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DRAFT REMEDIAL INVESTIGATION AND CLEANUP ACTION PLAN
NACHURS ALPINE SOLUTIONS SUNNYSIDE, WASHINGTON

Ecology Cleanup Site ID: 14601
Facility/Site ID: 29243
ERTS ID: 682162

Prepared for

Wilbur-Ellis Holdings II, Inc.
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Prepared by

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Project Number: PNR0696B

April 8, 2022

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
µm	micrometer
ARAR	Applicable, or Relevant and Approriate Requirements
ASTs	aboveground storage tanks
August Mack	August Mack Environmental
bgs	below ground surface
BNSF	Burlington Northern Santa Fe
CAP	Cleanup Action Plan
COPCs	constitutents of potential concern
CULs	cleanup levels
DO	dissolved oxygen
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ESAs	Environmental Site Assessments
EVO	emulsified vegetable oil
ft	feet
ft/ft	feet per foot
Geosyntec	Geosyntec Consultants, Inc.
GPS	global positioning systemMCLs maximum contaminant levels
mg/L	milligrams per liter
MNA	monitored natural attenuation
MS/MSD	matrix spike and matrix spike duplicate
MTCA	Model Toxics Control Cleanup Act
NAS	Nachurs Alpine Solutions, LLC
NAVD88	North American Vertical Datum 1988
NFA	No Further Action
On-Site Work Plan	Groundwater Well Installation and Monitoring Work Plan (Geosyntec, 2020a) and Response to Comments and Addendum to Groundwater Well Installation and Monitoring Work Plan (Geosyntec, 2020b)
ORP	oxidation reduction potential
Paragon	Paragon Consulting Group

QA/QC	quality assurance/quality control
RI	Remedial Investigation
SU	standard units
TEE	Terrestrial Ecological Evaluation
TRL	Target Remediation Levels
the Site	the former Nachurs Alpine Solutions Facility located at 101 North 1st Street in Sunnyside, Washington
VCP	Voluntary Cleanup Program
WAC	Washington Administrative Code
Wilbur-Ellis	Wilbur-Ellis Holdings II, Inc.
WPC	Washington State Plane Coordinate

EXECUTIVE SUMMARY

This document presents the Remedial Investigation (RI), remedy selection, Draft Cleanup Action Plan (Draft CAP), and remedy engineering design and implementation work plan for the Nachurs Alpine Solutions, LLC (NAS) Site near Sunnyside, Washington. This report was prepared for the Washington State Department of Ecology (Ecology) by Geosyntec Consultants (Geosyntec) on behalf of Wilbur-Ellis Holdings II, Inc. (Wilbur-Ellis), the direct parent company of NAS. This report has been prepared to meet the requirements of the Model Toxics Control Act (MTCA) administered by Ecology under Chapter 173-340 of the Washington Administrative Code (WAC). This report summarizes Site remedial investigations conducted to date, outlines the conceptual site model, proposes target remedial levels (TRLs) to address potential subsurface impacts related to former NAS operations, and describes the planned remedy for this Site.

Based on the results of Site investigations conducted to date, the remedial investigation is complete, and the nature and extent of constituents of potential concern (COPCs) have been delineated. The Site COPCs are nitrate as nitrogen, arsenic, cobalt, and molybdenum. Concentrations of Site COPCs in soil do not exceed MTCA cleanup levels (CULs) and regional background levels at the Site; however, residual levels of nitrate as nitrogen remain in soils above background levels in the former NAS operational area, where prior to 1999, ASTs lacked secondary containment and were loaded and unloaded over bare ground. On-Site groundwater concentrations for COPCs were compared against MTCA Method A, B, and C CULs and exceed at least one MTCA CUL. Concentrations above MTCA CULs and Site-specific background levels have not been observed in off-Site downgradient groundwater. The metals COPC concentrations in groundwater appear to be a result of geochemical changes due to the release of nitrate associated with former Site operations. Based on the conceptual site model, Geosyntec proposes Site-specific TRLs for groundwater, for the aforementioned COPCs. TRLs for groundwater are based on observed background concentrations at the Site, reviewing MTCA Method C CULs (given that the Site and vicinity are zoned light industrial), and Environmental Protection Agency Maximum Contaminant Levels (MCLs).

An evaluation of five Site-specific remedial approaches to address COPCs in groundwater were compared against Ecology's cleanup criteria evaluation metrics. Based on results from the remedial alternative comparison, in situ denitrification with contingency arsenic treatment was selected as the proposed remedial approach, to reduce COPCs (primarily nitrate) in groundwater to concentrations below the Site-specific TRLs. To achieve in situ denitrification, an electron donor will be injected into the groundwater in areas of the Site that have elevated COPC concentrations in groundwater. Based on baseline sampling results, iron sulfide may also be injected to target dissolved arsenic concentrations. This remedy is expected to reduce nitrate concentrations in groundwater within a short period following injections with attenuation of the COPC metals. Injection of an electron donor is expected to take place starting in Spring 2022. Routine groundwater compliance monitoring will be conducted at the four existing on-Site wells until concentrations of COPCs in groundwater decline to levels below TRLs. Due to the fact that all previous structures have been removed and no future use is planned by NAS along with the lack of human and ecological receptors and the proposed remedial approach, no institutional or engineering controls are required.

1. INTRODUCTION

Geosyntec Consultants, Inc. (Geosyntec) has prepared this *Draft Remedial Investigation* (RI) *and Cleanup Action Plan* (CAP) on behalf of Wilbur-Ellis Holdings II, Inc. (Wilbur-Ellis), the direct parent company of Nachurs Alpine Solutions, LLC (NAS). This document is associated with the former Nachurs Alpine Solutions Facility located at 101 North 1st Street in Sunnyside, Washington (the Site) and presents results from Site investigation activities that occurred from 2018 through 2021 and proposes actions to address constituents of potential concern (COPCs) potentially related to NAS' former operations at the Site. The Site was entered in the Voluntary Cleanup Program (VCP) in 2020 (VCP Project ID CE0510).

An RI, feasibility study, CAP, and engineering design report are required as part of the Site cleanup process under Chapter 173-340 Washington Administrative Code (WAC), Model Toxics Control Act (MTCA) Cleanup Regulations. Geosyntec discussed with Ecology's Site Manager on 13 August 2021, investigation results along with in situ reduction (i.e., denitrification) as the proposed presumptive remedy for groundwater at the Site. Based on this conversation, an abbreviated focused feasibility study is included to support this remedy selection. The primary focus of this document is twofold: (1) document the results of the RI to describe the nature and extent of COPCs in the subsurface soil and groundwater, including background levels and those potentially related to former NAS operations; and (2) detail the proposed cleanup action and engineering design to address these impacts. More specifically, this plan included the following elements, as outlined in Ecology's RI, feasibility study, and CAP guidance documents and checklists (Ecology, 2020, Ecology, 2016b and Ecology, 2016a, respectively):

- Describes the Site location, historical use, and current use;
- Details environmental field investigations conducted on and off-Site and the observed geology, hydrogeology, impacted media, and COPCs;
- Summarizes current Site conditions and presents a conceptual site model (CSM) based on observations and results from the environmental field investigations;
- Identifies cleanup levels for each medium of concern (i.e., groundwater for this Site);
- Evaluates cleanup action technologies and alternatives to select a preferred remedy;
- Describes the selected cleanup action for the Site and the rationale for selecting this alternative;
- Identifies points of compliance for each hazardous substance and medium of concern for the proposed cleanup action and cleanup levels;
- Identifies applicable state and federal laws for the proposed cleanup action;
- Discusses compliance monitoring requirements; and
- Presents the schedule for implementing the CAP.

Given Wilbur-Ellis' desire to implement the remedy outlined in this CAP beginning in Spring 2022, Geosyntec has also provided the proposed engineering design report and implementation work plan as an appendix to this document.

1.1 Report Organization

This document's objective is to present investigation results and recommend a remedial path forward that will reduce COPC concentrations in the groundwater to acceptable levels based on Ecology standards and background observations. The following report is organized as follows:

- Section 1 – Introduction: describes Site background and contact information, history, and land usage.
- Section 2 – Field Investigations: provides a summary of previous Site environmental investigations, reports, and characterization.
- Section 3 – Conceptual Site Model: provides a discussion of potential release scenarios, fate and transport of COPCs, and exposure pathways.
- Section 4 – Proposed Cleanup Standards: provides a summary of applicable screening levels, regional and site-specific background levels, and the proposed cleanup levels for remediation of potential impacts from former NAS operations.
- Section 5 – Remedy Alternative Evaluation and Selection: reviews five remedial alternatives against Ecology's cleanup criteria evaluation metrics and presents the selected remedy of in situ denitrification with contingency for targeted arsenic treatment.
- Section 6 – Cleanup Action Plan: summarizes the elements of the recommended Site remedy.
- Section 7 – Conclusions: provides a summary of the findings and path forward.
- Section 8 – References: provides a list of documents referenced in this report.

Supporting tables and figures are attached to this report. In addition, recent off-Site investigations and groundwater monitoring results, which haven't previously been reported to Ecology, are reported in Appendix A. Appendix B provides the completed Ecology Terrestrial Ecological Evaluation check list, and Appendix C provides an engineering design and implementation work plan for the selected remedy.

1.2 Site Location

The Site is located in Yakima County, Washington (Figure 1), within the City of Sunnyside limits, and in an area zoned for light industrial land use (M-1).[1] The Site is an approximately 0.35-acre property that is owned by Burlington Northern Santa Fe (BNSF) Railway and bordered by a BNSF rail corridor to the north and a rail spur to the south and west. Beyond the northern rail corridor is agricultural land that has been converted to public land, followed by general commercial land use

[1] City of Sunnyside Zoning, 14 January 2020. http://www.ci.sunnyside.wa.us/104/Planning-Division.

(zoned B-2).[1] The southern rail spur is associated with the former Valley Processing, which had fruit processing operations to the south and southeast of the Site until early 2021. To the east is 1st Street and approximately 100 feet (ft) to the northeast is Bee-Jay Scales (a former drum storage facility that is currently being remediated, Ecology Cleanup Site ID 3641).

The latitude and longitude for the Site are 46.32739N degrees, -120.02117W degrees. The Washington State Plane Coordinate (WPC) system is zone 4602, 1761378.945 ft United States East, and 362862.664 ft United States North. The Site is 35 miles from Yakima in township range section T10N R22E Section 26.

1.3 Project and Site Contact Information

Contact information for project coordinators is included below:

- Frank Winslow (Ecology Site Manager) - (509) 424-0543
- Melissa Asher (Geosyntec Consultants) - (206) 496-1449
- Jan Thompson (Nachurs Alpine Solutions, Tenant) - (541) 974-3112
- Doug McReynolds (Burlington Northern Santa Fe, Environmental Lease Team, Property Owner) - (817) 352-3724

1.4 Site History and Use

The Site and surrounding area have been used for agricultural warehouses, coal storage, and railroad transportation activities since 1906 (August Mack Environmental [August Mack], 2017). Prior to NAS leasing the property beginning in 1973, the land had been vacant since at least 1937, apart from a rail spur boarding the southern edge of the site property and some rail cars stored throughout the Site. NAS leased the Site for fertilizer storage and distribution (August Mack, 2017). NAS' operations at the Site ceased in August 2017 and by late 2017 NAS had removed all equipment, concrete, and structures associated with their operations from the Site. NAS no longer operates at the Site and plans to terminate its lease with BNSF after completion of work under Ecology's VCP. The Site is currently a vacant lot.

During NAS operations, NAS used the Site to receive fertilizer by rail spur and then distribute it locally via trucks. Nitrogen, phosphate, and potassium-based fertilizer were housed in multiple aboveground storage tanks (ASTs).[2] Based on the 7 May 2020 electronic-mail from Ecology, Site COPCs at that time included arsenic, cobalt, molybdenum, nickel, and nitrate in groundwater.[3] Metals (arsenic, cobalt, and molybdenum) were present in one fertilizer that may have been stored at the Site.[4] The ASTs were originally staged along the northern, southern, and eastern Site boundaries without secondary containment and, consequently, were relocated in 1999 to within a concrete containment area on the western portion of the property. The concrete containment area

[2] Fertilizers that were stored in ASTs and contained nitrogen included Nachurs 3-18-18 and Nachurs 6-24-6, which contained urea, which is approximately 46% nitrogen (August Mack, 2017).
[3] Winslow, Frank (Ecology Case Manager) Email to Luke Smith of Geosyntec. 7 May 2020.
[4] Arsenic, cobalt, and molybdenum would have been present in Nachurs N-Rage 23-4-2, the only fertilizer that was stated as being stored at the Site and also containing either of the three metals (August Mack, 2017).

had an east-adjoining concrete loading pad. The footprints of these former AST storage areas and other former Site features are shown in Figure 2. There was no specific spill or release event associated with the Site (August Mack, 2017). The occurrence of COPCs is attributed to historical fertilizer storage and handling operations.

1.5 Applicable Local, State and Federal Laws

Under WAC 173-340-710, MTCA requires that cleanup actions comply with all legally applicable local, state and federal laws, and requirements that are legally applicable and identified by Ecology to be relevant and appropriate (ARARs) for the cleanup site.

"Relevant and appropriate" requirements include those cleanup standards, standards of control, and other human health and environmental requirements, criteria, or limitations established under state or federal law that, while not legally applicable to the hazardous substance, cleanup action, location, or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site.

Based on the Site location and proposed remedial approach for the Site (Section 5), the cleanup action must comply with the requirements of these laws in accordance with WAC 173-340-710(9).

- Washington Solid Waste Management Act, Chapter 70.95 RCW;
- Washington Hazardous Waste Management Act, Chapter 70.105 RCW;[5]
- Washington Water Pollution Control Act, Chapter 90.48 RCW; and
- Any laws requiring or authorizing local government permits or approvals for the remedial action.

In addition to the above cleanup requirements, EPA maximum contamination levels (MCLs) WAC 246-290-310 were also used during the groundwater evaluation process.

[5] Based on investigation derived waste collected to date (2020 and 2021 investigations), and laboratory analysis of the investigation-derived waste (IDW) has been classified as non-hazardous.

2. FIELD INVESTIGATIONS

The following sections provide a general overview of the environmental history of the Site (Section 2.1), details on characterization methods and geology/hydrogeology (Section 2.2), and analytical results (Section 2.3). This information is utilized in the development of the Site CSM, which is summarized in Section 3.

2.1 Previous Environmental Investigations

In August 1998, a Limited Environmental Site Screen was conducted by Paragon Consulting Group (Paragon) at the Site, which included a Site visit, interview with the property manager, and a records review (Paragon, 1998). The report concluded that there were no "obvious indications of significant environmental liability" associated with NAS' operations. However, during Paragon's 1998 Site visit, Paragon noted minor staining at various areas of the Site from loading or unloading of fertilizer from on-Site aboveground storage tanks (ASTs) with no secondary containment observed at the Site. In 1999, ASTs were relocated within a secondary containment on the western portion of the property and a loading pad was installed adjoining the secondary containment, in the central portion of the Site.

In 2017, NAS removed all structures from the Site per BNSF's request as part of the lease termination. Additionally, BNSF requested Phase I and II Environmental Site Assessments (ESAs) prior to lease termination, which were completed by August Mack in December 2017 and February 2018, respectively (August Mack, 2017; August Mack, 2018). A 2017 Site visit was conducted as part of the Phase I ESA, and during the visit, no evidence of spills or releases were observed by August Mack. The Phase II ESA was conducted in 2018, which included the collection of soil from eight borings and groundwater samples from three borings, to assess impacts from historical operations. During the Phase II ESA investigation, no staining or odor was observed at any of the borings. Soil and groundwater samples collected as part of the Phase II ESA were analyzed for nitrate as nitrogen, total kjeldahl nitrogen, arsenic, cadmium, cobalt, lead, mercury, molybdenum, nickel, selenium, and zinc. After reviewing the Phase I and II ESA reports, Ecology provided early notice to BNSF in July 2018 indicating that additional investigation activities were necessary to characterize impacts to the Site and perform a cleanup action. As a result, BNSF requested that NAS participate in Ecology's VCP to obtain a No Further Action (NFA) letter for impacts related to NAS' operations.

In 2020, Geosyntec assisted NAS in enrolling the Site in Ecology's VCP. Concurrent with enrollment in the VCP, Geosyntec submitted *a Groundwater Well Installation and Monitoring Work Plan* (Geosyntec, 2020a) and a *Response to Comments and Addendum to Groundwater Well Installation and Monitoring Work Plan* (Geosyntec, 2020b) to Ecology. These documents are collectively referred to as the "On-Site Work Plan" and included the collection of additional soil and grab-groundwater samples at the Site and the installation of monitoring wells. Following this submission, Ecology informed Geosyntec that the Site-specific constituents of potential concern (COPCs) in groundwater were arsenic, cobalt, molybdenum, nickel, and nitrate as nitrogen (Ecology, 2020a).

The additional on-Site investigation, which included 14 soil and 8 grab-groundwater sampling from 11 borings, was completed in August 2020. The objective of this on-Site investigation was

to collect additional data after the previous Phase II ESA to enhance the understanding of nature and extent of COPCs on-Site relative to background levels. Based on findings from the on-site investigations, four groundwater wells were installed on-Site. During the installation of the groundwater monitoring wells, eight additional soil samples were collected at the well locations. The on-Site wells were installed to collect groundwater elevation and geochemistry data and to assess seasonal variability in groundwater elevations, groundwater gradients, and COPC concentrations (Geosyntec, 2021a).

In 2021, after three quarters of groundwater monitoring from the on-Site wells, Geosyntec submitted an *Off-Site Investigation Work Plan* (Geosyntec, 2021a). This work plan included plans to collect grab-groundwater samples at up to eight locations adjacent to the property. Two of the locations were upgradient of the Site and six of the locations were downgradient. Geosyntec also requested the removal of nickel as a COPC, because concentrations of nickel were below State of Washington screening levels (i.e., default MTCA CULs) in the Site soil and groundwater. Soil and groundwater samples were compared against MTCA Method A, B, and C CULs during the remedial investigation. Following Ecology's agreement with the *Off-Site Investigation Work Plan* and to remove nickel as a Site COC,[6] the off-Site field work was conducted in July 2021. Findings from the off-Site investigation indicated that COPCs have not migrated off-Site at levels over Site-specific background or State screening levels (Appendix A).

Since the submission of the *Off-Site Investigation Work Plan*, two more on-Site quarterly groundwater sampling events were completed (2nd Quarter 2021 [June] and 3rd Quarter 2021 [September]). Field activities and results associated with the off-Site grab-groundwater investigation and the 2nd and 3rd Quarter 2021 on-Site groundwater monitoring events are reported in Appendix A. Based on the off-Site results, as summarized in Sections 2.3.2.1 and 2.3.2.3 and Appendix A, no additional off-Site characterization is proposed.

2.2 Site Characterization

To date, 23 soil borings have been completed with 15 on-Site and eight off-Site, resulting in a total of 33 soil samples and 19 grab-groundwater samples. Soil sampling has targeted depths ranging from surface soil to first groundwater (as deep as at 6 ft bgs), and grab-groundwater samples have been collected down to 15 ft bgs. In addition, four on-Site monitoring wells were installed and five quarterly groundwater monitoring events have been completed where groundwater elevations and COPCs concentrations were monitored in the upper approximately 10 feet of groundwater (down to 15 ft bgs). Sampling and monitoring methods, field geochemical parameters, and field observations of geology and hydrogeology are summarized below. The analytical results and nature and extent of COPCs are discussed in Section 2.3.

[6] The removal of nickel as a Site COPC was presented to Ecology by Geosyntec in the *Off-Site Investigation Work Plan* and following discussions with Ecology on 24 May 2021 and as outlined in emails on 4 June 2021 was removed as a Site COPC. The reason for nickel's removal was that after obtaining average quarterly results of one year of sampling, nickel concentrations in groundwater were below MTCA CULs and did not exceed the EPA MCL criteria as presented in WAC 246-290-310.

2.2.1 Sampling and Monitoring Methodology

The soil and grab-groundwater sampling and quarterly monitoring followed the approaches put forth in the *On-Site Work Plan* and *Off-Site Investigation Work Plan* (Geosyntec, 2020a; Geosyntec, 2021b; Geosyntec, 2021a).

Soil samples were collected from the unsaturation zone down to a total depth of 6 ft bgs using a direct push drilling rig equipped with vinyl acetate sleeves. During drilling, soil cores were logged in accordance with the Unified Soil Classification System (USCS) by field personnel under oversight of a Washington State Professional Geologist. Soil samples were analyzed for metals (arsenic, cobalt, molybdenum, and nickel) by United States Environmental Protection Agency (EPA) Method 6020 and nitrate as nitrogen by EPA Method 300.0 Modified.

Groundwater samples were collected using low-flow sampling techniques with dedicated tubing. Monitoring wells were constructed with two-inch schedule 40 PVC casing with 0.01-inch slotted screen from 5 to 15 ft bgs. Wells were purged and groundwater field parameters were collected following the approach presented in the On-Site Work Plan. Grab-groundwater samples were collected using a temporary well consisting of a polyvinyl chloride (PVC) casing inserted into the borehole with a screen placed in first groundwater. On-Site grab-groundwater samples were collected from temporary wells with screens from 5 to 10 ft bgs, and off-Site grab-groundwater samples were collected from temporary wells with screens from 5 to 15 ft bgs. Water quality parameters (presented in Appendix A) that were collected during purging included pH, temperature, specific conductance, oxygen reduction potential (ORP), dissolved oxygen (DO), and turbidity.

Groundwater samples were collected in laboratory-supplied containers with samples planned for total and dissolved metals analysis being field filtered using a disposable 0.45-micrometer (µm) filter. Samples were placed into a cooler with ice, shipped using standard chain-of-custody procedures, and analyzed for total and dissolved metals (arsenic, cobalt, nickel [for samples prior to removal from COPC list in July 2021], and molybdenum by EPA Method 200.8 or equivalent) and nitrate as nitrogen (EPA Method 300.0 or equivalent).[7] Sampling information regarding Site COPCs, sampling methods, laboratory methods, and reporting limits are provided in Table 1.

Sampling events are summarized below.

- Phase II ESA, collection of soil and grab-groundwater samples in February 2018.
- Additional on-Site investigation, collection of soil and grab-groundwater samples in August 2020.
- Quarterly on-Site groundwater monitoring:
  - September 2020,
  - December 2020,
  - March 2021,

[7] Nickel was not sampled for during the off-Site investigation or third quarter 2021 groundwater sampling. This decision was outlined in the Ecology approved *Off-Site Investigation Work Plan.*

- June 2021, and
- September 2021.

- Off-Site investigation, collection of groundwater samples in July 2021.

The collective results of the soil and grab-groundwater sampling, as well as the groundwater monitoring, from these sampling events are summarized in Tables 2 through 5.

2.2.2 Site Geology and Hydrogeology

The Site topography is generally flat at an elevation of 745 ft North American Vertical Datum 1988 (NAVD88) (PLSA Engineering & Surveying, 2020) with no surface water bodies on-Site. The regional topographical gradient is to the southeast, toward the Snipes Mountain Lateral, a tributary of the Yakima River, which is the closest surface water body to the Site and is approximately 0.3 miles away. The Site is located within the Yakima Fold Belt, a structural sub-province of the Columbia Basin, characterized by east-west trending anticlinal ridges and synclinal valleys. Surficial geology at the Site and vicinity is Quaternary alluvium, which consists of unconsolidated sand and gravel with minor lenses of fine sand, silt, and clay.

Boring logs associated with 2020 on-Site and 2021 off-Site investigations are provided in the Off-Site Investigation Work Plan and Appendix A of this report, respectively. These logs indicate that underlying Site soils are predominantly sand, and gravel fill in the upper 2 ft underlain by a silty sand to at least 15 ft bgs (Geosyntec, 2021a). Similar geology was observed during the off-Site investigation conducted in July 2021 (Appendix A). During drilling, first groundwater was encountered at depths ranging from 5 to 8 ft bgs.

As shown in Table 3a, Site groundwater depth and elevation data, depth to groundwater is generally observed from 3 to 6 ft below top of casing (ft btoc), or a groundwater elevation of 740.6 to 738.4 ft NAVD88. As shown in Table 4, Site groundwater gradient is to the southeast ranging from 0.004 to 0.006 feet per foot (ft/ft) based on measurements during the five quarterly groundwater monitoring events between 2020 and 2021. For reference, a groundwater contour map from the most recently 3rd Quarter 2021 monitoring event is provided as Figure 4. The groundwater gradient is consistent with water level measurements at wells within 0.2 miles of the Site (Bee Jay Scales and Simplot [SECOR, 2007; HDR, 2018]) and regional surface topography.

2.2.3 Geochemical Field Parameters

This section summarizes the geochemical parameters collected during groundwater purging during the 2020 through 2021 quarterly groundwater sampling and the July 2021 off-Site investigation (Table 3b):

- pH in upgradient, on-Site, and downgradient locations are similar and generally neutral with a range from approximately 7.00 to 8.4.

- DO and ORP generally indicate lower values on-Site and downgradient of the Site. DO has been measured up to 5.7 milligrams per liter (mg/L) in upgradient samples (MW-1, SB-16, and SB-17), compared to values less than approximately 1.5 mg/L in on-Site and downgradient locations. ORP has been measured at levels ranging from approximately -22 to 34 millivolts (mV) in upgradient samples, compared to values ranging from

approximately -85 to 144 mV in on-Site wells and -297 to 95 mV in downgradient grab-groundwater samples. These results suggest a shift to more reducing conditions as groundwater flows on-Site and downgradient of the Site.

- Electrical conductivity measurements were observed to be highest on-Site and specifically at locations with higher nitrate concentrations (MW-2 and MW-4).[8] On-Site (MW-2, -3, and -4) conductivity measures were 1,062 to 5,562 microSiemens per centimeter (µS/cm), compared to measurements ranging from 710 to 1,937 µS/cm in off-Site groundwater.

2.3 Analytical Results

Analytical results from the on- and off-Site investigations and on-Site groundwater monitoring are summarized in this section with a discussion of nature and extent by media (soil and groundwater). Figure 3 presents the soil and groundwater investigation locations conducted by Geosyntec to date. Soil results from the on- and off-Site investigations were compared to the following: background levels and default MTCA CULs, including MTCA Method A, B, and C. Groundwater results (Table 5) from the on-Site investigation are compared to the following: background levels observed upgradient to the Site, EPA maximum contaminant levels (MCLs), and default MTCA CULs, including MTCA Method A (sites with few hazardous substances), B (unrestricted land use), and C (qualifying site uses and conditions [e.g., industrial]). Out of the default MTCA CULs, MTCA Method C is considered the most applicable to this Site, given that the Site and vicinity are zoned for light industrial; however, Method B for unrestricted land use is also considered in this section for evaluating these results.

In the sections below, for simplicity, if no particular MTCA Method is stated, the COPC(s) mentioned exceed one or more of the MTCA Method CULs.

2.3.1 Nature and Extent of COPCs in Soil

The soil results are summarized in Table 2. Soil samples collected during the 2018 Phase II ESA showed that arsenic was the only COPC that exceeded MTCA Method B CULs; however, the arsenic concentrations were within Ecology's background soil levels[9] and below the MTCA Method C CUL. Additional soil samples collected during the 2020 on-Site investigation were consistent with the 2018 results with no COPC concentrations in soil exceeding the background concentrations and MTCA Method B CULs (August Mack, 2018; Geosyntec, 2021a).

Nitrate as nitrogen was detected in soil samples across the Site, including samples collected outside the footprint of historical NAS operations (MW-1, SB-8), and the results are below the MTCA Method B CUL, meaning there is no unacceptable risk to human health for direct contact with soil for unrestricted land use. However, as shown in Figure 6, nitrate as nitrogen is still considered a COPC for soil, as concentrations in the central and western portion of the Site, where operations occurred historically, were generally higher than samples collected along the western edge of the

[8] Conductivity can serve as an indicator for the amount of water-soluble nutrients available for microorganisms (e.g. denitrification). Information provided by the United States Department of Agriculture and Natural Resources Conservation Service, *Soil Electrical Conductivity*.
[9] Background concentrations were taken from the Washington Department of Ecology *Natural Background Soil Metals Concentration in Washington* or based on observed upgradient location MW-1.

Site, outside and hydraulically upgradient to historical operations (23 to 60 milligrams per kilogram [mg/kg]; MW-1 and SB-8). The highest detections were observed in the central portion of the Site (SB-3, 4, 5, 10, 13, 14, and 15) at concentrations up to 930 mg/kg. In addition, at locations with detected concentrations above background levels (approximately >60 mg/kg), samples collected at the ground surface (0 to 3 ft bgs) were generally lower than samples collected deeper and immediately above or at the water table (between 3.5 to 6 ft bgs), with the exception of a few locations (SB-9, 10, and 13). As discussed in Section 3, the generally higher concentrations in deeper samples suggests that nitrate has migrated downward in the unsaturated zone overtime to shallow groundwater.

2.3.2 Nature and Extent of COPCs in Groundwater

The groundwater laboratory results from 2020 and 2021 sampling indicated that COPCs of arsenic, cobalt, molybdenum, and nitrate as nitrogen were detected in groundwater above MTCA CULs. However, MTCA exceedances for arsenic and nitrate as nitrogen were also observed at upgradient/offsite sample locations (SB-16, SB-17, and MW-1). Nickel was detected in groundwater samples collected on-Site; however, since the results are below the MTCA CULs and the EPA MCL, nickel was removed from the list of COPCs for the Site in June 2021. Results from on-Site and off-Site groundwater investigations and monitoring to date at the Site are summarized in Table 5 and in plan-view in the Figure 7 series and in cross-section in Figure 8 series.

2.3.2.1 Upgradient/Background Groundwater Results

Groundwater samples from three upgradient sampling locations have been collected for the Site (MW-1, SB-16, and SB-17). MW-1 was installed west (upgradient) of the Site in August 2020, with five quarterly groundwater sampling events being conducted since the well installation. SB-16 and SB-17 were grab-groundwater sample locations installed north (upgradient) of the Site during the off-Site groundwater sampling event in July 2021.

During the first groundwater sampling event, groundwater samples from monitoring well MW-1 contained groundwater that exceeded MTCA CULs for arsenic (total and dissolved) and nitrate as nitrogen; other Site COPCs were below MTCA CULs. The nitrate as nitrogen concentration during the first sampling event was 68 mg/L and represents the highest observed background concentration of nitrate as nitrogen for the Site. During the following four quarters of groundwater sampling, groundwater samples in upgradient well MW-1 continued to have concentrations of arsenic that exceeded MTCA CULs; other Site COPCs remained below MTCA CULs. While nitrate as nitrogen was also below MTCA CULs during the last four sampling events, concentrations ranged from 13 to 20 mg/L, which is above the EPA MCL of 10 mg/L.

During the July 2021 off-Site groundwater sampling event, locations SB-16 and SB-17 both had concentration of arsenic (total and dissolved) in their groundwater samples that were above MTCA CULs. SB-16 had a concentration of 65 micrograms per liter (µg/L) and SB-17 had a concentration of 90 µg/L as dissolved arsenic. The SB-17 concentration of 90 µg/L represents the highest observed background concentration of dissolved arsenic for the Site.

2.3.2.2 On-Site Groundwater Results

Results from the on-Site grab groundwater samples collected during the 2018 August Mack Phase II ESA and 2020 Geosyntec on-Site investigation showed that the central and downgradient portions of the Site, groundwater concentrations were elevated compared to the

upgradient/background concentrations for arsenic, cobalt, nitrate as nitrogen, and molybdenum. The highest concentration of arsenic was observed at SB-3 (located on the southern central edge of the Site) with a concentration of 520 µg/L. The highest concentrations of cobalt and nitrate as nitrogen were both observed at SB-13 (located on the eastern central half of the Site) with concentrations of 79 µg/L and 1,200 mg/L, respectively. The highest concentration of molybdenum was observed at SB-15 (located central eastern edge of the Site) with a concentration of 290 µg/L.

Quarterly groundwater results showed similar spatial distribution of COPCs to the grab-groundwater results; however, concentrations of COPCs were generally lower in well samples, and concentrations of nitrate as nitrogen appeared to decline 70 to 80% after the first well sampling event in September 2020.

The results from the five quarters of groundwater sampling showed that groundwater results from the three on-Site monitoring wells exceeded MTCA Method B CULs for dissolved arsenic during all five sampling events. The highest concentrations of arsenic in groundwater were observed at MW-2 (located on the southern central edge of the Site) with total and dissolved arsenic concentrations ranging from 76 µg/L to 210 µg/L. During the five quarterly sampling events, MW-2 also contained groundwater with concentrations exceeding of one or more MTCA CULs for cobalt and nitrate as nitrogen. The highest concentrations of cobalt, molybdenum, and nitrate as nitrogen in groundwater were observed at MW-4 (located on the southeastern edge of the Site). The maximum observed concentrations of total and dissolved cobalt in groundwater were 18 and 19 µg/L, respectively. The maximum observed concentration of total and dissolved molybdenum in groundwater was 130 µg/L. The maximum observed concentration of nitrate as nitrogen in groundwater at MW-4 was 760 µg/L during the first quarterly sampling event. Concentrations of nitrate as nitrogen in groundwater at MW-4 decreased to 180 µg/L during the remaining four quarterly sampling events (December 2020 and March, June, and September 2021). During the first quarterly groundwater sampling event, monitoring well MW-3 (located on the northeastern edge of the Site) contained groundwater that exceeded at least one MTCA CUL for arsenic and nitrate as nitrogen; other Site COPCs were below MTCA CULs. During the following four quarters of groundwater sampling at MW-3 concentrations of arsenic exceeded MTCA CULs, while other Site COPCs were below MTCA CULs.

2.3.2.3 Off-Site Downgradient Groundwater Results

As discussed in Appendix A, the results from the off-Site groundwater investigation sampling showed that groundwater results from upgradient/background locations were similar to concentrations downgradient of the Site. The highest concentrations of dissolved arsenic and cobalt were observed at SB-21 (located downgradient of Valley Processing Maintenance Shop) with concentrations of 120 µg/L and 10 µg/L, respectively. These results were inconsistent with the ratio of COPCs observed in on-Site groundwater samples, indicating that the dissolved arsenic and cobalt concentrations at this location may not be attributed to migration of water from the Site. Specifically, elevated nitrate detections are observed on-Site co-located with elevated dissolved arsenic and cobalt concentrations. Nitrate, arsenic, and cobalt are likely to migrate in groundwater similarly. As such, the lack of elevated nitrate detections at SB-21 suggests that the concentrations of arsenic and cobalt at this location are unlikely to be associated with on-Site impacts.

In addition, the highest downgradient concentration of nitrate as nitrogen was 27 mg/L observed at SB-20, which is located on the east side of 1st Street and approximately 70 feet from the Site as presented in Figure 7a. Between SB-20 and the Site is SB-23, which had a nitrate concentration of 24 mg/L, which is below the MTCA Method B CUL.

Overall, these results indicate that COPC impacts to groundwater potentially from former NAS operations do not appear to have migrated off-Site.

2.3.3 Quality Assurance/Quality Control Review

Geosyntec performed a quality assurance/quality control (QA/QC) review of the analytical data collected under Geosyntec oversight. Data were reviewed for completeness, accuracy, precision, sample constituents, conformance with holding times, and detection limits within acceptable ranges. This data quality review included the following:

- Duplicate samples were collected during each sampling event and submitted blind to the analytical laboratory. Analytical results showed relative percent differences within control limits for the compounds detected.
- Method blanks were used to separately analyze for nitrate as nitrogen, total metals (arsenic, cobalt, molybdenum, and nickel [when applicable]), and dissolved metals (arsenic, cobalt, molybdenum, and nickel [when applicable]) by the analytical laboratory. No analytes were detected in the blanks.
- Matrix spike and matrix spike duplicate (MS/MSD) results that paired with project samples were within control limits for the compounds analyzed.
- Laboratory control sample results were within control limits for the compounds analyzed.

Based on Geosyntec's review of the data quality, the data were found to be suitable for the purposes of this report.

In addition, Geosyntec notes that August Mack conducted a similar QA/QC review of their data collected during the 2018 Phase I ESA (August Mack, 2018). Based on the QA/QC conducted by August Mack the data were found to be suitable for the purposes of this report.

3. CONCEPTUAL SITE MODEL

This section utilizes information summarized in Sections 1 and 2 to present the Site CSM, including explaining the potential scenario at which COPCs may have been releases at the Site, the fate and transport of COPCs in the subsurface, potential exposure pathways, and potential human receptors. This section also provides a terrestrial ecological evaluation (TEE), as required by Ecology in Section 5 of the RI checklist (Ecology, 2020). Figure 8 series presents the Site CSM with a general cross-sectional view and observed COPC concentrations in groundwater.

3.1 Potential Contaminant Release Scenario

As noted in Section 2.1, no reported releases or spills have occurred at the Site. Based on Paragon's 1998 Site visit, they noted that minor staining was observed at various areas of the Site that could be associated with incidental drips and spills during loading or unloading of fertilizer from the Site's ASTs, which were located on unpaved ground and lacking secondary containment. As shown in Figure 2, prior to 1999, ASTs were noted in various locations in the central and eastern portions of the Site, indicating that loading and unloading operations were likely conducted across these portions of the Site. The details of the material transfer activities are unknown, but flexible hoses could have been used during this activity, and fertilizer impacts could be associated with the connecting and disconnecting of these hoses. In 1999, the ASTs were moved to a new concrete secondary containment in the western portion of the Site, with an associated paved loading pad adjoining the secondary containment in the west central portion of the Site. During the 2017 Site walk, no staining or evidence of spills or releases were observed by August Mack; however, this site walk occurred after NAS had ceased operations and demolished/removed the onsite structures. As a result, Geosyntec believes there may have been incidental drips or fertilizer releases associated with NAS activities prior to 1999, when loading and unloading activities from ASTs were conducted on unpaved ground surfaces, possibly using flexible hoses primarily in the central and eastern portions of the Site. After 1999, when secondary containments and a loading pad were present at the Site, releases to the subsurface were likely reduced.

The release scenario of incidental drips and spills during loading and unloading is also consistent with the nature and extent of COPC impacts, primarily nitrate as nitrogen, observed in soil and groundwater at the Site. As presented in Section 2, no source areas of COPCs in soil were identified; however, relatively low levels of nitrate as nitrogen were observed in soil across the Site with higher concentrations in the central and eastern portions of the Site consistent with historical NAS operations areas (Figure 6). This spatial distribution is also similar in groundwater samples, where nitrate released to surface soils likely leached over time from the surface to shallow groundwater (Figure 7a). The source of nitrate as nitrogen would have come from urea fertilizers[10] that contain varying concentrations of nitrate and ammonia, which readily converts to nitrate in the environment in the presence of oxygen. With respect to metals, concentrations in soil were within background ranges, suggesting that while metals may have been present in some of the fertilizer formulations historically stored at the Site, no soil source was identified. As such, given that these metals are also naturally occurring in soil, impacts to groundwater may not be a direct

[10] Nachurs 3-18-18 and Nachurs 6-24-6 fertilizers contained urea, which is approximately 46% nitrogen (containing different forms of nitrogen, including 25% nitrate as nitrogen).

result of NAS operations and may be attributed to natural presence of metals in soil and geochemical changes attributed to nitrate release(s) associated with historical incidental drips or spills at the Site, discussed further in Section 3.2.

3.2 Fate and Transport of COPCs

As stated in Section 2.3, nitrate as nitrogen is the primary COPC and is present above background levels in both soil and groundwater samples on-Site. In addition to nitrate, COPCs for groundwater also include three metals: arsenic, cobalt, and molybdenum. The fate and transport of each of these COPCs are summarized below.

3.2.1 Nitrate

As mentioned above, surface releases of fertilizers represent a direct source of nitrate and ammonia to surface soil and the conversion of ammonia to nitrate via nitrification in the subsurface represents a secondary source of nitrate. Nitrate and ammonia likely migrated downward in the subsurface initially as pure liquid fertilizer product, with partial sorption to the soil matrix. Nitrate and ammonia are soluble in water and would then migrate farther downward in the unsaturated zone via infiltrating precipitation before reaching groundwater. During this leaching process, ammonia would continue to convert to nitrate through nitrification.

Once nitrate is present in the subsurface soil and groundwater, it can either be taken up by plants (not present at the Site), immobilized by microorganisms, or reduced to atmospheric nitrogen through denitrification. The rate at which denitrification occurs is dependent on the quantity of electron donors available to denitrifying bacteria. In addition, nitrate in groundwater is also expected to migrate with groundwater with little retardation; however, given that off-Site impacts have not been observed above background levels (presented in Figure 8 series), groundwater migration at this Site is likely very slow. Lastly, nitrate in groundwater is expected to dilute overtime within the infiltration of precipitation and may also attenuate due to diffusion and dispersion processes.

Based on the above, it is expected that nitrate would continue to decrease in groundwater at the Site due to denitrification, dilution and diffusion/dispersion processes; however, the rate at which this is occurring is not expected to be rapid based concentrations that are still prevalent years after NAS operated at the Site without containment or a paved loading pad (pre-1999). The current rate of denitrification at the Site is likely slow because of limited electron donor availability.

3.2.2 Metals

Phosphate and micronutrient type fertilizers have been known to contain metals including arsenic, cobalt, and molybdenum; however, these metals are considered byproducts or contaminants within the product, as they originate from the raw materials used to manufacture the fertilizers. Therefore, the concentrations and quantity of these compounds in the fertilizer formulations are notably less than nitrogen. Arsenic, cobalt, and molybdenum concentrations in soil samples collected at the Site are generally similar to observed background concentrations. Therefore, metals in groundwater are likely naturally occurring and not from former NAS operations at the Site. The increased concentration of arsenic, cobalt, and molybdenum observed in groundwater are more likely a result of naturally occurring metals in soil matrices having become mobile in the

groundwater due to geochemical changes associated with the release of nitrogen compounds from historical Site activities.

Arsenic can be released naturally into the groundwater from soil by a variety of weathering, biological, and geochemical mechanisms. The valence state of arsenic will dictate the fate and transport of the compound in groundwater and is highly dependent on pH and the concentration of iron in the groundwater. The movement of arsenic in the groundwater may occur by the reduction of iron minerals. As noted in in Section 2, a shift in groundwater geochemistry to more reducing conditions has been observed within the footprint of nitrate impacts to groundwater. This also coincides with the footprint of elevated levels of dissolved arsenic in groundwater.

Cobalt is an activator of the urease enzyme, which is a catalyst in the urea decomposition reaction. As part of this reaction the nitrification process is enabled allowing ammonia to be oxidized to nitrites and nitrates (Kosiorek, M. and Wyszkowski, M., 2019). Metallic cobalt is insoluble in water; however, cobalt salts vary in solubility depending on the compound. One of the soluble cobalt salts is cobalt (II) nitrate. Based on observed groundwater chemistry cobalt will likely decrease at the rate similar to natural denitrification of nitrate in the groundwater. As mentioned in Section 3.2.1, the current rate of dentification is not believed to occur rapidly without the assistance of an electron donor.

Molybdenum compounds have low solubility in water, but when molybdenum-bearing minerals contact oxygen and water, the resulting molybdate ion MoO_2^{-4} is soluble. Molybdenum is redox-sensitive and at near-neutral pH values is rather weakly sorbed to soil. Molybdenum becomes less mobile when converted to thiomolybdates under strongly reducing conditions (Smedley, 2017). Based on current conditions, which do not show strong reducing conditions, it can be expected that molybdenum concentrations would persist. If reducing conditions became present at the Site, molybdenum concentrations would be expected to decrease.

In addition to the above and similar to nitrate, these metals are expected to attenuate in groundwater overtime due to denitrification, dilution and diffusion/dispersion processes; however, the rate at which this is occurring is likely relatively slow, given that the concentrations have remained relatively consistent during the past five quarterly groundwater monitoring events.

3.3 Exposure Pathways and Potential Receptors

The CSM is used to identify exposure pathways by which human and ecological receptors may be exposed to hazardous substances (WAC 173-340-708[3][e]). An exposure pathway consists of the following three main parts (WAC 173-340-200):

- Source of contamination in the subsurface (e.g. sources, such as from spills and leaks)
- Point of exposure (e.g. drinking water)
- Route of exposure (e.g. ingestion, inhalation, or dermal contact)

These exposure pathways and potential receptors are evaluated in further detail below.

3.3.1 Source of Contamination

As stated in Section 3.1, the source of contamination likely occurred prior to 1999 when secondary containments were not used at the Site and drips from loading and unloading of fertilizer may have occurred. By 2017, the former structures had been removed and NAS' use of the Site ended. As a result, there is currently no primary exposure pathway associated with the source of contamination since that likely occurred over 20 years ago and COPC concentrations in surface soil are below background or MTCA CULs. Additionally, there are no known potential receptors associated with the source of contamination because the Site is not actively used, surface soil concentrations are below MTCA CULs, there are no buildings or wells on the Site, and the Site groundwater is not used for any purpose.

3.3.2 Point of Exposure

There are no current points of exposure at the Site. Groundwater was evaluated as an exposure pathway; however, this is considered an incomplete pathway at and in the vicinity of the Site, because there are no known supply wells, including drinking water wells in the area. The closest drinking water well in the region is the City of Sunnyside Well 8, which is located 850 ft northwest (upgradient) of the Site and is screened between 325 and 440 ft bgs (City of Sunnyside, 2016). The next closest City well is S10, which is only used for emergencies and is located east of the Site (cross-gradient) 0.5 miles and screened between 1,202 and 1,701 ft bgs. No other City wells are within one mile of the Site and on the same side of the Snipes Mountain Lateral River.

Because soil concentration at the Site is below background or MTCA CULs and there is currently no industrial activity or buildings at the Site, there are no potential exposure points or potential receptors.

3.3.3 Route of Exposure

An exposure route is the way in which a chemical enters an organism upon contact. Based on the potential exposure pathways presented in Section 3.3, dermal and inhalation are not believed to be exposure routes of concern for the Site COPCs. Because COPCs are observed in groundwater, the route of exposures could be ingestion by groundwater; although this is believed to be an incomplete pathway, because there are no known shallow wells within the vicinity of the Site. The other exposure route could be uptake by plants; however, because the source of the COPCs in the groundwater are associated with fertilizers and provide nutritional value for plants, uptake of COPCs by plants is not believed to be a concern.

3.4 Terrestrial Ecological Evaluation

A Terrestrial Ecological Evaluation (TEE) is designed to protect native plants, soil biota, and wildlife at contaminated sites cleaned up under the state's cleanup law. As such, a TEE must be completed whenever contaminants could harm ecological receptors (e.g., native plants, soil biota, or wildlife). Appendix B provides the completed TEE for the Site. This Site qualifies for an exclusion based on the following two criteria:

- Contamination below the Point of Compliance: Soil concentrations at the Site are below MTCA Method A and C CULs for all COPCs, as well as below MTCA Method B CUL for all COPCs except for arsenic. Arsenic concentrations are above MTCA Method B

CULs but are generally within background ranges observed in the Yakima region (6 mg/kg; Ecology, 1994).

- Type of Contamination and Proximity to Ecological Receptors (i.e., Undeveloped land exclusion): Per WAC 173-340-7491(1)(c), this Site is less than 0.4 acres in size and qualifies for an exclusion because undeveloped land at the Site is limited to less than 1.5 acres.

4. PROPOSED SITE-SPECIFIC TARGET REMEDIATION LEVELS

Cleanup standards for the Site, as defined in WAC 173-340-700, include establishing target concentrations and points of compliance at which the target concentrations will be attained for the Site. The cleanup standards have been established for the Site in accordance with MTCA (WAC 173-340-700 through WAC 173-340-760). For the purposes of this document, the cleanup standards proposed herein are referred to as Target Remediation Levels (TRLs).

TRLs were developed for groundwater, because that is the only media that has concentrations exceeding background concentrations and/or MTCA CULs. Site-specific TRLs for groundwater have been developed to provide cleanup standard for the remediation of impacts potentially related to NAS' former operations at the Site and are based on a combination of observed Site background concentrations, primary MCLs,[11] and default MTCA Method C CULs. MTCA Method C was selected as the most applicable for the Site given that the Site and vicinity are zoned light industrial. Following WAC 173-340-700(6)(d), "cleanup level shall be established at a concentration equal to the practical quantitation limit or natural background concentration, whichever is higher." Background concentrations were selected as the proposed TRL, for COPCs that have background concentrations higher than the practical quantitation limit, MCL, and MTCA CULs. At this Site, background levels are based on groundwater samples from MW-1, SB-16, and SB-17 due to their upgradient and off-Site locations. These upgradient locations provide baseline information to differentiate impacts to groundwater from historical NAS operations at the Site versus other upgradient or regional sources.

In addition, TRLs were also established for dissolved metals instead of total metals since dissolved metals more accurately represent mobile compounds in the groundwater compared to total metals, which may contain higher concentrations attributed to colloidal suspension. Dissolved concentrations are more representative of what may impact downgradient receptors, or concentrations in extracted groundwater.

A list of groundwater TRLs, and the basis for each TRL, is provided below for each constituent and presented in Table 6.

- The proposed TRL for nitrate is 68 mg/L. This was selected based on the background groundwater result from MW-1 during the September 2020 quarterly sampling event.

[11] MCLs were provided by EPA National Primary Drinking Water Regulations. Updated January 5, 2021. https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

The proposed TRL is higher than the MTCA Method C CUL (56 mg/L) and primary MCL (10 mg/L) for drinking water.

- The proposed TRL for dissolved arsenic is 90 µg/L. This was selected based on background grab-groundwater results from SB-17 from the July 2021 off-Site investigation. The proposed TRL is higher than the MTCA Method C CUL (0.58 µg/L) and primary MCL (10 µg/L).
- The proposed TRL for dissolved cobalt is 11 µg/L. This was selected based on the MTCA Method C CUL, which is higher than background levels. There is not a primary MCL for cobalt.
- The proposed TRL for dissolved molybdenum is 180 µg/L. This was selected based on the MTCA Method C CUL, which is higher than background levels. There is not a primary MCL for molybdenum.

5. REMEDY ALTERNATIVE EVALUATION AND SELECTION

Prior to selecting the desired remedial approach, remedial technologies and alternatives were evaluated and compared. Based on this comparison, denitrification with contingency arsenic treatment was selected as the proposed remedy for the Site.

Five remedial alternatives were considered for the Site with details provided in Table 7:

1. Monitored natural attenuation (MNA),
2. Groundwater extraction and beneficial reuse (i.e., agricultural land application),
3. Permeable reactive barrier,
4. Phytoremediation, and
5. Denitrification with contingency arsenic treatment.

The above five remedial alternatives were screened against Ecology's seven evaluation and selection criteria, as presented in WAC 173-340-360, to select the most advantageous approach. Each of the remedial alternative was evaluated against the criteria presented below:

6. Ability to protect human health and the environment.
7. Permanence.
8. Effectiveness over the long-term.
9. Management of short-term risks.
10. Implementability (technical and administrative).
11. Public acceptance.
12. Cost.

Based on evaluation of the alternative remedies, denitrification with contingency arsenic treatment was selected as the proposed remedial approach for the Site. The denitrification includes the injection of an electron donor (e.g. food-grade emulsified vegetable oil [EVO] and/or sodium

lactate) into the shallow groundwater (approximately 5 to 15 ft bgs) to create a reducing environment and stimulate naturally-occurring bacteria to utilize nitrate and nitrite as electron acceptors for metabolic activities. Based on the baseline results, iron sulfide injection is included as a contingency measure to promote immobilization of arsenic. Injections into the central and eastern portions of the Site, including the downgradient Site boundary, are proposed, to target areas where the highest nitrate concentrations are detected in both soil and groundwater. The denitrification process ultimately results in the conversion to nitrogen gas under anaerobic conditions within the injection area and will also treat groundwater that will flow into this area from upgradient. The denitrification steps are shown below.

$$NO_3^- \rightarrow NO_2^- \rightarrow NO + N_2O \rightarrow N_2$$

Denitrification of nitrate within the injection area is anticipated to occur quickly, and depending on the type of electron donor amendment selected, electron donor and reducing conditions may persist for up to three to five years. Over this time period, this remedy will also reduce nitrate that may continue to leach from the residual concentrations remaining in soils overlying and immediately upgradient to the injection area. If concentrations in groundwater continue to remain below TRLs for nitrate following remedy implementation, residual nitrate or ammonia in unsaturated soil will not be considered a long-term risk to underlying groundwater.

In addition, with the injection of electron donor for dentification, metal COPC concentrations (arsenic, cobalt, molybdenum) are expected to reduce in groundwater concurrently with denitrification, or following denitrification; however, metal compounds (e.g. As (III) vs As (v)) can exhibit different mobility characteristics in reducing environment. Depending on the speciation of arsenic in groundwater, arsenic concentrations may persist and potentially increase following injections. The addition of iron sulfide may be needed to promote immobilization of arsenic and the other metals. Therefore, baseline sampling will be conducted prior to injections at the Site to evaluate arsenic speciation and the potential to mobilize metals during denitrification. Based on the results, iron sulfide maybe injected along with the electron donor. If metals were to mobilize during the denitrification process, the concentration of some metals may temporarily increase until nitrate is remediated, and geochemical conditions return to aerobic conditions and the metals precipitate or resorb back onto the soil matrix.

Compliance monitoring will be conducted before injections to establish baseline conditions and understand arsenic speciation present in the groundwater. Compliance monitoring will continue after injections on a regular schedule to evaluate changes to groundwater geochemistry and COPC concentrations. If COPC concentrations have not declined below their respective TRLs after remedy implementation, contingency measures may be considered, such as injection of an iron sulfide into the groundwater or additional electron donor injections.

As shown in Table 7, this remedial approach is expected to reduce COPCs at the Site at a faster rate than the other remedial approaches, is relatively easy to implement, and has shown long-term reduction in COPCs at similar sites.

6. CLEANUP ACTION PLAN

This CAP was created to establish the approach that will be taken to successfully reduce COPCs at the Site to concentrations below the proposed Site-specific TRLs presented in Section 4. This section summarizes the point of compliance, implementation approach, restoration timeframe, compliance monitoring, institutional and engineering controls, and public participation that will be part of this cleanup approach. The engineering design and implementation work plan for this CAP is provided in Appendix C.

6.1 Point of Compliance

This CAP has established points of compliance for groundwater (WAC 173-340-720) at the Site to confirm that the cleanup action is obtained. Points of compliance for groundwater will be to meet the proposed TRLs in groundwater samples collected from the three on-Site monitoring wells (MW-2, -3, and -4). The selected wells are representative of groundwater at the Site and the downgradient Site boundary. If groundwater concentrations do not respond to the proposed remedial approach, a contingency plan may be prepared to augment or increase remediation efforts to reach TRLs at these locations. Discussion regarding a contingency approach is presented in Appendix C.

No cleanup standards have been set for soil due to the low concentrations of COPCs observed at the Site that are below MTCA CULs for soil. Proposed groundwater performance monitoring, as presented in Section 6.4, will be used to monitor both remedy performance in groundwater, as well as to evaluate leaching of residual nitrate from overlying soil. If concentrations in groundwater continue to remain below TRLs for nitrate following remedy implementation, residual nitrate or ammonia in unsaturated soil will not be considered a long-term risk to underlying groundwater.

6.2 Implementation Approach

The denitrification with contingency arsenic treatment remedy consists of two implementation phases, first the delivery of electron donor amendments and contingent iron sulfide to groundwater and compliance monitoring, which will consist of baseline monitoring prior to injections and post injection monitoring for an extended period. The baseline monitoring event will be used to evaluate the arsenic speciation as well as concentrations of iron, manganese, nitrate, cobalt, and molybdenum in groundwater. Based on findings from the baseline sampling arsenic treatment with injection of iron sulfide may be conducted. Geosyntec estimates that baseline monitoring followed by amendment delivery will be implemented over a two-week period in Spring 2022.

To encourage denitrification, an electron donor (such as EVO and/or sodium lactate) will be injected into the groundwater. The injection of an electron donor will encourage denitrifying bacteria to reduce nitrate to an end product of nitrogen. Iron sulfide may be co-injected with the electron donor into the groundwater to reduce the dissolved arsenic concentrations (below the TRLs). Figure 9 presents the proposed injection area. The injection area was selected to target the nitrate source area and downgradient Site boundary. The source areas are generally areas with nitrate concentrations in grab-groundwater samples greater than approximately 150 mg/L (observed upgradient concentration at SB-8) and also includes groundwater underlying areas with the highest residual soil concentrations. In addition, a higher dosing of electron donor is proposed

to be injected in the area of the Site that has highest nitrate concentrations (>500 mg/L around SB-3, SB-13, and SB-14). The layout of the injection area also provides electron donor along the portion of the Site boundary that is downgradient of former NAS operations, providing treatment before groundwater migrates off-Site.

Associated post injection compliance monitoring to evaluate the reduction of Site-specific COPC concentrations in groundwater will continue to occur using the four existing monitoring wells (MW-1 through MW-4) for at least one year following the amendment injections and will include the collection of geochemistry and COPC concentration data. Compliance monitoring is further discussed in Section 6.3.2 below.

The proposed corrective action engineering design and implementation work plan is presented in Appendix C.

6.3 Restoration Timeframe and Compliance Monitoring

6.3.1 Restoration Time Frame

As required by WAC 173-340-360(2.b.ii), a cleanup shall provide for a reasonable restoration time frame by considering the following factors (WAC 173-340-360(4.b)):

1. Potential risks posed by the Site;
2. Practicability of achieving shorter restorations time frame;
3. Current uses of the Site;
4. Potential future uses of the Site;
5. Availability of alternative water supplies;
6. Effectiveness and reliability of institutional controls;
7. Ability to control and monitor migration of constituents;
8. Toxicity of the hazardous substances; and
9. Natural processes that reduce concentrations of the hazardous substances.

The proposed cleanup takes into consideration the above aforementioned criteria and is the remedial alternative most likely to effectively remediate the Site groundwater within a reasonable time frame while reducing risks.

The proposed remedial alternative is expected to show reduction in nitrate concentrations, within the injection area, within the first several months following injections. Metals concentrations are expected to decline concurrent with nitrate reduction, or following nitrate reduction after the electron donor is utilized, which may take up to a few years.

6.3.2 Compliance Monitoring

Compliance monitoring will be conducted in accordance with WAC 173-340-410, which addresses three types of compliance monitoring:

- Protection monitoring, which confirms that human health and the environment are adequately protected;
- Performance monitoring, which confirms the cleanup action has attained cleanup standards; and
- Confirmation monitoring, which confirms the long-term effectiveness of the cleanup action.

As discussed in the CSM (Section 3), there are no current potential receptors for this Site. As a result, sampling will be focused on performance and confirmation monitoring. For both monitoring types groundwater samples will be collected from the four existing Site monitoring wells. To address performance monitoring, groundwater samples will be collected prior to injection and collected monthly for three months following injection. To address confirmation monitoring, following the performance monitoring quarterly samples will be collected for at least one year, until groundwater concentrations decline to below the proposed TRLs. After one year, the frequency of performance monitoring may be reduced to semi-annually, in discussion with Ecology. Compliance monitoring plan is presented in the Corrective Action Engineering Design and Implementation Work Plan in Appendix C.

6.4 Institutional and Engineering Controls

According to WAC 173-340-440, institutional controls are "measures undertaken to limit or prohibit activities that may interfere with the integrity of an interim action or cleanup action or that may result in exposure to hazardous substances at a site." According to WAC 173-340-200, engineered controls are "containment and/or treatment systems that are designed and constructed to prevent or limit the movement of, or the exposure to, hazardous substances." Because the COPCs are not in the soil above background levels or MTCA Method B, the shallow groundwater at the Site is not used for consumption, COPCs have not migrated off-Site at levels above Site-specific background levels, and the Site is zoned light industrial, no institutional or engineering controls are needed for successful implementation of the proposed remedial approach or for protection of human health and the environment.

6.5 Public Participation

After completion of the corrective action presented herein, Geosyntec understand that Ecology may provide opportunity for public comment at the time of issuing a no further action for the Site related to impacts associated with the former NAS operations.

7. CONCLUSIONS

In conclusion, this document presents the RI, remedy selection, CAP, and a remedy engineering design and implementation work plan for the Site. The Site investigations conducted to date have included 23 soil borings on- and off-Site resulting in a total of 33 soil samples and 19 grab-groundwater samples, as well as the installation of four groundwater monitoring wells, which have been monitored for a total of five quarters. Based on this work, the remedial investigation is complete, the nature and extent of COPCs related to NAS' former operations are defined and limited to on-Site. COPCs primarily include nitrate as nitrogen in on-Site shallow groundwater, which likely leached from ground surface to groundwater from incidental spills and drips during loading and unloading activities prior to 1999, when ASTs at the Site were not in secondary containment. While some nitrate as nitrogen remains in unsaturated soil, current concentrations are likely residual levels remaining after 20 or more years of leaching and are below direct contact MTCA Method B CULs for unrestricted land use. Arsenic, cobalt, and molybdenum are also COPCs in on-Site shallow groundwater, and while these metals were potentially in fertilizer formulation stored at the facility, the current groundwater concentrations are primarily attributed to geochemical changes caused by nitrate release(s) associated with historical incidental drips or spills. In addition, background levels of COPCs are present in both soil and groundwater, and based on current site conditions, these COPCs in both soil and groundwater do not pose a risk to human health or the environments, as there are no complete exposure pathways.

Geosyntec has proposed site-specific cleanup levels, referred to as TRLs, to address nitrate, arsenic, cobalt, and molybdenum in groundwater that may be related to NAS's former operations. These TRLs are based on Site background, MTCA Method C CULs (given that the site and vicinity are zoned light industrial), and EPA MCLs. No cleanup levels for nitrate as nitrogen in soil are proposed, as concentrations are below MTCA Method B for unrestricted land use, and long-term risk of these residual levels in unsaturated soil to groundwater is likely low and will be evaluated based on groundwater monitoring results.

Due to the detections of COPCs above the TRLs, Geosyntec evaluated five different remedial approaches for the Site and selected denitrification with contingency arsenic treatment as the proposed remedial approach based on the remedy's short-term and long-term effectiveness, implementability, and ability to protect human health and the environment. Denitrification with contingency arsenic treatment will include injection of an electron donor amendment and ISR to the subsurface to promote nitrate reduction by naturally occurring microorganisms and immobilization of arsenic. While there may be a temporally limited increase in dissolved metals concentrations following injections, this remedy is expected to reduce COPCs in groundwater at the Site to concentrations below the Site-specific TRLs within a reasonable timeframe. Due to the lack of receptors and the proposed remedial approach, no institutional or engineering controls are required.

Once approval for the remedial approach and attached engineering design and implementation plan has been provided by Ecology, the remedy is expected to be implemented starting in Spring 2022, followed by compliance groundwater monitoring for a minimum of one year following injections.

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TABLES

TABLE 1: SOIL AND GROUNDWATER SAMPLING INFORMATION

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

COC	*Soil Sampling*			*Groundwater Sampling*		
	Sampling Method	**Laboratory Analytical Method**	**Reporting Limit**	**Sampling Method**	**Laboratory Analytical Method**	**Reporting Limit**
Nitrate as nitrogen	Direct-push drill rig with vinyl acetate sleeve.	EPA-300.0M	3.0 mg/kg	Low flow sampling once parameters stabilize.	EPA-300.0	0.15 mg/L
Arsenic	Direct-push drill rig with vinyl acetate sleeve.	EPA-6020	0.2 mg/kg	Low flow sampling once parameters stabilize.	EPA-200.8	1.0 µg/L
Cobalt			0.1 mg/kg			1.0 µg/L
Molybdenum			0.1 mg/kg			1.0 µg/L
Nickel			0.1 mg/kg			2.0 µg/L
Dissolved Arsenic	N/A			Low flow sampling once parameters stabilize. Field filter water using a 0.45-micron filter.		1.0 µg/L
Dissolved Cobalt						1.0 µg/L
Dissolved Molybdenum						1.0 µg/L
Nickel						2.0 µg/L

Notes:

COC = constituent of concern

EPA = Environmental Protection Agency Method

N/A = Not applicable for soil samples.

TABLE 2: SOIL SAMPLING RESULTS AND SCREENING LEVELS
Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Location	Date Collected	Sample Depth (ft bgs)	Nitrate (mg/kg)	Arsenic (mg/kg)	Cobalt (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)
MW-1	8/25/2020	0-3	**50**	**5.2**	**12**	**0.69**	**19**
	8/25/2020	3.5-5	**23**	**7.1**	**10**	**0.58**	**18**
MW-2	8/25/2020	0-3	**6.5**	**2.2**	**6**	**0.69**	**8.1**
	8/25/2020	3.5-5	**34**	**3.5**	**12**	**0.29**	**12**
MW-3	8/25/2020	0-3	**4.8**	**3.7**	**11**	**0.65**	**13**
	8/25/2020	3.5-5	**12**	**7.6**	**11**	**1.1**	**14**
MW-4	8/25/2020	0-3	**7.0**	**3.8**	**10**	**1.5**	**15**
	8/25/2020	3.5-5	**7.2**	**4.6**	**10**	**0.69**	**15**
SB-1	2/7/2018	0-3	<5.9	**5**	**8.5**	<1.1	**13**
SB-2	2/7/2018	0-3	<5.6	**3.8**	**9.2**	<1.1	**10**
SB-3	2/7/2018	0-3	**14**	**4.4**	**9.4**	<1.1	**13**
	8/5/2020	4.5-5	**190**	**5**	**14**	**0.31**	**16**
SB-4	2/7/2018	0-3	**26**	**4.6**	**9.2**	<1.2	**13**
	8/5/2020	3.5-5.5	**460**	**6.2**	**11**	**0.6**	**15**
SB-5	2/7/2018	0-3	**8.5**	**5.2**	**9.9**	<1.2	**15**
	8/5/2020	4-6	**140**	**9.3**	**13**	**0.93**	**17**
SB-6	2/7/2018	0-3	**9.1**	**5**	**9.6**	<1.2	**15**
SB-7	2/7/2018	0-3	**10**	**4.3**	**9.6**	<1.1	**15**
SB-8	2/7/2018	0-3	**43**	**8**	**9.6**	**1.8**	**19**
	8/5/2020	3.5-5.5	**60**	**10.0**	**16**	**2.3**	**18**
SB-9	8/5/2020	0-3	**70**	**4.0**	**10**	0.9	**14**
	2/8/2018	4-6	**57**	**10.1**	**9.8**	<1.2	**13**
SB-10	8/5/2020	0-3	**340**	**3.4**	**16**	0.81	**12**
	2/8/2018	4-6	**61**	**7.3**	**11**	<1.2	**15**
SB-11	2/8/2018	4-6	**12**	**7.3**	**9.4**	<1.1	**14**
SB-12	8/5/2020	0-3	**29**	**3.9**	**11**	**0.54**	**15**
	8/5/2020	3.5-5	**57**	**5.7**	**12**	**0.82**	**15**
SB-13	8/5/2020	0-3	**300**	**4.1**	**9.6**	**0.79**	**14**
	8/5/2020	4-6	**260**	**5.4**	**12**	**1.20**	**15**
SB-14	8/5/2020	0-3	**28**	**4.9**	**11**	**0.88**	**14**
	8/5/2020	4-6	**130**	**5.4**	**10**	**0.83**	**14**
SB-15	8/5/2020	0-3	**400**	**3.8**	**11**	**0.98**	**16**
	8/5/2020	4-6	**930**	**5.5**	**11**	**1.9**	**15**
Background Concentration			--	**10**	--	--	**20**
MTCA Method A Cleanup Levels			--	**20**	--	--	--
MTCA Method B Cleanup Levels			**130,000**	**0.67**	**24**	**400**	**1,600**
MTCA Method C Cleanup Levels			**5,600,000**	**88**	**1,100**	**18,000**	--

Notes: Results compared to State of Washington, Department of Ecology, Model Toxics Cleanup Act (MTCA) screening levels and background concentrations.
Background concentrations were taken from the Washington Department of Ecology, *Natural Background Soil Metals Concentrations in Washington State, October 1994.*

Acronyms:
< = Not detected above the reported laboratory method detection limit.
-- = No screening level available
mg/kg = micrograms per kilogram
MW = monitoring well
NA = Not Analyzed
SB = soil boring
Bold = Analyte was detected.
Highlight = Analyte was detected at concentrations that are greater than background and MTCA cleanup levels.

TABLE 3a: GROUNDWATER DEPTH AND ELEVATION
SUMMARY Former Nachurs Alpine Solutions Facility, Sunnyside, WA

WELL ID.	MW-1		MW-2		MW-3		MW-4	
DIAMETER (in)	2		2		2		2	
WELL DEPTH (ft)	15.00		15.00		15.00		15.00	
SCREEN INTERVAL (ft)	5-15		5-15		5-15		5-15	
TOC ELEVATION (ft)	743.33		744.40		744.41		744.40	
DATE	ELEV. (ft)	DTW (ft)	ELEV. (ft)	DTW (ft)	ELEV. (ft)	DTW (ft)	ELEV. (ft)	DTW (ft)
9/2/2020	740.35	2.98	739.42	4.98	738.99	5.42	738.62	5.78
12/9/2020	740.61	2.72	739.73	4.67	739.19	5.22	738.99	5.41
3/3/2021	740.28	3.05	739.45	4.95	739.23	5.18	739.08	5.32
6/9/2021	739.92	3.41	739.20	5.20	738.76	5.65	738.42	5.98
9/15/2021	740.13	3.20	739.37	5.03	739.01	5.40	738.70	5.70

Notes:

DTW = depth to water

ELEV = elevation (ft NAVD88)

ft = feet

in = inches

TABLE 3b: GROUNDWATER FIELD PARAMETERS SUMMARY

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

	Sample date	Temp (°C)	pH	Conductivity (µS/cm)	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)
On-Site Monitoring Well Samples							
MW-1	9/2/2020	19.46	7.42	1198	35	0.51	117.6
	12/9/2020	13.73	7.73	1166	32	0.35	-41.4
	3/3/2021	12.30	7.58	1139	9	2.17	82.3
	6/9/2021	15.35	7.56	1384	16	0.61	-61.9
	9/15/2021	20.28	7.66	2032	27	1.05	-18.0
MW-2	9/2/2020	21.68	7.90	2811	11	0.51	123.8
	12/9/2020	13.68	7.00	2685	46	0.90	-15.6
	3/3/2021	10.40	7.61	1924	11	1.06	143.6
	6/9/2021	16.15	7.74	3056	9	0.44	-63.8
	9/15/2021	22.93	7.82	4813	16	0.94	-17.7
MW-3	9/2/2020	19.77	7.83	1148	15	1.08	120.2
	12/9/2020	14.53	7.67	1062	17	0.70	-36.0
	3/3/2021	12.90	8.11	1065	5	1.08	35.3
	6/9/2021	15.81	7.95	1371	13	0.58	-84.6
	9/15/2021	20.62	8.04	2218	19	1.49	-50.1
MW-4	9/2/2020	19.82	8.12	3780	9	1.07	131.8
	12/9/2020	14.61	7.57	3512	17	0.47	-28.5
	3/3/2021	13.20	7.68	2902	14	0.95	74.0
	6/9/2021	15.43	7.71	3865	11	0.55	-75.1
	9/15/2021	21.08	7.84	5562	19	1.09	18.0
Off-Site Grab Groundwater Samples							
SB-16	7/13/2021	21.7	8.37	1441	336	5.7	34
SB-17	7/13/2021	21.9	8.26	1784	1100	0.52	-211.2
SB-18	7/13/2021	19.3	8.40	1937	1100	0.71	-297.1
SB-19	7/20/2021	23.94	7.34	1904	86	0.63	-126.7
SB-20	7/20/2021	25.92	7.31	1883	1.32	0.72	-14.9
SB-21	7/13/2021	21.5	8.34	1223	1100	6.08	-218.8
SB-22	7/20/2021	24.54	7.73	710	45.3	0.26	-113.3
SB-23	7/20/2021	21.54	7.33	1349	277	0.46	94.8

Notes:

°C =degree Celsius

D.O. = Dissolved oxygen

DTW = depth to water

ft = feet

mg/L = milligrams per liter

mV = milliVolt

NTU= Nephelometric Turbidity Unit

ORP = Oxidation Reduction Potential

Temp = Temperature

µS/cm = microsiemens per centimeter

TABLE 4: GROUNDWATER GRADIENT SUMMARY
Former Nachurs Alpine Solutions Facility, Sunnyside, WA

DATE	Gradient Direction	Hydraulic Gradient (ft/ft)
9/2/2020	SE	0.006
12/9/2020	SE	0.006
3/3/2021	SE	0.004
6/9/2021	SE	0.005
9/15/2021	SE	0.005

Notes:
ft = feet
SE = southeast

TABLE 5: GROUNDWATER SAMPLING RESULTS AND SCREENING LEVELS
Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Location		Screen Interval Depth (ft)	Date Collected	Nitrogen, Nitrate (mg/L)	Arsenic (dissolved) (µg/L)	Cadmium (dissolved) (µg/L)	Cobalt (dissolved) (µg/L)	Lead (dissolved) (µg/L)	Mercury (dissolved) (µg/L)	Molybdenum (dissolved) (µg/L)	Nickel (dissolved) (µg/L)	Selenium (dissolved) (µg/L)	Zinc (dissolved) (µg/L)	Arsenic (µg/L)	Cadmium (µg/L)	Cobalt (µg/L)	Lead (µg/L)	Mercury (µg/L)	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Zinc (µg/L)
On-Site Groundwater Monitoring Wells																						
MW-1	Up-Gradient	5-10	09/02/20	**68**	**14**	NA	< 1.0	NA	NA	**29**	< 2.0	NA	NA	NA[1]	NA	NA[1]	NA	NA	NA[1]	NA[1]	NA	NA
			12/9/20	**19**	**10**	NA	< 1.0	NA	NA	**28**	< 2.0	NA	NA	**10**	NA	<1.0	NA	NA	**29**	< 2.0	NA	NA
			3/3/21	**20**	**8.8**	NA	< 1.0	NA	NA	**23**	< 2.0	NA	NA	**8.9**	NA	< 1.0	NA	NA	**23**	< 2.0	NA	NA
			6/9/21	**14**	**10**	NA	< 1.0	NA	NA	**27**	< 2.0	NA	NA	**11**	NA	**1.4**	NA	NA	**22**	**3.8**	NA	NA
			9/15/21	**13**	**11**	NA	< 1.0	NA	NA	**30**	NA	NA	NA	**11**	NA	< 1.0	NA	NA	**29**	NA	NA	NA
MW-2	On-Site (southern central edge)	5-10	09/02/20	**430**	**210**	NA	**9**	NA	NA	**32**	**66**	NA	NA	NA[1]	NA	NA[1]	NA	NA	NA[1]	NA[1]	NA	NA
			12/9/20	**89**	**130**	NA	**7**	NA	NA	**28**	**74**	NA	NA	**130**	NA	**7.5**	NA	NA	**28**	**76**	NA	NA
			3/3/21	**98**	**110**	NA	**9.7**	NA	NA	**39**	**81**	NA	NA	**110**	NA	**10**	NA	NA	**41**	**81**	NA	NA
			6/9/21	**94**	**80**	NA	**9.7**	NA	NA	**37**	**88**	NA	NA	**76**	NA	**9.1**	NA	NA	**37**	**91**	NA	NA
			9/15/21	**92**	**79**	NA	**8.2**	NA	NA	**30**	NA	NA	NA	**77**		**8.2**	NA	NA	**31**	NA	NA	NA
MW-3	On-Site (Northeastern edge)	5-10	09/02/20	**83**	**72**	NA	< 1.0	NA	NA	**36**	< 2.0	NA	NA	NA[1]	NA	NA[1]	NA	NA	NA[1]	NA[1]	NA	NA
			12/9/20	**22**	**80**	NA	< 1.0	NA	NA	**41**	**2.1**	NA	NA	**81**	NA	<1.0	NA	NA	**40**	**2.1**	NA	NA
			3/3/21	**23**	**87**	NA	< 1.0	NA	NA	**41**	**2.0**	NA	NA	**85**	NA	< 1.0	NA	NA	**36**	< 2.0	NA	NA
			6/9/21	**27**	**71**	NA	< 1.0	NA	NA	**50**	**2.7**	NA	NA	**71**	NA	< 1.0	NA	NA	**50**	**2.9**	NA	NA
			9/15/21	**19**	**60**	NA	< 1.0	NA	NA	**42**	NA	NA	NA	**60**	NA	< 1.0	NA	NA	**45**	NA	NA	NA
MW-4	On-Site (southeastern edge)	5-10	09/02/20	**760**	**65**	NA	**19**	NA	NA	**130**	**80**	NA	NA	NA[1]	NA	NA[1]	NA	NA	NA[1]	NA[1]	NA	NA
			12/9/20	**160**	**66**	NA	**15**	NA	NA	**120**	**66**	NA	NA	**68**	NA	**15**	NA	NA	**120**	**66**	NA	NA
			3/3/21	**160**	**69**	NA	**18**	NA	NA	**130**	**70**	NA	NA	**67**	NA	**18**	NA	NA	**130**	**69**	NA	NA
			6/9/21	**170**	**66**	NA	**17**	NA	NA	**120**	**75**	NA	NA	**65**	NA	**17**	NA	NA	**110**	**77**	NA	NA
			9/15/21	**180**	**64**	NA	**18**	NA	NA	**120**	NA	NA	NA	**65**	NA	**18**	NA	NA	**120**	NA	NA	NA
On-Site Grab-Groundwater																						
SB-8	On-Site	6-10	08/05/20	**150**	**10**	NA	**1.0**	NA	NA	**130**	**3.2**	NA	NA	**21**	NA	**24**	NA	NA	**120**	**25**	NA	NA
SB-3	On-Site	6-10	08/05/20	**1,000**	**520**	NA	**22**	NA	NA	**83**	**91**	NA	NA	**580**	NA	**110**	NA	NA	**69**	**170**	NA	NA
SB-4	On-Site	6-10	08/05/20	**240**	**100**	NA	**3**	NA	NA	**160**	**11**	NA	NA	**160**	NA	**57**	NA	NA	**130**	**82**	NA	NA
SB-5	On-Site	6-10	08/05/20	**370**	**45**	NA	**1.6**	NA	NA	**190**	**10**	NA	NA	**48**	NA	**4.8**	NA	NA	**180**	**14**	NA	NA
SB-9	On-Site	7-10	02/08/18	**170**	**21.4**	<2.0	**14.6**	<10.0	<2.0	**122**	**61.8**	<10.0	<20.0	**373**	**2.9**	**438**	**374**	<2.0	**92.4**	**736**	**12.7**	**2,650**
SB-10	On-Site	7-10	02/08/18	**240**	**28.2**	<2.0	**22.9**	<10.0	<2.0	**194**	**146**	<10.0	<20.0	**29.5**	<2.0	**23.5**	<10.0	<2.0	**194**	**146**	<10.0	<20.0
SB-11	On-Site	7-10	02/08/18	**120**	**10.9**	<2.0	<10.0	<10.0	<2.0	**110**	**10.5**	<10.0	<20.0	<10.0	<2.0	<10.0	<10.0	<2.0	**110**	**11.5**	<10.0	<20.0
SB-12	On-Site	5-10	08/05/20	**450**	**28**	NA	**2.9**	NA	NA	**110**	**23**	NA	NA	**27**	NA	**6.2**	NA	NA	**120**	**33**	NA	NA
SB-13	On-Site	6-10	08/05/20	**1,200**	**12**	NA	**79**	NA	NA	**150**	**200**	NA	NA	**65**	NA	**120**	NA	NA	**120**	**260**	NA	NA
SB-14	On-Site	7-10	08/05/20	**780**	**49**	NA	**65**	NA	NA	**150**	**74**	NA	NA	**47**	NA	**72**	NA	NA	**160**	**74**	NA	NA
SB-15	On-Site	6-10	08/05/20	**460**	**83**	NA	**2**	NA	NA	**290**	**10**	NA	NA	**78**	NA	**3**	NA	NA	**290**	**12**	NA	NA
Off-Site Grab-Groundwater																						
SB-16	Up-Gradient	5-15	07/13/21	**8.4**	**65**	NA	< 1.0	NA	NA	**76**	NA	NA	NA	**93**	NA	**33**	NA	NA	**62**	NA	NA	NA
SB-17	Up-Gradient	5-15	07/13/21	**13**	**90**	NA	< 1.0	NA	NA	**44**	NA	NA	NA	**110**	NA	**43**	NA	NA	**38**	NA	NA	NA
SB-18	Down-Gradient	5-15	07/13/21	**28**	**35**	NA	< 1.0	NA	NA	**75**	NA	NA	NA	**67**	NA	**45**	NA	NA	**75**	NA	NA	NA
SB-19	Down-Gradient	5-15	07/20/21	**21**[a]	**14**	NA	**1.9**	NA	NA	**54**	NA	NA	NA	**28**	NA	**32**	NA	NA	**45**	NA	NA	NA
SB-20	Down-Gradient	5-15	07/20/21	**27**[a]	**10**	NA	**3.0**	NA	NA	**47**	NA	NA	NA	**110**	NA	**340**	NA	NA	**8.4**	NA	NA	NA
SB-21	Down-Gradient	5-15	07/13/21	**5.6**	**120**	NA	**10**	NA	NA	**30**	NA	NA	NA	**150**	NA	**41**	NA	NA	**24**	NA	NA	NA
SB-22	Down-Gradient	5-15	07/20/21	**0.12**[a]	**62**	NA	< 1.0	NA	NA	**16**	NA	NA	NA	**130**	NA	**170**	NA	NA	**7.4**	NA	NA	NA
SB-23	Down-Gradient	5-15	07/20/21	**24**[a]	**14**	NA	< 1.0	NA	NA	**32**	NA	NA	NA	**80**	NA	**530**	NA	NA	< 1.0	NA	NA	NA
Background Ranges[2]				**8.4-68**	**8.8-90**	--	**<1.0**	--	--	**23-76**	--	--	--	**8.9-110**	--	**<1.0-43**	--	--	**22-75**	--	--	--
EPA MCL				**10**	**10**	**5**	--	**15**	**2**	--	**100**	**50**	--	**10**	**5**	--	**15**	**2**	--	**100**	**50**	--
MTCA Method A Cleanup Levels				--	**5**	**5**	--	**15**	**2**	--	--	--	--	**5**	**5**	--	**15**	**2**	--	--	--	--
MTCA Method B Cleanup Levels				**26**	**0.058**	**8**	**5**	--	--	**80**	**320**	**80**	**4,800**	**0.058**	**8**	**5**	--	--	**80**	**320**	**80**	**4,800**
MTCA Method C Cleanup Levels				**56**	**0.580**	**5**	**11**	--	--	**180**	--	--	--	**0.580**	**5**	**11**	--	--	**180**	--	--	--

Notes:

a. Sample dilution or re-analysis was performed outside of hold time. Data from out of hold time confirmed data run within hold time.

1. Due to field staff oversight, total metals samples were inadvertently not collected from the monitoring wells on 2 September 2020.

2. Background ranges are based on groundwater samples from MW-1, SB-16, and SB-17 due to their upgradient locations.
Constituents shown include those analyzed in 2020 and 2021 or were detected at least once during the 2018 sampling event. 2018 data are from August Mack Phase II Subsurface Investigation.
Results compared to State of Washington, Department of Ecology, Model Toxics Cleanup Act (MTCA) screening levels and background concentrations.
Results compared to US EPA maximum contaminant level (MCL) primary screening levels.

Acronyms:

< = Not detected above the reported laboratory method detection limit.
-- = No screening level available
µg/L = micrograms per liter
AST = aboveground storage tank
EPA = Environmental Protection Agency
GW = groundwater
mg/L = milligrams per liter
MCL = maximum contaminant level
MW = monitoring wells
NA = Not Analyzed
SB = soil borings

Bold = Analyte was detected.
Highlight = Analyte was detected at concentrations that are greater than both background and MTCA cleanup levels. Concentrations are not highlighted if only an MTCA or background exceedence are present.

TABLE 6: PROPOSED GROUNDWATER TARGET REMEDIATION LEVELS

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

COC	Units	Screening Levels					Max COPC Concentration Detected on-Site	On-Site Dections Exceed Screening Levels	Target Site-Specific Remediation level[3]
		Site-Specific Background[1]	Regional Background[2]	MTCA Method B (Unrestricted)	MTCA Method C (Industrial)	EPA MCL			
Nitrate as nitrogen	mg/L	**68**	1.8	26	56	10	1200	yes	68
Dissolved Arsenic	µg/L	**90**	6	0.058	0.58	10	520	yes	90
Dissolved Cadmium	µg/L	--	--	8	5	5	<2.0	no	--
Dissolved Cobalt	µg/L	<1.0	--	5	**11**	--	19	yes	11
Dissolved Lead	µg/L	--	--	--	--	15	<10.0	no	--
Dissolved Mercury	µg/L	--	--	--	--	2	<2.0	no	--
Dissolved Molybdenum	µg/L	76	--	80	**180**	--	130	yes	180
Dissolved Nickel	µg/L	--	--	320	--	100	200	no	--
Dissolved Selenium	µg/L	--	--	80	--	50	<10.0	no	--
Dissolved Zinc	µg/L	--	--	4800	--	--	<20.0	no	--

Notes:

1) Site-specific background concentrations are based on the groundwater results from samples collected at upgradient locations (MW-1, SB-16, and SB-17). The maximum groundwater detections is shown.

2) Regional Background concentration for arsenic is based on the Department of Ecology *Natural Background Groundwater Arsenic Concentrations in Washington State* , July 2021. Regional background for nitrate was taken from the *City of Sunnyside Comprehensive Plan* 2007.

3) A proposed target-specific remediation level was selected for each COPC with maximum groundwater concentrations at the Site that have been detected above the default MTCA (Method C) or EPA MCL screening levels; these include nitrate as nitrogen, dissolved arsenic, dissolved cobalt, and dissolved molybdenum. If the site-specific or regional background levels are higher than the default screening level, the higher of the background levels was selected as the CUL. Otherwise, the applicable default screening level based on land use (i.e., EPA MCLs or MTCA Method C) was selected as the proposed CUL.

MCL criteria for non-compliance is presented in WAC 246-290-310, which requires the running annual average quarterly results of sampling to be above the MCL. Because one year of quaraterly sampling was conducted at the Site and nickel remained below the MCL, it was considered that there was not an on-Site detection that exceed screening levels.

MTCA Method B and C values provided by Ecology Cleanup Levels and Risk Calculation (CLARC) February 2021.

MCLs provided by EPA National Primary Drinking Water Regulations, January 2021.

Acronyms

"--" = No value available or not applicable

"<" = Not detected above the laboratory reporting limit shown

µg/L = micrograms per liter

mg/L = milligrams per liter

COPC = constituent of potential concern

CUL = Cleanup levels

EPA = Environmental Protection Agency

MTCA = Model Toxic Control Act

MCL = Maximum Contaminant Level

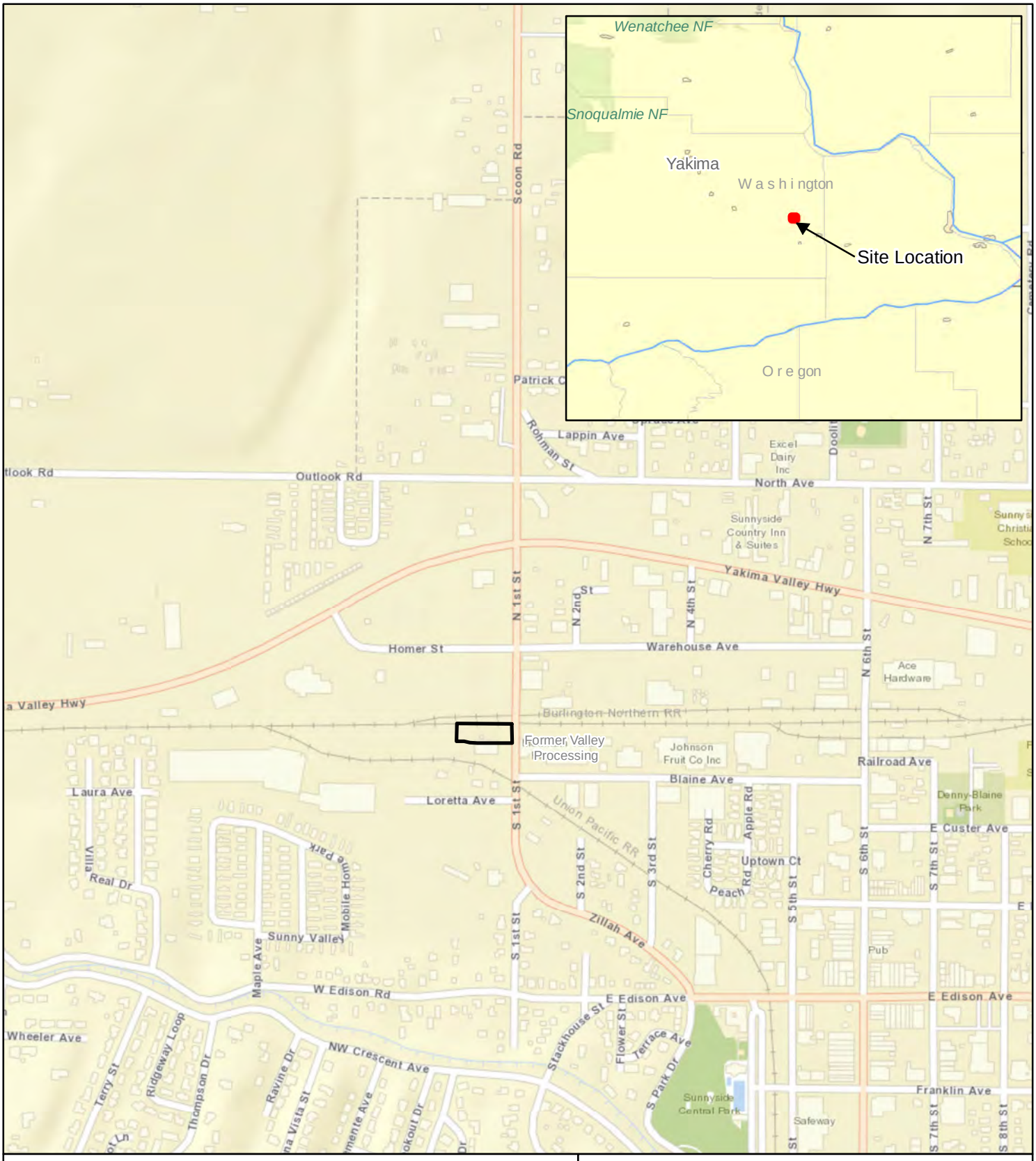
Bold = screening level used to establish proposed Site-Specific Target Remediation Level

TABLE 7: REMEDIAL ALTERNATIVES ANALYSIS
Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Alternative			Evaluation Categories																	
Alt No.	Name	Description	Protection of Human Health & the Environment (1=Low Protection; 5=Highly Protective)		Permanence (1=Ineffective; 5=Effective)		Effectiveness (1=Ineffective; 5=Effective)		Management of Short-Term Risks (1=Ineffective; 5=Effective)		Implementability (Technical & Administrative) (1=Low Feasibility; 5=High Feasibility)		Public Acceptance (1=Low Acceptance; 5=High Acceptance)		Cost (1=High Relative Cost; 5=Low Relative Cost)		Total Weighted Score	Selected Alternative?
			Score	Discussion	Score	Discussion	Score	Discussion	Score	Discussion	Score	Discussion	Score	Discussion	Score	Discussion		
Criteria Weight (1= low project importance; 3= high project importance)			3		2		3		1		2		2		3			
Source Remediation Alternatives																		
1	**MNA**	This alternative assumes no active remediation will be conducted at the Site. Existing on-Site monitoring wells will be monitored to evaluate natural attenuation long-term, which could extend to multiple decades. Off-Site wells will likely be needed to monitor potential off-Site migration. Monitoring parameters would include groundwater levels, field parameters, and Site COPCs.	2	No active remediation or containment is proposed under this alternative. While natural attenuation processes are likely occurring at the Site and there are no known receptors in the vicinity of the Site, the rate at which natural attenuation is expected to take is unknown and likely relatively slow.	2	Natural attenuation processes would like result in a permanent decline in COPC concentrations; however, a portion of the nitrate reduction may be to dilution and diffusion processes and not denitrification.	1	Unlikely to be effective in a reasonable timeframe, based on groundwater monitoring results to date.	5	The Site COPCs currently do not pose a risk to human health or the environment and have not impacted off-Site groundwater. No additional infrastructure would be required for this alternative, except for the potential addition of off-Site groundwater monitoring wells. As such, no known short-term risks are identified with this approach.	5	This alternative is highly implementable, as groundwater monitoring is already being performed at the Site. Additional wells would likely need to be installed off-Site to monitor off-Site migration of COPCs.	1	This alternative is unlikely to be acceptable to the public, including the property owner, due to the uncertainly and likely long cleanup timeframe.	4	Overall, this alternative would have a relatively low costs in comparison to the other alternatives. While capital costs for this alternative would be low, installation of wells off-Site and long-term monitoring would become more costly over the long-term.	**42**	**No**
2	**Extraction with Beneficial Use**	This alternative includes the extraction and removal of on-Site groundwater, with objectives of both removal of COPCs from groundwater and prevention of groundwater migration downgradient. On-Site groundwater extraction wells would need to be installed, as well as any associated piping. To be effective, it is expected that continuous pumping for approximately one year would be required. Water tank would also be placed on-Site to store water prior to transport for beneficial off-Site use. Beneficial use is assumed to be land application (i.e., farming). Electrical hookups would need to be installed to provide power to down-well pumps. It is not anticipated that the extracted groundwater would require on-Site treatment for land application. A permit would likely be needed.	4	This alternative is expected to be protective of human health and the environment, as COPC impacted groundwater would be removed from the subsurface of the Site.	4	COPC mass in groundwater would be expected to be permanently removed from groundwater.	3	This alternative would be effective at protection of human health and the environment; however, length of time that groundwater extraction would be required is unknown. A pump test would be proposed prior to implementation to evaluate the viable pumping rates and quantity of wells.	2	The Site COPCs currently do not pose a risk to human health or the environment and have not impacted off-Site groundwater. However, this remedy would require the addition of semi-permanent infrastructure (new extraction wells, associated conveyance lines, and tanks) and would result in more traffic to the area to haul water off-Site for land application at nearby farm.	1	This alternative will would be difficult to implement, as land application would likely need a permit and land would have to be identified to accept regular tanker trucks of water from the Site. This could lead to intermittent operations of the extraction system and/or a large storage of untreated water on-Site, pending off-Site use.	2	This alternative would have low to moderate public acceptance, as it would require daily tanker truck trips to the Site.	1	This alternative would have a relatively high cost in comparison to the other alternatives due to operations costs, including the hauling of water required for land application off-Site.	**40**	**No**
3	**Permeable Reactive Barrier**	This alternative requires the implementation of a permeable barrier along the downgradient Site boundaries to reduce dissolved phase COPCs to concentrations below the cleanup level before migrating off-Site. This approach will involve the periodic injection of an electron-donor and require long-term groundwater compliance monitoring.	2	This alternative is expected to be protective of human health and the environment and would address COPCs prior to migration off-Site, it would not address the source of COPCs in groundwater interior to the Site.	2.5	This alternative will reduce COPCs at the Site to concentrations below the proposed cleanup levels at the downgradient boundary of the Site; however, the interior areas with elevated COPC concentrations would rely on dilution and diffusion processes (MNA) and would not be remediated by this alternative.	2	Electron-donor injection is likely to be effective at reducing COPC concentrations at the Site boundary only. The interior of the Site is unlikely to be remediated within a reasonable timeframe, based on groundwater monitoring results to date.	4	The Site COPCs currently do not pose a risk to human health or the environment and have not impacted off-Site groundwater. A permeable reactive barrier will help reduce COPCs to concentrations below cleanup levels at the Site boundary with minor anticipated short-term impact during implementation.	4	Implementation of this alternative is feasible. Amendment would be injected into the shallow groundwater at the Site parameter. This remedial approach would likely require reinjection every few years as electron donor is depleted.	2	This alternative is unlikely to be acceptable to the public, including the property owner, due to the uncertainly and likely long cleanup timeframe.	1	This alternative would have a relatively high cost in comparison to the other alternatives due to the need to replenish the electron donor at the property boundary every few years.	**36**	**No**
4	**Phyto-remediation**	This remedial approach involves trees (e.g., poplars) being planted in the areas with COPC impacted groundwater and along the downgradient property boundary for hydraulic control. COPCs are expected to uptake from the saturated zone into the plants.	4	This alternative is expected to be moderately protective of human health and the environment, as the trees are expected to remove COPCs from groundwater.	3.5	This alternative is expected to permanently remove COPCs through uptake into the trees.	3	The Site COPCs are known compounds that can be readily absorbed by plants. Additionally, with the shallow groundwater conditions at the Site, plant roots are expected to provide hydraulic control and COPC absorption throughout the target zone (down to 15 feet below ground surface). The rate of absorption will be dependent on the size of the trees and would take years to be fully effective.	3	The Site COPCs currently do not pose a risk to human health or the environment and have not impacted off-Site groundwater. When initially installed younger trees need time to establish their root systems; additionally, the rate at which groundwater is extracted is dependent on tree maturation, which is not reached for a few years.	2	The implementability of phytoremediation is limited due to the proximity of railroad tracks surrounding the Site.	2.5	This remedy is likely to be acceptable by the public, but acceptable by the property owner my be limited due to the proximity of trees to the railroad tracks and the length of time to achieve remediation.	3	This alternative would have a moderate cost, mostly related to capital costs to install the trees and performance monitoring costs.	**49**	**No**
5	**Denitrification with Contingency Arsenic Treatment**	This remedial approach includes denitrification with the options for target arsenic treatment using iron sulfide. In the denitrification remedial approach, an electron-donor will be injected into shallow groundwater to enhance reductive degradation of COPCs in the groundwater, including denitrification of the main COPC of nitrate. Baseline sampling will be conducted prior to injections at the Site to evaluate arsenic speciation and the potential to mobilize metals during denitrification. Based on the baseline sampling results, iron sulfide may also be injected along with the electron-donor to remove dissolved arsenic and other metal COPCs from the groundwater. Multiple injection locations positioned throughout the Site will be used to inject amendments, such as emulsified vegetable oil (EVO) and iron sulfide, over an approximately two-week period. Existing on-Site wells will be monitored to assess performance.	4	This alternative is expected to be protective of human health and the environment, as it includes removal of mass from groundwater via denitrification and sorption of metals out of the dissolved phase. An increase in dissolved metals concentrations may be observed temporarily following injections but is not expected to impact groundwater long-term.	4	This alternative is expected to permanently remove nitrate in groundwater through denitrification and remove metal COPCs from the dissolved phase through immobilization.	4	Based on the arsenic speciation results, iron sulfide addition along with electron-donor injection is likely to be effective at this Site in addressing concentrations of COPCs across the Site and promoting its degradation.	4	The Site COPCs currently do not pose a risk to human health or the environment and have not impacted off-Site groundwater. This remedy is expected to reduce COPCs in groundwater within a relatively short time period with minor anticipated short-term impact during implementation.	4	Implementation of this alternative is feasible after the baseline results. Iron sulfide along with electron-donor would be injected into the shallow groundwater through temporary borings over a two week period. Compliance monitoring can be completed using the existing well network.	4	This alternative is expected to be accepted by the public due to its limited short-term risks and effectiveness at similar sites.	4	Overall, this alternative would depend on the baseline sampling results and therefore have a relatively low costs in comparison to the other alternatives. Capital costs would be higher for the injections; however, compliance monitoring would be limited, as this remedy is expected to achieve cleanup goals within a reasonable timeframe.	**64**	**Yes**

Notes:
COPC - Constituent of Potential Concern
MNA - Monitored Natural Attenuation
NA - Natural Attenuation
O&M - operation and maintenance

FIGURES



Legend

Site Location

N

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

0 0.05 0.1 0.2 0.3 Miles

Site Location Map

101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696-01	April 2022

Figure 1

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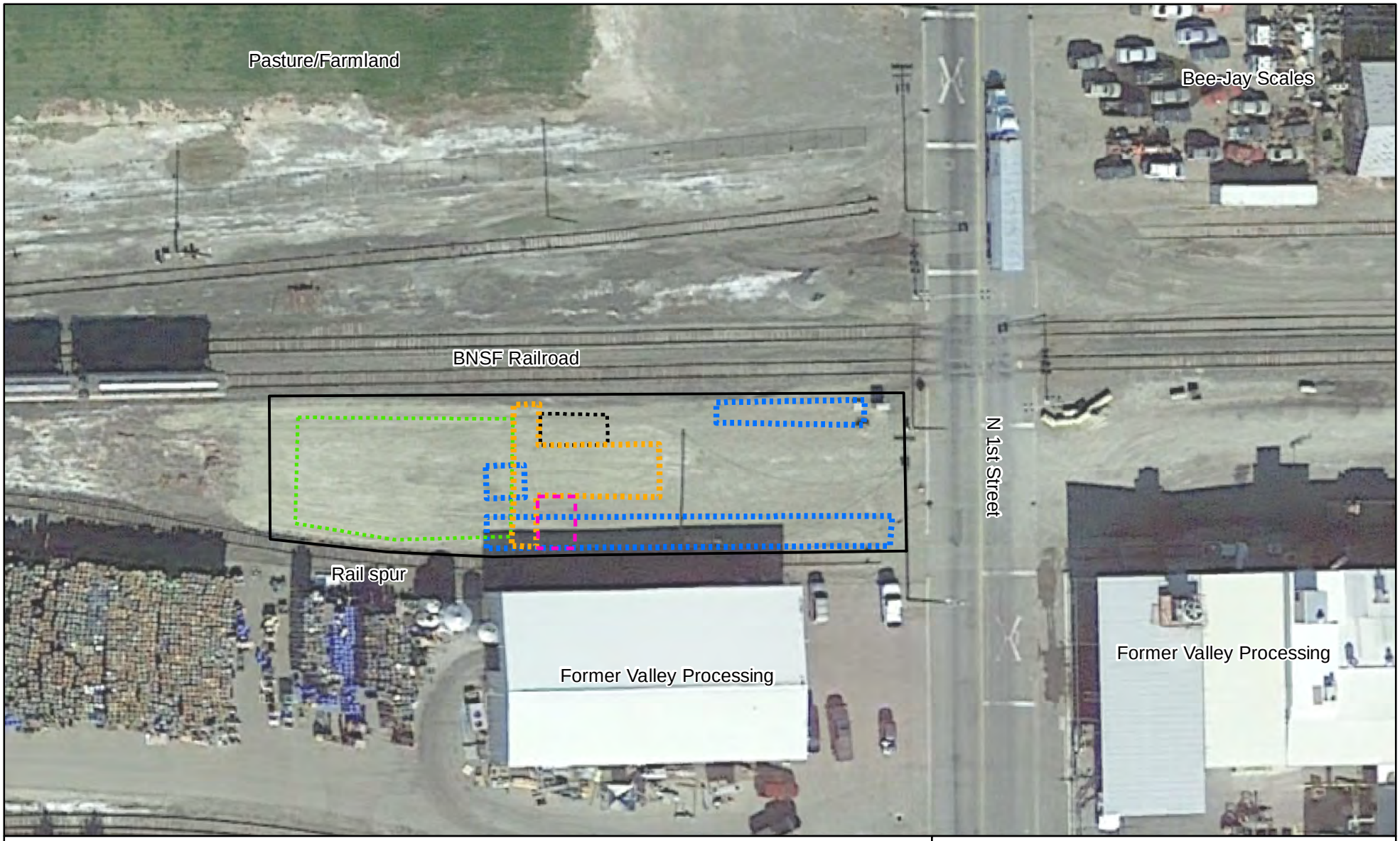


Legend

- Site Boundary
- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad

Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
The Site Boundary is the approximate area leased by NAS from BNSF.

N

0 50 Feet

Historical Site Layout

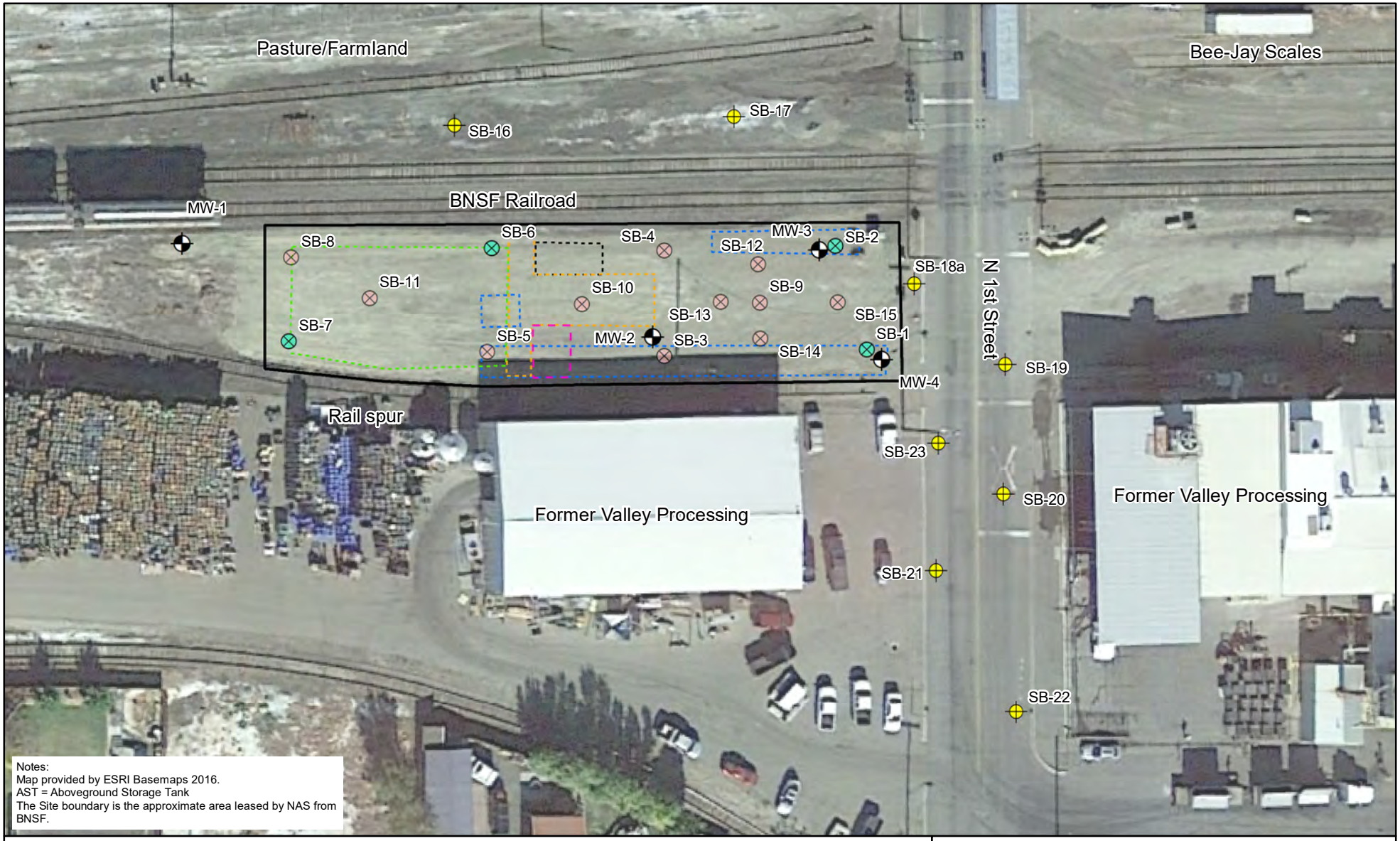
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696 | April 2022

Figure 2

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Figure 2 Historical Site Layout.mxd 11/30/2021 9:44:33 AM



Legend

- Off-Site Grab-Groundwater Sample Location
- Monitoring Well and Soil Sample Location
- On-Site Soil Sample Locations
- On-Site Grab-Groundwater and Soil Sample Location
- Site Boundary
- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad (1999 – 2017)

N

0 50 Feet

Soil and Groundwater Investigation Locations

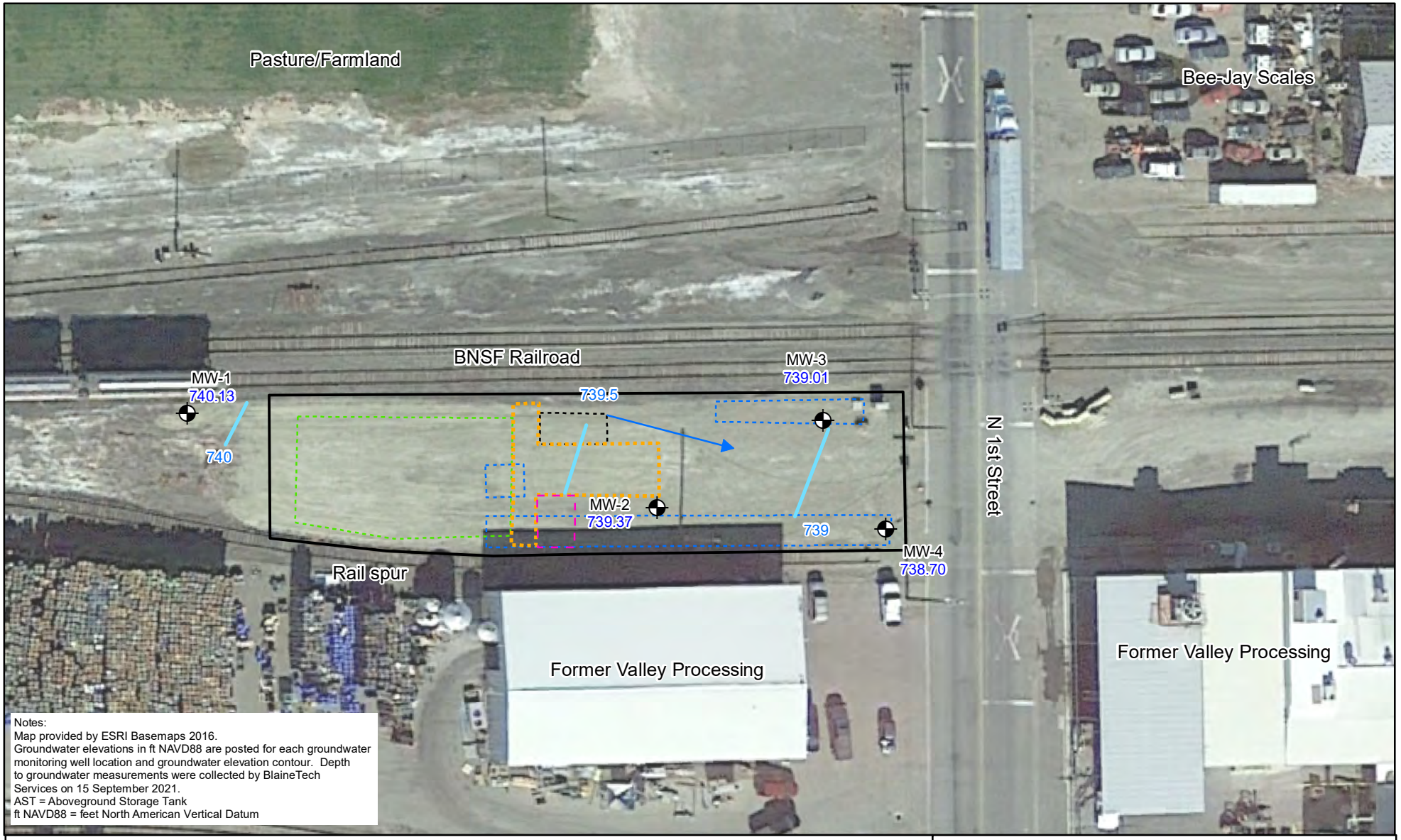
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696 | April 2022

Figure 3

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Figure 3 Soil and Groundwater Investigation Locations.mxd 1/27/2022 4:11:35 AM



Notes:
Map provided by ESRI Basemaps 2016.
Groundwater elevations in ft NAVD88 are posted for each groundwater monitoring well location and groundwater elevation contour. Depth to groundwater measurements were collected by BlaineTech Services on 15 September 2021.
AST = Aboveground Storage Tank
ft NAVD88 = feet North American Vertical Datum

Legend

- Monitoring Well and Soil Sample Location
- Groundwater Elevation Contour (ft NAVD88)
- Groundwater Gradient
- Site Boundary
- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad (1999 – 2017)

N

0 50 Feet

Groundwater Elevation Contour Map - September 2021
101 North 1st Street
Sunnyside, Washington

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Figure 4

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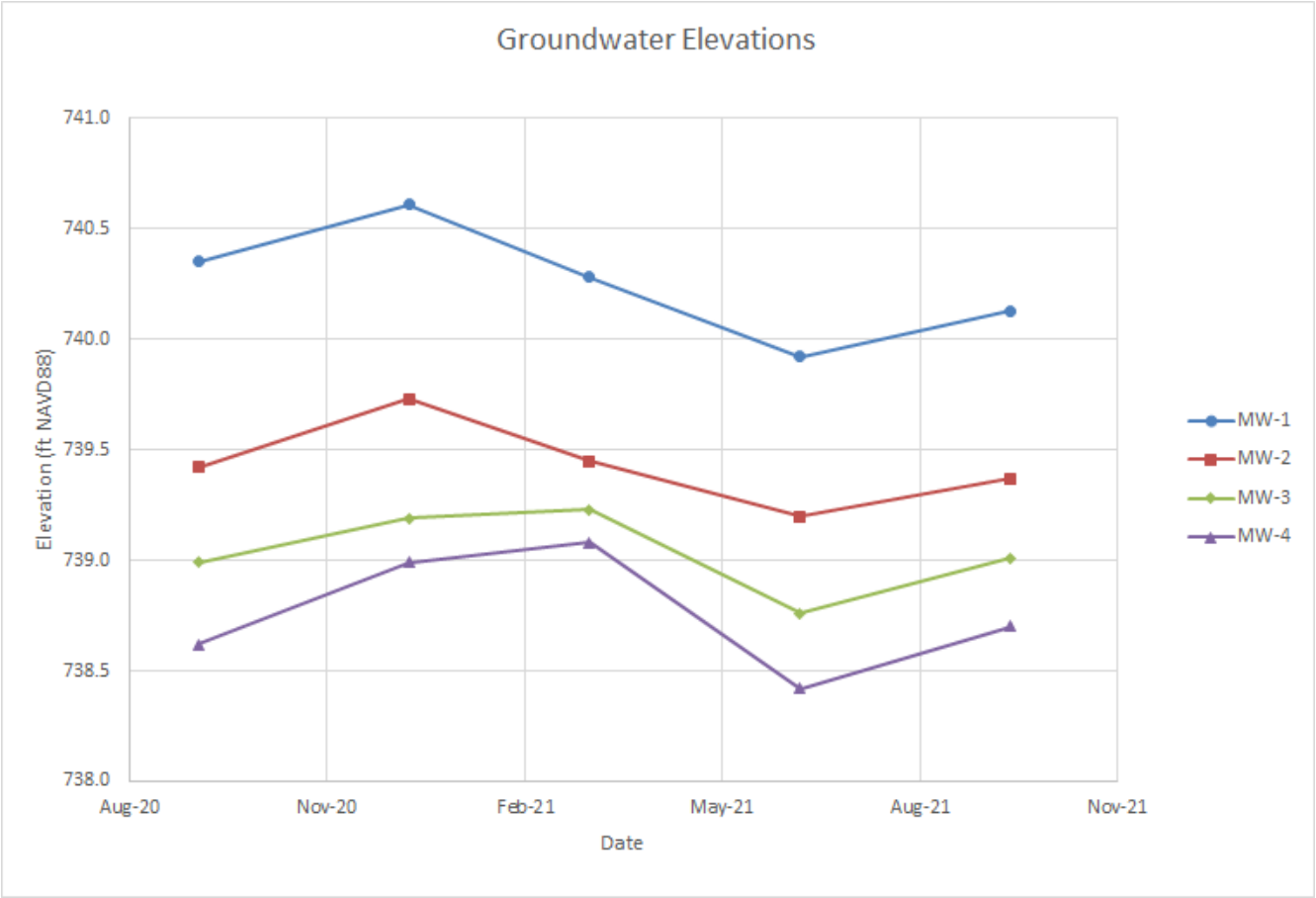


Notes:

Groundwater elevations are in feet North American Vertical Datum 1988

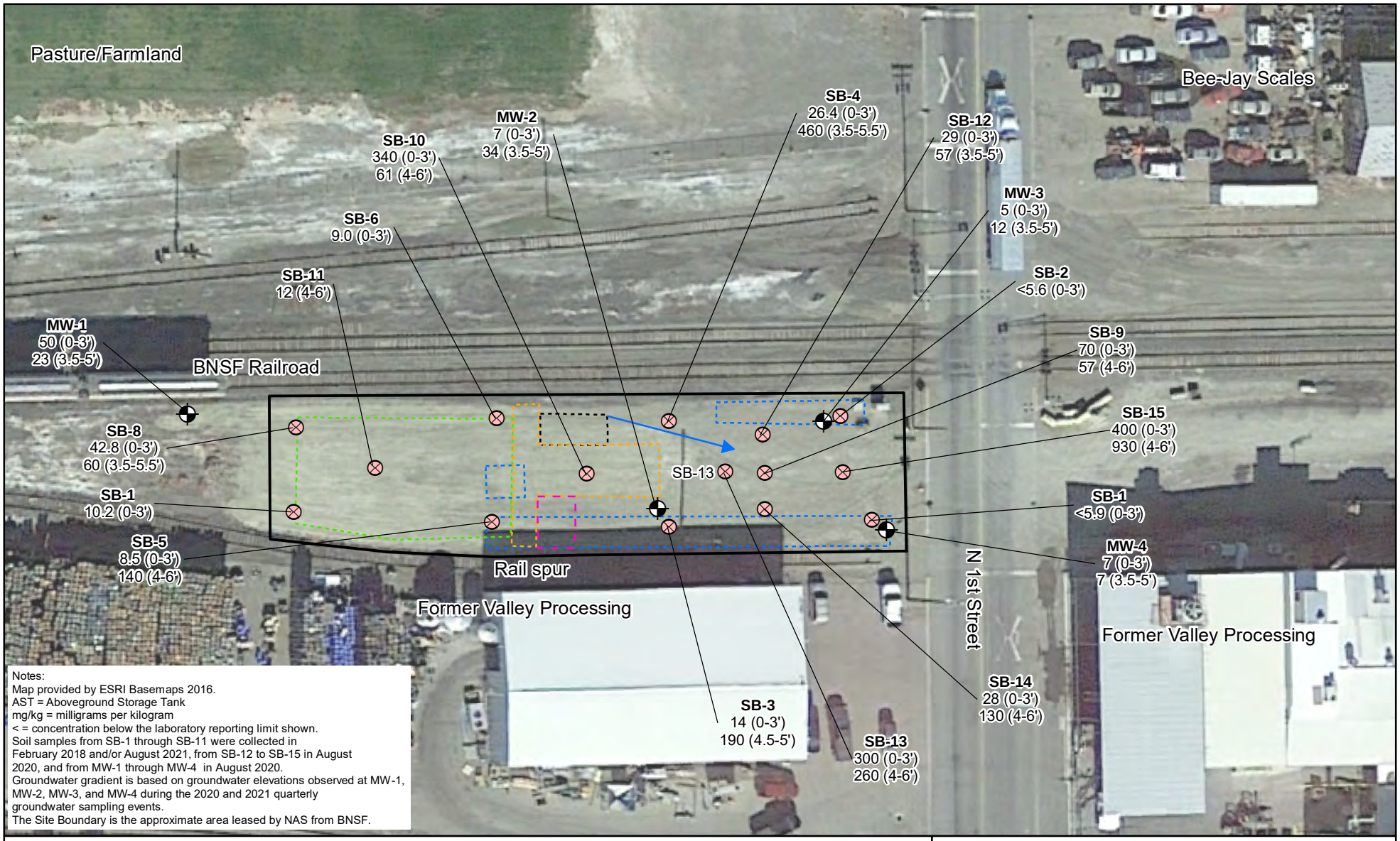
MW = monitoring well

Groundwater Hydrographs
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

Figure **5**

PNR0696 | April 2022



Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
mg/kg = milligrams per kilogram
< = concentration below the laboratory reporting limit shown.
Soil samples from SB-1 through SB-11 were collected in February 2018 and/or August 2021, from SB-12 to SB-15 in August 2020, and from MW-1 through MW-4 in August 2020.
Groundwater gradient is based on groundwater elevations observed at MW-1, MW-2, MW-3, and MW-4 during the 2020 and 2021 quarterly groundwater sampling events.
The Site Boundary is the approximate area leased by NAS from BNSF.

Legend

- Monitoring Well and Soil Sample Location
- Grab Groundwater and Soil Sample Location
- Groundwater Gradient
- Site Boundary
- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad (1999 – 2017)

SB-1 — Location ID
5.9 (0-3') — Sampling depth interval feet below ground surface
Nitrate as Nitrogen concentration by depth in milligrams per kilogram (mg/kg)

N

0 50 Feet

Nitrate in Soil Analytical Results

101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

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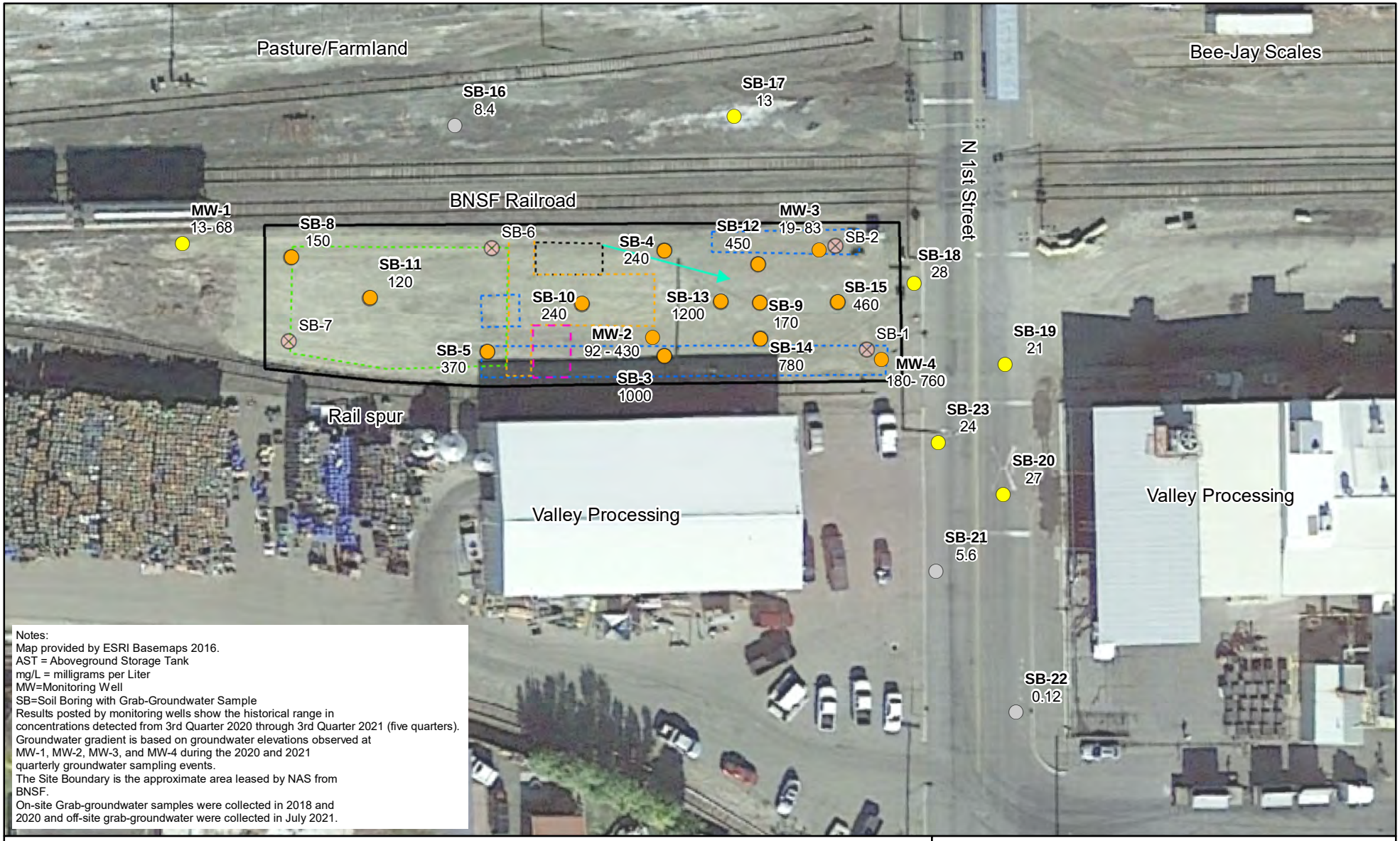
Figure 6

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Figure 6 Nitrate Soil results.mxd 1/27/2022 9:30:03 AM



Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
mg/L = milligrams per Liter
MW=Monitoring Well
SB=Soil Boring with Grab-Groundwater Sample
Results posted by monitoring wells show the historical range in concentrations detected from 3rd Quarter 2020 through 3rd Quarter 2021 (five quarters).
Groundwater gradient is based on groundwater elevations observed at MW-1, MW-2, MW-3, and MW-4 during the 2020 and 2021 quarterly groundwater sampling events.
The Site Boundary is the approximate area leased by NAS from BNSF.
On-site Grab-groundwater samples were collected in 2018 and 2020 and off-site grab-groundwater were collected in July 2021.

Legend

Nitrate as Nitrogen in Groundwater (mg/L)

- <10 mg/L (EPA MCL)
- 10 - 68 mg/L (Site Background)
- >68 mg/L
- Soil Sample Location
- Groundwater Gradient
- Site Boundary

- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad (1999 – 2017)

N

0 50 Feet

Nitrate in Groundwater Sampling Locations

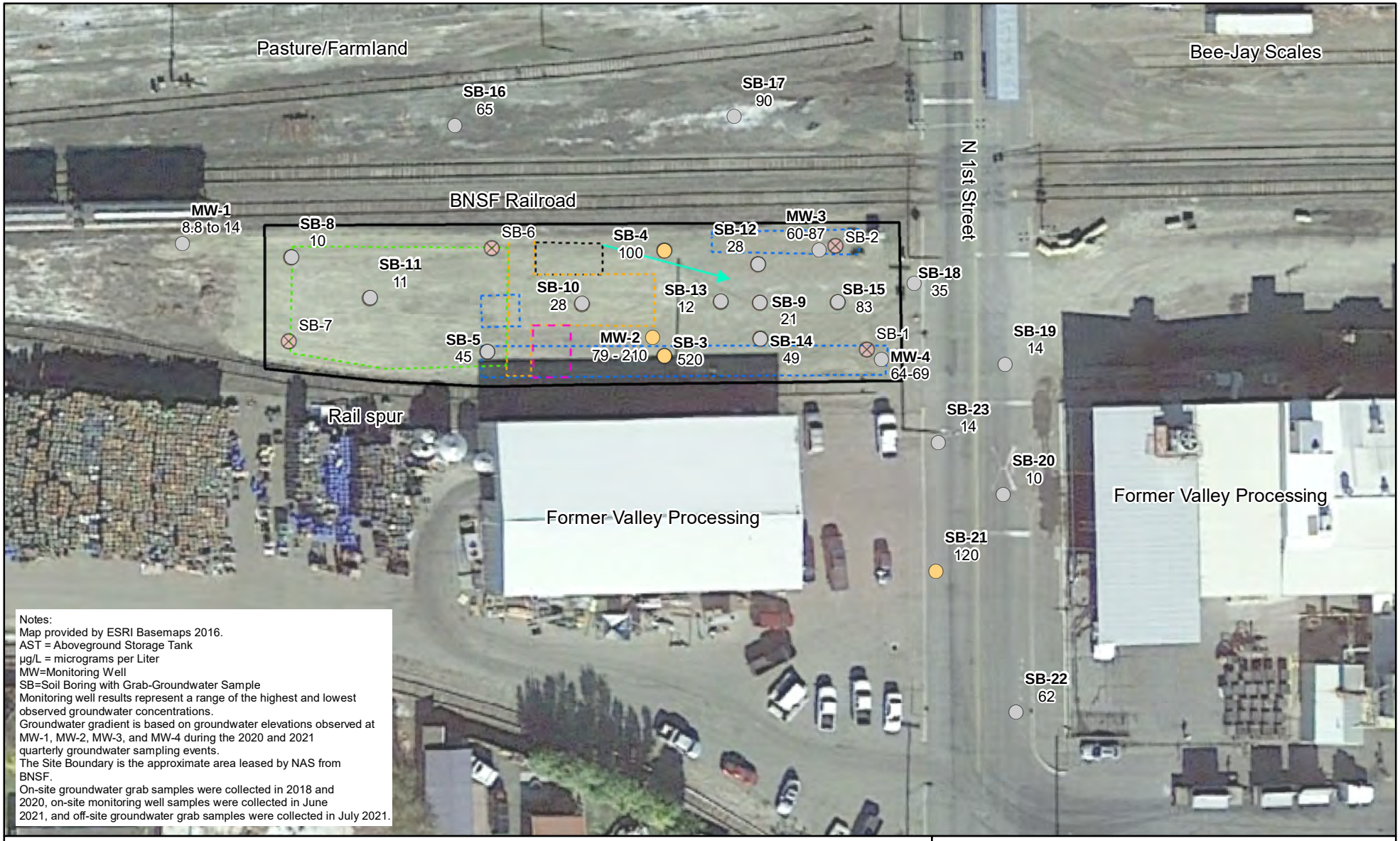
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696 | April 2022

Figure 7a

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Figure 7a Nitrate in GW.mxd 1/27/2022 9:17:55 AM



Legend

Dissolved Arsenic in Groundwater (µg/L)

- <90 µg/L (Background)
- >90 µg/L
- Soil Sample Location
- Groundwater Gradient
- Site Boundary
- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad (1999 – 2017)

N

0 50 Feet

Dissolved Arsenic in Groundwater Sampling Locations

101 North 1st Street
Sunnyside, Washington

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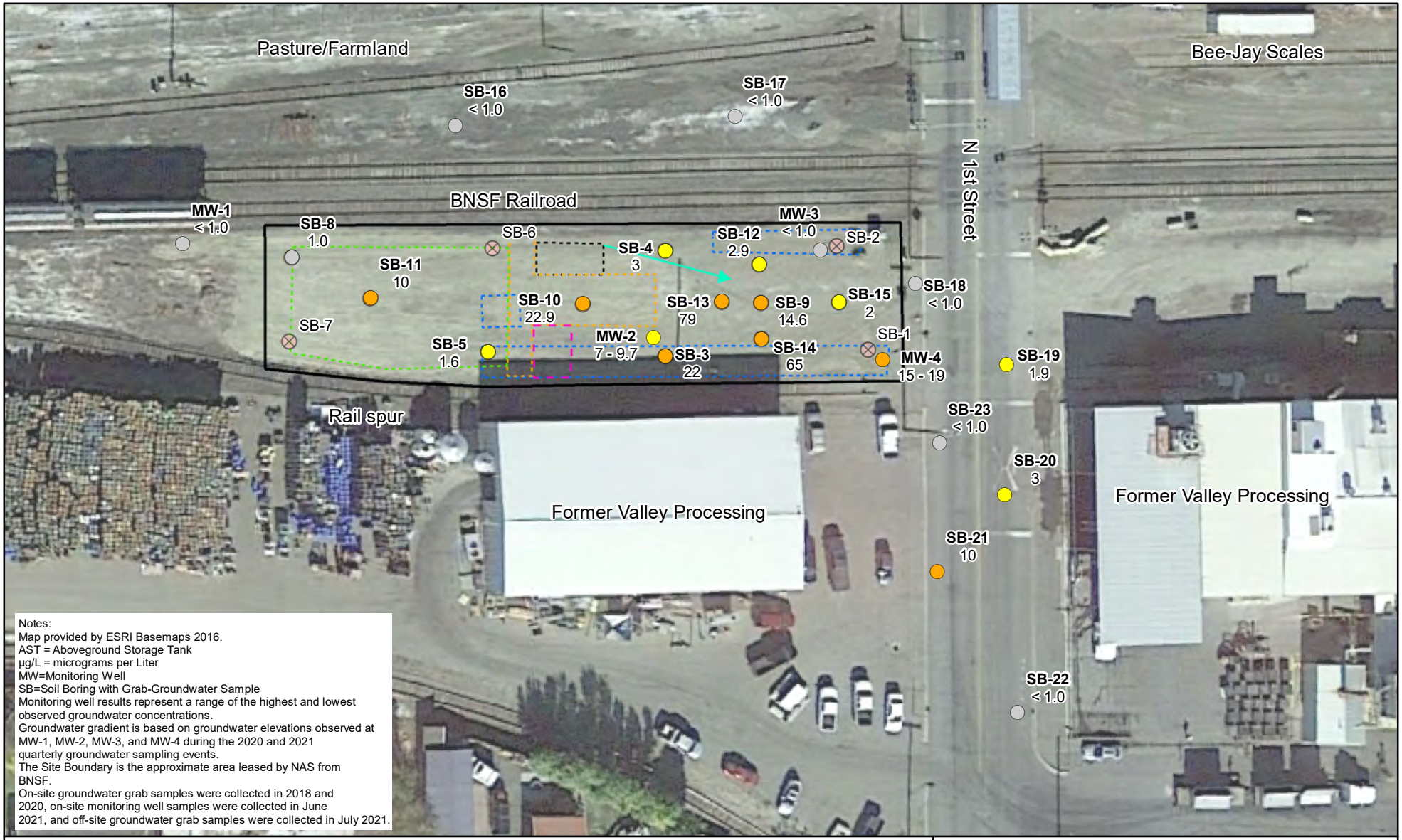
PNR0696 | April 2022

Figure 7b

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Figure 7b Dissolved Arsenic Results.mxd 1/27/2022 9:15:56 AM



Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
µg/L = micrograms per Liter
MW=Monitoring Well
SB=Soil Boring with Grab-Groundwater Sample
Monitoring well results represent a range of the highest and lowest observed groundwater concentrations.
Groundwater gradient is based on groundwater elevations observed at MW-1, MW-2, MW-3, and MW-4 during the 2020 and 2021 quarterly groundwater sampling events.
The Site Boundary is the approximate area leased by NAS from BNSF.
On-site groundwater grab samples were collected in 2018 and 2020, on-site monitoring well samples were collected in June 2021, and off-site groundwater grab samples were collected in July 2021.

Legend

Dissolved Cobalt in Groundwater (µg/L)

- <1.0 µg/L
- 1-5 (MTCA Method C CUL is 5 µg/L)
- >5 µg/L
- Soil Sample Location
- Groundwater Gradient
- Site Boundary

- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad (1999 – 2017)

N

0 50 Feet

Dissolved Cobalt in Groundwater Sampling Locations

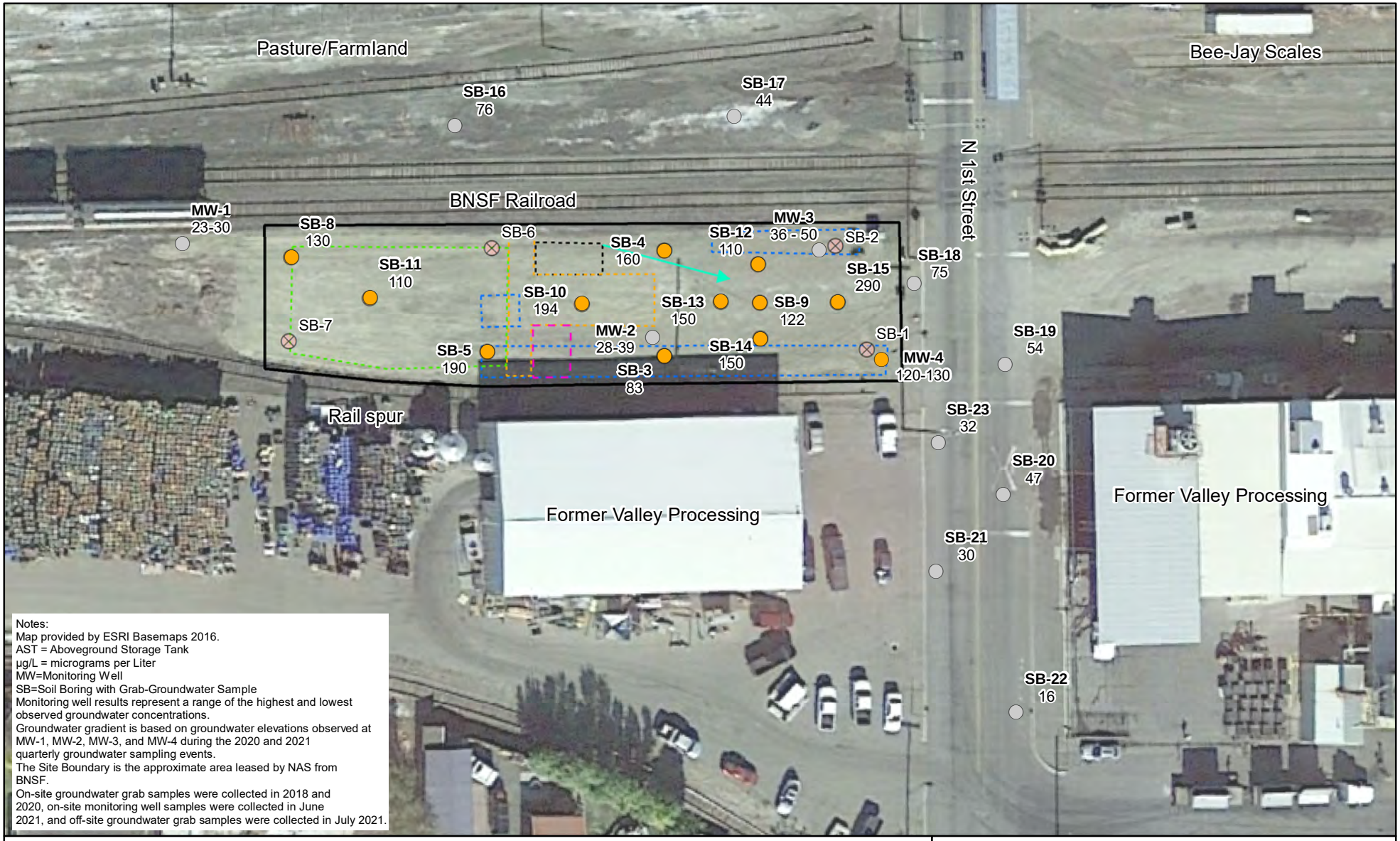
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696 | April 2022

Figure 7c

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Figure 7c Dissolved Cobalt Results.mxd 1/27/2022 12:09:35 PM



Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
µg/L = micrograms per Liter
MW=Monitoring Well
SB=Soil Boring with Grab-Groundwater Sample
Monitoring well results represent a range of the highest and lowest observed groundwater concentrations.
Groundwater gradient is based on groundwater elevations observed at MW-1, MW-2, MW-3, and MW-4 during the 2020 and 2021 quarterly groundwater sampling events.
The Site Boundary is the approximate area leased by NAS from BNSF.
On-site groundwater grab samples were collected in 2018 and 2020, on-site monitoring well samples were collected in June 2021, and off-site groundwater grab samples were collected in July 2021.

Legend

Dissolved Molybdenum in Groundwater (µg/L)

- < 76 µg/L
- 76 - 80 µg/L
- >80 µg/L
- Soil Sample Location
- Groundwater Gradient
- Site Boundary

- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad (1999 – 2017)

N

0 50 Feet

Dissolved Molybdenum in Groundwater Sampling Locations

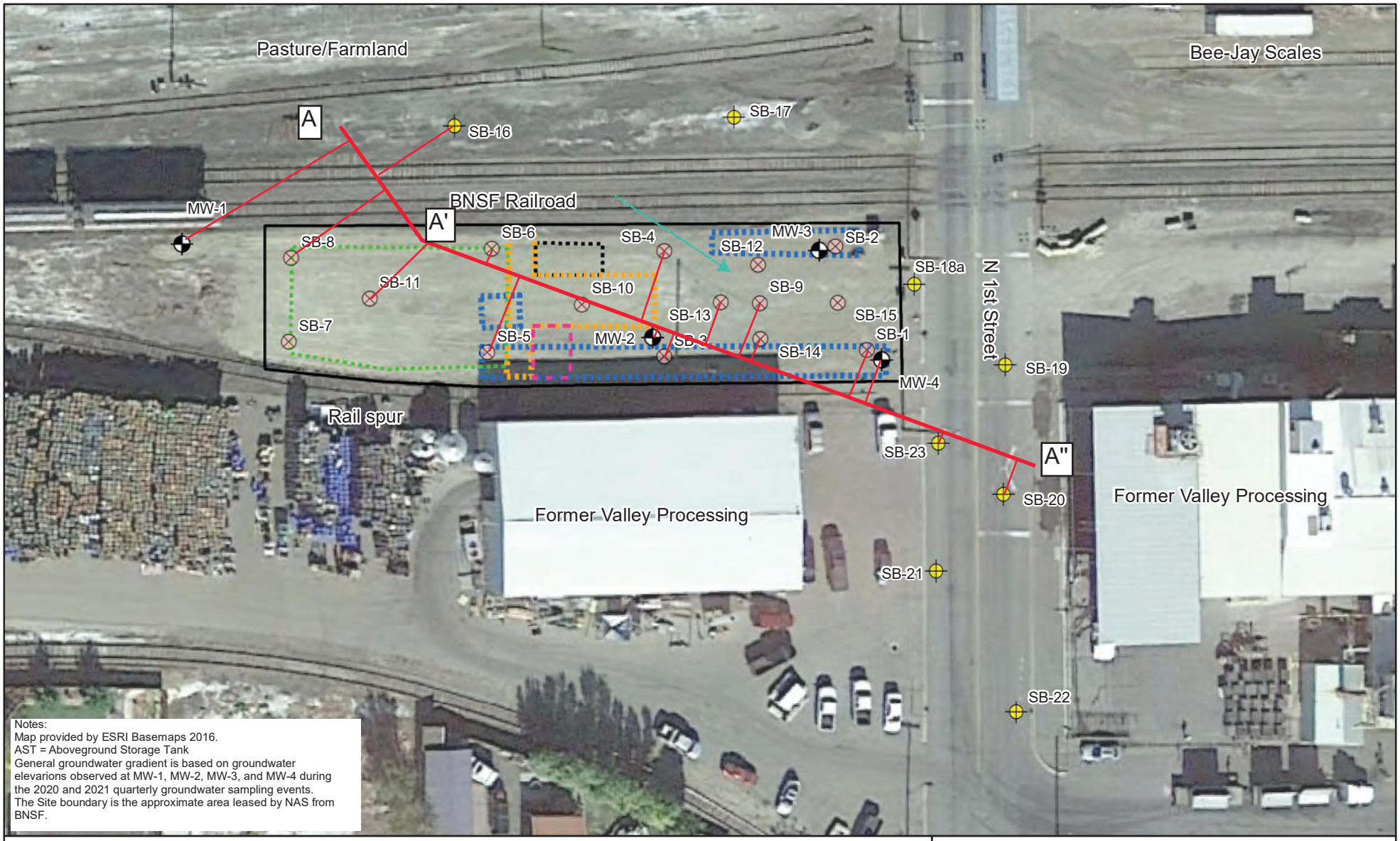
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696 | April 2022

Figure 7d

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Figure 7d Moly in GW.mxd 1/27/2022 9:19:42 AM



Legend

- Off-Site Grab-Groundwater Sample Location
- Monitoring Well and Soil Sample Location
- On-Site Grab-Groundwater and Soil Sample Location
- General Groundwater Gradient
- Site Boundary
- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad (1999 – 2017)

N

0 50 Feet

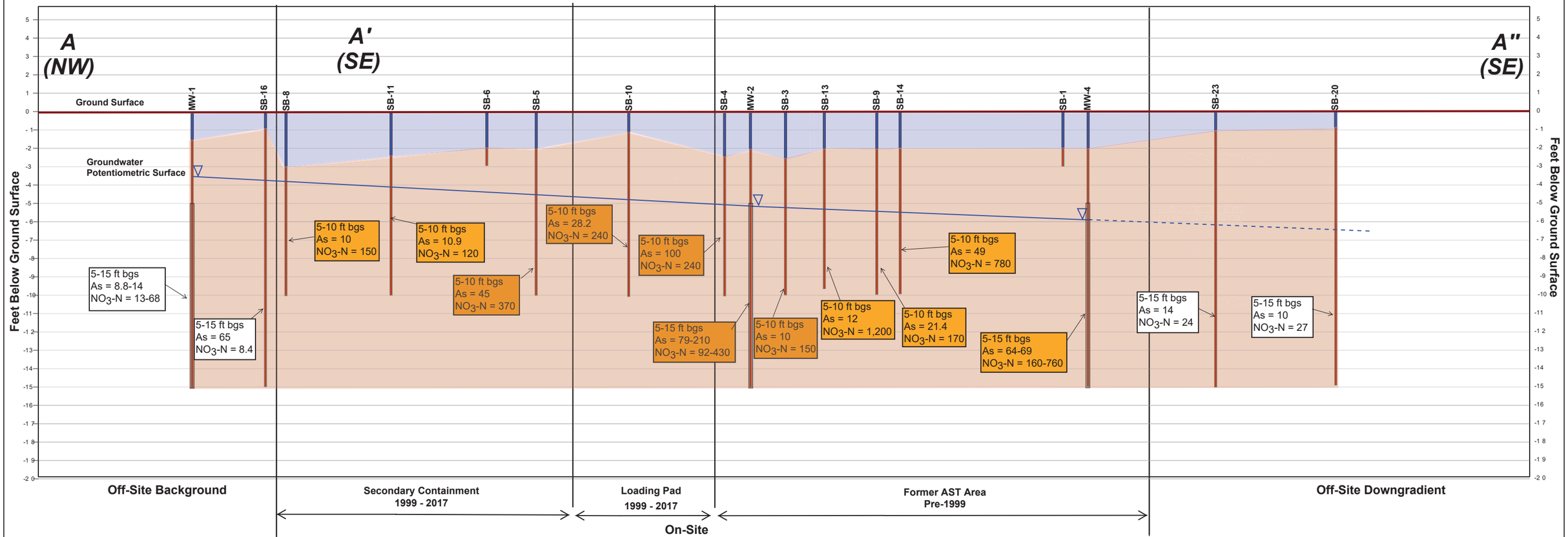
Generalized Cross-Section Layout

101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696-01 | April 2022

Figure 8a



Legend

Groundwater Samples

top of sample interval
bottom of sample interval
5-15 ft bgs
As = xx-xx
NO_3 = xx -xx
Arsenic (dissolved) concentration(s) in ug/L
No_3-N = Nitrate as Nitrogen concentration(s) in mg/L

For monitoring wells, a range in the quarterly sampling results to date is shown.
Boxes shaded orange indicate an exceedance of the Site-Specific Target Remediation Level for dissolved arsenic (90 ug/L) or nitrate as nitrogen (68 mg/L).

Boring Log Geology

- Course Sand with Gravel
- Silt with fine Sand or fine Sand with Silt

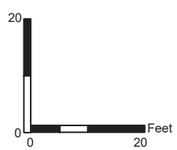
Interpolated Geology

- Course Sand with Gravel
- Silt with fine Sand or fine Sand with Silt

Notes:

Ground surface topograph is assumed to be flat for the purposes of this generalized cross-section. Distances between boring locations and site use areas shown are approximate.
Boring logs were from Site investigations conducted by August Mack in 2018 and Geosyntec in 2020 and 2021.
When more than one boring was conducted at a location, the log from the deepest boring was used to represent the lithology at that specific location.
Groundwater potentiometric surface is based off the 15 September 2021 quarterly groundwater monitoring results and is dashed where extrapolated off-Site.

ft = feet
bgs = below ground surface

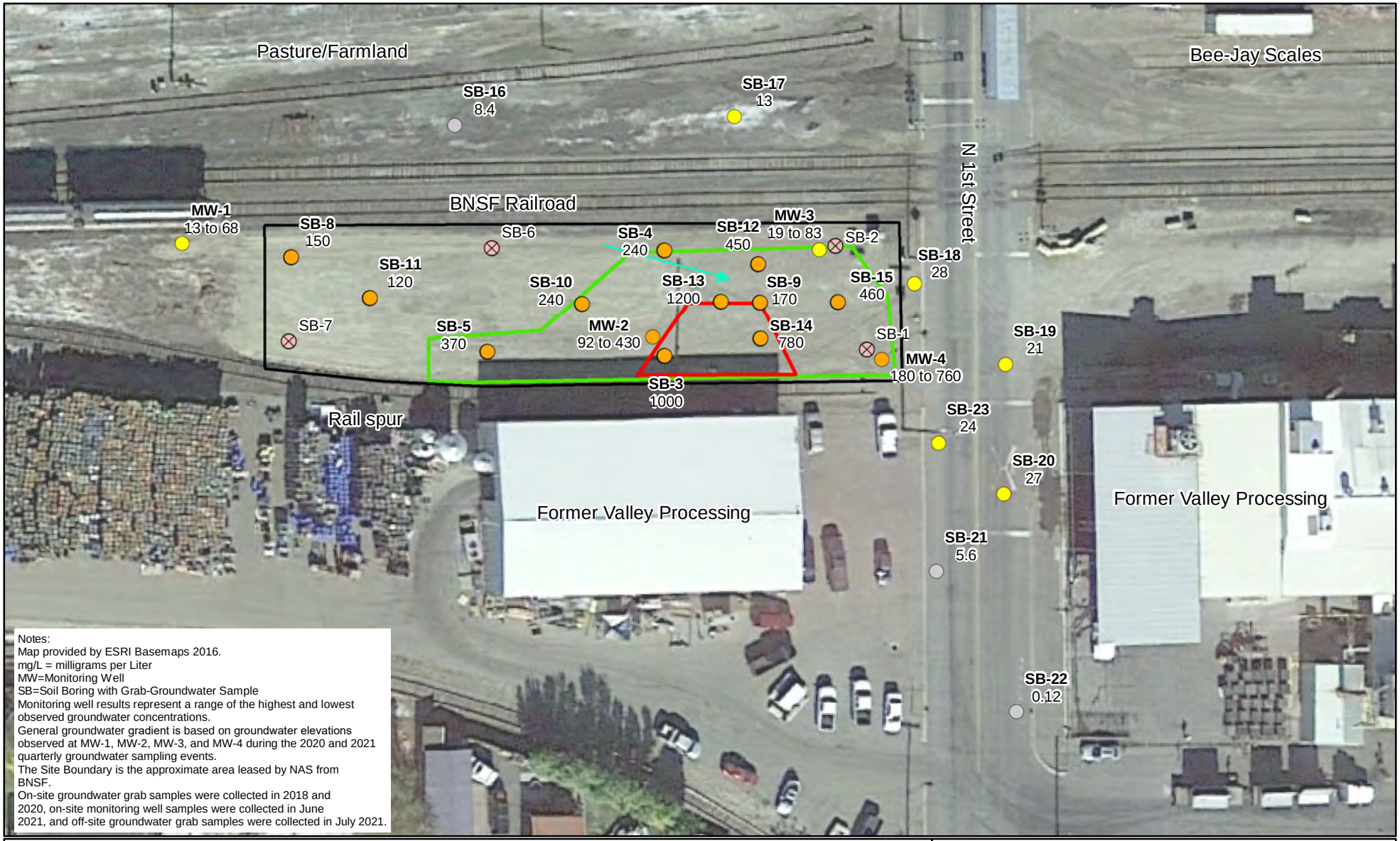


Generalized Cross-Section A-A'
Former Gulton-Statham Facility,
Oxnard, California

Geosyntec consultants

PNR0696B | April 2022

Figure 8b



Notes:
Map provided by ESRI Basemaps 2016.
mg/L = milligrams per Liter
MW=Monitoring Well
SB=Soil Boring with Grab-Groundwater Sample
Monitoring well results represent a range of the highest and lowest observed groundwater concentrations.
General groundwater gradient is based on groundwater elevations observed at MW-1, MW-2, MW-3, and MW-4 during the 2020 and 2021 quarterly groundwater sampling events.
The Site Boundary is the approximate area leased by NAS from BNSF.
On-site groundwater grab samples were collected in 2018 and 2020, on-site monitoring well samples were collected in June 2021, and off-site groundwater grab samples were collected in July 2021.

Legend

Nitrate as Nitrogen in Groundwater (mg/L)

- <10 mg/L
- 10 - 68 mg/L
- >68 mg/L
- Soil Sample Location
- General Groundwater Gradient
- Site Boundary
- Target In Situ Denitrification Injection Area
- Subarea for Higher Amendment Dosing

N

0 50 Feet

Proposed Target In Situ Denitrification Area

101 North 1st Street
Sunnyside, Washington

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PNR0696 | April 2022

Figure 9

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Figure 9 Target In Situ Denitrification Area.mxd 12/7/2021 12:04:55 PM

APPENDIX A
Off-Site Groundwater Investigation

Geosyntec consultants

engineers | scientists | innovators

APPENDIX A
OFF-SITE GROUNDWATER INVESTIGATION AND 2ND AND 3RD QUARTER 2021 GROUNDWATER MONITORING RESULTS REPORT

FORMER NACHURS ALPINE SOLUTIONS FACILITY SUNNYSIDE, WASHINGTON

Prepared for

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345 California Street, 27th Floor
San Francisco, California 94104

Prepared by

Geosyntec Consultants, Inc.
520 Pike Street, Suite 2600
Seattle, Washington 98101

Project Number: PNR0696B

April 8, 2022

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
bgs	below ground surface
COPCs	contaminants of potential concern
CULs	cleanup levels
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ESN	Environmental Services Network
ft	feet
Geosyntec	Geosyntec Consultants, Inc.
MTCA	Model Toxics Control Cleanup Act
NAS	Nachurs Alpine Solutions, LLC
On-Site Work Plan	*Groundwater Well Installation and Monitoring Work Plan* (Geosyntec, 2020a) and *Response to Comments and Addendum to Groundwater Well Installation and Monitoring Work Plan* (Geosyntec, 2020b)
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
the Site	the former Nachurs Alpine Solutions Facility located at 101 North 1st Street in Sunnyside, Washington
USCS	Unified Soil Classification System
VCP	Voluntary Cleanup Program
Wilbur-Ellis	Wilbur-Ellis Holdings II, Inc.

1. INTRODUCTION

This *Off-Site Groundwater Investigation and 2nd and 3rd Quarter 2021 Groundwater Monitoring Results Report*, presented as Appendix A to the *Remedial Investigation and Cleanup Action Plan*, has been prepared for the Washington State Department of Ecology (Ecology) to summarize the results of groundwater sampling activities conducted during June, July, and September 2021 at the former Nachurs Alpine Solutions Facility located at 101 North 1st Street, Sunnyside, Washington (the Site). This document was prepared by Geosyntec Consultants, Inc. (Geosyntec) on behalf of Wilbur-Ellis Holdings II, Inc. (Wilbur-Ellis), the direct parent company of Nachurs Alpine Solutions, LLC (NAS), the former operator at the Site.

In 2020, Geosyntec assisted NAS in enrolling the Site in Ecology's Voluntary Cleanup Program (VCP). Concurrent with enrollment in the VCP, Geosyntec submitted a *Groundwater Well Installation and Monitoring Work Plan* (Geosyntec, 2020a) and the *Response to Comments and Addendum to Groundwater Well Installation and Monitoring Work Plan* (Geosyntec, 2020b), approved by Ecology on July 13, 2020 (Ecology, 2020b), and collectively referred to as the On-Site Work Plan. Following submission, Ecology advised Geosyntec that the Site-specific contaminants of potential concern (COPCs) in groundwater are arsenic, cobalt, molybdenum, nickel, and nitrate as nitrogen (Ecology, 2020a). Following approval from Ecology (2020b), the On-Site Work was conducted in two phases. The first phase involved the collection of additional on-Site soil and groundwater data; the second phase included the installation of four monitoring wells and quarterly groundwater sampling. Results from these on-Site investigations identified potential impacted in groundwater of the COPCs of arsenic, cobalt, molybdenum, and nitrate as nitrogen (Geosyntec, 2021).

To date, five quarterly groundwater monitoring events have been conducted (third and fourth quarter 2020 and first, second, and third quarter 2021). Results from the initial investigation and first three quarters of groundwater sampling were submitted to Ecology on May 20, 2021, in the *Off-Site Investigation Work Plan*. Results from the second and third quarter 2021 on-Site groundwater sampling event are provided in this report. The scope of work in the *Off-Site Investigation Work Plan* included collection of six off-Site grab-groundwater samples and two additional contingency boring locations to evaluate upgradient, downgradient, and background concentrations of COPCs off-Site. Based on the results of the earlier on-Site investigations and groundwater monitoring, nickel was removed from the COPC list, as documented in the *Off-Site Investigation Work Plan.*

Results of the 2021 off-Site grab-groundwater sampling and results from the second and third quarter 2021 on-Site groundwater monitoring are presented herein.

2. OFF-SITE GROUNDWATER INVESTIGATION

Grab-groundwater sampling activities of eight total borings took place on July 12, 13, and 20, 2021, in accordance with the *Off-Site Investigation Work Plan* submitted to Ecology on 20 May 2021 (Geosyntec, 2021). Work was completed in accordance with the work plan, and field activities are summarized in this section.

2.1 Groundwater Investigation Activities

Prior to commencing the off-Site investigation, Geosyntec obtained a curb permit from the City of Sunnyside, which is provided as **Attachment 1**. Washington Utility Notification Center was contacted, and a private underground utility locate subcontractor (Utilities Plus) surveyed the proposed soil and groundwater sample locations for subsurface utilities. Due to the presence of a utility corridor on the eastern shoulder of North 1st Street, locations SB-19, SB-20, and SB-22 were moved from the shoulder to the eastern edge of the roadway; this adjustment was made in coordination with the City of Sunnyside. Once the locations were cleared for utilities, Geosyntec worked with a Washington State-licensed driller (Environmental Services Network [ESN] Northwest) to drill and collect groundwater samples at eight locations, including the two contingency locations (SB-16, SB-17, SB-18a, SB-19, SB-20, SB 21, SB-22, and SB-23). The grab-groundwater locations are shown in **Figure 1**.

Under direct oversight of Geosyntec field personnel, ESN Northwest used a direct push drill rig with vinyl acetate sleeves to collect soil cores from each soil boring to an approximate total depth of 15 feet below ground surface (ft bgs). Soil was logged by a Geosyntec field geologist using the Unified Soil Classification System (USCS); boring logs are provided in **Attachment 2**. First groundwater was generally encountered between 5 and 8 feet (ft) below ground surface (bgs).

Groundwater samples were collected using a temporary well consisting of a polyvinyl chloride (PVC) casing inserted into the borehole with a screen placed in first groundwater, approximately 5 to 15 ft bgs. Depth to groundwater was measured in each temporary well, and grab-groundwater samples were collected at the eight locations using low-flow sampling methods with dedicated disposal tubing used at each location. Groundwater field parameters (temperature, conductivity, pH, turbidity, dissolved oxygen, and oxidation-reduction potential) were recorded during purging until at least three well volumes had been purged then groundwater samples were collected.

Groundwater samples were collected in laboratory-supplied bottles and samples intended for dissolved metals analysis were field filtered using a 0.45-micron filter. One duplicate groundwater sample was collected by Geosyntec from location SB-17. Samples labeled upon collections and were immediately stored in coolers on ice pending shipment to the analytical laboratory under chain-of-custody procedures.

After the grab-groundwater sampling was completed, the temporary well materials were removed, and borings were backfilled to match the ground surface. Concrete was used to patch the holes in the right-of-way and bentonite chips were used for the upgradient, unpaved locations.

2.2 Laboratory Analysis

A total of nine sets of samples (eight original and one duplicate) were shipped to ALS Environmental and were analyzed for Site COPCs including total and dissolved metals (arsenic, cobalt, and molybdenum by EPA Method 200.8) and nitrate as nitrogen (EPA Method 300.0).

2.3 Investigation Derived Waste

Investigation derived waste that was generated during investigation activities, including soil cuttings and decontamination and purge water, were containerized in labeled Department of Transportation-approved steel drums. Geosyntec collected one composite water sample for waste

profiling. These samples were submitted to the analytical laboratory for analysis of eight Resource Conservation and Recovery Act (RCRA)-monitored metals (United States Environmental Protection Agency [EPA] Methods 6010 and 7470), volatile organic compounds (EPA Method 8260), and Northwest Total Petroleum Hydrocarbons [NWTPH] (diesel, motor oil, and gasoline ranges). In addition, samples were also submitted to Rainier Environmental for a Static Acute Fish Toxicity Test (Method 80-12). Profiling results indicated that the waste is characteristically non-hazardous/non-dangerous. Currently, these drums are stored at the Site pending disposal of at an off-Site landfill in accordance with State and Federal regulations.

3. 2ND AND 3RD QUARTER 2021 GROUNDWATER MONITORING

Groundwater monitoring was completed in the second quarter 2021 on June 9th and in the third quarter 2021 on September 15th by Blaine Tech Services, Inc. of Auburn, Washington (BTS). Samples were collected in accordance with the 2020 On-Site Work Plan with the exception of the removal of nickel from the COPC list, as discussed above. In addition, sulfate samples were also collected during the third quarter 2021 event to support in remedy evaluation.

During quarterly groundwater sampling events, at each of the four wells (MW-1, MW-2, MW-3, and MW-4), depth to groundwater was measured from top of casing and groundwater samples were collected and analyzed for Site COPCs. A duplicate sample was also collected for a total of five samples collected during each event. Prior to sampling each monitoring well, the wells were purged at a rate between 100 and 500 milliliters per minute and dedicated tubing. Groundwater parameters (depth to groundwater, temperature, conductivity, pH, turbidity, dissolved oxygen, and oxidation-reduction potential) were recorded approximately every 3 minutes during purging. Once field parameters stabilized or three well volumes had been purged then groundwater samples were collected for Site COPCs and sulfate. Dissolved metals samples were field filtered. Samples collected during the quarterly groundwater monitoring were placed into a cooler with ice immediately after collection. Samples were shipped to ALS Environmental using standard chain-of-custody procedures.

Field notes (groundwater purge and sample logs) from BTS for these two quarterly sampling events are included in **Attachment 4**.

3.1 Laboratory Analysis

Groundwater samples were analyzed by ALS for Site COPCs of total and dissolved metals (arsenic, cobalt, molybdenum, and nickel by EPA Method 200.8) and nitrate-nitrite as nitrogen (EPA Method 300.0). In addition, samples collected during the third quarter 2021 event were also analyzed for sulfate (EPA Method 300.0).

3.2 Investigation Derived Waste

Investigation derived waste that was generated during monitoring well purging, was containerized in labeled Department of Transportation-approved steel drums. Purge water from on-Site groundwater sampling was previously profiled and found to be characteristically non-hazardous/non-dangerous. The drums are temporarily stored on-Site, pending disposal of at an off-Site landfill in accordance with State and Federal regulations.

4. RESULTS

The following section summarizes Quality Assurance/Quality Control Review (QA/QC) and the geology/hydrogeology and analytical results for both the off-Site investigation and second and third quarter groundwater monitoring.

4.1 Quality Assurance/Quality Control Review

Geosyntec performed a QA/QC review of the laboratory analytical data. Data were reviewed for completeness, accuracy, precision, sample contamination, conformance with holding times, and detection limits within acceptable ranges. This data quality review included the following:

- Off-Site Investigation:
  - A duplicate sample was collected from SB-17 on July 13, 2021. The duplicate sample was submitted blind to the analytical laboratory. Analytical results between the original and duplicate sample at SB-17 showed relative percent differences within control limits (<30%) for all compounds detected.
  - Three method blanks were used to separately analyze for nitrate as nitrogen, total metals (arsenic, cobalt, and molybdenum), and dissolved metals (arsenic, cobalt, and molybdenum) by the analytical laboratory. No analytes were detected in any of the blanks.
  - Matrix spike and matrix spike duplicate (MS/MSD) results that paired with project samples were within control limits for all compounds analyzed.
  - Laboratory control sample (LCS) results were within control limits for all compounds analyzed.
- Second and Third Quarter Groundwater Monitoring:
  - A duplicate sample was collected from MW-2 during the second quarter 2021 event and MW-3 during the third quarter 2021 event. Duplicate samples were submitted blind to the analytical laboratory. Analytical results for MW-2 and MW-3 showed relative percent differences within control limits (<30%) for all compounds detected.
  - Two method blanks were used to separately analyze for nitrate as nitrogen, sulfate, total metals (arsenic, cobalt, molybdenum, and nickel), and dissolved metals (arsenic, cobalt, molybdenum, and nickel) by the analytical laboratory.[1] No analytes were detected in any of the blanks.
  - MS/MSD results that paired with project samples were within control limits for all compounds analyzed.
  - LCS results were within control limits for all compounds analyzed.

Based on the data quality review, the data are of acceptable quality for the purposes of this report.

[1] Nickel was not analyzed during the September 2021 quarterly groundwater sampling event.

4.2 Off-Site Investigation

4.2.1 Geology/Hydrogeology

Boring logs are provided in **Attachment 2** and depths to water measured in the temporary well screens installed in the soil borings are summarized in **Table 1**. As shown on the boring logs, where asphalt was present at the ground surface, the upper approximately 1 ft of soil off-Site consists of asphalt and asphalt road base followed by approximately 2 ft of sand/gravel fill, underlain by a predominantly silty sand that extends to approximately 15 ft bgs with intermittent lens of sandy silt, silt, sand, or gravel. Soil was generally observed to be wet (first groundwater) at a depth range of 5 to 8 ft bgs in the soil cores. These results are generally similar to the lithology observed during the previous on-Site investigations.

4.2.2 COPC Results

Laboratory analytical reports are provided in **Attachment 3**. Grab-groundwater sampling results are summarized in **Table 3**. Groundwater results are compared to Model Toxics Control Cleanup Act (MTCA) cleanup levels (CULs) for groundwater.

The laboratory analytical results in samples collected, during the off-Site investigation, indicated that arsenic was detected in groundwater above the MTCA CULs, including the upgradient sampling location of SB-16- and SB-17, located approximately 45 feet north and upgradient to the Site. The highest concentrations of dissolved arsenic and cobalt were observed at SB-21 (located downgradient of Valley Processing Maintenance Shop) with concentrations of 120 µg/L and 10 µg/L, respectively. These results were inconsistent with the groundwater chemistry of COPC concentration on-Site, indicating that the dissolved arsenic and cobalt concentrations at this location may not be attributed to migration of water from the Site.[2]

Molybdenum and nitrate as nitrogen were also detected in samples collected from the eight locations but at concentrations below MTCA Method B CULs, with one exception. At SB-20, which is located downgradient from the Site and across North 1st Street, nitrate as nitrogen was detected at 27 milligrams per liter (mg/L). This result is slightly over the MTCA Method B CUL of 26 mg/L but within background ranges observed in upgradient monitoring well MW-1 (8.4 to 68 mg/L). Concentrations between the Site and SB-20 were measured to be below the MTCA Method B CUL at SB-23. These results indicate that the MTCA CUL exceedance in the sample collected at SB-20 is likely background and unrelated to impacts from former Site operations.

[2] On-Site, concentrations of dissolved metals that are elevated compared to background coincide with locations that also had elevated concentrations of nitrate as nitrogen. In the SB-21 grab-groundwater sample nitrate and molybdenum concentrations were less than grab-groundwater results observed on-Site, and at the same time, the sample from SB-21 had the second highest arsenic observed of any samples collected on- and off-Site. In addition, the cobalt concentration in the sample from SB-21 was greater than half of on on-Site grab-groundwater sample results.

4.3 On-Site Quarterly Groundwater Monitoring

4.3.1 Hydrogeology

Depth to groundwater and groundwater elevations are summarized on **Table 2**. Groundwater elevation data and interpreted groundwater elevation contours for the two quarterly groundwater sampling events are presented in **Figure 2a** and **2b**. Over the two quarters, depth to groundwater at the Site was similar. In the upgradient well, MW-1, groundwater was measured at 3.20 and 3.41 ft below top of casing (btoc), and in the downgradient well, MW-4 groundwater was 5.7 to 5.98 ft btoc. These depths to groundwater correspond to groundwater elevations ranging from approximately 739 to 740 ft NAVD88. These results are consistent with previous monitoring events.

Based on the groundwater elevation contours, the groundwater gradient at the Site was observed to be in a southeasterly direction during both sampling events. Horizontal gradients (elevation difference in feet per foot of horizontal distance) were calculated to be 0.0052 feet per feet (ft/ft) and 0.0050 ft/ft for the June 2021 and September 2021 events, respectively. These results are also consistent with previous monitoring events.

4.3.2 COPC Results

Laboratory analytical reports associated with the second and third quarter 2021 quarterly groundwater sampling events are provided in **Attachment 5** and are summarized along with historical data in **Table 3**. Quarterly groundwater results showed similar spatial distribution of COPCs as observed during the first three quarterly groundwater sampling events (September and December 2020, and March 2021). COPC concentrations were elevated in the central and downgradient portions of the Site compared to the upgradient portions of the Site.

The laboratory analytical results showed that groundwater results from the four monitoring wells exceeded MTCA Method B CULs for arsenic during both sampling events with the highest concentrations of arsenic in groundwater observed at MW-2 (located on the southern central edge of the Site) with total and dissolved arsenic concentrations ranging from 76 µg/L to 80 µg/L. During both quarterly sampling events, results in samples from MW-2 also indicated that concentrations of cobalt and nitrate as nitrogen exceeding MTCA CULs. The highest concentrations of cobalt, molybdenum, and nitrate as nitrogen in groundwater were observed at MW-4.

5. CONCLUSIONS

Results from the second and third quarter 2021 on-Site groundwater monitoring show similar groundwater elevations, groundwater gradients, and concentrations of COPCs to previous on-Site quarterly groundwater sampling events in 2020 and 2021.

Based on the results of the off-Site investigation, potential impacts related to historical Site operations do not appear to have migrated off-Site. Concentrations of COPCs in downgradient groundwater samples appear to be similar to concentrations observed in background (upgradient) groundwater samples and/or generally below MTCA CULs. Groundwater COPCs concentrations were found to be below MTCA CULs or within background levels for COPCs at all off-Site

locations except SB-21. SB-21 is downgradient of the former Valley Processing Maintenance Shop and had concentrations of arsenic and cobalt at concentrations above background and MTCA Method B CULs. The results in the sample collected from SB-21 were inconsistent with the groundwater chemistry of COPC concentrations on-Site, indicating that the dissolved arsenic and cobalt concentrations at this location may not be attributed to migration of water from the Site.

Based on these results, COPCs related to former NAS operations do not appear to extend off-Site, and no additional off-Site investigations are recommended at this time.

6. REFERENCES

Geosyntec Consultants, Inc. (Geosyntec). 2020a. *Groundwater Well Installation and Monitoring Work Plan*, 101 North 1st Street, Sunnyside, Washington. 30 April.

Geosyntec. 2020b. *Response to Comments and Addendum to Groundwater Well Installation and Monitoring Work Plan*, 101 North 1st Street, Sunnyside, Washington. 10 July.

Geosyntec. 2021. *Off-Site Investigation Work Plan*, 101 North 1st Street, Sunnyside, Washington. 20 May.

Washington State Department of Ecology (Ecology). 2020a. Winslow, Frank. "Nachurs Alpine – CE0510 – Work Plan Comments." Email message to Luke Smith, Geosyntec Consultants. 19 May.

Ecology. 2020b. Winslow, Frank. "RE: Nachurs, Sunnyside, WA – Response to Comments and Work Plan Addendum." Email message to Luke Smith, Geosyntec Consultants. 13 July.

TABLES

TABLE 1: GRAB-GROUNDWATER BORING AND SAMPLING INFORMATION SUMMARY

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

LOCATION ID.	SB-16	SB-17	SB-18a	SB-19	SB-20	SB-21	SB-22	SB-23
DATE	7/13/2021	7/13/2021	7/13/2021	7/20/2021	7/20/2021	7/13/2021	7/20/2021	7/20/2021
DIAMETER (in)	1	1	1	2	1	1	1	1
BORING TOTAL DEPTH (ft)	15	15	15	15	15	15	15	15
SCREEN INTERVAL (ft)	5-15	5-15	5-15	5-15	5-15	5-15	5-15	5-15
DTW (ft)	4.67	5.24	6.73	7.7	7.63	7.5	7.81	7.5

Notes:

Grab-groundwater samples were collected from temporary wells with a 10 foot screened interval.

DTW = depth to water

ft = feet

in = inches

SB = soil boring

TABLE 2: GROUNDWATER MONITORING FIELD PARAMETERS AND ELEVATION SUMMARY

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

WELL ID.	MW-1		MW-2		MW-3		MW-4	
DIAMETER (in)	2		2		2		2	
WELL DEPTH (ft)	15.00		15.00		15.00		15.00	
SCREEN INTERVAL (ft)	5-15		5-15		5-15		5-15	
TOC ELEVATION (ft)	743.33		744.40		744.41		744.40	
DATE	6/9/2021	9/15/2021	6/9/2021	9/15/2021	6/9/2021	9/15/2021	6/9/2021	9/15/2021
ELEV. (ft)	739.92	740.13	739.20	739.37	738.76	739.01	738.42	738.70
DTW (ft)	3.41	3.20	5.20	5.03	5.65	5.40	5.98	5.70
Temp (°C)	15.35	20.28	16.15	22.93	15.81	20.62	15.43	21.08
pH	7.56	7.66	7.74	7.82	7.95	8.04	7.71	7.84
Conductivity (µS/cm)	1384.0	2032.00	3056.0	4813.0	1371.0	2218.0	3865.0	5562.0
Turbidity (NTUs)	16.0	27.00	9.0	16.0	13.0	19.0	11.0	19.0
D.O. (mg/L)	0.61	1.05	0.44	0.94	0.58	1.49	0.55	1.09
ORP (mV)	-61.90	-18.00	-63.80	-17.70	-84.60	-50.10	-75.10	18.00

Notes:

°C =degree Celsius

D.O. = Dissolved oxygen

DTW = depth to water

ELEV = elevation (ft NAVD88)

ft = feet

in = inches

mg/L = milligrams per liter

mV = milliVolt

NTU= Nephelometric Turbidity Unit

ORP = Oxidation Reduction Potential

Temp = Temperature

µS/cm = microsiemens per centimeter

TABLE 3: GROUNDWATER ANALYTICAL RESULTS SUMMARY
Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Location		Screen Interval Depth (ft)	Date Collected	Nitrogen, Nitrate (mg/L)	Arsenic (dissolved) (µg/L)	Cadmium (dissolved) (µg/L)	Cobalt (dissolved) (µg/L)	Lead (dissolved) (µg/L)	Mercury (dissolved) (µg/L)	Molybdenum (dissolved) (µg/L)	Nickel (dissolved) (µg/L)	Selenium (dissolved) (µg/L)	Zinc (dissolved) (µg/L)	Arsenic (µg/L)	Cadmium (µg/L)	Cobalt (µg/L)	Lead (µg/L)	Mercury (µg/L)	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Zinc (µg/L)
Groundwater Monitoring Wells																						
MW-1	Up-Gradient	5-10	09/02/20	68	14	NA	< 1.0	NA	NA	29	< 2.0	NA	NA	NA[1]	NA	NA[1]	NA	NA	NA[1]	NA[1]	NA	NA
			12/9/20	19	10	NA	< 1.0	NA	NA	28	< 2.0	NA	NA	10	NA	<1.0	NA	NA	29	< 2.0	NA	NA
			3/3/21	20	8.8	NA	< 1.0	NA	NA	23	< 2.0	NA	NA	8.9	NA	< 1.0	NA	NA	23	< 2.0	NA	NA
			6/9/21	14	10	NA	< 1.0	NA	NA	27	< 2.0	NA	NA	11	NA	1.4	NA	NA	22	3.8	NA	NA
			9/15/21	13	11	NA	< 1.0	NA	NA	30	NA	NA	NA	11	NA	< 1.0	NA	NA	29	NA	NA	NA
MW-2	On-Site	5-10	09/02/20	430	210	NA	9	NA	NA	32	66	NA	NA	NA[1]	NA	NA[1]	NA	NA	NA[1]	NA[1]	NA	NA
			12/9/20	89	130	NA	7	NA	NA	28	74	NA	NA	130	NA	7.5	NA	NA	28	76	NA	NA
			3/3/21	98	110	NA	9.7	NA	NA	39	81	NA	NA	110	NA	10	NA	NA	41	81	NA	NA
			6/9/21	94	80	NA	9.7	NA	NA	37	88	NA	NA	76	NA	9.1	NA	NA	37	91	NA	NA
			9/15/21	92	79	NA	8.2	NA	NA	30	NA	NA	NA	77		8.2	NA	NA	31	NA	NA	NA
MW-3	On-Site	5-10	09/02/20	83	72	NA	< 1.0	NA	NA	36	< 2.0	NA	NA	NA[1]	NA	NA[1]	NA	NA	NA[1]	NA[1]	NA	NA
			12/9/20	22	80	NA	< 1.0	NA	NA	41	2.1	NA	NA	81	NA	<1.0	NA	NA	40	2.1	NA	NA
			3/3/21	23	87	NA	< 1.0	NA	NA	41	2.0	NA	NA	85	NA	< 1.0	NA	NA	36	< 2.0	NA	NA
			6/9/21	27	71	NA	< 1.0	NA	NA	50	2.7	NA	NA	71	NA	< 1.0	NA	NA	50	2.9	NA	NA
			9/15/21	19	60	NA	< 1.0	NA	NA	42	NA	NA	NA	60	NA	< 1.0	NA	NA	45	NA	NA	NA
MW-4	On-Site	5-10	09/02/20	760	65	NA	19	NA	NA	130	80	NA	NA	NA[1]	NA	NA[1]	NA	NA	NA[1]	NA[1]	NA	NA
			12/9/20	160	66	NA	15	NA	NA	120	66	NA	NA	68	NA	15	NA	NA	120	66	NA	NA
			3/3/21	160	69	NA	18	NA	NA	130	70	NA	NA	67	NA	18	NA	NA	130	69	NA	NA
			6/9/21	170	66	NA	17	NA	NA	120	75	NA	NA	65	NA	17	NA	NA	110	77	NA	NA
			9/15/21	180	64	NA	18	NA	NA	120	NA	NA	NA	65	NA	18	NA	NA	120	NA	NA	NA
On-Site Grab-Groundwater																						
SB-8-GW	On-Site	6-10	08/05/20	150	10	NA	1.0	NA	NA	130	3.2	NA	NA	21	NA	24	NA	NA	120	25	NA	NA
SB-3-GW		6-10	08/05/20	1,000	520	NA	22	NA	NA	83	91	NA	NA	580	NA	110	NA	NA	69	170	NA	NA
SB-4-GW		6-10	08/05/20	240	100	NA	3	NA	NA	160	11	NA	NA	160	NA	57	NA	NA	130	82	NA	NA
SB-5 GW		6-10	08/05/20	370	45	NA	1.6	NA	NA	190	10	NA	NA	48	NA	4.8	NA	NA	180	14	NA	NA
SB-9-GW		7-10	02/08/18	170	21.4	<2.0	14.6	<10.0	<2.0	122	61.8	<10.0	<20.0	373	2.9	438	374	<2.0	92.4	736	12.7	2,650
SB-10-GW		7-10	02/08/18	240	28.2	<2.0	22.9	<10.0	<2.0	194	146	<10.0	<20.0	29.5	<2.0	23.5	<10.0	<2.0	194	146	<10.0	<20.0
SB-11-GW		7-10	02/08/18	120	10.9	<2.0	<10.0	<10.0	<2.0	110	10.5	<10.0	<20.0	<10.0	<2.0	<10.0	<10.0	<2.0	110	11.5	<10.0	<20.0
SB-12-GW		5-10	08/05/20	450	28	NA	2.9	NA	NA	110	23	NA	NA	27	NA	6.2	NA	NA	120	33	NA	NA
SB-13-GW		6-10	08/05/20	1,200	12	NA	79	NA	NA	150	200	NA	NA	65	NA	120	NA	NA	120	260	NA	NA
SB-14-GW		7-10	08/05/20	780	49	NA	65	NA	NA	150	74	NA	NA	47	NA	72	NA	NA	160	74	NA	NA
SB-15-GW		6-10	08/05/20	460	83	NA	2	NA	NA	290	10	NA	NA	78	NA	3	NA	NA	290	12	NA	NA
Off-Site Grab-Groundwater																						
SB-16-GW	Up-Gradient	5-15	07/13/21	8.4	65	NA	< 1.0	NA	NA	76	NA	NA	NA	93	NA	33	NA	NA	62	NA	NA	NA
SB-17-GW	Up-Gradient	5-15	07/13/21	13	90	NA	< 1.0	NA	NA	44	NA	NA	NA	110	NA	43	NA	NA	38	NA	NA	NA
SB-18-GW	Down-Gradient	5-15	07/13/21	28	35	NA	< 1.0	NA	NA	75	NA	NA	NA	67	NA	45	NA	NA	75	NA	NA	NA
SB-19-GW	Down-Gradient	5-15	07/20/21	21[a]	14	NA	1.9	NA	NA	54	NA	NA	NA	28	NA	32	NA	NA	45	NA	NA	NA
SB-20-GW	Down-Gradient	5-15	07/20/21	27[a]	10	NA	3.0	NA	NA	47	NA	NA	NA	110	NA	340	NA	NA	8.4	NA	NA	NA
SB-21-GW	Down-Gradient	5-15	07/13/21	5.6	120	NA	10	NA	NA	30	NA	NA	NA	150	NA	41	NA	NA	24	NA	NA	NA
SB-22-GW	Down-Gradient	5-15	07/20/21	0.12[a]	62	NA	< 1.0	NA	NA	16	NA	NA	NA	130	NA	170	NA	NA	7.4	NA	NA	NA
SB-23-GW	Down-Gradient	5-15	07/20/21	24[a]	14	NA	< 1.0	NA	NA	32	NA	NA	NA	80	NA	530	NA	NA	< 1.0	NA	NA	NA
Background Ranges[2]				8.4-68	8.8-90	--	<1.0	--	--	23-76	--	--	--	8.9-110	--	<1.0-43	--	--	22-75	--	--	--
MTCA Method A Cleanup Levels				--	5	5	--	15	2	--	--	--	--	5	5	--	15	2	--	--	--	--
MTCA Method B Cleanup Levels				26	0.058	8	5	--	--	80	320	80	4,800	0.058	8	5	--	--	80	320	80	4,800
MTCA Method C Cleanup Levels				56	0.580	5	11	--	--	180	--	--	--	0.580	5	11	--	--	180	--	--	--

Notes:

a. Sample dilution or re-analysis was performed outside of hold time. Data from out of hold time confirmed data run within hold time.

1. Due to field staff oversight, total metals samples were inadvertently not collected from the monitoring wells on 2 September 2020.

2. Background ranges are based on groundwater samples from MW-1, SB-16, and SB-17 due to their upgradient locations.

up-gradient locations are those that are hydraulically upgradient of the Site (e.g. MW-1, SB-16, SB-17)

down-gradient locations are those that are hydraulically downgradient of the Site.

Constituents shown include those analyzed in 2020 and 2021 or were detected at least once during the 2018 sampling event. 2018 data are from August Mack Phase II Subsurface Investigation.

Results compared to State of Washington, Department of Ecology, Model Toxics Cleanup Act (MTCA) screening levels and background concentrations.

Acronyms:

< = Not detected above the reported laboratory method detection limit.

-- = No screening level available

µg/L = micrograms per liter

EPA = Environmental Protection Agency

GW = groundwater

mg/L = milligrams per liter

MW = monitoring wells

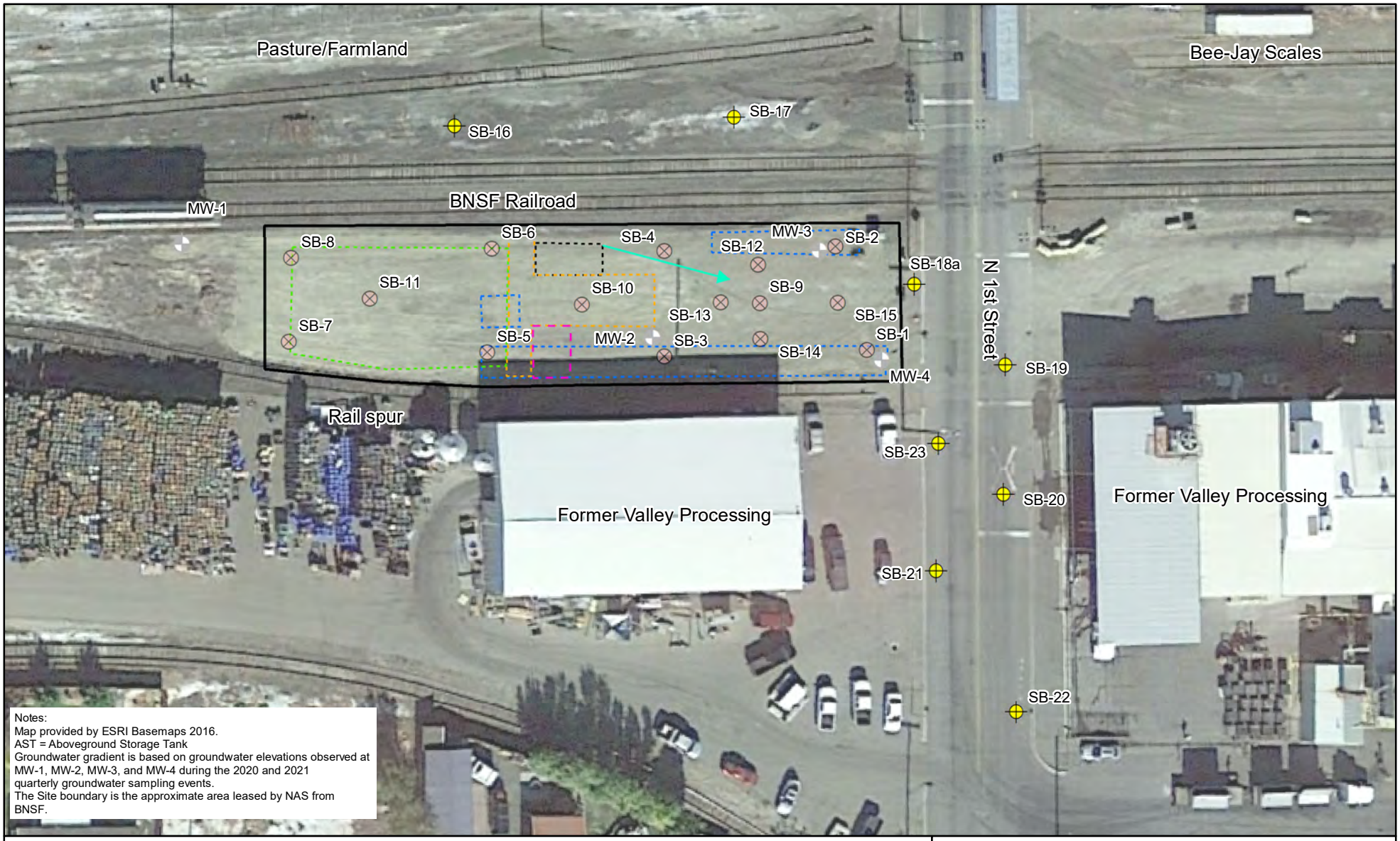
NA = Not Analyzed

SB = soil borings

Bold = Analyte was detected.

Highlight = Analyte was detected at concentrations that are greater than background and MTCA cleanup levels.

FIGURES



Legend

- Off-Site Grab-Groundwater Sample Location
- Monitoring Well and Soil Sample Location
- Off-Site Grab-Groundwater and Soil Sample Location
- Groundwater Gradient
- Site Boundary
- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad (1999 – 2017)

N

0 50 Feet

Off-Site Groundwater Investigation Locations

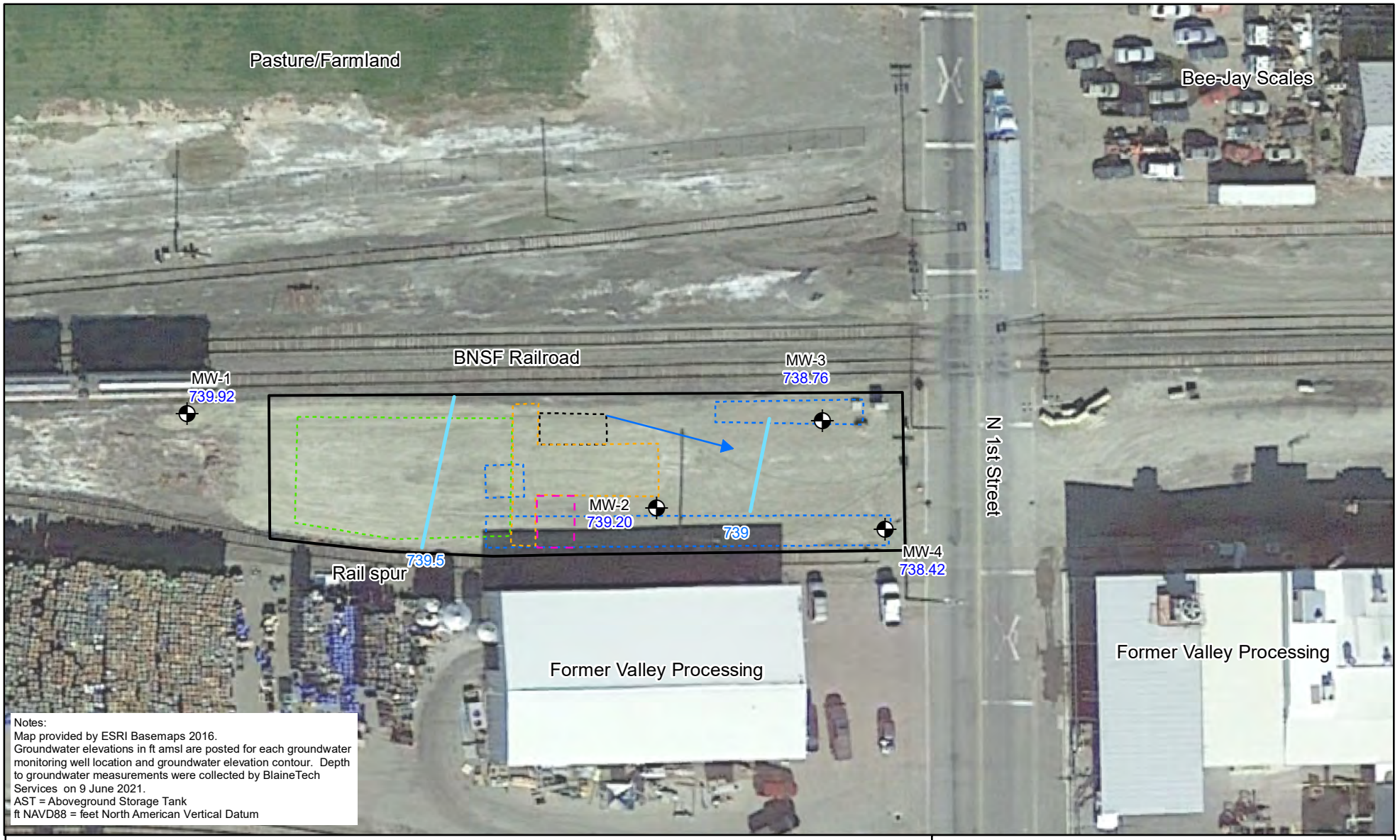
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696	April 2022

Figure 1

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Appendix A\Figure 1 Off-Site Groundwater Investigation Locations.mxd 1/27/2022 9:11:43 AM



Notes:
Map provided by ESRI Basemaps 2016.
Groundwater elevations in ft amsl are posted for each groundwater monitoring well location and groundwater elevation contour. Depth to groundwater measurements were collected by BlaineTech Services on 9 June 2021.
AST = Aboveground Storage Tank
ft NAVD88 = feet North American Vertical Datum

Legend

- Monitoring Well and Soil Sample Location
- Groundwater Elevation Contour (ft NAVD88)
- Groundwater Gradient
- Site Boundary
- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad (1999 – 2017)

N

0 50 Feet

Groundwater Elevation Contour Map - June 2021

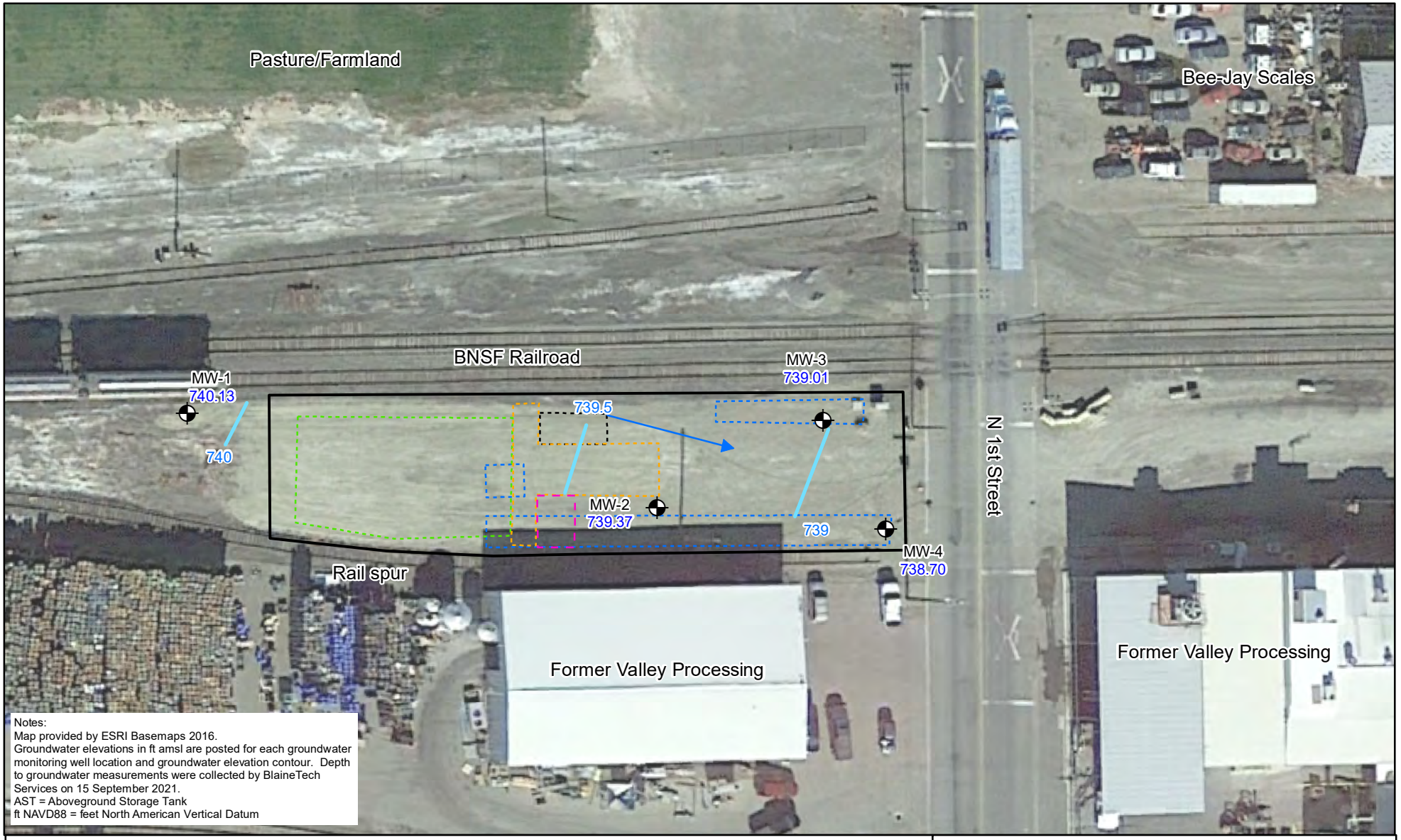
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696 | April 2022

Figure 2a

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Appendix A\Figure 2a Groundwater Elevation June.mxd 1/27/2022 4:09:19 AM



Notes:
Map provided by ESRI Basemaps 2016.
Groundwater elevations in ft amsl are posted for each groundwater monitoring well location and groundwater elevation contour. Depth to groundwater measurements were collected by BlaineTech Services on 15 September 2021.
AST = Aboveground Storage Tank
ft NAVD88 = feet North American Vertical Datum

Legend

- Monitoring Well and Soil Sample Location
- Groundwater Elevation Contour (ft NAVD88)
- Groundwater Gradient
- Site Boundary
- Former AST Area (Pre-1999)
- Former Building Location (Pre-1999)
- Former AST Area with Secondary Containment (1999-2017)
- Former Building Location (1999-2017)
- Former Concrete Loading Pad (1999 – 2017)

N

0 50 Feet

Groundwater Elevation Contour Map - September 2021
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696 | April 2022

Figure 2b

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Appendix A\Figure 2b Groundwater Elevation.mxd 1/27/2022 4:10:08 AM

ATTACHMENT 1
Off-Site Investigation Sunnyside Permit

Permit #: 20210230
Permit Date: 06/30/21
Permit Type: Curb Permit
Applicant Name: ESN Northwest Inc.
Applicant Address: 1210 Eastside St. SE Ste 200
Applicant City, State, ZIP: Olympia, WA 98501
Applicant Phone Number: 206-496-1449
Applicant Email:
Description: Environmental drilling in the right of way
Project Cost: 0
Square Feet: 0
Issued Date: 06/30/2021
Expiration Date: 12/27/2021
Status: Issued
Assigned To: Shane Fisher

Property

Parcel #	Address	Legal Description	Owner Name	Owner Phone	Zoning
	101 N. 1st St.		Nachurs Alpine Solutions	740-382-5701	COM

Inspections

Date	Inspection Type	Description	Scheduled Date	Completed Date	Inspector	Status
06/30/2021	Final Inspection					
06/30/2021	Gravel Compaction					

Plan Reviews

Date	Review Type	Description	Assigned To	Review Status
06/30/2021	Public Works		Andy Stamschror	*Pending

ATTACHMENT 2
Off-Site Investigation Boring Logs

Geosyntec consultants
520 Pike Street, Suite 1375
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM: CORE3 10/00

BOREHOLE LOG

BORING SB-16 **SHEET** 1 OF 1
START DATE 7/12/2021 **Elevation** 745.00 FT. MSL
FINISH DATE 7/12/2021
PROJECT Sunnyside VCP
LOCATION Sunnyside, WA
PROJECT NUMBER PNR0696B

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOLIC LOG	WELL LOG	WELL CONSTRUCTION MATERIAL	ELEVATION (ft)	SAMPLES: SAMPLE NAME	SAMPLES: TYPE	SAMPLES: % RECOVERY	SAMPLES: PID READING (ppm)	USCS Classification	COMMENTS
	Rock, asphalt fragments, hard, dry.					No soil samples taken.		74	N/A	ASPHALT	
	Fine silty SAND, brown to grayish brown, loose-soft, fine to medium gravels, damp-moist, wet @ 2 ft.									SM	
5					740			100			
	Sandy SILT, grayish brown, soft, fine to very fine sand, low plasticity, wet.									ML	
10	Gray, some interbedded fine to very fine silty sand.				735			100		ML	
15	Total Depth = 15 feet				730						

CONTRACTOR ESN NW
EQUIPMENT GEOPROBE
DRILL MTHD DIRECT PUSH
DIAMETER 3
LOGGER DJ **REVIEWER** DJ
NORTHING
EASTING
ANGLE Vertical
BEARING ------
PRINTED 09/05/21

REMARKS:

COORDINATE SYSTEM: NAV88
SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

BORING LOG W/WELL SONIC (SEATTLE) 2021 OFFSITE INVESTIGATION BORING LOGS.GPJ EED DEFAULT GINT LIBRARY.GLB 9/5/21

Geosyntec consultants
520 Pike Street, Suite 1375
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM: CORE3 10/00

BOREHOLE LOG

BORING SB-17 **SHEET** 1 OF 1
START DATE 7/12/2021 **Elevation** 745.00 FT. MSL
FINISH DATE 7/12/2021
PROJECT Sunnyside VCP
LOCATION Sunnyside, WA
PROJECT NUMBER PNR0696B

DEPTH (ft)	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLES: SAMPLE NAME	SAMPLES: TYPE	SAMPLES: % RECOVERY	SAMPLES: PID READING (ppm)	USCS Classification	COMMENTS
	ASPHALT, rock, hard, dry.		No soil samples taken.		60	N/A	ASPHALT	
	Fine to very fine SAND, grayish brown, loose, damp.						SM	
	Sandy SILT, grayish brown, soft, fine to very fine, low plasticity, damp to moist.						ML	
	Lost Recovery							
5	Sandy SILT, grayish brown, soft, fine to very fine, low plasticity, wet.	740			60		ML	
	Lost Recovery							
10	Sandy SILT, gray, soft, fine to very fine gravel, wet.	735			80		ML	
	Fine silty SAND, low plasticity, wet.						SM	
	Sandy SILT, brown, loose, low plasticity, wet.						ML	
15	Total Depth = 15 feet	730						

WELL CONSTRUCTION MATERIAL

CONTRACTOR ESN NW **NORTHING**
EQUIPMENT GEOPROBE **EASTING**
DRILL MTHD DIRECT PUSH **ANGLE** Vertical
DIAMETER 3 **BEARING** ------
LOGGER DJ **REVIEWER** DJ **PRINTED** 09/05/21

REMARKS:

COORDINATE SYSTEM: NAV88
SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
520 Pike Street, Suite 1375
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM: CORE3 10/00

BOREHOLE LOG

BORING SB18a
START DATE 7/13/2021
FINISH DATE 7/13/2021
PROJECT Sunnyside VCP
LOCATION Sunnyside, WA
PROJECT NUMBER PNR0696B

Elevation 745.00 FT. MSL

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOLIC LOG	WELL LOG	WELL CONSTRUCTION MATERIAL	ELEVATION (ft)	SAMPLES: SAMPLE NAME	SAMPLES: TYPE	SAMPLES: % RECOVERY	SAMPLES: PID READING (ppm)	USCS Classification	COMMENTS
	GRAVEL, brown, fine to coarse sand.					No soil samples taken.		74	N/A	GP	
	Fine silty SAND, grayish brown, loose/soft, damp to moist.									SM	
	Lost Recovery.										
5	Fine silty SAND, grayish brown, loose/soft, wet.				740			10		SM	
	Lost Recovery.										
10	Fine silty SAND, grayish brown, loose/soft, wet, little interbedded sandy silt.				735			72		SM	
	Lost Recovery.										
15	Total Depth = 15 feet				730						

CONTRACTOR ESN NW
EQUIPMENT GEOPROBE
DRILL MTHD DIRECT PUSH
DIAMETER 3
LOGGER DJ **REVIEWER** DJ

NORTHING
EASTING
ANGLE Vertical
BEARING ------
PRINTED 09/05/21

REMARKS:

COORDINATE SYSTEM: NAV88

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
520 Pike Street, Suite 1375
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM: CORE3 10/00

BOREHOLE LOG

BORING SB-19 **SHEET** 1 OF 1
START DATE 7/13/2021 **Elevation** 745.00 FT. MSL
FINISH DATE 7/13/2021
PROJECT Sunnyside VCP
LOCATION Sunnyside, WA
PROJECT NUMBER PNR0696B

DEPTH (ft)	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE NAME	TYPE	% RECOVERY	PID READING (ppm)	USCS Classification
	ASPHALT, hard, dry.		No soil samples taken.		68	N/A	ASPHALT
	Coarse SAND with gravel, loose to medium dense, trace silt, dry.						SWG
	Fine sandy SILT, brown, soft, low plasticity, damp to moist.						ML
	Lost Recovery.						
5	Fine sandy SILT, brown, soft, low plasticity, wet.	740			72		ML
	Lost Recovery.						
10	Fine silty SAND, grayish brown, loose to medium dense, trace clay, wet.	735			84		SM
	Fine sandy SILT, brown, soft, low plasticity, wet.						ML
	Fine silty SAND, brown, loose, wet.						SM
	Lost Recovery.						
15	Total Depth = 15 feet	730					

WELL CONSTRUCTION MATERIAL: SYMBOLIC LOG / WELL LOG

CONTRACTOR ESN NW **NORTHING**
EQUIPMENT GEOPROBE **EASTING**
DRILL MTHD DIRECT PUSH **ANGLE** Vertical
DIAMETER 3 **BEARING** ------
LOGGER DJ **REVIEWER** DJ **PRINTED** 09/05/21

REMARKS:

COORDINATE SYSTEM: NAV88
SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
520 Pike Street, Suite 1375
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM: CORE3 10/00

BOREHOLE LOG

BORING SB-20 **SHEET** 1 OF 1
START DATE 7/13/2021 **Elevation** 745.00 FT. MSL
FINISH DATE 7/13/2021
PROJECT Sunnyside VCP
LOCATION Sunnyside, WA
PROJECT NUMBER PNR0696B

DEPTH (ft)	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE NAME	TYPE	% RECOVERY	PID READING (ppm)	USCS Classification
	ASPHALT, hard, dry.		No soil samples taken.		76	N/A	ASPHALT
	Coarse SAND, gray, loose to medium dense, fine to coarse gravel, iron oxide at bottom.						SP
	Fine sandy SILT, brown, soft to stiff, trace iron oxide, dry.						ML
	Fine silty SAND, brown with mottled dark brown staining, loose, trace coarse gravel, damp.						SM
	Fine sandy SILT, brown, soft to stiff, damp to moist.						ML
	Lost Recovery.						
5	Fine sandy SILT, brown, soft to stiff, trace to few interbedded fine silty sand, wet.	740			84		ML
	Lost Recovery.						
10	Fine sandy SILT, brown, soft to stiff, reduced interbedded silty sand, wet.	735			60		ML
	Lost Recovery.						
15	Total Depth = 15 feet	730					

CONTRACTOR ESN NW **NORTHING**
EQUIPMENT GEOPROBE **EASTING**
DRILL MTHD DIRECT PUSH **ANGLE** Vertical
DIAMETER 3 **BEARING** ------
LOGGER DJ **REVIEWER** DJ **PRINTED** 09/05/21

REMARKS:

COORDINATE SYSTEM: NAV88
SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
520 Pike Street, Suite 1375
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM: CORE3 10/00

BOREHOLE LOG

BORING SB-21 **SHEET** 1 OF 1
START DATE 7/13/2021 **Elevation** 745.00 FT. MSL
FINISH DATE 7/13/2021
PROJECT Sunnyside VCP
LOCATION Sunnyside, WA
PROJECT NUMBER PNR0696B

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOLIC LOG	WELL LOG	WELL CONSTRUCTION MATERIAL	ELEVATION (ft)	SAMPLES: SAMPLE NAME	SAMPLES: TYPE	SAMPLES: % RECOVERY	SAMPLES: PID READING (ppm)	USCS Classification	COMMENTS
	ASPHALT, hard, fine to coarse sand, some gravel, dry.					No soil samples taken.		74	N/A	ASPHALT	
	Sandy SILT, brown to grayish brown, soft, fine to very fine sand, low plasticity, dry to damp.									ML	
	Lost Recovery.										
5	Sandy SILT, brown to grayish brown, soft, fine to very fine sand, low plasticity, wet.				740			54		ML	
	Lost Recovery.										
10	Sandy SILT, brown to grayish brown, soft, fine to very fine sand, low plasticity, wet.				735			76		ML	
	Fine silty SAND, brown to grayish brown, loose/medium dense, wet.									SM	
	Lost Recovery.										
15	Total Depth = 15 feet				730						

CONTRACTOR ESN NW
EQUIPMENT GEOPROBE
DRILL MTHD DIRECT PUSH
DIAMETER 3
LOGGER DJ **REVIEWER** DJ

NORTHING
EASTING
ANGLE Vertical
BEARING ------
PRINTED 09/05/21

REMARKS:

COORDINATE SYSTEM: NAV88
SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

BORING LOG W/WELL SONIC (SEATTLE) 2021 OFFSITE INVESTIGATION BORING LOGS.GPJ EED DEFAULT GINT LIBRARY.GLB 9/5/21

Geosyntec consultants
520 Pike Street, Suite 1375
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM: CORE3 10/00

BOREHOLE LOG

BORING SB-22 **SHEET** 1 OF 1
START DATE 7/20/2021 **Elevation** 745.00 FT. MSL
FINISH DATE 7/20/2021
PROJECT Sunnyside VCP
LOCATION Sunnyside, WA
PROJECT NUMBER PNR0696B

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOLIC LOG	WELL LOG	WELL CONSTRUCTION MATERIAL	ELEVATION (ft)	SAMPLES: SAMPLE NAME	SAMPLES: TYPE	SAMPLES: % RECOVERY	SAMPLES: PID READING (ppm)	USCS Classification	COMMENTS
	ASPHALT, hard, dry.					No soil samples taken.		70	N/A	ASPHALT	
	Coarse SAND, gray to brown, trace silt, iron oxide at interface, dry.									SP	
	Fine sandy SILT, brown, soft, trace pockets of silty sand, damp to moist, wet at 2.6 ft.									ML	
	Lost Recovery.										
5	Fine sandy SILT, brown, soft, trace pockets of silty sand, wet.				740			20		ML	
	Lost Recovery.										
10	Fine sandy SILT, brown, soft, trace pockets of silty sand, wet.				735			52		ML	
	Fine silty SAND, brown, loose to medium dense, wet.									SM	
	Lost Recovery.										
15	Total Depth = 15 feet				730						

CONTRACTOR ESN NW
EQUIPMENT GEOPROBE
DRILL MTHD DIRECT PUSH
DIAMETER 3
LOGGER DJ **REVIEWER** DJ
NORTHING
EASTING
ANGLE Vertical
BEARING ------
PRINTED 09/05/21

REMARKS:

COORDINATE SYSTEM: NAV88
SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

BORING LOG W/WELL SONIC (SEATTLE) 2021 OFFSITE INVESTIGATION BORING LOGS.GPJ EED DEFAULT GINT LIBRARY.GLB 9/5/21

Geosyntec consultants
520 Pike Street, Suite 1375
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM: CORE3 10/00

BOREHOLE LOG

BORING SB-23 **SHEET** 1 OF 1
START DATE 7/20/2021 **Elevation** 745.00 FT. MSL
FINISH DATE 7/20/2021
PROJECT Sunnyside VCP
LOCATION Sunnyside, WA
PROJECT NUMBER PNR0696B

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOLIC LOG	WELL LOG	WELL CONSTRUCTION MATERIAL	ELEVATION (ft)	SAMPLES: SAMPLE NAME	SAMPLES: TYPE	SAMPLES: % RECOVERY	SAMPLES: PID READING (ppm)	USCS Classification	COMMENTS
	ASPHALT, hard, dry.					No soil samples taken.		84	N/A	ASPHALT	
	Coarse SAND with fine to coarse gravel, brown, coarse, loose to medium dense, fine to coarse gravel, trace silt, dry.									SP	
	Sandy SILT, brown with mottled gray staining @ 2.9 ft, soft to medium stiff, trace coarse gravel at upper interface, trace iron oxide, dry to damp.									ML	
	Lost Recovery.										
5	Fine sandy SILT, brown, fine sand, soft, wet.				740			10		ML	
	Lost Recovery.										
10	Sandy SILT, grayish brown, fine sand, soft/loose, trace few interbedded fine silty sand, wet.				735			60		ML	
	Lost Recovery.										
15	Total Depth = 15 feet				730						

CONTRACTOR ESN NW **NORTHING**
EQUIPMENT GEOPROBE **EASTING**
DRILL MTHD DIRECT PUSH **ANGLE** Vertical
DIAMETER 3 **BEARING** ------
LOGGER DJ **REVIEWER** DJ **PRINTED** 09/05/21

REMARKS:

COORDINATE SYSTEM: NAV88
SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

ATTACHMENT 3
Off-Site Investigation Laboratory Analytical Reports

July 19, 2021

Mr. Luke Smith
Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101

Dear Mr. Smith,

On July 14th, 5 samples were received by our laboratory and assigned our laboratory project number EV21070058. The project was identified as your PNR0696B. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Carl Nott
Professional Scientist

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/19/2021 EV21070058 EV21070058-01
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	07/14/2021
CLIENT PROJECT:	PNR0696B	COLLECTION DATE:	7/13/2021 10:04:00 AM
CLIENT SAMPLE ID	GW-071321-DUP-1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**16**	0.34	10	MG/L	07/14/2021	RAL
Arsenic	EPA-200.8	**110**	1.0	1	UG/L	07/16/2021	EBS
Cobalt	EPA-200.8	**36**	1.0	1	UG/L	07/16/2021	EBS
Molybdenum	EPA-200.8	**42**	1.0	1	UG/L	07/16/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**92**	1.0	1	UG/L	07/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	1.0	1	UG/L	07/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**47**	1.0	1	UG/L	07/16/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/19/2021
		ALS JOB#:	EV21070058
		ALS SAMPLE#:	EV21070058-02
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	07/14/2021
CLIENT PROJECT:	PNR0696B	COLLECTION DATE:	7/13/2021 12:18:00 PM
CLIENT SAMPLE ID	SB-21-GW	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**5.6**	0.17	5	MG/L	07/14/2021	RAL
Arsenic	EPA-200.8	**150**	1.0	1	UG/L	07/16/2021	EBS
Cobalt	EPA-200.8	**41**	1.0	1	UG/L	07/16/2021	EBS
Molybdenum	EPA-200.8	**24**	1.0	1	UG/L	07/16/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**120**	1.0	1	UG/L	07/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	**10**	1.0	1	UG/L	07/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**30**	1.0	1	UG/L	07/16/2021	EBS

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/19/2021
		ALS JOB#:	EV21070058
		ALS SAMPLE#:	EV21070058-03
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	07/14/2021
CLIENT PROJECT:	PNR0696B	COLLECTION DATE:	7/13/2021 2:55:00 PM
CLIENT SAMPLE ID	SB-16-GW	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**8.4**	0.17	5	MG/L	07/14/2021	RAL
Arsenic	EPA-200.8	**93**	1.0	1	UG/L	07/16/2021	EBS
Cobalt	EPA-200.8	**33**	1.0	1	UG/L	07/16/2021	EBS
Molybdenum	EPA-200.8	**62**	1.0	1	UG/L	07/16/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**65**	1.0	1	UG/L	07/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	1.0	1	UG/L	07/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**76**	1.0	1	UG/L	07/16/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/19/2021
		ALS JOB#:	EV21070058
		ALS SAMPLE#:	EV21070058-04
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	07/14/2021
CLIENT PROJECT:	PNR0696B	COLLECTION DATE:	7/13/2021 4:05:00 PM
CLIENT SAMPLE ID	SB-17-GW	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**13**	0.34	10	MG/L	07/14/2021	RAL
Arsenic	EPA-200.8	**110**	1.0	1	UG/L	07/16/2021	EBS
Cobalt	EPA-200.8	**43**	1.0	1	UG/L	07/16/2021	EBS
Molybdenum	EPA-200.8	**38**	1.0	1	UG/L	07/16/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**90**	1.0	1	UG/L	07/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	1.0	1	UG/L	07/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**44**	1.0	1	UG/L	07/16/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/19/2021 EV21070058 EV21070058-05
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	07/14/2021
CLIENT PROJECT:	PNR0696B	COLLECTION DATE:	7/13/2021 5:24:00 PM
CLIENT SAMPLE ID	SB-18a-GW	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**28**	0.34	10	MG/L	07/14/2021	RAL
Arsenic	EPA-200.8	**67**	1.0	1	UG/L	07/16/2021	EBS
Cobalt	EPA-200.8	**45**	1.0	1	UG/L	07/16/2021	EBS
Molybdenum	EPA-200.8	**58**	1.0	1	UG/L	07/16/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**35**	1.0	1	UG/L	07/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	1.0	1	UG/L	07/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**75**	1.0	1	UG/L	07/16/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/19/2021
		ALS SDG#:	EV21070058
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Luke Smith		
CLIENT PROJECT:	PNR0696B		

LABORATORY BLANK RESULTS

MBLK-R387704 - Batch R387704 - Water by EPA-300.0

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	U	MG/L	0.034	07/14/2021	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MB-071521W - Batch 168037 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-200.8	U	UG/L	1.0	07/16/2021	EBS
Cobalt	EPA-200.8	U	UG/L	1.0	07/16/2021	EBS
Molybdenum	EPA-200.8	U	UG/L	1.0	07/16/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

MB-071521W - Batch 168037 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved)	EPA-200.8	U	UG/L	1.0	07/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	UG/L	1.0	07/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	U	UG/L	1.0	07/16/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/19/2021
		ALS SDG#:	EV21070058
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Luke Smith		
CLIENT PROJECT:	PNR0696B		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: R387704 - Water by EPA-300.0

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Nitrate as N - BS	EPA-300.0	**93.0**			80	120	07/14/2021	RAL
Nitrate as N - BSD	EPA-300.0	**92.0**	**1**		80	120	07/14/2021	RAL

ALS Test Batch ID: 168037 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Arsenic - BS	EPA-200.8	**98.5**			89.1	110	07/16/2021	EBS
Arsenic - BSD	EPA-200.8	**97.6**	**1**		89.1	110	07/16/2021	EBS
Cobalt - BS	EPA-200.8	**102**			85.8	108	07/16/2021	EBS
Cobalt - BSD	EPA-200.8	**101**	**1**		85.8	108	07/16/2021	EBS
Molybdenum - BS	EPA-200.8	**97.1**			90.3	113	07/16/2021	EBS
Molybdenum - BSD	EPA-200.8	**96.4**	**1**		90.3	113	07/16/2021	EBS

ALS Test Batch ID: 168037 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved) - BS	EPA-200.8	**98.5**			89.1	110	07/16/2021	EBS
Arsenic (Dissolved) - BSD	EPA-200.8	**97.6**	**1**		89.1	110	07/16/2021	EBS
Cobalt (Dissolved) - BS	EPA-200.8	**102**			85.8	108	07/16/2021	EBS
Cobalt (Dissolved) - BSD	EPA-200.8	**101**	**1**		85.8	108	07/16/2021	EBS
Molybdenum (Dissolved) - BS	EPA-200.8	**97.1**			90.3	113	07/16/2021	EBS
Molybdenum (Dissolved) - BSD	EPA-200.8	**96.4**	**1**		90.3	113	07/16/2021	EBS

APPROVED BY

Professional Scientist

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV2107 00 58

Date 7-13-21 Page 1 Of 1

PROJECT ID:	PNR0696B
REPORT TO COMPANY:	Geosyntec Consultants
PROJECT MANAGER:	Luke Smith
ADDRESS:	520 Pike St Suite 2600 Seattle, WA 98101
PHONE:	206-496-1450 P.O. #:
E-MAIL:	lsmith@geosyntec.com
INVOICE TO COMPANY:	Same as above
ATTENTION:	
ADDRESS:	

SAMPLE I.D.	DATE	TIME	TYPE	LAB#
1. GW-071321-DUP1	7-13-21	1004	GW	1
2. SB-21-GW	7-13-21	1218	GW	2
3. SB-16-GW	7-13-21	1455	GW	3
4. SB-17-GW	7-13-21	1605	GW	4
5. SB-18a-GW	7-13-21	1724	GW	5
6.				
7.				
8.				
9.				
10.				

ANALYSIS REQUESTED

NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA 8021 ☐ BTEX by EPA 8260 ☐	MTBE by EPA 8021 ☐ MTBE by EPA 8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	PCB by EPA 8082 ☐ Pesticides by EPA 8081 ☐	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Total and dissolved Metals Other (Specify) Arsenic, Cobalt, Molybdenum	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify) Nitrate as N Method 300.0	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
													X		X	3	
													X		X	3	
													X		X	3	
													X		X	3	
													X		X	3	

DJ 7-13-21

SPECIAL INSTRUCTIONS: Metals: Both dissolved and total. Dissolved samples were Field-filtered -SMH 7/14

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Geosyntec, 7-14-21, 10:50
   Received By: ALS 7/14/2021 1050
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: (10 Standard) 5 3 2 1 SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard 3 1 SAME DAY

OTHER: Specify:

*Turnaround request less than standard may incur Rush Charges

July 28, 2021

Mr. Luke Smith
Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101

Dear Mr. Smith,

On July 21st, 4 samples were received by our laboratory and assigned our laboratory project number EV21070103. The project was identified as your PNR0696B. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Glen Perry
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/28/2021
		ALS JOB#:	EV21070103
		ALS SAMPLE#:	EV21070103-01
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	07/21/2021
CLIENT PROJECT:	PNR0696B	COLLECTION DATE:	7/20/2021 11:54:00 AM
CLIENT SAMPLE ID	SB-20-GW	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**27 HT10**	0.86	25	MG/L	07/22/2021	RAL
Arsenic	EPA-200.8	**110**	1.0	1	UG/L	07/22/2021	EBS
Cobalt	EPA-200.8	**340**	1.0	1	UG/L	07/22/2021	EBS
Molybdenum	EPA-200.8	**8.4**	1.0	1	UG/L	07/22/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**10**	1.0	1	UG/L	07/22/2021	EBS
Cobalt (Dissolved)	EPA-200.8	**3.0**	1.0	1	UG/L	07/22/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**47**	1.0	1	UG/L	07/22/2021	EBS

HT10 -Sample dilution or re-analysis was performed outside of hold time.
Data from out of hold time confirmed data run within hold time.

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ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/28/2021
		ALS JOB#:	EV21070103
		ALS SAMPLE#:	EV21070103-02
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	07/21/2021
CLIENT PROJECT:	PNR0696B	COLLECTION DATE:	7/20/2021 10:18:00 AM
CLIENT SAMPLE ID	SB-19-GW	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**21 HT10**	0.86	25	MG/L	07/22/2021	RAL
Arsenic	EPA-200.8	**28**	1.0	1	UG/L	07/22/2021	EBS
Cobalt	EPA-200.8	**32**	1.0	1	UG/L	07/22/2021	EBS
Molybdenum	EPA-200.8	**45**	1.0	1	UG/L	07/22/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**14**	1.0	1	UG/L	07/22/2021	EBS
Cobalt (Dissolved)	EPA-200.8	**1.9**	1.0	1	UG/L	07/22/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**54**	1.0	1	UG/L	07/22/2021	EBS

HT10 -Sample dilution or re-analysis was performed outside of hold time.
Data from out of hold time confirmed data run within hold time.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/28/2021 EV21070103 EV21070103-03
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	07/21/2021
CLIENT PROJECT:	PNR0696B	COLLECTION DATE:	7/20/2021 2:48:00 PM
CLIENT SAMPLE ID	SB-22-GW	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**0.12 HT10**	0.034	1	MG/L	07/22/2021	RAL
Arsenic	EPA-200.8	**130**	1.0	1	UG/L	07/22/2021	EBS
Cobalt	EPA-200.8	**170**	1.0	1	UG/L	07/22/2021	EBS
Molybdenum	EPA-200.8	**7.4**	1.0	1	UG/L	07/22/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**62**	1.0	1	UG/L	07/22/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	1.0	1	UG/L	07/22/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**16**	1.0	1	UG/L	07/22/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.
HT10 -Sample dilution or re-analysis was performed outside of hold time.
Data from out of hold time confirmed data run within hold time.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/28/2021
		ALS JOB#:	EV21070103
		ALS SAMPLE#:	EV21070103-04
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	07/21/2021
CLIENT PROJECT:	PNR0696B	COLLECTION DATE:	7/20/2021 3:34:00 PM
CLIENT SAMPLE ID	SB-23-GW	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**24 HT10**	0.86	25	MG/L	07/22/2021	RAL
Arsenic	EPA-200.8	**80**	1.0	1	UG/L	07/22/2021	EBS
Cobalt	EPA-200.8	**530**	1.0	1	UG/L	07/22/2021	EBS
Molybdenum	EPA-200.8	U	1.0	1	UG/L	07/22/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**14**	1.0	1	UG/L	07/22/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	1.0	1	UG/L	07/22/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**32**	1.0	1	UG/L	07/22/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.
HT10 -Sample dilution or re-analysis was performed outside of hold time.
Data from out of hold time confirmed data run within hold time.

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ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/28/2021
		ALS SDG#:	EV21070103
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Luke Smith		
CLIENT PROJECT:	PNR0696B		

LABORATORY BLANK RESULTS

MBLK-R388392 - Batch R388392 - Water by EPA-300.0

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	U	MG/L	0.034	07/22/2021	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MB-072221W - Batch 168247 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-200.8	U	UG/L	1.0	07/22/2021	EBS
Cobalt	EPA-200.8	U	UG/L	1.0	07/22/2021	EBS
Molybdenum	EPA-200.8	U	UG/L	1.0	07/22/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

MB-072221W - Batch 168253 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved)	EPA-200.8	U	UG/L	1.0	07/22/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	UG/L	1.0	07/22/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	U	UG/L	1.0	07/22/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/28/2021
		ALS SDG#:	EV21070103
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Luke Smith		
CLIENT PROJECT:	PNR0696B		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: R388392 - Water by EPA-300.0

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Nitrate as N - BS	EPA-300.0	**105**			80	120	07/22/2021	RAL
Nitrate as N - BSD	EPA-300.0	**104**	**1**		80	120	07/22/2021	RAL

ALS Test Batch ID: 168247 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Arsenic - BS	EPA-200.8	**95.5**			89.1	110	07/22/2021	EBS
Arsenic - BSD	EPA-200.8	**97.1**	**2**		89.1	110	07/22/2021	EBS
Cobalt - BS	EPA-200.8	**99.1**			85.8	108	07/22/2021	EBS
Cobalt - BSD	EPA-200.8	**101**	**2**		85.8	108	07/22/2021	EBS
Molybdenum - BS	EPA-200.8	**93.5**			90.3	113	07/22/2021	EBS
Molybdenum - BSD	EPA-200.8	**96.1**	**3**		90.3	113	07/22/2021	EBS

ALS Test Batch ID: 168253 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved) - BS	EPA-200.8	**95.5**			89.1	110	07/22/2021	EBS
Arsenic (Dissolved) - BSD	EPA-200.8	**97.1**	**2**		89.1	110	07/22/2021	EBS
Cobalt (Dissolved) - BS	EPA-200.8	**99.1**			85.8	108	07/22/2021	EBS
Cobalt (Dissolved) - BSD	EPA-200.8	**101**	**2**		85.8	108	07/22/2021	EBS
Molybdenum (Dissolved) - BS	EPA-200.8	**93.5**			90.3	113	07/22/2021	EBS
Molybdenum (Dissolved) - BSD	EPA-200.8	**96.1**	**3**		90.3	113	07/22/2021	EBS

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV2107O103

Date 7-20-21 Page 1 Of 1

PROJECT ID:	PNR06963
REPORT TO COMPANY:	Geosyntec Consultants
PROJECT MANAGER:	Luke Smith
ADDRESS:	520 Pike St Suite 2600 Seattle, WA 98101
PHONE:	206-496-1450 P.O. #:
E-MAIL:	lsmith@geosyntec.com
INVOICE TO COMPANY:	same as above
ATTENTION:	
ADDRESS:	

ANALYSIS REQUESTED

OTHER (Specify)

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA 8021 ☐ BTEX by EPA 8260 ☐	MTBE by EPA 8021 ☐ MTBE by EPA 8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	PCB by EPA 8082 ☐ Pesticides by EPA 8081 ☐	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐ Metals Other (Specify) total and dissolved Arsenic, Cobalt, Mnly, Selenium	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	Nitrate as N method 300.0							NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. SB-20-GW	7-20-21	1154	GW	1													X		X							3	
2. SB-19-GW	↓	1018	↓	2													X		X							3	
3. SB-22-GW		1448		3													X		X							3	
4. SB-23-GW	↓	1534	↓	4													X		X							3	
5.																											
6.							DJ																				
7.							7-20-21																				
8.																											
9.																											
10.																											

SPECIAL INSTRUCTIONS Diss. metals are field filtered

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: [signature], Geosyntec, 7-21-21, 1436
   Received By: [signature] ALS 7/21/2021 1438
2. Relinquished By: _____
   Received By: _____

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 Standard | (5) | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard | 3 | 1 | SAME DAY

OTHER: Specify: _____

*Turnaround request less than standard may incur Rush Charges

ATTACHMENT 4

2nd and 3rd Quarter 2021 Groundwater Monitoring Field Logs

WELL GAUGING DATA

Project # 210609-LBI Date 6/9/21 Client GEOSYNTEC

Site SUNNYSIDE - 101 N 1ST STREET

Well ID	Time	Well Size (in.)	Sheen / Odor	Depth to Immiscible Liquid (ft.)	Thickness of Immiscible Liquid (ft.)	Volume of Immiscibles Removed (ml)	Depth to water (ft.)	Depth to well bottom (ft.)	Survey Point: TOB or TOC	Notes
MW-1	1015	2	—	—	—	—	3.41	14.98		
MW-2	1035	2	—	—	—	—	5.20	15.05		
MW-3	1030	2	—	—	—	—	5.65	14.97		
MW-4	1024	2	—	—	—	—	5.98	15.03	↓	

LOW FLOW WELL MONITORING DATA SHEET

Project #: 210609-LB1	Client: GEOSYNTEC
Sampler: LB	Gauging Date: 6/9/21
Well I.D.: MW-1	Well Diameter (in.): (2) 3 4 6 8 ____
Total Well Depth (ft.): 14.98	Depth to Water (ft.): 3.41
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type: YSI 556

Purge Method: 2" Grundfos Pump (Peristaltic Pump) Bladder Pump
Sampling Method: (Dedicated Tubing) New Tubing Other ____

Start Purge Time: 1049 Flow Rate: 200 mL/MIN Pump Depth: 10'

Time	Temp. (°C or °F)	pH	Cond. (mS/cm or µS/cm)	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Water Removed (gals. or mL)	Depth to Water (ft.)
1052	15.45	7.59	1377	38	0.64	-41.1	600	3.49
1055	15.41	7.56	1381	21	0.66	-46.1	1200	3.49
1058	15.37	7.57	1388	18	0.64	-58.1	1800	3.49
1101	15.35	7.58	1386	17	0.63	-60.0	2400	3.49
1104	15.35	7.56	1384	16	0.61	-61.9	3000	3.49

Did well dewater? Yes (No) Amount actually evacuated: 3L

Sampling Time: 1105 Sampling Date: 6/9/21

Sample I.D.: GW-060921-MW-1 Laboratory: ALS

Analyzed for: TPH-G BTEX MTBE TPH-D Other: SEE COC

Equipment Blank I.D.: @ Time Duplicate I.D.:

LOW FLOW WELL MONITORING DATA SHEET

Project #: 210609-LB1	Client: GEOSYNTEC
Sampler: LB	Gauging Date: 6/9/21
Well I.D.: MW-2	Well Diameter (in.): (2) 3 4 6 8 ____
Total Well Depth (ft.): 15.05	Depth to Water (ft.): 5.20
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type: YSI 556

Purge Method: 2" Grundfos Pump (Peristaltic Pump) Bladder Pump
Sampling Method: Dedicated Tubing (New Tubing) Other____

Start Purge Time: 1224 Flow Rate: 200 mL/MIN Pump Depth: 10'

Time	Temp. (°C or °F)	pH	Cond. (mS/cm or µS/cm)	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Water Removed (gals. or mL)	Depth to Water (ft.)
1227	16.07	7.82	3040	18	0.51	-43.9	600	5.25
1230	16.13	7.80	3045	12	0.50	-53.6	1200	5.25
1233	16.12	7.79	3053	11	0.46	-61.3	1800	5.25
1236	16.13	7.76	3054	10	0.45	-62.4	2400	5.25
1239	16.15	7.74	3056	9	0.44	-63.8	3000	5.25

Did well dewater? Yes (No) Amount actually evacuated: 3l

Sampling Time: 1240 Sampling Date: 6/9/21

Sample I.D.: GW-060921-MW-2 Laboratory: ALS

Analyzed for: TPH-G BTEX MTBE TPH-D Other: SEE COC

Equipment Blank I.D.: @ Time Duplicate I.D.: GW-060921-DUP-1

LOW FLOW WELL MONITORING DATA SHEET

Project #: 210609-LB1	Client: GEOSYNTEC
Sampler: LB	Gauging Date: 6/9/21
Well I.D.: MW-3	Well Diameter (in.): (2) 3 4 6 8 ____
Total Well Depth (ft.): 14.97	Depth to Water (ft.): 5.65
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type: YSI 556

Purge Method: 2" Grundfos Pump (Peristaltic) Pump Bladder Pump
Sampling Method: (Dedicated) Tubing New Tubing Other ____

Start Purge Time: 1152 Flow Rate: 200 mL/1MIN Pump Depth: 10'

Time	Temp. (°C or °F)	pH	Cond. (mS/cm or µS/cm)	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Water Removed (gals. or mL)	Depth to Water (ft.)
1155	16.04	8.00	1378	23	0.68	-57.2	600	5.73
1158	16.02	7.98	1365	19	0.59	-73.0	1200	5.73
1201	15.90	7.97	1366	15	0.60	-81.9	1800	5.73
1204	15.85	7.97	1369	14	0.59	-83.1	2400	5.73
1207	15.81	7.95	1371	13	0.58	-84.6	3000	5.73

Did well dewater? Yes (No) Amount actually evacuated: 3L

Sampling Time: 1208 Sampling Date: 6/9/21

Sample I.D.: GW-060921-MW-3 Laboratory: ALS

Analyzed for: TPH-G BTEX MTBE TPH-D Other: SEE COC

Equipment Blank I.D.: @ Time Duplicate I.D.:

LOW FLOW WELL MONITORING DATA SHEET

Project #: 210609-LB1	Client: GEOSYNTEC
Sampler: LB	Gauging Date: 6/9/21
Well I.D.: MW-4	Well Diameter (in.): (2) 3 4 6 8 ____
Total Well Depth (ft.): 15.03	Depth to Water (ft.): 5.98
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	Flow Cell Type: YSI 556

Purge Method: 2" Grundfos Pump (Peristaltic Pump) Bladder Pump
Sampling Method: Dedicated (Tubing) New Tubing Other ____

Start Purge Time: 1121 Flow Rate: 200 mL/MIN Pump Depth: 10'

Time	Temp. (°C or °F)	pH	Cond. (mS/cm or µS/cm)	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Water Removed (gals. or mL)	Depth to Water (ft.)
1124	15.35	7.72	3840	21	0.62	-185	600	6.03
1127	15.38	7.71	3883	15	0.54	-147.4	1200	6.03
1130	15.34	7.70	3878	13	0.50	-160.6	1800	6.03
1133	15.38	7.68	3871	12	0.53	-172.6	2400	6.03
1136	15.41	7.69	3869	11	0.54	-173.9	3000	6.03
1139	15.43	7.71	3865	11	0.55	-175.1	3600	6.03

Did well dewater? Yes (No)	Amount actually evacuated: 3.6L
Sampling Time: 1140	Sampling Date: 6/9/21
Sample I.D.: GW-060921-MW-4	Laboratory: ALS
Analyzed for: TPH-G BTEX MTBE TPH-D	Other: SEE COC
Equipment Blank I.D.: @ Time	Duplicate I.D.:

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only)

Date 6/9/21 Page 1 Of 1

PROJECT ID:	SUNNYSIDE
REPORT TO COMPANY:	GEOSYNTEC
PROJECT MANAGER:	LUKE SMITH
ADDRESS:	101 N 1ST STREET
	SUNNYSIDE, WA
PHONE:	P.O. #:
E-MAIL:	
INVOICE TO COMPANY:	GEOSYNTEC
ATTENTION:	LUKE SMITH
ADDRESS:	

ANALYSIS REQUESTED

OTHER (Specify)

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA 8021 ☐ BTEX by EPA 8260 ☐	MTBE by EPA 8021 ☐ MTBE by EPA 8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	PCB by EPA 8082 ☐ Pesticides by EPA 8081 ☐	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	NITROGEN, NITRATE (EPA 300)	TOTAL ARSENIC, CHROMIUM, MOLYBDENUM, NICKEL	DISSOLVED ARSENIC, CHROMIUM, MOLYBDENUM, NICKEL (FF)				NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. GW-060921-MW-1	6/9/21	1105	W																X	X		X					
2. GW-060921-MW-2		1240	W																X	X		X					
3. GW-060921-MW-3		1208	W																X	X		X					
4. GW-060921-MW-4		1140	W																X	X		X					
5. GW-060921-DUP-1	↓	—	W																X	X		X					
6.																											
7.																											
8.																											
9.																											
10.																											

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: BS 6/10/21 0905
   Received By: SHUTTLE ALS 6/10/2021 0905
2. Relinquished By: _____
   Received By: _____

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 Standard | 5 | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard | 3 | 1 | SAME DAY

OTHER:

Specify: _____

*Turnaround request less than standard may incur Rush Charges

WELLHEAD INSPECTION FORM

Client: GEOSYNTEC Site: SUNNYSIDE - 101 N 1ST STREET Date: 6/9/21

Job #: 210609 - LB1 Technician: L. BURES Page 1 of 1

Well ID	Well Inspected - No Corrective Action Required	Check indicates deficiency: Cap non-functional	Lock non-functional	Lock missing	Bolts missing (list qty)	Tabs stripped (list qty)	Tabs broken (list qty)	Annular seal incomplete	Apron damaged	Rim / Lid broken	Trip Hazard	Below Grade	Other (explain in notes)	Well Not Inspected (explain in notes)	Notes (list if cap or lick replaced, if there are access issues associated with repairs, if traffic control is required, if stand pipe damaged, or any specific details not covered by checklist)
MW-1	X														
MW-2	X														
MW-3	X														
MW-4	X														

NOTES:

TEST EQUIPMENT CALIBRATION LOG

PROJECT NAME Geosynthetic @ Sunnyside				PROJECT NUMBER 210609-LB1			
EQUIPMENT NAME	EQUIPMENT NUMBER	DATE/TIME OF TEST	STANDARDS USED	EQUIPMENT READING	CALIBRATED TO: OR WITHIN 10%:	TEMP.	INITIALS
YSI 556	02G0203AB	6/9/21 0615	pH 4.0 7.0 10.0	4.04 ✓ 6.98 ✓ 10.03 ✓	—	20.3	LB
			Cond 3900	3918 ✓	—	20.1	LB
			ORP 237.5	239.1 ✓	—	20.1	LB
			DO 100%	100.6% ✓	—	—	LB

SPH or Purge Water Drum Log

Client: Geosyntec

Site Address: 101 N 1st St Sunnyside WA

STATUS OF DRUM(S) UPON ARRIVAL

Date	9/2/20	12/9/20	3/3/21	6/9/21		
Number of drum(s) empty:	0	0	0	0		
Number of drum(s) 1/4 full:	0	0	0	0		
Number of drum(s) 1/2 full:	1	1	1	1		
Number of drum(s) 3/4 full:	0	0	0	0		
Number of drum(s) full:	9	9	8	8		
Total drum(s) on site:	10	10	9	9		
Are the drum(s) properly labeled?	Yes	Yes	Yes	YES		
Drum ID & Contents:	purge & decon H2O soil cuttings	purge & decon H2O soil cuttings	purge + soil cuttings	MIXED		
If any drum(s) are partially or totally filled, what is the first use date:						

- If you add any SPH to an empty or partially filled drum, drum must have at least 20 gals. of Purgewater or DI Water.

-If drum contains SPH, the drum MUST be steel AND labeled with the appropriate label.

-All BTS drums MUST be labeled appropriately.

STATUS OF DRUM(S) UPON DEPARTURE

Date	9/2/20	12/9/20	3/3/21	6/9/21		
Number of drums empty:	0	0	0	0		
Number of drum(s) 1/4 full:	0	0	0	0		
Number of drum(s) 1/2 full:	1	1	1	1		
Number of drum(s) 3/4 full:	0	0	0	0		
Number of drum(s) full:	9	9	8	8		
Total drum(s) on site:	10	10	9	9		
Are the drum(s) properly labeled?	Yes	Yes	Yes	YES		
Drum ID & Contents:	purge & decon H2O soil cutting	purge & decon H2O soil cutting	purge + soil cuttings	MIXED		

LOCATION OF DRUM(S)

Describe location of drum(s): Next to MW-2 by telephone Pole

FINAL STATUS

Number of new drum(s) left on site this event	0	0	0	0		
Date of inspection:	9/2/20	12/9/20	3/3/21	6/9/21		
Drum(s) labelled properly:	Yes	Yes	Yes	YES		
Logged by BTS Field Tech:	FK	FK	AH	LB		
Office reviewed by:						

WELL GAUGING DATA

Project # 210915-TK1 Date 9/15/21 Client GeoSyntec

Site 101 N 1st St Sunnyside WA

Well ID	Time	Well Size (in.)	Sheen / Odor	Depth to Immiscible Liquid (ft.)	Thickness of Immiscible Liquid (ft.)	Volume of Immiscibles Removed (ml)	Depth to water (ft.)	Depth to well bottom (ft.)	Survey Point: TOB or TOC	Notes
MW-1	1102	2					3.20	14.98		
MW-2	1106	2					5.03	15.00		
MW-3	1114	2					5.40	14.88		
MW-4	1110	2					5.70	15.07	↓	

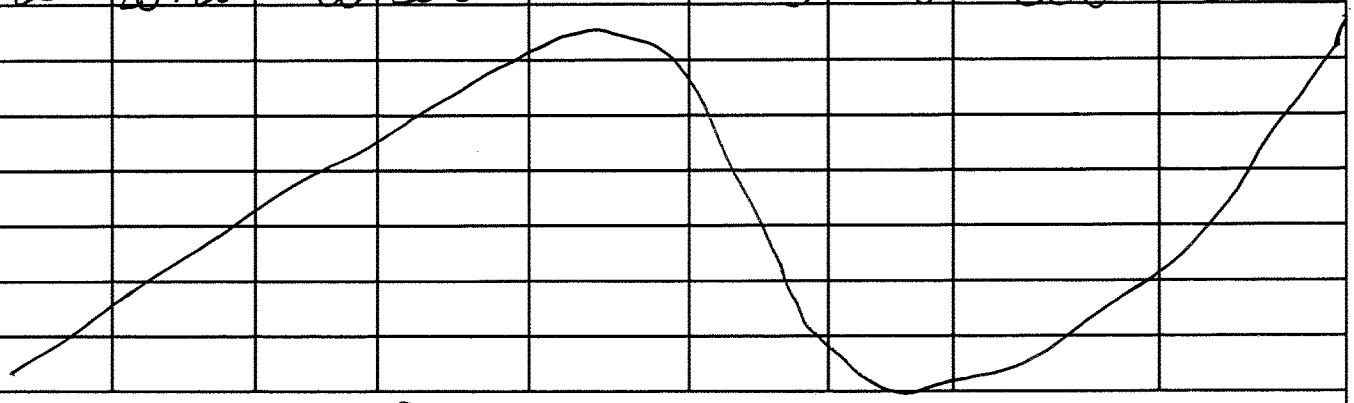
LOW FLOW WELL MONITORING DATA SHEET

Project #: 210915-FK1	Client: GeoSyntec
Sampler: FK	Gauging Date: 9/15/21
Well I.D.: MW-1	Well Diameter (in.): (2) 3 4 6 8 ___
Total Well Depth (ft.): 14.98	Depth to Water (ft.): 3.20
Depth to Free Product: —	Thickness of Free Product (feet): —
Referenced to: (PVC) Grade	Flow Cell Type: YSI 556

Purge Method: 2" Grundfos Pump (Peristaltic Pump) Bladder Pump
Sampling Method: (Dedicated Tubing) New Tubing Other ___

Start Purge Time: 1154 Flow Rate: 200 ML/min Pump Depth: 9

Time	Temp. (°C or °F)	pH	Cond. (mS/cm or µS/cm)	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Water Removed (gals. or mL)	Depth to Water (ft.)
1157	20.20	7.79	2051	39	2.06	2.0	600	3.20
1200	20.25	7.70	2048	36	1.42	-1.4	1200	3.20
1203	20.28	7.67	2042	29	1.17	-10.0	1800	3.20
1206	20.30	7.66	2038	27	1.10	-14.9	2400	3.20
1209	20.28	7.66	2032	27	1.05	-18.0	3000	3.20



Did well dewater? Yes (No) Amount actually evacuated: 3000 mL

Sampling Time: 1212 Sampling Date: 9/15/21

Sample I.D.: GW-091521-MW-1 Laboratory: ALS

Analyzed for: TPH-G BTEX MTBE TPH-D (Other) See COC

Equipment Blank I.D.: @ Time Duplicate I.D.: —

LOW FLOW WELL MONITORING DATA SHEET

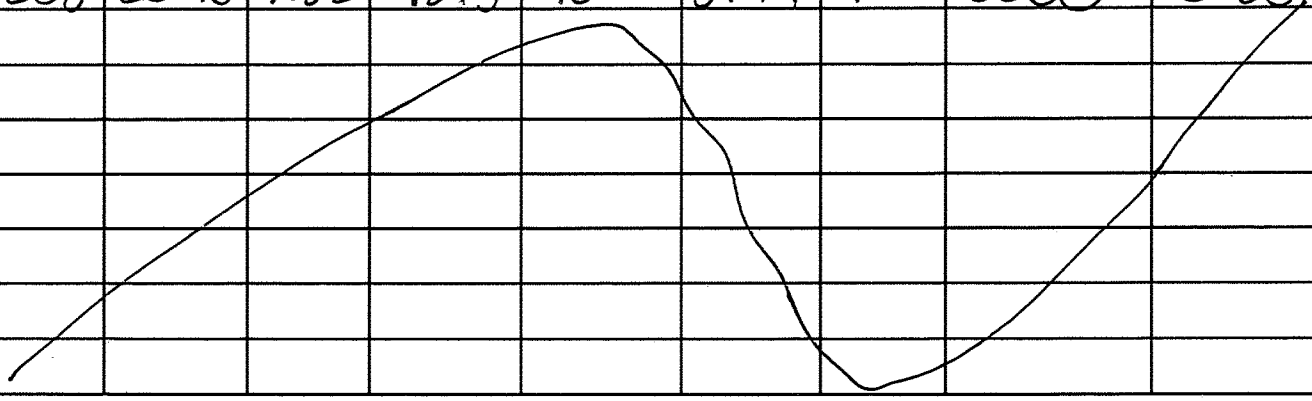
Project #: 210915-FK2	Client: Geosyntec
Sampler: FK	Gauging Date: 9/15/21
Well I.D.: MW-2	Well Diameter (in.): (2) 3 4 6 8 ____
Total Well Depth (ft.): 15.00	Depth to Water (ft.): 5.03
Depth to Free Product: ~~~	Thickness of Free Product (feet): ~~~
Referenced to: (PVC) Grade	Flow Cell Type: YSI 556

Purge Method: 2" Grundfos Pump (Peristaltic Pump) Bladder Pump

Sampling Method: (Dedicated Tubing) New Tubing Other ____

Start Purge Time: 1223 Flow Rate: 200 mL/min Pump Depth: 10

Time	Temp. (°C or °F)	pH	Cond. (mS/cm or µS/cm)	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Water Removed (gals. or mL)	Depth to Water (ft.)
1226	21.79	7.85	4728	26	1.99	-4.3	600	5.08
1229	22.19	7.85	4774	22	1.35	-12.4	1200	5.08
1232	22.42	7.85	4800	15	1.09	-15.7	1800	5.08
1235	22.37	7.84	4805	16	1.00	-17.6	2400	5.08
1238	22.43	7.82	4813	16	0.94	-17.7	3000	5.08



Did well dewater? Yes (No) Amount actually evacuated: 3000 mL

Sampling Time: 1241 Sampling Date: 9/15/21

Sample I.D.: GW-091521-MW-2 Laboratory: ALS

Analyzed for: TPH-G BTEX MTBE TPH-D (Other:) See COC

Equipment Blank I.D.: @ Time Duplicate I.D.: ~~~

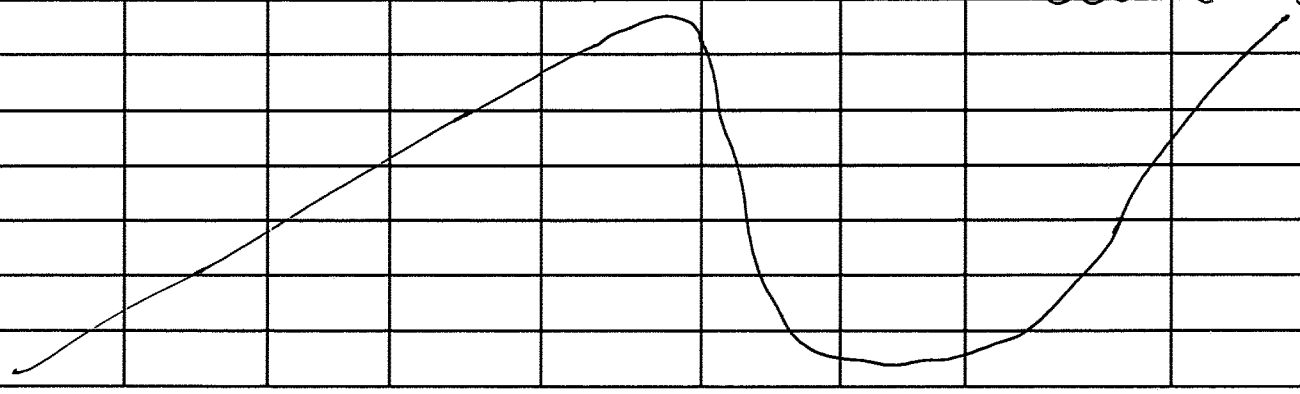
LOW FLOW WELL MONITORING DATA SHEET

Project #: 210915-FK2	Client: GeoSyntec
Sampler: FK	Gauging Date: 9/15/21
Well I.D.: MW-3	Well Diameter (in.): (2) 3 4 6 8 ____
Total Well Depth (ft.): 14.88	Depth to Water (ft.): 5.46
Depth to Free Product: ~~—~~	Thickness of Free Product (feet): ~~—~~
Referenced to: (PVC) Grade	Flow Cell Type: YSI 556

Purge Method: 2" Grundfos Pump (Peristaltic Pump) Bladder Pump
Sampling Method: (Dedicated Tubing) New Tubing Other ____

Start Purge Time: 1118 Flow Rate: 200 ML/min Pump Depth: 10

Time	Temp. (°C or °F)	pH	Cond. (mS/cm or µS/cm)	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Water Removed (gals. or mL)	Depth to Water (ft.)
1121	20.80	7.72	2214	18	2.31	-20.9	600	5.45
1124	20.42	7.86	2205	20	1.92	-32.0	1200	5.45
1127	20.68	7.98	2216	18	1.60	-42.3	1800	5.45
1130	20.65	8.02	2210	19	1.54	-46.9	2400	5.45
1133	20.62	8.04	2218	19	1.49	-50.1	3000	5.45



Did well dewater? Yes (No)	Amount actually evacuated: 3000 mL
Sampling Time: 1136	Sampling Date: 9/15/21
Sample I.D.: GW-091521-MW-3	Laboratory: ALS
Analyzed for: TPH-G BTEX MTBE TPH-D	(Other) See COC
Equipment Blank I.D.: @ Time	Duplicate I.D.: GW-091521-DUP-1

LOW FLOW WELL MONITORING DATA SHEET

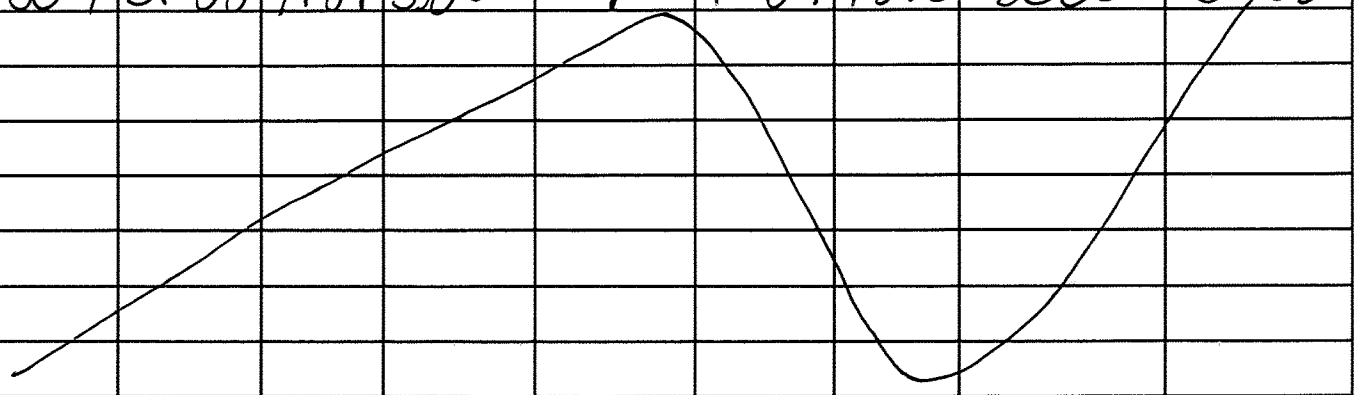
Project #: 210915-FK2	Client: Geosyntec
Sampler: FK	Gauging Date: 9/15/21
Well I.D.: MW-4	Well Diameter (in.): (2) 3 4 6 8 ____
Total Well Depth (ft.): 14.88	Depth to Water (ft.): 5.40
Depth to Free Product: ———	Thickness of Free Product (feet): ———
Referenced to: (PVC) Grade	Flow Cell Type: YSI 556

Purge Method: 2" Grundfos Pump (Peristaltic Pump) Bladder Pump

Sampling Method: (Dedicated Tubing) New Tubing Other ____

Start Purge Time: 1252 Flow Rate: 200 mL/min Pump Depth: 10

Time	Temp. (°C or °F)	pH	Cond. (mS/cm or µS/cm)	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)	Water Removed (gals. or mL)	Depth to Water (ft.)
1255	20.53	7.93	5465	24	1.88	6.9	600	5.45
1258	21.12	7.87	5548	20	1.51	7.1	1200	5.48
1301	21.05	7.86	5564	18	1.22	12.5	1800	5.51
1304	21.09	7.84	5579	19	1.14	16.4	2400	5.54
1307	21.08	7.84	5562	19	1.09	18.0	3000	5.56



Did well dewater? Yes (No)	Amount actually evacuated: 3000 mL
Sampling Time: 1310	Sampling Date: 9/15/21
Sample I.D.: GW-091521-MW-4	Laboratory: ALS
Analyzed for: TPH-G BTEX MTBE TPH-D	Other: ———
Equipment Blank I.D.: @ Time	Duplicate I.D.: ———

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only)

Date 9/15/21 Page 1 Of 1

PROJECT ID:
REPORT TO COMPANY: GeoSynter
PROJECT MANAGER: Rose Bier
ADDRESS: 101 N 1st St
Sunnyside WA
PHONE: (305) 903-9318 P.O. #:
E-MAIL:
INVOICE TO COMPANY:
ATTENTION:
ADDRESS:

ANALYSIS REQUESTED

OTHER (Specify)

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA 8021 ☐ BTEX by EPA 8260 ☐	MTBE by EPA 8021 ☐ MTBE by EPA 8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	PCB by EPA 8082 ☐ Pesticides by EPA 8081 ☐	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	Nitrates/Nitrogen	Total Metals	Dissolved Metals (filtered)	Sulfate				NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. GW-091521-MW-1	9/15/21	1212																	X	X	X	X				3	
2. GW-091521-MW-2	9/15/21	1241																	X	X	X	X				3	
3. GW-091521-MW-3	9/15/21	1136																	X	X	X	X				3	
4. GW-091521-MW-4	9/15/21	1310																	X	X	X	X				3	
5. GW-091521-DUP1	9/15/21	1200																	X	X	X	X				3	
6.																											
7.																											
8.																											
9.																											
10.																											

SPECIAL INSTRUCTIONS Metals are: Arsenic, cobalt & Molybdenum

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: BTS 9/15/21 0810
   Received By: ALS 9/15/21 08:10
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 Standard | 5 | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard | 3 | 1 | SAME DAY

OTHER:
Specify:

*Turnaround request less than standard may incur Rush Charges

WELLHEAD INSPECTION FORM

Client: Geosyntec Site: 101 N 1st St Sunnyside WA Date: 9/15/21

Job #: 210915-FK2 Technician: Foster K Page 1 of 1

Well ID	Well Inspected - No Corrective Action Required	Check indicates deficiency: Cap non-functional	Lock non-functional	Lock missing	Bolts missing (list qty)	Tabs stripped (list qty)	Tabs broken (list qty)	Annular seal incomplete	Apron damaged	Rim / Lid broken	Trip Hazard	Below Grade	Other (explain in notes)	Well Not Inspected (explain in notes)	Notes (list if cap or lick replaced, if there are access issues associated with repairs, if traffic control is required, if stand pipe damaged, or any specific details not covered by checklist)
MW-1				X											
MW-2				X											
MW-3				X											
MW-4				X											

NOTES:

TEST EQUIPMENT CALIBRATION LOG

PROJECT NAME 101 N 1st St Sunnyside WA				PROJECT NUMBER 210915-FK2			
EQUIPMENT NAME	EQUIPMENT NUMBER	DATE/TIME OF TEST	STANDARDS USED	EQUIPMENT READING	CALIBRATED TO: OR WITHIN 10%:	TEMP.	INITIALS
YSI 556	BTS #6	9/15/21 0550	pH 4 7 10	4.03 7.04 10.03	√	16.30°C 16.08 16.21°	FK
			cond 3900 us/cm DO 100%	3888 us/cm 97.9%	√	16.39°C 15.94°C	FK
			ORP 237.5 mV	240.0mV	√	16.45°C	FK

SPH or Purge Water Drum Log

Client: Geosyntec

Site Address: 101 N 1st St Sunnyside WA

STATUS OF DRUM(S) UPON ARRIVAL

Date	9/2/20	12/9/20	3/3/21	6/9/21	9/15/21	
Number of drum(s) empty:	0	0	0	0	0	
Number of drum(s) 1/4 full:	0	0	0	0	0	
Number of drum(s) 1/2 full:	1	1	1	1	0	
Number of drum(s) 3/4 full:	0	0	0	0	0	
Number of drum(s) full:	9	9	8	8	3	
Total drum(s) on site:	10	10	9	9	3	
Are the drum(s) properly labeled?	Yes	Yes	Yes	YES	Yes	
Drum ID & Contents:	purge & decon H2O soil cuttings	purge & decon H2O soil cuttings	purge & soil cuttings	MIXED	Mixed	
If any drum(s) are partially or totally filled, what is the first use date:						

- If you add any SPH to an empty or partially filled drum, drum must have at least 20 gals. of Purgewater or DI Water.

-If drum contains SPH, the drum MUST be steel AND labeled with the appropriate label.

-All BTS drums MUST be labeled appropriately.

STATUS OF DRUM(S) UPON DEPARTURE

Date	9/2/20	12/9/20	3/3/21	6/9/21	9/15/21	
Number of drums empty:	0	0	0	0	0	
Number of drum(s) 1/4 full:	0	0	0	0	1	
Number of drum(s) 1/2 full:	1	1	1	1	0	
Number of drum(s) 3/4 full:	0	0	0	0	0	
Number of drum(s) full:	9	9	8	8	3	
Total drum(s) on site:	10	10	9	9	4	
Are the drum(s) properly labeled?	Yes	Yes	Yes	YES	Yes	
Drum ID & Contents:	purge & decon H2O soil cuttings	purge & decon H2O soil cuttings	purge & soil cuttings	MIXED	Mixed	

LOCATION OF DRUM(S)

Describe location of drum(s): Next to MW-2 by telephone Pole

FINAL STATUS

Number of new drum(s) left on site this event	0	0	0	0	1	
Date of inspection:	9/2/20	12/9/20	3/3/21	6/9/21	9/15/21	
Drum(s) labelled properly:	Yes	Yes	Yes	YES	Yes	
Logged by BTS Field Tech:	FK	FK	AH	LB	FK	
Office reviewed by:						

ATTACHMENT 5

2nd and 3rd Quarter 2021 Groundwater Monitoring Laboratory Analytical Reports

June 15, 2021

Mr. Luke Smith
Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101

Dear Mr. Smith,

On June 10th, 5 samples were received by our laboratory and assigned our laboratory project number EV21060053. The project was identified as your Sunnyside, WA. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Glen Perry
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	6/15/2021 EV21060053 EV21060053-01
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/10/2021
CLIENT PROJECT:	Sunnyside, WA	COLLECTION DATE:	6/9/2021 11:05:00 AM
CLIENT SAMPLE ID	GW-060921-MW-1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**14**	0.34	10	MG/L	06/10/2021	RAL
Arsenic	EPA-200.8	**11**	1.0	1	UG/L	06/11/2021	RAL
Cobalt	EPA-200.8	**1.4**	1.0	1	UG/L	06/11/2021	RAL
Molybdenum	EPA-200.8	**22**	1.0	1	UG/L	06/11/2021	RAL
Nickel	EPA-200.8	**3.8**	2.0	1	UG/L	06/11/2021	RAL
Arsenic (Dissolved)	EPA-200.8	**10**	1.0	1	UG/L	06/11/2021	RAL
Cobalt (Dissolved)	EPA-200.8	U	1.0	1	UG/L	06/11/2021	RAL
Molybdenum (Dissolved)	EPA-200.8	**27**	1.0	1	UG/L	06/11/2021	RAL
Nickel (Dissolved)	EPA-200.8	U	2.0	1	UG/L	06/11/2021	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

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ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	6/15/2021 EV21060053 EV21060053-02
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/10/2021
CLIENT PROJECT:	Sunnyside, WA	COLLECTION DATE:	6/9/2021 12:40:00 PM
CLIENT SAMPLE ID	GW-060921-MW-2	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**94**	1.7	50	MG/L	06/10/2021	RAL
Arsenic	EPA-200.8	**76**	1.0	1	UG/L	06/11/2021	RAL
Cobalt	EPA-200.8	**9.1**	1.0	1	UG/L	06/11/2021	RAL
Molybdenum	EPA-200.8	**33**	1.0	1	UG/L	06/11/2021	RAL
Nickel	EPA-200.8	**91**	2.0	1	UG/L	06/11/2021	RAL
Arsenic (Dissolved)	EPA-200.8	**80**	1.0	1	UG/L	06/11/2021	RAL
Cobalt (Dissolved)	EPA-200.8	**9.7**	1.0	1	UG/L	06/11/2021	RAL
Molybdenum (Dissolved)	EPA-200.8	**37**	1.0	1	UG/L	06/11/2021	RAL
Nickel (Dissolved)	EPA-200.8	**88**	2.0	1	UG/L	06/11/2021	RAL

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ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	6/15/2021 EV21060053 EV21060053-03
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/10/2021
CLIENT PROJECT:	Sunnyside, WA	COLLECTION DATE:	6/9/2021 12:08:00 PM
CLIENT SAMPLE ID	GW-060921-MW-3	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**27**	0.34	10	MG/L	06/10/2021	RAL
Arsenic	EPA-200.8	**71**	1.0	1	UG/L	06/11/2021	RAL
Cobalt	EPA-200.8	U	1.0	1	UG/L	06/11/2021	RAL
Molybdenum	EPA-200.8	**50**	1.0	1	UG/L	06/11/2021	RAL
Nickel	EPA-200.8	**2.9**	2.0	1	UG/L	06/11/2021	RAL
Arsenic (Dissolved)	EPA-200.8	**71**	1.0	1	UG/L	06/11/2021	RAL
Cobalt (Dissolved)	EPA-200.8	U	1.0	1	UG/L	06/11/2021	RAL
Molybdenum (Dissolved)	EPA-200.8	**50**	1.0	1	UG/L	06/11/2021	RAL
Nickel (Dissolved)	EPA-200.8	**2.7**	2.0	1	UG/L	06/11/2021	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	6/15/2021 EV21060053 EV21060053-04
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/10/2021
CLIENT PROJECT:	Sunnyside, WA	COLLECTION DATE:	6/9/2021 11:40:00 AM
CLIENT SAMPLE ID	GW-060921-MW-4	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**170**	3.4	100	MG/L	06/10/2021	RAL
Arsenic	EPA-200.8	**65**	1.0	1	UG/L	06/11/2021	RAL
Cobalt	EPA-200.8	**17**	1.0	1	UG/L	06/11/2021	RAL
Molybdenum	EPA-200.8	**110**	1.0	1	UG/L	06/11/2021	RAL
Nickel	EPA-200.8	**77**	2.0	1	UG/L	06/11/2021	RAL
Arsenic (Dissolved)	EPA-200.8	**66**	1.0	1	UG/L	06/11/2021	RAL
Cobalt (Dissolved)	EPA-200.8	**17**	1.0	1	UG/L	06/11/2021	RAL
Molybdenum (Dissolved)	EPA-200.8	**120**	1.0	1	UG/L	06/11/2021	RAL
Nickel (Dissolved)	EPA-200.8	**75**	2.0	1	UG/L	06/11/2021	RAL

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ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	6/15/2021 EV21060053 EV21060053-05
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/10/2021
CLIENT PROJECT:	Sunnyside, WA	COLLECTION DATE:	6/9/2021
CLIENT SAMPLE ID	GW-060921-Dup-1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**100**	1.7	50	MG/L	06/10/2021	RAL
Arsenic	EPA-200.8	**76**	1.0	1	UG/L	06/11/2021	RAL
Cobalt	EPA-200.8	**8.5**	1.0	1	UG/L	06/11/2021	RAL
Molybdenum	EPA-200.8	**31**	1.0	1	UG/L	06/11/2021	RAL
Nickel	EPA-200.8	**91**	2.0	1	UG/L	06/11/2021	RAL
Arsenic (Dissolved)	EPA-200.8	**78**	1.0	1	UG/L	06/11/2021	RAL
Cobalt (Dissolved)	EPA-200.8	**9.6**	1.0	1	UG/L	06/11/2021	RAL
Molybdenum (Dissolved)	EPA-200.8	**36**	1.0	1	UG/L	06/11/2021	RAL
Nickel (Dissolved)	EPA-200.8	**89**	2.0	1	UG/L	06/11/2021	RAL

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ALS Group USA, Corp dba ALS Environmental

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CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	6/15/2021
		ALS SDG#:	EV21060053
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Luke Smith		
CLIENT PROJECT:	Sunnyside, WA		

LABORATORY BLANK RESULTS

MBLK-R385413 - Batch R385413 - Water by EPA-300.0

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	U	MG/L	0.034	06/10/2021	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MB-061021W - Batch 166777 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-200.8	U	UG/L	1.0	06/11/2021	RAL
Cobalt	EPA-200.8	U	UG/L	1.0	06/11/2021	RAL
Molybdenum	EPA-200.8	U	UG/L	1.0	06/11/2021	RAL
Nickel	EPA-200.8	U	UG/L	2.0	06/11/2021	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MB-061021W - Batch 166778 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved)	EPA-200.8	U	UG/L	1.0	06/11/2021	RAL
Cobalt (Dissolved)	EPA-200.8	U	UG/L	1.0	06/11/2021	RAL
Molybdenum (Dissolved)	EPA-200.8	U	UG/L	1.0	06/11/2021	RAL
Nickel (Dissolved)	EPA-200.8	U	UG/L	2.0	06/11/2021	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	6/15/2021
		ALS SDG#:	EV21060053
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Luke Smith		
CLIENT PROJECT:	Sunnyside, WA		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: R385413 - Water by EPA-300.0

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Nitrate as N - BS	EPA-300.0	**99.0**			80	120	06/10/2021	RAL
Nitrate as N - BSD	EPA-300.0	**100**	**1**		80	120	06/10/2021	RAL

ALS Test Batch ID: 166777 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Arsenic - BS	EPA-200.8	**95.9**			89.1	110	06/11/2021	RAL
Arsenic - BSD	EPA-200.8	**95.3**	**1**		89.1	110	06/11/2021	RAL
Cobalt - BS	EPA-200.8	**101**			85.8	108	06/11/2021	RAL
Cobalt - BSD	EPA-200.8	**99.1**	**2**		85.8	108	06/11/2021	RAL
Molybdenum - BS	EPA-200.8	**96.6**			90.3	113	06/11/2021	RAL
Molybdenum - BSD	EPA-200.8	**96.5**	**0**		90.3	113	06/11/2021	RAL
Nickel - BS	EPA-200.8	**95.5**			85.4	109	06/11/2021	RAL
Nickel - BSD	EPA-200.8	**94.9**	**1**		85.4	109	06/11/2021	RAL

ALS Test Batch ID: 166778 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved) - BS	EPA-200.8	**95.9**			89.1	110	06/11/2021	RAL
Arsenic (Dissolved) - BSD	EPA-200.8	**95.3**	**1**		89.1	110	06/11/2021	RAL
Cobalt (Dissolved) - BS	EPA-200.8	**101**			85.8	108	06/11/2021	RAL
Cobalt (Dissolved) - BSD	EPA-200.8	**99.1**	**2**		85.8	108	06/11/2021	RAL
Molybdenum (Dissolved) - BS	EPA-200.8	**96.6**			90.3	113	06/11/2021	RAL
Molybdenum (Dissolved) - BSD	EPA-200.8	**96.5**	**0**		90.3	113	06/11/2021	RAL
Nickel (Dissolved) - BS	EPA-200.8	**95.5**			85.4	109	06/11/2021	RAL
Nickel (Dissolved) - BSD	EPA-200.8	**94.9**	**1**		85.4	109	06/11/2021	RAL

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV2106053

Date 6/9/21 Page 1 Of 1

PROJECT ID: SUNNYSIDE
REPORT TO COMPANY: GEOSYNTEC
PROJECT MANAGER: LUKE SMITH
ADDRESS: 101 N 1ST STREET
SUNNYSIDE, WA
PHONE: P.O. #:
E-MAIL:
INVOICE TO COMPANY: GEOSYNTEC
ATTENTION: LUKE SMITH
ADDRESS:

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA 8021 ☐ BTEX by EPA 8260 ☐	MTBE by EPA 8021 ☐ MTBE by EPA 8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	PCB by EPA 8082 ☐ Pesticides by EPA 8081 ☐	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify): NITROGEN, NITRATE (EPA 300)	OTHER (Specify): TOTAL ARSENIC, COBALT, MOLYBDENUM, NICKEL		OTHER (Specify): DISSOLVED: ARSENIC, COBALT, MOLYBDENUM, NICKEL (FF)				NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. GW-060921-MW-1	6/9/21	1105	W	1															X	X		X						
2. GW-060921-MW-2		1240	W	2															X	X		X						
3. GW-060921-MW-3		1208	W	3															X	X		X						
4. GW-060921-MW-4		1140	W	4															X	X		X						
5. GW-060921-DUP-1		—	W	5															X	X		X						
6.																												
7.																												
8.																												
9.																												
10.																												

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: BJB 6/10/21 0905
   Received By: ALS 6/10/2021 0905
2. Relinquished By: _____
   Received By: _____

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: [10 Standard] [5] [3] [2] [1] [SAME DAY]

Fuels & Hydrocarbon Analysis: [5 Standard] [3] [1] [SAME DAY]

OTHER: Specify: _____

*Turnaround request less than standard may incur Rush Charges

September 24, 2021

Ms. Rose Bier
Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101

Dear Ms. Bier,

On September 16th, 5 samples were received by our laboratory and assigned our laboratory project number EV21090085. The project was identified as your None Given. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Glen Perry
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	9/24/2021 EV21090085 EV21090085-01
CLIENT CONTACT:	Rose Bier	DATE RECEIVED:	09/16/2021
CLIENT PROJECT:	None Given	COLLECTION DATE:	9/15/2021 2:12:00 PM
CLIENT SAMPLE ID	GW-091521-MW-1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**13**	0.34	10	MG/L	09/16/2021	RAL
Sulfate	EPA-300.0	**210**	13	50	MG/L	09/23/2021	EBS
Arsenic	EPA-200.8	**11**	1.0	1	UG/L	09/16/2021	EBS
Cobalt	EPA-200.8	U	1.0	1	UG/L	09/16/2021	EBS
Molybdenum	EPA-200.8	**30**	1.0	1	UG/L	09/16/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**11**	1.0	1	UG/L	09/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	1.0	1	UG/L	09/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**29**	1.0	1	UG/L	09/16/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	9/24/2021
		ALS JOB#:	EV21090085
		ALS SAMPLE#:	EV21090085-02
CLIENT CONTACT:	Rose Bier	DATE RECEIVED:	09/16/2021
CLIENT PROJECT:	None Given	COLLECTION DATE:	9/15/2021 2:41:00 PM
CLIENT SAMPLE ID	GW-091521-MW-2	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**92**	1.7	50	MG/L	09/16/2021	RAL
Sulfate	EPA-300.0	**700**	13	50	MG/L	09/16/2021	RAL
Arsenic	EPA-200.8	**79**	1.0	1	UG/L	09/16/2021	EBS
Cobalt	EPA-200.8	**8.2**	1.0	1	UG/L	09/16/2021	EBS
Molybdenum	EPA-200.8	**30**	1.0	1	UG/L	09/16/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**77**	1.0	1	UG/L	09/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	**8.2**	1.0	1	UG/L	09/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**31**	1.0	1	UG/L	09/16/2021	EBS

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	9/24/2021 EV21090085 EV21090085-03
CLIENT CONTACT:	Rose Bier	DATE RECEIVED:	09/16/2021
CLIENT PROJECT:	None Given	COLLECTION DATE:	9/15/2021 1:36:00 PM
CLIENT SAMPLE ID	GW-091521-MW-3	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**19**	0.69	20	MG/L	09/16/2021	RAL
Sulfate	EPA-300.0	**190**	5.2	20	MG/L	09/16/2021	RAL
Arsenic	EPA-200.8	**60**	1.0	1	UG/L	09/16/2021	EBS
Cobalt	EPA-200.8	U	1.0	1	UG/L	09/16/2021	EBS
Molybdenum	EPA-200.8	**42**	1.0	1	UG/L	09/16/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**60**	1.0	1	UG/L	09/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	1.0	1	UG/L	09/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**45**	1.0	1	UG/L	09/16/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	9/24/2021 EV21090085 EV21090085-04
CLIENT CONTACT:	Rose Bier	DATE RECEIVED:	09/16/2021
CLIENT PROJECT:	None Given	COLLECTION DATE:	9/15/2021 3:10:00 PM
CLIENT SAMPLE ID	GW-091521-MW-4	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**180**	3.4	100	MG/L	09/16/2021	RAL
Sulfate	EPA-300.0	**710**	26	100	MG/L	09/16/2021	RAL
Arsenic	EPA-200.8	**64**	1.0	1	UG/L	09/16/2021	EBS
Cobalt	EPA-200.8	**18**	1.0	1	UG/L	09/16/2021	EBS
Molybdenum	EPA-200.8	**120**	1.0	1	UG/L	09/16/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**65**	1.0	1	UG/L	09/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	**18**	1.0	1	UG/L	09/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**120**	1.0	1	UG/L	09/16/2021	EBS

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	9/24/2021 EV21090085 EV21090085-05
CLIENT CONTACT:	Rose Bier	DATE RECEIVED:	09/16/2021
CLIENT PROJECT:	None Given	COLLECTION DATE:	9/15/2021 2:00:00 PM
CLIENT SAMPLE ID	GW-091521-DUP-1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**20**	0.69	20	MG/L	09/16/2021	RAL
Sulfate	EPA-300.0	**180**	5.2	20	MG/L	09/16/2021	RAL
Arsenic	EPA-200.8	**58**	1.0	1	UG/L	09/16/2021	EBS
Cobalt	EPA-200.8	U	1.0	1	UG/L	09/16/2021	EBS
Molybdenum	EPA-200.8	**39**	1.0	1	UG/L	09/16/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**59**	1.0	1	UG/L	09/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	1.0	1	UG/L	09/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**43**	1.0	1	UG/L	09/16/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	9/24/2021
		ALS SDG#:	EV21090085
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Rose Bier		
CLIENT PROJECT:	None Given		

LABORATORY BLANK RESULTS

MBLK-R392026 - Batch R392026 - Water by EPA-300.0

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	U	MG/L	0.034	09/16/2021	RAL
Sulfate	EPA-300.0	U	MG/L	0.26	09/16/2021	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R392030 - Batch R392030 - Water by EPA-300.0

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Sulfate	EPA-300.0	U	MG/L	0.26	09/23/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

MB-091621W - Batch 170233 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-200.8	U	UG/L	1.0	09/16/2021	EBS
Cobalt	EPA-200.8	U	UG/L	1.0	09/16/2021	EBS
Molybdenum	EPA-200.8	U	UG/L	1.0	09/16/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

MB-091621W - Batch 170234 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved)	EPA-200.8	U	UG/L	1.0	09/16/2021	EBS
Cobalt (Dissolved)	EPA-200.8	U	UG/L	1.0	09/16/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	U	UG/L	1.0	09/16/2021	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT: Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101
CLIENT CONTACT: Rose Bier
CLIENT PROJECT: None Given

DATE: 9/24/2021
ALS SDG#: EV21090085
WDOE ACCREDITATION: C601

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: R392026 - Water by EPA-300.0

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Nitrate as N - BS	EPA-300.0	**105**			80	120	09/16/2021	RAL
Nitrate as N - BSD	EPA-300.0	**104**	**1**		80	120	09/16/2021	RAL
Sulfate - BS	EPA-300.0	**100**			80	120	09/16/2021	RAL
Sulfate - BSD	EPA-300.0	**104**	**4**		80	120	09/16/2021	RAL

ALS Test Batch ID: R392030 - Water by EPA-300.0

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Sulfate - BS	EPA-300.0	**100**			80	120	09/23/2021	EBS
Sulfate - BSD	EPA-300.0	**104**	**4**		80	120	09/23/2021	EBS

ALS Test Batch ID: 170233 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Arsenic - BS	EPA-200.8	**102**			89.1	110	09/16/2021	EBS
Arsenic - BSD	EPA-200.8	**102**	**0**		89.1	110	09/16/2021	EBS
Cobalt - BS	EPA-200.8	**103**			85.8	108	09/16/2021	EBS
Cobalt - BSD	EPA-200.8	**106**	**2**		85.8	108	09/16/2021	EBS
Molybdenum - BS	EPA-200.8	**98.8**			90.3	113	09/16/2021	EBS
Molybdenum - BSD	EPA-200.8	**101**	**2**		90.3	113	09/16/2021	EBS

ALS Test Batch ID: 170234 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved) - BS	EPA-200.8	**102**			89.1	110	09/16/2021	EBS
Arsenic (Dissolved) - BSD	EPA-200.8	**102**	**0**		89.1	110	09/16/2021	EBS
Cobalt (Dissolved) - BS	EPA-200.8	**103**			85.8	108	09/16/2021	EBS
Cobalt (Dissolved) - BSD	EPA-200.8	**106**	**2**		85.8	108	09/16/2021	EBS
Molybdenum (Dissolved) - BS	EPA-200.8	**98.8**			90.3	113	09/16/2021	EBS
Molybdenum (Dissolved) - BSD	EPA-200.8	**101**	**2**		90.3	113	09/16/2021	EBS

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV2190085

Date 9/15/21 Page 1 Of 1

PROJECT ID:
REPORT TO COMPANY: GeoSyntec
PROJECT MANAGER: Rose Bier
ADDRESS: 101 N 1st St
Sunnyside WA
PHONE: (305) 903-4318 P.O. #:
E-MAIL:
INVOICE TO COMPANY:
ATTENTION:
ADDRESS:

ANALYSIS REQUESTED

OTHER (Specify)

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA 8021 ☐ BTEX by EPA 8260 ☐	MTBE by EPA 8021 ☐ MTBE by EPA 8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	PCB by EPA 8082 ☐ Pesticides by EPA 8081 ☐	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	Nitrates as Nitrogen	Total Metals	Dissolved Metals (Field Filtered)	Sulfate				NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. GW-091521-MW-1	9/15/21	1212	W	1															X	X	X	X				3	
2. GW-091521-MW-2	9/15/21	1241		2															X	X	X	X				3	
3. GW-091521-MW-3	9/15/21	1136		3															X	X	X	X				3	
4. GW-091521-MW-4	9/15/21	1310		4															X	X	X	X				3	
5. GW-091521-DUP-1	9/15/21	1200		5															X	X	X	X				3	
6.																											
7.																											
8.																											
9.																											
10.																											

SPECIAL INSTRUCTIONS: Metals are: Arsenic, cobalt & Molybdenum

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: ~~[illegible]~~ BTS 9/16/21 0810
   Received By: Shipping ALS 9/16/21 08:10
2. Relinquished By: _____
   Received By: _____

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 (Standard) | 5 | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 (Standard) | 3 | 1 | SAME DAY

OTHER: Specify: _____

*Turnaround request less than standard may incur Rush Charges

APPENDIX B
Terrestrial Ecological Evaluation

APPENDIX B
Terrestrial Ecological Evaluation

Voluntary Cleanup Program

Washington State Department of Ecology
Toxics Cleanup Program

TERRESTRIAL ECOLOGICAL EVALUATION FORM

Under the Model Toxics Control Act (MTCA), a terrestrial ecological evaluation is necessary if hazardous substances are released into the soils at a Site. In the event of such a release, you must take one of the following three actions as part of your investigation and cleanup of the Site:

1. Document an exclusion from further evaluation using the criteria in WAC 173-340-7491.
2. Conduct a simplified evaluation as set forth in WAC 173-340-7492.
3. Conduct a site-specific evaluation as set forth in WAC 173-340-7493.

When requesting a written opinion under the Voluntary Cleanup Program (VCP), you must complete this form and submit it to the Department of Ecology (Ecology). The form documents the type and results of your evaluation.

Completion of this form is not sufficient to document your evaluation. You still need to document your analysis and the basis for your conclusion in your cleanup plan or report.

If you have questions about how to conduct a terrestrial ecological evaluation, please contact the Ecology site manager assigned to your Site. For additional guidance, please refer to https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Terrestrial-ecological-evaluation.

Step 1: IDENTIFY HAZARDOUS WASTE SITE	
Please identify below the hazardous waste site for which you are documenting an evaluation.	
Facility/Site Name: Nachurs Alpine Solutions	
Facility/Site Address: 101 North 1st Street in Sunnyside, Washington	
Facility/Site No: 29243	VCP Project No.: CE0510

Step 2: IDENTIFY EVALUATOR			
Please identify below the person who conducted the evaluation and their contact information.			
Name: Melissa Asher			Title: Senior Principal
Organization: Geosyntec Consultants			
Mailing address: 520 Pike Street, Suite #2600			
City: Seattle		State: WA	Zip code: 98101
Phone: 206-496-1449	Fax: NA	E-mail: masher@geosyntec.com	

Step 3: DOCUMENT EVALUATION TYPE AND RESULTS

A. Exclusion from further evaluation.

1. Does the Site qualify for an exclusion from further evaluation?

☒ Yes *If you answered **"YES,"** then answer **Question 2**.*

☐ No or Unknown *If you answered **"NO" or "UNKNOWN,"** then skip to **Step 3B** of this form.*

2. What is the basis for the exclusion? *Check all that apply. Then skip to **Step 4** of this form.*

Point of Compliance: WAC 173-340-7491(1)(a)

☒ All soil contamination is, or will be,* at least 15 feet below the surface.

☐ All soil contamination is, or will be,* at least 6 feet below the surface (or alternative depth if approved by Ecology), and institutional controls are used to manage remaining contamination.

Barriers to Exposure: WAC 173-340-7491(1)(b)

☐ All contaminated soil, is or will be,* covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.

Undeveloped Land: WAC 173-340-7491(1)(c)

☐ There is less than 0.25 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.

☒ For sites not containing any of the chemicals mentioned above, there is less than 1.5 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site.

Background Concentrations: WAC 173-340-7491(1)(d)

☐ Concentrations of hazardous substances in soil do not exceed natural background levels as described in WAC 173-340-200 and 173-340-709.

* An exclusion based on future land use must have a completion date for future development that is acceptable to Ecology.

[±] "Undeveloped land" is land that is not covered by building, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil.

[#] "Contiguous" undeveloped land is an area of undeveloped land that is not divided into smaller areas of highways, extensive paving, or similar structures that are likely to reduce the potential use of the overall area by wildlife.

B. Simplified evaluation.

1. Does the Site qualify for a simplified evaluation?

☐ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No or Unknown *If you answered **"NO"** or **"UNKNOWN,"** then skip to **Step 3C** of this form.*

2. Did you conduct a simplified evaluation?

☐ Yes *If you answered **"YES,"** then answer **Question 3** below.*

☐ No *If you answered **"NO,"** then skip to **Step 3C** of this form.*

3. Was further evaluation necessary?

☐ Yes *If you answered **"YES,"** then answer **Question 4** below.*

☐ No *If you answered **"NO,"** then answer **Question 5** below.*

4. If further evaluation was necessary, what did you do?

☐ Used the concentrations listed in Table 749-2 as cleanup levels. *If so, then skip to **Step 4** of this form.*

☐ Conducted a site-specific evaluation. *If so, then skip to **Step 3C** of this form.*

5. If no further evaluation was necessary, what was the reason? *Check all that apply. Then skip to **Step 4** of this form.*

Exposure Analysis: WAC 173-340-7492(2)(a)

☐ Area of soil contamination at the Site is not more than 350 square feet.

☐ Current or planned land use makes wildlife exposure unlikely. Used Table 749-1.

Pathway Analysis: WAC 173-340-7492(2)(b)

☐ No potential exposure pathways from soil contamination to ecological receptors.

Contaminant Analysis: WAC 173-340-7492(2)(c)

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations that exceed the values listed in Table 749-2.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays, and institutional controls are used to manage remaining contamination.

C. Site-specific evaluation. A site-specific evaluation process consists of two parts: (1) formulating the problem, and (2) selecting the methods for addressing the identified problem. Both steps require consultation with and approval by Ecology. *See* WAC 173-340-7493(1)(c).

1. Was there a problem? *See* WAC 173-340-7493(2).

☐ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No *If you answered **"NO,"** then identify the reason here and then skip to **Question 5** below:*

- ☐ No issues were identified during the problem formulation step.
- ☐ While issues were identified, those issues were addressed by the cleanup actions for protecting human health.

2. What did you do to resolve the problem? *See* WAC 173-340-7493(3).

- ☐ Used the concentrations listed in Table 749-3 as cleanup levels. *If so, then skip to **Question 5** below.*
- ☐ Used one or more of the methods listed in WAC 173-340-7493(3) to evaluate and address the identified problem. *If so, then answer **Questions 3 and 4** below.*

3. If you conducted further site-specific evaluations, what methods did you use?
Check all that apply. See WAC 173-340-7493(3).

- ☐ Literature surveys.
- ☐ Soil bioassays.
- ☐ Wildlife exposure model.
- ☐ Biomarkers.
- ☐ Site-specific field studies.
- ☐ Weight of evidence.
- ☐ Other methods approved by Ecology. If so, please specify:

4. What was the result of those evaluations?

- ☐ Confirmed there was no problem.
- ☐ Confirmed there was a problem and established site-specific cleanup levels.

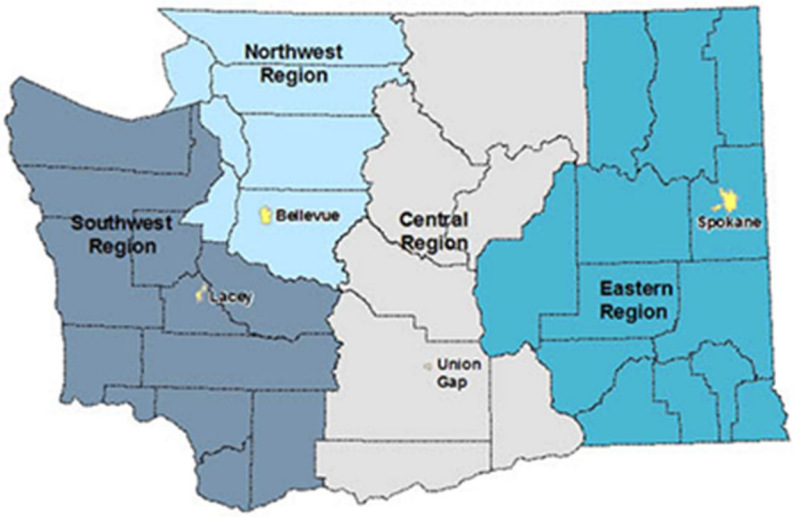
5. Have you already obtained Ecology's approval of both your problem formulation and problem resolution steps?

☐ Yes If so, please identify the Ecology staff who approved those steps:

☐ No

Step 4: SUBMITTAL

Please mail your completed form to the Ecology site manager assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.



Northwest Region: Attn: VCP Coordinator 3190 160th Ave. SE Bellevue, WA 98008-5452	**Central Region:** Attn: VCP Coordinator 1250 West Alder St. Union Gap, WA 98903-0009
Southwest Region: Attn: VCP Coordinator P.O. Box 47775 Olympia, WA 98504-7775	**Eastern Region:** Attn: VCP Coordinator N. 4601 Monroe Spokane WA 99205-1295

If you need this publication in an alternate format, please call the Toxics Cleanup Program at 360-407-7170. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call 877-833-6341.

APPENDIX C
In Situ Denitrification Engineering Design and Implementation Work Plan

Geosyntec consultants

engineers | scientists | innovators

DRAFT APPENDIX C CORRECTIVE ACTION ENGINEERING DESIGN AND IMPLEMENTATION WORK PLAN

FORMER NACHURS ALPINE SOLUTIONS FACILITY SUNNYSIDE, WASHINGTON

Ecology Cleanup Site ID: 14601
Facility/Site ID: 29243
ERTS ID: 682162

Prepared for

Wilbur-Ellis Holdings II, Inc.
345 California Street, 27th Floor
San Francisco, California 94104

Prepared by

Geosyntec Consultants, Inc.
520 Pike Street, Suite 2600
Seattle, Washington 98101

Project Number: PNR0696B

April 8, 2022

Geosyntec consultants

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

µm	micrometer
As	Arsenic
bgs	below ground surface
Blaine Tech	Blaine Tech Services of Auburn, Washington
COPCs	constitiuents of potential concern
DO	dissolved oxygen
DPT	direct-push technology
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
EVO	emulsified vegetable oil
ft	feet
Geosyntec	Geosyntec Consultants, Inc.
gpm	gallons per minute
IDW	investigation-derived waste
ISR	iron sulfide-based reagent
lbs	pounds
mL/min	milliliters per minute
MSDS	Material Safety Data Sheet
NAS	Nachurs Alpine Solutions, LLC
ORP	oxidation reduction potential
QA/QC	quality assurance/quality control
RI/CAP	*Remedial Investigation and Cleanup Action Plan*
ROI	radius of influence
the Site	the former Nachurs Alpine Solutions Facility located at 101 North 1st Street, Sunnyside, Washington
TRL	Target Remediation Level
Wilbur-Ellis	Wilbur-Ellis Holdings II, Inc.

1. INTRODUCTION

This Corrective Action Engineering Design and Implementation Work Plan (work plan) has been prepared for the Washington State Department of Ecology (Ecology) to outline plans for remedial implementation at the former Nachurs Alpine Solutions Facility located at 101 North 1st Street, Sunnyside, Washington (the Site). This document was prepared by Geosyntec Consultants, Inc. (Geosyntec) on behalf of Wilbur-Ellis Holdings II, Inc. (Wilbur-Ellis), the direct parent company of Nachurs Alpine Solutions, LLC (NAS), which was the former operator at the Site. This document has been prepared to meet the requirements of the Model Toxics Control Act (MTCA) administered by Ecology under Chapter 173-340 of the Washington Administrative Code (WAC) and includes the engineering design and implementation work plan for the proposed corrective action of in situ denitrification with contingency arsenic treatment.

This corrective action was proposed to address constituents of potential concern (COPCs) potentially related to former NAS operations at the Site. COPCs primary include nitrate in shallow groundwater. Dissolved arsenic, cobalt, and molybdenum are also COPCs in shallow groundwater and likely a result of mobilization of naturally-occurring metals due to geochemical changes from historical releases of fertilizers at the Site. The objective of this corrective action is to reduce levels of nitrate and metals to Site-Specific Target Remediation Levels (TRLs), as proposed in the RI/CAP.

This engineering design and work plan, presented as Appendix C to the *Remedial Investigation and Cleanup Action Plan* (RI/CAP) is organized as follows:

- Section 2 – Remedial Design
- Section 3 – Pre-Implementation Preparation
- Section 4 – Field Implementation Plans
- Section 5 – Groundwater Compliance Monitoring Plans
- Section 6 – Contingency Planning
- Section 7 – Proposed Implementation Schedule

Tables, figures, and attachments referenced in this document are attached, following the text.

2. REMEDIAL DESIGN

Geosyntec prepared the proposed injection design based on experience at similar Sites and using the Department of Defense's *Emulsion Design Tool Kit*.[1] This section represents the elements of the design including injection volume calculations, amendment selection, and injection method.

[1] https://www.serdp-estcp.org/Tools-and-Training/Environmental-Restoration/Groundwater-Plume-Treatment/Emulsion-Design-Tool-Kit

Details of the injection design are presented in Table 1 and Figure 1 presents the proposed injection locations along with the calculated theoretical radii of influence (ROIs).

It should be noted that with any injection design, the quantities for dosing, injection volumes, and ROI will be variable by injection location and are likely to be adjusted in the field based on field observations (such as but not limited to injection pressures, injection flow rates, and mounding or surfacing observations). As such, the design values presented herein and in Table 1 are intended to be a guide and represent average targets. In addition, the COVID-19 pandemic and other market factors have resulted in limitations on amendment supplies in recent years. The specific amendment products listed herein are anticipated to be used at the Site; however, they may be adjusted based on supply limitations at the time of implementation. If this occurs and an equivalent product is not available, Geosyntec will notify Ecology of the proposed change in amendment prior to implementation.

2.1 Target Injection Area and Volume

The target injection area is presented in the RI/CAP and includes the area shown in Figure 1. This area is approximately 6,800 square feet (sq ft) and includes a sub-area of 1,500 sq ft, which is intended for higher amendment dosing due to relatively higher nitrate concentrations. An injection depth interval is targeted from approximately first groundwater at 5 feet below ground surface (ft bgs) to the bottom of the shallow groundwater zone at approximately 15 ft bgs. This 10 ft injection interval results in a total treatment area of 68,000 cubic feet.

Based on boring logs at the Site, the geology primarily consisting of silty sands and silts with clayey fine sands. As such, a total porosity of 0.4 percent and an effective porosity of 0.2 percent was used to calculate the total target injection volume.[2,3] This equates to a total effective pore volume of 13,600 cubic feet. Assuming injections will target 100% of the effective porosity, the total injection volume is also calculated to be 13,600 cubic feet or 101,700 gallons.

2.2 Amendments

2.2.1 Type and Product Selection

For in situ reduction technologies, including denitrification, electron donors can generally be divided two types: short-chained (rapidly consumed) and long-chained (slowly consumed) hydrocarbons. Additionally, some electron donors will more readily disperse in water allowing for a more even distribution of product in the injectate. For this Site, a combination of short- and long-chained hydrocarbons is proposed, to enhance the rate of initial denitrification of the nitrate currently in groundwater and to also provide a longer lasting electron donor source to continue to reduce nitrate that may flow into the injection area from the upgradient portion of the Site, that may desorb from saturated soil matrices, and that may leach from overlying unsaturated soil. The long-chain electron donor is also expected to promote precipitation of molybdenum and cobalt

[2] Silty soils have a porosity near 0.5, with an effective porosity generally between 0.1 and 0.3 percent. This information was provided by the Effective Porosity of Geologic Materials First Annual Report from the Illinois Department of Energy and Natural Resources in 1984.

[3] Bee Jay Scales (property located approximately 150 cross-gradient of the Site) observed an effective porosity around 0.25 presented in their Phase III Remedial Investigation Report dated 26 October 2007.

under neutral pH conditions. Arsenic concentrations are expected to attenuate after the denitrification process and electron donor has been utilized; however, depending on the valence state of the arsenic compounds, which will be evaluated prior to injection, will either be immobilized as part of the denitrification process or may persist as dissolved in groundwater. As such, based on the results of the arsenic speciation planned as part of the baseline groundwater sampling (Section 5), the addition of iron sulfide to the injectate is included in this work plan as a contingency measure to promote immobilization of arsenic. If this is needed, Geosyntec proposes injection of iron sulfide-based reagent (ISR) from Tersus®. This is further discussed in Section 2.2.3.

Food-grade soybean oil that will be emulsified in water (i.e., emulsified vegetable oil [EVO]) has been selected to provide the long-chain hydrocarbons, and food-grade sodium lactate or equivalent has been selected to provide the short-chain hydrocarbons. For the soybean oil, Geosyntec proposes Tersus® EDS-ER™, a product that Geosyntec has effectively used in remediating similar sites. EDS-ER™ is a long-lasting water mixable soybean oil that is designed to release bio-available hydrogen over a 3 to 5-year period. EDS-ER™ self emulsifies on contact with water and has a low viscosity allowing for efficient distribution into groundwater during injections. To provide a quick release substrate that helps create an anaerobic environment and jumpstart the denitrification process, sodium lactate or equivalent (e.g. high fructose corn syrup or molasses) will be blended with the injection water and EVO. Sodium lactate is a soluble, food grade substrate that is readily bioavailable. Once injected into the groundwater sodium lactate disassociated to form lactate and a sodium ion. Sodium lactate helps rapidly establish reducing conditions in the ground that are conducive to denitrification, while the EVO will provide carbon and hydrogen to support continued denitrification over a longer period of time. The typical lifespan of sodium lactate and many of the quick release substrates is between one week and two months.[4] Material Safety Data Sheets (MSDS) for EDS-ER™ and sodium lactate (Wilclear® product is assumed) are included in Attachment 1.

2.2.2 Electron Donor Dosing and Volumes

In the higher concentration sub-area (portion of the Site that contains nitrate concentration above 500 mg/L in groundwater and nitrate concentrations in soil greater than 100 mg/kg), EVO will be injected into the ground at a target amendment dose of 1.1% oil to water, by volume. In the rest of the target area, EVO will be injected into the ground at a target amendment dose of 0.9% oil to water, by volume. Based on the target volume presented in Section 2.1, the target volume of EVO for injections is approximately 960 gallons, which equates to approximately 1,060 gallons of the EDS-ER™ product (which is approximately 92% oil by volume).

The quantity of sodium lactate that will be blended into the injection water and EVO mixture will be at a ratio of approximately 0.2% percent sodium lactate product to water by volume in the higher concentration subarea and 0.1% in the rest of the target area. The sodium lactate product (Wilclear®) is assumed to be approximately 60% sodium lactate by volume. Based on this

[4] Parsons, 2004. *Principles and Practices of Enhanced Anaerobic Bioremediation of Chlorinated Solvents.* August 2004.

approach, the target quantity of Wilclear® sodium lactate product for injections is approximately 207 gallons.

2.2.3 Iron Sulfide

To evaluate if iron sulfide will be injected in conjunction with EVO injections, a baseline sampling event will be conducted to analyze arsenic speciation as well as concentrations of iron, manganese, nitrate, cobalt, and molybdenum in groundwater. The chemical speciation of arsenic (As) is generally present as As (III) or as As (V) at neutral pH. The groundwater at this Site has generally reducing conditions based on the oxidation-reduction potential of groundwater samples collected from the monitoring wells in 2021. It is expected that the most stable form of arsenic in the groundwater would be As (III). Under reducing or neutral pH conditions, As (III) can become more mobile than As (V). The presence of iron and sulfide in the groundwater results in the precipitation of either arsenic as arsenic sulfide or arsenopyrite, chemically attenuating the dissolved arsenic.

Based on the baseline sampling and arsenic speciation results, Geosyntec proposes injection of ISR from Tersus® to be evaluated as part of a co-injected with EVO into the groundwater to reduce the dissolved arsenic concentrations (below the TRLs). Geosyntec estimate the addition of up to 13 totes of ISR (2,500 lbs per tote) for the Site, which can be variable based on the assessment of As (III) to As (V) ratios in the groundwater.

2.3 Injection Method

Given Site-specific considerations (target depth of injections, Site geology, area of impact, etc.), direct push technology (DPT) is the preferred method of delivering the amendments to the subsurface at the Site. With DPT, the amendments will be injected through an injection tool that is driven by a DPT rig to the desired depth. Injections will likely be conducted in two 5-foot intervals at each location, using a 5 feet long slotted screen. DPT allows for multiple injections to occur at the same time and provides flexibility for field staff to modify injection points in the field-based observations (e.g. pressures, flow rates, mounding, or daylighting/surfacing of amendments).

Geosyntec proposes to install 25 DPT points within the 6,800 sq ft treatment area. This number of locations is based on the proposed theoretical ROI from each injection point of 10 ft, including a 1-foot overlap of the theoretical ROIs at each injection location, as shown in Figure 1.

3. PRE-IMPLEMENTATION PREPARATION

In advance of injections, the following are planned:

- Geosyntec will complete required permits or applications (e.g. underground injection control registration).
- Geosyntec will update the site-specific health and safety plan (HASP) to address the proposed field activities presented herein.
- Geosyntec will contract a private underground utility locating service and notify the 811 Washington Utility Notification Center. A private utility locator will clear the

proposed injection locations of potential utilities and subsurface obstructions. Geosyntec will also coordinate with BNSF to identify and clear underground signal lines associated with the railroad.

- Geosyntec will subcontract the injection to a Washington State licensed driller with experience injecting EVO, ISR (if needed), and sodium lactate in the Yakima region. The driller will provide the water, injection manifold, and an inline mixing system to allow for the blending and dosing of amendments with water.
- Geosyntec will coordinate with NAS for Site access and with BNSF to coordinate flaggers when working within 25 feet of rail lines.
- Geosyntec will locate any stormwater drains in the vicinity of the Site and procure spill kits, in the event of surfacing of amendments during injections.

4. FIELD IMPLEMENTATION PLANS

This section outlines the planned field work to successfully delivery the amendments into the groundwater with the target treatment areas shown in Figure 1. As mentioned in the Section 2, the injection fluid will be delivered into the subsurface via direction injection at approximately 25 locations between 5 and 15 ft bgs.

4.1 Amendment Injections

Geosyntec will coordinate with the injection/drilling subcontractor to stage the amendment product, tanks, dosing, and injection equipment. There is a potential that ISR may be co-injected with EVO based on results from the baseline sampling event. The water source for these injections will be potable water either trucked on-Site or from a nearby hydrant. Injection equipment that will be set up will include dosing pumps for adding amendments to injection fluid, a manifold for injecting up to eight to ten locations at once, and gauges for monitoring flow rates and pressures.

Direct-push rods equipped with injection tooling will be installed into the first lift of the target interval at each location. The first half of the targeted volume of the amendment-water solution for that location will be injected. The tooling will then be advanced to the next lift and the procedures above will be repeated. Geosyntec anticipated that two 5-foot lifts will be completed at each of the proposed injection locations. Following completion of each injection location and after the rods have been removed, seal the hole with bentonite grout prior to starting the next round of injections.

The mounding of injection fluids at injection locations is a typical challenge when injecting large volumes of liquid into shallow subsurface. Daylighting occurs when injected materials come to the surface at or near the injection location. Geosyntec will make every attempt to utilize procedures that will prevent or minimize daylighting, including but not limited to time of year to inject, rate of injection, injection pressure, quantity of simultaneous injection locations, and spacing of injections. As discussed below, Geosyntec will deploy water level monitoring equipment at the existing on-Site groundwater monitoring wells during injections to track changes in water levels and evaluate if significant mounding of groundwater is occurring. If, despite these preventative measures, daylighting still occurs, there are changes that can be made in the field to

the injection program to reduce the amount of daylighting including: re-drilling an injection point, or changing the total injection volume at that location, or reducing the injection flow rate. Daylighted fluids will be containerized, and Geosyntec will have spill kits on-Site to prevent daylighted fluid from leaving the Site or entering storm drains.

In addition, if high pressures or lower than anticipated flow rates are encountered at a location, Geosyntec may adjust the amount of amendments injected into that location and redistribute the remaining volume into nearby injection points.

4.2 Injection Monitoring

During system injection, Geosyntec plans to monitor the following:

- Water levels in nearby on-Site groundwater monitoring wells to assess potential mounding and surfacing of amendments.
- Flow rates and pressures using gauges at each injection location
- The ground surface at and around each location will be monitored for surfacing.

These items will be recorded in daily field logs by Geosyntec and its drilling/injection subcontractor.

4.3 Investigation-Derived Wastes

IDW that may be generated during installation (e.g. daylighted fluids) will be containerized in labeled Department of Transportation-approved steel drums. Geosyntec will coordinate with NAS/Wilbur-Ellis on IDW profiling, transportation, and disposal at an appropriate off-site facility, including the review and signature of profiles and manifests.

5. GROUNDWATER COMPLIANCE MONITORING PLANS

Prior to injections, baseline groundwater samples will be collected from the four monitoring wells. Following the injections, monthly groundwater monitoring will be conducted at the Site for the three months followed by quarterly groundwater monitoring using existing on-Site monitoring wells. After four quarters of groundwater monitoring the frequency of sampling will be reevaluated and likely reduced in frequency. The proposed groundwater sampling plan is summarized in Table 2. Preparation and monitoring procedures are outlined below.

5.1 Preparation Activities

Prior to each groundwater monitoring events, the following tasks will be completed:

- Geosyntec will coordinate and subcontract with Blaine Tech Services of Auburn, Washington (Blaine Tech) to complete the scope of work.
- Geosyntec will coordinate with NAS for Site access and with BNSF to coordinate flaggers when working within 25 feet of rail lines.
- Geosyntec will coordinate with the analytical laboratory subcontractor regarding the specified sampling and analyses herein.

- Geosyntec will coordinate with NAS and a licensed waste hauler regarding storage, pickup, and disposal of investigation-derived waste (IDW).

5.2 Depth to Groundwater Measurements

During each monitoring event, groundwater level and total depth measurements will be obtained using an electronic depth to water meter at the four monitoring wells, prior to groundwater sample collection. These measurements will be collected relative to the top of the polyvinyl chloride casing inside the surface monument from a marked point that has been previously surveyed (i.e., the north side of the casing) and recorded on field data collection forms. The depth to water meter will be decontaminated using an Alconox® or Liquinox® wash and rinse upon arrival on-Site and between use at each well.

5.3 Groundwater Sampling

During each groundwater sampling event, one groundwater sample will be collected from each of the four monitoring wells and one duplicate sample will be collected for a total of five samples per event. Monitoring wells will be sampled using low-flow sampling techniques, and each well will have dedicated tubing.

Prior to sampling, wells will be purged at a rate of between 100 and 500 milliliters per minute (mL/min) with the depth to water being measured frequently and recorded on field data sheets. The purge rate will be adjusted to minimize drawdown (target of less than 0.1 feet of drawdown). A water quality meter, calibrated prior to the start of each field day, will be used to monitor field parameters during purging. Field parameters will be recorded on field data sheets approximately every five minutes while purging. Purging will continue until pH, temperature, specific conductance, oxygen reduction potential (ORP), dissolved oxygen (DO), and turbidity stabilize (three consecutive readings), defined as follows:

- 0.1 units for pH;
- 3% for specific conductance;
- 10 millivolts (mV) for ORP;
- 10% for temperature;
- 10% for turbidity; and
- 10% for DO.

In case the above criteria for stabilization are not met, a maximum of three well volumes will be purged prior to sample collection. Samples may also be collected if stabilization has not occurred after two hours of purging, regardless of well purge volume status.

Groundwater samples will be collected in laboratory-supplied containers for the analyses detailed in Table 2. Samples planned for dissolved metals analysis will be field filtered using a disposable 0.45-micrometer (µm) filter. Samples will be placed into a cooler with ice, shipped using standard chain-of-custody procedures and analyzed for total and dissolved metals (arsenic, cobalt, and

molybdenum, by United States Environmental Protection Agency [EPA] Method 200.8 or equivalent) and nitrate as nitrogen (EPA Method 300.0 or equivalent).

As outlined in Table 2, the following constituents may also be analyzed to further evaluate the effectiveness of the remedy: total and dissolved iron and manganese by EPA Method 200.8, sulfate by EPA Method 300.0, and total organic carbon by EPA Method 9060A or equivalent.

5.4 Investigation Derived Wastes

IDW generated during each sampling event will be containerized in labeled Department of Transportation-approved steel drums. Geosyntec will coordinate with NAS/Wilbur-Ellis on IDW profiling, transportation, and disposal at an appropriate off-site facility, including the review and signature of profiles and manifests.

5.5 Quality Assurance and Quality Control Samples and Review

As noted earlier, one duplicate sample will be collected during each monitoring event, submitted blind to the analytical laboratory. The duplicate will be analyzed for the same constituents as the original sample.

Upon receipt of the Blaine Tech field report and laboratory analysis results, Geosyntec will review the field records and the groundwater data for quality assurance/quality control (QA/QC). Field data sheets will be reviewed for completeness and conformance with the monitoring procedures outlined herein, and Geosyntec will complete a data validation checklist for the laboratory analytical report. The checklist will include a review of data completeness; sample contamination; conformance with holding times; and detection limits within acceptable ranges; as well as ensuring that the associated QC results of each sample are within the specified method criteria. Based on this checklist, laboratory data will be deemed acceptable or unacceptable for use for the purposes of this project.

5.6 Results Evaluation and Reporting

Following QA/QC of the laboratory data, Geosyntec will evaluate the groundwater results in relation to historical results and the TRLs. Each quarter, the analytical and water level results will be formatted and uploaded to Ecology's Environmental Information Management System (EIM) online database. Following the completion of at least four quarters of post-injection groundwater monitoring, the results will be incorporated into annual CAP status report, which will be submitted to Ecology.

6. CONTINGENCY PLANNING

Based on groundwater monitoring results if the general chemistry of the groundwater changes in a way, other than those changes anticipated as part of the proposed remedial approach, other remedial approaches or additional injections may be considered. If increases in dissolved metals in groundwater samples is observed and sustained following injections, then the injection of iron-sulfate or equivalent may be used to remediate any remaining dissolved metals above the proposed TRLs. If nitrate levels have not decreased to the TRL, then additional electron donor amendment may be injected.

7. PROPOSED IMPLENTATION SCHEDULE

Geosyntec proposes to begin procurement and project planning immediately upon Ecology's approval of the RI/CAP with a target to conduct baseline monitoring and injection in Spring 2022 followed by post-injection monitoring. It is estimated that procurement of amendments and scheduling of subcontractors will take at least one month to complete. Pre-field activities are estimated to take two to three months prior to beginning of injections. The injection period is anticipated to take approximately two weeks, including set-up and staging, drilling, performing injections, and cleanup and demobilization.

TABLES

Table 1 - Denitrification In Situ Injection Design
Former Nachurs Alpine Solutions Facility, Sunnyside, WA

PARAMETER	DESIGN QUANTITY (lower concentration subarea)	DESIGN QUANTITY (higher concentration subarea)	NOTES
General Lithology	Sandy	Sandy	Predominantely a fine grained sand with silt
Anticipated Electron Donor Demand (e.g., from nitrate, & sulfate)	Medium	Medium-High	
Target Vegetable Oil Amendment Dose (Oil (% injectate volume)	0.90%	1.10%	Based on concentrations of nitrate in groundwater in respective areas, with ~20% more oil injected into higher concentration sub-area
Target Sodium Lactate Amendment Dose (% injectate volume)	0.1%	0.2%	Assuming 100% solution of Sodium Lactate
Target Treatment Area (ft^2)	5,300	1,500	See Figure 1
Approximate Depth to Potentiometric Surface (ft bgs)	5	5	Groundwater is generally between 4 and 7 ft bgs. 5 ft bgs on average is assumed.
Target Treatment Depth Interval (ft bgs)	5-15	5-15	Estimated saturated portion of sandy aquifer
Estimated Average Target Treatment Thickness (ft)	10	10	
Assumed Average Effective Porosity	0.2	0.2	Estimate provided by the Illinois Department of Energy and Natural Resources based on the observed Site soil lithology. Value compared to nearby property Bee Jay Scales.
Total Pore Volume in Target Area (ft^3)	10,600	3,000	Volume of groundwater in the treatment zone
Target Injection Volume (ft^3)	10,600	3,000	
Target Injection Volume (gal)	79,300	22,400	Volume of fluid (oil & water) to be injected to achieve the target pore volume replacement
Number of Injection Points	20	5	
Average Target Injection Volume per Point (gal)	3,970	4,480	
Theoretical Radius of EVO Injection per Point(1) (ft)	10	10	Assumes that 100% of the effective pore volume will be replaced by the injection fluids. A 1 ft overlap between points has been proposed to help increase coverage of EVO during injections.
Volume of Vegetable Oil per Point (gal)	36	49	Quantities of vegetable oil are for pure phase (neat) oil
Total Volume of Vegetable Oil in Area (gal)	710	250	
Total Volume of Tersus EDS-ER™ EVO Product in Area (gal)	780	280	Tersus EDS-ER contains vegetable oil at 92% v/v and is a mix of soy bean oil and proprietary surfactants.
Mass of EVO Product (lb)	6,006	2,156	Based on a density of 7.7 lbs/gal
Volume of Sodium Lactate per point (gal)	4	9	
Total Volume of Sodium Lactate in Area (gal)	80	45	
Total Volume of Wilclear® Sodium Lactate in Area (gal)	133	75	WilClear® is 60% Sodium Lactate by weight.
Total Mass of WilClear® Sodium Lactate in Area (lbs)	1,390	778	WilClear® has a specific gravity of approximately 1.25
Estimated Injection Rate (gpm)	6	6	Based on injetion subcontractor experience in the region and shallow injection interval.
Water Volume Required (gal)	78,520	22,120	
Minimum Estimated Time to Inject per Point (h)	11	13	
Number of Points Injected Simultaneously	6		Based on discussion with injection subcontractor, assumes 75% efficiency of 8 limb manifold
Estimated Days of Injection (assume 8 hrs/day) (days)	10		Estimated duration assumes active injection for 8 h/day (ie, 80% efficiency) and includes a 20% contingency

Notes:

Quantities presented in this table are estimates based on conceptual design and may be refined, based on observed performance during injections.

1. Based on experience at this and other sites, it is anticipated that the effective radius of influence will be greater than the theoretical radius of influence because replacement of the effective pore volume will be less than 100%.

bgs = below ground surface
EVO = emulsified vegetable oil
ft = feet
ft^2 = square feet
ft^3 = cubic feet
gal = gallons
L = liters
gpm = gallons per minute
h = hours

Table 2 - Compliance Groundwater Sampling and Analysis Plan
Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Well	Location Relative to Injection Area	Monitoring Plan				
		COPCs[2]	Geochemical Parameters			
			Field Parameters[1]	Iron and Manganese[3]	Sulfate[4]	Total Organic Carbon[5]
MW-1	Upgradient/Background	Q	Q	S	S	S
MW-2	High Concentration Injection Area	Q	Q	S	S	S
MW-3	Upgradient (Northeastern) Edge of Injection Area	Q	Q	S	S	S
MW-4	Downgradient (Southeastern) Edge of Injection Area	Q	Q	S	S	S

Notes:

All analytes will be measured during the baseline sampling event (event prior to injections) and the first three months following injections. Baseline sampling will also include arsenic spection by EPA Method 1632 or similar. After the third monthly sampling event, then parameters will be sampled based on the schedule shown in the table.

[1] Field parameters will be analyzed for depth to water, pH, dissolved oxygen, electrical conductivity, turbidity, oxidation reduction potential, and temperature.

[2] COPCs include Nitrate as nitrogen analyzed by EPA Method 300.0, total and dissolved metals (arsenic, cobalt, and molybdenum) analyzed by EPA method 200.8. Dissolved metals samples will be field filtered with a 0.45-micron filter.

[3] Iron and manganese samples will be analyzed for total and dissolved metals by EPA method 200.8. Dissolved metals samples will be field filtered with a 0.45-micron filter.

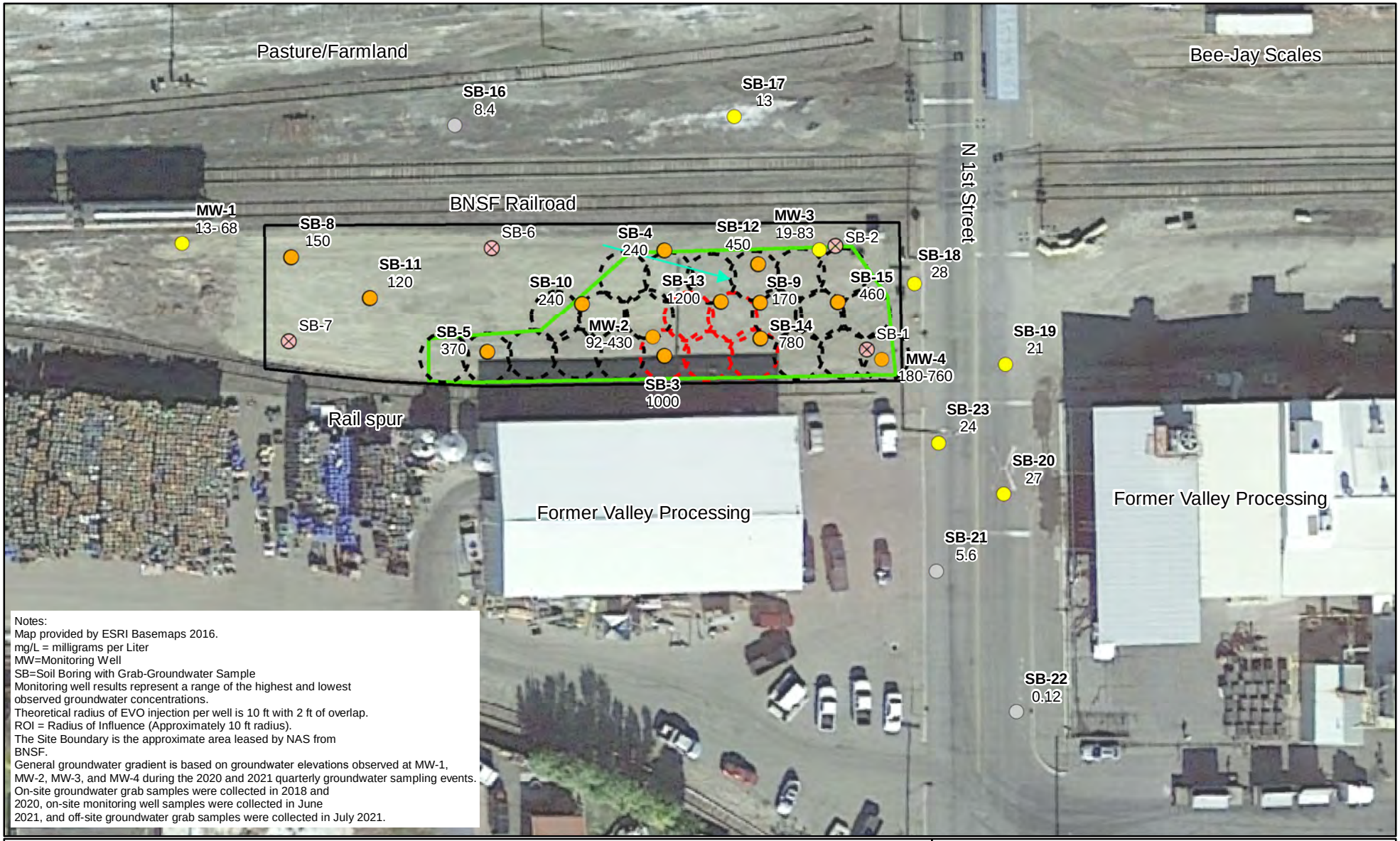
[4] Sulfate will be analyzed by EPA method 300.0.

[5] Total organic carbon will be analyzed by EPA method 9060A.

Acronyms:

COPCs = Constituents of Potential Concern
EPA = Environmental Protection Agency
n/a = not applicable
MW = monitoring well
Q = monthly for the first quarter and then quarterly
S = monthly for the first quarter and then semi-annually

FIGURES



Legend

Nitrate as Nitrogen in Groundwater (mg/L)

- <10 mg/L
- 10 - 68 mg/L
- >68 mg/L
- Soil Sample Location
- General Groundwater Gradient
- Site Boundary
- Target In Situ Denitrification Injection Area
- Proposed Injection location Theoretical ROI
- Proposed Injection location Theoretical ROI (increased EVO dosing planned)

N

0 50 Feet

Proposed Injection Locations

101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696 | April 2022

Figure 1

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Appendix B\Figure 1 Proposed Injection Locations.mxd 12/7/2021 12:03:39 PM

ATTACHMENT 1
Amendment Material Safety Data Sheets

SAFETY DATA SHEET
ISR-CI

Revision date: 2019-06-11
Version 1.0

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name: ISR-CI

Synonyms: Ferrous sulfide / Iron sulfide / Iron sulphide / Iron(II) sulfide / Ferrous sulfide / Iron sulfide / Iron sulphide / Iron(II) sulfide

Other means of identification

CAS No: 1317-37-9

Formula: FeS

Recommended use of the chemical and restrictions on use

Recommended Use: Remediation of contaminated groundwater and soils

Restrictions on Use: Use as recommended by the label

Details of the supplier and of the safety data sheet

Supplier
Tersus Environmental, LLC
1116 Colonial Club Rd
Wake Forest, NC 27587
Phone: +1-919-453-5577
Email: info@tersusenv.com

Contact Person
David F. Alden
Phone: +1-919-453-5577 x2002
Email: david.alden@tersusenv.com

Emergency telephone number

For leak, fire, spill or accident emergencies, call:

+1-919-453-5577 (Tersus Office Hours, 8:00 AM to 5:00 PM Eastern)
+1-800-424-9300 (Chemtrec 24 Hour Service – Emergency Only)
+1-703-527-3887 (Chemtrec Outside United States 24 Hour Service – Emergency Only)
+1-919-638-7892 Gary M. Birk (Outside office hours)

2. HAZARD IDENTIFICATION

Classification

GHS-US classification

Skin corrosion/irritation	Category 2	H315
Serious eye damage/eye irritation	Category 2A	H319

Full text of H statements: see Section 16

GHS Label elements, including precautionary statements

Label elements
Hazard Pictograms

Signal word Warning

Hazard statement H315 - Causes skin irritation
H319 - Causes serious eye irritation

Precautionary statement

P264 - Wash hands thoroughly after handling
P280 - Wear eye protection, protective clothing, protective gloves
P302+P352 - If on skin: Wash with plenty of water
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact
lenses, if present and easy to do. Continue rinsing
P321 - Specific treatment (see Consult a doctor/medical service if you feel unwell on this label)
P332+P313 - If skin irritation occurs: Get medical advice/attention
P337+P313 - If eye irritation persists: Get medical advice/attention
P362+P364 - Take off contaminated clothing and wash it before reuse

Hazard(s) not otherwise classified (HNOC)

HMIS Classification:
Health hazard: 0
Flammability: 0
Physical hazards: 0

NFPA Rating:
Health hazard: 1
Fire: 0
Reactivity Hazard: 0

Inhalation
May be harmful if inhaled. May cause respiratory tract irritation.

Skin
May be harmful if absorbed through skin. May cause skin irritation.

Eyes
May cause eye irritation.

Ingestion
May be harmful if swallowed.

Other Hazards not contributing to the classification
Generates toxic gas in contact with acid.

Supplemental information None.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Concentration (wt. %)	GHS-US classification
Iron sulfide (FeS)	1317-37-9	7 -11	Not classified
Sodium Sulfide	1313-82-2	0.1 - 1	Acute Tox. 3 (Oral), H301

Occupational exposure limits, if available, are listed in Section 8.
Full text of hazard classes and H-statements: see Section 16.

4. FIRST AID MEASURES

General	Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
Eye Contact	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a doctor/physician. If eye irritation persists: Get medical advice/attention.
Skin Contact	Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention.
Inhalation	Remove person to fresh air and keep comfortable for breathing. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center or doctor/physician.
Ingestion	Rinse mouth. Do NOT induce vomiting. Immediately call a poison center or doctor/physician. Call a poison center/doctor/physician if you feel unwell.
Most important symptoms and effects, both acute and delayed	• Symptoms/injuries: Causes skin and eye irritation. • Symptoms/injuries after skin contact: Irritation. • Symptoms/injuries after eye contact: Causes serious eye damage. Eye irritation.
Indication of immediate medical attention and special treatment needed, if necessary	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media	Foam. Dry powder. Carbon dioxide. Water spray. Sand.
Unsuitable extinguishing media	Do not use a heavy water stream.
Specific Hazards Arising from the Chemical	Reactivity: Corrosive vapors.
Firefighting instructions	Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protective equipment and precautions for firefighters	Do not enter fire area without proper protective equipment, including respiratory protection. Do not attempt to act without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Ventilate spillage area. Evacuate unnecessary personnel. Avoid contact with skin and eyes. Do not attempt to act without suitable protective equipment. Equip cleanup crew with proper protection. For further information refer to Section 8: "Exposure controls/personal protection".
Environmental Precautions	Avoid release to the environment. Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.
Methods for Containment	Dike to collect large liquid spills. Stop leak and contain spill if this can be done safely. Small spillage: Dilute with large quantities of water.
Methods for cleaning up	Take up liquid spill into absorbent material. Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials. Dispose of materials or solid residues at an authorized site.

7. HANDLING AND STORAGE

Precautions for Safe Handling

Handling	Ensure good ventilation of the workstation. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. Do not breathe dust, fume, gas, mist, spray, vapors. Avoid contact during pregnancy/while nursing. Avoid contact with skin and eyes. Wear personal protective equipment.
Hygiene	Wash hands thoroughly after handling. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures	Comply with applicable regulations.
Storage Conditions	Keep only in the original container in a cool, well ventilated place away from: Ignition sources, Incompatible materials. Keep container closed when not in use. Store in a well-ventilated place. Keep cool.
Incompatible Products	Strong bases. Strong acids.
Incompatible Materials	Sources of ignition. Direct sunlight.

8. EXPOSRE CONTROL / PERSONAL PROTECTION

Control parameters

Exposure guidelines, ingredients with workplace control parameters.

Chemical name	ACGIH TLV	OSHA PEL	NIOSH
ISR-CL 1317-37-9	TWA: 1.4 mg/m³ TWA: 1 ppm STEL: 7 mg/m³ STEL: 5 ppm	No information available	No information available
Iron sulfide (FeS) (1317-37-9)	No information available		
Sodium sulfide (1313-82-2)	No information available		

Appropriate engineering controls

Appropriate engineering controls Ensure good ventilation of the workstation. Provide eyewash station.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles) and a face shield.

Skin Protection (Hands) Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier. Be aware that the liquid may penetrate the gloves. Frequent change is advisable.

Skin Protection (Other) Wear suitable protective clothing.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

General hygiene considerations Keep from contact with clothing and other combustible materials. Remove and wash contaminated clothing promptly. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Do not eat, drink or smoke during use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Black liquid with visible suspended solids.
Physical State	Liquid
Color	Black
Odor	Rotten eggs
Odor threshold	No information available
pH	11.5 to 12.8
Melting point/freezing point	Not applicable
Boiling Point/Range	No information available
Flash point	No information available
Evaporation Rate	No information available
Flammability (solid, gas)	Non flamable
Flammability Limit in Air	No information available
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	No information available
Vapor density	No information available
Specific gravity	1.15 to 1.22
Water solubility	Minimally soluble in water.
Solubility in other solvents	No information available
Partition coefficient log Kow	No information available

Autoignition temperature	No information available
Decomposition temperature	No information available
Viscosity, kinematic	No information available
Viscosity, dynamic	No information available
Explosive properties	No information available
Oxidizing properties	No information available

10. STABILITY AND REACTIVITY

Reactivity	Acidic vapors.
Chemical stability	Not established.
Possibility of hazardous reactions	Contact with acids liberates toxic gas.
Conditions to avoid	Direct sunlight. Extremely high or low temperatures.
Incompatible materials	Acids will cause the release of highly toxic Hydrogen Sulfide. Reacts violently with diazonium salts. Ferrous sulfide(s) solution is not compatible with copper, zinc, aluminum or their alloys (i.e. bronze, brass, galvanized metals, etc.). Corrosive to steel above 150º F (65.5º C). These materials of construction should not be used in handling systems or storage containers for this product.
Hazardous decomposition products	Hazardous decomposition products formed under fire may include sulfur oxides, iron oxides.

11. TOXICOLOGICAL INFORMATION

Sodium Sulfide (113-82-2)

LD50 oral rat	208 mg/kg
ATE US (oral)	208 mg/kg body weight
LD50 dermal rabbit	< 340 mg/kg
ATE US (dermal)	300.000 mg/kg body weight

Information on toxicological effects

Acute toxicity	Not classified
Skin corrosion/irritation	Causes skin irritation. pH: 11.5 - 12.8
Serious eye damage/eye irritation	Causes eye irritation. pH: 11.5 - 12.8
Respiratory sensitization	Not classified
Skin sensitization	Not classified
Germ cell mutagenicity	Not classified
Carcinogenicity	Not classified
Reproductive toxicity	Not classified
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not classified
Chronic effects	Not classified
Potential Adverse human health effects and symptoms	Based on available data, the classification criteria are not met.
Symptoms/injuries after skin contact	Irritation.

Symptoms/injuries after eye contact Causes eye irritation.

12. ECOLOGICAL INFORMATION

Ecotoxicity Effects

Ecology - general: The product is not considered harmful to aquatic organisms or to cause long-term adverse effects in the environment.

Active Ingredient	Duration	Species	Value	Units
ISR-Cl (1317-37-9)	LC50	Mosquito fish	>10,000	mg/L
Sodium Sulfide (1313-82-2)	96 h LC50	Poecilia reticulata	7.7 - 29.1	mg/L
Sodium Sulfide (1313-82-2)	48 h EC50	Daphnia magna	2.1	mg/L

Persistence and Degradability
Not established.

Bioaccumulation
FerroBlack-FS27 (1317-37-9): Bioaccumulative potential not established.
Sodium Sulfide (16721-80-5): Log Pow, -3.5 (at 25 °C)

Mobility
No additional information available

Other Adverse Effects

- **Effect on the global warming**: No known effects from this product.
- **GWPmix comment**: No known effects from this product.
- **Other information**: Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods	Dispose of contents/container in accordance with licensed collector's sorting instructions.
Waste disposal recommendations	Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.
Ecology - waste materials	Avoid release to the environment.

14. TRANSPORTATION INFORMATION

U.S. (D.O.T.)

Proper Shipping Name:	Chemicals not otherwise indexed (NOI) nonhazardous.
Hazard Class:	Not applicable
UN/NA:	Not applicable
Labels:	Not applicable

Canada (T.D.G.)

Proper Shipping Name:	Chemicals not otherwise indexed (NOI) nonhazardous.
Hazard Class:	Not applicable
UN/NA:	Not applicable

Labels	Not applicable

IMDG

Proper Shipping Name:	Chemicals not otherwise indexed (NOI) nonhazardous.
Hazard Class:	Not applicable
UN/NA:	Not applicable
Labels:	Not applicable

IATA

Proper Shipping Name:	Chemicals not otherwise indexed (NOI) nonhazardous.
Hazard Class:	Not applicable
UN/NA:	Not applicable
Labels:	Not applicable

15. REGULATORY INFORMATION

U.S. Federal Regulations

Iron sulfide (FeS) (1317-37-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Sodium Sulfide (1313-82-2)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

International regulations

Canada
Iron sulfide (FeS) (1317-37-9)
Listed on the Canadian DSL (Domestic Substances List)
WHMIS Classification Uncontrolled product according to WHMIS classification criteria
Sodium Sulfide (1313-82-2)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations
Iron sulfide (FeS) (1317-37-9)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Sodium Sulfide (1313-82-2)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National regulations
Iron sulfide (FeS) (1317-37-9)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Sodium Sulfide (1313-82-2)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on INSQ (Mexican National Inventory of Chemical Substances)

US State Regulations
Sodium Sulfide (1313-82-2)
U.S. - Massachusetts - Right to Know List
U.S. - New Jersey - Right to Know Hazardous Substance List

16. OTHER INFORMATION

Full text of H-phrases:
H301 Toxic if swallowed
H315 Causes skin irritation
H319 Causes serious eye irritation
H400 Very toxic to aquatic life

Disclaimer: This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. All recommendations for the use of our products, weather given by us, orally or to be implied from data or lab tests results by us, are based on the current state of our knowledge at the time those recommendations are made. When additional information is obtained, these recommendations may be updated. They may also be influenced by circumstances outside our control. Notwithstanding, such recommendation the user is responsible that the product as supplied by us is suitable to the process or purpose he intends to use it. The user of the product is solely responsible for compliance with all laws and regulations applying to the use of this product. Since we cannot control the application, use or processing of the product, we do not accept responsibility. Therefore, the user should assure that the intended use of the product will not infringe in any party's intellectual property right.

919.453.5577 • info@tersusenv.com • tersus.com

End of Safety Data Sheet

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