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Groundwater Remediation System Work Plan for Estes West Express Trucking Facility, VCP # NW2532

Estes West Express Trucking Facility
2102 West Valley Highway North
Auburn, Washington

Prepared For:

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April 4, 2014

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Project Number: 61901.4

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1.0 INTRODUCTION

This Work Plan for groundwater impacts at the Estes West Express Trucking Facility has been prepared on behalf of Mr. David Pollart, the property owner, to facilitate remedial activities in groundwater at the property located at 2102 West Valley Highway North in Auburn, WA (the Site). The Site location is shown in Figure 1. This Work Plan has been prepared, and the remediation project is being performed, under Ecology's Voluntary Cleanup Program (VCP).

This work plan was prepared specifically for the field-scale remediation project being performed to remediate groundwater impacted by petroleum hydrocarbons, specifically diesel- and heavier-range petroleum hydrocarbons, at monitoring well MW-1, which is located at the northwest corner of the maintenance building at the Site as shown in Figure 2.

2.0 BACKGROUND

Soil and groundwater at the Site were impacted by petroleum hydrocarbon releases from a 550-gallon waste oil underground storage tank (UST) located near the northwest corner of the existing truck maintenance building. The UST and approximately 350 cubic yards of petroleum-contaminated soil (PCS) were removed and four monitoring wells, designated MW-1, MW-2, MW-3, and MW-4, were installed in December 1998. The locations of the former UST and monitoring wells relative to the truck maintenance building are shown on Figure 2.

Ecology issued a conditional No Further Action (NFA) determination for the Site in January 2000. The NFA contained the condition that quarterly groundwater monitoring and reporting be continued until "this site demonstrates sustained, continuous compliance with Model Toxics Control Act (MTCA) Groundwater Cleanup Levels (CULs) for at least one year." The NFA letter also stipulated that analytical results for groundwater compliance "shall include BTEX (benzene, toluene, ethylbenzene, and xylene), diesel, and heavy oils." Available records indicate that the monitoring wells were sampled approximately every quarter from December 1998 until October 2002.

In November 2002, the Site owner petitioned for a full NFA determination based on three years of data demonstrating that the benzene in groundwater at concentrations greater than MTCA Method A CULs was confined to samples from the area on the north side of the maintenance building around MW-2. At that time, the sample from MW-2 had a gasoline-range petroleum hydrocarbon (GRPH) concentration of 180 micrograms per liter (µg/L) and a benzene concentration of 12.0 µg/L. The GRPH concentration was less than its MTCA Method A CUL of 800 µg/L; however, the benzene concentration exceeded the MTCA Method A CUL of 5 µg/L. No other BTEX compounds, diesel-range petroleum hydrocarbons (DRPH), or heavier-range petroleum hydrocarbons (HRPH) were detected in the sample from MW-2 and none of the samples from the other monitoring wells had concentrations exceeding MTCA Method A CULs.

Groundwater sampling was discontinued in late 2002 and the Site did not receive a full NFA determination due to the benzene concentration exceeding its MTCA Method A CUL in samples from MW-2. Records indicate that the Site was subsequently dropped from the VCP due to inactivity.

The Site re-entered the VCP in August 2011 and was assigned VCP number NW2532. Quarterly groundwater sampling of the four on-site wells under the VCP resumed in August 2011. On March 26, 2012, Ecology notified the Site owner that the January 2000 conditional NFA determination was rescinded because the benzene concentrations in groundwater samples from well MW-2 remained at concentrations greater than MTCA CULs and the previous groundwater remedy did not achieve and maintain compliance with the applicable MTCA Method A CULs.

A 12,000-gallon diesel fuel UST was removed from the south side of the maintenance building on November 28, 2012. The location of the former UST is shown in Figure 2. According to available information, the UST was pumped and taken out of service in 1998 when the 550-gallon waste oil UST was removed. The UST had reportedly not been used between 1998 and 2012. EPI personnel oversaw the UST decommissioning activities and collected nine soil samples and one sample of water at the bottom of the UST excavation. EPI prepared the *Underground Storage Tank Site Assessment Report,* dated January 4, 2013, for submittal to Ecology's Underground Storage Tank Division. The reviewer is referred to that report for additional details regarding the UST decommissioning activities and soil and groundwater sampling results.

Ecology issued an Opinion Letter dated April 22, 2013, which indicated that additional information was required regarding the lateral and vertical extent of a migrating groundwater plume at the Site. In telephone and email discussions, the Ecology Site Manager requested an additional monitoring well near the southwest corner of the maintenance building and a monitoring well at the southeast corner of the former location of the 12,000-gallon diesel fuel UST that was removed in November 2012. EPI completed installation and sampling of these new wells, designated MW-5 and MW-6 respectively, on June 5th, 2013. The locations of new wells MW-5 and MW-6 are shown on Figure 2.

Groundwater samples collected from MW-5 and MW-6 were submitted for GRPH using Ecology Method NWTPH-Gx, BTEX using EPA Method 8021B, and DRPH and HRPH using Ecology Method NWTPH-Dx. Samples from both wells MW-5 and MW-6 were non-detect for GRPH, HRPH, and BTEX compounds; however, the samples from MW-5 and MW-6 had DRPH concentrations of 160 μg/L and 680 μg/L, respectively. The DRPH concentration in the sample from MW-6 exceeded the MTCA Method A CUL of 500 μg/L. Wells MW-5 and MW-6 were sampled again in August 2013 as part of the quarterly groundwater monitoring program. DRPH was again detected in samples from MW-5 and MW-6 at concentrations of 56 μg/L and 790 μg/L, respectively.

In a follow-up email communication with EPI on July 22, 2013, The Ecology Site Manager, Mr. Eugene Freeman, indicated that additional soil and groundwater sampling would be necessary to delineate the lateral and vertical extent of the soil and groundwater impacts in the vicinity of MW-1 and at the former 12,000 gallon diesel UST. Mr. Freeman's opinion is based upon concentrations of DRPH and HRPH greater than the MTCA CUL of 500 μg/L in samples from MW-1 observed since November 2011 and the DRPH concentration in the sample from MW-6, which also exceeded the MTCA CUL. Mr. Freeman indicated that it would be also necessary to demonstrate that there was no impact to Mill Creek located to the west of the Estes West facility.

In October 2013 EPI performed a Phase II Environmental Site Assessment (ESA) at the Site in response to Mr. Freeman's email request dated July 22, 2013. The scope of services for the tasks performed as part of the Phase II ESA was divided into four main tasks:

- Task 1: Coordinate with Ecology for approval of the planned probe locations and concurrence with the scope of services for the Phase II ESA.

- Task 2: Mark proposed probe locations and perform a private utility locate at each of the locations (see Figure 3 for probe locations).

- Task 3: Survey monitoring well measuring point elevations. Measuring point elevations for newer wells MW-5 and MW-6 were not surveyed after their installation. (Task 3 was performed concurrently with Task 2).

- Task 4: Perform soil and groundwater sampling and analysis.

Groundwater sample results, including data from the August 2013 quarterly sampling data, indicate that groundwater impacts are limited to two general areas of the Site: MW-1 and the surrounding area; and downgradient of the former 12,000-gallon diesel UST.

Probes DP-1 through DP-5 surround impacted well MW-1 in all four cardinal directions and to the southeast, which was thought to be the general groundwater flow direction based on historical data as shown in Figure 3. Analytical results from DP-1 indicate that groundwater impacts are not likely coming from the adjoining property to the north. The groundwater hot spot is at DP-3, which is at a location where previous remedial soil excavations left some impacted soil in place to maintain building foundation stability. Non-detections in the groundwater sample from DP-5 provide further indication that the general groundwater flow direction is not to the southeast as was thought based on historical data.

Probes DP-6 though DP-9 were placed at locations potentially downgradient of the former 12,000-gallon diesel UST based on historical (pre-Phase II ESA) data as shown in Figure 3.

DRPH detections in samples from DP-6 and DP-8 are likely attributable to the former UST. The detections of DRPH at concentrations less than their MTCA Method A CULs indicate that diesel impacts at concentrations greater than MTCA from the former UST extend to somewhere between well MW-6 and probes DP-6 and DP-8.

The HRPH concentration of 730 μg/L in the sample from DP-8 is not likely attributable to the former 12,000-gallon diesel UST. The two sampling locations downgradient of the former UST, MW-6 and DP-6, both have detections of DRPH but are non-detect for HRPH.

3.0 PURPOSE

Based on 10 rounds of quarterly groundwater monitoring and results from the Phase II ESA soil and groundwater impacts in the area surrounding MW-1 have been adequately characterized to design, install, test, and operate an active groundwater remediation system. Field parameter data, specifically dissolved oxygen (DO) and oxidation reduction potential (ORP), indicate that geochemical conditions in the aquifer are strongly reducing (anaerobic). Petroleum hydrocarbons are readily biodegraded by aerobic bacteria, which require aerobic geochemical conditions to be effective in that role. This work plan describes the proposed elements of a groundwater remediation system designed to increase DO

concentrations in groundwater to enhance biodegradation of petroleum hydrocarbons in groundwater in the impacted groundwater surrounding well MW-1.

The goal of the remediation system is to attain compliance with Model Toxics Control Act (MTCA) Method A Cleanup Levels for diesel range organics (DRO) and oil range organics (ORO) in groundwater in the area surrounding MW-1 at the Site. If this remediation strategy is successful it might be applied to the impacted groundwater downgradient of the former 12,000-gallon diesel UST with the ultimate goal of obtaining a no further action determination (NFA) from the Washington State Department of Ecology (Ecology) for the site.

4.0 TASKS

The tasks necessary for installation and operation of the proposed Groundwater Remediation System are summarized below.

Task 1 – Remediation System Design

EPI has prepared figures showing the locations of air injection wells to be installed at the site, the design of the air injection wells, a schematic of the air supply piping, and design of the blower and instrumentation necessary for air injection into shallow groundwater at the site. These system design elements are presented as Figures 4 and 5.

Field data collected as part of groundwater sampling events performed in November 2013 confirmed the assumption that subsurface geochemical conditions at the site are anaerobic. Bacteria that metabolize petroleum hydrocarbons require aerobic geochemical conditions to thrive and effectively biodegrade DRO and ORO. The purpose of air injection is to provide oxygen, in the form of atmospheric air, to the shallow groundwater through a series of three air injection wells installed within the estimated footprint of the DRPH and HRPH impacts in groundwater at MW-1.

Task 2 – Remediation System Installation

EPI has solicited bids from qualified well drilling companies to install air injection wells in the area surrounding MW-1. EPI will oversee drilling and installation of three shallow air injection wells in the area surrounding MW-1 at the locations shown in Figure 4.

The three injection wells will be drilled to approximately 15 ft. below ground surface (bgs). Well screens will 1-ft lengths of Kerfoot Technologies C-Sparger® screen set to be fully submerged at 14 to 15-ft bgs, which will force the injected air into groundwater as microbubbles, increasing the surface area of the bubbles for more efficient oxygenation. The remaining well annulus will be sealed using hydrated bentonite chips and the surface will be completed in 8-inch diameter flush completion steel monument set in concrete.

A separate contractor will connect the wells to the blower using 1-inch diameter PVC piping stubbed out below the surface through the side of each of the well monuments. Air supply lines will be installed in trenches that will be appropriately backfilled and patched with asphalt at the surface to match the

surrounding pavement. The proposed alignment of air supply lines from the blower to each of the three wells is shown in Figure 5.

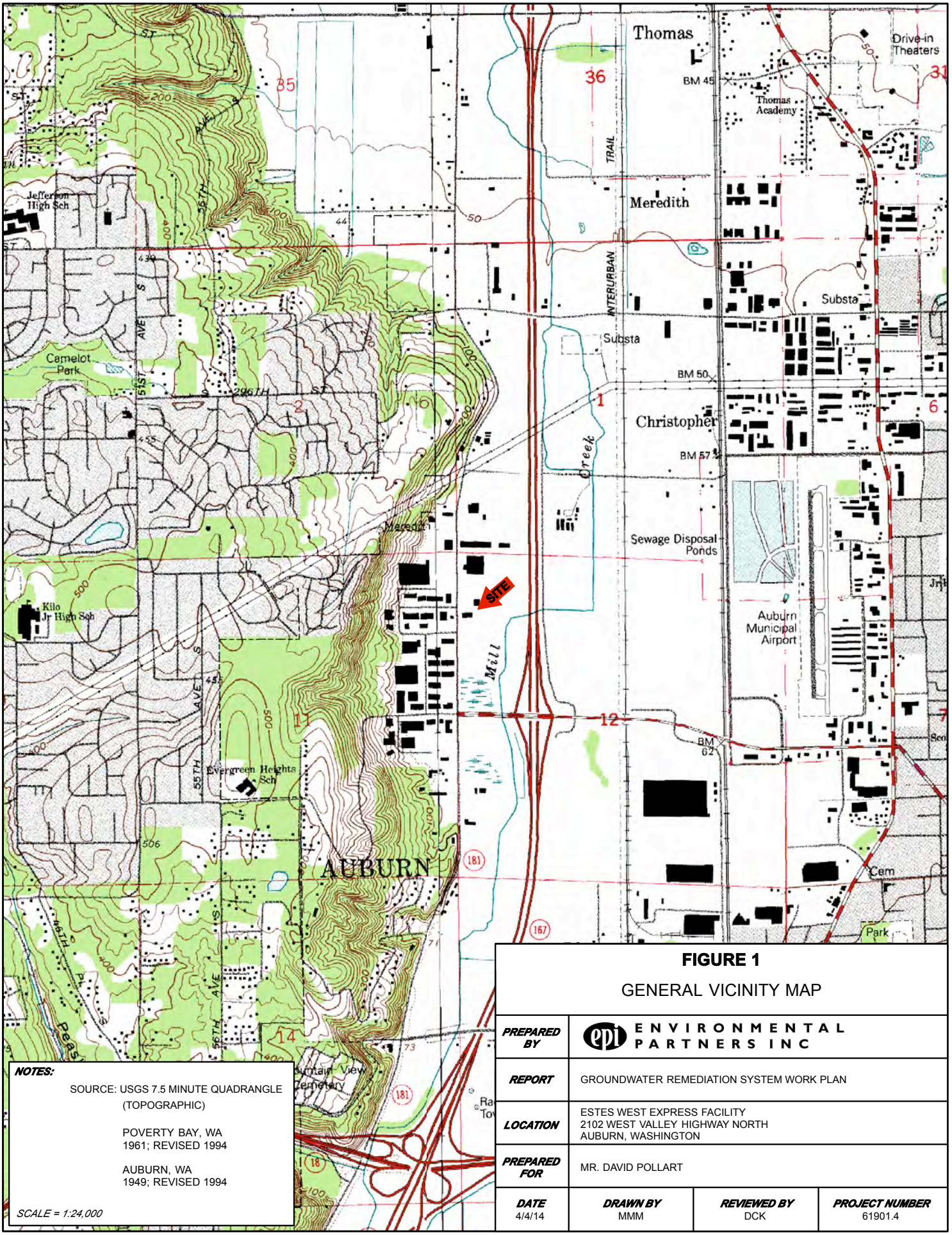
An appropriately-sized blower will be installed in the fenced area at the north end of the truck maintenance building at the approximate location of the current air compressor. 1-inch diameter PVC air supply lines will be installed in shallow trenches leading from the air compressor to each of the three air injection wells.

Task 3 – Operation and Monitoring

The system was designed with simplicity and ease of use in mind and as such it will be monitored during quarterly groundwater monitoring events. The initial indication of successful operation will be an increase in DO concentrations and ORP measurements in pure water from well MW-1. Longer-term success will be indicated by decreasing DRPH and HRPH concentrations in samples from MW-1 and increases in DO and ORP in wells MW-2 and MW-3, which are approximately 65 and 125 feet downgradient of MW-1, respectively.

5.0 SCHEDULE

EPI will schedule the proposed tasks immediately upon receipt of Ecology's written approval to proceed with implementation of this work plan. It is anticipated that the fieldwork for this installation of an active groundwater remediation system can be scheduled and completed within four weeks of receiving Ecology approval.



NOTES:

SOURCE: USGS 7.5 MINUTE QUADRANGLE
(TOPOGRAPHIC)

POVERTY BAY, WA
1961; REVISED 1994

AUBURN, WA
1949; REVISED 1994

SCALE = 1:24,000

FIGURE 1

GENERAL VICINITY MAP

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	GROUNDWATER REMEDIATION SYSTEM WORK PLAN		
LOCATION	ESTES WEST EXPRESS FACILITY 2102 WEST VALLEY HIGHWAY NORTH AUBURN, WASHINGTON		
PREPARED FOR	MR. DAVID POLLART		
DATE 4/4/14	***DRAWN BY*** MMM	***REVIEWED BY*** DCK	***PROJECT NUMBER*** 61901.4

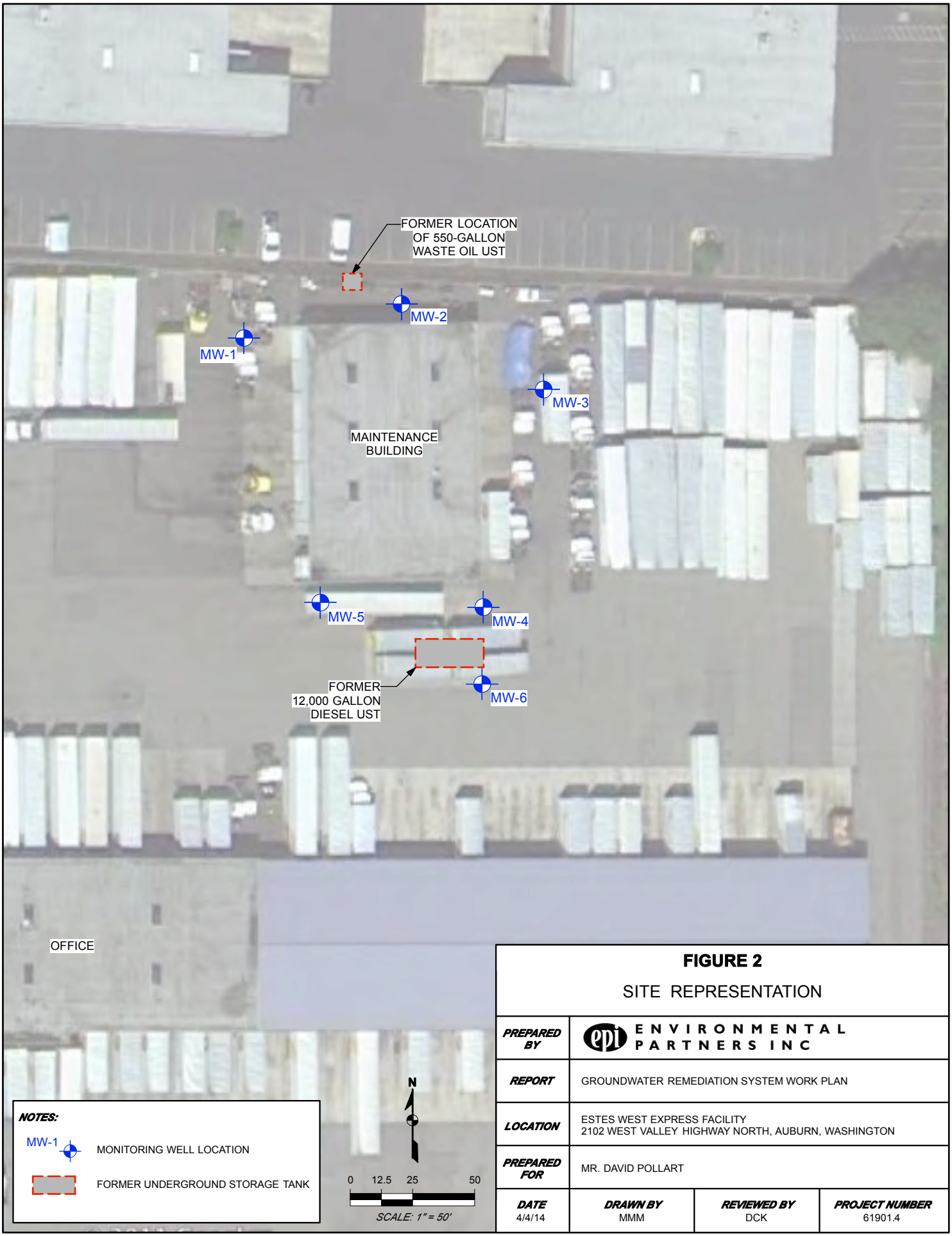


FIGURE 2

SITE REPRESENTATION

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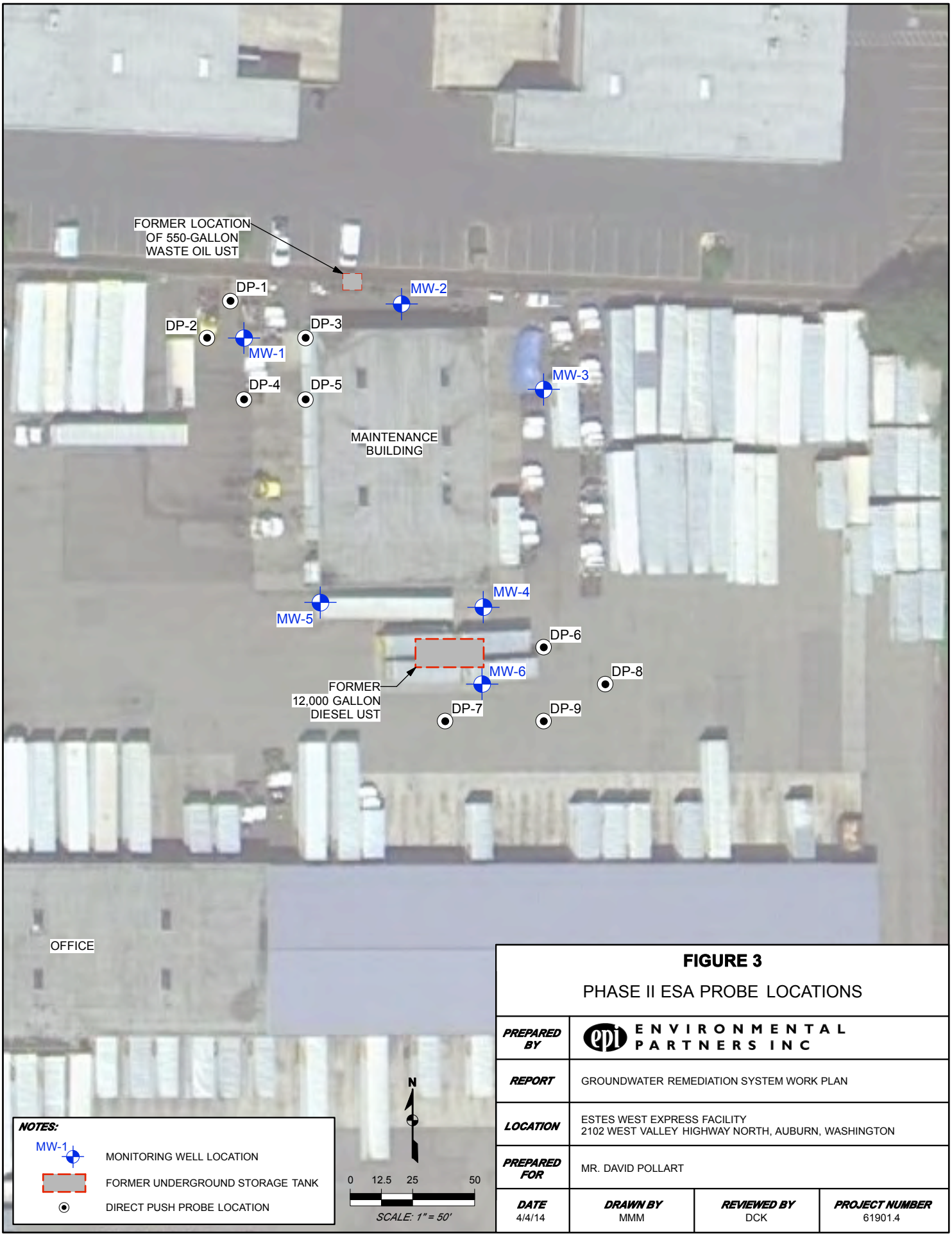

FIGURE 3

PHASE II ESA PROBE LOCATIONS

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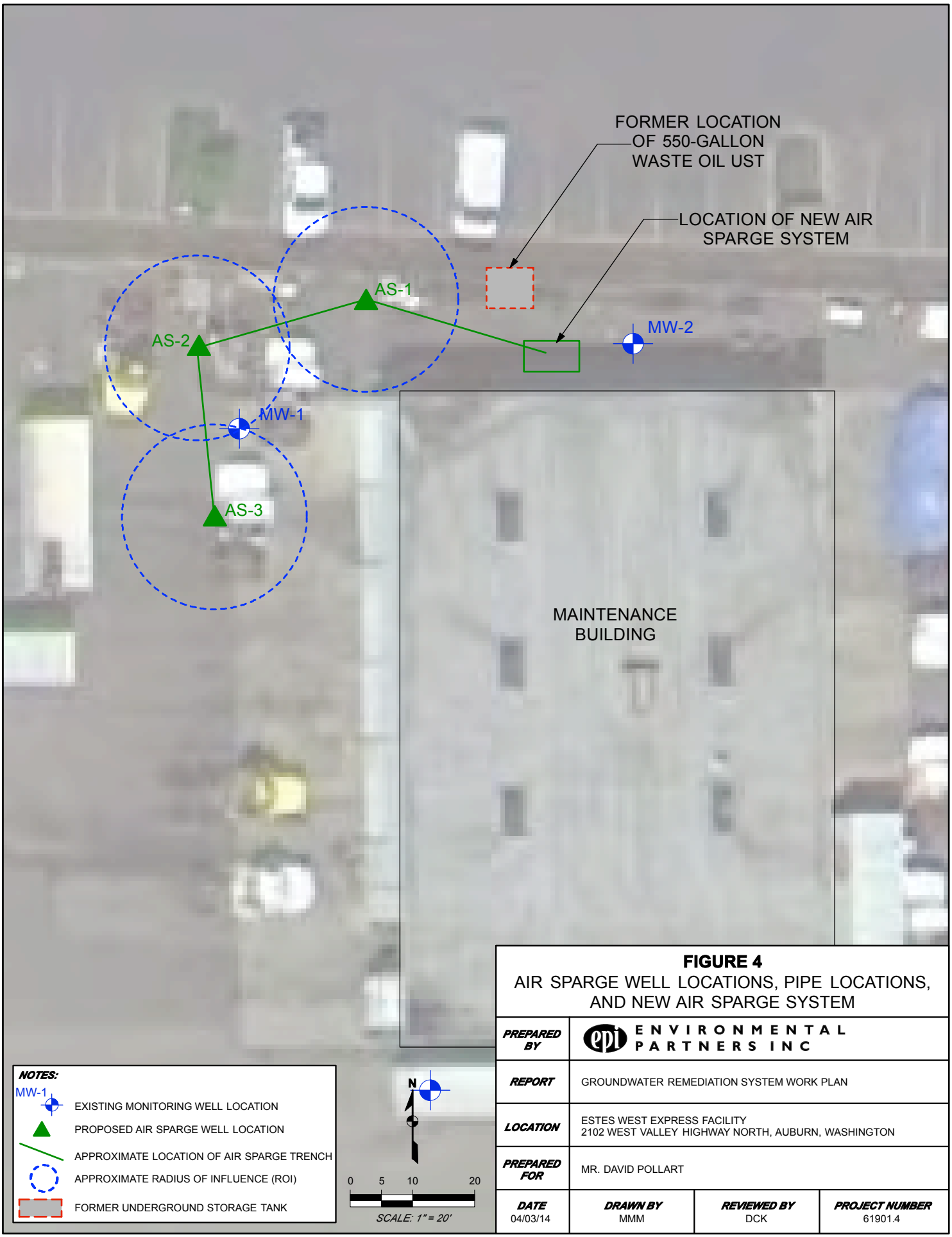

FIGURE 4

AIR SPARGE WELL LOCATIONS, PIPE LOCATIONS, AND NEW AIR SPARGE SYSTEM

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LOCATION	ESTES WEST EXPRESS FACILITY 2102 WEST VALLEY HIGHWAY NORTH, AUBURN, WASHINGTON		
PREPARED FOR	MR. DAVID POLLART		
DATE 04/03/14	***DRAWN BY*** MMM	***REVIEWED BY*** DCK	***PROJECT NUMBER*** 61901.4