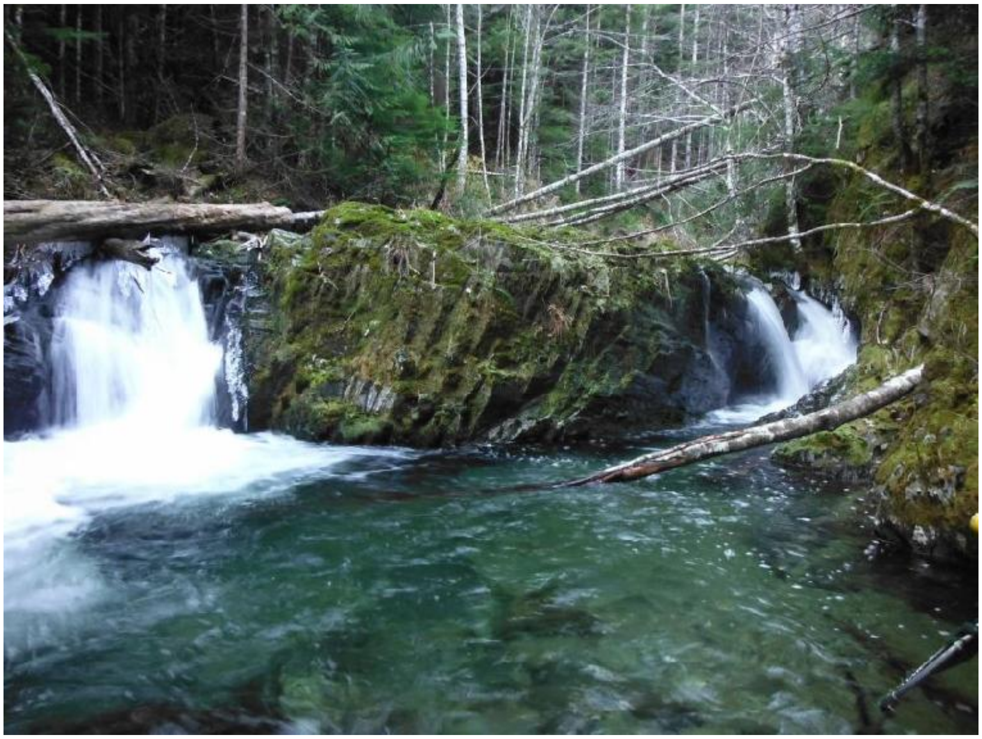


Photo B-3. An upstream view of the 2.5 m bedrock falls on Watson Creek, located at sample site WAT03, on November 14, 2014.

Photo B-4. An upstream view of the unnamed tributary to Watson Creek at site WAT-TRIB-01, taken approximately 770 m upstream of the confluence with Watson Creek, on November 12, 2014.

Photo B-5. A downstream view of Watson Creek at site WAT-01 taken on November 12, 2014.

Photo B-6. An upstream view of Tucker Creek at sample site TUC 01 on November 14, 2014.

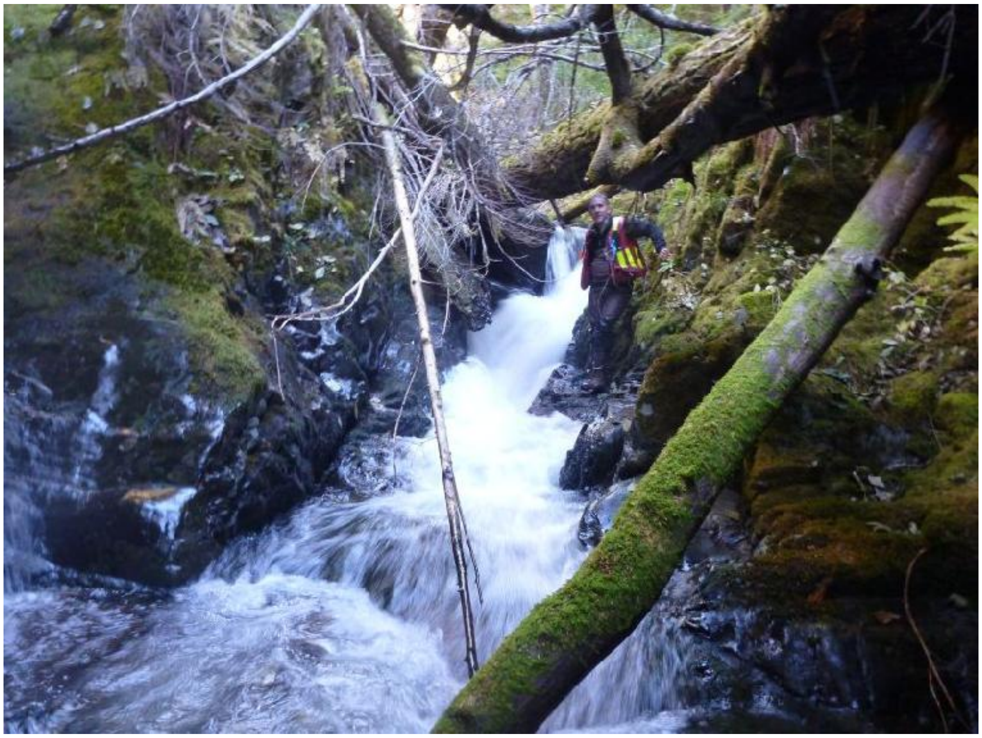


Photo B-7. An upstream view of Solly Creek, showing one of four cascades located several hundred metres upstream of sample site SOL 2, on November 13, 2014.

Photo B-8. An upstream view of the log jam located on Solly Creek immediately upstream of sample site SOL 02, on November 13, 2014.

Photo B-9. An upstream view of the 2.5 m bedrock cascade on Humbird Creek, located approximately 300 m downstream of sample site HUM 01, on November 13, 2014.

Photo B-10. A view of the earthen dam, located at the south end of Holyoak Lake looking south on November 14, 2014.

Photo B-11. A view of the concrete dam structure located at the north end of Holyoak Lake, on November 14, 2014.

APPENDIX D. DETAILED FISH SAMPLING DATA

Table C- 1. Summary of aquatic sampling locations.

Date	Waterbody	Site ID	UTM zone	UTM Easting	UTM Northing	Sample Method	EF Voltage (V)	EF Frequency (hz)	EF Pulse width (ms)	EF Seconds	Total # traps	Avg. soak time /trap (hrs)	Total Fish Captured
14-Nov-14	Chemainus River unnamed tributary	CHE TRIB 01	10 U	437022	5410593	EF	500	60	6	198	-	-	NFC
12-Nov-14	Chipman Creek	CHI-01	10 U	430707	5415209	EF	500	60	6	151	-	-	5
12-Nov-14	Chipman Creek	CHI-02	10 U	429849	5417883	EF	500	60	6	81	-	-	4
12-Nov-14	Hayne Creek	HA-01	10 U	430862	5415130	EF	500	60	6	26	-	-	3
13-Nov-14	Hayne Creek	HAY-02	10 U	431475	5416648	EF	500	60	6	246	-	-	NFC
13-Nov-14	HolyOak Creek	HOL-03				EF				50	-	-	1
14-Nov-14	Holyoak Creek	HOL-02				EF				56	-	-	NFC
13-Nov-14	Humbird Creek	HUM-01	10 U	437640	541646	EF				421			NFC
13-Nov-14	Solly Creek	SOL-01	10 U	433736	5414507	EF	500	60	6	266	-	-	NFC
13-Nov-14	Solly Creek	SOL-02	10 U	434920	5413041	EF	500	60	6	215	-	-	1
14-Nov-14	Sowerby Creek	SOU-02	10 U	428116	5417102	EF	600	60	6	40	-	-	3
14-Nov-14	Tucker Creek	TUC-01	10 U			EF	600	60	6	203	-	-	NFC
12-Nov-14	Watson Creek	WAT-01	10 U	428812	5416685	EF	500	60	6	118	-	-	2
12-Nov-14	Watson Creek	WAT-02	10 U	425339	5419270	MT	-	-	-	-	9	41	NFC
14-Nov-14	Watson Creek	WAT-03	10 U	426283	5418710	EF	600	60	6	328	-	-	NFC
12-Nov-14	Watson Creek Unnamed Tributary 1	WAT-TRIB-01	10 U	427738	5418724	EF	500	60	6	352	-	-	NFC

Table C- 2. A summary of individual fish captured during aquatic sampling in the Lara Property.

Date	Waterbody	Site ID	Sampling Method	Species	Fork length
12-Nov-14	Chipman Creek	CHI-01	EF	RB	75
12-Nov-14	Chipman Creek	CHI-01	EF	RB	68
12-Nov-14	Chipman Creek	CHI-01	EF	RB	65
12-Nov-14	Chipman Creek	CHI-01	EF	RB	65
12-Nov-14	Chipman Creek	CHI-01	EF	Tr	42
12-Nov-14	Chipman Creek	CHI-02	EF	RB	98
12-Nov-14	Chipman Creek	CHI-02	EF	Tr	51
12-Nov-14	Chipman Creek	CHI-02	EF	Tr	50
12-Nov-14	Chipman Creek	CHI-02	EF	Tr	52
12-Nov-14	Hayne Creek	HAY-01	EF	Tr	58
12-Nov-14	Hayne Creek	HAY-01	EF	Tr	56
12-Nov-14	Hayne Creek	HAY-01	EF	Tr	52
13-Nov-14	HolyOak Creek	HOL-03	EF	RB	58
14-Nov-14	Sowerby Creek	SOW-01	EF	RB	112
14-Nov-14	Sowerby Creek	SOW-01	EF	RB	136
14-Nov-14	Sowerby Creek	SOW-01	EF	RB	-
13-Nov-14	Solly Creek	SOL-02	EF	RB	125
12-Nov-14	Watson Creek	WAT-01	EF	Tr	56
12-Nov-14	Watson Creek	WAT-01	EF	Tr	61

APPENDIX E. WATER AND SEDIMENT SAMPLE LABORATORY RESULTS

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your C.O.C. #: 455293-01-01

Attention: Nichole Frederickson

EDI ENVIRONMENTAL DYNAMICS
NANAIMO
Unit 208A
2520 BOWEN ROAD
Nanaimo, BC
Canada V9T 3L3

Report Date: 2014/12/08
Report #: R1700756
Version: 1P

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B4A9035
Received: 2014/12/01, 09:00

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO3)	5	N/A	2014/12/02	BBY6SOP-00037	SM 22 2310 B m
Alkalinity - Water	5	2014/12/02	2014/12/02	BBY6SOP-00026	SM 22 2320 B m
Chloride by Automated Colourimetry	5	N/A	2014/12/02	BBY6SOP-00011	SM 22 4500-Cl- G m
Colour (True)	5	N/A	2014/12/02	BBY6SOP-00021	SM 22 2120 B m
Carbon (DOC) - field filtered/preserved (1)	4	N/A	2014/12/02	BBY6SOP-00003	SM 22 5310 C m
Carbon (DOC) - field filtered/preserved (1)	1	N/A	2014/12/04	BBY6SOP-00003	SM 22 5310 C m
Conductance - water	5	N/A	2014/12/02	BBY6SOP-00026	SM 22 2510 B m
Fluoride	5	N/A	2014/12/02	BBY6SOP-00048	SM 22 4500-F C m
Mercury (Total) by CVAF	5	2014/12/02	2014/12/03	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Bromide as Bromine (Br) by ICPMS	5	N/A	2014/12/04	BBY7SOP-00002	EPA 6020A R1 m
Nitrogen (Total)	5	2014/12/03	2014/12/03	BBY6SOP-00016	SM 22 4500-N C m
Ammonia-N (Preserved)	5	N/A	2014/12/02	BBY6SOP-00009	SM 22 4500-NH3- G m
Nitrate+Nitrite (N) (low level)	5	N/A	2014/12/02	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N) (low level)	5	N/A	2014/12/02	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrogen - Nitrate (as N)	5	N/A	2014/12/03	BBY6SOP-00010	SM 22 4500-NO3- I m
Filter and HNO3 Preserve for Metals	5	N/A	2014/12/02	BBY7 WI-00004	BCMOE Reqs 08/14
pH Water (2)	5	N/A	2014/12/02	BBY6SOP-00026	SM 22 4500-H+ B m
Orthophosphate by Konelab (low level)	5	N/A	2014/12/02	BBY6SOP-00013	SM 22 4500-P E m
Sulphate by Automated Colourimetry	3	N/A	2014/12/02	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate by Automated Colourimetry	2	N/A	2014/12/03	BBY6SOP-00017	SM 22 4500-SO42- E m
Total Dissolved Solids (Filt. Residue)	5	2014/12/02	2014/12/03	BBY6SOP-00033	SM 22 2540 C m
Carbon (Total Organic) (3)	4	N/A	2014/12/02	BBY6SOP-00003	SM 22 5310 C m
Carbon (Total Organic) (3)	1	N/A	2014/12/04	BBY6SOP-00003	SM 22 5310 C m
Total Phosphorus	5	N/A	2014/12/04	BBY6SOP-00013	SM 22 4500-P E m
Total Suspended Solids-Low Level	5	2014/12/02	2014/12/03	BBY6SOP-00034	SM 22 2540 D
Turbidity	5	N/A	2014/12/02	BBY6SOP-00027	SM 22 2130 B m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) DOC present in the sample should be considered as non-purgeable DOC.
(2) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.
(3) TOC present in the sample should be considered as non-purgeable TOC.

Your C.O.C. #: 455293-01-01

Attention: Nichole Frederickson

EDI ENVIRONMENTAL DYNAMICS
NANAIMO
Unit 208A
2520 BOWEN ROAD
Nanaimo, BC
Canada V9T 3L3

Report Date: 2014/12/08
Report #: R1700756
Version: 1P

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

-2-

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Graham Rudkin, Project Manager, Environmental
Email: GRudkin@maxxam.ca
Phone# (604) 638-5926 Ext:5926

==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

EDI ENVIRONMENTAL DYNAMICS

Maxxam Job #: B4A9035
Report Date: 2014/12/08

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		LG8948		LG8949		LG8950		
Sampling Date		2014/11/28		2014/11/28		2014/11/28		
COC Number		455293-01-01		455293-01-01		455293-01-01		
	UNITS	**CHI D/S 1**	**QC Batch**	**CHI D/S 2**	**QC Batch**	**CHI U/S**	**RDL**	**QC Batch**
Misc. Inorganics								
Acidity (pH 4.5)	mg/L	<0.50	7740068	<0.50	7740068	<0.50	0.50	7740068
Acidity (pH 8.3)	mg/L	0.78	7740068	0.74	7740068	0.93	0.50	7740068
Calculated Parameters								
Filter and HNO3 Preservation	N/A	LAB	7739203	LAB	7739203	LAB	N/A	7739203
Nitrate (N)	mg/L	0.0383	7739011	0.0358	7739011	0.0519	0.0020	7739011
Misc. Inorganics								
Fluoride (F)	mg/L	0.015	7739907	0.015	7739907	0.015	0.010	7739907
Dissolved Organic Carbon (C)	mg/L	3.24	7740245	3.10	7742729	2.64	0.50	7740245
Alkalinity (Total as CaCO3)	mg/L	8.11	7740018	7.94	7740018	7.15	0.50	7740018
Total Organic Carbon (C)	mg/L	2.69	7740251	3.26	7742732	3.89	0.50	7740249
Alkalinity (PP as CaCO3)	mg/L	<0.50	7740018	<0.50	7740018	<0.50	0.50	7740018
Bicarbonate (HCO3)	mg/L	9.89	7740018	9.69	7740018	8.72	0.50	7740018
Carbonate (CO3)	mg/L	<0.50	7740018	<0.50	7740018	<0.50	0.50	7740018
Hydroxide (OH)	mg/L	<0.50	7740018	<0.50	7740018	<0.50	0.50	7740018
Anions								
Orthophosphate (P)	mg/L	0.0014 (1)	7739975	0.0019 (1)	7739975	<0.0010 (1)	0.0010	7739975
Dissolved Sulphate (SO4)	mg/L	0.50	7740609	<0.50	7740609	<0.50	0.50	7741875
Dissolved Chloride (Cl)	mg/L	1.5	7740607	1.4	7740607	1.4	0.50	7741874
MISCELLANEOUS								
True Colour	Col. Unit	15.0 (1)	7740192	10.0 (1)	7740192	15.0 (1)	5.0	7740192
Nutrients								
Total Ammonia (N)	mg/L	0.0093	7740231	<0.0050	7740231	<0.0050	0.0050	7740231
Nitrate plus Nitrite (N)	mg/L	0.0383	7740193	0.0358	7740193	0.0519	0.0020	7740190
Nitrite (N)	mg/L	<0.0020	7740194	<0.0020	7740194	<0.0020	0.0020	7740191
Total Nitrogen (N)	mg/L	0.123	7740742	0.116	7740742	0.125	0.020	7740740
Total Phosphorus (P)	mg/L	0.0060	7741097	0.0076	7741097	0.0035	0.0020	7741097
Physical Properties								
Conductivity	uS/cm	23.5	7740005	23.2	7740005	23.1	1.0	7740005
pH	pH	7.00	7740016	7.03	7740016	7.02		7740016
Physical Properties								
Total Suspended Solids	mg/L	4.0	7739738	3.8	7739738	1.4	1.0	7739738
Total Dissolved Solids	mg/L	32	7739947	28	7739947	36	10	7739947

RDL = Reportable Detection Limit
(1) Sample analysed past hold time: sample was received on the hold time expiry date which did not allow sufficient time for preparation and analysis.

Maxxam
A Bureau Veritas Group Company

Success Through Science®

EDI ENVIRONMENTAL DYNAMICS

Maxxam Job #: B4A9035
Report Date: 2014/12/08

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		LG8948		LG8949		LG8950		
Sampling Date		2014/11/28		2014/11/28		2014/11/28		
COC Number		455293-01-01		455293-01-01		455293-01-01		
	UNITS	**CHI D/S 1**	**QC Batch**	**CHI D/S 2**	**QC Batch**	**CHI U/S**	**RDL**	**QC Batch**
Turbidity	NTU	0.70 (1)	7739808	1.10 (1)	7739808	0.28 (1)	0.10	7739808

RDL = Reportable Detection Limit
(1) Sample analysed past hold time: sample was received on the hold time expiry date which did not allow sufficient time for preparation and analysis.

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		LG8951		LG8952		
Sampling Date		2014/11/28		2014/11/28		
COC Number		455293-01-01		455293-01-01		
	UNITS	**SOL D/S**	**QC Batch**	**SOL U/S**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.50	7740068	<0.50	0.50	7740068
Acidity (pH 8.3)	mg/L	0.85	7740068	1.00	0.50	7740068
Calculated Parameters						
Filter and HNO3 Preservation	N/A	LAB	7739203	LAB	N/A	7739203
Nitrate (N)	mg/L	0.0062	7739011	0.0124	0.0020	7739011
Misc. Inorganics						
Fluoride (F)	mg/L	0.016	7739907	0.012	0.010	7739907
Dissolved Organic Carbon (C)	mg/L	3.73	7740245	4.25	0.50	7740245
Alkalinity (Total as CaCO3)	mg/L	6.19	7740018	4.42	0.50	7740018
Total Organic Carbon (C)	mg/L	3.58	7740251	3.80	0.50	7740249
Alkalinity (PP as CaCO3)	mg/L	<0.50	7740018	<0.50	0.50	7740018
Bicarbonate (HCO3)	mg/L	7.55	7740018	5.39	0.50	7740018
Carbonate (CO3)	mg/L	<0.50	7740018	<0.50	0.50	7740018
Hydroxide (OH)	mg/L	<0.50	7740018	<0.50	0.50	7740018
Anions						
Orthophosphate (P)	mg/L	<0.0010 (1)	7739975	<0.0010 (1)	0.0010	7739975
Dissolved Sulphate (SO4)	mg/L	<0.50	7741875	<0.50	0.50	7740606
Dissolved Chloride (Cl)	mg/L	1.4	7741874	1.5	0.50	7741874
MISCELLANEOUS						
True Colour	Col. Unit	20.0 (1)	7740192	10.0 (1)	5.0	7740192
Nutrients						
Total Ammonia (N)	mg/L	<0.0050	7740231	<0.0050	0.0050	7740231
Nitrate plus Nitrite (N)	mg/L	0.0062	7740190	0.0124	0.0020	7740190
Nitrite (N)	mg/L	<0.0020	7740191	<0.0020	0.0020	7740191
Total Nitrogen (N)	mg/L	0.089	7740742	0.086	0.020	7740740
Total Phosphorus (P)	mg/L	0.0031	7741097	0.0027	0.0020	7741097
Physical Properties						
Conductivity	uS/cm	23.8	7740005	16.5	1.0	7740005
pH	pH	7.06	7740016	6.77		7740016
Physical Properties						
Total Suspended Solids	mg/L	<1.0	7739738	1.0	1.0	7739738
Total Dissolved Solids	mg/L	39	7739947	34	10	7739947

RDL = Reportable Detection Limit
(1) Sample analysed past hold time: sample was received on the hold time expiry date which did not allow sufficient time for preparation and analysis.

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		LG8951		LG8952		
Sampling Date		2014/11/28		2014/11/28		
COC Number		455293-01-01		455293-01-01		
	UNITS	**SOL D/S**	**QC Batch**	**SOL U/S**	**RDL**	**QC Batch**
Turbidity	NTU	0.33 (1)	7739808	0.18 (1)	0.10	7739808

RDL = Reportable Detection Limit
(1) Sample analysed past hold time: sample was received on the hold time expiry date which did not allow sufficient time for preparation and analysis.

EDI ENVIRONMENTAL DYNAMICS

Maxxam Job #: B4A9035
Report Date: 2014/12/08

MERCURY BY COLD VAPOR (WATER)

Maxxam ID		LG8948	LG8949	LG8950	LG8951	LG8952		
Sampling Date		2014/11/28	2014/11/28	2014/11/28	2014/11/28	2014/11/28		
COC Number		455293-01-01	455293-01-01	455293-01-01	455293-01-01	455293-01-01		
	UNITS	**CHI D/S 1**	**CHI D/S 2**	**CHI U/S**	**SOL D/S**	**SOL U/S**	**RDL**	**QC Batch**
Elements								
Total Mercury (Hg)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7739882

RDL = Reportable Detection Limit

EDI ENVIRONMENTAL DYNAMICS

Maxxam Job #: B4A9035
Report Date: 2014/12/08

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LG8948	LG8949	LG8950	LG8951	LG8952		
Sampling Date		2014/11/28	2014/11/28	2014/11/28	2014/11/28	2014/11/28		
COC Number		455293-01-01	455293-01-01	455293-01-01	455293-01-01	455293-01-01		
	UNITS	**CHI D/S 1**	**CHI D/S 2**	**CHI U/S**	**SOL D/S**	**SOL U/S**	**RDL**	**QC Batch**
ANIONS								
Bromide (Br)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7742029

RDL = Reportable Detection Limit

Package 1	2.7°C
Package 2	3.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Samples analysed past hold time for Nitrate and Nitrite analysis: sample was received on the hold time expiry date which did not allow sufficient time for preparation and analysis.

Results relate only to the items tested.

EDI ENVIRONMENTAL DYNAMICS
Attention: Nichole Frederickson
Client Project #:
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: VB4A9035

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7739738	PSA	Spiked Blank	Total Suspended Solids	2014/12/03		100	%	80 - 120
		Method Blank	Total Suspended Solids	2014/12/03	<1.0		mg/L	
7739808	CO5	Spiked Blank	Turbidity	2014/12/02		100	%	80 - 120
		Method Blank	Turbidity	2014/12/02	<0.10		NTU	
		RPD	Turbidity	2014/12/02	1.1		%	20
7739882	EL2	Matrix Spike	Total Mercury (Hg)	2014/12/03		90	%	80 - 120
		Spiked Blank	Total Mercury (Hg)	2014/12/03		92	%	80 - 120
		Method Blank	Total Mercury (Hg)	2014/12/03	<0.010		ug/L	
		RPD	Total Mercury (Hg)	2014/12/03	NC		%	20
7739907	SC2	Matrix Spike	Fluoride (F)	2014/12/02		NC	%	80 - 120
		Spiked Blank	Fluoride (F)	2014/12/02		98	%	80 - 120
		Method Blank	Fluoride (F)	2014/12/02	0.012, RDL=0.010		mg/L	
		RPD [LG8951-02]	Fluoride (F)	2014/12/02	NC		%	20
7739947	PSA	Matrix Spike	Total Dissolved Solids	2014/12/03		NC	%	80 - 120
		Spiked Blank	Total Dissolved Solids	2014/12/03		110	%	80 - 120
		Method Blank	Total Dissolved Solids	2014/12/03	16, RDL=10		mg/L	
		RPD	Total Dissolved Solids	2014/12/03	7.3		%	20
7739975	SF1	Matrix Spike	Orthophosphate (P)	2014/12/02		108	%	80 - 120
		Spiked Blank	Orthophosphate (P)	2014/12/02		102	%	80 - 120
		Method Blank	Orthophosphate (P)	2014/12/02	<0.0010		mg/L	
		RPD	Orthophosphate (P)	2014/12/02	NC		%	20
7740005	MM3	Spiked Blank	Conductivity	2014/12/02		100	%	80 - 120
		Method Blank	Conductivity	2014/12/02	<1.0		uS/cm	
		RPD [LG8948-02]	Conductivity	2014/12/02	0.9		%	20
7740016	MM3	Spiked Blank	pH	2014/12/02		101	%	97 - 103
		RPD [LG8948-02]	pH	2014/12/02	0.9		%	N/A
7740018	MM3	Matrix Spike [LG8948-02]	Alkalinity (Total as CaCO3)	2014/12/02		104	%	80 - 120
		Spiked Blank	Alkalinity (Total as CaCO3)	2014/12/02		97	%	80 - 120
		Method Blank	Alkalinity (Total as CaCO3)	2014/12/02	0.50, RDL=0.50		mg/L	
			Alkalinity (PP as CaCO3)	2014/12/02	<0.50		mg/L	
			Bicarbonate (HCO3)	2014/12/02	0.61, RDL=0.50		mg/L	
			Carbonate (CO3)	2014/12/02	<0.50		mg/L	
			Hydroxide (OH)	2014/12/02	<0.50		mg/L	
		RPD [LG8948-02]	Alkalinity (Total as CaCO3)	2014/12/02	9.2		%	20
			Alkalinity (PP as CaCO3)	2014/12/02	NC		%	20
			Bicarbonate (HCO3)	2014/12/02	9.2		%	20
			Carbonate (CO3)	2014/12/02	NC		%	20
			Hydroxide (OH)	2014/12/02	NC		%	20
7740068	WAY	Spiked Blank	Acidity (pH 8.3)	2014/12/02		100	%	80 - 120
		Method Blank	Acidity (pH 4.5)	2014/12/02	<0.50		mg/L	
			Acidity (pH 8.3)	2014/12/02	<0.50		mg/L	
		RPD [LG8951-02]	Acidity (pH 4.5)	2014/12/02	NC		%	20
			Acidity (pH 8.3)	2014/12/02	NC		%	20
7740190	IW1	Matrix Spike	Nitrate plus Nitrite (N)	2014/12/02		NC	%	80 - 120
		Spiked Blank	Nitrate plus Nitrite (N)	2014/12/02		104	%	80 - 120
		Method Blank	Nitrate plus Nitrite (N)	2014/12/02	<0.0020		mg/L	
		RPD	Nitrate plus Nitrite (N)	2014/12/02	0.1		%	25
7740191	IW1	Matrix Spike	Nitrite (N)	2014/12/02		97	%	80 - 120
		Spiked Blank	Nitrite (N)	2014/12/02		103	%	80 - 120
		Method Blank	Nitrite (N)	2014/12/02	<0.0020		mg/L	
		RPD	Nitrite (N)	2014/12/02	NC		%	25
7740192	CO5	Method Blank	True Colour	2014/12/02	<5.0		Col. Unit	
		RPD	True Colour	2014/12/02	NC		%	20
7740193	IW1	Spiked Blank	Nitrate plus Nitrite (N)	2014/12/02		104	%	80 - 120

EDI ENVIRONMENTAL DYNAMICS
Attention: Nichole Frederickson
Client Project #:
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: VB4A9035

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7740193 IW1	Method Blank	Nitrate plus Nitrite (N)	2014/12/02	0.0030, RDL=0.0020		mg/L	
7740194 IW1	Spiked Blank	Nitrite (N)	2014/12/02		103	%	80 - 120
	Method Blank	Nitrite (N)	2014/12/02	<0.0020		mg/L	
7740231 SF1	Matrix Spike						
	[LG8950-09]	Total Ammonia (N)	2014/12/02		107	%	80 - 120
	Spiked Blank	Total Ammonia (N)	2014/12/02		96	%	80 - 120
	Method Blank	Total Ammonia (N)	2014/12/02	<0.0050		mg/L	
	RPD [LG8950-09]	Total Ammonia (N)	2014/12/02	NC		%	20
7740245 DC6	Matrix Spike	Dissolved Organic Carbon (C)	2014/12/02		NC	%	80 - 120
	Spiked Blank	Dissolved Organic Carbon (C)	2014/12/02		99	%	80 - 120
	Method Blank	Dissolved Organic Carbon (C)	2014/12/02	<0.50		mg/L	
	RPD	Dissolved Organic Carbon (C)	2014/12/02	2.6		%	20
7740249 DC6	Matrix Spike	Total Organic Carbon (C)	2014/12/02		86	%	80 - 120
	Spiked Blank	Total Organic Carbon (C)	2014/12/02		98	%	80 - 120
	Method Blank	Total Organic Carbon (C)	2014/12/02	<0.50		mg/L	
	RPD	Total Organic Carbon (C)	2014/12/02	1.1		%	20
7740251 DC6	Matrix Spike	Total Organic Carbon (C)	2014/12/02		101	%	80 - 120
	Spiked Blank	Total Organic Carbon (C)	2014/12/02		89	%	80 - 120
	Method Blank	Total Organic Carbon (C)	2014/12/02	<0.50		mg/L	
	RPD	Total Organic Carbon (C)	2014/12/02	2.8		%	20
7740606 BB3	Matrix Spike	Dissolved Sulphate (SO4)	2014/12/02		NC	%	80 - 120
	Spiked Blank	Dissolved Sulphate (SO4)	2014/12/02		94	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2014/12/02	<0.50		mg/L	
	RPD	Dissolved Sulphate (SO4)	2014/12/02	4.0		%	20
7740607 BB3	Spiked Blank	Dissolved Chloride (Cl)	2014/12/02		102	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2014/12/02	<0.50		mg/L	
7740609 BB3	Matrix Spike	Dissolved Sulphate (SO4)	2014/12/02		NC	%	80 - 120
	Spiked Blank	Dissolved Sulphate (SO4)	2014/12/02		94	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2014/12/02	<0.50		mg/L	
	RPD	Dissolved Sulphate (SO4)	2014/12/02	0.7		%	20
7740740 DC6	Matrix Spike	Total Nitrogen (N)	2014/12/03		NC	%	80 - 120
	Spiked Blank	Total Nitrogen (N)	2014/12/03		102	%	80 - 120
	Method Blank	Total Nitrogen (N)	2014/12/03	<0.020		mg/L	
	RPD	Total Nitrogen (N)	2014/12/03	0.3		%	20
7740742 DC6	Matrix Spike	Total Nitrogen (N)	2014/12/03		NC	%	80 - 120
	Spiked Blank	Total Nitrogen (N)	2014/12/03		98	%	80 - 120
	Method Blank	Total Nitrogen (N)	2014/12/03	<0.020		mg/L	
	RPD	Total Nitrogen (N)	2014/12/03	1.3		%	20
7741097 DC6	Matrix Spike						
	[LG8950-09]	Total Phosphorus (P)	2014/12/04		96	%	80 - 120
	Spiked Blank	Total Phosphorus (P)	2014/12/04		103	%	80 - 120
	Method Blank	Total Phosphorus (P)	2014/12/04	<0.0020		mg/L	
	RPD [LG8950-09]	Total Phosphorus (P)	2014/12/04	NC		%	20
7741874 BB3	Matrix Spike	Dissolved Chloride (Cl)	2014/12/03		96	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2014/12/03		106	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2014/12/03	<0.50		mg/L	
	RPD	Dissolved Chloride (Cl)	2014/12/03	0.5		%	20
7741875 BB3	Spiked Blank	Dissolved Sulphate (SO4)	2014/12/03		99	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2014/12/03	<0.50		mg/L	
7742029 JT3	Matrix Spike						
	[LG8951-02]	Bromide (Br)	2014/12/04		89	%	78 - 120
	Spiked Blank	Bromide (Br)	2014/12/04		100	%	80 - 120
	Method Blank	Bromide (Br)	2014/12/04	<0.010		mg/L	
	RPD [LG8951-02]	Bromide (Br)	2014/12/04	NC		%	20
7742729 IC4	Spiked Blank	Dissolved Organic Carbon (C)	2014/12/04		99	%	80 - 120

EDI ENVIRONMENTAL DYNAMICS
Attention: Nichole Frederickson
Client Project #:
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: VB4A9035

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7742729	IC4	Method Blank	Dissolved Organic Carbon (C)	2014/12/04	<0.50		mg/L	
7742732	IC4	Spiked Blank	Total Organic Carbon (C)	2014/12/04		90	%	80 - 120
		Method Blank	Total Organic Carbon (C)	2014/12/04	<0.50		mg/L	

N/A = Not Applicable
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Validation Signature Page

Maxxam Job #: B4A9035

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Data Validation Coordinator

==

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam

Maxxam Analytics International Corporation o/a Maxxam Analytics
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel:(604) 734 7276 Toll-Free:800-563-6266 Fax:(604) 731 2386 www.maxxam.ca

Chain Of Custody Record

Page of

INVOICE TO:		Report Information		Project Information	
Company Name	#7766 EDI ENVIRONMENTAL DYNAMICS	Company Name	SAME	Quotation #	B41113
Contact Name	Nichole Frederickson	Contact Name		P.O. #	
Address	Unit 208A 2520 BOWEN ROAD	Address		Project #	
	Nanaimo BC V9T 3L3			Project Name	
Phone / Fax	(250) 751-9070	Phone / Fax		Site #	
Email	nfrederickson@edynamics.com	Email		Sampled By	

Laboratory Use Only

Maxxam Job #	Bottle Order #:
B4A9035	455293
Chain Of Custody Record	Project Manager
C#455293-01-01	Graham Rudkin

Regulatory Criteria: ☐ CSR ☐ CCME ☐ BC Water Quality ☐ Other

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT: ☐
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
1 DAY ☐ 2 Day ☐ 3 Day ☐ Date Required: ☐
Rush Confirmation Number: (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	pH, Conductivity, Alkalinity, Acidity, Colour	Total Suspended Solids - Low Level	Total Dissolved Solids, Turbidity	Anions (Cl, SO4, F, Br)	Nitrate (N), Nitrite (N) - Low Level	Ammonia Nitrogen, Total Nitrogen	Total Phosphorus, Orthophosphorus (Low Level)	Carbon (Total Organic), Carbon (Dissovled Organic)	Low-Level Dissolved Metals w CVAF Hg	Low-Level Total Metals w CVAF Hg	# of Bottles	Comments
1	LG8948	CHI D/S 1	2014/11/28				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	12	
2	LG8949	CHI D/S 2	↓														↓	
3	LG8950	CHI U/S	↓														↓	
4	LG8951	SOL D/S	↓														↓	
5	LG8952	SOL U/S	↓														↓	
6	LG8953	SOL D/S 1 (Sediment)	↓															1 glass jar + 1 sediment bag
7	LG8954	SOL D/S 2 (Sediment)	↓															↓
8	LG8955	CHI D/S 1 (Sediment)	↓															↓
9	LG8956	CHI D/S 2 (Sediment)	↓															↓
10																		

B4A9035

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Nicole Frederickson / Nicole Frederickson	14/11/28	5:41 pm	Laurel Berthier	2014/12/01	09:00	

Lab Use Only

Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
☐	3,3,2	☑ Yes ☐ No

3,4,3

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Your Project #: B4A9035
Your C.O.C. #: na

Attention:Graham Rudkin

Maxxam Analytics
4606 Canada Way
Burnaby, BC
V5G 1K5

Report Date: 2014/12/30
Report #: R3274538
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4O3672
Received: 2014/12/24, 09:30

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Total Organic Carbon in Soil	4	N/A	2014/12/30	CAM SOP-00468	LECO Combustion

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Shaun Nowickyj, Customer Service
Email: SNowickyj@maxxam.ca
Phone# (905) 817-5700
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B4O3672
Report Date: 2014/12/30

Maxxam Analytics
Client Project #: B4A9035

RESULTS OF ANALYSES OF SOIL

Maxxam ID		YZ3401	YZ3402	YZ3403	YZ3404		
Sampling Date		2014/11/28	2014/11/28	2014/11/28	2014/11/28		
COC Number		na	na	na	na		
	Units	**LG8953\SOL D/S 1 (SEDIMENT)**	**LG8954\SOL D/S 2 (SEDIMENT)**	**LG8955\CHI D/S 1 (SEDIMENT)**	**LG8956\CHI D/S 2 (SEDIMENT)**	**RDL**	**QC Batch**
Inorganics							
Total Organic Carbon	mg/kg	15000	18000	24000	23000	500	3872376

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.3°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4O3672
Report Date: 2014/12/30

Maxxam Analytics
Client Project #: B4A9035

QUALITY ASSURANCE REPORT

			Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3872376	Total Organic Carbon	2014/12/30	<500	mg/kg	0.088	35	101	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your C.O.C. #: 455293-01-01

Attention:Nichole Frederickson
EDI ENVIRONMENTAL DYNAMICS
Unit 208A
2520 BOWEN ROAD
Nanaimo, BC
Canada V9T 3L3

Report Date: 2015/01/07
Report #: R1775499
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4A9035
Received: 2014/12/01, 09:00

Sample Matrix: Sediment
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
GS Special Analysis	4	N/A	2014/12/06		
Elements by ICPMS (total)	4	2014/12/05	2014/12/05	BBY7SOP-00001	EPA 6020a R1 m
Moisture	4	N/A	2014/12/03	BBY8SOP-00017	OMOE E3139 3.1 m
pH (2:1 DI Water Extract)	4	2014/12/05	2014/12/05	BBY6SOP-00028	BCMOE BCLM Mar2005 m
TOC Soil Subcontract (1)	4	2014/12/31	2014/12/31		
Total Sulphur in Soil (LECO) Subcontract (2)	4	2015/01/07	2015/01/07		

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO3)	5	N/A	2014/12/02	BBY6SOP-00037	SM 22 2310 B m
Alkalinity - Water	5	2014/12/02	2014/12/02	BBY6SOP-00026	SM 22 2320 B m
Chloride by Automated Colourimetry	5	N/A	2014/12/02	BBY6SOP-00011	SM 22 4500-Cl- G m
Colour (True)	5	N/A	2014/12/02	BBY6SOP-00021	SM 22 2120 B m
Carbon (DOC) - field filtered/preserved (3)	4	N/A	2014/12/02	BBY6SOP-00003	SM 22 5310 C m
Carbon (DOC) - field filtered/preserved (3)	1	N/A	2014/12/04	BBY6SOP-00003	SM 22 5310 C m
Conductance - water	5	N/A	2014/12/02	BBY6SOP-00026	SM 22 2510 B m
Fluoride	5	N/A	2014/12/02	BBY6SOP-00048	SM 22 4500-F C m
Hardness Total (calculated as CaCO3)	5	N/A	2014/12/10	BBY7SOP-00002	EPA 6020a R1 m
Hardness (calculated as CaCO3)	5	N/A	2014/12/10	BBY7SOP-00002	EPA 6020a R1 m
Mercury (Dissolved) by CVAF	5	N/A	2014/12/03	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Mercury (Total) by CVAF	5	2014/12/02	2014/12/03	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Bromide as Bromine (Br) by ICPMS	5	N/A	2014/12/04	BBY7SOP-00002	EPA 6020A R1 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	5	N/A	2014/12/10	BBY7SOP-00002	EPA 6020A R1 m
Elements by ICPMS Low Level (dissolved)	5	N/A	2014/12/10	BBY7SOP-00002	EPA 6020A R1 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	5	N/A	2014/12/10	BBY7SOP-00002	EPA 6020A R1 m
Elements by ICPMS Low Level (total)	5	N/A	2014/12/10	BBY7SOP-00002	EPA 6020A R1 m
Nitrogen (Total)	5	2014/12/03	2014/12/03	BBY6SOP-00016	SM 22 4500-N C m
Ammonia-N (Preserved)	5	N/A	2014/12/02	BBY6SOP-00009	SM 22 4500-NH3- G m

Your C.O.C. #: 455293-01-01

Attention:Nichole Frederickson

EDI ENVIRONMENTAL DYNAMICS
Unit 208A
2520 BOWEN ROAD
Nanaimo, BC
Canada V9T 3L3

Report Date: 2015/01/07
Report #: R1775499
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4A9035
Received: 2014/12/01, 09:00

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Nitrate+Nitrite (N) (low level)	5	N/A	2014/12/02	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N) (low level)	5	N/A	2014/12/02	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrogen - Nitrate (as N)	5	N/A	2014/12/03	BBY6SOP-00010	SM 22 4500-NO3- I m
Filter and HNO3 Preserve for Metals	5	N/A	2014/12/02	BBY7 WI-00004	BCMOE Reqs 08/14
pH Water (4)	5	N/A	2014/12/02	BBY6SOP-00026	SM 22 4500-H+ B m
Orthophosphate by Konelab (low level)	5	N/A	2014/12/02	BBY6SOP-00013	SM 22 4500-P E m
Sulphate by Automated Colourimetry	3	N/A	2014/12/02	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate by Automated Colourimetry	2	N/A	2014/12/03	BBY6SOP-00017	SM 22 4500-SO42- E m
Total Dissolved Solids (Filt. Residue)	5	2014/12/02	2014/12/03	BBY6SOP-00033	SM 22 2540 C m
Carbon (Total Organic) (5)	4	N/A	2014/12/02	BBY6SOP-00003	SM 22 5310 C m
Carbon (Total Organic) (5)	1	N/A	2014/12/04	BBY6SOP-00003	SM 22 5310 C m
Total Phosphorus	5	N/A	2014/12/04	BBY6SOP-00013	SM 22 4500-P E m
Total Suspended Solids-Low Level	5	2014/12/02	2014/12/03	BBY6SOP-00034	SM 22 2540 D
Turbidity	5	N/A	2014/12/02	BBY6SOP-00027	SM 22 2130 B m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Ontario (From Burnaby)
(2) This test was performed by Maxxam Montreal (From Burnaby)
(3) DOC present in the sample should be considered as non-purgeable DOC.
(4) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.
(5) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Graham Rudkin, Project Manager, Environmental
Email: GRudkin@maxxam.ca
Phone# (604)638-5926 Ext:5926
==

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B4A9035
Report Date: 2015/01/07

EDI ENVIRONMENTAL DYNAMICS

RESULTS OF CHEMICAL ANALYSES OF SEDIMENT

Maxxam ID		LG8953	LG8954	LG8955	LG8956	
Sampling Date		2014/11/28	2014/11/28	2014/11/28	2014/11/28	
COC Number		455293-01-01	455293-01-01	455293-01-01	455293-01-01	
	Units	**SOL D/S 1 (SEDIMENT)**	**SOL D/S 2 (SEDIMENT)**	**CHI D/S 1 (SEDIMENT)**	**CHI D/S 2 (SEDIMENT)**	**QC Batch**
Parameter						
Special Analysis	N/A	SEE REMARK	SEE REMARK	SEE REMARK	SEE REMARK	7745593
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	7768422

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

PHYSICAL TESTING (SEDIMENT)

Maxxam ID		LG8953	LG8954	LG8955	LG8956		
Sampling Date		2014/11/28	2014/11/28	2014/11/28	2014/11/28		
COC Number		455293-01-01	455293-01-01	455293-01-01	455293-01-01		
	Units	**SOL D/S 1 (SEDIMENT)**	**SOL D/S 2 (SEDIMENT)**	**CHI D/S 1 (SEDIMENT)**	**CHI D/S 2 (SEDIMENT)**	**RDL**	**QC Batch**
Physical Properties							
Moisture	%	20	21	23	18	0.30	7739693
RDL = Reportable Detection Limit							

Maxxam Job #: B4A9035
Report Date: 2015/01/07

EDI ENVIRONMENTAL DYNAMICS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		LG8948		LG8949		LG8950		LG8951		
Sampling Date		2014/11/28		2014/11/28		2014/11/28		2014/11/28		
COC Number		455293-01-01		455293-01-01		455293-01-01		455293-01-01		
	Units	**CHI D/S 1**	**QC Batch**	**CHI D/S 2**	**QC Batch**	**CHI U/S**	**QC Batch**	**SOL D/S**	**RDL**	**QC Batch**
Misc. Inorganics										
Acidity (pH 4.5)	mg/L	<0.50	7740068	<0.50	7740068	<0.50	7740068	<0.50	0.50	7740068
Acidity (pH 8.3)	mg/L	0.78	7740068	0.74	7740068	0.93	7740068	0.85	0.50	7740068
Calculated Parameters										
Filter and HNO3 Preservation	N/A	LAB	7739203	LAB	7739203	LAB	7739203	LAB	N/A	7739203
Total Hardness (CaCO3)	mg/L	9.47	7739050	9.66	7739050	8.71	7739050	6.33	0.50	7739050
Nitrate (N)	mg/L	0.0383	7739011	0.0358	7739011	0.0519	7739011	0.0062	0.0020	7739011
Misc. Inorganics										
Fluoride (F)	mg/L	0.015	7739907	0.015	7739907	0.015	7739907	0.016	0.010	7739907
Dissolved Hardness (CaCO3)	mg/L	9.14	7738279	9.17	7738279	8.81	7738279	6.38	0.50	7738279
Dissolved Organic Carbon (C)	mg/L	3.24	7740245	3.10	7742729	2.64	7740245	3.73	0.50	7740245
Alkalinity (Total as CaCO3)	mg/L	8.11	7740018	7.94	7740018	7.15	7740018	6.19	0.50	7740018
Total Organic Carbon (C)	mg/L	2.69	7740251	3.26	7742732	3.89	7740249	3.58	0.50	7740251
Alkalinity (PP as CaCO3)	mg/L	<0.50	7740018	<0.50	7740018	<0.50	7740018	<0.50	0.50	7740018
Bicarbonate (HCO3)	mg/L	9.89	7740018	9.69	7740018	8.72	7740018	7.55	0.50	7740018
Carbonate (CO3)	mg/L	<0.50	7740018	<0.50	7740018	<0.50	7740018	<0.50	0.50	7740018
Hydroxide (OH)	mg/L	<0.50	7740018	<0.50	7740018	<0.50	7740018	<0.50	0.50	7740018
Anions										
Orthophosphate (P)	mg/L	0.0014 (1)	7739975	0.0019 (1)	7739975	<0.0010 (1)	7739975	<0.0010 (1)	0.0010	7739975
Dissolved Sulphate (SO4)	mg/L	0.50	7740609	<0.50	7740609	<0.50	7741875	<0.50	0.50	7741875
Dissolved Chloride (Cl)	mg/L	1.5	7740607	1.4	7740607	1.4	7741874	1.4	0.50	7741874
MISCELLANEOUS										
True Colour	Col. Unit	15.0 (1)	7740192	10.0 (1)	7740192	15.0 (1)	7740192	20.0 (1)	5.0	7740192
Nutrients										
Total Ammonia (N)	mg/L	0.0093	7740231	<0.0050	7740231	<0.0050	7740231	<0.0050	0.0050	7740231
Nitrate plus Nitrite (N)	mg/L	0.0383	7740193	0.0358	7740193	0.0519	7740190	0.0062	0.0020	7740190
Nitrite (N)	mg/L	<0.0020	7740194	<0.0020	7740194	<0.0020	7740191	<0.0020	0.0020	7740191
Total Nitrogen (N)	mg/L	0.123	7740742	0.116	7740742	0.125	7740740	0.089	0.020	7740742
Total Phosphorus (P)	mg/L	0.0060	7741097	0.0076	7741097	0.0035	7741097	0.0031	0.0020	7741097
Physical Properties										
Conductivity	uS/cm	23.5	7740005	23.2	7740005	23.1	7740005	23.8	1.0	7740005
pH	pH	7.00	7740016	7.03	7740016	7.02	7740016	7.06	N/A	7740016
Physical Properties										
Total Suspended Solids	mg/L	4.0	7739738	3.8	7739738	1.4	7739738	<1.0	1.0	7739738
Total Dissolved Solids	mg/L	32	7739947	28	7739947	36	7739947	39	10	7739947
Turbidity	NTU	0.70 (1)	7739808	1.10 (1)	7739808	0.28 (1)	7739808	0.33 (1)	0.10	7739808

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Sample analysed past hold time: sample was received on the hold time expiry date which did not allow sufficient time for preparation and analysis.

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		LG8952		
Sampling Date		2014/11/28		
COC Number		455293-01-01		
	Units	**SOL U/S**	**RDL**	**QC Batch**
Misc. Inorganics				
Acidity (pH 4.5)	mg/L	<0.50	0.50	7740068
Acidity (pH 8.3)	mg/L	1.00	0.50	7740068
Calculated Parameters				
Filter and HNO3 Preservation	N/A	LAB	N/A	7739203
Total Hardness (CaCO3)	mg/L	5.88	0.50	7739050
Nitrate (N)	mg/L	0.0124	0.0020	7739011
Misc. Inorganics				
Fluoride (F)	mg/L	0.012	0.010	7739907
Dissolved Hardness (CaCO3)	mg/L	5.78	0.50	7738279
Dissolved Organic Carbon (C)	mg/L	4.25	0.50	7740245
Alkalinity (Total as CaCO3)	mg/L	4.42	0.50	7740018
Total Organic Carbon (C)	mg/L	3.80	0.50	7740249
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	7740018
Bicarbonate (HCO3)	mg/L	5.39	0.50	7740018
Carbonate (CO3)	mg/L	<0.50	0.50	7740018
Hydroxide (OH)	mg/L	<0.50	0.50	7740018
Anions				
Orthophosphate (P)	mg/L	<0.0010 (1)	0.0010	7739975
Dissolved Sulphate (SO4)	mg/L	<0.50	0.50	7740606
Dissolved Chloride (Cl)	mg/L	1.5	0.50	7741874
MISCELLANEOUS				
True Colour	Col. Unit	10.0 (1)	5.0	7740192
Nutrients				
Total Ammonia (N)	mg/L	<0.0050	0.0050	7740231
Nitrate plus Nitrite (N)	mg/L	0.0124	0.0020	7740190
Nitrite (N)	mg/L	<0.0020	0.0020	7740191
Total Nitrogen (N)	mg/L	0.086	0.020	7740740
Total Phosphorus (P)	mg/L	0.0027	0.0020	7741097
Physical Properties				
Conductivity	uS/cm	16.5	1.0	7740005
pH	pH	6.77	N/A	7740016
Physical Properties				
Total Suspended Solids	mg/L	1.0	1.0	7739738
Total Dissolved Solids	mg/L	34	10	7739947

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Sample analysed past hold time: sample was received on the hold time expiry date which did not allow sufficient time for preparation and analysis.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		LG8952		
Sampling Date		2014/11/28		
COC Number		455293-01-01		
	Units	**SOL U/S**	**RDL**	**QC Batch**
Turbidity	NTU	0.18 (1)	0.10	7739808

RDL = Reportable Detection Limit

(1) Sample analysed past hold time: sample was received on the hold time expiry date which did not allow sufficient time for preparation and analysis.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

MERCURY BY COLD VAPOR (WATER)

Maxxam ID		LG8948	LG8949	LG8950	LG8951	LG8952		
Sampling Date		2014/11/28	2014/11/28	2014/11/28	2014/11/28	2014/11/28		
COC Number		455293-01-01	455293-01-01	455293-01-01	455293-01-01	455293-01-01		
	Units	**CHI D/S 1**	**CHI D/S 2**	**CHI U/S**	**SOL D/S**	**SOL U/S**	**RDL**	**QC Batch**
Elements								
Dissolved Mercury (Hg)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7739925
Total Mercury (Hg)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7739882
RDL = Reportable Detection Limit								

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LG8948	LG8949	LG8950	LG8951	LG8952		
Sampling Date		2014/11/28	2014/11/28	2014/11/28	2014/11/28	2014/11/28		
COC Number		455293-01-01	455293-01-01	455293-01-01	455293-01-01	455293-01-01		
	Units	**CHI D/S 1**	**CHI D/S 2**	**CHI U/S**	**SOL D/S**	**SOL U/S**	**RDL**	**QC Batch**
ANIONS								
Bromide (Br)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7742029
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	ug/L	63.8	63.7	67.9	92.6	102	0.50	7742540
Dissolved Antimony (Sb)	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7742540
Dissolved Arsenic (As)	ug/L	0.051	0.046	0.032	0.084	0.046	0.020	7742540
Dissolved Barium (Ba)	ug/L	6.38	6.36	5.78	6.57	7.53	0.020	7742540
Dissolved Beryllium (Be)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7742540
Dissolved Bismuth (Bi)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7742540
Dissolved Boron (B)	ug/L	<10	<10	<10	<10	<10	10	7742540
Dissolved Cadmium (Cd)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7742540
Dissolved Chromium (Cr)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7742540
Dissolved Cobalt (Co)	ug/L	0.0343	0.0333	0.0390	0.0330	0.0333	0.0050	7742540
Dissolved Copper (Cu)	ug/L	0.695	0.894	0.743	0.717	0.699	0.050	7742540
Dissolved Iron (Fe)	ug/L	22.7	23.3	28.4	25.1	15.3	1.0	7742540
Dissolved Lead (Pb)	ug/L	0.0089	0.0123	0.0098	0.0126	0.0142	0.0050	7742540
Dissolved Lithium (Li)	ug/L	<0.50	0.57	<0.50	<0.50	<0.50	0.50	7742540
Dissolved Manganese (Mn)	ug/L	0.645	0.603	0.713	0.374	0.272	0.050	7742540
Dissolved Molybdenum (Mo)	ug/L	0.062	0.059	0.146	<0.050	<0.050	0.050	7742540
Dissolved Nickel (Ni)	ug/L	0.199	0.188	0.537	0.173	0.152	0.020	7742540
Dissolved Selenium (Se)	ug/L	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	7742540
Dissolved Silicon (Si)	ug/L	2190	2220	2310	2070	1760	50	7742540
Dissolved Silver (Ag)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7742540
Dissolved Strontium (Sr)	ug/L	10.2	10.4	10.1	8.55	7.64	0.050	7742540
Dissolved Thallium (Tl)	ug/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	7742540
Dissolved Tin (Sn)	ug/L	0.34	0.23	0.28	0.24	0.24	0.20	7742540
Dissolved Titanium (Ti)	ug/L	<0.50	0.53	<0.50	<0.50	0.54	0.50	7742540
Dissolved Uranium (U)	ug/L	0.0035	0.0035	0.0063	0.0030	<0.0020	0.0020	7742540
Dissolved Vanadium (V)	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7742540
Dissolved Zinc (Zn)	ug/L	0.24	0.13	0.23	0.24	0.21	0.10	7742540
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7742540
Dissolved Calcium (Ca)	mg/L	2.97	2.97	2.78	1.96	1.76	0.050	7738436
Dissolved Magnesium (Mg)	mg/L	0.418	0.428	0.453	0.362	0.335	0.050	7738436
Dissolved Potassium (K)	mg/L	0.129	0.129	0.139	0.153	0.150	0.050	7738436
Dissolved Sodium (Na)	mg/L	1.05	1.08	1.03	1.03	0.928	0.050	7738436
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	7738436
Total Metals by ICPMS								
Total Aluminum (Al)	ug/L	121	123	90.4	104	115	0.50	7742563
Total Antimony (Sb)	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7742563
RDL = Reportable Detection Limit								

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Maxxam Job #: B4A9035
Report Date: 2015/01/07

EDI ENVIRONMENTAL DYNAMICS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LG8948	LG8949	LG8950	LG8951	LG8952		
Sampling Date		2014/11/28	2014/11/28	2014/11/28	2014/11/28	2014/11/28		
COC Number		455293-01-01	455293-01-01	455293-01-01	455293-01-01	455293-01-01		
	Units	**CHI D/S 1**	**CHI D/S 2**	**CHI U/S**	**SOL D/S**	**SOL U/S**	**RDL**	**QC Batch**
Total Arsenic (As)	ug/L	0.078	0.068	0.035	0.077	0.060	0.020	7742563
Total Barium (Ba)	ug/L	7.19	7.49	5.97	6.85	7.52	0.020	7742563
Total Beryllium (Be)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7742563
Total Bismuth (Bi)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7742563
Total Boron (B)	ug/L	<10	<10	<10	<10	<10	10	7742563
Total Cadmium (Cd)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0369	0.0050	7742563
Total Chromium (Cr)	ug/L	0.10	0.11	<0.10	<0.10	<0.10	0.10	7742563
Total Cobalt (Co)	ug/L	0.0857	0.0968	0.0653	0.0417	0.0381	0.0050	7742563
Total Copper (Cu)	ug/L	0.909	0.928	0.826	0.779	0.832	0.050	7742563
Total Iron (Fe)	ug/L	89.4	97.8	53.7	46.2	23.4	1.0	7742563
Total Lead (Pb)	ug/L	0.0319	0.0310	0.0160	0.0265	0.0366	0.0050	7742563
Total Lithium (Li)	ug/L	0.54	<0.50	0.52	0.84	<0.50	0.50	7742563
Total Manganese (Mn)	ug/L	3.74	4.31	2.04	0.986	0.539	0.050	7742563
Total Molybdenum (Mo)	ug/L	0.062	0.060	0.161	<0.050	<0.050	0.050	7742563
Total Nickel (Ni)	ug/L	0.307	0.369	0.456	0.198	0.310	0.020	7742563
Total Selenium (Se)	ug/L	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	7742563
Total Silicon (Si)	ug/L	2260	2270	2220	2030	1800	50	7742563
Total Silver (Ag)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7742563
Total Strontium (Sr)	ug/L	10.7	10.7	9.96	8.53	7.58	0.050	7742563
Total Thallium (Tl)	ug/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	7742563
Total Tin (Sn)	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7742563
Total Titanium (Ti)	ug/L	2.87	3.00	1.09	1.20	0.89	0.50	7742563
Total Uranium (U)	ug/L	0.0049	0.0049	0.0083	0.0037	0.0020	0.0020	7742563
Total Vanadium (V)	ug/L	0.32	0.33	0.22	<0.20	<0.20	0.20	7742563
Total Zinc (Zn)	ug/L	1.34	0.38	0.73	1.53	1.93	0.10	7742563
Total Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7742563
Total Calcium (Ca)	mg/L	3.07	3.13	2.73	1.90	1.81	0.050	7738417
Total Magnesium (Mg)	mg/L	0.437	0.446	0.457	0.384	0.328	0.050	7738417
Total Potassium (K)	mg/L	0.132	0.130	0.131	0.151	0.154	0.050	7738417
Total Sodium (Na)	mg/L	1.07	1.07	0.994	1.07	0.908	0.050	7738417
Total Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	7738417
RDL = Reportable Detection Limit								

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

CSR/CCME METALS IN SOIL (SEDIMENT)

Maxxam ID		LG8953	LG8954	LG8955	LG8956		
Sampling Date		2014/11/28	2014/11/28	2014/11/28	2014/11/28		
COC Number		455293-01-01	455293-01-01	455293-01-01	455293-01-01		
	Units	**SOL D/S 1 (SEDIMENT)**	**SOL D/S 2 (SEDIMENT)**	**CHI D/S 1 (SEDIMENT)**	**CHI D/S 2 (SEDIMENT)**	**RDL**	**QC Batch**
Physical Properties							
Soluble (2:1) pH	pH	6.89 (1)	6.74 (2)	6.29 (2)	6.22 (2)	N/A	7743417
Total Metals by ICPMS							
Total Aluminum (Al)	mg/kg	23900	22800	21500	21700	100	7743414
Total Antimony (Sb)	mg/kg	0.58	0.62	0.34	0.34	0.10	7743414
Total Arsenic (As)	mg/kg	20.5	18.0	6.07	6.30	0.50	7743414
Total Barium (Ba)	mg/kg	182	176	138	141	0.10	7743414
Total Beryllium (Be)	mg/kg	0.42	0.43	<0.40	0.41	0.40	7743414
Total Bismuth (Bi)	mg/kg	0.13	0.12	<0.10	<0.10	0.10	7743414
Total Cadmium (Cd)	mg/kg	0.277	0.292	0.216	0.205	0.050	7743414
Total Calcium (Ca)	mg/kg	5530	6250	6240	6000	100	7743414
Total Chromium (Cr)	mg/kg	153	104	107	143	1.0	7743414
Total Cobalt (Co)	mg/kg	21.8	21.1	19.4	18.8	0.30	7743414
Total Copper (Cu)	mg/kg	77.4	75.4	71.5	71.3	0.50	7743414
Total Iron (Fe)	mg/kg	41900	42300	51200	48900	100	7743414
Total Lead (Pb)	mg/kg	7.78	8.64	4.92	4.97	0.10	7743414
Total Lithium (Li)	mg/kg	18.1	17.6	17.1	17.0	5.0	7743414
Total Magnesium (Mg)	mg/kg	10000	9610	10100	9750	100	7743414
Total Manganese (Mn)	mg/kg	882	794	695	680	0.20	7743414
Total Mercury (Hg)	mg/kg	0.080	0.088	<0.050	0.056	0.050	7743414
Total Molybdenum (Mo)	mg/kg	7.49	3.57	1.92	2.01	0.10	7743414
Total Nickel (Ni)	mg/kg	103	69.9	50.2	76.8	0.80	7743414
Total Phosphorus (P)	mg/kg	915	897	843	837	10	7743414
Total Potassium (K)	mg/kg	675	655	665	640	100	7743414
Total Selenium (Se)	mg/kg	0.63	0.63	<0.50	<0.50	0.50	7743414
Total Silver (Ag)	mg/kg	0.089	0.107	0.062	0.088	0.050	7743414
Total Sodium (Na)	mg/kg	233	244	232	224	100	7743414
Total Strontium (Sr)	mg/kg	30.2	31.6	32.6	32.6	0.10	7743414
Total Thallium (Tl)	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7743414
Total Tin (Sn)	mg/kg	0.55	0.79	0.52	0.57	0.10	7743414
Total Titanium (Ti)	mg/kg	1090	1220	1550	1470	1.0	7743414
Total Uranium (U)	mg/kg	0.417	0.411	0.471	0.465	0.050	7743414
Total Vanadium (V)	mg/kg	97.5	108	159	149	2.0	7743414
Total Zinc (Zn)	mg/kg	92.9	90.2	66.0	65.6	1.0	7743414
Total Zirconium (Zr)	mg/kg	2.01	2.05	2.07	2.05	0.50	7743414

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Due to insufficient sample water:soil extraction ratio has changed from 2:1 to 10:1 in order to analyse sample.
(2) Due to insufficient sample water:soil extraction ratio has changed from 2:1 to 5:1 in order to analyse sample.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C
Package 2	3.3°C

Samples analysed past recommended hold time for Nitrate and Nitrite analysis.

Sample LG8953-01 : >63um = 98.37%
<63um = 1.63%
DUP :
>63um = 98.45%
<63um = 1.55%

Sample LG8954-01 : >63um = 99.09%
<63um = 0.91%

Sample LG8955-01 : >63um = 97.41%
<63um = 2.59%

Sample LG8956-01 : >63um = 98.05%
<63um = 1.95%

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
7739693	Moisture	2014/12/03					<0.30	%	3.2	20		
7739738	Total Suspended Solids	2014/12/03			100	80 - 120	<1.0	mg/L				
7739808	Turbidity	2014/12/02			100	80 - 120	<0.10	NTU	1.1	20		
7739882	Total Mercury (Hg)	2014/12/03	90	80 - 120	92	80 - 120	<0.010	ug/L	NC	20		
7739907	Fluoride (F)	2014/12/02	NC	80 - 120	98	80 - 120	0.012, RDL=0.010	mg/L	NC	20		
7739925	Dissolved Mercury (Hg)	2014/12/03	100	80 - 120	91	80 - 120	<0.010	ug/L	NC	20		
7739947	Total Dissolved Solids	2014/12/03	NC	80 - 120	110	80 - 120	16, RDL=10	mg/L	7.3	20		
7739975	Orthophosphate (P)	2014/12/02	108	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20		
7740005	Conductivity	2014/12/02			100	80 - 120	<1.0	uS/cm	0.85	20		
7740016	pH	2014/12/02			101	97 - 103			0.85	N/A		
7740018	Alkalinity (PP as CaCO3)	2014/12/02					<0.50	mg/L	NC	20		
7740018	Alkalinity (Total as CaCO3)	2014/12/02	104	80 - 120	97	80 - 120	0.50, RDL=0.50	mg/L	9.2	20		
7740018	Bicarbonate (HCO3)	2014/12/02					0.61, RDL=0.50	mg/L	9.2	20		
7740018	Carbonate (CO3)	2014/12/02					<0.50	mg/L	NC	20		
7740018	Hydroxide (OH)	2014/12/02					<0.50	mg/L	NC	20		
7740068	Acidity (pH 4.5)	2014/12/02					<0.50	mg/L	NC	20		
7740068	Acidity (pH 8.3)	2014/12/02			100	80 - 120	<0.50	mg/L	NC	20		
7740190	Nitrate plus Nitrite (N)	2014/12/02	NC	80 - 120	104	80 - 120	<0.0020	mg/L	0.10	25		
7740191	Nitrite (N)	2014/12/02	97	80 - 120	103	80 - 120	<0.0020	mg/L	NC	25		
7740192	True Colour	2014/12/02					<5.0	Col. Unit	NC	20		
7740193	Nitrate plus Nitrite (N)	2014/12/02			104	80 - 120	0.0030, RDL=0.0020	mg/L				
7740194	Nitrite (N)	2014/12/02			103	80 - 120	<0.0020	mg/L				
7740231	Total Ammonia (N)	2014/12/02	107	80 - 120	96	80 - 120	<0.0050	mg/L	NC	20		
7740245	Dissolved Organic Carbon (C)	2014/12/02	NC	80 - 120	99	80 - 120	<0.50	mg/L	2.4	20		
7740249	Total Organic Carbon (C)	2014/12/02	86	80 - 120	98	80 - 120	<0.50	mg/L	1.1	20		
7740251	Total Organic Carbon (C)	2014/12/02	101	80 - 120	89	80 - 120	<0.50	mg/L	2.8	20		
7740606	Dissolved Sulphate (SO4)	2014/12/02	NC	80 - 120	94	80 - 120	<0.50	mg/L	4.0	20		
7740607	Dissolved Chloride (Cl)	2014/12/02			102	80 - 120	<0.50	mg/L				
7740609	Dissolved Sulphate (SO4)	2014/12/02	NC	80 - 120	94	80 - 120	<0.50	mg/L	0.71	20		
7740740	Total Nitrogen (N)	2014/12/03	NC	80 - 120	102	80 - 120	<0.020	mg/L	0.33	20		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
7740742	Total Nitrogen (N)	2014/12/03	NC	80 - 120	98	80 - 120	<0.020	mg/L				
7741097	Total Phosphorus (P)	2014/12/04	96	80 - 120	103	80 - 120	<0.0020	mg/L	NC	20		
7741874	Dissolved Chloride (Cl)	2014/12/03	96	80 - 120	106	80 - 120	<0.50	mg/L	0.50	20		
7741875	Dissolved Sulphate (SO4)	2014/12/03			99	80 - 120	<0.50	mg/L				
7742029	Bromide (Br)	2014/12/04	89	78 - 120	100	80 - 120	<0.010	mg/L	NC	20		
7742540	Dissolved Aluminum (Al)	2014/12/10	101	80 - 120	103	80 - 120	<0.50	ug/L	2.1	20		
7742540	Dissolved Antimony (Sb)	2014/12/10	NC	80 - 120	105	80 - 120	<0.020	ug/L	4.2	20		
7742540	Dissolved Arsenic (As)	2014/12/10	109	80 - 120	101	80 - 120	<0.020	ug/L	3.0	20		
7742540	Dissolved Barium (Ba)	2014/12/10	NC	80 - 120	110	80 - 120	<0.020	ug/L	0.91	20		
7742540	Dissolved Beryllium (Be)	2014/12/10	103	80 - 120	94	80 - 120	<0.010	ug/L	NC	20		
7742540	Dissolved Bismuth (Bi)	2014/12/10	98	80 - 120	97	80 - 120	<0.0050	ug/L	NC	20		
7742540	Dissolved Boron (B)	2014/12/10					<10	ug/L	NC	20		
7742540	Dissolved Cadmium (Cd)	2014/12/10	109	80 - 120	102	80 - 120	<0.0050	ug/L	NC	20		
7742540	Dissolved Chromium (Cr)	2014/12/10	99	80 - 120	95	80 - 120	<0.10	ug/L	NC	20		
7742540	Dissolved Cobalt (Co)	2014/12/10	101	80 - 120	97	80 - 120	<0.0050	ug/L	NC	20		
7742540	Dissolved Copper (Cu)	2014/12/10	98	80 - 120	96	80 - 120	<0.050	ug/L	6.2	20		
7742540	Dissolved Iron (Fe)	2014/12/10	107	80 - 120	104	80 - 120	<1.0	ug/L	6.0	20		
7742540	Dissolved Lead (Pb)	2014/12/10	104	80 - 120	100	80 - 120	0.0057, RDL=0.0050	ug/L	NC	20		
7742540	Dissolved Lithium (Li)	2014/12/10	94	80 - 120	91	80 - 120	<0.50	ug/L	NC	20		
7742540	Dissolved Manganese (Mn)	2014/12/10	NC	80 - 120	98	80 - 120	<0.050	ug/L	0.15	20		
7742540	Dissolved Molybdenum (Mo)	2014/12/10	NC	80 - 120	101	80 - 120	<0.050	ug/L	4.0	20		
7742540	Dissolved Nickel (Ni)	2014/12/10	98	80 - 120	96	80 - 120	<0.020	ug/L				
7742540	Dissolved Selenium (Se)	2014/12/10	105	80 - 120	97	80 - 120	<0.040	ug/L	NC	20		
7742540	Dissolved Silicon (Si)	2014/12/10					<50	ug/L	2.4	20		
7742540	Dissolved Silver (Ag)	2014/12/10	115	80 - 120	91	80 - 120	<0.0050	ug/L	NC	20		
7742540	Dissolved Strontium (Sr)	2014/12/10	NC	80 - 120	97	80 - 120	<0.050	ug/L	2.7	20		
7742540	Dissolved Thallium (Tl)	2014/12/10	92	80 - 120	101	80 - 120	<0.0020	ug/L	NC	20		
7742540	Dissolved Tin (Sn)	2014/12/10	105	80 - 120	101	80 - 120	<0.20	ug/L	NC	20		
7742540	Dissolved Titanium (Ti)	2014/12/10	103	80 - 120	95	80 - 120	<0.50	ug/L	NC	20		
7742540	Dissolved Uranium (U)	2014/12/10	NC	80 - 120	102	80 - 120	<0.0020	ug/L	1.7	20		
7742540	Dissolved Vanadium (V)	2014/12/10	105	80 - 120	98	80 - 120	<0.20	ug/L	NC	20		
7742540	Dissolved Zinc (Zn)	2014/12/10	100	80 - 120	97	80 - 120	<0.10	ug/L	NC	20		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
7742540	Dissolved Zirconium (Zr)	2014/12/10					<0.10	ug/L	NC	20		
7742563	Total Aluminum (Al)	2014/12/10	103	80 - 120	97	80 - 120	<0.50	ug/L	NC	20		
7742563	Total Antimony (Sb)	2014/12/10	105	80 - 120	105	80 - 120	<0.020	ug/L	NC	20		
7742563	Total Arsenic (As)	2014/12/10	106	80 - 120	102	80 - 120	<0.020	ug/L	NC	20		
7742563	Total Barium (Ba)	2014/12/10	108	80 - 120	110	80 - 120	<0.020	ug/L	NC	20		
7742563	Total Beryllium (Be)	2014/12/10	100	80 - 120	95	80 - 120	<0.010	ug/L	NC	20		
7742563	Total Bismuth (Bi)	2014/12/10	102	80 - 120	99	80 - 120	<0.0050	ug/L	NC	20		
7742563	Total Boron (B)	2014/12/10					<10	ug/L	NC	20		
7742563	Total Cadmium (Cd)	2014/12/10	108	80 - 120	105	80 - 120	<0.0050	ug/L	NC	20		
7742563	Total Chromium (Cr)	2014/12/10	97	80 - 120	95	80 - 120	<0.10	ug/L	NC	20		
7742563	Total Cobalt (Co)	2014/12/10	101	80 - 120	99	80 - 120	<0.0050	ug/L	NC	20		
7742563	Total Copper (Cu)	2014/12/10	99	80 - 120	97	80 - 120	<0.050	ug/L	NC	20		
7742563	Total Iron (Fe)	2014/12/10	108	80 - 120	105	80 - 120	<1.0	ug/L				
7742563	Total Lead (Pb)	2014/12/10	103	80 - 120	100	80 - 120	0.0065, RDL=0.0050	ug/L				
7742563	Total Lithium (Li)	2014/12/10	94	80 - 120	95	80 - 120	<0.50	ug/L	NC	20		
7742563	Total Manganese (Mn)	2014/12/10	101	80 - 120	99	80 - 120	<0.050	ug/L	NC	20		
7742563	Total Molybdenum (Mo)	2014/12/10	105	80 - 120	100	80 - 120	<0.050	ug/L	NC	20		
7742563	Total Nickel (Ni)	2014/12/10	100	80 - 120	98	80 - 120	<0.020	ug/L	NC	20		
7742563	Total Selenium (Se)	2014/12/10	104	80 - 120	96	80 - 120	<0.040	ug/L	NC	20		
7742563	Total Silicon (Si)	2014/12/10					<50	ug/L	NC	20		
7742563	Total Silver (Ag)	2014/12/10	98	80 - 120	93	80 - 120	<0.0050	ug/L	NC	20		
7742563	Total Strontium (Sr)	2014/12/10	106	80 - 120	101	80 - 120	<0.050	ug/L	NC	20		
7742563	Total Thallium (Tl)	2014/12/10	94	80 - 120	99	80 - 120	<0.0020	ug/L	NC	20		
7742563	Total Tin (Sn)	2014/12/10	103	80 - 120	104	80 - 120	<0.20	ug/L	NC	20		
7742563	Total Titanium (Ti)	2014/12/10	102	80 - 120	98	80 - 120	<0.50	ug/L	NC	20		
7742563	Total Uranium (U)	2014/12/10	103	80 - 120	102	80 - 120	<0.0020	ug/L	NC	20		
7742563	Total Vanadium (V)	2014/12/10	103	80 - 120	99	80 - 120	<0.20	ug/L	NC	20		
7742563	Total Zinc (Zn)	2014/12/10	102	80 - 120	101	80 - 120	<0.10	ug/L	NC	20		
7742563	Total Zirconium (Zr)	2014/12/10					<0.10	ug/L	NC	20		
7742729	Dissolved Organic Carbon (C)	2014/12/04			99	80 - 120	<0.50	mg/L				
7742732	Total Organic Carbon (C)	2014/12/04			90	80 - 120	<0.50	mg/L				
7743414	Total Aluminum (Al)	2014/12/05					<100	mg/kg	1.9	35	98	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
7743414	Total Antimony (Sb)	2014/12/05	89	75 - 125	98	75 - 125	<0.10	mg/kg	NC	30	108	70 - 130
7743414	Total Arsenic (As)	2014/12/05	93	75 - 125	100	75 - 125	<0.50	mg/kg	1.5	30	103	70 - 130
7743414	Total Barium (Ba)	2014/12/05	NC	75 - 125	99	75 - 125	<0.10	mg/kg	1.1	35	102	70 - 130
7743414	Total Beryllium (Be)	2014/12/05	95	75 - 125	96	75 - 125	<0.40	mg/kg	NC	30		
7743414	Total Bismuth (Bi)	2014/12/05					<0.10	mg/kg	NC	30		
7743414	Total Cadmium (Cd)	2014/12/05	98	75 - 125	101	75 - 125	<0.050	mg/kg	6.6	30	105	70 - 130
7743414	Total Calcium (Ca)	2014/12/05					<100	mg/kg	3.7	30	91	70 - 130
7743414	Total Chromium (Cr)	2014/12/05	NC	75 - 125	98	75 - 125	<1.0	mg/kg	0.36	30	110	70 - 130
7743414	Total Cobalt (Co)	2014/12/05	92	75 - 125	100	75 - 125	<0.30	mg/kg	1.4	30	99	70 - 130
7743414	Total Copper (Cu)	2014/12/05	NC	75 - 125	109	75 - 125	<0.50	mg/kg	1.7	30	99	70 - 130
7743414	Total Iron (Fe)	2014/12/05					<100	mg/kg	0.70	30	94	70 - 130
7743414	Total Lead (Pb)	2014/12/05	97	75 - 125	105	75 - 125	<0.10	mg/kg	2.1	35	102	70 - 130
7743414	Total Lithium (Li)	2014/12/05	NC	75 - 125	98	75 - 125	<5.0	mg/kg	4.7	30		
7743414	Total Magnesium (Mg)	2014/12/05					<100	mg/kg	0.18	30	91	70 - 130
7743414	Total Manganese (Mn)	2014/12/05	NC	75 - 125	98	75 - 125	<0.20	mg/kg	0.89	30	101	70 - 130
7743414	Total Mercury (Hg)	2014/12/05	98	75 - 125	100	75 - 125	<0.050	mg/kg	NC	35	90	70 - 130
7743414	Total Molybdenum (Mo)	2014/12/05	103	75 - 125	101	75 - 125	<0.10	mg/kg	NC	35	112	70 - 130
7743414	Total Nickel (Ni)	2014/12/05	NC	75 - 125	104	75 - 125	<0.80	mg/kg	1.6	30	107	70 - 130
7743414	Total Phosphorus (P)	2014/12/05					<10	mg/kg	0.37	30	96	70 - 130
7743414	Total Potassium (K)	2014/12/05					<100	mg/kg	1.4	35		
7743414	Total Selenium (Se)	2014/12/05	94	75 - 125	103	75 - 125	<0.50	mg/kg	NC	30		
7743414	Total Silver (Ag)	2014/12/05	79	75 - 125	84	75 - 125	<0.050	mg/kg	NC	35		
7743414	Total Sodium (Na)	2014/12/05					<100	mg/kg	1.5	35		
7743414	Total Strontium (Sr)	2014/12/05	NC	75 - 125	94	75 - 125	<0.10	mg/kg	0.43	35	104	70 - 130
7743414	Total Thallium (Tl)	2014/12/05	93	75 - 125	101	75 - 125	<0.050	mg/kg	NC	30	96	70 - 130
7743414	Total Tin (Sn)	2014/12/05	92	75 - 125	96	75 - 125	<0.10	mg/kg	NC	35		
7743414	Total Titanium (Ti)	2014/12/05	NC	75 - 125	93	75 - 125	<1.0	mg/kg	5.1	35	105	70 - 130
7743414	Total Uranium (U)	2014/12/05	101	75 - 125	99	75 - 125	<0.050	mg/kg	0.58	30	105	70 - 130
7743414	Total Vanadium (V)	2014/12/05	NC	75 - 125	94	75 - 125	<2.0	mg/kg	1.5	30	104	70 - 130
7743414	Total Zinc (Zn)	2014/12/05	NC	75 - 125	107	75 - 125	<1.0	mg/kg	2.3	30	99	70 - 130
7743414	Total Zirconium (Zr)	2014/12/05					<0.50	mg/kg	1.7	30		
7743417	Soluble (2:1) pH	2014/12/05			100	97 - 103			0.31	N/A		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**Units**	**Value (%)**	**QC Limits**	**% Recovery**	**QC Limits**
7745593	Special Analysis	2014/12/06							NC	35		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Data Validation Coordinator

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Maxxam — Maxxam Analytics International Corporation o/a Maxxam Analytics
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel:(604) 734 7276 Toll-Free:800-563-6266 Fax:(604) 731 2386 www.maxxam.ca

Chain Of Custody Record

Page of

INVOICE TO:		Report Information		Project Information	
Company Name	#7766 EDI ENVIRONMENTAL DYNAMICS	Company Name	SAME	Quotation #	B41113
Contact Name	Nichole Frederickson	Contact Name		P.O. #	
Address	Unit 208A 2520 BOWEN ROAD	Address		Project #	
	Nanaimo BC V9T 3L3			Project Name	
Phone	(250) 751-9070 Fax	Phone	Fax	Site #	
Email	nfrederickson@edynamics.com	Email		Sampled By	

Laboratory Use Only

Maxxam Job #	Bottle Order #:
B4A9035	455293
Chain Of Custody Record	Project Manager
C#455293-01-01	Graham Rudkin

Regulatory Criteria: ☐ CSR ☐ CCME ☐ BC Water Quality ☐ Other ______

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects
Regular (Standard) TAT: ☐
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.
Job Specific Rush TAT (if applies to entire submission)
1 DAY ☐ 2 Day ☐ 3 Day ☐ Date Required: ______ ☐
Rush Confirmation Number: ______ (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	pH, Conductivity, Alkalinity, Acidity, Colour	Total Suspended Solids - Low Level	Total Dissolved Solids, Turbidity	Anions (Cl, SO4, F, Br)	Nitrate (N), Nitrite (N) - Low Level	Ammonia Nitrogen, Total Nitrogen	Total Phosphorus, Orthophosphorus (Low Level)	Carbon (Total Organic), Carbon (Dissolved Organic)	Low-Level Dissolved Metals w CVAF Hg	Low-Level Total Metals w CVAF Hg	# of Bottles	Comments
1	LG8948	CHI D/S 1	2014/11/28				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	12	
2	LG8949	CHI D/S 2	↓														↓	
3	LG8950	CHI U/S	↓														↓	
4	LG8951	SOL D/S	↓														↓	
5	LG8952	SOL U/S	↓														↓	
6	LG8953	SOL D/S 1 (Sediment)	↓															1 glass jar + 1 sediment bag
7	LG8954	SOL D/S 2 (Sediment)	↓															↓
8	LG8955	CHI D/S 1 (Sediment)	↓															↓
9	LG8956	CHI D/S 2 (Sediment)	↓															↓
10																		

B4A9035

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Nicole Frederickson / Nicole Frederickson	14/11/28	5:41 pm	Laurel Berthier	2014/12/01	09:00	

Lab Use Only

Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
☐	3, 3, 2	☑ Yes ☐ No

3, 4, 3

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam
A Bureau Veritas Group Company

Your Project #: B4A9035
Your C.O.C. #: n-a

Attention:Graham Rudkin

MAXXAM ANALYTICS
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2015/01/05
Report #: R1960265
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B481153
Received: 2014/12/24, 08:00

Sample Matrix: DRY SOLID
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary Reference
Sulfur*	4	N/A	2015/01/05	STL SOP-00028	MA310-CS 1.0 R3 m

Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

* Maxxam is accredited as per the MDDELCC program.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rodrigo Caffarengo, Customer Service
Email: RCaffarengo@maxxam.ca
Phone# (514)448-9001 Ext:6336
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B481153
Report Date: 2015/01/05

MAXXAM ANALYTICS
Client Project #: B4A9035

CONVENTIONAL PARAMETERS (DRY SOLID)

Maxxam ID		AK5795	AK5796	AK5797	AK5798		
Sampling Date		2014/11/28	2014/11/28	2014/11/28	2014/11/28		
COC Number		n-a	n-a	n-a	n-a		
	Units	LG8953-02R/SOL D/S 1 (SEDIMENT)	LG8954-02R/SOL D/S 2 (SEDIMENT)	LG8955-02R/SOL D/S 1 (SEDIMENT)	LG8956-02R/SOL D/S 2 (SEDIMENT)	RDL	QC Batch
CONVENTIONALS							
Sulfur (S)	% g/g	0.06	0.07	0.03	0.03	0.01	1406747

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

2015/01/05 16:26

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

Maxxam Job #: B481153
Report Date: 2015/01/05

MAXXAM ANALYTICS
Client Project #: B4A9035

GENERAL COMMENTS

Condition of sample(s) upon receipt: GOOD

CONVENTIONAL PARAMETERS (DRY SOLID)

Please note that the results have not been corrected for QC recoveries nor for the method blank results.

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

Maxxam Job #: B481153
Report Date: 2015/01/05

MAXXAM ANALYTICS
Client Project #: B4A9035

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
1406747	JL1	QC Standard	Sulfur (S)	2015/01/05		118	%	77 - 128
1406747	JL1	Method Blank	Sulfur (S)	2015/01/05	<0.01		% g/g	

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

Maxxam Job #: B481153
Report Date: 2015/01/05

MAXXAM ANALYTICS
Client Project #: B4A9035

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Veronic Beausejour, B.Sc., Chemist, Supervisor

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

Purolator

FROM/DE
MAXXAM ANALYTICS
4606 CANADA WAY
BURNABY, BC V5G1K5
604-734-7276

Ref.

TO/A
SAMPLE RECEPTION
MAXXAM ANALYTICS
889 MONTEE DE LIESSE
SAINT-LAURENT, QC H4T1P5
415-448-9001

COLLECT

NOTE:
Purolator's published terms and conditions of service apply - see www.purolator.com
Les Modalités et conditions de service publiées de Purolator s'appliquent - voir www.purolator.com

DATE
23 DEC 2014

PIECES
1 of/de 1

WEIGHT/POIDS
8.00 LB

PUROLATOR PIN: 603291246347

9 AM/h YUL 38

SD: 2014/11/23 - Shipping System 1.0