LANDAU ASSOCIATES

TECHNICAL MEMORANDUM

TO: Bill Preston, City of Yakima

CC: Dana Kallevig, City of Yakima

FROM: Weston Boardman, GIT, and Shane Kostka, LG

DATE: February 7, 2025

RE: Interim Action Groundwater Injection Summary
Former Tiger Oil Site
1808 North 1st Street
Yakima, Washington
Landau Project No. 1148010.010

INTRODUCTION

This document was prepared by Landau Associates, Inc. (Landau) on behalf of the City of Yakima (City) and presents a summary of *in situ* chemical oxidation (ISCO) injection work at the former Tiger Oil gas station property located at 1808 North 1st Street in Yakima, Washington (Site; Facility ID No. 477; Cleanup Site ID No. 4922). This work was conducted in accordance with Agreed Order (AO) No. DE19882 between the City and the Washington State Department of Ecology (Ecology) and is consistent with the revised Scope of Work for the AO provided by Ecology in December 2021. The purpose of the ISCO treatment is to remediate remaining petroleum hydrocarbon contamination in groundwater and smear zone soils from historical releases from underground storage tanks (USTs) associated with former gas station operations at the Site.

SITE DESCRIPTION AND BACKGROUND

The primary Site property is owned by the City but is under a Lease-to-Own agreement between the City and the current Lessee. The property is currently occupied by a former convenience store building in the southwest corner and a drive-through coffee kiosk in the east central portion of the property. The Site is located at the northern end of the City, proximate to the south of the confluence of the Yakima and Naches rivers (Figure 1). The Site includes a 0.65-acre parcel that was used as a gasoline station and convenience store between 1979 and 2001. Gasoline, diesel, waste oil, and heating oil were stored in USTs at the property. Three gasoline tanks (20,000-, 8,000-, and 10,000-gallon), one 6,000-gallon diesel tank, and associated fueling islands/piping were removed in 2005. In 1982, a release of approximately 12,000 to 22,000 gallons of leaded and unleaded gasoline from the delivery lines between the USTs and fuel dispensers (GeoEngineers 2017) was reported. Several phases of investigation have been completed at the Site following the release. The heating and waste oil tanks, both of unknown size, were removed in 2019. No other USTs are known to have been present at the Site.

The Site boundaries (i.e., the known extent of remaining contamination based on the 2017 GeoEngineers remedial investigation (RI) and the October 2021 pre-ISCO injection investigation performed by Landau [discussed below]) extend onto the southeast corner of the neighboring property to the north (currently occupied by an auto repair shop), and into the City right-of-way (North 1st Street); see Figure 2.

Previous Investigations

An RI report completed in 2017 documented the presence of petroleum-contaminated vadose zone and smear zone soils associated with the UST systems (GeoEngineers 2017). During the RI, monitoring wells N1MW-6, N1MW-7, and N1MW-8 were installed at the Site along with soil borings N1DP-9 through N1DP-19, in addition to monitoring wells N1MW-1, N1MW-2, N1MW-3, N1MW-4, and N1MW-5, which were installed as a part of a Phase II environmental site assessment, along with soil borings N1DP-1 through N1DP-8, performed by GeoEngineers in 2014 (GeoEngineers 2015). Refer to Table 1 for soil boring and well construction details. A UST assessment report in 2019 documented one sidewall sample from the heating oil UST excavation pit and one bottom sample from the waste oil UST excavation pit that contained elevated petroleum concentrations (Fulcrum 2019). Data from the RI and Tank Assessment report indicated total petroleum hydrocarbon (TPH) concentrations in Site soils were above the applicable Model Toxics Control Act (MTCA) Method A cleanup levels (CULs), and exceedances of groundwater CULs were present in the vicinity of the former gasoline and diesel USTs and dispenser islands.

Landau Supplemental Investigation

A supplemental investigation was conducted by Landau in October 2021 to evaluate current Site conditions prior to proceeding with remedy planning. The investigation included drilling and sampling soil from eight soil borings (HSB-1 through HSB-5; N1MW-6R, N1MW-7R, and N1MW-9) and installing monitoring wells in three of the borings (N1MW-6R, N1MW-7R, and N1MW-9). Investigation locations are shown on Figure 2 along with investigation locations from the GeoEngineers RI. Refer to Appendix A for supplemental investigation borings logs and Table 1 for soil boring and well construction details. Monitoring wells N1MW-6R and N1MW-7R were replacement wells for former monitoring wells N1MW-6 and N1MW-7, which appear to have been destroyed or paved over during redevelopment of the Site with a coffee kiosk. N1MW-9 was installed to provide monitoring near the eastern property boundary between N1MW-6R and N1MW-7R. Top of casing and ground surface elevations, as well as horizontal coordinates of new and existing monitoring wells were surveyed by a licensed land surveyor following installation of the new monitoring wells. Groundwater was sampled from all monitoring wells at the Site including these three new/replacement monitoring wells and existing monitoring wells N1MW-2, N1MW-3, N1MW-4, N1MW-5, N1MW-8, and groundwater grab samples were collected from temporary wells installed in soil borings HSB-1, HSB-2, and HSB-3.

Soil and groundwater samples were analyzed for TPH in the gasoline-range (TPH-G), diesel-range (TPH-D), and oil-range (TPH-O), as well as benzene, toluene, ethylbenzene, and xylenes (BTEX). The results of the supplemental investigation indicate that soil TPH concentrations appear to have declined

since the RI but remain above CULs in the smear zone in the northeastern portion of the Site; however, no CUL exceedances were identified in soil at the former heating or waste oil UST locations where HSB-4 and

HSB-5 were drilled (see Figures 2 and 3A and Table 2). Groundwater concentrations in the northeastern portion of the Site also continue to exceed TPH and BTEX CULs, but contaminants were not detected further downgradient across 1st Street in the sample collected from monitoring well N1MW-2.

Soil and groundwater data from the supplemental investigation are shown on Figures 3A and 3B, respectively. Supplemental investigation groundwater analytical results and groundwater quality parameters are summarized in Tables 3 and 4, respectively.

Data from the RI and supplemental investigation indicate that the water table has been encountered at approximate depths of just over 10 feet (ft) below ground surface (bgs) to a maximum of 14 ft bgs (Table 5). The data also indicate that the residual petroleum contamination is primarily located in the smear zone at or near the water table, generally at depths below 12 ft bgs and declining sharply with depth, with photoionization detector readings indicating minimal impact present below approximately 18 ft bgs.

GROUNDWATER INJECTION SUMMARY

Eighteen groundwater injection wells (IW-1 through IW-18) were installed in August and September of 2022 to accommodate the ISCO injections. Refer to Figure 4 for Site investigation locations, including injection well locations, and Figure 5 for injection and groundwater monitoring locations. Prior to injection wells being installed and injection work commencing, the injection wells were rule authorized by Ecology's Underground Injection Control (UIC) program per Chapter 173-218 of the Washington Administrative Code (UIC Site Number 36713). All of the injection wells were developed at least 24 hours after construction.

Three injections of Klozur® One, a soluble activated persulfate,[1] were performed at the Site in October 2022, July 2023, and September 2024, all in general accordance with Landau's Ecology-approved Injection Work Plan (Landau 2022).

The target injection solution concentration for each injection was 67 grams of Klozur One activated persulfate (persulfate) per liter. During all Site injections, persulfate was pre-mixed with tap water in 55-gallon polyurethane (poly) drums before being pumped, using a compressed air-driven dual diaphragm pump, into a 6,500-gallon poly tank containing tap water. The solution was then mixed in the poly tank to achieve the design concentration for the injections. Up to four injection wells received injectate simultaneously and the pressure at each injection well was monitored and kept below 10 to 20 pounds per square inch (psi) to prevent short circuiting of fluid to the surface ("daylighting") or nearby storm drains, or damaging the injection well screens. To monitor temporary groundwater mounding, depth-to-water was measured in monitoring wells and other injection wells proximate to the wells

[1] Klozur One is produced by Evonik and is a proprietary blend of sodium persulfate and activator agents, including chelated iron and trace levels of permanganate.

receiving injection solution before injecting and during injections. Injections were temporarily stopped if mounding exceeded 5 ft to prevent contact of injection solution with underground utilities. Injections were then resumed at a decreased flow rate after the observed mounding decreased. Following each ISCO injection, approximately 100 gallons of tap water were injected into injection wells to push the injection fluid into the aquifer matrix and to flush the injection well screens to prevent clogging.

Depth-to-water was also measured in all injection wells and monitoring wells prior to starting the second and third injections to determine baseline water levels for monitoring mounding during injections to evaluate groundwater flow direction at the time of the injections. Groundwater flow direction at the Site is generally to the east with a flat gradient of approximately 0.0017 ft/ft. Figures 7A and 7B are groundwater contour maps associated with measurements taken in monitoring wells prior to the second and third injections. Injection wells were not used to calculate groundwater elevation contours. Irrigation season in the Yakima area generally begins each year on April 1 and ends on October 15 or earlier. Irrigation in the Yakima River basin generally has the greatest influence on shallow groundwater levels in the area throughout the year; shallow groundwater elevations are generally higher during the irrigation season and lower during the period when no irrigation is occurring.

Baseline groundwater samples were collected in September 2022 to characterize initial conditions within and downgradient of the source zone prior to the first injection event (October 2022). Post-injection groundwater monitoring was performed in January 2023 and November 2023, approximately 3 to 4 months after completion of the first (October 2022) and second (July 2023) injection events to evaluate post-injection groundwater conditions and to determine whether additional treatment may be necessary. Groundwater sampling locations and analytes for all monitoring events were determined in coordination with Ecology. Groundwater samples were collected using low-flow sampling techniques, and field parameters were measured including temperature, dissolved oxygen (DO), conductivity, pH, turbidity, and oxidation-reduction potential (ORP). Table 6 summarizes the baseline and post-injection groundwater quality field parameters. All samples were submitted to Eurofins TestAmerica of Spokane, Washington, for TPH-G analysis using Ecology-approved method NWTPH-Gx. Groundwater analytical results are summarized in Table 5.

Laboratory analytical data underwent US Environmental Protection Agency (EPA) Level IIA-equivalent validation and verification. Validation of data was performed in accordance with guidance from applicable portions of the National Functional Guidelines for Organic Superfund Methods Data Review (EPA 2020), analytical methods, and Landau data validation standard operating procedures. All samples were received by the laboratory in good condition and prepared and analyzed within holding times. The groundwater analytical results were compared with the MTCA Method A CUL for gasoline-range organics (GRO), assumed to be 800 micrograms per liter (µg/L) based previous sampling events identifying benzene being present in groundwater at the Site.

The sections below provide a more detailed summary of the completed groundwater injection activities that have occurred at the Site to date, including installation of groundwater injection wells, baseline groundwater sampling, three groundwater injections, and two post-injection groundwater sampling events.

Installation of Groundwater Injection Wells

Groundwater injection wells IW-1 through IW-18 were installed in August and September of 2022 in preparation for the ISCO injection events. To ensure adequate overlap of the injection radius of influence at each injection well, the well locations were designed with a nominal well spacing of approximately 20 ft in the direction of groundwater flow and approximately 17 ft perpendicular to flow, and injection wells were placed at least 10 ft from all Site monitoring wells. Injection wells were generally installed to a total depth of 20 ft bgs with 10 ft of 0.020-inch slot screen placed from 10 to 20 ft bgs with 12/20 silica sand backfilled up to at least 2 ft above the top of the well screen. The annular space above the sand pack was sealed using hydrated bentonite chips and concrete and all injection wells were completed with a flush-mount monument. All Injection wells were developed at least 24 hours after construction using surge and pump methodology and a centrifugal submersible pump. Injection wells were not surveyed after being installed; the locations of injection wells shown on Figures 4, 5, 6A, 6B, 6C, 7A, and 7B are approximate. Refer to Appendix B for injection well borings logs and Table 1 for soil boring and well construction details. Figure 5 shows the locations of groundwater injection wells including the treatment area and the radius of influence of each injection well.

Investigation derived waste (IDW) soil cuttings were characterized as non-hazardous waste and were disposed of at Subtitle D disposal facility. Development water IDW from installation of the groundwater injection wells was characterized in conjunction with the pre-injection baseline groundwater sampling event (see below).

Pre-injection Baseline Groundwater Sampling

On September 7 and 8, 2022, groundwater samples were collected from monitoring wells N1MW-6R, N1MW-7R, N1MW-8, and N1MW-9, and injection wells IW-1, IW-2, IW-3, IW-4, IW-8, IW-9, IW-10, IW-12, IW-14, IW-15, IW-17, and IW-18.

Detections of TPH-G were reported above the laboratory reporting limit (RL) and above the CUL in each groundwater sample with concentrations ranging from 1,100 µg/L (IW-1) to 44,000 µg/L (IW-18). Concentrations were generally the highest both within and to the east of the former UST excavation area (Figure 6A). The sample collected from IW-9 was also analyzed for total lead by EPA Method 6010D and for BTEX by EPA Method 8260D for waste characterization purposes. Analysis for benzene and lead is required by the Subtitle D disposal facility for IDW related to gasoline releases. Lead was not detected above the laboratory RL and BTEX compounds were detected at levels both below their respective CULs and below the applicable hazardous waste designation thresholds (40 Code of Federal Regulations [CFR] Part 261.24 Table 1).

Purge water IDW from the pre-injection baseline groundwater sampling event as well as development water IDW from the installation of the groundwater injection wells was characterized as non-hazardous waste based on the analytical results described above and was disposed of at a Subtitle D disposal facility.

Injection 1: October 2022

The first persulfate injection performed at the Site took place from October 11 through October 19, 2022 (Injection 1). It should be noted that the irrigation shutoff occurred during this injection event on October 14, 2022 (Smith 2022). Depth-to-water in monitoring wells was not measured prior to beginning injections and, therefore, groundwater elevations are not included in Table 5 and groundwater contours were not produced. Injection 1 was designed such that each of the Site injection wells (IW-1 through IW-18) was to receive 2,500 gallons of injection solution (45,000 gallons total) mixed at the concentration specified above. The injection generally proceeded from downgradient (east; beginning with IW-3, IW-6, IW-7, and IW-16) to upgradient (west) with the three injection wells that had the highest concentrations of TPH-G during the pre-injection baseline groundwater sampling event (IW-8, IW-14, and IW-18) injected last.

A total of approximately 25,080 pounds (lbs) of persulfate in 45,410 gallons of solution (a concentration of approximately 66 gallons per liter [g/L]) was injected. Additional injection solution volume was placed into injection wells IW-2, IW-4, IW-5, IW-6, IW-7, IW-9, IW-11, IW-16, and IW-18 due to injection wells IW-1, IW-8, IW-12, IW-14, and IW-17 receiving less than the design volume of injection solution due to slow injection rates and/or high pressures. The wells that received additional volume of injection solution were selected based on pre-injection groundwater analytical results as well as flow rates and pressures observed during the injection. Table 8 summarizes the actual volume injected into each injection well.

Daylighting of injection fluids occurred at the gravel surface of the adjacent property to the north of the Site when injecting into IW-3. Injection solution which daylighted was immediately recovered using a wet-dry vacuum, placed in 55-gal poly drums, and was later filtered to remove dirt/gravel and re-injected. Minor daylighting occurred at IW-18 and IW-10 during injections, but either infiltrated into the subsurface immediately or evaporated quickly after injections were paused.

Post-Injection 1 Groundwater Sampling

On January 18 and 19, 2023, approximately 3 months following Injection 1, groundwater samples were collected from injection wells IW-1, IW-2, IW-3, IW-4, IW-8, IW-9, IW-10, IW-12, IW-14, IW-15, IW-17, and IW-18 and monitoring wells N1MW-6R, N1MW-7R, N1MW-8, and N1MW-9 to evaluate post-Injection 1 Site conditions. Evidence that the injection solution was still present in groundwater, such as low pH and elevated conductivity values in groundwater, was observed during this event.

Detections of TPH-G were reported above the laboratory RL and above the CUL in groundwater samples collected from injection wells IW-2, IW-3, IW-4, IW-8, IW-9, IW-10, IW-12, and IW-18 and monitoring wells N1MW-6R and N1MW-9, with concentrations ranging from 840 µg/L (IW-3) to 15,000 µg/L (IW-4). Detections of TPH-G were reported above the laboratory RL but below the CUL in samples collected from injection wells IW-1, IW-15, and IW-17 and monitoring wells N1MW-7R and N1MW-8, with concentrations ranging from 190 µg/L (IW-17) to 690 µg/L (N1MW-7R). TPH-G was not detected above the laboratory RL, which is below the CUL, in the sample collected from IW-14. Concentrations were

generally the highest within and to the east (downgradient) of the former UST excavation area (Figure 6B).

TPH-G concentrations were observed to have decreased from above to below the CUL after Injection 1 in injection wells IW-1, IW-14, IW-15, and IW-17 and monitoring wells N1MW-7R and N1MW-8. TPH-G concentrations decreased, but not to below the CUL, after Injection 1 in injection wells IW-2, IW-3, IW-8, IW-12 and IW-18 and monitoring wells N1MW-6R and N1MW-9. TPH-G concentrations increased from

the pre-injection baseline sampling event in groundwater samples collected from injection wells IW-4 (from 2,300 µg/L to 15,000 µg/L), IW-9 (from 1,700 µg/L to 1,900 µg/L), and IW-10 (from 7,800 µg/L to 8,400 µg/L).

Injection 2: July 2023

The second persulfate injection performed at the Site took place from July 10 through July 13, 2023, (Injection 2) and occurred during irrigation season (high-groundwater season). Figure 4B shows groundwater contours based on depth-to-water measurements from Site monitoring wells on July 10, 2023, before injection activities began. Injection 2 was designed for injection wells IW-2, IW-4, IW-5, IW-9, IW-10, IW-11, IW-12, IW-13, IW-14, and IW-18 to receive 2,500 gallons of injection solution (25,000 gallons total) mixed at the design concentration specified above. These injection points were selected based on the groundwater analytical data following Injection 1 and their proximity to historical USTs. Injection 2 focused treatment on the area of the former UST excavation as most of the elevated TPH-G concentrations reported following Injection 1 were either within or immediately east/downgradient of this area. Injections generally progressed from the perimeter of the former UST excavation area toward the center of the excavation. A total of approximately 13,860 lbs of persulfate in 25,030 gallons of solution (a concentration of approximately 66 g/L) was injected. Additional injection solution volume was placed into injection wells IW-1 and IW-8 due to injection wells IW-10, IW-12, and IW-14 receiving less than the design volume of injection solution due to slow injection rates and/or high pressures. Minor daylighting, which either infiltrated into the subsurface immediately or evaporated quickly after injections were paused, occurred at IW-10, IW-14, and IW-18 during injections. Table 8 summarizes the actual volume injected into each injection well.

Post-Injection 2 Groundwater Sampling

On November 28 and 29, 2023, approximately 4 months following Injection 2, groundwater samples were collected from monitoring wells N1MW-6R, N1MW-7R, N1MW-8, and N1MW-9 as well as injection wells IW-1, IW-2, IW-3, IW-4, IW-8, IW-9, IW-10, IW-12, IW-14, IW-15, IW-17, and IW-18. Because the injection solution appeared to be present and active during the post-Injection 1 groundwater sampling event (conducted 3 months after the injection), the post-Injection 2 sampling event was conducted 4 months after the second injection to allow the persulfate additional time to react with *in situ* contamination. However, evidence that the injection solution was still present and active in groundwater, such as low pH and elevated conductivity values, was again observed during this event.

In addition to TPH-G by NWTPH-Gx, groundwater samples were analyzed for BTEX using EPA Method 8260D. The groundwater analytical results for benzene, toluene, ethylbenzene, and total xylenes were compared to their MTCA Method A CULs of 5 µg/L, 1,000 µg/L, 700 µg/L, and 1,000 µg/L, respectively.

Detections of TPH-G were reported above the laboratory RL and above the CUL in groundwater samples collected from injection wells IW-3, IW-4, IW-8, IW-10, and IW-17 and monitoring wells N1MW-6R, N1MW-7R, and N1MW-9, with concentrations ranging from 870 µg/L (IW-10) to 4,000 µg/L (IW-8). Detections of TPH-G were reported above the laboratory RL, but below the CUL, in samples collected from injection wells IW-1, IW-2, IW-9, IW-12 and IW-18 and monitoring well N1MW-8, with concentrations ranging from 310 µg/L (IW-1) to 690 µg/L (IW-9). TPH-G was not detected above the laboratory RL, which is below the CUL, in the samples collected from IW-14 and IW-15. Concentrations were generally highest at the eastern/downgradient end of the Site with all three monitoring wells in that area (N1MW-6R, N1MW-7R, and N1MW-9) having concentrations of TPH-G over the CUL as well as injection wells IW-3 and IW-8, which are located upgradient of N1MW-6R and N1MW-9, respectively (Figure 6C).

TPH-G concentrations decreased from above to below the CUL after Injection 2 in injection wells IW-2, IW-9, IW-12, and IW-18. TPH-G concentrations decreased from their post-Injection 1 values, but not below the CUL, after Injection 2 in injection wells IW-4 and IW-10. TPH-G concentrations increased from their post-Injection 1 values in injection wells IW-3 (from 840 µg/L to 3,900 µg/L), IW-8 (from 3,100 µg/L to 4,000 µg/L), and IW-17 (from 190 µg/L to 1,100 µg/L) and monitoring wells N1MW-6R (from 2,200 µg/L to 3,700 µg/L), N1MW-7R (from 690 µg/L to 1,200 µg/L), and N1MW-9 (from 1,400 µg/L to 1,500 µg/L).

A detection of benzene was reported above the laboratory RL and above the CUL in the groundwater sample collected from injection well IW-8 at a concentration of 7.2 µg/L. Detections of benzene were reported above the laboratory RL but below the CUL in all other groundwater samples, with concentrations ranging from 0.59 µg/L (IW-14) to 4.3 µg/L (IW-10), except the sample collected from IW-15 in which benzene was not detected above the laboratory RL. Toluene was detected above the laboratory RL but below the CUL in groundwater samples collected from injection wells IW-3, IW-8, and IW-17 and monitoring wells N1MW-6R, N1MW-7R, and N1MW-9, with concentrations ranging from 1.1 µg/L (IW-17) to 200 µg/L (IW-8). Toluene was not detected above the laboratory RL, which is below the CUL, in any other groundwater samples. Ethylbenzene was detected above the laboratory RL but below the CUL in all groundwater samples with concentrations ranging from 1.7 µg/L (IW-12) to 360 µg/L (IW-3). Total xylenes were detected above the laboratory RL and above the CUL in groundwater samples collected from injection wells IW-3 (1,800 µg/L) and IW-8 (1,000 µg/L). Total xylenes were detected above the laboratory RL but below the CUL in all groundwater samples except the samples collected from IW-12 and N1MW-8, where total xylenes were not detected above the laboratory RL, with concentrations ranging from 3.6 µg/L (IW-14) to 460 µg/L (N1MW-9).

Injection 3: September 2024

The third persulfate injection performed at the Site took place from September 9 through September 13, 2024 (Injection 3), during irrigation season (high-groundwater season). Figure 4B shows

groundwater contours based on depth-to-water measurements from Site monitoring wells on September 10, 2024, before injection activities began. Injection 3 was designed for injection wells IW-3, IW-4, IW-6, IW-7, IW-8, IW-10, IW-15, IW-16, IW-17, and IW-18 to receive 2,500 gallons of injection solution (25,000 gallons total) mixed at the design concentration specified above. These injection points were selected based on the groundwater analytical data collected following Injection 2. This injection focused treatment on the eastern/downgradient area of the Site where most of the TPH-G concentrations above the CUL were located following Injection 2 (IW-3, IW-6, IW-7, IW-8, IW-15, and IW-16). Treatment was also applied to injection wells where TPH-G concentrations were above the CUL following Injection 2 (IW-4, IW-10, and IW-17). IW-18 was also injected (TPH-G following Injection 2 was below the CUL) given that its TPH-G concentration in the pre-injection baseline sampling event was the highest (44,000 µg/L) reported in Site wells. A total of approximately 13,940 lbs of persulfate in 25,680 gallons of solution (a concentration of approximately 65 g/L) was injected. Each injection well received +/- 10 percent of the design volume (2,500 gallons) with no injection solution needing to be placed in other injection wells. Minor daylighting, which either infiltrated into the subsurface immediately or evaporated quickly after injections were paused, occurred at IW-10 and IW-18 during injections. Table 8 summarizes the actual volume injected into each injection well.

Continued Groundwater Monitoring and Reporting

Post-Injection 3 groundwater sampling is expected to be conducted up to 1 year after Injection 3 was completed to allow the persulfate ample time to react with *in situ* contamination. Groundwater analytical results are more likely to be representative of actual post-injection conditions when injection solution is not present and active in groundwater. Groundwater samples will be collected using low-flow sampling techniques. Groundwater sampling locations are anticipated to be determined in coordination with Ecology and each groundwater sample is anticipated to be submitted to the laboratory for TPH-G analysis using Ecology-approved method NWTPH-Gx as well as analysis for BTEX using EPA Method 8260. Depth-to-water measurements will be taken in Site monitoring wells concurrent with the sampling event before groundwater samples are collected to evaluate groundwater flow direction and gradient at the Site at the time of the sampling event. Groundwater quality field parameters including temperature, DO, conductivity, pH, turbidity, and ORP will be measured at all groundwater sampling locations.

Based on communications from Ecology, Landau understands that Ecology will assess the need for additional post-injection groundwater monitoring and determine whether there is sufficient data to support a No Further Action (NFA) determination for the Site (Ecology 2024). Landau also anticipates preparing an interim action completion report further detailing previous investigations, monitoring well replacement, injection well installation, and injection activities, as well as all groundwater monitoring results following Ecology's review of the post-injection monitoring event data.

DISCUSSION

A total of approximately 52,880 lbs of persulfate in 96,120 gallons of solution (an average concentration of approximately 66 g/L) was injected at the Site during the course of the three injection events between October 2022 and September 2024. Post-Injection 2 groundwater monitoring results indicate

that on average, GRO concentrations have decreased 71 percent from baseline sampling conducted prior to the injections. However, it is likely that injection solution was still present and active in groundwater during the post-Injection 2 monitoring event, indicating that treatment was likely still occurring. The third persulfate injection is expected to further decrease GRO concentrations. The post-Injection 3 groundwater monitoring event is planned to be conducted up to 1 year after completion of Injection 3 to more accurately determine post-injection groundwater quality and conditions. The sufficiency of data to support an NFA determination will be determined by Ecology following review of the data from the post-Injection 3 monitoring event as well as any subsequent post-injection monitoring.

USE OF THIS TECHNICAL MEMORANDUM

This technical memorandum has been prepared for the exclusive use of the City for specific application to the Former Tiger Oil Site. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau, shall be at the user's sole risk. Landau warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. Landau makes no other warranty, either express or implied.

This document has been prepared under the supervision and direction of the following key staff.

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Shane Kostka, LG
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Attachments

Figure 1. Vicinity Map
Figure 2. Site Boundaries and RI and Supplemental Investigation Exploration Locations
Figure 3A. 2021 Supplemental Investigation Soil Analytical Results Map

References

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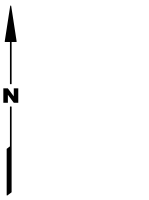
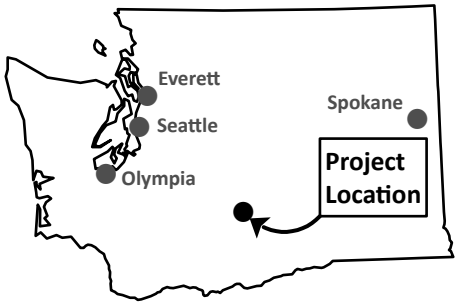
Smith, Kate. 2022. "Irrigation Season Ends Oct. 14 in Yakima." *Yakima Herald-Republic*. October 8. https://www.yakimaherald.com/news/local/irrigation-season-ends-oct-14-in-yakima/article_60010af4-4665-11ed-9b88-b70f607674e3.html.





Data Source: Esri.

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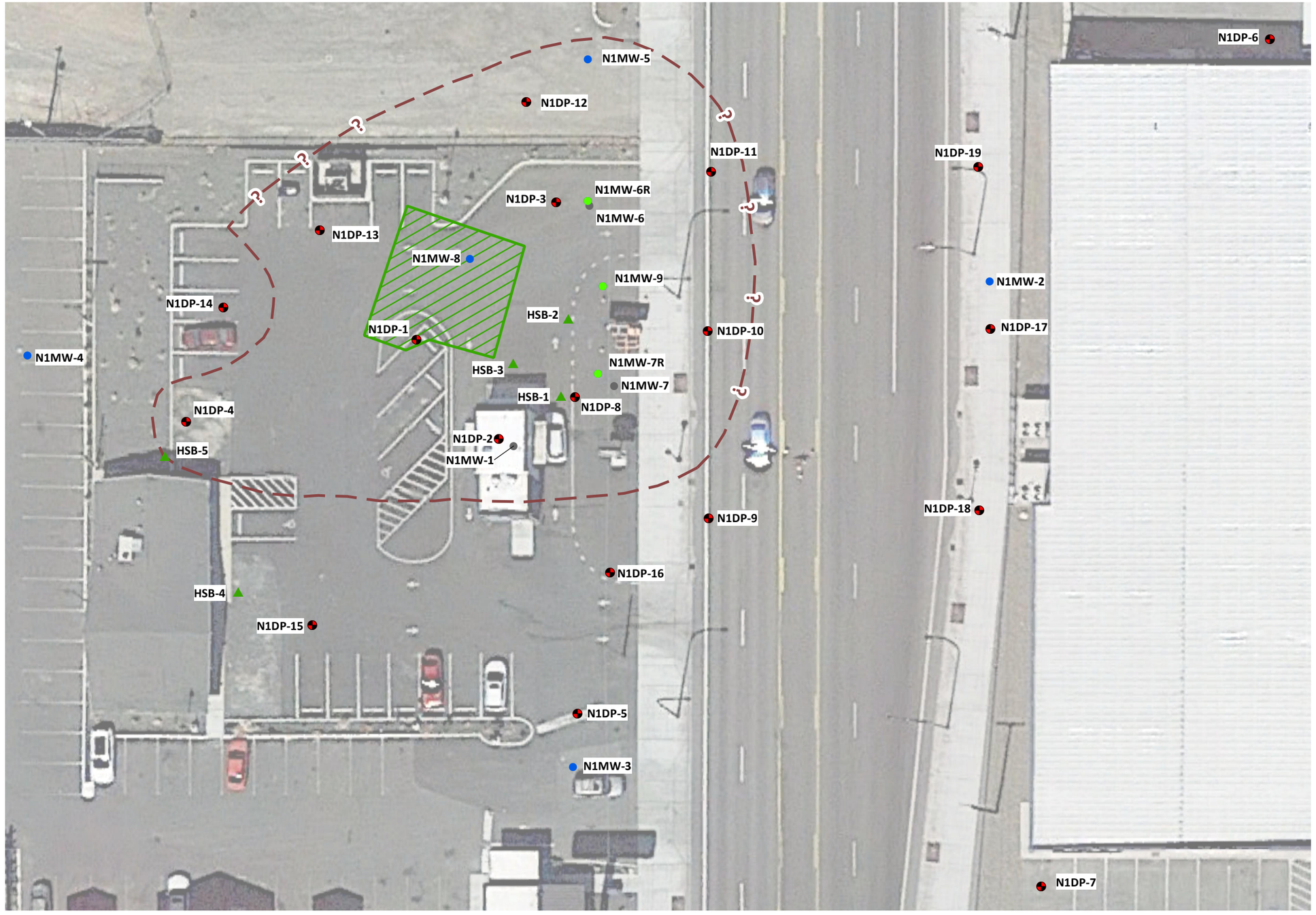
Tiger Oil 1808 North 1st Street Yakima, Washington	**Vicinity Map**	Figure 1



Legend

- Monitoring Well (Landau 2021)
- Monitoring Well (GeoEngineers 2014 and 2016)
- Former Monitoring Well
- Soil Boring (Landau 2021)
- RI Boring (GeoEngineers 2016)
- Extent of UST Excavation
- Estimated Extent of Impacted Soil and Groundwater Associated with the Site

Acronyms/Abbreviations

N1MW = North 1st Monitoring Well
N1MW-#R = North 1st Replacement Monitoring Well
N1DP = North 1st Direct Push
HSB = Hollow-Stem Boring
RI = Remedial Investigation

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Earth Pro, 2021; GeoEngineers, 2015, 2017

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Tiger Oil 1808 North 1st Street Yakima, Washington	**Site Boundaries and RI and Supplemental Investigation Exploration Locations**	Figure 2

N

0 30 60

Scale in Feet

Legend

- Monitoring Well (Landau 2021)
- Former Monitoring Well
- Soil Boring (Landau 2021)
- Soil Concentrations Exceed MTCA Method A Cleanup Level

Acronyms/Abbreviations

N1MW = North 1st Monitoring Well
N1MW-#R = North 1st Replacement Monitoring Well
HSB = Hollow-Stem Boring
GRO = Gasoline range organics
DRO = Diesel range organics
ORO = Oil range organics
ND = Not Detected
MTCA = Model Toxics Control Act

Notes

1. Analytical results for benzene, toluene, ethylbenzene, and xylenes not shown.
2. Results in mg/kg (milligrams per kilogram).
3. **Bold** indicates anaylte exceedance.
4. Green shading indicates detected analyte exceeds MTCA Method A cleanup level.
5. J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Earth Pro, 2021.

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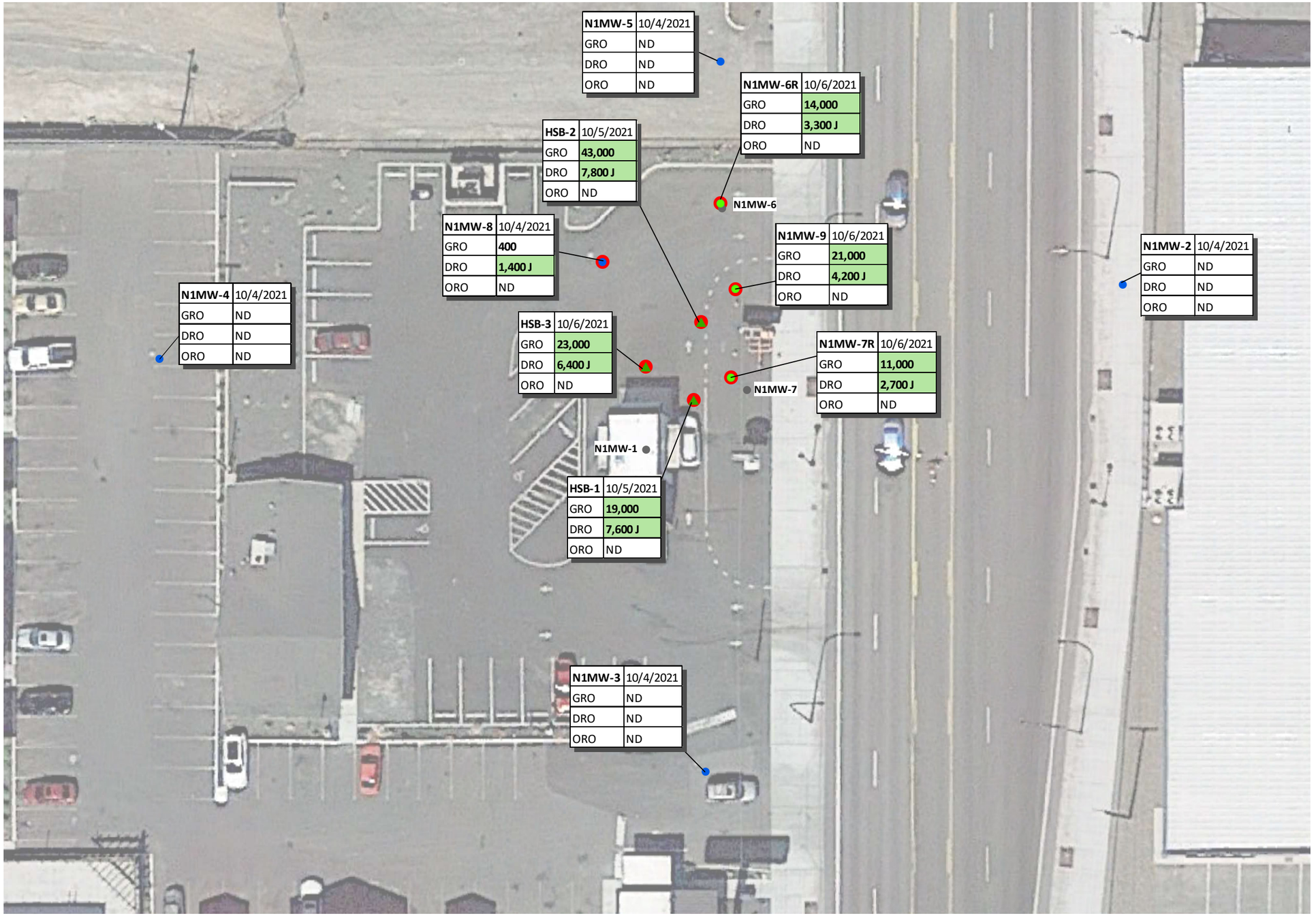
Tiger Oil 1808 North 1st Street Yakima, Washington	**2021 Supplemental Investigation Soil Analytical Results Map**	Figure 3A



N

0 30 60

Scale in Feet

Legend

- Monitoring Well (Landau 2021)
- Monitoring Well (GeoEngineers 2014 and 2016)
- Former Monitoring Well
- Soil Boring (Landau 2021)
- Groundwater Concentrations Exceed MTCA Method A Cleanup Level

Acronyms/Abbreviations

N1MW = North 1st Monitoring Well
N1MW-#R = North 1st Replacement Monitoring Well
HSB = Hollow-Stem Boring
GRO = Gasoline range organics
DRO = Diesel range organics
ORO = Oil range organics
ND = Not Detected
MTCA = Model Toxics Control Act

Notes

1. Analytical results for benzene, toluene, ethylbenzene, and xylenes not shown.
2. Results in µg/L (micrograms per liter).
3. **Bold** indicates anaylte exceedance.
4. Green shading indicates detected analyte exceeds MTCA Method A cleanup level.
5. J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Earth Pro, 2021.

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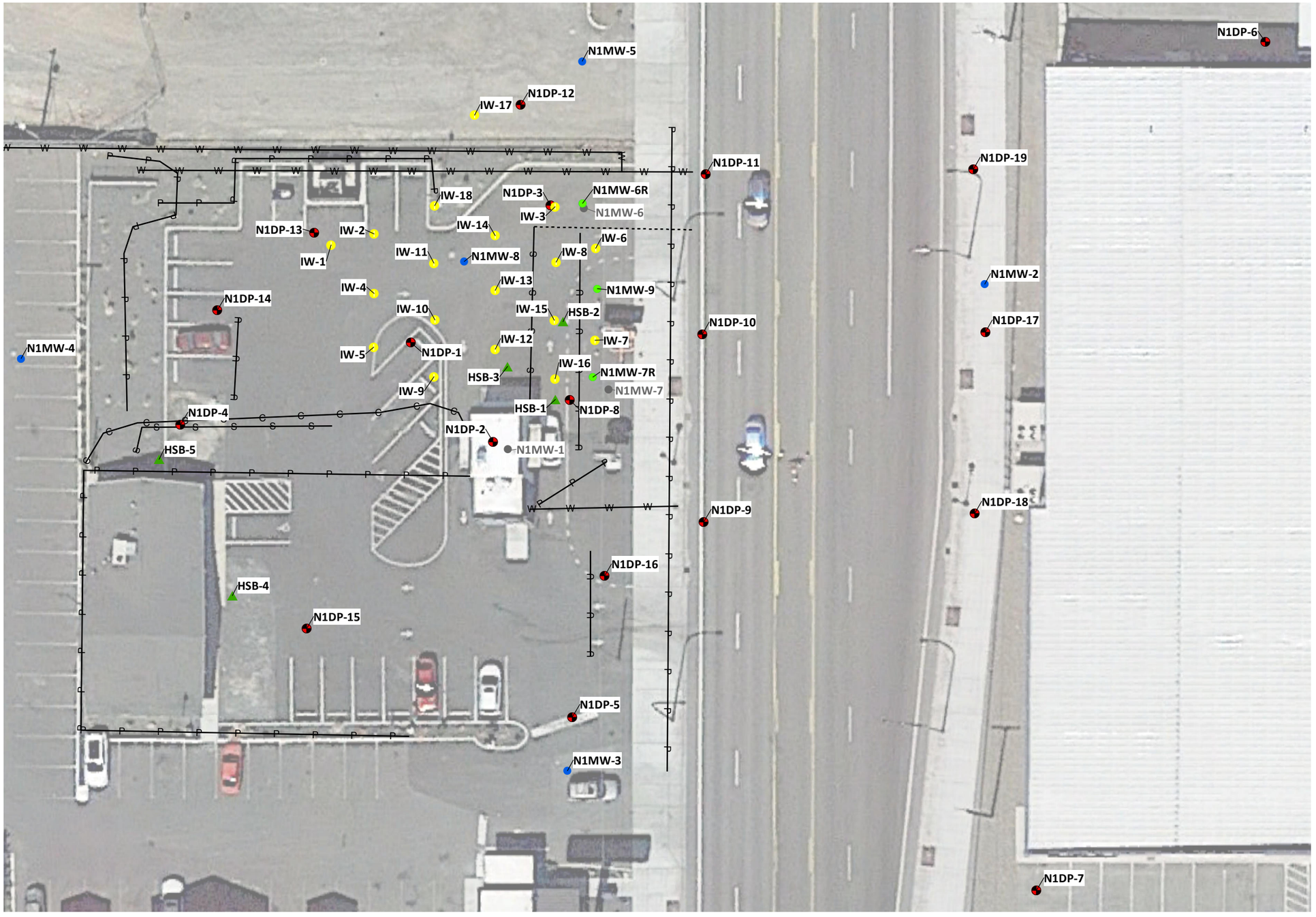
Tiger Oil 1808 North 1st Street Yakima, Washington	**2021 Supplemental Investigation Groundwater Analytical Results Map**	Figure 3B



0 30 60

Scale in Feet

Legend

- Monitoring Well (Landau 2021)
- Monitoring Well (GeoEngineers 2014 and 2016)
- Former Monitoring Well
- Injection Well (Landau 2022)
- Soil Boring (Landau 2021)
- RI Boring (GeoEngineers 2016)
- Water
- Power
- Sewer/SW
- Comm
- Unknown
- Continuance

Acronyms/Abbreviations

N1MW = North 1st Monitoring Well
N1MW-#R = North 1st Replacement Monitoring Well
N1DP = North 1st Direct Push
HSB = Hollow-Stem Boring
RI = Remedial Investigation

Notes

1. Injection wells not surveyed and locations are approximate.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Earth Pro, 2021.

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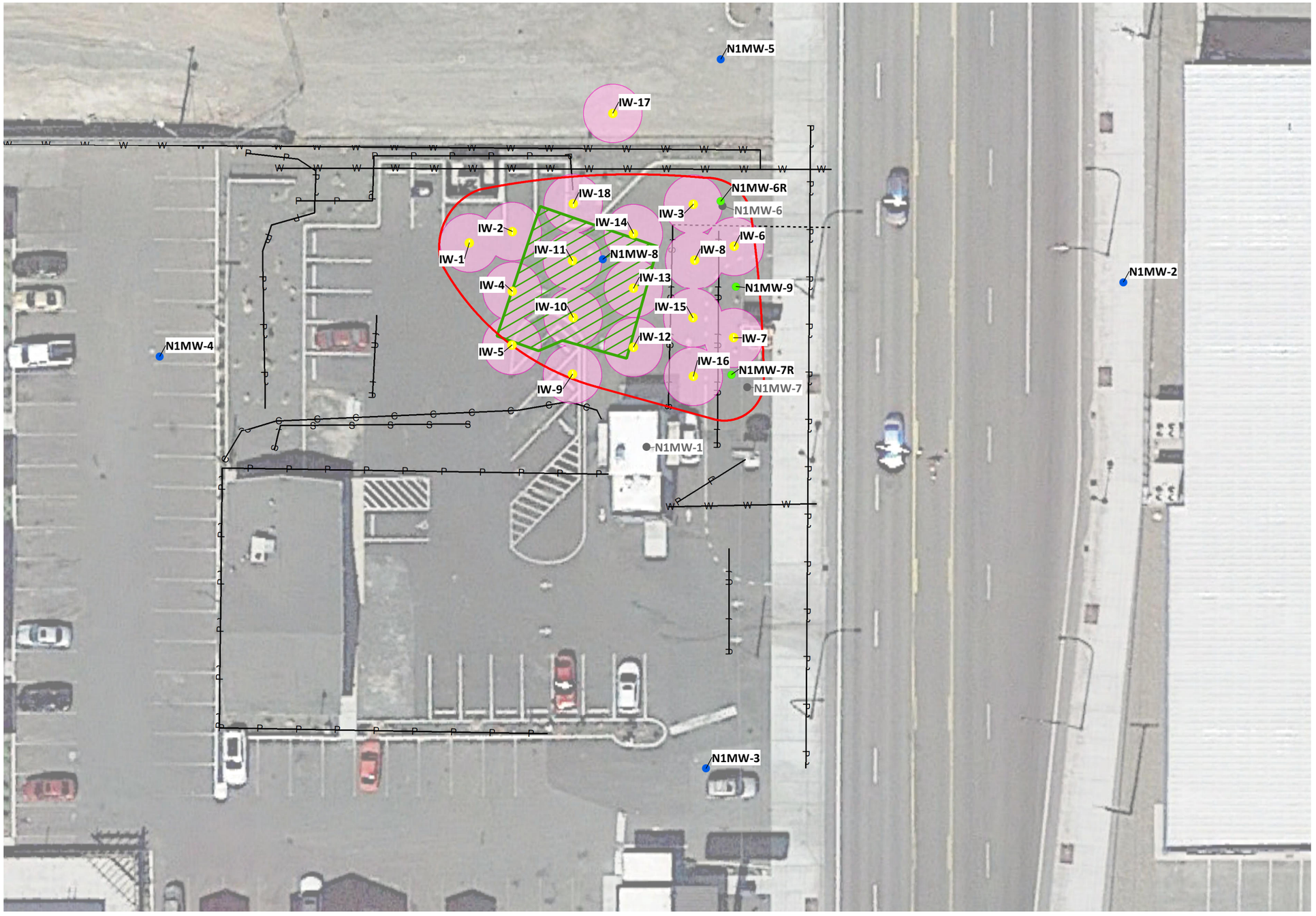
Tiger Oil 1808 North 1st Street Yakima, Washington	**Site Investigation Locations**	Figure 4



N

0 30 60

Scale in Feet

Legend

- Monitoring Well (Landau 2021)
- Monitoring Well (GeoEngineers 2014 and 2016)
- Former Monitoring Well
- Injection WellInjection Well (Landau 2022)
- W — Water
- P — Power
- S — Sewer/SW
- C — Comm
- U — Unknown
- Continuance
- Extent of UST Excavation
- Target Treatment Area
- Designed Injection Radius of Influence

Acronyms/Abbreviations

N1MW = North 1st Monitoring Well
N1MW-#R = North 1st Replacement Monitoring Well

Notes

1. Injection wells not surveyed and locations are approximate.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Earth Pro, 2021.

Tiger Oil 1808 North 1st Street Yakima, Washington	**Injection and Groundwater Monitoring Locations**	Figure 5

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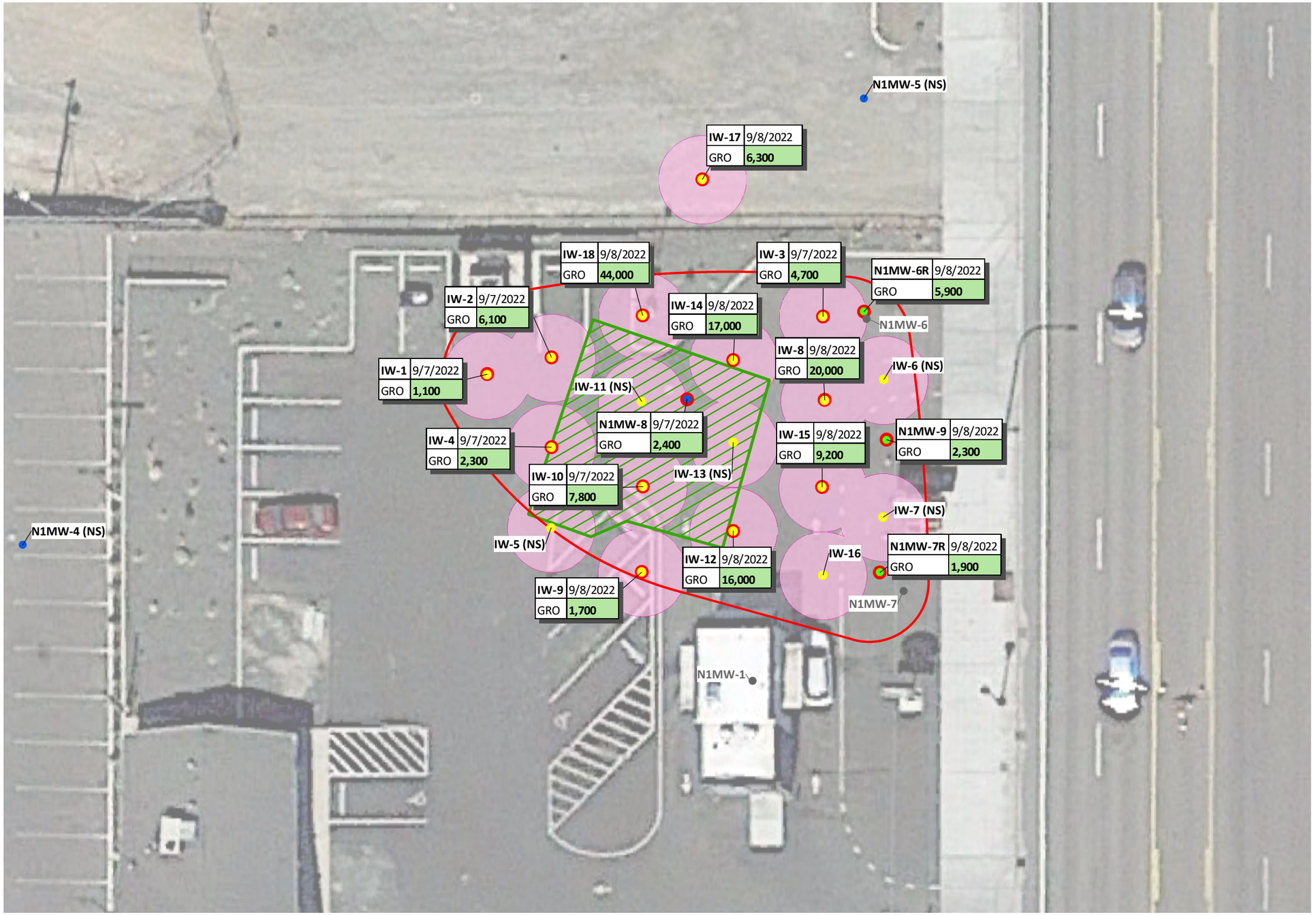

N

0 20 40

Scale in Feet

Legend

- Monitoring Well (Landau 2021)
- Monitoring Well (GeoEngineers 2014 and 2016)
- Former Monitoring Well
- Injection Well (Landau 2022)
- Groundwater Concentrations Exceed MTCA Method A Cleanup Level
- Extent of UST Excavation
- Target Treatment Area
- Designed Injection Radius of Influence

Acronyms/Abbreviations

N1MW = North 1st Monitoring Well
N1MW-#R = North 1st Replacement Monitoring Well
GRO = Gasoline range organics
MTCA = Model Toxics Control Act
NS = Not sampled

Notes

1. Analytical results for benzene, toluene, ethylbenzene, and xylenes not shown.
2. Results in µg/L (micrograms per liter).
3. **Bold** indicates anaylte exceedance.
4. Green shading indicates detected analyte exceeds MTCA Method A cleanup level.
5. Injection wells not surveyed and locations are approximate.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Earth Pro, 2021.

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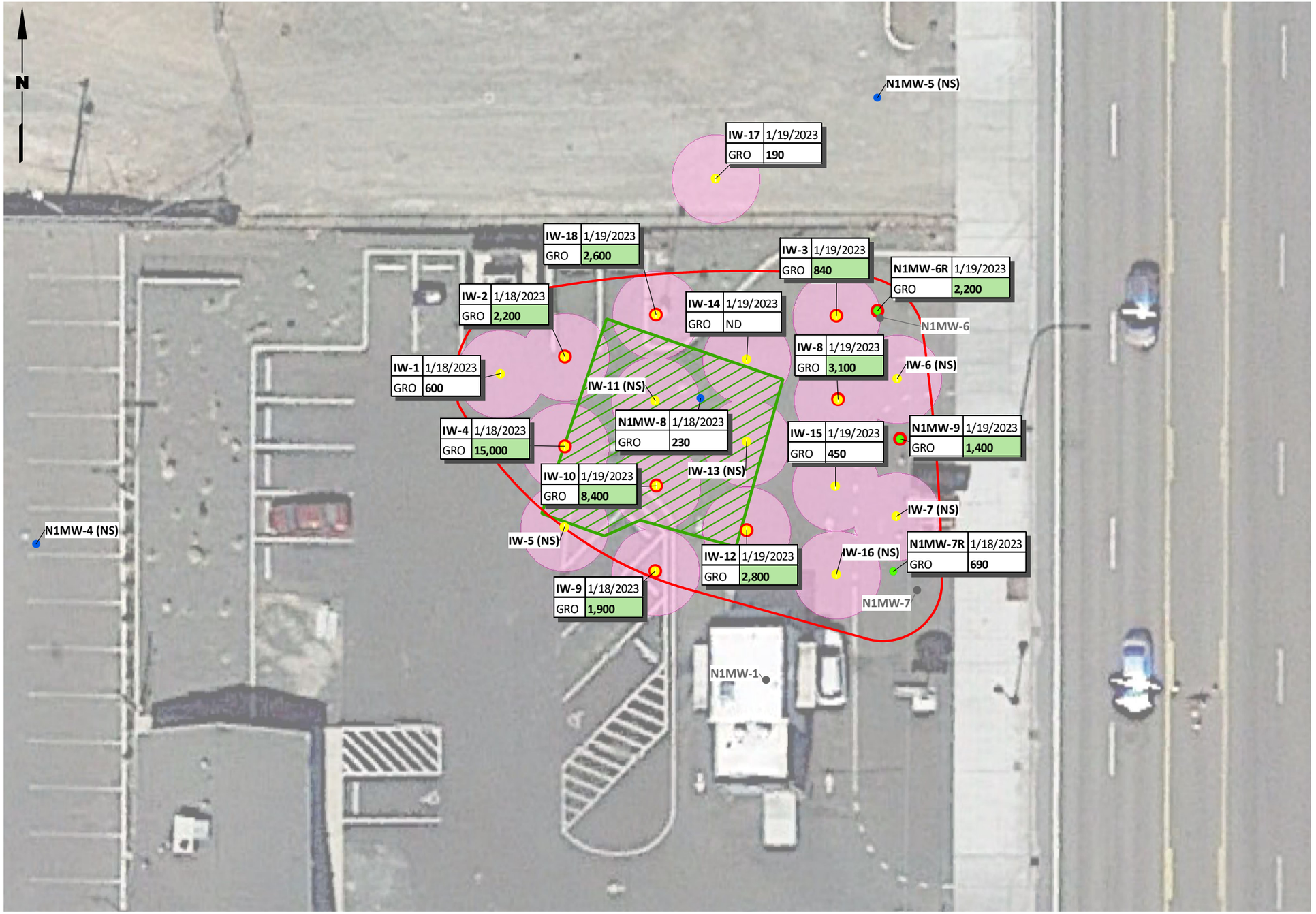
Tiger Oil 1808 North 1st Street Yakima, Washington	**Pre-Injection Baseline Groundwater Analytical Results Map**	Figure 6A



Legend

- Monitoring Well (Landau 2021)
- Monitoring Well (GeoEngineers 2014 and 2016)
- Former Monitoring Well
- Injection Well (Landau 2022)
- Groundwater Concentrations Exceed MTCA Method A Cleanup Level
- Extent of UST Excavation
- Target Treatment Area
- Designed Injection Radius of Influence

Acronyms/Abbreviations

N1MW = North 1st Monitoring Well
N1MW-#R = North 1st Replacement Monitoring Well
GRO = Gasoline range organics
MTCA = Model Toxics Control Act
NS = Not sampled

Notes

1. Analytical results for benzene, toluene, ethylbenzene, and xylenes not shown.
2. Results in µg/L (micrograms per liter).
3. **Bold** indicates anaylte exceedance.
4. Green shading indicates detected analyte exceeds MTCA Method A cleanup level.
5. Injection wells not surveyed and locations are approximate.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Earth Pro, 2021; GeoEngineers, 2017

Tiger Oil 1808 North 1st Street Yakima, Washington	**Post-Injection 1 Groundwater Analytical Results Map**	Figure 6B

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N

0 20 40

Scale in Feet

Legend

- Monitoring Well (Landau 2021)
- Monitoring Well (GeoEngineers 2014 and 2016)
- Former Monitoring Well
- Injection Well (Landau 2022)
- Groundwater Concentrations Exceed MTCA Method A Cleanup Level
- Extent of UST Excavation
- Target Treatment Area
- Designed Injection Radius of Influence

Acronyms/Abbreviations

N1MW = North 1st Monitoring Well
N1MW-#R = North 1st Replacement Monitoring Well
GRO = Gasoline range organics
MTCA = Model Toxics Control Act
NS = Not sampled

Notes

1. Analytical results for benzene, toluene, ethylbenzene, and xylenes not shown.
2. Results in µg/L (micrograms per liter).
3. **Bold** indicates anaylte exceedance.
4. Green shading indicates detected analyte exceeds MTCA Method A cleanup level.
5. Injection wells not surveyed and locations are approximate.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Earth Pro, 2021; GeoEngineers, 2017

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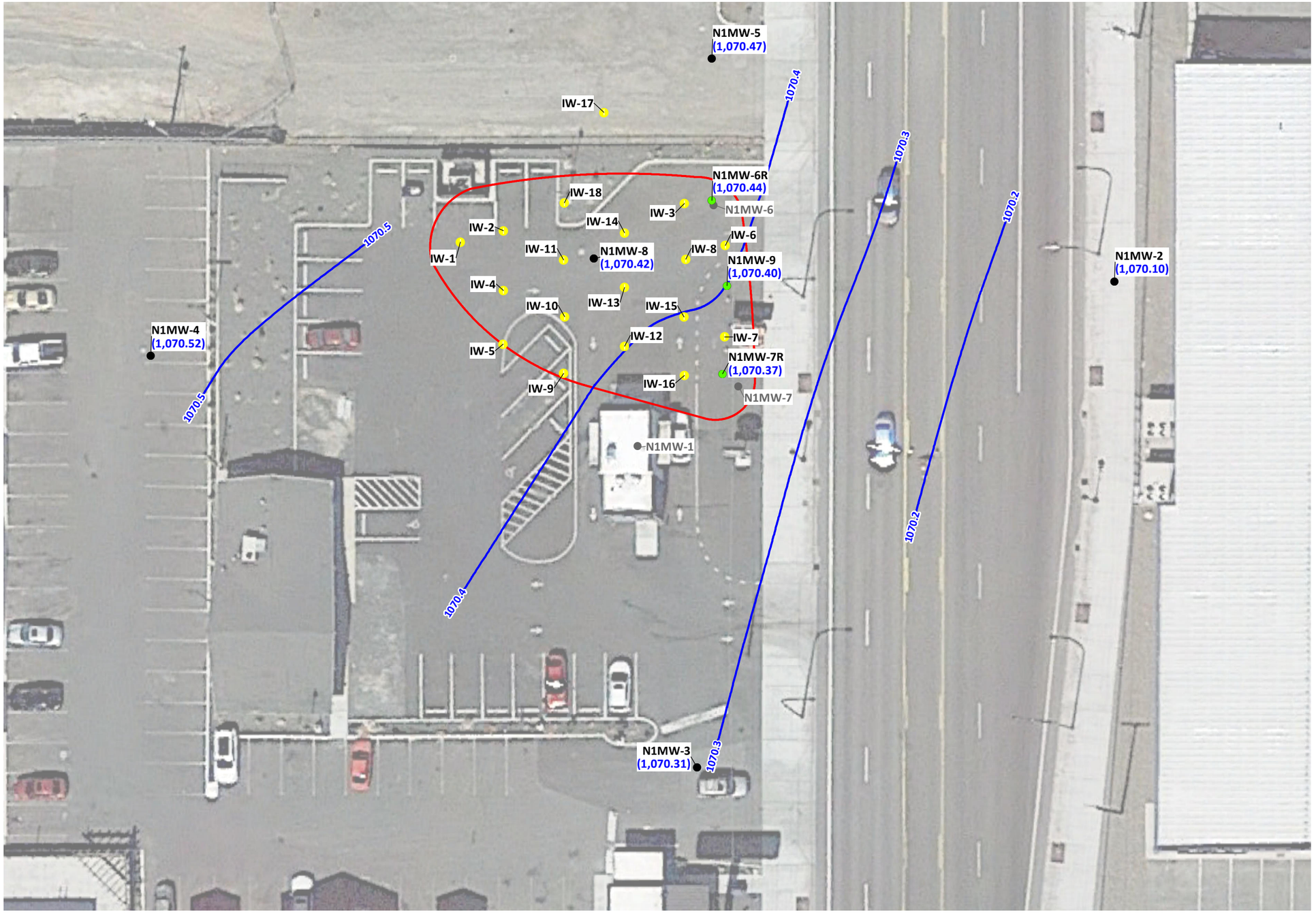
Tiger Oil 1808 North 1st Street Yakima, Washington	**Post-Injection 2 Groundwater Analytical Results Map**	Figure 6C



N

0 30 60

Scale in Feet

Legend

- Monitoring Well (Landau 2021)
- Monitoring Well (GeoEngineers 2014 and 2016)
- Former Monitoring Well
- Injection Well (Landau 2022)
- Groundwater Elevation Contour
- Target Treatment Area

Acronyms/Abbreviations

N1MW = North 1st Monitoring Well
N1MW-#R = North 1st Replacement Monitoring Well

Notes

1. Depth-to-water measurements taken on 7/10/2023 prior to injection beginning.
2. Elevations calculated based on TOC elevations surveyed by Gray Surveying under contract with Landau Associates in November 2021 and elevations reference NAVD88.
3. Injection wells were not used to calculate groundwater elevation contours.
4. Injection wells not surveyed and locations are approximate.
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Earth Pro, 2021.

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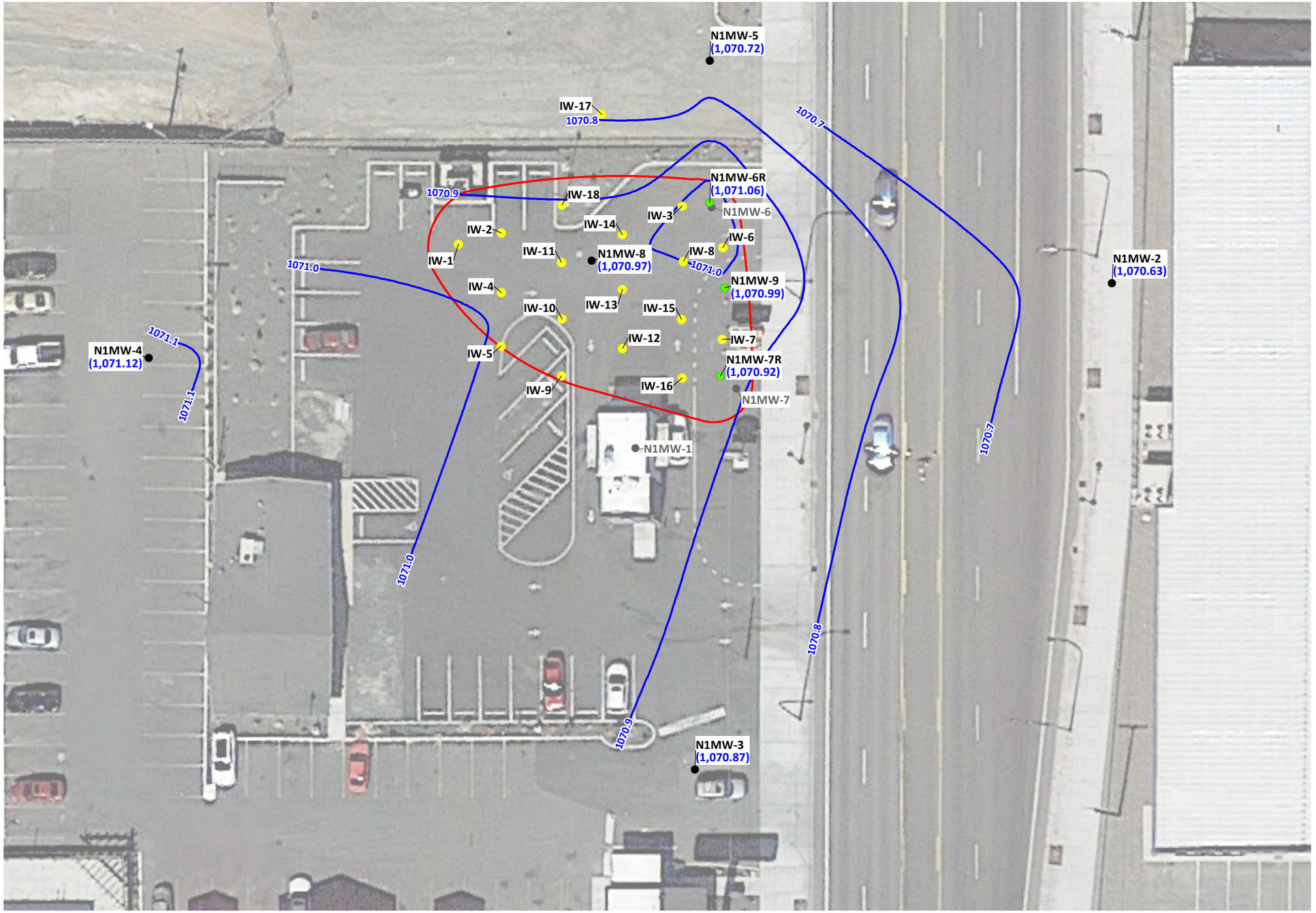
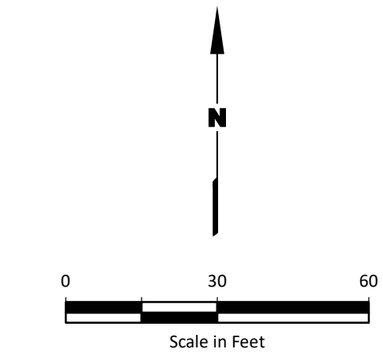
Tiger Oil 1808 North 1st Street Yakima, Washington	**Injection 2 Groundwater Contours**	Figure 7A





Legend

- Monitoring Well (Landau 2021)
- Monitoring Well (GeoEngineers 2014 and 2016)
- Former Monitoring Well
- Injection Well (Landau 2022)
- Groundwater Elevation Contour
- Target Treatment Area

Acronyms/Abbreviations

N1MW = North 1st Monitoring Well
N1MW-#R = North 1st Replacement Monitoring Well

Notes

1. Depth-to-water measurements taken on 9/9/2024 prior to injection beginning.
2. Elevations calculated based on TOC elevations surveyed by Gray Surveying under contract with Landau Associates in November 2021 and elevations reference NAVD88.
3. Injection wells were not used to calculate groundwater elevation contours.
4. Injection wells not surveyed and locations are approximate.
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Earth Pro, 2021.

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Tiger Oil 1808 North 1st Street Yakima, Washington	**Injection 3 Groundwater Contours**	Figure 7B

Table 1
Soil Boring and Well Construction Details
Former Tiger Oil Site
Yakima, Washington

Location ID	Boring Type	Date Installed	X Coordinate (easting)	Y Coordinate (northing)	Drilling Method	Total Boring Depth (ft bgs)	Ground Surface Elevation (ft NAVD88)	Total Well Depth (ft bgs)	Well Diameter/ Material/ Monument Type (inches)	Length of Screen (ft)	Top of Screen Interval (ft bgs)	Bottom of Screen Interval (ft bgs)	TOC Elevation (ft NAVD88)
N1DP-1	Soil Boring	4/16/2014	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-2	Soil Boring	4/16/2014	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-3	Soil Boring	4/16/2014	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-4	Soil Boring	4/16/2014	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-5	Soil Boring	4/16/2014	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-6	Soil Boring	4/16/2014	NS	NS	Direct Push	15	NS	--	--	--	--	--	--
N1DP-7	Soil Boring	4/16/2014	NS	NS	Direct Push	15	NS	--	--	--	--	--	--
N1DP-8	Soil Boring	4/16/2014	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-9	Soil Boring	8/3/2016	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-10	Soil Boring	8/3/2016	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-11	Soil Boring	8/3/2016	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-12	Soil Boring	8/4/2016	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-13	Soil Boring	8/4/2016	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-14	Soil Boring	8/4/2016	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-15	Soil Boring	8/4/2016	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-16	Soil Boring	8/4/2016	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-17	Soil Boring	8/3/2016	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-18	Soil Boring	8/3/2016	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
N1DP-19	Soil Boring	8/3/2016	NS	NS	Direct Push	20	NS	--	--	--	--	--	--
HSB-1 (c)	Soil Boring	10/5/2021	1637359.308	470583.971	Hollow-Stem Auger	20	1085.158	--	--	--	--	--	--
HSB-2 (c)	Soil Boring	10/5/2021	1637360.617	470603.488	Hollow-Stem Auger	20	1084.976	--	--	--	--	--	--
HSB-3 (c)	Soil Boring	10/6/2021	1637343.428	470591.606	Hollow-Stem Auger	19.5	1085.516	--	--	--	--	--	--
HSB-4 (c)	Soil Boring	10/6/2021	1637267.273	470515.372	Hollow-Stem Auger	17	1085.831	--	--	--	--	--	--
HSB-5 (c)	Soil Boring	10/6/2021	1637242.545	470564.059	Hollow-Stem Auger	16.5	1086.533	--	--	--	--	--	--
N1MW-1* (a)	Monitoring Well	8/7/2014	1637341.7	470569	Rotosonic	20	1058.19	19.5	2 / PVC / Flush	10	9.5	19.5	1084.85
N1MW-2 (c)	Monitoring Well	8/7/2014	1637480.028	470616.604	Rotosonic	20	1084.289	20	2 / PVC / Flush	10	10	20	1083.90
N1MW-3 (c)	Monitoring Well	8/6/2014	1637358.732	470475.202	Rotosonic	20	1084.855	20	2 / PVC / Flush	10	10	20	1084.54
N1MW-4 (c)	Monitoring Well	8/7/2014	1637199.855	470595.117	Rotosonic	20	1082.449	17	2 / PVC / Flush	10	7	17	1082.11
N1MW-5 (c)	Monitoring Well	8/6/2014	1637362.962	470681.530	Rotosonic	20	1083.554	19	2 / PVC / Flush	10	9	19	1083.34
N1MW-6* (b)	Monitoring Well	10/17/2016	1637363.5	470639	Hollow-Stem Auger	20.5	1083.96	20	2 / PVC / Flush	10	10	20	1083.54
N1MW-6R (c)	Monitoring Well	10/4/2021	1637367.775	470639.445	Hollow-Stem Auger	20.5	1084.671	20	2 / PVC / Flush	10	10	20	1084.26
N1MW-7* (b)	Monitoring Well	10/18/2016	1637370.7	470586.4	Hollow-Stem Auger	19	1085.18	18.8	2 / PVC / Flush	10	8.8	18.8	1084.84
N1MW-7R (c)	Monitoring Well	10/4/2021	1637362.962	470581.530	Hollow-Stem Auger	20.5	1084.948	20	2 / PVC / Flush	10	10	20	1084.54
N1MW-8 (c)	Monitoring Well	10/17/2016	1637328.275	470623.300	Hollow-Stem Auger	21	1085.517	20	2 / PVC / Flush	10	10	20	1084.42
N1MW-9 (c)	Monitoring Well	10/5/2021	1637369.489	470614.814	Hollow-Stem Auger	20.5	1084.754	20	2 / PVC / Flush	10	10	20	1084.36

Table 1
Soil Boring and Well Construction Details
Former Tiger Oil Site
Yakima, Washington

Location ID	Boring Type	Date Installed	X Coordinate (easting)	Y Coordinate (northing)	Drilling Method	Total Boring Depth (ft bgs)	Ground Surface Elevation (ft NAVD88)	Total Well Depth (ft bgs)	Well Diameter/ Material/ Monument Type (inches)	Length of Screen (ft)	Top of Screen Interval (ft bgs)	Bottom of Screen Interval (ft bgs)	TOC Elevation (ft NAVD88)
IW-1	Injection Well	8/1/2022	NS	NS	Rotosonic	20.9	NS	20.9	2 / PVC / Flush	10	10.9	20.9	NS
IW-2	Injection Well	8/1/2022	NS	NS	Rotosonic	20.8	NS	20.8	2 / PVC / Flush	10	10.8	20.8	NS
IW-3	Injection Well	8/1/2022	NS	NS	Rotosonic	20.4	NS	20.4	2 / PVC / Flush	10	10.4	20.4	NS
IW-4	Injection Well	8/2/2022	NS	NS	Rotosonic	20.4	NS	20.4	2 / PVC / Flush	10	10.4	20.4	NS
IW-5	Injection Well	8/2/2022	NS	NS	Rotosonic	20.7	NS	20.7	2 / PVC / Flush	10	10.7	20.7	NS
IW-6	Injection Well	8/2/2022	NS	NS	Rotosonic	20	NS	20	2 / PVC / Flush	10	10	20	NS
IW-7	Injection Well	8/2/2022	NS	NS	Rotosonic	20.6	NS	20	2 / PVC / Flush	10	10	20	NS
IW-8	Injection Well	8/31/2022	NS	NS	Hollow-Stem Auger	20.5	NS	20	2 / PVC / Flush	10	10	20	NS
IW-9	Injection Well	8/29/2022	NS	NS	Hollow-Stem Auger	21	NS	20	2 / PVC / Flush	10	10	20	NS
IW-10	Injection Well	8/29/2022	NS	NS	Hollow-Stem Auger	20.5	NS	20	2 / PVC / Flush	10	10	20	NS
IW-11	Injection Well	8/29/2022	NS	NS	Hollow-Stem Auger	20.5	NS	20	2 / PVC / Flush	10	10	20	NS
IW-12	Injection Well	8/30/2022	NS	NS	Hollow-Stem Auger	20	NS	20	2 / PVC / Flush	10	10	20	NS
IW-13	Injection Well	8/30/2022	NS	NS	Hollow-Stem Auger	20.5	NS	20	2 / PVC / Flush	10	10	20	NS
IW-14	Injection Well	8/30/2022	NS	NS	Hollow-Stem Auger	21	NS	20	2 / PVC / Flush	10	10	20	NS
IW-15	Injection Well	8/31/2022	NS	NS	Hollow-Stem Auger	20.5	NS	20	2 / PVC / Flush	10	10	20	NS
IW-16	Injection Well	8/31/2022	NS	NS	Hollow-Stem Auger	20.5	NS	20	2 / PVC / Flush	10	10	20	NS
IW-17	Injection Well	9/1/2022	NS	NS	Hollow-Stem Auger	18.5	NS	18.5	2 / PVC / Flush	10	8.5	18.5	NS
IW-18	Injection Well	9/1/2022	NS	NS	Hollow-Stem Auger	20.5	NS	20	2 / PVC / Flush	10	10	20	NS

Notes:

(a) Elevations and coordinates surveyed by PLS under contract with GeoEngineers in August 2014.

(b) Elevations and coordinates surveyed by PLS under contract with GeoEngineers in October 2016.

(c) Elevations and coordinates surveyed by Gray Surveying under contract with Landau Associates in November 2021.

- = Not applicable

Vertical elevations are with respect to NAVD88. Horizontal northings and eastings are with respect to the Washington State Plane coordinate system, south zone (NAD83-1996).

* N1MW-1, N1MW-6, and N1MW-7 are presumed to have been paved over and/or underneath the current drive-through coffee hut at the Site and there is no record of these wells being decomissioned.

Acronyms and Abbreviations:

ft = foot/feet

NAD83 = North American Datum of 1983

TOC = top of casing

N1DP = North 1st Direct Push

N1MW - North 1st Monitoring Well

IW = Injection Well

NS = not surveyed

Table 2
Supplemental Investigation Soil Analytical Results
Former Tiger Oil Site
Yakima, Washington

Sample Location	Sample Depth Interval	Laboratory SDG	Sample Date	Sample Type	Analytical Method, Analyte, Unit of Measurement								
					NWTPH-Gx	NWTPH-Dx		SW-846 8260D					
					Gasoline Range Organics	Diesel Range Organics	Residual Range Organics	Benzene	Ethylbenzene	m-&p-Xylenes	o-Xylene	Toluene	Xylenes, Total
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
HSB-1	15.5-17	590-16086-1	10/5/2021	N	**2100**	**210**	26 U	0.047 U	**33**	**180**	**57**	**9.3**	**230**
HSB-2	15.5-16	590-16086-1	10/5/2021	N	9.9 U	10 U	26 U	0.040 U	**0.035 J**	**0.14 J**	**0.052 J**	**0.030 J**	**0.19 J**
HSB-3	13.5-14.5	590-16086-1	10/6/2021	N	**270 J**	**19**	**40**	0.037 U	**3.2 J**	**11 J**	**3.6 J**	0.19 U	**15 J**
HSB-3	13.5-14.5	590-16086-1	10/6/2021	FD	**26 J**	**24**	**49**	0.057 U	**0.090 J**	**0.32 J**	**0.13 J**	0.28 U	**0.45 J**
HSB-4	7-8	590-16086-1	10/6/2021	N	12 U	12 U	29 U	0.049 U	0.25 U	0.99 U	0.49 U	0.25 U	1.5 U
HSB-4	11-12	590-16086-1	10/6/2021	N	12 U	10 U	25 U	0.047 U	0.23 U	0.93 U	0.47 U	0.23 U	1.4 U
HSB-5	7.5-9	590-16086-1	10/6/2021	N	11 U	10 U	**81**	0.045 U	0.22 U	0.90 U	0.45 U	0.22 U	1.3 U
N1MW-6R	14.5-15	590-16086-1	10/4/2021	N	**670**	**62**	**29**	0.042 U	**3.4**	**12**	**0.43**	0.21 U	**12 J**
N1MW-7R	14.5-16	590-16086-1	10/4/2021	N	**9700**	**180**	27 U	0.039 U	**110 J**	**550 J**	**160 J**	**1.6**	**710 J**
N1MW-9	16-17.5	590-16086-1	10/5/2021	N	**110**	11 U	27 U	0.039 U	**2.1**	**7.7**	**2.6**	**0.37**	**10**
MTCA Method A Cleanp Level					30/100 (a)	2,000	2,000	0.03	6	N/A	N/A	7	9

Notes:

* = This sample was initially identified as N1MW-1R in field and lab reports but was renamed per Ecology Request

Bold text indicates detected analyte

Green shading indicates detected analyte exceeds applicable cleanup level

U = the analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentrations of the analyte in the sample.

(a) MTCA Method A cleanup level is 100 µg/L if benzene is not present and the total of ethylbenzene, toluene, and xylenes is less than 1% of the gasoline mixture; otherwise, the cleanup level is 30 µg/L .

Acryonyms/Abbreviations:

mg/kg = milligrams per kilogram

NWTPH - Northwest Total Petroleum Hydrocarbon

N = primary sample

FD = field duplicate

Table 3
Supplemental Investigation Groundwater Analytical Results
Former Tiger Oil Site
Yakima, Washington

Sample Location	Laboratory SDG	Sample Date	Sample Type	Analytical Method, Analyte, Unit of Measurement								
				NWTPH-Gx	NWTPH-Dx		SW-846 8260D					
				Gasoline Range Organics µg/L	Diesel Range Organics µg/L	Residual Range Organics µg/L	Benzene µg/L	Ethylbenzene µg/L	m-&p-Xylenes µg/L	o-Xylene µg/L	Toluene µg/L	Xylenes, Total µg/L
HSB-1	590-16086-1	10/5/2021	N	**19000**	**7600 J**	380 U	2.0 U	**940**	**380**	**150**	**550**	**530**
HSB-2	590-16086-1	10/5/2021	N	**43000**	**7800 J**	380 U	**9.2**	**2900**	**8700**	**3600**	**180**	**12000**
HSB-3	590-16086-1	10/6/2021	N	**23000**	**6400 J**	380 U	**4.1**	**1600**	**4500**	**1800**	**22**	**6300**
HSB-3	590-16086-1	10/6/2021	FD	**24000**	**6000 J**	380 U	**4.0**	**1500**	**4300**	**1700**	**22**	**6000**
N1MW-2	590-16086-1	10/4/2021	N	150 U	240 U	390 U	0.40 U	1.0 U	2.0 U	1.0 U	1.0 U	3.0 U
N1MW-3	590-16086-1	10/4/2021	N	150 U	230 U	390 U	0.40 U	1.0 U	2.0 U	1.0 U	1.0 U	3.0 U
N1MW-4	590-16086-1	10/4/2021	N	150 U	240 U	390 U	0.40 U	1.0 U	2.0 U	1.0 U	1.0 U	3.0 U
N1MW-5	590-16086-1	10/4/2021	N	150 U	240 U	390 U	0.40 U	1.0 U	2.0 U	1.0 U	1.0 U	3.0 U
N1MW-6R	590-16086-1	10/6/2021	N	**14000**	**3300 J**	380 U	**0.85**	**550**	**2100**	**170**	**1.8**	**2200**
N1MW-7R	590-16086-1	10/6/2021	N	**11000**	**2700 J**	380 U	**2.0**	**640**	**2700**	**1000**	**380**	**3700**
N1MW-8	590-16086-1	10/4/2021	N	**400**	**1400 J**	390 U	**8.1**	**7.2**	**23**	**14**	**2.5**	**37**
N1MW-9	590-16086-1	10/6/2021	N	**21000**	**4200 J**	380 U	**6.2**	**1800**	**6200**	**2700**	**660**	**8900**
MTCA Method A Cleanp Level				800/1000 (a)	500	500	5	700	N/A	N/A	1000	1000

Notes:

* = This sample was initially identified as N1MW-1R in field and lab reports but was renamed per Ecology Request

Bold text indicates detected analyte

Green shading indicates detected analyte exceeds applicable cleanup level

U = the analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentrations of the analyte in the sample.

(a) MTCA Method A cleanup level is 1000 µg/L if benzene is not present in groundwater and 800 µg/L if benzene is present in groundwater.

Acryonyms/Abbreviations:

mg/kg = milligrams per kilogram

NWTPH - Northwest Total Petroleum Hydrocarbon

N = primary sample

FD = field duplicate

Table 4
Supplemental Investigation Groundwater Field Parameters
Former Tiger Oil Site
Yakima, Washington

Sample Location	Date Measured	Field Parameters					
		Temp (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	Oxidation Reduction Potential (mV)	Turbidity (NTU)
October 2021 Sampling Event							
NIMW-2	10/4/2021	18.2	361.2	1.23	6.21	70.7	--
NIMW-3	10/4/2021	18.5	345.1	3.48	6.29	71.2	--
NIMW-4	10/4/2021	17.0	284.6	4.30	6.33	76.8	--
NIMW-5	10/4/2021	19.9	341.2	0.89	5.79	69.5	--
NIMW-8	10/4/2021	18.7	7.4	2.08	6.11	31.3	--
NIMW-1R	10/6/2021	18.8	492.5	2.01	6.66	-86.5	--
NIMW-6R	10/6/2021	19.1	436.6	3	6.52	-66.7	--
NIMW-7R	10/6/2021	17.8	505	2.54	6.53	-74.3	--
HSB-1	10/5/2021	20.8	553	1.85	6.70	20.9	--
HSB-2	10/5/2021	21.7	705	0.38	6.57	-93.8	--
HSB-3	10/6/2021	21.3	788	0.56	6.58	-115.9	--
HSB-3	10/6/2021	21.1	788	0.55	6.57	-116.1	--

Notes:

-- = not sampled

NA = not available

Abbreviations and Acronyms:

°C = degrees Celsius

µS/cm = microsiemens per centimeter

mg/L = milligrams per liter

mV = millivolts

NTU = nephelometric turbidity units

Table 5
Cumulative Groundwater-Level Elevation Measurements
Former Tiger Oil Site
Yakima, Washington

Monitoring Well	N1MW-2		N1MW-3		N1MW-4		N1MW-5		N1MW-6R		N1MR-7R		N1MW-8		N1MW-9	
TOC Elevation (ft) (a)	1,083.90		1,084.54		1,082.11		1,083.34		1,084.26		1,084.54		1,084.42		1,084.36	
Date Measured	Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation
10/4/2021	13.70	1,070.20	14.16	1,070.38	11.48	1,070.63	12.77	1,070.57	Well not yet installed		Well not yet installed		13.90	1,070.52	Well not yet installed	
10/6/2021	-	-	-	-	-	-	-	-	13.66	1,070.60	14.03	1,070.51	-	-	13.80	1,070.56
9/8/2022	-	-	-	-	-	-	-	-	14.23	1,070.03	14.60	1,069.94	14.45	1,069.97	14.37	1,069.99
1/18/2023	-	-	-	-	-	-	-	-	13.71	1,070.55	14.03	1,070.51	13.36	1,071.06	13.85	1,070.51
7/10/2023	13.80	1,070.10	14.23	1,070.31	11.59	1,070.52	12.87	1,070.47	13.82	1,070.44	14.17	1,070.37	14.00	1,070.42	13.96	1,070.40
11/28/2023	14.28	1,069.62	14.77	1,069.77	12.24	1,069.87	13.39	1,069.95	14.30	1,069.96	14.71	1,069.83	14.53	1,069.89	14.45	1,069.91
9/9/2024	13.27	1,070.63	13.67	1,070.87	10.99	1,071.12	12.62	1,070.72	13.20	1,071.06	13.62	1,070.92	13.45	1,070.97	13.37	1,070.99

Notes:

(a) TOC elevation surveyed by Gray Surveying under contract with Landau Associates in November 2021.

- = Not measured

Depth measured in ft below TOC.

Elevation datum = NAVD88

Acronyms and Abbreviations:

ft = foot/feet

NAVD88 = North American Vertical Datum of 1988

TOC = top of casing

Table 6
Groundwater Field Parameters
Former Tiger Oil Site
Yakima, Washington

Sample Location	Date Measured	Field Parameters																	
		Temp (°C)			Specific Conductance (µS/cm)			Dissolved Oxygen (mg/L)			pH			Oxidation Reduction Potential (mV)			Turbidity (NTU)		
		Pre-injection Baseline Sampling (a)	Post Injection 1 (b)	Post Injection 2 (c)	Pre-injection Baseline Sampling (a)	Post Injection 1 (b)	Post Injection 2 (c)	Pre-injection Baseline Sampling (a)	Post Injection 1 (b)	Post Injection 2 (c)	Pre-injection Baseline Sampling (a)	Post Injection 1 (b)	Post Injection 2 (c)	Pre-injection Baseline Sampling (a)	Post Injection 1 (b)	Post Injection 2 (c)	Pre-injection Baseline Sampling (a)	Post Injection 1 (b)	Post Injection 2 (c)
IW-1	9/7/2022	16.82	--	--	569	--	--	6.15	--	--	6.55	--	--	-50.1	--	--	4.61	--	--
	1/18/2023	--	14.52	--	--	10326	--	--	0.94	--	--	1.69	--	--	534	--	--	2.62	--
	11/28/2023	--	--	15.20	--	--	8970	--	--	1.04	--	--	2.74	--	--	447.5	--	--	0.00
IW-2	9/7/2022	16.27	--	--	353	--	--	3.89	--	--	6.63	--	--	-52.1	--	--	1.93	--	--
	1/18/2023	--	14.85	--	--	2817	--	--	1.71	--	--	3.15	--	--	415.2	--	--	1.88	--
	11/28/2023	--	--	15.27	--	--	4180	--	--	0.44	--	--	3.28	--	--	440.9	--	--	0.93
IW-3	9/7/2022	16.16	--	--	359	--	--	2.34	--	--	6.69	--	--	-64.3	--	--	6.70	--	--
	1/19/2023	--	14.30	--	--	5688	--	--	0.33	--	--	3.19	--	--	471.7	--	--	3.87	--
	11/29/2023	--	--	14.77	--	--	3327	--	--	0.88	--	--	4.37	--	--	124.5	--	--	11.43
IW-4	9/7/2022	17.63	--	--	537	--	--	5.59	--	--	6.48	--	--	-100.8	--	--	1.25	--	--
	1/18/2023	--	15.35	--	--	6111	--	--	0.56	--	--	1.87	--	--	354.8	--	--	1.30	--
	11/28/2023	--	--	16.15	--	--	10853	--	--	0.40	--	--	2.69	--	--	517.9	--	--	3.89
IW-8	9/8/2022	16.83	--	--	473	--	--	1.32	--	--	6.46	--	--	-74.2	--	--	3.73	--	--
	1/19/2023	--	15.29	--	--	8030	--	--	1.60	--	--	3.35	--	--	358.4	--	--	2.52	--
	11/29/2023	--	--	15.52	--	--	4594	--	--	0.35	--	--	3.38	--	--	275.5	--	--	5.82
IW-9	9/8/2022	16.62	--	--	374	--	--	2.56	--	--	5.81	--	--	-29.5	--	--	1.22	--	--
	1/18/2023	--	14.35	--	--	845	--	--	0.50	--	--	5.14	--	--	-102.7	--	--	2.29	--
	11/28/2023	--	--	14.72	--	--	572	--	--	0.32	--	--	5.51	--	--	9.50	--	--	5.13
IW-10	9/7/2022	17.32	--	--	352	--	--	3.25	--	--	6.44	--	--	-50.6	--	--	1.22	--	--
	1/19/2023	--	14.54	--	--	3563	--	--	7.46	--	--	3.07	--	--	340.0	--	--	2.65	--
	11/30/2023	--	--	15.80	--	--	9206	--	--	0.21	--	--	2.79	--	--	415.0	--	--	10.05
IW-12	9/8/2022	16.92	--	--	609	--	--	1.46	--	--	6.34	--	--	-58.6	--	--	0.58	--	--
	1/19/2023	--	14.84	--	--	12605	--	--	2.47	--	--	3.23	--	--	499.2	--	--	4.52	--
	11/30/2023	--	--	15.13	--	--	9374	--	--	0.21	--	--	3.00	--	--	452.6	--	--	9.12
IW-14	9/8/2022	16.57	--	--	536	--	--	1.63	--	--	6.45	--	--	-73.6	--	--	2.81	--	--
	1/19/2023	--	15.05	--	--	2101	--	--	0.95	--	--	5.35	--	--	35	--	--	15.99	--
	11/29/2023	--	--	15.23	--	--	2623	--	--	0.22	--	--	4.41	--	--	164.1	--	--	42.13
IW-15	9/8/2022	17.09	--	--	460	--	--	1.57	--	--	6.37	--	--	-89.8	--	--	3.56	--	--
	1/19/2023	--	15.12	--	--	1015	--	--	0.46	--	--	3.86	--	--	369.7	--	--	4.61	--
	11/29/2023	--	--	15.74	--	--	712	--	--	0.34	--	--	5.39	--	--	-23.8	--	--	7.02
IW-17	9/8/2022	16.38	--	--	438	--	--	1.48	--	--	6.41	--	--	-8.6	--	--	2.79	--	--
	1/19/2023	--	12.75	--	--	1829	--	--	0.58	--	--	5.25	--	--	11.9	--	--	NA	--
	11/29/2023	--	--	14.38	--	--	3226	--	--	1.00	--	--	4.66	--	--	22.5	--	--	24.24
IW-18	9/8/2022	17.36	--	--	559	--	--	2.18	--	--	6.36	--	--	-70.3	--	--	2.06	--	--
	1/19/2023	--	14.17	--	--	6900	--	--	1.12	--	--	3.32	--	--	497.0	--	--	10.54	--
	11/28/2023	--	--	14.78	--	--	3479	--	--	0.83	--	--	4.07	--	--	381.6	--	--	6.66
N1MW-6R	9/8/2022	16.55	--	--	876	--	--	2.20	--	--	6.24	--	--	-50.9	--	--	2.64	--	--
	1/19/2023	--	14.09	--	--	5017	--	--	0.48	--	--	3.15	--	--	422.9	--	--	10.75	--
	11/29/2023	--	--	14.34	--	--	2504	--	--	1.36	--	--	4.27	--	--	-1.90	--	--	--

Table 6
Groundwater Field Parameters
Former Tiger Oil Site
Yakima, Washington

		Field Parameters																	
		Temp (°C)			Specific Conductance (µS/cm)			Dissolved Oxygen (mg/L)			pH			Oxidation Reduction Potential (mV)			Turbidity (NTU)		
N1MW-7R	9/8/2022	14.83	--	--	709	--	--	3.94	--	--	6.50	--	--	27.0	--	--	1.61	--	--
	1/18/2023	--	14.17	--	--	2779	--	--	1.06	--	--	2.48	--	--	455.5	--	--	58.35	--
	11/28/2024	--	--	14.70	--	--	2262	--	--	0.66	--	--	4.06	--	--	271.6	--	--	35.35
N1MW-8	9/7/2022	16.03	--	--	547	--	--	4.00	--	--	6.45	--	--	-35.5	--	--	2.68	--	--
	1/18/2023	--	14.74	--	--	1916	--	--	0.41	--	--	4.38	--	--	93	--	--	7.15	--
	11/30/2023	--	--	15.35	--	--	10907	--	--	0.46	--	--	2.78	--	--	505.8	--	--	8.81
N1MW-9	9/8/2022	15.77	--	--	803	--	--	2.12	--	--	6.46	--	--	-29.8	--	--	4.13	--	--
	1/19/2023	--	13.86	--	--	3554	--	--	0.99	--	--	1.34	--	--	422.7	--	--	1.47	--
	11/29/2023	--	--	15.04	--	--	1219	--	--	0.65	--	--	4.75	--	--	-67.1	--	--	10.04

Notes:

-- = not measured

NA = not available

(a) Parameters recorded during pre-injection baseline groundwater sampling took place on September 7 and 8, 2022 after injection wells were installed and developed prior to any injections occuring at the Site.

(b) Parameters recorded during groundwater sampling on January 18 and 19, 2023 following the 1st ISCO injection at the site which occurred October 11-19, 2023.

(c) Parameters recorded during groundwater sampling on November 28 and 29, 2023 following the 2nd ISCO injection at the site which occurred July 10-13, 2023.

Abbreviations and Acronyms:

°C = degrees Celsius

µS/cm = microsiemens per centimeter

mg/L = milligrams per liter

mV = millivolts

NTU = nephelometric turbidity units

Table 7
Groundwater Analytical Results
Former Tiger Oil Site
Yakima, Washington

Sample Location	Field Sample ID	Laboratory SDG	Sample Date	Analytical Method, Analyte, Unit of Measurement, Sampling Event									
				NWTPH-Gx			SW-846 6010D	SW-846 8260D					
				Gasoline Range Organics µg/L			Lead	Benzene	Ethylbenzene	m-&p-Xylenes	o-Xylene	Toluene	Xylenes, Total
				Pre-Injection Baseline Sampling (a)	Post-Injection 1 (b)	Post-Injection 2 (c)	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
IW-1	IW-1	590-18585-1	9/7/2022	**1,100**	--	--	--	--	--	--	--	--	--
		590-19667-1	1/18/2023	--	**600**	--	--	--	--	--	--	--	--
		590-22377-1	11/28/2023	--	--	**310**	--	**0.96**	**6.0**	**4.6**	**1.6**	1.0 U	**6.2**
IW-2	IW-2	590-18585-1	9/7/2022	**6,100**	--	--	--	--	--	--	--	--	--
		590-19667-1	1/18/2023	--	**2,200**	--	--	--	--	--	--	--	--
		590-22377-1	11/29/2023	--	--	**580**	--	**0.94**	**3.8**	**9.7**	**3.5**	1.0 U	**13**
IW-3	IW-3	590-18585-1	9/7/2022	**4,700**	--	--	--	--	--	--	--	--	--
		590-19667-1	1/19/2023	--	**840**	--	--	--	--	--	--	--	--
		590-22377-1	11/28/2023	--	--	**3,900**	--	**2.8**	**360**	**1,300**	**520**	**100**	**1,800**
IW-4	IW-4	590-18585-1	9/7/2022	**2,300**	--	--	--	--	--	--	--	--	--
		590-19667-1	1/18/2023	--	**15,000**	--	--	--	--	--	--	--	--
		590-22377-1	11/28/2023	--	--	**840**	--	**1.3**	**12**	**5.8**	**1.8**	1.0 U	**7.6**
IW-8	IW-8	590-18585-1	9/8/2022	**20,000**	--	--	--	--	--	--	--	--	--
		590-19667-1	1/19/2023	--	**3,100**	--	--	--	--	--	--	--	--
		590-22377-1	11/28/2023	--	--	**4,000**	--	**7.2**	**320**	**730**	**280**	**200**	**1,000**
IW-9	IW-9	590-18585-1	9/8/2022	**1,700**	--	--	0.060 U	**3.5**	**77**	**120 J**	**18**	1.0 U	**140 J**
		590-19667-1	1/18/2023	--	**1,900**	--	--						
		590-22377-1	11/28/2023	--	--	**690**	--	**2.6**	**35**	**64**	**8.6**	1.0 U	**73**
IW-10	IW-10	590-18585-1	9/7/2022	**7,800**	--	--	--	--	--	--	--	--	--
		590-19667-1	1/19/2023	--	**8,400**	--	--	--	--	--	--	--	--
		590-22377-1	11/29/2023	--	--	**870**	--	**4.3**	**36**	**19**	**2.6**	1.0 U	**21**
IW-12	IW-12	590-18585-1	9/8/2022	**16,000**	--	--	--	--	--	--	--	--	--
		590-19667-1	1/19/2023	--	**2,800**	--	--	--	--	--	--	--	--
		590-22377-1	11/29/2023	--	--	**420 J**	--	**0.94**	**1.7**	2.0 U	1.0 U	1.0 U	3.0 U
IW-14	IW-14	590-18585-1	9/8/2022	**17,000**	--	--	--	--	--	--	--	--	--
		590-19667-1	1/19/2023	--	150 U	--	--	--	--	--	--	--	--
		590-22377-1	11/29/2023	--	--	150 U	--	**0.59**	**10**	**2.2**	**1.3**	1.0 U	**3.6**
IW-15	IW-15	590-18585-1	9/8/2022	**9,200**	--	--	--	--	--	--	--	--	--
		590-19667-1	1/19/2023	--	**450**	--	--	--	--	--	--	--	--
		590-22377-1	11/29/2023	--	--	150 U	--	0.40 U	**4.8**	**4.1**	**1.8**	1.0 U	**5.9**
IW-17	IW-17	590-18585-1	9/8/2022	**6,300**	--	--	--	--	--	--	--	--	--
		590-19667-1	1/19/2023	--	**190**	--	--	--	--	--	--	--	--
		590-22377-1	11/29/2023	--	--	**1,100**	--	**1.2**	**91**	**89**	**13**	**1.1**	**100**
IW-18	IW-18	590-18585-1	9/8/2022	**44,000**	--	--	--	--	--	--	--	--	--
		590-19667-1	1/19/2023	--	**2,600**	--	--	--	--	--	--	--	--
		590-22377-1	11/28/2023	--	--	**420**	--	**0.75**	**4.8**	**4.9**	**1.9**	1.0 U	**6.8**

Table 7
Groundwater Analytical Results
Former Tiger Oil Site
Yakima, Washington

Sample Location	Field Sample ID	Laboratory SDG	Sample Date	Analytical Method, Analyte, Unit of Measurement, Sampling Event									
				NWTPH-Gx			SW-846 6010D	SW-846 8260D					
				Gasoline Range Organics µg/L			Lead	Benzene	Ethylbenzene	m-&p-Xylenes	o-Xylene	Toluene	Xylenes, Total
				Pre-Injection Baseline Sampling (a)	Post-Injection 1 (b)	Post-Injection 2 (c)	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
N1MW-6R	MW-6R	590-18585-1	9/8/2022	**5,900**	--	--	--	--	--	--	--	--	--
	NMW-6R	590-19667-1	1/19/2023	--	**2,200**	--	--	--	--	--	--	--	--
	MW-6R	590-22377-1	11/29/2023	--	--	**3,700**	--	**1.1**	**140**	**280**	**25**	**1.2**	**300**
N1MW-7R	MW-7R	590-18585-1	9/8/2022	**1,900**	--	--	--	--	--	--	--	--	--
	NMW-7R	590-19667-1	1/18/2023	--	**690**	--	--	--	--	--	--	--	--
	MW-7R	590-22377-1	11/28/2023	--	--	**1,200**	--	**1.7**	**40**	**74**	**66**	**38**	**140**
N1MW-8	MW-8	590-18585-1	9/7/2022	**2,400**	--	--	--	--	--	--	--	--	--
	NMW-8	590-19667-1	1/18/2023	--	**230**	--	--	--	--	--	--	--	--
	MW-8	590-22377-1	11/29/2023	--	--	**430**	--	**1.1 J**	**1.4 J**	2.0 UJ	1.0 UJ	1.0 UJ	3.0 UJ
N1MW-9	MW-1R	590-18585-1	9/8/2022	**2,300**	--	--	--	--	--	--	--	--	--
	NMW-9	590-19667-1	1/19/2023	--	**1,400**	--	--	--	--	--	--	--	--
	MW-9	590-22377-1	11/29/2023	--	--	**1,500**	--	**1.1**	**94**	**340**	**130**	**33**	**460**
MTCA Method A Cleanp Level				800/1,000 (d)			0.015	5	700	NL	NL	1,000	1,000

Notes:

Bold text indicates detected analyte**.**

Green shading indicates detected exceedance of associated screening level.

-- = Not analyzed

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

UJ = The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

(a) Pre-injection baseline groundwater sampling took place on September 7 and 8, 2022 after injection wells were installed and developed prior to any injections occuring at the Site.

(b) Samples collected on January 18 and 19, 2023 were collected following the 1st ISCO injection at the site which occurred October 11-19, 2023.

(c) Samples collected on November 28 and 29, 2023 were collected following the 2nd ISCO injection at the site which occurred July 10-13, 2023.

(d) MTCA Method A cleanup level is 1000 µg/L if benzene is not present in groundwater and 800 µg/L if benzene is present in groundwater.

Acronyms/Abbreviations:

µg/L = micrograms per liter

mg/L = milligrams per liter

NL = not listed

Table 8
Groundwater Injection Summary
Former Tiger Oil Site
Yakima, Washington

Injection Well ID	Volume Injected (gal)											
	Injection 1 (10/11/22 - 10/19/22)			Injection 2 (7/10/23 - 7/13/23)			Injection 3 (9/9/24 - 9/13/24)			Totals		
	Design Volume	Volume Injected	Percent of Design Volume (%)	Design Volume	Volume Injected	Percent of Design Volume (%)	Design Volume	Volume Injected	Percent of Design Volume (%)	Design Volume	Volume Injected	Percent of Total Design Volume
IW-1	2,500	1,114	45%	NA	1,805	NA	NA	NA	NA	2,500	2,919	117%
IW-2	2,500	3,196	128%	2,500	2,988	120%	NA	NA	NA	5,000	6,184	124%
IW-3	2,500	2,147	86%	NA	0	NA	2,500	2,452	98%	5,000	4,599	92%
IW-4	2,500	3,215	129%	2,500	3,453	138%	2,500	2,430	97%	7,500	9,098	121%
IW-5	2,500	3,135	125%	2,500	2,661	106%	2,500	NA		7,500	5,796	77%
IW-6	2,500	3,770	151%	NA	0	NA	2,500	2,735	109%	5,000	6,506	130%
IW-7	2,500	3,214	129%	NA	0	NA	2,500	2,759	110%	5,000	5,972	119%
IW-8	2,500	1,319	53%	NA	626	NA	2,500	2,549	102%	5,000	4,494	90%
IW-9	2,500	3,182	127%	2,500	2,805	112%	NA	NA	NA	5,000	5,986	120%
IW-10	2,500	2,505	100%	2,500	1,554	62%	2,500	2,333	93%	7,500	6,393	85%
IW-11	2,500	3,386	135%	2,500	2,736	109%	NA	NA	NA	5,000	6,122	122%
IW-12	2,500	780	31%	2,500	1,967	79%	NA	NA	NA	5,000	2,747	55%
IW-13	2,500	2,559	102%	2,500	2,712	108%	NA	NA	NA	5,000	5,271	105%
IW-14	2,500	886	35%	2,500	1,335	53%	NA	NA	NA	5,000	2,221	44%
IW-15	2,500	3,174	127%	NA	0	NA	2,500	2,709	108%	5,000	5,883	118%
IW-16	2,500	3,344	134%	NA	0	NA	2,500	2,581	103%	5,000	5,925	119%
IW-17	2,500	972	39%	NA	0	NA	2,500	2,355	94%	5,000	3,327	67%
IW-18	2,500	3,511	140%	2,500	390	16%	2,500	2,440	98%	7,500	6,341	85%
Totals:	45,000	45,410		25,000	25,032		27,500	25,343		97,500	95,785	

Notes:

NA = Injection well either not included in given injection design or not injected into during given injection.

APPENDIX A

Supplemental Investigation Boring Logs

Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS [2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50%	"GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50%	"very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30%	"gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15%	"with gravel," "with sand," "with silt," etc.
	≤ 5%	"with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

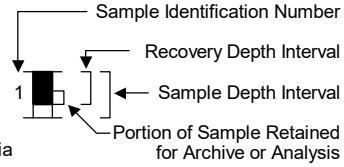
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	2.50-inch O.D., 2.00-inch I.D. WSDOT
h	3.00-inch O.D., 2.375-inch I.D. Mod. California
i	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Vibrocore (Rotosonic/Geoprobe)
5	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Groundwater

▽ Approximate water level at time of drilling (ATD)

▼ Approximate water level at time after drilling/excavation/well

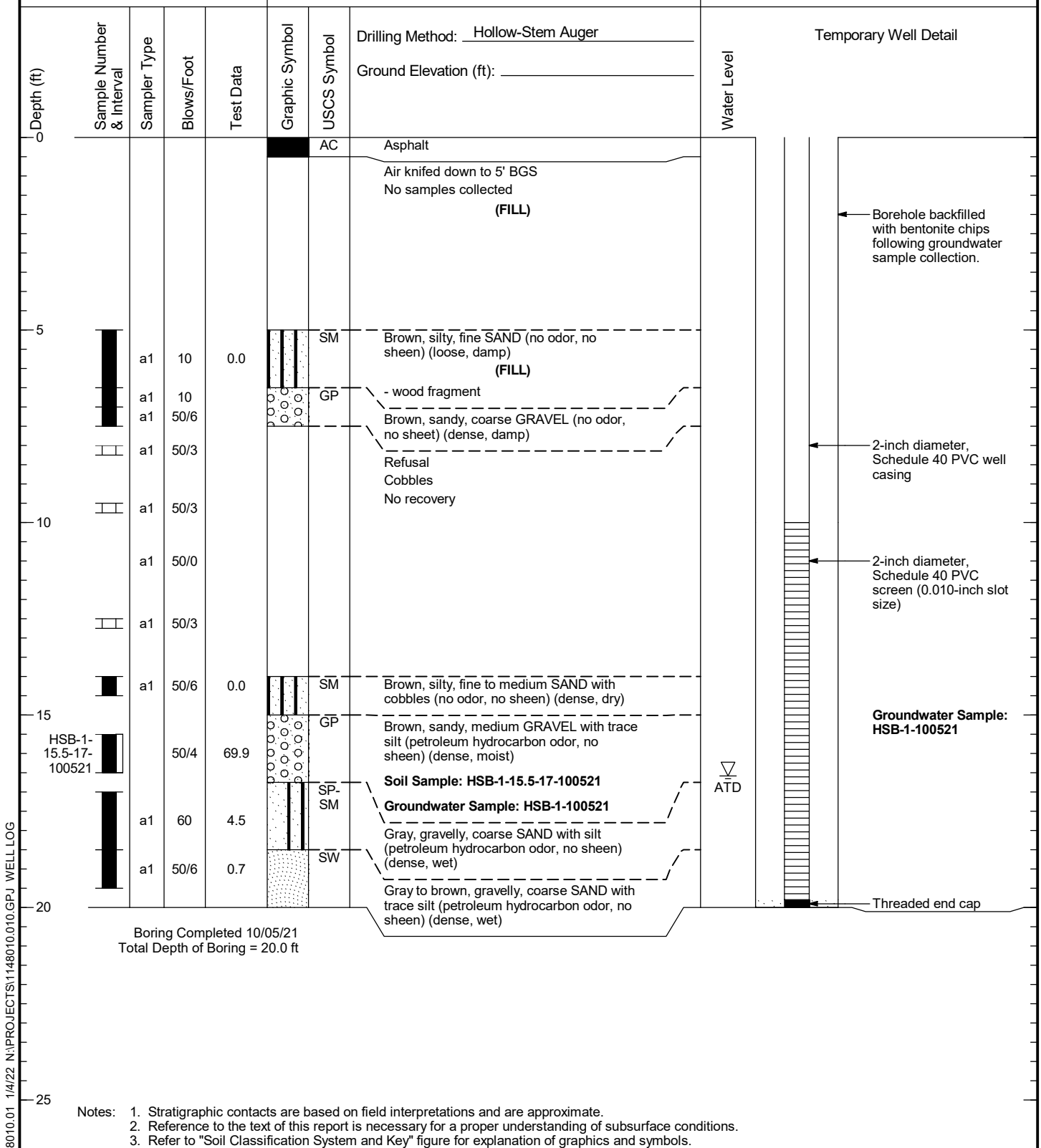
LANDAU ASSOCIATES

Tiger Oil
Yakima, WA

Soil Classification System and Key

Figure
A-1

HSB-1



Boring Completed 10/05/21
Total Depth of Boring = 20.0 ft

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 1/4/22 N:\PROJECTS\1148010.010.GPJ WELL LOG

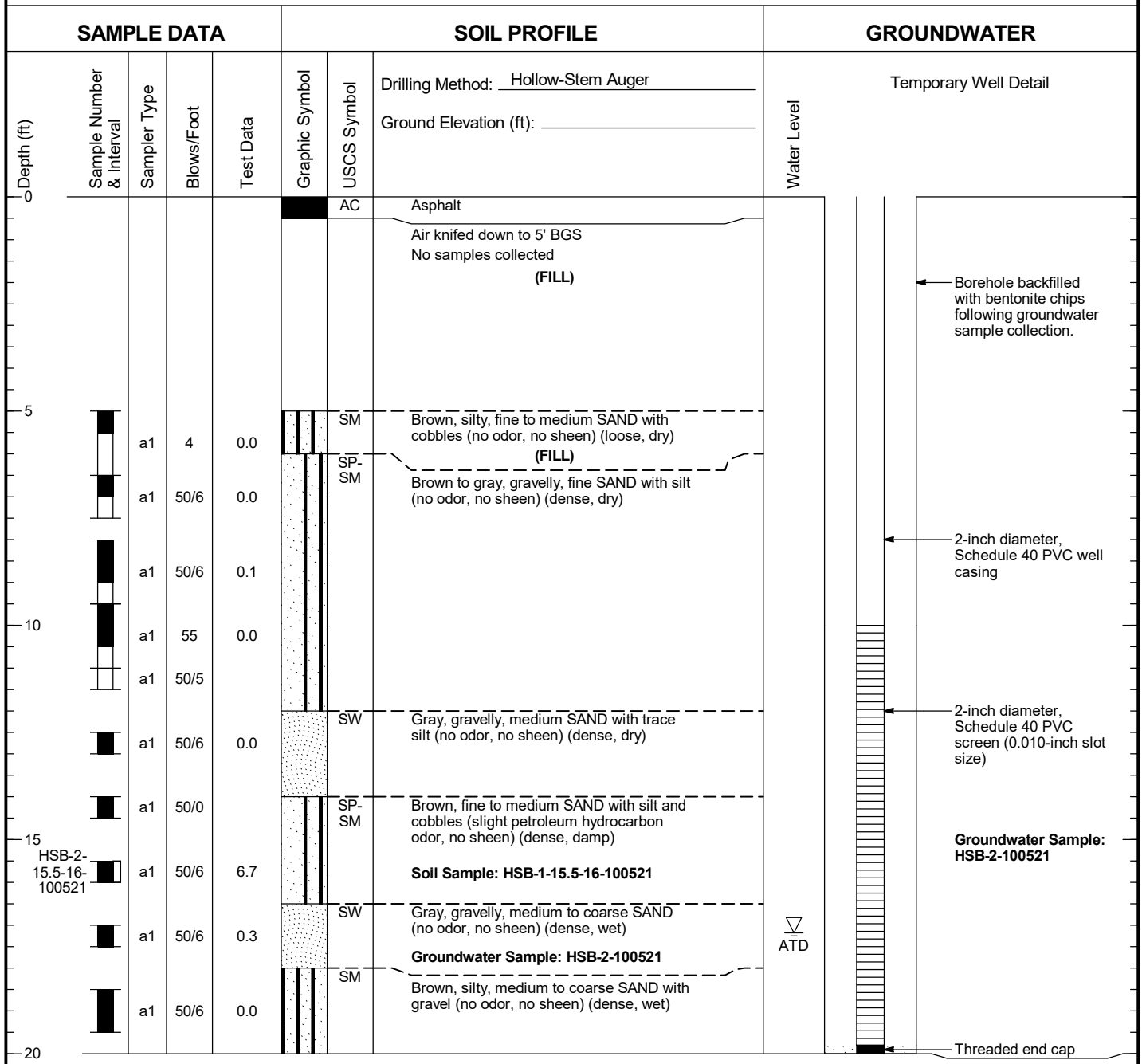
LANDAU ASSOCIATES

Tiger Oil
Yakima, WA

Log of Temporary Well HSB-1

Figure
A-2

HSB-2



Boring Completed 10/05/21
Total Depth of Boring = 20.0 ft

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 1/4/22 N:\PROJECTS\1148010.010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Temporary Well HSB-2	Figure A-3

HSB-3

SAMPLE DATA				SOIL PROFILE			GROUNDWATER	
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Hollow-Stem Auger Ground Elevation (ft):	Water Level
0						AC	Asphalt	
						SM	Brown, silty, fine SAND (no odor, no sheen) (loose, damp) **(FILL)**	
		a1	6	0.0				
		a1	8	0.0				
5		a1	9	0.0				
		a1	73	0.0				
		a1	50/6	0.0		SW-SM	Brown, gravelly, fine to medium SAND with silt (no odor, no sheen) (dense, damp)	
		a1					Refusal Cobbles No recovery	
10		a1						
		a1	50/6	0.0		SW-SM	Brown to gray, gravelly, fine to medium SAND with silt (no odor, no sheen) (dense, damp)	
	HSB-3-13.5-14.5-100621	a1	50/6	29.1		SP-SM	Brown, fine to medium SAND with silt and cobbles (petroleum hydrocarbon odor, no sheen) (dense, dry)	
15		a1	50/5	8.5		SW-SM	**Soil Sample: HSB-3-13.5-14.5-100621** Brown, gravelly, medium to coarse SAND with silt (light petroleum hydrocarbon odor, no sheen) (dense, wet)	ATD
		a1	50/6	8.6		SW	Gray, gravelly, medium to coarse SAND with trace silt (slight petroleum hydrocarbon odor, no sheen) (dense, wet)	
		a1	50/6	1.6				
20								
25								

Temporary Well Detail

- Borehole backfilled with bentonite chips following groundwater sample collection.
- 2-inch diameter, Schedule 40 PVC well casing
- 2-inch diameter, Schedule 40 PVC screen (0.010-inch slot size)
- **Groundwater Sample: HSB-3-100621**
- Threaded end cap

Boring Completed 10/06/21
Total Depth of Boring = 19.5 ft

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 1/4/22 N:\PROJECTS\1148010.010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil
Yakima, WA

Log of Temporary Well HSB-3

Figure
A-4

HSB-4

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Hollow-Stem Auger Ground Elevation (ft):	Water Level
0						GM	Gravel	
						SM	Brown, silty, fine SAND with cobbles (no odor, no sheen) (loose to medium dense, damp) **(FILL)**	
5		a1	14	0.0				
	HSB-4-7-8-100621	a1	50	0.0		SP-SM	Brown, fine to medium SAND with silt and cobbles (no odor, no sheen) (dense, dry) **Soil Sample: HSB-4-7-8-100621**	
10		a1	50/6	0.0				
	HSB-4-11-12-100621		50/6	0.0			**Soil Sample: HSB-4-11-12-100621**	
		a1	50/6	0.0				
		a1	50/6			SP-SM	Brown, gravelly, medium to coarse SAND with silt (no odor, no sheen) (dense, wet)	
15								▽ ATD
		a1	60	0.0				
20								
25								

Boring Completed 10/06/21
Total Depth of Boring = 17.0 ft

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 1/4/22 N:\PROJECTS\1148010.010.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Boring HSB-4	Figure A-5

HSB-5

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Hollow-Stem Auger Ground Elevation (ft):	Water Level
0						GM	Coarse gravel	
		a1	4	0.0		SM	Brown, silty, fine to medium SAND (no odor, no sheen) (loose, damp) **(FILL)**	
		a1	6	0.0				
5		a1	4	0.0				
		a1	4	0.0				
	HSB-5-7.5-9-100621		50/6	0.0			- with gravel	
						SP-SM	Brown to gray, medium SAND with silt and cobbles (no odor, no sheen) (dense, dry) **Soil Sample: HSB-5-7.5-9-100621**	
10		a1	50/6	0.0				
		a1	50/4	0.0				
		a1	50/0					
	HSB-5-13.5-14.5-100621		57	0.0		SW	Brown to light brown, gravelly, medium to coarse SAND with trace silt (no odor, no sheen) (dense, dry) **Soil Sample: HSB-5-13.5-14.5-100621**	
15		a1	60	0.0				ATD
20								
25								

Boring Completed 10/06/21
Total Depth of Boring = 16.5 ft

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 1/4/22 N:\PROJECTS\1148010.010.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Boring HSB-5	Figure A-6

NIMW-6R

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Hollow-Stem Auger Ground Elevation (ft):	Water Level
0						AC	Asphalt Air knifed down to 5' BGS No samples collected **(FILL)**	
5							Refusal - No lithologic data collected due to hard drilling	
10		a1	50/6	0.0		SP-SM	Gray, fine to medium SAND with silt and cobbles (no odor) (loose, dry)	
		a1	50/6	0.0		SP	Brown, gravelly, coarse SAND with trace silt (no odor) (loose, dry)	
		a1	50/6	68.5				
15	NIMW-6R-14.5-15-100421	a1	45	1.5		GW	**Soil Sample: NIMW-6R-14.5-15-100421** Brown, sandy, coarse GRAVEL (petroleum hydrocarbon odor, no sheen) (loose, wet)	ATD
		a1	50/6	6.1		SP	Brown, gravelly, coarse SAND (no odor, no sheen) (loose, wet)	
						SP-SM	Brown, medium to coarse SAND with silt and cobbles (no odor, no sheen) (loose, wet)	
		a1	50/6	0.0				
20								
25								

Monitoring Well Detail
(DOE#: BMM-919)

- Flush-mounted monument with locking cap
- Concrete Seal
- Bentonite chips
- 2-inch diameter, Schedule 40 PVC well casing
- 2/12 silica sand pack
- 2-inch diameter, Schedule 40 PVC screen (0.010-inch slot size)
- Threaded end cap
- Native Backfill

Boring Completed 10/04/21
Total Depth of Boring = 20.5 ft

Monitoring Well Completed 10/04/21
Total Depth of Monitoring Well = 20.0 ft

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 1/4/22 N:\PROJECTS\1148010.010.GPJ WELL LOG

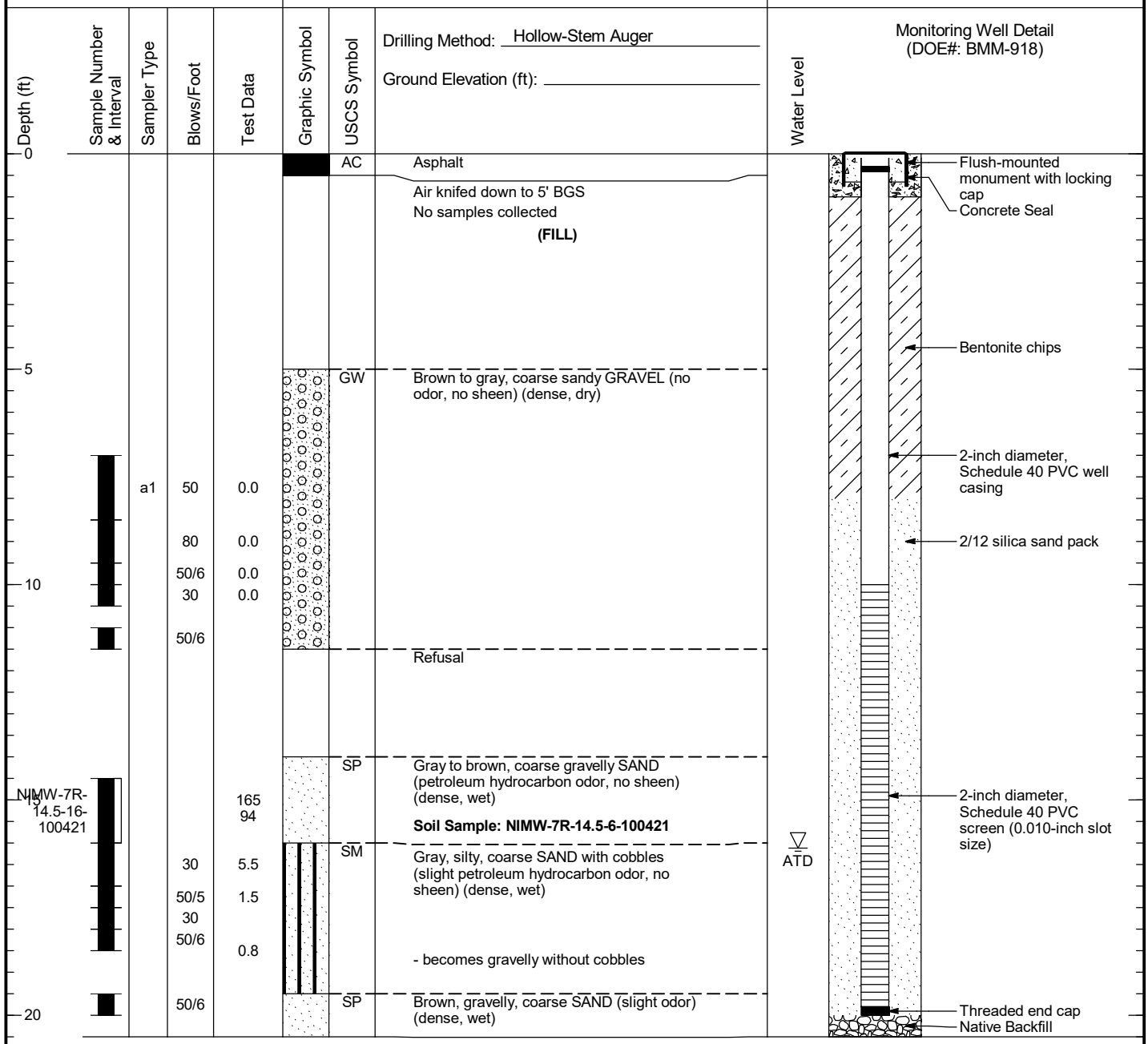
LANDAU ASSOCIATES

Tiger Oil
Yakima, WA

Log of Monitoring Well NIMW-6R

Figure
A-7

NIMW-7R



Boring Completed 10/04/21
Total Depth of Boring = 20.5 ft

Monitoring Well Completed 10/04/21
Total Depth of Monitoring Well = 20.0 ft

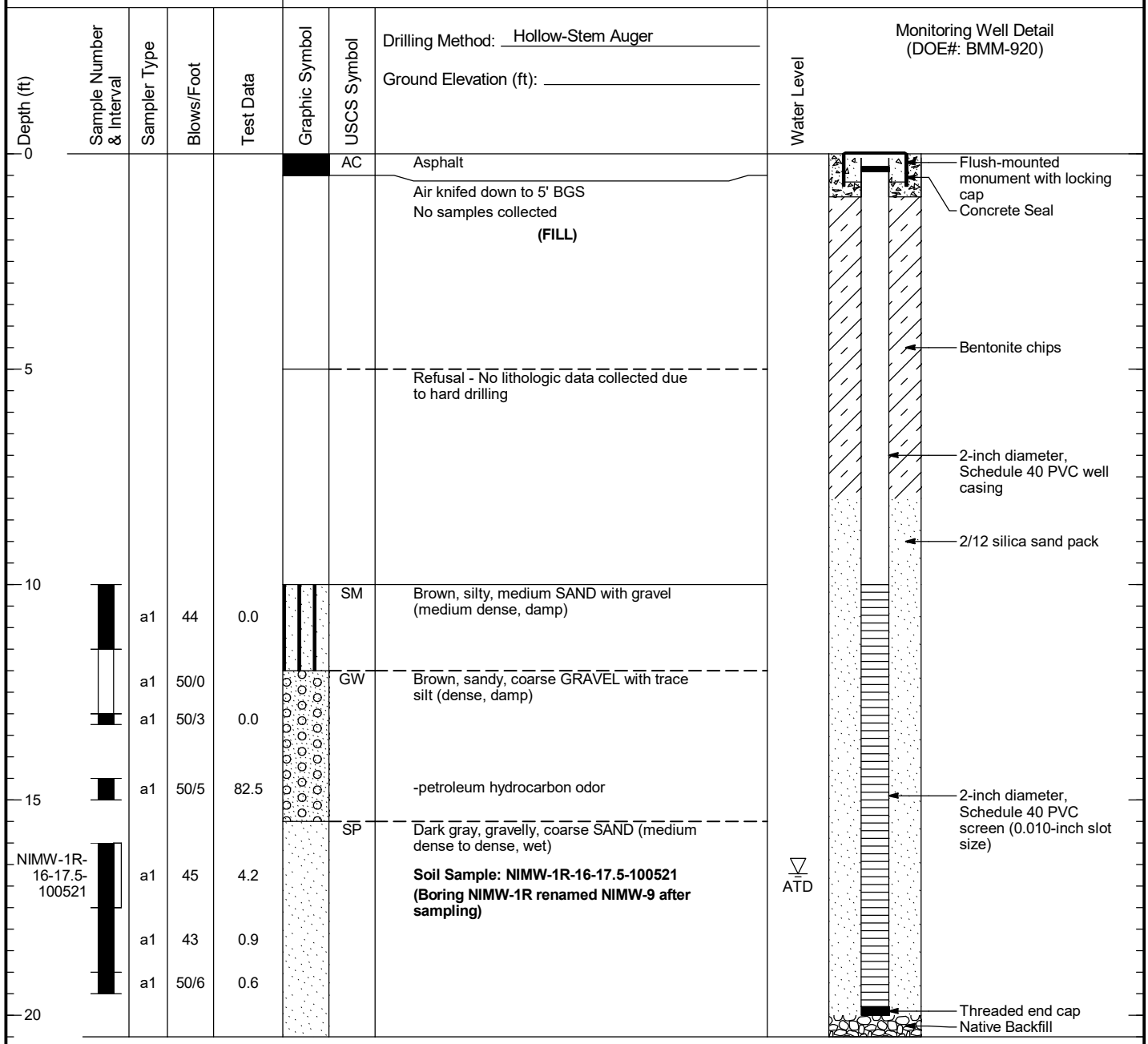
Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 1/4/22 N:\PROJECTS\1148010.010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Monitoring Well NIMW-7R	Figure A-8

NIMW-9



Boring Completed 10/05/21
Total Depth of Boring = 20.5 ft

Monitoring Well Completed 10/05/21
Total Depth of Monitoring Well = 20.0 ft

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 1/4/22 N:\PROJECTS\1148010.010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Monitoring Well NIMW-9	Figure A-9

APPENDIX B

Injection Well Boring Logs

Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS [2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with low plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand; elastic silt
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50%	"GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50%	"very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30%	"gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15%	"with gravel," "with sand," "with silt," etc.
	≤ 5%	"with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

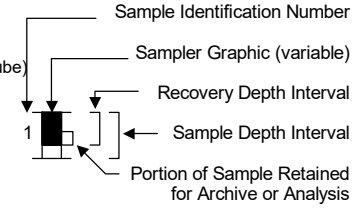
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE & METHOD

Graphic	Code	Description
☒	a	3.25-in OD, 2.42-in ID Split Spoon
⧓	b	2.00-in OD, 1.50-in ID Split Spoon
◧	c	Thin-Wall Sampler (aka Shelby Tube)
◪	d	Grab Sample
◧	e	Single-Tube Core Barrel
◧	f	Double-Tube Core Barrel
☒	g	2.50-in OD, 2.00-in ID WSDOT
☒	h	3.00-in OD, 2.37-in ID Mod. Calif.
☒	i	Other - See text if applicable
	1	300-lb Hammer, 30-inch Drop
	2	140-lb Hammer, 30-inch Drop
	3	Direct Push
	4	Vibrocore
	5	Other - See text if applicable
	6	Piston Extraction

SAMPLE NUMBER & INTERVAL



Groundwater

- ▽ Approximate water level at time of drilling (ATD)
- ▼ Approximate water level at time after drilling/excavation/well

Field and Lab Test Data

Code	Description
WOR	Weight of Rod
WOH	Weight of Hammer
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
UU	Triaxial Unconsolidated Undrained (UU) Strength
CU	Triaxial Consolidated Undrained (CU) Strength
Consol	1-D Consolidation Test
Perm	Permeability Test
CA	Chemical Analysis

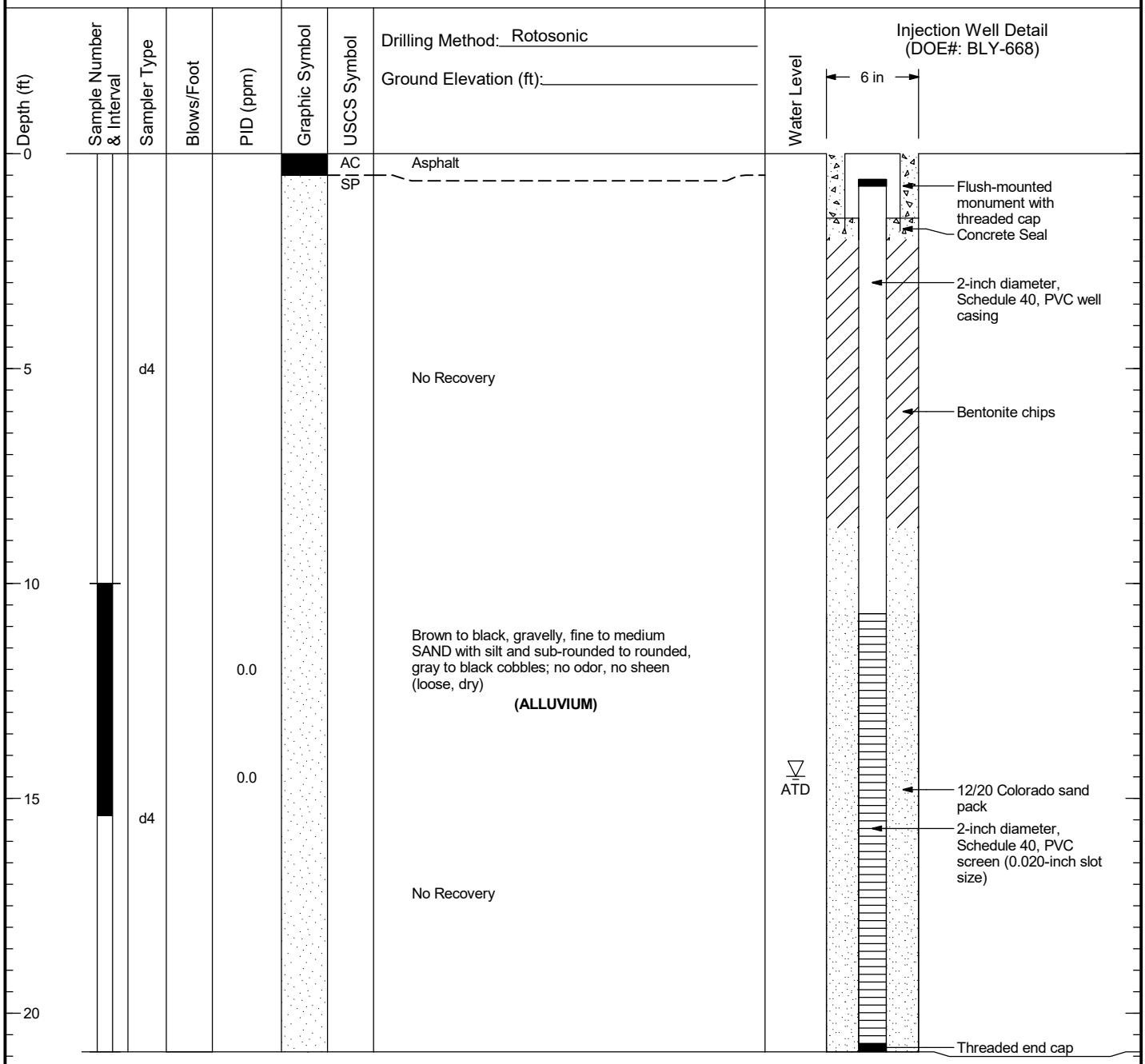
LANDAU ASSOCIATES

Tiger Oil
Yakima, WA

Soil Classification System and Key

Figure B-1

IW-1



Boring Completed 08/01/22
Total Depth of Boring = 20.9 ft.

Injection Well Completed 08/01/22
Total Depth of Injection Well = 20.9 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-1	Figure B-2

IW-2

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Rotosonic

Ground Elevation (ft): _____

Injection Well Detail
(DOE#: BLY-667)

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0				0.1		AC	
						ML	
				0.8		GM	
5							
10		d4					
15							ATD
20							
25							

Asphalt

Black, gravelly SILT with asphalt; no odor, no sheen (stiff to very stiff, moist)
(FILL)

Brown to black, silty GRAVEL with cobbles; no odor, no sheen (loose, moist to wet)
(ALLUVIUM)

No recovery

6 in

Flush-mounted monument with threaded cap

Concrete Seal

2-inch diameter, Schedule 40, PVC well casing

Bentonite chips

12/20 Colorado sand pack

2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)

Threaded end cap

Boring Completed 08/01/22
Total Depth of Boring = 20.8 ft.

Injection Well Completed 08/01/22
Total Depth of Injection Well = 20.8 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

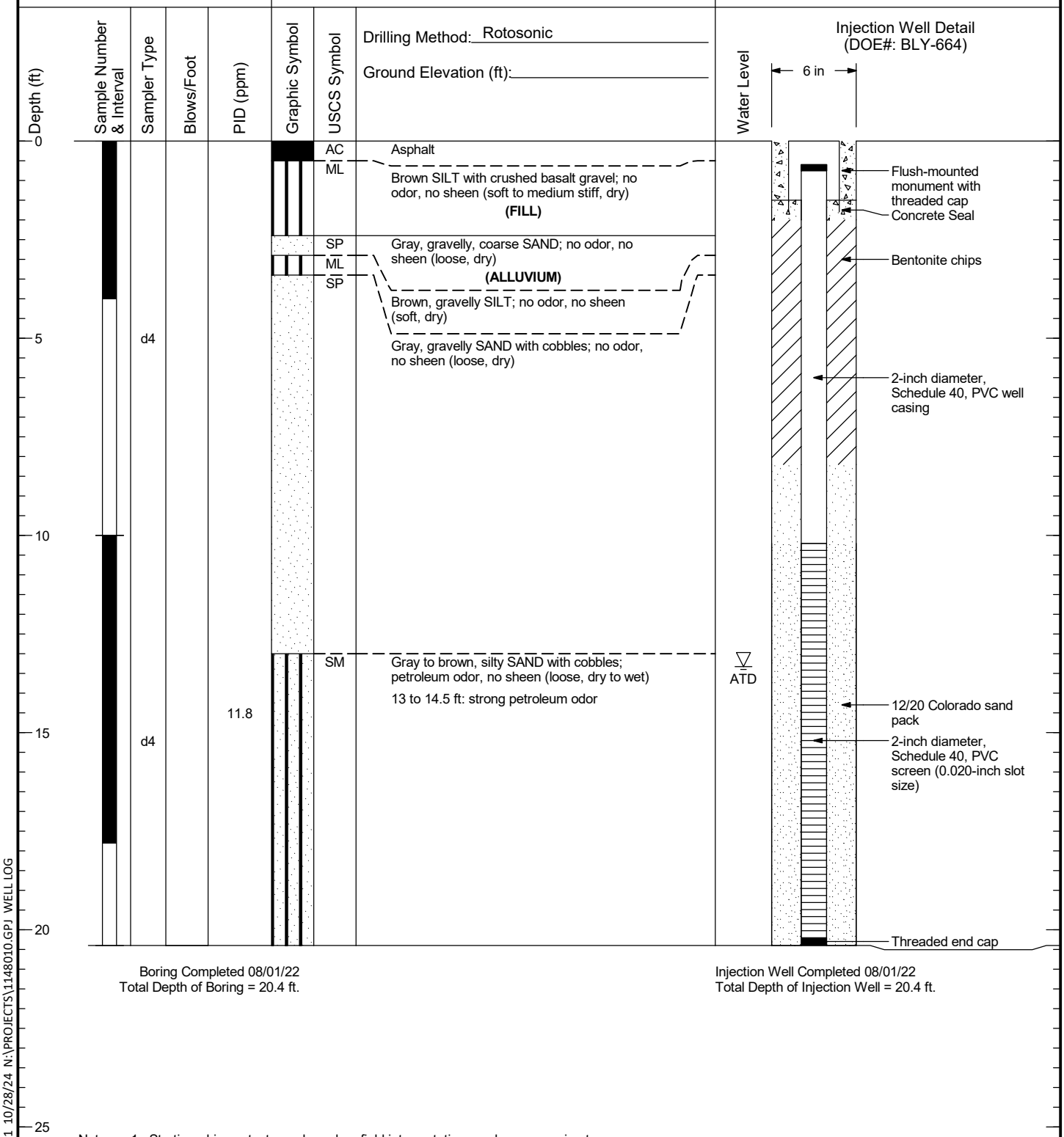
LANDAU ASSOCIATES

Tiger Oil
Yakima, WA

Log of Injection Well IW-2

Figure
B-3

IW-3



Boring Completed 08/01/22
Total Depth of Boring = 20.4 ft.

Injection Well Completed 08/01/22
Total Depth of Injection Well = 20.4 ft.

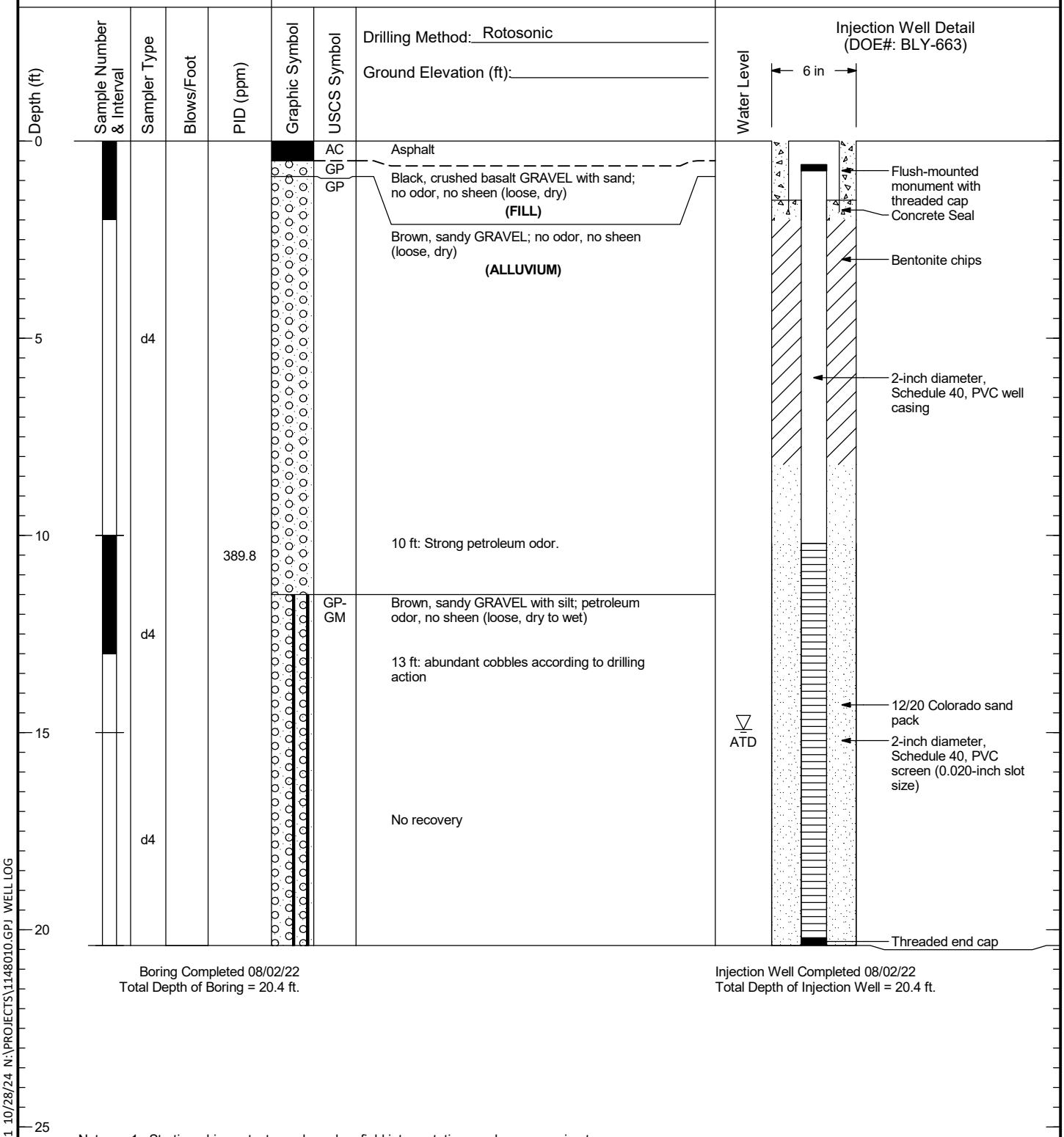
Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-3	Figure B-4

IW-4



Boring Completed 08/02/22
Total Depth of Boring = 20.4 ft.

Injection Well Completed 08/02/22
Total Depth of Injection Well = 20.4 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-4	Figure B-5

IW-5

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

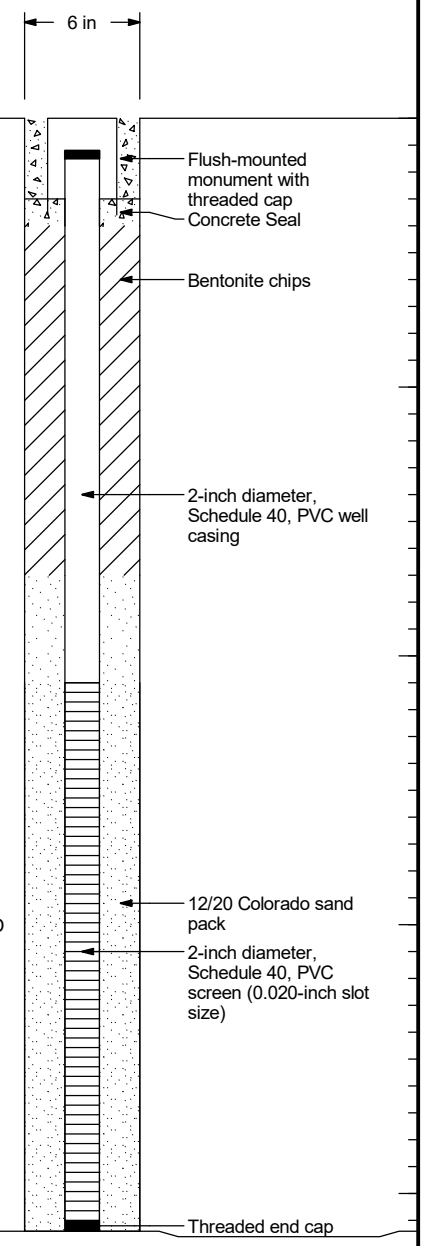
Drilling Method: Rotosonic

Ground Elevation (ft): _____

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Description
0						AC	Asphalt
						GP	Black, sandy, crushed basalt GRAVEL; no odor, no sheen (loose, dry) **(FILL)**
						ML	Brown, sub-rounded, gravelly SILT with sand; no odor, no sheen (loose, moist) **(ALLUVIUM)**
5		d4				SP-SM	Gray, gravelly, fine to medium SAND with silt and cobbles; no odor, no sheen (loose, dry)
						GP-GM	Brown to gray, sandy GRAVEL with silt; slight petroleum odor, no sheen (loose, moist to wet)
10		d4		0.0			
				0.1			14 ft: becomes wet
15							15 ft: gray to black
		d4		0.1			
20							
25							

Water Level: ATD

Injection Well Detail (DOE#: BLY-666)



Boring Completed 08/02/22
Total Depth of Boring = 20.7 ft.

Injection Well Completed 08/02/22
Total Depth of Injection Well = 20.7 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

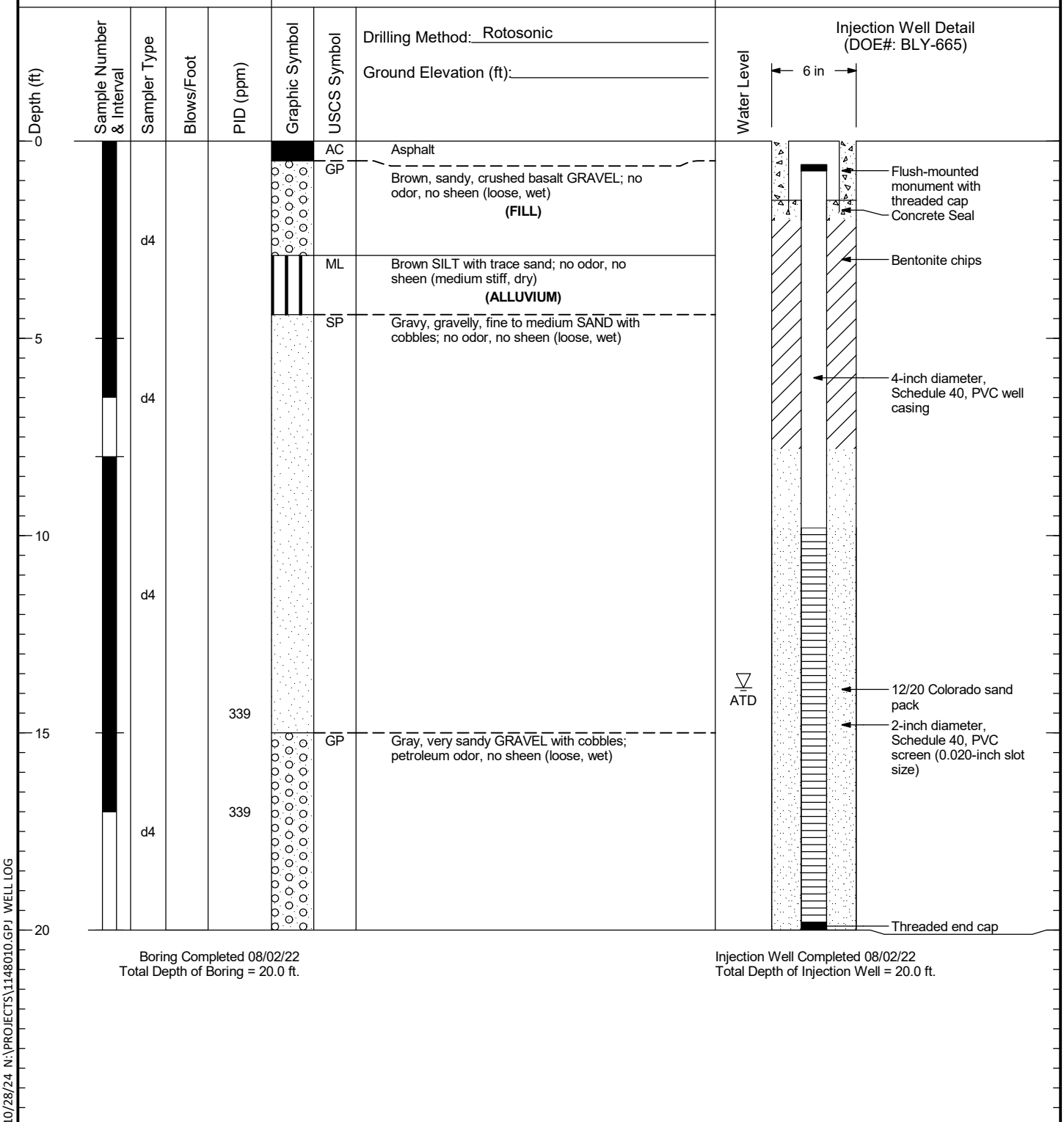
LANDAU ASSOCIATES

Tiger Oil
Yakima, WA

Log of Injection Well IW-5

Figure
B-6

IW-6



Boring Completed 08/02/22
Total Depth of Boring = 20.0 ft.

Injection Well Completed 08/02/22
Total Depth of Injection Well = 20.0 ft.

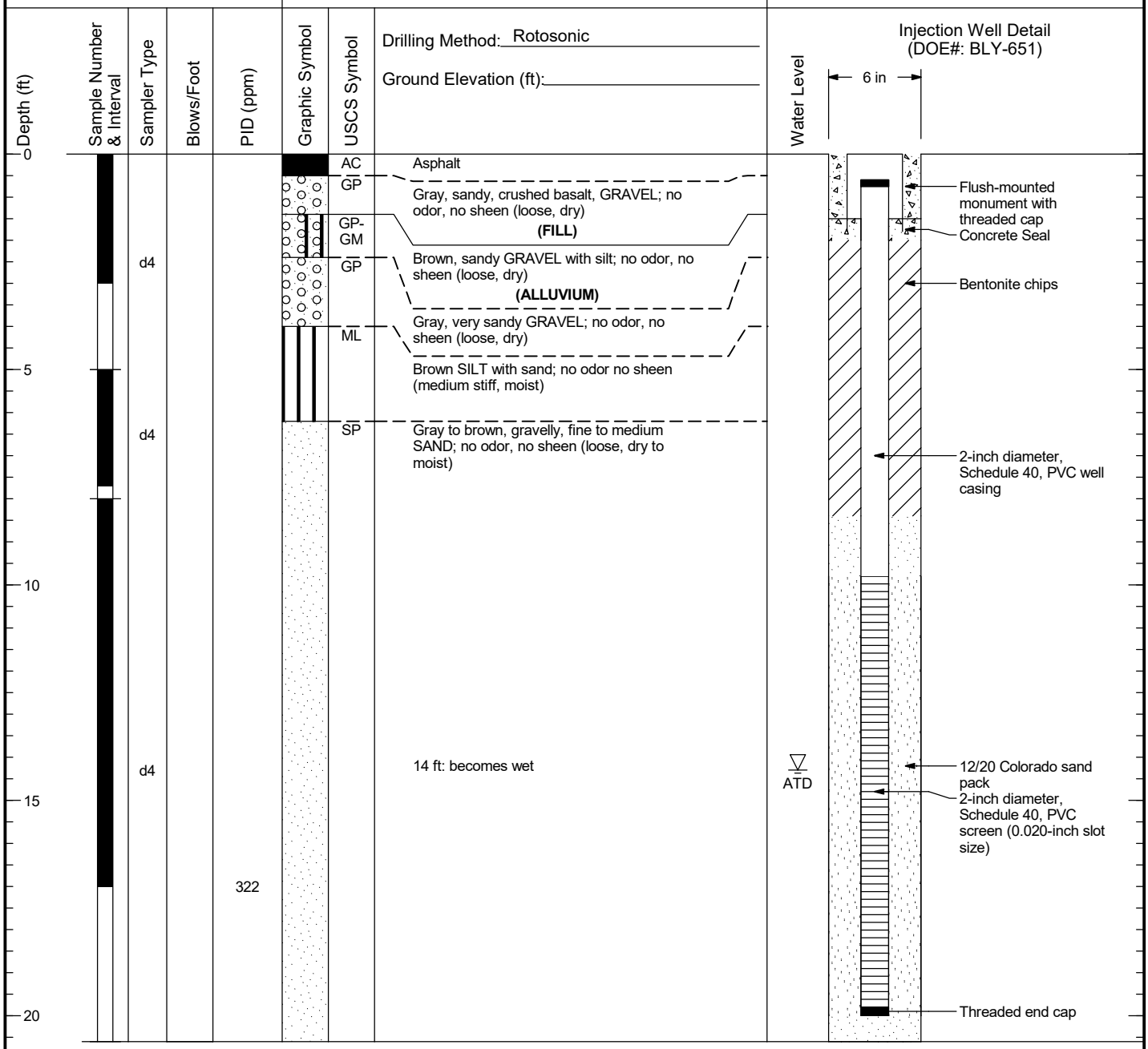
Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-6	Figure B-7

IW-7



Boring Completed 08/02/22
Total Depth of Boring = 20.6 ft.

Injection Well Completed 08/03/22
Total Depth of Injection Well = 20.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-7	Figure B-8

IW-8

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Hollow-Stem Auger

Ground Elevation (ft): _____

No samples collected. Lithology based on proximate borings/wells as well as soil cuttings.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Description
0						AC	Asphalt
						GP	Gray, sandy, crushed basalt GRAVEL; no odor, no sheen (loose, dry) **(FILL)**
						SP	Tan, fine to medium SAND with gravel; no odor, no sheen (loose, dry) **(ALLUVIUM)**
5							5 to 9 ft: Gravelly and with cobbles
						GP	Tan to brown GRAVEL with sand; no odor, no sheen (loose, dry to moist)
10				0.0			
				0.0			
15							14 ft: petroleum odor
				149.4			
20							
25							

Water Level: ATD

Injection Well Detail (DOE#: BNE-723)

8 in

- Flush-mounted monument with threaded cap
- Concrete Seal
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 12/20 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 08/31/22
Total Depth of Boring = 20.5 ft.

Injection Well Completed 08/31/22
Total Depth of Injection Well = 20.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-8	Figure B-9

IW-9

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Hollow-Stem Auger

Ground Elevation (ft): _____

No samples collected. Lithology based on proximate borings/wells as well as soil cuttings.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Description
0						AC	Asphalt
						GP	Black, sandy, crushed basalt GRAVEL; no odor, no sheen (loose, dry) **(FILL)**
						ML	Brown, gravelly SILT with sand; no odor no sheen (medium stiff, moist) **(ALLUVIUM)**
5						SP-SM	Gray, gravelly, fine to medium SAND with silt; no odor, no sheen (loose, dry)
10						GP	Gray to black GRAVEL with sand and cobbles; slight petroleum odor no sheen (loose, dry to moist)
15							Very little fines recovery in cuttings, not enough volume for PID samples
20							
25							

Water Level: ATD

Injection Well Detail (DOE#: BNE-727)

8 in

- Flush-mounted monument with threaded cap
- Concrete Seal
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 12/20 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 08/29/22
Total Depth of Boring = 21.0 ft.

Injection Well Completed 08/29/22
Total Depth of Injection Well = 20.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-9	Figure B-10

IW-10

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Hollow-Stem Auger

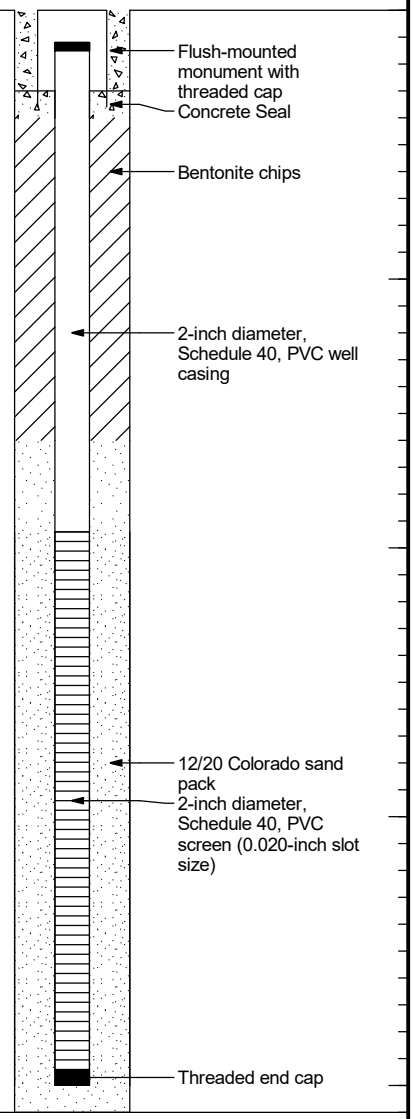
Ground Elevation (ft): _____

No samples collected. Lithology based on proximate borings/wells as well as soil cuttings.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Description
0						AC	Asphalt
						GP	Black, crushed basalt GRAVEL sand; no odor, no sheen (loose, dry) **(FILL)**
						GP	Brown, very sandy GRAVEL; no odor, no sheen (loose, dry) **(ALLUVIUM)**
10						GP	Gray to black, sandy GRAVEL with cobbles; slight petroleum odor, no sheen (loose, dry to moist)
15							Very little fines recovery in cuttings, not enough volume for PID samples
20							
25							

Water Level: ATD

Injection Well Detail (DOE#: BNE-728)



Boring Completed 08/29/22
Total Depth of Boring = 20.5 ft.

Injection Well Completed 08/29/22
Total Depth of Injection Well = 20.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-10	Figure B-11

IW-11

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Hollow-Stem Auger

Ground Elevation (ft): _____

No samples collected. Lithology based on proximate borings/wells as well as soil cuttings.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Description
0						AC	Asphalt
						GP	Black, crushed basalt GRAVEL with sand; no odor, no sheen (loose, dry) **(FILL)**
						SP	Tan to brown, fine to medium SAND with gravel; no odor, no sheen (loose, dry) **(ALLUVIUM)**
5						GP	Gray to black, sandy GRAVEL; slight petroleum odor, no sheen (loose, dry to moist)
10							
15							Very little fines recovery in cuttings, not enough volume for PID samples
20							
25							

Water Level: ATD

Injection Well Detail (DOE#: BNE-729)

8 in

- Flush-mounted monument with threaded cap
- Concrete Seal
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 12/20 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 08/29/22
Total Depth of Boring = 20.5 ft.

Injection Well Completed 08/29/22
Total Depth of Injection Well = 20.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-11	Figure B-12

IW-12

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Hollow-Stem Auger

Ground Elevation (ft): _____

No samples collected. Lithology based on proximate borings/wells as well as soil cuttings.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Description
0						AC	Asphalt
						GP	Gray, sandy, crushed basalt GRAVEL; no odor, no sheen (loose, dry) **(FILL)**
						SP	Gray to brown, fine to medium SAND with gravel and cobbles; no odor, no sheen (loose, dry) **(ALLUVIUM)**
5							
						GP	Gray to black GRAVEL with sand and cobbles; petroleum odor, no sheen (loose, dry to moist)
10				0.0			
				0.3			
15				49			16 ft: Petroleum odor
20							
25							

Water Level: ATD

Injection Well Detail (DOE#: BNE-730)

8 in

- Flush-mounted monument with threaded cap
- Concrete Seal
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 12/20 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 08/30/22
Total Depth of Boring = 20.0 ft.

Injection Well Completed 08/30/22
Total Depth of Injection Well = 20.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1148010.01 10/28/24 N:\PROJECTS\1148010.GPJ WELL LOG

LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-12	Figure B-13

IW-13

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0						AC	Asphalt
						GP	Gray, sandy, crushed basalt GRAVEL; no odor, no sheen (loose, dry) **(FILL)**
						SP	Tan to brown, fine to medium SAND with gravel; no odor, no sheen (loose, dry) **(ALLUVIUM)**
5				0.0		GP	Gray to black, sandy GRAVEL with cobbles; slight petroleum odor, no sheen (loose, dry to moist)
10							
15				1.2			Very little fines recovery in cuttings, not enough volume for PID sample at depth
20							ATD
25							

Drilling Method: Hollow-Stem Auger

Ground Elevation (ft): _____

No samples collected. Lithology based on proximate borings/wells as well as soil cuttings.

Injection Well Detail
(DOE#: BNE-731)

8 in

- Flush-mounted monument with threaded cap
- Concrete Seal
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 12/20 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 08/30/22
Total Depth of Boring = 20.5 ft.

Injection Well Completed 08/30/22
Total Depth of Injection Well = 20.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-13	Figure B-14

IW-14

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Hollow-Stem Auger

Ground Elevation (ft): _____

No samples collected. Lithology based on proximate borings/wells as well as soil cuttings.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Description
0						AC	Asphalt
						ML	Brown SILT with crushed basalt gravel; no odor, no sheen (medium stiff, moist) **(FILL)**
						SP	Gray, coarse SAND with gravel; no odor, no sheen (loose, dry) **(ALLUVIUM)**
5						GP	Gray to black, GRAVEL with sand and cobbles; petroleum odor, no sheen (loose, dry to moist)
				0.0			
10							
15				55			
20							
25							

Water Level: ATD

Injection Well Detail (DOE#: BNE-732)

8 in

- Flush-mounted monument with threaded cap
- Concrete Seal
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 12/20 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 08/30/22
Total Depth of Boring = 21.0 ft.

Injection Well Completed 08/30/22
Total Depth of Injection Well = 20.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-14	Figure B-15

IW-15

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Hollow-Stem Auger

Ground Elevation (ft): _____

No samples collected. Lithology based on proximate borings/wells as well as soil cuttings.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Description
0						AC	Asphalt
						GP	Gray, sandy, crushed basalt GRAVEL; no odor, no sheen (loose, dry) **(FILL)**
						SP	Gray, very gravelly, fine to medium SAND; no odor, no sheen (loose, dry) **(ALLUVIUM)**
5						GP	Gray to black, sandy GRAVEL with cobbles; slight petroleum odor, no sheen (loose, dry to wet)
10				0.0			
15				7.3			
20							
25							

Water Level: ATD

Injection Well Detail (DOE#: BNE-734)

8 in

- Flush-mounted monument with threaded cap
- Concrete Seal
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 12/20 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 08/31/22
Total Depth of Boring = 20.5 ft.

Injection Well Completed 08/31/22
Total Depth of Injection Well = 20.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-15	Figure B-16

IW-16

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Hollow-Stem Auger

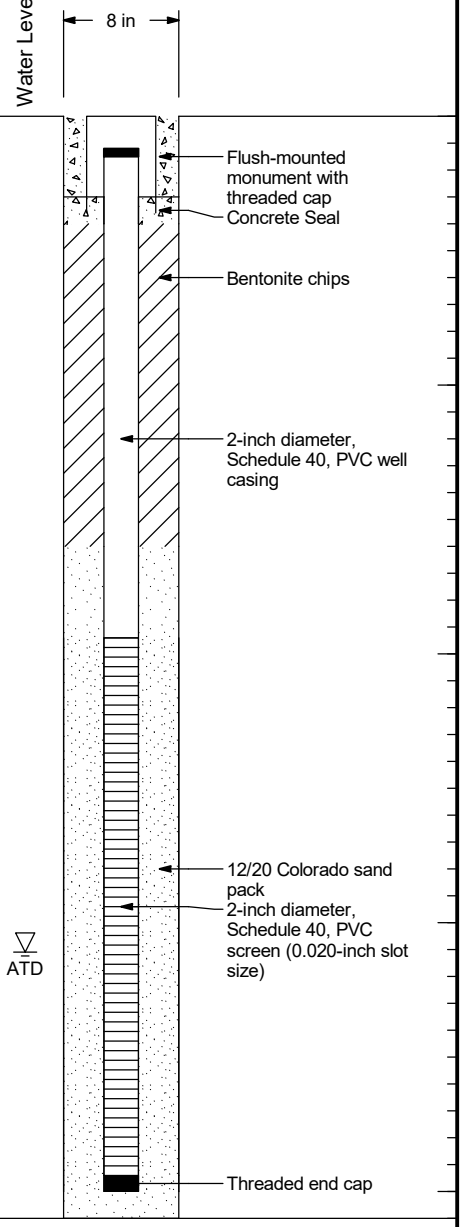
Ground Elevation (ft): _____

No samples collected. Lithology based on proximate borings/wells as well as soil cuttings.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Description
0						AC	Asphalt
						GP	Gray, sandy, crushed basalt GRAVEL; no odor, no sheen (loose, dry) **(FILL)**
						GP	Gray, very gravelly, fine to medium SAND; no odor, no sheen (loose, dry) **(ALLUVIUM)**
5						GP	Gray to black, sandy GRAVEL with cobbles; sligth petroleum odor, no sheen (loose, dry to wet)
10				0.0			
15				21.3			
20							
25							

Water Level: ATD

Injection Well Detail (DOE#: BNE-735)



Boring Completed 08/31/22
Total Depth of Boring = 20.5 ft.

Injection Well Completed 08/31/22
Total Depth of Injection Well = 20.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-16	Figure B-17

IW-17

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level

Drilling Method: Hollow-Stem Auger

Ground Elevation (ft): _____

No samples collected. Lithology based on proximate borings/wells as well as soil cuttings.

Depth (ft)	PID (ppm)	USCS Symbol	
0		AC	Heavily weathered asphalt
		ML	Brown SILT with gravel and fine to medium sand; no odor, no sheen (medium stiff, moist) **(ALLUVIUM)**
		SP	Gray to black, very gravelly SAND with cobbles; sligth petroleum odor, no sheen (loose, dry to moist)
10	0.0		
	1.1		
	6.0		

ATD

Injection Well Detail
(DOE#: BNE-736)

8 in

- Flush-mounted monument with threaded cap
- Concrete Seal
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 12/20 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 09/01/22
Total Depth of Boring = 18.5 ft.

Injection Well Completed 09/01/22
Total Depth of Injection Well = 18.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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LANDAU ASSOCIATES

Tiger Oil Yakima, WA	Log of Injection Well IW-17	Figure B-18

IW-18

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Hollow-Stem Auger

Ground Elevation (ft): _____

No samples collected. Lithology based on proximate borings/wells as well as soil cuttings.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Description
0						AC	Asphalt
						ML	Brown SILT with crushed basalt gravel; no odor, no sheen (soft to medium stiff, moist) **(FILL)**
						SP	Gray, gravelly, fine to medium SAND with cobbles; no odor, no sheen (loose, dry) **(ALLUVIUM)**
5							
						GP	Gray to black, sandy GRAVEL with cobbles; petroleum odor, no sheen (loose, dry to moist)
10				100.4			
15				50.0			
20							
25							

Water Level: ATD

Injection Well Detail (DOE#: BNE-737)

8 in

- Flush-mounted monument with threaded cap
- Concrete Seal
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 12/20 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 09/01/22
Total Depth of Boring = 20.5 ft.

Injection Well Completed 09/02/22
Total Depth of Injection Well = 20.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Tiger Oil Yakima, WA	Log of Injection Well IW-18	Figure B-19