DRAFT REMEDIAL ACTION WORK PLAN

GLADE ROAD FACILITY

PASCO, WASHINGTON

Prepared for0

Western Farm Service

January 8, 2004

Prepared by

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Project 0030.01.02

Draft Remedial Action Work Plan, Glade Road Facility, Pasco, Washington

The material and data in this report were prepared under the supervision and direction of the undersigned.

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CONTENTS

LIST OF FIGURES

Following Text:

Figures

1 INTRODUCTION

On October 1, 2003, Crop Production Services, Inc. (CPS) entered into Agreed Order No. 03TCPER-5649 (Agreed Order) with the Washington Department of Ecology (Ecology) to conduct a remedial action at the Glade Road facility (site) near Pasco, Washington. The remedial action will be conducted in general accordance with the Final Cleanup Action Plan (CAP). The objectives of the remedial action are: 1) to remove the dinoseb-impacted soil that is in contact with groundwater (source of impacted groundwater), 2) to prevent direct contact with the shallow impacted soils, 3) to eliminate storm water infiltration through the impacted soils, and 4) to monitor the natural attenuation of the dinoseb- and nitrate-impacted groundwater.

This Work Plan describes the remedial action for the site. The remedial action was initially developed and evaluated during a feasibility study (FS) that was conducted during 2002 (MFA, 2002). Based on the results of an additional assessment of the soil near the former wash pad that was conducted in June 2003 (MFA, 2003), the remedial action scope of work was refined.

2 BACKGROUND

2.1 General Site Information

The Glade Road facility is located in a rural area approximately 5 miles north of Pasco, Washington (Figure 1). The site occupies an area of approximately 20 acres that is located near the center of Section 25, Township 10 North, Range 29 East, Willamette Meridian. The site address is 3482 Glade Road North.

The site is currently zoned as medium industrial (I2), and is surrounded by a fence to prevent access to the public. The site surface slopes gently downward to the south and west. Surface water runoff from the site drains to the west toward Glade Road North. During most rainfall events, surface water puddles near the equipment repair shop (Figure 2). During heavy rainfall events, the runoff drains into ditches along the east side of Glade Road North. The ditch located north of the site driveway drains into a stream within the Esquatzel Coulee, approximately 400 feet to the north of the site (Figure 1). The surface water that enters the ditch located south of the driveway collects in the ditch and eventually evaporates.

The nearest surface water bodies are a network of intermittent ponds, marshes, and a stream within the Esquatzel Coulee, located at least 400 feet to the west and north of the site. Wetlands are located within the Esquatzel Coulee approximately 250 feet northwest of the site and 1,000 feet north of the site (Washington Department of Fish and Wildlife, 1999). The Columbia River is located approximately 8 miles to the west-southwest of the site.

From 1973 to the present, the site has been used for fertilizer and pesticide storage and distribution, and equipment and vehicle maintenance and storage. Until 1988, petroleum hydrocarbon storage and truck fueling operations were also conducted on site. PureGro Company (PureGro) leased the site from Burlington Northern Santa Fe Railroad (BNSF) from 1973 to 1985. In 1985, PureGro purchased a parcel approximately 20 acres in area, including most of the property occupied by the facility and a vacant adjacent property along Glade Road North (current equipment storage and truck parking area). A strip of property approximately 200 feet wide along the BNSF tracks, which includes the eastern edge of the site, is still leased railroad right-of-way (Figure 2).

The PureGro operations consisted of four main PureGro businesses: 1) the Glade retail fertilizer and pesticide operation located in the northeast part of the site, 2) the Leaf Life specialty fertilizer products operation located in the southeast part of the site, 3) the northwest regional trucking operation located near the center of the site, and 4) the northwest regional office located in the southwest part of the site (Figure 2). The western part of the site was leased to Aero Air, an applicator of agricultural chemicals by helicopter. In 1993, the site was sold to CPS, who merged with Western Farm Service, Inc. (WFS), in 1995. CPS and WFS are subsidiaries of Agrium, Inc. The four site operations have been altered or discontinued since the sale of PureGro to CPS.

Products currently or historically stored at the site include compounds from the organochlorine, carbamate, triazine, organophosphorus, synthetic pyrethoid, and sulfony urea chemical families, nitrogen- and phosphorus-based fertilizers, and petroleum hydrocarbons. There is limited information about previous chemicals stored at the site; however, according to facility personnel, discontinued products that may have been stored at the site include dinoseb, toxaphene, and DDT (Woodward-Clyde Consultants, 1992). Sulfuric acid usage and storage was discontinued in 1996 (EMCON, 1998). The locations of the current and former product storage areas are shown on Figure 2.

Structures currently on site mainly consist of 2 office buildings, 5 chemical and/or fertilizer storage warehouses, an equipment repair shop, and over 15 aboveground chemical, fertilizer, or rinse water storage tanks (Figure 2). Concrete containment berms surround all of the liquid storage tanks. There are two on-site wells (Well #1 and Well #2) that supply production water to the site (Figure 2).

2.2 Site Geology and Hydrogeology

Beneath the gravel, asphalt, or concrete surface cover at the site, the uppermost geology typically consists of approximately 4 to 18.5 feet of sandy silt to silt. Locally, up to 12 feet of silty sand to sand occurs on top of the sandy silt to silt unit. The sandy silt to silt unit is underlain by a lower silty sand to sand unit that coarsens downwards to gravelly sand. This silty sand to sand unit (including the gravelly sand) ranges from approximately 5 to 23 feet thick. The silty sand to sand unit overlies a cemented silt unit that is approximately 15 to 23 feet thick. Beneath the western part of the site, the cemented silt unit is underlain by a silty sand unit that is approximately 3 to 3.5 feet thick. The silty sand unit is underlain by a sandy gravel to gravel unit that is at least 11 feet thick (MFA, 2001a).

Unconfined groundwater beneath the site occurs within the silty sand to sand unit located directly above the cemented silt unit, and appears to be perched on top of the cemented silt unit. Deeper semi-confined groundwater occurs within the silty sand and the sandy gravel to gravel units beneath the cemented silt. The general groundwater flow direction

of the unconfined aquifer is to the southwest. The general groundwater flow direction of the semi-confined aquifer is to the south. There is a downward vertical gradient from the unconfined aquifer to the deeper semi-confined aquifer (MFA, 2001a).

2.3 Contaminants of Concern

Based on the results of previous remedial investigation and soil remediation activities at the site, the area-specific soil contaminants of concern (COCs) for direct contact and/or protection of groundwater include the following:

- Former open-top tank area: disulfoton and 2,4-D
- Former wash pad: 2,4-D, dinoseb, and dicamba
- 21-0-0-7 fertilizer spill area: dieldrin and heptachlor
- Former gasoline underground storage tank (UST) area: total petroleum hydrocarbons as gasoline (TPH-G)
- Former helicopter spray office building area: toxaphene
- Former helicopter pad area: toxaphene

The locations of the former open-top tank, the former wash pad, the 21-0-0-7 fertilizer spill area, the former gasoline UST, and the former helicopter spray office building are shown on Figure 2. The locations of the soil samples that contained soil COC concentrations greater than the site cleanup levels established in the CAP are shown on Figures 2 and 3. Based on the previous remedial investigations results, the groundwater COCs at the site are dinoseb and nitrate (MFA, 2002). The estimated areas of dinoseb-impacted groundwater and nitrate-impacted groundwater that exceed the site cleanup levels established in the CAP are shown on Figure 4. The nature and extent of the soil and groundwater COCs are detailed in MFA's *Final Feasibility Study Report*, dated August 16, 2002, and in MFA's *Additional Subsurface Assessment Report, Former Wash Pad Area*, dated July 25, 2003.

3 PLANNED REMEDIAL ACTION

To meet the objectives described in Section 1, the planned remedial action consists of: 1) excavating the dinoseb-impacted soil that is in contact with the shallow groundwater beneath the former wash pad area, 2) installing and maintaining asphalt surface caps over the impacted soil at the 21-0-0-7 fertilizer spill area, the former gasoline UST area, the former helicopter spray office building area, and the former helicopter pad area, 3) installing two groundwater monitoring wells to the west of the site to monitor the off-site shallow groundwater conditions, 4) conducting groundwater sampling events to monitor the natural attenuation of the dinoseb- and nitrate-impacted groundwater, and 5) implementing institutional controls to limit the exposure and risks associated with the remaining impacted soil and groundwater beneath the site.

This section describes the scope of work for the remedial action. Detailed procedures for sampling and analysis, and quality assurance are presented in a Sampling and Analysis Plan (Appendix A). The health and safety procedures associated with the remedial action are presented in a Health and Safety Plan (Appendix B).

3.1 Excavate Dinoseb-Impacted Soil – Former Wash Pad Area

Based on the results of the previous investigations, the dinoseb-impacted soil that is in contact with the shallow groundwater beneath the former wash pad is the source of the dinoseb-impacted groundwater at the site. The estimated area of the impacted soil that is in contact with the groundwater is approximately 1,400 square feet (Figure 5). The area of impacted soil appears to extend a few feet beyond the northern boundary of the site, on to Franklin County property. The zone of groundwater fluctuation beneath the former wash pad area occurs at a depth of approximately 25 to 29 feet below ground surface (bgs).

The on-site dinoseb-impacted soil that is in contact with the groundwater will be removed by excavation methods. Prior to excavation, the overhead and underground utility lines (electrical and telephone) that are located in the area of excavation will be temporarily relocated. All of the underground utilities within 50 feet of the planned excavation area will be located and marked by using a private utility locating company.

To prevent the soil excavation from extending onto the neighboring Franklin County property, steel sheet piling will be installed along the northern property line and along the

western and eastern extents of excavation. Sheet piling may also be installed along the southern extent of the excavation or the sidewall may be sloped to prevent caving. The location and depth of the sheet piling will be determined by the selected excavation contractor, in accordance with OSHA regulations. The minimum area of the excavation is shown on Figure 5.

A minimum of approximately 3,000 cubic yards of impacted and "clean" soil will be removed from the excavation. The soil excavated at depths between 25 and 29 feet bgs (approximately 250 cubic yards) will be hauled to the Regional Disposal Company Landfill in Roosevelt, Washington, for disposal as a non-hazardous waste. The soil excavated at depths of less than 25 feet bgs will be temporarily stockpiled on site. After completing the excavation, a soil sample will be collected from each of the sidewalls that do not consist of sheet piling, at a depth of approximately 25 feet bgs. The soil samples will be submitted to North Creek Analytical, Inc. (NCA), in Bothell, Washington, for analysis of chlorinated herbicides by EPA Method 8151A.

If the soil samples contain dinoseb concentrations below the site cleanup level (130 micrograms per kilogram), then the excavation will be backfilled. If any soil sample contains a dinoseb concentration above the site cleanup level, then the sidewall where the sample was collected will be extended another 5 feet and re-sampled.

Clean imported material will be used to backfill the excavation at depths within the zone of groundwater fluctuation. After backfilling the imported material and placing a geotextile fabric over the material, the stockpiled soil will be used to backfill the excavation to ground surface. After completing the backfilling, the sheetpiling will be removed and the excavation area will be covered with a 3-inch-thick asphalt cap to prevent direct contact with the impacted backfilled soil and to eliminate the infiltration of storm water through the impacted soil (protect the groundwater). An Engineering Design Report (EDR) that provides the design specifications for the work is presented in Appendix C. An Operation and Maintenance Plan that provides the specifications for inspection and maintenance of the asphalt cap is presented in Appendix D.

3.2 Install Asphalt Caps

Impacted soils at the 21-0-0-7 fertilizer spill area, the former gasoline UST area, the former helicopter spray office building, the former helicopter pad area, and the former open-top tank area occur at depths above the zone of groundwater fluctuation and are not sources of the impacted groundwater. These areas of impacted soil are shown on Figures 6, 7, and 8. To prevent direct contact with the shallow impacted soil and eliminate storm water infiltration through the impacted soil, the ground surface above each impacted soil area, except at the former open-top tank area, will be covered with a 3-inch-thick asphalt cap. The area of impacted soil in the vicinity of the former open-top tank is currently

located beneath the concrete floor of a warehouse; therefore, a surface cap is already in place (Figure 8). The paving specifications are detailed in the EDR (Appendix C) and the inspection and maintenance procedures are detailed in the Operation and Maintenance Plan (Appendix D). After the installation of the caps, a deed restriction will be implemented that restricts the disturbance of the caps and the excavation of the impacted soil beneath the caps.

To verify the effectiveness of the caps, groundwater samples will be collected on an annual basis from on-site shallow groundwater monitoring wells MW-4 and MW-14 for a period of at least five years. MW-4 and MW-14 are located along the western boundary of the site (Figure 2). The groundwater samples will be submitted to NCA for analysis of chlorinated herbicides. When the dinoseb concentrations in the samples are below the site cleanup level for two consecutive annual events, then the annual monitoring will be discontinued.

3.3 Monitor Natural Attenuation of Impacted Groundwater

Based on the results of the previous investigations, dinoseb-impacted shallow groundwater that contains concentrations greater than the site cleanup level (7 micrograms per liter) occurs beneath the former wash pad area and extends to the west-southwest, beyond the western boundary of the site (Figure 4). Nitrate-impacted shallow groundwater that contains concentrations greater than the site cleanup level (17.7 milligrams per liter) occurs beneath the northeastern part of the site and extends to the west-southwest, beyond the western boundary of the site (Figure 4). The remedial action for the impacted groundwater will consist of monitoring the natural attenuation of the dinoseb and nitrate concentrations. The dinoseb concentrations are expected to decrease rapidly following the excavation of the impacted soil from the zone of groundwater fluctuation beneath the former wash pad area. After completing the soil excavation activities, a deed restriction will be implemented that prevents the use of the shallow impacted groundwater beneath the site for drinking water purposes.

To allow for monitoring of the off-site shallow groundwater, two groundwater monitoring wells (designated MW-16 and MW-17) will be installed to the west of the site (Figure 4). MW-16 will be located on the property of Mr. Glen Roundy, approximately 400 feet to the southwest (hydraulically downgradient) of the estimated downgradient extent of dinoseb-impacted groundwater. MW-17 will be located on Franklin County property, approximately 60 feet southwest of the downgradient extent of the nitrate-impacted groundwater. Prior to conducting the well installation, WFS will obtain permits from Mr. Roundy and Franklin County to install the wells on their properties. All of the underground utilities within 50 feet of the planned well locations will be located and marked by using a private utility locating company.

During drilling, soil samples will be collected at 5-foot intervals by using a split-spoon sampler. A soil sample collected from each boring, at a depth of less than 5 feet above the groundwater table, will be submitted to NCA for analysis. The samples will be analyzed for nitrate by EPA Method 300.0 and for chlorinated herbicides. Both borings will be completed to depths of approximately 5 feet below the shallow groundwater table (approximately 25 to 30 feet bgs). The wells will be constructed similar to the existing shallow monitoring wells at the site and the well screens will straddle the groundwater table. After installation, a licensed surveyor will survey the locations and top of casing elevations of the new wells.

To monitor the natural attenuation of the dinoseb- and nitrate-impacted shallow groundwater beneath the site and to the west of the site, groundwater samples will be collected from selected wells on a semi-annual to quarterly basis. Prior to each groundwater sampling event, the depths to groundwater will be measured in all of the on-site and off-site shallow groundwater monitoring wells. To monitor the attenuation of the dinoseb-impacted groundwater, groundwater samples will be collected from on-site wells MW-3 and MW-8 and off-site well MW-16 on a semi-annual basis. The samples will be submitted to NCA for analysis of chlorinated herbicides. When the dinoseb concentrations in the groundwater samples from the on-site compliance point (MW-8) are below the site cleanup level for two consecutive semi-annual sampling events, groundwater samples will be collected from MW-3, MW-8, and MW-16 on a quarterly basis for a period of at least one year. If the dinoseb concentrations in the quarterly samples from on-site compliance point MW-8 are below the cleanup level for four consecutive sampling events, then the groundwater monitoring for dinoseb will be discontinued.

To monitor the attenuation of the nitrate-impacted groundwater, groundwater samples will be collected from on-site wells MW-4 and MW-14 and off-site wells MW-16 and MW-17 on a semi-annual basis. The samples will be submitted to NCA for analysis of nitrate. When the nitrate concentrations in the groundwater samples from the two on-site compliance points (MW-4 and MW-14) are below the site cleanup level for two consecutive semi-annual sampling events, groundwater samples will be collected from MW-4, MW-14, MW-16, and MW-17 on a quarterly basis for a period of at least one year. If the nitrate concentrations in the quarterly samples from the two on-site compliance points are below the cleanup level for four consecutive sampling events, then the groundwater monitoring for nitrate will be discontinued.

4 DELIVERABLES

4.1 Progress Reports

Progress reports will be submitted to Ecology on a semi-annual basis and will consist of:

- A list of the previous six month's activities
- A description of any deviations from the CAP or this Work Plan
- A description of any deviations from the schedule and any planned deviations in the coming six months
- Plans for recovering lost time and complying with the schedule

4.2 Remedial Action Report

Following completion of the soil excavation and capping activities, a Draft Remedial Action Report will be prepared that describes the soil excavation, capping, and well installation activities. The report will present the field data, the validated soil sample analytical data, and the validated groundwater sample analytical data from the first semi-annual sampling event. After receiving comments from Ecology concerning the draft report, a Final Remedial Action Report will be prepared.

4.3 Groundwater Sampling Reports

After completing the second semi-annual groundwater sampling event and each of the subsequent annual, semi-annual, and quarterly sampling events, a groundwater sampling report will be prepared and submitted to Ecology. Each report will describe the field activities and present the field data and the validated sample analytical data.

5 SCHEDULE

After obtaining permits from the property owners, the two off-site groundwater monitoring wells will be installed in May or June 2004. To minimize the impacts to the site operations, the soil excavation and capping activities will be conducted during August and September 2004, which is typically a "slower" period at the site. The first semi-annual groundwater sampling event will be conducted in August 2004, and the first annual groundwater sampling event (to test the performance of the caps) will be conducted in August 2005.

The schedule of deliverables and the due date for each deliverable are presented below.

Deliverables	Due Date
Final Remedial Action Work Plan	45 days after receipt of the Ecology's comments on the Draft Remedial Action Work Plan
Draft Remedial Action Report	60 days after completion of the soil excavation and capping activities
Final Remediation Action Report	45 days after the receipt of Ecology's comments on the Draft Remedial Action Report
Groundwater Sampling Reports	60 days after completion of each groundwater sampling event
Progress Reports	Every 6 months (beginning in April 2004)

REFERENCES

EMCON, 1998. Final Phase I Remedial Investigation Technical Report, Glade Road Facility, Pasco, Washington. July 27.

Maul Foster & Alongi, Inc. 2001a. Final Phase II Remedial Investigation Technical Report, Glade Road Facility, Pasco, Washington. April 23.

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Maul Foster & Alongi, Inc. 2002. Final Feasibility Study Report, Glade Road Facility, Pasco, Washington. August 16.

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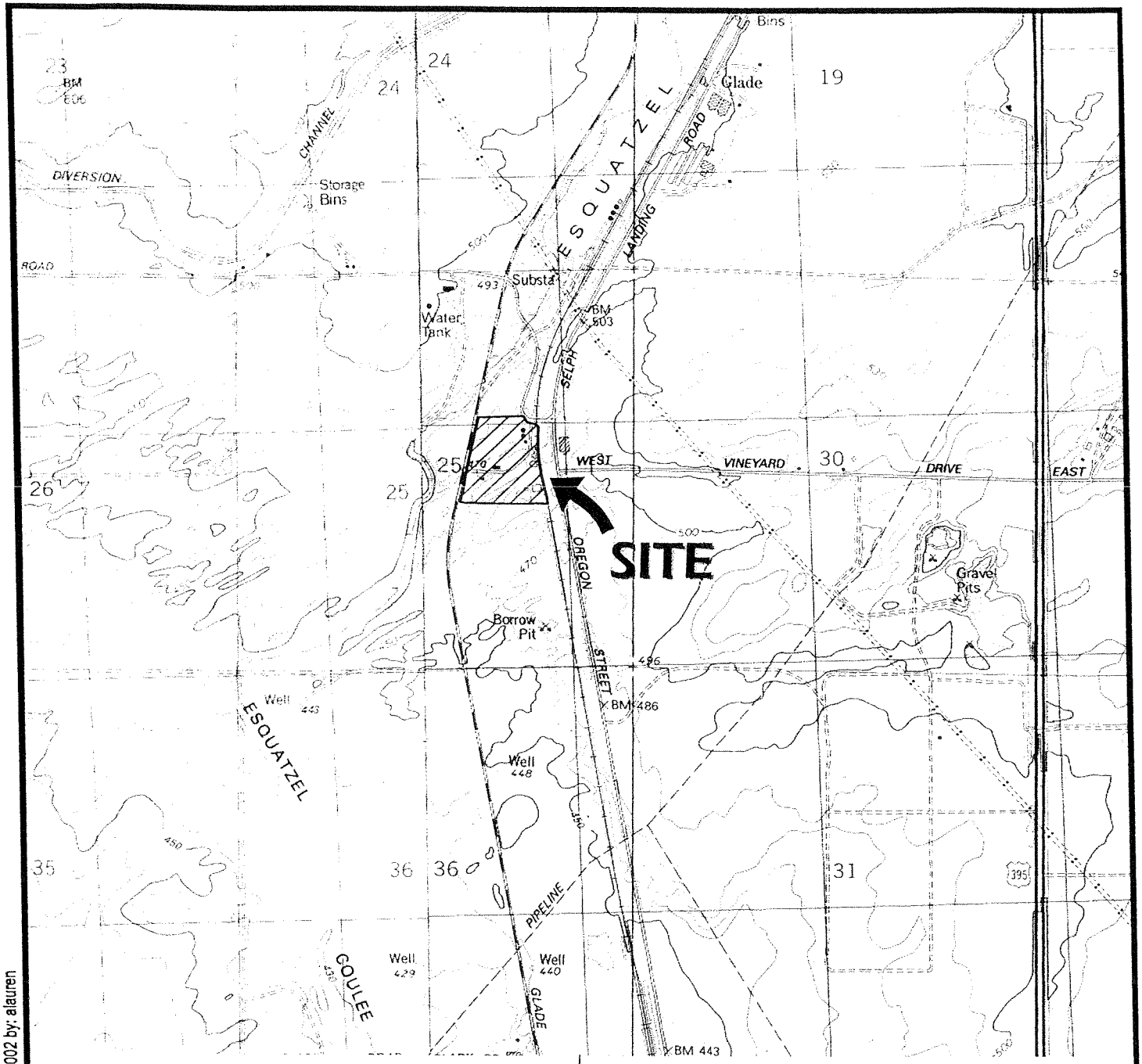

Base map prepared from USGS 7.5-minute quadrangle of Glade, Washington (1979), and Columbia Point, Washington (1979).

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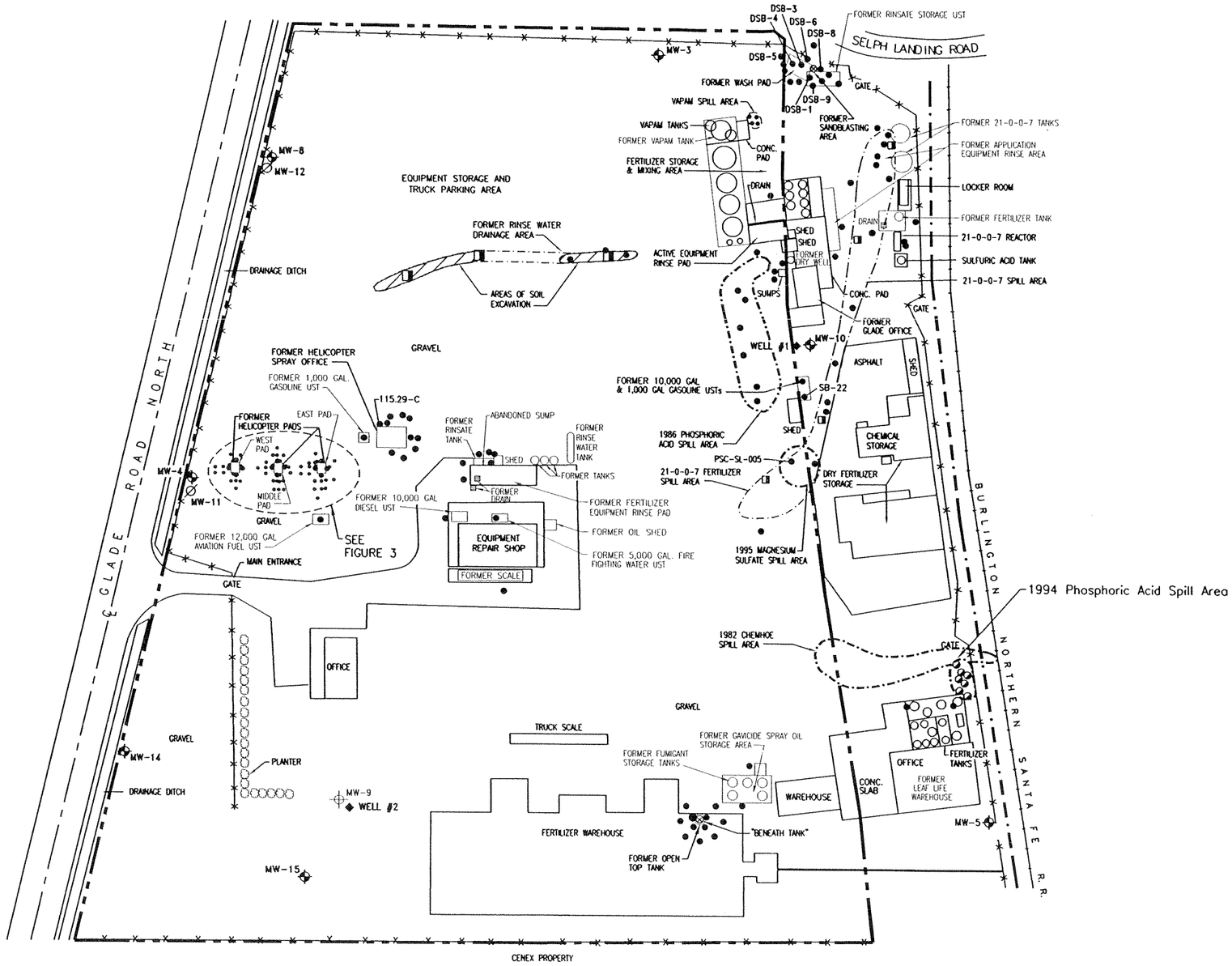
Figure 1
GLADE ROAD FACILITY
PASCO, WASHINGTON

SITE LOCATION MAP

Last edited: July 16, 2002 by: alauren

File: P:\0030.01.01\Site Location Map

LAYOUT: 1



LEGEND:

- MW-3 Shallow Monitoring Well Location and Designation
- MW-12 Deep Monitoring Well Location and Designation
- MW-9 Abandoned Monitoring Well Location and Designation
- Soil Boring Location
- Test Pit Location
- Surface Soil Sample Location
- Excavation Confirmation Sample Location
- WELL #1 Water Supply Well Location and Designation
- Railroad Tracks
- Leased Property Boundary
- Property Line
- Existing Fence

NOTES:

1. The soil boring, test pit, and surface soil sample locations are approximate.
2. Soil boring, test pit, and surface soil sample names were only listed at locations where contaminants of concern in soil exceeded MTCA Method B cleanup levels for direct contact or protection of groundwater.

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FIGURE 2
GLADE ROAD FACILITY
PASCO, WASHINGTON
SAMPLE LOCATIONS CONTAINING
SOIL COC CONCENTRATIONS GREATER THAN SITE CLEANUP LEVELS

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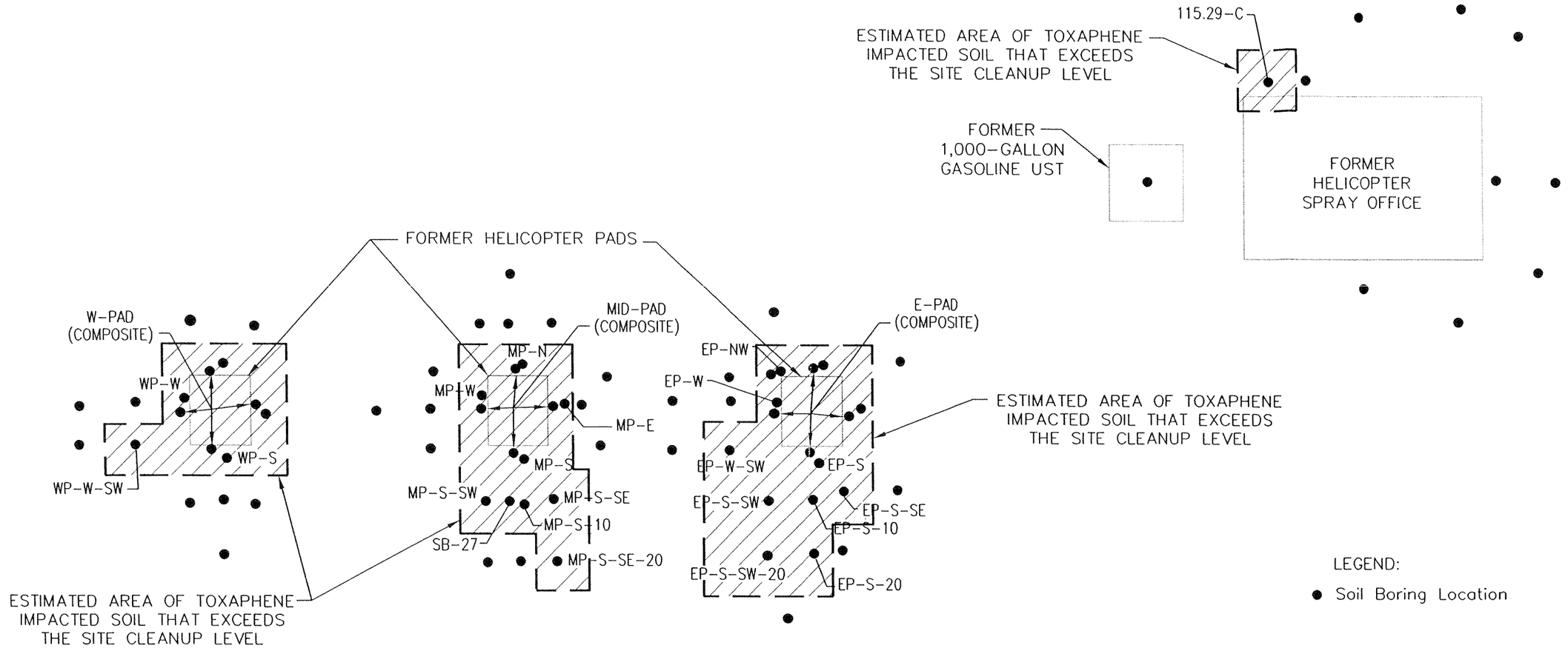

NOTES:

1. The soil boring locations are approximate.
2. Soil boring names were only listed at locations where contaminants of concern in soil exceeded the site cleanup levels.

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FIGURE 3
GLADE ROAD FACILITY
PASCO, WASHINGTON

ESTIMATED AREAS OF IMPACTED SOIL - FORMER HELICOPTER PAD AREA

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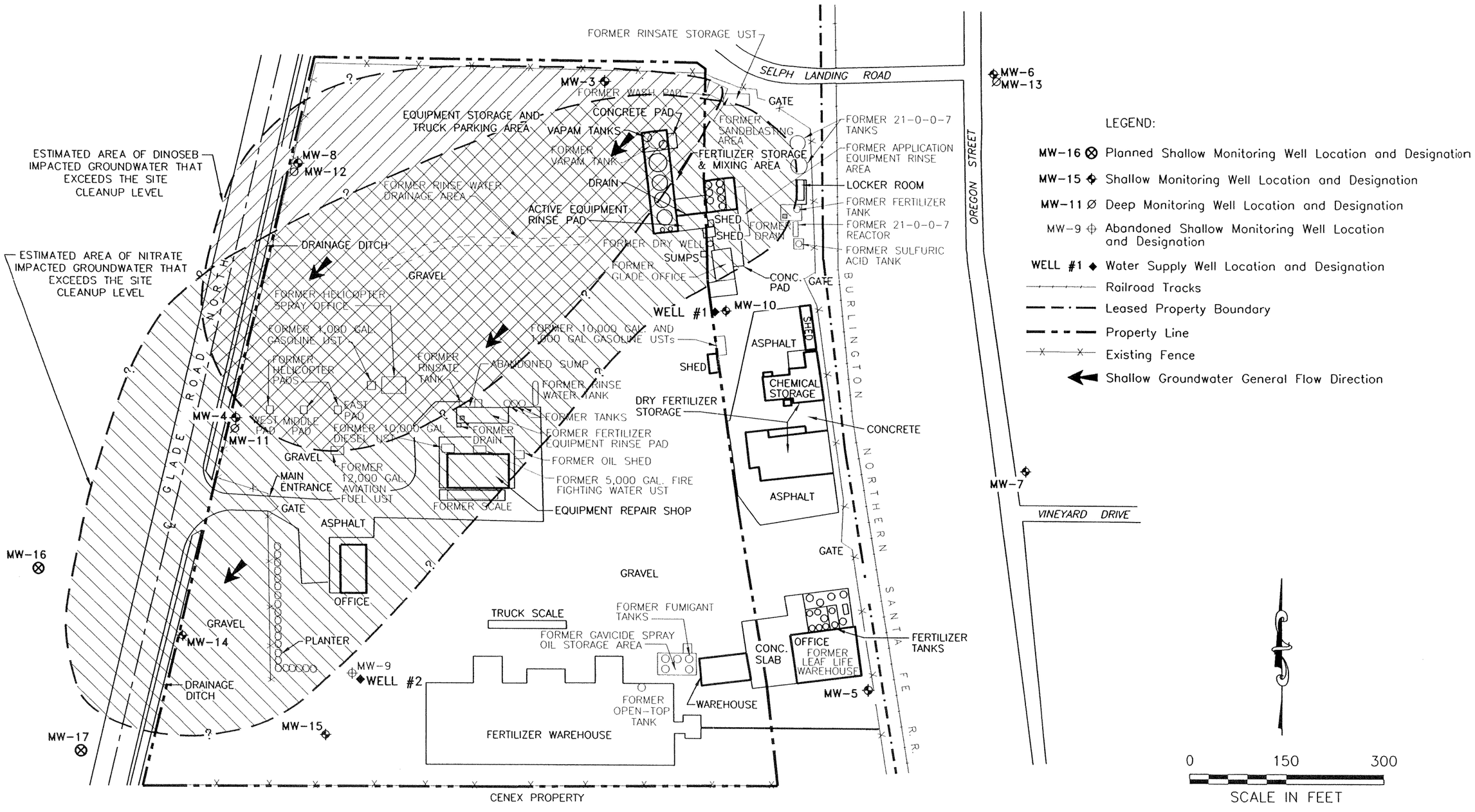

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FIGURE 4
GLADE ROAD FACILITY
PASCO, WASHINGTON

PLANNED SHALLOW MONITORING WELL LOCATIONS

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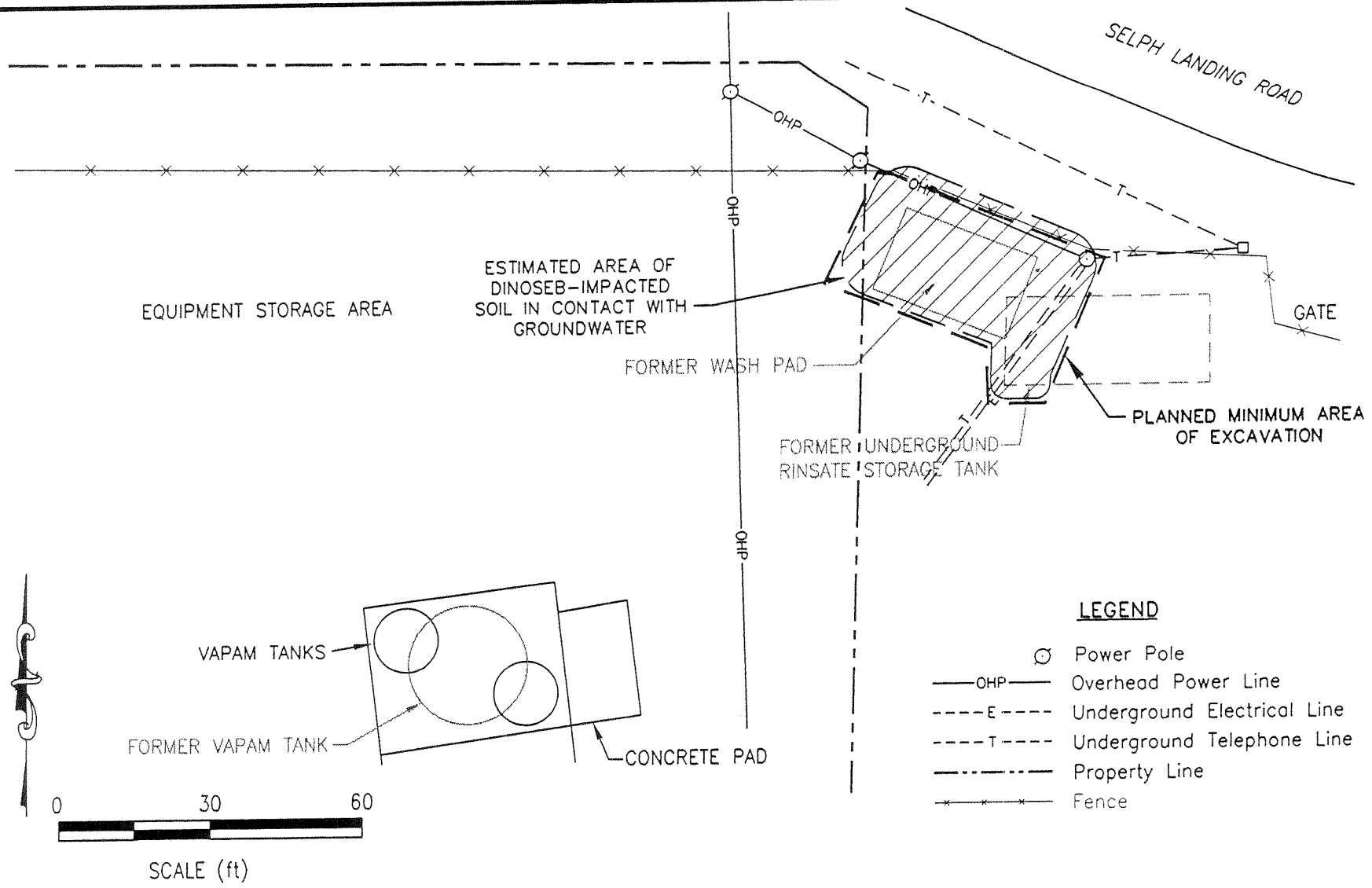

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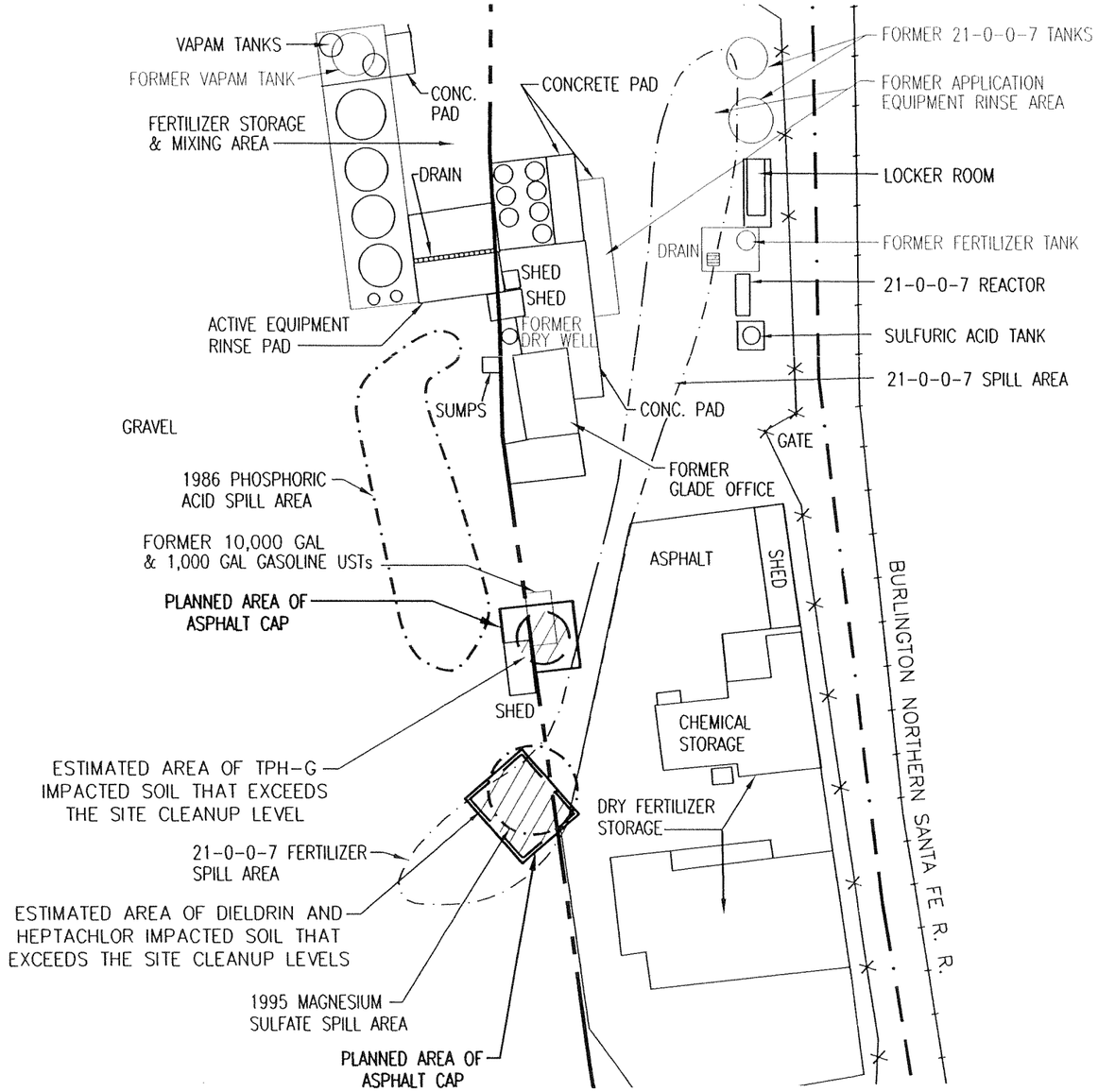
FIGURE 5
GLADE ROAD FACILITY
PASCO, WASHINGTON

PLANNED MINIMUM AREA OF SOIL EXCAVATION



LEGEND:

- Railroad Tracks
- Leased Property Boundary
- Property Line
- Existing Fence

0 80 160

SCALE IN FEET

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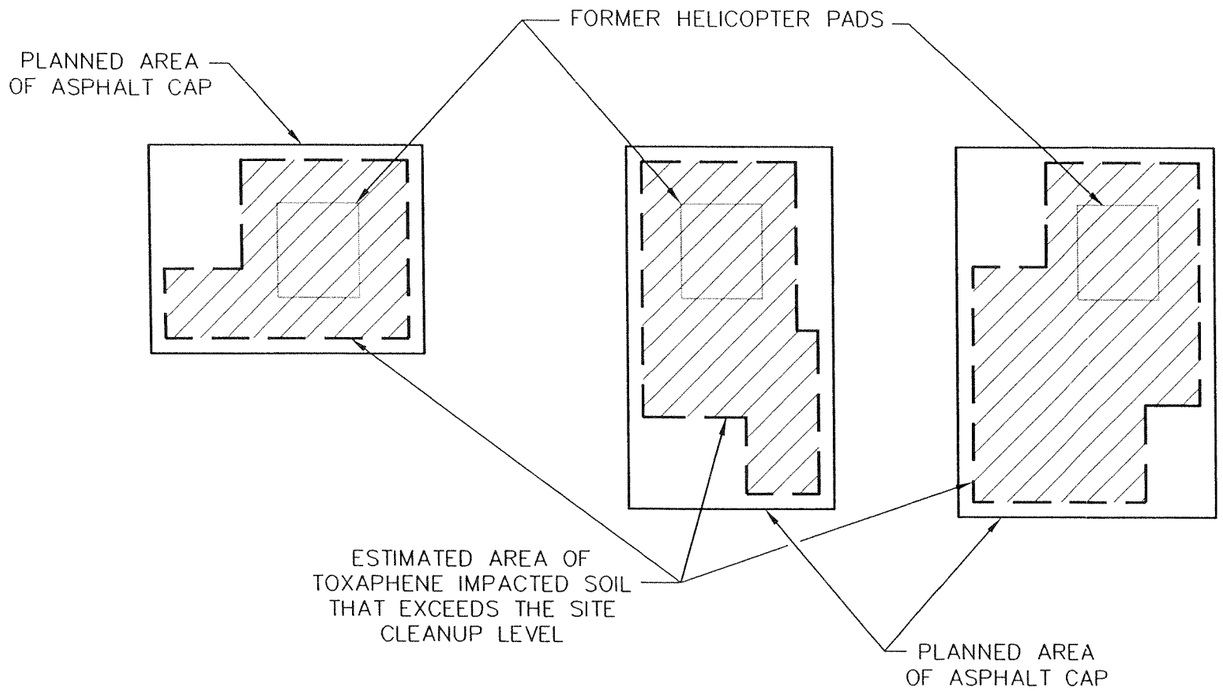
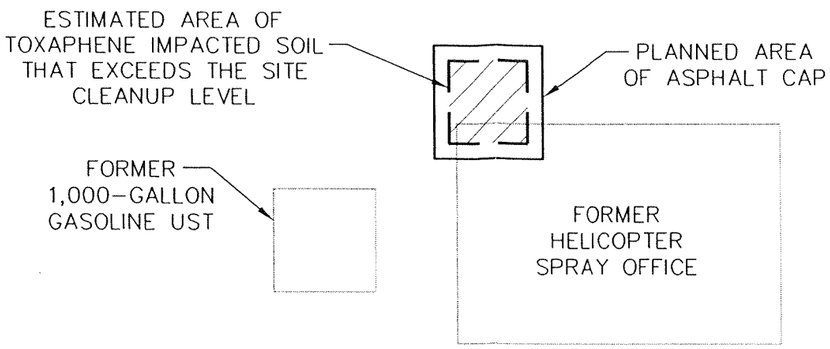
FIGURE 6
GLADE ROAD FACILITY
PASCO, WASHINGTON

ESTIMATED AREAS OF IMPACTED SOIL - EASTERN PART OF SITE





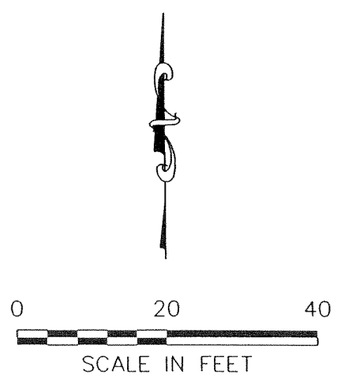


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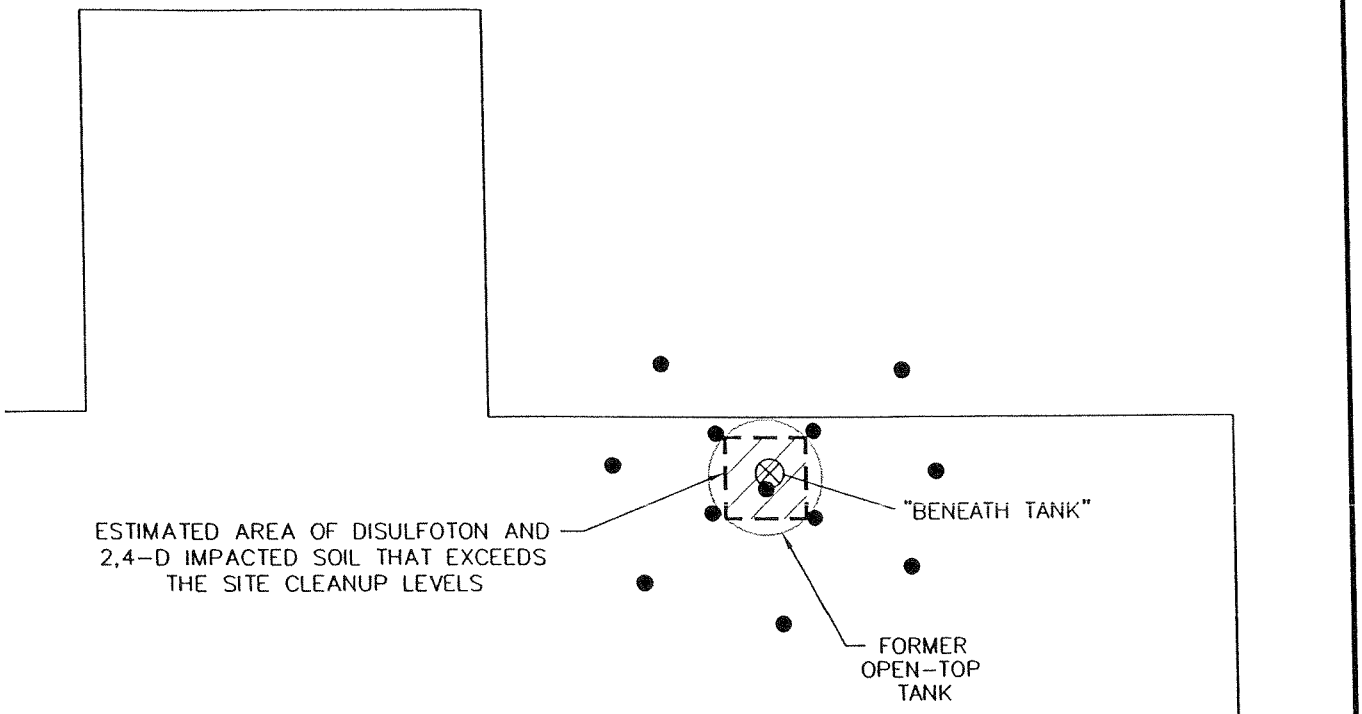
FIGURE 7
GLADE ROAD FACILITY
PASCO, WASHINGTON

**PLANNED AREAS OF ASPHALT CAPS -
FORMER HELICOPTER PAD AREA**



LEGEND:

- ● Previous Soil Boring Location
- ⊗ Previous Surface Soil Sample Location

NOTES:

1. The soil boring and surface soil sample locations are approximate.
2. Soil boring and surface soil sample names were only listed at locations where contaminants of concern in soil exceeded site cleanup levels.

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SCALE IN FEET

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FIGURE 8
GLADE ROAD FACILITY
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ESTIMATED AREA OF IMPACTED SOIL - FORMER OPEN-TOP TANK AREA

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APPENDIX A

SAMPLING AND ANALYSIS PLAN

SAMPLING AND ANALYSIS PLAN

REMEDIAL ACTION

GLADE ROAD FACILITY

PASCO, WASHINGTON

Prepared for

Western Farm Service

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Prepared by

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Sampling and Analysis Plan
Glade Road Facility, Pasco, Washington

The material and data in this report were prepared under the supervision and direction of the undersigned.

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CONTENTS

TABLES AND ILLUSTRATIONS

Following text:

Tables

Figures

1 INTRODUCTION

1.1 Purpose

The purposes of this Sampling and Analysis Plan (SAP) are to: 1) specify procedures for field sampling activities described in the Work Plan, 2) identify quality assurance (QA) procedures to be implemented during sampling activites and laboratory analyses, and 3) meet the requirements of WAC 173-340-820, Model Toxics Control Act (MTCA) regulations, for sampling and analysis plans.

1.2 Sampling and Analysis Plan Organization

The SAP is organized in four sections. A brief description of each section is presented below.

- **Section 1 – Introduction.** Section 1 contains an overview of the SAP.
- **Section 2 – Field Sampling Plan.** Section 2 identifies the sampling locations and depths, and presents the procedures to be used in field sampling and characterization studies. Included are procedures for: soil and groundwater sample collection; sample labeling, shipping, and custody; well installation, development, and sampling; surveying; decontamination; and residuals management.
- **Section 3 – Quality Assurance Program Plan.** Section 3 identifies the project organization and includes QA procedures for field activities and laboratory analyses.
- **Section 4 – Field Forms.** Section 4 provides a set of forms to be used during field activities.

2 FIELD SAMPLING PLAN

2.1 Sampling Needs and Objectives

The remedial action sampling activities at the Glade Road facility (site) will be performed to provide data of sufficient quality and quantity to satisfy the following data quality objectives (DQOs):

- Confirm that the soils within the zone of groundwater fluctuation containing dinoseb concentrations greater than the site cleanup level have been effectively removed.
- Effectively monitor the natural attenuation of the dinoseb and nitrate in groundwater.

The sampling will supplement the previous testing conducted at the site.

2.2 Sample Locations

Two off-site soil borings wil be drilled and sampled for soil identification, and for chemical analysis. Each of the borings will be completed as a groundwater monitoring well (MW-16 and MW-17), and groundwater samples will be collected from the planned wells and selected existing monitoring wells for chemical analysis. The locations of the planned and existing wells are shown on Figure 4 of the Work Plan.

A discrete soil sample will be collected from any sidewall of the soil excavation that does not consist of steel sheet piling. The samples will be collected at a depth of approximately 25 feet below ground surface (bgs).

Groundwater samples will be collected on a quarterly to annual basis from on-site shallow groundwater monitoring wells MW-3, MW-4, MW-8, and MW-14, and from off-site shallow monitoring wells MW-16 and MW-17. The locations of the wells are shown on Figure 4 of the Work Plan.

2.3 Sample Types, Frequency, and Analyses

2.3.1 Soil Samples

Subsurface soil samples will be collected from each soil boring at approximately 5-foot intervals, beginning at approximately 1 foot bgs. A selected sample from each boring, collected at a depth of less than 5 feet above the groundwater table, will be submitted to a laboratory [North Creek Analytical, Inc. (NCA) in Bothell, Washington] for chemical analysis.

Any soil sample collected from the soil excavation at the former wash pad area will be analyzed for chlorinated herbicides by EPA Method 8151A. The selected soil samples from the soil borings will be analyzed for nitrate by using EPA Method 300.0 and for chlorinated herbicides. The laboratory objectives for the chemical analyses are presented in Table 1. The laboratory deliverable requirements and the data validation parameters are presented in Tables 2 and 3, respectively.

2.3.2 Groundwater Samples

To verify the effectiveness of the asphalt caps, groundwater samples will be collected on an annual basis from on-site monitoring wells MW-4 and MW-14 for a period of at least 5 years. The samples will be submitted to NCA for analysis of nitrate by using EPA Method 300.0 and chlorinated herbicides by using EPA Method 8151A.

To monitor the attenuation of the dinoseb concentrations, groundwater samples will be collected on a semi-annual to quarterly basis from on-site monitoring wells MW-3 and MW-8 and from off-site monitoring well MW-16. The samples will be submitted to NCA for analysis of chlorinated herbicides.

To monitor the attenuation of the nitrate concentrations, groundwater samples will be collected from on-site monitoring wells MW-4 and MW-14 and off-site monitoring wells MW-16 and MW-17 on a semi-annual to quarterly basis. The samples will be submitted to NCA for analysis of nitrate. The groundwater sampling schedule is described in the Work Plan.

2.3.3 Field Quality Assurance

Field quality assurance (QA) will be maintained through compliance with the SAP, collection of duplicate samples, and documentation of sample plan alterations. Duplicate samples will be collected at a frequency of up to 10 percent of the total number of groundwater samples.

2.4 Sample Designation

Soil samples will be identified by the boring or excavation sidewall from which they are collected, and groundwater samples will be identified by the monitoring well from which they are collected. The soil boring samples will be identified by the soil boring number and the sample depth. For example, the sample collected from boring SB-17, at a depth of 20 feet, would be designated "SB-17-20". The sidewall samples from the excavation will be identified by the sidewall name (direction), sequential sample number, and the sample depth. For example, the first sample collected from the southern sidewall, at a depth of 25 feet, would be designated "SSW-1-25". The groundwater samples will be identified by the monitoring well name and date. For example, the groundwater sample collected from well MW-4 in August 2004 would be designated "MW-4-0804"

QA samples (field duplicates) will be submitted blind (i.e., not identified as QA samples) to the laboratory. The QA samples, samples will be labeled with a fictitious sample name (e.g., a non-existent sampling location). Trip blanks will be identified with sequential sample number and a date suffix (e.g., TB-1-0804) on the container. Extra samples collected for laboratory duplicates and matrix spike and matrix spike duplicate (MS/MSD) analyses will be identified with the same designation as the sample.

2.5 Drilling and Soil Sampling Procedures

2.5.1 Utility Location

All drilling locations will be checked for underground utilities prior to the start of drilling. Boring locations may be moved due to underground or aboveground utilities. The field geologist may approve relocations within 25 feet of the original site and will notify the environmental contractor's project manager. Relocations greater than 25 feet from the original boring location will require approval by both the environmental contractor's project manager and Ecology before drilling commences.

2.5.2 Drilling Procedures

All soil borings will be drilled by using a hollow-stem-auger drilling rig equipped with 8-inch inside-diameter (i.d.) casing and a bit. All downhole drilling equipment will be decontaminated prior to use and between drilling locations as described in Section 2.12. If water must be added to the borings to control heaving conditions, only potable water will be used. All residual soil and water collected during drilling and sampling will be handled and disposed of following the procedures described in Section 2.13. The monitoring wells will be completed as described below.

2.5.3 Soil Sampling

Subsurface soil samples will be collected at 5-foot intervals from both soil borings. Soil samples will be collected at the designated intervals in advance of the drill bit by using an 18-inch-long, 2-inch-diameter split-spoon sampler. Table 4 includes a list of the equipment that will be used for the soil sampling activities. A summary of the soil sampling procedures is listed below.

A. All sampling equipment and reusable materials that will contact the sample will be decontaminated on site in accordance with procedures identified in Section 2.12. The field geologist will use clean neoprene or vinyl gloves for handling each sample.

B. The sample container labels will be filled out and attached to the appropriate containers as described in Section 2.10.

C. Soil samples for chemical analysis will be collected from both borings. The samples will be transferred directly from the sampler into the sample containers. A clean stainless-steel spoon will be used to collect soil from along the length of the split spoon. To protect the sample from possible contamination during handling, the split-spoon sampler will be placed on a clean piece of plastic sheeting. All subsequent handling of the sample will take place over the plastic sheeting.

D. One 8-ounce glass jar will be filled at each sample interval if sample volume permits. Soil will be transferred directly from the split spoon sampler to the sample containers. Care will be taken to minimize disturbance of soil placed in the containers. Each container will be filled as full as possible to minimize headspace.

E. After filling the 8-ounce sample jars, the remaining sample will be logged on a Boring Log Form (Figure 1) using the United Soil Classification System. A soil description based on the United Soil Classification System is shown on Figure 2.

F. Samples submitted for duplicate chemical analysis will be collected by using the procedures described above. Samples will be blind labeled when submitted to the lab.

G. After filling, the sample container(s) will be placed on ice in a cooler and handled as described in Section 2.10. The sample coolers will be sent to the laboratory within 12 hours of sampling.

2.6 Monitoring Well Installation and Development

Two shallow groundwater monitoring wells will be installed to the west of the site. The wells will be constructed so that the screens straddle the groundwater table. All monitoring wells will be installed in accordance with the requirements of Chapter 173-160 WAC, Part 3, "Resource Protection Well Guidelines." The wells will be constructed of 2-inch-i.d. flush-threaded Schedule 40 PVC, including a threaded end plug (Figure 3). The wells will be constructed using a 10-foot-long screen with machined 0.010-inch slots. At higher ground surface elevations (MW-16), the monitoring well screen will be placed across the water table from approximately 20 to 30 feet bgs. At lower ground surface elevations (MW-17), the monitoring well screen will be placed across the water table at approximately 15 to 25 feet bgs.

The annular space around the screen zone of each monitoring well will be backfilled with clean Colorado 10-20 silica sand. This filter pack will extend from approximately 2 to 12 inches below the lowest slot to at least 2 feet above the uppermost slot. The annular space above the filter pack will be sealed with 3/8-inch (medium) bentonite chips that are hydrated with potable water. The bentonite seal will extend from the top of the filter pack to the base of the surface security casing in all monitoring wells.

All annular space materials will be placed concurrent with casing withdrawal. As-built construction details, including the volumes of materials used to construct each well, will be recorded on the boring log. The total depth of each boring and the placement depths of the filter pack, the bentonite seal, and the surface completion will be measured to the nearest 0.1 foot, using a weighted fiberglass tape.

The top of each well will be secured with an above-ground lockable security casing (Figure 3). Above-ground security casings will be cemented in place, with the surface of the cement sloping away from the security casing.

The newly installed wells will be developed by pumping, surging, or bailing. The water level in the well will be measured to the nearest 0.01 foot (from the north side of the well casing) before development by using an electric water level probe. Water depths will be recorded on a Groundwater Sampling Data Sheet (Figure 5) and will include date, time, and developer's initials. The total pore (casing) volume of the installation will be determined using the measured water level and the as-built installation depth. Groundwater pH, specific conductance, and temperature, may be measured during development. A well will be considered developed when at least ten times the pore volume of water has been removed from the well, and the color of the discharge water does not change with additional development. If after one hour of development the discharge water does not clear, then no further development will be attempted and the suitability of sampling groundwater from the well will be evaluated by the environmental contractor's project manager.

Well development details, including discharge volume, discharge rate, pH, specific conductance, temperature, and appearance will be recorded on a Groundwater Sampling Data Sheet. All development water will be handled as described in Section 2.13.

2.7 Excavation Soil Sampling

2.7.1 Soil Sampling Procedures

During the excavations the prime environmental contractor will record the excavation dimensions, the types of soil encountered, the depths of sample collection, and the depth to groundwater, if present, on an Excavation Log (Figure 4). Soil samples will be collected from the sidewalls of the excavation that do not consist of sheet piling by using the backhoe bucket (construction contractor). The environmental contractor will transfer the soil from the bucket to laboratory-prepared containers by using a clean stainless-steel spoon. Exact sample locations will be based on field screening (odors and visual appearance) results.

Table 4 (Field Equipment and Supplies) includes a list of equipment to be used for soil sampling activities. A summary of the soil sampling procedures as listed below:

- All sampling equipment and reusable materials that contact the sample will be decontaminated on site consistent with procedures identified in Section 2.12.
- The sample container labels will be filled out and attached to the appropriate containers as described in Section 2.10.
- Soil from the backhoe bucket will be transferred directly into the sample jars by using a clean stainless steel spoon.
- The sample will be logged on an Excavation Log (Figure 4) or in a field notebook.
- After being filled, the sample container(s) will be placed in a cooler with ice and handled as described in Section 2.10. The sample coolers will be shipped to the laboratory within 48 hours of sampling.

2.8 Groundwater Sampling Procedures

The groundwater in selected on-site and off-site shallow monitoring wells will be sampled using new disposable PVC bailers. The groundwater sampling events will be conducted in accordance with the schedule described in the Work Plan. The groundwater sampling procedures include the following:

A. The depth to groundwater will be measured in the well before sampling. The water level will be measured to the nearest 0.01 foot from a surveyed notch in the well casing by using an electric water level probe. Water depths will be recorded on a Groundwater Sampling Data Sheet, and will include date, time, and sampler's initials.

B. The monitoring wells will be purged with a new disposable PVC bailer. During purging, the temperature, pH, and specific conductance of the extracted water will be measured with a thermometer and a pH/conductivity meter, respectively, and recorded after the removal of each well casing volume. Parameters must stabilize to within a 10 percent difference between consecutive pore volume removals prior to obtaining a sample. Measurements will be recorded to the following standards:

   - Temperature to $\pm$ 0.5°C
   - pH to $\pm$ 0.1 units
   - Specific conductance to $\pm$ 1 μS/cm

C. The pH/conductivity meter will be calibrated before measurements are taken and approximately every four hours thereafter.

D. No less than three well casing volumes will be purged before collecting groundwater samples. After at least three pore volumes have been purged and the field parameters have stabilized, final measurements of temperature, pH, and specific conductance will be obtained and recorded. Residuals will be managed as described in Section 2.13.

E. Each sample will be collected with a new disposable PVC bailer. All samples will be transferred in the field from the sampling equipment to a laboratory-prepared container.

F. Samples will be labeled, handled, and shipped by using the procedures described in Section 2.10. Sample custody will be maintained until delivery to the analytical laboratory. All sampling field activity and data will be recorded on a Groundwater Sampling Data Sheet (Figure 5).

G. QA samples will be collected at the frequency described in Section 2.3.3. Duplicate samples will be collected by alternately filling like containers until both containers are filled.

H. The sampler(s) will wear new neoprene or vinyl gloves at each sample location. New bailer cord (monofilament nylon) will be used at each sample location.

I. All reusable purging and sampling equipment will be decontaminated by using the procedures described in Section 2.12.

2.9 Sample Procedure Alterations

Any deviations from the general sampling procedures presented here will be brought to the attention of the environmental contractor's project manager, and a Sample Alteration Checklist will be completed (Figure 6).

2.10 Sample Labeling, Shipping, and Chain-of-custody

Sample Labeling. Sample container labels will be completed immediately before or immediately after sample collection. Container labels will include the following information:

- Project name and project number
- Sample number
- Name of collector
- Date and time of collection
- Analyses requested

Sample Shipping. Sample containers will be transported in a sealed, iced cooler. In each shipping container, glass bottles will be separated by a shock-absorbing and absorbent material to prevent breakage and leakage. Ice or "blue ice," sealed in separate plastic bags, will be placed into each cooler with the samples. All sample shipments will be accompanied by a Chain-of-Custody Form (Figure 7). The completed form will be sealed in a plastic bag and taped to the inside lid of the shipping container. Signed and dated chain-of-custody seals will be placed on all shipping containers. The name and address of the analytical laboratory and the environmental contractor's name and office (return) address will be placed on each shipping container prior to shipping.

Chain-of-Custody. Once a sample is collected, it will remain in the custody of the sampler or other the environmental contractor's personnel until shipment to the laboratory. Upon transfer of sample containers to subsequent custodians, a Chain-of-Custody (Figure 7) will be signed by each person transferring custody of the sample container. A signed and dated chain-of-custody seal will be placed on each cooler prior to shipping. Upon receipt of samples at the laboratory, the cooler seal will be broken and the

condition of the samples will be recorded by the receiver. Chain-of-custody records will be included in the analytical report prepared by the laboratory.

2.11 Surveying

The locations of off-site monitoring wells MW-16 and MW-17 will be surveyed by a licensed surveyor. Each well will be surveyed for ground surface elevation (to the nearest 0.1 foot), horizontal position (to the nearest 1.0 foot), and well casing rim elevation (to the nearest 0.01 foot). Unless otherwise specified, the north side of the well casing rim will be surveyed. The ground surface and well casing rim elevations will be surveyed relative to mean sea level. The horizontal position of the wells will be measured relative to site structures or county roads.

The lateral and vertical extents of the soil excavation will be surveyed by a licensed surveyor. The lateral extents will be measured every 20 feet relative to site structures or county roads. The inside of the excavation will be surveyed for horizontal position and for depth bgs.

2.12 Decontamination Procedures

A decontamination area will be established for cleaning the drilling rig, excavation equipment, and soil sampling equipment. All down-hole drilling equipment will be steam-cleaned or hot water pressure-washed prior to beginning drilling and between drilling each boring. Split spoon samplers, spoons, and other sampling equipment that will contact samples will be decontaminated prior to initial use, between sampling locations, and between different sampling depths at the same location. Soil sampling equipment will be decontaminated by steam cleaning, hot water pressure washing, or by the following procedure:

- Tap water rinse
- Non-phosphatic detergent (Liquinox) and tap water wash
- Tap water rinse
- Dilute nitric acid rinse (pH < 2) at the start of each day and if the split-spoon sampler or sampling spoons are visibly rusty
- Distilled water rinse

All groundwater sampling equipment (bailer and cord) will be disposed after collecting each sample. The water level probe will be rinsed with distilled water between uses in

different monitoring wells. All well casings and screens will be steam-cleaned or hot water pressure-washed before installation. All labels and binding tape will be removed from well materials prior to steam cleaning or washing. Decontamination of personnel involved in sampling activities will be accomplished as described in the Health and Safety Plan (Appendix B of Work Plan).

2.13 Residuals Management

All residual soil, water, and decontamination solutions will be handled appropriately. Used disposable clothing and equipment will be placed in plastic bags and disposed of as solid waste. Appropriate personal protective clothing will be worn during the transfer of residuals to protect against potential skin contact and splash hazards.

All soil generated during drilling will be placed in properly labeled, 55-gallon drums. Water generated from development, sampling, and decontamination will be placed in properly labeled, 55-gallon drums that are separate from the soil drums. The drums will be labeled with the date filled and a description of the contents (including approximate quantity). The drums will be sealed and secured. All of the drums will be stored at an on-site holding area until they are transferred off site for disposal.

The excavated soils will be temporarily stockpiled on site. The stockpile of the soil excavated from depths within the zone of groundwater fluctuation (25 to 29 feet bgs) will be hauled off site for disposal. The stockpile of the soil excavated from depths of less than 25 feet bgs will be used to backfill the excavation.

A record of all generated residuals will be maintained to expedite characterization and disposal upon completion of field activities. Western Farm Service (WFS) will be responsible for the proper disposal of all wastes. The environmental contractor will coordinate with WFS for appropriate disposal procedures.

3 QUALITY ASSURANCE/ QUALITY CONTROL PLAN

3.1 Quality Assurance Objectives

The overall QA objective for measurement data is to obtain data of known and acceptable quality. All measurements will be made to yield accurate and precise results representative of the media and conditions measured. All data will be calculated and reported in units consistent with those used by regulatory agencies to allow for comparability of data. QA objectives for precision, accuracy, and completeness have been established for each measurement variable, where possible, and are presented in Table 1.

3.2 Analytical Procedures

The analytical methods for the analyses are summarized in Table 1. Analysis of the samples will be performed by using procedures based on the following methods:

- Method 300.0: nitrate by ion chromatography (USEPA, 1983)
- Method 8151A: chlorinated herbicides by gas chromatography/electron capture detector or electrolytic conductivity (USEPA, 1998)

Any special analytical method that is employed will be determined with laboratory concurrence prior to beginning sample analysis.

3.3 Data Reduction, Validation, and Reporting

The laboratory performing sample analyses will be required to submit summary data and QA information to permit independent and conclusive determination of data quality. The determination of data quality will be performed using the following as guidelines for data review: *Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses* (EPA, 1988a), and *Laboratory Data Validation Guidelines for Evaluating Organics Analyses* (EPA, 1988b).

Laboratory deliverable requirements for the chemical analyses will include the information outlined below and in Table 2.

- A cover letter for each sample batch will include a summary of any quality control, sample, shipment, or analytical problems, and will document all internal decisions. Problems will be outlined and final solutions documented. A copy of the signed chain of custody form for each batch of samples will be included in the narrative packet.

- Sample concentrations will be reported on standard data sheets in proper units and to the appropriate number of significant figures. For undetected values, the lower limit of detection for each compound will be reported separately for each sample. Dates of sample extraction or preparation and analysis must be included.

- A method blank summary will be included.

- Surrogate percent recovery will be calculated and reported.

- MS/MSD percent recoveries, spike level, and relative percent difference will be included.

- A list of the detection limits calculated for laboratory instruments for all analytes will be included.

Sample holding times will be calculated by comparing the date of sample collection (shown on the chain of custody) with the date of sample analysis. All laboratory deliverables will be reviewed for data validation of chemical analyses. The main items for review are described in Table 3.

3.4 Data Assessment Procedures

Accuracy, precision, completeness, representativeness, and comparability are terms used to describe the quality of analytical data. Routine procedures for measuring precision and accuracy include use of replicate analyses, standard reference materials (SRMs), matrix spikes, and procedural blanks. Replicate matrix spikes and method blanks will be analyzed by the selected laboratory. Additional spikes and replicate analyses may be implemented. The minimum frequencies are as follows:

- Replicate analysis

  - Nitrate and chlorinated herbicides: 10 percent of the groundwater samples will be analyzed as laboratory duplicates.

- Matrix Spike

  - Nitrate and chlorinated herbicides: one matrix spike will be analyzed per sample batch.

- Method Blank

  - Nitrate and chlorinated herbicides: one preparation blank per matrix will be analyzed for each sample batch.

Quality of analytical data represented by precision and accuracy are calculated using the mean, standard deviation, and percent recoveries. The mean, C, of a series of replicate measurements of concentration, C_i, for a given analyte will be calculated as:

$$\overline{C} = \frac{1}{n}\sum_{i=1}^{n} C_i$$

where:

n = Number of replicate measurements

The estimate of precision of a series of replicate measurements can be expressed as the relative standard deviation, RSD:

$$\text{RSD} = \frac{SD}{\overline{C}} X \ 100\%$$

where:

SD = Standard deviation:

$$SD = \frac{\sqrt{\sum_{i=1}^{n} (C_i - \overline{C})^2}}{(n-1)}$$

Alternatively, for data sets with a small number of points (e.g., duplicate measurements), the estimate of precision will be expressed as a relative percent difference (RPD):

$$RPD = \frac{C_1 - C_2}{\overline{C}} x\, 100$$

where:

C_1 = First concentration value or recovery value measured for a variable

C_2 = Second concentration value or recovery value measured for a variable

Accuracy as measured by matrix spike or laboratory control sample results will be calculated as:

$$\text{Recovery} = \frac{\Delta C}{C_s} \; x \; 100$$

where:

ΔC = The measured concentration increase due to spiking (relative to the unspiked portion)

C_s = The known concentration increase in the spike

Accuracy can also be measured by analysis of standard reference material (SRM) or regional reference material and will be determined by comparing the measured value with the 95 percent confidence interval established for each analyte.

Completeness will be measured for each set of data received by dividing the number of valid measurements actually obtained by the number of valid measurements that were planned.

3.5 Field Quality Assurance

Field quality assurance (QA) will be maintained through compliance with the sampling plan, collection of field QA samples, and documentation of sampling plan alterations.

Duplicate groundwater samples will be collected at a minimum frequency of 10 percent of the total number of samples. Duplicate samples will be labeled similar to the other samples and submitted blind to the laboratory. The locations for duplicate sample collection will be determined in the field. If problems arise during field sampling, a Sampling Alteration Checklist (Figure 6) will be completed by the site QA officer.

4 STANDARD FIELD FORMS AND EQUIPMENT LIST

Standard field forms used to record sampling data and field observations include:

- Boring Log Form (Figure 1)
- Excavation Log (Figure 4)
- Groundwater Sampling Data Sheet (Figure 5)
- Sampling Alteration Checklist (Figure 6)
- Chain of Custody Form (Figure 7)
- Photograph Log (Figure 8)

A blank copy of each form is presented in the Figures section of this document. The environmental contractor can alter the forms as necessary to conduct the work. A list of the equipment that may be used during the field activities is presented in Table 4 (Field and Equipment Supplies).

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TABLES

Table 1

Objectives for Measurement Data
Glade Road Facility
Pasco, Washington

Variable	Units	Lower Limit of Detection	Accuracy[a]	Precision[a]	Completeness	Method No.	Bottle/Preservative	Maximum Holding Time[b]
Soil								
Nitrate/nitrite	mg/kg	0.05-5.0[b]	±60%	±40%	95%	EPA 300.0	8-oz. glass / keep on ice (4°C)	14 days
Chlorinated Herbicides	mg/kg	1.0[b]	±50%	±25%	95%	EPA 8151A	8-oz. glass / keep on ice (4°C)	28 days
Groundwater								
Nitrate/nitrite	mg/L	0.05	±25%	±25%	95%	EPA 300.0	One 1-L HDPE/H_2SO_4 to pH <2, keep on ice (4°C)	28 days
Chlorinated Herbicides	µg/L	0.2-200	±25%	±25%	95%	EPA 8151A	One 1-Liter amber glass/keep on ice (4°C)	7 days/40 days

[a] Accuracy and precision results may deviate from these criteria as identified by the analytical method reference on a substance specific basis.
[b] Where two times are given, the first refers to the maximum time from sample collection to extraction, the second to the maximum time prior to extract analysis.
[c] Dry-weight basis.

Table 2

Laboratory Deliverable Requirements
Glade Road Facility
Pasco, Washington

The following items will be delivered to support data validation:

- A transmittal letter and case narrative which includes information about receipt of the samples, the analytical results, and any significant problems in any aspect of sample analysis (e.g., deviation from methodologies or quality control parameters)
- Sample analytical results:
  - Soil results in µg/kg or mg/kg dry-weight
  - Method detection limit for undetected values reported for each analyte on a sample-by-sample basis
  - Date of sample preparation/extraction
  - Date of sample analysis
- Method blank results, including the samples associated with each blank
- Surrogate recovery results, reported as percent recoveries, including actual spike levels
- Duplicate results
- Matrix spike/matrix spike duplicate (MS/MSD) results and matrix spike results, reported as percent recoveries, including actual spike levels
- Copies of signed chain-of-custodies

Table 3

Data Validation of Analytical Results
Glade Road Facility
Pasco, Washington

The following items will be reviewed for data validation:

- Holding times
- Method blank results
- Surrogate recovery results
- Field duplicate results
- Laboratory duplicate results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Matrix spike results
- Completeness
- Reported detection limits for analyses
- Laboratory control sample results
- Copies of signed chain-of-custodies

Table 4

Field Equipment and Supplies
Glade Road Facility
Pasco, Washington

Forms/Documentation
• Field logbooks • Log of excavation • Field sampling data sheet • Chain of custody form • Custody seal • Project photo log • Drum labels • Health and Safety Plan (HASP) • Field Sampling and Analysis Plan (SAP)
Tools
• Fiberglass tape with stainless-steel weight • Tape measure calibrated to 0.1 inch • Decontamination brushes • Flashlight • Watch • Tool kit • Small sledge hammer • Shovel
Soil Sampling
• Stainless steel spoons • Stainless steel bowls • Sample jars and labels • Photoionization detector • Water • Hexane • Liquinox • Distilled Water
Health and Safety Equipment
• Fire extinguisher • Half-face respirators • Organic vapor/acid gas cartridges with pre-dust filters • First aid kits • Safety glasses • Eyewash • Ear plugs • Tyvek® • Gloves-vinyl, nitrile, and neoprene • Duct tape

Table 4

Field Equipment and Supplies
Glade Road Facility
Pasco, Washington

Miscellaneous Equipment
• Spray paint, pencils, pens, labels • Waterproof markers • Paint pens for drums • Water jugs and sprayers • Bubble wrap and tape for shipping • Cameras and film • Resealable plastic bags • Paper towels • Aluminum foil • Visqueen sheets • Buckets • Squirt bottle (wash) • Brunton compass • Plastic funnel • Cotton gloves • Nalgene wash bottles • Reagent bottles • Coolers (sample shipping) • Scrub brushes • Plastic tubs • Ice, in leak-proof bags • Drinking water • Large-scale site map

Maul Foster & Alongi, Inc.	Log of Exploratory Boring

CLIENT _____
PROJECT No. _____
Engineer/Geologist _____
Drilling Contractor _____
Drilling Method _____
Hole Diameter _____

Sheet ____ of _____
Boring Number _____
Date Started _____
Date Finished _____
Total Depth _____
Ground Elevation _____
Datum _____

Water Level Data

Depth				
Time				
Date				
Boring Depth				

Completion Details	Sample Number	Sampling Method	Blow Count	Sample Interval	Other (Specify)	Depth in Feet	Soil Group Symbol	Field Location of Boring:

Notes:

19401 40th Avenue W, Suite 310
Lynnwood, WA 98036
425.744.1489 P
425.744.0919 F
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PROJECT NO.
0030.01.02

Figure 1
GLADE ROAD FACILITY
PASCO, WASHINGTON

BORING LOG FORM

SOIL DESCRIPTION CHECKLIST - FIELD LOG

Guide for Written Soil Description

1. Depth of sample or unit, in feet below ground surface
2. Classification (description and symbol)
3. Color
4. Grain size distribution beginning with most abundant to least abundant constituents (i.e., percentage of fines including plasticity; percentage and size of sand, gravel cobbles, and boulders)
5. Relative density and consistency (condition)
6. Moisture conditions
7. Other relevant information (e.g., structure, laminations, occurrences or organic material)
8. Geologic interpretation (e.g., fill, alluvium)
9. Length of sample recovery/length driven

Example: 5-to 6.5 feet: SILTY SAND (SM), dark gray, 80% fine to medium sand, 15 to 20% non-plastic silt, <5% subrounded fine gravel, very dense, wet. Some leaves, twigs on bedding planes. Sulfur odor. (ALLUVIUM) (14"/18")

Basic Classification

GRAVEL: Gravel Size: Fine = #4 sieve to 3/4"
Medium = 3/4" to 1-1/2"
Coarse = 1-1/2" to 3"

a. GW, well-graded gravel (2 to 5% fines)
b. GW-GM or GW-GC, well-graded gravel with silt or clay (5 to 15% fines)
c. GM or GC, well-graded silty or clayey gravel (>15% fines)
d. GP, poorly-graded gravel (0 to 5% fines)
e. GP-GM or GP-GC, poorly-graded gravel with silt or clay (5 to 15% fines)
f. GM or GC, poorly-graded silty or clayey gravel (>15% fines)

SAND: Sand Size: Fine = #200 (75 μm) to # 40 (425 μm) sieve
Medium = # 40 (425 μm) to #10 (2mm) sieve
Coarse = #10 (2mm) sieve to #4 (4.75 mm) sieve

a. SW, well-graded sand (2 to 5% fines)
b. SW-SM or SW-SC, well-graded sand with silt or clay (5 to 15% fines)
c. SM or SC, well-graded silty or clayey sand (>15% fines)
d. SP, poorly-graded sand (0 to 5% fines)
e. SP-SM or SP-SC, poorly-graded sand with silt or clay (5 to 15% fines)
f. SM or SC, poorly-graded silty or clayey sand (>15% fines)

FINES: Minus #200 Sieve (less than 75 μm)

a. ML, inorganic silts, fine sands, clayey silts or sands of low plasticity, or non-plastic
b. CL, inorganic clays, sandy or silty clays of medium plasticity
c. OL, inorganic silts or clays of low plasticity
d. MH, organic silts, micaceous or diatomaceous fine sand or silty soils, elastic silts
e. CH, organic clays or silts or high plasticity, fat clays
f. OH, organic clays or silts of low to medium plasticity
g. PT, peat and other highly organic soils

COBBLES: 3 to 12" diameter, estimate size(s) and percentage

BOULDERS: Greater than 12" diameter, note size(s) and estimate percentage

MINOR ORGANIC CONTENTS: Describe type and occurrence

a. Wood debris = roots, branches, logs
b. Organic debris = decaying vegetation

MISCELLANEOUS DESCRIPTIVE TERMS (use with discretion, estimate percentages if possible):

Trace	- particles are present but <5%
Few	- 5 to 15%
Little	- 15 to 25%
Some	- 25 to 45%

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Figure 2
GLADE ROAD FACILITY
PASCO, WASHINGTON

SOIL DESCRIPTIONS

Procedure for Estimating Plasticity

1. Remove particles larger than the #40 sieve size (greater than fine sand). Select a specimen the size of a 1/2" cube. Mold the specimen to the consistency of putty. It too dry, add water and if sticky, spread it out in a thin layer and allow it to lose some moisture by evaporation. Roll the specimen by hand on a smooth surface, or between the palms, into a thread about 1/8" in diameter. Fold the thread and re-roll repeatedly. This procedure gradually reduces the moisture content and the specimen will stiffen, eventually losing its plasticity. It will crumble at a diameter of 1/8" when near plastic limit.
2. After the thread crumbles, combine the pieces and knead slightly. Continue kneading until the lump crumbles.
3. If the specimen forms a tough thread near the plastic limit and if a lump is stiff when it crumbles, the colloidal clay fraction in the soil is high. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay or low plasticity.
4. Highly organic clays feel very weak and spongy at the plastic limit.

Criteria for Describing Plasticity

Non-plastic	A 1/8" thread cannot be rolled at any water content.
Low	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be re-rolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	The specimen can be rolled and kneaded to reach the plastic limit. The thread can be re-rolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

Condition

1. Relative density for sand or gravel

   a. Using Standard Penetration Test, blows per foot

Blows/ft (N)	Relative Density
0 – 4	very loose
5 – 10	loose
11 – 30	medium
31 – 50	dense
> 50	very dense

   b. Estimated (no testing)

Loose – sand and/or gravel can be excavated with a shovel
Compact – sand and/or gravel requiring use of a pick for removal

   c. Consistency for fines (note whether blow counts or tactile tests were used)

Blows/ft (N)	Relative Density	Tactile Test
< 2	very soft	sample sags or slumps
2 – 4	soft	sample can be pinched in two
5 – 8	firm	sample easily imprinted to 1" by thumb
9 – 15	stiff	sample readily indented by thumb with pressure
16 – 30	very stiff	sample readily indented by thumbnail
> 30	hard	sample cannot be imprinted w/thumb, can pierce w/pencil

Moisture

1. Dry: contains no water (rarely occurs in nature))
2. Damp: less water than moist
3. Moist: "optimum" water content: a sample squeezes tight and maintains its shape, but you cannot squeeze out excess water
4. Wet: more water than moist

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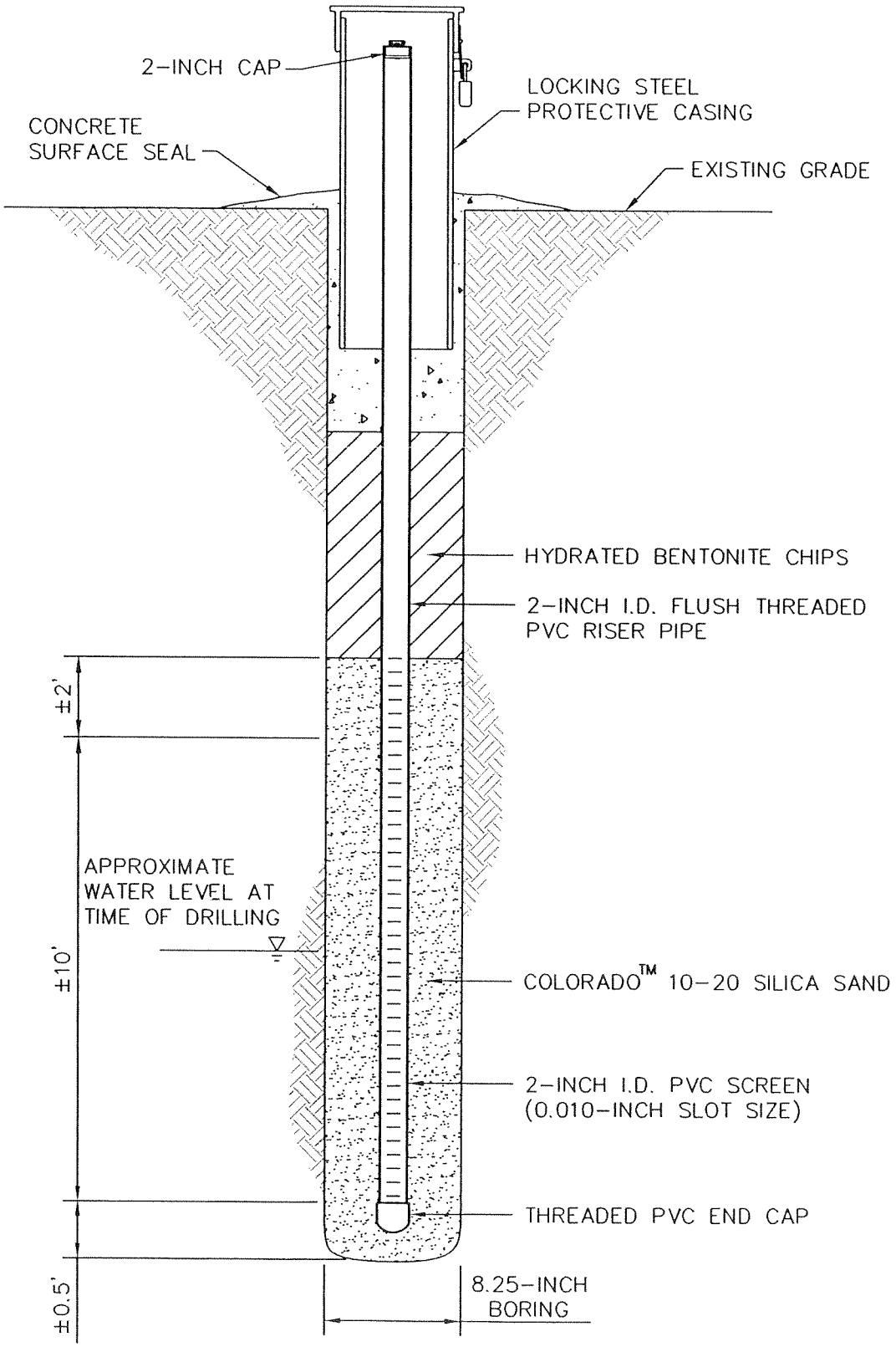
Figure 2 (continued)
GLADE ROAD FACILITY
PASCO, WASHINGTON

SOIL DESCRIPTIONS



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(360) 694-2691
Edmonds:
(425) 744-1489
Portland:
(971) 544-2139

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Figure 3
GLADE ROAD FACILITY
PASCO, WASHINGTON
GENERALIZED WELL INSTALLATION DETAILS

Maul Foster & Alongi, Inc.				Excavation Log			
Client				Sheet		of	
Project Name				Excavation No.			
Project Number				Date Started			
Engineer/Geologist				Date Finished			
Excavation Contractor				Total Depth			
Method				Ground Elevation			
Depth-to-water in Exc.				Datum			

Sample Number and Number	Sample Interval	FID/ PID Reading (ppm)	Soul Group Symbol (USCS)	Field Location of Excavation: / LITHOLOGIC DESCRIPTION

Excavation Drawing:

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Figure 4
GLADE ROAD FACILITY
PASCO, WASHINGTON

EXCAVATION LOG

Groundwater Field Sampling Data Sheet

Project Name: _____
Client Name: _____ Sample Location: _____
Project Number: _____
Sample Name: _____ Sampler: _____

Hydrology/Level Measurements (Nearest 0.01ft.)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW (Product Thickens)	DTB-DTW (Water Column)	Volume (gallons) (Gallons/ft x Water Column)	
							1 Pore Vol.:	
							3 Pore Vol.:	

Gallons of Water/Foot for Various Well Diameters
(1" = 0.041 gal/ft) (2" = 0.136 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (10" = 4.080 gal/ft) (12" = 5.875 gal/ft)

Water Quality Data

Vol. #	Purge Method*	Gallons Purged	pH	E Cond (µS/cm)	Temp (C°/F°)	DO (mg/L)	Redox Potential	Water Quality Observations
1								
2								
3								
4								

* Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) PVC/Teflon Bailer (5) Dedicated Bailer (6) Dedicated Pump (7) Other [Specify]:

Groundwater Sampling Data

Bottle Type	Date	Time	Method*	Num. @ Vol.	Preservative (Circle)	Filtered (Y/N) Filtered
VOA Glass				3 @ 40 ml.	HCL	YES / NO
Amber Glass				@	None/HCL/H_2SO_4	YES / NO
White Poly				@	None	YES / NO
Yellow Poly				@	H_2SO_4	YES / NO
Green Poly				@	NaOH	YES / NO
Red Total Poly				@	HNO_3	YES / NO
Red Diss. Poly				@	HNO_3	YES / NO
				@		YES / NO

(Circle if Used) Total Bottles (Include duplicate count): _____ Duplicate ID:

Bottle Type	Typical Analysis Allowed Per Bottle Type (Circle Applicable or Specify Non-Standard Analysis Below)
VOA Glass	(8010) (8010/8020) (8021B) (8020) (8060) (8240) (8260) (BTEX) (NWTPH-G_X) (BTEX/NWTPH-G_X) OR [ ] WA [ ]
Amber Glass	(PAH) (TPH-HCID) (TPH-D_X) (TPH-418.1) (Oil & Grease)
White Poly	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO_3/CO_3) (SO_4) (NO_3) (NO_2) (F)
Yellow Poly	(COD) (TOC) (Total PO_4) (Total Keldahl Nitrogen) (NH_3) (NO_3/NO_2)
Green Poly	(Cyanide)
Red Total Poly	(As) (Sb) (Ba) (Ca) (Cd)(Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (So) (Tl) (V) (Zn) (Hg) (K) (Na)
Red Diss. Poly	(As) (Sb) (Ba) (Ca) (Cd)(Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (So) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness)

SAMPLER: _____ _____
(Printed Name) (Signature)

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Figure 5
GLADE ROAD FACILITY
PASCO, WASHINGTON
GROUNDWATER SAMPLING DATA SHEET

File: P:\0020.01.01\SAP Figure 3.pub Last edited: Thursday, December 18, 2003

SAMPLING ALTERATION CHECKLIST

Sample program identification: _____

Material to be sampled: _____

Measurement variable: _____

Standard procedure for analysis: _____

_____

Reference:: _____

_____

_____

Variation from standard procedure: _____

_____

_____

_____

_____

_____

Reason for variation: _____

_____

_____

_____

Resultant change in field sample procedure: _____

_____

_____

_____

Special equipment, material, or personnel required: _____

_____

_____

Author's name: _____ Date: _____

Approval: _____ Title: _____

Date: _____

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Figure 6
GLADE ROAD FACILITY
PASCO, WASHINGTON

SAMPLING ALTERATION CHECKLIST

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT:	INVOICE TO:
REPORT TO:	
ADDRESS:	
PHONE: FAX:	P.O. NUMBER:
PROJECT NAME:	
PROJECT NUMBER:	
SAMPLED BY:	

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | < 1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | < 1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

REQUESTED ANALYSES

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME: FIRM:	TIME:	PRINT NAME: FIRM	TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME: FIRM:	TIME:	PRINT NAME: FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE OF

COC REV 3/99

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Figure 7
GLADE ROAD FACILITY
PASCO, WASHINGTON

CHAIN OF CUSTODY FORM

File: P:\0030.01_Western Farm\02\SAP Figure 7.pub Last edited: 12/17/2003

PHOTOGRAPH LOG

Maul Foster Alongi

Client:	
Site:	
Project No.:	
Recorded By:	

Photo	Date	Comments	Photo	Date	Comments

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Figure 8
GLADE ROAD FACILITY
PASCO, WASHINGTON

PHOTOGRAPH LOG

APPENDIX B

HEALTH AND SAFETY PLAN

HEALTH & SAFETY PLAN

GLADE ROAD FACILITY
PASCO, WASHINGTON

Prepared for

Western Farm Service

January 8, 2004

Prepared by

Maul Foster & Alongi, Inc.
19401 40th Avenue West, Suite 310
Seattle, Washington 98036

Project 0030.01.02

Health and Safety Plan
Glade Road Facility
Pasco, Washington

The material and data in this Health and Safety Plan were prepared under the supervision and direction of the undersigned.

Mike Staton
Project Manager,
SLR International Corp.

Elisabeth Silver
Health and Safety Coordinator,
Maul Foster & Alongi, Inc.

SITE HEALTH AND SAFETY PLAN

Site: Glade Road Facility **Project no.:** 0030.01.02

Location: 3482 Glade Road **Date:** January 8, 2004

Pasco, Washington **Prepared by:** Elisabeth Silver

Reviewed by: Mike Staton

Client contact: Brian Miller, Western Farm Service

Project objectives: To remediate the dinoseb-impacted soil that is in contact with groundwater, to eliminate storm water infiltration through impacted soils, to prevent direct contact with shallow impacted soils, and to monitor the natural attenuation of the nitrate and dinoseb in groundwater.

Scheduled activities and time period: In May or June 2004, two off-site groundwater monitoring wells will be installed. In August and September 2004, the dinoseb-impacted soil at the former wash-pad will be excavated, and the other designated areas of contaminated soil will be capped with asphalt. From August 2004 through at least 2009, groundwater samples will be collected from selected wells on a quarterly to annual basis.

Purpose

This health and safety plan (HASP) has been prepared to instruct Maul Foster & Alongi, Inc. (MFA) personnel involved with remedial actions at the Glade Road facility in Pasco, Washington. The purpose of this plan is to provide work procedures to minimize the risk of chemical exposure or physical injuries during these activities. It is the responsibility of the MFA Project Manager to assure all aspects of this HASP are implemented. All MFA employees and their subcontractors who will be working on site are required to read and understand this HASP.

MFA subcontractors are advised that the requirements of this plan will apply to all operations conducted within the exclusion zone. Subcontractors shall develop their own plan using the provisions of this plan as minimum requirements. Subcontractors are advised that this field project may result in exposure to chemical and physical hazards. A combination of personal protective equipment, engineering controls, and safe work practices will be used to minimize exposure. All MFA personnel entering the exclusion zone must sign the attached consent agreement, acknowledging that they have read and understood the safety plan and will abide by it.

It is important for the MFA on-site geologist or engineer to keep all pedestrians a safe distance

from the exclusion zone.

Hospitals/emergency medical center (address/phone no.) Map attached

☒ **Yes** ☐ **No**

1. Our Lady of Lourdes Health Center - 520 N. 4th Ave. Pasco. Phone number is (509) 547-7704 or 911.

Route to Hospital:

To Our Lady of Lourdes Health Center

1. Turn left from southwest gate onto Glade Road North.
2. Travel southeast on Glade Road North; it will become North 4th Avenue/Glade Road North.
3. North 4th Avenue/Glade Road North will turn into North 4th Ave. Continue on North 4th Ave.
4. Hospital will be on the right side of the street (at intersection with West Clark Street).

Hospital is 4.1 miles from the site.

Refer to Figure 1

Emergency transportation (fire, ambulance, police):

Call 911

Background Review

Access, overhead/underground utilities, etc.: no access restrictions.

Waste characterization: Dinoseb in soil; dinoseb and nitrate in groundwater.

Hazard/safety level determination: Level D and possible upgrade to Modified Level D (see below)

Comments: _____

Waste Type(s)/Characteristics

Liquid Decon, development, and purge water ☒

Solid Soil cuttings, excavated soil, and concrete ☒

Sludge No ☒ **Ignitable** No ☒ **Volatile** No ☒

Facility Description

Size: 20 acres **Buildings and structures:** Western Farm Service buildings and structures (2 office buildings, 5 chemical/fertilizer storage warehouses, an equipment repair shop, and over 20 above-ground chemical, fertilizer, or rinse water storage tanks), roads, and fences.

Topography and access: Slopes gently downward to the south and west.

Temporary Storage of Wastes:

Well development, decon and purge water: Well development, decon, and purge water will be placed in 55-gallon drums, with lids bolted securely, and stored on site. Drums will be labeled with waste generation location (Example: Purge Water MW-1), media type, and date. MFA will assist Western Farm Service with coordinating disposal of the generated water.

Drill cuttings and excavated soil: Drill cuttings will be placed in 55-gallon drums, with lids bolted securely, and stored on site. Drums will be labeled with waste generation location, media type, and date. The excavated soil will be temporarily stockpiled near the excavation. The stockpiles will be placed on and covered with plastic sheeting. MFA will assist Western Farm Service with coordinating disposal of the drill cuttings and the impacted soil excavated from depths of approximately 25 to 29 feet bgs.

Status (active, closed, unknown): The site is active.

History: The results of an ongoing site investigation showed that the contaminants of concern (COCs) in soil in different areas of the site include dieldrin, disulfoton, heptachlor, toxaphene, 2,4-D, dinoseb, dicamba, and TPH as gasoline. The COCs for groundwater are nitrate and dinoseb.

CHEMICAL HAZARD EVALUATION

Potentially hazardous chemicals known or suspected to be onsite:

Chemical of Concern	Concentration	Medium	OSHA PEL	OSHA STEL	OSHA IDLH	Odor Threshold	LEL (%)	IP(eV)	Other Hazard
Nitrate	109,000 µg/L 5,250 µg/kg	water soil	NA	NA	NA	NA	NA	NA	F, P, R, E
Dinoseb	81.8 µg/L 10,100 µg/kg	water soil	NA	NA	NA	NA	NA	NA	P

Notes:
-- - none established
C - carcinogen
GW - groundwater
IDLH - immediately dangerous to life and health
IP (eV) - ionization potential
N/A - not applicable
F - flammable
COR - Corrosive
NA - not available
P - poison
PCB - polychlorinated biphenyl
PEL - permissible exposure level
SC - suspected carcinogen
STEL - short-term exposure level
R - Reactive
E - Explosivity

PHYSICAL HAZARD EVALUATION

Noise levels > 85 dB Wear ear protection	**Drilling hazards** (see attached MFA Drilling SOP)	**Excavation hazards** (see attached MFA Excavation SOP)	**Moving equipment** Be alert for vehicles. Surround well area with cones and vehicle.
Unstable surface	**Slips/Trips**	**Fall hazards**	**High temperatures**
Low temperatures	**Repetitive motion activities (soft tissue)**	**High particulate levels**	**Sharp objects (needles, glass, etc.)**
Silica dust	**Falling objects**	**Flying objects**	**Heavy lifting**

Physical Hazards Description

Trips/Falls. As with all work sites, caution will be exercised to prevent slips on wet surfaces. Caution should be exercised when carrying equipment.

Vehicular traffic: Restrict access to work areas with vehicles, traffic cones or barriers, or barrier tape. Be alert for inattentive drivers at operating job sites. Wear high-visibility orange safety vests, when appropriate.

OPERATIONS PLAN

Zones of contamination: ☒ Known ☐ Projected ☐ Unknown

Sampling method: Soil sampling using split-spoon samplers (soil borings) and decontaminated spoons (excavator bucket). Groundwater sampling using disposable PVC bailers.

SAFETY EQUIPMENT AND PROCEDURES

Based on the hazards identified above, the following personal protective equipment will be required for the following site activities (specify both an initial level of protection and a more protective level of protection in the event conditions should change):

Task Description	Level	Level if Upgrade
Site inspection	**D**	**MD or leave site**
Soil excavation and capping	**D**	**MD or leave site**
Monitoring well installation	**D**	**MD or leave site**
Groundwater sampling	**D**	**MD or leave site**
Sample handling	**D**	**MD**

Each level of protection will incorporate the following equipment (specify type of coveralls, boots, gloves, respiratory cartridges or other protection, safety glasses, hard hat, and hearing protection):

Level D:	Steel-toed work boots, work clothes or coveralls (long-sleeved), hard hat, safety glasses, nitrile gloves
Modified D:	Same as Level D with addition of Tyvek®, coated Tyvek® or rain gear and chemical-resistant, steel-toed boots
Level C:	Same as Level D Modified with addition of respirator

Note: Project personnel are not permitted to deviate from the specified levels of protection without the prior approval of the site safety officer or project manager.

TOXICITY ACTION LEVELS

The toxicity action levels given below (**SAFETY/HEALTH EQUIPMENT CHECKOUT LIST**, on page 8) are set to comply with Occupational Safety and Health Administration (OSHA) Permissible Exposure Levels and ACGIH Threshold Limit Values (TLVs), and NIOSH recommendations for the chemicals which may be encountered on the site.

Respirator/Respirator Cartridge Information

Is there potential for a respirator to be used during fieldwork? Yes

If dust concentrations detected in the breathing zone of field personnel exceed the action levels indicated above, the procedures will include dual-cartridge half face or full-face air purifying respirators equipped with North™ combination organic vapor/HEPA cartridges. If dust concentrations decrease to below the action levels the level of personal protective equipment will be downgraded to Level D protection.

Respirator Manufacturer #1	**North**
Respirator Cartridge Selected for Use	HEPA/organic vapor
Respirator Cartridge Change Schedule	Every 4 hours

Respirator Manufacturer #2	**MSA**
Respirator Cartridge Selected for Use	HEPA/organic vapor/acid gas
Respirator Cartridge Change Schedule	Every 8 hours

Note: Project personnel are not permitted to deviate from the specified levels of protection without the prior approval

AREA CONTROL

Access to hazardous and potentially hazardous areas must be controlled to reduce the probability of occurrence of physical injury and chemical exposure of field personnel, visitors, and the public. The boundaries of hazardous and potentially hazardous areas must be identified by cordons, barricades, or emergency traffic cones or posts, depending on conditions. If such areas are left unattended, signs warning of the danger and forbidding entry must be placed around the perimeter

if the areas are accessible to the public. Entry to hazardous areas shall be limited to individuals who must work in those areas. Unofficial visitors must not be permitted to enter hazardous areas while work in those areas is in progress. Official visitors should be discouraged from entering hazardous areas, but may be allowed to enter only if they agree to abide by the provisions of this document, follow orders issued by the site safety officer, and are informed of the potential dangers that could be encountered in the areas.

DECONTAMINATION

Field decontamination of personnel and equipment is required. Recommended decontamination procedures follow.

Personnel Decontamination

Soil and groundwater possibly contaminated with pesticides, herbicides, or nitrates should be removed from skin using a mild detergent and water. Hot water is more effective than cold. Liquid dishwashing detergent is more effective than hand soap.

Equipment Decontamination

Gloves, boots, and goggles should be cleaned as described above; however, if boots do not become clean after washing with detergent and water, wash them with a strong solution of trisodium phosphate and hot water. Sampling equipment should be disposed after collecting soil samples and the groundwater samples at each well.

SMOKING **Smoking and open flames are strictly prohibited at this work site.**

SITE ENTRY PROCEDURES

Site team (no.): ☒ MFA ☐ Client ☐Agency ☐ Other

Entry briefing date: May or June 2004 (drilling activities); August 2004 (excavation and capping activities)

Location: On site

Site work team (name/responsibility):

1. Mike Staton, SLR International (project manager)
2. Scott Zorn, MFA (geologist)
3. _____

Special conditions (e.g., work schedule or limitations): None

EMERGENCY PROCEDURES

	Acute exposure symptom(s):	First aid:
1.	Eyes – slight to moderate	Flush with water for 15 minutes
2.	Skin – irritation, redness, drying	Wash with soap and water
3.	Respiratory – dizziness; irritation of eyes, nose, or throat; headache; nausea	Remove to fresh air
4.	Ingestion	Do not induce vomiting; call a physician

SAFETY/HEALTH EQUIPMENT CHECKOUT LIST

General Safety:

First aid kit	☒	Eye wash station	☒
Safety glasses/face shield	☒	Drinking water	☒
Safety shoes/gloves	☒	Tyvek suits/vinyl gloves	☒
Personal clothing change	☒	Hearing protection	☒
Wash/decontamination materials	☒	Other	☐

Specific Safety Equipment:

☒ **Dust Monitor** (if sustained airborne dust is present; use wetting to minimize.)

☒ **Respirator** (Respirator required if dust monitor shows >1 ppm in air sustained)

☐ Combustible gas/explosimeter

☒ **Oxygen indicator** (needed if workers will enter an excavation >4 feet deep)

☐ Dosimeter badge(s)

☐ Draeger/Sensidyne pump and benzene tubes

☒ **Duct tape, brushes, buckets, water, soap, paper towels, caution tape, and traffic cones**

☐ Photoionization detector

☒ **Fire extinguisher**

Note: This H&S plan has been developed for the use of MFA and SLR personnel only. MFA and SLR make this plan available for review by other personnel on a work site; however, this plan does not cover the employees of any other employer on the work site.

Medical monitoring

OSHA requires medical monitoring for personnel potentially exposed to chemical hazards in concentrations in excess of the PEL for more than 30 days per year and for personnel who must use respiratory protection for more than 30 days per year. Exponent requires medical monitoring for all employees potentially exposed to chemical hazards.

Will personnel working at this site be enrolled in a medical monitoring program? ☒ Yes ☐ No

Supplemental signature page included? ☒ Yes ☐ No

SITE SAFETY AND OPERATIONS PLAN Project No. 0030.01.02

Site: Glade Road Facility, Pasco, Washington

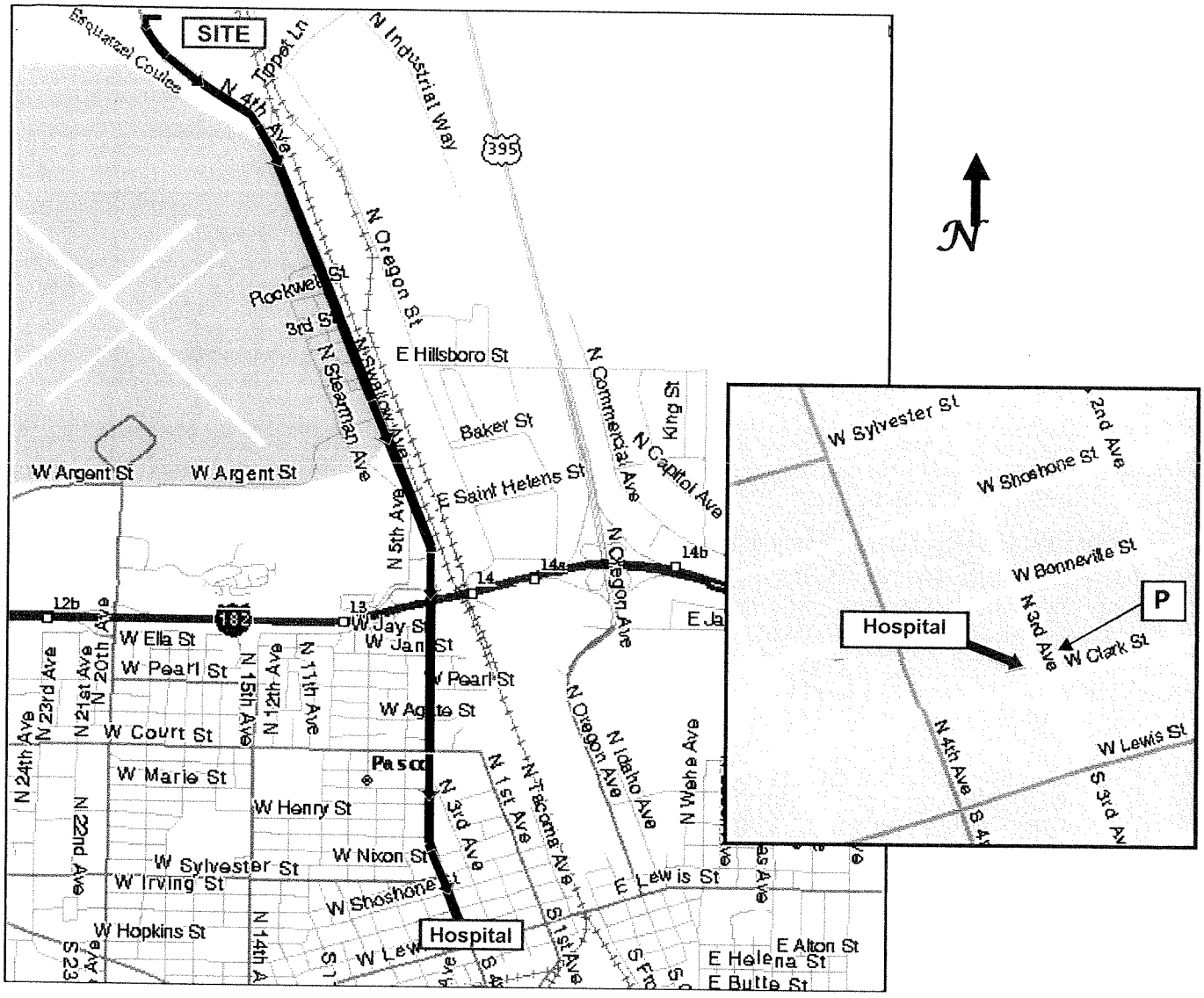
Date: January 8, 2004

Note: MFA and SLR personnel must understand and comply with the specific practices and guidelines described in the Site-Specific Health and Safety Plan regarding field safety and health hazards.

Sign-off: I have read and I understand the attached Health and Safety Plan, and agree to comply with the requirements described within.

Name	Title	Date

FIGURE



Our Lady of Lourdes Health Center
520 North 4th Avenue
Pasco, WA 99301
(509) 547-7704

Starting at:
3482 N Glade Rd North, Pasco, WA 99301

Arriving at:
Our Lady of Lourdes Health Center

Distance: 4.1 miles

Directions:
1. Exit site by turning left [south] on **Glade North Road**
2. **Glade North Road** becomes **North 4th Ave**
3. Hospital is on right [west] side of road.
   General parking is on left [east] side of road.

Note: in case of an emergency, call 9-1-1

19401 40th Avenue W, Suite 310
Lynnwood, WA 98036
425.744.1489 P
425.744.0919 F
MAUL FOSTER ALONGI
ENVIRONMENTAL & ENGINEERING CONSULTANTS

DATE 11/03
DWN. maa
APPR. ____
REVIS. ____
PROJECT NO.
0030.01.02

FIGURE 1

GLADE ROAD FACILITY
PASCO, WASHINGTON

ROUTE TO HOSPITAL

File: L:\0030.01.02\Figure 1 HASP– Route to Hospital .pub Last edited: 11/25/03 by: maa

ATTACHMENT A

TAILGATE SAFETY MEETING FORM

ATTACHMENT A
TAILGATE SAFETY MEETING FORM

Date:_____Time:_____ Job Number:_____

Client:_____ Address:_____

Site Location:_____

Scope of Work:_____

Safety Topics Presented

Protective Clothing/Equipment:_____

Chemical Hazards:_____

Physical Hazards:_____

Special Equipment:_____

Decontamination Procedures:_____

Emergency Procedures:_____

Meeting Attendance

1. _____ 8. _____

2. _____ 9. _____

3. _____ 10. _____

4. _____ 11. _____

5. _____ 12. _____

6. _____ 13. _____

7. _____ 14._____

ATTACHMENT B

INJURY/ACCIDENT FORMS

ATTACHMENT B
ACCIDENT/LOSS REPORT

******THIS REPORT MUST BE COMPLETED IN FULL AND SUBMITTED WITHIN 24 HOURS TO THE REGIONAL HEALTH AND SAFETY MANAGER***

Date of Accident:_____ Company:_____

Time Occurred:_____ Project Number:_____

Where Occurred:_____ Name and Location of Project:_____

_____ _____

PART I — PROPERTY DAMAGE/LOSS

Equipment Involved:_____

Names of Persons Involved:_____

Describe Incident/Damage:_____

_____

Estimated Cost of Damage:_____

***Police Report must be filed on all automobile accidents and on all equipment thefts. Copy of Police Report must also be submitted.**

DRAW A DIAGRAM OF INCIDENT ON THE BACK OF THIS REPORT

PART II — PERSONAL INJURY *(Fill out only if personal injury occurred)*

Name of employee injured:_____ Age:_____ Social Security No._____

Address:_____ Occupation:_____

What was employee doing when injured:_____

Exact location where injury occurred (station number or prominent landmark):_____

_____

Was place of accident or exposure on job site?:_____

Describe injury:_____

_____

How did injury occur?:_____

_____

Did employee see a doctor or go to the hospital?_____ If yes, give name, address, ad phone number of doctor or hospital:_____

Did employee lose time?_____ If yes, how long?_____ Date returned to work:_____

_____

Number of days employee usually worked a week: _____ Number of hours worked:_____

_____

Date of this report:_____ Report prepared by:_____

ATTACHMENT C

PERSONAL ACKNOWLEDGMENT

ATTACHMENT C
PERSONAL ACKNOWLEDGMENT

A component of the Health and Safety Plan (HASP), designed to provide personnel safety during this subsurface investigation requires that you receive training as described in the HASP prior to working at the site. I have read, understand, and agree to abide by the provisions as detailed in this Site-Specific Health and Safety Plan. Failure to comply with these provisions may lead to disciplinary action and/or my dismissal from the work site.

PRIME CONTRACTOR EMPLOYEES:

Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date

SUBCONTRACTOR EMPLOYEES:

Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date

ATTACHMENT D

MFA EXCAVATION SOP

SAFETY PROCEDURES FOR TRENCH CONSTRUCTION AND OTHER EXCAVATING OPERATIONS

PURPOSE

This procedure contains an overview of the safety requirements for excavating and trenching operations and working in the area of heavy equipment. The requirements are consistent with standards established by the Occupational Safety and Health Administration (OSHA) and described in Title 29 Code of Federal Regulations (CFR) 1926.650. The detailed OSHA standard was effective in January 1990 and should be consulted before design of a shoring system, with questions regarding sloping options, or before working as a "competent person" on an excavation site.

RESPONSIBILITY

The responsibility and authority for excavating and trenching safety must be well defined prior to project start-up. The contractor will assume responsibility for excavation safety and Maul Foster & Alongi (MFA) will maintain safety responsibility and authority only for MFA employees. MFA employees will not serve in the OSHA defined role of "competent person" unless specifically defined in the project scope of work and approved by the Project Manager (PM) and Management Oversight Reviewer (MOR). The PM shall ensure that the MFA field staff clearly understands the limitation of their excavation safety responsibilities and authorities.

MFA employees are responsible for understanding the general excavation safety requirements for not entering improper trenches or excavations and for understanding the potential hazards of working near heavy equipment.

APPLICABILITY

This procedure is applicable to all MFA projects in which trenching or other excavating operations, exclusive of borings, are entered by MFA personnel or personnel employed by firms under contract to MFA. It is also applicable to MFA projects requiring MFA personnel or personnel of firms under contract to MFA to enter trenches and other types of excavations.

The best approach for avoiding the detailed trenching requirements is to perform sampling and other procedures without entry into excavations. Use of a backhoe to bring up samples, use of long-handled sampling devices, and similar techniques are recommended.

REQUIREMENTS

Preliminary Requirements

Certain government agencies (e.g. California) require a permit to perform excavation operations.

Before digging, determine or have the client determine if underground installations, such as sewer, water, fuel, or electrical lines are to be encountered, and if so, determine the exact locations of the

lines. Information can be obtained by contacting Underground Service Alert (consult local telephone directory for toll-free number), local utility companies, and the owner of the property on which excavating operations are planned.

Trees, boulders, and other surface encumbrances, located so as to pose a potential hazard to employees must be removed or made safe before the operation begins.

Placement of Excavated Materials

Excavated materials must be placed at least two feet back from the edge of the excavation and precautions must be taken to prevent the materials from falling into the excavation.

Working in Excavations

Shoring and Sloping

Except for solid rock, trenches in which personnel are required to work must be shored or sloped if the depth of the excavation is three (3) feet or more. When a shoring system is used, it shall consist of hydraulic shores or the equivalent, with sheathing or sheet piling as needed. Trench boxes are also permitted. OSHA uses a soil classification system to determine the allowable slopes for trenches. The shoring system must be properly designed and installed to sustain all existing and expected loads. For details on shoring and sloping requirements, consult Title 29 CFR, Subpart P, Sections 1926.650 to 1926.653.

Access

When work is to be performed in any excavation, safe access to the excavation must be provided by means of ladders, stairs, or ramps. Trenches four or more feet deep must have ladders spaced no less than 25 feet apart, and the ladders must extend at least three feet above grade.

Hazardous Atmospheres

At sites where oxygen deficiency or hazardous concentrations of flammable or toxic vapors or gases may be encountered in excavations, the atmosphere in the excavations must be tested by the site safety officer or other qualified person before work in an excavation begins and at appropriate intervals afterward. Trenches may be classified as confined spaces and require an entry permit. If trenches are recognized as a confined space by the MFA site safety officer (SSO) and the MFA health and safety coordinator (HSC), no entry will be made into the trench by MFA personnel.

Inspection of Excavation

Excavations must be observed daily by the "competent person". If evidence for potential cave-ins or slides is apparent, all work in the excavation must be suspended until necessary steps have been taken to safeguard employees.

Operations of Vehicles Near Excavations

When vehicles or heavy equipment must operate near an excavation, the sides of the excavation must be shored or braced as necessary to withstand forces exerted by the superimposed load and the earth pressure. Stop logs or other types of secure barriers must be installed at the edges of the excavations.

Worker Safety Around Equipment

All vehicles should be parked far enough away from heavy equipment routes to avoid possible collisions. All personnel should wear high visibility safety vests when working in the area of heavy equipment. Other applicable safety gear includes hard hats, safety glasses, steel-toed boots, and (if applicable) hearing protection. When working in the vicinity of heavy equipment, personnel should always be sure the equipment operators are aware of their presence. Never attempt to cross the path of heavy equipment even if they appear to be a safe distance away. Always be aware the height of certain equipment creates blind spots. Never stand near onsite heavy equipment if it is not moving, whether it is running or not.

Barricades and Fences

Drilling areas should be completely guarded on all sides with barricades or fences, if deemed necessary, to keep onsite personnel not involved with drilling activities a safe distance from the drilling rig. If barricades are used, they must be spaced no more than 20 feet apart and shall not be less than 35 inches high when erected. A yellow or yellow and black tape, at least 0.75 inches wide, shall be stretched between the barricades.

Backfilling

Excavated areas must be backfilled in accordance with the work plan as soon as practical after work is completed, and all associated equipment must be removed from the area.

EXCAVATIONS NEXT TO EXISTING STRUCTURES

A registered engineer will review all plans for excavations next to existing structures to avoid undermining the structures and possible collapse.

ATTACHMENT E
MFA DRILLING SOP

SAFETY GUIDELINES FOR DRILLING INTO SOIL AND ROCKS USING A HOLLOW STEM AUGER DRILL RIG

PURPOSE

The purpose of this Standard Operating Procedure (SOP) List to provide an overview for working safely around hollow stem drilling operations. It is to be used only in conjunction with the site-specific Health and Safety Plan (HSP).

This SOP addresses MFA employee's responsibility and authority for overseeing the use of safe work practices during drilling operations. The SOP also includes safety guidelines for:

- Drill rig mobilization and set-up.
- Clearing overhead lines, buried utilities and work area.
- Safety considerations with the use of auger drilling operations and activities.
- Roadside drilling and traffic.
- Personal protective gear.
- Drilling tools and downhole equipment.
- Fire safety.

APPLICATION

The guidelines will be applied to Maul Foster & Alongi (MFA) projects in which drilling activities are used. The guidelines are only applicable to MFA employees.

RESPONSIBILITY AND AUTHORITY

MFA field personnel are responsible for reviewing the site health and safety plan before the start of work activities. Drilling subcontractors are responsible for the safe operation of the drill rig, and the safety of their personnel.

SAFETY GUIDELINES

Drill Rig Mobilization and Set-up

The following guidelines should be considered when drilling equipment is mobilized:

- Drilling equipment, tools and materials must be secured.
- When moving between multiple drilling locations, the drill mast should be lowered and secured. Exceptions maybe granted if the distance between holes is small and the terrain flat.

- To the extent practical, walk the planned route of travel with the drill operator and inspect it for depressions, gullies, ruts, and other obstacles.
- Appropriate driving speeds should be maintained when driving on-site. This includes the use of forklifts, and all-terrain vehicles.
- A spotter should be used when the drill rig is backed-up, pulling on to a busy roadway, in the vicinity of overhead lines, and/or maneuvering in tight spaces.
- No passengers should accompany the drill rig or support truck when moving on variable terrain where rough, steep or soft conditions exist.
- Driving drill rigs along hillsides or embankments should be avoided; however, if hillside travel becomes necessary, the operator must conservatively evaluate the ability of the rig to remain upright.

When setting up a drill rig over a drilling location, the following conditions should be considered:

- Potential drilling locations should be okayed by the client or facility personnel.
- Drilling locations should be cleared of underground utilities and overhead lines by a professional utility locator. The utility locator should indicate that the location has been approved by physically marking it (see underground utilities and overheads lines).
- After the rig has been positioned to begin drilling, all brakes and/or locks must be set before drilling begins. If the rig is positioned on a steep grade and leveling of the ground is impossible or impractical, the wheel of the transport vehicle should be blocked and/or other means should be used to prevent the rig from moving.
- A minimum 8-foot by 8-foot workspace area should exist around the borehole and the back of the drill rig. Drill operators should have clear access to enter or exit the work area.
- Appropriate traffic cones should be placed in the front and rear drill rig (see traffic).
- MFA employees should maintain tidy and organized work areas during drilling activities. Obstacles in the work area should be removed or marked. Drilling materials should be placed on level ground and not restrict access to the drill rig.
- MFA employees should be wary of slip hazards caused by wet drill cuttings and/or rain.
- Open boreholes should be covered to prevent tripping hazards. Abandoned boreholes should be completed with at least 2-feet of loose gravel, cement or asphalt. Appropriate amounts of bentonite or grout should be used to prevent mounding or caving at the surface.

UNDERGROUND UTILITIES AND OVERHEAD LINES

- The location of overhead and buried utility lines must be determined before drilling begins, and the locations should be noted on boring plans and/or assignment sheets. Potential borehole locations should be okayed by the client or site-personnel. A public and/or private utility locator should be used to clear all boring locations of underground utilities and overhead lines. In cases where the underground utility line is in question, MFA employees should carefully advance a hand auger to at least 5-feet below ground surface as a precaution.

- When overhead power lines are close by, the drill rig mast should not be raised unless the distance between the rig and the nearest power line is at least 20 feet away. The drill rig operator or assistant should walk completely around the rig to make sure that proper distances exist.

- When the drill rig is positioned near an overhead line, the rig operator should be aware of swaying hoist lines and/or power lines contacting each other during windy conditions. When necessary and approved by the Project Manager (PM), the utility and/or overhead lines may be shielded, deactivated, or moved by the appropriate agency or personnel.

SAFE USE OF AUGERS AND WINCH LINES

- Auger flights should be stacked on wood blocks or drill rod before, during and after drill activities.

- Use care when lifting auger flights that are caked with clay or cuttings. Auger flights can be extremely heavy and awkward. Moving and handling of auger flights should be completed two people.

- Never place hands or fingers under the bottom of an auger flight or drill rods when hoisting them over the top of another auger or rod, or other hard surfaces, such as the drill rig platform. Never allow feet to get under the auger or drill rod while they are being hoisted.

- When the drill is rotating or advancing, stay clear of the drill string and other moving components of the drill rig. Never reach behind or around a rotating auger or moving drill string for any reason. MFA employees should never approach the auger string unless the transmission is in neutral or the engine is off, and the augers have stopped rotating.

- Move auger cuttings away from the auger with a long-handled shovel or spade; never use hands or feet.

- Never clean an auger attached to the drill rig unless the transmission is in neutral or the engine is off, and the auger has stopped rotating.

- Power washing or steam cleaning auger flights should be conducted by personnel using protective eye ware and rain suites at a minimum.

- Attention to safety should be given when pulling augers from the borehole with the main winch line or top head. In cases where the winch line or top head is being used to pull downhole auger flights that are locked in place, the drilling area should be cleared of all personnel except for the drill operator.
- Winch lines and sand lines should be properly secured when not being used. MFA employees should note the condition of the winch lines (i.e., fraying, spliced sections).
- Drill rod strings should be secured using the mast cage or placed on blocks on the ground. The length of the drill rod strings should not exceed the mast height (typically 40-feet).

SAFE USE OF HAND TOOLS

OSHA regulations regarding hand tools should be observed in addition to the guidelines provided below:

- Each tool should be used only to perform tasks for which it was originally designed.
- Damaged tools should be repaired before use or discarded.
- Safety goggles or glasses should be worn when using a hammer or chisel. Nearby co-workers and by-standers should be required to wear safety goggles or glasses also, or move away.
- Tools should be kept cleaned and stored in an orderly manner when not in use.

PROTECTIVE GEAR

Minimum Protective Gear

Items listed below should be worn by all members of the drilling team while engaged in drilling activities.

- Hard Hat
- Safety Shoes (shoes or boots with steel toes and shanks)
- Gloves
- Safety Glasses
- Hearing Protection

Other Gear

Items listed below should be worn when conditions warrant their use. Some of the conditions are listed after each item.

- **Respirator for Dust:** When working with materials that produce particulate matter such as silica sand or cement grout, the appropriate respirator should be used.

- **Safety Harnesses and Lifelines:** Safety harnesses and lifelines shall be worn by all persons working on top of an elevated derrick beam or mast. The lifeline should be secured at a position that will allow a person to fall no more than six feet. OSHA Full Protection (1926 Subpart m) requirements apply.

- **Life Vests:** Use for work over water.

TRAFFIC SAFETY

Drilling in streets, parking lots or other areas of vehicular traffic requires definition of the work zones with cones, warning tape, etc. and compliance with local police requirements. A minimum buffer should be established around the drilling area that is conducive to a safe work environment.

FIRE SAFETY

- Fire extinguishers shall be kept on or near drill rigs for fighting small fires.

- If methane is suspected in the area, a combustible gas instrument (CGI) shall be used to monitor the air near the borehole with all work to stop at 10 percent of the Lower Explosive Limit (LEL).

- Work shall stop during lightning storms.

APPENDIX C

ENGINEERING DESIGN REPORT

ENGINEERING DESIGN REPORT

GLADE ROAD FACILITY
PASCO, WASHINGTON

- Design Specifications
- Design Drawing

Prepared by
Maul Foster & Alongi, Inc.
19401 40th Avenue West, Suite 310
Lynnwood, Washington 98036

Project 0030.01.02

Engineering Design Report
Glade Road Facility
Pasco, Washington

CERTIFICATION OF ENGINEER

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned MFA project manager, whose seal, as a professional engineer licensed to practice as such, is affixed below.

Prepared by: _____
Michelle M. Wittenbrink, PE
Project Engineer

Checked by: _____
Steven P. Taylor, PE
Principal Engineer

Approved by: _____
Michael D. Staton, RG
Project Manager
SLR International Corporation

DESIGN SPECIFICATIONS

STANDARD SPECIFICATIONS

The work on this project will be accomplished in accordance with the WSDOT Standard Specifications for Road, Bridge, and Municipal Construction 2002, English Units, including the 1-99 APWA Supplement, as amended, as issued by the Washington State Department of Transportation (WSDOT) and the American Public Works Association (APWA), Washington State Chapter (hereafter "Standard Specifications").

INTRODUCTION TO THE SPECIAL PROVISIONS

The Standard Specifications, as modified or supplemented by the following Special Provisions, will govern all of the Work. In the event there is a discrepancy between the Standard Specifications and these Special Provisions, the Special Provisions will prevail. The Special Provisions apply specifically to the details of the work, as shown on the construction plans for this project.

The prime Contractor will have a copy of the Standard Specifications, a full set of design specifications (Special Provisions) and all addenda to the Contract documents on the job site while the work is being performed.

GENERAL DESCRIPTION OF WORK

Generally, the Work consists of providing the labor, equipment, and materials to complete the following tasks:

- Excavate a approximately 3,250 cubic yards of soil at the former wash pad area of the site, at depths ranging from approximately 0 to 29 feet below ground surface (bgs). The purpose of the excavation will be to remove the dinoseb-impacted soil that is in contact with the shallow groundwater (at depths of 25 to 29 feet bgs). The soil excavated at depths from approximately 25 to 29 feet bgs (total volume of approximately 250 cubic yards) will be hauled off site for disposal. The remaining excavated soil will be used as backfill in the excavation.

- Haul the excavated dinoseb-impacted soil from 25 to 29 feet bgs to the Rabanco Regional Landfill in Roosevelt, Washington, for disposal.

- Supply approximately 250 cubic yards of clean, imported backfill material, and backfill the material at depths of approximately 25 to 29 feet bgs.
- Place a 3-inch-thick asphalt pavement as a permanent cap over the area of excavation and over several other areas of the site (total area of approximately 10,000 square feet).
- Coordinate with utility companies for relocation of underground and overhead power and telephone utility lines.
- Transmit construction documentation to Engineer.

SPECIAL PROVISIONS

DIVISION 1—GENERAL REQUIREMENTS

SECTION 01330 SUBMITTAL REQUIREMENTS

The Contractor will submit copies of the following documents five (5) days before starting on-site work:

Health and Safety Plan: The Contractor is responsible for the health and safety of its workers and subcontractors. The Contractor will prepare a site-specific health and safety plan (HASP) per applicable regulations and submit it to the Engineer for review within five business days of contract award. Contractor is solely responsible for the execution of his HASP. Each subcontractor is required to prepare its own site-specific HASP. The Owner will not approve or disapprove of the Contractor's HASP. The Contractor will control the area of work and establish site work zones (exclusion zone, contamination reduction zone, and clean zone).

Project Plan: The Contractor will submit a Project Plan to be reviewed by the Engineer. At a minimum, the project plan will include a schedule, excavation sequencing, proposed stockpile/material management area(s) location(s), proposed work area entrance locations, and a general description of the methods and equipment the Contractor plans to use to complete the project. Prior to conducting the Work, the Contractor will meet with the Engineer to discuss the Project Plan.

Project Records: During the Work, the Contractor will maintain detailed records to document construction techniques, materials removed, materials placed, and tests and measurements performed. The documentation procedures are discussed briefly below.

The Contractor will complete records to document the Work performed. These records will include, but are not limited to, the following:

- Daily Activity Log—A daily activity log will be completed by the Contractor to describe general site activity and to identify personnel working on site. These records will be completed daily and copies will be provided to the Engineer weekly.

- On-Site Transfer Logs—The Contractor will prepare a daily log of the excavated soil generated and transferred within the site boundaries (e.g., from excavations to stockpiles). The source (e.g., "material from excavation area ABC") and the approximate quantity of material will be identified in this daily log. Copies will be provided to the Engineer weekly.

- Off-Site Tracking Log—A continuous log of all off-site shipments, which will be maintained by the Contractor, will include the following information: type of material, source of material, day shipped, receiver and weight. Copies will be provided to the Engineer weekly.

- Health and Safety Log—A daily record will be maintained of the personnel who are on site and the levels of protection they worked in by task. Results of field health and safety monitoring will be documented in the health and safety log.

Upon completion of the site work, the Contractor will submit copies of the following to the Engineer:

Load and Weight Tickets: All load tickets for imported backfill, and weight tickets from the disposal facility accepting the soil.

Bills of Lading/Manifests: All bills of lading and manifests used to transport the soil to the off-site disposal facility.

Compaction Documentation: Field and laboratory reports per Section 02315 BACKFILLING.

Backfill Documentation: Contractor will provide a statement identifying the source(s) of the backfill material and certification that it met specifications.

Survey: Prior to backfilling, the Contractor will complete a survey of the vertical and horizontal extent of the excavated areas. The survey will include bottom of excavation and top of excavation at each corner and breakpoint and at a minimum of 10-foot intervals. Assume four additional reference points will be surveyed at the direction of the Engineer. The survey will be completed by a surveyor licensed in the State of Washington. Vertical dimensions will be to the nearest tenth of a foot. Horizontal dimensions will be to the nearest tenth of a foot. A preliminary survey data file will be provided to the Engineer. Backfilling can commence only after the Engineer's review of the survey and notice to proceed with backfilling. Two (2) copies of the As-Built Survey will be supplied to the Engineer at the end of the project.

**** END OF SECTION ****

SECTION 01410 CODE REQUIREMENTS

It is the responsibility of the Contractor to investigate and comply with all applicable federal, state, county, and local laws.

The applicable codes and regulations include, but are not limited to:

1. Occupational Safety and Health Act and related regulations.
2. Washington Industrial Safety and Health Act and related regulations.
3. Chapter 296-155 WAC, Safety Standards for Construction Work.
4. Chapter 296-24 WAC, General Safety and Health Standards.
5. Chapter 296-62 WAC, General Occupational Health Standards.
6. USEPA 165.5, Hazardous Materials Incident Response.
7. Flammable and Combustible Liquids Code, National Fire Protection Association, NFPA-30.
8. National Electrical Code, National Fire Prevention Association, NFPA-70.
9. National Institute for Occupational Safety and Health, Criteria for a Recommended Standard: Working in Confined Spaces.
10. Department of Transportation Hazardous Materials Regulations, Title 49 CFR.
11. Resource Conservation and Recovery Act and related regulations.
12. National Emission Standard for Hazardous Air Pollutants, 40 CFR 61 Part M.
13. Uniform Fire Code, 1997 Edition.
14. Chapter 173-340 WAC, Model Toxics Control Act Cleanup Regulation.
15. Franklin County Codes and Regulations.

At a minimum, all workers potentially contacting contaminated soil or materials will be 40-hour trained per the requirements of 29 CFR 1910.120.

The Contractor will resolve conflicts arising from interpretation of these codes. The Owner reserves the right to approve the Contractor's resolution of code conflicts.

**** END OF SECTION ****

SECTION 01415 PERMIT REQUIREMENTS

Since the Work will be conducted under an Agreed Order, the requirement to obtain local and state permits for this Work is waived under the Model Toxics Control Act. However, the Contractor will comply with the substantive requirements of a Franklin County Grading Fill and

Excavation Permit. Any discrepancy between the substantive requirements of this permit and the Technical Specifications will immediately be brought to the attention of the Engineer.

Contractor actions that result in potential violations of the substantive permit requirements are grounds for a stop work order from the Owner or Engineer. To the extent the Contractor's actions result in a violation of the substantive requirements of a permit, the Contractor will be liable for fines and damages assessed against the Owner, if any.

** END OF SECTION **

SECTION 01510 TEMPORARY UTILITIES

No utilities will be available to the Contractor at the site. The Contractor will furnish electricity and water as necessary to complete the scope of work. All temporary wiring and services necessary to provide utilities will meet applicable code and permit requirements. The Contractor will install lighting if the Work is performed under conditions deficient for inspection and safe work.

** END OF SECTION **

SECTION 01550 SITE ACCESS AND TRAFFIC CONTROL

The Contractor will make the necessary arrangements for delivery of equipment to the site and determine the condition and availability of public roads, access, and rights-of-way, and of restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress from the site. In addition, the Contractor will prevent dust nuisance, impassable conditions, and dirt accumulation on public streets used for access.

The Contractor will coordinate on-site traffic with the site manager. The Contractor will maintain access for site activities and the site fire hydrants.

** END OF SECTION **

SECTION 01561 STOCKPILING

The Contractor will maintain separate stockpiles for the material excavated at depths of less than 25 feet and the soil excavated at depths between 25 and 29 feet bgs. Dust will be controlled. Soil stockpiles will be constructed by the Contractor. The locations of the stockpiles will be approved by the Engineer and the site manager.

Stockpile liners will be used and constructed in accordance with Section 02111, EXCAVATION OF SOIL. At the end of each workday, the stockpiles will be covered with 6 mils polyethylene plastic sheeting. Soil stockpile covers will be secured so that they cannot be blown off by wind, and will not allow precipitation to come in contact with excavated material. The Contractor will take measures to prevent run-on and runoff.

** END OF SECTION **

SECTION 01570 SPECIAL CONTROLS

Dust Control. During the Work, the Contractor will sprinkle at frequent intervals areas where operations would otherwise create a dust nuisance, and sweep paved roads periodically and at the Engineer's request. Watering provisions must be in place to prevent dust from becoming airborne. Stockpiles must be maintained so as to prevent dust from becoming airborne. Water added for dust control must be sufficient to minimize dust, but not to the point of mobilizing surface soil. All open-bodied trucks transporting material from the site must be covered to prevent dust from blowing from the trucks. During the Work, all public streets adjacent to the site that will be used by construction traffic will be kept clean of all materials resulting from the Work. The Contractor will be responsible for all damage resulting from dust produced by Contractor operations.

Erosion Control: The Contractor will provide temporary erosion control work shown in the Design Drawing and specified in Section 2630 EROSION AND SEDIMENTATION CONTROLS. This work is intended to provide prevention, control, and abatement of water pollution/erosion within the limits of the project. The area of excavation, stockpiling, and soil management will be limited commensurate with the Contractor's capability and progress in keeping the erosion control measures current.

Noise Control: The Contractor will comply with WISHA-allowable construction noise, and will equip internal combustion engines with effective mufflers.

Decontamination: All personnel and equipment must be decontaminated before leaving the Contractor-designated contamination reduction zones.

Sanitary Provisions: The Contractor will provide and maintain neat and sanitary accommodations for the use of Contractor employees and the Engineer, as may be necessary to comply with the requirements and regulations of the agencies or organizations having jurisdiction over sanitary and health conditions and of other bodies or offices having jurisdiction thereover.

** END OF SECTION **

SECTION 01650 TRUCK LOADING

The Contractor will load all trucks in a manner that prevents spilling or tracking of contaminated soil. A sacrificial geotextile will be used in the truck loading area to prevent surface soil contamination from spillage. The Contractor will remove the loose soil that falls outside the truck during loading, before the truck leaves the loading area.

Truck loading will be adjacent to stockpiles or excavations, just outside the Contractor-designated exclusion zones. The Contractor will place any material that collects on the barrier geotextile in the loading area back into the truck or respective excavation.

No free liquids will be placed in trucks for transportation off site.

** END OF SECTION **

SECTION 01760 PROTECTION OF EXISTING FACILITIES

This Section concerns protection of those facilities within or nearby the work areas that are to remain in place after completion of the project. The Contractor will adhere to all requirements of the Standard Specifications and these requirements. Excavation activities will involve the temporary relocation of overhead and buried power and telephone lines and a power pole that are located in the area of excavation. The Contractor will take all measures for the coordination and protection of the utilities so that site operations are not impacted.

No excavation will be performed until site utilities have been field-located by a private utility locating company. The Contractor will also notify Utilities Underground Location Center at 800-424-5555. The Contractor will take the necessary precautions to ensure no damage occurs to existing structures and utilities. Damage to existing structures and utilities resulting from the Contractor's operations will be repaired at no additional cost to the Owner. Utilities encountered that were not previously shown or otherwise located will not be disturbed without approval from the Engineer.

Before beginning the Work, the location, dimensions, and elevations of nearby facilities that are to remain will be recorded by the Contractor. Photographs will be taken to record any prior damage to structures. A listing of any existing damage, along with the dimensional record and photographs, will be given to the Engineer prior to beginning work. The Contractor will provide for the safety, stability, and integrity of facilities that are to remain in place, and will promptly notify the Engineer if any damage becomes evident. The Contractor will be responsible for any and all damages resulting from actions that damage or otherwise diminish the functionality and/or integrity of the facilities that are to remain in place.

The Contractor will immediately repair any damage caused by the Work, and will restore the facilities to the condition existing prior to the start of work.

** END OF SECTION **

DIVISION 2—SITE WORK

SECTION 02111 EXCAVATION OF SOIL

The work will consist of excavation and removal of approximately 250 cubic yards of dinoseb-impacted soil, and the excavation, temporary storage, and reutilization as backfill of approximately 3,000 cubic yards of impacted and "clean" soil in the former wash pad area, as shown on the Design Drawing. The soil to be excavated and removed for disposal occurs within the zone of groundwater fluctuation, approximately 25 to 29 feet bgs, as shown on the Design

Drawing. In order to remove this soil, the Contractor will excavate and stockpile the soils ranging from 0 to 25 feet bgs. The two soil zones will be segregated in stockpiles to prevent any cross contamination. The Contractor will be aware that the limits of excavation and estimated depths are estimates and may change during the excavation activities. Deviations from the estimated limits may be made only with prior approval from the Engineer.

Site operations should be minimally impacted during the Work activities. The Contractor will clearly mark the work areas and confine their operations to within those areas. The site manager will approve the designated work areas.

Execution

Prior to any excavation, the Contractor will locate all utilities within the excavation limits as described in Section 02760 PROTECTION OF EXISTING FACILITIES. Stockpiling areas will be established in accordance with Section 1561 STOCKPLING and this Section.

Within the limits of excavation, soil will be excavated to the minimum depth and extent shown on the drawing and not more than 0.5 feet beyond the depth and extent shown unless directed by the Engineer. Excavation will be performed in a manner that will limit spills and the potential for soil to be mixed with uncontaminated material. Excavation sequencing will follow the Project Plan and will meet the intent as shown in the Design Drawing.

Throughout the excavation, the Contractor will monitor through visual observation the structural integrity of the excavation sides. If any sloughing, raveling, or potential breaching of the excavation is identified, and may potentially cause harm to any existing structure or to an off-site property, the Contractor will immediately notify the Engineer.

Prior to off-site hauling of the soil, the Contractor will segregate and manage the soil to meet the requirements stated within Section 02120, DISPOSAL AND OFF-SITE TRANSPORTATION. The Contractor will take all necessary precautions to protect facilities that will remain. In the event facilities impede the work activities, the Contractor may temporarily remove the facilities with the Engineer's approval and replace in a condition as good or better. The Contractor will bear all costs associated with the replacement of the utility, including all labor, materials, and testing, as required by the utility company. Any sheeting, shoring, bracing, and sloping will be conducted in accordance with Section 02160, SHEETING, SHORING AND BRACING.

Water will be diverted to prevent entry into the excavation. Any dewatering activities will be conducted in accordance with Section 02240 DEWATERING. Dewatering will be used, as necessary, to assure adequate access and a safe excavation, and to ensure that compaction requirements can be met.

Sampling and Monitoring

The Engineer will be present to monitor the removal of soil. At the completion of the soil excavation, the Engineer will conduct sampling procedures. The Contractor will use excavation equipment to assist in the collection of soil samples at the direction of the Engineer. Secondary

excavation and secondary sampling may be required dependent on the soil sample analytical results.

Stockpile

Stockpile areas will meet the requirements of Section 01561 STOCKPILING, and this Section. Stockpiles will be lined with 20 mils geomembrane or two layers of 6 mil polyethylene plastic sheeting. The ground surface on which the liner is to be placed will be free of rocks greater than 0.5 inches in diameter and any other object that could damage the geomembrane.

At the end of each workday, the stockpiles will be covered with 6 mil polyethylene plastic sheeting. Soil stockpile covers will be secured so that they cannot be blown off by wind, and will not allow precipitation to come in contact with excavation material.

** END OF SECTION **

SECTION 02120 DISPOSAL AND OFF-SITE TRANSPORTATION

Work described within this Section includes the hauling and disposal of the dinoseb-impacted soil, as shown on the Design Drawing.

Dinoseb-Impacted Material

The Contractor will haul the material to Rabanco Regional Landfill for disposal (see Section 01025 MEASUREMENT AND PAYMENT). Trucks and drivers will have the appropriate licenses and certifications required by the State of Washington to transport the soil. The Contractor will be responsible for ensuring that trucks loaded for off-site disposal are within acceptable weight limits. The trucks will be covered before they leave the loading area.

Uncontaminated Material

Disposal of any uncontaminated material that the Contractor may encounter during excavation (e.g., debris, wood scrap) will be loaded and hauled by the Contactor to a permitted facility, approved by the Owner.

** END OF SECTION **

SECTION 02160 SHEETING, SHORING AND BRACING

This Section specifies requirements for sheeting, shoring and bracing of open excavations greater than 4 feet in depth. Where sheet piling, shoring, sheeting, bracing, or other supports are necessary, they will be furnished, placed, maintained and, except as shown or specified otherwise, removed by the Contractor.

All sheeting, shoring, and bracing will be conducted in accordance with the Standard Specifications, 2-09 STRUCTURAL EXCAVATION. The Contractor will submit working drawings and calculations showing the proposed method of shoring. The Contractor will not begin construction of structural shoring or cofferdams, nor begin excavation operations, until approval of the structural shoring submittal has been given by the Engineer.

Contractor will be aware that the excavation for the former wash pad area will not exceed the fence line located along the north edge of the limits of excavation. Open excavation and benching of the remaining boundaries of the excavation are permitted with note that the Contractor is fully responsible for coordination with the Engineer and the site manager.

SECTION 02240 DEWATERING

Surface water will be diverted to prevent entry into the excavation. No dewatering will be performed without prior approval of the Engineer.

** END OF SECTION **

SECTION 02315 BACKFILLING

The Work involves the backfilling of the soil excavation areas and as directed by the Engineer. Under no circumstances will backfilling commence until the Engineer confirms that the cleanup levels have been met and additional excavation is not required, if appropriate. The Contractor will verify with the Engineer before backfilling.

Only clean, imported backfill material will be used for the backfill in the 25- to 29-foot zone as depicted on the Design Drawing. No spoils can be backfilled within this zone. After completion of the zone between 25 to 29 feet bgs, a geotextile fabric will be placed on top of the clean fill. The geotextile fabric will meet the requirements of Table 3, Geotextile for separation or soil stabilization, in Section 9-33 CONSTRUCTION GEOTEXTILE. The fabric will be spread uniformly over the clean fill surface, and each sheet will be overlapped a minimum of 24 inches.

The 0- to 25-foot zone will be backfilled with spoils that meet the requirements of Standard Specification Section 9-03.14(3) COMMON BORROW, and were previously excavated from this zone. Imported backfill may be needed to supplement the excavated material.

Imported backfill material will be clean, imported structural fill material as defined by Standard Specification Section 9-03.14(2) SELECT BORROW. The Contractor will be responsible for submitting a particle size analysis of Contractor-supplied fill for approval by the Engineer before bringing any fill on site. Imported fill will be certified by the Contractor as meeting the definition of "clean soil" as provided in WAC 173-350-100.

Compaction of fill material and associated control testing will be consistent with the requirements of Standard Specification Sections 2-03.3(14)C Method B and 2-03.3(14)D. Per Standard Specification Section 2-03.3(14)C Method B, the Contractor will compact the top 2 feet

of each backfilled excavation to 95 percent of the maximum dry density. Maximum dry density will be determined by the Contractor, using ASTM Test Designation (D) 1557-00. The Contractor will compact material below the 2-foot level to 90 percent of the maximum density as determined by ASTM D 1557-00.

The Contractor will be responsible for providing field testing to confirm that in-place compaction requirements have been met. The results of all field and any supporting laboratory testing will be provided to the Engineer after each excavation is backfilled. The Engineer will perform random testing during backfilling to verify compaction control.

The Owner may test the backfill material to confirm that it conforms to specification. If the backfill material fails, the Contractor will be responsible for removal and proper disposal of the off-specification material and its replacement, at no cost to the Owner.

**** END OF SECTION ****

SECTION 02630 EROSION AND SEDIMENTATION CONTROLS

The Contractor is solely responsible for implementing appropriate erosion prevention and sediment control, and will do so prior to commencing work. The erosion control measures shown on the Design Drawing are advisory and are the minimum required. The Contractor will apply additional measures as appropriate based on actual field conditions encountered, commensurate with weather requirements and construction impacts.

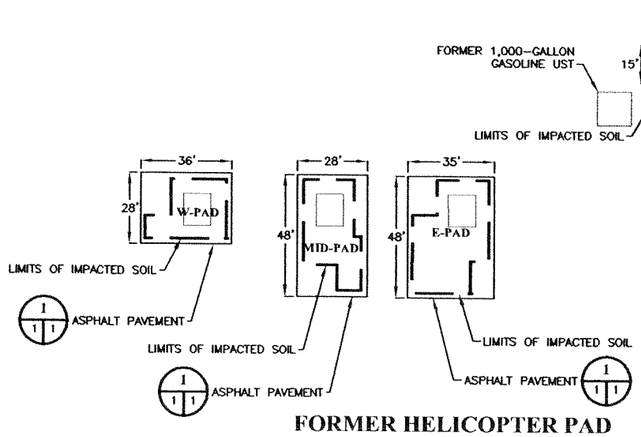
**** END OF SECTION ****

SECTION 02740 ASPHALT CONCRETE PAVEMENT

The Asphalt Concrete Pavement Class "A" (ACP A) will comply with the Standard Specifications. The asphalt pavement will be installed over the area of soil excavation, and at the designated areas on the Design Drawing. The total area of pavement is approximately 10,000 square feet. This area may increase depending on the actual extent of the soil excavation.

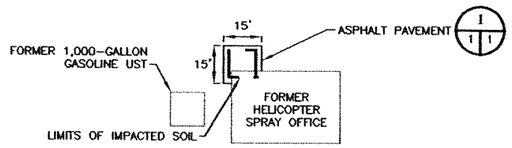
**** END OF SECTION ****

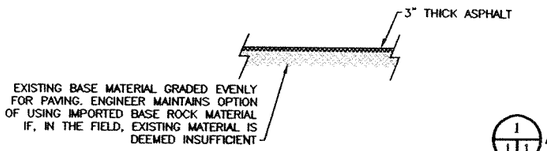
Design Drawing



FORMER HELICOPTER PAD AREA

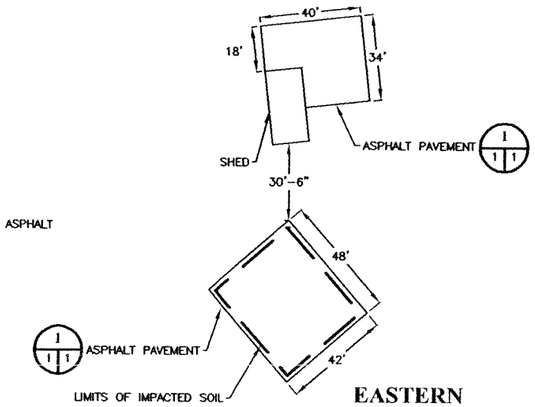
1" = 60'





TYPICAL ASPHALT PAVEMENT DETAIL

1" = 10'



EASTERN AREA

1" = 60'

GENERAL NOTES:

1) THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION. CONTRACTOR SHALL CALL THE LOCAL UTILITY LOCATE NUMBER A MINIMUM OF 48-HOURS PRIOR TO THE START OF CONSTRUCTION.

2) IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ANY APPLICABLE PERMITS, LICENSES AND CERTIFICATES RELATIVE TO THE TRADES TO COMPLETE THE PROJECT AND THE USE OF SUCH WORK WHEN COMPLETED.

3) ALL EROSION CONTROL DEVICES SHALL BE CONSTRUCTED IN ACCORDANCE WITH FRANKLIN COUNTY STANDARDS.

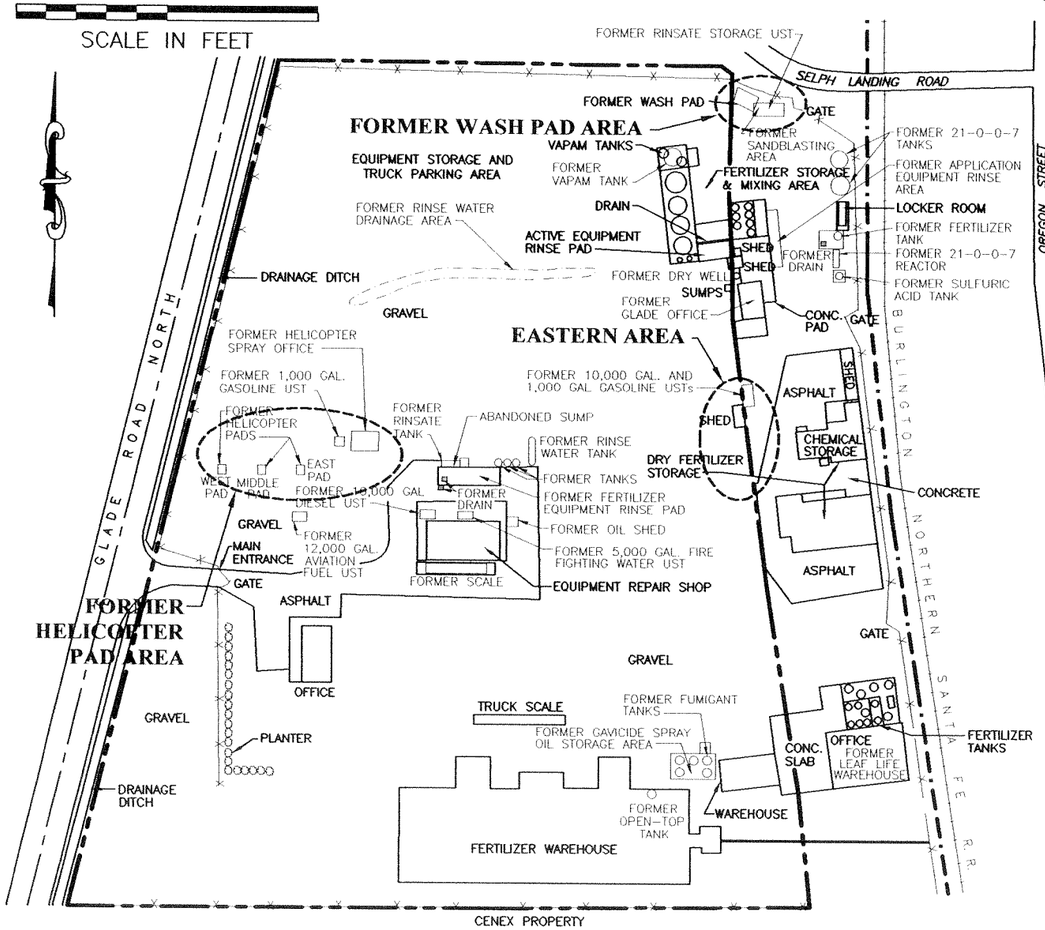
4) NO SITE SURVEY WAS CONDUCTED FOR THESE DRAWINGS AND ALL INFORMATION SHOWN WAS PROVIDED USING AERIAL PHOTOGRAPHY AND PREVIOUS SITE INVESTIGATIONS. THE CONTRACTOR IS TO USE CAUTION WHILE CONDUCTING THE WORK. THE ENGINEER SHALL MAKE THE DECISIONS ON ANY POTENTIAL CONFLICTS AND SHALL DETERMINE THE LIMITS OF EXCAVATION.

5) EXCAVATION SHALL TAKE PLACE ONLY WITHIN THE FORMER WASH PAD AREA. WORK IN OTHER AREAS SHALL INVOLVE ONLY THE PLACEMENT OF ASPHALT PAVEMENT UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

GRADING CALCULATIONS:	
ESTIMATED DEPTH	29 FT BGS
EXCAVATED & REMOVED	250 CY
FILL	250 CY
LATERAL WIDTH	26-35 FT
LATERAL LENGTH	49 FT

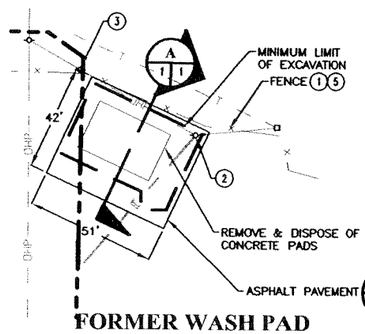
0 200 400

SCALE IN FEET



LEGEND:

- Railroad Tracks
- Leased Property Boundary
- Property Line
- Existing Fence
- Buried Telephone
- Buried Electrical
- Over Head Power
- Utility Pole

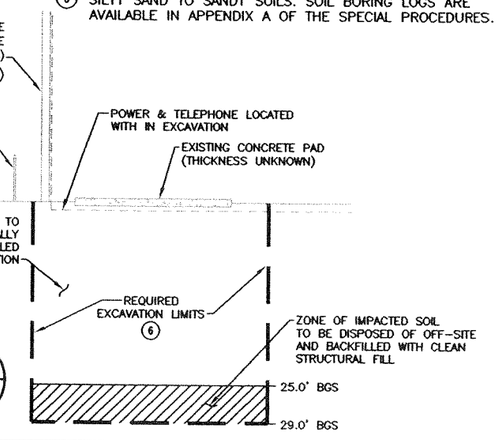


FORMER WASH PAD AREA

1" = 60'

NOTES:

1. REMOVE & REPLACE FENCE AS NEEDED TO ACCOMMODATE WORK.
2. POWER & TELEPHONE POLE LOCATED WITHIN LIMITS OF EXCAVATION. CONTRACTOR SHALL WORK WITH OWNER IN TEMPORARY RELOCATION AND PROVIDE A NEW PERMANENT PLACEMENT OF POLE.
3. TO BE PROTECTED DURING WORK.
4. FINAL ASPHALT PAVEMENT LIMITS SHALL BE FIELD DETERMINED BY ENGINEER.
5. LIMITS OF EXCAVATION SHALL NOT EXCEED FENCE LINE. CONTRACTOR SHALL SUBMIT WORKING DRAWINGS AND CALCULATIONS SHOWING THE PROPOSED METHOD OF SHORING AS DESCRIBED IN THE SPECIFICATIONS.
6. SOILS WITHIN THE EXCAVATION LIMIT CONSIST MAINLY OF SILTY SAND TO SANDY SOILS. SOIL BORING LOGS ARE AVAILABLE IN APPENDIX A OF THE SPECIAL PROCEDURES.



SECTION

A

1" = 20'

STEVEN P. TAYLOR
STATE OF WASHINGTON
34036
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES:

Vancouver: (360) 694-2691
Seattle: (425) 744-1489
Portland: (971) 544-2139

MAUL FOSTER ALONGI

DATE 12/05/03
DWN. AJY
APPR.
REVIS.
PROJECT NO. 0030.01.02

Figure 1
GLADE ROAD FACILITY
PASCO, WASHINGTON

SITE PLAN & DETAILS

APPENDIX D

OPERATION AND MAINTENANCE PLAN

OPERATION AND MAINTENANCE PLAN

A three-inch-thick asphalt cap will be used to cover the designated areas of impacted soil. The capping will eliminate the direct contact pathway with the soil and prevent storm water infiltration through the soil. The capped areas will be inspected annually by site personnel, and repaired as needed. Inspections will focus on erosion, settling, cracks or other visible damage. If the integrity of the asphalt cap is determined to be compromised, then it will be repaired by the site owner. The asphalt cap will be considered compromised if asphalt is completely missing or if a crack greater than ¼-inches in width extends through the asphalt.

The method for asphalt repair will be dependent upon the damage to the cap. The repair may be as simple as sealing a crack or may consist of removal and replacement of an entire section. Crack sealing will be completed by using the procedures described in WSDOT Standard Specifications Section 5-04.3(5)C. Asphalt replacement will be completed by using the procedures described in WSDOT Standard Specifications Section 5-04.3(5)E. As part of planned maintenance, it is assumed that after 15 years, a one-inch-thick asphalt overlay will be placed over each capped area.