FINAL

Engineering Design Report
USG Interiors Highway 99 Site
7110 Pacific Highway East
Milton, Washington

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November 22, 2023

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A Report Prepared For:

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ENGINEERING DESIGN REPORT
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7110 PACIFIC HIGHWAY EAST
MILTON, WASHINGTON

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Acronyms

µg/L	micrograms per liter
ARARs	applicable or relevant and appropriate requirements
bgs	below ground surface
CDM Smith	CDM Smith Inc.
CDR	Conceptual Design Report
cy	cubic yards
DCA	Disproportionate Cost Analysis
CAP	Cleanup Action Plan
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
EL	Elevation
EP	Extraction Procedure
EPA	Environmental Protection Agency
FS	Feasibility Study
FSH	ferrous sulfate heptahydrate
ft	Feet
HASP	Health and Safety Plan
I-5	Interstate 5
IAWP	Interim Action Work Plan
ISCO	In situ chemical oxidation
ISS	In situ solidification and stabilization
Leapfrog	Leapfrog Works®
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MSL	mean sea level
MTCA	Model Toxics Control Act
MW	monitoring well
RCAP	Revised Cleanup Action Plan
RCW	Revised Code of Washington
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
UIC	Underground injection control
USGI	USG Interiors LLC
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

Executive Summary

This document presents an Engineering Design Report (EDR) for the USG Interiors LLC (USGI) Highway 99 site (Cleanup Site ID 3618) generally located at 7110 Pacific Highway East (aka Highway 99), Milton, Washington (site or Highway 99 site). The purpose of this EDR is to provide sufficient information for development and review of the construction plans and specifications. The EDR documents engineering concepts and design criteria used for design of the selected remedial alternative as presented in the revised cleanup action plan (RCAP) completed for the site.

Background

Before 1985, USGI used waste from their rock wool manufacturing plant in Tacoma to fill the site. This waste was a by-product of using slag (waste) from the ASARCO copper smelter in Tacoma as a raw material for rock wool production. The slag contained a high concentration of arsenic. The waste is the source material for the arsenic contamination at the site. In 1984 and 1985, 20,000 to 30,000 cubic yards of arsenic-contaminated waste and soil were excavated and removed from the site. Sampling in 2006 showed that soil and groundwater were still impacted by arsenic at concentrations greater than cleanup levels and therefore, required cleanup under the state's toxics cleanup law, the Model Toxics Control Act (MTCA). A Cleanup Action Plan (CAP) was completed and Agreed Order (AO) 11099 between USGI and the Washington State Department of Ecology (Ecology) was signed in 2016 to initiate the remedial action. However, pilot testing of the cleanup method described in the CAP, which was completed prior to initiation of the full-scale remedial action, showed it would not reduce the arsenic contamination within a reasonable amount of time (less than 20 years). Based on these findings, an alternative approach to the remedial action was developed. Proposed modifications to the remedial action were presented in a Conceptual Design Report (CDR). Work completed to further assess the viability of the proposed modifications to the remedial action included conducting a geotechnical field investigation and bench scale treatability study for the Highway 99 site, as well as a pilot study at USGI's nearby Puyallup site, which is similarly contaminated. This work resulted in the completion of the Draft RCAP.

Description and Implementation of the Selected Remedial Alternative

Elements of the selected remedial alternative include in situ stabilization and solidification (ISS) of all vadose and saturated soils exceeding 250 milligrams per kilogram (mg/kg) arsenic throughout what is termed the "core-remediation area." ISS solidifies the soil using a mixture of cement, bentonite, and iron. Modelling indicates that targeting soils exceeding 250 mg/kg arsenic will also capture the majority of soil that exceeds 90 mg/kg arsenic and a large percentage of soil that exceeds the Method A cleanup level of 20 mg/kg arsenic. The planned area of ISS will encompass about 11,500 square feet and treat 5,135 cubic yards of arsenic contaminated soil, both within the vadose and saturated zones. Groundwater will no longer freely flow in areas treated by ISS due to solidification of in situ soils and reduced permeability of the treated zone. Implementing ISS in high arsenic impacted saturated soils will immediately show significant improvement in groundwater quality. Residual arsenic concentrations in groundwater downgradient of the ISS treated area will decline by the process of natural attenuation.

This document describes the requirements to implement the ISS, including: permits, registrations, and site access; health and safety; site preparation and mobilization; the ISS design, implementation, quality control testing and waste management; site restoration; compliance monitoring; and the schedule to implement the project. Design drawings and specifications are appended to this document.

In addition to the ISS in the core remediation area, as summarized in the previous paragraphs, the Washington State Department of Transportation (WSDOT) purchased property to the south of the core remediation area of the Highway 99 site for planned freeway improvements. The property includes the parcel (P429), which is located adjacent to the Highway 99 property and is considered a part of the "site" as defined by the general area of arsenic contamination. WSDOT plans to conduct remedial actions involving excavation of all soil on the P429 parcel that contains arsenic concentrations greater than 20 mg/kg in conjunction with the freeway improvements. A section of existing WSDOT-owned right-of-way adjacent to the P429 parcel is also included in this remediation. The P429 parcel and right-of-way together are referred to as P429 Plus property. A separate EDR will be prepared by WSDOT's design build contractor for excavation of the P429 Plus Property and Hylebos Creek.

Section 1
Introduction

USG Interiors LLC (USGI) is conducting cleanup actions at the property generally located at 7110 Pacific Highway East (aka Highway 99) in Milton, Washington (site or Highway 99 site; **Figures 1 and 2**). CDM Smith Inc. developed this Engineering Design Report (EDR) to document the engineering concept and design criteria used for design of the selected cleanup action. The EDR was developed to meet the relevant requirements defined by the Washington Model Toxics Control Act (MTCA) Cleanup Regulation in Section 400 of Chapter 340 of Title 173 of the Washington Administrative Code (WAC 173-340-400). This EDR was prepared under the authority of Agreed Order No. DE 11099 (Ecology 2016) between USGI and the Washington State Department of Ecology (Ecology), dated May 22, 2023.

In accordance with WAC 173-340-350(7) USGI has performed a remedial investigation (RI) sufficient to define the extent of contamination and characterize the site for developing and evaluating cleanup action alternatives (CDM Smith, 2016a). An initial evaluation of cleanup action technologies was summarized in a Feasibility Study (FS) report completed in accordance with WAC 173-340-350(8) (CDM Smith, 2016b) and the selected cleanup action components were presented in a Cleanup Action Plan (CAP) prepared by Ecology (Ecology, 2016). Elements of the remediation included in situ solidification and stabilization (ISS) of vadose soils containing arsenic concentrations greater than 500 milligrams per kilogram (mg/kg) and treatment of arsenic in groundwater using in situ chemical oxidation (ISCO) methods.

A pilot study for treatment of groundwater using ISCO was completed subsequent to the CAP and determined the remedial alternative selected in the CAP would likely not reduce arsenic concentrations in the groundwater to the levels desired. Based on these findings, an alternative approach to the remedial action was developed. Proposed modifications to the remedial action were presented in a Conceptual Design Report (CDR) (CDM Smith, 2020). Work completed to further assess the viability of the proposed modifications to the remedial action included conducting a geotechnical field investigation and bench scale treatability study for the Highway 99 site, as well as a pilot study at USGI's nearby Puyallup site, which is similarly contaminated. This work resulted in the completion of a Draft Revised Cleanup Action Plan (RCAP) (Ecology, 2023).

As will be discussed in later sections of this report, the Washington State Department of Transportation (WSDOT) purchased property within the site, referred to as the P429 Plus and P428 properties to support planned freeway improvements (**Figure 2**). To expedite cleanup of the WSDOT-owned property and meet WSDOT's specific needs for the redevelopment, USGI and WSDOT have developed an agreement for WSDOT to conduct cleanup actions on the P429 Plus property, as well as sediment cleanup in Hylebos Creek independent of remedial actions that USGI is conducting. This EDR does not encompass WSDOT's planned work. WSDOT's remedial action will consist of soil excavation and offsite disposal of all soil exceeding the MTCA Method A cleanup level, an approach which is allowed under MTCA. Therefore, this EDR is focused on

remedial actions to be completed in the area referred to the Core Remediation Area as described in Section 3.2.1.

1.1 Purpose and Objective

The purpose of this EDR is to document engineering concepts and design criteria sufficient to develop construction plans and specifications for the selected remedial alternative as presented in the RCAP.

This EDR includes the following information:

- Goals of the cleanup action, including specific cleanup and performance requirements;
- General information on the site, including a summary of information in the RI/FS and subsequent studies;
- Identification of who is responsible for the cleanup action, including post construction maintenance;
- Site maps showing existing site conditions and the proposed location of the cleanup action;
- Characteristics, quantity and location of materials being treated;
- Design criteria and drawings to implement the cleanup action;
- Expected outcome of the treatment and how effectiveness is determined;
- Long-term monitoring; and
- Schedule for the final design and construction.

1.2 Report Organization

This EDR has been organized into the following sections:

- **Section 1 Introduction –** This section provides a description of the purpose and objective of this document.
- **Section 2 Site Description and Background** - This section provides a description of the site location, the site and regulatory history, current and future land use, and physical setting.
- **Section 3 Nature and Extent of Contamination** – This section provides a summary of the nature and extent of contamination as developed from the RI and subsequent investigations.
- **Section 4 Site Cleanup Standards and Points of Compliance** – This section presents the cleanup levels and remediation levels developed for the various areas and media at the site, as well as points of compliance.

- **Section 5 Selected Cleanup Actions** – This section provides a brief description of the cleanup actions developed for various areas of the site.
- **Section 6 Cleanup Action Engineering Design** – This section provides the design details of the remedial actions to be completed in the Core Remediation Area.
- **Section 7 Compliance Monitoring** – This section summarizes the plan for groundwater confirmation monitoring to ensure the remedy is performing as intended, and for confirmation of the long-term effectiveness of the remedy.
- **Section 8 Schedule** – This section provides a summary of the project schedule.
- **Section 9 References** - This section lists the documents cited in this EDR.
- **Appendix A –** Project Schedule
- **Appendix B –** Design Specifications
- **Appendix C –** Design Drawings

Section 2
Site Description and Background

2.1 Location and Description

The Highway 99 site is located in a commercial area situated between Pacific Highway East and Interstate 5 (I-5) in Milton, Washington, as shown on **Figure 1**. At the western edge of the site is Pacific Highway East, also known as Highway 99. Hylebos Creek and I-5, extend along the eastern side of the site. Hylebos Creek and 70th Avenue East mark the southern boundary of the site.

The site encompasses 8 parcels. The northernmost parcel is a 0.58-acre property previously occupied by Linwood Custom Homes and has an address of 7220 Pacific Highway East. To the south of this is a 1.16-acre parcel owned by East Fork Corp. and is occupied by General Trailer Co. (7200 Pacific Highway East). South of General Trailer Co. are four parcels that total 1.24 acres and are owned by Freeway Sales (7110 Pacific Highway East). The northern two of these four parcels are occupied by Kanopy Kingdom, and the southern two parcels are currently vacant. They were previously occupied by Discount RV. To the south of the former Discount RV parcels are two parcels that total 2.66 acres, which are also presently vacant (7100 Pacific Highway East). The parcels were previously occupied by Freeway Trailer. WSDOT purchased these parcels for planned freeway improvements. The WSDOT-owned parcels are referred to as the P429 Plus and P428 parcels. The term "Plus" after P429 accounts for a strip of land that was previously part of the road right-of-way which was added to this parcel. **Figure 2** shows the parcel lines and areas occupied by these entities.

The western portion of the site is relatively flat, but the site drops off sharply on the east where the surface slopes down either to Hylebos Creek or a roadside ditch. The central portion of the site (i.e., Kanopy Kingdom/Discount RV) is located at an elevation of approximately 20 feet above Mean Sea Level (MSL).

2.2 Site and Regulatory History

I-5 was constructed in this area in 1961. Prior to this, the site was used for rural residential and agricultural purposes. When I-5 was constructed, Hylebos Creek was re-routed to its current location where it extends along the eastern boundary of the site. The freeway construction and re-routing of Hylebos Creek cut the site off from the adjoining agricultural land to the east. Fill was then imported to bring the site up to grade with Pacific Highway East. From 1971 to 1973 industrial waste, including baghouse dust, "shot" (small, rounded, glassy particles broken off from the ends of the mineral fibers during extrusion process), and off-specification product, from USGI's Tacoma plant was reportedly used as fill at the Highway 99 site (Ecology, 1986). During that time-period, USGI's Tacoma plant used ASARCO slag as a raw material for mineral fiber production. ASARCO's copper smelting process was later found to concentrate metals and arsenic, but most particularly arsenic, in the slag. USGI's industrial waste similarly contained high concentrations of metals, but in particular, arsenic. USGI did not own the property during the period when this fill was used.

In the early 1980s, USGI became aware of the association between ASARCO slag and arsenic contamination. Subsequently, USGI purchased what is now the property owned by Freeway Sales from Partner's Financial Incorporated on August 18, 1982. That same year USGI voluntarily approached Ecology to negotiate an administrative process to govern the removal of industrial fill from the property. Soil and groundwater cleanup standards had not been established in Washington State at this time. Accordingly, Agreed Order No. DE 84-506 established project-specific arsenic cleanup standards for soil at 0.5 milligrams per liter [mg/L]) by the Extraction Procedure (EP) Toxicity (leaching) method and groundwater at 0.5 mg/L. The 1984 Agreed Order also required USGI to conduct post-cleanup groundwater monitoring.

The initial cleanup action for the Highway 99 site occurred between October 12, 1984, and January 25, 1985 (Ecology, 1986). Detailed records of the cleanup, termed the "source removal action," have not been located. Ecology estimated that 20,000 to 30,000 cubic yards of material were excavated and disposed of off-site (Ecology, 1986). The material excavated from the Freeway Sales property is inferred to include soil fill mixed with waste insulation, shot, baghouse dust, and native soil exceeding the cleanup standard in effect at the time. Native soil exceeding the project-specific cleanup standard was reportedly excavated in the vicinity of monitoring well 99-1, which is on the southernmost Discount RV parcel (see **Figures 2** and **3** for the well location). This is referred to as the contaminant source area. Ecology (1986) stated that soil cleanup standards for the project were met.

The property was cleared and re-graded in June 1985 and the site subsequently underwent commercial development. USGI maintained responsibility for groundwater verification monitoring, as specified in Agreed Order No. DE 87-506 issued in 1987. The 1987 Agreed Order retained the 0.5 mg/L groundwater cleanup level for the site. Post-source removal action groundwater sampling was performed by USGI from June 1985 to April 2006.

MTCA was enacted and went into effect in March 1989. MTCA governs state-led environmental cleanups in Washington State. In 1991, Ecology established MTCA "Method A" arsenic cleanup levels of 20 mg/kg for soil and 5 micrograms per liter (µg/L) for groundwater. Both cleanup levels account for concentrations considered to be natural background at the time. Recently, Ecology revised the background concentration for arsenic in groundwater to 8 µg/L, which is the current Method A cleanup level.

In 2006, Ecology required that USGI conduct a soil and groundwater assessment for arsenic in the vicinity of well 99-1. This assessment showed that arsenic in soil and groundwater exceeded MTCA Method A cleanup standards. On March 30, 2007, Ecology issued a letter naming USGI as a potentially liable party for the release of arsenic at the Highway 99 site, which led to Agreed Order No. DE 6333, issued in 2009, which required completing an RI, FS, and CAP. In June 2016, Ecology issued Agreed Order No. DE 11099 which requires USGI to implement the cleanup action plan developed under Agreed Order No DE 6333. Agreed Order No. DE 11099 is currently being amended to account for revisions to the CAP.

2.3 Future Land Use

With the exception of the WSDOT-owned parcels, referred to as the P429 Plus and P428 properties, land use is expected to remain similarly commercial. WSDOT plans on rerouting

Hylebos Creek and developing a riparian corridor along the new creek alignment through the P429 Plus and P428 properties in conjunction with planned freeway improvements. Following completion of the ISS treatment, an Environmental Covenant will be drafted to document the soil conditions. The Environmental Covenant will need to be signed by the property owner and recorded by USG with Pierce County.

2.4 Physical Setting

2.4.1 Geology

The site is situated in a north-trending valley that is the floodplain of Hylebos Creek and its tributaries. The valley is located just north of the lower Puyallup River valley. Alluvium, associated with Hylebos Creek, and the lower Puyallup River forms the uppermost native soil at the site. The alluvium consists predominantly of overbank flood, slack water, and bar accretion deposits. Glacially consolidated glacial drift and interglacial deposits hundreds to thousands of feet thick underlie the alluvial deposits.

Subsurface conditions at the site were characterized as a part of the RI. **Figure 3** shows boring locations. **Figures 4** and **5** show geologic cross sections. The surficial material at the site was determined to be fill, which is differentiated into three units, described from youngest to oldest:

- Fill-3: Fill used as backfill for the 1984/1985 source removal action, primarily located on the former Discount RV parcels. This fill consists of fine- to coarse-grained silty sand with gravel and silty sand. This material extends from ground surface to depths ranging from 4.5 to 14 feet below ground surface (bgs).
- Fill-2: Fill containing industrial waste from USGI's Tacoma plant. This is residual material was not captured during USGI's source removal action. This material was encountered in some areas at depths between 4 and 12.5 feet bgs.
- Fill-1: Soil placed during the initial development of the site. This fill consists of silt, sandy silt, organic silt, and silty sand with traces of debris, including wood chips and gravel. This fill extends to a maximum depth of 9 feet bgs.

Alluvium underlies fill at the site and pinches out to the west. The alluvium can be subdivided into two units based on soil type and hydraulic properties, including:

- Upper Silt Unit: Soil in this unit is comprised of dark brown to gray-brown silt and sandy silt, often with bedding laminations. The Upper Silt Unit ranges in thickness from 1 to 6 feet.
- Alluvial Aquifer: Soil in the Alluvial Aquifer consists of fine-grained silty sand, fine- to medium-grained sand, and well-graded sand. The thickness of the Alluvial Aquifer is approximately 30 feet in the contaminant source area.

Glacial sediments underlie the alluvium. At monitoring well 12 (MW-12), which is offsite adjacent to the west side of Pacific Highway East, glacial sediments occurred directly beneath fill. The glacial sediments are subdivided into the following units based on hydraulic properties:

- Lower Silt Aquitard: Soil in this unit consists of greenish-gray silt. The fine-grained nature of the soil indicates a low energy lacustrine (or possibly glacio-marine) depositional environment. The thickness of this unit ranges from approximately 5 to 15 feet.
- Glacial Aquifer: Water-bearing sand, silty gravel, and silty sand with gravel underlie the Lower Silt Aquitard.

2.4.2 Hydrogeology

Groundwater occurs under unconfined conditions within the Alluvial Aquifer. The low permeability soil of the Lower Silt Aquitard acts as a lower confining layer to the Alluvial Aquifer, restricting vertical flow. During the RI, groundwater was encountered at depths ranging from 4 to 14 feet bgs., depending on the well location. Groundwater flows east toward Hylebos Creek and south, parallel to the creek (**Figure 6**). The horizontal hydraulic gradient ranges from 0.003 foot/foot in the central area of the site, steepening to 0.03 foot/foot at the west bank of Hylebos Creek. The different hydraulic and geochemical characteristics of the Glacial Aquifer and the Alluvial Aquifer indicate that the two aquifers are not in hydraulic communication.

2.4.3 Groundwater/Surface Water Interaction

The nature of interaction between the Alluvial Aquifer and Hylebos Creek is difficult to characterize because of the 1961 diversion of Hylebos Creek during construction of I-5 into its current channelized section. The base of the channelized section adjacent to the contaminant source area intersects the Alluvial Aquifer. Alluvial Aquifer groundwater contours bend sharply adjacent to Hylebos Creek, indicating the Alluvial Aquifer does flow into Hylebos Creek. However, the very steep Alluvial Aquifer gradient of 0.03 foot/foot at the west bank of Hylebos Creek indicates there is a weak hydraulic connection between the Alluvial Aquifer and Hylebos Creek adjacent to the contaminant source area. This channelized section of Hylebos Creek does not appear to function as a true groundwater discharge area that would be found in an unconfined aquifer and an unmodified stream.

Section 3

Nature and Extent of Contamination

3.1 Media and Contaminant of Concern

Soil, groundwater, and sediment are the media of concern for the Highway 99 site. Contaminants of potential concern included metals (typically lead) and arsenic associated with industrial wastes derived from ASARCO slag that were previously used as fill at the site. Ultimately, arsenic was determined to be the contaminant of concern due to its toxicity and relative mobility; other metals associated with ASARCO slag had been largely removed during the 1980s source removal actions. Residual metals are relatively minor in occurrence, immobile, not impacting groundwater, and their remediation will occur in conjunction with the arsenic remediation.

3.2 Nature and Extent of Contamination

3.2.1 Distribution of Arsenic in Soil

Figure 3 shows the locations of all boring, monitoring well, and other subsurface investigations previously conducted throughout the site where soil samples were collected during the RI and subsequent site work. A three-dimensional model of arsenic in soil throughout the site using all data collected to date was created using Leapfrog Works® (Leapfrog) software version 3.0.1. The arsenic soil analytical data was interpolated using Leapfrog's radial basis function (mathematically equivalent to kriging) to create iso-value surfaces of the arsenic-impacted soils. These interpolated volumes from the iso-value surfaces were used to develop the remedial design. Plan and cross section views of the interpolated arsenic concentrations are presented on **Figures 7** through **9**. Please note that the Leapfrog software is limited in presenting three-dimensional plume data for two-dimensional visualization. Colors associated with the plume concentrations in **Figure 7** may not directly reflect those identified in the legend due to overlying data. For the most accurate correlation between the plume colors and the legend colors, please refer to the cross-sections in **Figure 8** and **Figure 9**.

For this site, the soil remediation has been divided into two areas: Core Remediation Area (see **Figure 3**) and the WSDOT P429 Plus property. The Core Remediation Area includes the contaminant source area. A description of the distribution of arsenic in each of these two areas follows.

Core Remediation Area

In general, arsenic concentrations are relatively low (i.e., less than 20 mg/kg) at ground surface to about 5 feet bgs, reflecting the 1984/1985 remedial action performed by USGI that removed waste fill and some native soil. These materials were replaced with imported fill as part of the site restoration. Arsenic concentrations then increase in depth, with the highest arsenic concentrations generally occurring within the 10-to-16-foot bgs interval. Arsenic concentrations in soil attenuate at depths below 16 feet bgs.

In general, the highest arsenic concentrations in soil occur along the west side of the former Discount RV property (**Figure 7**); this area has been identified as the soil hot spot. Soil with high arsenic concentrations extend into the saturated zone and is in direct contact with groundwater. The depth to groundwater is about 8 to 8.5 feet bgs. The deeper arsenic contamination in the Alluvial Aquifer is interpreted to have leached downward out of the historical industrial fill and the present Fill-2 unit and adsorbed onto the underlying soil.

WSDOT P429 Plus Property

Figures 7 through **9** also show the modeled distribution of arsenic across WSDOT's P429 Plus property. While arsenic concentrations are generally lower than on the former Discount RV property, two lobes with elevated arsenic concentrations appear to extend southward into the WSDOT P429 Plus property. Except for a sample collected from boring C8 at a depth of 5 feet bgs, which contained 10,450 mg/kg arsenic, arsenic concentrations in samples collected from the WSDOT P429 Plus property were less than 500 mg/kg.

3.2.2 Distribution of Arsenic in Groundwater

The distribution of dissolved arsenic in groundwater at the site, based on samples collected during the 2010-2012 time-period, is shown in **Figure 10**. The highest arsenic concentrations were detected in the area bound by wells MW-4, MW-5, 99-1, MW-1, and MW-3. The dissolved arsenic concentrations in these wells ranged from 630 to 2,490 µg/L, with the greatest arsenic concentration in monitoring well 99-1 (contaminant source area). During the chemical oxidation pilot study conducted after the RI the arsenic concentration in well M-1, located in the soil hot spot area west of 99-1, ranged up to 2,900 µg/L. From monitoring well 99-1 arsenic migrates in the direction of groundwater flow to the east and south.

Arsenic concentrations in the Alluvial Aquifer attenuate with distance from monitoring well 99-1. However, arsenic concentrations in all Alluvial Aquifer monitoring wells exceed the MTCA Method A cleanup level of 8 µg/L, including the MW-13 (south end of WSDOT P429 Plus property) and MW-16 (Linwood Custom Homes) locations. Elevated arsenic concentrations extend east of Hylebos Creek. MW-10, located east of Hylebos Creek, had a dissolved arsenic concentration of 366 µg/L.

Arsenic concentrations in groundwater deeper in the Alluvial Aquifer (MW-7 and MW-8) are two orders of magnitude lower than arsenic concentrations in groundwater collected from the shallow Alluvial Aquifer and just slightly above the MTCA Method A cleanup level, indicating that arsenic attenuates rapidly with depth within this aquifer. Dissolved arsenic was detected at a concentration of 44 µg/L in the Glacial Aquifer (MW-9).

3.2.3 Distribution of Arsenic in Sediment

Fourteen sediment samples were collected from the Hylebos Creek during the RI and analyzed for arsenic, six of which exceeded the sediment cleanup level (see Section 4.1). Arsenic concentrations in these samples ranged from 14.6 mg/kg to 295 mg/kg. Arsenic cleanup level exceedances occurred in one or both of the west bank and bottom samples at sample locations SED-3, SED-4, SED-5 and SED-6, adjacent to the southernmost former Discount RV parcel and the WSDOT P429 Plus parcel (**Figure 3**). These data indicate that dissolved arsenic in shallow groundwater at the site is discharging to Hylebos Creek and adsorbing onto sediment or co-

precipitating with iron onto sediment at the groundwater/surface water interface. Sediment samples collected north and south of these sediment samples did not exceed cleanup levels.

Section 4
Site Cleanup Standards and Points of Compliance

As defined in WAC 173-340-700, cleanup standards for the site include establishing cleanup levels and the points of compliance at which those cleanup levels will be attained. The cleanup standards for the site have been established in accordance with WAC 173-340-700 through 173-340-760, are protective of human health and the environment and comply with the applicable or relevant and appropriate requirements (ARARs) defined for the site.

4.1 Cleanup Levels

Cleanup levels are the concentrations of the contaminants of concern that will be met for the media of concern at the points of compliance defined for the site to meet MTCA requirements. The soil, groundwater, and sediment cleanup levels for arsenic are summarized in **Table 4-1**:

Table 4-1 Arsenic Cleanup Levels

Media	Basis	Cleanup Level
Soil	MTCA Method A (Background)	20 mg/kg
Groundwater	MTCA Method A (Background)	8 µg/L
Sediment	WAC 173-204	14 mg/kg[(a)]

Note:

[(a)] Freshwater sediment cleanup screening levels and sediment cleanup objectives for protection of the benthic community are established in the Sediment Management Standards (WAC 173-204). The freshwater sediment cleanup screening level for arsenic is 120 mg/kg, which is the concentration that minor adverse effects are expected to the benthic community. The freshwater sediment cleanup objective is 14 mg/kg, which is the concentration that no adverse effects are expected to the benthic community.

The MTCA Method A cleanup level is proposed for the WSDOT P429 Plus property soils and the freshwater sediment cleanup objective for sediment in Hylebos Creek. Remediation levels proposed for soils in the Core Remediation Area are discussed in Section 4.2.

4.2 Soil Remediation Level

Cleanup actions often involve a combination of cleanup action components, such as treatment of some soil contamination and containment of the remainder. Remediation levels are used to identify the concentration of hazardous substances at which different cleanup action components will be used. The RCAP included a cost-benefit analysis of the various treatment options evaluated for the Core Remediation Area. A disproportionate cost analysis (DCA) was conducted for treatment of soils at varying arsenic concentrations within the Core Remediation Area. Four different remediation/cleanup levels were considered: 500, 250, 90, and 20 mg/kg. The original CAP was based on treatment of vadose soils exceeding 500 mg/kg arsenic. The Method A cleanup level of 20 mg/kg is the most conservative value. 90 mg/kg is approximately the same as the MTCA Method B cleanup level, which is 88 mg/kg. 250 mg/kg was considered as a reasonably conservative remediation level between the 500 mg/kg remediation level and the Method B cleanup level. The DCA resulted in the recommendation to treat both saturated and unsaturated

soils exceeding 250 mg/kg arsenic. This remediation level has been approved by Ecology in the amended Agreed Order.

4.3 Points of Compliance

WAC 173-340-200 defines the points of compliance as the locations where cleanup levels (established in accordance with WAC 173-340-720 through 173-340-760) will be attained to meet MTCA requirements. The points of compliance for the cleanup action for soil, groundwater, and sediment are provided in the following subsections.

Soil

The standard point of compliance for soil is the point or points where the soil cleanup level is established. For soil, cleanup levels based on protection of groundwater, the point of compliance is throughout the site (WAC 173 340-740(6)(a)(b)).

In instances where cleanup actions involve containment, as the cleanup action in Core Remediation Area does, soil cleanup levels will typically not be met at the standard points of compliance. In these instances, compliance is determined if: (1) the selected remedy is permanent to the extent practicable; (2) the remedy is protective of human health; (3) the remedy is protective of ecological receptors; (4) institutional controls are implemented; and (5) compliance monitoring and 5-year periodic reviews are implemented to ensure the long-term integrity of the containment system (WAC 173-340-740(6)(f)).

Groundwater

The standard point of compliance for groundwater is the attainment of groundwater cleanup levels throughout the site to the outer boundary of the hazardous substance plume from the uppermost level of the saturated zone, extending vertically to the lowest depth which could be affected (WAC 173-340-720(8)(a)(b)). If the cleanup levels for groundwater cannot be met within a reasonable restoration time frame, conditional points of compliance can be defined in accordance with WAC 173-340-720(8)(c) and an institutional control that precludes the use of groundwater in the shallow water-bearing zone as a potable water source would be implemented at the site.

Between planned soil treatment and, if applicable, in situ treatment of groundwater (see section 5), it is expected that groundwater cleanup level will be achieved throughout the aquifer within a reasonable time frame.

Sediment

The point of compliance for sediment in Hylebos Creek is within the biologically active zone in the upper 10 centimeters (approximately upper 4 inches) of sediment.

Section 5
Selected Cleanup Actions

As noted previously, WSDOT purchased property to the south of the core remediation area for planned freeway improvements. To expedite cleanup of the WSDOT-owned property and meet WSDOT's specific needs for the redevelopment, USGI and WSDOT have developed an agreement for WSDOT to conduct cleanup actions on the P429 Plus property independent of remedial actions that USGI is conducting in the Core Remediation Area. In addition, because WSDOT will also be working in Hylebos Creek during the freeway improvement construction, WSDOT will be conducting the sediment remediation. An Interim Action Work Plan (IAWP; Innovex, 2021) was completed for the Parcel P429 Plus property and sediment remediation, a copy of which was attached to the RCAP. The IAWP describes WSDOT's planned cleanup actions for these areas. WSDOT will be completing the engineering design for cleanup actions on its P429 Plus property and in Hylebos Creek separate from this EDR. Therefore, other than a general description in Section 5.1.2, the remediation in those two areas is not discussed further.

5.1 Soil Remediation

5.1.1 Core Remediation Area

The selected cleanup action within the Core Remediation Area, as approved in the first amendment to the Agreed Order, is to conduct ISS treatment of all vadose and saturated soils exceeding 250 mg/kg arsenic. Modelling indicates that solidification of all soils that exceed 250 mg/kg arsenic will also capture approximately 85% of soil that exceeds 90 mg/kg and 35% of soil that exceeds the Method A cleanup level of 20 mg/kg. Groundwater will be limited in areas treated by ISS due to reduced permeability of the soils, effectively treating groundwater in this area. Groundwater upgradient of the ISS treated area will flow around the ISS-treated area, no longer flowing through these arsenic-contaminated soils. Implementing ISS in high arsenic concentration saturated soils should result in significant improvement to groundwater quality.

The ISS will provide an immediate benefit by:

1. reducing the potential for direct exposure to arsenic-impacted soil;
2. binding up high arsenic concentrations in vadose soils, which in turn reduces the potential for continued leaching to groundwater; and
3. binding up arsenic in what were once saturated soils, thus having an immediate impact on the reduction of arsenic concentrations in groundwater and continued leaching to groundwater.

5.1.2 P429 Plus Property and Hylebos Creek

The WSDOT SR 167/I-5 to SR 509 – New Expressway Stage 1b project includes rerouting Hylebos Creek by moving the present undercrossing about 300 feet south where it will enter WSDOT's P429 parcel and by developing a riparian corridor along the new creek alignment. As a part of

this construction, WSDOT plans to conduct excavation of all soils exceeding 20 mg/kg on the P429 Plus property. WSDOT will also remove contaminated sediment and streambank soil in the existing Hylebos Creek channel. The IAWP further describes the proposed remedial methodology and includes figures that outline the anticipated areas of excavation. **Figures 11** and **12** show WSDOT's planned remedial excavation area on WSDOT's P429 plus property and the sediment removal area in Hylebos Creek. A separate EDR will be prepared by WSDOT's design build contractor for excavation of the P429 Plus Property and Hylebos Creek.

5.2 Groundwater Remediation

Residual arsenic concentrations in groundwater downgradient of the ISS treated area will decline by the process of natural attenuation. A program of groundwater monitoring will be implemented to monitor the effectiveness of natural attenuation and determine the need for additional remedial actions, if any. At end of the initial groundwater monitoring program (up to 5 years), the groundwater data will be evaluated regarding the progress in achieving groundwater cleanup levels. If this assessment determines that groundwater cleanup levels will likely not be achieved throughout the site within a 20-year time period, a program of in situ groundwater treatment will be initiated. The RCAP proposes in situ treatment by zero-valent iron (ZVI) injection. As such time as groundwater treatment is determined necessary, an EDR will be developed specific to that remediation technology. Since WSDOT will be removing all soil greater than 20 mg/kg from its property and will conduct dewatering during the excavation, the need for future groundwater treatment is not planned on the P429 Plus property.

Section 6

Cleanup Action Engineering Design

This section discusses in detail the engineering design, permitting requirements, safety controls, and monitoring parameters for the remedial action. The project schedule is included in **Appendix A.** The referenced design specifications are included in **Appendix B** and the design drawings are included in **Appendix C .**

6.1 Permits, Registrations, and Site Access Agreements

Cleanup actions performed under an Agreed Order are exempt from the procedural requirements of certain state and local environmental laws, the actions nevertheless must comply with the substantive requirements of such laws (Revised Code of Washington [RCW] 70A.305.090; WAC 173-340-710(9)(b). Regardless, in most instances where there is a permit process, a permit will likely be obtained. All required permits /approvals not previously obtained by USG will be obtained by the Contractor.

6.1.1 Utility Removal

There is an electrical power pole in the southwest corner of the Highway 99 site that is at the edge of the treatment area. Temporary movement of the electrical power pole stability cables will be required to complete the ISS work. This will require coordination with Tacoma Public Utilities.

There is a 24-inch corrugated metal pipe that extends across the site from west to east, through the ISS area. It appears to be a city storm strain line that extends from the top of the upslope area on the east and drains into Hylebos Creek. This line will need to be temporarily diverted during construction and then replaced. The Contractor will need to coordinate this work with the City of Milton.

A Lumen's communication line runs east-west and approximately follows the property line on the southern boundary of the USG property and the adjacent WSDOT property to the south. The utility extends across the width of the site and continues across Hylebos Creek. Lumens has plans to abandon this utility line in late summer of 2023. ISS treatment work will not begin before this utility has been abandoned.

6.1.2 Grading Permit

The excavation and ISS work will require compliance with the City of Milton's Municipal Code, Chapter 13.27 Clear, Fill, and Grade.

6.1.3 Underground Injection Control Registration

Washington State Department of Ecology's Water Quality Control Program requires underground injection control (UIC) registration for any material injected into the subsurface. The ISS will require completion of a UIC registration.

6.1.4 Site Access Agreements

Highway 99 property is owned by Freeway Sales LLC. USG presently has a lease agreement with Freeway Sales LLC, specifically for the purpose of conducting remedial actions. No additional access agreements are required to perform intrusive work within the property limits. WSDOT owns the adjacent P429 Plus parcel to the west of the site and USG will coordinate use of a portion of the parcel for equipment staging during the work. In addition, work within WSDOT right-of-way requires a General Permit through the WSDOT Olympic Region.

6.2 Health and Safety

A site-specific health and safety plan (HASP) will be implemented for the duration of the project which shall include a detailed accident prevention plan due to the potentially hazardous conditions at this site. The site-specific health and safety plan shall include air monitoring, personal protective equipment, and equipment decontamination to assure safety of the site workers and local community. Health and Safety requirements are outlined in **Appendix B Specification 01 35 29 Safety, Health, and Emergency Response.**

6.3 Site Preparation and Mobilization

6.3.1 Temporary Construction Facilities

The Contractor will be responsible for providing temporary facilities at the site, including a trailer compound and parking area, to house on-site personnel, field supplies, and equipment.

The northern portion of the WSDOT P429 will be used as a temporary staging area and access point into the site. The proposed batch plant and material staging areas are shown on **Appendix C Sheet No. C-02 Site Preparation and Stormwater Control and Erosion Plan.** The fence between WSDOT P429 and the site will be removed for access. Established access points includes two gates into the site property and two gates into the WSDOT P429 property. It is anticipated that the main access point from Pacific Highway to the temporary staging area will be the southern gate of the WSDOT P429 lot.

6.3.1.1 Equipment Decontamination Facilities

The Contractor will construct a decontamination pad for equipment decontamination between the site and the WSDOT P429 lot. All equipment and vehicles that come in contact with contaminated materials will be decontaminated prior to leaving the site.

6.3.1.2 Site Security and Fencing

The entry gate for the trailer compound, parking lot, and equipment staging area is through the WSDOT P429 lot currently being used by WSDOT for their nearby construction. Coordination on site security via the entry gate will need to occur between the Contractor, WSDOT, and Engineer. There is fencing present around the north, west, and southern portions of the site. The eastern side of the site which borders the Hylebos Creek does not have a fence; however, fencing along this side of the property is unnecessary due to the presence of the creek, the highway, and the construction work that is already ongoing in this area. The southern fencing will be removed during site preparation and will need to be reinstalled after project completion. Replacement of fencing will be performed by WSDOT's construction contractor following completion of their work.

6.3.2 Soil Erosion and Sediment Control

Sedimentation and erosion controls will be employed at the site during construction to prevent the release of fines into undisturbed areas and waterbodies. Erosion and sediment controls are outlined in **Appendix B Specification 31-25-00 Erosion and Sedimentation Control.** Anticipated control measures include a temporary silt fence and straw wattles around the eastern side of the site as shown on **Appendix C Sheet No. C-02 Site Preparation and Stormwater Control and Erosion Plan.**

6.3.3 Site Preparation

Prior to implementation of ISS, the surface material, consisting of asphalt and concrete slabs, will be stripped within the boundary of ISS, along with the removal of the small shed located in the middle of the site on the northwest boundary. Site preparation activities are outlined in **Appendix B Specification 31-10-00 Site Preparation.** A utility locate must be performed to identify the location of underground utilities as shown in **Appendix C Sheet No. C-02 Site Preparation and Stormwater Control and Erosion Plan.** The temporary movement, diversion, and support of utilities that are within the work zone will be completed prior to initiation of the work.

6.4 Monitoring Well Decommissioning

All monitoring wells situated within the ISS treatment area, as shown on **Appendix C Sheet No. C-02 Site Preparation and Stormwater Control and Erosion Plan,** will need to be decommissioned. Wells in the ISS treatment area will be decommissioned by a licensed well driller in accordance with Ecology Water Well Construction Act, RCW 18.104 (WAC 173-160-460) prior to initiation of treatment. A list of the monitoring wells to be decommissioned and their approximate depths are provided in **Table 6-1** below.

Table 6-1 Summary of Monitoring Well Decommission List

Monitoring Well ID	Approx. Depth (ft bgs)
AS-1	35
AS-2	35
INJ-1	25
INJ-2	25
M-1	25
M-2	25
M-3	25
M-4	25
MW-1	18
MW-2	17
MW-7	30
MW-9	48
MW-99-1	28

6.5 ISS Design

ISS Design and quality control specifications are included in **Appendix B Specification 31-56-14 Insitu Soil Solidification** and **Appendix B Specification 01-40-00 - Quality Requirements.** The extent of the ISS area to treat all soils that exceed 250 mg/kg is presented in **Appendix C Sheet No. C-03 Limits of Mass Stabilization**. Typical cross-sections of the ISS area are presented in **Appendix C Sheet No. C-04 Excavation Cross Section**. A summary of the physical components is provided below:

Total Treated Soil (ISS) Area = 11,500 square feet
Total Treated Soil (ISS) Volume = 5,135 cubic yards

As is shown in **Appendix C Sheet No. C-04 Excavation Cross Section** and indicated in **Table 6-2**, the top five feet of soils will be excavated and temporarily stockpiled onsite. These are the clean soils that were used as backfill during the initial remedial action. Once these soils have been excavated, ISS treatment will commence using an excavator to place and mix in the admixture. During ISS treatment, the ISS mixing slurry will be contained with the cell and any excess ISS mixing slurry will be contained within the excavation, effectively minimizing the risk of onsite spills or leakage into the surrounding area.

In accordance with findings of the pilot study, the admixture will consist of Portland cement at a dosage rate of 13 percent by weight, bentonite at a dosage rate of 1 percent by weight, and ferrous sulfate heptahydrate (FSH) at a molar ratio of 4:1 to the arsenic concentration.

The treatment area will be divided into four treatment sub-areas and the excavator will complete work in one treatment area before moving to another. After completing the ISS, the temporarily stockpiled soil will be used to backfill the remainder of the excavation. Due to the ISS treatment process, ISS swell is anticipated to occur and may vary based on the composition of the soil but is anticipated to be contained within the previously excavated top 5 feet of the restoration ground surface. **Table 6-2** presents the physical data for each of these treatment sub-areas including volume, top and bottom of treatment zone, and treatment zone thickness.

Table 6-2 Summary of Proposed ISS Treatment Sub-Areas and Volumes[a]

Area ID	Volume	Average Ground Surface	Top of Treatment Zone		Bottom of Treatment Zone		Treated Area Thickness	Pre-Excavation Depth
	(cy)	(EL)[b]	(EL)	(ft bgs)	(EL)[b]	(ft bgs)	(ft)	(ft bgs)
250-1	2,800	22	17	5	5	17	12	5
250-2	2,300	23	18	5	7	16	11	5
250-3	10	23	7	16	3	20	4	-
250-4	25	23	18	5	8	15	10	5
Total	5,135	--	--	--	--	--	--	--

Notes:
cy – cubic yards
ft – feet
EL – elevation.

ft bgs – feet below ground surface
(a) Volume of impacted soils are interpreted based on available analytical data and 3D interpolated volumes.
(b) Elevations referenced are based on the North American Vertical Datum of 1988 (NAVD 88).

6.5.1 ISS Implementation Methodology and Sequencing

The selected ISS plan includes a mixing head to mix in the ISS reagents through the targeted soil mixing zones. Construction equipment that can perform the ISS on a full-scale basis, typically includes excavators as shown in **Photo 6-1** below and a batch plant for additive mixing if additional mixing is required as shown in **Photo 6-2** below.

Photo 6-1: ISS treatment in progress.

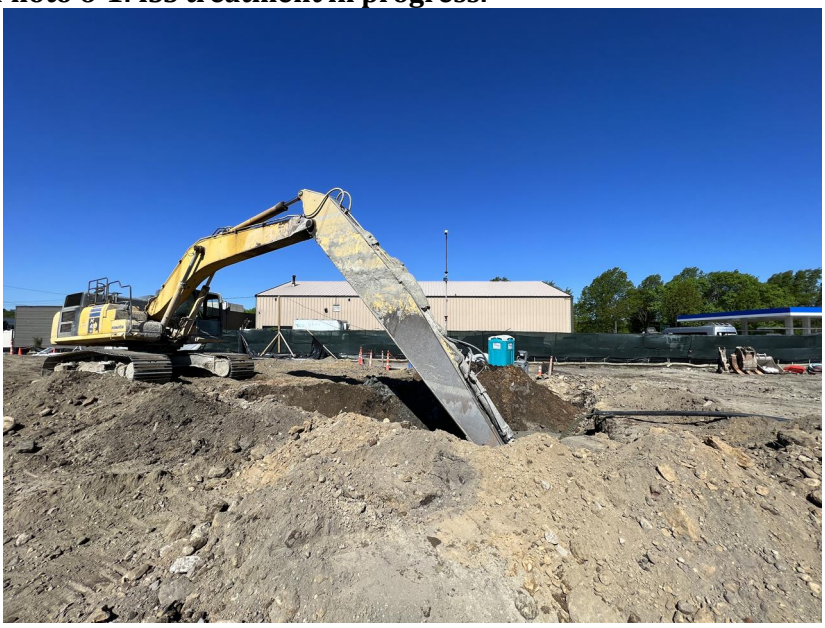

Photo 6-2: ISS batch plant.

6.5.1.1. Construction Sequencing

Prior to commencing ISS treatment, the contractor will sequence the excavation to minimize the emission of dust and odors, disturbance of existing topsoil outside of the proposed work areas and contact of exposed contaminated soil with precipitation and run off. The contractor will sequence the work to limit extent of practical runoff that contacts contaminated material. The project schedule is included in **Appendix A.** The general construction sequence will be as follows:

- Implement health and safety and environmental controls as provided in the contractor's approved work plan.
- Perform a site survey to establish limits of construction and proposed ISS treatment areas. Perform an underground utility locate/survey.
- Install sediment control measures as shown on drawing **Appendix C Sheet No. C-02 Site Preparation and Stormwater Control and Erosion Plan.**
- Relocate, remove, and or plug as required all utilities that conflict with the proposed work.
- Remove the shed structure as required.
- Removal and offsite disposal of asphalt and/or concrete pads that conflict with the proposed work.
- Excavate and stockpile shallow soil materials as shown on drawing **Appendix C Sheet No. C-02 Site Preparation and Stormwater Control and Erosion Plan.**
- Perform ISS treatment of soils as shown on **Appendix C Sheet No. C-03 Limits of Mass Stabilization.**
- Backfill shallow soil material, by placing, spreading, and compacting to meet final site grade requirements as shown on **Appendix C Sheet No. C-05 Final Grading and Restoration Plan.**
- Install crushed rock and hot mix asphalt to meet final site grade requirements as shown on **Appendix C Sheet No. C-05 Final Grading and Restoration Plan.**
- Transport excess shallow soil material not used as backfill for offsite disposal.

6.5.1.1 Handling of Materials

The equipment and materials outlined above shall be staged in the project support area for use as outlined in **Appendix B Specification 02-61-13 Excavation and Management of Soil** and as shown in **Appendix C Drawing C-03**. All items shall be brought to the site clean and in like-new condition and kept clean and in satisfactory condition throughout the duration of the contract. Damaged materials, torn bags, etc., shall be replaced. The Subcontractor shall be responsible for the security of all stockpiled materials and equipment.

6.5.1.2 Decontamination Equipment

All tools used during the ISS treatment will be decontaminated upon completion of the stabilization treatment work. Following completion of stabilization in the treatment area and placement of stockpiled overburden soil as backfill, the contractor will use a pressure water or hose wash to perform final decontamination of the equipment on site, allowing the water to drain into the stabilized area. Then, placement of the crushed fill can be added, followed by the asphalt surface.

6.5.1.3 Safety Equipment

All safety equipment shall meet the requirements of National Institute for Occupational Safety and Health (NIOSH)/OSHA and site-specific HASP. Contractor is responsible for having spill kits in place at the site for control of accidental leaks/discharges from equipment.

6.5.2 Quality Control Testing

The subcontractor shall implement a quality assurance/quality control (QA/QC) program as outlined in **Appendix B Specification 31-56-14 Insitu Soil Solidification**. At a minimum, the Subcontractor shall:

- Check all equipment for function. Precision, and accuracy in accordance with the manufacturer's recommendations and maintain records of such checks. Maintain and calibrate all equipment according to the manufacturer's recommendations and maintain records of such calibrations and maintenance. The Subcontractor shall make records of these checks available to the Engineer on request. Any equipment that does not function properly or cannot be calibrated will not be used at the site and shall be replaced by the Subcontractor promptly.
- Maintain detailed documentation of ISS mixing activities. Daily detailed reports shall be maintained by the Subcontractor and submitted to the Engineer as requested.
- The Subcontractor shall implement quality control measures as necessary to assure that the ISS zones are constructed in a manner that satisfies the performance requirements as indicated in Technical Specification 31-56-14.

6.5.3 Waste Management

Waste handling, including classification, segregation, and on-site and off-site disposal, is a major component of site remediation. Transportation and disposal of excess soil material is outlined in **Appendix B Specification 02-61-29 Transportation and Disposal of Excess Material.** Materials for off-site disposal include the following:

- Material related to the removal of the shed;
- Soil erosion controls removed as part of demobilization, including but not limited to, the silt fence and turbidity curtain;
- Material associated with construction and demobilization;
- Excess shallow soil material not used as backfill;

- Drums containing PPE and miscellaneous solid materials;
- Concrete and asphalt paving removed during site preparation;
- Decontamination water.

6.5.4 Traffic Control

Traffic control is not required during ISS implementation at the site. All equipment offloading and parking will be contained within the WSDOT property. Cones and flaggers will be present as necessary to safely mobilize and demobilize equipment/materials to and from the site. Traffic management, if needed is outlined in **Appendix B Specification 01-32-13 Control of Work.**

6.6 Site Restoration

6.6.1 Utility Restoration

Restoration of the electrical pole stability lines in the southwest corner of the site will be required following completion of the treatment. Coordination with Tacoma Public Utilities will be required to ensure placement follows proper guidelines.

Additionally, any other critical utility identified during the utility locate (e.g., the storm drain line) that must be temporarily removed during ISS implementation will need to be restored following completion of the treatment.

6.6.2 Final Grading and Surface Restoration

Following implementation of the ISS, the remainder of the excavation will be backfilled with the stockpiled excavated soils, topped off with basecourse gravel, as appropriate and entire site will be asphalt-paved as outlined in **Appendix B Specification 31-20-02 Earthwork** and as shown on **Appendix C Sheet No. C-05 Final Grading and Restoration Plan.**

6.6.3 Demobilization

After final inspection is completed, the Contractor will initiate demobilization activities. This will include but is not limited to removal of all trailers, equipment, materials, and PPE.

Section 7
Compliance Monitoring

Groundwater quality monitoring will be conducted as part of the confirmation monitoring per WAC 173-340-410(1)(c) to ensure the remedy is performing as intended, as well as the long-term effectiveness of the remedy. The purpose of a groundwater monitoring program is to verify that arsenic concentrations in groundwater are declining and to evaluate whether the cleanup level will be achieved within a reasonable timeframe. Ecology selected a 20-year restoration timeframe as reasonable for this site. A groundwater quality sampling and analysis plan (SAP) for the Highway 99 site will be developed and submitted to Ecology (WAC 173-340-410(2)) for review and approval per WAC 173-340-820. The SAP will be developed after Ecology has approved the engineering design of the ISS remedy and implemented following implementation of the ISS remedy. The SAP will detail:

- The purpose and objectives of the data collection;
- Schedule;
- The layout of the monitoring well network, including the locations of new wells to be installed;
- The frequency of groundwater monitoring;
- Procedures for sample collection;
- The analytical methods;
- Quantitation limits;
- Quality assurance and quality control procedures; and
- Reporting.

The SAP will also include requirements for groundwater data analysis and evaluation procedures to demonstrate and confirm compliance.

Quarterly groundwater monitoring will commence on the Highway 99 site immediately following completion of the ISS. Following completion of soil excavation and rehabilitation of the WDSOT P429 Plus property, the SAP will be modified to include additional wells to be installed on that property. Groundwater monitoring will continue, on a quarterly basis, for another 2 years after inclusion of the groundwater monitoring program on the WSDOT property. After approximately five years of quarterly monitoring, groundwater data will be evaluated by trend analysis to evaluate a restoration timeframe to reach the cleanup level and the potential need for implementing groundwater treatment.

Section 8
Schedule

The preliminary remediation schedule is shown below. A Gantt Chart showing the timeline and sequencing for the project is provided in **Appendix A**.

The major features and sequence are as follows:

- Submittal, review, and approval of the EDR
- Development of the final design package concurrent with the EDR review
- Development and Solicitation of the bid packages for contractor work, especially the ISS work
- Contractor awards
- Contractor workplan development
- Well Abandonment
- Site Mobilization
- Installation of erosion control features and site preparation
- Utility locating, relocation, and removal
- Structure and asphalt demolition
- Cover soil removal and stockpiling
- In-situ stabilization
- Cover soil replacement and compaction
- Off-site soil disposal (if needed)
- Placement of structural fill and asphalt repaving
- Restoration/seeding (as needed)
- Demobilization
- Reporting

Note that the dates and durations are estimated, subject to change depending upon review schedules, contractor availability, weather, coordination with other stakeholders, and other factors.

Section 9
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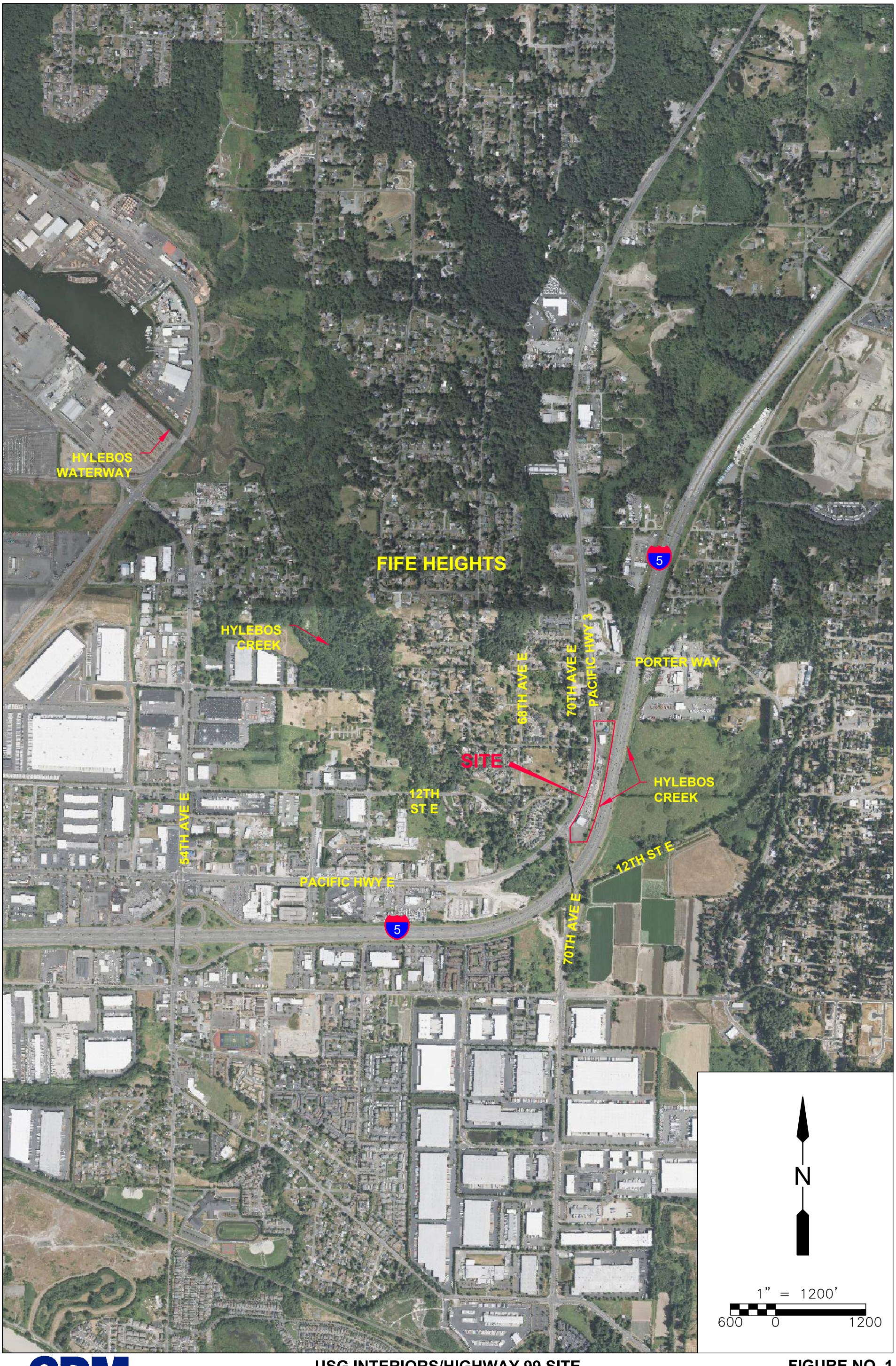
Figures



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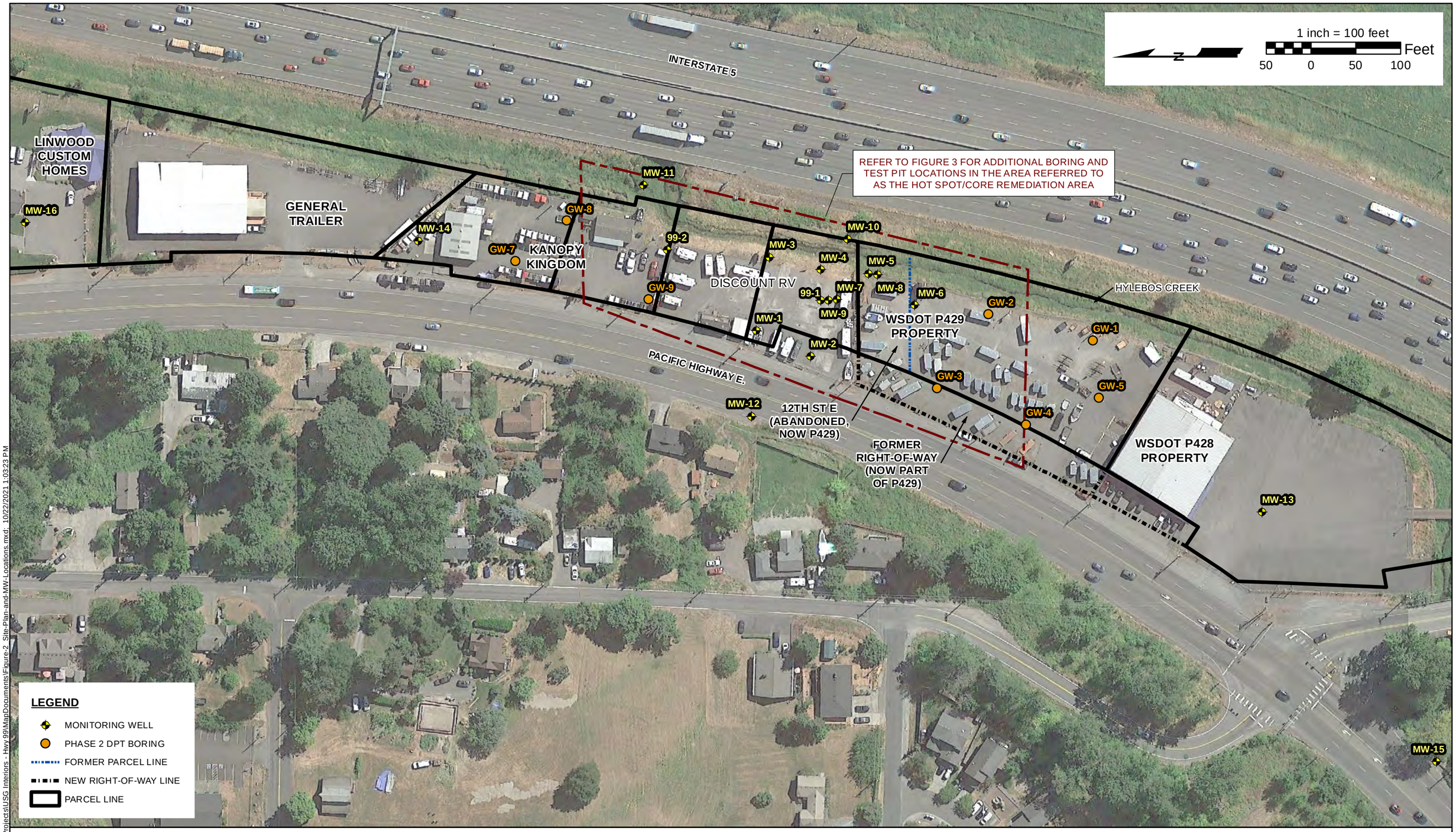
USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 1
VICINITY MAP



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USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 2
SITE PLAN AND REMEDIAL INVESTIGATION GROUNDWATER SAMPLE LOCATION MAP

LEGEND

- PARCEL BOUNDARY
- SURFACE CONTOURS(MAJOR)
- SURFACE CONTOURS(MINOR)
- SOIL BORING LOCATION
- SURFACE SOIL SAMPLE
- GROUNDWATER MONITORING WELL
- SEDIMENT SAMPLE LOCATION
- SURFACE WATER SAMPLE
- TEST PIT LOCATION

CORE REMEDIATION AREA

KANOPY KINGDOM PARCEL

DISCOUNT RV PARCEL

12ST E (ABANDONED)
NOW PART OF P429

WSDOT P429 PARCEL
(FORMERLY FREEWAY TRAILER)

PACIFIC HWY EAST (HWY 99)

P429 PLUS
(EXISTING RIGHT-OF-WAY)

PROPOSED FUTURE
RIGHT-OF-WAY LINE

6' CHAIN LINK FENCE

ECO BLOCK WALL

A

A'

B

B'

N

1" = 40'
20 0 40

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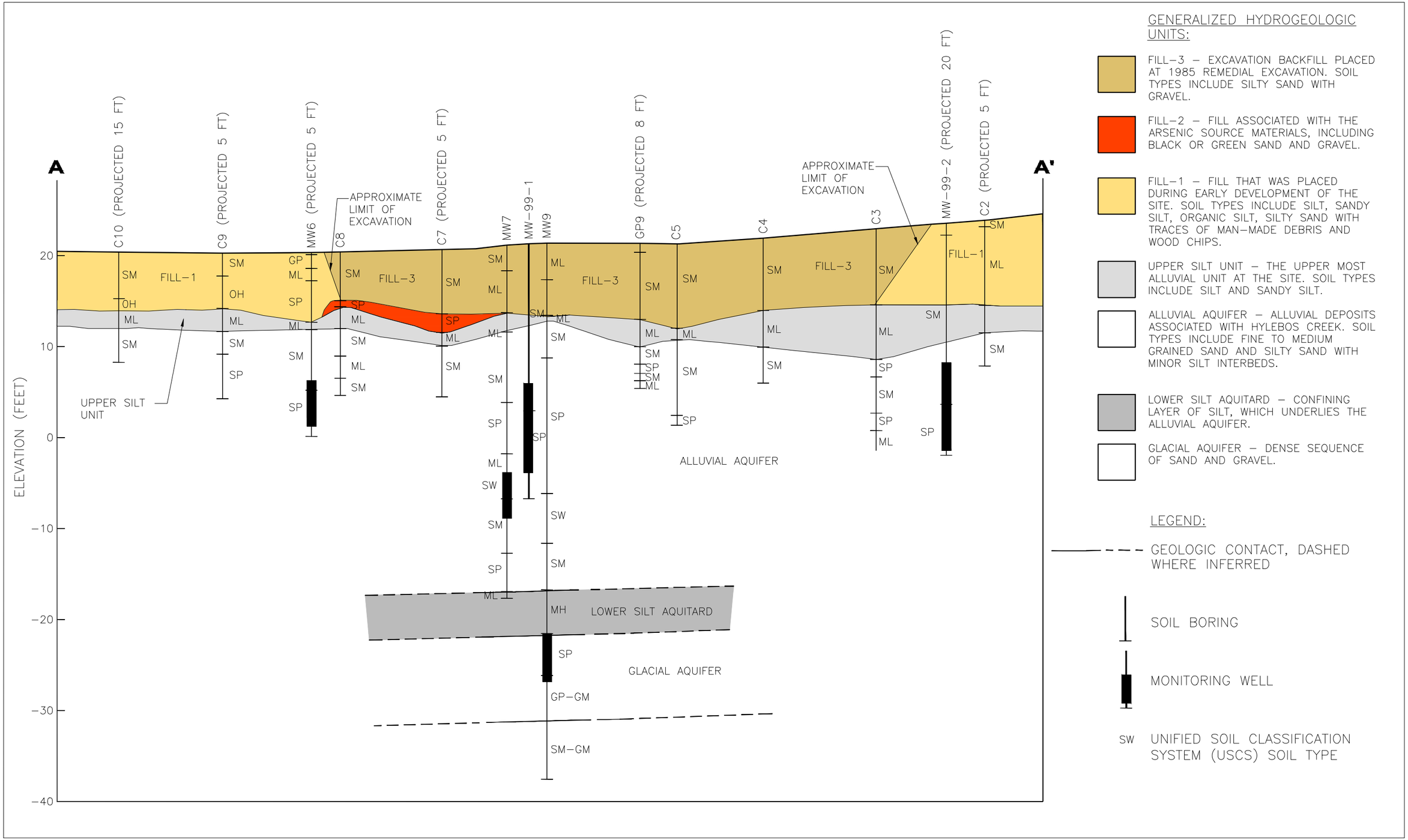
USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 3
CORE REMEDIATION AREA AND
BORING/MONITORING WELL LOCATIONS



GENERALIZED HYDROGEOLOGIC UNITS:

FILL−3 – EXCAVATION BACKFILL PLACED AT 1985 REMEDIAL EXCAVATION. SOIL TYPES INCLUDE SILTY SAND WITH GRAVEL.

FILL−2 – FILL ASSOCIATED WITH THE ARSENIC SOURCE MATERIALS, INCLUDING BLACK OR GREEN SAND AND GRAVEL.

FILL−1 – FILL THAT WAS PLACED DURING EARLY DEVELOPMENT OF THE SITE. SOIL TYPES INCLUDE SILT, SANDY SILT, ORGANIC SILT, SILTY SAND WITH TRACES OF MAN−MADE DEBRIS AND WOOD CHIPS.

UPPER SILT UNIT – THE UPPER MOST ALLUVIAL UNIT AT THE SITE. SOIL TYPES INCLUDE SILT AND SANDY SILT.

ALLUVIAL AQUIFER – ALLUVIAL DEPOSITS ASSOCIATED WITH HYLEBOS CREEK. SOIL TYPES INCLUDE FINE TO MEDIUM GRAINED SAND AND SILTY SAND WITH MINOR SILT INTERBEDS.

LOWER SILT AQUITARD – CONFINING LAYER OF SILT, WHICH UNDERLIES THE ALLUVIAL AQUIFER.

GLACIAL AQUIFER – DENSE SEQUENCE OF SAND AND GRAVEL.

LEGEND:

GEOLOGIC CONTACT, DASHED WHERE INFERRED

SOIL BORING

MONITORING WELL

SW UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) SOIL TYPE

1" = 40'

20 0 40

VERTICAL EXAGGERATION 4X

USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 4
GEOLOGIC CROSS SECTION A-A'

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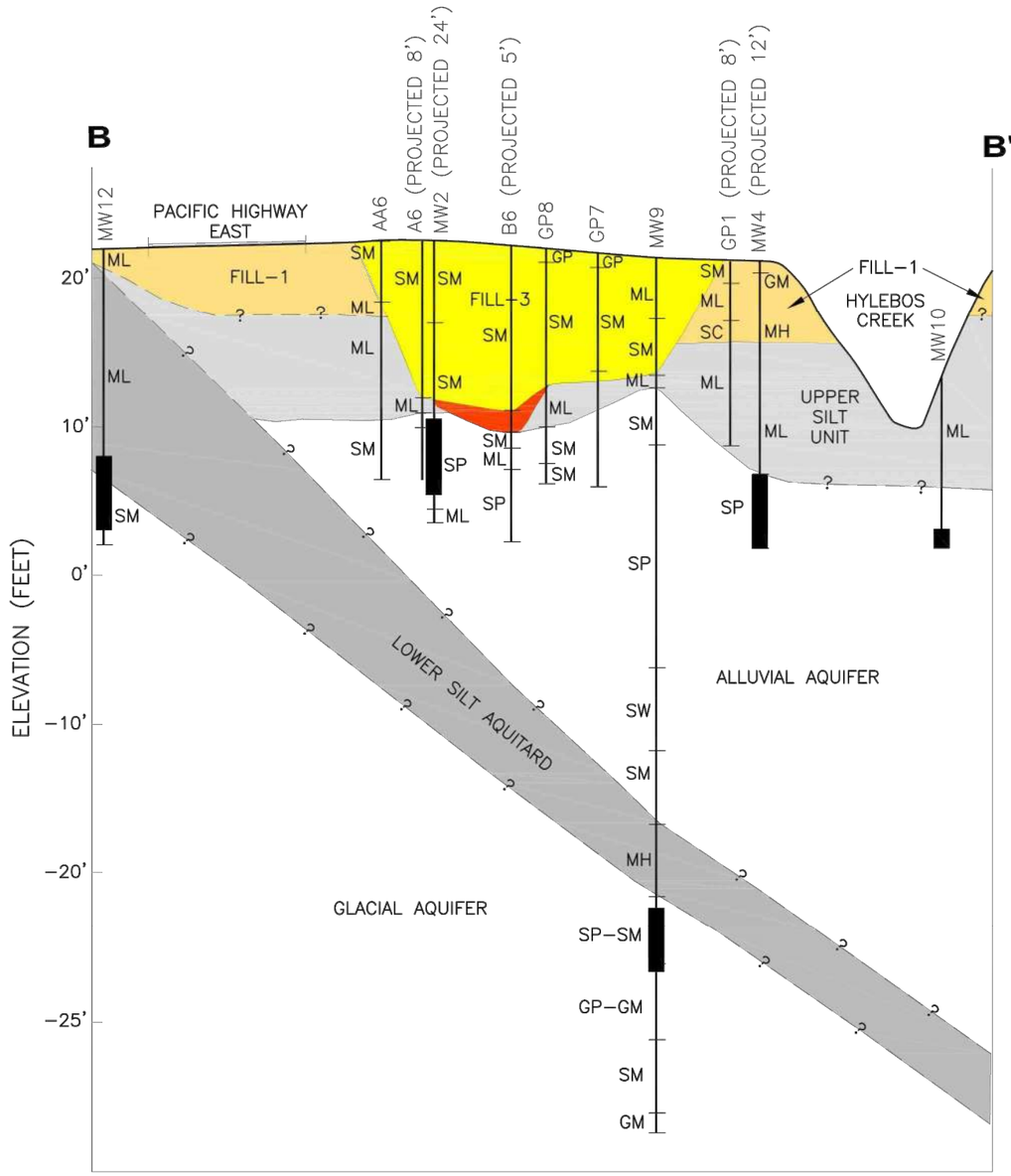


GENERALIZED HYDROGEOLOGIC UNITS:

FILL–3 – EXCAVATION BACKFILL PLACED AT 1985 REMEDIAL EXCAVATION. SOIL TYPES INCLUDE SILTY SAND WITH GRAVEL.

FILL–2 – FILL ASSOCIATED WITH THE ARSENIC SOURCE MATERIALS, INCLUDING BLACK OR GREEN SAND AND GRAVEL.

FILL–1 – FILL THAT WAS PLACED DURING EARLY DEVELOPMENT OF THE SITE. SOIL TYPES INCLUDE SILT, SANDY SILT, ORGANIC SILT, SILTY SAND WITH TRACES OF MAN–MADE DEBRIS AND WOOD CHIPS.

UPPER SILT UNIT – THE UPPER MOST ALLUVIAL UNIT AT THE SITE. SOIL TYPES INCLUDE SILT AND SANDY SILT.

ALLUVIAL AQUIFER – ALLUVIAL DEPOSITS ASSOCIATED WITH HYLEBOS CREEK. SOIL TYPES INCLUDE FINE TO MEDIUM GRAINED SAND AND SILTY SAND WITH MINOR SILT INTERBEDS.

LOWER SILT AQUITARD – CONFINING LAYER OF SILT, WHICH UNDERLIES THE ALLUVIAL AQUIFER.

GLACIAL AQUIFER – DENSE SEQUENCE OF SAND AND GRAVEL.

LEGEND:

GEOLOGIC CONTACT, DASHED WHERE INFERRED

SOIL BORING

MONITORING WELL

SW UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) SOIL TYPE

1" = 40'

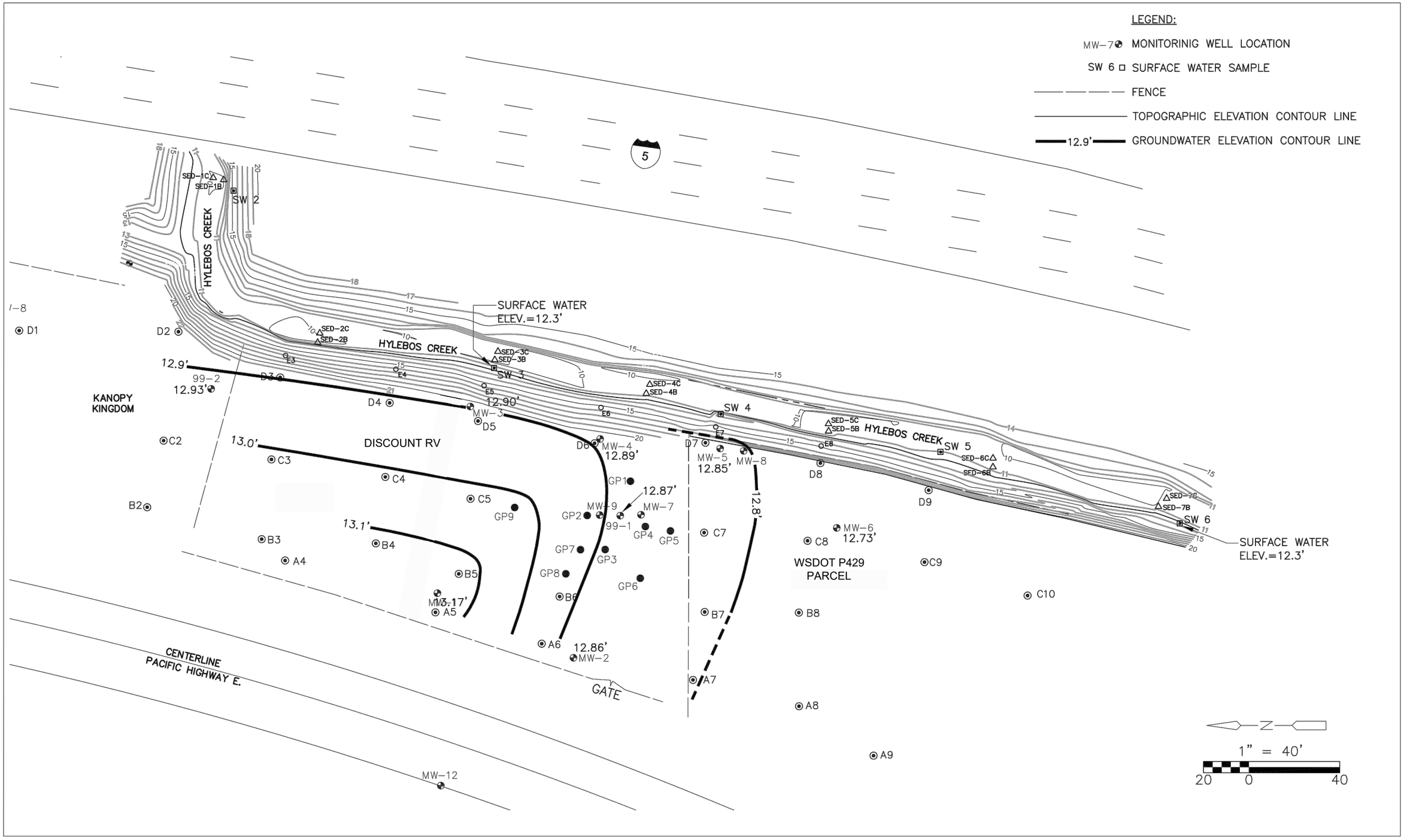
20 0 40

VERTICAL EXAGGERATION 4X

USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 5
GEOLOGIC CROSS SECTION B-B'

C:\pw_pl1\thomastj\d2608406\Figure 5.dwg SAVED:10/1/21 PRINTED:10/1/21 BY: THOMASTJ

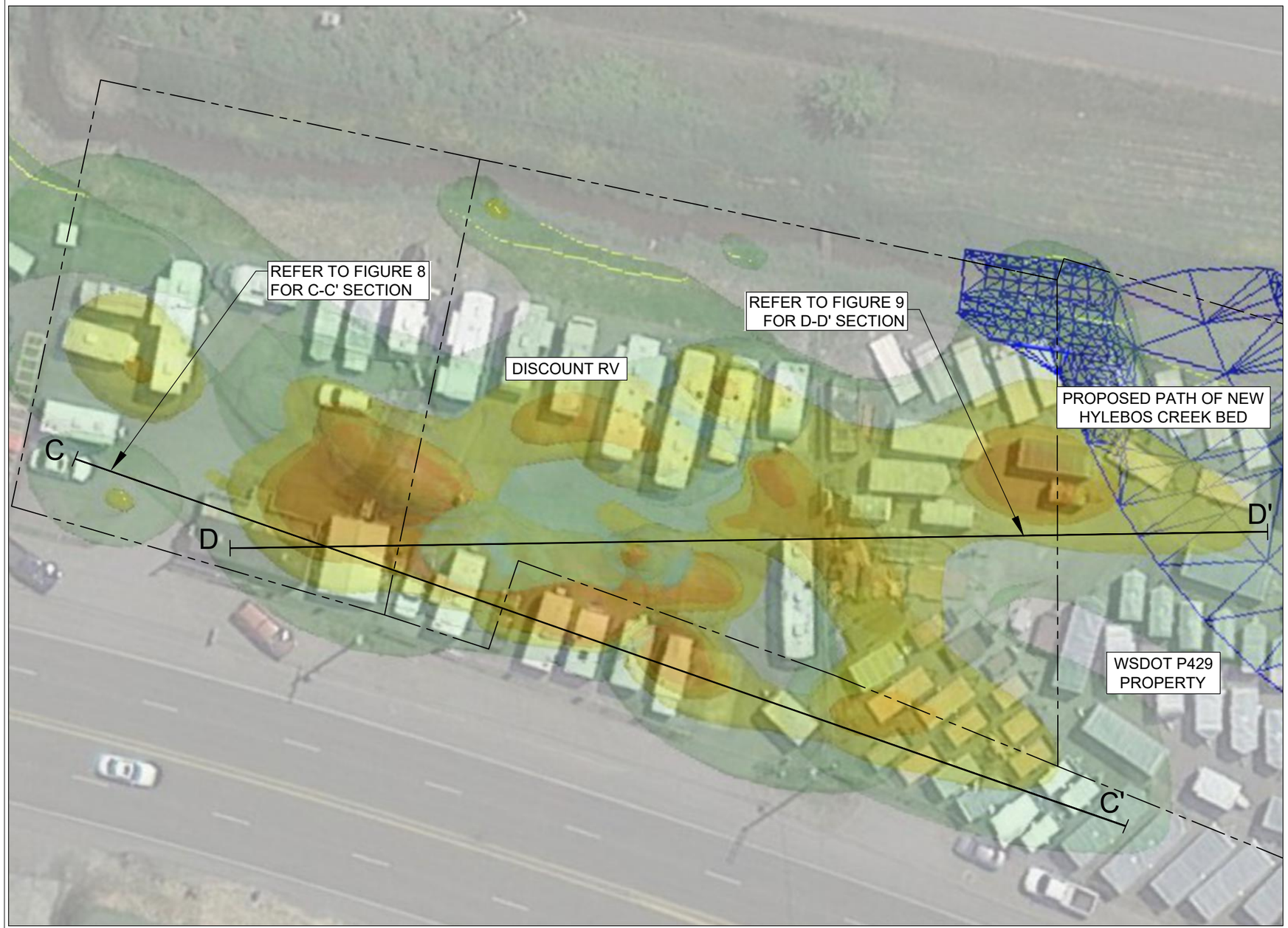


C:\pw_pl1\thomastj\d2608406\Figure 6.dwg SAVED:10/12/21 PRINTED:10/13/21 BY:THOMASTJ

CDM Smith

USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 6
GROUNDWATER ELEVATION CONTOUR MAP
ON JULY 15, 2010



LEGEND:

- ARSENIC CONCENTRATION > 500 PPM
- ARSENIC CONCENTRATION > 250 PPM
- ARSENIC CONCENTRATION > 90 PPM
- ARSENIC CONCENTRATION > 20 PPM
- PARCEL BOUNDARY

NOTE:

PLEASE NOTE THAT THE LEAPFROG SOFTWARE IS LIMITED IN PRESENTING THREE-DIMENSIONAL DATA FOR TWO-DIMENSIONAL VISUALIZATION. COLORS ASSOCIATED WITH THE PLUME CONCENTRATIONS MAY NOT DIRECTLY REFLECT THOSE IDENTIFIED IN THE LEGEND. FOR THE MOST ACCURATE DEPICTION OF THE PLUME COLORATION ASSOCIATED WITH THE PLUME CONCENTRATIONS, PLEASE REFER TO THE CROSS-SECTIONS ON FIGURE 8 AND FIGURE 9.

ACRONYMS:

PPM PARTS PER MILLION

DATA REFERENCES:

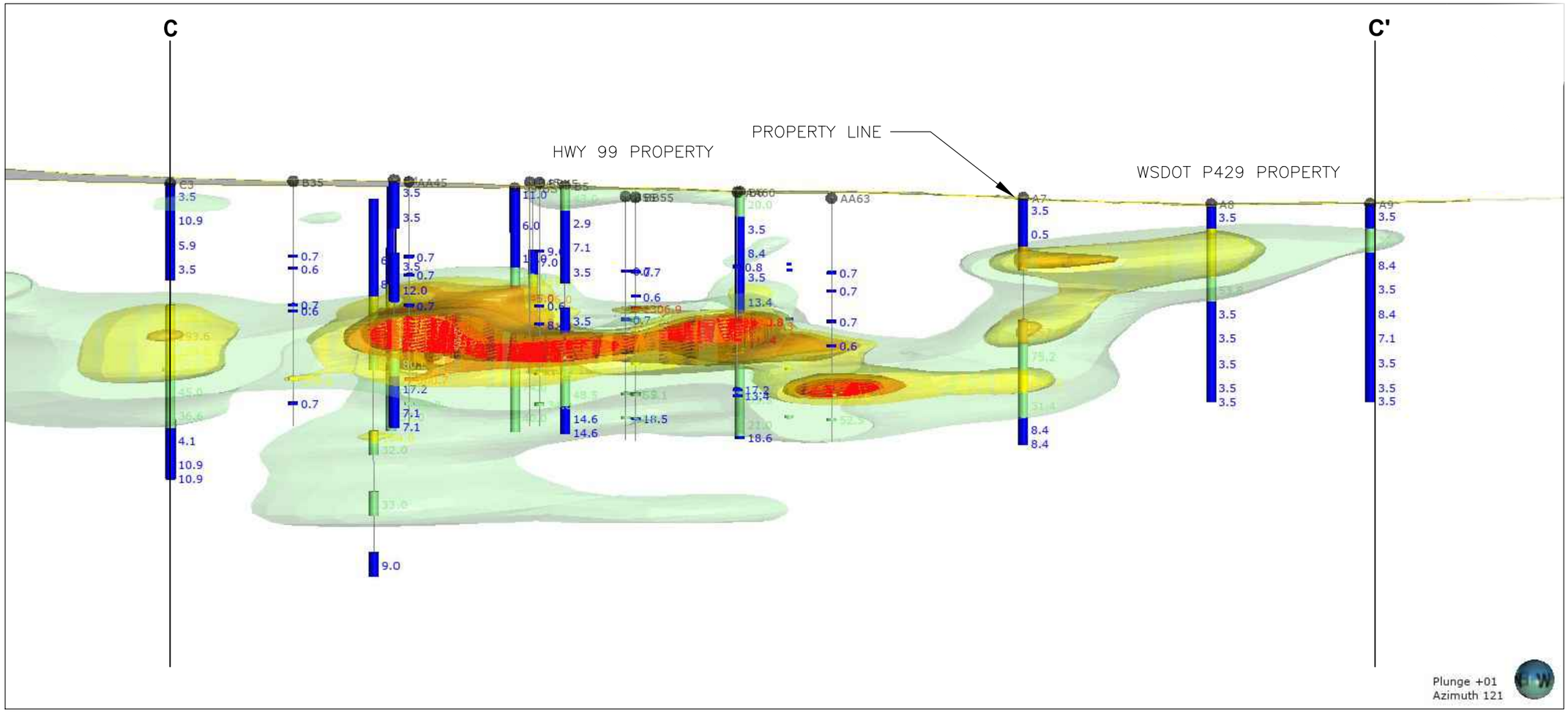
SURVEY, ANALYTICAL DATA COLLECTED, AND LEAPFROG MODEL BY CDM SMITH.

C:\pw_pl1\casean\d3124383\Figure 7.dwg SAVED: 6/28/22 PRINTED: 6/28/22 BY: CASEAN

CDM Smith

USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 7
LEAPFROG MODEL EXTENTS OF ARSENIC IN SOIL
PLAN VIEW



LEGEND:

- ARSENIC CONCENTRATION > 500 PPM
- ARSENIC CONCENTRATION > 250 PPM
- ARSENIC CONCENTRATION > 90 PPM
- ARSENIC CONCENTRATION > 20 PPM
- ARSENIC CONCENTRATION < 20 PPM

ACRONYMS:

PPM PARTS PER MILLION

DATA REFERENCES:

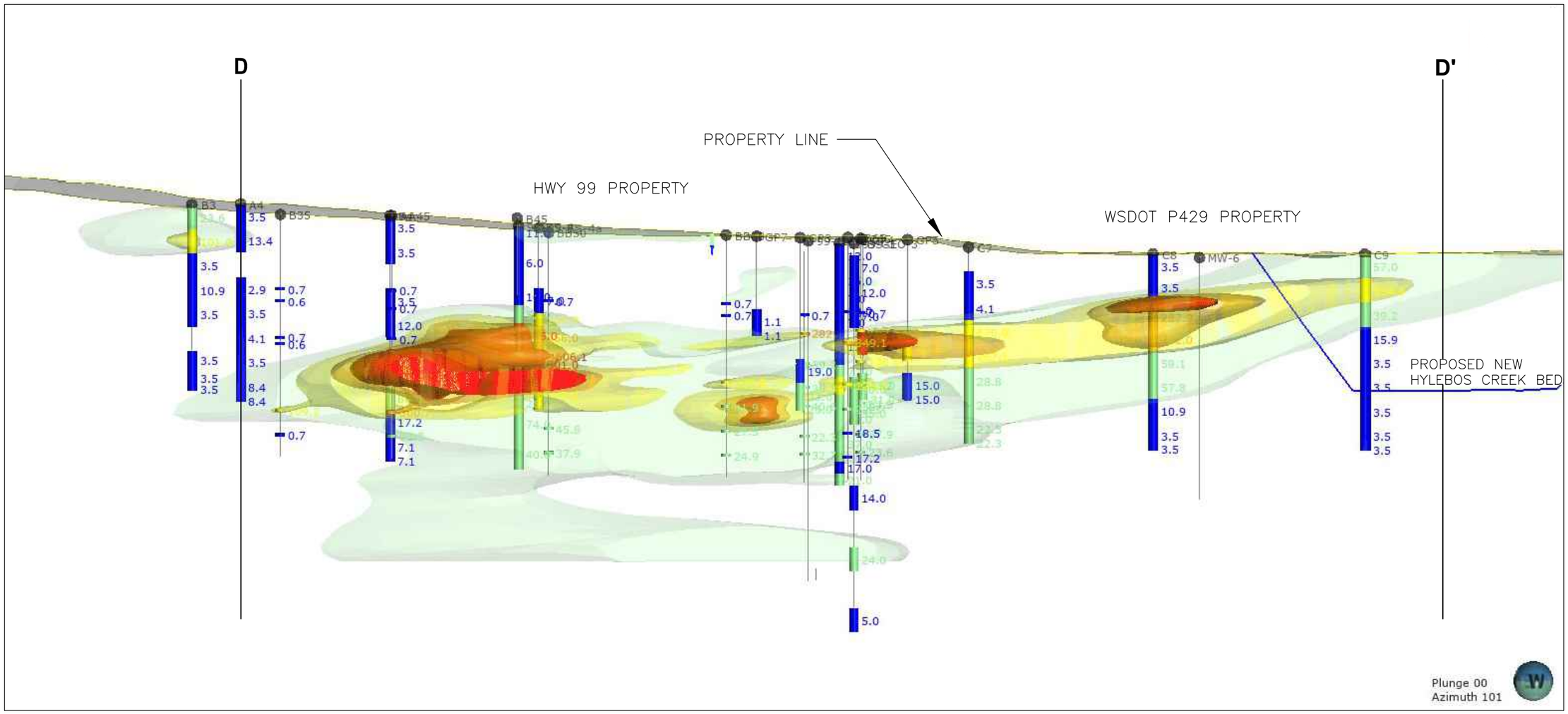
SURVEY, SUBSURFACE, AND ANALYTICAL DATA COLLECTED AS PART OF THE REMEDIAL INVESTIGATION AND LATER INVESTIGATIONS PERFORMED BY CDM SMITH.

CDM Smith

USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 8
LEAPFROG MODEL CROSS SECTION C-C'

C:\pw_pl1\casean\d3124383\Figure 8.dwg SAVED: 6/28/22 PRINTED: 6/28/22 BY: CASEAN



LEGEND:

- ARSENIC CONCENTRATION > 500 PPM
- ARSENIC CONCENTRATION > 250 PPM
- ARSENIC CONCENTRATION > 90 PPM
- ARSENIC CONCENTRATION > 20 PPM
- ARSENIC CONCENTRATION < 20 PPM

ACRONYMS:

PPM PARTS PER MILLION

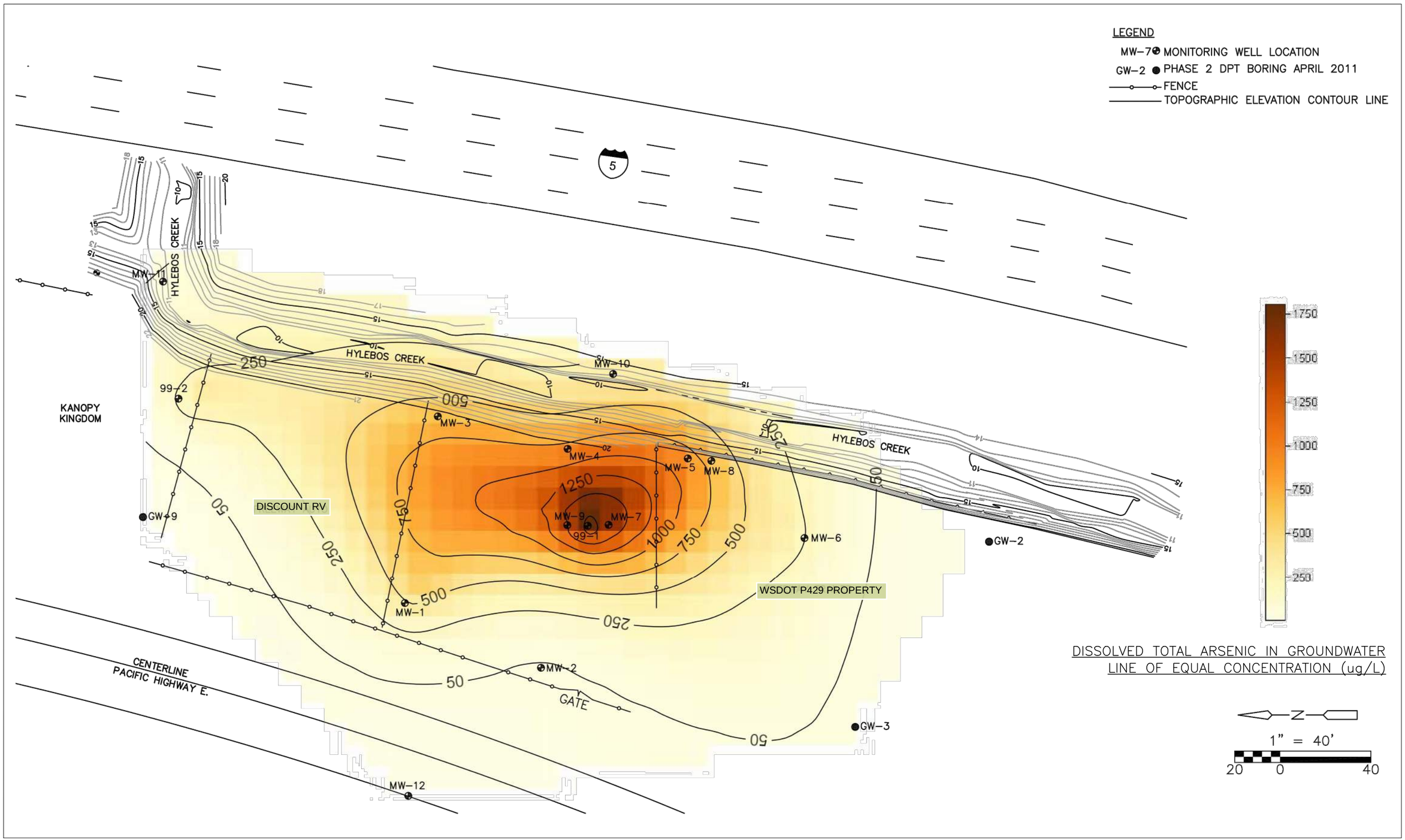
DATA REFERENCES:

SURVEY, SUBSURFACE, AND ANALYTICAL DATA COLLECTED AS PART OF THE REMEDIAL INVESTIGATION AND LATER INVESTIGATIONS PERFORMED BY CDM SMITH.

CDM Smith

USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 9
LEAPFROG MODEL CROSS SECTION D-D'



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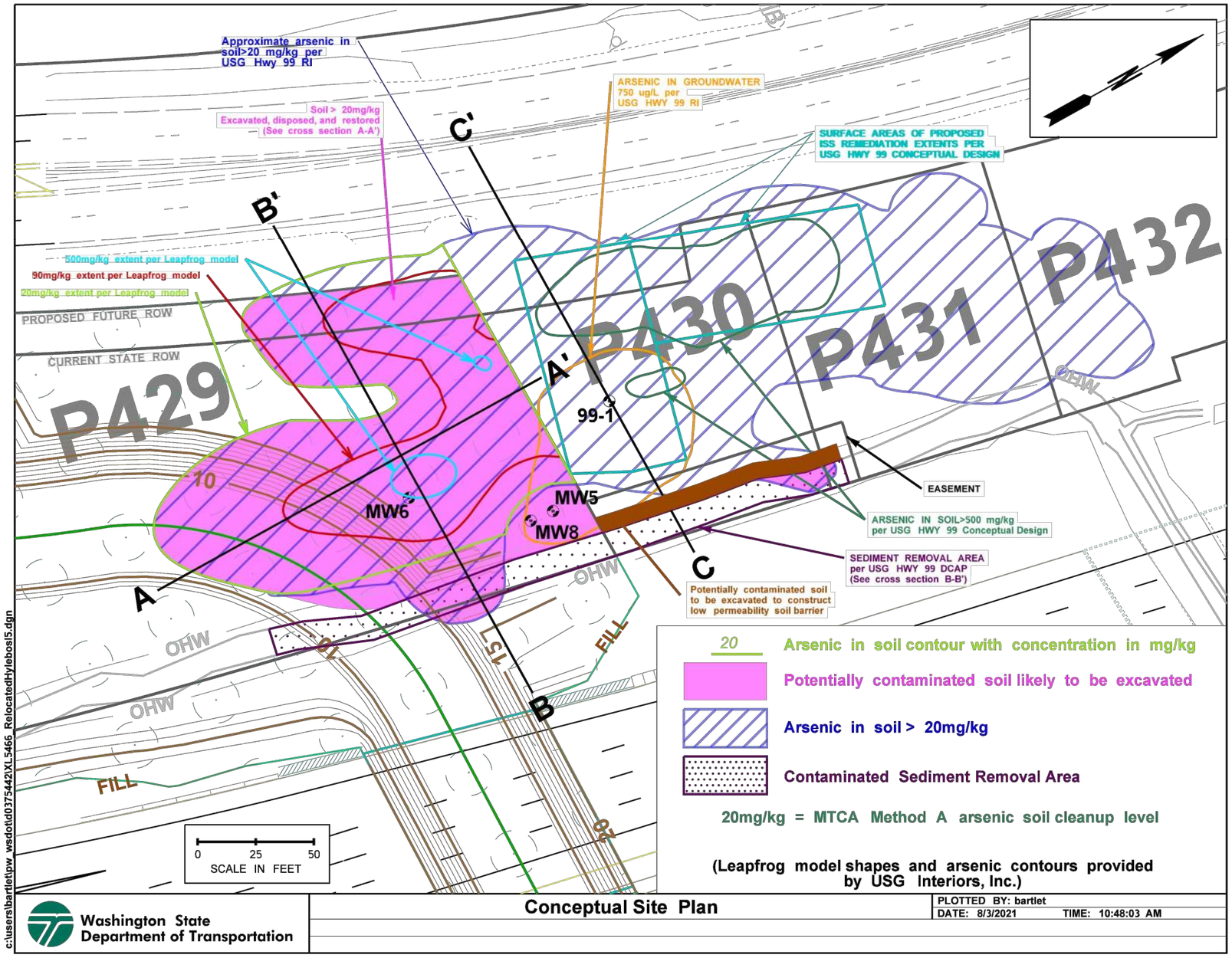
CDM Smith

USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 10
DISSOLVED ARSENIC IN GROUNDWATER
(2010-2012)



REFERENCE: INNOVEX ENVIRONMENTAL MANAGEMENT, INC. 2021. SR 167/I–5 TO SR 509 – NEW EXPRESSWAY, USG HIGHWAY 99 SITE, HYLEBOS CREEK CONTAMINATED SEDIMENT REMOVAL AND PARCEL P 429 PLUS SOIL EXCAVATION, INTERIM ACTION WORK PLAN, PREPARED FOR WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. SEPTEMBER 15.

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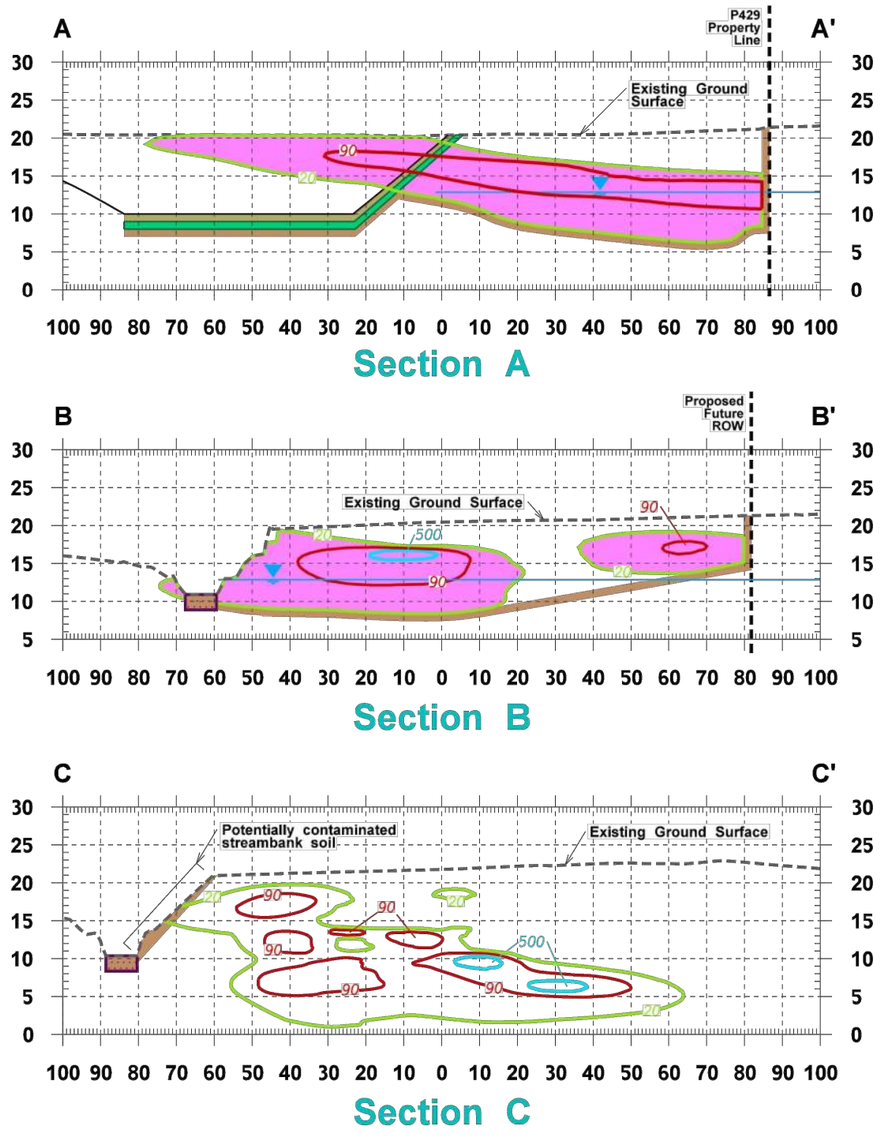
CDM Smith

USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 11
PLANNED REMEDIAL EXCAVATION WSDOT P429 PLUS PROPERTY AND CREEK BED - PLAN VIEW



12" Streambed Sediment

12" Erosion Control Riprap

12" Low Permeability Soil Barrier (except in Sediment Removal Area which is 24")

Potentially contaminated soil

Contaminated Sediment Removal

Water Table July 2015

20 Arsenic in soil contour with concentration in mg/kg (Arsenic contours from Leapfrog model provided by USG)

Washington State Department of Transportation

Representative Cross Sections

Cross Section A-A' is Proposed Hylebos Creek and Arsenic Contamination from USG Site

Cross Section B-B' is Existing Hylebos Creek and Arsenic Contamination from USG Site

PLOTTED BY: bartlet
DATE: 9/2/2021 TIME: 1:15:18 PM

c:\users\bartlet\pw_wsdot\d0375442\XL5466_RelocatedHylebosIS5.dgn

C:\pw_pl1\casean\d3124383\Figure 13.dwg SAVED: 6/27/22 PRINTED: 6/28/22 BY: CASEAN

REFERENCE: INNOVEX ENVIRONMENTAL MANAGEMENT, INC. 2021. SR 167/I–5 TO SR 509 – NEW EXPRESSWAY, USG HIGHWAY 99 SITE, HYLEBOS CREEK CONTAMINATED SEDIMENT REMOVAL AND PARCEL P 429 PLUS SOIL EXCAVATION, INTERIM ACTION WORK PLAN, PREPARED FOR WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. SEPTEMBER 15.

CDM Smith

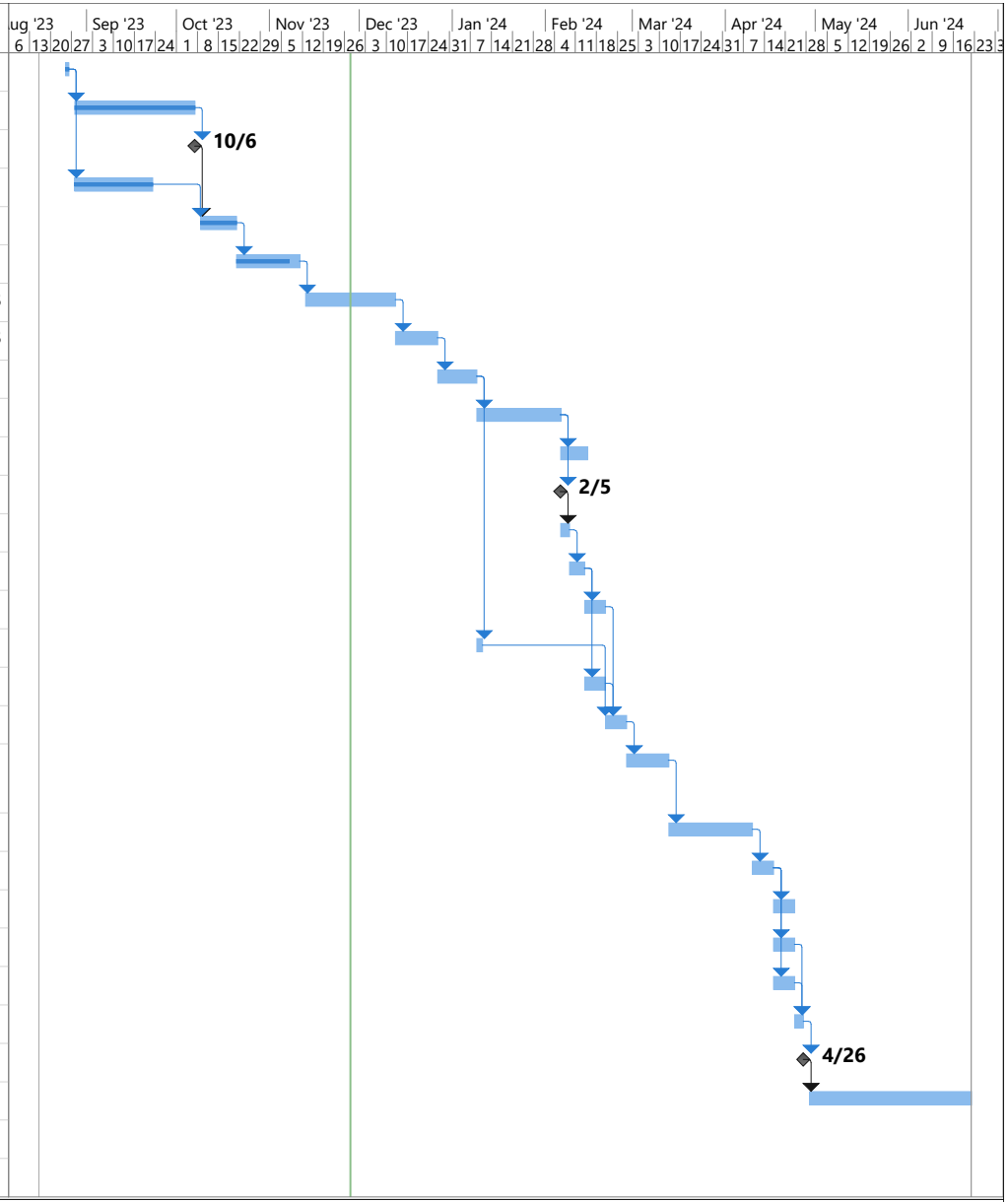
USG INTERIORS/HIGHWAY 99 SITE
MILTON, WASHINGTON

FIGURE NO. 12
PLANNED REMEDIAL EXCAVATION WSDOT P429 PLUS PROPERTY AND CREEK BED - CROSS SECTION VIEWS

Appendix A

Project Schedule

ID	Task Name	Duration	Start	Finish
1	EDR Submittal to Ecology	1 day	Fri 8/25/23	Fri 8/25/23
2	EDR Review by Ecology	30 days	Mon 8/28/23	Fri 10/6/23
3	EDR Approval by Ecology	0 days	Fri 10/6/23	Fri 10/6/23
4	Design Finalization	20 days	Mon 8/28/23	Fri 9/22/23
5	Bid Package(s) development	10 days	Mon 10/9/23	Fri 10/20/23
6	Bid Package(s) issuance	15 days	Fri 10/20/23	Fri 11/10/23
7	Responses from bidders	22 days	Mon 11/13/23	Tue 12/12/23
8	Bid Evaluations	10 days	Wed 12/13/23	Tue 12/26/23
9	Bid Awards	9 days	Wed 12/27/23	Mon 1/8/24
10	Contractor Work Plan Development	20 days	Tue 1/9/24	Mon 2/5/24
11	Review of Work Plans	7 days	Tue 2/6/24	Wed 2/14/24
12	Approval of Plans	0 days	Mon 2/5/24	Mon 2/5/24
13	Mobilization	3 days	Tue 2/6/24	Thu 2/8/24
14	Site Preparation, incl Erosion Control	3 days	Fri 2/9/24	Tue 2/13/24
15	Utility removal/reroute	5 days	Wed 2/14/24	Tue 2/20/24
16	Well abandonment	2 days	Tue 1/9/24	Wed 1/10/24
17	Demolition	5 days	Wed 2/14/24	Tue 2/20/24
18	Cover soil removal/stockpile	5 days	Wed 2/21/24	Tue 2/27/24
19	Insitu Stabilization Quality Control Demonstration	10 days	Wed 2/28/24	Tue 3/12/24
20	Insitu Stabilization	20 days	Wed 3/13/24	Tue 4/9/24
21	Cover soil replacement	5 days	Wed 4/10/24	Tue 4/16/24
22	Off-site soil disposal (if needed)	5 days	Wed 4/17/24	Tue 4/23/24
23	Structural fill and Asphalt Paving	5 days	Wed 4/17/24	Tue 4/23/24
24	Seeding/restoration (as needed)	5 days	Wed 4/17/24	Tue 4/23/24
25	Demobilization	3 days	Wed 4/24/24	Fri 4/26/24
26	Field Completion	0 days	Fri 4/26/24	Fri 4/26/24
27	Draft Reports to Ecology	40 days	Mon 4/29/24	Fri 6/21/24
28				
29				



Project: USG Hwy 99 Remediati
Date: Tue 11/28/23

Task	Inactive Task	Manual Summary Rollup	External Milestone
Split	Inactive Milestone	Manual Summary	Deadline
Milestone	Inactive Summary	Start-only	Progress
Summary	Manual Task	Finish-only	Manual Progress
Project Summary	Duration-only	External Tasks	

Appendix B

Design Specifications

SECTION 01 11 02
SUMMARY OF WORK

PART 1 GENERAL

1.01 LOCATION OF WORK

A. The work under this Contract is for the USG Interiors LLC (USGI) Highway 99 Site, located in Milton, Pierce County, Washington.

B. The northern section of the Washington State Department of Transportation (WSDOT) P430 property will be available for use as a staging area, material stockpile, and batch plant location.

1.02 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required to excavate, treat, and restore the impacted soils located at the Highway 99 site construction project in its entirety as shown on the Drawings and as specified herein.

B. The Work includes, but is not necessarily limited to, the following:

1. Provide work plans, schedule and other submittals in accordance with the specifications.

2. Conduct all necessary surveys for the completion of the project.

3. Install erosion and sediment control features as shown on the Drawings and specified herein.

4. Site preparation including developing site access, staging area setup, installation of temporary facilities, construction fence, and access roads and removal/abandonment of existing monitoring wells/piezometers and other obstructions as shown on the Drawings.

5. Perform earthwork including pre-excavation of material, insitu solidification of impacted soils, and backfilling using pre-excavated soils to achieve the design grades shown on the Drawings.

6. Haul and dispose of excess excavated soils in accordance with the applicable technical specifications.

7. Perform site clean-up and restoration activities in accordance with the specifications.

8. Provide as-built drawings and records in accordance with the specifications.

1.03 WORK SEQUENCE

A. Perform Work in the suggested construction sequence as identified in Section 1.02 above or in accordance with the work plan approved by the Engineer.

1.04 CONTRACTOR'S USE OF PREMISES

A. Contractor shall have complete and exclusive use of the Highway 99 site for the performance of the Work as shown on the Drawings.

B. Contractor will have shared use of WSDOT P430 for the performance of the Work as shown on the Drawings.

C. Contractor shall limit the use of the premises for his/her Work and for storage to allow for:

1. Work by other contractors.

D. Coordinate use of premises with WSDOT and Engineer.

E. Contractor shall assume full responsibility for security of all his/her materials equipment and his/her subcontractor's materials and equipment stored on the site.

F. If directed by the WSDOT or Engineer, move any stored items which interfere with operations of WSDOT or other contractors.

1.05 PRODUCTS

A. Contractor's Responsibilities

1. Arrange for and deliver necessary shop drawings, product data and samples to the Engineer.

2. Arrange and pay for delivery of items to site.

3. Deliver supplier's bill of materials to Engineer.

4. Receive, unload, and log items at site.

5. Inspect items jointly with Engineer and record any shortages, damaged or defective items.

6. Assume responsibility for items, including insurance, upon acceptance of items at site.

7. Handle items at site, including uncrating and storage. Protect items from exposure to elements and damage.

8. Assemble, install, connect and finish products and provide warranty for Contractor furnished material and workmanship as specified.

9. Repair or replace items damaged as a result of Contractor's work.

END OF SECTION

SECTION 01 20 00
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SCOPE

A. This Section includes specification for the measurement and payment of the various elements of the Work; with provisions applicable to lump sum prices, unit prices, and allowances, if applicable.

B. In the case of conflict between this Section and the measurement methods specified in the individual technical Sections, the measurement methods in the technical specifications shall govern.

C. The Contractor shall receive no payment for any portion of the work until it is installed. The only exception to this is payment for stored materials on site if the Contract provides for the payment of stored materials. Partial payment may be requested for items partially installed.

1.2 LUMP SUM ITEMS

A. Lump Sum measurement will be for the entire item, unit of work, structure, or combination thereof, as specified and as indicated in the Basis of Payment. Measurement and payment for all bid items indicated as Lump Sums shall include the cost of all labor, materials and equipment necessary to furnish, install, clean, test, and place each bid item into operation; including permitting, general conditions, overhead and profit.

B. Progress payments will be based on the Schedule of Values prepared by the Contractor and approved by the Engineer and Owner before acceptance of the first Application for Payment.

C. For the Contractor to request progress payments against Lump Sum items, the Contractor shall provide a disaggregation or breakdown in sufficient measurable detail that is acceptable to the Engineer.

D. Measurement

1. Measurement shall be based on the estimated percent complete of each item of the Schedule of Values, as determined by the Engineer.

E. Payment

1. Payment will be made at the lump sum price proportional to the completion percentages approved by the Engineer.

1.3 UNIT PRICE ITEMS

A. Quantity and measurement estimates stated in the Request for Proposal (RFP) are estimates for bidding purposes only. Actual payments outside lump sum pricing shall be based on actual quantities installed, in-place, as measured and/or verified by the Engineer.

B. Unless otherwise provided in the General Conditions, the bid unit prices shall be in effect throughout the contract duration, regardless of variances between the estimated quantities and the actual installed quantities.

C. The Contractor shall make no claim, nor receive any compensation, for anticipated profits, loss of profit, damages, or any extra payment due to any difference between the amounts of work actually completed, or materials or equipment furnished, and the estimated quantities.

D. Unless otherwise approved by the Owner, any unit quantities exceeded may not be invoiced until the estimated quantity is increased by contract change order.

E. Contractor shall assist Engineer by providing necessary equipment, workers, and survey personnel as required to measure quantities.

F. Measured quantities shall be rounded to the nearest whole integer, unless the value of the unit price exceeds [$100], in which case measured quantities shall be rounded to the nearest half unit.

G. Measurement

1. Measurement for progress payment shall be made by, or approved by, the Engineer based on the estimated effective quantity installed. The effective quantity installed represents the actual units or quantities installed, adjusted for incomplete elements or components.

2. Unless otherwise provided for in the RFP unit price items are all inclusive of all related work, direct and indirect, to provide a complete and functional item. For example, underground pipe installation would include trenching, shoring, dewatering, bedding, installation, backfill, testing, flushing, disinfection, and commissioning; including all labor, materials, and equipment necessary to furnish, install, clean, test, and place into operation; including permitting, general conditions, overhead and profit.

3. The final measurement shall be based on actual quantities, jointly measured by Contractor and Engineer, complete, fully, tested, and placed into service.

H. Payment

1. Progress payments shall be in accordance with the contract documents based on estimated effective quantities installed, paid at the bid unit price.

2. The final payment shall be based on actual quantities, fully installed, tested, and placed into service, paid at the bid unit price.

1.4 ALLOWANCES

A. Allowances, if any, specified in the Contract Documents and indicated in the RFP are considered provisional amounts to be used only if needed. Allowances are exclusive of work indicated in the Contract Documents for which payment is included under other items in the RFP. No work may be performed under an allowance without the prior written approval of the Owner.

B. Any unused balance of the allowances shall revert to the Owner upon completion of the project. Prior to final payment, the original amount provided for allowances shall be adjusted to actual costs by deductive Change Order, adjusting the contract price, accordingly.

C. The Contractor shall make no claim, nor receive any compensation, for anticipated profits, loss of profit, damages, or any extra payment due to any unexpended portion of the allowances.

D. The Contractor is to include time for allowance work in the construction schedule. No adjustment of Contract Time shall be allowed for any work performed under allowance items.

E. Allowance items shall be included in the Schedule of Values.

F. Unless otherwise indicated in the specific measurement and payment provisions under allowance items, the measurable and allowable costs for work performed under an Allowance item shall be limited to the actual, demonstrable, and direct costs associated with that Allowance item. Shipping and sales taxes are allowable costs.

    1. No mark-up for overhead or profit shall be included for payment under an Allowance account item. Overhead and profit shall be included in the contract base bid or allocated across other bid items.

    2. Work authorized by the Owner under an allowance may be performed as a lump sum (negotiated before the fact), unit prices (when applicable), or time and material. For work performed under time and material, Contractor shall submit detailed verification (break-down) of all costs, subject to the approval of the Engineer or Owner.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – REFER TO INVITATION TO BID

3.1 MOBILIZATION/DEMOBILIZATION

A. Measurement and payment by lump sum (LS)

B. Payment will be made for all costs associated with the furnishing, setup, and removal of all equipment associated with the completion of the scope of work. This shall include all costs associated with the following items:

    1. Transportation of equipment and personnel to and from the site.

2. Decontamination of equipment.

3. Incidental tools and materials.

4. Ensuring security of Subcontractor's equipment and supplies during non-working hours.

5. Site cleanup.

6. All charges incidental to equipment set-up and removal (in order that the charges need not be distributed among the more variable items of the Contract).

7. Demobilization shall include removal of all Subcontractor equipment, supplies, and material from the site.

8. All charges incidental to the Subcontractor's cost for safety training, and medical surveillance for their employees including drill crew, superintendent, and equipment operators.

9. All other costs not specifically included in other bid items.

3.2 UTILITY SURVEY/LOCATION

A. Measurement and payment by lump sum (LS)

B. Payment will be made for all costs associated with locating utilities prior to the start of work

3.3 EROSION CONTROL

A. Measurement and payment by lump sum (LS)

B. Payment will be made for all costs associated with the furnishing, setup, and removal of all erosion and sediment controls as specified in section 31 25 00 and shown on the Drawings. This shall include:

1. Furnishing and installation of straw wattles and silt fencing

2. Plastic sheeting for stockpile management.

3.4 STORMWATER PIPE PLUG AND BYPASS

A. Measurement by LS.

B. Payment will be made for all costs associated with plugging and bypassing the stormwater pipe as shown on the Drawings.

3.5 REMOVAL/REPLACE STORMWATER CORRUGATED METAL PIPE

A. Measurement by LS.

B. Payment will be made for all costs associated with the removal and replacement of the stormwater pipe as shown on the Drawings.

3.6 CONCRETE SLAB DEMOLITION & RECYCLING/DISPOSAL

A. Measurement by each (EA).

B. Payment will be made for all costs associated with the demolition and offsite recycling or disposal of concrete slab associated with the shed. This includes any labor, equipment, transportation, and disposal fees associated with the slab removal.

3.7 ASPHALT REMOVAL & RECYCLING/DISPOSAL

A. Measurement by cubic yard (CY).

B. Payment will be made for all costs associated with the demolition and offsite recycling or disposal of asphalt pavement marked for removal on the Drawings. This includes any labor, equipment, transportation, and disposal fees associated with the asphalt removal.

3.8 STORAGE SHED DEMOLITION

A. Measurement by LS.

B. Payment will be made for all costs associated with the demolition and offsite disposal of the storage shed located on the northern portion of the site.

3.9 CLEAN COVER REMOVAL AND STOCKPILE/COVER

A. Measurement by LS.

B. Payment will be made for all labor and equipment costs associated with the excavation, handling, and stockpiling of clean overburden soils (Approximately 2,120 cubic yards). Materials shall be handled and stockpiled in accordance with these specifications.

3.10 FILL REPLACEMENT OVER SOLIDIFIED MATERIAL AND COMPACTION

A. Measurement by LS.

B. Payment will be made for all labor and equipment costs associated with the backfilling and compaction of clean overburden soils (Approximately 2,120 cubic yards) over ISS treated materials.

3.11 WORK PLANS

A. Measurement by LS.

B. Payment will be made for the preparation of all required work plans described in the specifications. This includes the following:

1. Health and Safety Plan

2. ISS Work Plan

3. Quality Control Plan

3.12 SITE PREPARATION WORK FOR STABILIZATION

A. Measurement by LS.

B. Payment will be made for all labor and equipment costs associated with work associated with getting the site ready for ISS. This includes setting up equipment pads, preparing a batch plant, and removal of monitoring wells. Labor associated with the excavation or handling of overburden materials is not included under this item. Any costs previously covered under the mobilization bid item should be excluded from this item.

3.13 ISS IMPLEMENTATION

A. Measurement by LS.

B. Payment will be made for labor associated with import, preparation, and application of the admixture. This includes the following:

1. An approximate volume of 5,140 cubic yards of insitu soil treated for the pilot study area shown on the Drawings. Treatment depth between the four treatment areas varies from 15 to 20 feet bgs.

2. Identifying the additional volume of water needed to fully cure the in-situ soils.

3. Identifying the “swell” or soil bulking factors after in-situ mixing is complete.

4. Wet sampling materials for quality assurance testing. The Subcontractor will be responsible for the collection of the wet samples and the Engineer will be responsible for the preparation and testing of the samples.

5. Materials include Portland cement, bentonite, ferrous sulfate heptahydrate, bulking sand.

3.14 LOAD/HAUL/DISPOSAL OF EXCESS UNCONTAMINATED SOIL (WITHIN 50 MILE RADIUS)

A. Measurement by cubic yard (TON) as measured by disposal tickets.

B. Payment will be made for the transportation and offsite disposal of excavated overburden determined to be suitable for reuse by the Engineer. Material shall be taken to an approved offsite facility within a 50 mile radius of the site.

3.15 TRANSPORTATION AND DISPOSAL OF EXCESS OVERBURDEN

A. Measurement by cubic yard (TON) as measured by disposal tickets.

B. Payment will be made for the transportation and offsite disposal of excavated overburden determined to be unsuitable for reuse by the Engineer. Material shall be taken to an approved licensed Subtitle D facility within a 50 mile radius of the site.

END OF SECTION

SECTION 01 32 13
CONTROL OF WORK

PART 1 GENERAL

1.01 PLANT AND EQUIPMENT

A. Furnish plant and equipment which will be efficient, appropriate, and large enough to secure a satisfactory quality of work and a rate of progress that will ensure the completion of the work within the Contract Time. If at any time such plant appears to be inefficient, inappropriate, or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, CQA Personnel may order the Contractor to increase the efficiency, change the character or increase the plant equipment and the Contractor shall conform to such order. Failure of the CQA Personnel to give such an order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

1.02 PRIVATE LAND

A. Do not enter or occupy private land outside of easements, except by written permission of the land owner.

1.03 PRE-EXCAVATIONS

A. Adequately safeguard all pre-excavations by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property. If the pre-excavation becomes a hazard, the CQA Personnel may require special construction procedures.

1.04 MAINTENANCE OF TRAFFIC

A. Unless permission to close a street is received in writing from the proper authority, place all excavated material so that vehicular and pedestrian traffic may be maintained at all times. If the construction operations cause traffic hazards, repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the CQA Personnel.

B. Detours around construction will be subject to the approval of the Owner and the CQA Personnel. Where detours are permitted, provide all necessary barricades and signs as required to divert the flow of traffic. Expedite construction operations while traffic is detoured. Periods when traffic is being detoured will be strictly controlled by the Owner.

C. Take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. Be fully responsible for damage or injuries whether or not police protection has been provided.

1.05 CARE AND PROTECTION OF PROPERTY

A. Be responsible for the preservation of all public and private property and use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, restore such property to a condition similar or equal to that existing before the damage was done, or make good the damage in other manner acceptable to the CQA Personnel.

1.06 WATER FOR CONSTRUCTION PURPOSES

A. The approval of the Owner shall be obtained before water is used. Waste of water shall be sufficient cause for withdrawing the privilege of unrestricted use. Hydrants shall only be operated under the supervision of the Owner's personnel.

1.07 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

A. During the course of the work, keep the site of operations as clean and neat as possible. Dispose of all residue resulting from the construction work and, at the conclusion of the work, remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations and leave the entire site of the work in a neat and orderly condition.

B. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, comply with all applicable Federal, State, and local laws and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and in other related sections.

C. Disposal of excess excavated material in wetlands, stream corridors, and plains is strictly prohibited even if the permission of the property owner is obtained. Any violation of this restriction by the Contractor or any person employed by him will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. The Contractor will be required to remove the fill and restore the area impacted at no increase in the Contract Price.

END OF SECTION

SECTION 01 35 29

HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

A. Section includes:

1. Prepare and implement a Health and Safety Plan (HASP) to establish in detail the protocols necessary for protecting workers, facility staff and neighboring community from potential hazards that may be encountered during the project. Work performed shall meet all Federal, State, and local health and safety requirements.
2. Utilize the services of a health and safety professional designated the Health and Safety Manager (HSM) to develop and implement the HASP, including the air monitoring program if required, conduct initial site-specific training and provide support for all health and safety activities as needed.
3. In addition, provide a Site Safety and Health Officer (SSHO) to assist and represent the HSM in the continued implementation and enforcement of the HASP. The SSHO shall be assigned to the site on a full-time basis and shall be either the Contractor's employee or a subcontractor who reports to the Contractor and the HSM in matters pertaining to site safety and health.

B. Related Requirements:

1. Section 014000 for Quality Requirements

1.3 DEFINITIONS

A. Health and Safety Manager (HSM): The Contractor's employee or a subcontractor assigned to develop the HASP and assume full responsibility for the health and safety program. The HSM shall meet the qualifications of a Certified Industrial Hygienist (CIH) or a Certified Safety Professional (CSP).

B. HASP: The plan shall establish and detail the procedures necessary for protecting workers from potential hazards encountered during the implementation of the work. The HASP shall apply to all subcontractors working at the site and include provision for site visitors.

C. Site Safety and Health Officer (SSHO): The Contractor's employee or a subcontractor assigned to the site on a full-time basis for the duration of the project with functional responsibility for implementation of the HASP.

D. Site: For the purpose of the HASP, the site shall be the area within the limits of work as indicated on the Drawings.

E. Monitoring: Indicates the use of field instrumentation to provide information regarding the levels of potential airborne contaminants which are being released during the work.

F. Physician: A licensed physician with experience in the practice of occupational medicine.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. Designate an individual as the Health and Safety Manager (HSM). HSM shall be a Certified Industrial Hygienist (CIH) or a Certified Safety Professional (CSP) and shall develop and implement the HASP. The qualified individual shall be the Contractor's internal review and acceptance authority for the HASP.
2. Submit the qualifications of the HSM within 7 days of issuance of Notice to Proceed and prior to the development of the HASP. The qualifications must include:

    a. A minimum of five years working experience in prior health and safety roles during remediation and construction activity.

    b. Demonstrable expertise in air monitoring techniques and in the development of personal protective equipment programs for working in potentially toxic atmospheres.

    c. Working knowledge of Federal, State, and local occupational safety and health regulations.

3. Designate an individual as the Site Safety and Health Officer (SSHO) who shall assist and represent the HSM in the continuous daily implementation and enforcement of the HASP. The SSHO shall be assigned to the site on a full-time basis and shall report to the Contractor and the HSM in matters pertaining to site safety and health. The SSHO shall be responsible for preparing and maintaining daily HASP site logs and reports.
4. Submit the qualifications of the SSHO within 7 days of usance of Notice to Proceed and prior to the development of the HASP. The qualifications include:

    a. A minimum of 2 years working experience in prior health and safety roles during remediation or construction.

    b. A working knowledge of Federal, State, and local safety and health regulations.

    c. Specialized training in personal and respiratory protective equipment program implementation and in the proper use of air monitoring instruments and air sampling methods and procedures.

    d. Current certification in first aid and cardiopulmonary resuscitation (CPR) by a recognized approved organization such as the American Red Cross.

e. In addition to 40-hour Occupational Safety and Health Administration (OSHA) Hazardous Waste training, 8-hour OSHA Refresher training, and participation in a qualified medical surveillance program.

f. Has the authority and knowledge necessary to implement the site-specific HASP and verify compliance with applicable safety and health requirements.

B. Training Certificates:

1. Submit SSHO training certificates that verify 40-hour OSHA HAZWOPER training, current 8-hour OSHA Refresher training, and current medical monitoring.
2. Provide names and documentation of training for all individuals designated as OSHA Competent Persons.

C. Submit the Safety, Health and Emergency Response Plan (HASP).

1.5 REGULATORY REQUIREMENTS AND APPLICABLE PUBLICATIONS

A. Site specific health and safety procedures, including a detailed accident prevention plan are required due to the potentially hazardous conditions at this site. These procedures shall be described in a Safety, Health and Emergency Response Plan (HASP) prepared by the Contractor. The HASP shall be submitted to the Engineer and be reviewed by the Engineer and Owner before any Work at the site can be initiated. The Contractor is responsible for the Contractor's workers and subcontractors' health and safety. Implement, maintain, and enforce the HASP procedures at the appropriate time prior to and during all phases of the Work.

B. Provide a site specific HASP consistent with the requirements of the following:

1. Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Part 1926
2. United States Environmental Protection Agency (USEPA) Standards and Regulations contained in Title 40

C. Provide a HASP-that contains, at a minimum, the following components

1. Site Description and Evaluation
2. Names of key personnel and alternates responsible for site safety and health (responsibilities and chain of command)
3. Safety and health hazard assessment and risk analysis for each site task and operation (Accident Prevention Plan).
4. Education and Training
5. Personnel Protective Equipment
6. Medical Surveillance
7. Air Monitoring
8. Standard Operating Procedures, Engineering Controls and Work Practices
9. Site Control Measures (Work Zones, Communications and Security including sign-in and sign-out procedures)
10. Personnel Hygiene and Decontamination
11. Equipment Decontamination

12. Emergency Equipment and First Aid Requirements
13. Pre-Emergency Planning, Emergency Response Plan and Contingency Procedures
14. Emergency recognition and prevention
15. Safe distances and places of refuge
16. Site security and control
17. Evacuation routes and procedures
18. Emergency medical treatment, first aid, and hospital route
19. Personnel roles, lines of authority, training and communication
20. Heat/Cold Stress Monitoring
21. Logs, Reports and Record Keeping
22. Copies of Safety Data Sheets for all chemicals to be used
23. Any additional employee training that is required for this project
24. Biological Hazards
25. Lockout Tagout Procedures
26. Fall protection
27. Excavation safety
28. Crane and manlift use (if applicable)

D. The HASP must include requirements for appropriate field screening equipment, including, at a minimum: dust monitoring.

E. HASPThe HASP must evaluate the applicability of 29 CFR 1926.62 (Lead Exposure in Construction) and if necessary, implement the necessary mitigation measures and medical monitoring.

F. HASPTwo copies of the site specific HASP shall be submitted to the Engineer within 21 days following the Effective Date of the Agreement and at least 10 days prior to commencement of any onsite work. The HASP must be finalized prior to commencement of any on-site work.

G. Determination of the appropriate level of worker safety equipment and procedures shall be made by the Contractor as a result of initial site survey review of existing data and a continued safety and health monitoring program performed by the SSHO and reviewed by the Engineer, in accordance with the requirements specified herein. Existing data suggests that all work can be performed in Level D, Modified Level D with contingency procedures to move to Level C protection.

H. Standards delineated in this Section are in addition to or an amplification of procedures and requirements of the above referenced regulations and documents.

I. Should any unforeseen or site specific safety related factor, hazard, or condition become evident during the performance of work at this site, it shall be the Contractor's responsibility to bring such to the attention of the Engineer and Owner both verbally and in writing within two hours, for resolution. In the interim, the Contractor shall take prudent action to establish and maintain safe working conditions and to safeguard employees, the public and the environment.

J. The HASP developed by the Contractor shall include provisions for initial site preparation prior to implementation of the facilities described in this Contract. It shall be the responsibility of the Contractor to conduct whatever testing and monitoring is deemed necessary to assure a safe operation during the initial site preparation work.

K. Any temporary facilities or special construction procedures required to construct the Support and Contamination Reduction Zones (if necessary) shall be the responsibility of the Contractor and shall be delineated in the HASP.

1.6 SITE CONTROL

A. Communications

1. Emergency numbers, including police, fire, ambulance, hospital and Owner, shall be prominently posted in the work area.

B. Security

1. Unauthorized access to these areas shall be restricted. Specific components of this security operation are as follows:

a. Vehicular access to all fenced areas shall be restricted to authorized vehicles only.

b. Maintain a log of security incidents.

c. Require visitors having access to all fenced areas to sign-in and sign-out and keep a record of all site access.

d. All approved visitors shall be briefed on safety and security and escorted by the Contractor SSHO throughout their visit.

e. All exclusion zones shall be posted, "Warning, Hazardous Work Area, Do Not Enter Unless Authorized".

1.7 TRAINING

A. Develop a training program to inform employees, Subcontractors, supplier's representatives, and official visitors to the project site of the special hazards and procedures (including PPE, its use and inspection) to control these hazards during field operations. This program shall be consistent with the requirements of 29 CFR 1926.65. "Official visitors" include but are not limited to Federal Agency Representatives, State Agency Representatives, Municipal Agency Representatives, subcontractors, etc.

B. Certify that all personnel assigned to or regularly entering the site for the purpose of performing or supervising work, for health, safety, security, or administrative purposes, for maintenance, or for any other site-related function, have received appropriate safety training in accordance with the HASP. Documentation of all such training shall be submitted to the Engineer before any employees will be allowed to perform work at the site.

1.8 MEDICAL SURVEILLANCE

A. The services of a physician shall be utilized to provide at least minimum medical examinations and surveillance as specified herein and shall be outlined in the HASP. The name of the physician, evidence of examination and written certification of fitness for work

and ability to wear required respiratory protection for any personnel that will be required to wear respiratory protection shall be provided to the Engineer prior to assigning these personnel to the site.

B. If the HASP identifies the need for a medical surveillance program, the Contractor shall provide the physician with site-specific information and the physician must provide the Contractor with a written medical opinion.

1. Additional clinical tests may be included at the discretion of the attending physician performing the physical examination.
2. Periodic surveillance examinations shall be performed:

    a. at the discretion of the attending physician performing the physical examination.

3. In addition, a non-scheduled medical examination shall be conducted under the following circumstances:

    a. After acute exposure to any toxic or hazardous material.

    b. At the discretion of the Contractor's HSM/SSHO or the consulting physician, when an employee has been exposed to dangerous levels of toxic or hazardous materials.

    c. At the discretion of the Contractor's HSM/SSHO or the consulting physician, and at the request of an employee with demonstrated symptoms of exposure to toxic or hazardous materials.

    d. Non-scheduled medical examinations shall be at the discretion of the attending physician performing the physical examination.

4. Maintain all medical surveillance records in accordance applicable OSHA requirements and make these records available to the Engineer or other regulatory agencies as required.
5. These records shall be maintained for a period of 30 years. One copy of all records shall be turned over to the Owner as specified in Section 017839 Project Record Documents.

1.9 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

A. Develop contingency plans including evacuation procedures and routes to places of refuge or safe distances from the danger area, for the following potential emergencies: chemical exposure, personal injury, potential or actual fire or explosion, environmental accident (spill or release) and discovery of radioactive material or other event that would require the evacuation of the site. In the event of any emergency associated with the work, without delay: take action to remove or otherwise minimize the cause of the emergency; alert the Owner and Engineer within two hours and institute whatever measures might be necessary to prevent any repetition of the conditions or actions leading to, or resulting in, the emergency.

B. Establish emergency communications with health and emergency services. The name of this facility, name of contact, emergency routes and emergency communications arrangements shall be provided in the HASP. In addition, the Contractor shall provide the following equipment:

1. At least one first aid kit shall be provided and maintained fully stocked at a first aid station which is in close proximity to the work, but not inside a hazardous work area. Each vehicle within the work zone shall be equipped with a first aid kit. First aid kit locations shall be specially marked and provided with adequate water, an eye wash kit, and other supplies necessary to cleanse and decontaminate burns, wounds, or lesions.
2. Have at least one certified First Aid Technician on the site at any time there is work being performed. This person may perform other duties but must be immediately available to render first aid when needed. Certification shall be by the American Red Cross or other approved agency and shall be submitted to the Engineer.
3. 2A-10 B:C type dry chemical fire extinguishers shall be provided at each work area and within each construction vehicle.

1.10 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

A. Develop an emergency response and contingency plan for on-site and off-site emergencies, which shall address at a minimum:

1. Pre-emergency planning
2. Personnel roles, lines of authority, training and communication
3. Emergency recognition and prevention
4. Safe distances and places of refuge
5. Site security and control
6. Evacuation routes and procedures
7. Decontamination
8. Emergency medical treatment and first aid
9. Emergency alerting and response procedures
10. Critique of response and follow-up
11. Personal Protection Equipment (PPE) and emergency equipment

B. In the event of any emergency, without delay: take action to remove or otherwise minimize the cause of the emergency; alert the Owner and institute whatever measures might be necessary to prevent any repetition of the conditions or actions leading to, or resulting in, the emergency.

C. Verify in advance that the emergency medical care services at the nearby medical facility are equipped to treat emergencies that might result in contamination of the patients clothing and skin.

D. Establish emergency communications with health and emergency services. The name of this facility, name of contact, emergency routes and emergency communications arrangements shall be posted at the site. The posted list shall include the following minimum points:

1. Contractor physician name, address and telephone number.
2. Ambulance service and fire department telephone numbers.

3. Procedure for prompt notification of Owner.

E. In the event that an accident or some other safety related incident occurs during the course of the project, the Owner and Engineer shall be telephoned immediately and receive a written notification within 24 hours. The report shall include the following items:

1. Name, organization, telephone number, and location of the Contractor.
2. Name and title of the person(s) reporting.
3. Date and time of accident/incident.
4. Location of accident/incident, including site location and facility name.
5. Summary of accident/incident giving pertinent details including type of operation ongoing at time of accident.
6. Cause of accident/incident, if known.
7. Casualties (fatalities, disabling injuries).
8. Details of any existing chemical hazard or contamination.
9. Estimated property damage, if applicable.
10. Nature of damage; effect on contract schedule.
11. Action taken by Contractor to ensure safety and security.
12. Other damage or injuries sustained (public or private).

1.11 PERSONAL PROTECTIVE EQUIPMENT

A. Provide all on-site personnel with appropriate personal safety equipment and protective clothing as indicated in the HASP and ensure that all safety equipment and protective clothing is kept clean and well maintained. The Contractor's HSM shall establish upgrade/downgrade "action levels" from the specified minimum levels of protection based upon air monitoring results and direct contact potential. Protocols formally changing the level of protection and the communication network for doing so shall be described in the HASP. Any changes to the minimum level of protection shall be approved by the SSHO and reviewed by the Engineer.

1.12 PERSONAL HYGIENE AND DECONTAMINATION

A. All on-site personnel performing or supervising remedial work within a hazardous work area or exposed or subject to exposure to hazardous chemical vapors, liquids, or contaminated solids shall observe and adhere to the personnel hygiene-related provisions of this paragraph. A detailed description of personnel decontamination protocols to be followed by site workers shall be submitted as part of the HASP. Personnel found to be disregarding the personal hygiene-related provisions of the HASP shall be barred from the site. In addition, the following conditions and procedures shall be followed:

1. Provide and require use by personnel of:

   a. Storage and disposal containers for used disposable outerwear.

   b. Hand washing facilities.

   c. A facility for changing into and out of and storing work clothing separate from street clothing.

d. A designated lunch and/or break area with drinking water facilities.

e. A smoking area, if allowed on-site by the Owner.

B. Disposable outerwear shall not be reused, and when removed, shall be placed inside disposal containers provided for this purpose located in the Contamination Reduction Zone.

C. Smoking and chewing tobacco shall be prohibited except in a designated Contractor provided smoking area in the Support Zone.

D. Eating and drinking shall be prohibited except in a designated Contractor provided lunch or break area in the Support Zone.

E. All disposable outerwear shall be removed prior to entering the lunch area or smoking area and prior to cleansing hands.

F. Contractor personnel shall be required to thoroughly cleanse their hands and other exposed areas before entering the smoking or lunch area.

1.13 HASPHASPEQUIPMENT DECONTAMINATION

A. All vehicles and equipment used in Exclusion Zones (if required) or in contact with contaminated soil shall be decontaminated prior to leaving the site. The procedures for decontamination of vehicles and equipment shall be outlined in the HASP. Monitoring all vehicle decontamination prior to exiting the site.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 HASP IMPLEMENTATION

A. Implement and maintain the HASP throughout the performance of work within the project limits, as indicated in the Contract Documents or by the HASP. In work locations and areas identified as having a potential risk to worker health and safety and any other areas deemed appropriate by the SSHO, the Contractor shall be prepared to immediately implement the appropriate health and safety measures, including but not limited to the use of PPE, and engineering and administrative control.

B. Should any unforeseen hazard become evident during the performance of the work, the SSHO shall immediately bring such hazard to the attention of the Contractor, HSM, Engineer and the Owner. In the interim, the Contractor shall take action, including Stop Work Orders and/or upgrading PPE as necessary to re-establish and maintain safe working conditions and to safeguard on-site personnel, visitors, the public and the environment. The HASP shall then be revised/amended to reflect the changed condition.

C. The HASP shall be maintained on-site by the Contractor and shall be kept current with abatement, excavation, demolition, material handling, and construction activities and general site conditions under this Contract. The HASP shall be recognized as a flexible document which shall be subject to revisions and amendments, as required, in response

to actual site conditions, changes in work methods and/or alterations in the relative risk present. All changes and modifications shall be signed by the Contractor's HSM and shall require the review and acceptance by the Owner or Engineer prior to implementation of such changes.

D. The Contractor shall be responsible for the health and safety of his employees and subcontractors during the progress of the work.

E. If the Engineer observes deficiencies in the Contractor's operations with respect to the HASP, they shall be assembled in a written directive and given to the Contractor. The Contractor shall immediately correct the deficiencies and respond, in writing, as to how each was corrected. Failure to bring the work area(s) and implementation procedures into compliance may result in a Stop Work Order and a written directive to discuss an appropriate resolution(s) to the matter. When the Contractor demonstrates compliance, the Engineer shall remove the Stop Work Order. If a Stop Work Order has been issued for cause, no delay claims on the part of the Contractor will be honored.

END OF SECTION

SECTION 01 35 43
ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, and equipment and perform all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Section, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.

B. The control of environmental pollution requires consideration of air, water, and land, and involves management of noise and solid waste, as well as other pollutants.

C. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching, or other special surface treatments as are required to prevent silting and muddying of streams, rivers, impoundments, lakes, etc. All erosion control measures shall be in place in an area prior to construction activity in that area. [Specific requirements for erosion and sedimentation controls are specified in Section 31 25 00].

D. This Section is intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the Contractor's responsibility to determine the specific construction techniques to meet these guidelines.

1.02 APPLICABLE REGULATIONS

A. Comply with all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement.

B. Clean Air Act: 42 U.S.C. §7401 et seq. (1970) including National Ambient Air Quality Standards (40 CFR part 50) https://www.epa.gov/criteria-air-pollutants/naaqs-table

C. Substantive requirements of Washington State Construction Stormwater permit and City of Milton grading permit.

1.03 NOTIFICATIONS

A. The Engineer will notify the Contractor in writing of any non-compliance with the foregoing provisions and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements shall notify the Contractor in writing, through the Engineer, of any non-compliance with State or local requirements. After receipt of such notice from the Engineer or from the regulatory agency

through the Engineer, Contractor shall immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later determined that the Contractor was in compliance with these provisions.

1.04 IMPLEMENTATION

A. Prior to commencement of the work, meet with the Owner and Engineer to develop mutual understandings relative to compliance with these provisions and administration of the environmental pollution control program.

B. Remove temporary environmental control features, when approved by the Engineer, and incorporate permanent control features into the project at the earliest practicable time.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EROSION CONTROL

A. Flow of surface water into excavated areas shall be prevented. Erosion and sedimentation controls are included in Section 31 25 00. At the completion of the work, ditches shall be backfilled, and the ground surface restored to original condition.

3.02 PROTECTION OF STREAMS AND SURFACE WATERS

A. Take all precautions to prevent, or reduce to a minimum, any damage to any stream or surface water from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such streams. Water that has been used for washing or processing shall not be directly returned to the stream.

B. Take all preventative measures to avoid spillage of petroleum products and other pollutants. In the event of any spillage, Contractor shall notify the Engineer and prompt remedial action shall be taken. If a spill meets the criteria of a reportable spill

3.03 PROTECTION OF LAND RESOURCES

A. Restore land resources within the project boundaries and outside the limits of permanent work to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas shown on the Drawings.

B. Do not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the Engineer. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags

over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.

3.04 PROTECTION OF AIR QUALITY

A. Burning - The use of burning at the project site for the disposal of refuse and debris will not be permitted.

B. Dust Control - Maintain all excavations, embankment, stockpiles, access roads, plant sites, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded and which would cause a hazard or nuisance to others.

C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides may be permitted with approval from the Engineer.

D. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor shall have sufficient competent equipment on the job to accomplish this. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs, as determined by the Engineer.

E. Waste piles – All stockpiled soils shall be covered and secured at the end of each workday or when not in use.

3.05 NOISE CONTROL

A. Make every effort to minimize noises caused by the construction operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with Federal and State regulations. Work activities shall be performed in accordance with local (Pierce County, City of Milton, WA) codes between the hours of 7 AM and 7 PM.

3.06 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

A. Maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and quality-control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Requirements:

1. Section 01 45 29 for Testing and Testing Laboratory Services.
2. Section 31 20 02 for Earthwork
3. Section 31 56 14 for Insitu Soil Solidification

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term “testing laboratory” shall have the same meaning as the term “testing agency.”

H. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

I. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Engineer.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Engineer regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Engineer for clarification before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

E. Reports: Prepare and submit certified written reports and documents as specified.

F. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 14 days of Notice to Proceed, and not less than 14 days prior to preconstruction conference. Submit in format acceptable to Engineer. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner’s quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.

B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
2. Owner-performed tests and inspections indicated in the Contract Documents.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include Work Engineer has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement of whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Design Professional Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.

E. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged in the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

F. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329**,** and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect, demonstrate, repair and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

H. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods. Contractor responsibilities include the following:

1. Provide test specimens representative of proposed products and construction.
2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.

1.9 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Engage a qualified testing agency to perform quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspection equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

G. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payments.

1. Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.
2. Distribution: Distribute schedule to Owner, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Engineer.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 02 61 13

EXCAVATION AND MANAGEMENT OF SOILS

PART 1 - GENERAL

1.1 SUMMARY

A. This section is provided for the management of soils generated during construction. Within the project work area described in Paragraph 1.1 (B) below, furnish all labor, materials, tools, equipment necessary for screening, tracking, stockpiling, and management of excavated soil.

B. Based on the information collected at the site to date, contaminated soils are expected to be encountered starting at approximately 5 feet below ground surface (ft-bgs). Concentrations of arsenic were detected in soil and groundwater samples in excess of the Model Toxics Controls Act (MTCA) Method A arsenic clean-up levels of 20 mg/kg for soil and 8 ug/L for groundwater.

C. Soils must be re-used on-site to the extent possible. If soil cannot be re-used, an appropriate disposal facility must be selected by the Contractor and approved by the Engineer. Soil generated from within the project limits must be excavated, stockpiled and managed in accordance with the Contract Drawings.
   1. Unsaturated soil, approximately 0 – 5 ft-bgs can be temporarily stockpiled onsite for reuse following approval by Engineer. If soil is determined to be unsuitable for reuse by Engineer, Contractor may dispose of soils at a licensed Subtitle-D landfill approved by Engineer.

D. The Contractor will be responsible for selecting appropriate receiving facilities and securing approvals for all excess material requiring off-site disposal. Engineer in coordination with the Contractor will perform all of the additional sampling and analysis required by these receiving facilities.

E. Section Includes:
   1. Screening, tracking, stockpiling, stockpile sampling, and managing of excavated soil.

F. Related Requirements:
   1. Section 013529 Safety, Health, and Emergency Response Procedures
   2. Section 028102 Transportation and Disposal of Excess Material
   3. Section 312002 Earthwork
   4. Section 312500 Erosion and Sedimental Controls
   5. Section 315614 Insitu Soil Solidification

1.2 DEFINITIONS

A. Contaminated Soil: Any surface or subsurface soil, waste material, or clay with contaminant concentrations above the MTCA Method A limits or excavated material with visual or olfactory evidence of environmental impact, or with headspace readings greater than or equal to 250 ppm.

B. EP: Environmental Professional – Someone who is certified by the State or specializes in soil remediation to conduct site investigations and/or remedial actions at hazardous waste sites

C. EPA: United States Environmental Protection Agency

D. Ecology: Washington State Department of Ecology

E. Excess Soil: Soil that cannot be reused onsite and requires offsite disposal. Collectively surplus soil, unsuitable soil, and contaminated soil are excess soil.

F. Soil Disposal Category: Designations are based on the category of soil disposal facility, that soil can be accepted at based on analytical soil characterization data.

G. Suitable Soil: Excavated soil that is physically suitable for reuse onsite.

H. Washington State Department of Ecology (Ecology)

1.3 ACTION SUBMITTALS

A. Regulatory Requirements.
   1. United States Department of Environmental Protection (EPA)
      a. Federal Hazardous Waste Regulations, 40 CFR Parts 261-268.
   2.

PART 2 - PRODUCTS

PART 3 - NOT USED

PART 4 - EXECUTION

4.1 PERFORMANCE REQUIREMENTS

A. Comply with governing local (Pierce County), Ecology and/or EPA notification regulations before beginning work. Comply with hauling and disposal regulations of authorities having jurisdiction.

4.2 HEALTH AND SAFETY APPLICABILITY

A. As a minimum, the requirements of Section 01 35 29 Safety, Health, and Emergency Response Procedures, shall apply to all Work involving Contaminated Soil, Contaminated Groundwater.

4.3 PREPARATION

4.4 Conduct utility clearance before beginning excavations. Before excavating within 20 feet of utility poles and after pipeline stake out, coordinate construction with the appropriate utility company. Contact utility companies to determine the cost of any pole relocations or support as well as underground utility relocations and include the cost of the work in the bid.

4.5 GENERAL EXCAVATION PROCEDURES

Excavation shall extend to the width and depth shown on the Drawings or as specified herein and shall be suitably wide for working clearances.

Excavation shall be performed in-the-dry as possible and shall be accomplished by methods which preserve the undisturbed state of subgrade soils.

Blasting is not allowed. Rock and boulder excavation may be performed by drilling, wedging, sledging, cutting, barring, jack hammering, hoe ramming, expansive chemical splitting, or other similar process in a manner, which does not cause damage to the existing structures, utilities or new construction.

4.6 EXCAVATION BELOW GRADE

If the Contractor excavates below grade through error or for his own convenience, they may be directed by the Engineer to segregate that material in a separate stockpile for characterization and disposal. The work of stockpiling and disposing of over excavated soils and furnishing and placing the refill shall be performed at no additional cost to the Owner. Over-excavation beyond the limits and depths required by the Contract Documents shall be replaced at no additional cost to the Owner by structural fill, crushed stone or other approved material subject to the prior approval of the Engineer.

4.7 EXCAVATED SOIL MANAGEMENT

A. Pre-characterization has been performed to identify areas of contaminated and uncontaminated soil. The Contract Drawings present soil designations based on sampling conducted to date. Management of excavated overburden soil shall be managed in accordance with these drawings and this Section.

B. Temporarily stockpile excavated overburden soil on site the area designated on the Contract Drawings. All excavated soil shall be stockpiled and handled in accordance with the most recent version of Ecology guidance policies.

C. All excavated soil requires proper handling and management until it has been identified and characterized for re-use or for proper off-site disposal.

D. Reuse onsite as much excavated soil as possible. Excavated soils shall be backfilled and compacted in accordance with Section 31 20 02 (Earthwork).

4.8 STOCKPILE MANAGEMENT

A. All excavated soils shall be handled, stockpiled, and managed as if they may be potentially contaminated. Stockpiles shall be contained and covered at the end of each workday or when not in use to prevent runoff. Excavated material shall be placed in stockpiles not exceeding a volume of 500 cubic yards.

B.

1. Assign each stockpile a unique identifier.

2. Stockpiled material must be covered securely (from rain and wind disturbances) with an impermeable top liner (cover) at the end of each workday.

3. Top liner and stockpiled material must be configured in a manner to prevent pooling of rainwater.

4. Contractor shall inspect stockpiles on a daily basis, and maintain the stockpiles including berms, top liner, and bottom liner, throughout construction activities.

C. Engineer will be responsible for the collection of samples for uncharacterized material. Based on sample results, Engineer will provide Contractor the soil designation for the appropriate soil disposal category. Based on the soil disposal category, the Contractor will identify the appropriate facility and the Engineer will collect any additional samples if required to meet the disposal facility requirements.

D. Dispose of soil in accordance with Section 02 61 13.

END OF SECTION

SECTION 02 61 29
TRANSPORTATION AND DISPOSAL OF EXCESS MATERIAL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The purpose of this section is to provide the Contractor with the minimum requirements and constraints for transportation and disposal of excess soil and sediment within the Highway 99 site, if required.

B. No site personnel shall be allowed to enter the excavated area unless the excavation is performed in accordance with Occupational Safety and Health Administration (OSHA) regulations as specified in 29 CFR 1926.652.

C. The Contractor shall be responsible for compliance with all Federal, State, and local laws and regulations.

D. Furnish all labor, material, tools and equipment necessary for the transportation of contaminated materials. Work includes preparing Bills of Lading as required and ensuring the material to be disposed of conforms to the acceptance criteria for disposal in Pierce County, Washington.

1.02 RELATED WORK

A. Earthwork is included in Section 31 20 02

B. Safety Health and Emergency Response is included in Section 01 35 26

C. Management of Impacted Soils is included in Section 02 61 13

1.03 SUBMITTALS

A. Contractor shall provide Engineer and Owner with the following prior to the offsite transportation of excess soils.

1. Name and address of all material transporters to be used to complete the project.

2. Washington Department of Transportation Transporter Identification Number and expiration date.

3. Destination of materials and approved waste profile (if applicable).

1.04 REGULATORY REQUIREMENTS

A. The requirements governing hazardous material health and safety contained in Section 01 35 26 Safety Health and Emergency Response Requirements all other applicable Federal, State and local laws, codes, and ordinances which govern or regulated hazardous materials and wastes shall apply to the work of this Section, including the Washington State Department of Ecology Hazardous Waste Guidance, United States Environmental

Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) regulations at 40 CFR 261-268.

B. The Contractor shall coordinate with Engineer to deliver contaminated materials to a properly permitted landfill.

B. The Contractor shall obtain all Federal, State and local permits, as needed, required for the transport of contaminated material. The Contractor shall adhere to all permit requirements.

PART 2 PRODUCTS

2.01 GENERAL

A. All Contractor personnel shall wear personal protective equipment and protective clothing consistent with the levels of protection for this Work as indicated in the Safety Health and Emergency Response in Section 01 35 29.

PART 3 EXECUTION

3.01 GENERAL

A. The Owner will be the generator and will sign waste profiles, non-hazardous waste manifests, bills of lading and material shipping records.

B. The Contractor shall transport the contaminated material to the designated licensed landfill or alternate Engineer-approved disposal facility.

3.02 DISPOSAL FACILITY TESTING

A. Excavated soil is expected to be uncontaminated and suitable for onsite reuse. The Engineer will collect characterization samples from excavated stockpiles and submit to an analytical laboratory. Engineer will provide Contractor with results from characterization samples for use in creating a waste profile, if necessary.

3.03 WATER FROM DECONTAMINATION ACTIVITES

A. Water used for final decontamination activities shall be placed in directed into the excavation area once stabilization mixing activities have been completed and prior to backfilling with granular material.

3.04 WASTE PROFILES AND SHIPPING DOCUMENTS

A. Identify disposal facilities and provide to the Engineer all disposal facility soil acceptance information, including but not limited to waste profile forms, certifications, and acceptance criteria. Perform all coordination with the disposal facilities.

B. Prepare all manifests and if necessary, land ban certifications. Submit these to the Owner for review at least 3 days before transport.

C. Submit to Owner and the Engineer documentation certifying that all materials were transported to and accepted at the designated landfill. Documentation to include:

1. Facility signed manifests, original bills of lading and material shipping records.

2. Certified tare and gross weights for each load.

3.07 TRANSPORT AND DISPOSAL

A. Materials are not permitted for transport off-site until all disposal facility documentation has been received, reviewed, and accepted by Owner and the Engineer. Materials are not permitted for transport until the Contractor provides back to the Engineer the disposal facility's approval letter documenting acceptance of the material.

B. Transport in accordance with all United States Department of Transportation (DOT), EPA regulations and other regulations of State of Washington.

C. The Contractor shall be responsible for ensuring that free liquid does not develop during transport of any soils. "Wet soils" shall not be loaded for transport. The Contractor shall be responsible for adding water-absorbing materials to capture any free liquids that may result during transportation.

D. Deliver waste material to the designated landfill for disposal within 90 days of generation.

END OF SECTION

SECTION 31 10 00
SITE PREPARATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, and equipment required and perform all site preparation, complete as shown on the Design Drawings and as specified herein.

B. The areas to be cleared within public rights-of-way and utility easements shall be minimized to the extent possible for the scope of In-Situ Soil Solidification work and in consideration of the actual means and methods of construction used. No unnecessary site preparation within these areas shall be performed.

PART 2 EXECUTION

2.01 MONITORING WELL DECOMMISSIONING

A. Decommission monitoring wells shown on Drawings in accordance with WAC 173-160-381.

B. All monitoring wells that terminate below the remediation depths shall be grouted from the termination depth to the remediation depth.

2.02 EXISTING UTILITES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.

B. Excavate and remove underground utilities indicated to be removed on the Drawings.

2.03 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate In-Situ Soil Solidification.

B. Remove slabs, paving, and aggregate base as indicated.

2.04 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Dispose of material and debris from site preparation operations by hauling such materials and debris to an approved offsite disposal area.

2.05 PROTECTION

A. Restrict construction activities to those areas within the limits of construction designated on the Drawings, within public rights-of-way, and within easements provided by the Owner. Adjacent properties and improvements thereon, public or private, which become damaged by construction operations shall be promptly restored to their original condition, to the full satisfaction of the property owner.

END OF SECTION

SECTION 31 20 02
EARTHWORK

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and perform all backfill, fill and grading required to complete the work as shown on the Drawings and as specified herein. The work shall include, but not necessarily be limited to; all backfilling and fill; compactions; s and restoration of excavation surfaces.

B. Wherever the requirement for compaction is referenced to herein, it shall mean minimum percentage of maximum density as determined by ASTM D1557.

1.2 RELATED WORK

A. Safety, Health, and Emergency Response in Section 01 35 29.

B. Excavation and Management of Soil are included in Section 02 61 13.

C. Transportation and Disposal of Excess Material are included in Section 02 61 29.

D. Insitu Soil Solidification is included in Section 31 56 14.

E. Asphalt Paving is included in Section 32 12 16.

1.3 SUBMITTALS

A. Submit to the Engineer, the proposed methods of construction, including earthwork operations, fill material moisture conditioning and handling, compaction equipment, and material sources for the various portions of the work.

B. Submit to the Engineer complete product data for materials specified in this Section. Submit laboratory test results for all fill materials (maximum density, gradation, Atterberg limits, sand equivalent, etc., as applicable) prior to importing or placing any fill.

C. Compaction and laboratory test results of backfill materials under structures, utilities, appurtenances and pavements shall be provided to the Engineer.

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)
   1. ASTM D6913 – Standard Test Methods for Particle-Size Distribution of Soils Using Sieve Analysis
   2. ASTM D698 - Test Method for Laboratory Compaction Characteristics of Soils Using Standard Efforts
   3. ASTM D1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort

4. ASTM D1682 - Standard Test Method for Breaking Load and Elongation of Textile Fabrics
5. ASTM D2487 - Standard Test Method for Classification of Soils for Engineering Purposes
6. ASTM D2922 - Density of Soil in Place by Nuclear Methods (Shallow Depth)
7. ASTM D3017 - Standard Test Method for Water Content of Soil in Place by Nuclear Methods (Shallow Depth)
8. ASTM D4751 - Test Method for Determining the Apparent Opening Size of a Geotextile

B. American Association of State Highway and Transportation Officials (AASHTO).

C. Washington Department of Transportation Standard Specifications for Road, Bridge, and Municipal Construction and all addenda and supplements thereto, latest edition.

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.5 PROTECTION

A. Specified existing facilities which include but are not limited to structures, buildings, utilities, pavements, sidewalks, landscaping, fencing, and other improvements not marked for removal shall be adequately protected during construction as per the Drawings. All on and off-site features damaged by the construction shall be replaced with materials fully identical to, and including but not necessarily limited to, the same type, dimension, size, species and conditions before damage to the satisfaction of the Owner.

B. Locate and mark underground utilities to remain in service before beginning the work. Protect all existing utilities to remain in service during operations. Do not interrupt existing utilities except when authorized in writing by authorities have jurisdiction unless otherwise indicated on the Contract Drawings. Active utilities existing on the site shall be carefully protected from damage or relocated as required by the work. Inactive or abandoned utilities encountered during construction operations shall be removed, plugged, capped or filled. The location of existing utilities shall be recorded on the Record Drawings.

C. Provide barricades, fences, lights, signs, and all other safety devices required to protect the public against injury.

1.6 QUALITY ASSURANCE

A. Regulations: Perform all work in accordance with current applicable regulations and codes of all Federal, State, and local agencies.

B. The Contractor shall have at least five (5) years of experience with comparable work, which include but are not limited to insitu soil solidification, excavation and handling of contaminated materials, and earthwork, employing labor and supervisory personnel who are similarly experienced in this type of work.

C. The Contractor's surveyor shall be a Professional Land Surveyor or Professional Engineer, registered in the State of Washington and shall have at least five (5) years of experience in construction survey of the type required under this Contract and acceptable to the Engineer and Owner.

D. Prior to and during the placement of backfill and fill coordinate with the soils testing laboratory to perform in-place soil density tests to verify that the backfill/fill material has been compacted in accordance with the compaction requirements specified elsewhere. The Engineer may designate areas to be tested.

1.7 CONSTRUCTION CONTROL

A. Contractor is responsible for all construction layout and reference staking necessary for the proper control and satisfactory completion of all structures, cutting, filling, grading, drainage and utilities installation, fencing, curbing, and all other appurtenances required for the completion of the construction work and acceptance of the Contract as specified and as shown on the Drawings.

B. All construction layout, staking and surveying shall be performed by a Professional Land Survey registered by the State of Washington, experienced and skilled in construction layout, staking and surveying of the type required under this Contract, and acceptable to the Engineer and Owner.

C. The Engineer will furnish the Contractor with control points, bench marks and other data as may be necessary for the construction staking, layout and survey.

D. The Contractor shall be responsible for the placement and preservation of adequate ties to all control points necessary for the accurate re-establishment of all base lines or center lines shown on the Drawings.

E. The Engineer may check the control of the work as established by the Contractor, at any time as the work progresses. The Contractor will be informed of the results of these checks, but by doing so, the Engineer in no way shall relieve the Contractor of his responsibility for the accuracy of the layout work.

1.8 DEFINITIONS

A. **Structures** are all buildings, manholes and below grade tanks, vaults and equipment capsules.

B. **Percent Compaction** is the required in-place dry density of the material, expressed as a percentage of the maximum dry density of the same material, as determined in the laboratory by ASTM D1557 (Modified Proctor).

C. **Optimum Moisture Content** is the moisture content (percent by dry weight) corresponding to the maximum dry density of the same material as determined by ASTM D1557.

D. **In-the-Dry** is defined as an excavation subgrade where the groundwater level has been lowered to at least 2 feet below the lowest level of the excavation, is stable with no ponded water, mud, or muck and shall be able to support construction equipment without rutting or disturbance and shall be suitable for the placement and compaction of fill material, pipe or concrete foundations.

E. **Unsuitable Soil** includes organic soils, loose or disturbed soils, or frozen soil.

F. **Objectionable Material** includes topsoil, organic matter, contaminated soil, construction debris, perishable materials, snow, ice, and rocks or lumps of cemented soils over 6 inches in maximum dimension.

G. **Over-excavation** is removal of Unsuitable Soil or Objectionable Material at or below the normal grade of the excavation or subgrade as indicated on the Drawings.

H. **ISS-treated** material is waste fill that has been solidified via insitu soil mixing techniques as described in Section 315614.

I. **Subgrade** is the bottom surface of a trench or excavation extending to the underside of site improvements, including dimensioned fill, structures, paving, or other surfacing material.

J. **Pass** shall mean a single complete coverage with compaction equipment over the entire surface of an exposed lift or subgrade being compacted.

1.9 DELIVERY, STORAGE AND HANDLING

A. If granular fill materials are delivered to the site prior to placement approval, materials shall be stockpiled on site in areas as directed by the Engineer. Provision shall be implemented to minimize surface water impact on the stockpile. Removal and placement of granular fill material shall be done in a manner to minimize intrusion of soils adjacent to and beneath the stockpile.

PART 2 - PRODUCTS

2.1 GRANULAR MATERIAL

A. Backfill and Fill materials shall be suitable excavated site soils, natural or processed mineral soils obtained from off-site sources, or graded crushed stone or gravel.

B. Backfill and Fill materials shall be free of all organic material, trash, snow, ice, frozen soil, or other objectionable materials which may be compressible or which cannot be properly compacted. Soft, wet, plastic soils which may be expansive, clay soils having a natural, in-place water content in excess of 30 percent, soils containing more than 5 percent (by weight) fibrous organic materials, and soils having a plasticity index greater than 30 shall be considered unsuitable for use as backfill and fill. Backfill and fill materials shall have a maximum of 1 percent expansion when testing is performed on a sample remolded to 95 percent of maximum dry density (per ASTM D698) at 2 percent below optimum moisture content under a 100 lbs/sq ft surcharge.

C. Screened Gravel should be hard, durable, rounded, or subangular particles of proper size and gradation, and should be free from sand, loam, clay, excess fines, and other deleterious materials. Screened gravel shall be used for pipe bedding as detailed and at other locations indicated on the Drawings. The material shall conform to the following gradation:

Sieve Size	Percent Finer by Weight
2-in	100
1-1/2-in.	95 to 100
1-in.	35 to 70
3/4-in	0 to 25

PART 3 - EXECUTION

3.1 PREPARATION

3.2 Prepare site in accordance with Section 31 10 00 GENERAL FILLING AND BACKFILLING PROCEDURES

A. Excavated site soils including clean topsoil clean granular fill, , may be used as common fill in accordance with Section 2.1 of this specification.

B. Fill and backfill materials shall be placed in lifts to suit the specified compaction requirements to the lines and grades required, making allowances for settlement and placement of cover materials (i.e. topsoil, sod, etc). Soft spots or uncompacted areas shall be corrected.

C. Fill shall not be placed on a frozen surface or one covered by snow or ice, nor shall snow, ice or frozen earth be incorporated in the compacted fill.

D. Compaction in open areas may be accomplished using heavy vibratory rollers. Compaction in confined areas (including areas within a 45 degree angle extending upward and outward from the base of a wall) and in areas where the use of large equipment is impractical, shall be accomplished by hand operated vibratory equipment or mechanical tampers.

E. Where other methods are not practicable, compaction shall be by use of hand or pneumatic ramming with tools weighing at least 20 lbs. The material shall be spread and compacted in layers not over 6in thick. If necessary, sprinkling shall be employed in conjunction with rolling or ramming. Puddling is not allowed.

F. Fill and backfill shall not be placed and compacted when the materials are too wet to properly compact either from rain or from excess application of water (i.e. the in-place moisture content of the soil at that time is no more than three percentage points above the optimum moisture content of that soil as determined by the laboratory test of the moisture-density relation appropriate to the specified level of compaction). At such times, work shall be suspended until the previously placed and new materials have dried sufficiently to permit proper compaction.

G. Notify the Engineer in advance of compaction activities and make prepared subgrade surfaces available to the Engineer for observation and testing

H. The method and degree of compacting backfill as directed by the Engineer will be governed by the type of material compacted and the underlying subgrade material and condition.

I. Dust control measures shall be employed at all times.

J. All road surfaces shall be broomed and hosecleaned immediately after backfilling.

3.3 BACKFILLING

A. Compaction of structural fill and crushed stone in open areas shall consist of a heavy vibratory roller and may also be supplemented by fully loaded tenwheel trucks, a tractor dozer weighing at least 30,000 lbs. and operated at full speed, or other methods approved by the Engineer. Compaction of structural fill, crushed stone and screened gravel in confined areas shall be accomplished by hand operated vibratory equipment or mechanical tampers approved by the Engineer. As a minimum, compaction of structural fill shall consist of four coverages of the approved equipment.

B. Screened gravel shall be placed in layers having a maximum thickness of 8in in open areas and 4in in confined areas including points where conduit and piping joint structures, measured before compaction. Each layer of fill shall be compacted with at least four coverages of the approved equipment.

C. For excess soils, proof-rolling shall be performed in lieu of density testing. Proofrolling shall be performed with a minimum of 2 completed coverages of the full area with a vibratory drum roller with a minimum of a 10-ton static drum weight. Proofrolling in confined areas may be accomplished with hand operated vibratory equipment approved by the Engineer. Proofrolling shall be conducted in the presence of the Engineer. Where Proofrolling may negatively impact the subgrade, the Engineer may waive this requirement.

D. Materials placed in fill areas shall be deposited to the lines and grades shown on the Drawings making considerations for settlements and the placement of surface treatments such as loam, pavement, etc.

E. The surfaces of filled areas shall be graded to smooth true lines, strictly conforming to grades indicated on the Drawings and no soft spots or uncompacted areas will be allowed in the work.

F. In freezing weather, a layer of fill shall not be left in an uncompacted state at the close of the day's operations. Prior to terminating work for the day, the final layer of compacted fill shall be rolled with a smooth wheeled roller to eliminate ridges of soil left by compaction equipment.

3.4 RESTORING EXAVATION

A. Where the excavation occurs adjacent to paved streets, in shoulders, sidewalks, or in cross country areas, thoroughly consolidate the backfill and maintain the surface as the work progresses. If settlement takes place, immediately deposit additional fill to restore the level of the ground.

B. The surface of any driveway or any other area which is disturbed by the excavation and which is not a part of the paved road shall be restored to a condition at least equal to that existing before work began.

C. In sections where the excavation passes through grassed areas, and at the Contractor's own expense, remove and replace the sod, or loam and seed the surface to the satisfaction of the Engineer.

D. In sections where the excavation passes through landscaped areas, the Contractor shall, at his own expense, remove and replace the topsoil, mulch or other material to the satisfaction of the Engineer.

3.5 STORAGE AND DISPOSAL OF EXCESS MATERIALS

A. Excavated material meeting the site disposal criteria shall be excavated and stockpiled in accordance with Section 02 61 13, in the areas identified on the Drawings. Materials shall be neatly piled so as to inconvenience, as little as possible, the Owner, the public and adjoining property owners until used or otherwise disposed of as specified below.

B. It is expressly understood that excavated material shall be removed from the site of the work or disposed of as directed by the Engineer. When removal of materials has been approved by the Engineer, dispose of such material in accordance with Section 02 61 13 and Section 02 61 29.

C. All excess and unsuitable excavated soil shall be removed from the site and legally disposed off-site by the Contractor at no additional cost to the Owner.

D. Should conditions make it impracticable or unsafe to stack material adjacent to the trench, the material shall be hauled and stored at a location provided. When required, it shall be re-handled and used in backfilling the trench at no additional cost to the Owner.

3.6 GRADING

A. Grading shall be performed to the lines and grades shown on the Drawings and otherwise as directed by the Engineer and shall be performed in such a manner that the requirements for formation of grades and embankments can be followed. All objectionable material encountered within the limits indicated shall be removed and disposed of. Subgrades shall be completely and continuously drained and dewatered throughout the grading process. Install temporary drains, drainage ditches, etc., to intercept or divert surface water which may affect the execution or condition of grading work.

B. If at the time of grading it is not possible to place any material in its proper section of the Work, it shall be stockpiled in approved areas for later use. No extra payment will be made for the stockpiling or double handling of excavated material.

C. The right is reserved to make minor adjustments or revisions in lines or grades if found necessary as the work progresses, in order to obtain satisfactory construction.

D. Stones or rock fragments larger than 4-in in their greatest dimensions will not be permitted within the top 6-in of the finished grade of fills and embankments.

END OF SECTION

SECTION 31 25 00
EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required and perform all installation, maintenance, removal, and area cleanup related to erosion and sedimentation control work as shown on the Drawings and as specified herein. The work shall include, but not necessarily be limited to; installation of temporary access ways and staging areas, silt fences, straw wattles, installation and final cleanup.

1.02 RELATED WORK

A. Earthwork is included in Section 31 20 02.

1.03 SUBMITTALS

A. Submit within 10 days after award of Contract, technical product literature for all commercial products to be used for erosion and sedimentation control.
A. Submit within 14 days prior to the start of work an erosion and sediment control plan for Engineer approval.

1.04 QUALITY ASSURANCE

A. Be responsible for the timely installation and maintenance of all sedimentation control devices necessary to prevent the movement of soils from the construction site to offsite areas via surface runoff or underground drainage systems. Measures in addition to those shown on the Drawings necessary to prevent the movement of sediment off-site shall be installed, maintained, removed, and cleaned up at the expense of the Contractor. No additional charges to the Owner will be considered.

B. Sedimentation and erosion control measures shall conform to the requirements outlined in the Washington State Department of Transportation Temporary Erosion and Sediment Control Manual.

PART 2 PRODUCTS

2.01 MATERIALS

A. Crushed stone for sediment filtration devices, access ways, stabilized construction entrance, temporary sediment trap, and staging areas shall conform to grade in Section 31 20 02 or approved equal.

B. Silt fence shall be a prefabricated commercial product made of a woven, polypropylene, ultraviolet resistant material such as “Envirofence” by Mirafi Inc., Charlotte, NC or equal.

C. Straw wattles shall be a flexible, 9- to 12-in diameter by 12- to 20-feet (ft) long tubular bundle of lightly packed weed-free coconut fiber, recycle rice straw, or wood fiber. Bundled material shall be contained by a high strength (60 pounds [lb.]) ultraviolet (UV) resistant high-density polyethylene (HDPE) netting. Straw wattles shall be commercially manufactured products specifically made to reduce sediment-laden runoff velocity, and

control or capture eroded soil and projected product life of 2 to 5 years, such as Straw Wattles by Cherokee Manufacturing, BioDWatl by RoLanka International of Earth Saver, or equal. Wood stakes shall be 1 in x 2 ft long.

PART 3 EXECUTION

3.01 INSTALLATION

A. Silt Fence Installation

1. Silt fences shall be positioned as indicated on the Drawings and as necessary to prevent offsite movement of silt produced by construction activities as directed by the Engineer.

2. Dig trench approximately 6-in wide and 6-in deep along proposed fence lines.

3. Drive stakes, 10-ft on center (maximum) at back edge of trenches. Stakes shall be driven 2-ft (minimum) into ground.

4. Hang filter fabric on posts carrying to the bottom of trench with about 4-in of fabric laid across bottom of trench. Stretch fabric fairly taut along fence length and maintain secure both ways.

5. Backfill trench with excavated material and tamp.

6. Install pre-fabricated silt fence according to manufacturer's instructions.

B. Straw Wattles

1. Straw wattles shall be installed parallel to slope contours. Dig a 2- to 3-in deep trench along the contour. Lay straw wattles in the trench, fitting it snuggly against the soil, ensuring no gaps exist between the roll and the rear wall of the trench. Use wood stakes to secure the straw wattles as shown on the Drawings. Make pilot holes in the straw wattles prior to inserting stakes. Drive staked through the straw wattles leaving no more than 1- to 2-in of the stake exposed. Install a minimum per manufacturer’s recommendation. Place straw wattles end so that each end is fit snuggly against the roll next to it. Place compacted trench backfill material against the downhill side of the roll.

2. Once the sediment has as reached half the height of the roll, remove and dispose of the sediment and straw wattle, regrade and stabile the wasted out areas, retrench and install new straw wattle in a similar manner as specified herein, as directed by the Engineer.

D. Staging areas and construction entrance shall be surfaced with a minimum depth of 6in of crushed stone.

E. Silt fence shall be placed no more than 50 feet apart.

3.02 MAINTENANCE AND INSPECTIONS

A. Inspections

1. Make a visual inspection of all erosion and sedimentation control devices once per week and promptly after every rainstorm. If such inspection reveals that additional measures are needed to prevent movement of sediment to offsite areas, promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly.

B. Device Maintenance

1. Silt Fences
   a. Remove accumulated sediment once it builds up to 1/2 of the height of the fabric.
   b. Replace damaged fabric, or patch with a 2-ft minimum overlap.
   c. Make other repairs as necessary to ensure that the fence is filtering all runoff directed to the fence.

2. Add crushed stone to access ways and staging area as necessary to maintain a firm surface free of ruts and mudholes.

3.03 REMOVAL AND FINAL CLEANUP

A. Once the site has been fully stabilized against erosion, remove sediment control devices and all accumulated silt. Dispose of silt and waste materials in a proper manner. Regrade all areas disturbed during this process and stabilize against erosion with surfacing materials as indicated on the Drawings.

END OF SECTION

SECTION 315614
INSITU SOIL SOLIDIFICATION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to perform the insitu soil solidification, as indicated in the Contract Drawings and specified herein.

B. The zones of the insitu soil solidification (ISS) shall be implemented to stabilize impacted soils and reduce groundwater migration through impacted soils onsite.

1.3 RELATED WORK

A. Health and Safety and Emergency Response in Section 01 35 29.

B. Excavation and Management of Soil in Section 02 61 13.

C. Transportation and Disposal of Excess Material in Section 02 61 29.

D. Earthwork is included in Section 31 20 02.

1.4 SUBMITTALS

A. The Contractor shall submit a Final ISS Implementation Work Plan including the following:
   1. The general work sequence and layout of operations. The layout of operations shall include scale drawings, which depict preparation and storage areas. The plan shall describe Contractor qualifications, equipment, method of soil mixing, spoils handling and management, and site clean-up.
   2. The plan will specify:
      a. Names and qualifications of the ISS Contractor; including, project experience, resumes and other documentation that demonstrates the qualifications of each field superintendent. The Contractor shall submit qualifications that he or his is competent in ISS construction. An ISS specialist shall be employed by the Contractor.
      b. Detailed descriptions of the sequence of construction and all construction procedures, equipment (catalog cut sheets), and ancillary equipment to be used to penetrate the ground, soil preparation methods such as placing working platform, proportion, and mix binders, and inject and mix the site soils.
      c. Mix design shall adhere to the baseline mix design provided by the Engineer in Section 1.9 and include the required mixing time, and binder-to-soil volume ratio for an ISS cell.

d. The necessary procedure and measurement to confirm minimum ISS penetration into confining stratum.
e. Working drawings for the ISS zones showing the site location of the project as well as the dimensions, layout, and locations of all ISS cells. Drawings shall indicate the identification number of every cell and identification number will be used for documentation and QA/QC purposes.
f. Sequencing and pattern of ISS cell mixing to prevent inter-mixing of freshly mixed cells (refer to Section 3.4 for further details).
g. Proposed methods and details for crossing "fresh" ISS zones during construction, including protection of ISS zone, anticipated equipment loading (if any), ISS monitoring, and plan of action shall the ISS be damaged during zone crossing. Contractor shall minimize the number of zone crossings and protect these zones from damage caused by surcharge loading during curing periods.
h. Proposed truck traffic patterns and stockpile areas.

B. As part of this work, a pilot study program for the ISS areas was conducted at the nearby Puyallup site to demonstrate the design and mixing methodologies on the project site. The results from this study will be made available to the Contractor during the project planning phase.

C. The Contractor shall submit a Quality Control Work Plan in accordance with Section 01 40 00 that includes a summary of the performance criteria testing, geometric acceptance criteria, uniformity criteria, and non-conformance procedures of the ISS. Quality control testing shall be performed by the Contractor. Quality Assurance testing shall be performed by the Engineer. The Engineer shall make the sole determination if the results obtained satisfy the quality control criteria. The Contractor shall be responsible for correcting the location or quality of the ISS cells that do not satisfy the quality control criteria.

D. As-built drawings of the completed ISS zones.

E. Daily Production Records:
1. By the end of the next business day following each soil mixing shift, the Contractor shall submit a daily production report. The report shall contain at a minimum the following information:
a. Project name, location, and date.
b. Name of field superintendent in charge of work for the Contractor.
c. Soil mixing equipment (rig number) in operation during the shift and specific activities conducted by said equipment.
d. Type of mixing tool (e.g., mixing head).
e. Treatment zone and reference drawing number.
f. Elevation of top and bottom of treatment zone.
g. Cell number, plan area/diameter, and location.
h. Date and time (start and finish) of cell.
i. Location of each completed cell installed during the work shift and all zones completed to date on a plan of suitable scale to clearly show the location of the cells.
j. A description of obstructions, interruptions of binder injections, or other difficulties during installation and their resolution.

k. For wet grab samples, provide collection date, time, plan location, elevation, and identification numbers of all soil mixed samples, including unsuccessful attempts to retrieve samples.
l. Quantities of all binder materials delivered to the site plus a reconciliation showing the amount actually injected.
m. Summary of any downtime or other unproductive time including time, duration, and reason.
n. Detailed results of all testing.

1.5 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)
1. ASTM C150 – Standard Specification for Portland Cement.
2. ASTM D2166 – Standard Specification for Unconfined Compressive Strength of Cohesive Soil.
3. ASTM D5084 – Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
4. United States Environmental Protection Agency (USEPA) SW-846 Method 1311 (Toxicity Characteristic Leaching Procedure for Lead)

B. U.S. Environmental Protection Agency (EPA)
1. EPA 600/4-79/020 – Methods for Chemical Analysis of Water and Wastes.

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.6 QUALITY CONTROL

A. The Contractor shall provide quality control measures as necessary to assure that the ISS zones are constructed in a manner that satisfies the performance requirements set forth in these Specifications. The Contractor shall implement quality control measures during the construction sequence to avoid defects in the finished ISS zones that would reduce the effectiveness of the ISS. These measures shall include but not be limited to visual observations and measurements by the Contractor's experienced personnel on the soil mixing procedures, mixing depth, and testing of soil-cement mix, as necessary, to provide ISS zones meeting these Specifications. The Contractor is required to perform all quality control testing in accordance with Parts 2 and 3 of this Specification and to provide the Engineer with the results of all quality control testing, measurements, and documentation of observations daily.

1.7 QUALITY ASSURANCE

A. Additional testing, measurements, and observations as described for quality control, will be conducted by the Engineer for purposes of quality assurance. The Contractor shall cooperate with the Engineer in conducting quality assurance testing. A summary of the quality assurance sample collection is presented in **Table 1**. Quality assurance testing, presented in Table 1, are minimums provided for the purpose of bidding and are subject to change at the direction of the Engineer during construction.

1.8 DEFINITIONS

A. Binder: Chemically reactive material (i.e., lime, cement, gypsum, blast furnace slag, fly ash, or other hardening reagents) that can be used for mixing with insitu soils to strengthen the soils and form the ISS zones. Also referred to as stabilizer or reagent.

B. Binder slurry: Stable colloidal mixture of water and binder (i.e., cement grout) that assists in loosening the soils for effective mixing and strengthening the insitu soil upon setting.

C. Mixing: Mixing refers to the mixing of soils and binder (i.e., ISS) with an excavator-mounted mixing head.

D. Cell: An area of ISS produced by excavator-mounted mixing head with specified dimensions and depth.

E. Confining Stratum: The soil stratum into which the ISS zones are keyed in. The confining stratum for the ISS zones will be the Silt and Clay layer.

F. Dry Mixing: Process of mechanical disaggregation of the soil insitu and its mixing with binders with or without fillers and admixtures in dry powder form. Binders are delivered primarily on tool retrieval.

G. Insitu Soil Solidification (ISS): Product of soil mixing consisting of a mixture of insitu soil and binder. Also referred to as treated soil or deep mixed soil.

H. Mixing Tool: Equipment used to disaggregate the soil and distribute and mix the binder with the soil (i.e., mixing head).

I. Pilot Test Program: A small scale preliminary study conducted to evaluate the proposed mix design and construction methodology of ISS performed prior to full-scale implementation.

J. Quality Assurance: Quality assurance is defined as the necessary testing and survey measures conducted by a third party or the Engineer to assure that the ISS is constructed in a manner that satisfies the performance requirements of this specification.

K. Quality Control: Quality control is defined as the necessary testing and survey measures conducted by the Contractor to assure that the ISS is constructed in a manner that satisfies the performance requirements of this specification.

L. Retrieval: Withdrawal of mixing tool from bottom depth to the ground surface. Binder may be injected during retrieval, which also imparts additional mixing energy.

M. Volume ratio: Ratio of the volume of the binder injected to the volume of soil to be treated.

N. Wet Mixing: Process of mechanical disaggregation of the soil insitu and its mixing with slurry consisting of water and binders with or without fillers and admixtures. Binder is delivered on mixing tool penetration for vertical and horizontal axis mixing tools.

1.9 BASELINE ISS MIX DESIGN

A. The baseline ISS mix design, based on results from the Pilot Test Program, is provided below:

1. Depth, layout, and sizes of ISS cells shall be designed and installed to form one continuous, uniform zone that meets the areal extents and embedment depth specified on the Drawings.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. In accordance with findings of the pilot study, the admixture will consist of the following on a per soil mass basis (for example, 10% by weight equals 200 pounds of Portland Cement per 2000 pounds of in-place soil).

- 13 percent by weight Portland Cement,
- 2 percent by weight bentonite,
- 0.5% by weight Ferrous sulfate heptahydrate, and
- 10 percent by weigh bulking sand.

B. Contractor shall provide Engineer and Owner with all applicable data sheets and material sources for all components of the admixture.

2.1 EQUIPMENT

A. Soil mixing equipment shall be sufficient size and capacity to perform required ISS mixing to the desired depths. Characteristics of soil mixing equipment are as follows:
1. The equipment shall be capable of advancing adjacent to or through previously installed cells to achieve designed overlapping or remixing as needed at the maximum depth to achieve thorough mixing.
2. The mixing equipment shall be sufficient to adequately blend and distribute the binder with insitu soils to provide the required strength.

2.2 BINDER MATERIALS STORAGE AND HANDLING

A. The Contractor shall measure, handle the transport, and store bulk binder in accordance with the manufacturer’s recommendations.

B. Dry materials shall be stored in dry containers. The binder shall be adequately protected from moisture and contamination while in transit and when stored at the project site.

C. Dry material shall be transported to the project site and placed in the onsite storage tanks using a closed system. Any air evacuated from the storage tanks during the loading process shall be filtered before being discharged to the atmosphere.

D. Material that has become caked due to moisture absorption shall not be used. Binder materials containing lumps or foreign matter of a nature and in amounts that may be deleterious to the injection operation shall not be used. In each instance in which the binder source is changed, the batch plant silos shall be completely emptied before storing binder from the new source. Mixing binders from different sources in the same silos is not permitted.

E. Equipment used for proportioning during the binder production shall be calibrated prior to initial use and repeated every 3 months or every time the batch plant is relocated, whichever is sooner. Calibration records must be submitted to the Owner in accordance with Section 1.4.

F. The Contractor shall demonstrate that the equipment can uniformly deliver binder at suitable rates in accordance with the ISS implementation plan.

PART 3 - EXECUTION

3.1 GENERAL

A. A pilot study conducted at a nearby site determined a mixture of Portland cement, bentonite, ferrous sulphate heptahydrate, and bulking sand in the ratios listed in part 2.1 of this specification was suitable to meet the performance criteria. The treatability testing program and results are summarized in the Pilot Study Report (PSR) and will be made available to the Contractor upon request. It is recognized that differences between the means and methods used for the Pilot program and those used for full-scale implementation may require a greater amount of reagent to achieve effective ISS. For this reason, the ISS treatment means and methods including proposed reagents and reagent mix selected by the Contractor shall be verified in the field by conducting a field trial study prior to the start of work as described in part 3.4 of this specification.

B. ISS cells shall be constructed to the lines, grades, and cross section indicated in the Drawings and shall meet the minimum specified performance criteria. The Contractor shall establish consistent procedures during construction to ensure that the above criteria are satisfied. The procedures shall be established based on the results of the Pilot Test program.

C. As part of project completion, additional ISS may be required outside the limits of ISS implementation currently presented on the Drawings.

D. During ISS treatment, the ISS mixing slurry will be contained with the cell and any excess ISS mixing slurry will be contained within the excavation, effectively minimizing the risk of onsite spills or leakage into the surrounding area.

3.2 CEMENT GROUT BATCH PLANT MIXING

A. The cement grout batch plant shall include the necessary equipment including a mixer capable of continuously producing a homogenous mixture of cement and water, and pumps, valves, hoses, supply lines, and all other equipment as required to adequately supply cement grout to the mixing cell locations.

3.3 LOCATING CELLS

A. Before beginning installation, the Contractor shall accurately stake the location of the ISS cells shown in the Drawings. The Contractor shall provide an adequate method for locating cells to allow the Engineer to verify the as-built location of the cells during construction. The Contractor will not be compensated for cells that are located outside of the tolerance specified. The Owner will review the location of misaligned cells to determine if the cells interfere with the proposed construction. If the Owner determines that misaligned cells will interfere with construction, the Contractor shall correct the alignment. The method of correction shall be submitted by the Contractor to the Owner/Engineer for review and approval.

B. If an obstruction is encountered that prevents mixing advancement, the Contractor shall immediately notify the Engineer and investigate the location and extent of the obstruction using methods approved by the Engineer. The Contractor shall propose remedial measures to clear the obstruction for approval by the Engineer. The Contractor will be compensated for removal or clearing of obstructions with prior approval from the Owner. If the cell cannot be installed at the design location due to obstructions, the cell shall be relocated as directed by the Engineer.

3.4 ISS DEMONSTRATION CELL

A. Prior to the start of full-scale implementation, the contractor shall perform a test cell to demonstrate that the mix and application method are sufficient to meet the performance criteria identified in this specification. The contractor shall stabilize material in the 250-4 treatment area shown on the Drawings. In coordination with the Contractor the engineer will collect wet mix samples and send them to a laboratory for testing. If the collected samples show an UCS after 7-days indicative that the final performance criteria will be met after 28-days, the Engineer will provide approval to move ahead with the ISS.

3.5 ISS MIXING –Excavator-Mounted Mixing Head

A. The Contractor may use the ISS mix design documented in the pilot study and described in Section 2.1 of this specification. The Contractor may request that the established mix design, equipment, installation procedure, or test methods be modified; however, the Engineer may require additional testing or a new test section at no additional cost to the Owner to verify that acceptable results can be achieved. The Contractor shall not employ modified mix designs, equipment, installation procedures, or sampling and testing methods until approved by the Engineer in writing.

B. If the Contractor must modify established methods due to equipment breakdowns, manpower changes, or improved conditions, a new test section shall be installed at no cost to the Owner. If the Owner requests modifications to the means and methods for design or other reasons (e.g., site conditions differ from what were encountered during the geotechnical explorations and the Pilot Test program), the Contractor shall be compensated for new test sections.

C. Installation of each cell shall be continuous. If an interruption of more than 1 hour occurs, the cell shall be remixed at no additional cost to the Owner.

D. Mixing shall be performed throughout the depth and lateral extents of each cell to provide a uniformly blended soil matrix. The Contractor shall perform mixing with a minimum key-in, or overlap, of 2 feet or as otherwise approved by the Engineer to adjacent previously mixed cells to ensure complete coverage of ISS.

E. The Contractor shall provide a plan detailing the layout and dimensioning of the ISS cells. The Contractor shall provide a detailed plan of the mixing sequence of cells in the work plan to be approved by the Engineer. Mixing of adjacent cells may be performed after allowing primary cells sufficient time to cure. Sufficient cure time shall be determined after initial field demonstration by the Contractor and will be agreed to by the Engineer and Contractor. Mixing of adjacent cells shall be performed with a minimum key-in, or overlap, at all elevations in the cells as demonstrated in the field and as agreed to between Contractor and the Engineer in the field and as approved by Engineer, to adjacent primary cells to ensure complete coverage of ISS mixing throughout the areas to be treated. Adjust overlap as needed within the waste fill zones as conditions vary.

F. Control of spoils: The Contractor shall control and dispose of all waste materials produced as a result of the mixing operation in accordance with the project requirements. The areas designated in the ISS implementation plan shall be used for containing and processing the spoils.

G. Cell top and bottom elevations:
   1. Cells shall be installed in accordance with the line and grades shown in the Drawings.
   2. The Contractor shall provide a suitable means for determining the depth of the cell to within 0.5 feet.

3.6 QUALITY CONTROL TESTING

A. The Contractor shall be responsible for project quality control records. Tests and measurements shall be carried out by the Contractor and the Engineer, as specified in the ISS Quality Control Plan, and data sheets for all tests and measurements shall be maintained on a current basis at the job site. All quality control records, routine testing procedures, observations and measurements shall be available for inspection by the Owner or Engineer at any time. The Engineer shall make the sole determination if the results obtained satisfy the quality control criteria.

B. The Contractor shall make simple routine checks of material quantities such as counting the number of bags or truckloads of binder materials that have been used. These quantities shall be records in the daily production report.

C. Wet sampling and testing:
   1. The Contractor shall perform all wet sampling in the presence of the Engineer. The Contractor shall notify the Engineer at least 1 business day in advance of beginning the sampling operations.
   2. The Contractor shall propose locations for wet sampling while considering input from the Owner/Engineer. Sample locations shall be distributed uniformly both laterally and vertically within the deep mixed zone.
   3. The Contractor shall report the information required in the daily production report for all attempts, successful and unsuccessful, to obtain wet samples.
   4. ISS wet bulk samples shall be collected using a bailer-type sampling tool or similar. Jet grout wet bulk samples shall be collected from spoil return at the surface. Both shall be collected in accordance with **Table 1** for quality assurance sampling requirements**.**
   5. Test specimens from each wet bulk sample shall be cast in cylinder molds (2-inch diameter by 4-inch in length, or 3-inch diameter by 6-inch in length) for subsequent laboratory testing. Quality assurance test specimens shall be prepared onsite by CDM Smith's onsite representative.

3.7 ISS PERFORMANCE CRITERIA

A. The mix design for the ISS was established by laboratory and pilot testing and will be verified by testing. The mix designs must meet the performance criteria outlined in the subsections below.

B. ISS
   1. The average 28-day cured ISS sample shall be equal to or greater than a UCS result of 50 psi with no test result below 40 psi, or as approved by the Engineer.

   2. The average 7-day ISS sample shall be equal to or less than a permeability result of 1x10-6 cm/sec with no individual test greater than 5×10^{-6} cm/sec, or as approved by the Engineer.

3.8 QUALITY ASSURANCE TESTING

A. The Contractor shall obtain wet samples, in accordance with Section 3.5 (C), to achieve the quality assurance sampling requirements in **Table 1** for full production**.** Testing requirements presented in Table 1 are estimated values and are minimums provided for the purpose of bidding. The quality assurance testing requirements for full production are subject to change based on encountered site conditions, at the direction of the Engineer.

B. Quality assurance test samples shall be collected in the presence of the Engineer. Test samples collected for quality assurance shall be submitted to the CDM Smith's onsite representative who will prepare specimens for testing at the CDM Smith's Geotechnical Laboratory located in Chelmsford, Massachusetts. The Contractor may propose other sampling techniques to obtain continuous samples of the mixed material which, if approved by the Engineer, could be submitted as further documentation of compliance with the acceptance requirements.

TABLE 1
SUMMARY OF ISS QUALITY ASSURANCE SAMPLE COLLECTION

No. of Cylinders	Estimated Collection Depth	Estimated Sample Frequency	Required Performance Criteria Testing
8	Between approx. El. 17 and El. 12	Per 1,000 CY	3-Day UCS
			7-Day UCS
			14-Day UCS
			28-Day UCS
			Permeability
8	Between approx. El. 12 and El. 7	Per 1,000 CY	3-Day UCS
			7-Day UCS
			14-Day UCS
			28-Day UCS
			Permeability

Appendix C

Design Drawings

PIERCE COUNTY
MILTON, WASHINGTON

USG INTERIOR
HIGHWAY 99 SITE
REMEDIATION / IN-SITU SOLIDIFICATION

SCALE : 1" = 500'

INDEX OF DRAWINGS

PREPARED BY:

CDM Smith
14432 SE Eastgate Way, Suite 100
Bellevue, WA 98007
Tel: (425) 519-8300

NOVEMBER 2023
100% DESIGN SET - ISSUED FOR BIDDING

CDM SMITH PROJECT No. 19921-272436

GENERAL NOTES:

1. LOCATIONS, ELEVATIONS, AND DIMENSIONS OF ALL EXISTING UTILITIES, STRUCTURES, SUBSTRUCTURES, PROPERTY LINES, SUBSURFACE SOIL OR ROCK CONDITIONS, AND OTHER FEATURES ARE APPROXIMATE BASED ON AVAILABLE INFORMATION AND ARE NOT GUARANTEED ACCURACY, NOR IS IT WARRANTED THAT ALL POTENTIAL CONFLICTS ARE SHOWN. ALL EXISTING UTILITIES ARE SHOWN FOR INFORMATION ONLY. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD LOCATING ALL UTILITIES AND AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT OCCUR BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL EXISTING UTILITIES, STRUCTURES, AND OTHER FEATURES AFFECTING HIS/HER WORK. EXISTING ITEMS SHOWN IN PROFILE ARE APPROXIMATE ELEVATIONS ONLY. ALL OVERHEAD ELECTRICAL AND TELEPHONE CABLES AND POLES ARE NOT WARRANTED TO BE SHOWN.
2. REPORT FINDINGS OF FIELD LOCATING OF EXISTING UTILITIES AND STRUCTURES TO THE ENGINEER PRIOR TO CONSTRUCTION. IT IS THE INTENT TO SHOW PROPERTY LINES, EXISTING UTILITIES, AND UNDERGROUND STRUCTURES ON THE PLANS. HOWEVER, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SATISFY HIMSELF/HERSELF THAT ALL LISTING UTILITIES AND OTHER ITEMS, SHOWN ON THESE DRAWINGS OR NOT, HAVE BEEN PROPERLY LOCATED.
3. IF ANY UTILITY OR STRUCTURE REQUIRES RELOCATION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF THE ITEM WELL IN ADVANCE OF THE APPROACH TO THE ITEM AND SHALL BE RESPONSIBLE FOR MAKING ALL ARRANGEMENTS WITH THE ENGINEER FOR RELOCATION OF THE ITEM.
4. THE CONTRACTOR SHALL NOTIFY DIG SAFE WASHINGTON (CALL 811) CALL AT LEAST THREE WORKING DAYS IN ADVANCE OF EXCAVATION AND SHALL FOLLOW ALL REQUIREMENTS OF EACH UTILITY WHEN AROUND THEIR FACILITIES.
5. EXCAVATIONS OR TRENCHING WITHIN CLOSE PROXIMITY TO UTILITIES, OR UTILITY POLES SHALL BE PROTECTED TO PREVENT DAMAGE OR INTERRUPTION TO SERVICE.
6. THE CONTRACTOR IS RESPONSIBLE FOR ALL PROJECT SAFETY INCLUDING, BUT NOT LIMITED TO, TRENCH EXCAVATION AND SHORING, TRAFFIC CONTROL, AND SECURITY.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR STORMWATER, SEDIMENT, AND EROSION CONTROL DURING ALL PHASES OF CONSTRUCTION AND SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS.
8. ANY DEVIATION FROM CONTRACT DRAWINGS OR SPECIFICATIONS MUST BE ACCEPTED BY THE ENGINEER IN WRITING PRIOR TO THE WORK BEING DONE. ANY DEVIATION PERFORMED WITHOUT THE OWNER'S REPRESENTATIVE ACCEPTANCE WILL NOT BE PAID FOR AND MAY BE REQUIRED TO BE REDONE AT NO ADDITIONAL COST TO THE CLIENT. THE CONTRACTOR IS RESPONSIBLE FOR IMMEDIATELY CONTACTING THE OWNER'S REPRESENTATIVE UPON FINDING ANY CONFLICTS DURING CONSTRUCTION ON ANY IMPROVEMENTS SHOWN ON THE DRAWINGS.
9. EXCEPT AS MODIFIED BY THE CONTRACT DOCUMENTS, ALL WORK SHALL BE IN ACCORDANCE WITH ALL FEDERAL OR STATE REQUIREMENTS. THE CONTRACTOR SHALL HAVE A COPY OF ALL APPLICABLE STANDARD SPECIFICATIONS AND DRAWINGS AT THE WORK SITE AT ALL TIMES.
10. GEOTECHNICAL BORING AND TEST DATA ARE PROVIDED WITH THE SPECIFICATIONS.
11. IF A SYMBOL AND CALL OUT CONFLICT WITH EACH OTHER, THE CALL OUT SHALL BE USED FOR IDENTIFICATION.

GENERAL CONSTRUCTION SEQUENCE:

1. EXCAVATION SHALL BE SEQUENCED TO MINIMIZE THE EMISSION OF DUST AND ODORS, DISTURBANCE OF EXISTING TOPSOIL OUTSIDE THE PROPOSED WORK AREAS, AND CONTACT OF EXPOSED CONTAMINATED SOIL WITH PRECIPITATION AND RUNOFF.
2. THE CONTRACTOR SHALL SEQUENCE THE WORK TO LIMIT EXTENT OF PRACTICAL RUNOFF THAT CONTACTS CONTAMINATED MATERIAL. ALL RUNOFF THAT CONTACTS CONTAMINATED MATERIAL SHALL BE COLLECTED AND DISPOSED OF IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS AND THE APPROVED SOIL MANAGEMENT PLAN IN ACCORDANCE WITH 02 61 29.
3. THE ENGINEER HAS BASED THE DESIGN ON THE FOLLOWING GENERAL CONSTRUCTION SEQUENCE. THIS SEQUENCE DOES NOT PRECLUDE THE CONTRACTOR FROM MODIFYING THE CONSTRUCTION SEQUENCE TO COMPLETE THE WORK IN A MORE TIMELY AND COST-EFFECTIVE MANNER AND TO ACCOMMODATE THE CONTRACTOR'S CHOSEN MEANS AND METHODS.

3.1. IMPLEMENT HEALTH AND SAFETY AND ENVIRONMENTAL CONTROLS AS PROVIDED IN THE CONTRACTOR'S APPROVED WORK PLAN.

3.2. PERFORM SITE SURVEY TO ESTABLISH LIMITS OF CONSTRUCTION.

3.3. RELOCATE, REMOVE, AND OR PLUG AS REQUIRED ALL UTILITIES THAT CONFLICT WITH THE WORK OF THIS CONTRACT.

3.4. REMOVE THE SHED STRUCTURE AS REQUIRED WITH THE WORK OF THIS CONTRACT.

3.5. REMOVAL OF ASPHALT AND CONCRETE PADS THAT CONFLICT WITH THE WORK OF THIS CONTRACT.

3.6. SHALLOW SOIL MATERIALS TO BE EXCAVATED AS SHOWN ON DRAWING C-02 SHALL BE STOCKPILED FOR BACKFILLING.

3.7. PERFORM ISS TREATMENT OF SOILS AS SHOWN ON DRAWING C-03.

3.8. SHALLOW SOIL MATERIAL TO BE PLACED, SPREAD, AND COMPACTED TO MEET FINAL SITE GRADE REQUIREMENTS AS SHOWN ON DRAWING C-05.

3.9. EXCESS TREATED WASTE OR SHALLOW SOIL MATERIAL SHALL BE TRANSPORTED FOR OFFSITE DISPOSAL NOT USED AS BACKFILL.

EROSION AND SEDIMENTATION CONTROL NOTES:

1. EROSION CONTROLS SHOWN ON PLANS ARE THE MINIMUM REQUIRED. CONTRACTOR MAY BE REQUIRED TO ADJUST LOCATIONS AND ELEVATIONS OF SEDIMENTATION BARRIERS OR ADD ADDITIONAL EROSION CONTROL MEASURES AS REQUIRED BY ENGINEER.
2. INSTALL STRAW WADDLES AT THE LIMITS OF WORK ON THE DOWNGRADIENT SIDE OF THE WORK AREA AS SHOWN ON THE PROJECT PLANS PRIOR TO COMMENCEMENT OF WORK TO PREVENT EROSION OR SEDIMENTATION INTO RESOURCE AREAS.
3. INSPECT SEDIMENT BARRIERS WEEKLY AND AFTER ALL STORM EVENTS OF ½-INCH OR GREATER. REPAIR AS NEEDED AND AS DIRECTED BY THE ENGINEER OR OWNER WITHIN 48 HOURS OF ANY STORM EVENT.
4. MAINTAIN THE SEDIMENTATION AND EROSION CONTROL SYSTEMS FOR THE DURATION OF THE CONTRACT. MAINTENANCE SHALL INCLUDE CLEANING AND/OR REPLACING SYSTEMS THAT ARE NO LONGER FUNCTIONAL DUE TO SEDIMENT BUILD-UP AND DEGRADATION AS DETERMINED BY THE ENGINEER. BARRIERS SHALL BE LEFT IN PLACE UNTIL THE AREA IS PERMANENTLY STABILIZED.
5. WORK SHALL PROCEED AS RAPIDLY AS POSSIBLE TO LIMIT THE EXPOSURE TIME OF DISTURBED SOILS TO WIND AND PRECIPITATION.
6. APPLY WATER AS NECESSARY TO MINIMIZE DUST.
7. REMOVE AND SATISFACTORILY DISPOSE ALL SEDIMENT CONTROL STRUCTURES UPON COMPLETION OF ALL WORK AND SOIL STABILIZATION AS DIRECTED BY THE ENGINEER AND OWNER.

STORAGE AND STOCKPILE NOTES:

1. ALL EQUIPMENT STORAGE, REFUELING, AND ANY REQUIRED MINOR MAINTENANCE SHALL OCCUR WITHIN THE LIMITS OF TEMPORARY CONSTRUCTION FENCE.
2. MAINTAIN A SUPPLY OF ALL-PURPOSE OIL ABSORBENT MATERIAL WITH THE EQUIPMENT AND IN THE REFUELING AREA FOR THE CLEAN-UP OF ANY ACCIDENTAL SPILLS DURING REFUELING OR MAINTENANCE OPERATIONS. NOTIFY THE PROPER AUTHORITIES IN THE EVENT OF AN ACCIDENTAL RELEASE.
3. INSPECT ALL HYDRAULIC LINES ON ALL CONSTRUCTION EQUIPMENT AND VEHICLES AT THE BEGINNING AND END OF EACH WORKDAY.
4. STORE ALL OIL, HYDRAULIC FLUID, OR OTHER HAZARDOUS MATERIAL IN ORIGINAL CONTAINERS. FUEL SHALL BE STORED IN CLEARLY MARKED, TIGHTLY SEALED CONTAINERS. ALL SUCH MATERIAL SHALL BE STORED UNDER A ROOF OR IN A COVERED ENCLOSURE.
5. ALL TRUCKS, STORAGE BINS, AND CONTAINERS ENTERING OR LEAVING THE SITE SHALL BE COVERED.

LEGEND:

- UNDERGROUND ELECTRIC
- CONTOUR MINOR
- CONTOUR MAJOR
- EXISTING FENCE
- PROPERTY LINE
- SILT FENCE
- STAGING AREA
- STRAW WATTLE
- CONTAMINATED BOUNDARY & REMEDIATION AREA
- DEMOLISH

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: H. PROVINSAL
DRAWN BY: A. CASE
SHEET CHK'D BY: H. PROVINSAL
CROSS CHK'D BY: M. PASSARO
APPROVED BY: A. WELSH
DATE: NOVEMBER 2023

CDM Smith
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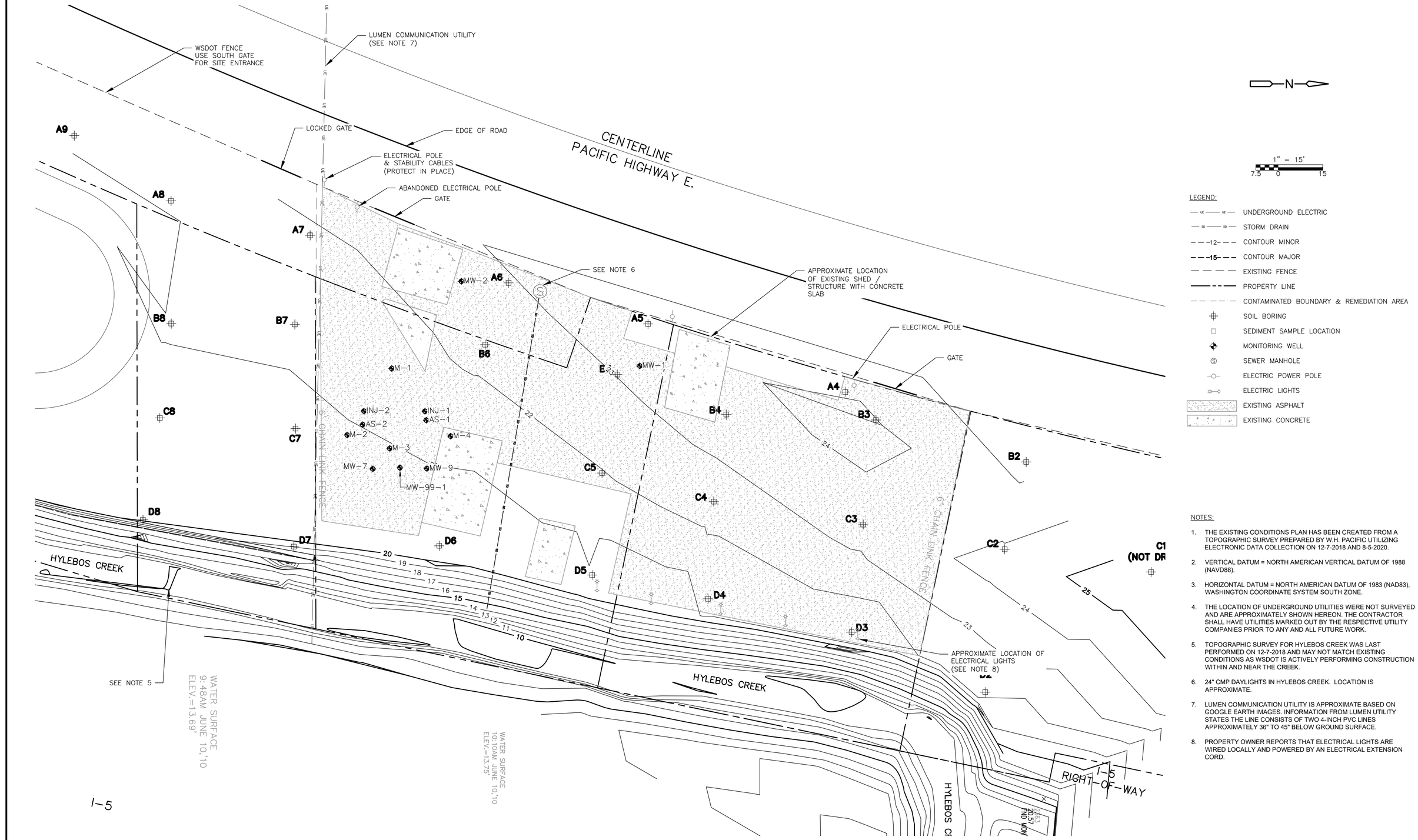
USG INTERIORS

HIGHWAY 99 SITE
REMEDIATION / IN-SITU SOLIDIFICATION

GENERAL NOTES AND ABBREVIATIONS

PROJECT NO. 19921-272436
FILE NAME: G001NVLG.DWG
SHEET NO.
G-1

100% DESIGN - ISSUED FOR BIDDING



LEGEND:

- UNDERGROUND ELECTRIC
- STORM DRAIN
- CONTOUR MINOR
- CONTOUR MAJOR
- EXISTING FENCE
- PROPERTY LINE
- CONTAMINATED BOUNDARY & REMEDIATION AREA
- SOIL BORING
- SEDIMENT SAMPLE LOCATION
- MONITORING WELL
- SEWER MANHOLE
- ELECTRIC POWER POLE
- ELECTRIC LIGHTS
- EXISTING ASPHALT
- EXISTING CONCRETE

NOTES:

1. THE EXISTING CONDITIONS PLAN HAS BEEN CREATED FROM A TOPOGRAPHIC SURVEY PREPARED BY W.H. PACIFIC UTILIZING ELECTRONIC DATA COLLECTION ON 12-7-2018 AND 8-5-2020.
2. VERTICAL DATUM = NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. HORIZONTAL DATUM = NORTH AMERICAN DATUM OF 1983 (NAD83), WASHINGTON COORDINATE SYSTEM SOUTH ZONE.
4. THE LOCATION OF UNDERGROUND UTILITIES WERE NOT SURVEYED AND ARE APPROXIMATELY SHOWN HEREON. THE CONTRACTOR SHALL HAVE UTILITIES MARKED OUT BY THE RESPECTIVE UTILITY COMPANIES PRIOR TO ANY AND ALL FUTURE WORK.
5. TOPOGRAPHIC SURVEY FOR HYLEBOS CREEK WAS LAST PERFORMED ON 12-7-2018 AND MAY NOT MATCH EXISTING CONDITIONS AS WSDOT IS ACTIVELY PERFORMING CONSTRUCTION WITHIN AND NEAR THE CREEK.
6. 24" CMP DAYLIGHTS IN HYLEBOS CREEK. LOCATION IS APPROXIMATE.
7. LUMEN COMMUNICATION UTILITY IS APPROXIMATE BASED ON GOOGLE EARTH IMAGES. INFORMATION FROM LUMEN UTILITY STATES THE LINE CONSISTS OF TWO 4-INCH PVC LINES APPROXIMATELY 36" TO 45" BELOW GROUND SURFACE.
8. PROPERTY OWNER REPORTS THAT ELECTRICAL LIGHTS ARE WIRED LOCALLY AND POWERED BY AN ELECTRICAL EXTENSION CORD.

REV. NO.	DATE	DRWN	CHKD	REMARKS

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DRAWN BY: A. CASE
SHEET CHK'D BY: H. PROVINSAL
CROSS CHK'D BY: M. PASSARO
APPROVED BY: A. WELSH
DATE: NOVEMBER 2023

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USG INTERIORS

HIGHWAY 99 SITE
REMEDIATION / IN-SITU SOLIDIFICATION

EXISTING CONDITIONS PLAN

PROJECT NO. 19921-272436
FILE NAME: C-00-01

SHEET NO.
C-01

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WSDOT FENCE
USE SOUTH GATE
FOR SITE ENTRANCE

LUMEN UTILITY

GATE

EDGE OF ROAD

CENTERLINE
PACIFIC HIGHWAY E.

ELECTRICAL POLE
& STABILITY CABLES
(PROTECT IN PLACE)

SAW-CUT ASPHALT WHERE
ASPHALT EXTENDS OFF-SITE

GATE

STORM SEWER MANHOLE
(PROTECT IN PLACE) AND 24" CMP
(SEE NOTE 7)

EXISTING SHED/STRUCTURE
TO BE REMOVED
(SEE NOTE 4)

BATCH PLANT AND
MATERIAL STOCKPILE
(IF NEEDED)

REMOVE 6' FENCE

ELECTRICAL POLE

GATE

POTENTIAL STOCKPILE
LOCATION FOR CLEAN COVER SOIL

SILT FENCE

EXTENTS OF ASPHALT AND CONCRETE
REMOVAL AREA (SEE NOTE 4)

HYLEBOS CREEK

INSTALL STRAW WATTLES
AND SILT FENCE

B
2D-01

C
2D-01

SAW-CUT ASPHALT WHERE
ASPHALT EXTENDS OFF-SITE

24" CMP OUTLET TO REMAIN IN PLACE
AND BE PROTECTED DURING CONSTRUCTION

HYLEBOS CREEK

APPROXIMATE LOCATION OF
ELECTRICAL LIGHTS

WATER SURFACE
9:48AM JUNE 10,'10
ELEV.=13.69'

WATER SURFACE
10:10AM JUNE 10,'10
ELEV=13.75'

I-5

I-5
RIGHT-OF-WAY

HYLEBOS CREEK

MONITORING WELLS TO BE DECOMMISSIONED

POINT ID	NORTHING	EASTING	DEPTH
AS-1	702987.81	1184699.53	35
AS-2	702966.44	1184701.03	35
INJ-1	702987.36	1184696.52	25
INJ-2	702966.85	1184696.45	25
M-1	702976.19	1184682.12	25
M-2	702961.20	1184704.51	25
M-3	702975.51	1184708.99	25
M-4	702996.02	1184704.90	25
MW-1	703059.65	1184681.28	18
MW-2	702999.60	1184652.77	17
MW-7	702969.79	1184715.93	30
MW-9	702988.01	1184715.80	48
MW-99-1	702978.95	1184715.54	UNKWN

N

1" = 15'
7.5 0 15

LEGEND:

- UNDERGROUND ELECTRIC
- CONTOUR MINOR
- CONTOUR MAJOR
- EXISTING FENCE
- PROPERTY LINE
- SILT FENCE
- STAGING AREA
- STRAW WATTLE
- CONTAMINATED BOUNDARY & REMEDIATION AREA
- DEMOLISH
- ASPHALT AND CONCRETE REMOVAL AREA
- MONITORING WELL
- SEWER MANHOLE
- ELECTRIC POWER POLE
- ELECTRIC LIGHTS

NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF THE SILT CONTROL FENCE, STRAW WATTLES, AND OTHER EROSION CONTROL MEASURES.
2. CONTRACTOR SHALL COVER SOIL PILES WITH PLASTIC LINER AND WEIGHT ACCORDINGLY TO PROTECT FROM EROSION AND TO KEEP LINER IN PLACE
3. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF REMOVAL OR RELOCATION OF EXISTING UTILITIES IMPACTED BY THE WORK ZONE.
4. SITE PREPARATION INCLUDES DEMOLITION OF EXISTING CONCRETE SLABS, ASPHALT, AND STORAGE SHED. SITE PREPARATION ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION 31 10 00.
5. MONITORING WELL ABANDONMENT SHALL BE CONDUCTED IN ACCORDANCE WITH WAC 173-160-381.
6. PROPOSED SIZE AND LOCATIONS OF STORAGE PADS, STOCKPILE AREAS, AND BATCH PLANTS ARE SHOWN FOR CONCEPTUAL PURPOSES. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A STAGING AND LAYOUT PLAN AS PART OF THE CONTRACTOR'S WORK PLAN.
7. 24" CMP THAT CROSSES IN-SITU SOIL SOLIDIFICATION AREA SHALL BE REMOVED DURING SOLIDIFICATION ACTIVITIES AND REPLACED FOLLOWING SOLIDIFICATION ACTIVITIES. DRAINAGE FROM STORM SEWER TO OUTLET SHALL BE MAINTAINED DURING CONSTRUCTION (E.G., TEMPORARY SUMP PUMP INSTALLED WITH TEMPORARY PIPING TO OUTLET OR TEMPORARY FLEXIBLE PIPING, ETC.).

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: H. PROVINSAL
DRAWN BY: A. CASE
SHEET CHK'D BY: H. PROVINSAL
CROSS CHK'D BY: M. PASSARO
APPROVED BY: A. WELSH
DATE: NOVEMBER 2023

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USG INTERIORS

HIGHWAY 99 SITE
REMEDIATION / IN-SITU SOLIDIFICATION

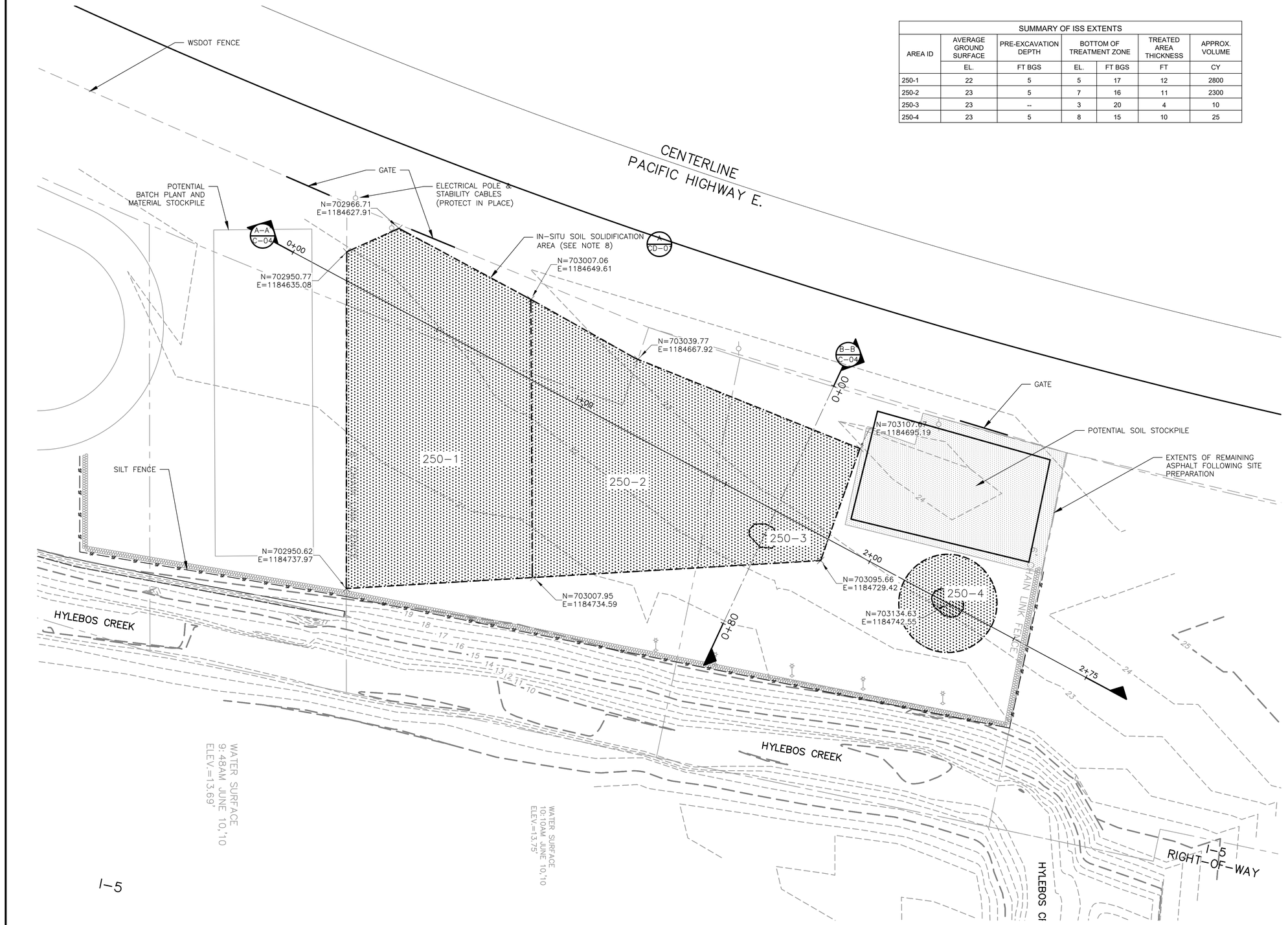
SITE PREPARATION AND STORMWATER
CONTROL AND EROSION PLAN

PROJECT NO. 19921-272436
FILE NAME: C-00-02

SHEET NO.
C-02

100% DESIGN - ISSUED FOR BIDDING

SUMMARY OF ISS EXTENTS						
AREA ID	AVERAGE GROUND SURFACE	PRE-EXCAVATION DEPTH	BOTTOM OF TREATMENT ZONE		TREATED AREA THICKNESS	APPROX. VOLUME
	EL.	FT BGS	EL.	FT BGS	FT	CY
250-1	22	5	5	17	12	2800
250-2	23	5	7	16	11	2300
250-3	23	--	3	20	4	10
250-4	23	5	8	15	10	25



N

1" = 15'
7.5 0 15

LEGEND:

- CONTOUR MINOR
- CONTOUR MAJOR
- EXISTING FENCE
- PROPERTY LINE
- SILT FENCE
- STAGING AREA
- STRAW WATTLE
- CONTAMINATED BOUNDARY & REMEDIATION AREA

NOTES:

1. ALL EQUIPMENT STORAGE, REFUELING, AND ANY REQUIRED MINOR MAINTENANCE SHALL OCCUR WITHIN THE LIMITS OF TEMPORARY CONSTRUCTION FENCE.
2. MAINTAIN A SUPPLY OF ALL-PURPOSE OIL ABSORBENT MATERIAL WITH THE EQUIPMENT AND IN THE REFUELING AREA FOR THE CLEAN-UP OF ANY ACCIDENTAL SPILLS DURING REFUELING OR MAINTENANCE OPERATIONS. NOTIFY WASHINGTON EMERGENCY MANAGEMENT DIVISION IN THE EVENT OF AN ACCIDENTAL RELEASE.
3. INSPECT ALL HYDRAULIC LINES ON ALL CONSTRUCTION EQUIPMENT AND VEHICLES AT THE BEGINNING AND END OF EACH WORKDAY.
4. STORE ALL OIL, HYDRAULIC FLUID, OR OTHER HAZARDOUS MATERIAL IN ORIGINAL CONTAINERS. FUEL SHALL BE STORED IN CLEARLY MARKED, TIGHTLY SEALED CONTAINERS. ALL SUCH MATERIAL SHALL BE STORED UNDER A ROOF OR IN A COVERED ENCLOSURE.
5. ALL TRUCKS, STORAGE BINS, AND CONTAINERS ENTERING OR LEAVING THE SITE SHALL BE COVERED.
6. HANDLING OF IMPACTED SOILS SHALL BE IN ACCORDANCE WITH SECTION 02 61 13. ACCESS ROADS AND AREAS OUTSIDE THE LIMITS OF WORK MUST BE KEPT CLEAN OF ALL SOILS AND GROUNDWATER.
7. CONTRACTOR IS RESPONSIBLE FOR THE CONTAINMENT OF EXCAVATED SPOILS, GROUNDWATER, AND BACKFILL MATERIALS WITHIN THE LIMITS INDICATED ON THE PLAN.
8. ALL PRE-EXCAVATED MATERIAL WILL BE PROPERLY STOCKPILED ON SITE. MATERIAL MAY BE USED AS BACKFILL ON SITE OR WILL BE DISPOSED OF PROPERLY BY WASTE PROFILE.
9. THE REMEDIATION AREA SHALL BE REMEDIATION THROUGH IN-SITU SOIL SOIL SOLIDIFICATION IN ACCORDANCE WITH SECTION 31 56 14.

REV. NO.	DATE	DRWN	CHKD	REMARKS

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USG INTERIORS

HIGHWAY 99 SITE
REMEDIATION / IN-SITU SOLIDIFICATION

LIMITS OF MASS STABILIZATION

PROJECT NO. 19921-272436
FILE NAME: C-00-03
SHEET NO. C-03

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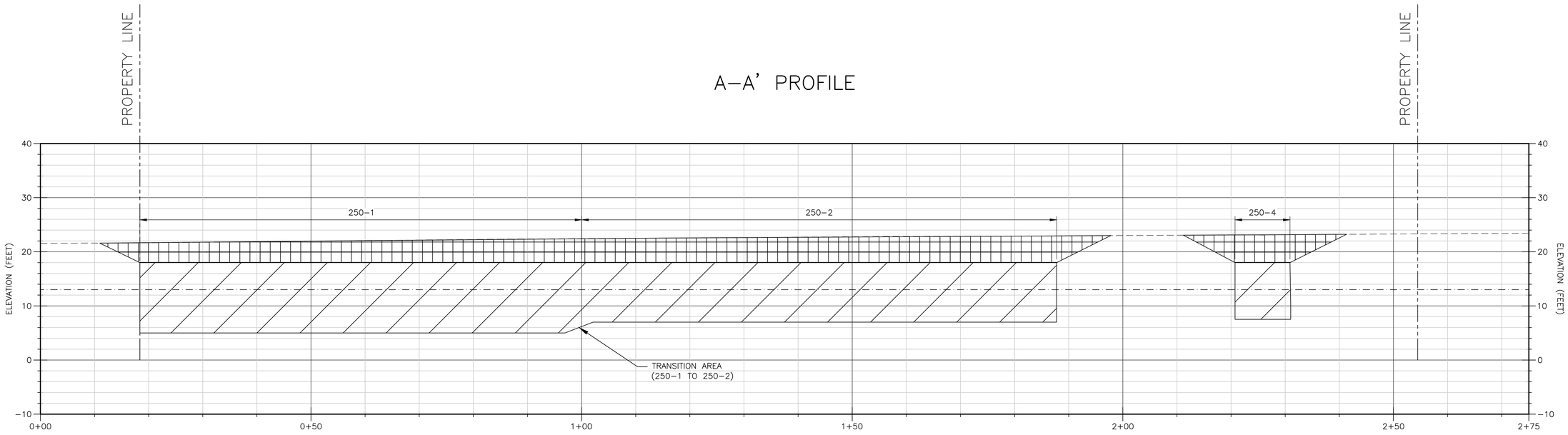
A–A' PROFILE



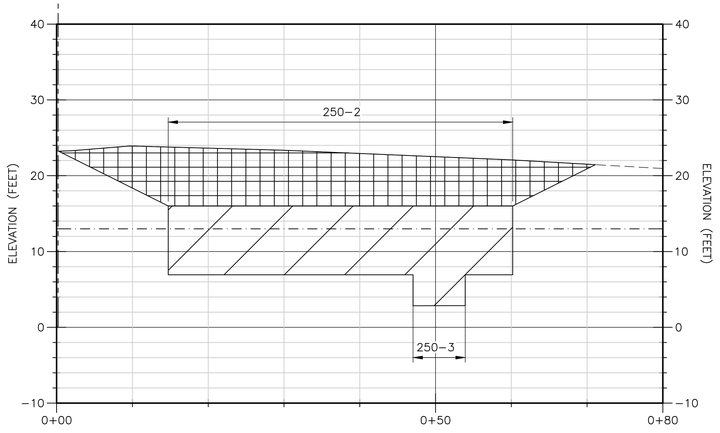
A–A' EXCAVATION

PROFILE

HORIZONTAL: 1" = 10'
VERTICAL: 1" = 10'

1" = 10'
5 0 10

B–B' PROFILE



B–B' EXCAVATION

PROFILE

HORIZONTAL: 1" = 10'
VERTICAL: 1" = 10'

1" = 10'
5 0 10

LEGEND:

- PROPERTY LINE
- IN–SITU SOIL SOLIDIFICATION AREA
- PRE–EXCAVATION OF CLEAN SOILS
- APPROXIMATE GROUNDWATER TABLE (VARIES SEASONALLY)

NOTES:

1. ARSENIC CONCENTRATIONS EXTEND OUTSIDE HIGHWAY 99 PROPERTY BOUNDARY.
2. ELEVATIONS NOTED ARE IN FEET AND BASED ON HORIZONTAL DATUM NAD 83 WASHINGTON STATE PLANE, SOUTH ZONE AND VERTICAL DATUM NGVD–88.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: H. PROVINSAL
DRAWN BY: A. CASE
SHEET CHK'D BY: H. PROVINSAL
CROSS CHK'D BY: M. PASSARO
APPROVED BY: A. WELSH
DATE: NOVEMBER 2023

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USG INTERIORS

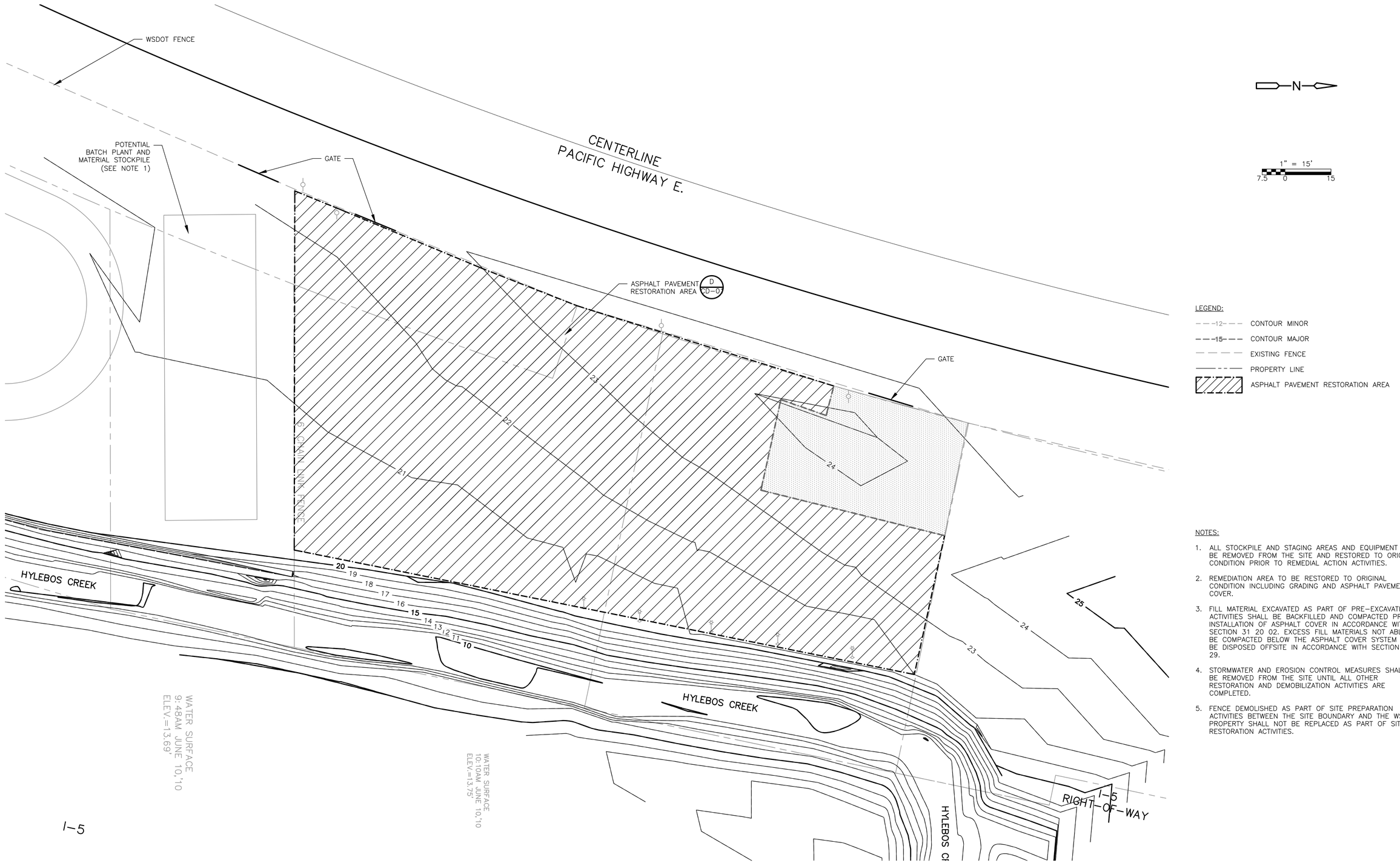
HIGHWAY 99 SITE
REMEDIATION / IN-SITU SOLIDIFICATION

EXCAVATION CROSS SECTION

PROJECT NO. 19921–272436
FILE NAME: C–00–04

SHEET NO.
C-04

100% DESIGN - ISSUED FOR BIDDING



NOTES:

1. ALL STOCKPILE AND STAGING AREAS AND EQUIPMENT SHALL BE REMOVED FROM THE SITE AND RESTORED TO ORIGINAL CONDITION PRIOR TO REMEDIAL ACTION ACTIVITIES.
2. REMEDIATION AREA TO BE RESTORED TO ORIGINAL CONDITION INCLUDING GRADING AND ASPHALT PAVEMENT COVER.
3. FILL MATERIAL EXCAVATED AS PART OF PRE-EXCAVATION ACTIVITIES SHALL BE BACKFILLED AND COMPACTED PRIOR TO INSTALLATION OF ASPHALT COVER IN ACCORDANCE WITH SECTION 31 20 02. EXCESS FILL MATERIALS NOT ABLE TO BE COMPACTED BELOW THE ASPHALT COVER SYSTEM SHALL BE DISPOSED OFFSITE IN ACCORDANCE WITH SECTION 02 61 29.
4. STORMWATER AND EROSION CONTROL MEASURES SHALL NOT BE REMOVED FROM THE SITE UNTIL ALL OTHER RESTORATION AND DEMOBILIZATION ACTIVITIES ARE COMPLETED.
5. FENCE DEMOLISHED AS PART OF SITE PREPARATION ACTIVITIES BETWEEN THE SITE BOUNDARY AND THE WSDOT PROPERTY SHALL NOT BE REPLACED AS PART OF SITE RESTORATION ACTIVITIES.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: H. PROVINSAL
DRAWN BY: A. CASE
SHEET CHK'D BY: H. PROVINSAL
CROSS CHK'D BY: M. PASSARO
APPROVED BY: A. WELSH
DATE: NOVEMBER 2023

CDM Smith
14432 SE Eastgate Way, Suite 100
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USG INTERIORS

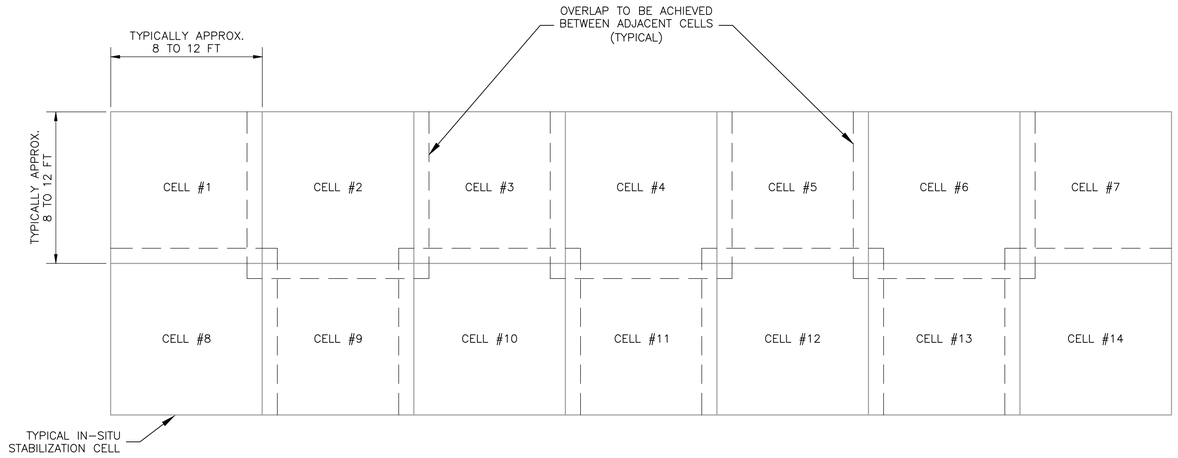
HIGHWAY 99 SITE
REMEDIATION / IN-SITU SOLIDIFICATION

FINAL GRADING AND RESTORATION PLAN

PROJECT NO. 19921-272436
FILE NAME: C-00-05

SHEET NO.
C-05

100% DESIGN - ISSUED FOR BIDDING

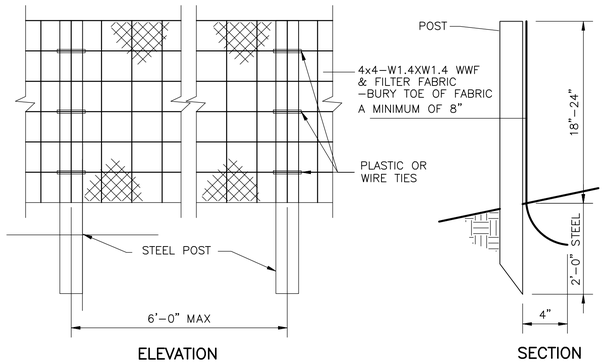


GENERAL SEQUENCING AND EXAMPLE OVERLAPPING DETAIL FOR ISS CELLS:

1. ESTABLISH LAYOUT OF CELLS BASED ON PROPOSED CELL DIMENSIONS AND BUCKET SIZE, AND CONSIDERING OVERLAP REQUIREMENTS (SEE NOTE 4). DETAILS ON DIMENSIONING, OVERLAP, SEQUENCING, ETC. TO BE PROPOSED IN CONTRACTOR WORK PLAN FOR APPROVAL BY THE ENGINEER.
2. FIRST ROUND OF MIXING TO BE PERFORMED ON EVERY OTHER CELL. LEAVING AT LEAST ONE UNMIXED CELL IN BETWEEN MIXED CELLS IN THE LOGITUDINAL AND LATERAL DIRECTION (E.G., 1, 9, 3, 11, 5, 13, 7, ETC.).
3. AFTER IN-SITU STABILIZATION HAS SUFFICIENTLY CURED IN FIRST ROUND OF MIXED CELLS (APPROXIMATELY 3 DAYS), INTERMEDIARY CELLS SHALL THEN BE MIXED (E.G., CELLS 8, 2, 10, 4, 12, 6, 14, ETC.).
4. DURING MIXING OF INTERMEDIARY CELLS, SUFFICIENT OVERLAP OF CELLS SHALL BE PPROVIDED IN BOTH THE LATERAL AND LONGITUDINAL DIRECTIONS TO PROVIDE CONTINUITY AND CONSISTENCY OF MIX THROUGHOUT IN-SITU STABILIZATION TREATMENT ZONE.
5. CONTRACTOR MAY PROPOSE ALTERNATE METHODS FOR ACHIEVING CONTINUITY AND OVERLAPPING REQUIREMENTS OF IN-SITU STABILIZATION IN THE WORK PLAN FOR APPROVAL BY THE ENGINEER.

EXAMPLE CELL SEQUENCING AND OVERLAP

DETAIL A — N.T.S. — C-03

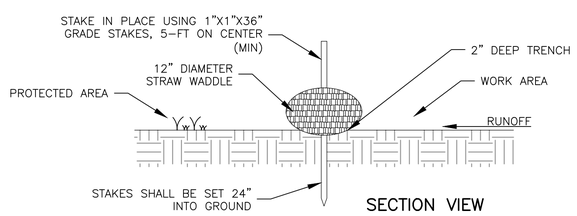


NOTES:

1. INSPECT SEDIMENT FENCES AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY.
2. SHOULD THE FABRIC COLLAPSE, TEAR, DCOMPOSE, OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY.
3. REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND REDUCE PRESSURE ON THE FENCE. TAKE CARE TO ADVIOD UNDERMINING THE FENCE DURING CLEANOUT.
4. REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
5. BACKFILL TRENCH AND COMPACT THOROUGHLY.

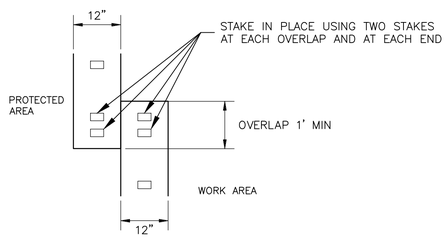
SILT FENCE

DETAIL B — NTS — C-2



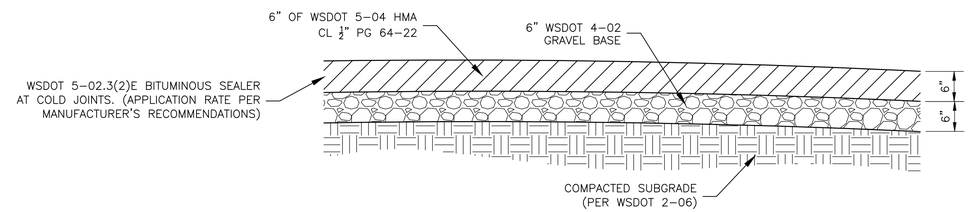
NOTES:

1. STAKES SHALL NOT EXTEND ABOVE THE STRAW WADDLE MORE THAN 2"
2. ENDS OF WADDLE SHALL BE TURNED SLIGHTLY UPSLOPE



12-IN STRAW WATTLE

DETAIL C — N.T.S. — C-02



HMA NOTES:

1. PROVIDE A THICKENED EDGE JOINT AT EXISTING ASPHALT WHERE OUTER 12" OF NEW ASPHALT IS 4" THICKER (OR 10" TOTAL THICKNESS) AND TRANSITION TO THICKENED EDGE SHALL BE A MINIMUM OF 2'.
2. MATCH GRADE OF NEW ASPHALT GRADE WITH EXISTING GRADE, SEAL PER ASTM D-3405

ASPHALT PAVEMENT RESTORATION

DETAIL D — N.T.S. — C-05

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: H. PROVINSAL
DRAWN BY: A. CASE
SHEET CHK'D BY: H. PROVINSAL
CROSS CHK'D BY: M. PASSARO
APPROVED BY: A. WELSH
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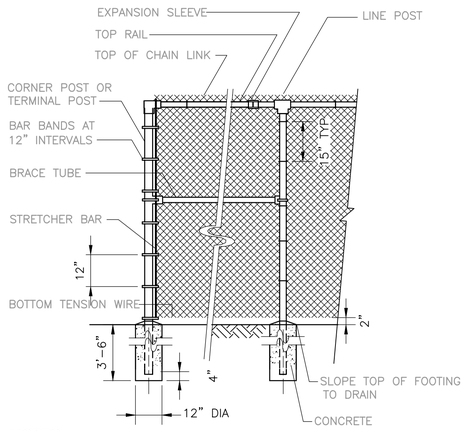
USG INTERIORS

HIGHWAY 99 SITE
REMEDIATION / IN-SITU SOLIDIFICATION

DETAILS

PROJECT NO. 19921-272436
FILE NAME: CD-00-01.dwg
SHEET NO.
CD-01

100% DESIGN - ISSUED FOR BIDDING

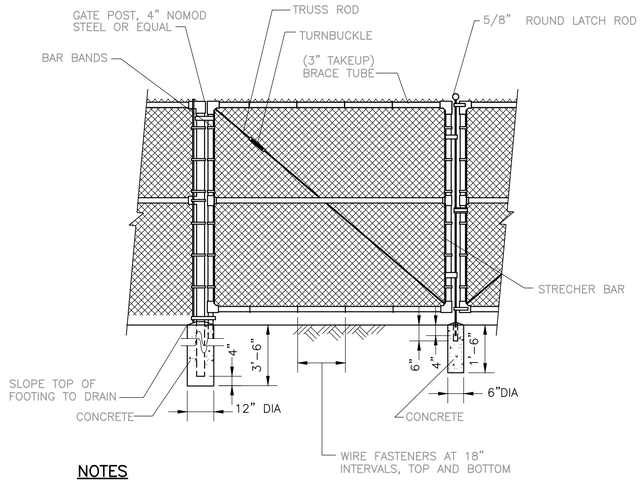


NOTES

1. FENCE TO BE CONSTRUCTED IN ACCORDANCE WITH SECTION 32 31 13.
2. TOP OF FINISHED FENCE SHALL BE A MINIMUM OF 6 FEET ABOVE GROUND SURFACE.

CHAINLINK FENCE

DETAIL A
NTS



NOTES

1. GATE TO BE CONSTRUCTED IN ACCORDANCE WITH SECTION 32 31 13.
2. TOP OF FINISHED GATE SHALL BE A MINIMUM OF 6 FEET ABOVE GROUND SURFACE.

CHAINLINK VEHICLE GATE

DETAIL B
NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

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USG INTERIORS

HIGHWAY 99 SITE
REMEDIATION / IN-SITU SOLIDIFICATION

DETAILS II

PROJECT NO. 19921-272436
FILE NAME: CD-00-02.dwg

SHEET NO.
CD-02

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