REMEDIAL INVESTIGATION AND CLEANUP ACTION PLAN

FORMER 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: PNR0696C

September 23, 2022

Geosyntec
consultants

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September 23, 2022

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
µm	micrometer
ARAR	Applicable, or Relevant and Approriate Requirements
As	arsenic
As (III)	arsenite
As (V)	arsenate
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 system
MCLs	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, Cleanup Action Plan (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 remediation 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 Method B cleanup levels (CULs) and regional background levels at the Site. While little nitrate as nitrogen currently remains in soil, historically, nitrate as nitrogen was detected 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. COPC concentrations in groundwater are above MTCA CULs and area-specific background levels have generally not been observed directly downgradient of the Site. 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 along with natural fluctuations based on shallow groundwater elevations. Based on the conceptual site model, Geosyntec proposes Site-specific TRLs for groundwater, for the aforementioned COPCs. TRLs for groundwater are based on area-specific background levels for nitrate as nitrogen and total arsenic and MTCA Method B CULs for cobalt and molybdenum.

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 metals attenuation 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. During and after denitrification, metals concentrations are expected to attenuate. Concentrations of molybdenum are expected to become less mobile while groundwater conditions are reducing during denitrification, and based on baseline monitoring results and geochemical modeling, reductions in concentrations of arsenic and cobalt are expected following the denitrification via oxidation of existing iron and manganese. Injection of an electron donor is expected to take place starting in Fall 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 *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 2022 and proposes actions to address constituents of potential concern (COPCs) potentially related to NAS' former operations at the Site. This RI/CAP was submitted as a draft to Ecology on 8 April 2022 (Draft RI/CAP) and is finalized, based on additional sampling and evaluations presented herein. 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. On 13 August 2021 (prior to submitting the Draft RI/CAP) and again on 29 August 2022 (in advance of finalizing the RI/CAP), Geosyntec discussed with Ecology's Site Manager Site 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 October 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 Site environmental investigations, reports, and characterization activities to date.
- Section 3 – Conceptual Site Model: provides a discussion of potential release scenarios, fate and transport of COPCs, and exposure pathways.
- Section 4 – Proposed Site-specific Target Remediation Levels: provides a summary of applicable screening levels, regional and area-specific background levels, and the proposed target remediation levels for 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 metals attenuation.
- 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 area-specific background concentrations for arsenic and nitrate in groundwater, and Appendix C provides the June 2022 soil analytical results. Baseline monitoring and arsenic geochemistry modeling are discussed in Appendix D. Appendix E provides the completed Ecology Terrestrial Ecological Evaluation check list and Appendix F 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

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

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 (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
- Luke Smith (Geosyntec Consultants) - (206) 496-1452
- Jan Thompson (Wilbur-Ellis, lessee) - (541) 974-3112
- Mark Engdahl (Burlington Northern Santa Fe, Environmental Lease Team, Property Owner) - (817) 352-3777

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

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[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.

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 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.

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[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 any of the three metals (August Mack, 2017).

[5] Laboratory analysis of investigation derived waste collected to date (2020 and 2021 investigations) 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

From 2018 through 2022, environmental investigations associated with on-site soil and groundwater sampling, groundwater monitoring well installation, and off-site groundwater sampling has been conducted. Sampling events are listed below and summarized in this section.

- Phase II ESA, collection of soil and grab-groundwater samples in February 2018.
- On-Site investigation, collection of soil and grab-groundwater samples in August 2020.
- Quarterly on-Site groundwater monitoring:
  - September 2020,
  - December 2020,
  - March 2021,
  - June 2021, and
  - September 2021.
- Off-Site investigation, collection of grab-groundwater samples in July 2021.
- Baseline monitoring, collection of groundwater samples from monitoring wells in June 2022.
- Additional collection of on-Site soil samples in June 2022.
- Upgradient, background arsenic investigation, collection of grab-groundwater samples in June 2022.

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, geochemistry data, 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

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[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

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* (Geosyntec, 2021a), 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 downgradient off-Site characterization is proposed.

In April 2022, Geosyntec submitted the Draft RI/CAP to Ecology that discussed the injection of electron donor amendments to remediate nitrate and potential contingency injection of iron sulfide to remediate arsenic in groundwater (Geosyntec, 2022a). Ecology provided informal comments in an email dated 18 April 2022 (Ecology, 2022). These comments and a path forward were discussed in a call on 24 May 2022 with Wilbur-Ellis, Geosyntec, and Ecology. Based on the call, the following was completed and incorporated into the final RI/CAP:

- Background grab-groundwater sampling and statistical data analysis of regional nitrate concentrations in groundwater from Ecology's Environmental Information Management database, to establish area-specific background concentrations for arsenic and nitrate in groundwater (Appendix B).
- Additional on-Site soil sampling was conducted to evaluate current nitrate and ammonia concentrations and assess if residual nitrate or ammonia remained in soil may pose a long-term risk to groundwater following in situ remedy implementation (Appendix C).
- Baseline groundwater monitoring and arsenic geochemistry modeling was conducted to gage the geochemical parameters and evaluate iron sulfide as a potential contingency measure for arsenic removal (Appendix D).

2.2 Site Characterization

From 2018 through 2022, 49 soil borings have been completed with 31 on-Site and 18 off-Site. A total of 54 soil samples and 29 grab-groundwater samples were collected with the soil sampling targeting depths ranging from surface soil to first groundwater (as deep as at 6 feet below ground surface [ft bgs]), and grab-groundwater samples have been collected down to 15 ft bgs. In 2020, four on-Site monitoring wells were installed, and five quarterly groundwater monitoring events were completed, where groundwater elevations and COPCs concentrations were monitored in the upper approximately 10 feet of groundwater (down to 15 ft bgs). In June 2022, baseline monitoring was conducted at the four groundwater monitoring wells for a total of six rounds of groundwater sampling to date. Sampling and monitoring methods, field geochemical parameters, and field

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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.

observations of geology and hydrogeology are summarized below. The analytical results and nature and extent of COPCs are discussed in Section 2.3.

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, Off-Site Investigation Work Plan,* and *Area Background Sampling* (Geosyntec, 2020a; Geosyntec, 2020b; Geosyntec, 2021a; Geosyntec 2022b).

From 2018 through 2020, soil samples were collected from the unsaturated 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. In June 2022, an additional 21 on-Site soil samples were collected from 16 locations, two of which were co-located with previous borings. Samples were collected in a manner consistent with previous soil sampling events with samples collected from the upper 5 feet of soil. The 2022 soil samples were analyzed for nitrate-nitrite as nitrogen (EPA300.0M) and ammonia as nitrogen (EPA-350.1).

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 (Geosyntec, 2020a). 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, collected in 2021 and 2022, were collected from temporary wells with screens from 5 to 15 ft bgs. Water quality parameters from quarterly monitoring events and grab-groundwater samples from 2020 to 2022 are presented in Table 3b 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).[7,8,9] Additional geochemical and water

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[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.*

[8] Upgradient background off-Site grab-groundwater samples were only analyzed for total and dissolved arsenic.

[9] Baseline groundwater samples were analyzed for total and dissolved iron and manganese by EPA Method 200.8, sulfate (EPA Method 300.0), phosphate by SM 4500 P-E, ammonia by SM 4500-NH_3 G, dissolved organic carbon by SM5310 C, and arsenic speciation analysis by EPA 1632A, in addition to the Site COPC list.

quality parameters were collected during the June 2022 baseline monitoring event, as detailed in Appendix D.

Sampling information regarding Site COPCs, sampling methods, laboratory methods, and reporting limits are provided in Table 1. The collective results of the soil, quarterly groundwater monitoring, baseline sampling, and grab-groundwater sampling are summarized in Tables 2 through 6.

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, 2021 off-Site, and 2022 background investigations are provided in the Off-Site Investigation Work Plan (Geosyntec, 2021a), Appendix A, and Appendix B 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) and during the background arsenic investigation in June 2022 (Appendix B). However, one location (BSB-7) was observed to have black staining with some odor from 5 to 7 ft bgs. During drilling, first groundwater was encountered at depths ranging from 3 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 six groundwater monitoring events in 2020 to 2022. For reference, a groundwater contour map from the most recently baseline monitoring 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 investigation and monitoring events in 2020 through 2022 (Table 3b):

- pH in upgradient, on-Site, and downgradient locations are similar and generally neutral with a range from approximately 6.98 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, SB-17, BSB-1 through BSB-10), compared to values less than approximately 1.5 mg/L in on-Site and downgradient locations except at SB-21, which had a DO reading of 6.08 mg/L.

ORP has been measured at levels ranging from approximately -211.2 to 68 millivolts (mV) in upgradient samples, compared to values ranging from approximately -85 to 230 mV in on-Site wells, and -297 to 95 mV in downgradient grab-groundwater samples. The variability in ORP appears to be correlated to meteoric recharge and corresponding fluctuations in groundwater levels at the Site, as presented in Appendix D.

- Electrical conductivity measurements were observed to be relatively consistent between on-Site (1,062 to 5,562 microSiemens per centimeter [µS/cm]) and off-site (710 to 4,877 µS/cm).

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 and groundwater results from the on- and off-Site investigations were compared in Table 2 to the following: background levels and default MTCA CULs, including MTCA Method A, B, and C and EPA MCL for drinking water. Groundwater results in Table 5 are also compared to the proposed target remediation levels (TRLs)[10] presented in Table 7 and established in Section 4.

In the sections below, for simplicity, MTCA Method B is stated as MTCA CUL.

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 the following for Site COPCs, with respect to MTCA CULs:

- Arsenic exceeded MTCA CULs for direct contact and for protection of groundwater in the vadose zone;
- Cobalt did not exceed the MTCA CUL for direct contact, but did exceed MTCA Method B CUL for protection of groundwater in the vadose zone; and
- Molybdenum did not exceed MTCA CULs for direct contact or protection of groundwater in the vadose zone.

Although arsenic concentrations exceeded MTCA Method B CULs for soil, they were within Ecology's background regional soil levels.[11] Soil samples collected during the 2020 on-Site investigation were consistent with the 2018 results with no COPC concentrations in soil exceeding the arsenic regional background concentrations and MTCA CULs (August Mack, 2018; Geosyntec, 2021a).

Although concentrations of cobalt in soil did exceed the MTCA CUL for protection of groundwater in the vadose zone (4.3 mg/kg), concentrations are consistent between on-Site and

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[10] Target remediation levels are based on MTCA method B CULs for cobalt and molybdenum and area-specific background for arsenic and nitrate.

[11] 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.

off-Site locations, suggesting that cobalt concentrations in soil are representative of background. Additionally, there is no statistical correlation between the concentration of cobalt in soil and the concentration of cobalt in groundwater at co-located sampling locations. A statistical regression analysis was conducted among cobalt concentrations in soil at varying depths vs dissolved cobalt, and total cobalt concentrations in groundwater. Therefore, although cobalt concentrations in soil exceed the MTCA CUL for protection of groundwater in the vadose zone, there is no indication of a soil source at the Site, and no indication of cobalt in vadose zone soil impacting groundwater.

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 for direct contact, meaning there is no unacceptable risk to human health for direct contact with soil for unrestricted land use. The highest detections were observed in the central portion of the Site with a maximum concentration of 930 mg/kg as nitrogen observed in 2020. 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 to 6 ft), with the exception of a few locations (SB-9, 10, and 13). As discussed in Section 3, the generally higher concentration in deeper samples suggests that nitrate has migrated downward in the unsaturated zone overtime to shallow groundwater. While these results indicated potential impacts to soil as a result of former NAS operations, additional on-Site soil sampling was conducted in June 2022, which showed a reduction in nitrate as nitrogen concentrations throughout the Site. The highest nitrate as nitrogen concentration observed during the 2022 sampling was 78 mg/kg, which was located at the same interval and location as the 2020 sample, which had a concentration of 930 mg/kg. These recent results indicate that little nitrate remains in soil at the Site. Analytical results from the June 2022 sampling event are provided in Appendix C.

2.3.2 Nature and Extent of COPCs in Groundwater

The groundwater laboratory results from 2020 through 2022 sampling indicated that COPCs of total and dissolved arsenic, cobalt, molybdenum, and nitrate as nitrogen exceeded MTCA CULs on- and off-Site. 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.

For upgradient, on-site, and downgradient discussions below, it is important to note that because of complexation between colloidal humic substances and metals (discussed in Appendix D), dissolved concentrations of arsenic may misrepresent the actual concentration present in groundwater, and total concentrations should be relied upon at this Site. In addition, it's important to note that for cobalt concentrations are notably higher in grab-groundwater samples than samples collected from monitoring wells.

2.3.2.1 Upgradient/Background Groundwater Results

Groundwater samples from 13 upgradient sampling locations have been collected for the Site (MW-1, SB-16, and SB-17, BSB-1 through BSB-10). MW-1 was installed west (upgradient) of the Site in August 2020, with six sampling events being conducted since the well installation (five quarterly groundwater sampling events and one baseline sampling event). 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. BSB-1 through BSB-10 were grab-groundwater sample locations collected north (upgradient) of the BNSF railroad tracks in June of 2022. BSB-1 through BSB-10 were only sampled for total and dissolved arsenic in order to evaluate area-specific background concentrations (Appendix B).

During the first quarterly groundwater sampling event, groundwater samples from upgradient 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 the MTCA CULs. SB-16 had a concentration of 93 micrograms per liter (µg/L) and SB-17 had a concentration of 110 µg/L as total arsenic and dissolved arsenic concentrations of 65 and 90 µg/L, respectively. During the June 2022 background grab-groundwater sampling event, locations BSB-1 through BSB-10 had total and dissolved concentrations exceeding the MTCA CUL for arsenic. Total arsenic concentrations ranged from 25 to 110 µg/L, while dissolved arsenic concentrations ranged from 3.3 to 18 µg/L.

During the July 2021 off-Site groundwater sampling event, total cobalt concentrations from locations SB-16 and SB-17 exceeded the MTCA CUL, while dissolved concentrations were more representative of concentrations observed in groundwater samples from MW-1. Grab-groundwater concentrations of cobalt were routinely higher than monitoring well results from upgradient, on-site, and downgradient locations.

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 total arsenic was observed at SB-3 (located on the southern central edge of the Site) with a concentration of 580 µg/L. The highest concentrations of total cobalt was observed at SB-9 (located on the eastern half of the Site) with a concentration of 438 µg/L and the highest concentration of nitrate as nitrogen was observed at SB-13 (located on the eastern central half of the Site) with a concentration of 1,200 mg/L. 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 and baseline groundwater monitoring results showed similar spatial distribution of COPCs to the grab-groundwater results; however, concentrations of nitrate as nitrogen appeared to decline 70 to 80% after the first well sampling event in September 2020.

The results from the six groundwater sampling events showed that groundwater results from the three on-Site monitoring wells exceeded MTCA Method B CULs for arsenic during all 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 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 approximately 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 approximately 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.

During the baseline sampling event, conducted in June 2022, groundwater samples collected from the four monitoring wells were analyzed for arsenite (As (III)), arsenate (As (V)), total inorganic arsenic (As), and total As. Arsenic speciation results, from the baseline monitoring event, were used to conduct geochemistry modeling (presented in Appendix D) in order to further evaluate the remedial approach for the Site. Arsenic speciation results showed a similar ratio of As (V) to As (III) at the four wells.

2.3.2.3 Off-Site Downgradient Groundwater Results

As discussed in Appendix A, the results from the July 2021 off-Site groundwater investigation sampling showed that groundwater results from upgradient/background locations were similar to concentrations downgradient of the Site. The highest concentration of total arsenic was observed at SB-21 (located downgradient of Valley Processing Maintenance Shop) with concentrations of 150 µg/L. The highest concentration of total cobalt was observed at SB-20 with a concentration of 340 µg/L, As previously mentioned, cobalt concentrations in grab-groundwater samples at the Site are notably higher than monitoring well groundwater samples.

Off-Site downgradient results were inconsistent with the ratio of COPCs observed in on-Site groundwater samples, indicating that the arsenic and cobalt concentrations at these locations may not be attributed to migration of water from the Site. Specifically, elevated nitrate detections are observed on-Site co-located with elevated cobalt concentrations. Nitrate, arsenic, and cobalt are likely to migrate in groundwater similarly. As such, the lack of elevated nitrate detections downgradient of the Site suggests that the concentrations of arsenic and cobalt 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 (<30%) for the compounds detected.
- Method blanks were used to separately analyze for the COPCs and various geochemical and water quality parameters 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 (LCS) results were within control limits for compounds analyzed.

Based on the data quality review, the data are of acceptable quality for the purposes of this report. During the baseline sampling event As(III) was detected in the method blanks greater than the MDL, but below the reporting limit. As a result, As(III) concentrations that were detected at estimated concentrations below the reporting limits should be considered not detected at the reporting limit. Additional discussion on this topic is provided in Appendix D, Section 3.

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[12] 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

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[12] 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 or a rinse water containing fertilizers 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. Given that sampling in 2022 of soil and groundwater at the site indicated little to no remaining nitrate or ammonia in soil and little to no ammonia in groundwater, past releases from the Site appear to have nitrified to nitrate and migrated to shallow groundwater.

Once nitrate is present in the subsurface 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 or from upgradient land uses 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 fluctuations at the Site from infiltration of precipitation and associated with the release of nitrogen compounds from historical Site activities.

Arsenic can be mobilized naturally into groundwater from soil by a variety of weathering, biological, and geochemical processes. The valence state of arsenic governs the fate and transport of arsenic in groundwater and is highly dependent on pH, ORP, and the presence of other constituents known to be reactive towards arsenic (such as sulfides or iron oxides). As noted in Section 2 and Appendix D, groundwater geochemistry at the site appears to fluctuate between oxidizing and reducing conditions, suggesting the natural disposition is state of dynamic equilibrium with both As (III) and As (V) dominating arsenic speciation at different times. Because the groundwater is naturally fluctuating between oxidizing and reducing conditions, it is not expected that additional arsenic will mobilize as a direct consequence of injection of food-grade emulsified vegetable oil (EVO) and sodium lactate (for nitrate remediation) (further discussed in Appendix D and Section 5). Additionally, once nitrate concentrations are reduced and reoxidation occurs, natural attenuation of arsenic is expected due to adsorption onto aquifer minerals.

In oxic environments, cobalt is predominantly removed from the aqueous phase through sorption to and co-precipitation with iron and manganese hydroxides. Cobalt is typically found as a cation and as such sorption increases as pH increases (USEPA, 2003). Cobalt has moderate to high affinity for sorption at circumneutral to basic pH values (Krupka, 2002). However, the presence of natural organic matter may increase the sorption of cobalt in circumneutral to slightly acidic conditions (Krupka, 2002). It is also thermodynamically feasible for cobalt to precipitate as the sparingly soluble carbonate mineral spherocobalite, $CoCO_3$, in alkaline environments (Krupka, 2002). In sulfate-reducing conditions, cobalt may also precipitate as or co-precipitate with sparingly soluble metal-sulfides (USEPA, 2003). If sulfate reducing conditions became present at the Site, cobalt may precipitate as, or co-precipitate with, sparingly soluble sulfide minerals. If cobalt is attenuated through association with iron and manganese hydroxides, a shift from an oxic environment to a reducing environment or decreasing pH may destabilize the host material. Complexation with nitrates, sulfates, and dissolved organic carbon can reduce sorption, especially in alkaline environments (Krupka, 2002). Based on observed groundwater chemistry cobalt will likely decrease at the rate similar to natural denitrification of nitrate in the groundwater.

Molybdenum chemistry is complex and currently its behavior in the environment is poorly understood (Smedley, 2017). 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 in the presence of sulfide (Smedley, 2017). In oxic environments with acidic to neutral pH, molybdenum is sorbed by iron oxides. As an oxyanion, sorption of molybdenum is enhanced as pH decreases below pH 7. Of the oxyanions, molybdenum has moderate affinity for iron oxides. Acidic conditions destabilize iron oxides, so while acidic environments increase the potential for molybdenum to sorb, once pH decreases to 4 or less host iron oxide minerals dissolve. Molybdenum de-sorbs from iron oxides as pH increases, at pH 4 or higher. By pH 7, the majority of molybdenum is released from sorption sites (USEPA, 2003). In reducing environments, molybdenum may precipitate as a sulfide (USEPA, 2003). However, the sulfide precipitation reaction appears to be kinetically limited, and it may be more likely that molybdenum co-precipitates or sorbs to sulfide minerals (Smedley, 2017). Correlative data suggests that molybdenum may be attenuated through sorption to organic matter (Smedley, 2017). Based on current conditions, which do not show strong reducing conditions, it can be expected that molybdenum concentrations would persist. If sulfate 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 and advection/dispersion processes; however, the rate at which this is occurring is likely relatively slow, given the low hydraulic gradient and low observed groundwater velocities at the site.

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 E 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 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,[13] and MTCA Method B CUL. MTCA Method B was selected based on Ecology's recommendation on 18 April 2022 (Ecology, 2022). 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." Area-specific background concentrations were selected as the proposed TRL for COPCs that have background concentrations higher than the practical quantitation limit, MCL, and MTCA CUL. Area-specific background concentrations were developed for nitrate as nitrogen and total arsenic in Appendix B using regional data and upgradient grab groundwater sampling results, respectively. These area-specific background levels were developed in accordance with WAC 173-340-709.

In addition, TRLs were established for total metals, because of observations presented in Appendix D that suggests that complexation between colloidal humic substances and metals, resulting in changes to the solubilities of these metals. As a result, dissolved concentrations may misrepresent the actual concentration of some metals (e.g. arsenic and cobalt) in the groundwater. In addition, as previously noted in Section 2.3.2, cobalt concentrations are notably higher in grab-groundwater samples than samples collected from monitoring wells. Given that monitoring well data would be more representative of exposure pathway (i.e., ingestion) used to develop the MTCA Method B level, monitoring well data will be used during remedy implementation to achievement of TRLs.

A list of groundwater TRLs, and the basis for each TRL, is provided below for each constituent and presented in Table 7.

- The proposed TRL for nitrate is 48 mg/L. This was selected based on the area-specific background concentration developed in Appendix B. The proposed TRL is higher than the MTCA Method B CUL (26 mg/L) and primary MCL (10 mg/L) for drinking water.
- The proposed TRL for total arsenic is 71 µg/L. This was selected based on the area-specific background concentration developed in Appendix B. The proposed TRL is higher than the MTCA Method B CUL (0.058 µg/L) and primary MCL (10 µg/L).
- The proposed TRL for total cobalt is 5 µg/L. This was selected based on the MTCA Method B CUL, which is higher than upgradient background levels. There is not a primary MCL for cobalt.
- The proposed TRL for total molybdenum is 80 µg/L. This was selected based on the MTCA Method B CUL, which is higher than upgradient 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, in situ denitrification with metals attenuation was selected as the proposed remedy for the Site.

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[13] 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

Five remedial alternatives were considered for the Site with details provided in Table 8:

1. Monitored natural attenuation (MNA),
2. Groundwater extraction and beneficial reuse (i.e., agricultural land application),
3. Permeable reactive barrier,
4. Phytoremediation, and
5. In situ denitrification with metals attenuation.

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:

1. Ability to protect human health and the environment.
2. Permanence.
3. Effectiveness over the long-term.
4. Management of short-term risks.
5. Implementability (technical and administrative).
6. Public acceptance.
7. Cost.

Based on evaluation of the alternative remedies, in situ denitrification with metals attenuation was selected as the proposed remedial approach for the Site. The denitrification includes the injection of an electron donor (e.g. 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. Electron donor 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 represent a long-term risk to 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. Arsenic and cobalt concentrations are expected to decline following denitrification and reoxidation of existing iron and manganese. At this point, it is expected that remaining dissolved arsenic will precipitate or resorb out of the groundwater and bind to the iron and manganese compounds.[14] Molybdenum is expected to reduce during injections as molybdenum becomes less mobile under strongly reducing conditions. The baseline compliance monitoring was conducted in June 2022 in order 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 then the injection of other amendments may be used, depending on the specific metals and concentrations relative to screening levels. If nitrate levels have not decreased to the TRL, then additional electron donor amendment may be injected.

As shown in Table 8, 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.

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[14] In the Draft RI/CAP, potential contingency injections of iron sulfide were proposed to target arsenic in groundwater. However, based on the baseline sampling and geochemical modeling results (Appendix D), iron sulfide injection is no longer included as a contingency measure, because it is not expected to be successful given the Site geochemistry.

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 F.

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 modify remediation efforts to reach TRLs at these locations. Discussion regarding a contingency approach is presented in Appendix F.

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, and recent soil sampling confirmed that potential sources of nitrate to groundwater from overlying soils are likely no longer present. However, the 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 potential 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 remedy consists of the delivery of electron donor amendments to groundwater and compliance monitoring, which consists of the June 2022 baseline monitoring and the post injection monitoring for an extended period. The baseline monitoring event was used to evaluate the arsenic speciation as well as concentrations of orthophosphate, sulfate, dissolved organic carbon, iron, manganese, nitrate, ammonia, cobalt, and molybdenum in groundwater. Geosyntec estimates that amendment delivery will be implemented over a two-week period in October 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. 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 and also includes groundwater underlying areas which previously contained 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 existing monitoring wells (MW-2, MW-3, and 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 F.

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 in samples collected from these monitoring wells 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 F.

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 CULs, 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 49 soil borings on- and off-Site resulting in a total of 54 soil samples and 29 grab-groundwater samples, as well as the installation of four groundwater monitoring wells, which have been monitored for a total of six times (five quarterly events and the baseline sampling). 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. Little nitrate as nitrogen remains in unsaturated soil after 20 or more years of leaching, and concentrations 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 fertilizers products 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 and regional conditions being in a state of dynamic equilibrium associated with fluctuations in shallow groundwater. 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 TRLs to address nitrate, arsenic, cobalt, and molybdenum in groundwater that may be related to NAS's former operations. These TRLs are based on area-specific background, MTCA Method B CULs, and EPA MCLs. No cleanup levels for nitrate as nitrogen in soil are proposed, as concentrations are below the MTCA Method B CUL, 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 in situ denitrification with metals attenuation as the proposed remedial approach based on the remedy's short-term and long-term effectiveness, baseline sampling and geochemical modeling results, implementability, and ability to protect human health and the environment. Denitrification will include injection of an electron donor amendment to the subsurface to promote nitrate reduction by naturally occurring microorganisms and immobilization of molybdenum caused by reducing conditions, the attenuation of arsenic and cobalt is expected to occur following the reoxidation of existing iron and manganese. While there may be a temporally limited increase in dissolved metals concentrations following injections, geochemical modeling does not expect this to be notable or persist. Overall, 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.

The remedy is expected to be implemented starting in October 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	*Groundwater Sampling*			*Soil Sampling*		
	Sampling Method	Laboratory Analytical Method	Reporting Limit	Sampling Method	Laboratory Analytical Method	Reporting Limit
Orthophosphate as phosphorus	Low flow sampling once parameters stabilize.	SM 4500-P E	1.3 mg/L	N/A		
Sulfate		EPA-300.0	20 mg/L			
Nitrate as nitrogen			10 mg/L	Direct-push drill rig with vinyl acetate sleeve.	EPA-300.0M	3.0 mg/kg
Ammonia		SM 4500-NH_3 G	0.050 mg/L		EPA-350.1	0.30 mg/kg
Arsenic		EPA-200.8	1.0 µg/L		EPA-6020	0.2 mg/kg
Cobalt			1.0 µg/L			0.1 mg/kg
Molybdenum			1.0 µg/L			0.1 mg/kg
Nickel			2.0 µg/L			0.1 mg/kg
Dissolved Arsenic	Low flow sampling once parameters stabilize. Field filter water using a 0.45-micron filter.		1.0 µg/L	N/A		
Dissolved Cobalt			1.0 µg/L			
Dissolved iron			2.0 µg/L			
Dissolved Manganese			0.2 µg/L			
Dissolved Molybdenum			1.0 µg/L			
Nickel	Low flow sampling once parameters stabilize.		2.0 µg/L			
Iron			2.0 µg/L			
Manganese			0.2 µg/L			
Arsenic (III)		1632A	0.02 µg/L			
Arsenic (V)			0.4 µg/L			
Inorganic Arsenic			0.4 µg/L			
Dissolved Organic Carbon	Low flow sampling once parameters stabilize. Field filter water using a 0.45-micron filter.	SM 5310 C	0.5 mg/L			

Notes:
COC = constituent of concern
EPA = Environmental Protection Agency Method
N/A = Not applicable for soil samples.
mg/L = milligrams per liter
mg/kg = milligrams per kilogram
µg/L = micrograms per liter

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)	Ammonia (mg/kg)	Arsenic (mg/kg)	Cobalt (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)
MW-1	8/25/2020	0-3	**50**	NA	**5.2**	**12**	**0.69**	**19**
		3.5-5	**23**	NA	**7.1**	**10**	**0.58**	**18**
MW-2	8/25/2020	0-3	**6.5**	NA	**2.2**	**6.0**	**0.69**	**8.1**
		3.5-5	**34**	NA	**3.5**	**12**	**0.29**	**12**
MW-3	8/25/2020	0-3	**4.8**	NA	**3.7**	**11**	**0.65**	**13**
		3.5-5	**12**	NA	**7.6**	**11**	**1.1**	**14**
MW-4	8/25/2020	0-3	**7.0**	NA	**3.8**	**10**	**1.5**	**15**
		3.5-5	**7.2**	NA	**4.6**	**10**	**0.69**	**15**
SB-1	2/7/2018	0-3	<5.9	NA	**5.0**	**8.5**	<1.1	**12.8**
SB-2	2/7/2018	0-3	<5.6	NA	**3.8**	**9.2**	<1.1	**10.2**
SB-3	2/7/2018	0-3	**14**	NA	**4.4**	**9.4**	<1.1	**12.9**
	8/5/2020	4.5-5	**190**	NA	**5.0**	**14**	**0.31**	**16**
SB-4	2/7/2018	0-3	**26.4**	NA	**4.6**	**9.2**	<1.2	**13.3**
	8/5/2020	3.5-5.5	**460**	NA	**6.2**	**11**	**0.6**	**15**
SB-5	2/7/2018	0-3	**8.5**	NA	**5.2**	**9.9**	<1.2	**14.7**
	8/5/2020	4-6	**140**	NA	**9.3**	**13**	**0.93**	**17**
SB-6	2/7/2018	0-3	**9.1**	NA	**5.0**	**9.6**	<1.2	**14.6**
SB-7	2/7/2018	0-3	**10.2**	NA	**4.3**	**9.6**	<1.1	**14.9**
SB-8	2/7/2018	0-3	**42.8**	NA	**8.0**	**9.6**	**1.8**	**18.6**
	8/5/2020	3.5-5.5	**60**	NA	**10.0**	**16**	**2.3**	**18**
SB-9	8/5/2020	0-3	**70**	NA	**4.0**	**10**	0.87	**14**
	2/8/2018	4-6	**56.7**	NA	**10.1**	**9.8**	<1.2	**13.0**
SB-10	8/5/2020	0-3	**340**	NA	**3.4**	**16**	0.81	**12**
	2/8/2018	4-6	**60.7**	NA	**7.7**	**10.6**	<1.2	**15.3**
SB-11	2/8/2018	4-6	**11.9**	NA	**7.3**	**9.4**	<1.1	**13.5**
SB-12	8/5/2020	0-3	**29**	NA	**3.9**	**11**	**0.54**	**15**
		3.5-5	**57**	NA	**5.7**	**12**	**0.82**	**15**
SB-13*	8/5/2020	0-3	**300**	NA	**4.1**	**9.6**	**0.79**	**14**
		4-6	**260**	NA	**5.4**	**12**	**1.2**	**15**
SB-14	8/5/2020	0-3	**28**	NA	**4.9**	**11**	**0.88**	**14**
		4-6	**130**	NA	**5.4**	**10**	**0.83**	**14**
SB-15*	8/5/2020	0-3	**400**	NA	**3.8**	**11**	**0.98**	**16**
		4-6	**930**	NA	**5.5**	**11**	**1.9**	**15**
SB-24	6/20/2022	0-3	**26**	<0.30	NA	NA	NA	NA
SB-25	6/20/2022	0-3	**17**	<0.29	NA	NA	NA	NA
SB-26	6/20/2022	0-3	**19**	<0.35	NA	NA	NA	NA
SB-27	6/20/2022	0-3	**14**	<0.28	NA	NA	NA	NA
		3-5	**45**	<0.32	NA	NA	NA	NA
SB-28*	6/20/2022	0-3	**55**	<0.28	NA	NA	NA	NA
		3-5	**70**	<0.33	NA	NA	NA	NA
SB-29	6/20/2022	0-3	**4.6**	<0.28	NA	NA	NA	NA
SB-30	6/20/2022	0-3	**41**	<0.28	NA	NA	NA	NA
SB-31	6/20/2022	0-3	**15**	<0.29	NA	NA	NA	NA
SB-32*	6/20/2022	0-3	**31**	<0.29	NA	NA	NA	NA
		3-5	**78**	<0.31	NA	NA	NA	NA
SB-33	6/20/2022	0-3	**36**	<0.30	NA	NA	NA	NA
SB-34	6/20/2022	0-3	**14**	<0.30	NA	NA	NA	NA
SB-35	6/20/2022	0-3	**35**	<0.29	NA	NA	NA	NA
SB-36	6/20/2022	0-3	**20**	<0.31	NA	NA	NA	NA
		3-5	**41**	<0.33	NA	NA	NA	NA
SB-37	6/20/2022	0-3	**20**	<0.29	NA	NA	NA	NA
		3-5	**69**	<0.34	NA	NA	NA	NA
SB-38	6/20/2022	0-3	**3.6**	<0.32	NA	NA	NA	NA
SB-39	6/20/2022	0-3	**20**	<0.28	NA	NA	NA	NA
Background Concentration			--		10	--	--	20
MTCA Method B Protective of Groundwater			--	--	2.9	4.3	3.2	--
MTCA Method B Direct Contact			130,000		0.67	24	400	1,600

Notes:

Results compared to State of Washington, Department of Ecology, Model Toxics Cleanup Act (MTCA) Method B 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.*

*SB-28 and SB-32 were co-located with previous borings SB-13 and SB-15, respectively.

Acronyms:

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

-- = No screening level available

ft bgs = feet below ground surface

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 level for direct contact.

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
6/8/2022*	740.58	2.75	740.09	4.31	739.29	5.12	738.90	5.50

Notes:

DTW = depth to water

ELEV = elevation (ft NAVD88)

ft = feet

in = inches

*Baseline sampling event, pre-remedy implementation

TABLE 3b: GROUNDWATER FIELD PARAMETERS SUMMARY

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

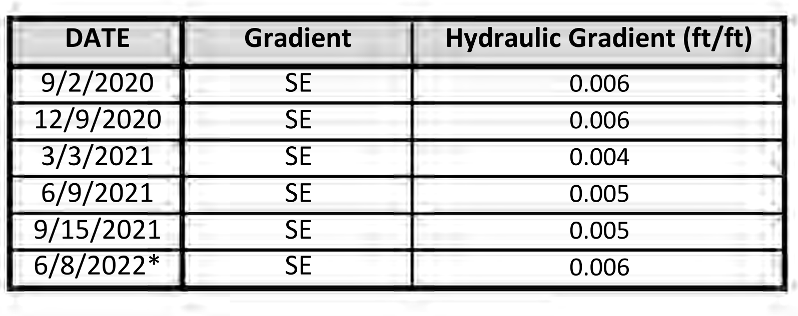
	Sample date	Temp (°C)	pH	Conductivity (µS/cm)	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)
On-Site Monitoring Well Samples							
MW-1	9/2/2020	19.46	7.42	1198	35	0.51	117.6
	12/9/2020	13.73	7.73	1166	32	0.35	-41.4
	3/3/2021	12.30	7.58	1139	9	2.17	82.3
	6/9/2021	15.35	7.56	1384	16	0.61	-61.9
	9/15/2021	20.28	7.66	2032	27	1.05	-18.0
	6/8/2022*	16.36	7.68	1411	46	1.77	100.5
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
	6/8/2022*	16.00	7.62	3108	8	1.37	123.0
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
	6/8/2022*	16.28	7.69	1178	9	0.49	137.3
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
	6/8/2022*	16.60	7.95	3795	20	1.15	229.9
Downgradient Grab Groundwater Samples							
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	82	0.63	-126.7
SB-20	7/20/2021	25.92	7.31	1883	1.32	0.72	-124.9
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
Upgradient Grab Groundwater Samples							
SB-16	7/13/2021	21.7	8.37	1441	336	5.7	34.0
SB-17	7/13/2021	21.9	8.26	1784	1100	0.52	-211.2
BSB-1	6/21/2022	13.27	7.49	1043	>1000	1.34	16.7
BSB-2	6/21/2022	13.85	7.34	2325	>1000	2.32	-52.5
BSB-3	6/21/2022	15.85	7.70	1260	>1000	1.82	-72.1
BSB-4	6/22/2022	12.75	7.45	1361	>1000	1.22	-86.7
BSB-5	6/22/2022	12.86	7.05	2194	>1000	1.08	66.2
BSB-6	6/22/2022	12.60	7.46	2231	>1000	3.83	60.3
BSB-7	6/22/2022	13.56	7.13	4877	>1000	2.68	67.7
BSB-8	6/22/2022	14.98	6.98	3654	>1000	5.37	54.9
BSB-9	6/22/2022	15.39	7.3	1200	237	2.21	-18.8
BSB-10	6/22/2022	14.80	7.29	1443	>1000	5.57	-28

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
*Baseline sampling event, pre-remedy implementation

TABLE 4: GROUNDWATER GRADIENT SUMMARY

Former Nachurs Alpine Solutions Facility, Sunnyside, WA



DATE	Gradient	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
6/8/2022*	SE	0.006

Notes:
ft = feet
SE = southeast
*Baseline sampling event, pre-remedy implementation

TABLE 5: QUARTERLY AND GRAB GROUNDWATER SAMPLING RESULTS

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Location	Screen Interval Depth (ft bgs)	Date Collected	Nitrogen, Nitrate (mg/L)	Arsenic (total) (µg/L)	Arsenic (dissolved) (µg/L)	Cadmium (total) (µg/L)	Cadmium (dissolved) (µg/L)	Cobalt (total) (µg/L)	Cobalt (dissolved) (µg/L)	Lead (total) (µg/L)	Lead (dissolved) (µg/L)	Molybdenum (total) (µg/L)	Molybdenum (dissolved) (µg/L)	Nickel (total) (µg/L)	Nickel (dissolved) (µg/L)	Selenium (total) (µg/L)	Selenium (dissolved) (µg/L)	Zinc (total) (µg/L)	Zinc (dissolved) (µg/L)
On-Site Groundwater Monitoring Wells																			
MW-1	5-15	09/02/20	68	NA[1]	14	NA	NA	NA[1]	< 1.0	NA	<1.0	NA[1]	29	NA[1]	< 2.0	NA	NA	NA	NA
		12/9/20	19	10	10	NA	NA	<1.0	< 1.0	NA	NA	29	28	< 2.0	< 2.0	NA	NA	NA	NA
		3/3/21	20	8.9	8.8	NA	NA	< 1.0	< 1.0	NA	NA	23	23	< 2.0	< 2.0	NA	NA	NA	NA
		6/9/21	14	11	10	NA	NA	1.4	< 1.0	NA	NA	22	27	3.8	< 2.0	NA	NA	NA	NA
		9/15/21	13	11	11	NA	NA	< 1.0	< 1.0	NA	NA	30	29	NA	NA	NA	NA	NA	NA
MW-2	5-15	09/02/20	430	NA[1]	210	NA	NA	NA[1]	9.1	NA	<1.0	NA[1]	32	NA[1]	66	NA	NA	NA	NA
		12/9/20	89	130	130	NA	NA	7.5	7.0	NA	NA	28	28	76	74	NA	NA	NA	NA
		3/3/21	98	110	110	NA	NA	10	9.7	NA	NA	41	39	81	81	NA	NA	NA	NA
		6/9/21	94	76	80	NA	NA	9.1	9.7	NA	NA	37	37	91	88	NA	NA	NA	NA
		9/15/21	92	79	77	NA	NA	8.2	8.2	NA	NA	30	31	NA	NA	NA	NA	NA	NA
MW-3	5-15	09/02/20	83	NA[1]	72	NA	NA	NA[1]	< 1.0	NA	<1.0	NA[1]	36	NA[1]	< 2.0	NA	NA	NA	NA
		12/9/20	22	81	80	NA	NA	<1.0	< 1.0	NA	NA	40	41	2.1	2.1	NA	NA	NA	NA
		3/3/21	23	85	87	NA	NA	< 1.0	< 1.0	NA	NA	36	41	< 2.0	2.0	NA	NA	NA	NA
		6/9/21	27	71	71	NA	NA	< 1.0	< 1.0	NA	NA	50	50	2.9	2.7	NA	NA	NA	NA
		9/15/21	19	60	60	NA	NA	< 1.0	< 1.0	NA	NA	42	45	NA	NA	NA	NA	NA	NA
MW-4	5-15	09/02/20	760	NA[1]	65	NA	NA	NA[1]	19	NA	<1.0	NA[1]	130	NA[1]	80	NA	NA	NA	NA
		12/9/20	160	68	66	NA	NA	15	15	NA	NA	120	120	66	66	NA	NA	NA	NA
		3/3/21	160	67	69	NA	NA	18	18	NA	NA	130	130	69	70	NA	NA	NA	NA
		6/9/21	170	65	66	NA	NA	17	17	NA	NA	110	120	77	75	NA	NA	NA	NA
		9/15/21	180	64	65	NA	NA	18	18	NA	NA	120	120	NA	NA	NA	NA	NA	NA
On-Site Grab-Groundwater																			
SB-8	6-10	08/05/20	150	21	10	NA	NA	24	1.0	NA	NA	120	130	25	3.2	NA	NA	NA	NA
SB-3	6-10	08/05/20	1,000	580	520	NA	NA	110	22	NA	NA	69	83	170	91	NA	NA	NA	NA
SB-4	6-10	08/05/20	240	160	100	NA	NA	57	3.0	NA	NA	130	160	82	11	NA	NA	NA	NA
SB-5	6-10	08/05/20	370	48	45	NA	NA	4.8	1.6	NA	NA	180	190	14	10	NA	NA	NA	NA
SB-9	7-10	02/08/18	170	373	21.4	2.9	<2.0	438	14.6	374	<10.0	92.4	122	736	61.8	12.7	<10.0	2,650	<20.0
SB-10	7-10	02/08/18	240	29.5	28.2	<2.0	<2.0	23.5	22.9	<10.0	<10.0	194	194	146	146	<10.0	<10.0	<20.0	<20.0
SB-11	7-10	02/08/18	120	<10.0	10.9	<2.0	<2.0	<10.0	<10.0	<10.0	<10.0	110	110	11.5	10.5	<10.0	<10.0	<20.0	<20.0
SB-12	5-10	08/05/20	450	27	28	NA	NA	6.2	2.9	NA	NA	120	110	33	23	NA	NA	NA	NA
SB-13	6-10	08/05/20	1,200	65	12	NA	NA	120	79	NA	NA	120	150	260	200	NA	NA	NA	NA
SB-14	7-10	08/05/20	780	47	49	NA	NA	72	65	NA	NA	160	150	74	74	NA	NA	NA	NA
SB-15	6-10	08/05/20	460	78	83	NA	NA	3.1	2.0	NA	NA	290	290	12	10	NA	NA	NA	NA
Downgradient Grab-Groundwater Samples																			
SB-18	5-15	07/13/21	28	67	35	NA	NA	45	< 1.0	NA	NA	58	75	NA	NA	NA	NA	NA	NA
SB-19	5-15	07/20/21	21[a]	28	14	NA	NA	32	1.9	NA	NA	45	54	NA	NA	NA	NA	NA	NA
SB-20	5-15	07/20/21	27[a]	110	10	NA	NA	340	3.0	NA	NA	8.4	47	NA	NA	NA	NA	NA	NA
SB-21	5-15	07/13/21	5.6	150	120	NA	NA	41	10	NA	NA	24	30	NA	NA	NA	NA	NA	NA
SB-22	5-15	07/20/21	0.12[a]	130	62	NA	NA	170	< 1.0	NA	NA	7.4	16	NA	NA	NA	NA	NA	NA
SB-23	5-15	07/20/21	24[a]	80	14	NA	NA	530	< 1.0	NA	NA	< 1.0	32	NA	NA	NA	NA	NA	NA

TABLE 5: QUARTERLY AND GRAB GROUNDWATER SAMPLING RESULTS

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Location	Screen Interval Depth (ft bgs)	Date Collected	Nitrogen, Nitrate (mg/L)	Arsenic (total) (µg/L)	Arsenic (dissolved) (µg/L)	Cadmium (total) (µg/L)	Cadmium (dissolved) (µg/L)	Cobalt (total) (µg/L)	Cobalt (dissolved) (µg/L)	Lead (total) (µg/L)	Lead (dissolved) (µg/L)	Molybdenum (total) (µg/L)	Molybdenum (dissolved) (µg/L)	Nickel (total) (µg/L)	Nickel (dissolved) (µg/L)	Selenium (total) (µg/L)	Selenium (dissolved) (µg/L)	Zinc (total) (µg/L)	Zinc (dissolved) (µg/L)
Upgradient Grab-Groundwater Samples																			
SB-16	5-15	07/13/21	**8.4**	**93**	**65**	NA	NA	**33**	< 1.0	NA	NA	**62**	**76**	NA	NA	NA	NA	NA	NA
SB-17	5-15	07/13/21	**13**	**110**	**90**	NA	NA	**43**	< 1.0	NA	NA	**38**	**44**	NA	NA	NA	NA	NA	NA
BSB-1	5-15	06/21/22	NA	**55**	**5.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BSB-2	5-15	06/21/22	NA	**67**	**8.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BSB-3	5-15	06/21/22	NA	**87**	**8.8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BSB-4	5-15	06/22/22	NA	**57**	**16**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BSB-5	5-15	06/22/22	NA	**40**	**5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BSB-6	5-15	06/22/22	NA	**110**	**17**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BSB-7	5-15	06/22/22	NA	**25**	**18**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BSB-8	5-15	06/22/22	NA	**52**	**5.4**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BSB-9	5-15	06/22/22	NA	**25**	**9**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BSB-10	5-15	06/22/22	NA	**31**	**3.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPA MCL			**10**	**10**	**10**	**5**	**5**	--	--	**15**	**15**	--	--	**100**	**100**	**50**	**50**	--	--
MTCA Method A Cleanup Levels			--	**5**	**5**	**5**	**5**	--	--	**15**	**15**	--	--	--	--	--	--	--	--
MTCA Method B Cleanup Levels			**26**	**0.058**	**0.058**	**8**	**8**	**5**	**5**	--	--	**80**	**80**	**320**	**320**	**80**	**80**	**4,800**	**4,800**
MTCA Method C Cleanup Levels			**56**	**0.580**	**0.580**	**5**	**5**		**11**		--		**180**		--		--		--
Target Remediation Levels^2			**48**	**71**	--	--	--	**5**	--	--	--	**80**	--	--	--	--	--	--	--

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. Target Site-Specific Remediation Levels are developed and presented in Table 7.

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.

Acronyms:

< = Not detected above the reported laboratory method detection limit.
-- = No Target Site-Specific Remediation Level selected or available (see Table 7)
µg/L = micrograms per liter
mg/L = milligrams per liter
BSB = background soil borings
ft bgs = feet below ground surface
MW = monitoring wells
NA = Not Analyzed
SB = soil borings
Bold = Analyte was detected.
Highlight = Analyte was detected at concentrations that are greater than the Target Remediation Level.

TABLE 6: BASELINE GROUNDWATER SAMPLING RESULTS
Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Location	Screen Interval Depth (ft bgs)	Date Collected	Constituents of Potential Concern							Other Geochemical Analytes										
			Nitrate as Nitrogen (mg/L)	Arsenic (total) (µg/L)	Arsenic (dissolved) (µg/L)	Cobalt (total) (µg/L)	Cobalt (dissolved) (µg/L)	Molybdenum (total) (µg/L)	Molybdenum (dissolved) (µg/L)	Arsenic, Inorganic (total) (µg/L)	Arsenic (V) (µg/L)	Arsenic (III) (µg/L)	Iron (total) (µg/L)	Iron (dissolved) (µg/L)	Manganese (total) (µg/L)	Manganese (dissolved) (µg/L)	Nitrogen, Ammonia (mg/L)	Ortho-Phosphate (mg/L)	Sulfate (mg/L)	Dissolved Organic Carbon (mg/L)
MW-1	5-15	6/8/22	**15.0**	**11.2**	**9.71**	**0.825**	**0.067**	**28**	**26.5**	**6.50**	**6.50**	0.007J	**1,340**	**2.2**	**295**	**2.09**	<0.050	**0.094**	**229**	**3.20**
MW-2	5-15	6/8/22	**90**	**70.0**	**67.3**	**9.56**	**9.10**	**37.9**	**36.0**	**43.8**	**43.7**	**0.088**	**156**	**11.9**	**237**	**182**	**2.24**	**9.5**	**584**	**5.80**
MW-3	5-15	6/8/22	**15.2**	**72.0**	**72.8**	**0.662**	**0.325**	**32.8**	**34.4**	**46.4**	**46.2**	**0.160**	**127**	**30.1**	**597**	**173**	<0.050	**0.313**	**131**	**2.90**
MW-4	5-15	6/8/22	**185**	**58.3**	**59.0**	**18.8**	**18.3**	**133**	**135**	**38.5**	**38.4**	**0.079**	**458**	**33.6**	**237**	**203**	<0.050	**0.314**	**667**	**7.40**
Target Remediation Levels[1]			**48**	**71**	--	**5**	--	**80**	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

1. Target site specific remediation levels are developed and presented in Table 7

Acronyms:

< = Not detected above the reported laboratory method detection limit

-- = No target remediation level selected or available

µg/L = micrograms per liter

mg/L = milligrams per liter

J = The result is an estimated value

ft bgs = feet below ground surface

MW = monitoring well

Bold = Analyte was detected

Highlight Analyte was detected at concentrations that are greater than the Target Remediation Level

TABLE 7: PROPOSED GROUNDWATER TARGET REMEDIATION LEVELS

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

COPC	**Units**	**Screening Levels**				**Max COPC Concentration Detected on-Site**	**On-Site Dections Exceed Screening Levels**	**Target Remediation Level**[3]
		Area-Specific Background[1]	**Regional Background**[2]	**MTCA Method B (Unrestricted)**	**EPA MCL**			
Nitrate as nitrogen	mg/L	**48**	1.8	26	10	1200	yes	48
Total Arsenic	µg/L	**71**	6	0.058	10	580	yes	71
Total Cadmium	µg/L	--	--	8	5	<2.0	no	--
Total Cobalt	µg/L	--	--	**5**	--	79	yes	5
Total Lead	µg/L	--	--	--	15	<10.0	no	--
Total Mercury	µg/L	--	--	--	2	<2.0	no	--
Total Molybdenum	µg/L	--	--	**80**	--	290	yes	80
Total Nickel	µg/L	--	--	320	100	200	yes*	--
Total Selenium	µg/L	--	--	80	50	<10.0	no	--
Total Zinc	µg/L	--	--	4800	--	<20.0	no	--

Notes:

1) Area-Specific Background concentrations are based on area-specific groundwater samples provided by Ecology's EIM database for nitrate and collected directly upgradient of the Site (MW-1, SB-16, SB-17, BSB-1 through BSB-10) for total arsenic. Calculations for determining the area-specific background levels are presented in Appendix C.

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) Target remediation levels were selected for COPCs with detections over screening levels. The area-specific background level for nitrate as nitrogen and total arsenic was selected, and MTCA Method B levels were selected as the Target Remediation Levels for total cobalt and total molybdenum, based on land use in the area and that no EPA MCLs exist for these two metals.

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

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

* Nickel was originally a site COPC, but following four rounds of groundwater sampling for nickel no concentrations exceeded the EPA MCL or MTCA Method B 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. Following discussions with Ecology nickel was removed as a Site COPC.

Acronyms

"--" = No value available or not applicable
µg/L = micrograms per liter
mg/L = milligrams per liter
COPC = constituents of potential concern
EPA = Environmental Protection Agency
MTCA = Model Toxic Control Act
MCL = Maximum Contaminant Level
Bold = screening level used to establish proposed Target Remediation Level

TABLE 8: REMEDIAL ALTERNATIVES ANALYSIS

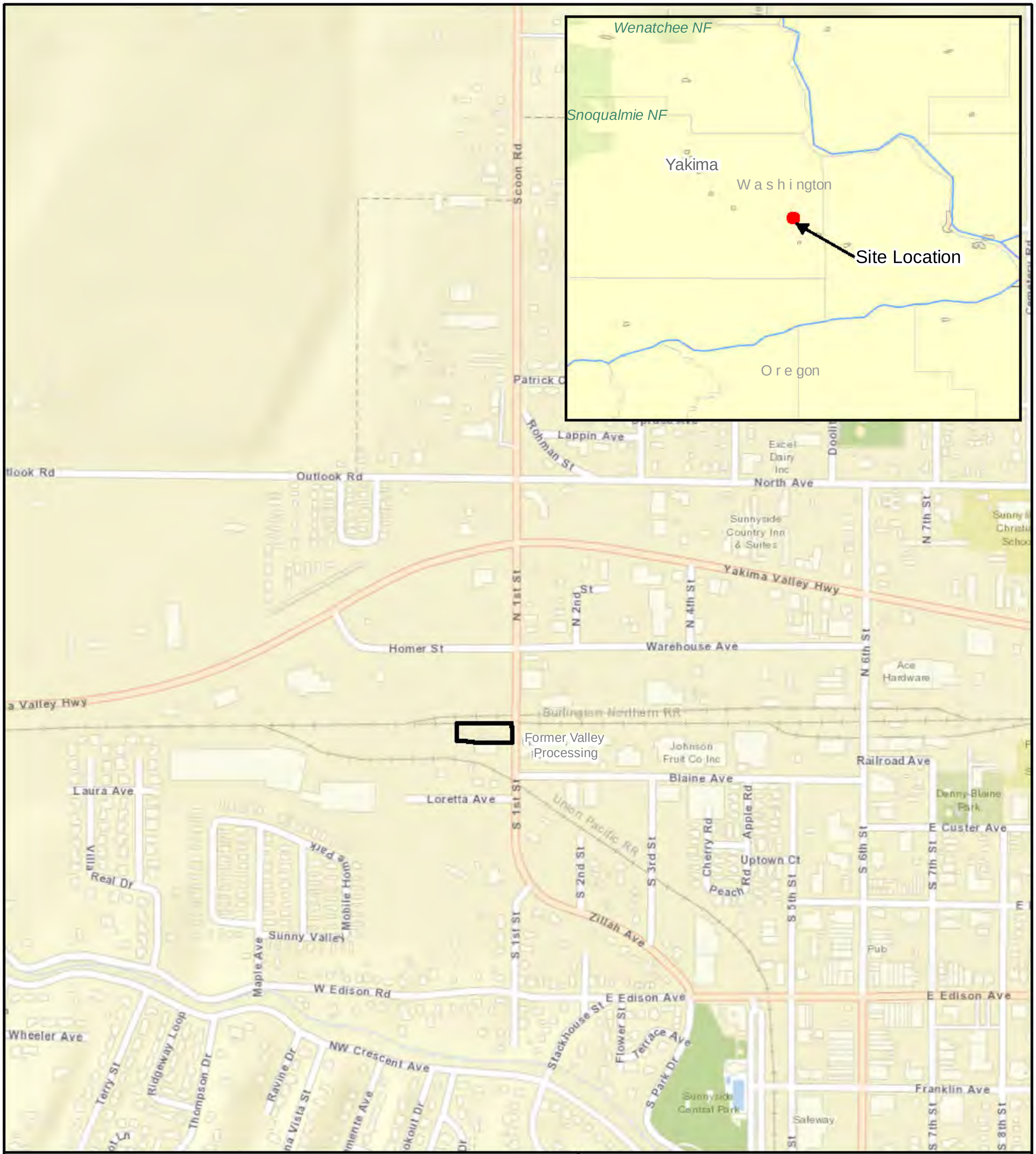
Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Alternative			Evaluation Categories														Total Weighted Score	Selected Alternative?
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)			
			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	**In-Situ Denitrification with Metals Attenuation**	This remedial approach includes in-situ denitrification with metal attenuation. In this remedial approach, an electron-donor will be injected into shallow groundwater to enhance reductive degradation of COPCs in the groundwater, including denitrification of nitrate and metal attenuation. Baseline sampling was conducted in June 2022 at the Site to evaluate arsenic speciation and the potential to mobilize metals during denitrification. Based on the baseline sampling and geochemical modeling results an increase in dissolved metals after electron donor injections is not anticipated. Multiple injection locations positioned throughout the Site will be used to inject amendments, such as emulsified vegetable oil (EVO), 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 during or following remedy implementation. Mobilization of metals from injections is not anticipated 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, 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 assessment. Electron-donor will 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 will 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 - Constituents 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

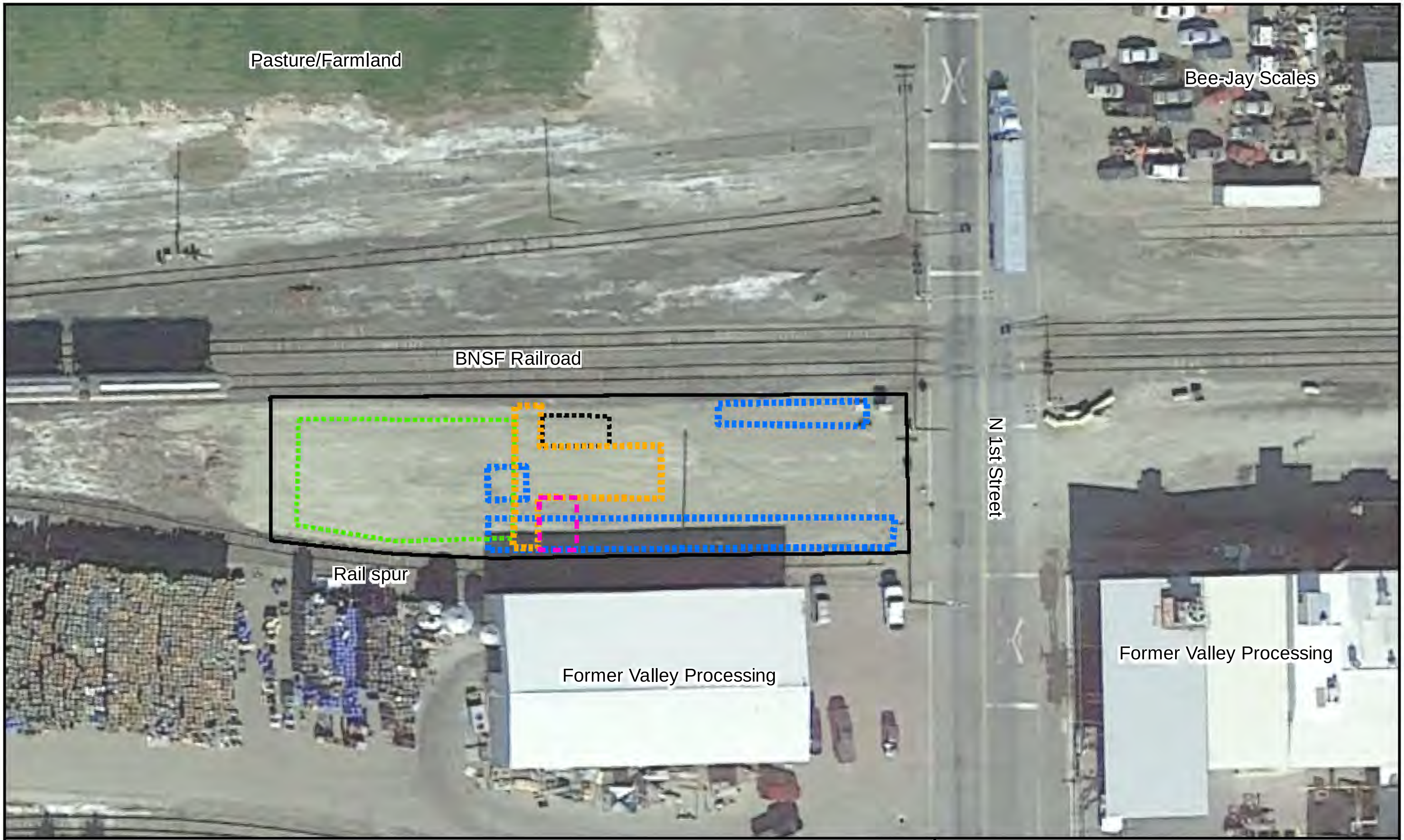
Figure

1

PNR0696C

August 2022

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions111721\Figure 1 Site Location Map.mxd 12/7/2021 9:16:37 AM



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

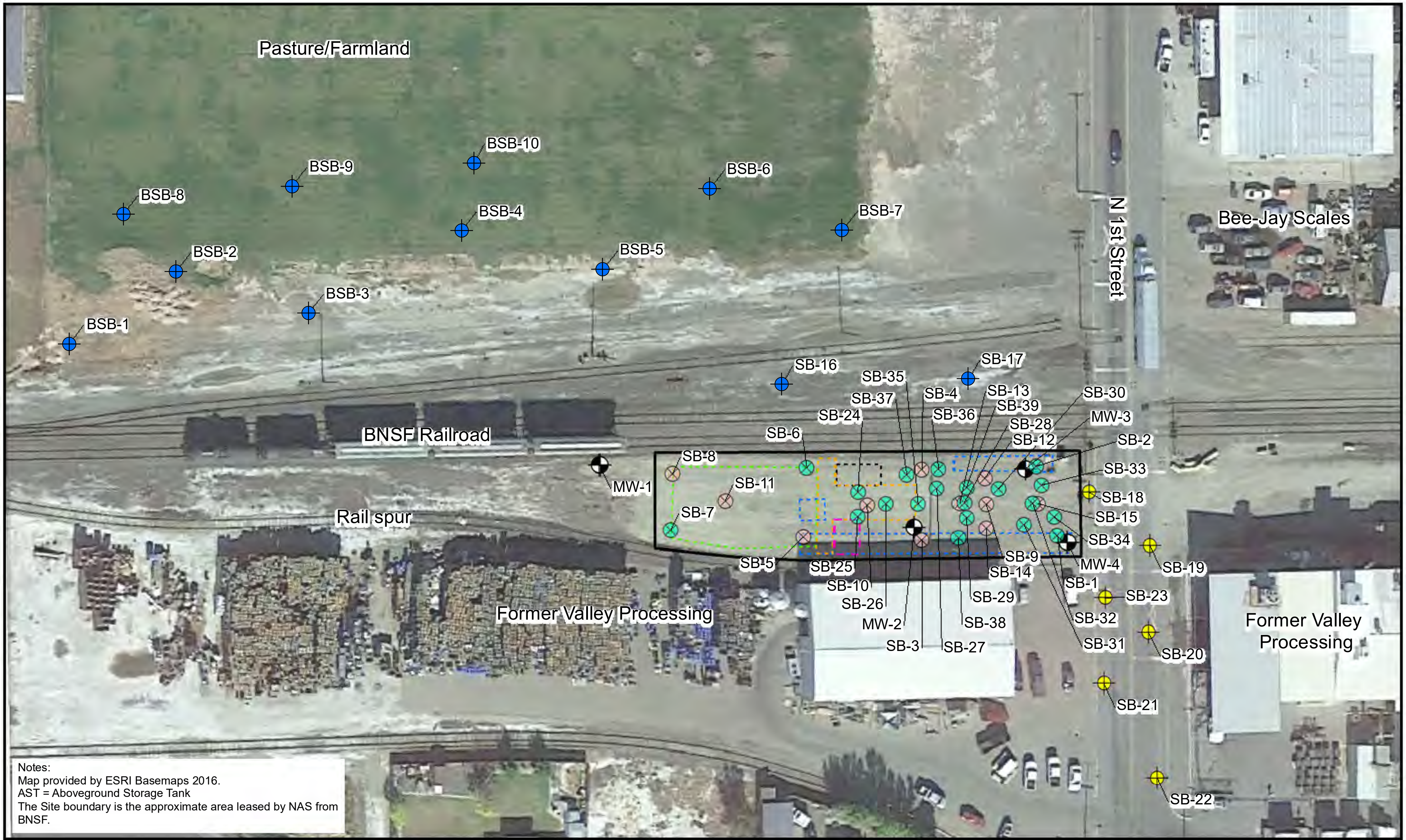
PNR0696C

August 2022

Figure

2

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



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

Legend

- ⊕ Upgradient Grab-Groundwater Sample Location
- ⊕ Downgradient Grab-Groundwater Sample Location
- ◐ Monitoring Well and Soil Sample Location
- ⊗ On-Site Grab-Groundwater and Soil Sample Location
- ⊗ On-Site 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)

SB-23 - Location ID

N

0 80 Feet

Soil and Groundwater Investigation Locations

101 North 1st Street
Sunnyside, Washington

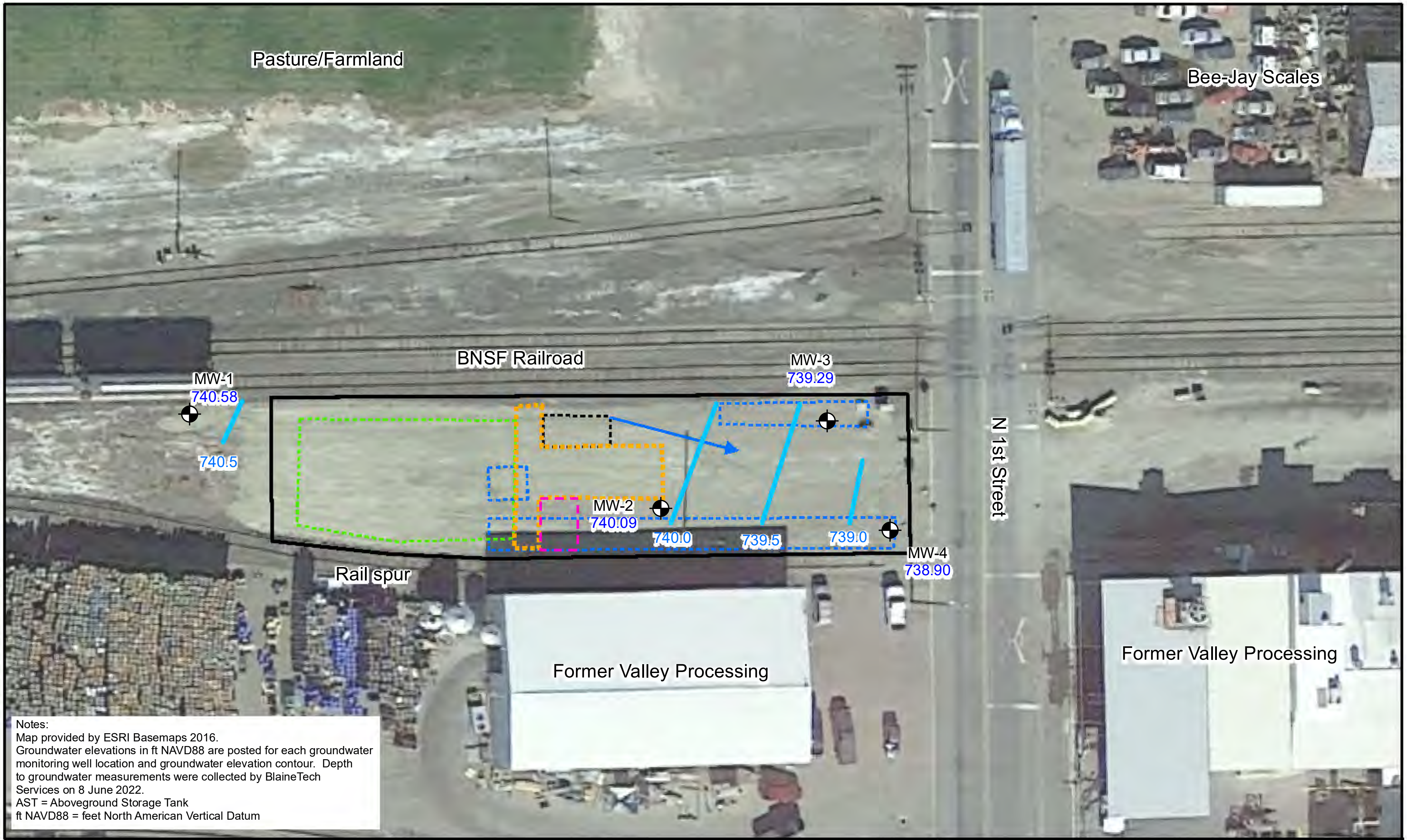
Geosyntec consultants

PNR0696C

August 2022

Figure
3

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions052022\Figure 3 Soil and Groundwater Investigation Locations.mxd 8/18/2022 11:52:55 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 8 June 2022.
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)

MW-4 — Location ID
738.90 — Groundwater Elevation in feet NAVD88

N

0 50 Feet

Groundwater Elevation Contour Map - June 2022

101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

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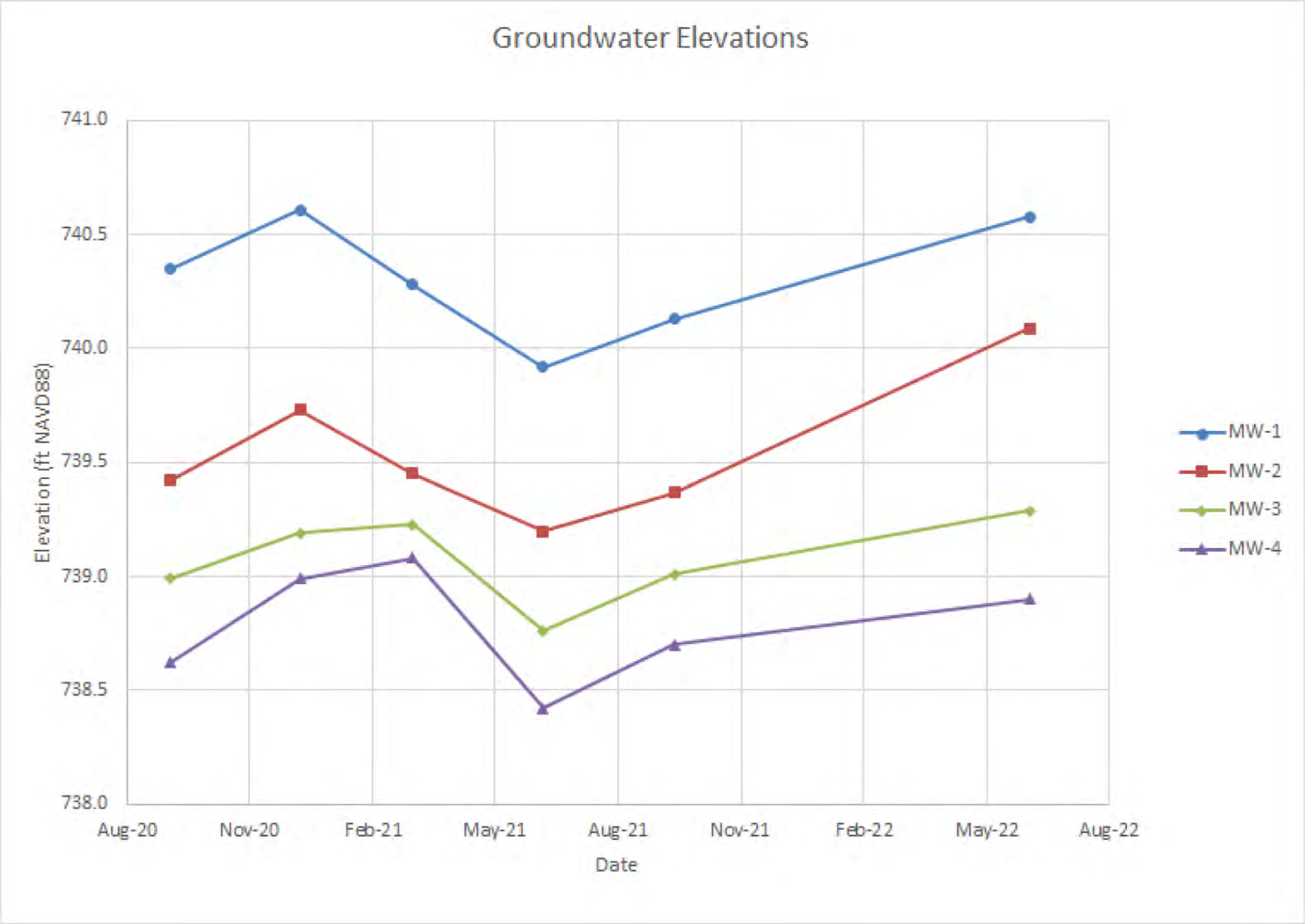
August 2022

Figure 4

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions052022\Figure 4 Groundwater Elevation 2022.mxd 8/30/2022 5:21:03 AM



Notes:

Groundwater elevations are in feet North American Vertical Datum 1988

MW = monitoring well

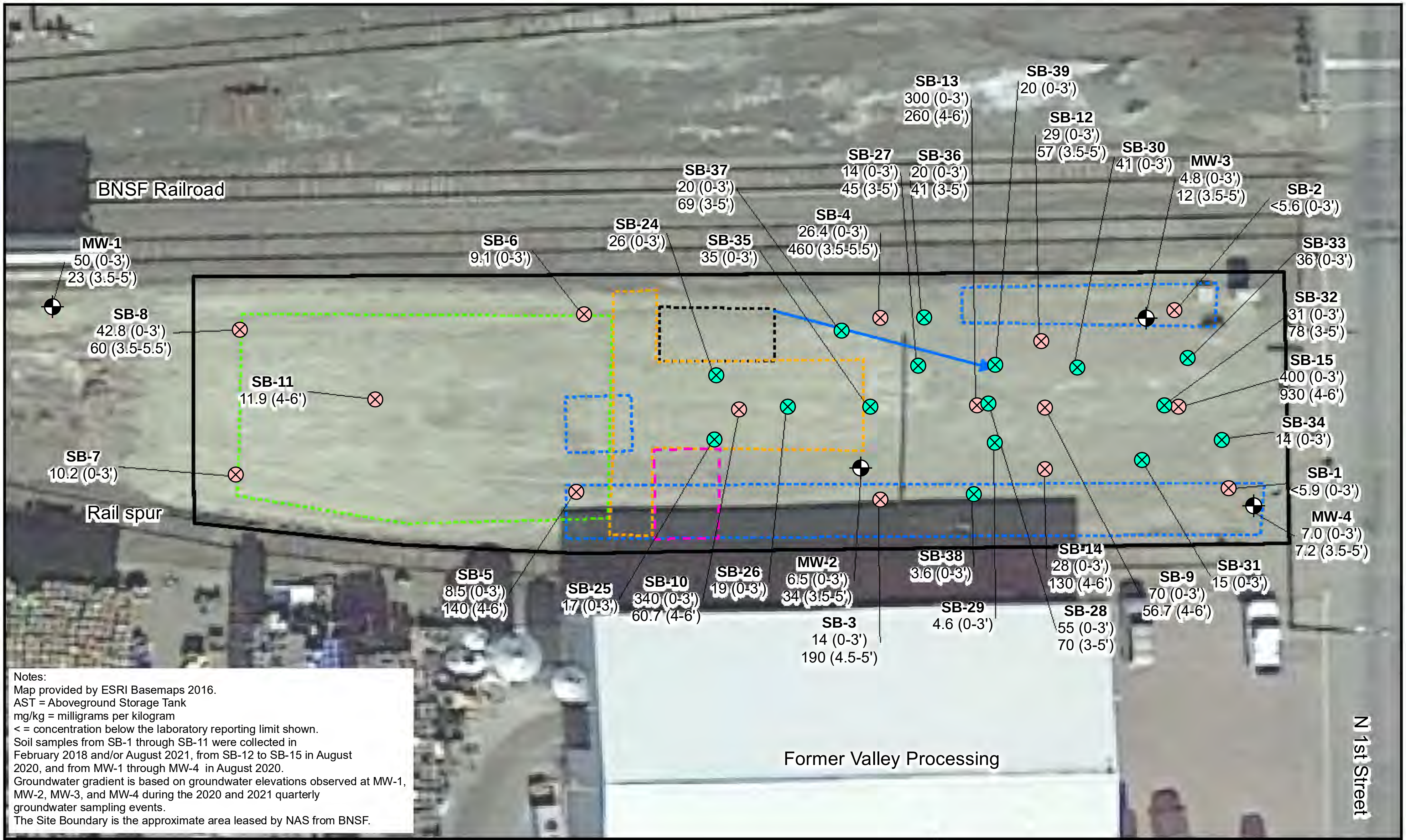
Groundwater Hydrographs
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

Figure
5

PNR0696C

August 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
- ⊗ Soil Sample Location (2022)
- ⊗ Grab Groundwater and Soil Sample Location (Historical)
- → 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 20 Feet

Nitrate in Soil Analytical Results

101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

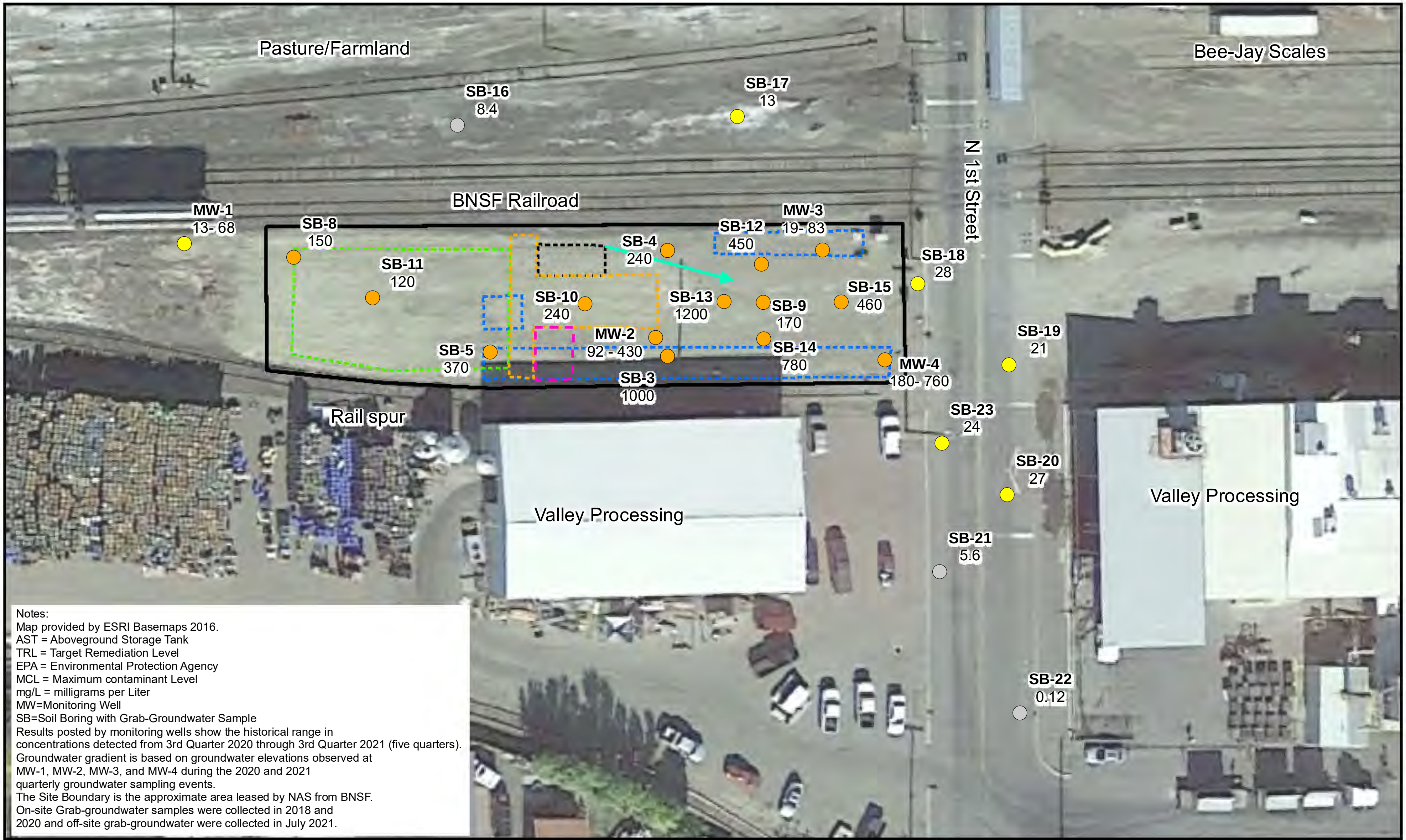
PNR0696C

August 2022

Figure

6

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions052022\Figure 6 Nitrate Soil results.mxd 8/30/2022 5:44:46 AM



Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
TRL = Target Remediation Level
EPA = Environmental Protection Agency
MCL = Maximum contaminant Level
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 - 48 mg/L
- ● >48 mg/L (TRL)
- → 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)

MW-4 — Location ID
180-760— Nitrate concentration in groundwater mg/L

N

0 50 Feet

Nitrate in Groundwater Sampling Locations

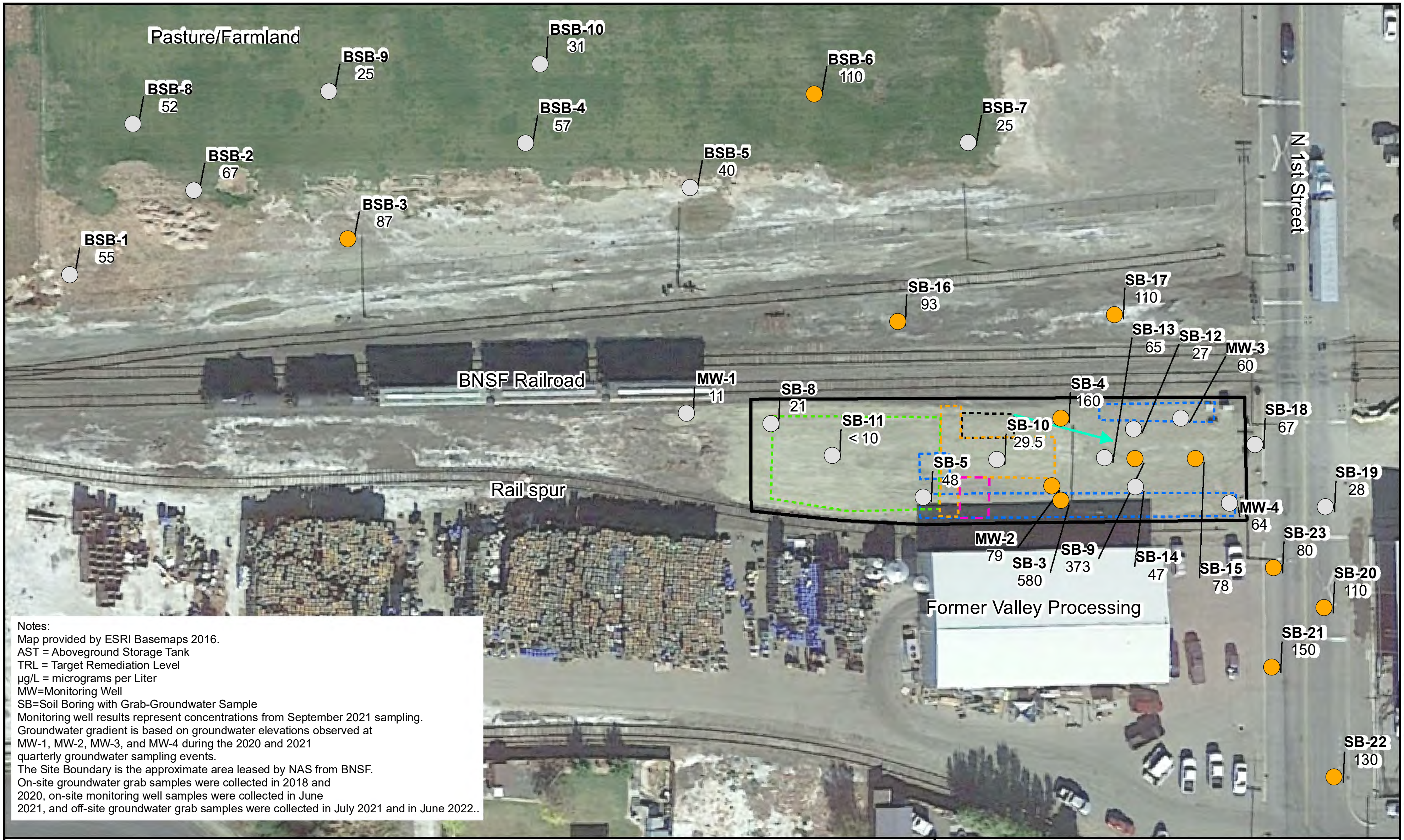
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696C | August 2022

Figure 7a

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions052022\Figure 7a Nitrate in GW.mxd 9/2/2022 4:30:10 AM



Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
TRL = Target Remediation Level
µg/L = micrograms per Liter
MW=Monitoring Well
SB=Soil Boring with Grab-Groundwater Sample
Monitoring well results represent concentrations from September 2021 sampling.
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 and in June 2022..

Legend

Total Arsenic in Groundwater (µg/L)

- ○ <71 µg/L (TRL)
- ● >71 µg/L
- → 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)

MW-4 — Location ID
64 — Total Arsenic concentration in groundwater µg/L

N

0 60 Feet

Total Arsenic in Groundwater Sampling Locations

101 North 1st Street
Sunnyside, Washington

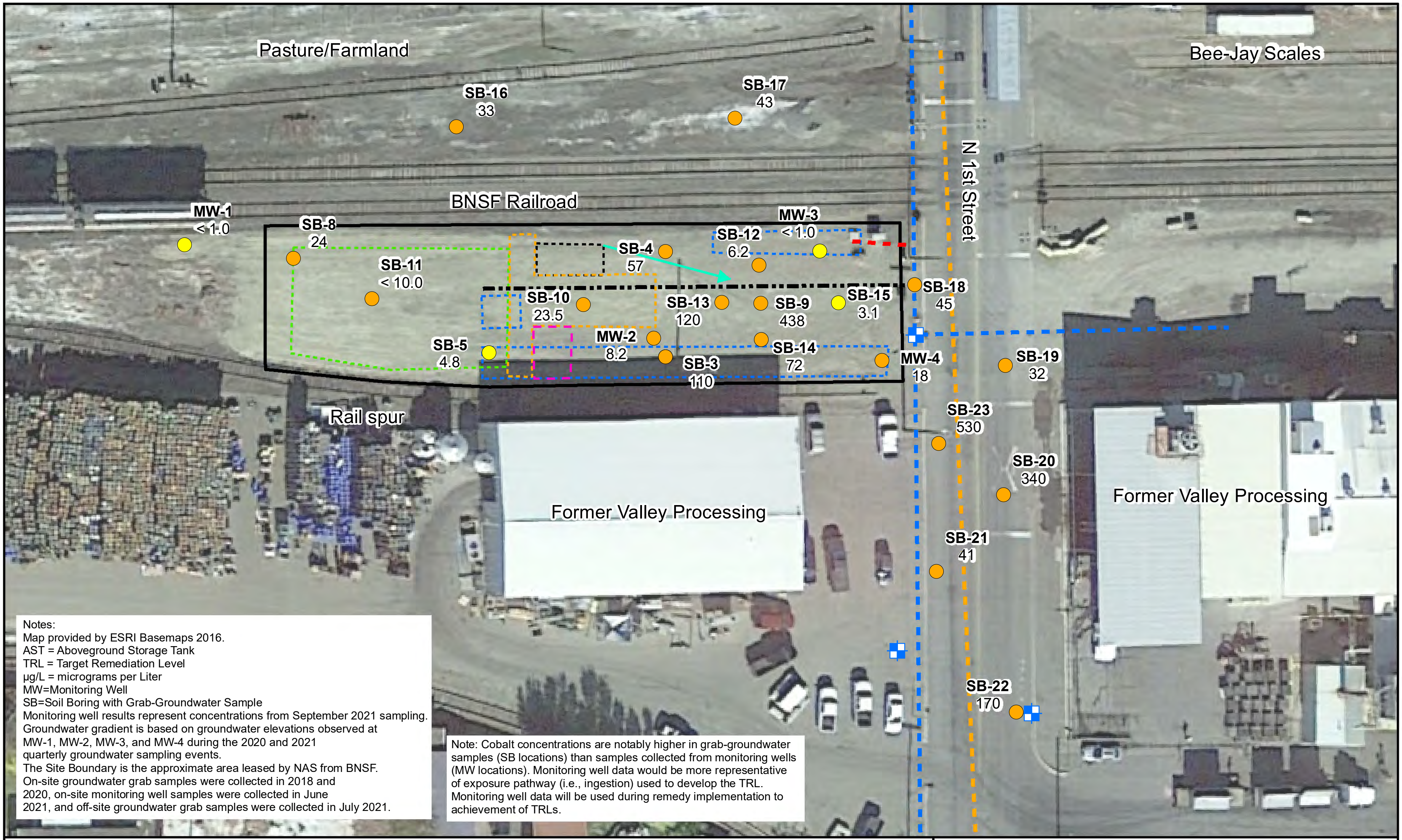
Geosyntec consultants

PNR0696C

September 2022

Figure 7b

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions052022\Figure 7b Dissolved Arsenic Results.mxd 9/2/2022 1:42:57 PM



Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
TRL = Target Remediation Level
µg/L = micrograms per Liter
MW=Monitoring Well
SB=Soil Boring with Grab-Groundwater Sample
Monitoring well results represent concentrations from September 2021 sampling.
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.

Note: Cobalt concentrations are notably higher in grab-groundwater samples (SB locations) than samples collected from monitoring wells (MW locations). Monitoring well data would be more representative of exposure pathway (i.e., ingestion) used to develop the TRL. Monitoring well data will be used during remedy implementation to achievement of TRLs.

Legend

Total Cobalt in Groundwater (µg/L)

- ● <1-5 µg/L
- ● >5 µg/L (TRL)
- ✚ Storm Drain Location
- Electrical Line
- Approximate Stormwater Line Location
- Approximate Sewer Line Location
- Approximate Abandoned Pipe 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)

MW-4 — Location ID
64 — Cobalt concentration in groundwater µg/L

N

0 50 Feet

Total Cobalt in Groundwater Sampling Locations

101 North 1st Street
Sunnyside, Washington

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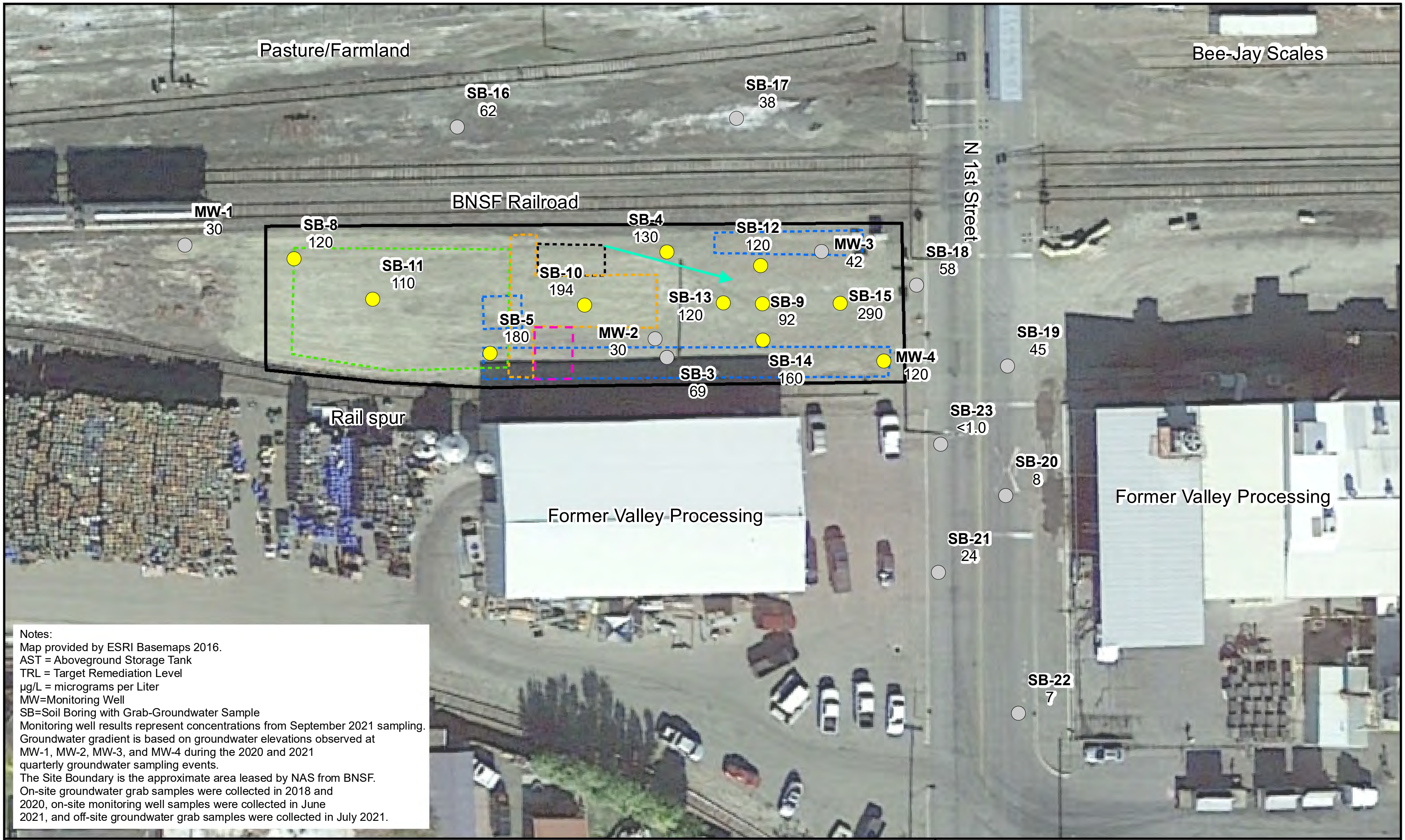
PNR0696C | September 2022

Figure 7c



Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
TRL = Target Remediation Level
µg/L = micrograms per Liter
MW=Monitoring Well
SB=Soil Boring with Grab-Groundwater Sample
Monitoring well results represent concentrations from September 2021 sampling.
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

Total Molybdenum in Groundwater (µg/L)

- ● < 80 µg/L
- ● >80 µg/L (TRL)
- → 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)

MW-4 — Location ID
120 — Molybdenum concentration in groundwater µg/L

N

0 50 Feet

Total Molybdenum in Groundwater Sampling Locations

101 North 1st Street
Sunnyside, Washington

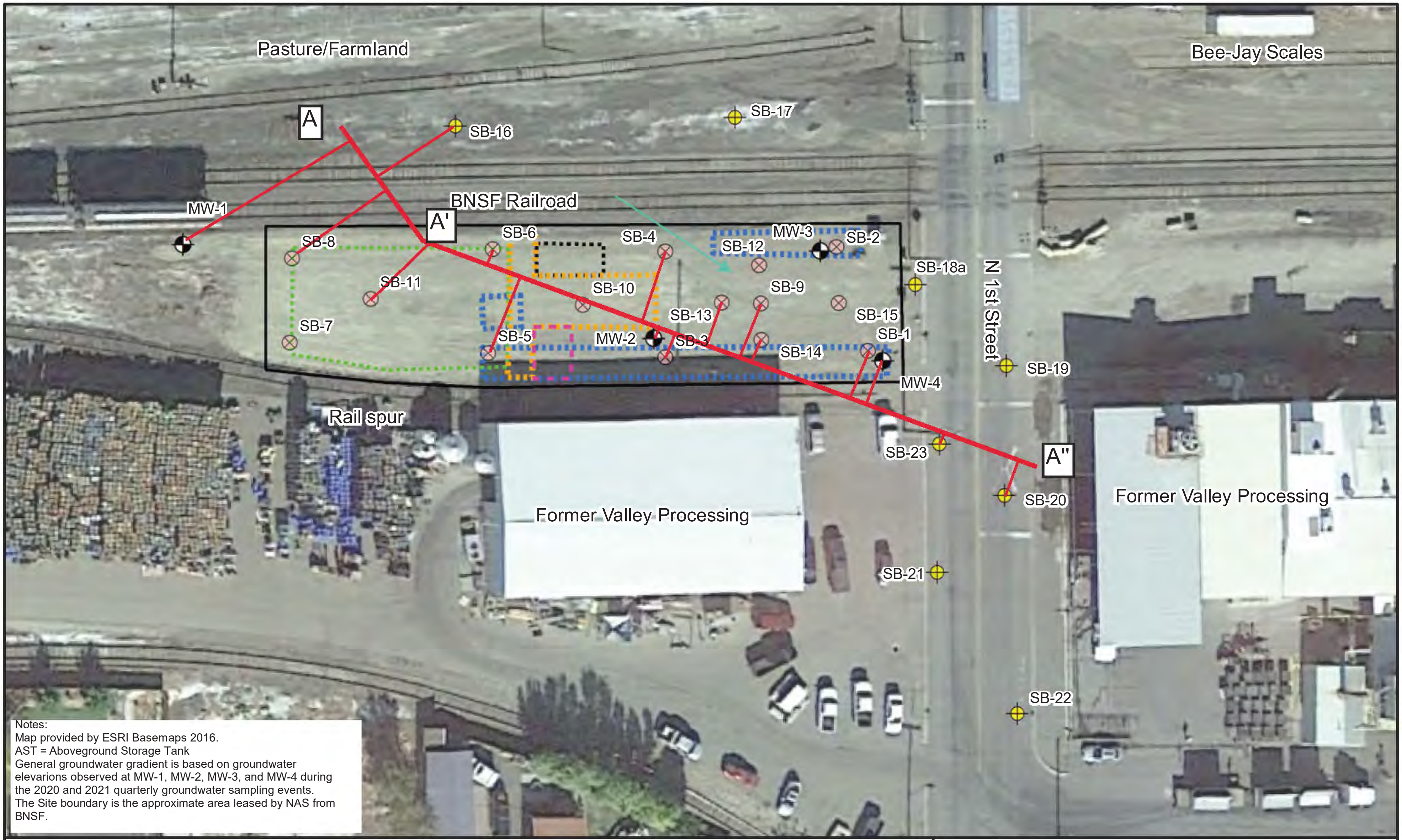
Geosyntec consultants

PNR0696C

August 2022

Figure 7d

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions052022\Figure 7d Moly in GW.mxd 9/2/2022 1:44:22 PM



Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
General groundwater gradient is based on groundwater elevarions 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

- ⊕ 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

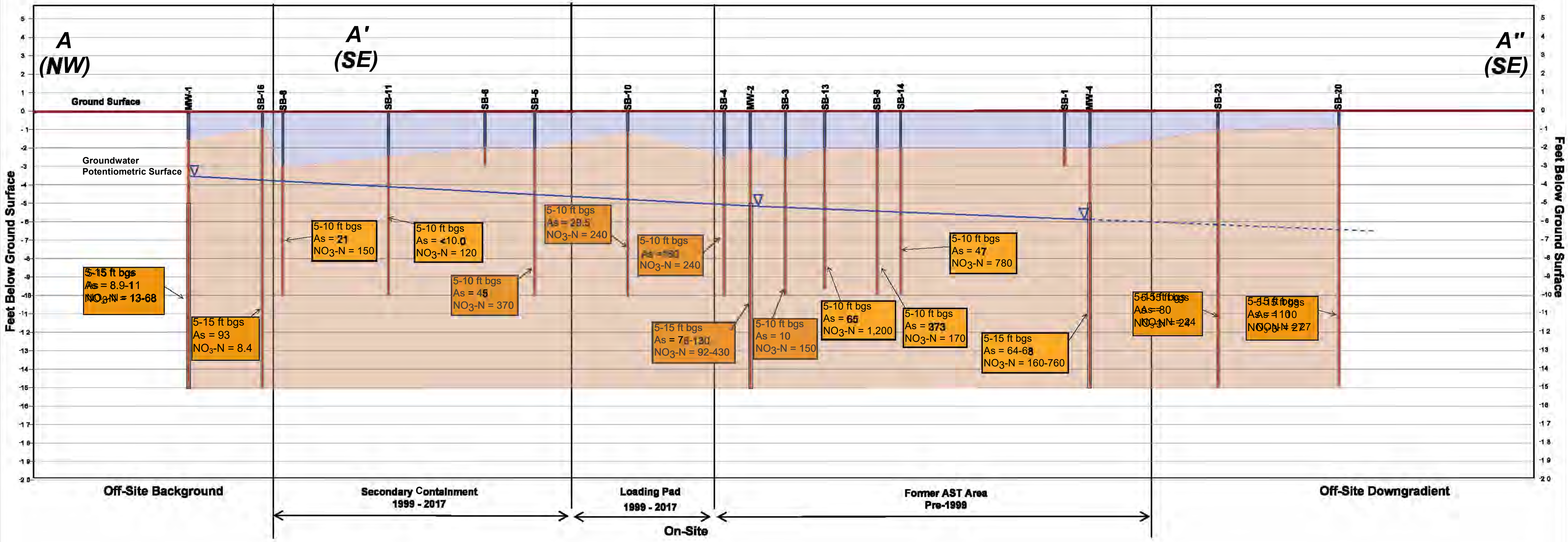
Geosyntec consultants

PNR0696C

August 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 (total) 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 Target Remediation Level for total arsenic (71 ug/L) or nitrate as nitrogen (37 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:

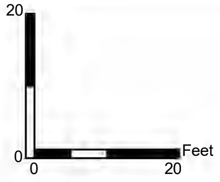
Ground surface topograph is assumed to be flat for the purposes of this generalized cross-section. Distances between boring locations and site use areas shown are approximate.

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

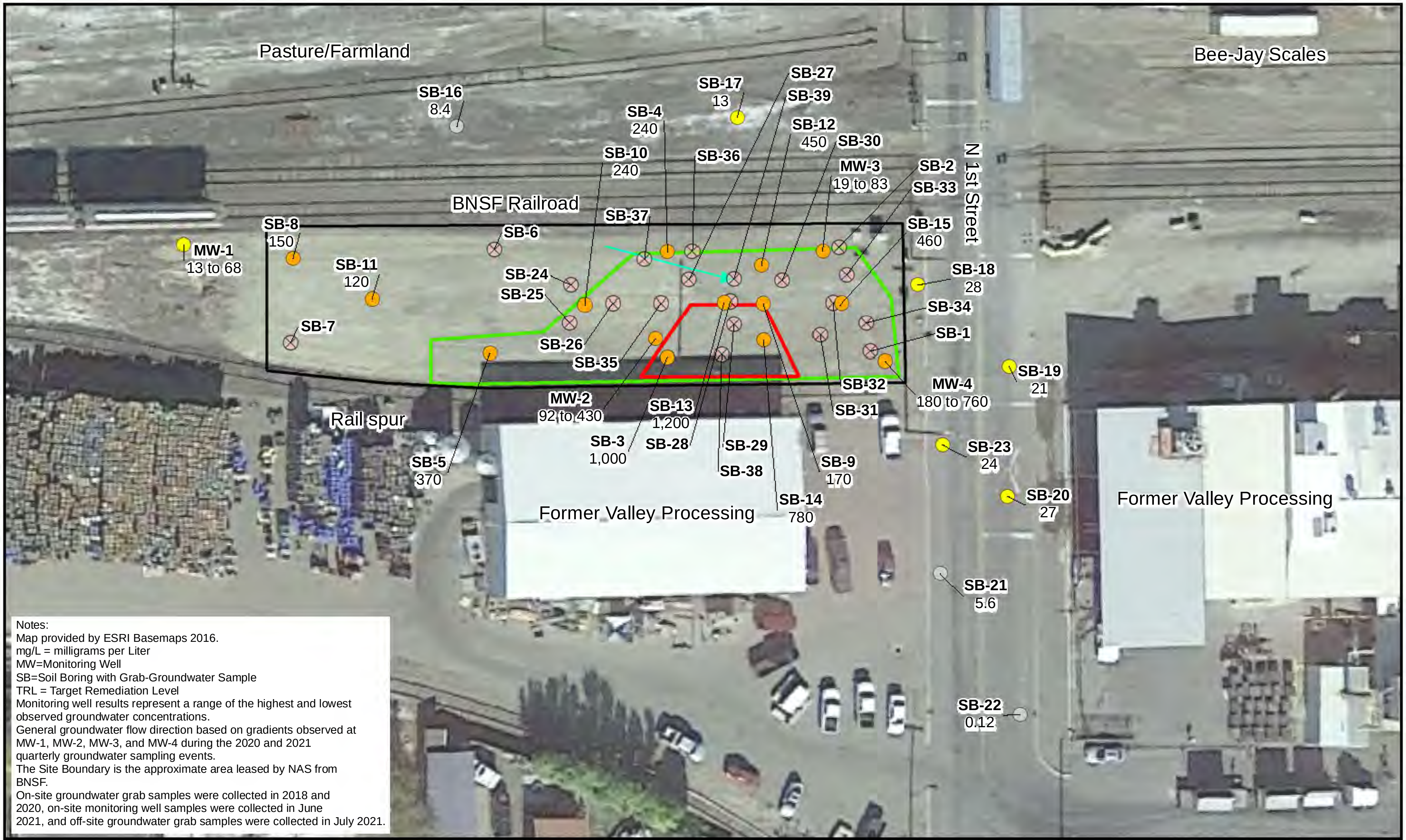


Generalized Cross-Section A-A'
Former Gulton-Statham Facility,
Oxnard, California

Geosyntec consultants

PNR0696C
August 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
TRL = Target Remediation Level
Monitoring well results represent a range of the highest and lowest observed groundwater concentrations.
General groundwater flow direction based on gradients 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 - 48 mg/L
- ● > 48 mg/L (TRL)
- ⊗ Grab Groundwater and Soil Sample Location
- → General Groundwater Flow Direction
- ▭ 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

Geosyntec
consultants

Figure

9

PNR0696C

August 2022

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APPENDIX A

Off-Site Groundwater Investigation and 2nd and 3rd Quarter 2021 Groundwater Monitoring Results Report

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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September 23, 2022

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
bgs	below ground surface
BTS	Blaine Tech Services, Inc. of Auburn, Washington
COPCs	constituents of potential concern
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ESN	Environmental Services Network
ft	feet
Geosyntec	Geosyntec Consultants, Inc.
mg/L	milligrams per liter
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
TRL	Target Remediation Levels
USCS	Unified Soil Classification System
VCP	Voluntary Cleanup Program
Wilbur-Ellis	Wilbur-Ellis Holdings II, Inc.

1. INTRODUCTION

This *Off-Site Groundwater Investigation and* 2^{nd} *and* 3^{rd} *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.

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[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 the Target Remediation Levels (TRL).

The laboratory analytical results in samples collected, during the off-Site investigation, indicated that total arsenic was detected in groundwater above the TRLs except at a downgradient location of SB-19. The highest concentrations of total and dissolved arsenic were at SB-21 (located downgradient of Valley Processing Maintenance Shop) with concentrations of 150 µg/L and 120 µg/L, respectively. The highest concentration of total cobalt was observed at SB-23 located downgradient from the Site with a concentration of 530 µg/L. These results were inconsistent with the groundwater chemistry of COPC concentration on-Site, indicating that the total and dissolved arsenic and cobalt concentrations at these locations 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 TRLs of 80 µg/L and 48 µg/L respectively. The highest concentration of nitrate was detected downgradient at location SB-20, which is located across North 1st Street, at 27 milligrams per liter (mg/L). This result is slightly over the MTCA Method B CUL of 26 mg/L but within area-specific background of 48 mg/L.

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

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[2] On-Site, concentrations of total and dissolved metals that are elevated compared to background coincide with locations that also had elevated concentrations of nitrate as nitrogen. In the downgradient grab-groundwater samples (SB-18 through SB-23) 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 concentration of arsenic observed of any grab-groundwater sample collected on- or off-Site. In addition, the total cobalt concentration in the groundwater sample from SB-23 was the highest concentration of any on- or off-Site samples. greater than.

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 one monitoring well exceeded TRLs for total arsenic during both sampling events 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 TRLs. 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 TRLs. Groundwater COPCs concentrations were found to be below TRLs for nitrate and molybdenum at all off-Site locations. Concentrations of arsenic and cobalt were shown to exceed TRLs at most of the locations. The results in the downgradient groundwater samples were inconsistent with the groundwater chemistry of COPC concentrations on-Site, indicating that the arsenic and cobalt concentrations at these locations 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 bgs)	Date Collected	Nitrate as Nitrogen (mg/L)	Arsenic (total) (µg/L)	Arsenic (dissolved) (µg/L)	Cadmium (total) (µg/L)	Cadmium (dissolved) (µg/L)	Cobalt (total) (µg/L)	Cobalt (dissolved) (µg/L)	Lead (total) (µg/L)	Lead (dissolved) (µg/L)	Mercury (total) (µg/L)	Mercury (dissolved) (µg/L)	Molybdenum (total) (µg/L)	Molybdenum (dissolved) (µg/L)	Nickel (total) (µg/L)	Nickel (dissolved) (µg/L)	Selenium (total) (µg/L)	Selenium (dissolved) (µg/L)	Zinc (total) (µg/L)	Zinc (dissolved) (µg/L)
Groundwater Monitoring Wells																						
MW-1	Up-Gradient	5-10	09/02/20	**68**	NA[1]	**14**	NA	NA	NA[1]	< 1.0	NA	NA	NA	NA	NA[1]	**29**	NA[1]	< 2.0	NA	NA	NA	NA
			12/9/20	**19**	**10**	**10**	NA	NA	<1.0	< 1.0	NA	NA	NA	NA	**29**	**28**	< 2.0	< 2.0	NA	NA	NA	NA
			3/3/21	**20**	**8.9**	**8.8**	NA	NA	< 1.0	< 1.0	NA	NA	NA	NA	**23**	**23**	< 2.0	< 2.0	NA	NA	NA	NA
			6/9/21	**14**	**11**	**10**	NA	NA	**1.4**	< 1.0	NA	NA	NA	NA	**22**	**27**	**3.8**	< 2.0	NA	NA	NA	NA
			9/15/21	**13**	**11**	**11**	NA	NA	< 1.0	< 1.0	NA	NA	NA	NA	**29**	**30**	NA	NA	NA	NA	NA	NA
MW-2	On-Site	5-10	09/02/20	**430**	NA[1]	**210**	NA	NA	NA[1]	**9**	NA	NA	NA	NA	NA[1]	**32**	NA[1]	**66**	NA	NA	NA	NA
			12/9/20	**89**	**130**	**130**	NA	NA	**7.5**	**7**	NA	NA	NA	NA	**28**	**28**	**76**	**74**	NA	NA	NA	NA
			3/3/21	**98**	**110**	**110**	NA	NA	**10**	**9.7**	NA	NA	NA	NA	**41**	**39**	**81**	**81**	NA	NA	NA	NA
			6/9/21	**94**	**76**	**80**	NA	NA	**9.1**	**9.7**	NA	NA	NA	NA	**37**	**37**	**91**	**88**	NA	NA	NA	NA
			9/15/21	**92**	**77**	**79**		NA	**8.2**	**8.2**	NA	NA	NA	NA	**31**	**30**	NA	NA	NA	NA	NA	NA
MW-3	On-Site	5-10	09/02/20	**83**	NA[1]	**72**	NA	NA	NA[1]	< 1.0	NA	NA	NA	NA	NA[1]	**36**	NA[1]	< 2.0	NA	NA	NA	NA
			12/9/20	**22**	**81**	**80**	NA	NA	<1.0	< 1.0	NA	NA	NA	NA	**40**	**41**	**2.1**	**2.1**	NA	NA	NA	NA
			3/3/21	**23**	**85**	**87**	NA	NA	< 1.0	< 1.0	NA	NA	NA	NA	**36**	**41**	< 2.0	**2.0**	NA	NA	NA	NA
			6/9/21	**27**	**71**	**71**	NA	NA	< 1.0	< 1.0	NA	NA	NA	NA	**50**	**50**	**2.9**	**2.7**	NA	NA	NA	NA
			9/15/21	**19**	**60**	**60**	NA	NA	< 1.0	< 1.0	NA	NA	NA	NA	**45**	**42**	NA	NA	NA	NA	NA	NA
MW-4	On-Site	5-10	09/02/20	**760**	NA[1]	**65**	NA	NA	NA[1]	**19**	NA	NA	NA	NA	NA[1]	**130**	NA[1]	**80**	NA	NA	NA	NA
			12/9/20	**160**	**68**	**66**	NA	NA	**15**	**15**	NA	NA	NA	NA	**120**	**120**	**66**	**66**	NA	NA	NA	NA
			3/3/21	**160**	**67**	**69**	NA	NA	**18**	**18**	NA	NA	NA	NA	**130**	**130**	**69**	**70**	NA	NA	NA	NA
			6/9/21	**170**	**65**	**66**	NA	NA	**17**	**17**	NA	NA	NA	NA	**110**	**120**	**77**	**75**	NA	NA	NA	NA
			9/15/21	**180**	**65**	**64**	NA	NA	**18**	**18**	NA	NA	NA	NA	**120**	**120**	NA	NA	NA	NA	NA	NA
On-Site Grab-Groundwater																						
SB-8-GW	On-Site	6-10	08/05/20	**150**	**21**	**10**	NA	NA	**24**	**1.0**	NA	NA	NA	NA	**120**	**130**	**25**	**3.2**	NA	NA	NA	NA
SB-3-GW		6-10	08/05/20	**1,000**	**580**	**520**	NA	NA	**110**	**22**	NA	NA	NA	NA	**69**	**83**	**170**	**91**	NA	NA	NA	NA
SB-4-GW		6-10	08/05/20	**240**	**160**	**100**	NA	NA	**57**	**3**	NA	NA	NA	NA	**130**	**160**	**82**	**11**	NA	NA	NA	NA
SB-5 GW		6-10	08/05/20	**370**	**48**	**45**	NA	NA	**4.8**	**1.6**	NA	NA	NA	NA	**180**	**190**	**14**	**10**	NA	NA	NA	NA
SB-9-GW		7-10	02/08/18	**170**	**373**	**21.4**	**2.9**	<2.0	**438**	**14.6**	**374**	<10.0	<2.0	<2.0	**92.4**	**122**	**736**	**61.8**	**12.7**	<10.0	**2,650**	<20.0
SB-10-GW		7-10	02/08/18	**240**	**29.5**	**28.2**	<2.0	<2.0	**23.5**	**22.9**	<10.0	<10.0	<2.0	<2.0	**194**	**194**	**146**	**146**	<10.0	<10.0	<20.0	<20.0
SB-11-GW		7-10	02/08/18	**120**	<10.0	**10.9**	<2.0	<2.0	<10.0	<10.0	<10.0	<10.0	<2.0	<2.0	**110**	**110**	**11.5**	**10.5**	<10.0	<10.0	<20.0	<20.0
SB-12-GW		5-10	08/05/20	**450**	**27**	**28**	NA	NA	**6.2**	**2.9**	NA	NA	NA	NA	**120**	**110**	**33**	**23**	NA	NA	NA	NA
SB-13-GW		6-10	08/05/20	**1,200**	**65**	**12**	NA	NA	**120**	**79**	NA	NA	NA	NA	**120**	**150**	**260**	**200**	NA	NA	NA	NA
SB-14-GW		7-10	08/05/20	**780**	**47**	**49**	NA	NA	**72**	**65**	NA	NA	NA	NA	**160**	**150**	**74**	**74**	NA	NA	NA	NA
SB-15-GW		6-10	08/05/20	**460**	**78**	**83**	NA	NA	**3**	**2**	NA	NA	NA	NA	**290**	**290**	**12**	**10**	NA	NA	NA	NA

TABLE 3: GROUNDWATER ANALYTICAL RESULTS SUMMARY

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Location		Screen Interval Depth (ft bgs)	Date Collected	Nitrate as Nitrogen (mg/L)	Arsenic (total) (µg/L)	Arsenic (dissolved) (µg/L)	Cadmium (total) (µg/L)	Cadmium (dissolved) (µg/L)	Cobalt (total) (µg/L)	Cobalt (dissolved) (µg/L)	Lead (total) (µg/L)	Lead (dissolved) (µg/L)	Mercury (total) (µg/L)	Mercury (dissolved) (µg/L)	Molybdenum (total) (µg/L)	Molybdenum (dissolved) (µg/L)	Nickel (total) (µg/L)	Nickel (dissolved) (µg/L)	Selenium (total) (µg/L)	Selenium (dissolved) (µg/L)	Zinc (total) (µg/L)	Zinc (dissolved) (µg/L)
Off-Site Grab-Groundwater																						
SB-16-GW	Up-Gradient	5-15	07/13/21	**8.4**	**93**	**65**	NA	NA	**33**	< 1.0	NA	NA	NA	NA	**62**	**76**	NA	NA	NA	NA	NA	NA
SB-17-GW	Up-Gradient	5-15	07/13/21	**13**	**110**	**90**	NA	NA	**43**	< 1.0	NA	NA	NA	NA	**38**	**44**	NA	NA	NA	NA	NA	NA
SB-18-GW	Down-Gradient	5-15	07/13/21	**28**	**67**	**35**	NA	NA	**45**	< 1.0	NA	NA	NA	NA	**75**	**75**	NA	NA	NA	NA	NA	NA
SB-19-GW	Down-Gradient	5-15	07/20/21	**21**[a]	**28**	**14**	NA	NA	**32**	**1.9**	NA	NA	NA	NA	**45**	**54**	NA	NA	NA	NA	NA	NA
SB-20-GW	Down-Gradient	5-15	07/20/21	**27**[a]	**110**	**10**	NA	NA	**340**	**3.0**	NA	NA	NA	NA	**8.4**	**47**	NA	NA	NA	NA	NA	NA
SB-21-GW	Down-Gradient	5-15	07/13/21	**5.6**	**150**	**120**	NA	NA	**41**	**10**	NA	NA	NA	NA	**24**	**30**	NA	NA	NA	NA	NA	NA
SB-22-GW	Down-Gradient	5-15	07/20/21	**0.12**[a]	**130**	**62**	NA	NA	**170**	< 1.0	NA	NA	NA	NA	**7.4**	**16**	NA	NA	NA	NA	NA	NA
SB-23-GW	Down-Gradient	5-15	07/20/21	**24**[a]	**80**	**14**	NA	NA	**530**	< 1.0	NA	NA	NA	NA	< 1.0	**32**	NA	NA	NA	NA	NA	NA
Area Specific Background Concentration[2]				48	71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MTCA Method A Cleanup Levels				--	5	5	5	5	--	--	15	15	2	2	--	--	--	--	--	--	--	--
MTCA Method B Cleanup Levels				26	0.058	0.058	8	8	5	5	--	--	--	--	80	80	320	320	80	80	4,800	4,800
MTCA Method C Cleanup Levels				56	0.580	0.580	5	5	11	11	--	--	--	--	180	180	--	--	--	--	--	--
Target Remediation Level[3]				48	71	--	--	--	5	--	--	--	--	--	80	--	--	--	--	--	--	--

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. Area-specific background concentrations are based on groundwater samples from MW-1, SB-16, SB-17, and BSB1 through BSB-10 (2022 grab-groundwater sampling) due to their upgradient locations.

3.Target Remediation Levels are developed and presented in the main RI/CAP.

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.

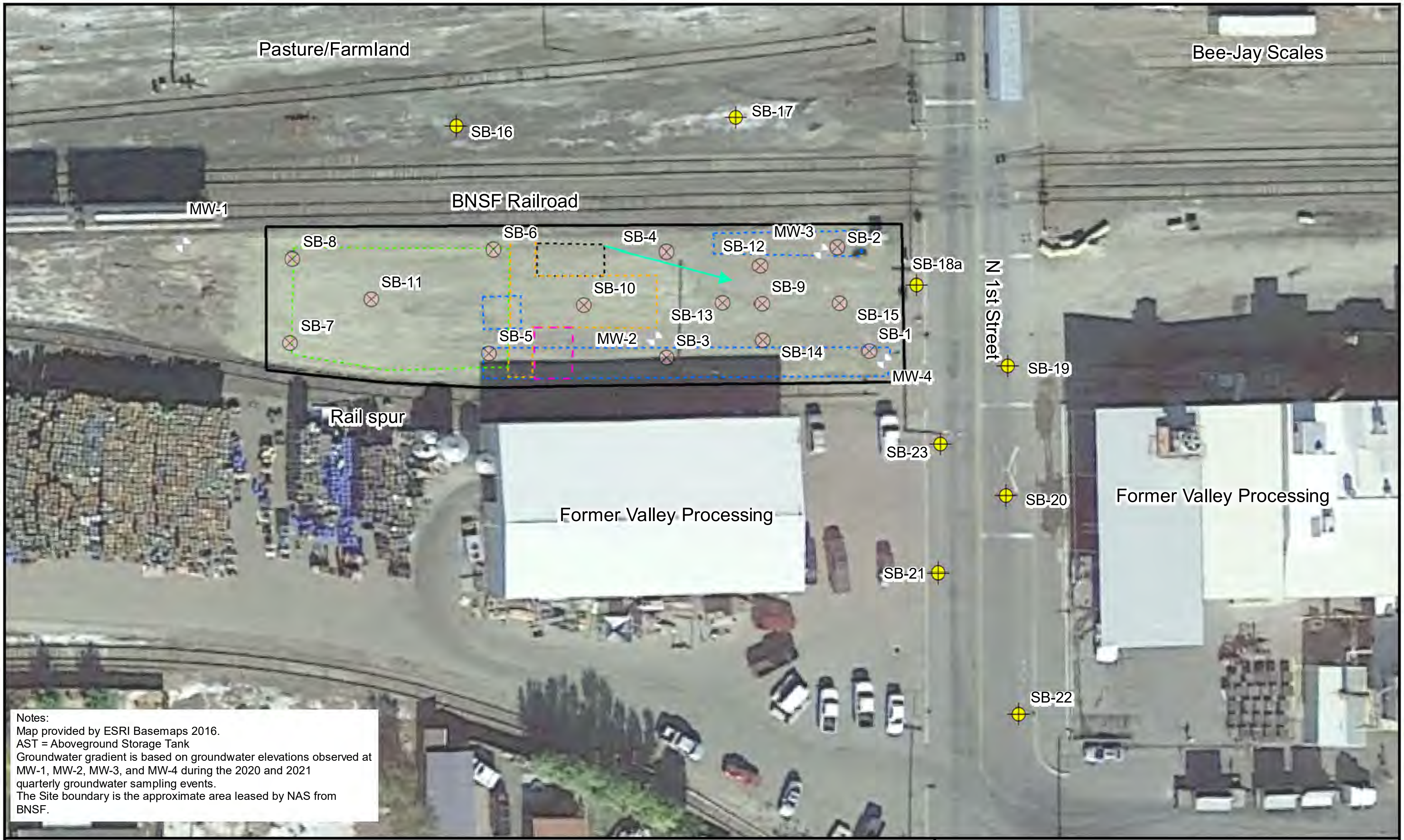
Constituents shown include those analyzed in 2020 and 2021 or were detected at least once during the 2018 sampling event. 2018 data are from August Mack Phase II Subsurface Investigation.
Results compared to State of Washington, Department of Ecology, Model Toxics Cleanup Act (MTCA) screening levels 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

ft bgs = feet below ground surface
NA = Not Analyzed
SB = soil borings
Bold = Analyte was detected.
Highlight = Analyte was detected at concentrations that are greater than target remediation levels.

FIGURES



Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
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

- ⊕ 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

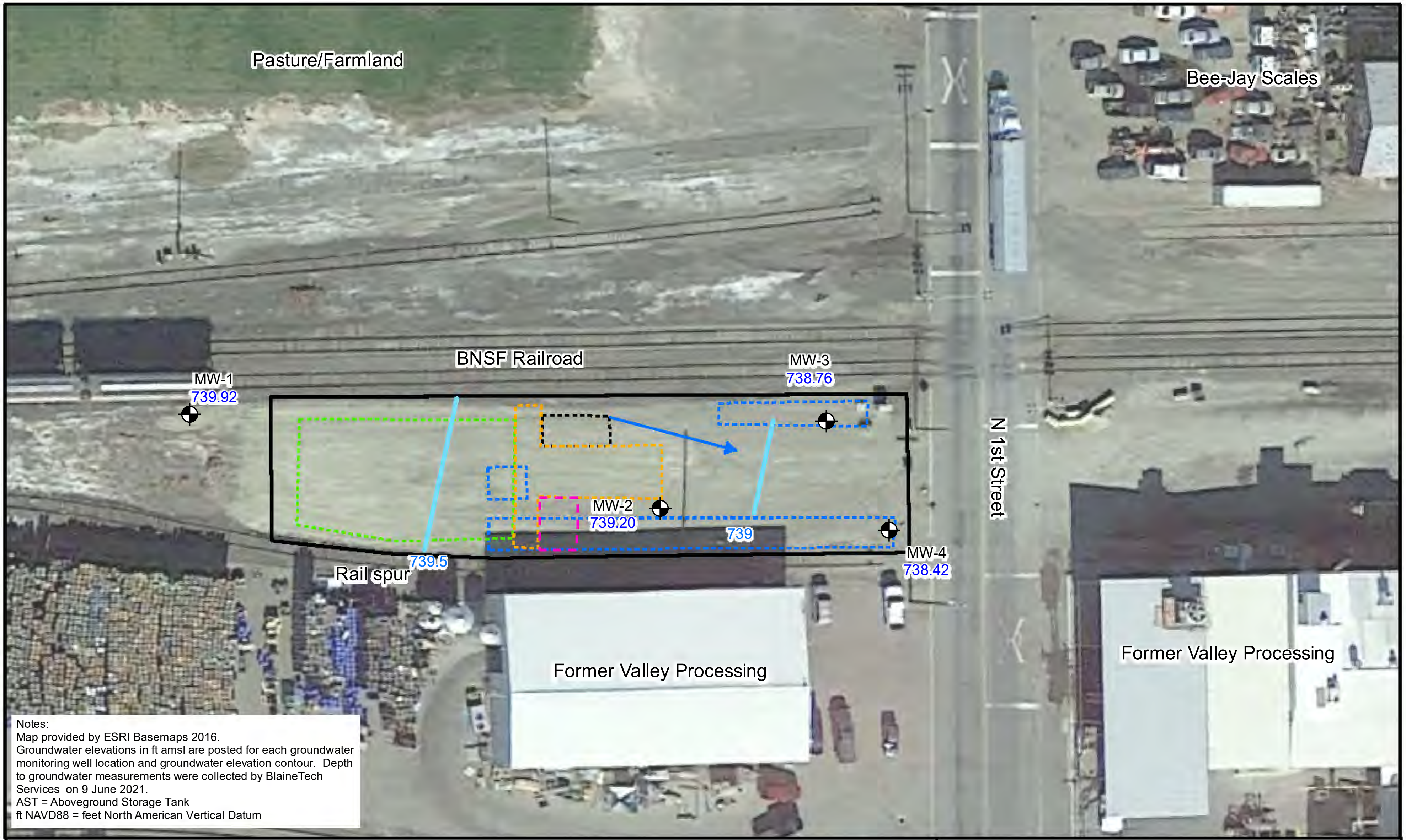
PNR0696

September 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 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

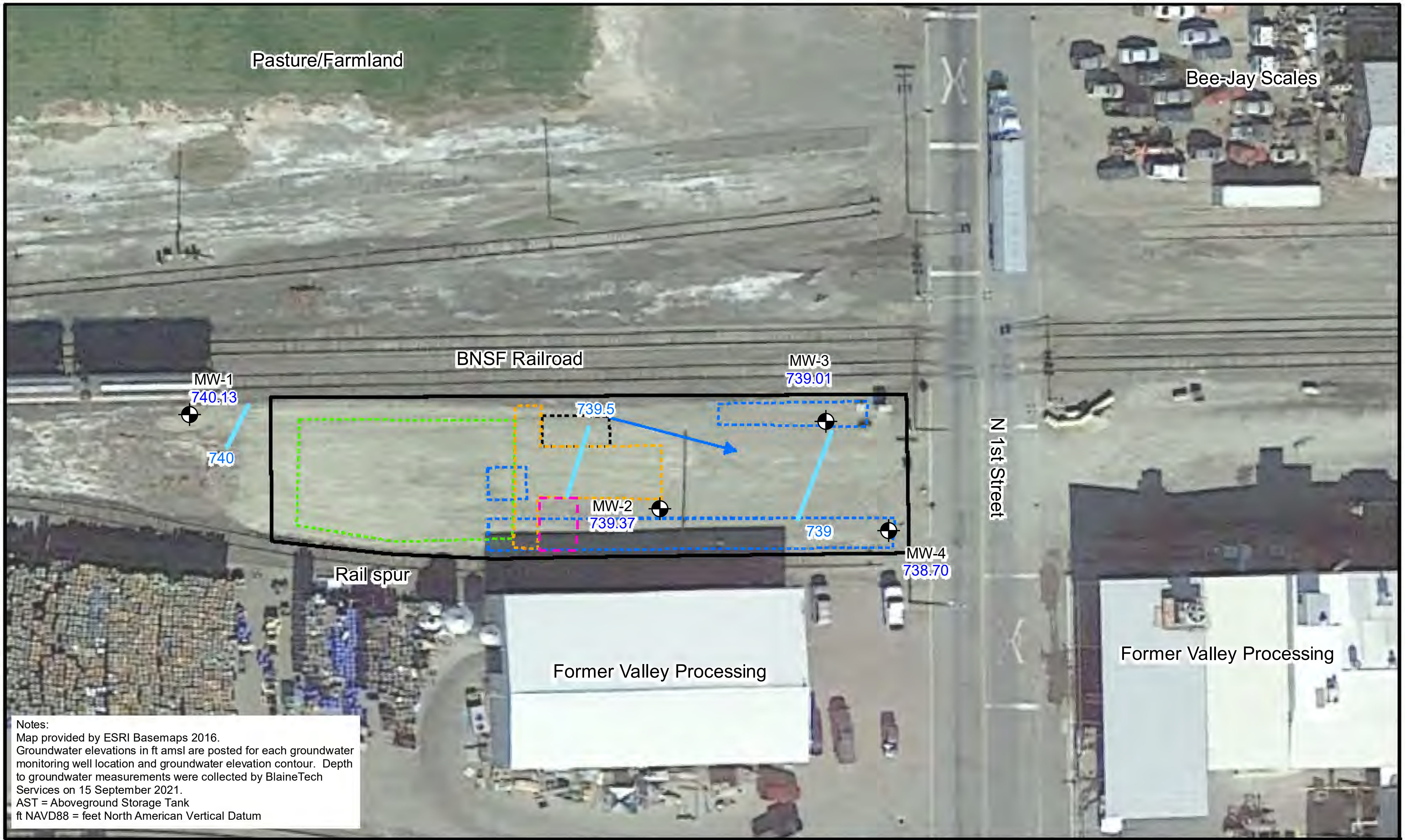
101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696 | September 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

Figure 2b

PNR0696

September 2022

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

City of
SUNNYSIDE
WASHINGTON

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	TYPE	% RECOVERY	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

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	SYMBOLIC LOG	WELL LOG	WELL CONSTRUCTION MATERIAL	ELEVATION (ft)	SAMPLES				USCS Classification	COMMENTS
						SAMPLE NAME	TYPE	% RECOVERY	PID READING (ppm)		
	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						

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

NORTHING
EASTING
ANGLE Vertical
BEARING ------
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REMARKS:

COORDINATE SYSTEM: NAV88
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520 Pike Street, Suite 1375
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM:
CORE3 10/00

BOREHOLE LOG

BORING	**SB18a**	**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	TYPE	% RECOVERY	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**	**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

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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	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.		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						

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

NORTHING
EASTING
ANGLE Vertical
BEARING ------
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REMARKS:

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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	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.		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
EQUIPMENT GEOPROBE
DRILL MTHD DIRECT PUSH
DIAMETER 3
LOGGER DJ **REVIEWER** DJ

NORTHING
EASTING
ANGLE Vertical
BEARING ------
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REMARKS:

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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				USCS Classification	COMMENTS
						SAMPLE NAME	TYPE	% RECOVERY	PID READING (ppm)		
	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 ------
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REMARKS:

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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				USCS Classification	COMMENTS
						SAMPLE NAME	TYPE	% RECOVERY	PID READING (ppm)		
	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

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				USCS Classification	COMMENTS
						SAMPLE NAME	TYPE	% RECOVERY	PID READING (ppm)		
	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
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

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

Carl Nott
Professional Scientist

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/19/2021
		ALS JOB#:	EV21070058
		ALS SAMPLE#:	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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**16**	0.34	0.34	0.34	10 10		MG/L	07/14/2021	RAL	07
Arsenic	EPA-200.8	**110**	1.0	1.0	0.45	1 1		UG/L	07/16/2021	EBS	07
Cobalt	EPA-200.8	**36**	1.0	1.0	0.25	1 1		UG/L	07/16/2021	EBS	07
Molybdenum	EPA-200.8	**42**	1.0	1.0	0.26	1 1		UG/L	07/16/2021	EBS	07
Arsenic (Dissolved)	EPA-200.8	**92**	1.0	1.0	0.45	1 1		UG/L	07/16/2021	EBS	07
Cobalt (Dissolved)	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	07/16/2021	EBS	07
Molybdenum (Dissolved)	EPA-200.8	**47**	1.0	1.0	0.26	1 1		UG/L	07/16/2021	EBS	07

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

CERTIFICATE OF ANALYSIS

CLIENT: Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101
CLIENT CONTACT: Luke Smith
CLIENT PROJECT: PNR0696B
CLIENT SAMPLE ID SB-21-GW

DATE: 7/19/2021
ALS JOB#: EV21070058
ALS SAMPLE#: EV21070058-02
DATE RECEIVED: 07/14/2021
COLLECTION DATE: 7/13/2021 12:18:00 PM
WDOE ACCREDITATION: C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**5.6**	0.17	0.17	0.17	5 5		MG/L	07/14/2021	RAL	07
Arsenic	EPA-200.8	**150**	1.0	1.0	0.45	1 1		UG/L	07/16/2021	EBS	07
Cobalt	EPA-200.8	**41**	1.0	1.0	0.25	1 1		UG/L	07/16/2021	EBS	07
Molybdenum	EPA-200.8	**24**	1.0	1.0	0.26	1 1		UG/L	07/16/2021	EBS	07
Arsenic (Dissolved)	EPA-200.8	**120**	1.0	1.0	0.45	1 1		UG/L	07/16/2021	EBS	07
Cobalt (Dissolved)	EPA-200.8	**10**	1.0	1.0	0.25	1 1		UG/L	07/16/2021	EBS	07
Molybdenum (Dissolved)	EPA-200.8	**30**	1.0	1.0	0.26	1 1		UG/L	07/16/2021	EBS	07

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/19/2021 EV21070058 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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**8.4**	0.17	0.17	0.17	5 5		MG/L	07/14/2021	RAL	07
Arsenic	EPA-200.8	**93**	1.0	1.0	0.45	1 1		UG/L	07/16/2021	EBS	07
Cobalt	EPA-200.8	**33**	1.0	1.0	0.25	1 1		UG/L	07/16/2021	EBS	07
Molybdenum	EPA-200.8	**62**	1.0	1.0	0.26	1 1		UG/L	07/16/2021	EBS	07
Arsenic (Dissolved)	EPA-200.8	**65**	1.0	1.0	0.45	1 1		UG/L	07/16/2021	EBS	07
Cobalt (Dissolved)	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	07/16/2021	EBS	07
Molybdenum (Dissolved)	EPA-200.8	**76**	1.0	1.0	0.26	1 1		UG/L	07/16/2021	EBS	07

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

CERTIFICATE OF ANALYSIS

CLIENT: Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101
CLIENT CONTACT: Luke Smith
CLIENT PROJECT: PNR0696B
CLIENT SAMPLE ID SB-17-GW

DATE: 7/19/2021
ALS JOB#: EV21070058
ALS SAMPLE#: EV21070058-04
DATE RECEIVED: 07/14/2021
COLLECTION DATE: 7/13/2021 4:05:00 PM
WDOE ACCREDITATION: C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR		QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**13**	0.34	0.34	0.34	10	10		MG/L	07/14/2021	RAL	07
Arsenic	EPA-200.8	**110**	1.0	1.0	0.45	1	1		UG/L	07/16/2021	EBS	07
Cobalt	EPA-200.8	**43**	1.0	1.0	0.25	1	1		UG/L	07/16/2021	EBS	07
Molybdenum	EPA-200.8	**38**	1.0	1.0	0.26	1	1		UG/L	07/16/2021	EBS	07
Arsenic (Dissolved)	EPA-200.8	**90**	1.0	1.0	0.45	1	1		UG/L	07/16/2021	EBS	07
Cobalt (Dissolved)	EPA-200.8	U	1.0	1.0	0.25	1	1	U	UG/L	07/16/2021	EBS	07
Molybdenum (Dissolved)	EPA-200.8	**44**	1.0	1.0	0.26	1	1		UG/L	07/16/2021	EBS	07

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

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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**28**	0.34	0.34	0.34	1010		MG/L	07/14/2021	RAL	07
Arsenic	EPA-200.8	**67**	1.0	1.0	0.45	1 1		UG/L	07/16/2021	EBS	07
Cobalt	EPA-200.8	**45**	1.0	1.0	0.25	1 1		UG/L	07/16/2021	EBS	07
Molybdenum	EPA-200.8	**58**	1.0	1.0	0.26	1 1		UG/L	07/16/2021	EBS	07
Arsenic (Dissolved)	EPA-200.8	**35**	1.0	1.0	0.45	1 1		UG/L	07/16/2021	EBS	07
Cobalt (Dissolved)	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	07/16/2021	EBS	07
Molybdenum (Dissolved)	EPA-200.8	**75**	1.0	1.0	0.26	1 1		UG/L	07/16/2021	EBS	07

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

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	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F T	O R G	F TY
Nitrate as N	EPA-300.0	U	U	MG/L	0.034	0.034	0.034	07/14/2021	RAL	N	Y	TR

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

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

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F T	O R G	F TY
Arsenic	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	07/16/2021	EBS	N	N	TR
Cobalt	EPA-200.8	U	U	UG/L	1.0	1.0	0.090	07/16/2021	EBS	N	N	TR
Molybdenum	EPA-200.8	U	U	UG/L	1.0	1.0	0.11	07/16/2021	EBS	N	N	TR

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

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

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F T	O R G	F TY
Arsenic (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	07/16/2021	EBS	N	N	TR
Cobalt (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.090	07/16/2021	EBS	N	N	TR
Molybdenum (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.11	07/16/2021	EBS	N	N	TR

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

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT: Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101
CLIENT CONTACT: Luke Smith
CLIENT PROJECT: PNR0696B

DATE: 7/19/2021
ALS SDG#: EV21070058
WDOE ACCREDITATION: C601

LABORATORY CONTROL SAMPLE RESULTS

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	RPD	ANALYSIS DATE	ANALYSIS BY	L F	OR G RSLT TYPE	F.P RT
Nitrate as N - BS	EPA-300.0	**93.0**			100	93.0	0.804	0120		07/14/2021	RAL	Y	YSC	Yes
Nitrate as N - BSD	EPA-300.0	**92.0**	1		100	92.0	0.804	0120	0.2534	07/14/2021	RAL	Y	YSC	Yes

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	RPD	ANALYSIS DATE	ANALYSIS BY	L F	OR G RSLT TYPE	F.P RT
Arsenic - BS	EPA-200.8	**98.5**			125	123	8901	01150		07/16/2021	EBS	Y	NSC	Yes
Arsenic - BSD	EPA-200.8	**97.6**	1		125	122	8901	01150	0105	07/16/2021	EBS	Y	NSC	Yes
Cobalt - BS	EPA-200.8	**102**			125	128	8508	01080		07/16/2021	EBS	Y	NSC	Yes
Cobalt - BSD	EPA-200.8	**101**	1		125	127	8508	01080	0.1090	07/16/2021	EBS	Y	NSC	Yes
Molybdenum - BS	EPA-200.8	**97.1**			125	121	9003	01136		07/16/2021	EBS	Y	NSC	Yes
Molybdenum - BSD	EPA-200.8	**96.4**	1		125	120	9003	01136	0101	07/16/2021	EBS	Y	NSC	Yes

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	RPD	ANALYSIS DATE	ANALYSIS BY	L F	OR G RSLT TYPE	F.P RT
Arsenic (Dissolved) - BS	EPA-200.8	**98.5**			125	123	8901	01150		07/16/2021	EBS	Y	NSC	Yes
Arsenic (Dissolved) - BSD	EPA-200.8	**97.6**	1		125	122	8901	01150	0105	07/16/2021	EBS	Y	NSC	Yes
Cobalt (Dissolved) - BS	EPA-200.8	**102**			125	128	8508	01080		07/16/2021	EBS	Y	NSC	Yes
Cobalt (Dissolved) - BSD	EPA-200.8	**101**	1		125	127	8508	01080	02.0780	07/16/2021	EBS	Y	NSC	Yes
Molybdenum (Dissolved) - BS	EPA-200.8	**97.1**			125	121	9003	01136		07/16/2021	EBS	Y	NSC	Yes
Molybdenum (Dissolved) - BSD	EPA-200.8	**96.4**	1		125	120	9003	01136	0.61	07/16/2021	EBS	Y	NSC	Yes

APPROVED BY:

Professional Scientist

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) EV21070058

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:

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, Moly, Selenium	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	Nitrate as N Method 300.0							NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. GW-071321-DUP-1	7-13-21	1004	GW	1														X		X							3	
2. SB-21-GW	7-13-21	1218	GW	2														X		X							3	
3. SB-16-GW	7-13-21	1455	GW	3														X		X							3	
4. SB-17-GW	7-13-21	1605	GW	4														X		X							3	
5. SB-18a-GW	7-13-21	1724	GW	5														X		X							3	
6.																												
7.																												
8.																												
9.																												
10.																												

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

Glen Perry
Laboratory Director

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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**27 HT10**	0.86	0.86	0.86	25 25	**HT10**	MG/L	07/22/2021	RAL	07
Arsenic	EPA-200.8	**110**	1.0	1.0	0.45	1 1		UG/L	07/22/2021	EBS	07
Cobalt	EPA-200.8	**340**	1.0	1.0	0.25	1 1		UG/L	07/22/2021	EBS	07
Molybdenum	EPA-200.8	**8.4**	1.0	1.0	0.26	1 1		UG/L	07/22/2021	EBS	07
Arsenic (Dissolved)	EPA-200.8	**10**	1.0	1.0	0.45	1 1		UG/L	07/22/2021	EBS	07
Cobalt (Dissolved)	EPA-200.8	**3.0**	1.0	1.0	0.25	1 1		UG/L	07/22/2021	EBS	07
Molybdenum (Dissolved)	EPA-200.8	**47**	1.0	1.0	0.26	1 1		UG/L	07/22/2021	EBS	07

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

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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate as N	EPA-300.0	**21 HT10**	0.86	0.86	0.86	25 25	HT10	MG/L	07/22/2021	RAL
Arsenic	EPA-200.8	**28**	1.0	1.0	0.45	1 1		UG/L	07/22/2021	EBS
Cobalt	EPA-200.8	**32**	1.0	1.0	0.25	1 1		UG/L	07/22/2021	EBS
Molybdenum	EPA-200.8	**45**	1.0	1.0	0.26	1 1		UG/L	07/22/2021	EBS
Arsenic (Dissolved)	EPA-200.8	**14**	1.0	1.0	0.45	1 1		UG/L	07/22/2021	EBS
Cobalt (Dissolved)	EPA-200.8	**1.9**	1.0	1.0	0.25	1 1		UG/L	07/22/2021	EBS
Molybdenum (Dissolved)	EPA-200.8	**54**	1.0	1.0	0.26	1 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.

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#:	EV21070103-03
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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**0.12HT10**	0.034	0.034	0.034	1 1	HT10	MG/L	07/22/2021	RAL	07
Arsenic	EPA-200.8	**130**	1.0	1.0	0.45	1 1		UG/L	07/22/2021	EBS	07
Cobalt	EPA-200.8	**170**	1.0	1.0	0.25	1 1		UG/L	07/22/2021	EBS	07
Molybdenum	EPA-200.8	**7.4**	1.0	1.0	0.26	1 1		UG/L	07/22/2021	EBS	07
Arsenic (Dissolved)	EPA-200.8	**62**	1.0	1.0	0.45	1 1		UG/L	07/22/2021	EBS	07
Cobalt (Dissolved)	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	07/22/2021	EBS	07
Molybdenum (Dissolved)	EPA-200.8	**16**	1.0	1.0	0.26	1 1		UG/L	07/22/2021	EBS	07

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.

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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**24**	0.86	0.86	0.86	25 25	HT10	MG/L	07/22/2021	RAL	07
Arsenic	EPA-200.8	**80**	1.0	1.0	0.45	1 1		UG/L	07/22/2021	EBS	07
Cobalt	EPA-200.8	**530**	1.0	1.0	0.25	1 1		UG/L	07/22/2021	EBS	07
Molybdenum	EPA-200.8	U	1.0	1.0	0.26	1 1	U	UG/L	07/22/2021	EBS	07
Arsenic (Dissolved)	EPA-200.8	**14**	1.0	1.0	0.45	1 1		UG/L	07/22/2021	EBS	07
Cobalt (Dissolved)	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	07/22/2021	EBS	07
Molybdenum (Dissolved)	EPA-200.8	**32**	1.0	1.0	0.26	1 1		UG/L	07/22/2021	EBS	07

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.

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	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F T	O R G	F.S TY
Nitrate as N	EPA-300.0	U	U	MG/L	0.034	0.034	0.034	07/22/2021	RAL	N	Y	TR

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

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

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F T	O R G	F.S TY
Arsenic	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	07/22/2021	EBS	N	N	TR
Cobalt	EPA-200.8	U	U	UG/L	1.0	1.0	0.090	07/22/2021	EBS	N	N	TR
Molybdenum	EPA-200.8	U	U	UG/L	1.0	1.0	0.11	07/22/2021	EBS	N	N	TR

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

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

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F T	O R G	F.S TY
Arsenic (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	07/22/2021	EBS	N	N	TR
Cobalt (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.090	07/22/2021	EBS	N	N	TR
Molybdenum (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.11	07/22/2021	EBS	N	N	TR

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

CERTIFICATE OF ANALYSIS

CLIENT: Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101
CLIENT CONTACT: Luke Smith
CLIENT PROJECT: PNR0696B

DATE: 7/28/2021
ALS SDG#: EV21070103
WDOE ACCREDITATION: C601

LABORATORY CONTROL SAMPLE RESULTS

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	LIMITS RPD	ANALYSIS DATE	ANALYSIS BY			
Nitrate as N - BS	EPA-300.0	**105**			100	105	0.8034	01202		07/22/2021	RAL	Y	YSC	Yes
Nitrate as N - BSD	EPA-300.0	**104**	**1**		100	104	0.8034	01202	0.2534	07/22/2021	RAL	Y	YSC	Yes

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	LIMITS RPD	ANALYSIS DATE	ANALYSIS BY			
Arsenic - BS	EPA-200.8	**95.5**			125	119	8901	01150		07/22/2021	EBS	Y	NSC	Yes
Arsenic - BSD	EPA-200.8	**97.1**	**2**		125	121	8901	01150	0105	07/22/2021	EBS	Y	NSC	Yes
Cobalt - BS	EPA-200.8	**99.1**			125	124	8508	01080		07/22/2021	EBS	Y	NSC	Yes
Cobalt - BSD	EPA-200.8	**101**	**2**		125	126	8508	01080	0.1090	07/22/2021	EBS	Y	NSC	Yes
Molybdenum - BS	EPA-200.8	**93.5**			125	117	9003	01136		07/22/2021	EBS	Y	NSC	Yes
Molybdenum - BSD	EPA-200.8	**96.1**	**3**		125	120	9003	01136	0101	07/22/2021	EBS	Y	NSC	Yes

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	LIMITS RPD	ANALYSIS DATE	ANALYSIS BY			
Arsenic (Dissolved) - BS	EPA-200.8	**95.5**			125	119	8901	01150		07/22/2021	EBS	Y	NSC	Yes
Arsenic (Dissolved) - BSD	EPA-200.8	**97.1**	**2**		125	121	8901	01150	0105	07/22/2021	EBS	Y	NSC	Yes
Cobalt (Dissolved) - BS	EPA-200.8	**99.1**			125	124	8508	01080		07/22/2021	EBS	Y	NSC	Yes
Cobalt (Dissolved) - BSD	EPA-200.8	**101**	**2**		125	126	8508	01080	02080	07/22/2021	EBS	Y	NSC	Yes
Molybdenum (Dissolved) - BS	EPA-200.8	**93.5**			125	117	9003	01136		07/22/2021	EBS	Y	NSC	Yes
Molybdenum (Dissolved) - BSD	EPA-200.8	**96.1**	**3**		125	120	9003	01136	0.61	07/22/2021	EBS	Y	NSC	Yes

APPROVED BY:

Glen Perry

Laboratory Director

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) EV21070103

Date 7-20-21 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:

					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, molybdenum	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.																												
7.																												
8.																												
9.																												
10.																												

DJ
7-20-21

SPECIAL INSTRUCTIONS Diss. metals are field filtered

SIGNATURES (Name, Company, Date, Time):
1. Relinquished By: , Geosyntec, 7-21-21, 1436
Received By: 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-LB1 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.:

Blaine Tech Services, Inc. 1680 Rogers Ave., San Jose, CA 95112 (408) 573-0555

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 #: Z10609-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/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.)
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: 3 L
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	-18.5	600	6.03
1127	15.38	7.71	3883	15	0.54	-47.4	1200	6.03
1130	15.34	7.70	3878	13	0.50	-60.6	1800	6.03
1133	15.38	7.68	3871	12	0.53	-72.6	2400	6.03
1136	15.41	7.69	3869	11	0.54	-73.9	3000	6.03
1139	15.43	7.71	3865	11	0.55	-75.1	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.:

Blaine Tech Services, Inc. 1680 Rogers Ave., San Jose, CA 95112 (408) 573-0555

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 COBALT MOLYBDENUM	NICKEL	DISSOLVED: ARSENIC COBALT	MOLYBDENUM NICKEL (FE)			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: BJS 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

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

		Check indicates deficiency													
Well ID	Well Inspected - No Corrective Action Required	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 GEOSYNTEC @ 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 H_2O soil cuttings	purge & decon H_2O soil cuttings	purge + soil cuttings	IMDXED		
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 H_2O soil cutting	purge & decon H_2O soil cutting	purge + soil cuttings	IMDXED		

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-FK1 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	1119	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.: ———

Blaine Tech Services, Inc. 1680 Rogers Ave., San Jose, CA 95112 (408) 573-0555

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	26.68	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: 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 ☐	Nitrate 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																		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 9/16/21 0810
   Received By: 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

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

		Check indicates deficiency													
Well ID	Well Inspected - No Corrective Action Required	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°c	FK
			Cond 3900 us/cm DO 100%	3888 us/cm 97.9%	✓	16.39°c 15.94°c	FK
			ORP 237.5mv	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 cutting	purge & decon H2O soil cutting	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

Glen Perry
Laboratory Director

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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**14**	0.34	0.34	0.34	1010		MG/L	06/10/2021	RAL	06
Arsenic	EPA-200.8	**11**	1.0	1.0	0.45	1 1		UG/L	06/11/2021	RAL	06
Cobalt	EPA-200.8	**1.4**	1.0	1.0	0.25	1 1		UG/L	06/11/2021	RAL	06
Molybdenum	EPA-200.8	**22**	1.0	1.0	0.26	1 1		UG/L	06/11/2021	RAL	06
Nickel	EPA-200.8	**3.8**	2.0	2.0	1.5	1 1		UG/L	06/11/2021	RAL	06
Arsenic (Dissolved)	EPA-200.8	**10**	1.0	1.0	0.45	1 1		UG/L	06/11/2021	RAL	06
Cobalt (Dissolved)	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	06/11/2021	RAL	06
Molybdenum (Dissolved)	EPA-200.8	**27**	1.0	1.0	0.26	1 1		UG/L	06/11/2021	RAL	06
Nickel (Dissolved)	EPA-200.8	U	2.0	2.0	1.5	1 1	U	UG/L	06/11/2021	RAL	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	6/15/2021
		ALS JOB#:	EV21060053
		ALS SAMPLE#:	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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**94**	1.7	1.7	1.7	5050		MG/L	06/10/2021	RAL	06
Arsenic	EPA-200.8	**76**	1.0	1.0	0.45	1 1		UG/L	06/11/2021	RAL	06
Cobalt	EPA-200.8	**9.1**	1.0	1.0	0.25	1 1		UG/L	06/11/2021	RAL	06
Molybdenum	EPA-200.8	**33**	1.0	1.0	0.26	1 1		UG/L	06/11/2021	RAL	06
Nickel	EPA-200.8	**91**	2.0	2.0	1.5	1 1		UG/L	06/11/2021	RAL	06
Arsenic (Dissolved)	EPA-200.8	**80**	1.0	1.0	0.45	1 1		UG/L	06/11/2021	RAL	06
Cobalt (Dissolved)	EPA-200.8	**9.7**	1.0	1.0	0.25	1 1		UG/L	06/11/2021	RAL	06
Molybdenum (Dissolved)	EPA-200.8	**37**	1.0	1.0	0.26	1 1		UG/L	06/11/2021	RAL	06
Nickel (Dissolved)	EPA-200.8	**88**	2.0	2.0	1.5	1 1		UG/L	06/11/2021	RAL	06

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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**27**	0.34	0.34	0.34	1010		MG/L	06/10/2021	RAL	06
Arsenic	EPA-200.8	**71**	1.0	1.0	0.45	1 1		UG/L	06/11/2021	RAL	06
Cobalt	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	06/11/2021	RAL	06
Molybdenum	EPA-200.8	**50**	1.0	1.0	0.26	1 1		UG/L	06/11/2021	RAL	06
Nickel	EPA-200.8	**2.9**	2.0	2.0	1.5	1 1		UG/L	06/11/2021	RAL	06
Arsenic (Dissolved)	EPA-200.8	**71**	1.0	1.0	0.45	1 1		UG/L	06/11/2021	RAL	06
Cobalt (Dissolved)	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	06/11/2021	RAL	06
Molybdenum (Dissolved)	EPA-200.8	**50**	1.0	1.0	0.26	1 1		UG/L	06/11/2021	RAL	06
Nickel (Dissolved)	EPA-200.8	**2.7**	2.0	2.0	1.5	1 1		UG/L	06/11/2021	RAL	06

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

CERTIFICATE OF ANALYSIS

CLIENT: Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101
CLIENT CONTACT: Luke Smith
CLIENT PROJECT: Sunnyside, WA
CLIENT SAMPLE ID GW-060921-MW-4

DATE: 6/15/2021
ALS JOB#: EV21060053
ALS SAMPLE#: EV21060053-04
DATE RECEIVED: 06/10/2021
COLLECTION DATE: 6/9/2021 11:40:00 AM
WDOE ACCREDITATION: C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**170**	3.4	3.4	3.4	10 100		MG/L	06/10/2021	RAL	06
Arsenic	EPA-200.8	**65**	1.0	1.0	0.45	1 1		UG/L	06/11/2021	RAL	06
Cobalt	EPA-200.8	**17**	1.0	1.0	0.25	1 1		UG/L	06/11/2021	RAL	06
Molybdenum	EPA-200.8	**110**	1.0	1.0	0.26	1 1		UG/L	06/11/2021	RAL	06
Nickel	EPA-200.8	**77**	2.0	2.0	1.5	1 1		UG/L	06/11/2021	RAL	06
Arsenic (Dissolved)	EPA-200.8	**66**	1.0	1.0	0.45	1 1		UG/L	06/11/2021	RAL	06
Cobalt (Dissolved)	EPA-200.8	**17**	1.0	1.0	0.25	1 1		UG/L	06/11/2021	RAL	06
Molybdenum (Dissolved)	EPA-200.8	**120**	1.0	1.0	0.26	1 1		UG/L	06/11/2021	RAL	06
Nickel (Dissolved)	EPA-200.8	**75**	2.0	2.0	1.5	1 1		UG/L	06/11/2021	RAL	06

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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**100**	1.7	1.7	1.7	5050		MG/L	06/10/2021	RAL	06
Arsenic	EPA-200.8	**76**	1.0	1.0	0.45	1 1		UG/L	06/11/2021	RAL	06
Cobalt	EPA-200.8	**8.5**	1.0	1.0	0.25	1 1		UG/L	06/11/2021	RAL	06
Molybdenum	EPA-200.8	**31**	1.0	1.0	0.26	1 1		UG/L	06/11/2021	RAL	06
Nickel	EPA-200.8	**91**	2.0	2.0	1.5	1 1		UG/L	06/11/2021	RAL	06
Arsenic (Dissolved)	EPA-200.8	**78**	1.0	1.0	0.45	1 1		UG/L	06/11/2021	RAL	06
Cobalt (Dissolved)	EPA-200.8	**9.6**	1.0	1.0	0.25	1 1		UG/L	06/11/2021	RAL	06
Molybdenum (Dissolved)	EPA-200.8	**36**	1.0	1.0	0.26	1 1		UG/L	06/11/2021	RAL	06
Nickel (Dissolved)	EPA-200.8	**89**	2.0	2.0	1.5	1 1		UG/L	06/11/2021	RAL	06

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	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	DFT	ORG	RS TY
Nitrate as N	EPA-300.0	U	U	MG/L	0.034	0.034	0.034	06/10/2021	RAL	N	Y	TR

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

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

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	DFT	ORG	RS TY
Arsenic	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	06/11/2021	RAL	N	N	TR
Cobalt	EPA-200.8	U	U	UG/L	1.0	1.0	0.090	06/11/2021	RAL	N	N	TR
Molybdenum	EPA-200.8	U	U	UG/L	1.0	1.0	0.11	06/11/2021	RAL	N	N	TR
Nickel	EPA-200.8	U	U	UG/L	2.0	2.0	0.090	06/11/2021	RAL	N	N	TR

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

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

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	DFT	ORG	RS TY
Arsenic (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	06/11/2021	RAL	N	N	TR
Cobalt (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.090	06/11/2021	RAL	N	N	TR
Molybdenum (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.11	06/11/2021	RAL	N	N	TR
Nickel (Dissolved)	EPA-200.8	U	U	UG/L	2.0	2.0	0.090	06/11/2021	RAL	N	N	TR

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

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	SPIKE ADDED	RESULT	LIMITS MIN	MAX	RPD	ANALYSIS DATE	ANALYSIS BY	L FA	ORG RSLT TYPE	REP RT
Nitrate as N - BS	EPA-300.0	**99.0**			1100	99.0	0.8034	01202		06/10/2021	RAL	Y	YSC	Yes
Nitrate as N - BSD	EPA-300.0	**100**	**1**		1100	100	0.8034	01202	0.2534	06/10/2021	RAL	Y	YSC	Yes

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	MAX	RPD	ANALYSIS DATE	ANALYSIS BY	L FA	ORG RSLT TYPE	REP RT
Arsenic - BS	EPA-200.8	**95.9**			1125	120	8901	01150		06/11/2021	RAL	Y	NSC	Yes
Arsenic - BSD	EPA-200.8	**95.3**	**1**		1125	119	8901	01150	0105	06/11/2021	RAL	Y	NSC	Yes
Cobalt - BS	EPA-200.8	**101**			1125	126	8508	01080		06/11/2021	RAL	Y	NSC	Yes
Cobalt - BSD	EPA-200.8	**99.1**	**2**		1125	124	8508	01080	0.1090	06/11/2021	RAL	Y	NSC	Yes
Molybdenum - BS	EPA-200.8	**96.6**			1125	121	9003	01136		06/11/2021	RAL	Y	NSC	Yes
Molybdenum - BSD	EPA-200.8	**96.5**	**0**		1125	121	9003	01136	0101	06/11/2021	RAL	Y	NSC	Yes
Nickel - BS	EPA-200.8	**95.5**			1125	119	8504	01090		06/11/2021	RAL	Y	NSC	Yes
Nickel - BSD	EPA-200.8	**94.9**	**1**		1125	119	8504	01090	0.1090	06/11/2021	RAL	Y	NSC	Yes

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	MAX	RPD	ANALYSIS DATE	ANALYSIS BY	L FA	ORG RSLT TYPE	REP RT
Arsenic (Dissolved) - BS	EPA-200.8	**95.9**			1125	120	8901	01150		06/11/2021	RAL	Y	NSC	Yes
Arsenic (Dissolved) - BSD	EPA-200.8	**95.3**	**1**		1125	119	8901	01150	0105	06/11/2021	RAL	Y	NSC	Yes
Cobalt (Dissolved) - BS	EPA-200.8	**101**			1125	126	8508	01080		06/11/2021	RAL	Y	NSC	Yes
Cobalt (Dissolved) - BSD	EPA-200.8	**99.1**	**2**		1125	124	8508	01080	02.0790	06/11/2021	RAL	Y	NSC	Yes
Molybdenum (Dissolved) - BS	EPA-200.8	**96.6**			1125	121	9003	01136		06/11/2021	RAL	Y	NSC	Yes
Molybdenum (Dissolved) - BSD	EPA-200.8	**96.5**	**0**		1125	121	9003	01136	0.61	06/11/2021	RAL	Y	NSC	Yes
Nickel (Dissolved) - BS	EPA-200.8	**95.5**			1125	119	8504	01090		06/11/2021	RAL	Y	NSC	Yes
Nickel (Dissolved) - BSD	EPA-200.8	**94.9**	**1**		1125	119	8504	01090	03020	06/11/2021	RAL	Y	NSC	Yes

APPROVED BY:

Glen Perry

Laboratory Director

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): EV21060053

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, COBALT, MOLYBDENUM, NICKEL		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: BB 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

Glen Perry
Laboratory Director

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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**13**	0.34	0.34	0.34	1010		MG/L	09/16/2021	RAL	09
Sulfate	EPA-300.0	**210**	13	13	13	5050		MG/L	09/23/2021	EBS	09
Arsenic	EPA-200.8	**11**	1.0	1.0	0.45	1 1		UG/L	09/16/2021	EBS	09
Cobalt	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	09/16/2021	EBS	09
Molybdenum	EPA-200.8	**30**	1.0	1.0	0.26	1 1		UG/L	09/16/2021	EBS	09
Arsenic (Dissolved)	EPA-200.8	**11**	1.0	1.0	0.45	1 1		UG/L	09/16/2021	EBS	09
Cobalt (Dissolved)	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	09/16/2021	EBS	09
Molybdenum (Dissolved)	EPA-200.8	**29**	1.0	1.0	0.26	1 1		UG/L	09/16/2021	EBS	09

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

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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**92**	1.7	1.7	1.7	50 50		MG/L	09/16/2021	RAL	09
Sulfate	EPA-300.0	**700**	13	13	13	50 50		MG/L	09/16/2021	RAL	09
Arsenic	EPA-200.8	**79**	1.0	1.0	0.45	1 1		UG/L	09/16/2021	EBS	09
Cobalt	EPA-200.8	**8.2**	1.0	1.0	0.25	1 1		UG/L	09/16/2021	EBS	09
Molybdenum	EPA-200.8	**30**	1.0	1.0	0.26	1 1		UG/L	09/16/2021	EBS	09
Arsenic (Dissolved)	EPA-200.8	**77**	1.0	1.0	0.45	1 1		UG/L	09/16/2021	EBS	09
Cobalt (Dissolved)	EPA-200.8	**8.2**	1.0	1.0	0.25	1 1		UG/L	09/16/2021	EBS	09
Molybdenum (Dissolved)	EPA-200.8	**31**	1.0	1.0	0.26	1 1		UG/L	09/16/2021	EBS	09

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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**19**	0.69	0.69	0.69	2020		MG/L	09/16/2021	RAL	09
Sulfate	EPA-300.0	**190**	5.2	5.2	5.2	2020		MG/L	09/16/2021	RAL	09
Arsenic	EPA-200.8	**60**	1.0	1.0	0.45	1 1		UG/L	09/16/2021	EBS	09
Cobalt	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	09/16/2021	EBS	09
Molybdenum	EPA-200.8	**42**	1.0	1.0	0.26	1 1		UG/L	09/16/2021	EBS	09
Arsenic (Dissolved)	EPA-200.8	**60**	1.0	1.0	0.45	1 1		UG/L	09/16/2021	EBS	09
Cobalt (Dissolved)	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	09/16/2021	EBS	09
Molybdenum (Dissolved)	EPA-200.8	**45**	1.0	1.0	0.26	1 1		UG/L	09/16/2021	EBS	09

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

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 RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**180**	3.4	3.4	3.4	10100		MG/L	09/16/2021	RAL	09
Sulfate	EPA-300.0	**710**	26	26	26	10100		MG/L	09/16/2021	RAL	09
Arsenic	EPA-200.8	**64**	1.0	1.0	0.45	1 1		UG/L	09/16/2021	EBS	09
Cobalt	EPA-200.8	**18**	1.0	1.0	0.25	1 1		UG/L	09/16/2021	EBS	09
Molybdenum	EPA-200.8	**120**	1.0	1.0	0.26	1 1		UG/L	09/16/2021	EBS	09
Arsenic (Dissolved)	EPA-200.8	**65**	1.0	1.0	0.45	1 1		UG/L	09/16/2021	EBS	09
Cobalt (Dissolved)	EPA-200.8	**18**	1.0	1.0	0.25	1 1		UG/L	09/16/2021	EBS	09
Molybdenum (Dissolved)	EPA-200.8	**120**	1.0	1.0	0.26	1 1		UG/L	09/16/2021	EBS	09

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	9/24/2021
		ALS JOB#:	EV21090085
		ALS SAMPLE#:	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

SAMPDATA RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate as N	EPA-300.0	**20**	0.69	0.69	0.69	2020		MG/L	09/16/2021	RAL	09
Sulfate	EPA-300.0	**180**	5.2	5.2	5.2	2020		MG/L	09/16/2021	RAL	09
Arsenic	EPA-200.8	**58**	1.0	1.0	0.45	1 1		UG/L	09/16/2021	EBS	09
Cobalt	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	09/16/2021	EBS	09
Molybdenum	EPA-200.8	**39**	1.0	1.0	0.26	1 1		UG/L	09/16/2021	EBS	09
Arsenic (Dissolved)	EPA-200.8	**59**	1.0	1.0	0.45	1 1		UG/L	09/16/2021	EBS	09
Cobalt (Dissolved)	EPA-200.8	U	1.0	1.0	0.25	1 1	U	UG/L	09/16/2021	EBS	09
Molybdenum (Dissolved)	EPA-200.8	**43**	1.0	1.0	0.26	1 1		UG/L	09/16/2021	EBS	09

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

CERTIFICATE OF ANALYSIS

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

LABORATORY BLANK RESULTS

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

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

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

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

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY			
Sulfate	EPA-300.0	U	U	MG/L	0.26	0.26	0.26	09/23/2021	EBS	N	Y	TR

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

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

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY			
Arsenic	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	09/16/2021	EBS	N	N	TR
Cobalt	EPA-200.8	U	U	UG/L	1.0	1.0	0.090	09/16/2021	EBS	N	N	TR
Molybdenum	EPA-200.8	U	U	UG/L	1.0	1.0	0.11	09/16/2021	EBS	N	N	TR

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

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

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY			
Arsenic (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	09/16/2021	EBS	N	N	TR
Cobalt (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.090	09/16/2021	EBS	N	N	TR
Molybdenum (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.11	09/16/2021	EBS	N	N	TR

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

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 CONTROL SAMPLE RESULTS

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	LIMITS RPD	ANALYSIS DATE	ANALYSIS BY	FLAG	RSLT TYPE	REPRT
Nitrate as N - BS	EPA-300.0	**105**			100	105	0 8034	01202		09/16/2021	RAL	Y	YSC	Yes
Nitrate as N - BSD	EPA-300.0	**104**	1		100	104	0 8034	01202	0.2534	09/16/2021	RAL	Y	YSC	Yes
Sulfate - BS	EPA-300.0	**100**			100	100	0806	01287		09/16/2021	RAL	Y	YSC	Yes
Sulfate - BSD	EPA-300.0	**104**	4		100	104	0806	01287	0256	09/16/2021	RAL	Y	YSC	Yes

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	LIMITS RPD	ANALYSIS DATE	ANALYSIS BY	FLAG	RSLT TYPE	REPRT
Sulfate - BS	EPA-300.0	**100**			100	100	0806	01287		09/23/2021	EBS	Y	YSC	Yes
Sulfate - BSD	EPA-300.0	**104**	4		100	104	0806	01287	0256	09/23/2021	EBS	Y	YSC	Yes

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	LIMITS RPD	ANALYSIS DATE	ANALYSIS BY	FLAG	RSLT TYPE	REPRT
Arsenic - BS	EPA-200.8	**102**			125	127	8901	01150		09/16/2021	EBS	Y	NSC	Yes
Arsenic - BSD	EPA-200.8	**102**	0		125	127	8901	01150	0105	09/16/2021	EBS	Y	NSC	Yes
Cobalt - BS	EPA-200.8	**103**			125	129	8508	01080		09/16/2021	EBS	Y	NSC	Yes
Cobalt - BSD	EPA-200.8	**106**	2		125	132	8508	01080	0.1090	09/16/2021	EBS	Y	NSC	Yes
Molybdenum - BS	EPA-200.8	**98.8**			125	124	9003	01136		09/16/2021	EBS	Y	NSC	Yes
Molybdenum - BSD	EPA-200.8	**101**	2		125	126	9003	01136	0101	09/16/2021	EBS	Y	NSC	Yes

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

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	LIMITS RPD	ANALYSIS DATE	ANALYSIS BY	FLAG	RSLT TYPE	REPRT
Arsenic (Dissolved) - BS	EPA-200.8	**102**			125	127	8901	01150		09/16/2021	EBS	Y	NSC	Yes
Arsenic (Dissolved) - BSD	EPA-200.8	**102**	0		125	127	8901	01150	0105	09/16/2021	EBS	Y	NSC	Yes
Cobalt (Dissolved) - BS	EPA-200.8	**103**			125	129	8508	01080		09/16/2021	EBS	Y	NSC	Yes
Cobalt (Dissolved) - BSD	EPA-200.8	**106**	2		125	132	8508	01080	02090	09/16/2021	EBS	Y	NSC	Yes
Molybdenum (Dissolved) - BS	EPA-200.8	**98.8**			125	124	9003	01136		09/16/2021	EBS	Y	NSC	Yes
Molybdenum (Dissolved) - BSD	EPA-200.8	**101**	2		125	126	9003	01136	0.61	09/16/2021	EBS	Y	NSC	Yes

APPROVED BY:

Glen Perry

Laboratory Director

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) EV21090085

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:

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 ☐	Nitrate 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: BTS 9/16/21 0810
Received By: 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

Area-Specific Background Arsenic and Nitrate Target Remediation Level Evaluation

APPENDIX B
AREA-SPECIFIC BACKGROUND ARSENIC AND NITRATE TARGET REMEDIATION LEVEL EVALUATION

FORMER NACHURS ALPINE SOLUTIONS FACILITY
SUNNYSIDE, WASHINGTON

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: PNR0696C

September 23, 2022

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
mg/L	milligrams per liter
bgs	below ground surface
COPCs	constituents of potential concern
CUL	Cleanup level
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
EIM	Environmental Information Management
ft	feet
Geosyntec	Geosyntec Consultants, Inc.
LCS	Laboratory control sample
MTCA	Model Toxics Control Cleanup Act
MS/MSD	Matrix spike/matrix spike duplicate
NAS	Nachurs Alpine Solutions, LLC
Off-Site Work Plan	*Off-Site Investigation Work Plan* (Geosyntec, 2021)
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
Q-Q	quantile-quantile
the Site	the former Nachurs Alpine Solutions Facility located at 101 North 1st Street in Sunnyside, Washington
TRL	target remediation level
UCL	Upper confidence limit
USCS	Unified Soil Classification System
VCP	Voluntary Cleanup Program
Wilbur-Ellis	Wilbur-Ellis Holdings II, Inc.

1. INTRODUCTION

This *Area-Specific Background Arsenic and Nitrate Target Remediation Level Evaluation,* presented as Appendix B to the *Remedial Investigation and Cleanup Action Plan*, has been prepared for the Washington State Department of Ecology (Ecology). The purpose of this evaluation is to develop area-specific background concentrations for total arsenic and nitrate for 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.

Results from previous Site investigations indicate the presence of nitrate and arsenic in groundwater at levels above Model Toxics Control Cleanup Act (MTCA) screening levels and the regionally-established background level for arsenic. The objective of the evaluation presented herein is to develop area-specific background levels for nitrate and arsenic to use as target remediation levels (TRL) for the Site. As detailed below, the nitrate area-specific background level was calculated using regional groundwater data provided by Ecology, and the arsenic area-specific background level was calculated following the collection of upgradient groundwater samples from temporary wells and one on-site monitoring well. The upper confidence limits were calculated for both data sets to select an appropriate TRL representing background conditions.

The following sections summarized the collection of background data sets, including upgradient groundwater arsenic samples, compilation of background arsenic data for the Site, review of regional nitrate data from Ecology, and statistical data analysis for the development of representative TRLs for arsenic and nitrate.

2. BACKGROUND DATA COLLECTION

2.1 Upgradient Groundwater Arsenic Sampling

To expand the upgradient arsenic data set, grab-groundwater samples were collected from ten upgradient temporary wells on 21 and 22 June 2022, following the same sampling procedures as set forth in the *Off-Site Investigation Work Plan* submitted to Ecology on 20 May 2021 (Geosyntec, 2021). Groundwater samples were analyzed for total and dissolved arsenic. Field activities associated with the background sampling are summarized in this section.

2.1.1 Groundwater Investigation Activities

Prior to commencing the off-Site investigation, Geosyntec obtained a right-of-way 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 of Spokane Valley, Washington) surveyed the proposed sample locations for subsurface utilities. Geosyntec worked with a Washington State-licensed driller (Holt Services Inc. [Holt] of Edgewood, Washington) to drill and collect groundwater samples at ten locations (BSB-1 through BSB-10). The grab-groundwater locations are shown in Figure 1.

Under direct oversight of Geosyntec field personnel, Holt 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 cores at three of the locations (BSB-1, -2, and -7) were logged by Geosyntec field personnel using the Unified Soil Classification System (USCS); boring logs are provided in Attachment 2. First groundwater was generally encountered between 3 and 5.5 ft bgs. As shown on the boring logs, the upper approximately 3 feet of soil consists of brown silt and coarse sand followed by approximately 3 feet of silty sand, underlain by a predominantly silty sand with clay that extends to approximately 15 ft bgs. These results are generally similar to the lithology observed during the previous on-Site and off-Site investigations. However, at one location, BSB-7, black staining and odor were observed from 5 to 7 ft 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 (summarized in Table 1), and grab-groundwater samples were collected at the ten locations using low-flow sampling methods with dedicated disposal tubing for each location. Groundwater field parameters (temperature, conductivity, pH, turbidity, dissolved oxygen, and oxidation-reduction potential) were recorded during purging until field parameters stabilized or 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 arsenic analysis were field filtered using a 0.45-micron filter. One duplicate groundwater sample was collected by Geosyntec from location BSB-7. Samples were labeled upon collection and then immediately stored in a cooler on ice pending shipment to the analytical laboratory under standard 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. Hydrated bentonite chips were used to seal the boring locations. Investigation derived waste that was generated during investigation activities, including decontamination and purge water and soil from the temporary borings, were containerized in a labeled Department of Transportation-approved steel drum, pending profiling and off-site disposal.

2.1.2 Laboratory Analysis

A total of eleven sets of samples (ten original and one duplicate) were shipped to ALS Environmental of Everett, Washington and were analyzed for total and dissolved arsenic by EPA Method 200.8. Laboratory analytical reports are provided in Attachment 3. Grab-groundwater sampling results are summarized in Table 2.

2.1.3 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:

- A duplicate sample was collected from BSB-7 on 22 June 2022. The duplicate sample was submitted blind to the analytical laboratory. Analytical results between the original and duplicate sample at BSB-7 showed relative percent differences within control limits (<30%) for the compounds detected.

- Two method blanks were used to separately analyze for total arsenic and dissolved arsenic 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 compounds analyzed.
- Laboratory control sample (LCS) results were within control limits for compounds analyzed.

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

2.2 Arsenic Background Data

Total concentrations for arsenic were evaluated instead of dissolved concentrations because of high variability in the dissolved data due to the complexation between colloidal humic substances and arsenic (Appendix D). Results of the June 2022 investigation presented above were combined with previous investigation and monitoring results from upgradient locations including the following: Samples from SB-16 and SB-17 that were collected in July 2021, and samples from MW-01 that were collected quarterly between September 2020 and September 2021. Given the multiple sample dates for MW-01, an average of the total arsenic values was used in the data set to represent the total arsenic concentration in that well.

Consistent with the previous results from MW-01, SB-16, and SB-17, the laboratory analytical results in samples collected during the June 2022 background investigation indicated that total arsenic concentration was detected in groundwater above the MTCA Method B cleanup level (CUL) at all locations. The highest background concentrations of total arsenic were observed at SB-17 and BSB-6 at 110 µg/L. These elevated concentrations of arsenic upgradient of the Site provides further justification for establishing a TRLs for arsenic that is based on the area-specific background concentrations.

2.3 Nitrate Background Data

Regional nitrate plus nitrite as nitrogen groundwater concentration data was downloaded from the Department of Ecology's EIM database on 22 April 2022 and was used to calculate a TRL that is representative of the regional background. Nitrite is often absent or at concentrations in groundwater noticeably lower than nitrate because of the compounds ability to rapidly convert to nitrate;[1,2] as a result, the nitrate plus nitrite data is assumed to be representative of nitrate concentrations and referred to for simplicity herein as nitrate as nitrogen. The study ID used to collect this data from the EIM database website and is associated with these wells is MRED0005.[3] The locations of the wells extend throughout the Yakima Valley with various installation depths. This dataset was further filtered by depth and region, as follows:

---

[1] https://www.atsdr.cdc.gov/csem/nitrate-nitrite/where_are.html

[2] California Water Board, 2013. Fact Sheet: Nitrate/Nitrite in Drinking Water. 16 December 2013.

[3] EIM Search (wa.gov)

- The data evaluated based on distance, with all proposed locations within an eight-mile radius from the Site, to still provide enough locations to perform the upper confidence limit (UCL) calculation.
- Given that the wells at the Site are shallow (<15 ft bgs), groundwater wells with an upper screen interval depth less than 20 feet deep and groundwater elevations shallower than 20 feet deep were chosen to represent background. The selected depth provided a data set representative of shallowest groundwater, while still having enough wells in the data set (eight locations).

The locations of the wells are shown in Figure 2, and a summary table of the data is shown in Table 3. Details on the statistical UCL evaluation are presented in Section 3 below.

3. BACKGROUND DATA ANALYSIS & DEVELOPMENT OF TARGET REMEDIATION LEVELS

The following section summarizes the data analysis conducted in order to create area-specific background levels for both arsenic and nitrate as nitrogen to use at TRLs.

3.1 Data Analysis

Quantile-Quantile (Q-Q) plots were created with the datasets for both total arsenic and nitrate as nitrogen to understand how the data was distributed (e.g. normally or lognormally). Q-Q plots are probability plots that are used to compare distributions by comparing quantiles. Q-Q plots were created with the data, comparing the distribution of the data within each quantile relative to the theoretical distribution of the data in each quantile. When preparing the plot for total arsenic the measured and theoretical distributions are similar when normally distributed. However, when plotting the nitrate as nitrogen data the measured and theoretical distribution are similar when the lognormally distributed. The Q-Q plots for total arsenic and nitrate are shown in Figure 3.

3.2 Calculation of Target Remediation Levels

As stated in WAC 173-340-200, "'Area background' means the concentrations of hazardous substances that are consistently present in the environment in the vicinity of a site ..." The method for calculating the area background is dependent on how the data is distributed (Section 3.1). As laid out in WAC Section 173-340-709, for datasets that are lognormally distributed, the area background can be calculated as the lower of the true upper 90th percentile and four times the true 50th percentile. For datasets that are normally distributed, the area background can be calculated as the lower of the true upper 80th percentile and four times the true 50th percentile. Upper confidence limit calculations were conducted in ProUCL, which are included in Attachment 4.

3.2.1 Arsenic Target Remediation Level

As outlined in above, the upgradient dataset for total arsenic concentrations is normally distributed, which means the corresponding area background is set at the lower of the 80% UCL or four times the true 50th percentile. The resulting values for the 80% UCL and four times the true 50th percentile are 71 µg/L and 220 µg/L, respectively. Given that the 80% UCL is lower than four times the true 50th percentile, the area-specific background TRL is 71 µg/L.

3.2.2 Nitrate Target Remediation Level

Similar to the analysis performed on the arsenic data, the nitrate concentrations were analyzed by EPA's ProUCL software. Given that the data for nitrate was lognormally distributed, the applicable area background can be calculated as the lower of the 90% UCL or four times the true 50th percentile. The 90% UCL for nitrate as nitrogen is 48 milligrams per liter (mg/L) and four times the true 50th percentile is 98 mg/L. Since the 90% UCL is lower, 48 mg/L represents the area background of nitrate as nitrogen and the proposed area-specific TRL for the Site.

4. CONCLUSIONS

An investigation into the area background levels of total arsenic and nitrate were performed to evaluate area-specific background level use as TRLs. The data set for arsenic was developed using a combination of upgradient grab-groundwater and well samples from a total of 13 locations. Nitrate data was collected from Ecology's EIM database and filtered to wells representative of the Site vicinity (within eight miles) and depth of impacts (maximum upper screening depth of 20 ft). The total arsenic dataset was evaluated to be normally distributed, while the nitrate dataset was evaluated to be lognormally distributed. Based on these distributions and as stated in WAC 173-340-709, the applicable area background corresponds to the 80% UCL for total arsenic and 90% UCL for nitrate. The 80% UCL for arsenic and 90% UCL for nitrate as nitrogen were evaluated to be 71 µg/L and 48 mg/L, respectively.

Based on these results, Geosyntec recommends TRLs of 71 µg/L for total arsenic and 48 mg/L for nitrate as nitrogen.

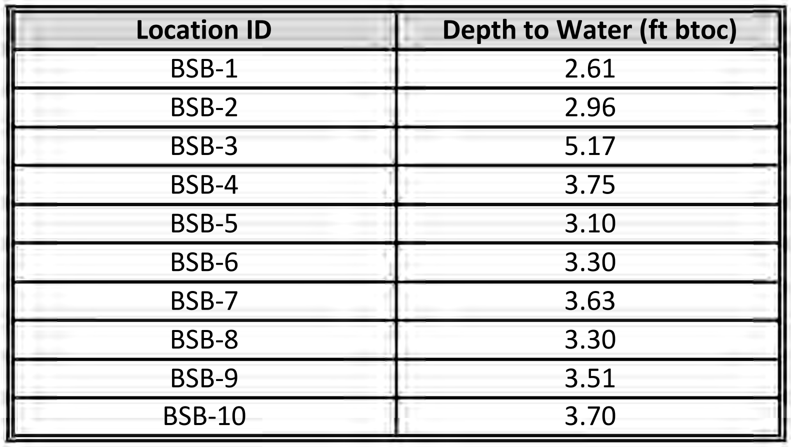
5. REFERENCES

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

TABLES

TABLE 1: DEPTHS TO WATER IN TEMPORARY UPGRADIENT WELLS

Former Nachurs Alpine Solutions Facility, Sunnyside, WA



Location ID	Depth to Water (ft btoc)
BSB-1	2.61
BSB-2	2.96
BSB-3	5.17
BSB-4	3.75
BSB-5	3.10
BSB-6	3.30
BSB-7	3.63
BSB-8	3.30
BSB-9	3.51
BSB-10	3.70

Notes:

ft btoc = feet below top of temporary well casing, which was approximately at ground surface

Measurements were collected on June 21 and 22, 2022

TABLE 2: UPGRADIENT GROUNDWATER ARSENIC RESULTS SUMMARY
Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Location ID	Sample Type	Sample Date	Screen Interval Depth (ft bgs)	Arsenic (µg/L)	
				Total	Dissolved
BSB-1	Grab	6/21/2022	5-15	55	5
BSB-2	Grab	6/21/2022	5-15	67	8
BSB-3	Grab	6/21/2022	5-15	87	9
BSB-4	Grab	6/22/2022	5-15	57	16
BSB-5	Grab	6/22/2022	5-15	40	5
BSB-6	Grab	6/22/2022	5-15	110	17
BSB-7	Grab	6/22/2022	5-15	25	18
BSB-8	Grab	6/22/2022	5-15	52	5
BSB-9	Grab	6/22/2022	5-15	25	9
BSB-10	Grab	6/22/2022	5-15	31	3
MW-1	Monitoring Well	9/15/2021	5-15	11*	11*
SB-16	Grab	7/13/2021	5-15	93	65
SB-17	Grab	7/13/2021	5-15	110	90

Notes:

Dissolved samples were field filtered using a 0.45 micron filter

µg/L = micrograms per liter

ft bgs = feet below ground surface

*arithmetic mean concentration in samples collected from MW-01 during the five quarterly monitoring events in 2020 and 2021 is shown.

TABLE 3: VICINITY GROUNDWATER NITRATE DATA SUMMARY

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Location ID	Sample Date	Upper Screen Interval Depth (ft bgs)	Approximate Distance from Site (miles)	Nitrate + Nitrite as N (mg/L)
LYV-PS-031	8/5/2021	4.5	2.1	89
LYV-MW-018	8/4/2021	10	1.7	23
LYV-MW-020	8/2/2021	12	3.3	26
LYV-MW-010	8/16/2021	13	5.9	30
LYV-MW-009	8/3/2021	14	7.9	5
LYV-MW-011	8/4/2021	16	3.8	19
LYV-MW-012	8/4/2021	18	3.2	22
LYV-PS-032	8/5/2021	20	3.1	37

Notes:

Nitrate + nitrite as nitrogen data summary was extracted from Environmental Information Management on April 22, 2022. Two parameters were used to filter the extracted data i.e. only wells with an upper screen interval depth less than 20 feet and wells within 8 miles of the site.

mg/L = milligrams per liter

ft bgs = feet below ground surface

FIGURES

Notes:
Map provided by ESRI Basemaps 2016.
AST = Aboveground Storage Tank
µg/L = micrograms per Liter
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.
SB-16 and SB-17 were collected in July 2021, and MW-01 was collected on September 2020, December 2020, March 2021, and June 2021
Additional off-site groundwater grab samples (BSB-1 through BSB-10) were collected in June 2022.

Legend

Dissolved Arsenic in Groundwater (µg/L)

- ● <10
- ● 10 - 33
- ● >33
- → Groundwater Gradient
- ▭ Site Boundary

N

0 80 Feet

Off-Site Upgradient Groundwater Investigation Locations

101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

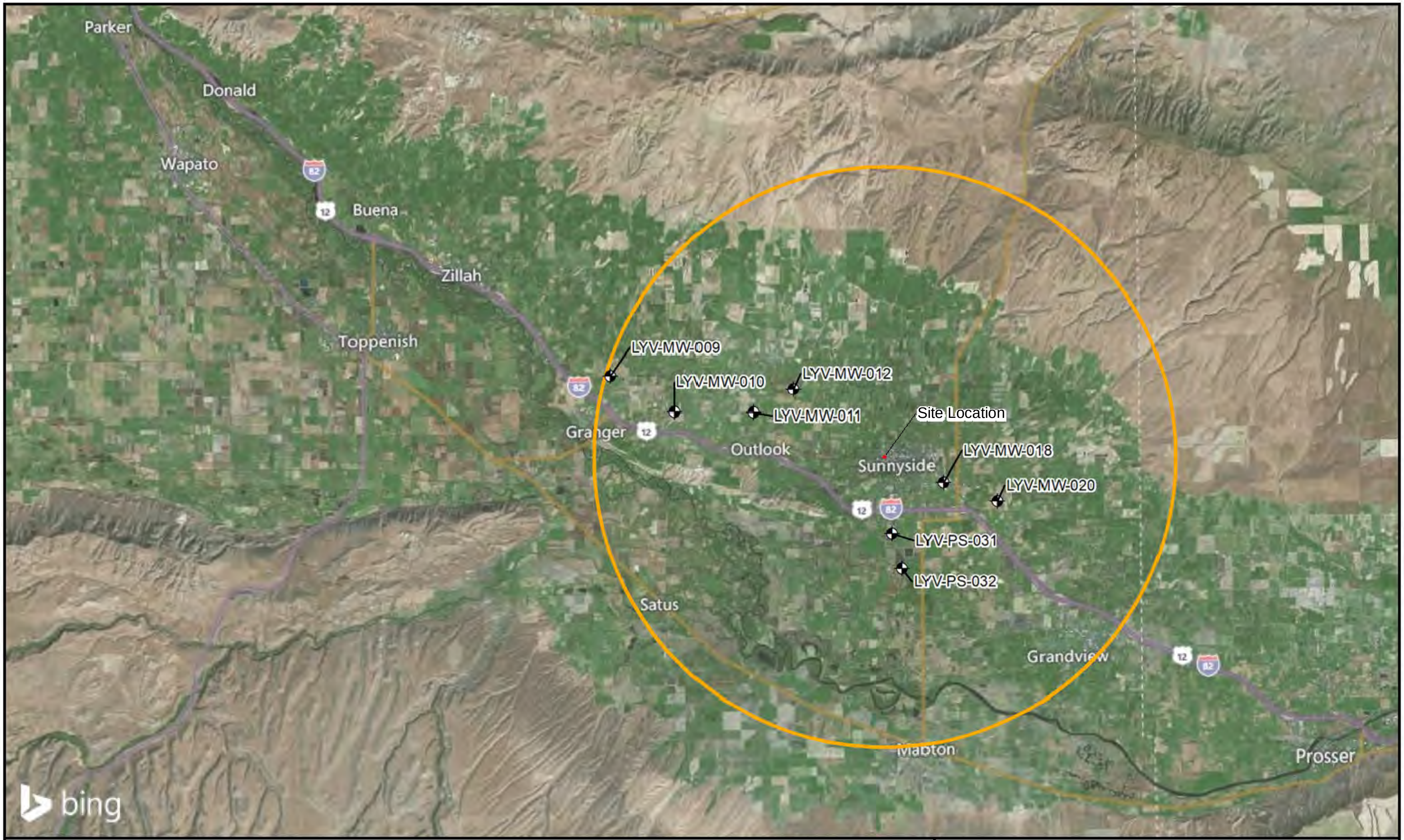
Figure

1

PNR0696C

August 2022

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions052022\Figure 1 Off Site Arsenic Sampling Locations.mxd 8/30/2022 11:05:01 AM



Legend

- ⌖ Monitoring Well Location
- 🟥 Site Location
- ▢ 8-mile Site Radius

Notes:
Map provided by ESRI Basemaps 2016.
The Site boundary is the approximate area leased by NAS from BNSF.

N

0 20,000 Feet

Vicinity Nitrate Data Well Locations

101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

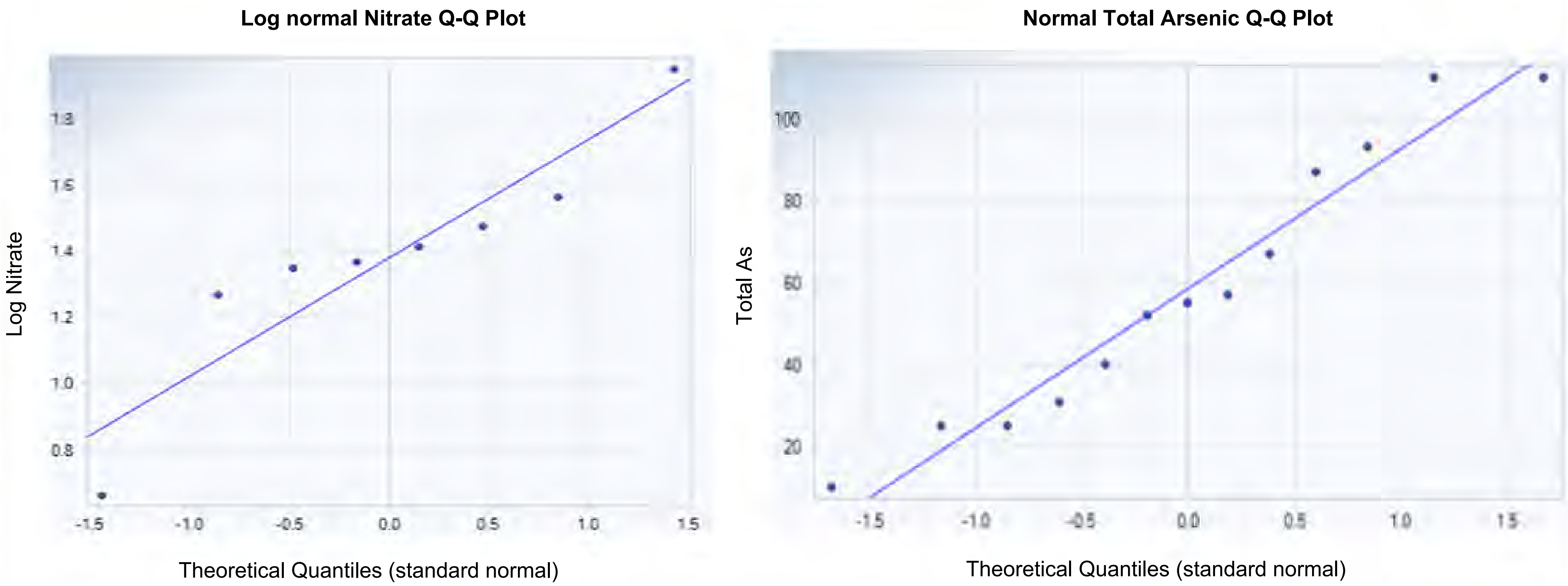
PNR0696C

September 2022

Figure

2

P:\CAD_GIS\Projects\PNR0696_Sunnyside\MXDs\Revisions052022\Figure 2 Monitoring Well Locations.mxd 9/1/2022 6:48:11 AM



Notes

Normal and Log normal Q-Q plots were prepared for arsenic and nitrate. The plot with the highest correlation coefficient, R, was chosen as a higher R indicates a better fit.

Arsenic Data
Data from samples BSB-1 through BSB-10 collected on June 2022, SB-16 and SB-17 from July 2021, and MW-01 taken on September 2020, December 2020, March 2021, and June 2021.
Correlation coefficient, R: 0.978

Log of Nitrate Data
Data Ecology EIM database. Data collected October 2021.
Correlation coefficient, R: 0.929

— Line of best fit

Q-Q Plot of Total Arsenic and Nitrate Data

101 North 1st Street
Sunnyside, Washington

Geosyntec consultants

PNR0696C

August 2022

Figure

3

ATTACHMENT 1

Off-Site Investigation Sunnyside Permit

City of
SUNNYSIDE
WASHINGTON.

PUBLIC WORKS DEPARTMENT
818 E. Edison Avenue, Sunnyside, Washington
Phone (509) 837-5206 Fax (509) 836-6383
www.sunnyside-wa.gov

RIGHT-OF-WAY PERMIT APPLICATION

Job Address: 401 Homer St, Sunnyside, WA 98944 Parcel #: 22102611407 Lot #: ______

Owner Name: Nachurs Alpine Solutions Phone #: 740-382-5701
Mailing Address: 421 Leader Street, Marion, Ohio 43302

Architect/Engineer: Geosyntec Consultants (Melissa Asher) Phone #: 206-496-1449
Mailing Address: 520 Pike Street Suite 2600, Seattle, WA 98101
Contractor: Cascade Remediation Services Phone #: 503-775-4118
Mailing Address: 13600 SE Ambler Road, Clackamas, OR 97015

Describe Work: Two to three days of environmental drilling for grab groundwater sampling in the field associated with the job address and parcel number listed above.

Footage curb and gutter: ______ Footage sidewalk: ______
Plans showing the extent of the proposed work attached hereto: ☒ Yes ☐ No

Dimensions of excavation: ______ ft. width x ______ ft. length = ______ sq. ft.
@ $1.50 = Amount of deposit ______

****CALL 48 HOURS BEFORE YOU DIG** 1-800-424-5555**

NOTICE TO APPLICANT:

This permit becomes null and void if the work or construction authorized is not commenced within 180 days or if work or construction is suspended or abandoned for 180 days at any time after work is commenced or if work is not complete within one (1) year from date of issue.

All work shall be done in accordance with the approved plans, except where such approval is in conflict with other codes. The approved plans shall not be changed or modified without the prior approval for the City.

It is the responsibility of the permittee to obtain the required inspections. Failure to notify this department that the work is ready for inspection may necessitate the removal of some of the construction materials at the owner's expense in order to perform such inspection.

I hereby certify that I have read this application and know the same to be true and correct. All provisions of laws and ordinances governing this type of work will be complied with whether specified herein or not. The granting of a permit does not presume to give authority to violate or cancel the provision of any other state or local law regulating construction or the performance of construction.

PERMIT FEES	
Curb & gutter	$
Sidewalk	$
Street excavation	$
Sewer equality fee	$
Water equality fee	$
Water meter	$
Water installation fee	$
Curb cut	$
Other	$
TOTAL FEE	$

Cash deposit ______
Surety bond ______

Signature of owner/contractor/or authorized agent Date

Permit is approved for work described above in accordance with the approved plans and specifications.
By: Shane Date: 5/18/22 Application #: ______

INSPECTIONS		DATE	APPROVED BY
Rough			
Tests			
Final			

ATTACHMENT 2

Temporary Well Boring Logs

Geosyntec consultants

520 Pike Street, Suite 2600
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM: OAKLAND

LOG OF BSB-1

START DATE 6/21/2022
FINISH DATE 6/21/2002
PROJECT Sunnyside
LOCATION Sunnyside, WA
PROJECT NUMBER PNR0696C **Elevation** FT. MSL
SHEET 1 **OF** 1

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOLIC LOG	ELEVATION (ft)	SAMPLES SAMPLE ID	 TYPE	 RECOVERY (%)	 Water Level	USCS Classification	COMMENTS
	Fine SAND with silt; dark brown; moist; 10% coarse sand			No soil samples taken		60		SP-SM	
	Very fine silty SAND; wet; dark brown						▽	SM	DTW at 3 ft
5						100			
10	Silt, clay, very fine sand; wet; dark brown					100		SM	
15	Boring terminated at 15 ft bgs								

CONTRACTOR Holt Services
EQUIPMENT Geoprobe 7800
DRILL MTHD Direct Push
DIAMETER (in) 2
LOGGER
REVIEWER L. Smith

NORTHING
EASTING
ANGLE Vertical
BEARING ------
PRINTED 08/24/22

REMARKS:

COORDINATE SYSTEM:

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants

520 Pike Street, Suite 2600
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM: OAKLAND

LOG OF BSB-2

START DATE 6/21/2022
FINISH DATE 6/21/2002
PROJECT Sunnyside
LOCATION Sunnyside, WA
PROJECT NUMBER PNR0696C **Elevation** FT. MSL

SHEET 1 **OF** 1

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOLIC LOG	ELEVATION (ft)	SAMPLES SAMPLE ID	 TYPE	 RECOVERY (%)	 Water Level	USCS Classification	COMMENTS
	SILT; brown; moist; 20% coarse sand, 80% silt			No soil samples taken				ML	
						80			
	3 ft bgs - Dark brown with black spots of fine sand; 10% coarse sand						∇		DTW at approximately 3.5 ft
5	Silty SAND; dark brown; moist; 20-30% saturated clay							SM	
	6 ft bgs - Very fine silty SAND with clay								
						100			
10				BSB-2 (10')					
						100			
15	Boring terminated at 15 ft bgs								

CONTRACTOR Holt Services
EQUIPMENT Geoprobe 7800
DRILL MTHD Direct Push
DIAMETER (in) 2
LOGGER **REVIEWER** L. Smith

NORTHING
EASTING
ANGLE Vertical
BEARING ------
PRINTED 08/24/22

REMARKS:

COORDINATE SYSTEM:

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
520 Pike Street, Suite 2600
Seattle, Washington 98101
Phone: 206.496.1450

GS FORM: OAKLAND

LOG OF BSB-7

START DATE 6/22/2022
FINISH DATE 6/22/2022
PROJECT Sunnyside
LOCATION Sunnyside, WA
PROJECT NUMBER PNR0696C
Elevation FT. MSL
SHEET 1 **OF** 1

DEPTH (ft)	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE ID	RECOVERY (%)	Water Level	USCS Classification	COMMENTS
	ORGANIC soil with gravel; moist; dark brown; 20% coarse gravel		No soil samples taken			OL	
	Fine SAND with clay; dark brown; moist					SP-SC	
				90			
	3 ft bgs - Wet				▽		DTW at 3 ft
5	5 ft bgs - Odor; black staining						
	7 ft bgs - No odor; no staining						
				95			
10							
	CLAY; medium brown; medium stiff; <5% coarse gravel					CL	
				100			
15	Boring terminated at 15 ft bgs						

CONTRACTOR Holt Services
EQUIPMENT Geoprobe 7800
DRILL MTHD Direct Push
DIAMETER (in) 2
LOGGER P. Sharma **REVIEWER** L. Smith

NORTHING
EASTING
ANGLE Vertical
BEARING ------
PRINTED 08/24/22

REMARKS:

COORDINATE SYSTEM:

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

ATTACHMENT 3

Off-Site Investigation Laboratory Analytical Reports

July 1, 2022

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

Dear Mr. Smith,

On June 23rd, 11 samples were received by our laboratory and assigned our laboratory project number EV22060145. The project was identified as your PNR0696B Sunnyside. 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

Glen Perry
Laboratory Director

CERTIFICATE OF ANALYSIS

CLIENT: Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101
CLIENT CONTACT: Luke Smith
CLIENT PROJECT: PNR0696B Sunnyside
CLIENT SAMPLE ID BSB-1

DATE: 7/1/2022
ALS JOB#: EV22060145
ALS SAMPLE#: EV22060145-01
DATE RECEIVED: 06/23/2022
COLLECTION DATE: 6/21/2022 2:35:00 PM
WDOE ACCREDITATION: C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Arsenic	EPA-200.8	**55**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06
Arsenic (Dissolved)	EPA-200.8	**5.2**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060145
		ALS SAMPLE#:	EV22060145-02
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/21/2022 3:56:00 PM
CLIENT SAMPLE ID	BSB-2	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Arsenic	EPA-200.8	**67**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06
Arsenic (Dissolved)	EPA-200.8	**8.3**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/1/2022 EV22060145 EV22060145-03
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/21/2022 5:16:00 PM
CLIENT SAMPLE ID	BSB-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Arsenic	EPA-200.8	**87**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06
Arsenic (Dissolved)	EPA-200.8	**8.8**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060145
		ALS SAMPLE#:	EV22060145-04
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/22/2022 2:05:00 PM
CLIENT SAMPLE ID	BSB-4	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Arsenic	EPA-200.8	**57**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06
Arsenic (Dissolved)	EPA-200.8	**16**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/1/2022 EV22060145 EV22060145-05
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/22/2022 10:48:00 AM
CLIENT SAMPLE ID	BSB-5	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Arsenic	EPA-200.8	**40**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06
Arsenic (Dissolved)	EPA-200.8	**5.0**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06

CERTIFICATE OF ANALYSIS

CLIENT: Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101
CLIENT CONTACT: Luke Smith
CLIENT PROJECT: PNR0696B Sunnyside
CLIENT SAMPLE ID BSB-6

DATE: 7/1/2022
ALS JOB#: EV22060145
ALS SAMPLE#: EV22060145-06
DATE RECEIVED: 06/23/2022
COLLECTION DATE: 6/22/2022 11:52:00 AM
WDOE ACCREDITATION: C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Arsenic	EPA-200.8	**110**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06
Arsenic (Dissolved)	EPA-200.8	**17**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060145
		ALS SAMPLE#:	EV22060145-07
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/22/2022 12:40:00 PM
CLIENT SAMPLE ID	BSB-7	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Arsenic	EPA-200.8	**25**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06
Arsenic (Dissolved)	EPA-200.8	**18**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060145
		ALS SAMPLE#:	EV22060145-08
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/22/2022 1:26:00 PM
CLIENT SAMPLE ID	BSB-8	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Arsenic	EPA-200.8	**52**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06
Arsenic (Dissolved)	EPA-200.8	**5.4**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/1/2022 EV22060145 EV22060145-09
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/22/2022 3:00:00 PM
CLIENT SAMPLE ID	BSB-9	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Arsenic	EPA-200.8	**25**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06
Arsenic (Dissolved)	EPA-200.8	**9.0**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060145
		ALS SAMPLE#:	EV22060145-10
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/22/2022 3:30:00 PM
CLIENT SAMPLE ID	BSB-10	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Arsenic	EPA-200.8	**31**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06
Arsenic (Dissolved)	EPA-200.8	**3.3**	1.0	1.0	0.45	1 1		UG/L	06/30/2022	EBS	06

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/1/2022 EV22060145 EV22060145-11
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/22/2022 12:40:00 PM
CLIENT SAMPLE ID	Dup-1	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Arsenic	EPA-200.8	**23**	1.0	1.0	0.45	1 1		UG/L	06/27/2022	EBS	06
Arsenic (Dissolved)	EPA-200.8	**20**	1.0	1.0	0.45	1 1		UG/L	06/27/2022	RAL	06

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS SDG#: WDOE ACCREDITATION:	7/1/2022 EV22060145 C601
CLIENT CONTACT:	Luke Smith		
CLIENT PROJECT:	PNR0696B Sunnyside		

LABORATORY BLANK RESULTS

MB-062422W - Batch 180483 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F T	O R G	F TY
Arsenic	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	06/27/2022	EBS	N	N	TR

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

MB-062822W - Batch 180563 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F T	O R G	F TY
Arsenic	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	06/30/2022	EBS	N	N	TR

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

MB-062422W - Batch 180484 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F T	O R G	F TY
Arsenic (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	06/27/2022	RAL	N	N	TR

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

MB-062822W - Batch 180564 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F T	O R G	F TY
Arsenic (Dissolved)	EPA-200.8	U	U	UG/L	1.0	1.0	0.15	06/30/2022	EBS	N	N	TR

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS SDG#: WDOE ACCREDITATION:	7/1/2022 EV22060145 C601
CLIENT CONTACT:	Luke Smith		
CLIENT PROJECT:	PNR0696B Sunnyside		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 180483 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	RPD	ANALYSIS DATE	ANALYSIS BY	L F	OR G RSLT TYPE	REP RT
Arsenic - BS	EPA-200.8	**98.6**			125	123	8901	01150		06/27/2022	EBS	Y	NSC	Yes
Arsenic - BS	EPA-200.8	**94.7**			125	118	8901	01150		06/27/2022	EBS	Y	NSC	Yes
Arsenic - BSD	EPA-200.8	**99.7**	**1**		125	125	8901	01150	0105	06/27/2022	EBS	Y	NSC	Yes
Arsenic - BSD	EPA-200.8	**96.6**	**2**		125	121	8901	01150	0105	06/27/2022	EBS	Y	NSC	Yes

ALS Test Batch ID: 180563 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	RPD	ANALYSIS DATE	ANALYSIS BY	L F	OR G RSLT TYPE	REP RT
Arsenic - BS	EPA-200.8	**97.6**			125	122	8901	01150		06/30/2022	EBS	Y	NSC	Yes
Arsenic - BSD	EPA-200.8	**98.4**	**1**		125	123	8901	01150	0105	06/30/2022	EBS	Y	NSC	Yes

ALS Test Batch ID: 180484 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	RPD	ANALYSIS DATE	ANALYSIS BY	L F	OR G RSLT TYPE	REP RT
Arsenic (Dissolved) - BS	EPA-200.8	**98.6**			125	123	8901	01150		06/27/2022	RAL	Y	NSC	Yes
Arsenic (Dissolved) - BSD	EPA-200.8	**99.7**	**1**		125	125	8901	01150	0105	06/27/2022	RAL	Y	NSC	Yes

ALS Test Batch ID: 180564 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	LIMITS MAX	RPD	ANALYSIS DATE	ANALYSIS BY	L F	OR G RSLT TYPE	REP RT
Arsenic (Dissolved) - BS	EPA-200.8	**97.6**			125	122	8901	01150		06/30/2022	EBS	Y	NSC	Yes
Arsenic (Dissolved) - BSD	EPA-200.8	**98.4**	**1**		125	123	8901	01150	0105	06/30/2022	EBS	Y	NSC	Yes

APPROVED BY:

Laboratory Director

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) EV22060145

6/22/2022
Date ~~6/21/2022~~ Page 1 Of 2

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

					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 + Dissolved Arsenic*	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐							NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. BSB-1	6/21/22	1235	W	1														X									2	
2. BSB-2	6/21/22	1356	W	2														X									2	
3. BSB-3	6/21/22	1516	W	3														X									2	
4. BSB-4	6/22/22	1205	W	4														X									2	
5. BSB-5	6/22/22	0848	W	5														X									2	
6. BSB-6	6/22/22	0952	W	6														X									2	
7. BSB-7	6/22/22	1040	W	7														X									2	
8. BSB-8	6/22/22	1126	W	8														X									2	
9. BSB-9	6/22/22	1300	W	9														X									2	
10. BSB-10	6/22/22	~~1350~~ 1330 PS	W	10														X									2	

SPECIAL INSTRUCTIONS * Dissolved Sample field filtered PO 1000 37991

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Priyam Sharma, Geosyntec 6/23/22, 1045

Received By: ALS 6-23-22 1045

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

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) EV22060145

Date 6/22/2022 Page 2 Of 2

PROJECT ID: PNR0696B
REPORT TO COMPANY: Geosyntec
PROJECT MANAGER: Luke Smith
ADDRESS: 520 Pike St Suite 2600
Seattle WA 98101
PHONE: 206-496-1449 P.O. #: PNR0696B
E-MAIL: Luke.Smith@geosyntec.com
INVOICE TO COMPANY: Geosyntec
ATTENTION: Luke Smith
ADDRESS: Same as above

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 + Dissolved* Arsenic	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify)							NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. Dup-1	6/22/22	1040	W	11														X									2	
2.																												
3.																												
4.																												
5.																												
6.																												
7.																												
8.																												
9.																												
10.																												

SPECIAL INSTRUCTIONS * Dissolved samples are field filtered

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Priyam Sharma, Geosyntec, 6/23/22, 1045
   Received By: ALS 6-23-22 1045
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

ProUCL Statistical Calculations

ProUCL Results for Arsenic

Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.17/28/2022 5:21:07 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	0.95

Total Arsenic Results

Total As

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	10
Maximum	110
Mean of Raw Data	58.62
Standard Deviation of Raw Data	33.08
Khat	2.804
Theta hat	20.9
Kstar	2.208
Theta star	26.54
Mean of Log Transformed Data	3.882
Standard Deviation of Log Transformed Data	0.699

Normal GOF Test Results

Correlation Coefficient R	0.978
Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical (0.05) Value	0.866
Approximate Shapiro Wilk P Value	0.547
Lilliefors Test Statistic	0.135
Lilliefors Critical (0.05) Value	0.234

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

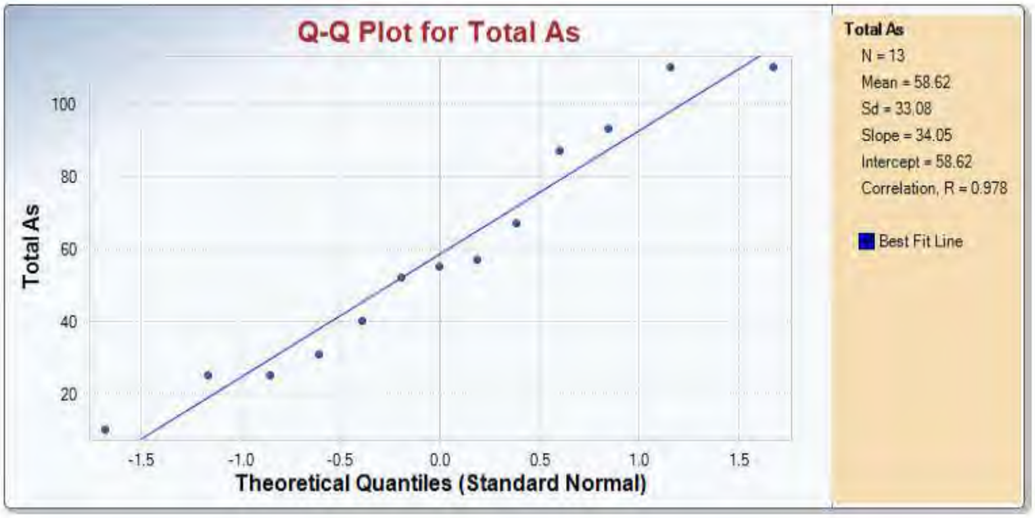
Correlation Coefficient R	0.962
A-D Test Statistic	0.246
A-D Critical (0.05) Value	0.74
K-S Test Statistic	0.124
K-S Critical(0.05) Value	0.238

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.964
Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical (0.05) Value	0.866
Approximate Shapiro Wilk P Value	0.318
Lilliefors Test Statistic	0.155
Lilliefors Critical (0.05) Value	0.234

Data appear Lognormal at (0.05) Significance Level


Q-Q Plot for Total As
Total As
100
80
60
40
20
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Theoretical Quantiles (Standard Normal)
Total As
N = 13
Mean = 58.62
Sd = 33.08
Slope = 34.05
Intercept = 58.62
Correlation, R = 0.978
Best Fit Line

Dissolved Arsenic Results

Dissolved As

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	13
Minimum	3.3
Maximum	90
Mean of Raw Data	20.13
Standard Deviation of Raw Data	26.39
Khat	1.084
Theta hat	18.58
Kstar	0.885
Theta star	22.75
Mean of Log Transformed Data	2.474
Standard Deviation of Log Transformed Data	0.974

Normal GOF Test Results

Correlation Coefficient R	0.784
Shapiro Wilk Test Statistic	0.628
Shapiro Wilk Critical (0.05) Value	0.866
Approximate Shapiro Wilk P Value	4.6627E-5
Lilliefors Test Statistic	0.378
Lilliefors Critical (0.05) Value	0.234

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.939
A-D Test Statistic	1.076
A-D Critical (0.05) Value	0.756
K-S Test Statistic	0.262
K-S Critical(0.05) Value	0.243

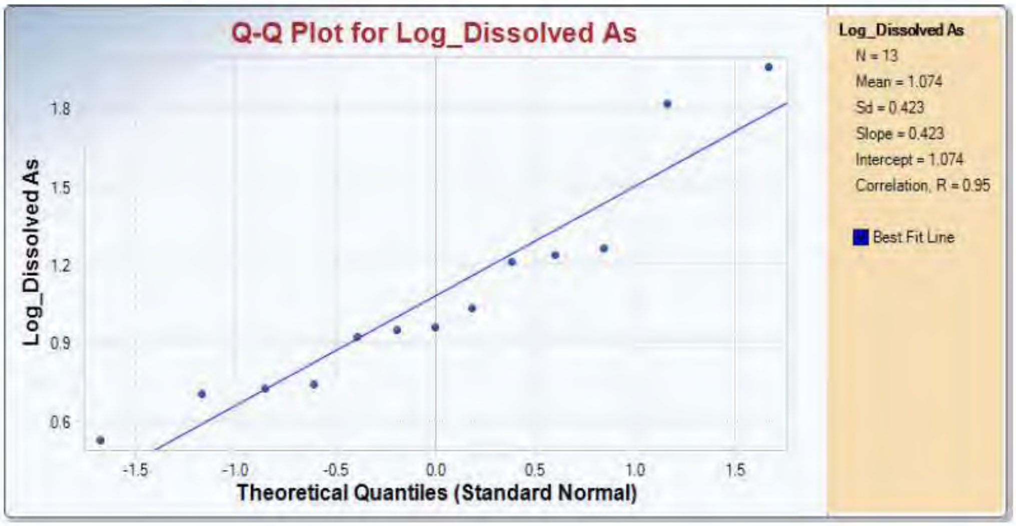
Data not Gamma Distributed at (0.05) Significance Level

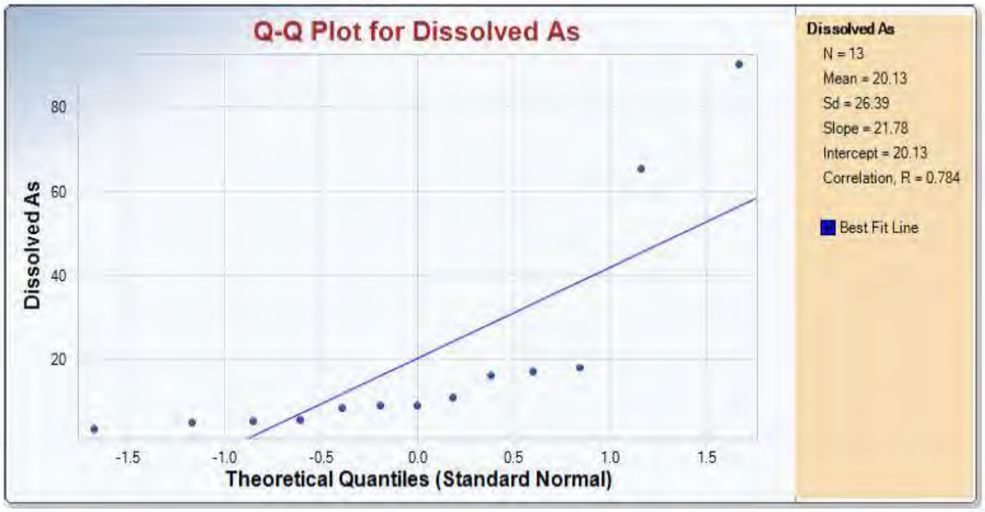
Lognormal GOF Test Results

Correlation Coefficient R	0.95
Shapiro Wilk Test Statistic	0.901
Shapiro Wilk Critical (0.05) Value	0.866
Approximate Shapiro Wilk P Value	0.14
Lilliefors Test Statistic	0.181
Lilliefors Critical (0.05) Value	0.234

Data appear Lognormal at (0.05) Significance Level

ProUCL Results for Arsenic





ProUCL Results for Arsenic

Total Arsenic 80% UCL Calculation	
Mean	58.6154
Standard Error	9.17462
Median	55
Mode	110
Standard Deviation	33.0795
Sample Variance	1094.26
Kurtosis	-1.06714
Skewness	0.31762
Range	100
Minimum	10
Maximum	110
Sum	762
Count	13
Confidence Level(80.0%)	12.4428

80 UCL	71.1	ug/L
4x 50%	220	ug/L

ProUCL Results for Nitrate

Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.19/1/2022 10:09:24 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	0.95

Nitrate_ite_mg/L

Raw Statistics

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	4.59
Maximum	88.6
Mean of Raw Data	31.17
Standard Deviation of Raw Data	24.98
Khat	2.058
Theta hat	15.14
Kstar	1.37
Theta star	22.76
Mean of Log Transformed Data	3.177
Standard Deviation of Log Transformed Data	0.823

Normal GOF Test Results

Correlation Coefficient R	0.86
Shapiro Wilk Test Statistic	0.771
Shapiro Wilk Critical (0.05) Value	0.818
Approximate Shapiro Wilk P Value	0.00748
Lilliefors Test Statistic	0.289
Lilliefors Critical (0.05) Value	0.283

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

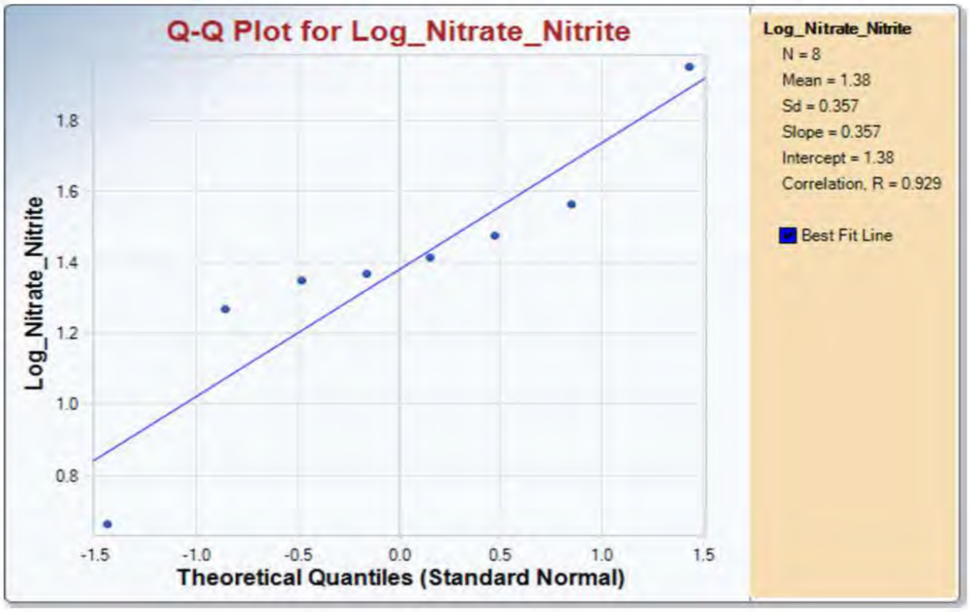
Correlation Coefficient R	0.942
A-D Test Statistic	0.479
A-D Critical (0.05) Value	0.724
K-S Test Statistic	0.203
K-S Critical(0.05) Value	0.297

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.929
Shapiro Wilk Test Statistic	0.897
Shapiro Wilk Critical (0.05) Value	0.818
Approximate Shapiro Wilk P Value	0.143
Lilliefors Test Statistic	0.251
Lilliefors Critical (0.05) Value	0.283

Data appear Lognormal at (0.05) Significance Level


Q-Q Plot for Log_Nitrate_Nitrite
Log_Nitrate_Nitrite
1.8
1.6
1.4
1.2
1.0
0.8
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Theoretical Quantiles (Standard Normal)
Log_Nitrate_Nitrite
N = 8
Mean = 1.38
Sd = 0.357
Slope = 0.357
Intercept = 1.38
Correlation, R = 0.929
☑ Best Fit Line

ProUCL Results for Nitrate

Nitrate 90% UCL	
Mean	31.1738
Standard Error	8.83138
Median	24.5
Mode	#N/A
Standard Deviation	24.9789
Sample Variance	623.947
Kurtosis	5.15075
Skewness	2.04528
Range	84.01
Minimum	4.59
Maximum	88.6
Sum	249.39
Count	8
Confidence Level(90.0%)	16.7317

90 UCL	47.9	mg/L
4x 50%	98	mg/L

APPENDIX C

June 2022 Soil Analytical Results

July 1, 2022

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

Dear Mr. Smith,

On June 23rd, 21 samples were received by our laboratory and assigned our laboratory project number EV22060144. The project was identified as your PNR0696B Sunnyside. 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

Glen Perry
Laboratory Director

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-01
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 3:15:00 PM
CLIENT SAMPLE ID	SB-34-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**14**	1.0	1.0	0.00E+00	2 2		MG/KG	06/28/2022	RAL	06
Ammonia	EPA-350.1	U	0.30	0.30	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-02
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 3:30:00 PM
CLIENT SAMPLE ID	SB-31-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**15**	1.0	1.0	0.00E+00	2 2		MG/KG	06/28/2022	RAL	06
Ammonia	EPA-350.1	U	0.29	0.29	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-03
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 3:45:00 PM
CLIENT SAMPLE ID	SB-38-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**3.6**	0.50	0.50	0.00E+00	1 1		MG/KG	06/28/2022	RAL	06
Ammonia	EPA-350.1	U	0.32	0.32	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/1/2022 EV22060144 EV22060144-04
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 3:55:00 PM
CLIENT SAMPLE ID	SB-29-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**4.6**	1.0	1.0	0.00E+00	2 2		MG/KG	06/28/2022	RAL	06
Ammonia	EPA-350.1	U	0.28	0.28	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-05
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 4:05:00 PM
CLIENT SAMPLE ID	SB-35-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**35**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	RAL	06
Ammonia	EPA-350.1	U	0.29	0.29	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-06
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 4:25:00 PM
CLIENT SAMPLE ID	SB-26-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**19**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	RAL	06
Ammonia	EPA-350.1	U	0.35	0.35	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-07
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 4:45:00 PM
CLIENT SAMPLE ID	SB-25-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**17**	1.0	1.0	0.00E+00	2 2		MG/KG	06/28/2022	RAL	06
Ammonia	EPA-350.1	U	0.29	0.29	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/1/2022 EV22060144 EV22060144-08
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 4:55:00 PM
CLIENT SAMPLE ID	SB-24-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR		QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**26**	2.5	2.5	0.00E+00	5	5		MG/KG	06/28/2022	RAL	06
Ammonia	EPA-350.1	U	0.30	0.30	0.00E+00	1	1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-09
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 5:00:00 PM
CLIENT SAMPLE ID	SB-37-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**20**	1.0	1.0	0.00E+00	2 2		MG/KG	06/28/2022	RAL	06
Ammonia	EPA-350.1	U	0.29	0.29	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-10
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 5:05:00 PM
CLIENT SAMPLE ID	SB-37-3-5	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**69**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	RAL	06
Ammonia	EPA-350.1	U	0.34	0.34	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-11
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 5:10:00 PM
CLIENT SAMPLE ID	SB-36-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**20**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	EBS	06
Ammonia	EPA-350.1	U	0.31	0.31	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT: Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101
CLIENT CONTACT: Luke Smith
CLIENT PROJECT: PNR0696B Sunnyside
CLIENT SAMPLE ID SB-36-3-5

DATE: 7/1/2022
ALS JOB#: EV22060144
ALS SAMPLE#: EV22060144-12
DATE RECEIVED: 06/23/2022
COLLECTION DATE: 6/20/2022 5:15:00 PM
WDOE ACCREDITATION: C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**41**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	EBS	06
Ammonia	EPA-350.1	U	0.33	0.33	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-13
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 5:20:00 PM
CLIENT SAMPLE ID	SB-27-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**14**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	EBS	06
Ammonia	EPA-350.1	U	0.28	0.28	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/1/2022 EV22060144 EV22060144-14
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 5:25:00 PM
CLIENT SAMPLE ID	SB-27-3-5	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**45**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	EBS	06
Ammonia	EPA-350.1	U	0.32	0.32	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/1/2022 EV22060144 EV22060144-15
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 5:50:00 PM
CLIENT SAMPLE ID	SB-39-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**20**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	EBS	06
Ammonia	EPA-350.1	U	0.28	0.28	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT: Geosyntec Consultants
520 Pike St, Suite 2600
Seattle, WA 98101

CLIENT CONTACT: Luke Smith

CLIENT PROJECT: PNR0696B Sunnyside

CLIENT SAMPLE ID SB-30-0-3

DATE: 7/1/2022

ALS JOB#: EV22060144

ALS SAMPLE#: EV22060144-16

DATE RECEIVED: 06/23/2022

COLLECTION DATE: 6/20/2022 6:00:00 PM

WDOE ACCREDITATION: C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**41**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	EBS	06
Ammonia	EPA-350.1	U	0.28	0.28	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/1/2022 EV22060144 EV22060144-17
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 6:15:00 PM
CLIENT SAMPLE ID	SB-32-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**31**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	EBS	06
Ammonia	EPA-350.1	U	0.29	0.29	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-18
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 6:20:00 PM
CLIENT SAMPLE ID	SB-32-3-5	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**78**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	EBS	06
Ammonia	EPA-350.1	U	0.31	0.31	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-19
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 6:30:00 PM
CLIENT SAMPLE ID	SB-33-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**36**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	EBS	06
Ammonia	EPA-350.1	U	0.30	0.30	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS JOB#: ALS SAMPLE#:	7/1/2022 EV22060144 EV22060144-20
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 5:40:00 PM
CLIENT SAMPLE ID	SB-28-0-3	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR		QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**55**	2.5	2.5	0.00E+00	5	5		MG/KG	06/28/2022	EBS	06
Ammonia	EPA-350.1	U	0.28	0.28	0.00E+00	1	1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS JOB#:	EV22060144
		ALS SAMPLE#:	EV22060144-21
CLIENT CONTACT:	Luke Smith	DATE RECEIVED:	06/23/2022
CLIENT PROJECT:	PNR0696B Sunnyside	COLLECTION DATE:	6/20/2022 5:45:00 PM
CLIENT SAMPLE ID	SB-28-3-5	WDOE ACCREDITATION:	C601

SAMPLE RESULTS

ANALYTE	METHOD	RESULTS	RL	REPORTING LIMITS	PQL	DILUTION FACTOR	QUAL	UNITS	ANALYSIS DATE	ANALYSIS BY	
Nitrate/Nitrite as N	EPA-300.0M	**70**	2.5	2.5	0.00E+00	5 5		MG/KG	06/28/2022	EBS	06
Ammonia	EPA-350.1	U	0.33	0.33	0.00E+00	1 1	U	MG/KG	06/27/2022	CAS	06

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE: ALS SDG#: WDOE ACCREDITATION:	7/1/2022 EV22060144 C601
CLIENT CONTACT:	Luke Smith		
CLIENT PROJECT:	PNR0696B Sunnyside		

LABORATORY BLANK RESULTS

MBLK-R411978 - Batch R411978 - Soil by EPA-300.0M

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F	O R G	F TY
Nitrate/Nitrite as N	EPA-300.0M	U	U	MG/KG	0.50	0.50	0.00E+00	06/28/2022	EBS	N	Y	TR

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

MBLK-R411979 - Batch R411979 - Soil by EPA-300.0M

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F	O R G	F TY
Nitrate/Nitrite as N	EPA-300.0M	U	U	MG/KG	0.50	0.50	0.00E+00	06/28/2022	RAL	N	Y	TR

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

MBLK-R411977 - Batch R411977 - Soil by EPA-350.1

ANALYTE	METHOD	RESULTS	QUAL	UNITS	RL	REPORTING LIMITS	PQL	ANALYSIS DATE	ANALYSIS BY	D F	O R G	F TY
Ammonia	EPA-350.1	U	U	MG/KG	0.28	0.28	0.00E+00	06/27/2022	CAS	N	Y	TR

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

CERTIFICATE OF ANALYSIS

CLIENT:	Geosyntec Consultants 520 Pike St, Suite 2600 Seattle, WA 98101	DATE:	7/1/2022
		ALS SDG#:	EV22060144
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Luke Smith		
CLIENT PROJECT:	PNR0696B Sunnyside		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: R411978 - Soil by EPA-300.0M

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	MAX	RPD	ANALYSIS DATE	ANALYSIS BY			
Nitrate/Nitrite as N - BS	EPA-300.0M	**99.0**			100	99.0	80	120		06/28/2022	EBS	Y	QC	Yes
Nitrate/Nitrite as N - BSD	EPA-300.0M	**99.0**	0		100	99.0	80	120	20	06/28/2022	EBS	Y	QC	Yes

ALS Test Batch ID: R411979 - Soil by EPA-300.0M

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	MAX	RPD	ANALYSIS DATE	ANALYSIS BY			
Nitrate/Nitrite as N - BS	EPA-300.0M	**99.0**			100	99.0	80	120		06/28/2022	RAL	Y	QC	Yes
Nitrate/Nitrite as N - BSD	EPA-300.0M	**99.0**	0		100	99.0	80	120	20	06/28/2022	RAL	Y	QC	Yes

ALS Test Batch ID: R411977 - Soil by EPA-350.1

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	RESULT	LIMITS MIN	MAX	RPD	ANALYSIS DATE	ANALYSIS BY			
Ammonia - BS	EPA-350.1	**104**			27.1	28.1	90	110		06/27/2022	CAS	Y	QC	Yes

APPROVED BY:

Laboratory Director

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): EV22060144

Date 6/20/22 Page 1 Of ~~2~~ 32

PROJECT ID: PNR0696B Sunnyside
REPORT TO COMPANY: Geosyntec
PROJECT MANAGER: Luke Smith
ADDRESS: ~~8~~ 520 ~~13th Ave~~ NW Pike St.
Suite 2600, Seattle WA 98101
PHONE: 206-496-4450 P.O. #: PNR0696B
E-MAIL: Luke.Smith@geosyntec.com
INVOICE TO COMPANY: Geosyntec
ATTENTION: Luke Smith
ADDRESS: Same as above

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 ☐	Nitrate-Nitrite (TON) EPA 330	Ammonia SM4500-NH3						NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. SB-34-0-3	6/20/22	1315	S	1																X	X						2	
2. SB-31-0-3	↓	1330	↓	2																X	X						2	
3. SB-28-0-3	↓	1345	↓	3																X	X						2	
4. SB-29-0-3	↓	1355	↓	4																X	X						2	
5. SB-35-0-3	↓	1405	↓	5																X	X						2	
6. SB-26-0-3	↓	1425	↓	6																X	X						2	
7. SB-25-0-3	↓	1445	↓	7																X	X						2	
8. SB-24-0-3	↓	1455	↓	8																X	X						2	
9. SB-37-0-3	↓	1500	↓	9																X	X						2	
10. SB-37-3-5	↓	1505	↓	10																X	X						2	

SPECIAL INSTRUCTIONS PO 100037991

SIGNATURES (Name, Company, Date, Time):
1. Relinquished By: Priyam Sharma, Geosyntec, 6/23/22, 1045
Received By: ALS 6-23-22 1045
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

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) EV22060144

Date 6/20/22 Page 2 Of ~~2~~ 3 RRM

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

					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 ☐	Nitrate-Nitrite (TON) EPA 300	Ammonia SM4500-NH3						NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. SB-36-0-3	6/20/22	1510	S	11																X	X						2	
2. SB-36-3-5	↓	1515	↓	12																X	X						2	
3. SB-27-0-3		1520		13																X	X						2	
4. SB-27-3-5		1525		14																X	X						2	
5. SB-39-0-3		1550		15																X	X						2	
6. SB-30-0-3		1600		16																X	X						2	
7. SB-32-0-3		1615		17																X	X						2	
8. SB-32-3-5		1620		18																X	X						2	
9. SB-33-0-3		1630		19																X	X						2	
10. SB-28-03		1540		20																X	X						2	
11. SB-28-3-5	↓	1545	↓	21																X	X						2	

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Priyam Sharma, Geosyntec, 6/23/22, 1045 am
Received By: ALS 6-23-22 1045
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 D

Baseline Monitoring and Arsenic Geochemistry Modeling Report

APPENDIX D
BASELINE MONITORING AND ARSENIC GEOCHEMISTRY MODELING REPORT

FORMER NACHURS ALPINE SOLUTIONS FACILITY
SUNNYSIDE, WASHINGTON

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: PNR0696C

September 23, 2022

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
As	arsenic
As(III)	arsenite
As(V)	arsenate
COPCs	constituents of potential concern
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
Ecology	Washington State Department of Ecology
Eh	oxidation potential
EPA	United States Environmental Protection Agency
ft	feet
Geosyntec	Geosyntec Consultants, Inc.
mg/L	milligrams per liter
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)
ORP	Oxidation-Reduction Potential
QA/QC	quality assurance/quality control
RPD	relative percent differences
Site	the former Nachurs Alpine Solutions Facility located at 101 North 1st Street in Sunnyside, Washington
TRL	Target Remediation Level
Wilbur-Ellis	Wilbur-Ellis Holdings II, Inc.

1. INTRODUCTION

This *Baseline Monitoring and Arsenic Geochemistry Modeling Report*, presented as Appendix D to the *Remedial Investigation and Cleanup Action Plan (RI/CAP)*, has been prepared for the Washington State Department of Ecology (Ecology) to summarize the results of baseline groundwater monitoring activities conducted on 8 June 2022 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.

To date, five quarterly groundwater monitoring events have been conducted as part of the remedial investigation (third and fourth quarter 2020 and first, second, and third quarter 2021). The objective of the baseline monitoring was to collect field measurements and analyze groundwater samples to support the develop of a groundwater remedy for the Site, as presented in Appendix E, and to collect data prior to remedy implementation. The scope of work for this report included the following:

- Collection of groundwater samples and for analysis of groundwater constituents for potential concern (COPCs) (i.e., arsenic, cobalt, molybdenum, nitrate as nitrogen).
- Collection of geochemical and other water quality parameters, including field parameters (dissolved oxygen [DO], oxidation-reduction potential [ORP], pH, etc.) and samples for laboratory analysis of iron, manganese, ammonia as nitrogen, dissolved organic carbon, sulfate, and orthophosphate.
- Collection of samples for arsenic speciation analysis.
- Performing geochemical modeling on arsenic species in groundwater using speciation and geochemical results.

Field activities and analytical and geochemical modeling results are presented and discussed herein.

2. BASELINE MONITORING

The following section summarizes field activities conducted during the 8 June 2022 baseline groundwater monitoring event.

2.1 Groundwater Monitoring Field Activities

During the groundwater monitoring event, groundwater samples were collected from the four monitoring wells (MW-1, MW-2, MW-3, and MW-4) and analyzed for Site COPCs and additional geochemical and water quality parameters. Prior to sampling each monitoring well, depth to water was measured, then the wells were purged at a rate between 100 and 500 milliliters per minute with dedicated tubing. Groundwater field parameters (depth to groundwater, temperature, conductivity, pH, turbidity, DO, and ORP) were recorded during purging. Once field parameters stabilized for three successive readings or 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 analysis of dissolved metals and dissolved organic carbon were field filtered using a 0.45-micron filter. The tubing and samples used during the collection of groundwater for arsenic speciation analysis were wrapped in foil to reduce the chance for photochemical oxidation. One duplicate sample was collected during the sampling event from well MW-4 for a total of five groundwater samples. Samples were labeled upon collection and immediately stored in coolers on ice pending shipment to the ALS Environmental (ALS) analytical laboratory under standard chain-of-custody procedures.

2.2 Laboratory Analysis

A total of five sets of samples (four original and one duplicate) were shipped to ALS and analyzed for total and dissolved metals (arsenic, cobalt, iron, manganese, and molybdenum by EPA Method 200.8), dissolved organic carbon (DOC) (SM 5310C), ammonia (SM 4500-NH_3 G), orthophosphate as phosphorus (SM 4500-P E), sulfate, and nitrate as nitrogen (EPA Method 300.0), and arsenic speciation by EPA 1632.

3. RESULTS

The following section summarizes Quality Assurance/Quality Control Review (QA/QC) and analytical results from the baseline sampling.

3.1 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 criteria. This data quality review included the following:

- A field duplicate sample was collected from MW-4. The duplicate sample was submitted blind to the analytical laboratory. Analytical results between the original and duplicate sample at MW-4 showed relative percent differences (RPDs) within control limits (<30%) for all compounds detected except for total iron and arsenic (III) that had RPDs of 49% and 40% in the field duplicate pair, respectively.
- Five method blanks were used to for the arsenic speciation analysis. Arsenic (III) and inorganic arsenic were detected at estimated concentrations greater than the method detection limits in four of the blanks. Because the observed Arsenic (III) concentrations in the associated method blanks were detected as estimated concentrations greater than the method detection limits (MDLs) and less the reporting limits (RLs), the estimated Arsenic (III) concentration in sample GW-060822-MW-1 should be considered not detected at the RL, based on National Functional Guidelines (US EPA 2020) and professional and technical judgement. This data validation change is incorporated into the results evaluation below.

- Three method blanks were used for nitrate as nitrogen, sulfate, total metals (arsenic, cobalt, iron, manganese, and molybdenum), and dissolved metals (arsenic, cobalt, iron, manganese, and molybdenum) by the analytical laboratory. Two method blanks were used to analyze for dissolved organic carbon. One method blank was used to analyze for ammonia as nitrogen and orthophosphate as phosphorus. No analytes were detected in any of the blanks except for the arsenic method blanks discussed above.
- Matrix spike and matrix spike duplicate results, using sample MW-1, were within control limits for all compounds analyzed except for total iron and manganese. Since the total iron and manganese results in sample MW-1 were greater than four times the spike concentration, the recovery limits were not applicable, and the data were not affected.
- Laboratory control sample 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 with the data valuation qualifier noted above for Arsenic (III) results in the sample from MW-1.

3.2 Analytical Results Summary

Results from the groundwater sampling are presented in Table 1. Groundwater results are compared to the target remediation levels (TRLs) as discussed in the RI/CAP. Laboratory analytical reports for baseline sampling are provided in Attachment 1.

COPCs were detected at similar concentrations to the remedial investigation quarterly groundwater sampling results. Nitrate as nitrogen was above the TRL of 48 milligrams per liter (mg/L) at MW-2 and MW-4. Ammonia concentrations were below the detection limit in three of the four samples, which indicates that there is not a potential ongoing source of nitrate in groundwater through nitrification of ammonia.

As(V) was detected in groundwater in abundance and above the As(III) concentrations in all samples. The highest concentrations of total arsenic were observed at MW-3 (northeastern edge of the Site) and MW-2 (southern central edge of the Site) with concentrations of 72 µg/L and 70 µg/L, respectively. MW-3 slightly exceeded the TRL of 71 µg/L for total arsenic. The total cobalt concentrations at MW-2 and MW-4 exceeded the TRL of 5 µg/L. Total molybdenum concentration at MW-4 exceeded the TRL of 80 µg/L.

Analyses of sulfate, DOC, iron, manganese, and orthophosphate were analyzed to improve understanding of geochemically competitive anions for attenuation of arsenic in groundwater via sorption onto reactive surfaces of aquifer solids. DOC was relatively high, ranging from 2.90 mg/L (MW-3) through 7.40 mg/L (MW-4). These parameters are incorporated into the geochemical modeling results below.

3.3 Geochemical Modeling

Arsenic typically exists in natural environments as two different species: as arsenate, a +5 oxidation state (As(V)); or as arsenite, a +3 oxidation state (As(III)). The dominant oxidation state and species of aqueous arsenic is governed primarily by pH, total arsenic concentration, and oxidation-reduction (redox) conditions. The different species of arsenic in groundwater will interact with aquifer materials and other aqueous components in different ways. Arsenic fate and transport processes are largely dependent upon geochemical interactions between individual arsenic species and other components in the subsurface system. Therefore, knowledge of arsenic speciation is crucial to development of a long-term remedial strategy, particularly when that remediation strategy may alter the redox conditions in the subsurface.

3.3.1 Methodology

Eh-pH diagrams defining thermodynamic arsenic stability were generated using average aqueous total arsenic, sulfate, iron, and manganese concentrations and temperature values from the sampling event as inputs to calculate the boundaries between each species stability field. Field ORP measurements were converted into oxidation potential (Eh) values for use in Eh-pH diagrams.

Concentrations of As(III) and As(V) were used as input values in geochemical modeling efforts. Eh values calculated from field ORP measurements were verified by comparison to Eh values calculated using the Nernst Equation for the H_3AsO_3/H_3AsO_4 redox couple. Nernst Equation calculations for As(III)/As(V) require an estimate of the fractions of As(V) and As(III) in the form of arsenic acid and arsenious acid, respectively (Holm and Curtiss, 1989; Panagiotaras et al., 2012). Arsenic speciation was modeled using USGS aqueous geochemical modeling software PHREEQC. Further thermodynamic modeling was completed using Geochemist's Workbench module Act2. The Lawrence Livermore 'thermo.com.V8.R6_.tdat' thermodynamic dataset was modified to include additional As-Fe-S species, based on modeling work conducted on similar systems by Cleverley et al. (2003).

3.3.2 Evaluation of Redox Conditions with Respect to Arsenic

Findings from the Eh-pH diagram and geochemical models suggest that Site conditions do not favor an in-situ remedial approached intended for sequestration of aqueous arsenic into either oxyhydroxide or sulfide mineral phases (such as iron sulfide as originally proposed in the Draft RI/CAP; Geosyntec, 2022). Formation and stability of these mineral phases is jeopardized by dynamic redox conditions.

Arsenic speciation results from the June 2022 sampling event indicate that > 99% of total aqueous arsenic concentrations at all four sampled wells consists of As(V) (Table 1). Generally, As(V) is the dominant oxidation state of arsenic in aerobic aquifer systems of approximately neutral pH. Field parameter readings during the recent sampling event indicate that redox conditions at all wells are aerobic, with ORP values ranging from +101.5 to +234.5 millivolts (mV) and DO values from 0.51 to 1.78 mg/L (Table 2). Historically, field parameters from prior sampling events indicate that redox conditions at Site MWs are not consistently aerobic. ORP values from previous sampling events have been indicative of anaerobic conditions and the associated DO concentrations have been commensurately low (consistent with anaerobic conditions). To illustrate the historical record of redox conditions at this Site, ORP values from prior sampling events were plotted against groundwater elevations (Figure 1). Figure 1 suggests that ORP, and redox conditions generally, are correlated with groundwater elevation at the Site, strongly suggesting that meteoric recharge is responsible for governing redox conditions. All four on-site monitoring wells are screened from 5 to 15 feet below ground surface.

Arsenic speciation results from the June 2022 sampling event indicate that, while total As is dominated by As(V), some detectable As(III) is present. Calculated Eh values derived from the analytical arsenic speciation results were lower than the field-measured ORP values. An Eh-pH diagram displaying both field-derived Eh values and the calculated (Nernst equation) Eh values is provided as Figure 2. Figure 2 indicates that thermodynamic stability of $HAsO^{2-}{}_4$ (+5 oxidation state) is favored for samples collected in June 2022. However, field-measured ORP values predict the stability of As(V) species, whereas calculated Eh values from the June 2022 sampling are predicted near the stability boundary between As(III) ($HAsO_2$[aq]) and As(V) ($HAsO^{2-}{}_4$) species. The presence of detectable As(III) indicate that current redox conditions at Site MWs may be nearer to a dynamic equilibrium state than field measured ORP-derived Eh values would suggest.

The differences between field ORP-derived Eh values and calculated ORP values from the June 2022 sampling event were averaged to calculate a ‘correction factor’ which represents the difference between field meter and arsenic speciation result estimates of oxidation potential. This correction factor was then applied to Eh values calculated from field ORP measurements from historic sampling events. These ‘corrected’ Eh values were then plotted on the Eh-pH diagram along with pH values for all historical samples (Figure 3). Figure 3 demonstrates that when the correction factor is applied to historical samples, these samples illustrate a dynamic natural baseline condition, with some samples plotting along the stability boundary between predominantly aqueous As(III) or as As(V). This relationship between As(III) and As(V) stability suggests that injection of electron donors resulting in a system shift towards generally anaerobic conditions would not result in unprecedented changes to arsenic speciation nor long-term increases in aqueous arsenic concentrations, as natural conditions within Site groundwater already favor dynamic equilibrium. Therefore, a remedial approach for nitrate via anaerobic denitrification is not expected to appreciably influence aqueous arsenic concentrations.

Analysis of field parameters, evaluation of analytical data, and thermodynamic modeling suggest that arsenic in Site groundwater exists in a state of dynamic equilibrium, with the thermodynamically favorable species naturally fluctuating between As(III) and As(V) oxidation states, depending upon redox conditions. Field measurements from previous sampling events indicate that redox conditions at the Site are highly variable, likely as a result of the influence of mixing groundwater with precipitation (Figure 1).

3.3.3 Nature of Arsenic Association in Groundwater

Assessments of metals in groundwater commonly consist of laboratory analysis of both the total and dissolved components. Field filtration through a 0.45-micron filter allows for assessment of the dissolved portion of a metal, rather than a combination of the dissolved portion and the larger portion typically associated with particulate, or colloidal material. Table 1 contains results for dissolved and total fractions of various metals from the June 2022 sampling event. Notable differences in dissolved and total concentrations are observed for iron and manganese.

Low dissolved concentrations of iron and manganese relative to total concentrations suggests that a significant fraction these constituents are comprised of larger colloidal material rather than a truly dissolved fraction. Further support for a prominent colloidal fraction is provided by relatively high concentrations of DOC (2.9 to 7.4 mg/L) observed in Site monitoring wells. This observation suggests that complexation between colloidal humic substances and metals such as arsenic or cobalt may be occurring, resulting in changes to the solubilities of these metals. Accumulation of these metals as colloids may result in misrepresentation of the actual concentration of these parameters in groundwater if only the dissolved component is considered. Therefore, usage of total concentrations of metals in setting target remedial levels is recommended.

4. CONCLUSIONS

Evaluation of analytical data and field parameters collected during the June 2022 sampling event and subsequent thermodynamic modeling suggest the following conclusions:

- Baseline monitoring results are similar to the previous five quarterly monitoring results discussed in the RI/CAP.
- Ammonia was detected in one groundwater sample from MW-2 at 2.24 mg/L, indicating that there is no ongoing source of nitrate from ammonia nitrification.
- Groundwater elevation and subsequently redox conditions in Site groundwater are strongly influenced by meteoric recharge.
- Arsenic in Site groundwater likely exists in a state of dynamic equilibrium, fluctuating between As(III) and As(V) species depending upon groundwater elevation changes.
- The natural shift between predominantly As(III) and As(V) suggest that a remedial approach for nitrate via anaerobic denitrification will not cause any unprecedented changes to arsenic speciation, nor long-term increases in aqueous arsenic concentrations.
- Geochemical conditions at the Site do not favor in-situ remediation approaches intended to encourage sequestration of aqueous arsenic into either oxyhydroxide or sulfide mineral phases (such as iron sulfide as originally proposed in the Draft RI/CAP). Formation and stability of these mineral phases is jeopardized by dynamic redox conditions.

5. REFERENCES

Cleverley, J.S., Benning, L.G., and Mountain, B.W. 2003. Reaction Path Modelling in the As-S System: A Case Study for Geothermal As Transport. *Applied Geochemistry*. 18(9): 1325-1345.

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TABLES

TABLE 1: BASELINE GROUNDWATER SAMPLING RESULTS SUMMARY
Former Nachurs Alpine Solutions Facility, Sunnyside, WA

Location	Screen Interval Depth (ft)	Date Collected	Constituents of Potential Concerns							Arsenic Speciation			Other Geochemical Parameters							
			Nitrate as Nitrogen (mg/L)	Arsenic (total) (µg/L)	Arsenic (dissolved) (µg/L)	Cobalt (total) (µg/L)	Cobalt (dissolved) (µg/L)	Molybdenum (total) (µg/L)	Molybdenum (dissolved) (µg/L)	Arsenic, Inorganic (total) (µg/L)	Arsenic (V) (µg/L)	Arsenic (III) (µg/L)	Iron (total) (µg/L)	Iron (dissolved) (µg/L)	Manganese (total) (µg/L)	Manganese (dissolved) (µg/L)	Ammonia as Nitrogen (mg/L)	Ortho-Phosphate (mg/L)	Sulfate (mg/L)	Dissolved Organic Carbon (mg/L)
MW-1	5-10	6/8/22	**15.0**	**11.2**	**9.71**	**0.825**	**0.067**	**28**	**26.5**	**6.50**	**6.50**	<0.02	**1,340**	**2.2**	**295**	**2.09**	<0.050	**0.094**	**229**	**3.20**
MW-2	5-10	6/8/22	**90**	**70.0**	**67.3**	**9.56**	**9.10**	**37.9**	**36.0**	**43.8**	**43.7**	**0.088**	**156**	**11.9**	**237**	**182**	**2.24**	**9.5**	**584**	**5.80**
MW-3	5-10	6/8/22	**15.2**	**72.0**	**72.8**	**0.662**	**0.325**	**32.8**	**34.4**	**46.4**	**46.2**	**0.160**	**127**	**30.1**	**597**	**173**	<0.050	**0.313**	**131**	**2.90**
MW-4	5-10	6/8/22	**185**	**58.3**	**59.0**	**18.8**	**18.3**	**133**	135	**38.5**	**38.4**	**0.079**	**458**	**33.6**	**237**	**203**	<0.050	**0.314**	**667**	**7.40**
Target Remediation Levels[1]			**48**	**71**	--	**5**	--	**80**	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

1. Target remediation levels are developed and proposed in Table 7 of the Remedial Investigation Cleanup Action Plan (Geosyntec, 2022).

Acronyms:

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

-- = No target site-specific remediation level selected or available

µg/L = micrograms per liter

mg/L = milligrams per liter

J = The result is an estimated value

MW = monitoring wells

Bold = Analyte was detected.

🟧 Analyte was detected at concentrations that are greater than the Target Remediation Level

TABLE 2: HISTORICAL GROUNDWATER FIELD PARAMETER SUMMARY

Former Nachurs Alpine Solutions Facility, Sunnyside, WA

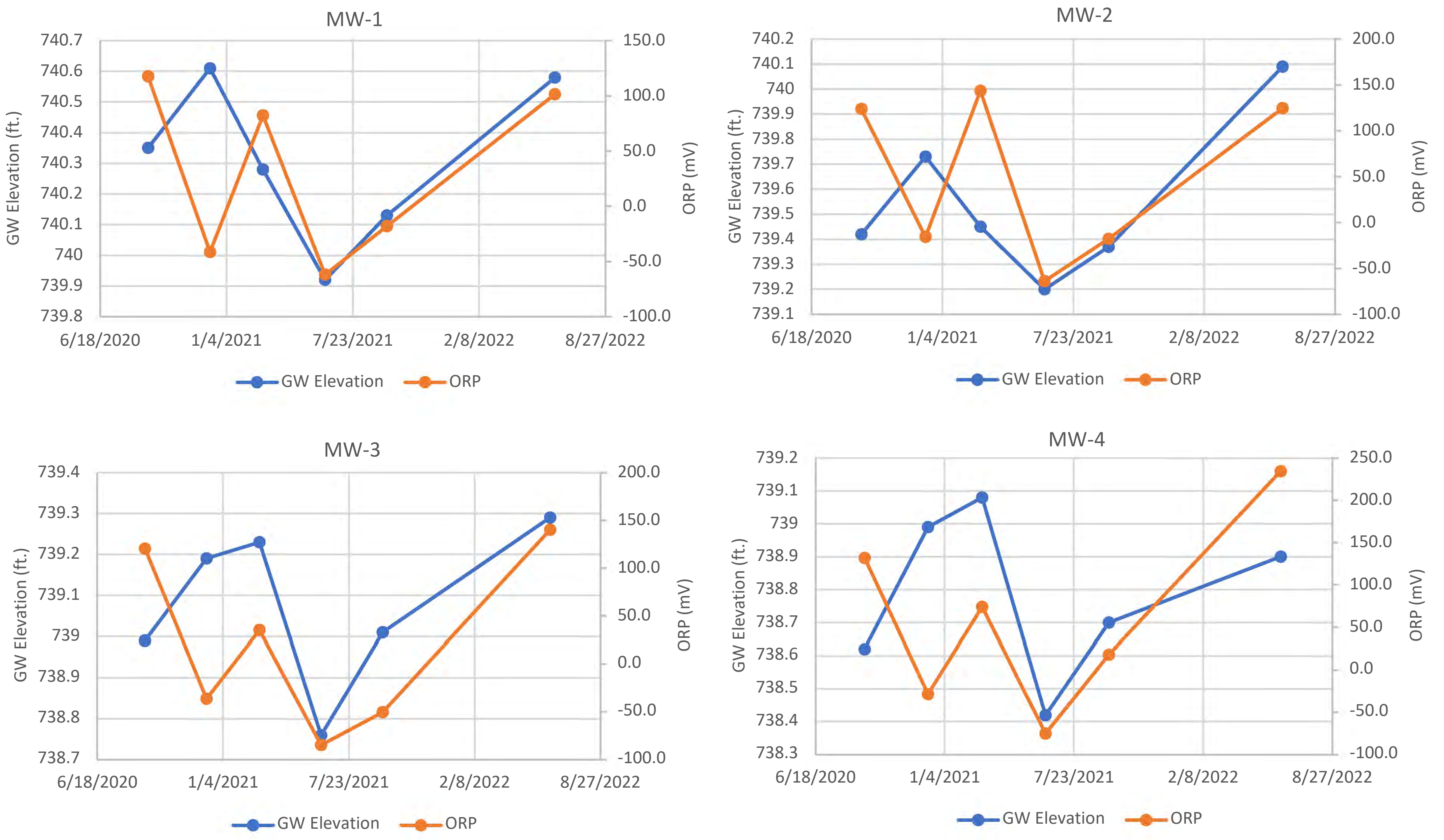
Monitoring Well Identification	Sample date	Temp (°C)	pH	Conductivity (µS/cm)	Turbidity (NTUs)	D.O. (mg/L)	ORP (mV)
MW-1	9/2/2020	19.46	7.42	1198	35	0.51	117.6
	12/9/2020	13.73	7.73	1166	32	0.35	-41.4
	3/3/2021	12.30	7.58	1139	9	2.17	82.3
	6/9/2021	15.35	7.56	1384	16	0.61	-61.9
	9/15/2021	20.28	7.66	2032	27	1.05	-18.0
	6/8/2022*	16.36	7.68	1411	46	1.77	100.5
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
	6/8/2022*	16.00	7.62	3108	8	1.37	123.0
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
	6/8/2022*	16.28	7.69	1178	9	0.49	137.3
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
	6/8/2022*	16.60	7.95	3795	20	1.15	229.9

Notes:

°C =degree Celsius
D.O. = Dissolved oxygen
DTW = depth to water
ft = feet
mg/L = milligrams per liter
*Baseline monitoring event

mV = milliVolt
NTU= Nephelometric Turbidity Unit
ORP = Oxidation Reduction Potential
Temp = Temperature
µS/cm = microsiemens per centimeter

FIGURES



Notes:
Groundwater elevation is presented in units of feet above mean sea level (amsl).

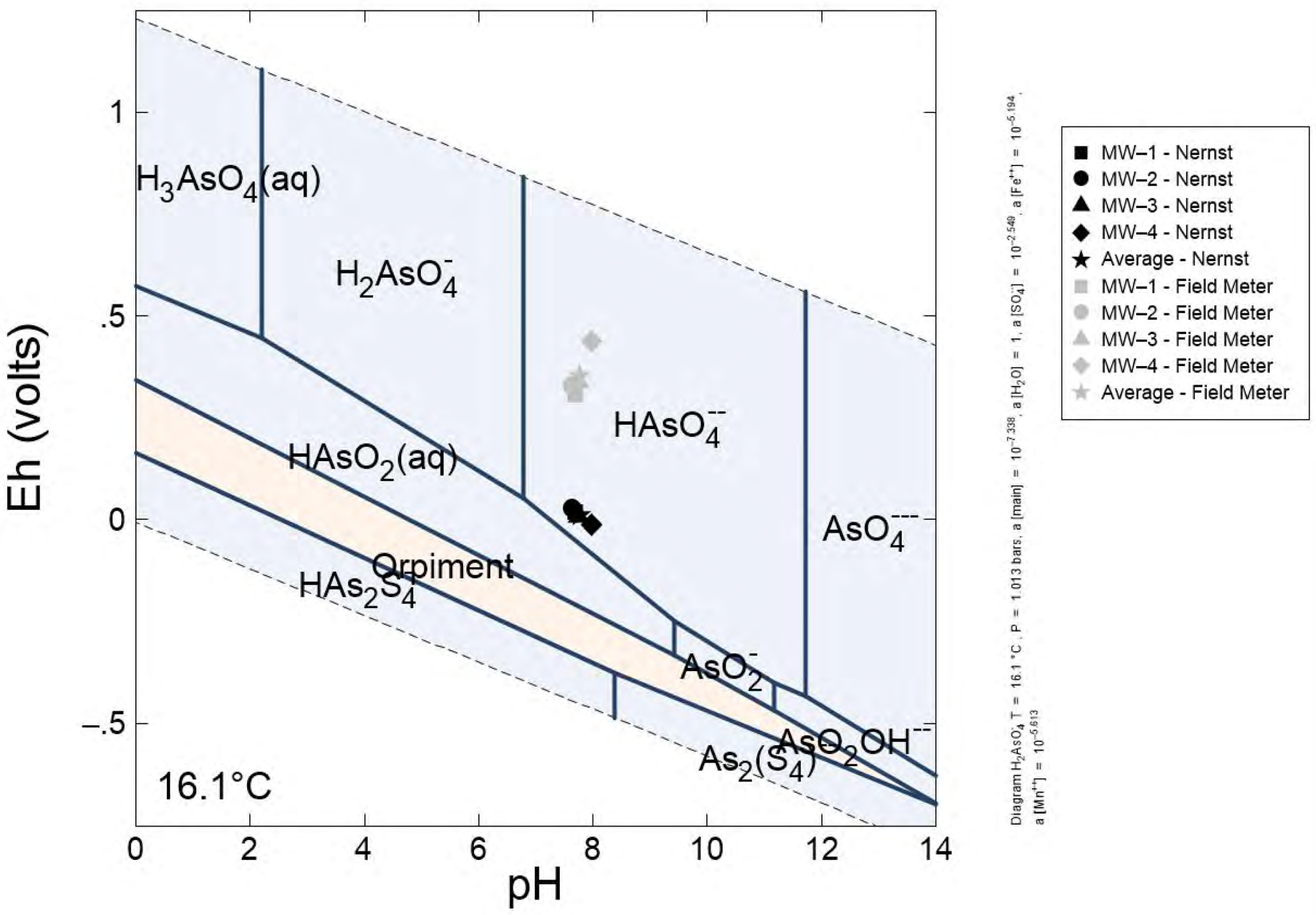
Groundwater Elevation v. ORP
Former Nachurs Alpine Solutions Facility
Sunnyside, Washington

Geosyntec consultants

Figure
1

Project No: PNR0696C

August 2022



Notes: Average groundwater concentrations of parameters included in baseline monitoring from on-site monitoring wells were used to establish baseline conditions for the diagram. Calculated Eh values based on Nernst Equation As(III/V) redox couple analytical results are shown in black. Eh values from field ORP measurements are shown in gray.

Arsenic Eh-pH Diagram – Field ORP Measurements vs Calculated Eh Values

Former Nachurs Alpine Solutions Facility
Sunnyside, Washington

Geosyntec consultants

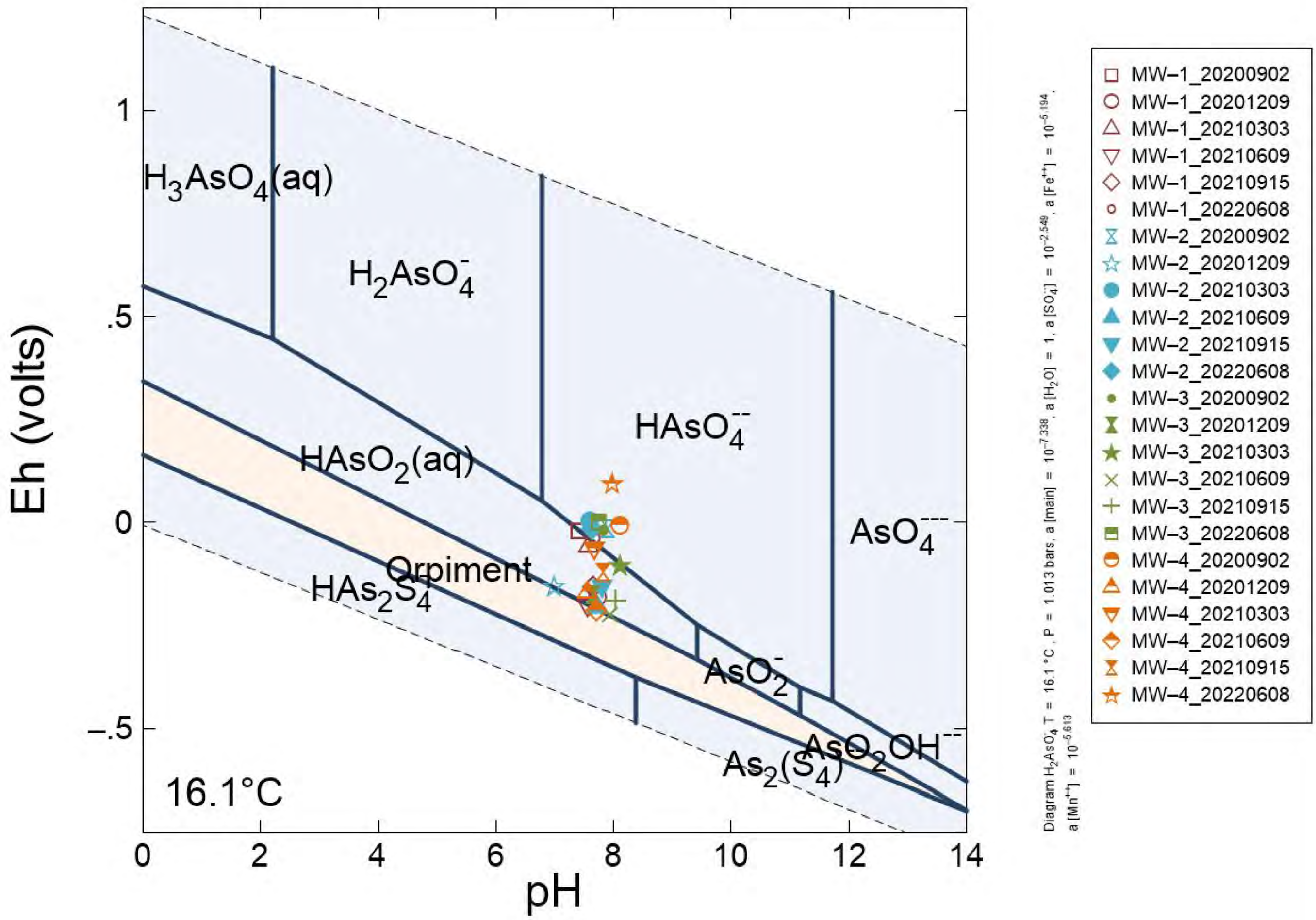
Figure

2

Project No: PNR0696C

August 2022

internal info: path, date revised, author



Notes: Average groundwater concentrations of parameters included in baseline monitoring from on-site monitoring wells sampled in June 2022 were used to establish baseline conditions for the diagram. Eh values of samples from historical sampling events were modified using a calculated 'correction factor' and are plotted on the diagram.

Arsenic Eh-pH Diagram – 'Corrected' Historical Samples

Former Nachurs Alpine Solutions Facility
Sunnyside, Washington

Geosyntec consultants

Project No: PNR0696C

August 2022

Figure

3

internal info: path, date revised, author

ATTACHMENT 1

Baseline Sampling Field Notes

WELL GAUGING DATA

Project # 220608-cm1 Date 6/8/22 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	0948	2	—	—	—	—	2.75	14.79		
MW-2	0944	2	—	—	—	—	4.31	14.94		
MW-3	0941	2	—	—	—	—	5.12	14.91		
MW-4	0938	2	—	—	—	—	5.50	14.92		

LOW FLOW WELL MONITORING DATA SHEET

Project #: 220608-cm1	Client: Geosyntec
Sampler: cm	Gauging Date: 6/8/22
Well I.D.: mw-1	Well Diameter (in.) : [✓ 2] 3 4 6 8 ____
Total Well Depth (ft.) : 14.79	Depth to Water (ft.) : 2.75
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: 1236 Flow Rate: 200mL/min Pump Depth: 8.75 ft

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.)
1239	16.99	7.17	1.410	79	2.27	100.2	600	2.91
1242	16.54	7.70	1.410	75	2.00	105.1	1200	2.98
1245	16.45	7.79	1.425	73	1.83	105.1	1800	2.98
1248	16.26	7.77	1.416	56	1.82	104.6	2400	2.98
1251	16.37	7.73	1.407	48	1.76	103.1	3000	2.98
1254	16.38	7.69	1.403	46	1.80	101.0	3600	2.98
1257	16.36	7.68	1.411	46	1.77	100.5	4200	2.98

Did well dewater? Yes [✓ No]	Amount actually evacuated: 3000 mL
Sampling Time: 1300	Sampling Date: 6/8/22
Sample I.D.: GW-060822-MW-1	Laboratory: ALS
Analyzed for: TPH-G BTEX MTBE TPH-D	[✓ Other:] See COC
Equipment Blank I.D.: @ Time	Duplicate I.D.:

Blaine Tech Services, Inc. 1680 Rogers Ave., San Jose, CA 95112 (408) 573-0555

LOW FLOW WELL MONITORING DATA SHEET

Project #: 220608-cm1
Client: Geosyntec
Sampler: CM
Gauging Date: 6/8/22
Well I.D.: MW-2
Well Diameter (in.) : [✓ 2] 3 4 6 8 ____
Total Well Depth (ft.) : 14.94
Depth to Water (ft.) : 4.31
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: 1158 Flow Rate: 200 mL/min Pump Depth: 9 ft

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.)
1201	16.50	7.59	3.094	11	1.47	125.1	600	4.93
1204	16.17	7.70	3.096	9	1.33	127.1	1200	5.02
1207	16.12	7.67	3.088	9	1.34	126.2	1800	5.05
1210	15.95	7.64	3.101	9	1.33	125.0	2400	5.08
1213	16.00	7.62	3.108	8	1.37	123.0	3000	5.08

Did well dewater? Yes [✓ No]
Amount actually evacuated: 3000 mL
Sampling Time: 1216
Sampling Date: 6/8/22
Sample I.D.: GW-060822-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 #: 220608-cm1	Client: Geosyntec
Sampler: cm	Gauging Date: 6/8/22
Well I.D.: mw-3	Well Diameter (in.) : [✓ 2] 3 4 6 8 ____
Total Well Depth (ft.) : 14.91	Depth to Water (ft.) : 5.12
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: 1119 Flow Rate: 200mL/min Pump Depth: 10 ft

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.)
1122	16.71	7.32	1.197	17	0.97	140.2	600	5.18
1125	16.46	7.95	1.193	12	0.64	143.9	1200	5.18
1128	16.28	7.79	1.185	10	0.53	142.7	1800	5.18
1131	16.37	7.76	1.182	9	0.50	140.1	2400	5.18
1134	16.28	7.69	1.178	9	0.49	137.3	3000	5.18

Did well dewater? Yes [✓ No]	Amount actually evacuated: 3000 mL
Sampling Time: 1137	Sampling Date: 6/8/22
Sample I.D.: GW-060822-mw-3	Laboratory: ALS
Analyzed for: TPH-G BTEX MTBE TPH-D	[✓ Other:] see COC
Equipment Blank I.D.: @ Time	Duplicate I.D.:

Blaine Tech Services, Inc. 1680 Rogers Ave., San Jose, CA 95112 (408) 573-0555

LOW FLOW WELL MONITORING DATA SHEET

Project #: 220608-cm1	Client: Geosyntec
Sampler: cm	Gauging Date: 6/8/22
Well I.D.: MW-4	Well Diameter (in.) : [✓ 2] 3 4 6 8 ____
Total Well Depth (ft.) : 14.92	Depth to Water (ft.) : 5.50
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: 1021 Flow Rate: 200 mL/min Pump Depth: 10 ft

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.)
1024	18.08	6.17	3.770	23	1.33	244.4	600	5.50
1027	17.04	8.24	3.772	29	1.21	247.9	1200	5.50
1030	16.77	8.14	3.779	29	1.16	245.9	1800	5.50
1033	16.87	8.03	3.782	21	1.10	239.7	2400	5.50
1036	16.73	7.96	3.796	21	1.03	233.9	3000	5.50
1039	16.60	7.95	3.795	20	1.15	229.9	3600	5.50

Did well dewater? Yes [✓ No]	Amount actually evacuated: 3600 mL
Sampling Time: 1042	Sampling Date: 6/8/22
Sample I.D.: GW-060822-MW-4	Laboratory: ALS
Analyzed for: TPH-G BTEX MTBE TPH-D	[✓ Other:] See COC
Equipment Blank I.D.: @ Time	Duplicate I.D.: GW-060822-Dup-1

Blaine Tech Services, Inc. 1680 Rogers Ave., San Jose, CA 95112 (408) 573-0555

@1200

ALS

CHAIN OF CUSTODY

SR# ______

1317 South 13th Ave., Kelso, WA 98626 | +1 360 577 7222 | +1 800 695 7222 | +1 360 636 1068 (fax)

PAGE 1 OF 1 COC# ______

PROJECT NAME Sunnyside
PROJECT NUMBER
PROJECT MANAGER Priyam Sharma
COMPANY NAME Geosyntec
ADDRESS 101 N 1st St
CITY/STATE/ZIP Sunnyside, WA
E-MAIL ADDRESS
PHONE # FAX #
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS		Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐ SIM PAH☐	Volatile Organics 624☐ 8260☐ 8021☐ BTEX☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCBs Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐	Chlorophenolics - 8151M Tri☐ /Tetra☐ PCP☐	Metals, Total or Dissolved (See List below)	Cyanide☐ Hex-Chrom☐	(circle) pH, Cond., Cl, SO4, [✓ PO4], F, NO2, [✓ NO3], BOD, TSS, TDS, Turb.	(circle) NH3-N, COD, TKN, TOC, [✓ DOC], NO2+NO3, T-Phos (FF)	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity☐ CO3☐ HCO3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases RSK 175☐ Methane☐ Ethane☐ Ethene☐ CO2☐	Ammonia (SM 4500-NH3 G)	Arsenic Speciation As (III) As(V) EPA 1632		REMARKS
GW-060822-MW-1	6/8/22	1300		GW	7									X		X	X					X	X		
GW-060822-mw-2	↓	1216		↓	7									X		X	X					X	X		
GW-060822-mw-3	↓	1137		↓	7									X		X	X					X	X		
GW-060822-mw-4	↓	1042		↓	7									X		X	X					X	X		
GW-060822-Dup-1	↓	1200		↓	7									X		X	X					X	X		

REPORT REQUIREMENTS

- ___ I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- ___ III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- ___ V. EDD

INVOICE INFORMATION

P.O. # ______
Bill To: ______

TURNAROUND REQUIREMENTS

- ___ 24 hr. ___ 48 hr.
- ___ 5 day
- X Standard (15 working days)
- ___ Provide FAX Results

______ Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al [✓ As] Sb Ba Be B Ca Cd [✓ Co] Cr Cu [✓ Fe] Pb Mg [✓ Mn] [✓ Mo] Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al [✓ As] Sb Ba Be B Ca Cd [✓ Co] Cr Cu [✓ Fe] Pb Mg [✓ Mn] [✓ Mo] Ni K Ag Na Se Sr Tl Sn V Zn Hg

***INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: ______ (CIRCLE ONE)**

SPECIAL INSTRUCTIONS/COMMENTS:

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
	6/8/22 1500	Shipped via FedEx					
Signature	Date/Time	Signature	Date/Time	Signature	Date/Time	Signature	Date/Time
Printed Name	Firm	Printed Name	Firm	Printed Name	Firm	Printed Name	Firm

WELLHEAD INSPECTION FORM

Client: Geosyntec Site: 101 N 1st st, Sunnyside, WA Date: 6/8/22

Job # : 220608-cm1 Technician: cm Page 1 of 1

		Check indicates deficiency													
Well ID	Well Inspected - No Corrective Action Required	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 220608-cm1

EQUIPMENT NAME	EQUIPMENT NUMBER	DATE/TIME OF TEST	STANDARDS USED	EQUIPMENT READING	CALIBRATED TO: OR WITHIN 10%:	TEMP.	INITIALS
YSI-556	0260203	6/8/22 0615	pH 7 10 4	6.92 10.05 4.03	✓	20.0	cm
			cond 3900 orp 237.5 DO 100	3906 236.9 100.7	✓	20.1	cm

PURGE DRUM INVENTORY LOG

CLIENT Geosyntec

SITE ADDRESS 101 N 1st St, Sunnyside, WA

STATUS OF DRUM(S) UPON ARRIVAL							
Number of drum(s) empty:	0						
Number of drum(s) 1/4 full:	0						
Number of drum(s) 1/2 full:	0						
Number of drum(s) 3/4 full:	0						
Number of drum(s) full:	0						
Total drum(s) on site:	0						
STATUS OF DRUM(S) UPON DEPARTURE							
Number of drum(s) empty:	0						
Number of drum(s) 1/4 full:	1						
Number of drum(s) 1/2 full:	0						
Number of drum(s) 3/4 full:	0						
Number of drum(s) full:	0						
Total drum(s) on site:	1						
LOCATION OF DRUM(S)							
Is/Are drum(s) at wellhead(s)?	Yes						
Describe location if drum(s) is/are located elsewhere:	At MW-2 at Post						
Label drum(s) properly:	yes						
FINAL STATUS							
Number of new drum(s) left on site this event:	1						
Date of inspection:	6/8/22						
Logged by BTS Field Technician:	cm						
Office reviewed by:							

ATTACHMENT 2

Baseline Sampling Laboratory Analytical Report

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

June 24, 2022

Analytical Report for Service Request No: K2206281

Samuel Scherer
Geosyntec Consultants
520 Pike St #2600,
Seattle, WA 98101

RE: Sunnyside

Dear Samuel,

Enclosed are the results of the sample(s) submitted to our laboratory June 09, 2022
For your reference, these analyses have been assigned our service request number **K2206281.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at howard.holmes@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Howard Holmes
Project Manager

Table of Contents

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory’s NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
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Chain of Custody

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CHAIN OF CUSTODY

SR# K2206281

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PAGE 1 OF 1 COC#

PROJECT NAME Sunnyside
PROJECT NUMBER
PROJECT MANAGER Priyam Sharma
COMPANY NAME Geosyntec
ADDRESS 101 N 1st St
CITY/STATE/ZIP Sunnyside, WA
E-MAIL ADDRESS
PHONE # FAX #
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS		Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐ SIM PAH☐	Volatile Organics 624☐ 8260☐ 8021☐ BTEX☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCBs Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	Metals, Total or Dissolved (See List below)	Cyanide☐ Hex-Chrom☐	(circle) pH, Cond., Cl, [✓ SO4], [✓ PO4] →ortho, F, NO2, [✓ NO3], BOD, TSS, TDS, Turb.	(circle) NH3-N, COD, TKN, TOC, [✓ DOC], NO2+NO3, T-Phos →as nitrogen (FF)	TOX 9020☐ AOX 1650☐	Alkalinity☐ CO3☐ HCO3☐ 506☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases RSK 175☐ Methane☐ Ethane☐ Ethene☐ CO2☐	Ammonia (SM 4500-NH3 G)	Arsenic speciation As (III) As(V) EPA 1632		REMARKS
GW-060822-MW-1	6/8/22	1300		GW	7									X		X	X					X	X		
GW-060822-mw-2	↓	1216		↓	7									X		X	X					X	X		
GW-060822-mw-3		1137			7									X		X	X					X	X		
GW-060822-mw4		1042			7									X		X	X					X	X		
GW-060822-Dup-1		1200			7									X		X	X					X	X		

REPORT REQUIREMENTS

- ___ I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- ___ III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- ___ V. EDD

INVOICE INFORMATION

P.O. # ______
Bill To: ______

TURNAROUND REQUIREMENTS

- ___ 24 hr. ___ 48 hr.
- ___ 5 day
- X Standard (15 working days)
- ___ Provide FAX Results

______ Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al [✓ As] Sb Ba Be B Ca Cd [✓ Co] Cr Cu [✓ Fe] Pb Mg [✓ Mn] [✓ Mo] Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al [✓ As] Sb Ba Be B Ca Cd [✓ Co] Cr Cu [✓ Fe] Pb Mg [✓ Mn] [✓ Mo] Ni K Ag Na Se Sr Tl Sn V Zn Hg

***INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: ______ (CIRCLE ONE)**

SPECIAL INSTRUCTIONS/COMMENTS:

Container Supply Number

124347

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
	6/8/22 1500	Shipped via FedEx					6/9/22 1000
Signature	Date/Time	Signature	Date/Time	Signature	Date/Time	Signature	Date/Time
						Dalton Hidden	ALS
Printed Name	Firm	Printed Name	Firm	Printed Name	Firm	Printed Name	Firm

PM HH

Cooler Receipt and Preservation Form

Client Geosyntec Service Request K2206281

Received: 6/9/22 Opened: 6/9/22 By: DH Unloaded: 6/9/22 By: DH

1. Samples were received via? USPS [✓ Fed Ex] UPS DHL PDX Courier Hand Delivered
2. Samples were received in: (circle) [✓ Cooler] Box Envelope Other______ NA
3. Were custody seals on coolers? NA [✓ Y] N If yes, how many and where? 1 Front

   If present, were custody seals intact? [✓ Y] N If present, were they signed and dated? [✓ Y] N

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
1.7		IR01				2741 0971 9424	

4. Was a Temperature Blank present in cooler? NA [✓ Y] N If yes, notate the temperature in the appropriate column above:

   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":

5. Were samples received within the method specified temperature ranges? NA [✓ Y] N

   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. [✓ NA] Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

6. Packing material: *Inserts* [✓ *Baggies*] *Bubble Wrap* *Gel Packs* [✓ *Wet Ice*] *Dry Ice* *Sleeves* ______
7. Were custody papers properly filled out (ink, signed, etc.)? NA [✓ Y] N
8. Were samples received in good condition (unbroken) NA [✓ Y] N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA [✓ Y] N
10. Did all sample labels and tags agree with custody papers? NA [✓ Y] N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA [✓ Y] N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA [✓ Y] N
13. Were VOA vials received without headspace? *Indicate in the table below.* [✓ NA] Y N
14. Was C12/Res negative? [✓ NA] Y N
15. Were 100ml sterile microbiology bottles filled exactly to the 100ml mark? [✓ NA] Y N Under filled Overfilled

Sample ID on Bottle	Sample ID on COC	Identified by:

SHORT HOLDTIME

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions:______

:______

General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Analytical Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/8/22
Sample Matrix:	Ground Water	**Date Received:**	06/9/22
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Nitrate as Nitrogen

Sample Name	Lab Code	Result		MRL	Dil.	Date Analyzed	Q
GW-060822-MW-1	K2206281-001	**15.0**		5.0	100	06/10/22 16:20	*
GW-060822-MW-2	K2206281-002	**90**		10	200	06/10/22 16:56	*
GW-060822-MW-3	K2206281-003	**15.2**		2.5	50	06/10/22 17:23	*
GW-060822-MW-4	K2206281-004	**185**		10	200	06/10/22 17:32	*
GW-060822-DUP-1	K2206281-005	**186**		10	200	06/10/22 17:41	*
Method Blank	K2206281-MB1	ND	U	0.050	1	06/10/22 14:56	
Method Blank	K2206281-MB2	ND	U	0.050	1	06/10/22 19:20	
Method Blank	K2206281-MB3	ND	U	0.050	1	06/10/22 23:13	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project	Sunnyside	**Date Collected:**	06/08/22
Sample Matrix:	Ground Water	**Date Received:**	06/09/22
		Date Analyzed:	06/10/22

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	GW-060822-MW-1	**Units:**	mg/L
Lab Code:	K2206281-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample K2206281-001DUP Result	Average	RPD	RPD Limit
Nitrate as Nitrogen	300.0	5.0	15.0	14.8	14.9	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22
Sample Matrix:	Ground Water	**Date Received:**	06/09/22
		Date Analyzed:	06/10/22
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Nitrate as Nitrogen

Sample Name:	GW-060822-MW-1	**Units:**	mg/L
Lab Code:	K2206281-001	**Basis:**	NA
Analysis Method:	300.0		
Prep Method:	None		

		Matrix Spike K2206281-001MS			Duplicate Matrix Spike K2206281-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate as Nitrogen	15.0	201	200	93	201	200	93	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Analyzed:**	06/10/22
Sample Matrix:	Ground Water	**Date Extracted:**	NA

Lab Control Sample Summary
Nitrate as Nitrogen

Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	767076

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K2206281-LCS1	2.41	2.50	96	90-110
Lab Control Sample	K2206281-LCS2	2.40	2.50	96	90-110
Lab Control Sample	K2206281-LCS3	2.40	2.50	96	90-110

Analytical Report

Client: Geosyntec Consultants
Project: Sunnyside
Sample Matrix: Ground Water
Service Request: K2206281
Date Collected: 06/8/22
Date Received: 06/9/22

Analysis Method: 300.0
Prep Method: None
Units: mg/L
Basis: NA

Sulfate

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
GW-060822-MW-1	K2206281-001	**229**	10	100	06/10/22 16:20	
GW-060822-MW-2	K2206281-002	**584**	20	200	06/10/22 16:56	
GW-060822-MW-3	K2206281-003	**131**	5.0	50	06/10/22 17:23	
GW-060822-MW-4	K2206281-004	**667**	20	200	06/10/22 17:32	
GW-060822-DUP-1	K2206281-005	**674**	20	200	06/10/22 17:41	
Method Blank	K2206281-MB1	ND U	0.10	1	06/10/22 14:56	
Method Blank	K2206281-MB2	ND U	0.10	1	06/10/22 19:20	
Method Blank	K2206281-MB3	ND U	0.10	1	06/10/22 23:13	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project	Sunnyside	**Date Collected:**	06/08/22
Sample Matrix:	Ground Water	**Date Received:**	06/09/22
		Date Analyzed:	06/10/22

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	GW-060822-MW-1	**Units:**	mg/L
Lab Code:	K2206281-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample K2206281-001DUP Result	Average	RPD	RPD Limit
Sulfate	300.0	10	229	227	228	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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Superset Reference:22-0000630008 rev 00

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22
Sample Matrix:	Ground Water	**Date Received:**	06/09/22
		Date Analyzed:	06/10/22
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Sulfate

Sample Name:	GW-060822-MW-1	**Units:**	mg/L
Lab Code:	K2206281-001	**Basis:**	NA
Analysis Method:	300.0		
Prep Method:	None		

		Matrix Spike K2206281-001MS			**Duplicate Matrix Spike** K2206281-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Sulfate	229	609	400	95	613	400	96	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Analyzed:**	06/10/22
Sample Matrix:	Ground Water	**Date Extracted:**	NA

Lab Control Sample Summary
Sulfate

Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	767076

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K2206281-LCS1	4.77	5.00	95	90-110
Lab Control Sample	K2206281-LCS2	4.77	5.00	95	90-110
Lab Control Sample	K2206281-LCS3	4.76	5.00	95	90-110

Analytical Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/8/22
Sample Matrix:	Ground Water	**Date Received:**	06/9/22
Analysis Method:	SM 4500-NH3 G	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA

Ammonia as Nitrogen

Sample Name	Lab Code	Result		MRL	Dil.	Date Analyzed	Date Extracted	Q
GW-060822-MW-1	K2206281-001	ND	U	0.050	1	06/13/22 11:37	6/13/22	
GW-060822-MW-2	K2206281-002	**2.24**		0.10	2	06/13/22 11:37	6/13/22	
GW-060822-MW-3	K2206281-003	ND	U	0.050	1	06/13/22 11:37	6/13/22	
GW-060822-MW-4	K2206281-004	ND	U	0.050	1	06/13/22 11:37	6/13/22	
GW-060822-DUP-1	K2206281-005	ND	U	0.050	1	06/13/22 11:37	6/13/22	
Method Blank	K2206281-MB1	ND	U	0.050	1	06/13/22 11:37	6/13/22	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Analyzed:**	06/13/22
Sample Matrix:	Ground Water	**Date Extracted:**	06/13/22

Lab Control Sample Summary
Ammonia as Nitrogen

Analysis Method:	SM 4500-NH3 G	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA
		Analysis Lot:	767298

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K2206281-LCS1	4.46	4.58	97	86-114

Analytical Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/8/22
Sample Matrix:	Ground Water	**Date Received:**	06/9/22
Analysis Method:	SM 4500-P E	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Orthophosphate as Phosphorus

Sample Name	Lab Code	Result		MRL	MDL	Dil.	Date Analyzed	Q
GW-060822-MW-1	K2206281-001	**0.094**		0.050	0.020	1	06/09/22 04:20	
GW-060822-MW-2	K2206281-002	**9.5**		1.3	0.5	25	06/09/22 04:20	
GW-060822-MW-3	K2206281-003	**0.313**		0.050	0.020	1	06/09/22 04:20	
GW-060822-MW-4	K2206281-004	**0.314**		0.050	0.020	1	06/09/22 04:20	
GW-060822-DUP-1	K2206281-005	**0.307**		0.050	0.020	1	06/09/22 04:20	
Method Blank	K2206281-MB1	ND	U	0.050	0.020	1	06/09/22 04:20	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project	Sunnyside	**Date Collected:**	06/08/22
Sample Matrix:	Ground Water	**Date Received:**	06/09/22
		Date Analyzed:	06/09/22

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	GW-060822-MW-1	**Units:**	mg/L
Lab Code:	K2206281-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K2206281-001DUP Result	Average	RPD	RPD Limit
Orthophosphate as Phosphorus	SM 4500-P E	0.050	0.020	0.094	0.092	0.0930	2	20

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Client:	Geosyntec Consultants		**Service Request:**	K2206281
Project:	Sunnyside		**Date Collected:**	06/08/22
Sample Matrix:	Ground Water		**Date Received:**	06/09/22
			Date Analyzed:	06/9/22
			Date Extracted:	NA

Duplicate Matrix Spike Summary
Orthophosphate as Phosphorus

Sample Name:	GW-060822-MW-1		**Units:**	mg/L
Lab Code:	K2206281-001		**Basis:**	NA
Analysis Method:	SM 4500-P E			
Prep Method:	None			

		Matrix Spike K2206281-001MS			**Duplicate Matrix Spike** K2206281-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Orthophosphate as Phosphorus	0.094	2.16	2.00	103	2.24	2.00	107	75-125	4	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Analyzed:**	06/09/22
Sample Matrix:	Ground Water	**Date Extracted:**	NA

Lab Control Sample Summary
Orthophosphate as Phosphorus

Analysis Method:	SM 4500-P E	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	767227

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K2206281-LCS1	1.69	1.57	108	85-115
Lab Control Sample	K2206281-LCS2	1.68	1.57	107	85-115

Analytical Report

Client: Geosyntec Consultants
Project: Sunnyside
Sample Matrix: Ground Water
Service Request: K2206281
Date Collected: 06/8/22
Date Received: 06/9/22

Analysis Method: SM 5310 C
Prep Method: None
Units: mg/L
Basis: NA

Carbon, Dissolved Organic (DOC)

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
GW-060822-MW-1	K2206281-001	**3.20**	0.50	1	06/20/22 14:59	
GW-060822-MW-2	K2206281-002	**5.80**	0.50	1	06/20/22 14:59	
GW-060822-MW-3	K2206281-003	**2.90**	0.50	1	06/20/22 14:59	
GW-060822-MW-4	K2206281-004	**7.40**	0.50	1	06/20/22 14:59	
GW-060822-DUP-1	K2206281-005	**7.30**	0.50	1	06/20/22 14:59	
Method Blank	K2206281-MB1	ND U	0.50	1	06/20/22 14:59	
Method Blank	K2206281-MB2	ND U	0.50	1	06/20/22 14:59	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Analyzed:**	06/20/22
Sample Matrix:	Ground Water	**Date Extracted:**	NA

Lab Control Sample Summary
Carbon, Dissolved Organic (DOC)

Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	768029

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K2206281-LCS1	25.4	25.0	102	83-117
Lab Control Sample	K2206281-LCS2	24.9	25.0	100	83-117

Metals

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Client: Geosyntec Consultants
Project: Sunnyside
Sample Matrix: Ground water

Service Request: K2206281
Date Collected: 6/8/2022
Date Received: 6/9/2022

Total Metals

Sample Name: GW-060822-MW-1
Lab Code: K2206281-001
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MDL**	**Dilution Factor**	**Date Extracted**	**Date Analyzed**	**Result**	**Result Notes**
Arsenic (III)	None	1632A	0.02	0.003	1	NA	6/14/2022	0.007	J
Arsenic (V)	None	1632A	0.4	0.06	20	NA	NA	6.50	
Inorganic Arsenic	None	1632A	0.4	0.06	20	NA	6/13/2022	6.50	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	6/8/2022
Sample Matrix:	Ground water	**Date Received:**	6/9/2022

Total Metals

Sample Name:	GW-060822-MW-2	Units:	ug/L (ppb)
Lab Code:	K2206281-002	Basis:	NA
Test Notes:			

Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MDL**	**Dilution Factor**	**Date Extracted**	**Date Analyzed**	**Result**	**Result Notes**
Arsenic (III)	None	1632A	0.02	0.003	1	NA	6/14/2022	0.088	
Arsenic (V)	None	1632A	4.0	0.6	200	NA	NA	43.7	
Inorganic Arsenic	None	1632A	4.0	0.6	200	NA	6/13/2022	43.8	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	6/8/2022
Sample Matrix:	Ground water	**Date Received:**	6/9/2022

Total Metals

Sample Name:	GW-060822-MW-3	Units:	ug/L (ppb)
Lab Code:	K2206281-003	Basis:	NA
Test Notes:			

Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MDL**	**Dilution Factor**	**Date Extracted**	**Date Analyzed**	**Result**	**Result Notes**
Arsenic (III)	None	1632A	0.02	0.003	1	NA	6/14/2022	0.160	
Arsenic (V)	None	1632A	4.0	0.6	200	NA	NA	46.2	
Inorganic Arsenic	None	1632A	4.0	0.6	200	NA	6/13/2022	46.4	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	6/8/2022
Sample Matrix:	Ground water	**Date Received:**	6/9/2022

Total Metals

Sample Name:	GW-060822-MW-4	Units:	ug/L (ppb)
Lab Code:	K2206281-004	Basis:	NA
Test Notes:			

Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MDL**	**Dilution Factor**	**Date Extracted**	**Date Analyzed**	**Result**	**Result Notes**
Arsenic (III)	None	1632A	0.02	0.003	1	NA	6/14/2022	0.079	
Arsenic (V)	None	1632A	2.0	0.3	100	NA	NA	38.4	
Inorganic Arsenic	None	1632A	2.0	0.3	100	NA	6/13/2022	38.5	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	6/8/2022
Sample Matrix:	Ground water	**Date Received:**	6/9/2022

Total Metals

Sample Name:	GW-060822-DUP-1	Units:	ug/L (ppb)
Lab Code:	K2206281-005	Basis:	NA
Test Notes:			

Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MDL**	**Dilution Factor**	**Date Extracted**	**Date Analyzed**	**Result**	**Result Notes**
Arsenic (III)	None	1632A	0.02	0.003	1	NA	6/14/2022	0.118	
Arsenic (V)	None	1632A	2.0	0.3	100	NA	NA	35.5	
Inorganic Arsenic	None	1632A	2.0	0.3	100	NA	6/13/2022	35.6	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	6/8/2022
Sample Matrix:	Ground water	**Date Received:**	6/9/2022

Total Metals

Sample Name:	Method Blank 1	Units:	ug/L (ppb)
Lab Code:	K2206281-MB1	Basis:	NA
Test Notes:			

Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MDL**	**Dilution Factor**	**Date Extracted**	**Date Analyzed**	**Result**	**Result Notes**
Arsenic (III)	None	1632A	0.02	0.003	1	NA	6/14/2022	0.011	J
Inorganic Arsenic	None	1632A	0.02	0.003	1	NA	6/13/2022	ND	

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Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	6/8/2022
Sample Matrix:	Ground water	**Date Received:**	6/9/2022

Total Metals

Sample Name:	Method Blank 2	Units:	ug/L (ppb)
Lab Code:	K2206281-MB2	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632A	0.02	0.003	1	NA	6/14/2022	ND	
Inorganic Arsenic	None	1632A	0.02	0.003	1	NA	6/13/2022	ND	

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Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	6/8/2022
Sample Matrix:	Ground water	**Date Received:**	6/9/2022

Total Metals

Sample Name:	Method Blank 3	Units:	ug/L (ppb)
Lab Code:	K2206281-MB3	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632A	0.02	0.003	1	NA	6/14/2022	0.004	J
Inorganic Arsenic	None	1632A	0.02	0.003	1	NA	6/13/2022	0.006	J

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Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	6/8/2022
Sample Matrix:	Ground water	**Date Received:**	6/9/2022

Total Metals

Sample Name:	Method Blank 4	Units:	ug/L (ppb)
Lab Code:	K2206281-MB4	Basis:	NA
Test Notes:			

Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MDL**	**Dilution Factor**	**Date Extracted**	**Date Analyzed**	**Result**	**Result Notes**
Arsenic (III)	None	1632A	0.02	0.003	1	NA	6/14/2022	0.012	J
Inorganic Arsenic	None	1632A	0.02	0.003	1	NA	6/13/2022	ND	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	6/8/2022
Sample Matrix:	Ground water	**Date Received:**	6/9/2022

Total Metals

Sample Name:	Method Blank 5	Units:	ug/L (ppb)
Lab Code:	K2206281-MB5	Basis:	NA
Test Notes:			

Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MDL**	**Dilution Factor**	**Date Extracted**	**Date Analyzed**	**Result**	**Result Notes**
Arsenic (III)	None	1632A	0.02	0.003	1	NA	6/14/2022	0.006	J
Inorganic Arsenic	None	1632A	0.02	0.003	1	NA	6/13/2022	ND	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	06/13-06/14/2022

Calibration Verification (CALVER) Sample Summary
Total Metals

Sample Name: CALVER 1

Units: ug/L (ppb)
Basis: NA

Test Notes:

Analyte	**Prep Method**	**Analysis Method**	**True Value**	**Result**	**Percent Recovery**	**ALS Percent Recovery Acceptance Limits**	**Result Notes**
Arsenic (III)	None	1632A	0.20	0.226	113	70-130	
Inorganic Arsenic	None	1632A	0.20	0.192	96	80-120	

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QA/QC Report

Client: Geosyntec Consultants
Project: Sunnyside
LCS Matrix: Water

Service Request: K2206281
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 06/13-06/14/2022

Calibration Verification (CALVER) Sample Summary
Total Metals

Sample Name: CALVER 2

Units: ug/L (ppb)
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Arsenic (III)	None	1632A	0.20	0.219	110	70-130	
Inorganic Arsenic	None	1632A	0.20	0.179	89	80-120	

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QA/QC Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	06/13-06/14/2022

Calibration Verification (CALVER) Sample Summary
Total Metals

Sample Name: CALVER 3

Units: ug/L (ppb)

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Arsenic (III)	None	1632A	0.20	0.224	112	70-130	
Inorganic Arsenic	None	1632A	0.20	0.186	93	80-120	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	06/13-06/14/2022

Calibration Verification (CALVER) Sample Summary
Total Metals

Sample Name:	CALVER 4	Units:	ug/L (ppb)
		Basis:	NA

Test Notes:

Analyte	**Prep Method**	**Analysis Method**	**True Value**	**Result**	**Percent Recovery**	**ALS Percent Recovery Acceptance Limits**	**Result Notes**
Arsenic (III)	None	1632A	0.20	0.226	113	70-130	
Inorganic Arsenic	None	1632A	0.20	0.196	98	80-120	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22 13:00
Sample Matrix:	Ground Water	**Date Received:**	06/09/22 10:00
Sample Name:	GW-060822-MW-1	**Basis:**	NA
Lab Code:	K2206281-001		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**9.71**	ug/L	0.50	0.09	1	06/13/22 14:26	06/13/22	
Cobalt	200.8	**0.067**	ug/L	0.020	0.009	1	06/13/22 14:26	06/13/22	
Iron	200.8	**2.2**	ug/L	2.0	0.3	1	06/13/22 14:26	06/13/22	
Manganese	200.8	**2.09**	ug/L	0.20	0.04	1	06/13/22 14:26	06/13/22	
Molybdenum	200.8	**26.5**	ug/L	0.10	0.03	1	06/13/22 14:26	06/13/22	

Analytical Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22 13:00
Sample Matrix:	Ground Water	**Date Received:**	06/09/22 10:00
Sample Name:	GW-060822-MW-1	**Basis:**	NA
Lab Code:	K2206281-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**11.2**	ug/L	0.50	0.09	1	06/13/22 14:10	06/13/22	
Cobalt	200.8	**0.825**	ug/L	0.020	0.009	1	06/13/22 14:10	06/13/22	
Iron	200.8	**1340**	ug/L	2.0	0.3	1	06/13/22 14:10	06/13/22	
Manganese	200.8	**295**	ug/L	0.20	0.04	1	06/13/22 14:10	06/13/22	
Molybdenum	200.8	**28.0**	ug/L	0.10	0.03	1	06/13/22 14:10	06/13/22	

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Analytical Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22 12:16
Sample Matrix:	Ground Water	**Date Received:**	06/09/22 10:00
Sample Name:	GW-060822-MW-2	**Basis:**	NA
Lab Code:	K2206281-002		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**67.3**	ug/L	0.50	0.09	1	06/13/22 14:28	06/13/22	
Cobalt	200.8	**9.10**	ug/L	0.020	0.009	1	06/13/22 14:28	06/13/22	
Iron	200.8	**11.9**	ug/L	2.0	0.3	1	06/13/22 14:28	06/13/22	
Manganese	200.8	**182**	ug/L	0.20	0.04	1	06/13/22 14:28	06/13/22	
Molybdenum	200.8	**36.0**	ug/L	0.10	0.03	1	06/13/22 14:28	06/13/22	

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Superset Reference:

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22 12:16
Sample Matrix:	Ground Water	**Date Received:**	06/09/22 10:00
Sample Name:	GW-060822-MW-2	**Basis:**	NA
Lab Code:	K2206281-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**70.0**	ug/L	0.50	0.09	1	06/13/22 14:15	06/13/22	
Cobalt	200.8	**9.56**	ug/L	0.020	0.009	1	06/13/22 14:15	06/13/22	
Iron	200.8	**156**	ug/L	2.0	0.3	1	06/13/22 14:15	06/13/22	
Manganese	200.8	**237**	ug/L	0.20	0.04	1	06/13/22 14:15	06/13/22	
Molybdenum	200.8	**37.9**	ug/L	0.10	0.03	1	06/13/22 14:15	06/13/22	

Analytical Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22 11:37
Sample Matrix:	Ground Water	**Date Received:**	06/09/22 10:00
Sample Name:	GW-060822-MW-3	**Basis:**	NA
Lab Code:	K2206281-003		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**72.8**	ug/L	0.50	0.09	1	06/13/22 14:30	06/13/22	
Cobalt	200.8	**0.325**	ug/L	0.020	0.009	1	06/13/22 14:30	06/13/22	
Iron	200.8	**30.1**	ug/L	2.0	0.3	1	06/13/22 14:30	06/13/22	
Manganese	200.8	**173**	ug/L	0.20	0.04	1	06/13/22 14:30	06/13/22	
Molybdenum	200.8	**34.4**	ug/L	0.10	0.03	1	06/13/22 14:30	06/13/22	

Analytical Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22 11:37
Sample Matrix:	Ground Water	**Date Received:**	06/09/22 10:00
Sample Name:	GW-060822-MW-3	**Basis:**	NA
Lab Code:	K2206281-003		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**72.0**	ug/L	0.50	0.09	1	06/13/22 14:17	06/13/22	
Cobalt	200.8	**0.662**	ug/L	0.020	0.009	1	06/13/22 14:17	06/13/22	
Iron	200.8	**127**	ug/L	2.0	0.3	1	06/13/22 14:17	06/13/22	
Manganese	200.8	**597**	ug/L	0.20	0.04	1	06/13/22 14:17	06/13/22	
Molybdenum	200.8	**32.8**	ug/L	0.10	0.03	1	06/13/22 14:17	06/13/22	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22 10:42
Sample Matrix:	Ground Water	**Date Received:**	06/09/22 10:00
Sample Name:	GW-060822-MW-4	**Basis:**	NA
Lab Code:	K2206281-004		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**59.0**	ug/L	0.50	0.09	1	06/13/22 14:32	06/13/22	
Cobalt	200.8	**18.3**	ug/L	0.020	0.009	1	06/13/22 14:32	06/13/22	
Iron	200.8	**33.6**	ug/L	2.0	0.3	1	06/13/22 14:32	06/13/22	
Manganese	200.8	**203**	ug/L	0.20	0.04	1	06/13/22 14:32	06/13/22	
Molybdenum	200.8	**135**	ug/L	0.10	0.03	1	06/13/22 14:32	06/13/22	

Analytical Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22 10:42
Sample Matrix:	Ground Water	**Date Received:**	06/09/22 10:00
Sample Name:	GW-060822-MW-4	**Basis:**	NA
Lab Code:	K2206281-004		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**58.3**	ug/L	0.50	0.09	1	06/13/22 14:19	06/13/22	
Cobalt	200.8	**18.8**	ug/L	0.020	0.009	1	06/13/22 14:19	06/13/22	
Iron	200.8	**458**	ug/L	2.0	0.3	1	06/13/22 14:19	06/13/22	
Manganese	200.8	**237**	ug/L	0.20	0.04	1	06/13/22 14:19	06/13/22	
Molybdenum	200.8	**133**	ug/L	0.10	0.03	1	06/13/22 14:19	06/13/22	

Analytical Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22 12:00
Sample Matrix:	Ground Water	**Date Received:**	06/09/22 10:00
Sample Name:	GW-060822-DUP-1	**Basis:**	NA
Lab Code:	K2206281-005		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**60.0**	ug/L	0.50	0.09	1	06/13/22 14:34	06/13/22	
Cobalt	200.8	**18.1**	ug/L	0.020	0.009	1	06/13/22 14:34	06/13/22	
Iron	200.8	**29.0**	ug/L	2.0	0.3	1	06/13/22 14:34	06/13/22	
Manganese	200.8	**201**	ug/L	0.20	0.04	1	06/13/22 14:34	06/13/22	
Molybdenum	200.8	**136**	ug/L	0.10	0.03	1	06/13/22 14:34	06/13/22	

Analytical Report

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project:	Sunnyside	**Date Collected:**	06/08/22 12:00
Sample Matrix:	Ground Water	**Date Received:**	06/09/22 10:00
Sample Name:	GW-060822-DUP-1	**Basis:**	NA
Lab Code:	K2206281-005		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**58.5**	ug/L	0.50	0.09	1	06/13/22 14:21	06/13/22	
Cobalt	200.8	**18.8**	ug/L	0.020	0.009	1	06/13/22 14:21	06/13/22	
Iron	200.8	**278**	ug/L	2.0	0.3	1	06/13/22 14:21	06/13/22	
Manganese	200.8	**233**	ug/L	0.20	0.04	1	06/13/22 14:21	06/13/22	
Molybdenum	200.8	**135**	ug/L	0.10	0.03	1	06/13/22 14:21	06/13/22	

Client: Geosyntec Consultants
Project: Sunnyside
Sample Matrix: Ground Water

Service Request: K2206281
Date Collected: NA
Date Received: NA

Sample Name: Method Blank
Lab Code: KQ2209551-01

Basis: NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.09	1	06/13/22 14:04	06/13/22	
Cobalt	200.8	ND U	ug/L	0.020	0.009	1	06/13/22 14:04	06/13/22	
Iron	200.8	ND U	ug/L	2.0	0.3	1	06/13/22 14:04	06/13/22	
Manganese	200.8	ND U	ug/L	0.20	0.04	1	06/13/22 14:04	06/13/22	
Molybdenum	200.8	ND U	ug/L	0.10	0.03	1	06/13/22 14:04	06/13/22	

Client:	Geosyntec Consultants	**Service Request:**	K2206281
Project	Sunnyside	**Date Collected:**	06/08/22
Sample Matrix:	Ground Water	**Date Received:**	06/09/22
		Date Analyzed:	06/13/22

Replicate Sample Summary
Total Metals

Sample Name:	GW-060822-MW-1	**Units:**	ug/L
Lab Code:	K2206281-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2209551-03 Result	Average	RPD	RPD Limit
Arsenic	200.8	0.50	0.09	11.2	11.5	11.4	3	20
Cobalt	200.8	0.020	0.009	0.825	0.828	0.827	<1	20
Iron	200.8	2.0	0.3	1340	1340	1340	<1	20
Manganese	200.8	0.20	0.04	295	294	295	<1	20
Molybdenum	200.8	0.10	0.03	28.0	29.1	28.6	4	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Geosyntec Consultants
Project: Sunnyside
Sample Matrix: Ground Water

Service Request: K2206281
Date Collected: 06/08/22
Date Received: 06/09/22
Date Analyzed: 06/13/22
Date Extracted: 06/13/22

Matrix Spike Summary
Total Metals

Sample Name: GW-060822-MW-1
Lab Code: K2206281-001
Analysis Method: 200.8
Prep Method: EPA CLP ILM04.0

Units: ug/L
Basis: NA

Matrix Spike
KQ2209551-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	11.2	60.0	50.0	98	70-130
Cobalt	0.825	24.3	25.0	94	70-130
Iron	1340	1310	50.0	-56 #	70-130
Manganese	295	305	25.0	39 #	70-130
Molybdenum	28.0	52.4	25.0	98	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Client: Geosyntec Consultants
Project: Sunnyside
Sample Matrix: Ground Water

Service Request: K2206281
Date Analyzed: 06/13/22

Lab Control Sample Summary
Total Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ2209551-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	200.8	50.1	50.0	100	85-115
Cobalt	200.8	25.1	25.0	100	85-115
Iron	200.8	46.4	50.0	93	85-115
Manganese	200.8	25.3	25.0	101	85-115
Molybdenum	200.8	25.5	25.0	102	85-115

APPENDIX E

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.

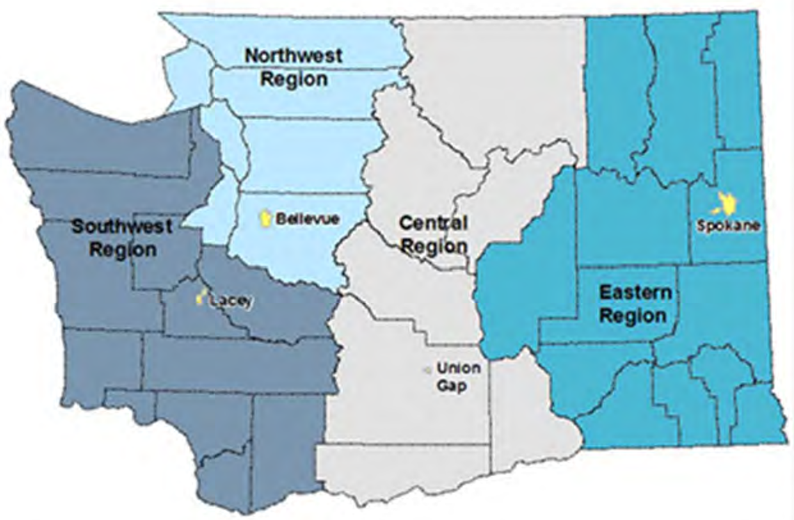
5. Have you already obtained Ecology's approval of both your problem formulation and problem resolution steps?

☐ 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

APPENDIX F

Corrective Action Engineering Design and Implementation Work Plan

Geosyntec
consultants

engineers | scientists | innovators

APPENDIX F
CORRECTIVE ACTION ENGINEERING DESIGN AND IMPLEMENTATION WORK PLAN

FORMER NACHURS ALPINE SOLUTIONS FACILITY SUNNYSIDE, WASHINGTON

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: PNR0696C

September 23, 2022

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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
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 metals attenuation.

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. 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 E 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. 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).

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

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 under neutral pH conditions.

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[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.

Based on analysis of the baseline sampling and arsenic speciation results, collected by Geosyntec in June 2022, Geosyntec's model predicts that concentrations of dissolved arsenic will remain similar after electron donor injections. Arsenic concentrations in the dissolved phase are expected to sorb to existing iron and manganese compounds following reduction of electron donors and nitrate in the groundwater and reoxidation of groundwater at the Site. Therefore, the planned remedy is first focused on the reduction of nitrate utilizing electron donor amendments, followed by precipitation of arsenic over time. Evaluation of the baseline sampling and arsenic speciation results are presented in Appendix D.

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] Safety Data Sheets (SDS) 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 approach, the target quantity of Wilclear® sodium lactate product for injections is approximately 207 gallons.

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

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 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 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. 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. IDW will be profiled, transported, and disposed of at an appropriate off-site facility.

5. GROUNDWATER COMPLIANCE MONITORING PLANS

Baseline groundwater samples were collected from the four monitoring wells in June 2022. 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 dissolved organic carbon by SIM5310C 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 metals in groundwater samples are observed and sustained following injections, then the injection of other amendments may be used, depending on the specific metals and concentrations relative to screening levels. 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 injections in October 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]	Dissolved 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 the first three months following injections. 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.

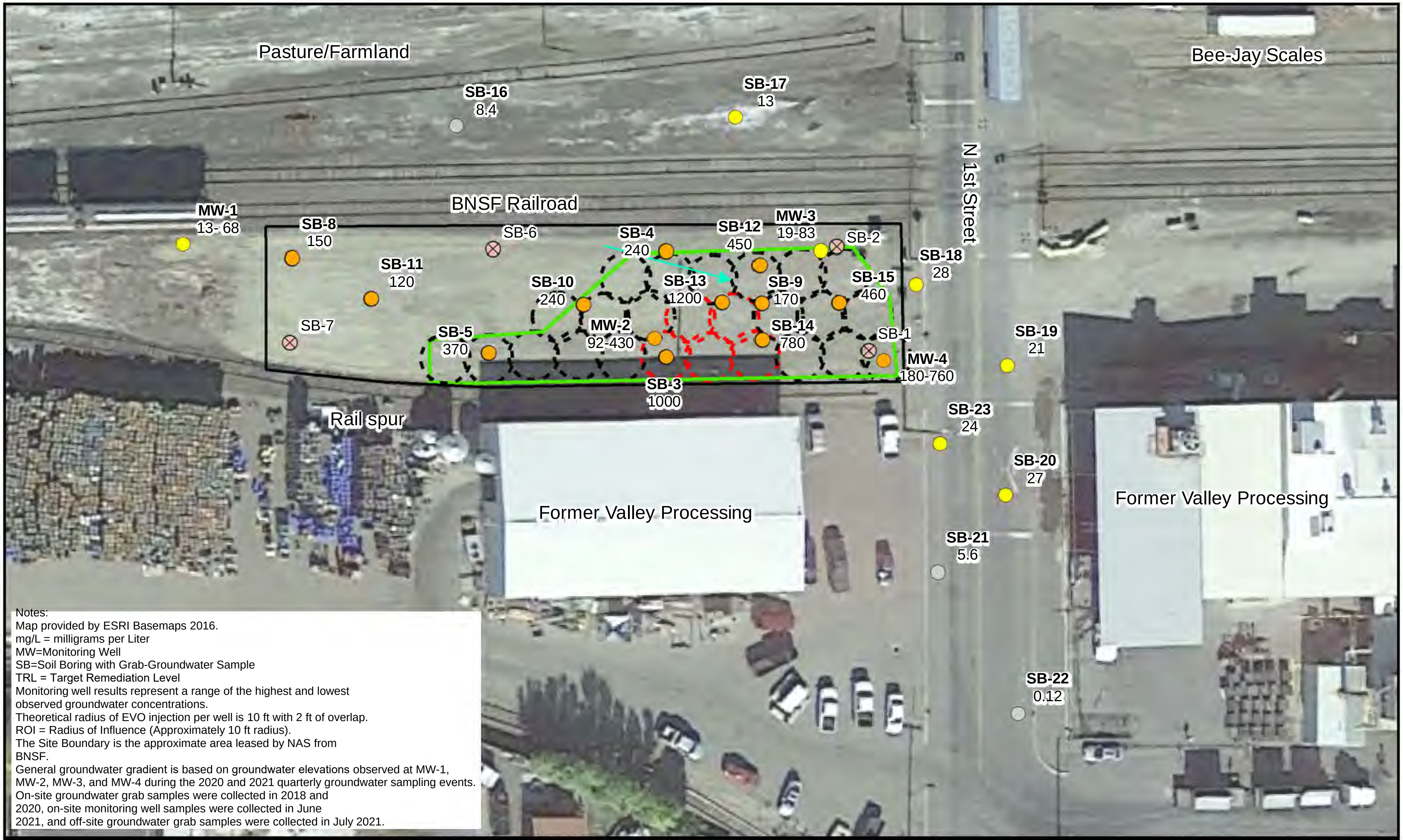
[4] Sulfate will be analyzed by EPA method 300.0.

[5] Dissolved 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



Notes:
Map provided by ESRI Basemaps 2016.
mg/L = milligrams per Liter
MW=Monitoring Well
SB=Soil Boring with Grab-Groundwater Sample
TRL = Target Remediation Level
Monitoring well results represent a range of the highest and lowest observed groundwater concentrations.
Theoretical radius of EVO injection per well is 10 ft with 2 ft of overlap.
ROI = Radius of Influence (Approximately 10 ft radius).
The Site Boundary is the approximate area leased by NAS from BNSF.
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.
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 - 48 mg/L (TRL)
- ● >48 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

PNR0696C August 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 Safety Data Sheets

SAFETY DATA SHEET
EDS-QR™

Revision Date: 2021-02-16
Version 1.1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name: EDS-QR™, Electron Donor Solution – Quick Release

Synonyms: 1,2,3-Propanetriol, Glycerol, Glycerine

Trade Name: Refined Glycerin 99.7% min purity

Product Form: Substance

Recommended use of the chemical and restrictions on use

Recommended Use:	Remediation of contaminated groundwater and soils.
Identified Uses:	Raw material for manufacturing oleochemical derivatives; used in synthesis and as a solvent.
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)
+1-919-638-7892 Gary M. Birk (Outside office hours)

2. HAZARD IDENTIFICATION

Relevant identified uses of the substance or mixture

No applicable GHS categories. Not a hazardous substance or mixture. This product is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Other hazards

None known.

GHS Label elements

None

Potential Health Effects
Can be irritating to the eyes.
Can be harmful if ingested.
Can be harmful if inhaled. Avoid breathing mist.
Can be irritating to the skin.

Other Non-GHS Classification

NFPA 704

NFPA Scale (0 - 4)

HMIS® IV

Health	1
Flammability	1
Physical Hazard	0
Personal Protection	X

HMIS® Ratings (0 – 4)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance	Glycerin
Chemical Formula	$C_3H_8O_3$

Chemical Name	CAS number	EC number	Concentration (%)	EU Classification	GHS Classification
Glycerin	56-81-5	200-289-5	99.7% min.	Not Classified	Not Classified

Impurities and Stabilizing Additives
There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and require reporting in this section.

Synonyms are provided in Section 1.
Occupational exposure limits, if available, are listed in Section 8.

4. FIRST AID MEASURES

General Information	Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). Take care to self-protect by avoiding becoming contaminated.
Eye Contact	Promptly wash eye with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes and get medical attention. Do not apply (chemical) neutralizing agents. In case of eye irritation consult an ophthalmologist. Remove any contact lenses and open eyelids wide apart.
Skin Contact	Wash off promptly and flush contaminated skin with water. Promptly remove clothing of soaked through and flush skin with water. Get medical attention if irritation persists after washing. Do not apply (chemical) neutralizing agents.
Inhalation	Move the exposed person to fresh air at once. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Perform artificial respiration if breathing has stopped. Keep the affected person warm and at rest. Get prompt medical attention.

Ingestion	Drink plenty of water. DO NOT induce vomiting. Get medical attention immediately. Never give anything by mouth to an unconscious person.	
Most important symptoms and effects, both acute and delayed	Symptoms/injuries after skin contact Symptoms/injuries after eye contact	Causes skin irritation Eye damage / irritation
Indication of any immediate medical attention and special treatment needed	If exposed or concerned, get medical advice and attention.	

Description of First Aid Measures

First-aid measures after inhalation: Remove the victim into fresh air. If signs/symptoms continue, get medical attention. Give oxygen or artificial respiration as needed.
First-aid measures after skin contact: Wash immediately with lots of water (15 minutes)/shower. Soap may be used. Remove clothing before washing.
First-aid measures after eye contact: Rinse immediately with plenty of water for 15 minutes. Take victim to an ophthalmologist if irritation persists.
First-aid measures after ingestion: DO NOT induce vomiting. If vomiting does occur, have victim lean forward to prevent aspiration. Rinse mouth with water. Seek medical attention. Never give anything by mouth to an unconscious individual.
Ingestion of large quantities: immediately to hospital.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If medical advice is needed, have product container or label at hand. All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media	Use dry powder, foam, carbon dioxide for extinguishing.
Specific Hazards Arising from the chemical or mixture	**Fire hazard**: DIRECT FIRE HAZARD. Combustible keep away from open flame, no smoking. INDIRECT FIRE HAZARD. Temperature above flashpoint: higher fire/explosion hazard. **Explosion hazard**: No direct explosion hazard. **Reactivity**: Decomposes on exposure to temperature rise: release of toxic/corrosive/combustible gases/vapors (acrolein). Upon combustion CO and CO_2 are formed. May polymerize on exposure to temperature rise. Reacts violently with (strong) oxidizers: (increased) risk of fire/explosion. Reacts with (some) acids: (increased) risk of fire/explosion.
Advice for Firefighters	**Firefighting instructions**: Exercise caution when fighting any chemical fire. **Protection during firefighting**: Firefighters should wear full protective gear. Use self-contained breathing equipment if in confined place. Do not enter fire area without proper protective equipment, including respiratory protection.
Other Information	Refer to Section 9 for flammability properties.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Wear protective clothing as described in Section 8 of this safety data sheet. Do not smoke or use open fire or other sources of ignition. Contact with walking surface may result in formation of slippery film/falling hazard.
First Aid:	In case of contact with skin, wash with soap and water. If symptoms occur, seek medical attention. In case of contact with eyes, rinse with plenty of water for at least 15 minutes and see an eye specialist if irritation persists. In case of inhalation, remove to fresh air. In case of ingestion, drink water. If symptoms occur, seek medical assistance.
Environmental Precautions	Do not discharge into drains, sewers, or watercourses or onto the ground. Inform the relevant authorities if this occurs.
Methods for Containment and Clean Up	**For containment**: Collect leakage in sealable containers, soak up with sand or other inert absorbent and remove to safe place. Flush away remainder with water. **Methods for cleaning up**: Clear up spills immediately and dispose of waste safely

7. HANDLING AND STORAGE

Precautions for safe handling	**Prevention of user exposure**: Put on appropriate personal protective equipment. Use gloves and wear goggles when handling. Avoid breathing mist. **Prevention of fire and explosion**: Handling temperature ≥ 10 °C above melting point **Precautions while moving the product**: Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous.
Hygiene measures	Handle in accordance with good industrial hygiene and safety procedures. Workers should wash hands and face before eating, drinking, and smoking.
Conditions for safe storage, including any incompatibilities	**Storage precautions:** Keep in a cool and dry place. Keep separate from oxidants. Avoid extreme heat and cold. Avoid direct fire. Store in clean, dry, and preferably stainless steel or HDPE vessels. In bulk, store at ambient temperature. Temperature higher than necessary degrades quality at rate dependent on time and temperature of exposure. Exposure to ultraviolet light, especially sunlight, must be minimized to prevent quality loss. **Incompatible products**: KEEP SUBSTANCE AWAY FROM: heat sources, oxidizing agents, (strong) acids, (strong) bases. **Packaging materials**: Packaging should be closable, dry, clean, correctly labelled, and meet the legal requirements. Secure fragile packaging in solid containers. Suitable storage includes steel, aluminum, iron, synthetic material, glass.

8. EXPOSRE CONTROL / PERSONAL PROTECTION

Control parameters

Exposure guidelines, ingredients with workplace control parameters.

Occupational Exposure Controls: n/a
Technical measures: n/a
Occupational Exposure Limits:

Glycerin

Source	Type	Value	Note
US (OSHA)	TWA	15 mg/m^3	29 CFR 1910.1000 Table Z-1 Limits for Air Contaminants
US (ACGIH)	TWA	15 mg/m^3	ACGIH Threshold Limit Value

Exposure Control

Protective equipment

Appropriate engineering controls	Provide adequate general and local exhaust ventilation. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Observe any occupational exposure limits for the product or ingredients. Do not allow uncontrolled discharge of product into the environment.
Eye/face protection	Use protective goggles and/or a full-face shield where splashing is possible. Use equipment approved by appropriate government standards, such as NIOSH (US) or EN166 (EU). Maintain eye wash fountain and quick-drench facilities in work area.
Respiratory protection	Mist formation: aerosol mask with filter type P1. On heating: gas mask with filter type A.
Hand protection	Suitable protective gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
Other skin and body protection	Wear appropriate clothing to prevent any possibility of skin contact.
Hygiene measures	Wash promptly if skin becomes contaminated. Wash hands at the end of each work shift and before eating, smoking, and using the toilet. When using do not eat, drink, or smoke.
Environmental Exposure Controls	If exposure limits are exceeded or irritation is experienced, NIOSH approved respiratory protection should be worn.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

General Information

Physical State	Clear, colorless, hygroscopic viscous liquid
Color	colorless
Odor	odorless
Molecular Weight	92.09 g/mol

Safety Data

pH:	Neutral
Initial boiling point and boiling range:	290 - 295 °C @ 760mm Hg
Flash point:	>199 °C
Evaporation rate:	n/a
Flammability (solid, gas):	n/a
Upper/lower flammability or explosive limits:	n/a
Vapor pressure:	< 0.001 hPa @ 20°C
Vapor pressure:	0.0033 hPa @ 50°C
Vapor density:	3.2 (relative, air=1)
Relative density:	1.0 @ 20 °C at saturated mixture vapor/air (air=1)
pH:	Neutral
Solubility(ies):	Infinite g/100 ml in water @ 20 °C
Partition coefficient: n-octanol/water:	-2.6
Auto-ignition temperature:	429 °C
Decomposition temperature:	290 °C
Viscosity:	1400 mPas (20 °C)
Log Pow: -	1.76/2.6
Melting point/freezing point:	18 °C
Boiling Point:	290 °C

10. STABILITY AND REACTIVITY

Reactivity	Vapor mixes readily with air. Decomposes on exposure to temperature rise: release of toxic, corrosive, combustible gases/ vapors (acrolein). Upon combustion CO and CO_2 are formed. May polymerize on exposure to temperature rise. Reacts violently with (strong) oxidizers: (increased) risk of fire/explosion. Reacts with (some) acids: (increased) risk of fire/explosion.
Chemical stability	Hygroscopic. Able to polymerize above 149 °C. Decomposes when heated above 290 °C.
Possibility of hazardous reactions	None known
Conditions to avoid	None known
Incompatible materials	Reacts violently with strong oxidants
Hazardous decomposition products	Low toxicity in original state and not considered hazardous to human beings. On heating/burning release of toxic/combustible gases/vapors (acrolein).

11. TOXICOLOGICAL INFORMATION

Acute toxicity by oral route, inhalation, and dermal route: Not Classified

Product	Test	Species	Dose
Glycerin	LD50, Oral	Rat	12,600 mg/kg
	LC50, Inhalation	Rat	>570mg/m3/1Hr
	LD50, Dermal	Rabbit	> 10,000 mg/kg

Additional Toxicological Information
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us. The substance is not subject to classification.

Carcinogenic Categories

IRAC (International Agency for Research on Cancer): No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible, or confirmed human carcinogen by IARC.

ACGIH (American Conference of Governmental Industrial Hygienists): No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by ACGIH.

NTP (National Toxicology Program): No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by NTP.

OSHA (Occupational Safety & Health Administration): No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

12. ECOLOGICAL INFORMATION

Ecotoxicity (aquatic and terrestrial, where available)

- **Ecology - General**: No supplementary information available.
- **Ecology - Air**: TA-Luft Klasse 5.2.5.
- **Ecology - Water**:
  - Mild water pollutant (surface water)
  - Not harmful to fishes (LC50 (96h) >1,000 mg/l)
  - Not harmful to aquatic organisms (EC50 >1,000 mg/l)
  - Not harmful to algae
  - Not harmful to bacteria
  - Bioaccumulation: not applicable
  - Sludge digestion is inhibited at >1,000 mg/l 50%
  - Readily biodegradable in water (OECD 301D: 82%; 20 days)

Organism/Biotic Test	**Toxicity**
LC50 fishes 1	54,000 mg/l (96 h, SALMO GAIRDNERI/ ONCORHYNCHUS MYKISS)
LC50 other aquatic organisms 1	> 1,000 mg/l (96 h)
LC50 other aquatic organisms 1	> 1,000 mg/l (BACTERIA, ACTIVATED SLUDGE)
LC50 fish 2	> 1,000 mg/l (96 h, PISCES)
EC50 Daphnia 2	> 10,000 mg/l (24 h, DAPHNIA MAGNA, LOCOMOTOR EFFECT)
TLM fish 1	> 1,000 ppm (96 h, PISCES)
TLM other aquatic organisms 1	> 1,000 ppm (96 h)
Threshold limit other aquatic organisms 1	2,900 mg/l (192 h, MICROCYSTIS AERUGINOSA, TOXICITY TEST)

Threshold limit other aquatic organisms 2	> 10,000 mg/l (16 h, PSEUDOMONAS PUTIDA, TOXICITY TEST)
Threshold limit algae 1	> 10,000 mg/l (168 h, SCENEDESMUS QUADRICAUDA, TOXICITY TEST)

Persistence and Degradability: Readily biodegradable, OECD 301
Biochemical oxygen demand (BOD): 0.87 g O2/g substance
Chemical oxygen demand (COD): 1.16 g O2/g substance (ISO 15705)
ThOD: 1.217 g O2/g substance
BOD: (% of ThOD) 71 % ThOD
Bioaccumulative Potential: Log P octanol /water = -1.76/2.6

Mobility in the Soil
Surface tension 0,063 N/m (20°C)
Ecology - biodegradability in soil: no data available.

Other Adverse Effects: None available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods	Dispose according to federal, state, and local laws. Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Authority. Waste is suitable for incineration.
Methods of Disposal of Waste Residue:	Take up liquid spill into absorbent material, e.g.: sand, earth, vermiculite, or powdered limestone. Scoop absorbed substance into closing containers. See "Material-handling" for suitable container materials. Wash down leftovers with plenty of water. Wash clothing and equipment after handling. Do not discharge into surface water.
Disposal of Contaminated Packaging	Dispose according to federal, state, and local laws. Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Authority. Waste is suitable for incineration.

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

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 311/312 Hazards: No SARA Hazards

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

California Prop. 65
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The components of this product are reported in the following inventories:

CH INV:	On the inventory, or in compliance with the inventory
DSL:	All components of this product are on the Canadian DSL
AICS:	On the inventory, or in compliance with the inventory
NZIoC:	On the inventory, or in compliance with the inventory
ENCS:	On the inventory, or in compliance with the inventory
KECI:	Not in compliance with the inventory
PICCS:	On the inventory, or in compliance with the inventory
IECSC:	On the inventory, or in compliance with the inventory
TCSI:	On the inventory, or in compliance with the inventory
TSCA:	On the inventory, or in compliance with the inventory

National Regulations
Chemical inventories: Listed on AICS, DSL, ECL, ECST, ENCS, IECSC, NZIoC, PICCS, SWISS, TSCA, EC inventories Swiss Ordinance (RS 817.023.21) Annex 6: List of additives (part A), List of binders (part A), List of solvents (part A) WGK class: 1 (weak water endangering)

EU Regulations
No REACH Annex XVII restrictions
EU Regulation 10/2011 (Annex I): FCM 103 - (CAS 0000056-81-5) glycerol

TSCA - 5(a) Significant New Use Rule List of Chemicals
No substances are subject to a Significant New Use Rule.

US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D)
No substances are subject to TSCA 12(b) export notification requirements.

16. OTHER INFORMATION

Training advice: Before using/handling the product one must read carefully present SDS. Always work safely around open hatches on bulk tanks.

The information contained in this Safety Data Sheet, as of the issue date, is believed to be true and correct. However, the accuracy or completeness of this information and any recommendations or suggestions are made without warranty or guarantee. Since the conditions of use are beyond the control of our company, it is the responsibility of the user to determine the conditions of safe use of this product. The information in this sheet does not represent analytical specifications; for this information contact Tersus Environmental.

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.

tersus environmental

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End of Safety Data Sheet

SAFETY DATA SHEET

WILCLEAR
LACTATE CONCENTRATE

1. IDENTIFICATION OF MATERIAL AND SUPPLIER

Product Identifier:	Wilclear Sodium Lactate 60% Solution
Other Name(s):	sodium lactate
Recommended Use:	In-situ Bioremediation
Recommended Restrictions:	none known
Supplier Name:	JRW Bioremediation, LLC
Address:	14321 W. 96th Terrace Lenexa, KS 66215
Telephone:	913-438-5544
EMERGENCY Telephone:	800-779-5545 x 116 (Mon-Fri 9am-5pm CST) 913-961-6644 (afterhours)

2. HAZARD IDENTIFICATION

Health & Physical Hazards:

This product contains no substances in their current physical state that are considered to be hazardous to health and has a low order of toxicity. No acute or delayed symptoms or effects have been observed.

Flammability Hazards:

This is a Non-Flammable liquid

Reactivity Hazards:

This product is considered stable. There are no known physical or chemical hazards, incompatibilities, hazardous decomposition or byproducts.

OSHA Hazards: L

This material is not considered hazardous by OSHA. No labels or signage are known to be required.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS #	% by Weight	Hazard Classification
Sodium lactate	72-17-3	60%	none
Water	7732-18-5	40%	none

4. FIRST-AID MEASURES

Inhalation:
Inhalation of mist may cause mild irritation of respiratory system. Move to fresh air.

Skin Contact:
In case of contact with skin, immediately wash with plenty of soap and water while removing contaminated clothing. Seek medical attention if skin Irritation develops or persists.

Eye Contact:
In case of contact with eyes, immediately flush eyes with water for at least 15 minutes, lifting eyelids to facilitate irrigation. Get medical attention if necessary.

Ingestion:
If swallowed, rinse mouth. Should symptoms occur, get medical attention.

Signs and symptoms of exposure:	None determined. Treat symptomatically.
Medical Conditions aggravated by exposure:	None determined. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:	Water, carbon dioxide, foam, or dry chemical.
Unsuitable Extinguishing Media:	Do not use heavy water stream as it may spread or scatter.
Specific hazards from substance/mixture:	Thermal decomposition may lead to release of irritating or toxic gases and vapors.
General fire hazards:	No unusual fire or explosion hazards noted

Special protective equipment / precautions for fire-fighters:
Wear full protective clothing and positive pressure breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Methods and Materials for containment and clean up:
Contain spill with absorbent materials such as vermiculite or soil; shovel and place material in drum for disposal. Flush area with water. Surfaces may become slippery after spillage. Dispose of according to all local, state, and federal regulations at an approved waste treatment facility.

Personal precautions / Protective equipment:
Use personal protective equipment. Prevent spills, contamination, and leakage.

Environmental precautions:
No special environmental precautions required.

7. HANDLING AND STORAGE

Precautions for safe handling:
Observe good work and industrial hygiene practices. Use personal protective equipment. Avoid contact with skin, eyes, and clothing. Avoid breathing mists and vapors. Wash hands after use of this product. Do not eat, drink, or smoke while using product. Prevent spills, contamination, and leakage.

Conditions for safe storage, including any incompatibilities:
Keep container tightly closed. Keep in properly labeled containers. Store in a well ventilated, cool, dry area.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters:	No exposure or biological limits noted for ingredients(s).
Appropriate engineering controls:	Use adequate mechanical ventilation, especially in confined spaces. Local exhaust is recommended. Temperatures best kept below 200^0 C or 390^0 F.

Individual protection measures, such as Personal Protective Equipment (PPE):

Eye/Face protection:	Chemical goggles recommended.
Skin / hand / body protection:	Chemical resistant gloves recommended. Suitable protective clothing as defined by employer.
Respiratory protection:	None required under normal use.
General considerations:	Use good industrial hygiene and best safety practices. When using material, do not eat, drink, or smoke. Remove and wash any contaminated clothing before storage or re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear to light yellow
Physical state:	liquid
Odor:	slight to no odor
Odor threshold:	not applicable
pH:	6.0 - 8.5
Melting point/freezing point:	decomposes
Initial boiling point:	221ºF
Closed cup Flash point:	not applicable
Evaporation rate:	not determined
Flammability (solid, gas):	not determined
Upper/lower flammability or explosive limits:	not determined
Vapor pressure (Mg Hg):	not determined
Vapor density (air = 1):	not determined
Density:	1320-1340 kg/m^3
Viscosity	100cP @ 20^0
Molecular Weight:	112.07
Solubility in water:	soluable
Auto-ignition temperature:	not determined
Decomposition temperature:	>200^0 C / >392 ºF
Specific Gravity (H_2O = 1):	1.32 H2O=1 @ 20ºC

10. STABILITY AND REACTIVITY

Reactivity:	Non-reactive under conditions of normal use, storage & transport.
Chemical stability:	Stable under conditions of normal use, storage and transport.
Possibility of hazardous reactions:	
Conditions to avoid:	Temperatures above >200^0 C / >392 ºF
Incompatible materials:	None in particular.
Hazardous decomposition products:	None known.

11. TOXICOLOGICAL INFORMATION

No adverse health effects are expected if the product is used as intended and in accordance with this Safety Data Sheet.

Inhalation:	No known effects but if symptoms are experienced, remove source of contamination or move to fresh air.
Ingestion:	If swallowed, get medical attention.
Skin:	In case of contact with skin, immediately wash with plenty of soap and water while removing contaminated clothing. No known effect but seek medical attention if skin irritation develops or persists.
Eye contact:	In case of contact with eyes, immediately flush eyes with water for at least 15 minutes, lifting eyelids to facilitate irrigation. Get medical attention if necessary.

Signs & symptoms of exposure:

Carcinogenicity:	Contains no known ingredient listed as carcinogen.
Mutagenicity:	No known effect.
Reproductive Toxicity:	No known effect.

12. ECOLOGICAL INFORMATION

Ecotoxicity:	Product is not considered environmentally hazardous and is not expected to cause significant harm to aquatic, animal, or plant life.
Persistence/degradability:	Readily biodegradable.
Bioaccumulative potential:	Not expected to bioconcentrate or bioaccumulate.
Mobility in soil:	No specific information available.

13. DISPOSAL CONSIDERATIONS

Disposal Methods:

Contain spill with absorbent materials such as clay or soil and shovel and place material in drum for disposal. Surfaces may become slippery after spillage. Dispose of according to all local, state, and federal regulations at an approved waste treatment facility.

14. TRANSPORTATION INFORMATION

DOT hazard class:	Not Applicable, non-regulated
Labeling:	Not Applicable
Proper Shipping Name:	Wilclear® Sodium Lactate 60% Solution
NMFC#:	46400.02
Class	70

15. REGULATORY INFORMATION

Restrictions on use:	None.
Other regulations:	No information available or not applicable.

16. OTHER INFORMATION

The information in this SDS summarizes to the best of our knowledge at the date of issue, the chemical health and safety hazards of this material and general guidance for safe handling, use, processing, storage, transportation, disposal, and release. This information is not intended to be considered a warranty or quality specifications. The information contained relates only to the specific material designated and may not be valid if used in conjunction with other materials or in any other processes other than intended use. If further clarification or information is required, please contact JRW Bioremediation.