FINAL

Human Health and Ecological Risk Assessment

Former Widow Point Mine – South of West Side Road, Country Harbour, Nova Scotia

Prepared for:

Build Nova Scotia
45 Wabana Court
Sydney, NS B1P 0B9

June 18, 2024

Pinchin File: 327768.002

Issued To:	**Build Nova Scotia**
Issued On:	**June 18, 2024**
Pinchin File:	**327768.002**
Issuing Office:	**Dartmouth, NS**

Author: Jenny Pittman, P.Geo.,
Project Manager, Environmental Due Diligence & Remediation
902.461.9999
jpittman@pinchin.com

Reviewer: Adam Aulenback, P.Eng.,
Senior Technical Manager, Environmental Due Diligence & Remediation
902.461.9999
aaulenback@pinchin.com

Reviewer: Theresa Phillips, Ph.D., P.Biol. (AB), QPRA (ON,SK)
National Risk Assessment Lead, Environmental Due Diligence & Remediation
416.457.8141
tphillips@pinchin.com

EXECUTIVE SUMMARY

Pinchin Ltd. (Pinchin) was retained by Build Nova Scotia (Client) to conduct a Human Health and Ecological Risk Assessment (HHERA) of the property located at Former Widow Point Mine – South of West Side Road, Country Harbour, Nova Scotia (hereafter referred to as the Site).

The Site is undeveloped and forested, free of any permanent structures and/or buildings.

The objective of the HHERA is to assess potential risks to on-Site human and ecological receptors occupying or visiting the Site, that may result from exposure to known subsurface impacts at the Site. It is Pinchin's understanding that the work is required to inform the selection of remedial option(s) to address the impacts identified at the Site.

The previous Limited L2 Environmental Site Assessments (L2 ESA) completed on the Site by Pinchin for the Client identified some metal concentrations in soil at the central portion of the Site which exceeded the Nova Scotia Contaminated Sites Regulations (NSCSR) Tier I Environmental Quality Standards (EQS) for agricultural / undeveloped wild lands, with potable groundwater and coarse-grained soil.

The HHERA identified potential risks to Outdoor Workers, and mammals and birds, that may be directly exposed to soil contaminants. However, these risks are currently being managed by the existing naturally occurring vegetative fill cap distributed across the Site. Potential risks were also identified for future Outdoor Workers who may come into contact with soil contaminants during future ground-intrusive works, but which can be managed with a health and safety plan (HASP). Risk management measures are recommended to address this exposure pathways.

The HHERA did not identify any other potential risks to human or ecological receptors, associated with soil impacts found on-Site.

Based on the results of this HHERA, Pinchin recommends that a Risk Management Plan be prepared for the Site, and that the previously identified metal concentrations in soil at the central portion of the Site which exceeded the generic Tier I EQS be managed in-place.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.

TABLE OF CONTENTS

TABLES WITHIN BODY OF REPORT

APPENDICES

FIGURES (APPENDIX I)

TABLES (APPENDIX II)

1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained by Build Nova Scotia (Client) to conduct a Human Health and Ecological Risk Assessment (HHERA) of the property located at Former Widow Point Mine – South of West Side Road, Country Harbour, Nova Scotia (hereafter referred to as the Site). An HHERA is a scientific tool that can be used for the assessment and management of environmental contamination caused by historical, current or future activities at a site. Risk assessment can be used to identify whether there are risks to human and ecological health, arising from exposure to contaminants of concern (COCs), and aid the decision-making process with regards to what action to take to mitigate the risks, if any.

The Site is undeveloped and forested, free of any permanent structures and/or buildings. As indicated on Figure 1 (Key Map), the Site is located approximately 175 m south of the intersection of West Side Road and the adjacent logging road in Country Harbour Mines, Nova Scotia. Pinchin observed that the Site and surrounding area appeared to be generally forested with logging/fire roads throughout. Figure 2 illustrates the Site and surrounding area. All figures are provided in Appendix I.

1.1 Background

A Phase I Environmental Site Assessment (ESA) and Limited L2 ESA (L2 ESA) have been conducted at the Site, the results of which indicate that historical mine operations on-Site may have resulted in exceedances of the Tier I Environmental Quality Standards (EQSs) presented in the Notification of Contamination Protocol (PRO-100) of the Nova Scotia Contaminated Sites Regulations (NSCSR - 2013). The appropriate standards for the Site are the Tier I EQS for agricultural / undeveloped wild lands, with potable groundwater and coarse-grained soil (*Tier I EQS*).

The findings of the L2 ESA conducted at the Site identified several metal concentrations in soil samples above the applicable *Tier I EQS* at the north portion of the Site.

1.2 Objective

The objective of the HHERA is to further assess potential risks to human and ecological receptors, occupying or visiting the Site, that may result from exposure to known soil impacts. The HHERA will be used to inform the selection of remedial option(s) to address the impacts identified at the Site.

1.3 Scope of Work

The work completed herein was performed in general accordance with standard environmental consulting practices and the following guidance documents:

- Atlantic Risk-Based Corrective Action (RBCA) Environmental Quality Standards Rationale and Guidance Document (July 2021), updated 2022. https://atlanticrbca.com/.
- Canadian Council of Ministers of the Environment (CCME) https://ccme.ca/en/.
- Nova Scotia Contaminated Sites Regulations (2013) and associated Ministerial Protocols: https://www.novascotia.ca/nse/contaminatedsites/protocols.asp.
- Canadian Council of Ministers of the Environment (CCME) https://ccme.ca/en/.

The HHERA considered the current and continued agricultural/ undeveloped wild land use and configuration of the Site, and involved the following tasks:

1. Review, analysis and reporting of the available environmental data collected at the Site.
2. Assessment of potential human health and ecological concerns on-Site only.
3. Assessment of potential ecological concerns at the nearest surface water body: two unnamed streams located immediately north and approximately 36 m southeast of an abandoned mine opening (AMO1) observed at the Site.
4. Proposing high level options for risk management at the Site, as required.
5. Preparation of this HHERA report for the Site.

1.4 Regulatory Context

Analytical data have been assessed in comparison to recognized guidelines. The criteria selected for use in this assessment are detailed in this section.

1.4.1 Contaminated Sites Regulations – Tier I EQSs

Actions on the Site are governed by the NSCSR.

Metal concentrations in soil were initially assessed using the *Tier I EQSs* (revised September 2021, updated September 2022) as presented in the Notification of Contamination Protocol (PRO-100) of the Regulations. The *Tier I EQSs* provide numerical criteria that are used along with exemption conditions outlined in PRO-100 to determine the need for regulatory notification.

The *Tier I EQSs* have been developed as generic standards that represent a standardized level of risk to human health for contributing exposure pathways, using land use and other factors. The *Tier I EQSs* for agricultural land use / undeveloped wild lands include direct ecological pathways, in addition to human health exposure pathways, in the derivation of criteria.

1.4.1.1 Notification of Contamination Protocol (PRO-100)

The PRO-100 provides requirements for determining the need for regulatory notification of a contaminated Site. The protocol addresses two contamination situations, which include:

- Free product presence in soil; and
- Soil, sediment, surface water or groundwater contamination.

Notification of free product relies on field observations of the affected media, while notification of contamination relies on comparison of sample analytical results with the *Tier 1 EQSs* presented in PRO-100 of the Regulations. The *Tier I EQSs* provide generic numerical criteria that represent a standardized level of risk for contributing exposure pathways using different site scenarios and are used along with exemption conditions outlined in PRO-100 to determine the need for regulatory notification.

Based on the results of the 2023 Pinchin Limited L2 ESA (see Section 2.1), NSECC was formally notified of the contaminants exceeding the applicable *Tier I EQSs* on May 12, 2024.

1.4.1.2 Environmental Site Assessment for Limited Remediation Protocol (PRO-200)

Based on Site characteristics, the work is being completed following the L2 ESA approach as outlined in Environmental Site Assessment for Limited Remediation Protocol (PRO-200) of the Regulations, and to meet the Minimum L2 ESA Requirements. The document entitled “Environmental Site Assessment for Limited Remediation Checklist” (CHK-200) will need to be completed for the Site and submitted to NSECC along with the 2023 Pinchin Limited L2 ESA report.

1.4.1.3 Remediation Levels Protocol (PRO-500)

The Remediation Levels Protocol (PRO-500) provides the basis for determining the appropriate numerical remediation levels or long-term exposure management measures applicable to a contaminated site.

PRO-500 provides a tiered approach whereby increasingly site-specific criteria can be used to develop remedial levels for a property. The *Tier I EQSs* outlined in PRO-100 can be used to determine generic Tier I remediation levels. The *Tier I EQSs* have been derived using “default assumptions” related to conditions in Nova Scotia. A site professional can refer to guideline tables that give EQSs for different site scenarios. However, if site conditions differ significantly from conditions defined by the Tier I default assumptions or petroleum concentrations exceed the EQSs applicable to the site, then a Tier II Site-Specific Risk Assessment can be completed to develop Site-Specific Target Levels (SSTLs).

In addition to the *Tier I EQSs*, Tier II Pathway-Specific Standards (PSSs) have been developed which can be applied based on certain site conditions and the absence of one or more exposure pathways. For example, if no building is present on a site, the ‘indoor air’ exposure pathway is not present. As such, less stringent guidelines that do not take into consideration the indoor air exposure pathway may be referenced. Metal concentrations identified in soil have been further assessed by comparison to the NSCSR *Tier I EQSs* for an agricultural/ undeveloped wild land property with coarse-grained soil and are further discussed in Section 1.5.1.

1.4.2 Atlantic Risk-Based Corrective Action

Metal concentrations in soil have also been assessed using Atlantic Risk-Based Corrective Action (RBCA) Version 4.0 (revised July 2021, updated July 2022) Tier I Ecological EQSs.

The Atlantic RBCA Site Assessment and Tier I/II Table Checklist was completed as part of the L2 ESA in order to ensure that the use of RBCA is appropriate. A copy of the completed checklist is presented in Appendix III.

1.4.2.1 Tier I Ecological Environmental Quality Standards

We have used the Tier I Ecological EQS for an agricultural, potable site with coarse-grained soil. The Ecological EQS values are adopted values that have been derived by other regulatory authorities in Canadian or International jurisdictions. The agricultural/ undeveloped wild land and coarse-grained criteria were applied based on the same rationale used for the *Tier I EQSs*. The coarse-grained soil criteria have been selected because it is the most conservative choice.

1.4.2.2 Tier II Ecological Pathway-Specific Standards

We have used the Tier II Ecological Pathway Specific Standards (PSS) for an agricultural, potable site with coarse-grained soil. The Ecological PSS values are adopted values that have been derived by other regulatory authorities in Canadian or International jurisdictions. The agricultural/ undeveloped wild land and coarse-grained criteria have been applied based on the same rationale used for the Tier I EQSs of the Regulations. The coarse-grained soil criteria have been selected because it is the most conservative choice.

2.0 PROPERTY INFORMATION, SITE PLAN AND GEOLOGICAL INTERPRETATION

2.1 Previous Environmental Investigations

The following environmental reports were previously prepared by Pinchin:

- "*FINAL Phase I Environmental Site Assessment Memo and Field Program Report, Former Widow Point Mine – south of West Side Road, Country Harbour, Guysborough Nova Scotia (PID 37544913)*", prepared by Pinchin Ltd (Pinchin), prepared for Build Nova Scotia and dated October 6, 2023 (2023 Pinchin Phase I ESA);
- "*Species at Risk Screening, West Side Country Harbour, Guysborough, Nova Scotia PID 37544913*", prepared by Pinchin, prepared for Build Nova Scotia and dated October 2, 2023 (2023 Pinchin SAR Screening); and
- "*REVISED Limited (L2) Environmental Site Assessment and Remedial Options Analysis, Former Widow Point Mine – South of West Side Road, Country Harbour, Nova Scotia*", prepared by Pinchin, prepared for Build Nova Scotia and dated February 23, 2024 (2024 Pinchin L2 ESA).

All environmental reports were relied upon for the preparation of the HHERA and are summarized below.

Figure 4 illustrates the relevant environmental information and Tables 2 to 5 (attached in Appendix II) summarize the analytical data relied upon for this HHERA.

In the following discussion, all soil data were compared to the *Tier I EQSs* to facilitate the selection of COCs to be addressed in the HHERA.

2023 Pinchin Phase I ESA

The purpose of the Phase I ESA was to determine the presence or absence of potential environmental concern on the Site in relation to the former mine operations associated with the historical Widow Point Gold Mine workings, in accordance with CSA Standards. The scope of work included a records review, Site visit and interview(s) with individuals familiar with the Site operations. In addition, a portion of the 2024 Pinchin L2 ESA (summarized below) was completed concurrently with the 2023 Pinchin Phase I ESA. The Phase I ESA identified potential rock dumps, an inferred tailings area as well as two abandoned mine openings (AMOs). The first AMO (AMO1) was observed to be located approximately 211 m south of the intersection between West Side Road and the adjacent logging trail while the second (AMO2) was observed to be located approximately 750 m south of the intersection between West Side Road and the adjacent logging trail. During the Site visit AMO1 was observed to be filled with water and wood debris and marked with snow fencing. AMO2 was reportedly backfilled in the summer of 2022 by Nova Scotia Department of Natural Resources and Renewables (NSDNRR). An unnamed stream was observed to be located adjacent to the inferred tailings area oriented in a northeast directions and discharges into Country Harbour located northeast of the Site.

2024 Pinchin L2 ESA

The purpose of the L2 ESA was to assess the potential environmental concerns identified in the 2023 Pinchin Phase I ESA, in accordance with CSA Standards and the Regulations. A portion of the L2 ESA was completed concurrently with the Phase I ESA. The work was completed between July 25, 2023 and October 30, 2023 and is summarized as follows:

- The investigation included the advancement of three boreholes all of which were completed as monitoring wells (MW01 to MW03), the collection of 26 hand-dug soil samples (HS01 to HS26, including one QA/QC field duplicate), as well as the collection of three sediment samples (including one QAQC field duplicate) and two surface water samples.
- Twenty (20) most apparent “worst case” soil samples (including two QA/QC field duplicates), based on field pH analysis, recovered from the hand-dug test pits and each borehole were submitted for analysis of standard available metals including mercury and pH.

- Two (2) samples recovered from hand-dug test pits collected from the tailings area were submitted for leachable metals, including mercury.
- Two (2) samples, one each near AMO1 and AMO2, recovered by hand-dug test pits were submitted for analysis of acid rock drainage (ARD), including modified acid-base accounting (ABA).
- Three (3) samples recovered from hand-dug test pits in areas located outside the inferred former mine operations to provide an indication of background soil conditions of the Site and surrounding area, were submitted for standard available metals including mercury and soluble pH.
- Groundwater samples were collected on October 30, 2023 from each of the three monitoring wells and were submitted for laboratory analysis of standard dissolved metals and general chemistry;
- Groundwater levels at the Site measured on October 30, 2023 varied between 3.05 metres below ground surface (mbgs) (MW02) and 0.82 mbgs (MW01). The inferred groundwater flow direction is to the northeast towards an unnamed stream based on the water table elevations obtained from groundwater monitoring;

Background conditions at the Site were determined from soil samples collected surrounding the Site as well as upgradient sediment and surface water samples. Based on the background data, the reported concentrations of aluminum, beryllium, iron and vanadium in four soil samples (HS04, HS11, HS DUP A (a duplicate of HS11), and HS12) collected from the north portion of the Site (near AMO1) exceeded both the *Tier I EQSs* and inferred background concentrations.

The reported concentrations in all groundwater samples submitted for analysis of standard dissolved metals satisfied the *Tier I EQSs* for groundwater. Some samples exceeded the applicable guidelines for groundwater discharging to surface water; however these metals are inferred to be representative of background concentrations.

The reported concentrations in the surface water and sediment samples submitted for analysis of standard total metals and general chemistry as well as standard available metals, respectively, satisfied their respective *Tier I EQSs* or are inferred to be representative of background concentrations.

2023 Pinchin SAR Screening

The 2023 SAR Screening was completed in support of an application to the Department of Natural Resources and Renewables (DNRR) for a Letter of Authority (LOA) to access the Site for L2 ESA investigation. The main purpose of the Species at Risk (SAR) Screening was to assess and determine if the Site has the potential for SAR and habitat in the vicinity of the Site.

Based on the results of the desktop review and Site reconnaissance, there are potentially suitable habitats present on the Site for Blue Felt Lichen, Canada Warbler, Eastern Wood-pewee, Evening Grosbeak, and Rusty Blackbird. However, there was no evidence of any of these species being present on the Site or within the Study Area. Although none of the discussed SAR were observed, some of them do have potential to occur on the Site and in the adjacent lands. In order to ensure that any potential impacts are mitigated to possible SAR within the Study Area, a number of avoidance and mitigation measures are recommended for proposed remediation work and discussed further in Section 5.1.

2.2 Physical Site Setting

2.2.1 Site Description

As indicated on Figure 1 (Key Map), the Site is located approximately 175 m south of the intersection of West Side Road and the adjacent logging road in Country Harbour Mines, Nova Scotia. Pinchin observed that the Site and surrounding area appeared to be generally forested with logging/fire roads throughout. Based on the findings of the Pinchin L2 ESA (Section 2.1) the HHERA study area was determined to be located in the vicinity of AMO1. Figure 2 illustrates the study area relative to the Site and surrounding area.

2.2.2 Geology and Hydrogeology

Based on the soil samples recovered during the borehole drilling (2024 Pinchin L2 ESA) three predominant soil types were encountered. A native subsurface material underlying the site consisting of a brown silty sand with clay and organics was observed in hand-dug test pits between 0.0 to 0.3 mbgs. A grey/brown silty sand with clay was observed in soil samples collected from boreholes located in the vicinity of the inferred tailings area that extended to the maximum borehole completion depth of 5.39 mbgs. In addition, a black sand with clay was identified in soil samples collected between AMO1 and AMO2.

Based on the groundwater survey data, equipotential lines were plotted and the groundwater flow direction was determined. Groundwater flow at the Site during the October 30, 2023 monitoring event was generally in a north-easterly direction as indicated on Figure 4. The average horizontal hydraulic gradient in the area is approximately 0.562 m/m (56.2%). Pinchin notes that groundwater flow within the vicinity of the borehole locations appears to be towards the unnamed streams.

2.3 Contaminants of Concern (COCs)

2.3.1 Applicable Site Condition Standards

The applicable Standards for screening COCs to be evaluated in the HHERA were established during the 2024 Pinchin L2 ESA as discussed above.

COCs were identified using the analytical data collected during environmental investigations relied upon for the preparation of the HHERA. A parameter was considered to be a COC if the following applied:

- The parameter exceeded the applicable *Tier I EQS* and/or the inferred background concentrations established for the Site.

2.3.2 Exposure Point Concentrations

An essential step of the risk assessment process is determining the exposure point concentration (EPC) for each COC, to be used in estimating human and ecological receptor exposure. For the purpose of this report, the maximum measured concentrations of the soil and groundwater COCs on-Site were conservatively selected as EPCs and were presumed to be representative of on-Site conditions across the entire footprint of the Study Area. This approach ensures that human and ecological health risks are not underestimated.

2.3.3 Soil COCs

The soil contaminant inventory, including the EPCs assessed in the HHERA, is provided in Table 3, and the soil COCs are as follows:

- Metals: aluminium, beryllium, iron, and vanadium.

The locations of soil exceedances on the Site are shown on Figure 4.

2.3.4 Groundwater COCs

No groundwater impacts were identified, and therefore no groundwater COCs are considered in the HHERA.

2.3.5 Sediment COCs

No sediment impacts were identified, and therefore no sediment COCs are considered in the HHERA.

2.3.6 Surface Water COCs

No surface water impacts were identified, and therefore no surface water COCs are considered in the HHERA.

3.0 HUMAN HEALTH RISK ASSESSMENT (HHRA)

The Human Health Risk Assessment (HHRA) section of the HHERA was conducted to assess if environmental conditions on the Site could present potential human health risks due to COCs identified in soil. The following sections discuss the quantitative and qualitative assessment of COCs in relation to selected receptors.

3.1 Problem Formulation

The problem formulation step is used to identify how contaminants on the Site might adversely impact human health. It requires an understanding of present and historical activities at the Site, identification of COCs, identification of potential human receptors, and characterization of exposure pathways. The outcome of the problem formulation step is a Human Health Conceptual Site Model (HHCSM), which represents the current understanding of the sources of COCs, release and transport mechanisms within and between environmental media, and exposure pathways by which COCs may contact identified human receptors.

A complete pathway is a means through which a receptor is anticipated to come into contact with the contaminated media (i.e., soil or groundwater). An incomplete pathway is one for which exposure is presumed to be blocked either by means of the absence of activities which would induce exposure, or by physical means (i.e., physical barriers).

Where exposure pathways can be reasonably assumed to be complete, a more detailed examination or quantification of potential risks is conducted. The detailed assessment comprises the remaining stages of the HHERA including exposure and toxicity assessment, and risk characterization.

The HHCSM considered in this HHERA is presented in Figure 6. The human receptors of interest are Property Visitors who may visit the Site for recreational activities and Outdoor Worker that may be present at ground surface for occasional maintenance activities. Although visitors might also frequent the Site, they are expected to experience less frequent and lower intensity exposures than on-Site workers, thus the worker scenario is intended as a surrogate for any Site visitors.

3.2 Exposure Assessment

An exposure assessment was completed to characterize the mechanisms by which the human health receptors would be exposed to soil COCs on the Site. The following receptor characteristics were used to model exposure to COCs that were carried forward for quantitative assessment.

The **Outdoor Worker** is an adult who works outside at least part of each day and whose activities bring them into direct contact with surface soil. This includes people who are grounds keepers (i.e., landscaping or grass cutting) or participate in surface maintenance activities. In keeping with relevant regulatory guidance (Health Canada, 2021), this activity is typically assumed to take place for 9.8 h/d, 5 d/w, 39 w/y (i.e., during the spring, summer, and fall), over a 56-year adult lifespan. Given the remoteness of the Site, Pinchin recognizes that this frequency of exposure likely far exceeds the actual exposure that would be experienced by workers (or visitors). However, screening was conducted using Tier II PSS that were derived using these exposure assumptions. Thus, the screening process is considered to be highly conservative and more than adequately protective of any anticipated exposure scenario.

3.2.1 Exposure Pathways

All receptors at the Site are exposed to COCs in soil via the inhalation of vapours that could migrate into either trench (below grade), outdoor (above grade) or indoor air. As no buildings are present on Site and none are expected to be constructed, the indoor air inhalation pathway is considered incomplete. Volatile COCs were not identified at the Site, therefore vapour air inhalation pathway is considered incomplete.

The Outdoor Worker may be exposed to COCs in soil via direct contact (dermal contact and incidental ingestion).

No other human health exposure pathways are considered to be complete, thus no others are evaluated.

Exposure pathways considered in the HHERA for a potable groundwater condition are listed in Table 3-1.

Table 3-1 – Human Receptors and Exposure Pathways

Property Use	Receptor	Pathway	Status
Agricultural / Undeveloped Wild Lands	Outdoor Worker / Property Visitors	Direct contact and incidental ingestion of soil	Complete
		Soil leaching to potable water	Complete

3.3 Toxicity Assessment

The NSCSR Tier II PSS were utilized as a preliminary step to evaluating risks for each COC and applicable exposure pathway. PSS are effects-based criteria protective of human health and the environment, upon which the *Tier I EQSs* are based. They have been calculated based on protection of relevant receptors in different land uses and soil situations, consideration of typical exposure frequency and intensity for each relevant pathway, and application of physical and chemical characteristics that affect contaminant transport and fate in the environment.

In selecting the Tier II PSS for the Site, the following criteria were considered:

- There are no features capable of sustaining sensitive receptors on-Site;
- The land use is to remain agricultural/undeveloped wild land. No buildings or subsurface infrastructure will be constructed on-Site;
- The predominant soil texture is coarse grained;
- There is between 0.3 to 5.39 m of overburden soil;
- Two surface water bodies, one located immediately north and the other approximately 36 m southeast of AMO1, are located at the Site; and
- Groundwater was measured at depths ranging between 0.80 and 3.0 mbgs.

3.4 Risk Characterization

The risk characterization stage integrates the exposure and toxicity assessments to identify if potential risks would be predicted, and the driving exposure pathways and routes. A semi-quantitative assessment of risk was initially undertaken whereby the EPC of each COC was compared to the appropriate Tier II PSS values in order to assess potential risk.

For the purpose of the HHRA, only the PSS values that address human receptors appropriate for the Site are considered. Once this semi-quantitative assessment is performed using the appropriate values, an additional quantitative or qualitative assessment of risks may be undertaken for certain COCs and exposure pathways.

3.4.1 Screening Level Assessment of Soil COCs

Based on the selection criteria, the Tier II PSS for Agricultural Soil using the Soil Contact/Ingestion pathway were determined to be the most applicable criteria for assessing the complete human health exposure pathways for COC impacts in soil at the Site. In addition, values were compared against background soil concentrations established during the 2024 Pinchin L2 ESA summarized above.

Soil analytical results are summarized in Table 4 and compared against EPC for COCs in soil.

Direct Contact and Incidental Ingestion of Soil

Where detected, all COCs in soil are below the PSSs for soil contact/ ingestion and/or the established background concentrations at the Site, with the exception of aluminium, iron and vanadium in four soil samples: HS04 (0.0-0.3m), HS11 (0.0-0.3m) and its field duplicate HS DUP A and HS 12 (0.0-0.3 m).

Based on the above-noted exceedances of the applicable PSSs and background concentrations, there is potential risk to an Outdoor Worker from exposure to impacted soil via the dermal contact and incidental ingestion exposure pathways that will need to be managed should the impacts remain. However, Pinchin recognizes the exposure scenario applied to the Site is highly conservative and further Quantitative Risk Evaluation using site-specific exposure assumptions may be a preferred option. The conceptual risk management measures (RMM) are discussed further in Section 5.

Soil Leaching to Potable Groundwater

Where detected, all COCs in soil are below the PSSs for leaching to potable groundwater and/or background concentrations, with the exception of beryllium in four soil samples: HS04 (0.0-0.3m), HS11 (0.0-0.3m), and it's field duplicate HS DUP A, and HS 12 (0.0-0.3m) HS24 (0.0-0.3m) (0-0.6m).

However, this pathway has been further evaluated through the actual measurement of COC concentrations in groundwater. Contaminant concentrations in groundwater at these and surrounding locations were below the applicable SCS and/or background concentrations. As such, the leaching to potable groundwater exposure pathway is not considered further in this HHRA.

3.5 Summary of Human Health Risks

The results of the HHRA indicated that there are potential human health risks posed for the following receptors/exposure pathways:

- Outdoor Worker (including Property Visitors) – Direct Soil Contact/Ingestion

Risk management measures are recommended to mitigate potential risks for Outdoor Workers, as detailed in Section 5.

3.6 Discussion of Uncertainty in the HHRA

Risk assessments are, by their very nature, attended by many areas of uncertainty. These include the inherent uncertainty used in the exposure assessment, in the mathematical models and/or equations used to derive the *Tier I EQSs* as well as *PSS* used to characterize potential risk of each of the COCs for each relevant receptor. These uncertainties, which relate to regulatory guidance, are considered acceptable for a HHERA. Examples of such uncertainties include:

- Outdoor Workers were assumed to work for 56 years at the same location. However, statistics presented in MECP (2011b) suggest that this is a significant overestimation of the actual amount of time that an outdoor maintenance worker would spend on a given site being exposed to the maximum concentration of COCs in soil and/or groundwater.
- Property Visitors were assumed to have the same exposure as Outdoor Workers. However, this is likely an overestimation of the actual exposure given that property visitors would not be expected to be present for the same duration as an Outdoor Worker Therefore, this evaluation is expected to result in a significantly higher estimate of risk than is likely to occur in reality.
- The assessment assumes that all human receptors are exposed to the maximum soil COC concentrations (i.e., the EPCs) for the full exposure duration. This is likely an overestimation of the actual exposure given that humans are mobile and are unlikely to spend all of their time within the area where contaminants at the EPCs were found. In addition, it is highly conservative to assume that soil COCs are ubiquitous throughout the entire Site at the EPCs. This is especially significant given the wild land use of the Site. A more likely scenario is one of heterogeneity and that humans are generally exposed to (on average) much lower concentrations of each COC. Therefore, this assumption is expected to result in a significantly higher estimate of risk than is likely to occur in reality.
- The assessment does not include consideration for established vegetative cover over the affected area, and therefore this evaluation is expected to result in a significantly higher estimate of risk than is likely to occur in reality.

The conclusions made with respect to potential human health risks are influenced by the level of uncertainty that is proportional to the uncertainty identified in the exposure inputs and model assumptions and toxicity input values made during development of regulatory guidelines. Some of the exposure and hazard uncertainties could result in over- as well as under-estimations of exposure or risk levels. However, in general, cautious assumptions were applied in order to ensure that exposure and risk would not be underestimated. These uncertainties were thus considered acceptable for a HHERA.

4.0 ECOLOGICAL RISK ASSESSMENT (ERA)

The Ecological Risk Assessment (ERA) section of the HHERA was conducted to assess if environmental conditions on the Site could present potential ecological risks due to COCs identified in soil. The ERA considered the following:

- The current environmental setting;
- The absence or presence of surface water that may be affected;
- The absence or presence of SAR;
- COCs at the Site and the maximum concentration of each COC present;
- Contaminant fate and transport mechanisms that might exist;
- Mechanisms of ecotoxicity associated with COCs and receptors that may be affected; and
- Relevant exposure pathways that might exist at the Site.

The following sections outline the assumptions, results and conclusions of the ERA.

4.1 Problem Formulation

An ecological conceptual site model (ECSM) was created to depict the exposure pathways that are possible between COCs at the Site, and relevant ecological receptors. The ECSM considered in this HHERA is presented in Figure 7. Incomplete pathways were eliminated from further consideration in the ERA. Where exposure pathways were complete, a more detailed examination of potential risks was conducted.

The entirety of the Site consists of forested undeveloped wild lands. Therefore, there is suitable habitat present on-Site for terrestrial ecological receptors to be present.

There are potentially suitable habitats present on the Site for Blue Felt Lichen, Canada Warbler, Eastern Wood-pewee, Evening Grosbeak, and Rusty Blackbird. However, there was no evidence of any of these species being present on the Site or within the Study Area at the time of the 2023 Pinchin SAR Screening summarized above. Although none of the discussed SAR were observed, some of them do have potential

to occur on the Site and in the adjacent lands. As such, these species have been considered further in the HHERA.

Receptors that may be present at or near the Site are consistent with those considered by the NSCSR in setting generic standards, as listed below:

- On-Site Terrestrial Ecological Receptors:
  - Mixed Forest vegetation common to the Sheet Harbour Eco district of the South - Central Nova Scotia Uplands Ecoregion;
  - Vegetative communities including a Moist Hemlock and White Birch Mixed Forest and Moist Forb Meadows;
  - Incidental wildlife such as black-capped chickadee, common loon, golden-crowned kinglet and wood frog; and
  - Species at Risk including Blue Felt Lichen, Canada Warbler, Eastern Wood-pewee, Evening Grosbeak and Rusty Blackbird.

4.2 Exposure Assessment

An exposure assessment was completed to characterize the mechanisms by which the ecological receptors would be exposed to soil COCs on the Site. As in the HHRA, the maximum measured concentrations of COCs in soil were used as the EPCs.

Exposures to ecological receptors are not estimated in this ERA using uptake and dose metrics. Instead, a qualitative approach was used whereby the EPCs were compared to the Atlantic RBCA Tier II Ecological PSS used in the derivation of the Tier I standards. For the purpose of this exercise, it was assumed that soil is exposed, and that no man-made barriers (i.e., building foundations, pavement) exist to prevent ecological exposure.

4.2.1 Exposure Pathways

Exposure pathways considered in the HHERA are those described in the Nova Scotia Environment Environmental Quality Standards for Contaminated Sites Rational and Guidance Document for a potable groundwater condition and are listed in Table 4-1.

Plants may be exposed to soil COCs via root uptake at ground surface and the upper soil horizon, or indirectly exposed to soil COCs via stem or foliar uptake of vapours in outdoor air.

Soil Organisms may be exposed to soil COCs via direct contact at ground surface and the upper soil horizon, or indirectly exposed to soil COCs via inhalation of vapours or vapour skin contact within the subgrade or in outdoor air.

Mammals and Birds may be directly exposed to soil COCs via ingestion of or dermal contact with soil at ground surface and the upper soil horizon, or the inhalation of soil particulate/dust; they may also be indirectly exposed to soil COCs via inhalation of vapours within burrows and outdoor air; or, to COCs via the ingestion (consumption) of prey.

Given the shallow depth to groundwater at the Site, Pinchin considered the possible exposure of terrestrial ecological receptors to soil COCs that had leached to groundwater. Roots of terrestrial vegetation are typically widespread but relatively shallow in depth (Dobson and Moffat, 1993; Dobson, 1995). It is uncommon for tree roots to penetrate to depths greater than 2 mbgs, with 80- 90% of tree root systems found within the top 0.60 m of the soil profile (Crow, 2005). Thus, plant roots are not considered likely to take up groundwater found at depths below 1 mbgs but may be exposed to shallower groundwater on parts of the Study Area.

Soil invertebrates typically occupy surficial soil layers close to organic layers and rhizospheres of vegetation (Stewart, 1997; COG, 2001; Ogg, 2006). Anecic earthworms, such as *Lumbricus terrestris*, burrow more deeply into soil but consume organic matter at the soil surface (Langdon et al., 2003). Even those invertebrates that burrow more deeply are liable to avoid saturated soils and are, thus, unlikely to come into contact with groundwater.

Burrowing animals, such as voles, moles, rats and chipmunks, generally have relatively shallow burrows and dens. For example, the Meadow vole makes its burrows along surface runways in grasses or other herbaceous vegetation (US EPA, 1993), and Norwegian rat burrows are only about 0.30 m deep. Moles can have extensive tunnel systems below ground but are usually confined to depths between 0.15 and 0.50 m below the surface (Anderson and Stephens, 2002; Eder, 2002; PCAB, 2003). These too, are likely to avoid saturated soil and unlikely to encounter groundwater, particularly beyond depths of 1 mbgs.

There are surface water bodies located on-Site, and therefore the aquatic life exposure pathways are relevant to the Site in that soil may erode to sediment in surface water bodies and soil COCs may leach to groundwater, which then discharges to surface water.

The contributions of stem exposure, foliar deposition, and inhalation pathways for terrestrial vegetation, soil invertebrates, mammals and birds (as appropriate) are not considered to be significant in terms of exposure, relative to ingestion of environmental media and food items and are, thus, marked “MIN” on Figure 7.

The US EPA (2005) states that, for mammals and birds, the “contact and inhalation pathways of exposure are difficult to evaluate because they are difficult to quantify, and little information is available in the literature on contaminant effects on wildlife species through these pathways. However, these exposure pathways are believed to be small (when compared to the significance of the ingestion pathways).” As such, these pathways are considered minimal and are not carried forward in the HHERA.

Table 4-1 – Ecological Receptors and Exposure Pathways

Property Use	Receptor	Pathway (Component Value)	Status
Agricultural / Undeveloped Wild Lands	Terrestrial Plants	Root uptake/ contact with soil Uptake of soil COCs leaching to groundwater	Complete
	Terrestrial Soil Organisms	Direct contact with soil	Complete
	Aquatic Life	Soil COCs leaching to surface water via groundwater Soil erosion to sediment	Complete

4.3 Toxicity Assessment

The Tier II Ecological PSS values were utilized as a preliminary step to evaluating risks for each COC and applicable exposure pathway. Tier II Ecological PSS are effects-based criteria for soil, groundwater and sediment, protective of the environment, upon which the generic Tier I standards are based. They have been calculated based on protection of relevant receptors in different land uses and soil situations, consideration of typical exposure frequency and intensity for each relevant pathway, and application of physical and chemical characteristics that affect contaminant transport and fate in the environment.

4.4 Risk Characterization

The risk characterization stage integrates the exposure and toxicity assessments to identify if potential risks would be predicted, and the driving exposure pathways and routes. An assessment of risk was undertaken for those exposure pathways that have been evaluated by the NSCSR. A semi-quantitative assessment of risk was initially undertaken whereby the EPC of each COC was compared to the appropriate Tier II Ecological PSS values in order to assess potential risk.

For the purpose of the ERA, only the PSS that address ecological receptors appropriate for the Site are considered. Once this semi-quantitative assessment is performed using the appropriate component values, an additional quantitative or qualitative assessment of risks may be undertaken for certain COCs and exposure pathways.

4.4.1 Screening Level Assessment of Soil COCs

Based on the selection criteria, the Tier II Ecological PSS for Agricultural Soil were determined to be the most applicable criteria for assessing the complete ecological exposure pathways for COC impacts in soil at the Site.

Soil analytical results are summarized in Table 5 and compared against the EPC for COCs in soil.

Direct Contact of Soil for Plants and Soil Organisms

The EPC of aluminium, beryllium, iron and vanadium in soil are below the direct contact Ecological PSSs. COC concentrations are present at levels that are not considered to be a risk to plants and soil organisms, and no further evaluation is required for this pathway.

Soil and Food Ingestion for Mammals and Birds

The EPC of vanadium in soil exceed the soil and food ingestion Ecological PSSs. As such, there may be a potential risk to Terrestrial Mammals and Birds from exposure to impacted soil via the soil and food ingestion exposure pathways. The single vanadium exceedance was obtained from soil sample HS12 which is located on the eastern edge of the study area. Based on the results of the adjacent soil samples, vanadium exceedances appear to be localized and is not considered to be a significant risk to mammals and birds, and as such no further evaluation is required for this pathway.

Terrestrial Plant Exposure to Soil COCs via Leachate

There are no Tier II Ecological PSS to address possible plant root uptake of soil contaminants that have leached to groundwater. However, groundwater data collected from within the Study Area indicate that the metals that were identified as soil COCs met their respective groundwater criteria. Therefore, risks to terrestrial plants are not anticipated for this pathway.

Aquatic Life Exposure to Soil COCs via Erosion to Sediment and Leachate

There are no Tier II Ecological PSS for the soil erosion to sediment, or soil contaminant leachate and discharge to surface water pathways. However, sediment and groundwater data collected from within the Study Area indicate that the metals that were identified as soil COCs met their respective sediment and groundwater criteria. Therefore, risks to aquatic life are not anticipated.

4.5 Additional Ecological Risk Characterization

There is a level of uncertainty associated with those parameters that do not have applicable PSSs: there are no PSSs for aluminium or iron.

It is understood that the PSSs for select metals have not been established for some environmental pathways, media and /or receptors. However, guideline derivation methods have demonstrated that all are adequately conservative and protective of human and/or environmental health. In addition, parameters that have not been assigned a PSS have been deemed not to require a guideline due either to a physical-chemical, environmental fate and behavioural toxicological properties such that a substance will not pose an ecological risk if it does occur in soil (Atlantic RBCA, July 2022).

Finally, it is noted that the ERA was conducted using a “deterministic” approach, which assumes that the maximum measured concentrations of COCs in soil are, in fact, found across the entire Site. In reality, it is expected that the exposure estimates for terrestrial receptors are likely over-estimated, and the ERA over-predicts risks to representative bird and mammal species by assuming that they consume plants and soil invertebrates exposed to the maximum soil concentrations and would ingest only soil containing COCs at EPCs. It is highly unlikely that a mobile receptor, such as a rodent or bird would consume plants or soil invertebrates or ingest soil only within the area of maximum COC concentrations in soil.

Thus, the actual risk to ecological receptors is likely low due to the spatial distribution of the soil exceedances and the mobility of potential receptors. In addition, the areas where the soil exceedances were found are densely vegetated and gives the visual appearance of a thriving ecosystem of diverse plant species underlain by layers of naturally decomposing material that will contribute to a future organic soil cap. A hard cap installation or fill cap replacement in the vicinity of the exceedances would cause more harm to the existing habitat. As such, it is recommended that risks to on-Site terrestrial receptors be managed by allowing natural attenuation to take place, as opposed to habitat destruction. Finally, any future disturbance activities should be undertaken in a manner that would reduce harm to the environment. These and other details are discussed further in Section 5.

4.6 Species at Risk

The assessment of ecological risks was conducted using a screening level approach and Tier II Ecological PSS that are intended for the protection of populations or communities of ecological receptors, and not individual species as would be required if species at risk were present. As noted above, a deterministic approach is a conservative approach to evaluating potential risks. Although there are potentially suitable habitats present on the Site for several SAR, only the Blue Felt Lichen would be immobile. The Canada Warbler, Eastern Wood-pewee, Evening Grosbeak, and Rusty Blackbird are likely to experience a much lower exposure frequency to impacted soil, than is assumed in the exposure assessment. In addition, there was no evidence of any of these species being present on the Site or within the Study Area at the time of the 2023 Pinchin SAR Screening summarized above. As such, it was considered unlikely that the soil COCs evaluated in this HHERA present a substantial health risk to individuals of these species.

4.7 Summary of Ecological Risks

The results of the ERA indicated that risks to ecological health are unlikely. Therefore, no RMM are required and no further action recommended.

4.8 Discussion of Uncertainty in the ERA

As noted previously, risk assessments are, by their very nature, attended by many areas of uncertainty. These include the inherent uncertainty used in the exposure assessment, in the mathematical models and/or equations used to derive the standards, as well as PSS used to characterize the potential risk of each of the COCs for each relevant receptor. These uncertainties, which relate to regulatory guidance, are considered acceptable for a HHERA. Examples of such uncertainties include:

- The assessment assumes that all ecological receptors are exposed to the maximum soil COC concentrations for the full exposure duration. In reality, maximum soil COC concentrations are not found throughout the entire Site, and mammals, birds and soil organisms are not expected to stay only within the area of maximum concentrations throughout the entire duration of exposure. Therefore, it is expected that the exposure estimates for terrestrial mammals, birds and soil organisms are likely over-estimated. The approach also over-predicts the risks to plant and soil invertebrate communities. Within a community, some organisms may be exposed to the maximum soil concentrations, but for the community as a whole, which exists over a wider area and depth, the assumption that each individual organism is exposed to all COCs at their EPC will likely over-predict the exposure, and hence the risk to the community.
- The ERA also over-predicts risks to receptors by assuming that they consume plants and soil organisms exposed to the maximum soil concentrations and would ingest only soil containing COCs at EPCs. It is highly unlikely that a mobile receptor, such as a rodent or bird would consume plants or soil invertebrates or ingest soil only within the area of maximum COC concentrations in soil.
- For the assessment of risks to plants and soil organisms, the bioavailability of COCs in soil was assumed to be equivalent to the bioavailability in the soils of the studies used to derive the benchmark concentrations. If the bioavailability of COCs in on-Site soil is greater or less than in the study soils, the predicted risks may be under- or over-estimated, respectively.
- Toxicological effects data are more readily available for domestic and laboratory mammals, such as rats and mice than for other mammals. The use of this data in the derivation of the mammal and bird component values may result in over- or under-

estimations of risk, if applied to exposure estimates for wildlife species that are less or more sensitive, respectively, than the test species.

- The soil ingestion rates, dietary compositions, and dietary consumption rates used to derive the pathway specific values were taken from reputable sources but may have been based on animals in captivity. These values may not be completely representative of parameters for individuals in the wild.

The conclusions made with respect to potential ecological health risks are influenced by the level of uncertainty that is proportional to the uncertainty identified in the exposure inputs and model assumptions and toxicity input values. Some of the exposure and hazard uncertainties could result in over- as well as under-estimations of exposure or hazard values. However, in general, cautious assumptions were applied in order to ensure that exposure and risk would not be underestimated. These uncertainties were thus considered acceptable for a HHERA.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The results of the HHRA indicated that there are potential human health risks posed for the following receptors/exposure pathways:

- Outdoor Worker (including Property Visitors) – Direct contact with soil (currently addressed by the existing on-Site soil caps – see below)

The results of the ERA indicated that risks to ecological health are unlikely. Risk management measures are recommended to mitigate potential human health risks, should the impacts remain on-Site. The RMM are discussed in Section 5.1.

5.1 Conceptual Risk Management Plan

The main objective of the Conceptual Risk Management Plan is to ensure that risks do not exceed maximum acceptable levels for the relevant receptors. Table 5-1 summarizes the combination of exposure pathways, environmental media, COCs, and receptors for which RMM are recommended.

Table 5-1 – Summary of Potential Risks

Media	Receptor	Pathway	COCs	Risk Management Measure
Soil	Outdoor Worker (Including Property Visitor)	Direct Soil Contact	Aluminium, Beryllium, Iron and Vanadium	Maintain existing vegetative cover (Section 5.1.1), Health and Safety Plan (Section 5.1.2)

Risk management measures are recommended to protect the receptors on-Site and mitigate the potential risks summarized in Table 5-1. With these RMMs in place, no potential human health or ecological risks are anticipated for the Site.

5.1.1 Vegetative Cover / Cap

The existing vegetative cover (i.e., caps) include the naturally vegetated areas and sloped creekbank along the north and southeast portion of the Site, which has the visual appearance of a thriving ecosystem of diverse plant species underlain by layers of naturally decomposing material that will contribute to a future organic soil cap and are presumed to act as suitable fill covers that are already mitigating potential risks. The dense vegetation present along the creekbank is also presumed to be acting as a natural erosion control, reducing surface soil from entering the adjacent water body.

Should the soil impacts be disturbed in the future, measures should be implemented to prevent harm to the environment, including but not limited to soil erosion controls along the two unnamed tributaries, fencing, natural habitat restoration, capping of soil impacts with suitable hard or fill caps, and/or soil remediation.

Pinchin notes that soil impacts on-Site have been delineated and appear to be limited to areas that are currently capped with existing naturally vegetated fill caps, with the exception of AMO1. Thus, this area should be capped with suitable material.

5.1.2 Health and Safety Plan (HASP)

Any future construction workers who may come into contact with the impacted soil (i.e., for any redevelopment, utility, earth works, or other subsurface activities anticipated to take place at the Site) should be notified of the presence of soil contaminants. In addition to the health and safety measures that would routinely be required for these undertakings in the absence of environmental contaminants, a Site-specific component to the contractors HASP is recommended to address potential exposure of workers to COCs in soil.

The Site-specific HASP should require the use of PPE such as gloves, long sleeves and pants, and boots, and hygienic safe work procedures, to prevent contact with soil COCs.

5.2 Summary of Recommendations

The following recommendations are proposed for the Site:

- **Health and Safety Plan:** Development and use of a Site-Specific HASP to be used by future construction subsurface workers during subsurface activities where contact with soil COCs is likely to occur.

- **Maintain Existing Soil Cap:** The existing naturally occurring vegetative cap distributed across the Site should be maintained so long as the contaminants are present at the Site above applicable standards.

In summary, with the implementation of the recommendations listed above, and under the current Site use and configuration, the potential risks to human health and the environment can be managed in place.

6.0 TERMS AND LIMITATIONS

This HHERA was performed for Build Nova Scotia (Client) in order to investigate potential environmental impacts at Former Widow Point Mine – South of West Side Road, Country Harbour, Nova Scotia (Site).

This work was performed subject to the Terms and Limitations presented or referenced in the proposal for this project.

Information provided by Pinchin is intended for Client use only. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law. Any use by a third party of reports or documents authored by Pinchin or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. No other warranties are implied or expressed.

The term recognized environmental condition means the presence or likely presence of any hazardous substance on a property under conditions that indicate an existing release, past release, or a material threat of a release of a hazardous substance into structures on the property or into the ground, groundwater, or surface water of the property. This HHERA does not quantify the extent of the current and/or recognized environmental condition or the cost of any remediation.

Conclusions derived are specific to the immediate area of study and cannot be extrapolated extensively away from sample locations. Samples have been analyzed for a limited number of contaminants that are expected to be present at the Site, and the absence of information relating to a specific contaminant does not indicate that it is not present.

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions on a property. Performance of this HHERA to the standards established by Pinchin is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions on the Site and recognizes reasonable limits on time and cost.

This HHERA was performed in general compliance with currently acceptable practices for environmental site investigations, and specific Client requests, as applicable to this Site. The scope of work completed by Pinchin, as part of this HHERA, is not sufficient (in and of itself) to meet the requirements for the submission of a Record of Site Condition (RSC). If an RSC is an intended end product of work conducted at the Site, further consultation and/or work will be required.

This report was prepared for the exclusive use of the Client, subject to the terms, conditions and limitations contained within the duly authorized proposal for this project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

If additional parties require reliance on this report, written authorization from Pinchin will be required. Pinchin disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed. Furthermore, this report should not be construed as legal advice. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law.

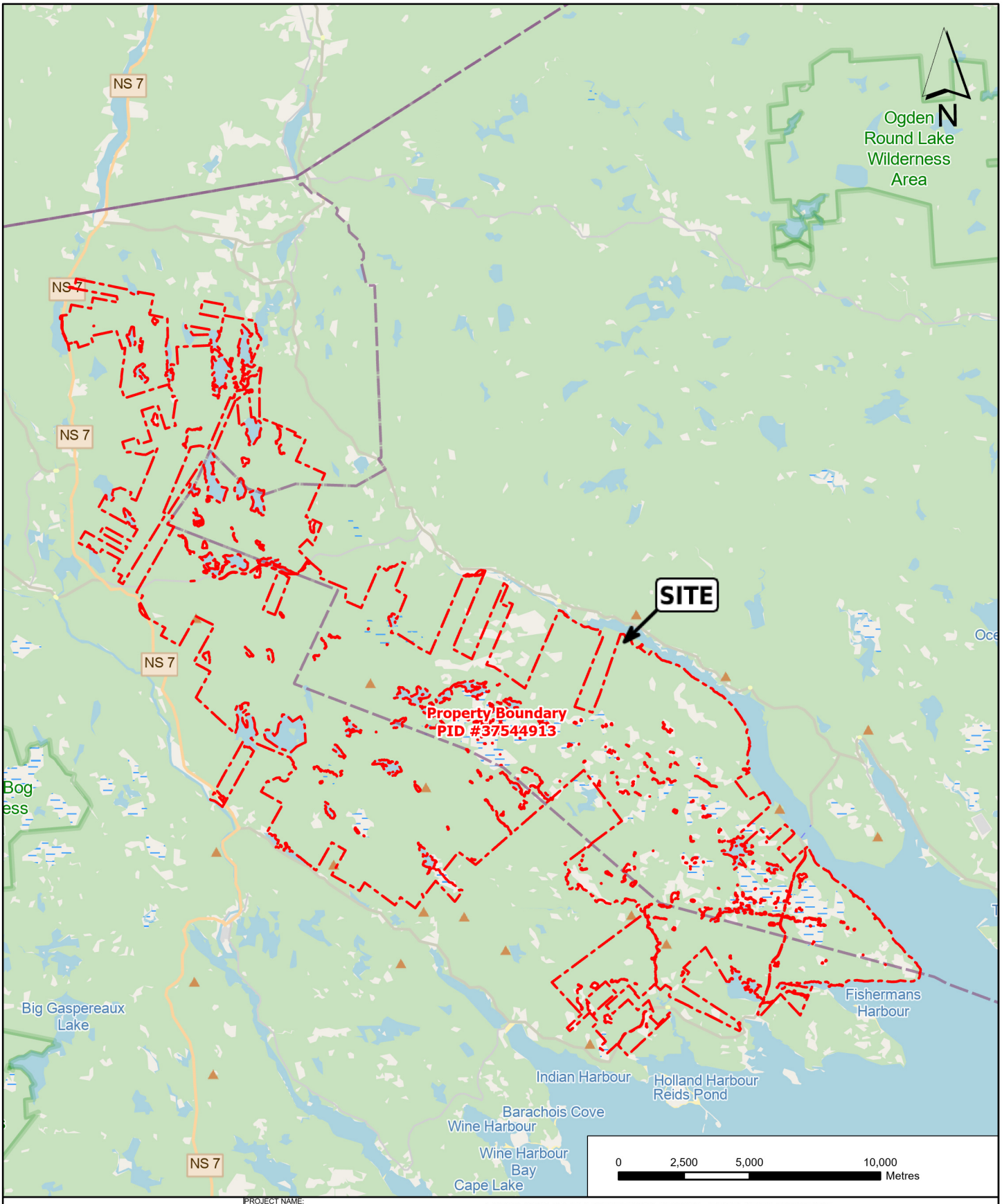
Pinchin makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

7.0 REFERENCES

1. Anderson, R. and Stephens, J. 2002. Tamias striatus. Animal Diversity. Available online at: http://animaldiversity.ummz.edu/site/accounts/information/Tamias_striatus.html
2. COG. 2001. The Organic Field Crop Handbook. Canadian Organic Growers, Ste-Anne-de-Bellevue, QC. Canadian Organic Growers.
3. Crow, P. 2005. The influence of soils and species on tree root depth. Information Note. Forestry Commission, Environmental and Human Sciences Division, Forest Research, Edinburgh, UK. November, 2005. Crown Copyright ©. ISBN 0-85538-679-7. Available online at: http://www.urbanforestrysouth.org/resources/library/the-influence-of-soils-and-species-on-tree-root-depth/file [September 25, 2009].
4. Dobson, M.C. 1995. Tree root systems. Arboriculture Research and Information Note 130. Arboricultural Advisory and Information Service, Farnham. Cited In: Crow, 2005.
5. Dobson, M.C. and Moffat, A.J. 1993. The potential for woodland establishment on landfill sites. HMSO, London. Cited In: Crow, 2005.

6. Eder, T. 2002. Mammals of Ontario. Lone Pine Publishing, Edmonton, AB.
7. Green, S.M., Machin, R., and Cresser, M.S. 2008. Effect of long-term changes in soil chemistry induced by road salt applications on N-transformations in roadside soils. Environmental Pollution, 152: 20 – 31.
8. Health Canada March 2021. Federal Contaminated Site Risk Assessment in Canada: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 3.0.
9. Ogg, B. 2006. Centipedes and Millipedes. University of Nebraska-Lincoln, Publication Number 012–93.
10. PCAB. 2003. Rat Control in Saskatchewan. Provincial Council of Agriculture Development and Diversification Boards for Saskatchewan Inc. ISBN 0–88656–692–0.
11. Stewart, J.W. 1997. Centipedes and Millipedes. Texas Agricultural Extension Service, Publication Number L–1747. 1997.
12. Nova Scotia Contaminated Sites Regulations (2013) and associated Ministerial Protocols: https://www.novascotia.ca/nse/contaminatedsites/protocols.asp.
13. Nova Scotia Environment Environmental Quality Standards for Contaminated Sites Rational and Guidance Document (April 2014).
14. Atlantic Risked-Based Corrective Action (RBCA) for Impacted Sites in Atlantic Canada Version 4.0 User Guidance (July 2021, Updated July 2022) https://atlanticrbca.com/.
15. Atlantic RBCA Environmental Quality Standards Rational and Guidance Document (July 2021, Updated July 2022, Updated June 2023) https://atlanticrbca.com/.
16. FINAL Phase I Environmental Site Assessment Memo and Field Program Report, Former Widow Point Mine – south of West Side Road, Country Harbour, Guysborough Nova Scotia (PID 37544913)", prepared by Pinchin Ltd (Pinchin), prepared for Build Nova Scotia and dated October 6, 2023 (2023 Pinchin Phase I ESA);
17. "Species at Risk Screening, West Side Country Harbour, Guysborough, Nova Scotia PID *37544913*", prepared by Pinchin, prepared for Build Nova Scotia and dated October 2, 2023 (2023 Pinchin SAR Screening); and
18. "REVISED Limited (L2) Environmental Site Assessment and Remedial Options Analysis, Former Widow Point Mine – South of West Side Road, Country Harbour, Nova Scotia", prepared by Pinchin, prepared for Build Nova Scotia and dated February 23, 2024 (2024 Pinchin L2 ESA).

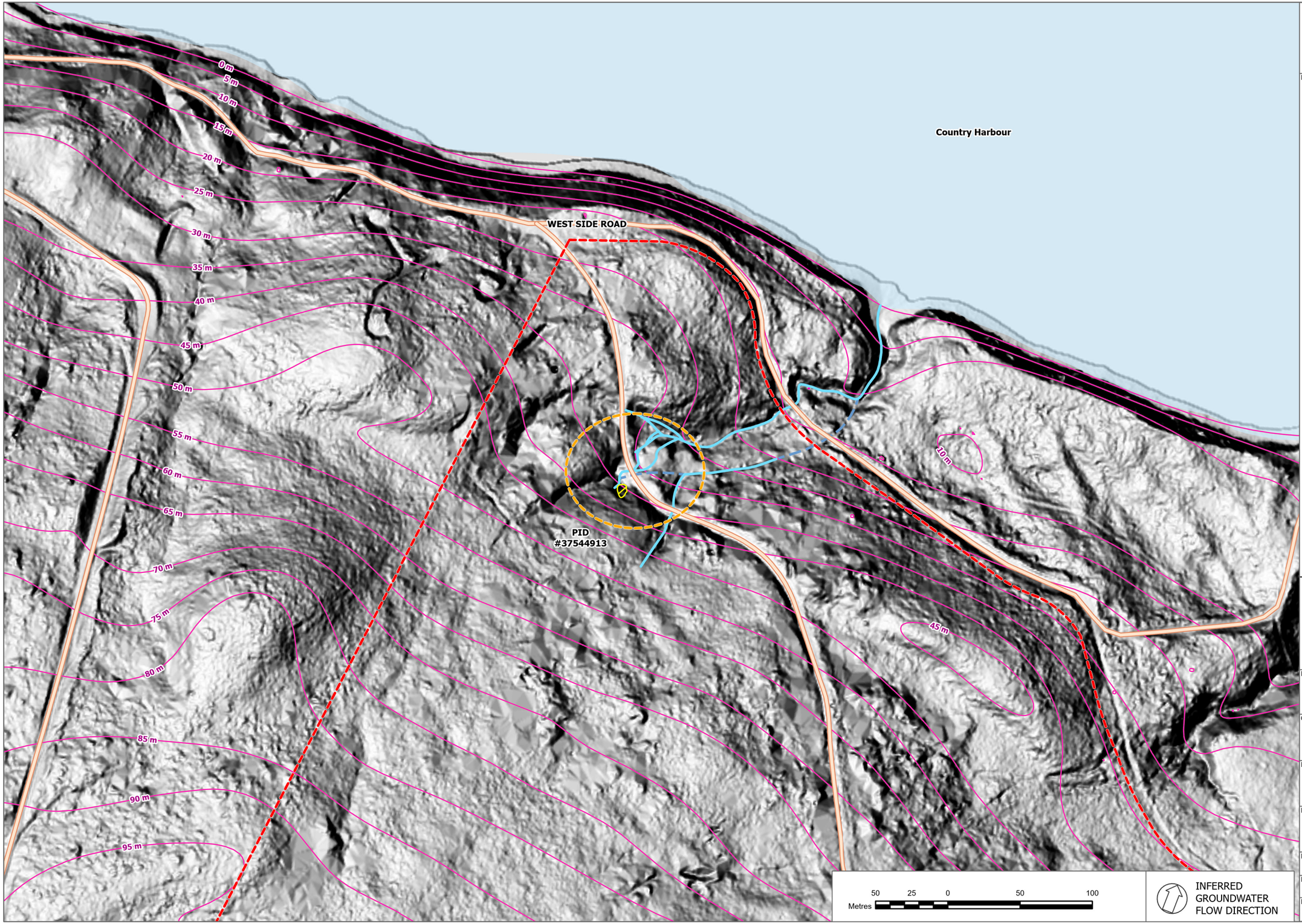
APPENDIX I
Figures



PINCHIN

PROJECT NAME:	HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT
CLIENT NAME:	BUILD NOVA SCOTIA
PROJECT LOCATION:	FORMER WIDOW POINT MINE SITE, GUYSBOROUGH COUNTY, NOVA SCOTIA
FIGURE NAME:	KEY MAP
FIGURE NUMBER	1

PROJECT NUMBER:	SCALE:	DRAWN BY:	REVIEWED BY:	DATE:
327768.002	AS SHOWN	CF	AA	JUNE 2024



N

LEGEND

- ELEVATION CONTOURS (MASL)
- OBSERVED STREAM
- ROAD NETWORK
- PROPERTY BOUNDARIES
- AMO1
- STUDY AREA
- WATER BODIES

MASL = METERS ABOVE SEA LEVEL
PID = PREMISES IDENTIFICATION NUMBER

NOTES:
1) Proprietary information may not be reproduced or divulged without prior written consent of Pinchin Ltd.
2) This drawing may have been reduced. All scale notations indicated are based on a 11"x17" format drawings.
3) Legend is color dependent. Non-colour copies may alter interpretation.
4) Coordinate system: NAD 1983 CSRS UTM Zone 20N.
5) Source: Pinchin Ltd., .

PINCHIN

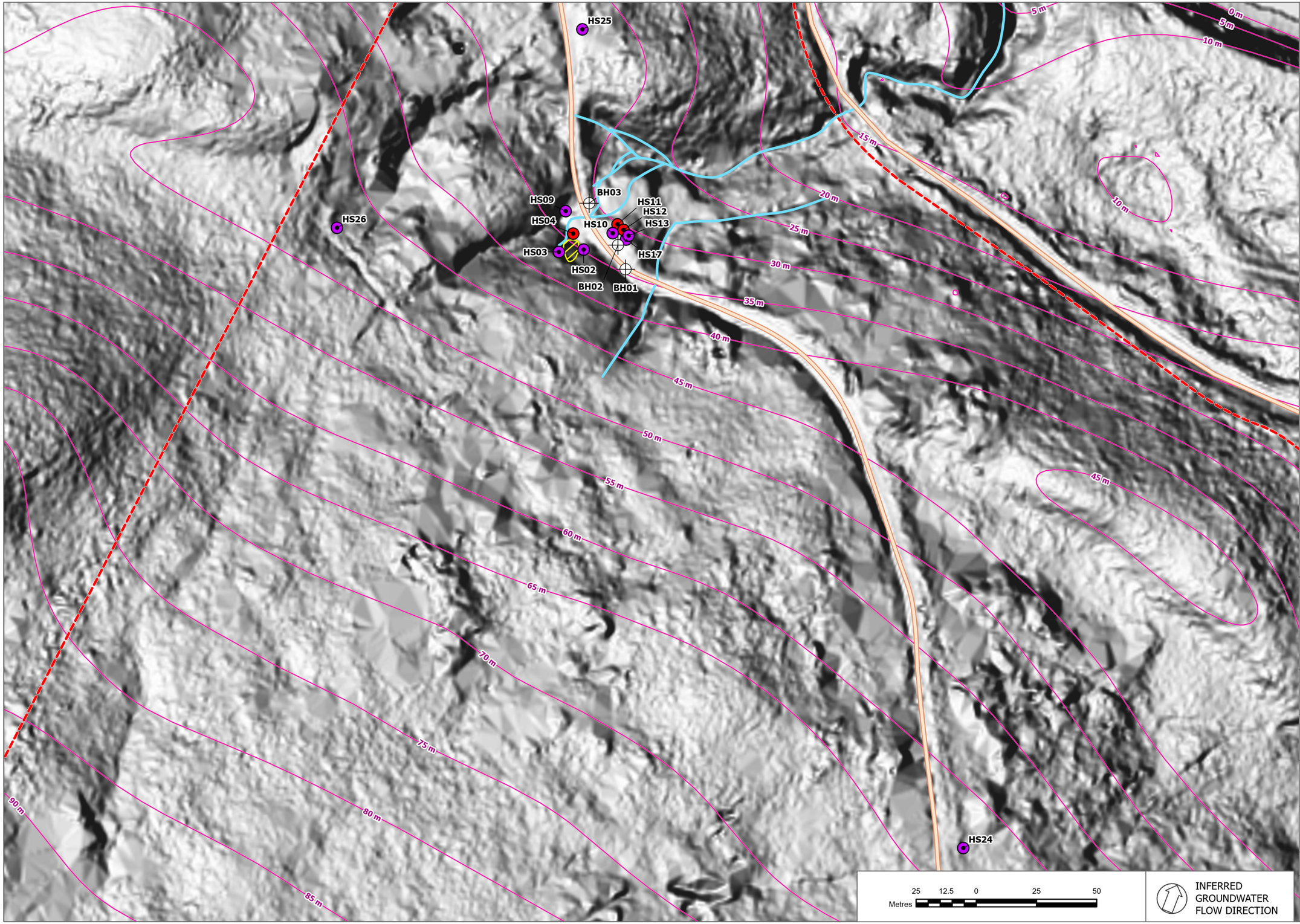
PROJECT NAME
HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

CLIENT NAME
BUILD NOVA SCOTIA

PROJECT LOCATION
FORMER WIDOW POINT MINE, GUYSBOROUGH, NOVA SCOTIA

FIGURE NAME
SITE AND SURROUNDING LAND USE

PROJECT NUMBER:	SCALE
327768.002	**AS SHOWN**
DRAWN BY **CF**	REVIEWED BY **JP**
DATE **JUNE 2024**	FIGURE NUMBER **2**



N

LEGEND

- SOIL SAMPLE EXCEEDING TIER 1 EQSS AND/OR BACKGROUND CONCENTRATION
- SOIL SAMPLE LOCATION (SOIL SAMPLE BELOW TIER 1 EQS AND/OR BACKGROUND CONCENTRATION)
- BOREHOLE LOCATION
- ELEVATION CONTOURS (MASL)
- OBSERVED STREAM
- ROAD NETWORK
- PROPERTY BOUNDARIES
- AMO1

MASL = METERS ABOVE SEA LEVEL

INFERRED GROUNDWATER FLOW DIRECTION

NOTES:
1) Proprietary information may not be reproduced or divulged without prior written consent of Pinchin Ltd.
2) This drawing may have been reduced. All scale notations indicated are based on a 11"x17" format drawings.
3) Legend is color dependent. Non-colour copies may alter interpretation.
4) Coordinate system: NAD 1983 CSRS UTM Zone 20N.
5) Source: Pinchin Ltd., .

PINCHIN

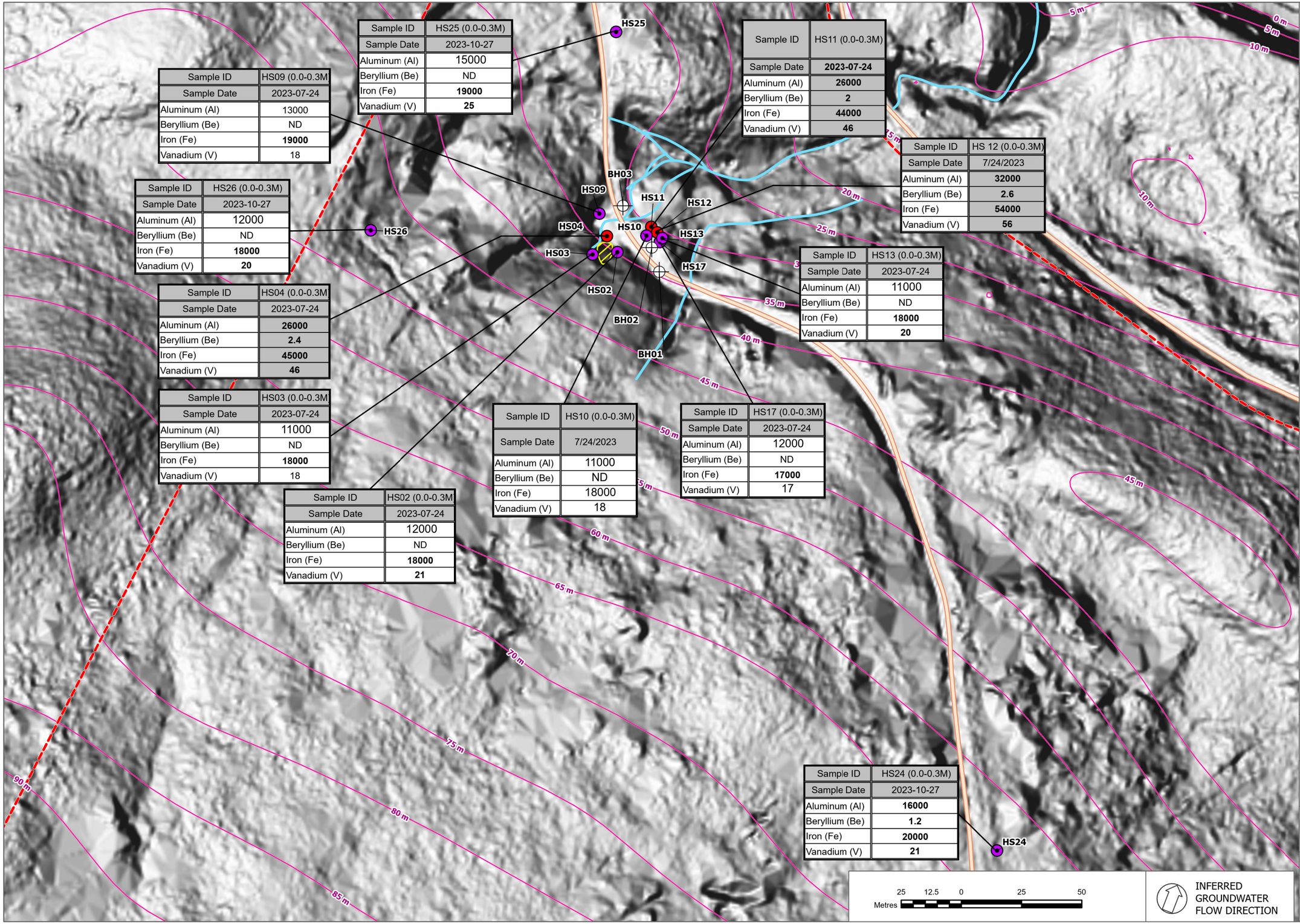
PROJECT NAME
HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

CLIENT NAME
BUILD NOVA SCOTIA

PROJECT LOCATION
FORMER WIDOW POINT MINE, GUYSBOROUGH, NOVA SCOTIA

FIGURE NAME
BOREHOLE AND SURFACE SAMPLE LOCATION PLAN

PROJECT NUMBER:	SCALE
327768.002	AS SHOWN
DRAWN BY: CF	REVIEWED BY: JP
DATE: JUNE 2024	FIGURE NUMBER: 3



Sample ID	HS25 (0.0-0.3M)
Sample Date	2023-10-27
Aluminum (Al)	15000
Beryllium (Be)	ND
Iron (Fe)	**19000**
Vanadium (V)	**25**

Sample ID	HS09 (0.0-0.3M)
Sample Date	2023-07-24
Aluminum (Al)	13000
Beryllium (Be)	ND
Iron (Fe)	**19000**
Vanadium (V)	18

Sample ID	HS11 (0.0-0.3M)
Sample Date	**2023-07-24**
Aluminum (Al)	**26000**
Beryllium (Be)	**2**
Iron (Fe)	**44000**
Vanadium (V)	**46**

Sample ID	HS 12 (0.0-0.3M)
Sample Date	7/24/2023
Aluminum (Al)	**32000**
Beryllium (Be)	**2.6**
Iron (Fe)	**54000**
Vanadium (V)	**56**

Sample ID	HS26 (0.0-0.3M)
Sample Date	2023-10-27
Aluminum (Al)	12000
Beryllium (Be)	ND
Iron (Fe)	**18000**
Vanadium (V)	**20**

Sample ID	HS13 (0.0-0.3M)
Sample Date	2023-07-24
Aluminum (Al)	11000
Beryllium (Be)	ND
Iron (Fe)	**18000**
Vanadium (V)	**20**

Sample ID	HS04 (0.0-0.3M)
Sample Date	2023-07-24
Aluminum (Al)	**26000**
Beryllium (Be)	**2.4**
Iron (Fe)	**45000**
Vanadium (V)	**46**

Sample ID	HS03 (0.0-0.3M)
Sample Date	2023-07-24
Aluminum (Al)	11000
Beryllium (Be)	ND
Iron (Fe)	**18000**
Vanadium (V)	18

Sample ID	HS10 (0.0-0.3M)
Sample Date	7/24/2023
Aluminum (Al)	11000
Beryllium (Be)	ND
Iron (Fe)	18000
Vanadium (V)	18

Sample ID	HS17 (0.0-0.3M)
Sample Date	2023-07-24
Aluminum (Al)	12000
Beryllium (Be)	ND
Iron (Fe)	**17000**
Vanadium (V)	17

Sample ID	HS02 (0.0-0.3M
Sample Date	2023-07-24
Aluminum (Al)	12000
Beryllium (Be)	ND
Iron (Fe)	**18000**
Vanadium (V)	**21**

Sample ID	HS24 (0.0-0.3M)
Sample Date	2023-10-27
Aluminum (Al)	**16000**
Beryllium (Be)	**1.2**
Iron (Fe)	**20000**
Vanadium (V)	**21**

N

LEGEND

- SOIL SAMPLE EXCEEDING TIER 1 EQSS AND/OR BACKGROUND CONCENTRATION
- SOIL SAMPLE LOCATION (SOIL SAMPLE BELOW TIER 1 EQS AND/ OR BACKGROUND CONCENTRATION)
- BOREHOLE LOCATION
- ELEVATION CONTOURS (MASL)
- OBSERVED STREAM
- ROAD NETWORK
- PROPERTY BOUNDARIES
- AMO1

MASL = METERS ABOVE SEA LEVEL

Metres: 25 12.5 0 25 50

INFERRED GROUNDWATER FLOW DIRECTION

NOTES:
1) Proprietary information may not be reproduced or divulged without prior written consent of Pinchin Ltd.
2) This drawing may have been reduced. All scale notations indicated are based on a 11"x17" format drawings.
3) Legend is color dependent. Non-colour copies may alter interpretation.
4) Coordinate system: NAD 1983 CSRS UTM Zone 20N.
5) Source: Pinchin Ltd., .

PINCHIN

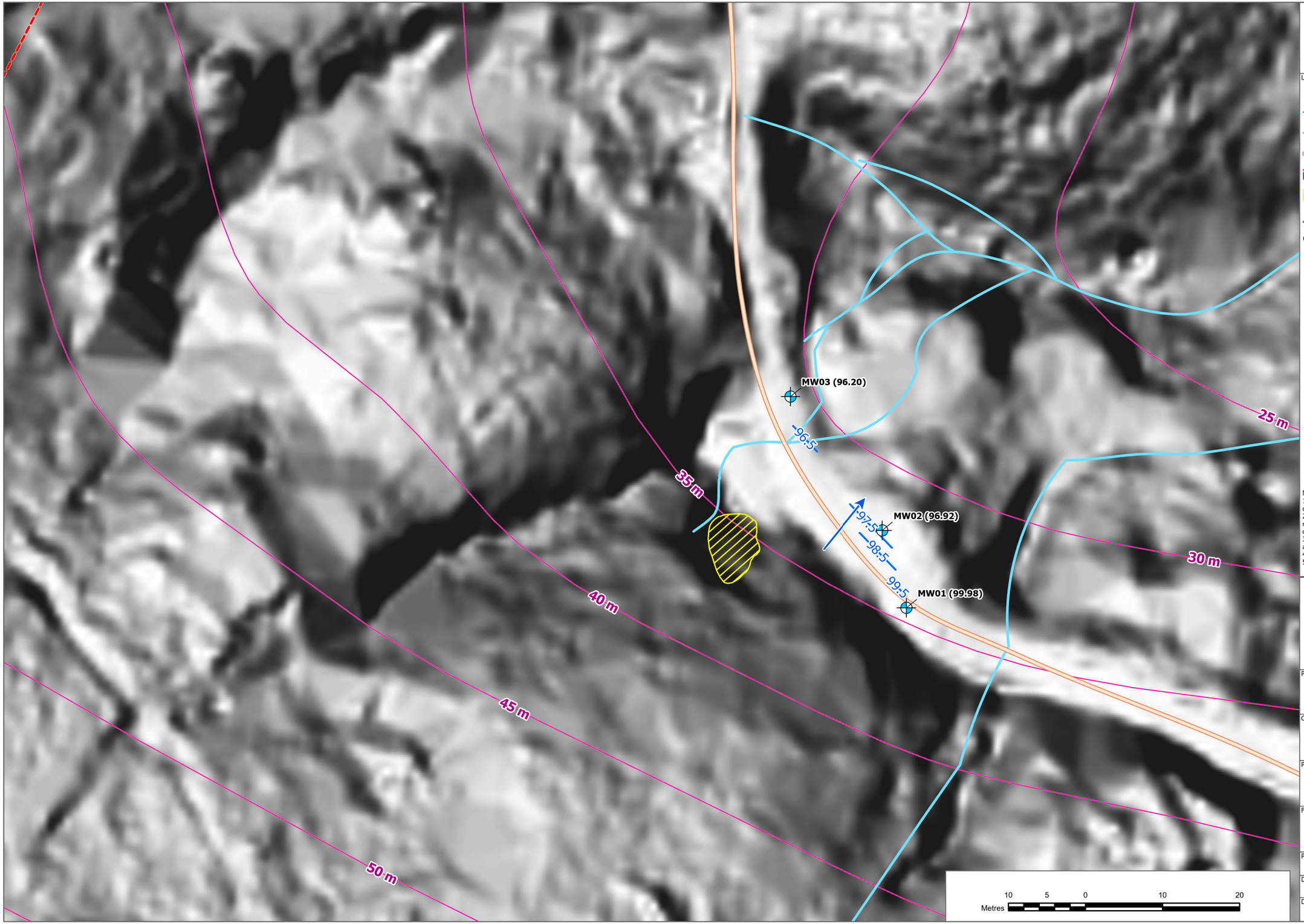
PROJECT NAME
HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

CLIENT NAME
BUILD NOVA SCOTIA

PROJECT LOCATION
FORMER WIDOW POINT MINE, GUYSBOROUGH, NOVA SCOTIA

FIGURE NAME
CONCENTRATIONS OF SOIL PARAMETERS

PROJECT NUMBER:	SCALE
327768.002	**AS SHOWN**
DRAWN BY: **CF**	REVIEWED BY: **JP**
DATE: **JUNE 2024**	FIGURE NUMBER: **4**



N

LEGEND

- MONITORING WELL
- ELEVATION CONTOURS (MASL)
- OBSERVED STREAM
- ROAD NETWORK
- PROPERTY BOUNDARIES
- AMO1
- INFERRED GROUNDWATER ELEVATION CONTOURS
- **(100.00)** CALCULATED WATER LEVEL (MASL)
- 100.00 GROUNDWATER CONTOUR ELEVATION
- INFERRED GROUNDWATER FLOW DIRECTION
- MASL = METERS ABOVE SEA LEVEL

NOTES:
1) Proprietary information may not be reproduced or divulged without prior written consent of Pinchin Ltd.
2) This drawing may have been reduced. All scale notations indicated are based on a 11"x17" format drawings.
3) Legend is color dependent. Non-colour copies may alter interpretation.
4) Coordinate system: NAD 1983 CSRS UTM Zone 20N.
5) Source: Pinchin Ltd., .

PINCHIN

PROJECT NAME
HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

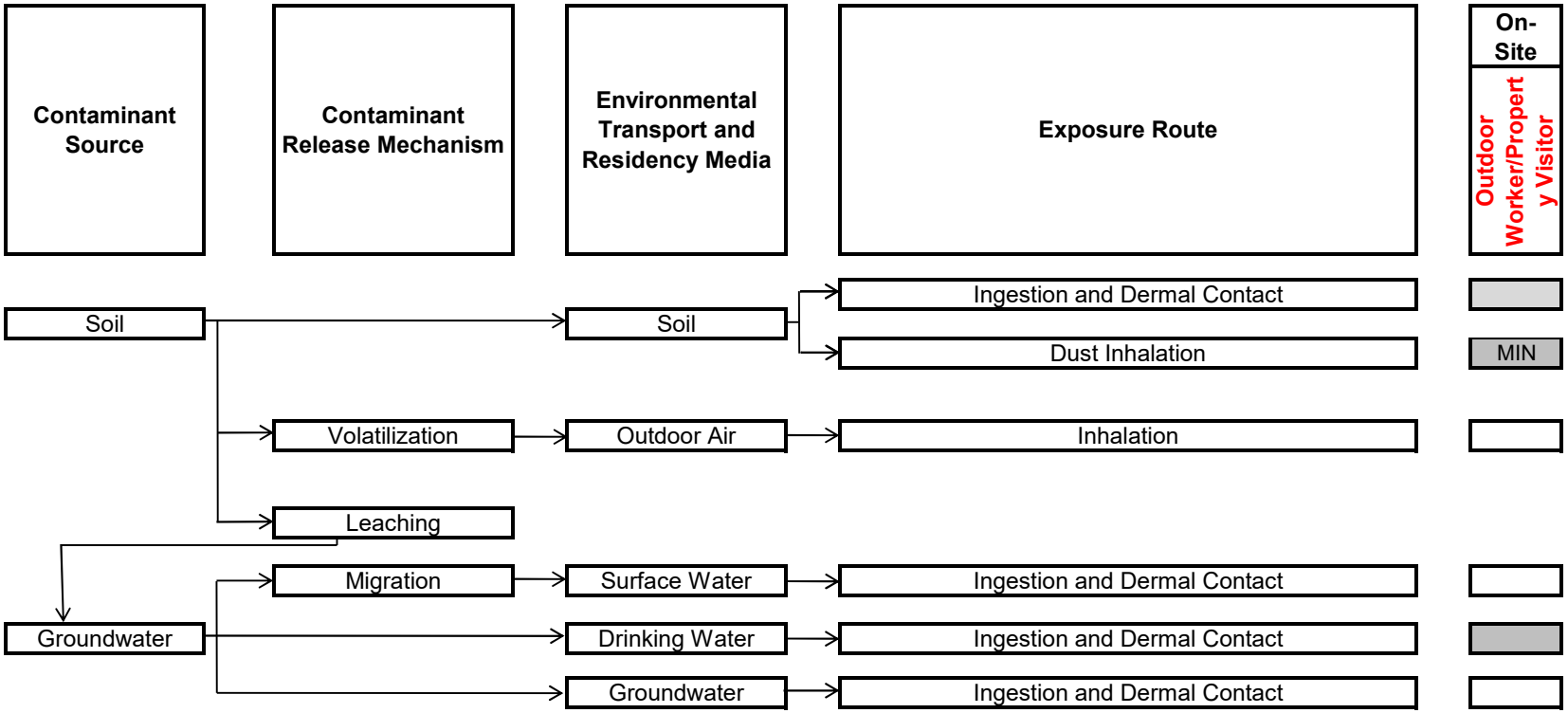
CLIENT NAME
BUILD NOVA SCOTIA

PROJECT LOCATION
FORMER WIDOW POINT MINE, GUYSBOROUGH, NOVA SCOTIA

FIGURE NAME
MONITORING WELL LOCATIONS AND GROUNDWATER FLOW DETAILS

PROJECT NUMBER:	SCALE
327768.002	**AS SHOWN**
DRAWN BY: **CF**	REVIEWED BY: **JP**
DATE: **JUNE 2024**	FIGURE NUMBER: **5**

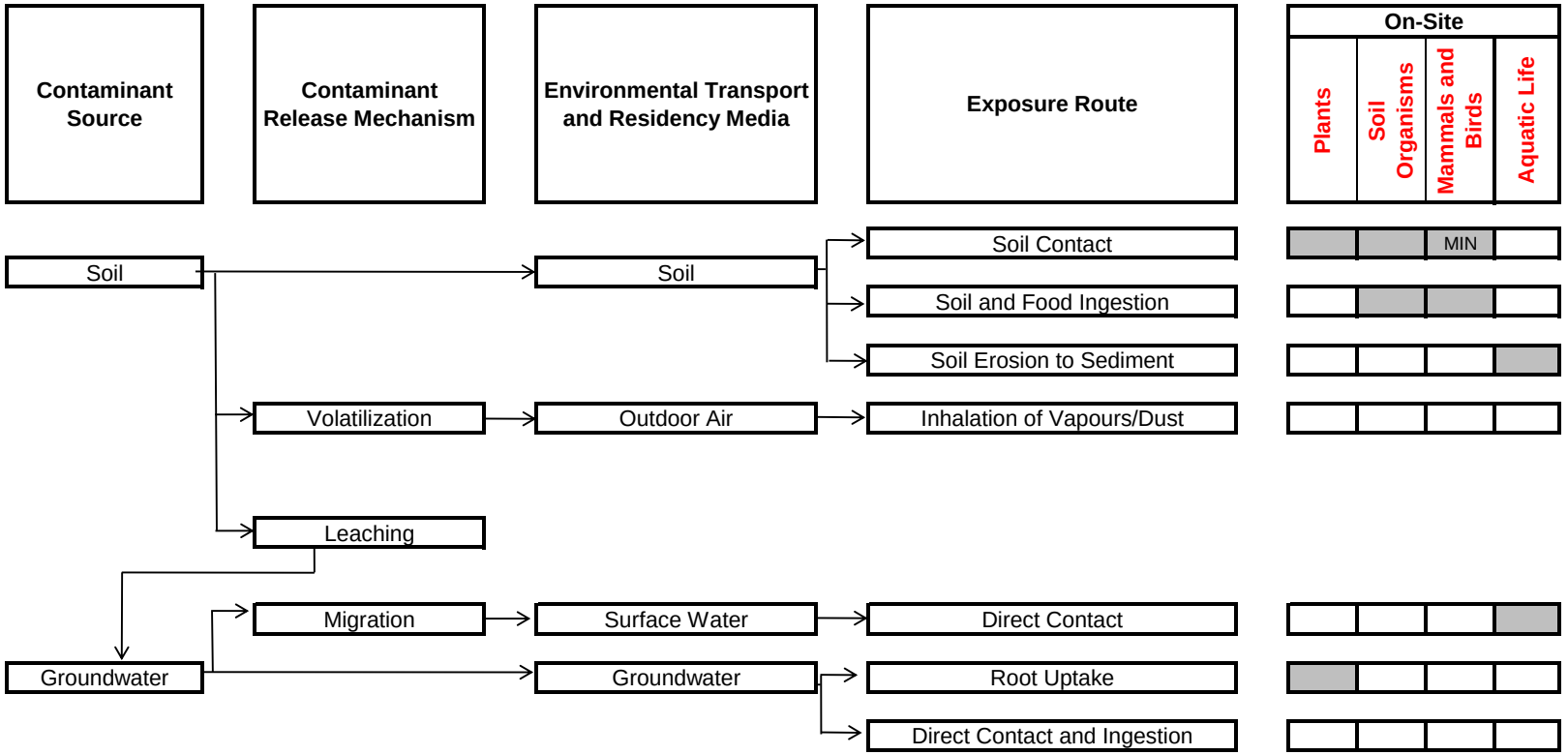
FIGURE 6: HUMAN HEALTH CONCEPTUAL SITE MODEL



Notes:

- Complete Pathway that does not require Risk Management Measure (RMM)
- Incomplete Pathway
- Complete Pathway that has been blocked by RMM
- MIN — Complete Pathway, but minimal contributor to overall exposure

FIGURE 7: ECOLOGICAL HEALTH CONCEPTUAL SITE MODEL



Notes:

- Complete Pathway that does not require Risk Management Measure (RMM)
- Incomplete Pathway
- Complete Pathway that has been blocked by RMM
- MIN — Complete Pathway, but minimal contributor to overall exposure

APPENDIX II

Tables

Project Name: Human Health and Ecological Risk Assessment, Former Widow Point Mine, Guysborough, NS
Project Number: 327768.002

TABLE 1
GROUNDWATER MONITORING DATA
(metres)

Well Number	Top of Well Casing Elevation	Well Screen Interval	Monday, October 30, 2023	
			Depth to Groundwater	Groundwater Elevation
MW01	101.540	0.61 - 3.05	1.565	99.975
MW02	101.008	0.61 - 5.39	4.085	96.923
MW03	98.665	0.61 - 3.66	2.461	96.204

NOTES:

1) Depth to groundwater is measured from top of well casing.
2) Ground surface and casing elevations at each well were determined with respect to to a temporary benchmark given an assumed elevation of 100.00 m.
3) Free product surveys completed using an electronic interface probe followed by bailer confirmation.

Project Name: Human Health and Ecological Risk Assessment, Former Widow Point Mine, Guysborough, NS
Project Number: 327768.002

TABLE 2
SOIL ANALYTICAL DATA
(mg/kg)

Sample ID	HS02 (0.0-0.3M)	HS03 (0.0-0.3M)	HS04 (0.0-0.3M)	HS09 (0.0-0.3M)	HS10 (0.0-0.3M)	HS11 (0.0-0.3M)	HS DUP A	HS 12 (0.0-0.3M)	HS13 (0.0-0.3M)	HS17 (0.0-0.3M)	HS19 (0.0-0.3M)	HS22 (0.0-0.3M)	HS23 (0.0-0.3M)	HS24 (0.0-0.3M)	HS25 (0.0-0.3M)	HS26 (0.0-0.3M)	RDL	NSCSR Tier I EQSs	RBCA Tier I Ecological EQSs	Inferred Background Concentration
Sample Date	7/24/2023	7/24/2023	7/24/2023	7/24/2023	7/24/2023	7/24/2023	7/24/2023	7/24/2023	7/24/2023	7/24/2023	7/25/2023	10/27/2023	10/27/2023	10/27/2023	10/27/2023	10/27/2023				
Aluminum (Al)	12000	11000	**26000**	13000	11000	**26000**	**27000**	**32000**	11000	12000	14000	12000	**16000**	**16000**	15000	12000	10	15400	NA	10000 to 21000
Antimony (Sb)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	7.5	20	NA
Arsenic (As)	**98**	**110**	**38**	**70**	**100**	**27**	**27**	**16**	**100**	**77**	**33**	**29**	**29**	**76**	**80**	**49**	2	10	17.1	Up to 200
Barium (Ba)	23	41	120	22	47	120	120	140	35	39	13	14	17	42	51	35	5	350	400	NA
Beryllium (Be)	ND	ND	**2.4**	ND	ND	**2**	**2.1**	**2.6**	ND	ND	ND	ND	ND	**1.2**	ND	ND	1	1	5	Up to 1.5
Bismuth (Bi)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	NA	NA	NA
Boron (B), Total	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50	120	120	NA
Cadmium (Cd)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3	1	3.8	NA
Chromium (Cr), Total	14	16	42	14	16	41	43	52	14	17	12	12	9.8	17	19	15	2	64	64	NA
Cobalt (Co)	3.4	4.5	**27**	3.9	5.1	18	18	**23**	3.7	5.1	1.8	1.5	1.8	**26**	5.5	7.8	1	20	20	Up to 30
Copper (Cu)	10	9.6	42	7.4	12	57	35	19	8.5	11	3.3	3.6	5.1	9	9.7	6.9	2	63	63	NA
Iron (Fe)	**18000**	**18000**	**45000**	**19000**	**18000**	**44000**	**44000**	**54000**	**18000**	**17000**	**35000**	**35000**	**23000**	**20000**	**19000**	**18000**	50	11000	NA	15 000 to 40 000
Lead (Pb)	14	16	23	16	14	24	23	23	14	13	22	19	27	48	15	21	0.5	70	70	NA
Lithium (Li)	20	29	83	24	29	79	81	93	23	30	8.5	8.7	8.7	29	33	29	2	NA	NA	NA
Manganese (Mn)	170	220	**1400**	240	260	**1100**	**1100**	**1400**	210	270	160	120	88	**5200**	**580**	**1900**	2	360	NA	up to 5250
Mercury (Hg), Total	ND	ND	ND	ND	ND	0.11	0.12	0.22	ND	ND	0.12	0.14	0.24	0.13	ND	ND	0.1	6.6	12	NA
Molybdenum (Mo)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	4	4	NA
Nickel (Ni)	9.1	11	39	8.8	13	41	41	**47**	9.2	13	3.8	5.7	5.8	13	14	10	2	45	45	Up to 50
Rubidium (Rb)	12	21	72	11	22	75	78	95	15	20	7	7.1	8.9	16	18	14	2	NA	NA	NA
Selenium (Se)	0.54	ND	ND	0.82	ND	ND	ND	ND	0.54	ND	**2.1**	**2**	**2.8**	**1.5**	ND	0.99	0.5	1	1	Up to 3.0
Silver (Ag)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	20	20	NA
Strontium (Sr)	ND	ND	ND	ND	ND	ND	ND	5.2	ND	ND	ND	ND	ND	ND	ND	ND	5	9400	NA	NA
Thallium (Tl)	0.11	0.17	0.59	0.14	0.15	0.53	0.53	0.61	0.14	0.16	ND	ND	0.11	0.36	0.15	0.2	0.1	1	1	NA
Tin (Sn)	ND	ND	ND	ND	ND	1	ND	1	ND	ND	ND	1.4	1.1	ND	ND	ND	1	5	5	NA
Uranium (U)	0.98	0.86	1.2	0.99	1	0.89	0.87	0.72	0.91	0.98	1.5	1.3	1.3	1.5	1.2	1.1	0.1	23	33	NA
Vanadium (V)	**21**	18	**46**	18	18	**46**	**47**	**56**	**20**	17	18	**20**	17	**21**	**25**	**20**	2	18	18	Up to 45
Zinc (Zn)	34	42	94	48	47	100	110	110	43	49	20	15	18	67	56	50	5	200	200	NA

NOTES:

1) Nova Scotia Contaminated Sites Regulations (NSCSR) Tier I Environmental Quality Standards (EQS) for soil based on an agricultural property with potable groundwater usage and coarse-grained soil type (revised September 2021, updated September 2022).
2) Atlantic Risk-Based Corrective Action (RBCA) v4.0 Tier I Ecological EQSs for soil based on an agricultural property with coarse-grained soil type (revised July 2021, updated July 2022).
3) Shading and bold denotes values in excess of applicable guidelines.
4) Bolding denotes values in excess of applicable guildines but below inferred background concentrations.
5) Soil sample HS DUPA is a field duplicate for sample HS11.
6) Soil samples HS23 to HS26 are considered to be background samples.
7) Background concentrations developed based on background soil and sediment data collected in the study area.

ACRONYMS:

mg/kg	Milligrams per kilogram
RDL	Reportable detection limit
NA	Value not established
ND	Not detected

TABLE 3
CONTAMINANT INVENTORY FOR FULL DEPTH SOIL
(mg/kg)

Contaminant	Maximum Measured Concentration	RDL	Applicable Site Condition Standad (SCS)		Inferred Background Concentration (BG)	Retained as a Contaminant for Risk Assessment?			Exposure Point Concentration (EPC)
Metals			NSCSR Tier I EQSs	NSCSR Tier I Ecological EQSs		Yes	No	Comment	
Aluminum (Al)	**32000**	10	15400	NA	10000 to 21000	x		exceeds SCS and BG	32000
Antimony (Sb)	<2.0	2	7.5	20	NA		x	meets SCS	<2.0
Arsenic (As)	**110**	2	10	17.1	Up to 200		x	meets BG	110
Barium (Ba)	140	5	350	400	NA		x	meets SCS	140
Beryllium (Be)	**2.6**	1	1	5	Up to 1.5	x		exceeds SCS and BG	2.6
Bismuth (Bi)	<2	2	NA	NA	NA		x	meets SCS	<2
Boron (B), Total	<50	50	120	120	NA		x	meets SCS	<50
Cadmium (Cd)	<0.3	0.3	1	3.8	NA		x	meets SCS	<0.3
Chromium (Cr), Total	52	2	64	64	NA		x	meets SCS	52
Cobalt (Co)	**27**	1	20	20	Up to 30		x	meets BG	27
Copper (Cu)	57	2	63	63	NA		x	meets SCS	57
Iron (Fe)	**54000**	50	11000	NA	15 000 to 40 000	x		exceeds SCS and BG	54000
Lead (Pb)	48	0.5	70	70	NA		x	meets SCS	48
Lithium (Li)	93	2	NA	NA	NA		x	meets SCS	93
Manganese (Mn)	**5200**	2	360	NA	up to 5250		x	meets BG	5200
Mercury (Hg), Total	0.24	0.1	6.6	12	NA		x	meets SCS	0.24
Molybdenum (Mo)	<2	2	4	4	NA		x	meets SCS	<2
Nickel (Ni)	**47**	2	45	45	Up to 50		x	meets BG	47
Rubidium (Rb)	95	2	NA	NA	NA		x	meets SCS	95
Selenium (Se)	**2.8**	0.5	1	1	Up to 3.0		x	meets BG	2.8
Silver (Ag)	<0.5	0.5	20	20	NA		x	meets SCS	<0.5
Strontium (Sr)	5.2	5	9400	NA	NA		x	meets SCS	5.2
Thallium (Tl)	0.61	0.1	1	1	NA		x	meets SCS	0.61
Tin (Sn)	1.4	1	5	5	NA		x	meets SCS	1.4
Uranium (U)	1.5	0.1	23	33	NA		x	meets SCS	1.5
Vanadium (V)	**56**	2	18	18	Up to 45	x		exceeds SCS and BG	56
Zinc (Zn)	110	5	200	200	NA		x	meets SCS	110

NOTES:

1) Nova Scotia Contaminated Sites Regulations (NSCSR) Tier I Environmental Quality Standards (EQS) for soil based on an agricultural property with potable groundwater usage and coarse-grained soil type (revised September 2021, updated September 2022).
2) Atlantic Risk-Based Corrective Action (RBCA) v4.0 Tier I Ecological EQSs for soil based on an agricultural property with coarse-grained soil type (revised July 2021, updated July 2022).
3) Background concentrations developed based on background soil and sediment data collected in the study area (2024 Pinchin Limited L2 ESA).
4) Exposure point concentration (EPC) is equivalent to the maximum measured concentration.
5) Shading and bold indicate values that exceed the standard (SCS).
6) Bolding denotes values that exceed the standard (SCS) but are below inferred background concentrations (BG).

ACRONYMS:

mg/kg Milligrams per kilogram
RDL Reportable detection limit
NA Value not established

TABLE 4
HUMAN HEALTH SCREENING LEVEL ASSESSMENT OF SOIL COCs
(mg/kg)

Contaminant of Concern	Exposure Point Concentration (EPC)	Applicable Site Condition Standard (SCS)		Inferred Background Concentration (BG)
Metals		NSCSR Tier II PSS Soil Contact/Ingestion	NSCSR Tier II PSS Leaching to Potable Groundwater	
Aluminum (Al)	32000	**15400**	NA	**21000**
Beryllium (Be)	2.6	75	**1.5***	**1.5**
Iron (Fe)	54000	**11000**	NA	**40000**
Vanadium (V)	56	**39**	100	**45**

NOTES:

1) Nova Scotia Contaminated Sites Regulations (NSCSR) Tier II Pathway Specific Standards (PSS) for soil based on an agricultural property with potable groundwater usage and coarse-grained soil type (revised September 2021, updated September 2022).

2) Shading and bold indicate EPC values that exceed the applicable Site Condition Standard (SCS) and/or the inferred background concentration (BG).

3) Background concentrations developed based on background soil and sediment data collected in the study area (2024 Pinchin Limited L2 ESA).

4) Exposure point concentration (EPC) is equivalent to the maximum measured concentration.

5) (*) indicates the adopted BC CSR Schedule 3.1 value is pH-dependent. The corresponding value from Schedule 3.1 representing measured pH in soil at the Site (<6) is presented.

ACRONYMS:

mg/kg Milligrams per kilogram

Project Name: Human Health and Ecological Risk Assessment, Former Widow Point Mine, Guysborough, NS
Project Number: 327768.002

TABLE 5
ECOLOGICAL SCREENING LEVEL ASSESSMENT OF SOIL COCs
(mg/kg)

Contaminant of Concern	Exposure Point Concentration (EPC)	Atlantic RBCA - Tier II Ecological PSS			Inferred Background Concentration (BG)
Metals		Soil Contact	Soil and Food Ingestion	Soil Erosion to Sediment	
Aluminum (Al)	32000	NA	NA	NA	**21000**
Beryllium (Be)	2.6	5	13	NA	**1.5**
Iron (Fe)	54000	NA	NA	NA	**40000**
Vanadium (V)	56	130	**18**	NA	**45**

NOTES:

1) Atlantic RBCA Tier II Ecological Pathway Specific Standards (PSS)
for soil based on an agricultural property with potable groundwater usage and
coarse-grained soil type (July 2022).
2) Shading and bold indicate EPC values that exceed the applicable standard and/or the inferred background concentration (BG).
3) Background concentrations developed based on background soil and sediment data collected in the study area (2024 Pinchin Limited L2 ESA).
4) Exposure point concentration (EPC) is equivalent to the maximum measured concentration.

ACRONYMS:

mg/kg Milligrams per kilogram

APPENDIX III

Atlantic RBCA Site Assessment and Tier I/II Table Checklist

SITE ASSESSMENT & TIER I/II TABLE CHECKLIST

		Method Used	
Site Location:	Former Widow Point Mine - South of West Side Road	Tier I RBSL	Used
Site Professional:	Adam Aulenback, P.Eng.	Tier II PSSL	
Date:	Jan 11, 2023	Tier II SSTL	
Contaminants of Concern at site: Metals (including mercury) and, pH			
Minimum Site Assessment Requirements		Other	
Issue		**Yes or No***	**Comment**
PID, owner, location identified		Yes	
Current and anticipated future land use identified		Yes	
Review of underground services as conduits		Yes	
Historical review completed		Yes	
Local groundwater use identified		Yes	
Adjacent land uses and receptors identified		Yes	
Ecological screening completed		Yes	
Soil and groundwater samples from all source areas obtained		Yes	
For CVOCs, all hydrogeologic units assessed (i.e., shallow/deep)		No	CVOCs not assessed
Impacts delineated to acceptable levels (Refer to Section 2.2.2 of guidance document), vertically and horizontally, for potential receptors (adjacent property receptor may have lower screening levels)		Yes	
Groundwater flow direction and gradient established		Yes	
Combination of surface and sub-surface soil samples analysed		Yes	
Vapour samples collected and analysed, if applicable		No	Vapour samples not collected
Free product observations made in soil and groundwater		Yes	No free product observed
Low lab detection level for benzene in soil if potable water area		No	Benzene not assessed
Grain size and organic carbon analysis completed on soil		No	Carbon analysis not complete
TPH fractionation done on soil and water if calculating Tier II SSTL for TPH		No	TPH not assessed
All CVOCs (including parent and biodegradation (daughter) products) assessed		No	CVOCs not assessed
Scaled site plan showing all relevant site features		Yes	
Receptor building characteristics obtained (e.g., stories, floor condition, ceiling height, building size)		Yes	No buildings on-Site
Mandatory Conditions			
Issue		**Yes or No***	**Comment**
Non-aqueous phase liquids not present in groundwater		Yes	Non-aqueous phase liquids not observed
Potable water free of objectionable taste and odour		N/A	No water supply on-Site
Soils do not contain liquid and/or free petroleum product		Yes	
Residual hydrocarbons do not create objectionable odours or explosive conditions in indoor or outdoor air		Yes	
Surface soils are not stained		Yes	
No dirt basement floors, sumps with dirt bottoms, etc.		Yes	
Confirmed that correct TPH type selected in RBSL or PSSL Table		N/A	TPH not assessed
Confirmed that correct soil type selected in RBSL or PSSL Tables		Yes	
Default Site Characteristics and Exposure Scenarios			
Issue		**Yes or No***	**Comment**
Depth to groundwater approximately 3.0 metres		No	Depth < 3.0 m in two monitoring wells
Impacted soil thickness is less than 3.0 metres		Yes	
Default foundation crack fraction is appropriate		N/A	No foundation
Default foundation thickness is appropriate		N/A	No foundation
Two floors exist if using a residential scenario		N/A	Not a residential scenario
PHC impacts in soil above Tier I RBSL and detectable concentrations of CVOCs in soil, are not within 0.3 m of foundation walls or floor slab		Yes	PHCs not assessed
Confirmed that RBSL or PSSL Table values is correct for adjacent property receptors (i.e. use residential at property line if adjacent property is residential)		N/A	
Where exposure pathways have been eliminated at Tier II, detailed explanation provided in report explain why pathways are not relevant		N/A	
Where PSSLs tables are used based on elimination or control of a pathway that could be reopened by changes in site use, this condition is specified as a limitation in the report		N/A	
Where Tier II SSTLs have been calculated by changing default values, the report includes the parameter changed, the default value, the site-specific value used, and the rationale and/or detailed written justification		N/A	

* If No, indicate in comment section if and where in report the issue is addressed.
Consult the Best Management Practices (Appendix 1) for additional details.