# Periodic Review
# K Ply

## 439 Marine Drive, Port Angeles, Clallam County, WA 98363
## Facility Site ID: 1002, Cleanup Site ID: 28

**Toxics Cleanup Program, Southwest Region**

Washington State Department of Ecology
Lacey, Washington

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# Document Information

This document is available on the Department of Ecology's K Ply cleanup site page.[1]

**Related Information**

- Facility Site ID: 1002
- Cleanup Site ID: 28

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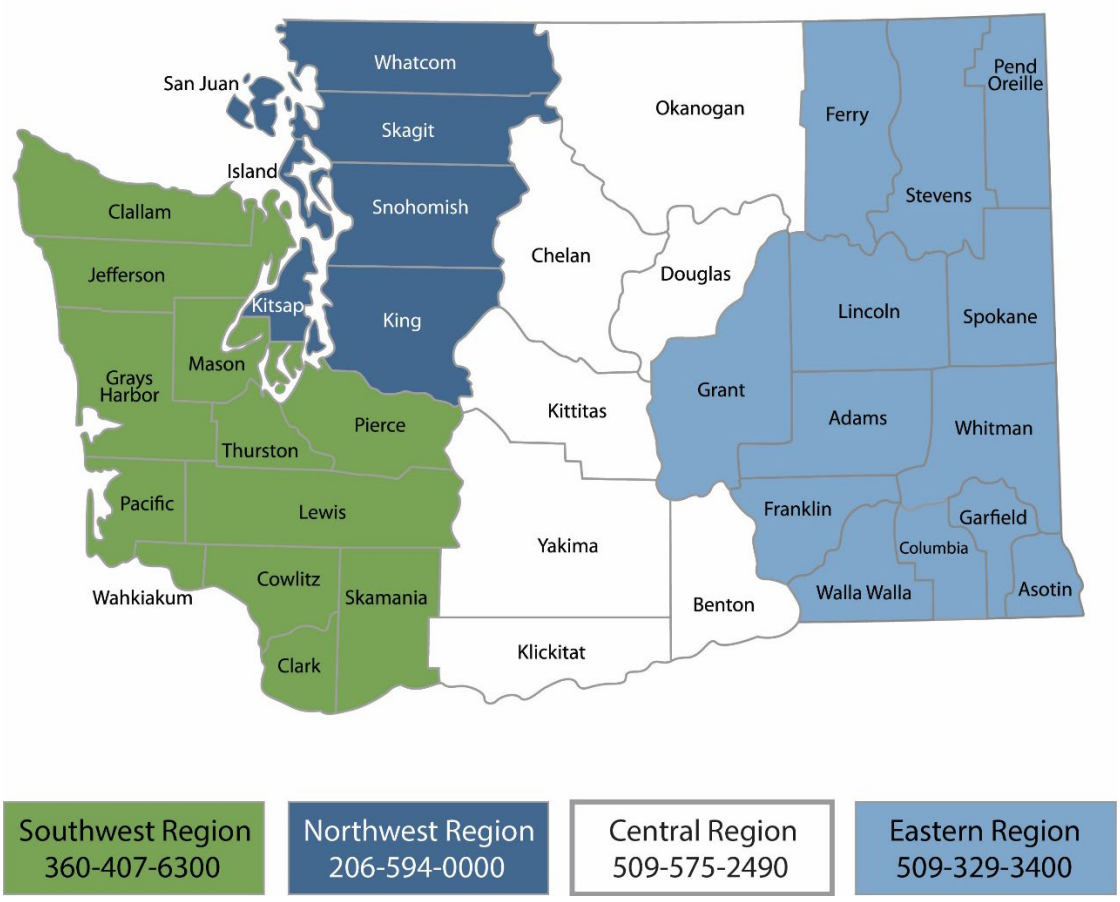
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[1] https://apps.ecology.wa.gov/cleanupsearch/site/28
[2] https://ecology.wa.gov/About-us/Who-we-are/Our-Programs/Toxics-Cleanup
[3] https://ecology.wa.gov/About-us/Accountability-transparency/Our-website/Accessibility

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# Introduction

The Washington State Department of Ecology (Ecology) reviewed post-cleanup site conditions and monitoring data to ensure human health and the environment are being protected at the K Ply cleanup site (Site). Site cleanup was implemented under the Model Toxics Control Act (MTCA) regulations, Chapter 173-340 Washington Administrative Code (WAC). This is the first periodic review conducted for this Site.

Cleanup activities at this Site are being completed under an agreed order and consist of soil excavation, bio-amendment applications in both soil and groundwater, and monitoring of soil and groundwater. Residual concentrations of petroleum hydrocarbons (gasoline, diesel, and heavy oil range), benzene, and dioxins in soil and petroleum hydrocarbons (gasoline, diesel, and heavy oil range) and benzene in groundwater that exceed MTCA cleanup levels remain on the Site. The MTCA cleanup levels for soil and groundwater are established under WAC 173-340-740[4] and WAC 173-340-720,[5] respectively. Cleanup levels are listed in Table 1.

Ecology determined institutional controls in the form of an environmental covenant (Covenant) would be required as part of the cleanup action for the Site. WAC 173-340-420(2)[6] requires Ecology to conduct a periodic review of certain sites every five years. For this Site, a periodic review is required because the department approved cleanup actions under an agreed order and an institutional control is required as part of the cleanup action.

When evaluating whether human health and the environment are being protected, Ecology must consider the following factors (WAC 173-340-420(4)):

a) The effectiveness of ongoing or completed cleanup actions, including the effectiveness of engineered controls and institutional controls in limiting exposure to hazardous substances remaining at the site;

b) New scientific information for individual hazardous substances or mixtures present at the site;

c) New applicable state and federal laws for hazardous substances present at the site;

d) Current and projected site and resource uses;

e) The availability and practicability of more permanent remedies; and

f) The availability of improved analytical techniques to evaluate compliance with cleanup levels.

Ecology will publish a notice of this periodic review in the *Site Register* and provide an opportunity for public comment.

[4] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-740
[5] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-720
[6] https://app.leg.wa.gov/wac/default.aspx?cite=173-340-420

# Summary of Site Conditions

## Site description and history

The Site is located on level ground directly west of downtown Port Angeles at 439 Marine Drive (Figure 1, Appendix A). It is bounded by Marine Drive to the south, Port Angeles Harbor to the north, the Valley Creek Estuary to the east, and the Marine Trades Area (MTA) cleanup site to the west including Platypus Marine Inc. (Platypus) and Westport Yachts. The approximately 18.6-acre Site is entirely owned by the Port of Port Angeles (Port) and zoned "Industrial Heavy" by the City of Port Angeles. To the north of the Site are approximately 4.7 acres of aquatic land (tidelands and filled tidelands) owned by Washington State Department of Natural Resources and managed by the Port under a Port Management Agreement.

The Site consists of dredge fill over native beach deposits. This dredged fill material consists of sand and silty sand in some areas with abundant shell fragments and occasional lenses of silt. The thickness of the fill generally ranges from 12 to 16 feet and increases in thickness to approximately 20 feet at the shoreline bulkhead. The bulkhead consists of a historical railroad trestle that was filled and armored with a riprap slope. Native deposits underlying the dredged fill are visually similar to the overlying dredge fill and consist of unconsolidated, fine to coarse sand with variable amounts of silt and gravel, as well as interbeds of silt and fine sand and occasional shell fragments.

A shallow, unconfined aquifer is present beneath the Site in the dredged fill and is generally encountered between 8 and 10 feet below ground surface (bgs). The overall groundwater flow direction is predominately northerly, toward the Port Angeles Harbor. Mixing of groundwater with marine waters occurs within the riprap slope that armors the front of the Site. Tidal influence is strongest on groundwater level elevations near the shoreline and decreases in effect inland. Observations of petroleum contamination spread above and below the average water table as a smear zone suggest a strong influence of tidal fluctuations on shallow water levels.

After the Site was filled in approximately 1926, a small lumber mill operated at the Site until 1941, when a plywood mill was built. Site-wide operations to support plywood manufacture included plywood mill operations, log storage in the log yard and log pond, log rafting in the Port Angeles Harbor, hog fuel burning, log debarking, log peeling, pressing and gluing, steam drying, Site maintenance and other miscellaneous operations, including a plywood retail store located across Marine Drive. Various companies operated the plywood mill between its years of operation (1941-2011), including Peninsula Plywood Corporation (PenPly); ITT Rayonier, Inc. (ITT Rayonier)/PenPly; K Ply Inc., a subsidiary of Klukwan, Inc. (K Ply); and Peninsula Plywood Group LLC (PenPly).

Environmental contamination under the mill was first documented in the late 1980s with partial cleanup actions undertaken by ITT Rayonier. The mill was permanently closed in 2011 and was demolished by the Port as part of an Interim Cleanup Action to allow for a more comprehensive remedial investigation and feasibility study (RI/FS) and cleanup to be completed. A more

thorough description of Site background, prior operations, and general history is provided in the K Ply Site RI/FS[7] (Floyd|Snider 2015a).

The Site is currently vacant aside from a wash down facility in the northwest portion of the Site. The wash down facility includes an oil/water separator and is used by the adjacent businesses, Platypus and Westport Yachts, to wash and clean yachts. The current Site features and layout are depicted in Figures 1 and 2 in Appendix B.

## Site investigations

Since at least 1988, numerous investigations have been conducted at the Site. Between 2005 and 2012, the Site was included within the boundaries of the adjacent MTA site and investigated under Agreed Order DE 03TCPSR-5738[8] (Ecology 2005). In 2012, the source and extent of the contamination under the former K Ply mill was determined by Ecology to be distinct and separate from the contamination on the western half of the MTA site and the sites were split to promote a more expeditious cleanup of both sites. In 2012, Ecology and the Port signed Agreed Order DE 9546[9] (Ecology 2012) to complete an interim action, RI/FS, and draft cleanup action plan (CAP). This work was completed, and a satisfaction letter issued on September 28, 2016. In 2015, the Port entered into Agreed Order DE 11302[10] (Ecology 2015a) with Ecology to implement the CAP.

The primary contaminants of concern (COCs) detected at the Site are petroleum hydrocarbons, mainly gasoline and hydraulic oil, found in both soil and groundwater. Historical releases include hydraulic oil from several large presses within the mill, leaks of gasoline from a petroleum pipeline that passed underneath the mill and dioxins/furans from the hog-fuel boiler. Contaminant detections of gasoline and hydraulic oil at concentrations greater than cleanup levels were generally limited to the footprint of the former K Ply mill building with some benzene migration in groundwater west of the former mill building footprint into S. Cedar Street. A small area of petroleum hydrocarbons greater than cleanup levels were also detected in subsurface soil at the base of the former log pond, located in the eastern half of the Site which was used for log debarking and log storage operations. There were some localized, shallow areas of dioxins/furans and localized areas of pentachlorophenol (PCP) soil contamination above Site cleanup levels.

## Cleanup actions

The primary goal of the remedial action was to remove contaminant mass in soil such that the groundwater concentrations would be reduced to levels less than the cleanup levels within 10

[7] https://apps.ecology.wa.gov/cleanupsearch/document/44808
[8] https://apps.ecology.wa.gov/cleanupsearch/document/994
[9] https://apps.ecology.wa.gov/cleanupsearch/document/9591
[10] https://apps.ecology.wa.gov/cleanupsearch/document/45345

years. Removal of gasoline-impacted soil would also reduce the potential for vapor intrusion inside any future buildings constructed on the Site.

## Soil cleanup

The CAP identified six distinct cleanup areas (Ecology 2015b). This included two primary and four minor cleanup areas. Six excavation areas were developed as part of the design to address these cleanup areas.

The two primary cleanup areas included the following (Figure 3, Appendix B):

- The Gasoline Area (Excavation Areas 5 and 6) – Remediation consisted of excavation of both vadose and smear zone soils followed by application of bio-amendments during backfilling.
- The Hydraulic Oil Area (Excavation Area 6) – Remediation consisted of excavation of both vadose and smear zone soils followed by application of bio-amendments during backfilling.

The four minor cleanup areas included the following (Figure 3, Appendix B):

- The Stack Area (Excavation Area 1) – The dioxin/furan concentrations in this area were less than the industrial cleanup level; however, this soil posed a risk of being spread by wind or other mechanisms to neighboring properties. Remediation consisted of scraping the upper foot of surface soils and placing this soil as backfill below other cover soils in Excavation Area 6.
- The Hog Fuel Storage Area (Excavation Areas 2 and 3) – Remediation consisted of excavation and backfilling.
- The PCP Area (Excavation Area 4) – There was a small area of surface soil lying beneath the former mill floor where PCP was detected due to past panel oiling operations. This area underwent a remedial action by ITT Rayonier in the 1990s, and while the cleanup levels were met for PCP, elevated levels of total petroleum hydrocarbons (TPH) remained in this area, likely originating from application of plywood form oil. Remediation consisted of excavation and backfilling.
- The Log Pond Fill Area – An area of deeper soil contamination at approximately 12 feet below grade in the area of the former log pond bottom was left in place and did not appear to be affecting groundwater. Institutional controls were applied to this area to manage the risk of soil over the long term. Monitoring of groundwater downgradient of this area at wells PP-21 and PP-22 is intended to confirm the remedy remains protective.

In total, 53,765 tons of contaminated soil was excavated and disposed of off-Site in 2015 (Floyd|Snider 2016). The applicable cleanup levels for soil were met in all excavation areas with the exception of Area 5, where contaminated soil remains in the bottom of the excavation, below S. Cedar Street and an alley, and along the eastern edge of the excavation. Contaminated soil also remains above applicable cleanup levels in Area 6 along the bulkhead.

### Groundwater cleanup

Groundwater at the Site was designed to be treated via application of bio-amendments in two forms.

- S. Cedar Street Plume Bio-Injections: Oxygen-releasing compound (ORC) was injected during the construction throughout a 1-acre area corresponding to benzene concentrations greater than 500 micrograms per liter (µg/l).
- Groundwater Infiltration Galleries: Infiltration galleries were installed in Excavation Areas 5 and 6 prior to backfilling. These galleries allowed additional applications of ORC or bacteriological nutrients.

## Soil monitoring

Soil samples were collected from 29 boring locations in April 2021 during the first post-remediation long-term soil monitoring event to be conducted every five years in accordance with the Engineering Design Report (Floyd|Snider 2015b) and the Long-Term Soil Monitoring Plan (Floyd|Snider 2021). The monitoring locations were established within the areas of residual contamination summarized in the Construction Completion Report (Floyd|Snider 2016). The goal of monitoring is to track progress of the long-term natural attenuation of residually contaminated soil left in place in Areas 5 and 6 during the 2015/2016 remedial excavation.

Soil analytical results are presented in Table 2 with exceedance status illustrated on Figures 4, 5, and 6 in Appendix B. The results from this monitoring event will be used as a baseline for COC concentrations for subsequent soil monitoring events.

The post-remediation baseline results collected around Area 5 are generally consistent with the post-remediation confirmational monitoring results and presumed extent of residually contaminated soil documented by in situ confirmation results collected during the RI and remedial excavation, which are document in the Construction Completion Report (Floyd|Snider 2016). This suggests that the source of soil contamination has been controlled by the remedial excavation; however, little attenuation has been observed in Area 5.

The soil samples collected at the bulkhead (Area 6) show an improvement of gasoline-range organics (GRO) and diesel-range organics (DRO) concentrations suggesting that TPH is attenuating in this area. Groundwater results from PP-18R2 in this area also support this observation of improvements in soil concentrations because GRO in groundwater has steadily declined over the past few years (Figure 13, Appendix B).

Based on discussions held on December 9, 2025, among Ecology, the Port, and the Port's consultant, Ecology has concluded that continued soil performance monitoring is not necessary at this time. Ecology's assessment is that the current groundwater monitoring program adequately evaluates the Site's progress toward achieving cleanup levels, assesses the potential for leaching of residual soil contamination to groundwater, and provides a mechanism for tracking long-term natural attenuation. The need for soil monitoring should be reassessed in

the future if Site use changes, if groundwater contaminant concentrations change substantially, or if the Port seeks to modify or remove soil-related restrictions in the Covenant.

## Groundwater monitoring

Following completion of construction, long-term groundwater compliance monitoring continued quarterly in 2016 through 2018 and semiannually in 2019 and thereafter. Groundwater samples are collected from wells in the long-term monitoring network in accordance with confirmational monitoring outlined in the Engineering Design Report and the long-term groundwater monitoring plan outlined in the Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) included as an appendix to the Engineering Design Report (Floyd|Snider 2015b).

The extent of GRO, DRO, and benzene in groundwater as of the May and October 2025 sampling events are depicted in Figures 7 through 12 in Appendix B. Concentrations of GRO and benzene in groundwater at the conditional points of compliance are decreasing as shown in Figures 13 and 15 (Appendix B) depicting post-remediation concentrations. Concentrations of GRO and benzene have been below cleanup levels since 2021. However, concentrations of DRO in groundwater remain above cleanup levels with concentrations fluctuating (Figure 14, Appendix B). Based on Mann-Kendall trend analysis performed by Ecology, concentrations of DRO appear to be increasing in monitoring wells PP-17, PP-19, and PP-34, and no trend in monitoring well PP-18R2. However, it should be noted that concentrations of DRO in monitoring well PP-19 have remained below the cleanup level.

Beginning in May 2022, groundwater samples collected for DRO analysis have been analyzed with and without silica gel cleanup. DRO concentrations at all four conditional point of compliance wells have been below cleanup levels for the last seven sampling events when analyzed with silica gel cleanup. However, according to Ecology's "Guidance for Silica Gel Cleanup in Washington State" (Ecology 2023b), for sites with detectable petroleum hydrocarbons, the NWTPH-Dx method without silica gel cleanup may be as high as 1,000 µg/L if it is shown that both portions of the TPH mixture (i.e., petroleum and polar organics) are less than or equal to 500 µg/L. The polar organic concentration is the difference in the NWTPH-Dx concentration with and without silica gel cleanup. Therefore, DRO concentrations at point of compliance wells PP-17, PP-18R2, and PP-34 are still considered above cleanup levels (Tables 3 through 6). However, the Port and their consultant have recommended evaluating naturally occurring organics in representative background wells to support adjustment of polar organic concentrations at the Site. The Port, in coordination with Ecology, will identify appropriate background wells and develop an approach for establishing background total organic carbon concentrations for the Site.

Groundwater monitoring is also conducted at two monitoring wells downgradient of the log pond (PP-21 and PP-22) at a 2.5-year frequency. Soil contamination remains at the bottom of the log pond at approximately 12 feet bgs. The groundwater monitoring program at PP-21 and PP-22 is intended to confirm the remedy remains protective. Results from the October 2023

sampling event show concentrations of all COCs are either non-detect or below cleanup levels (Tables 7 and 8).

## Cleanup standards

Cleanup standards include cleanup levels, the location where these cleanup levels must be met (point of compliance), and any other regulatory requirements that apply to the Site. WAC 173-340-704[11] states MTCA Method A may be used to establish cleanup levels at sites that have few hazardous substances, are undergoing a routine cleanup action, and where numerical standards are available for all indicator hazardous substances in the media for which the Method A cleanup level is being used. Method B may be used at any site and is the most common method for setting cleanup levels when sites are contaminated with substances not listed under Method A. Method C cleanup levels may be used to set soil and air cleanup levels at industrial sites.

MTCA Method A soil cleanup levels for unrestricted land use were determined to be appropriate for all contaminants at this Site, except benzene. However, MTCA Method A cleanup levels are not available for PCP or dioxins/furans; therefore, the soil cleanup levels for these contaminants established in the CAP are MTCA Method C cleanup levels for direct contact. The cleanup actions conducted at the Site were determined to be routine, few hazardous substances were found at the Site, and numerical standards were available in the MTCA Method A table for each hazardous substance, except PCP and dioxins/furans. Even though Site use is expected to remain industrial, MTCA method A cleanup levels were applied because they were considered protective of all pathways including protection of groundwater and surface water. The MTCA Method A values for TPH consider the cumulative risk for all the individual substances such as benzene, toluene, ethylbenzene, and xylenes (BTEX) and semi-volatile organic compounds (SVOCs) present in petroleum. The MTCA Method A value of 0.03 milligram per kilogram (mg/kg) for benzene was considered overly conservative as it is based upon protection of groundwater to a level of 5 µg/L, which is based upon drinking water use (refer to footnote C of Table 740-1 in WAC 173-340-900[12]). Instead, the cleanup level for benzene in soil was based upon the highest beneficial use of Site groundwater, which is protection of marine waters. The MTCA three-phase rule was used to adjust the proposed benzene cleanup level for soil to 0.3 mg/kg which is protective of marine waters. The soil cleanup levels are shown in Table 1.

Groundwater cleanup levels are based on the highest beneficial use of groundwater being discharge to the surface water of the Port Angeles Harbor. The reasonable maximum exposure scenario expected to occur is based on the discharge to surface water and ingestion of aquatic organisms that accumulate COCs. Site groundwater meets the requirements for non-potable groundwater under WAC 173-340-720(2)[13]. According to WAC 173-340-730(3)(c)[14], MTCA

[11] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-704
[12] https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-900
[13] https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-720
[14] https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-730

Method A concentrations for TPH are appropriate for protection of surface water. Benzene is the only carcinogenic COC at the Site and its cleanup level of 51 µg/L is based on the lowest of Washington State's Water Quality Standards under WAC 173-201A[15], the National Toxics Rule, and the National Recommended Water Quality Criteria at the time the 2015 CAP was written. The groundwater cleanup levels are shown in Table 1.

The point of compliance is the area where the cleanup levels must be attained. For soil cleanup levels based on the protection of groundwater, as they are for this Site, the point of compliance is established as soils throughout the Site (standard point of compliance).

Given that there is no potable use of Site groundwater and the highest beneficial use of groundwater at the Site is discharge to surface water, a groundwater conditional point of compliance (CPOC) was approved by Ecology in the CAP. The CPOC for groundwater for the Site is along the bulkhead at the closest monitoring location to the point of discharge to surface water. Monitoring wells PP-19, PP-17, PP-18R2, and PP-34 are identified as the current CPOC monitoring locations. Groundwater monitoring wells PP-21 and PP-22, downgradient of the log pond, should also be considered point of compliance monitoring locations.

## Environmental Covenant

Ecology determined that institutional controls would be required as part of the cleanup action to document the remaining contamination, protect the cleanup action, and protect human health and the environment. On June 29, 2017, institutional controls in the form of a Covenant[16] (Ecology 2017) were recorded for the Site.

The Covenant recorded for the property imposes the following Site-specific restrictions and requirements (Section 2 of the Covenant). The complete list of restrictions and requirements are described in the Covenant, including general restrictions and requirements, access requirements, notice and approval requirements, modification and termination requirements, and enforcement.

1. **Land use**. The remedial action for the property is based on a cleanup designed for industrial property. As such, the property shall be used in perpetuity only for industrial uses, as that term is defined in the rules promulgated under Chapter 70.105D RCW (now under Chapter 70A.305 RCW). Prohibited uses on the property include but are not limited to residential uses, childcare facilities, K-12 public or private schools, parks, grazing of animals, growing of food crops, and non-industrial commercial uses.
2. **Management of Soil/Waste Materials.** The Ecology-approved Soil Management Plan (Exhibit C to the Covenant) specifying soil management procedures and health and safety requirements for any Site redevelopment or maintenance that involves removal

[15] https://apps.leg.wa.gov/WAC/default.aspx?cite=173-201A
[16] https://apps.ecology.wa.gov/cleanupsearch/document/65090

or disturbance of subsurface material in areas of the Site exceeding MTCA Method A or C soil cleanup levels must be followed.

3. **Stormwater facilities.** None**.**

4. **Vapor Intrusion Assessment and Mitigation.** The residual contamination on the property includes volatile chemicals that may generate harmful vapors. As such, the following restrictions shall apply on the property.

   A vapor intrusion assessment must be performed consistent with current Ecology guidance or regulation prior to the construction of buildings on Site. If the assessment indicates a risk of vapor intrusion from either contaminated soil or groundwater, then further assessment/mitigation of that risk must occur before or as part of building construction.

5. **Groundwater use.** The groundwater beneath the property remains contaminated and shall not be extracted for any purpose other than temporary construction dewatering, investigation, monitoring or remediation. Drilling of a well for any water supply purpose is strictly prohibited. Groundwater extracted from the property for any purpose shall be considered potentially contaminated and any discharge of this water shall be done in accordance with state and federal law.

6. **Sediments.** None.

7. **Monitoring.** Per the terms of the Agreed Order (Section VII, paragraph A), long term monitoring is required until soil and groundwater cleanup levels are achieved. The groundwater monitoring wells are located on and off the property to monitor the performance of the remedial action. Exhibit D of the Covenant shows the locations of the monitoring wells. Groundwater and soil monitoring will continue until cleanup levels are achieved in each media. Groundwater monitoring is required following the schedule outlined in the Compliance Monitoring Plan in the Engineering Design Plan. Monitoring frequency may decrease if results are stable or decreasing according to the Compliance Monitoring Plan and once four quarters of compliance are reached at the groundwater points of compliance.

   In addition, there are four infiltration galleries within the property as shown on Exhibit D of the Covenant. The galleries are to be used to add bio-amendments as necessary to increase the rate of natural attenuation of residual hydrocarbons in soil and groundwater. The Grantor shall maintain clear access to these devices and protect them from damage. The Grantor shall report to Ecology within forty-eight (48) hours of the discovery of any damage to any monitoring device. Unless Ecology approves of an alternative plan in writing, the Grantor shall promptly repair the damage and submit a report documenting this work to Ecology within thirty (30) days of completing the repairs.

# Periodic Review

## Effectiveness of completed cleanup actions

During the Site visit Ecology conducted on November 11, 2023, Ecology found no indications that the integrity of the cleanup action has been compromised. The Site is currently vacant aside from a wash down facility in the northwest portion of the Site. A photo log is in Appendix C.

### Direct contact

The cleanup actions were intended to eliminate exposure to contaminated soil, groundwater, and vapors at the Site. Exposure pathways to contaminated soils by ingestion and direct contact were reduced by excavation of select soils, soil monitoring, and implementation of a Soil Management Plan for management of contaminated soils left on Site. These cleanup actions and controls appear to be protective of human health and the environment, and no contingency actions are required at this time.

As noted in the Engineering Design Report (Floyd|Snider 2015b), long-term soil monitoring sampling is to be performed once every five years to confirm that monitored natural attenuation in areas of residually contaminated soils is effective. The post-remediation baseline results collected in 2021 around Area 5 are generally consistent with the post-remediation confirmational monitoring results and presumed extent of residually contaminated soil documented by in situ confirmation results collected during the RI and remedial excavation, which are documented in the Construction Completion Report (Floyd|Snider 2016). This suggests that the source of soil contamination has been controlled by the remedial excavation; however, little attenuation has been observed in Area 5. The soil samples collected in 2021 at the bulkhead (Area 6), on the other hand, show an improvement of GRO and DRO concentrations in this area suggesting that TPH is attenuating in this area. As noted in the "Soil monitoring" section of this periodic review, Ecology has concluded that continued soil performance monitoring is not necessary at this time. However, the need for soil monitoring should be reassessed in the future if Site use changes, if groundwater contaminant concentrations change substantially, or if the Port seeks to modify or remove soil-related restrictions in the Covenant.

As noted in the Engineering Design Report (Floyd|Snider 2015b), quarterly groundwater confirmational monitoring was to be conducted for a minimum of two years after implementation of the remedy and then semi-annually thereafter if results are stable or decreasing. Groundwater samples are collected from wells in the long-term monitoring network in accordance with confirmational monitoring outlined in the Engineering Design Report and the long-term groundwater monitoring plan outlined in the SAP/QAPP included as an appendix to the Engineering Design Report (Floyd|Snider 2015b).

### Protection of groundwater

Soils with COCs at concentrations exceeding cleanup levels remain at the Site; however, most of the contaminated soil source material has been removed.

Groundwater with COCs at concentrations exceeding cleanup levels at the Site was treated via application of bio-amendments. Groundwater is monitored semi-annually to ensure that residual soil contamination does not pose a risk to surface water in the Port Angeles Harbor via leaching of contaminants to groundwater and migration of contaminated groundwater to surface water.

Concentrations of GRO and benzene in groundwater at the conditional points of compliance are decreasing as shown in Figures 13 and 15 (Appendix B) depicting post-remediation concentrations. However, concentrations of DRO in groundwater remain above cleanup levels with concentrations fluctuating (Figure 14, Appendix B). Beginning in May 2022, groundwater samples collected for DRO analysis have been analyzed with and without silica gel cleanup. Although DRO concentrations at all four conditional point of compliance wells have been below cleanup levels for the last seven sampling events when analyzed with silica gel cleanup, the polar organic concentrations exceed 500 µg/L in some point of compliance wells. Therefore, DRO compliance has not yet been reached (see Ecology's Guidance for Silica Gel Cleanup in Washington State [Ecology 2023b]). Additional cleanup actions may be needed to address DRO in groundwater, as cleanup levels are not likely to be reached within 10 years as originally anticipated.

Groundwater monitoring is also conducted at two monitoring wells downgradient of the log pond (PP-21 and PP-22) at a 2.5-year frequency. Concentrations of COCs in these wells were either non-detect or below cleanup levels for all COCs during the last sampling event in October 2023.

### Institutional controls

Institutional controls in the form of a Covenant were implemented at the Site in 2017. The Covenant remains active and discoverable through the Clallam County Auditor's Office. Ecology found no evidence that a new instrument has been recorded that limits the effectiveness or applicability of the Covenant. This Covenant prohibits activities that will result in the release of contaminants contained as part of the cleanup action and prohibits any use of the property that is inconsistent with the Covenant, unless approved by Ecology in advance. This Covenant ensures the long-term integrity of the cleanup action will be protected.

## New scientific information for individual hazardous substances or mixtures present at the Site

There is no new relevant scientific information for the hazardous substances remaining at the Site.

## New applicable state and federal laws for hazardous substances present at the Site

The cleanup at the Site was governed by Chapter 173-340 WAC. WAC 173-340-702(12)(c) [2023 ed.] provides that,

> "A release cleaned up under the cleanup levels determined in (a) or (b) of this subsection shall not be subject to further cleanup action due solely to subsequent amendments to the provisions in this chapter on cleanup levels or subsequent availability of more sensitive analytical methods, unless the department determines, on a case-by-case basis, that the previous cleanup action is no longer sufficiently protective of human health and the environment."

The current MTCA Method A cleanup level for benzene in soil has decreased from 0.3 to 0.03 mg/kg. The current MTCA Method C cleanup level for dioxins/furans in soil has increased from 0.00059 to 0.0017 mg/kg. These changes in the original standards have not resulted in the need for additional remediation actions at the Site. A comparison of the 2015 cleanup levels and currently available cleanup levels are included in Table 1.

The current groundwater cleanup level for benzene is 1.6 µg/L based on human health criteria for marine water under WAC 173-201A for the consumption of organisms. Therefore, the cleanup level of 51 µg/L established in the CAP is no longer protective of human health and the environment. However, based on the most recent results from the October 2025 sampling event at the point of compliance wells, concentrations of benzene are below 1.6 µg/L in two of the four wells. Benzene in well PP-17 was detected at a concentration of 16.9 µg/L; however, concentrations appear to be trending downward and may eventually reach the current cleanup level of 1.6 µg/L. Benzene in well PP-34 was detected at a concentration of 1.92 µg/L. Concentrations of benzene in well PP-34 are also trending downward and were below 1.6 µg/L during the April 2024 and May 2025 sampling events. Future groundwater monitoring events at the Site should evaluate if the remedy is still protective by comparing results against current cleanup levels.

## Current and projected Site and resource uses

The Site is currently vacant aside from a wash facility used by adjacent businesses to clean yachts. The Port is in the process of redeveloping the Site to include potentially five tenant lease spaces for yacht-related businesses, such as construction and repairing of yachts. The proposed plan will also include space for storing yachts that are being worked on. The current and future Site uses are not likely to have a negative impact on the protectiveness of the cleanup action. However, as noted in the Covenant, a vapor intrusion assessment must be performed consistent with current Ecology guidance or regulation prior to the construction of any buildings on Site. If the assessment indicates a risk of vapor intrusion from either contaminated soil or groundwater, then further assessment/mitigation of that risk must occur before or as part of building construction.

## Availability and practicability of more permanent remedies

The remedy implemented included excavation, containing hazardous substances, bio-amendment application, and soil and groundwater monitoring and it continues to be protective of human health and the environment. However, additional cleanup actions may be needed to address DRO concentrations in groundwater in order to attain cleanup levels within a reasonable timeframe. While more permanent remedies may be available, they are still likely not practicable at this Site.

## Availability of improved analytical techniques to evaluate compliance with cleanup levels

The analytical methods used at the time of the cleanup action were capable of detection below the selected MTCA cleanup levels. The presence of improved analytical techniques would not affect decisions or recommendations made for the Site.

# Conclusions

- The cleanup actions completed at the Site appear to be protective of human health and the environment.
- Soil cleanup levels have not been met at the Site; however, the cleanup action is determined to comply with cleanup standards under WAC 173-340-740(6)(f), since the long-term integrity of the containment system is ensured and the requirements for containment technologies have been met.
- Soil monitoring is required on a 5-year frequency. Sampling conducted in 2021 suggested that the source of soil contamination in Area 5 has been controlled by remedial excavation, but little attenuation has been observed. In Area 6, results show improvement of GRO and DRO concentrations suggesting that TPH is attenuating. Based on discussions held on December 9, 2025, among Ecology, the Port, and the Port's consultant, Ecology

has concluded that continued soil performance monitoring is not necessary at this time. The current groundwater monitoring program adequately evaluates the Site's progress toward achieving cleanup levels, assesses the potential for leaching of residual soil contamination to groundwater, and provides a mechanism for tracking long-term natural attenuation. The need for soil monitoring should be reassessed in the future if Site use changes, if groundwater contaminant concentrations change substantially, or if the Port seeks to modify or remove soil-related restrictions in the Covenant.

- Groundwater monitoring is required on a semi-annual basis to ensure that residual soil contamination does not pose a risk to surface water in the Port Angeles Harbor via leaching of contaminants to groundwater and migration of contaminated groundwater to surface water. GRO and benzene concentrations in groundwater at the conditional points of compliance are below the cleanup levels established in the CAP. However, the current groundwater cleanup level for benzene is 1.6 µg/L based on human health criteria for marine water under WAC 173-201A for the consumption of organisms. Therefore, the cleanup level of 51 µg/L established in the CAP is no longer protective of human health and the environment. Concentrations of benzene in groundwater appear to be trending downward and may eventually reach the current cleanup level of 1.6 µg/L. Groundwater monitoring is recommended to continue at the current required frequency. Future monitoring events should evaluate if the remedy is still protective by comparing results against current cleanup levels.

  DRO concentrations in groundwater remain above the cleanup level with concentrations showing an increasing trend in PP-17, PP-19, and PP-34. Therefore, it is unlikely that the cleanup level will be attained within a reasonable timeframe of 10 years as established in the CAP. Additional cleanup actions may be needed to address DRO in groundwater at the Site. However, the Port and their consultant have recommended evaluating naturally occurring organics first in representative background wells to support adjustment of polar organic concentrations at the Site. The Port, in coordination with Ecology, will identify appropriate background wells and develop an approach for establishing background total organic carbon concentrations for the Site. Groundwater monitoring is also required at a 2.5-year frequency at two monitoring wells downgradient of the log pond (PP-21 and PP-22) to ensure residual contamination at approximately 12 feet below grade in the area of the former log pond bottom does not impact groundwater. Results from the October 2023 sampling event show concentrations of all COCs are either non-detect or below cleanup levels. Groundwater monitoring is recommended to continue at the current required frequency in these two wells.

- The Covenant for the property is in place and is effective in protecting human health and the environment from exposure to hazardous substances and the integrity of the cleanup action.

Based on this periodic review, Ecology has determined the requirements of the Covenant are being followed. However, additional cleanup actions may be needed to address DRO concentrations at the Site. The property owner is responsible for evaluating and implementing

additional cleanup actions (if deemed necessary based on background total organic carbon concentrations), continuing to inspect the Site to ensure the integrity of the existing cleanup actions are maintained, and continuing to monitor groundwater at the current required frequencies.

## Next review

Ecology will schedule the next review for the Site five years from the date of this periodic review. If additional cleanup actions or institutional controls are required, the next periodic review will be scheduled five years after those activities are completed.

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# Tables

**Table 1.** Cleanup levels for soil and groundwater established in the Cleanup Action Plan and currently available.

| Contaminant | 2015 Soil Cleanup Level (mg/kg)[1] | Current Soil Cleanup Level (mg/kg) [1] | 2015 Groundwater Cleanup Level (µg/L)[1] | Current Groundwater Cleanup Level (µg/L) [1] |
|---|---|---|---|---|
| TPH-Gasoline-Range | 30 | 30 | 800 | 800 |
| TPH – Diesel-range | 2,000 | 2,000 | 500 | 500 |
| TPH – Oil-range | 2,000 | 2,000 | 500 | 500 |
| Benzene | 0.30 (2) | 0.03 | 51 (3) | 1.6 (4) |
| Toluene | 7 | 7 | - | - |
| Ethylbenzene | 6 | 6 | - | - |
| Xylenes | 9 | 9 | - | - |
| PCP | 330 (5) | 330 (5) | - | - |
| Dioxins/Furans | 0.00059 (5) | 0.0017 (5) | - | - |

Notes:

1 Cleanup levels are MTCA Method A cleanup levels for unrestricted land use, unless otherwise notes.

2 The MTCA three-phase rule was used to adjust the MTCA Method A cleanup level for benzene to 0.3 mg/kg.

3 Groundwater cleanup level for benzene is based on the lowest of Washington State's Water Quality Standards under WAC 173-201A, the National Toxics Rule, and the National Recommended Water Quality Criteria.

4 Cleanup level is Washington State's Water Quality Standard for human health, marine water, consumption of organisms under WAC 173-201A.

5 Cleanup levels are MTCA Method C cleanup levels for direct contact.

µg/L = micrograms per liter
CAP = Cleanup Action Plan
mg/kg = milligrams per kilogram
PCP = Pentachlorophenol
TPH = total petroleum hydrocarbons
WAC = Washington Administrative Code

**Table 2:** Soil analytical results from 2021.

| Location ID | Sample Name | Date | Depth Range | TPH-DRO (mg/kg) | TPH-ORO (mg/kg) | TPH-GRO (mg/kg) | Benzene (mg/kg) | Ethylbenzene (mg/kg) | Toluene (mg/kg) | Xylenes (total) (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| A14 | 2021-A14-6-8 | 4/20/2021 | 6-8 ft | 105 (1) | 418 | 1,170 | 0.410 U | 5.3 | 2.91 U | 8.94 |
| A14 | 2021-A14-15-16 | 4/20/2021 | 15-16 ft | 58.5 U | 347 | 283 | 0.121 U | 0.943 | 0.393 U | 0.302 U |
| B12 | 2021-B12-11.5-12.5 | 4/21/2021 | 11.5-12.5 ft | 52.3 U | 105 U | 2.07 U | 0.0194 | 0.0104 U | 0.0269 U | 0.0207 U |
| B16 | 2021-B16-12-13 | 4/20/2021 | 12-13 ft | 57.9 U | 352 | 2.65 U | 0.0145 | 0.0133 U | 0.0345 U | 0.0265 U |
| C10 | 2021-C10-6-7 | 4/21/2021 | 6-7 ft | 53 U | 106 U | 4.12 | 0.0101 U | 0.117 | 0.0329 U | 0.0253 U |
| C11 | 2021-C11-6-7.5 | 4/21/2021 | 6-7.5 ft | 58.6 U | 117 U | 3.73 | 0.0233 | 0.148 | 0.0203 U | 0.0156 U |
| C16 | 2021-C16-11-12 | 4/20/2021 | 11-12 ft | 8,720 | 1,210 | 961 | 0.422 | 0.555 | 0.628 U | 0.483 U |
| C17 | 2021-C17-12-14 | 4/20/2021 | 12-14 ft | 8,070 | 1,150 | 22.1 U | 0.222 U | 0.277 U | 0.72 U | 0.554 U |
| D1 | 2021-D1-16-17 | 4/21/2021 | 16-17 ft | 52.6 U | 105 U | 2.11 U | 0.0085 U | 0.0106 U | 0.0275 U | 0.0211 U |
| D9 | 2021-D9-14-15 | 4/21/2021 | 14-15 ft | 67.5 U | 135 U | 7.91 | 1.8 | 0.0158 U | 0.0412 U | 0.0366 |
| D10 | 2021-D10-5.5-7(2) | 4/21/2021 | 5.5-7 ft | 61.8 U | 124 U | 143 | 0.103 U | 1.5 | 0.334 U | 2.95 |
| D16 | 2021-D16-9.5-11 | 4/20/2021 | 9.5-11 ft | 3,140 | 718 | 1,710 | 0.197 U | 1.29 | 0.641 U | 0.493 U |
| D17 | 2021-D17-11-12 | 4/20/2021 | 11-12 ft | 4,800 | 879 | 19.7 U | 0.198 U | 0.247 U | 0.642 U | 0.494 U |
| E1 | 2021-E1-14-15 | 4/21/2021 | 14-15 ft | 53.6 U | 107 U | 4.59 | 0.0108 U | 0.0136 U | 0.0352 U | 0.0271 U |
| F1 | 2021-F1-16-17 | 4/21/2021 | 16-17 ft | 61.7 U | 123 U | 2.04 U | 0.0082 U | 0.0102 U | 0.0265 U | 0.0204 U |
| F15 | 2021-F15-8.75-9.25 | 4/20/2021 | 8.75-9.25 ft | 75.4 | 372 | 180 | 0.115 U | 0.736 | 0.375 U | 0.288 U |
| G8 | 2021-G8-7-8 | 4/21/2021 | 7-8 ft | 177 | 104 U | 1,880 | 0.162 U | 9.11 | 0.526 U | 7.41 |
| G10 | 2021-G10-7-8 | 4/20/2021 | 7-8 ft | 61.4 U | 123 U | 124 | 0.0132 U | 0.144 | 0.0429 U | 0.189 |
| G11 | 2021-G11-7.5-8.5 | 4/20/2021 | 7.5-8.5 ft | 184 | 325 | 635 | 0.087 U | 1.08 | 0.283 U | 0.218 U |
| G12 | 2021-G12-7.5-8.5 | 4/20/2021 | 7.5-8.5 ft | 539 | 359 | 781 | 0.226 U | 10.7 | 1.6 U | 1.23 U |
| G15 | 2021-G15-10-11(2) | 4/20/2021 | 10-11 ft | 398 | 358 | 449 | 0.079 U | 4.74 | 0.257 U | 3.77 |
| GH9 | 2021-GH9-5.5-6.5 | 4/21/2021 | 5.5-6.5 ft | 62.8 U | 126 U | 54.1 | 0.0112 U | 0.023 | 0.0364 U | 0.028 U |
| H7 | 2021-H7-8.5-9.5 | 4/21/2021 | 8.5-9.5 ft | 52 U | 104 U | 6.82 | 0.0086 U | 0.0108 U | 0.028 U | 0.0215 U |
| H8 | 2021-H8-5.5-6.5 | 4/21/2021 | 5.5-6.5 ft | 58.2 U | 116 U | 3.72 | 0.0057 U | 0.00717 U | 0.0186 U | 0.0143 U |
| H12 | 2021-H12-9.5-10 | 4/20/2021 | 9.5-10 ft | 200 | 364 | 707 | 0.12 U | 2.2 | 0.39 U | 0.30 U |

| Location ID | Sample Name | Date | Depth Range | TPH-DRO (mg/kg) | TPH-ORO (mg/kg) | TPH-GRO (mg/kg) | Benzene (mg/kg) | Ethylbenzene (mg/kg) | Toluene (mg/kg) | Xylenes (total) (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| H13 | 2021-H13-9.5-10 | 4/20/2021 | 9.5-10 ft | 349 | 425 | **2,930** | 0.146 U | **30.3** | 1.04 U | 0.797 U |
| H14 | 2021-H14-10.5-11.5 | 4/20/2021 | 10.5-11.5 ft | 122 | 352 | **1,700** | 0.285 U | **16.6** | 2.02 U | 1.55 U |
| H15 | 2021-H15-9-10 | 4/20/2021 | 9-10 ft | 47.3 U | 279 | 2.06 U | 0.0083 U | 0.0103 U | 0.0268 U | 0.0206 U |
| I13 | 2021-I13-12-13 | 4/20/2021 | 12-13 ft | 58.5 U | 394 | **59.5** | 0.0067 U | 0.00843 U | 0.0219 U | 0.0169 U |
| I14 | 2021-I14-7.5-8.5 | 4/20/2021 | 7.5-8.5 ft | 67.1 U | 410 | 2.93 U | 0.0117 U | 0.0146 U | 0.0381 U | 0.0293 U |

Notes:

[1] Chromatogram indicates the presence of unresolved compounds eluting from the dodecane through tetracosane (~C12-C24), pattern resembles a continuation of the gasoline detection not qualified under NWTPH-Gx method.

[2] A field duplicate was collected for these samples. The maximum result between the two is shown.

**Highlighted, red bold text** = exceedance of the cleanup level
***Italics, bold text*** = reporting limit exceeds the cleanup level
DRO = diesel-range organics
ft = feet
GRO = gasoline-range organics
ID = identification
mg/kg = milligrams per kilogram
ORO = oil-range organics
TPH = total petroleum hydrocarbons
U = Analyte was not detected at or above the associated reporting limit.

**Table 3:** Groundwater contaminant concentration at monitoring well PP-17 between 2016 and 2025.

| Date | TPH-GRO (µg/L) | TPH-DRO without SGC (µg/L) | TPH-ORO without SGC (µg/L)[1] | Total TPH without SGC (DRO + ORO) (µg/L) | TPH-DRO with SGC (µg/L) | TPH-ORO with SGC (µg/L) | Total TPH with SGC (DRO + ORO) (µg/L) | Polar Organics (µg/L)[2] | Benzene (µg/L) | Ethylbenzene (µg/L) | Toluene (µg/L) | Xylenes (total) (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/27/2016 | 59.5 | 417 J (3) | **1,010** | **1,427 J** | -- | -- | -- | -- | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 10/27/2016 | 102 | 257 | **1,180** | **1,437** | 153 | **543** | **696** | **741** | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 1/26/2017 | 195 | 160 | **1,520** | **1,680** | 49.8 U | **633** | **633** | **1,047** | **60.1** | 1.00 U | 1.00 U | 1.00 U |
| 4/26/2017 | 287 | 167 | **931** | **1,098** | -- | -- | -- | -- | **82.3** | 1.10 | 1.09 | 2.01 |
| 8/2/2017 | 147 | 135 (3) | **969** | **1,104** | -- | -- | -- | -- | **121** | 1.32 | 1.31 | 2.33 |
| 11/07/2017 | 404 | 471 | **1,210** | **1,681** | -- | -- | -- | -- | 50.9 | 1.00 U | 1.00 U | 1.23 |
| 2/8/2018 | 228 | 91.1 (3) | **525** | **616** | -- | -- | -- | -- | **68.6** | 1.06 | 1.00 U | 1.39 |
| 05/2/2018 (4) | 352 | 218 (3) | **834** | **1,052** | -- | -- | -- | -- | **78.6** | 1.76 | 1.07 | 2.52 |
| 10/25/2018 | 417 | 354 | **1,130** | **1,484** | -- | -- | -- | -- | **108** | 2.70 | 1.04 | 2.76 |
| 4/8/2019 | 341 | 49.6 U | **996** | **996** | -- | -- | -- | -- | **76.2** | 1.80 | 1.00 U | 2.62 |
| 10/22/2019 | 150 | 49.8 UJ | 234 J | 234 J | 49.8 UJ | 178 J | 178 J | 56 | 15.0 | 1.00 U | 1.00 U | 1.00 U |
| 04/27/2020 (4) | 353 | 158 (3) | **1,290** | **1,448** | -- | -- | -- | -- | 46.1 | 1.53 | 1.00 U | 2.70 |
| 10/21/2020 | 375 | 49.3 U | **1,100** | **1,100** | -- | -- | -- | -- | **63.6** | 1.90 | 1.00 U | 3.34 |
| 4/21/2021 | 272 | 99.5 U | **1,990** | **1,990** | -- | -- | -- | -- | 43.4 | 1.68 | 0.750 U | 2.75 |
| 10/13/2021 | 397 | **873** | 98.1 U | **873** | -- | -- | -- | -- | 45.2 | 1.77 | 0.750 U | 2.98 |
| 5/4/2022 (4) | 291 | **1,010** (3) | 93.6 U | **1,010** | **651** (3) | 93.6 U | **651** | 359 | 28.6 | 1.41 | 0.750 U | 2.40 |
| 11/10/2022 | 317 | **1,190** (3) | 94.2 U | **1,190** | 194 J (3,5) | 94.2 U | 194 J | **996** | 35.7 | 3.56 | 1.31 | 5.52 |
| 4/19/2023 (4) | 298 | **1,470** (3) | 94.8 U | **1,470** | 274 J (5) | 94.8 U | 274 J | **1,196** | 36.1 | 1.84 | 1.00 U | 3.00 |
| 10/26/2023 | 226 | **1,200 J** (3) | 95.1 U | **1,200 J** | 229 J | 95.1 U | 229 J | **971** | 29.2 | 1.41 | 1.00 U | 2.38 |
| 4/17/2024 | 249 | **1,550** (3) | 142 U | **1,550** | 94.7 U | 94.7 U | ND | **1,550** | 27.7 | 5.00 U | 5.00 U | 10.0 U |
| 10/10/2024 | 171 | **1,030** (3,5) | 143 U | **1,030** | 183 (3,5) | 143 U | 183 | **847** | 20.9 | 1.20 | 0.518 | 2.23 |
| 5/1/2025 (4) | 128 (6) | **1,120** (3) | 138 U | **1,120** | 145 (5) | 138 U | 145 | **975** | 14.3 | 0.974 | 0.500 U | 2.16 |
| 10/15/2025 | 130 (3) | **972** (3) | 141 U | **972** | 94.3 U | 141 U | ND | **972** | 16.9 | 0.886 | 0.500 U | 2.25 |

Notes:

1 Coordination with laboratory on quantification of DRO versus ORO was conducted between the April and October 2021 monitoring events. Laboratory concluded that overlap of DRO and ORO carbon ranges in a single peak is more indicative of a weathered diesel rather than heavy oil. ORO results collected prior to October 2021 interpretated as weathered-diesel product based on laboratory coordination and conceptual site model of residual diesel contamination in soil acting as source to groundwater.

2 Polar organics is equal to the total TPH without SGC minus the total TPH with SGC.

3 Chromatogram indicates unresolved compounds, refer to annual reports for laboratory-specific comments.

4 A field duplicate was collected. The greatest value was reported.

5 Detection is biased due to overlap with gasoline range material, refer to annual reports for laboratory-specific comments.

6 Chromatographic pattern indicates weathered gasoline or Stoddard; refer to annual reports for laboratory-specific comments.

**Highlighted, red bold text** = exceedance of the cleanup level
µg/L = microgram per liter
DRO = diesel-range organics
GRO = gasoline-range organics
J = concentration is estimated
ND = not detected
ORO = oil-range organics
SGC = silica gel cleanup
TPH = total petroleum hydrocarbons
U = analyte was not detected at or above the associated reporting limit.
UJ = analyte is not detected at the associated reporting limit, which is considered to be an estimate.

**Table 4:** Groundwater contaminant concentration at monitoring well PP-18R2 between 2016 and 2025.

| Date | TPH-GRO (µg/L) | TPH-DRO without SGC (µg/L) | TPH-ORO without SGC (µg/L)[1] | Total TPH without SGC (DRO + ORO) (µg/L) | TPH-DRO with SGC (µg/L) | TPH-ORO with SGC (µg/L) | Total TPH with SGC (DRO + ORO) (µg/L) | Polar Organics (µg/L)[2] | Benzene (µg/L) | Ethylbenzene (µg/L) | Toluene (µg/L) | Xylenes (total) (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/28/2016 | **835** | 151 J [3] | 163 | 314 | -- | -- | -- | -- | **135** | 2.10 | 2.82 | 6.69 |
| 10/27/2016 | 503 | **1,090** | **2,140** | **3,230** | 406 | **1,200** | **1,606** | **1,624** | **217** | 1.31 | 1.00 U | 2.05 |
| 1/26/2017 | **921** | 494 | **4,470** | **4,964** | 279 | **1,760** | **2,039** | **2,925** | **284** | 11.2 | 4.32 | 19.4 |
| 4/26/2017 | **1,130** | **643** | **2,620** | **3,263** | -- | -- | -- | -- | **248** | 12.9 | 4.46 | 22.6 |
| 8/2/2017 | **1,780** | **572 J** [3] | **2,350 J** | **2,922 J** | -- | -- | -- | -- | **211** | 15.5 | 3.93 | 19.8 |
| 11/7/2017 | 538 | 425 | **789** | **1,214** | -- | -- | -- | -- | **52.8** | 7.06 | 1.20 | 9.74 |
| 2/8/2018 | 401 | **596** [3] | **1,320** | **1,916** | -- | -- | -- | -- | 40.9 | 14.4 | 1.65 | 15.7 |
| 5/2/2018 | **1,900** | **781** [3] | **1,920** | **2,701** | -- | -- | -- | -- | **73.3** | 17.8 | 1.94 | 20.2 |
| 10/25/2018 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 04/8/2019 [4] | **4,320** | 50.4 U | **1,340** | **1,340** | 50.4 U | **1,120** | **1,120** | 220 | 24.5 | 19.8 | 1.00 U | 6.09 |
| 10/22/2019 | **1,950** | 84.6 J [3] | 462 J | **547 J** | 129 J [3] | 375 J | **504 J** | 43 | 3.28 | 13.4 | 1.00 U | 1.23 |
| 4/27/2020 | **1,730** | 271 [3] | **1,130** | **1,401** | -- | -- | -- | -- | 4.87 | 9.84 | 1.00 U | 1.61 |
| 10/21/2020 | **829** | 242 [3] | **526** | **768** | -- | -- | -- | -- | 2.09 | 7.14 | 1.00 U | 1.00 U |
| 4/21/2021 | **933** | 394 [3] | **1,500** | **1,894** | -- | -- | -- | -- | 4.34 | 4.20 | 0.750 U | 1.31 |
| 10/13/2021 | 337 | **828** | 98.9 U | **927** | -- | -- | -- | -- | 0.440 U | 0.400 U | 0.750 U | 1.00 U |
| 5/4/2022 | 336 [3] | **591** [3] | 93.9 U | **591** | 307 [3] | 93.9 U | 307 | 284 | 0.485 | 1.27 | 0.750 U | 1.00 U |
| 11/10/2022 | 217 | **910** [3] | 94.7 U | **910** | 172 J [5] | 94.7 U | 172 J | **738** | 1.47 | 1.02 | 1.00 U | 1.00 U |
| 4/19/2023 | 50.0 U | 482 [3] | 93.1 U | 482 | 93.1 U | 93.1 U | ND | 482 | 0.440 U | 0.400 U | 1.00 U | 1.00 U |
| 10/26/2023 | 89.9 | **532 J** [3] | 95.4 U | **532 J** | 95.4 U | 95.4 U | ND | **532** | 0.440 U | 0.400 U | 1.00 U | 1.00 U |
| 4/17/2024 | 99.1 [3] | **831** [3] | 143 U | **974** | 95.2 U | 95.2 U | ND | **974** | 0.340 | 0.500 U | 0.500 U | 1.00 U |
| 10/10/2024 [4] | 50.0 U | **529** [3] | 140 U | **529** | 93.5 U | 140 U | ND | **529** | 0.314 | 0.500 U | 0.500 U | 1.00 U |
| 5/1/2025 | 278 [6] | **546** [3] | 141 U | **546** | 230 J [5] | 141 U | 230 J | 316 | 0.367 | 0.500 U | 0.500 U | 1.00 U |
| 10/15/2025 [4] | 132 [3] | **591 J** [3] | 145 U | **591 J** | 116 J [5] | 145 U | 116 J | 475 | 0.200 U | 0.500 U | 0.500 U | 1.00 U |

Notes:

1 Coordination with laboratory on quantification of DRO versus ORO was conducted between the April and October 2021 monitoring events. Laboratory concluded that overlap of DRO and ORO carbon ranges in a single peak is more indicative of a weathered diesel rather than heavy oil. ORO results collected prior to October 2021 interpretated as weathered-diesel product based on laboratory coordination and conceptual site model of residual diesel contamination in soil acting as source to groundwater.

2 Polar organics is equal to the total TPH without SGC minus the total TPH with SGC.

3 Chromatogram indicates unresolved compounds, refer to annual reports for laboratory-specific comments.

4 A field duplicate was collected. The greatest value was reported.

5 Detection is biased due to overlap with gasoline range material, refer to annual reports for laboratory-specific comments.

6 Chromatographic pattern indicates weathered gasoline or Stoddard; refer to annual reports for laboratory-specific comments.

**Highlighted, red bold text** = exceedance of the cleanup level
µg/L = microgram per liter
DRO = diesel-range organics
GRO = gasoline-range organics
J = concentration is estimated
ND = not detected
ORO = oil-range organics
SGC = silica gel cleanup
TPH = total petroleum hydrocarbons
U = analyte was not detected at or above the associated reporting limit.

**Table 5:** Groundwater contaminant concentration at monitoring well PP-19 between 2016 and 2025.

| Date | TPH-GRO (µg/L) | TPH-DRO without SGC (µg/L) | TPH-ORO without SGC (µg/L)[1] | Total TPH without SGC (DRO + ORO) (µg/L) | TPH-DRO with SGC (µg/L) | TPH-ORO with SGC (µg/L) | Total TPH with SGC (DRO + ORO) (µg/L) | Polar Organics (µg/L)[2] | Benzene (µg/L) | Ethylbenzene (µg/L) | Toluene (µg/L) | Xylenes (total) (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/27/2016 | 50.0 U | 49.9 U | 99.7 U | ND | -- | -- | -- | -- | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 10/27/2016 | 50.0 U | 50.0 U | 127 | 127 | -- | -- | -- | -- | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 1/26/2017 | 50.0 U | 49.8 U | 500 | 500 | 49.8 U | 248 | 248 | 252 | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 4/26/2017 | 50.0 U | 49.8 U | 260 | 260 | -- | -- | -- | -- | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 8/2/2017 | 50.0 U | 50.0 U | 100 U | ND | -- | -- | -- | -- | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 11/7/2017 | 50.0 U | 49.7 U | 99.4 U | ND | -- | -- | -- | -- | 1.96 | 1.00 U | 1.00 U | 1.00 U |
| 2/8/2018 | 50.0 U | 50.0 U | 159 | 159 | -- | -- | -- | -- | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 5/2/2018 | 50.0 U | 50.2 U | 203 | 203 | -- | -- | -- | -- | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 10/25/2018 | 50.0 U | 50.0 U | 215 | 215 | -- | -- | -- | -- | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 10/22/2019 | 50.0 U | 49.9 UJ | 99.9 UJ | ND | -- | -- | -- | -- | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 4/27/2020 | 50.0 U | 49.9 U | 266 | 266 | -- | -- | -- | -- | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 10/21/2020 | 50.0 U | 49.5 U | 99.0 U | ND | -- | -- | -- | -- | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 4/20/2021 | 50.0 U | 98.5 U | 425 | 425 | -- | -- | -- | -- | 0.440 U | 0.400 U | 0.750 U | 1.00 U |
| 10/13/2021 | 50.0 U | 181 | 98.8 U | 181 | -- | -- | -- | -- | 0.440 U | 0.400 U | 0.750 U | 1.00 U |
| 5/4/2022 | 50.0 U | 156 [3] | 94.9 U | 156 | 94.9 U | 94.9 U | ND | 156 | 0.440 U | 0.400 U | 0.750 U | 1.00 U |
| 11/10/2022 | 50.0 U | 166 [3] | 94.1 U | 166 | -- | -- | -- | -- | 0.440 U | 0.400 U | 1.00 U | 1.00 U |
| 4/19/2023 | 50.0 U | 167 [3] | 93.0 U | ND | -- | -- | -- | -- | 0.440 U | 0.400 U | 1.00 U | 1.00 U |
| 10/26/2023 | 50.0 U | 142 J [3] | 95.4 U | 142 | 95.4 U | 95.4 U | ND | 142 | 0.440 U | 0.400 U | 1.00 U | 1.00 U |
| 4/17/2024 | 50.0 U | 327 [3] | 141 U | 327 | 93.9 U | 93.9 U | ND | 327 | 0.200 U | 0.500 U | 0.500 U | 1.00 U |
| 10/10/2024 | 50.0 U | 324 [3] | 151 U | 324 | 101 U | 151 U | ND | 324 | 0.200 U | 0.500 U | 0.500 U | 1.00 U |
| 5/1/2025 | 50.0 U | 199 J [3] | 138 U | 199 | 91.9 J [3] | 138 U | 91.9 J | 107.1 | 0.200 U | 0.500 U | 0.500 U | 1.00 U |
| 10/15/2025 | 50.0 U | 94.0 U | 141 U | ND | 94.0 U | 141 U | ND | -- | 0.200 U | 0.500 U | 0.500 U | 1.00 U |

Notes:

[1] Coordination with laboratory on quantification of DRO versus ORO was conducted between the April and October 2021 monitoring events. Laboratory concluded that overlap of DRO and ORO carbon ranges in a single peak is more indicative of a weathered diesel rather than heavy oil. ORO results collected prior to October 2021 interpretated as weathered-diesel product based on laboratory coordination and conceptual site model of residual diesel contamination in soil acting as source to groundwater.

[2] Polar organics is equal to the total TPH without SGC minus the total TPH with SGC.

[3] Chromatogram indicates unresolved compounds, refer to annual reports for laboratory-specific comments.

[4] Chromatogram pattern indicates an unresolved complex mixture, which may be weathered or organic material.

[5] Detection is biased due to overlap with gasoline range material, refer to annual reports for laboratory-specific comments.

µg/L = microgram per liter
DRO = diesel-range organics
GRO = gasoline-range organics
J = concentration is estimated
ND = not detected
ORO = oil-range organics
SGC = silica gel cleanup
TPH = total petroleum hydrocarbons
U = analyte was not detected at or above the associated reporting limit.
UJ = analyte is not detected at the associated reporting limit, which is considered to be an estimate.

**Table 6:** Groundwater contaminant concentration at monitoring well PP-34 between 2016 and 2025.

| Date | TPH-GRO (µg/L) | TPH-DRO without SGC (µg/L) | TPH-ORO without SGC (µg/L)[1] | Total TPH without SGC (DRO + ORO) (µg/L) | TPH-DRO with SGC (µg/L) | TPH-ORO with SGC (µg/L) | Total TPH with SGC (DRO + ORO) (µg/L) | Polar Organics (µg/L)[2] | Benzene (µg/L) | Ethylbenzene (µg/L) | Toluene (µg/L) | Xylenes (total) (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/28/2016 | **1,510** | 328 J [3] | 433 | **761 J** | -- | -- | -- | -- | 29.1 | 76.3 | 7.19 | 132 |
| 10/27/2016 | 665 | **603** | **1,310** | **1,913** | 493 | **772** | **1,265** | **648** | 18.0 | 35.1 | 3.77 | 62.6 |
| 1/26/2017 | **1,220** | **503** | **2,290** | **2,793** | 348 | **688** | **1,036** | **1,757** | 25.8 | 61.8 | 4.10 | 88.7 |
| 4/26/2017 | **1,420** | 357 | **1,490** | **1,847** | -- | -- | -- | -- | 12.9 | 70.4 | 3.81 | 83.9 |
| 8/2/2017 | **1,480** | 238 [3] | **1,040** | **1,278** | -- | -- | -- | -- | 15.1 | 117 | 5.26 | 122 |
| 11/7/2017 [4] | **1,000** | **695** | **1,200** | **1,895** | -- | -- | -- | -- | 29.2 | 82.6 | 3.92 | 86.1 |
| 2/8/2018 | 309 | 212 [3] | **560** | **772** | -- | -- | -- | -- | 3.31 | 15.2 | 1.00 U | 15.0 |
| 5/2/2018 | **1,130** | 458 [3] | **1,320** | **1,778** | -- | -- | -- | -- | 9.78 | 44.6 | 1.81 | 45.0 |
| 10/25/2018 | **1,140** | 417 [3] | **1,040** | **1,457** | -- | -- | -- | -- | 19.2 | 60.8 | 2.30 | 51.9 |
| 4/8/2019 | 749 | 50.0 U | **1,970** | **1,970** | -- | -- | -- | -- | 7.39 | 29.4 | 1.38 | 23.9 |
| 10/22/2019 | 249 | 90.7 J [3] | **1,460 J** | **1,551 J** | 105 J [3] | **1,030 J** | **1,135 J** | 416 | 3.79 | 9.81 | 1.00 U | 6.53 |
| 4/27/2020 | 552 | 376 [3] | **1,580** | **1,956** | -- | -- | -- | -- | 9.01 | 17.4 | 1.00 U | 10.6 |
| 10/21/2020 | 351 | 114 [3] | **1,640** | **1,754** | -- | -- | -- | -- | 6.28 | 20.9 | 1.00 U | 11.6 |
| 4/21/2021 [4] | 307 | 99.9 U | **1,710** | **1,710** | -- | -- | -- | -- | 7.09 | 13.8 | 0.750 U | 8.54 |
| 10/13/2021 | 403 | **2,510** | 98.2 U | **2,510** | 110 [3] | 250 U | 110 | **2,400** | 5.28 | 16.9 | 0.750 U | 10.1 |
| 5/4/2022 | 174 | **1,890** [3] | 93.7 U | **1,890** | **969** [3] | 93.7 U | **969** | **921** | 1.37 | 5.23 | 0.750 U | 3.30 |
| 11/10/2022 | 140 | **2,420** [3] | 94.3 U | **2,420** | 260 J [5] | 94.3 U | 260 J | **2,160** | 1.94 | 7.56 | 1.00 U | 4.96 |
| 4/19/2023 | 86.5 | **1,740** [3] | 95.1 U | **1,740** | 199 | 95.1 U | 199 | **1,541** | 0.522 | 2.04 | 1.00 U | 1.67 |
| 10/26/2023 | 205 | **2,060 J** [3] | 94.3 U | **2,060 J** | 177 | 94.3 U | 177 | **1,883** | 1.75 | 5.90 | 1.00 U | 4.18 |
| 4/17/2024 | 155 [3] | **1,810 J** [3] | 142 U | **1,810 J** | 94.5 U | 94.5 U | ND | **1,810** | 1.19 | 3.94 | 0.500 U | 3.05 |
| 10/10/2024 | 180 | **1,590** [3,5] | 142 U | **1,590** | 328 [3,5] | 142 U | 328 | **1,262** | 2.44 | 8.41 | 0.619 | 7.21 |
| 5/1/2025 | 118 [6] | **1,630** [3] | 139 U | **1,630** | 130 [5] | 139 U | 130 | **1,500** | 1.56 | 5.58 | 0.500 U | 4.15 |
| 10/15/2025 | 155 [3] | **1,710 J** [3] | 146 UJ | **1,710 J** | 170 J [5] | 146 UJ | 170 J | **1,540** | 1.92 | 7.16 | 0.614 | 5.95 |

Notes:

1 Coordination with laboratory on quantification of DRO versus ORO was conducted between the April and October 2021 monitoring events. Laboratory concluded that overlap of DRO and ORO carbon ranges in a single peak is more indicative of a weathered diesel rather than heavy oil. ORO results collected prior to October 2021 interpretated as weathered-diesel product based on laboratory coordination and conceptual site model of residual diesel contamination in soil acting as source to groundwater.

2 Polar organics is equal to the total TPH without SGC minus the total TPH with SGC.

3 Chromatogram indicates unresolved compounds, refer to annual reports for laboratory-specific comments.

4 A field duplicate was collected. The greatest value was reported.

5 Detection is biased due to overlap with gasoline range material, refer to annual reports for laboratory-specific comments.

6 Chromatographic pattern indicates weathered gasoline or Stoddard; refer to annual reports for laboratory-specific comments.

**Highlighted, red bold text** = exceedance of the cleanup level
µg/L = microgram per liter
DRO = diesel-range organics
GRO = gasoline-range organics
J = concentration is estimated
ORO = oil-range organics
SGC = silica gel cleanup
TPH = total petroleum hydrocarbons
U = analyte was not detected at or above the associated reporting limit.
UJ = analyte is not detected at the associated reporting limit, which is considered to be an estimate.

**Table 7:** Groundwater contaminant concentration at monitoring well PP-21 in 2023.

| Date | TPH-GRO (µg/L) | TPH-DRO without SGC (µg/L) | TPH-ORO without SGC (µg/L) | Total TPH without SGC (DRO + ORO) (µg/L) | TPH-DRO with SGC (µg/L) | TPH-ORO with SGC (µg/L) | Total TPH with SGC (DRO + ORO) (µg/L) | Polar Organics (µg/L)[1] | Benzene (µg/L) | Ethylbenzene (µg/L) | Toluene (µg/L) | Xylenes (total) (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/26/2023 | 50.0 U | 259 J [(2)] | 93.3 U | 259 J | 93.3 U | 93.3 U | ND | 259 | 0.440 U | 0.400 U | 1.00 U | 1.00 U |

Notes:

[1] Polar organics is equal to the total TPH without SGC minus the total TPH with SGC.

[2] Chromatogram indicates unresolved compounds, refer to annual reports for laboratory-specific comments.

µg/L = microgram per liter
DRO = diesel-range organics
GRO = gasoline-range organics
J = concentration is estimated
ND = not detected
ORO = oil-range organics
SGC = silica gel cleanup
TPH = total petroleum hydrocarbons
U = analyte was not detected at or above the associated reporting limit.

**Table 8:** Groundwater contaminant concentration at monitoring well PP-22 in 2023.

| Date | TPH-GRO (µg/L) | TPH-DRO without SGC (µg/L) | TPH-ORO without SGC (µg/L) | Total TPH without SGC (DRO + ORO) (µg/L) | TPH-DRO with SGC (µg/L) | TPH-ORO with SGC (µg/L) | Total TPH with SGC (DRO + ORO) (µg/L) | Polar Organics (µg/L)[1] | Benzene (µg/L) | Ethylbenzene (µg/L) | Toluene (µg/L) | Xylenes (total) (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/26/2023 | 50.0 U | 336 J (2) | 94.1 U | 336 J | 94.1 U | 94.1 U | ND | 336 | 0.440 U | 0.400 U | 1.00 U | 1.00 U |

Notes:

[1] Polar organics is equal to the total TPH without SGC minus the total TPH with SGC.

[2] Chromatogram indicates unresolved compounds, refer to annual reports for laboratory-specific comments.

µg/L = microgram per liter
DRO = diesel-range organics
GRO = gasoline-range organics
J = concentration is estimated
ND = not detected
ORO = oil-range organics
SGC = silica gel cleanup
TPH = total petroleum hydrocarbons
U = analyte was not detected at or above the associated reporting limit.

# Appendix A. Vicinity Map

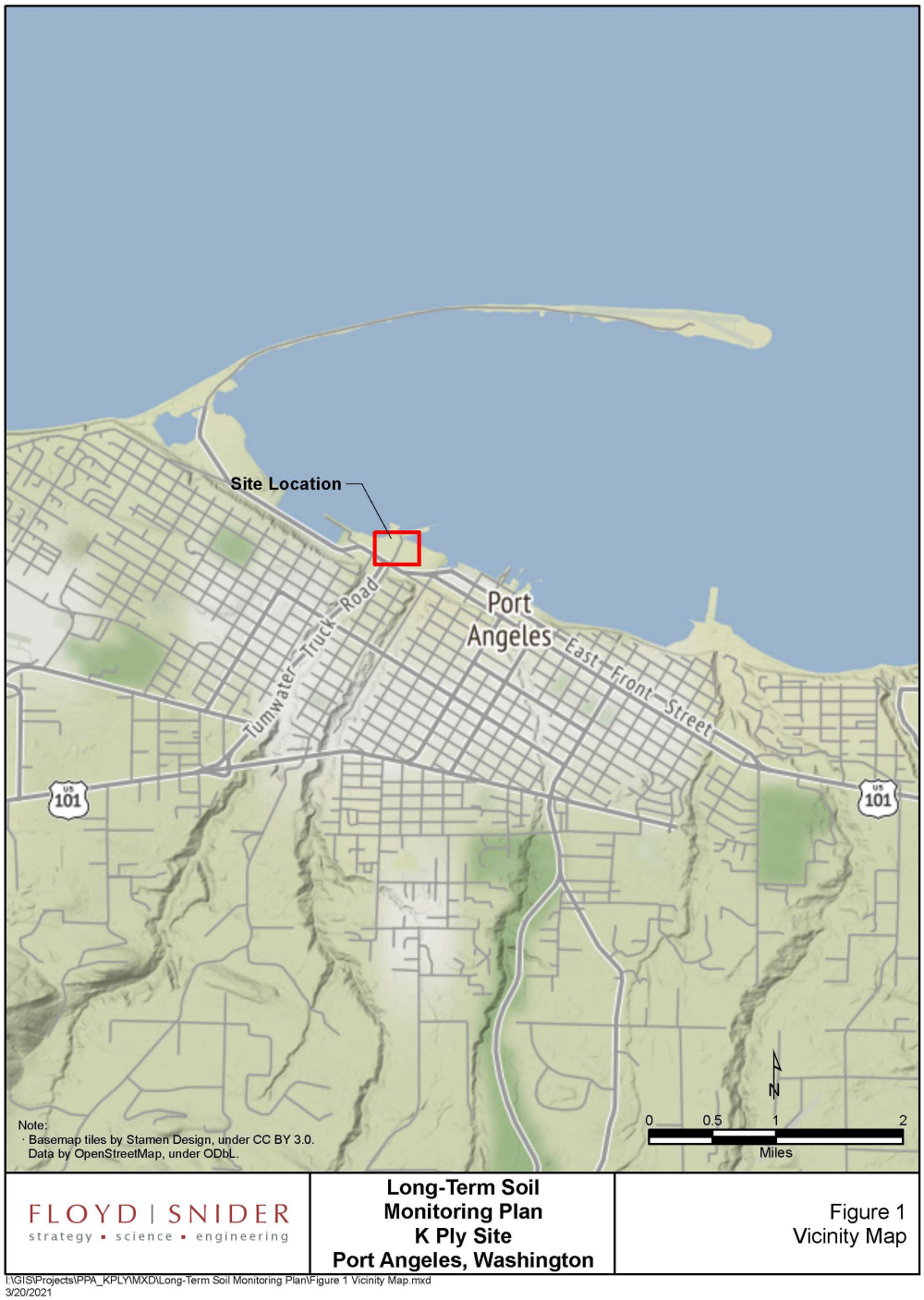



**Figure 1:** Vicinity Map (Floyd|Snider 2021)

# Appendix B. Site Plans

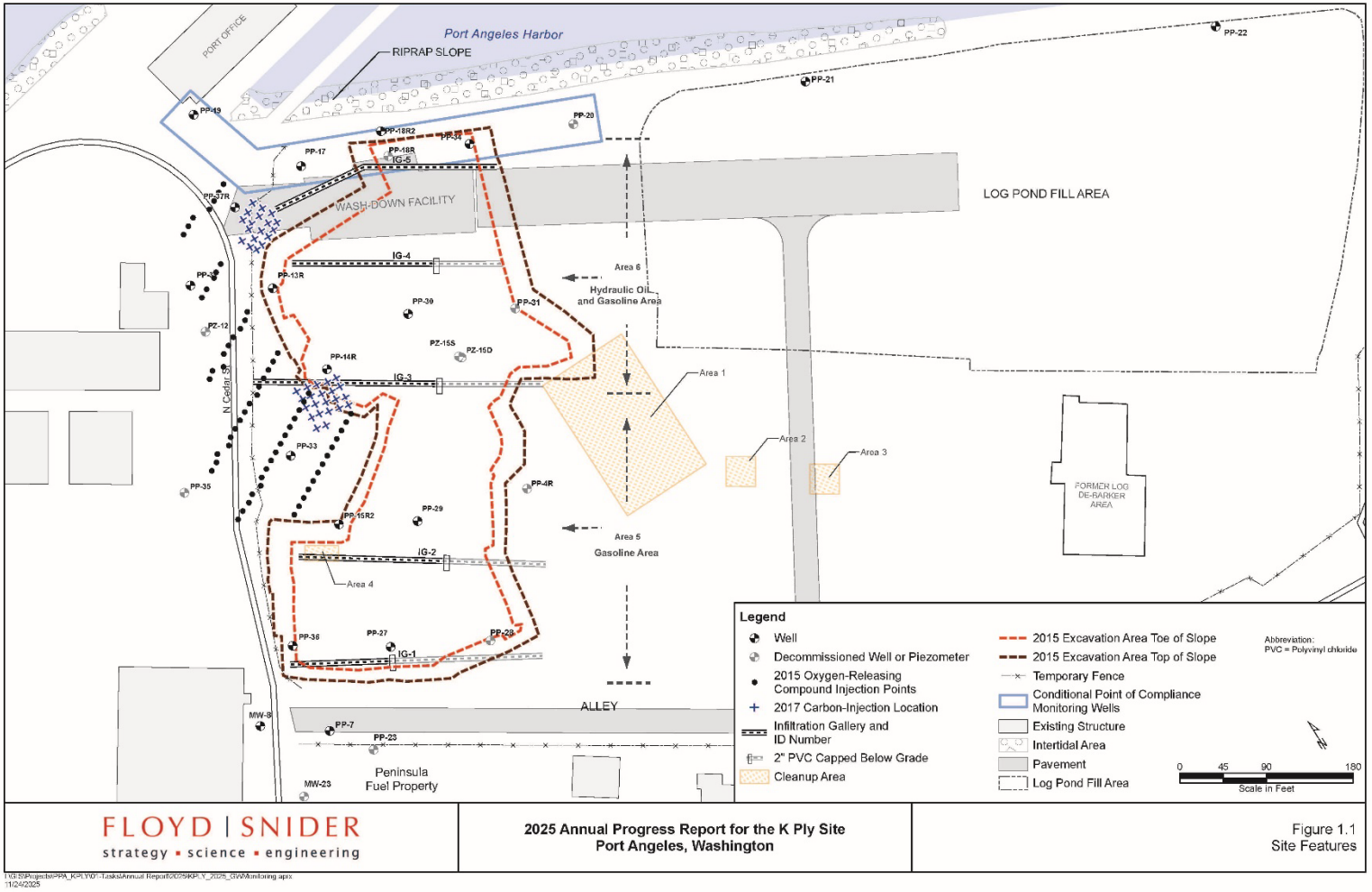



**Figure 1:** Site Features (Floyd|Snider 2026)

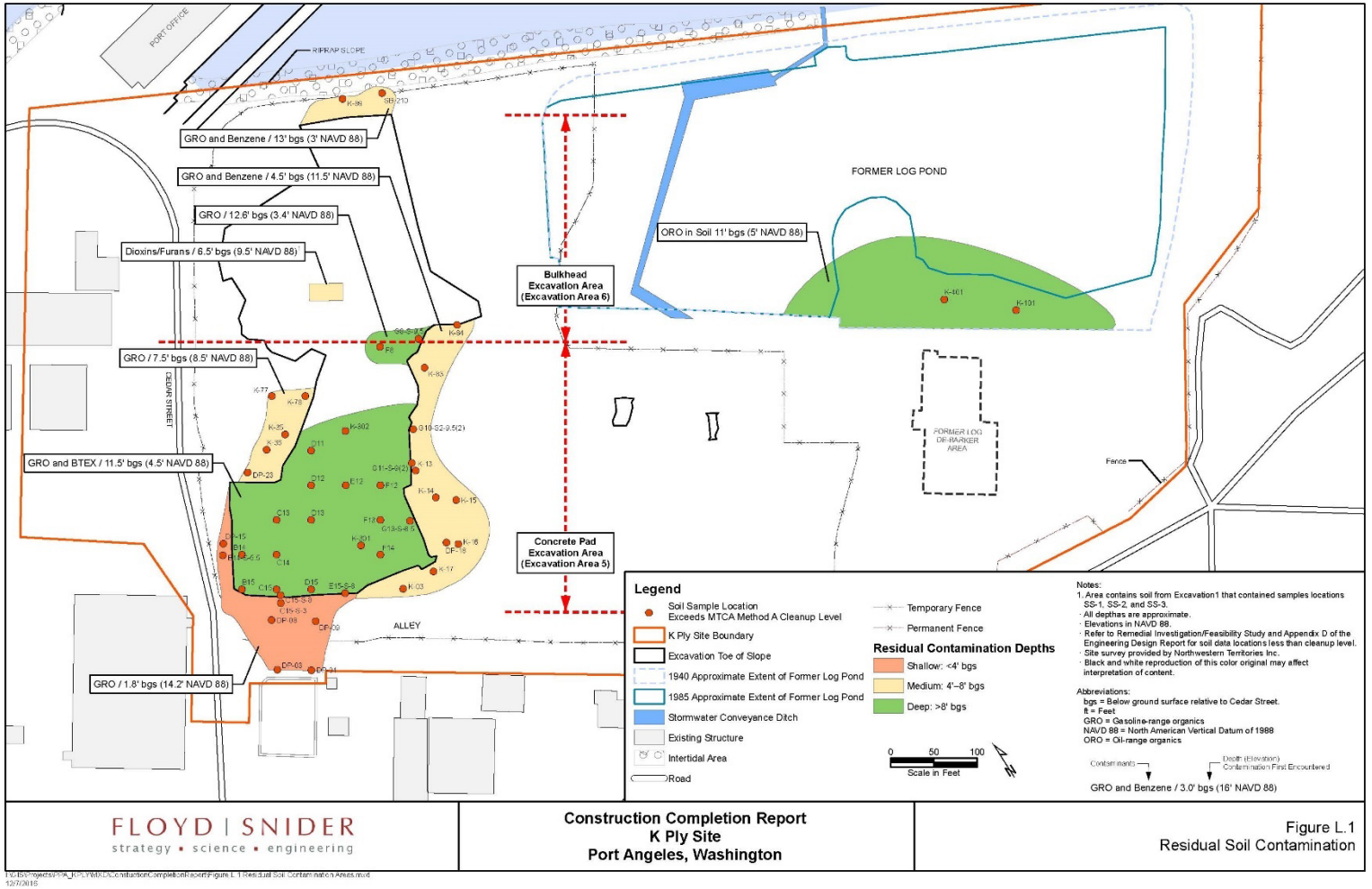



**Figure 2:** Site Plan (Floyd|Snider 2016)

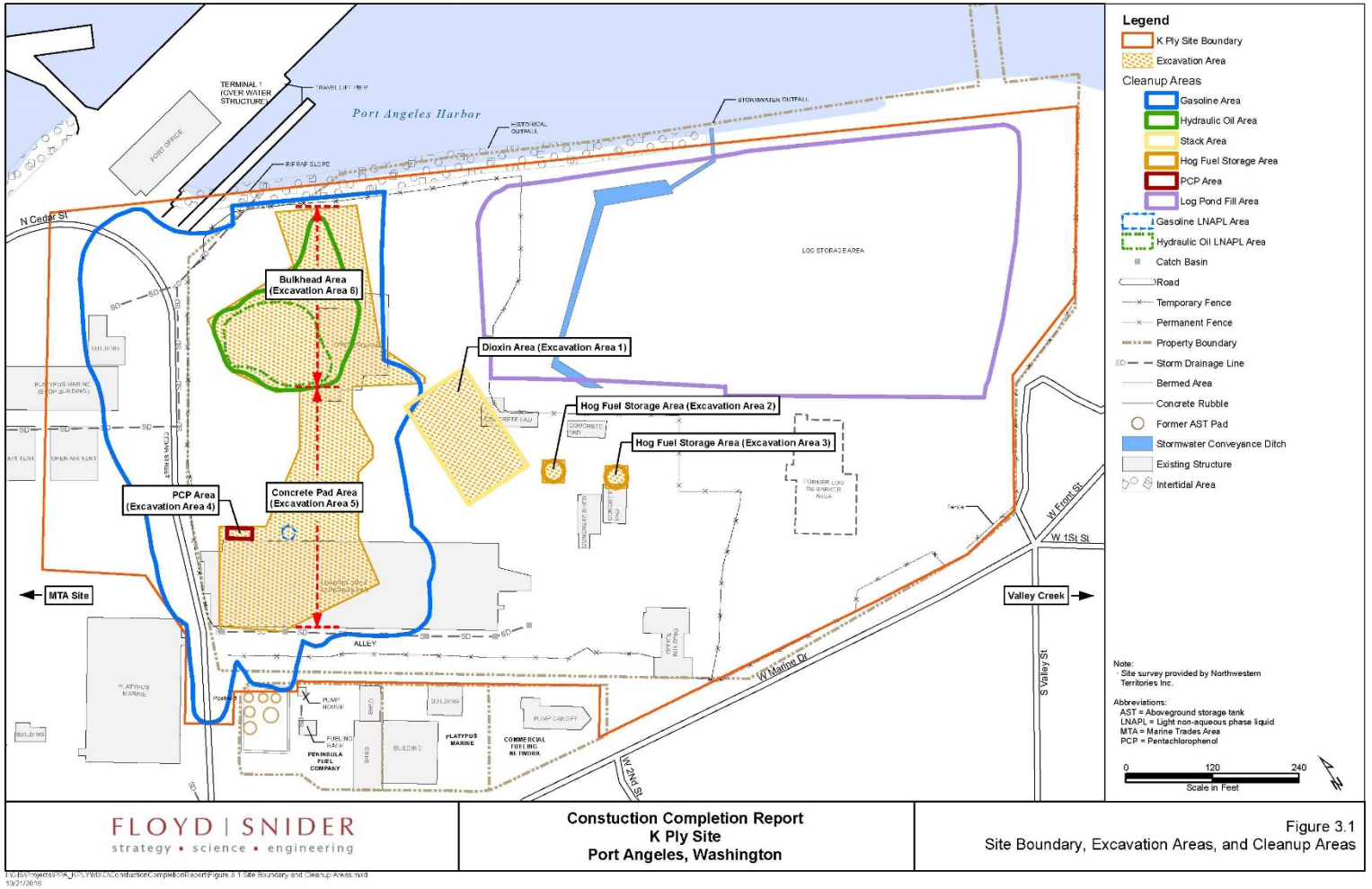



**Figure 3:** Site Boundary, Excavation Areas, and Cleanup Areas (Floyd|Snider 2016)

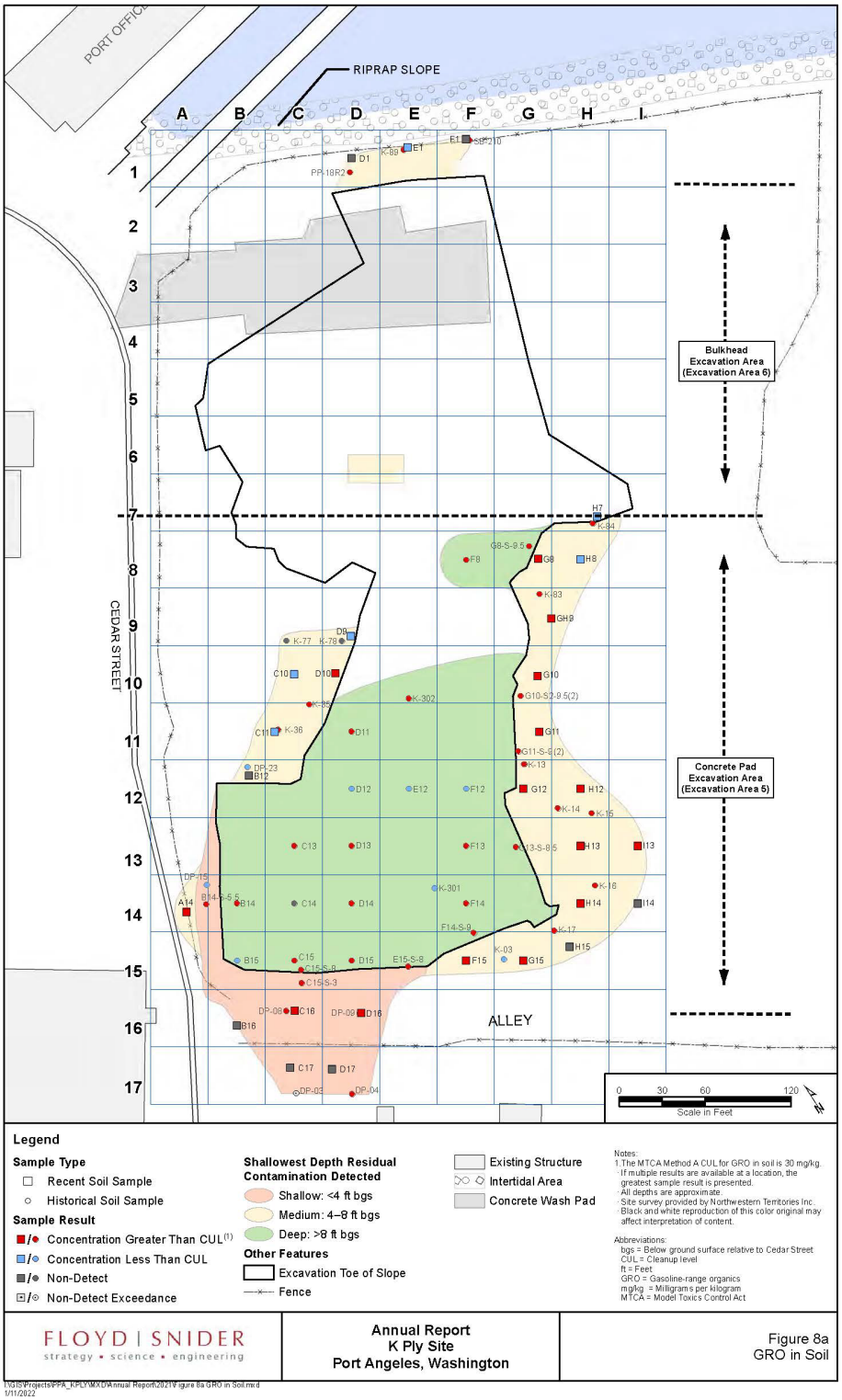



**Figure 4:** GRO in soil – Results of 5-year soil monitoring (Floyd|Snider 2022)

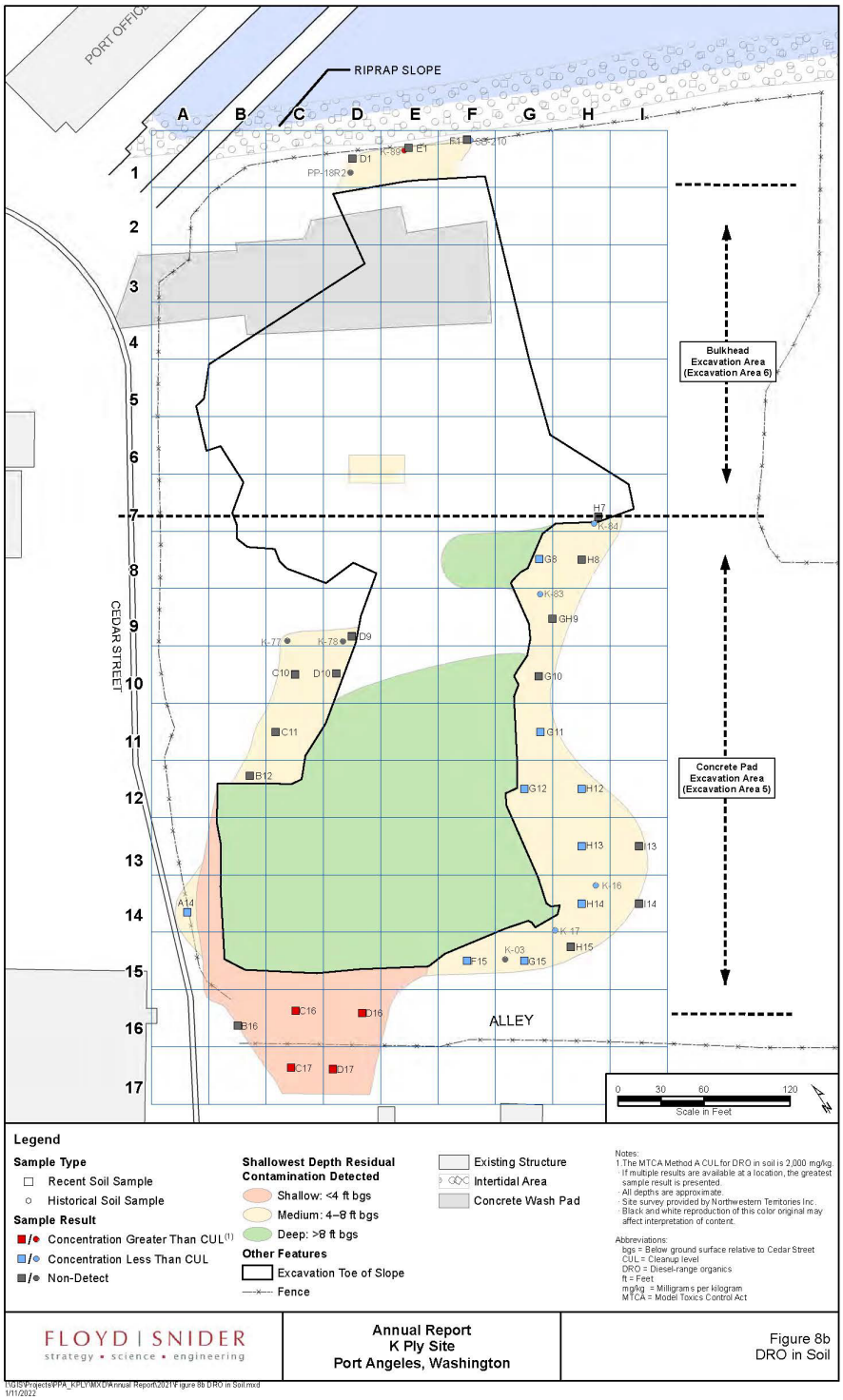



**Figure 5:** DRO in soil – Results of 5-year soil monitoring (Floyd|Snider 2022)

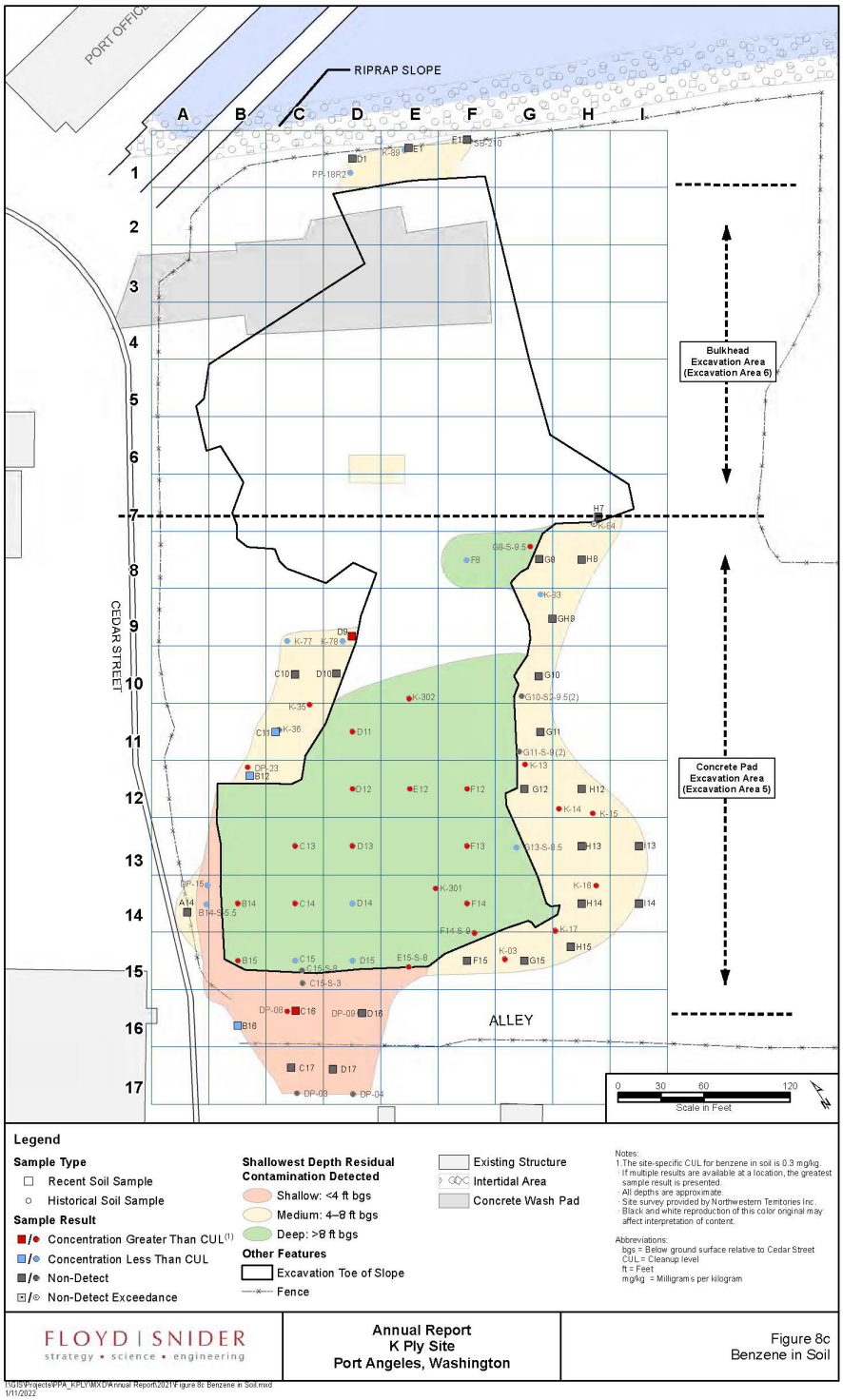



**Figure 6:** Benzene in soil – Results of 5-year soil monitoring (Floyd|Snider 2022)

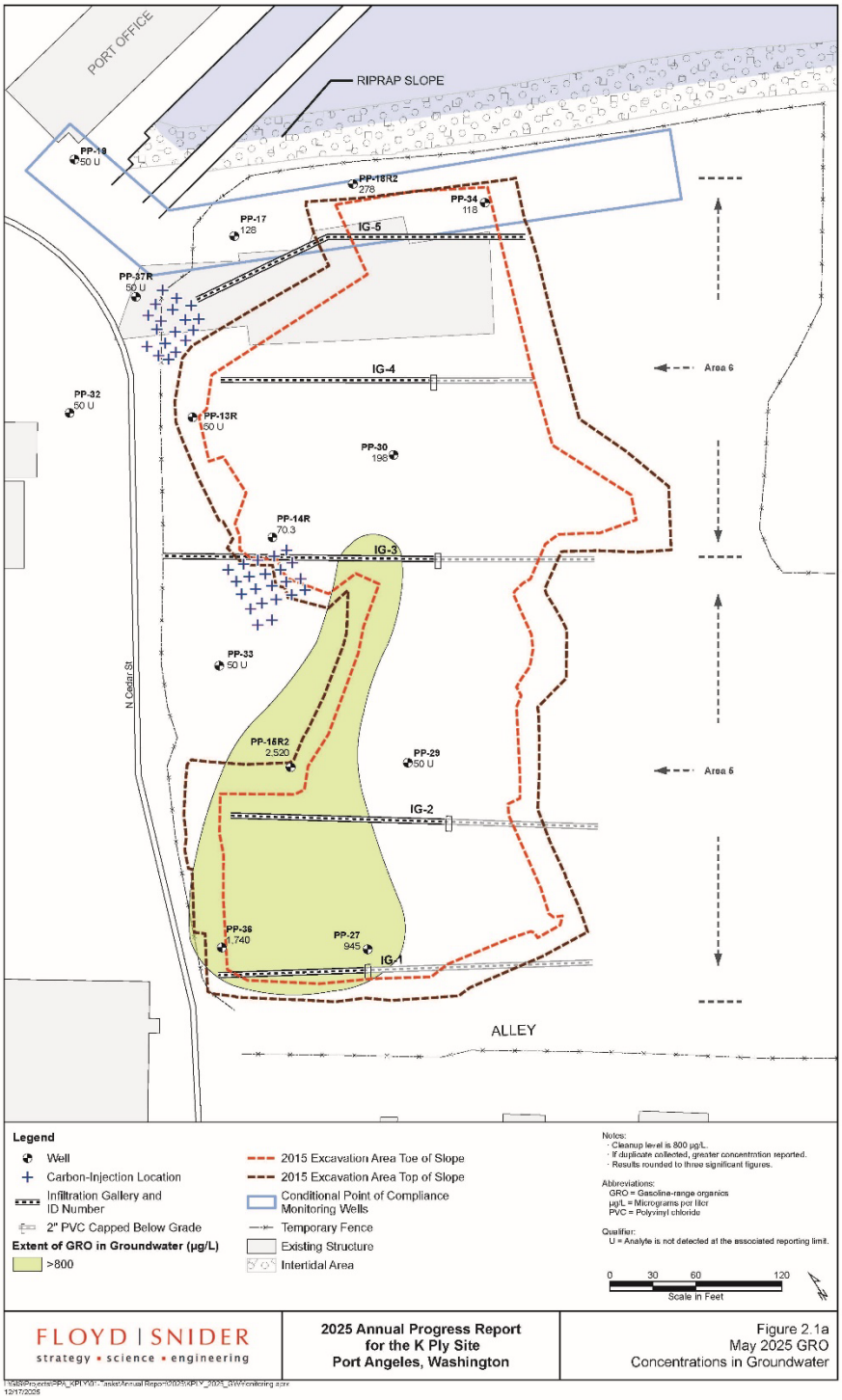



**Figure 7:** GRO in Groundwater – May 2025 (Floyd|Snider 2026)

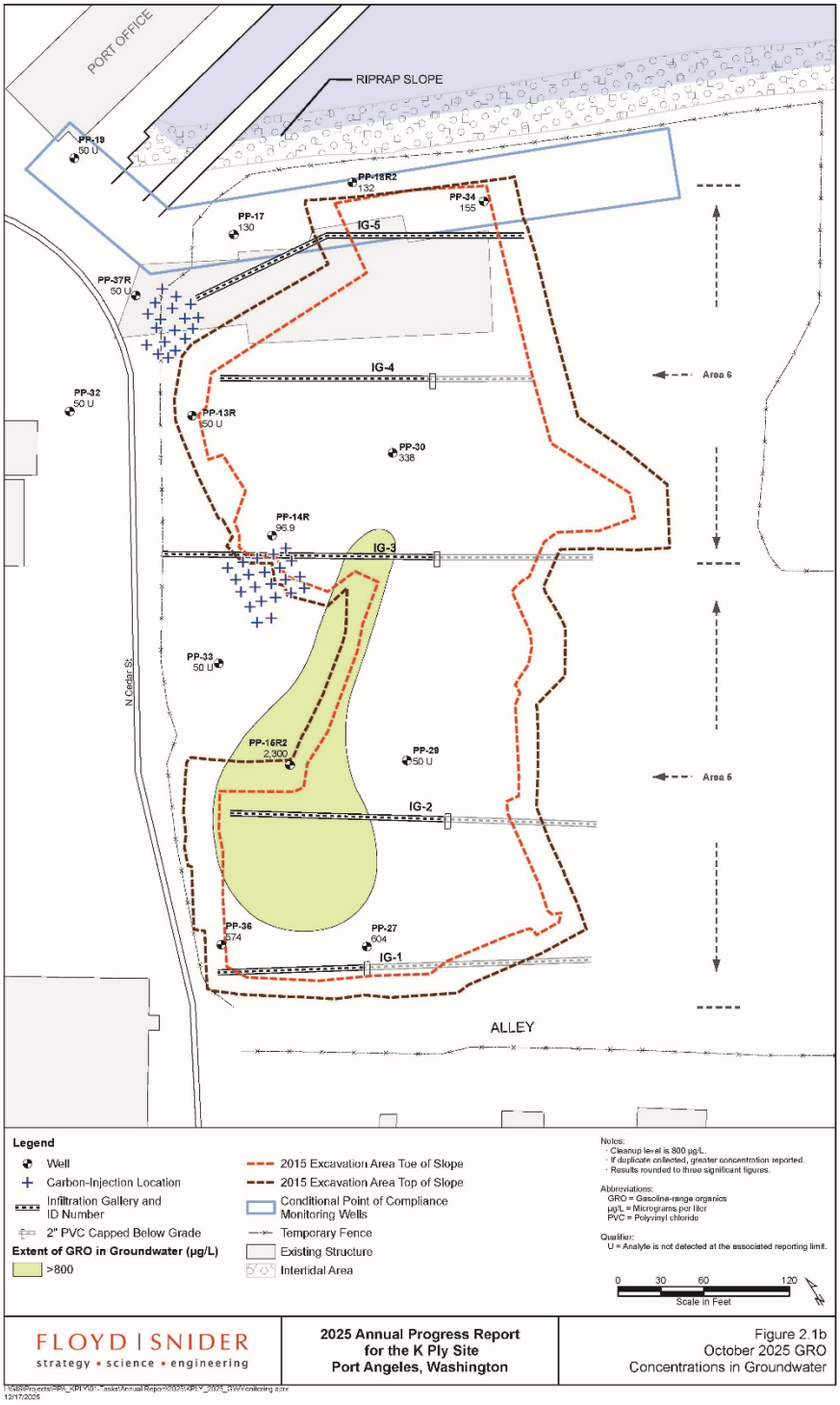



**Figure 8.** GRO in Groundwater – October 2025 (Floyd|Snider 2026)

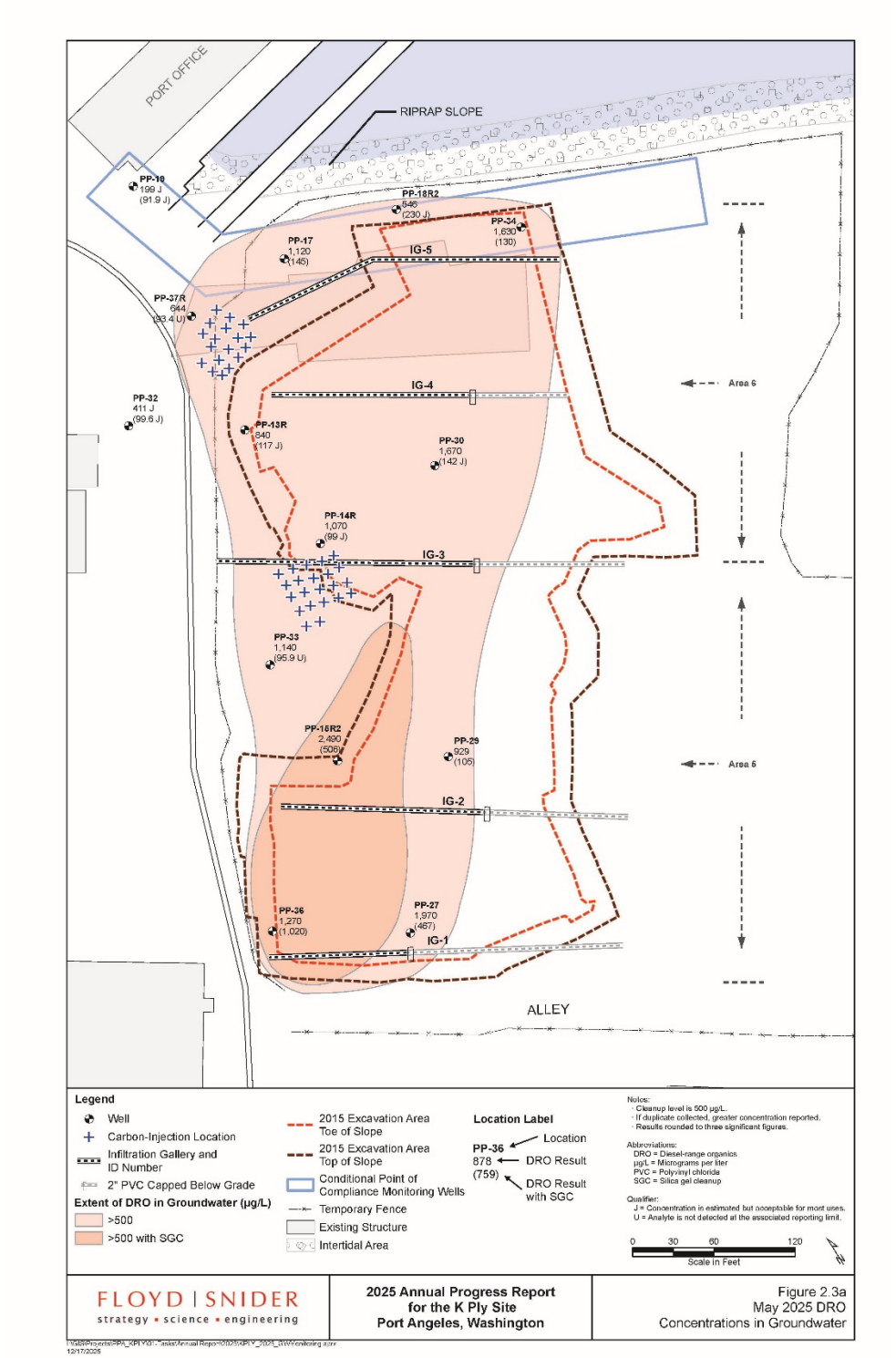



**Figure 9:** DRO in Groundwater – May 2025 (Floyd|Snider 2026)

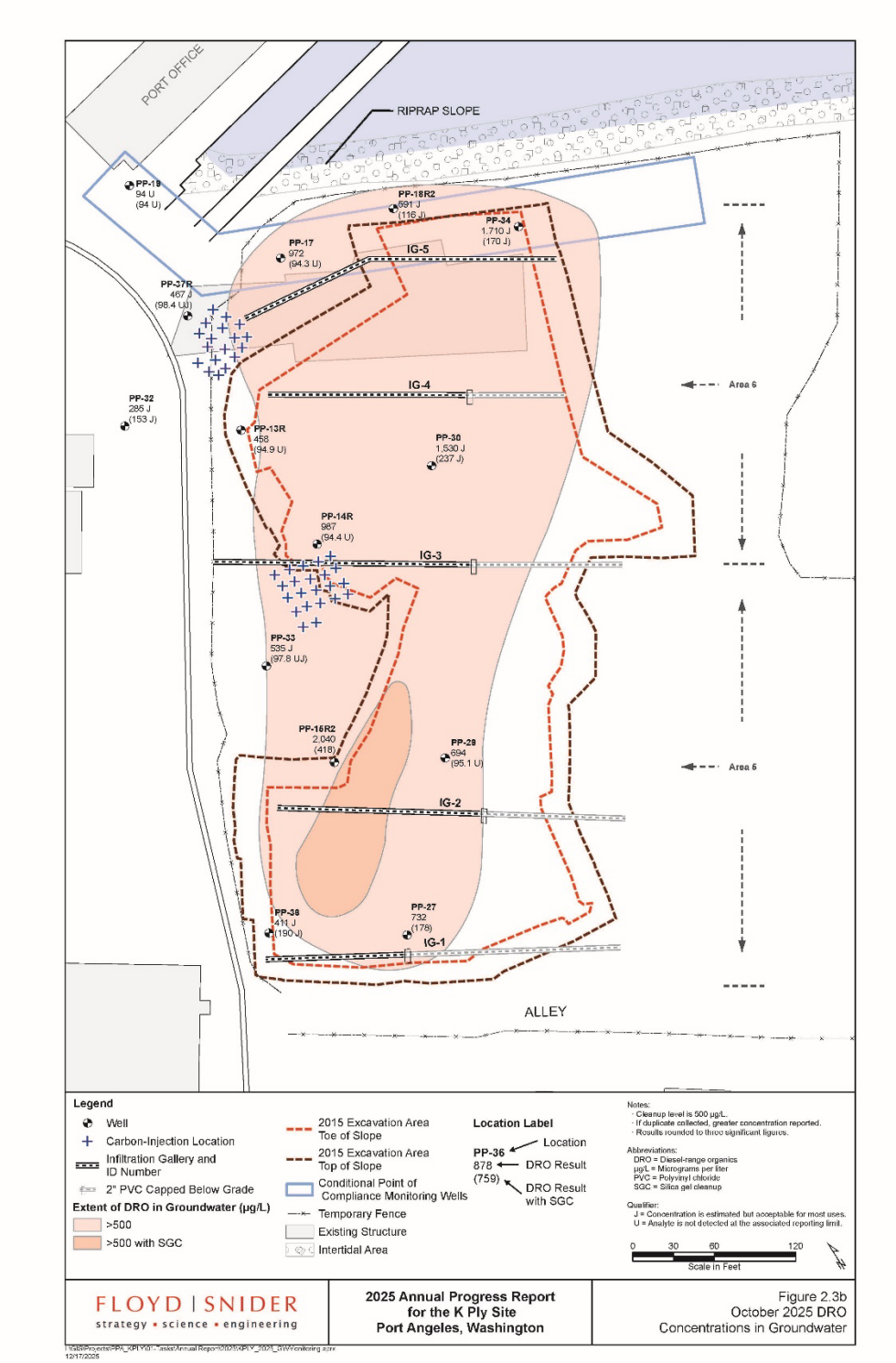



**Figure 10:** DRO in Groundwater – October 2025 (Floyd|Snider 2026)

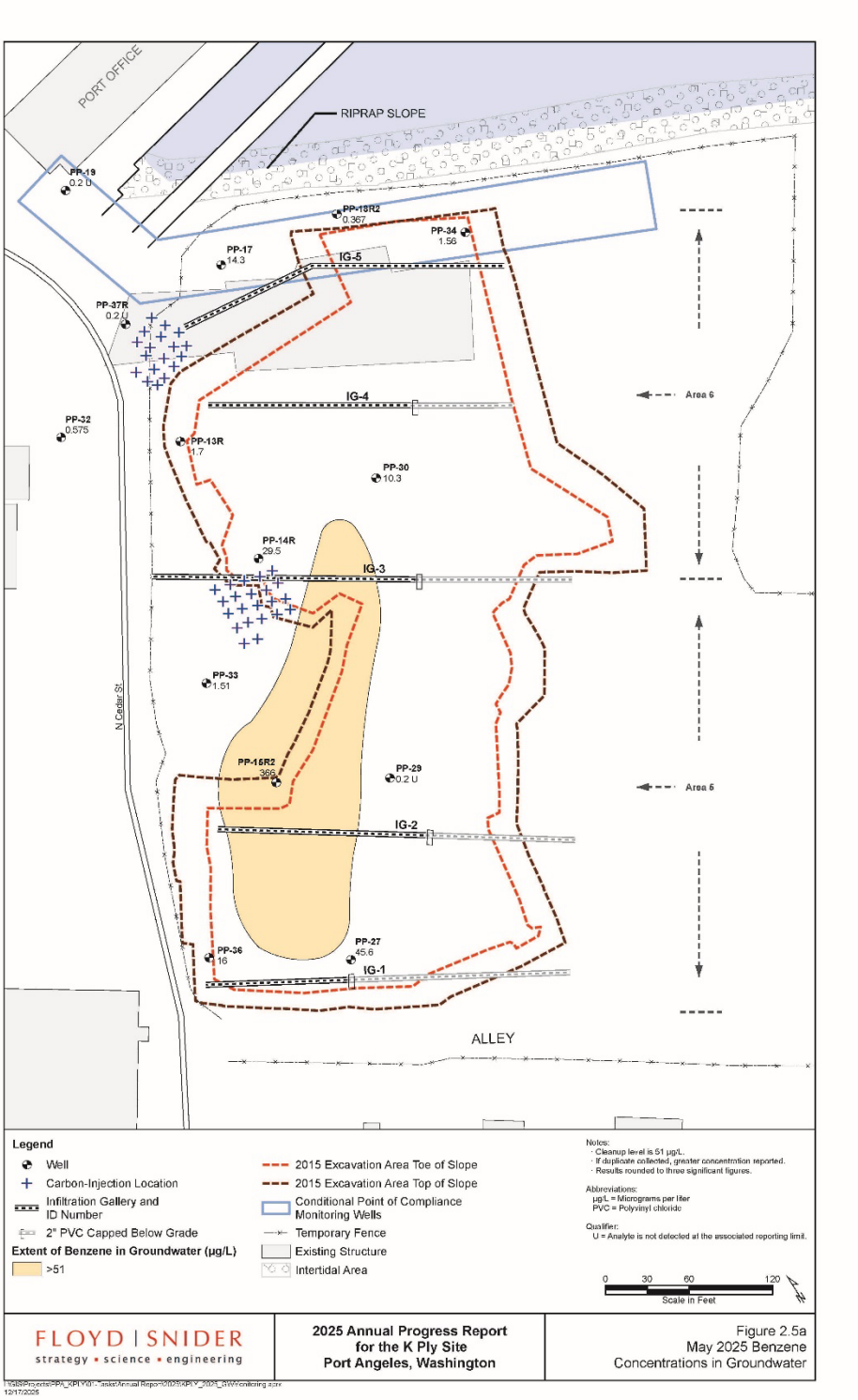



**Figure 11:** Benzene in Groundwater – May 2025 (Floyd|Snider 2026)

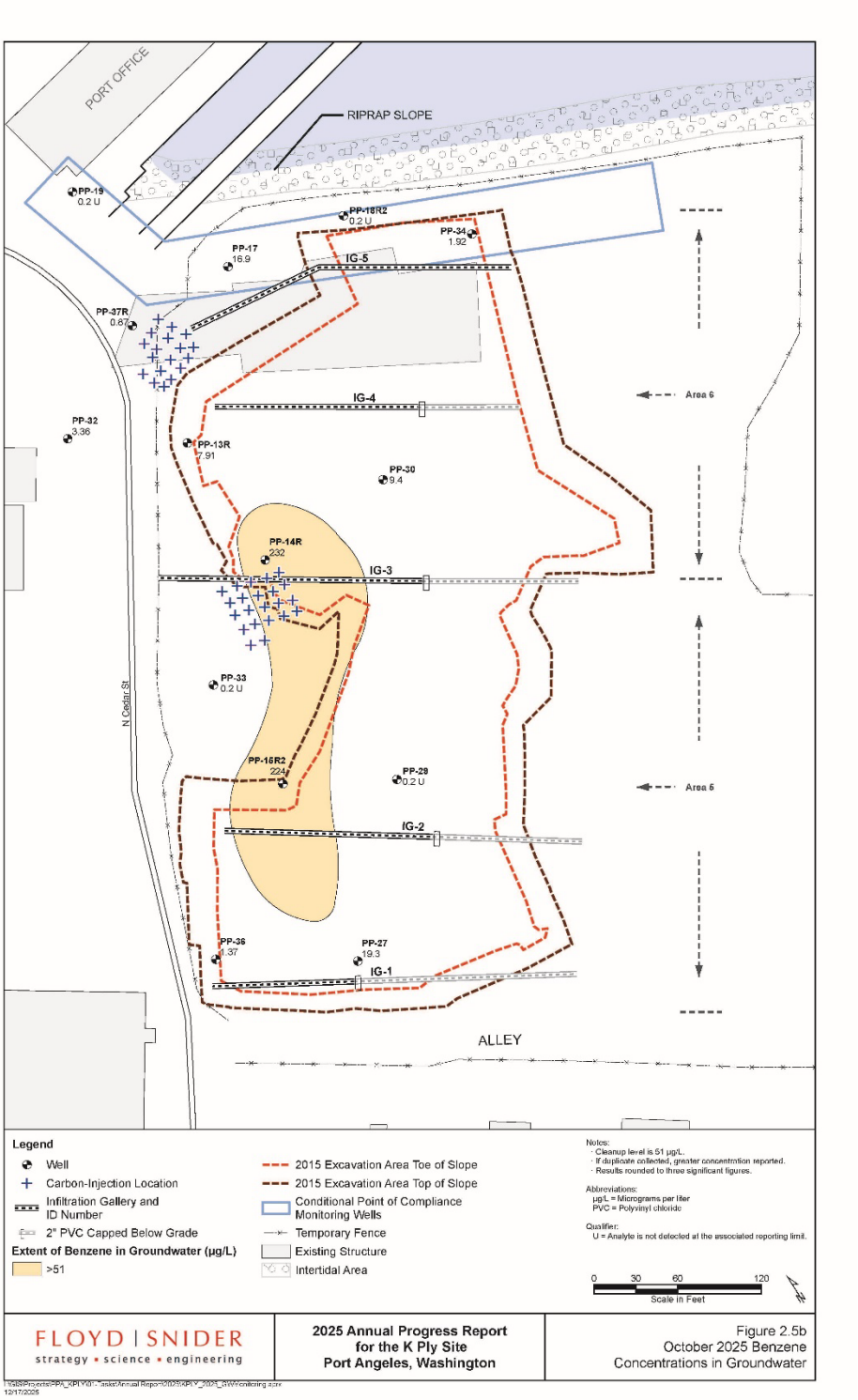



**Figure 12:** Benzene in Groundwater – October 2025 (Floyd|Snider 2026)

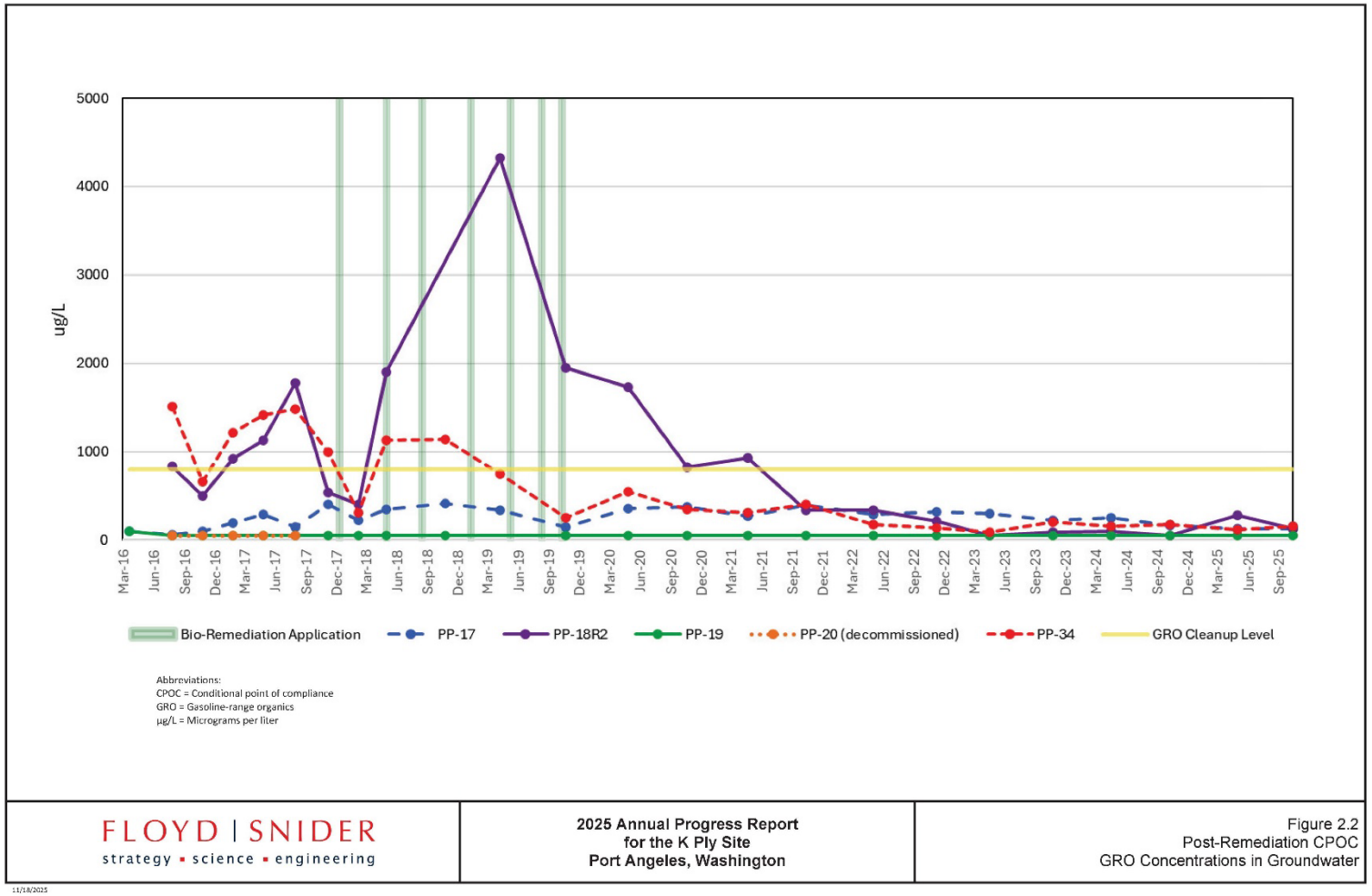



**Figure 13:** Post-Remediation GRO Concentrations in Groundwater (Floyd|Snider 2026)

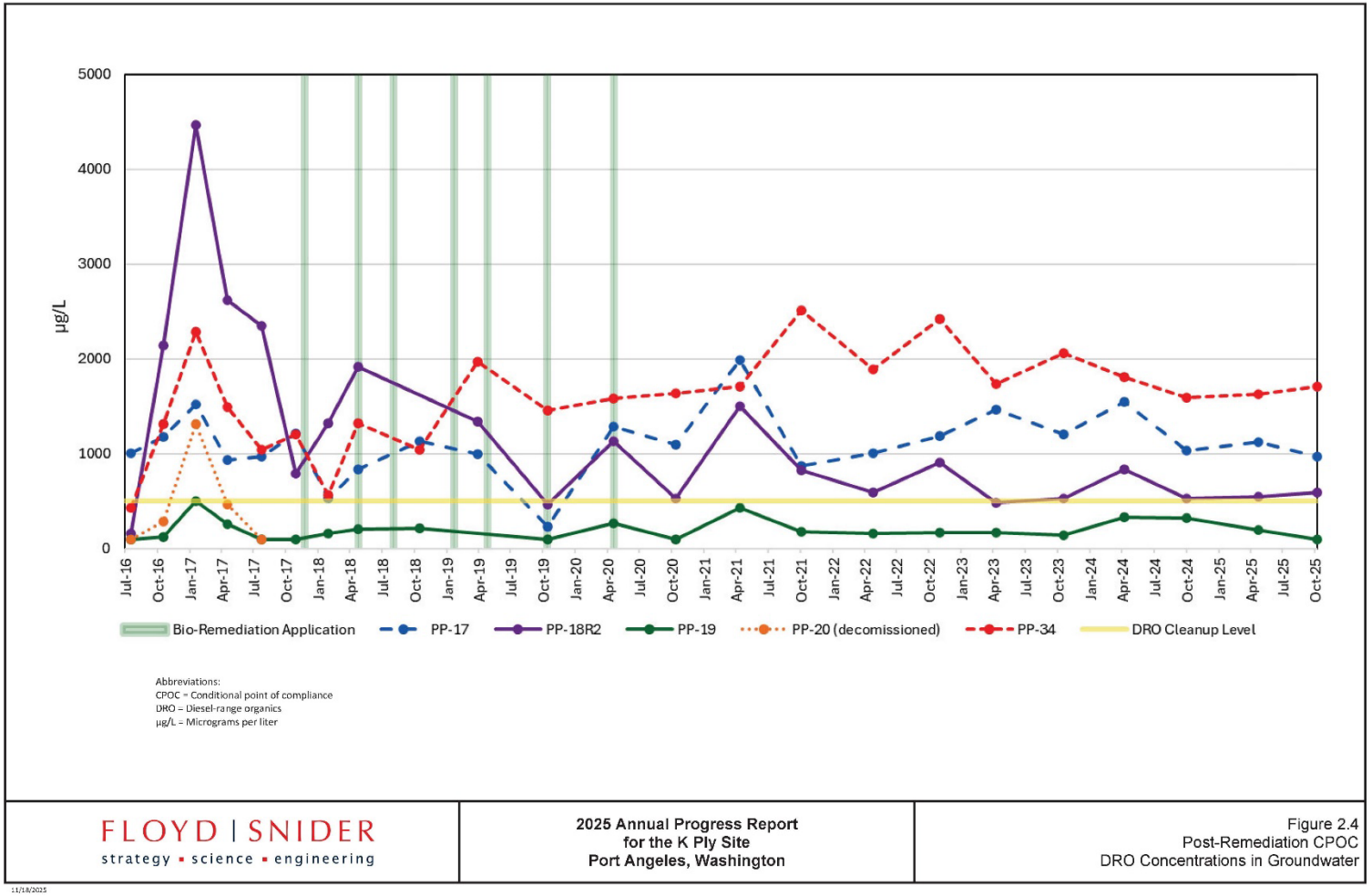



**Figure 14:** Post-Remediation DRO Concentrations in Groundwater (Floyd|Snider 2026)

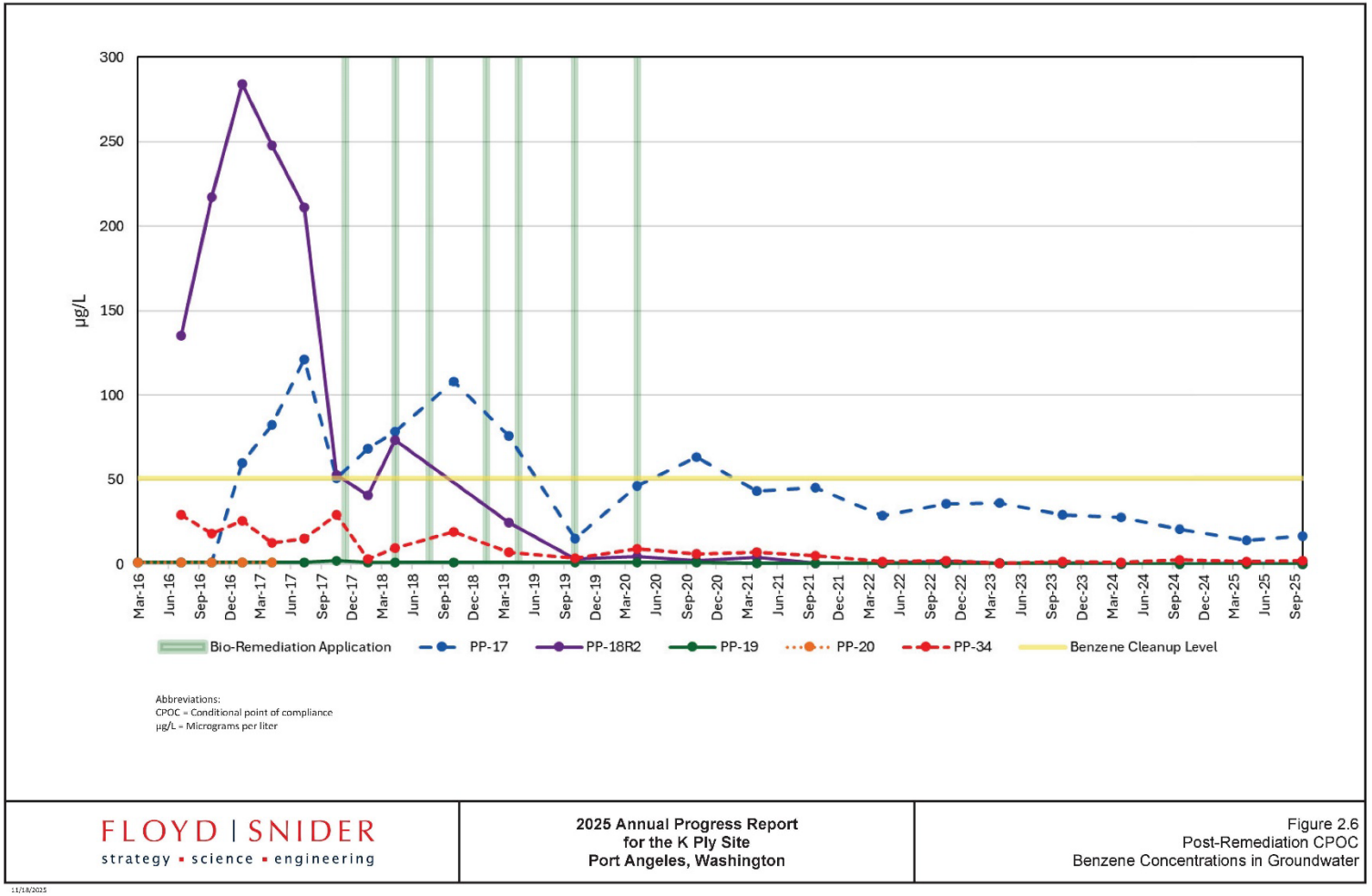



**Figure 15:** Post-Remediation Benzene Concentrations in Groundwater (Floyd|Snider 2026)

# Appendix C. Photo Log

## Photo 1: View west across southwest area of the Site.



**Photo 2: Typical well PP-27 completed aboveground surrounded by concrete blocks.**



## Photo 3: Photo of locked cap on monitoring well PP-15R2.



## Photo 4: Flush mounted well PP-33.



**Photo 5: Flush-mounted well PP-37R in pavement located at the entrance to Wash Pad.**



**Photo 6: Infiltration Gallery #2 risers on either side of remediation area.**



**Photo 7: Flush-mounted well PP-18R2 in gravel north of Wash-Down Facility.**



## Photo 8: Metal bollards protecting well PP-21.

