2022 ANNUAL SITE REPORT
SEAPORT SEATTLE TERMINAL
(FORMER ARCO/BP HARBOR ISLAND TERMINAL)
CLEANUP SITE ID: 4426
1652 SW LANDER STREET
SEATTLE, WASHINGTON

CONSENT DECREE NO. 00-2-05714-8SEA

APRIL 2023

Submitted to
Washington State Department of Ecology
Northwest Regional Office
15700 Dayton Avenue North
Shoreline, Washington 98133

Prepared for
TLP Management Services, LLC
1670 Broadway
Suite 3100
Denver, CO 80202

Prepared by
Techsolve Environmental, Inc.
7518 NE 169th Street
Kenmore, Washington 98028
www.Techsolveinc.com

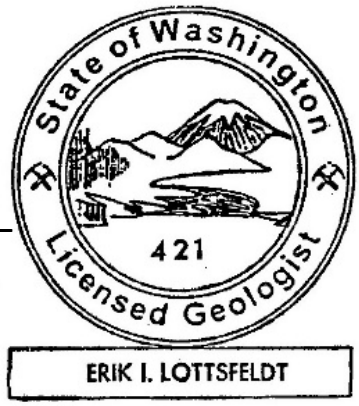
2022 ANNUAL SITE REPORT
SEAPORT SEATTLE TERMINAL
(FORMER ARCO/BP HARBOR ISLAND TERMINAL)

CLEANUP SITE ID: 4426
1652 SW LANDER STREET
SEATTLE, WASHINGTON

CONSENT DECREE NO. 00-2-05714-8SEA

APRIL 2023

Erik I. Lottsfeldt, LG
Project Geologist/Project Manager
Techsolve Environmental, Inc.



Larry E. Roberts, LG, LHG
Principal, WA Licensed Geologist/Hydrogeologist
Techsolve Environmental, Inc.

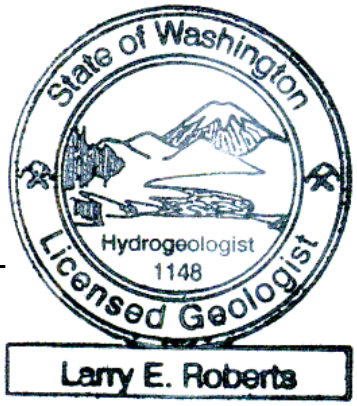


TABLE OF CONTENTS

TABLES

1. Waterfront Groundwater Petroleum Hydrocarbon Recovery Rates
2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
3. Waterfront Systems Recovered Petroleum Hydrocarbon History
4. Containment Boom Sheen Monitoring
5. Inland SVE System Petroleum Hydrocarbon Recovery Rates
6. Groundwater Monitoring Analytical Results for TPH and Benzene
7. Groundwater Monitoring Analytical Results for cPAHs
8. Monthly Groundwater LNAPL and Sheen Monitoring
9. 2022 Quarterly Performance Monitoring Groundwater Elevations

FIGURES

1. Site Location Map
2. Areas of Remediation - Plant 1
3. Areas of Remediation - Plant 2
4. Remediation System Plant 1 Waterfront
5. Final System Influent vs. Effluent Gasoline Concentrations
6. Final System Influent vs. Effluent Benzene Concentrations
7. Final System Influent vs. Effluent Diesel Concentrations
8. Plant 1 East/West Cross Section Warehouse Construction & Waterway Details
9. Cumulative Waterfront LNAPL Recovery Through December 2022
10. Areas of Restriction - Plant 2
11. Areas of Restriction - Plant 1
12. Former Hydrocarbon Mass Distribution Plant 1 Southern Property Boundary
13. Inland SVE Remediation System Layout
14. Inland SVE System Cumulative Hydrocarbon Recovery
15. Inland SVE System Gasoline, Benzene, and Carbon Dioxide History
16. Inland SVE Biodegradation and Vapor Recovery
17. Plant 1 Monitoring Well Network
18. Plant 1 First Quarter 2022 Groundwater Monitoring Analytical Results

19. Plant 1 Second Quarter 2022 Groundwater Monitoring Analytical Results
20. Plant 1 Third Quarter 2022 Groundwater Monitoring Analytical Results
21. Plant 1 Fourth Quarter 2022 Groundwater Monitoring Analytical Results
22. Plant 1 Waterfront Hydrograph
23. Plant 1 Southern Boundary Area Hydrograph
24. Plant 2 Monitoring Well Network
25. Plant 1 Hydraulic Evaluation Study Wells
26. Plant 1 Probing Investigation Boring Locations

APPENDICES

A. King County Industrial Waste Semi-Annual Self-Monitoring Reports
B. Sheen Observations – Loading Rack & Warehouse 2021 Through 1996
C. Groundwater Monitoring Wells Hydrocarbon Analytical Graphs
D. Seattle Terminal Northern Bulkhead Replacement Project Typical Section

List of Abbreviations and Acronyms

ARCO	-	Atlantic Richfield Company
bgs	-	Below Ground Surface
BP	-	British Petroleum West Coast Products Company
BTEX	-	Benzene, Toluene, Ethylbenzene, Xylenes
cPAHs	-	Carcinogenic Polycyclic Aromatic Hydrocarbons
CAP	-	Cleanup Action Plan
CCR	-	Construction Completion Report
DAS	-	Diffused Air Stripper
Ecology	-	Washington State Department of Ecology
EDR	-	Engineering Design Report
EPA	-	United States Environmental Protection Agency
ft./ft.	-	Feet per Foot
GPM	-	Gallons Per Minute
GWCMCP	-	Groundwater Compliance Monitoring & Contingency Program
HASP	-	Health and Safety Plan
IHSs	-	Indicator Hazardous Substances
KCDNR	-	King County Department of Natural Resources
LNAPL	-	Light Non-Aqueous Phase Liquid
µg/L	-	Micrograms per Liter
mg/kg	-	Milligrams per Kilogram
NRD	-	Natural Resource Damage
OWS	-	Oil Water Separator
OU	-	Operable Unit
O&M	-	Operation and Maintenance
POC	-	Point of Compliance
PSCAA	-	Puget Sound Clean Air Agency
RI	-	Remedial Investigation
RI/FS	-	Remedial Investigation and Feasibility Study
SeaPort	-	SeaPort Midstream Partners, LLC
SVE	-	Soil Vapor Extraction
Techsolve	-	Techsolve Environmental, Inc.
TMS	-	TLP Management Services, LLC
TPH	-	Total Petroleum Hydrocarbons
TPH-D	-	TPH as Diesel
TPH-G	-	TPH as Gasoline
TPH-O	-	TPH as Oil

Executive Summary

This report summarizes remedial actions conducted in 2022 at the Former ARCO/BP Harbor Island Terminal (the Site) located on Harbor Island, Seattle, Washington. For additional context, the report also presents summaries of previous investigations and remedial actions, recent changes that affect the Site, and the current status of the Site. The terminal is currently owned by SeaPort Midstream Partners, LLC (SeaPort) and managed by TLP Management Services, LLC (TMS).

Remedial actions have been conducted per Consent Decree No. 00-2-05714-8SEA. The Consent Decree, which was entered into in 2000, requires implementation of remedies to address soil and groundwater impacted with petroleum hydrocarbons (light non-aqueous phase liquid [LNAPL]) above cleanup levels. Extensive investigations concluded that LNAPL detected across the Site the was primarily highly weathered diesel-range and heavier LNAPL, with minor amounts of gasoline-range LNAPL. The detected LNAPLs are associated with historical operations and releases at the terminal. The selected remedies included excavation and off-site disposal of accessible soil, and installing and operating active remediation systems to treat areas of inaccessible soil and groundwater that were primarily located along the waterfront beneath the warehouse and truck loading rack areas. Natural attenuation was selected as the remedy for treatment of any remaining residual LNAPL. The effectiveness of the remedies was to be determined through the Groundwater Compliance Monitoring that includes Protection Monitoring, Performance Monitoring, and Confirmation Monitoring. The Consent Decree also established restoration timetables for soil and groundwater that have been subsequently revised, as needed, with approval from the Washington State Department of Ecology (Ecology). The monitoring results indicate that the cleanup goals for active remediation have been met and that moving forward towards Confirmation Monitoring and Site closure is warranted, per recent discussions with Ecology.

At Plant 1, located adjacent to the West Duwamish Waterway, mobile and recoverable LNAPL, as well as residual LNAPL, was detected primarily along the waterfront beneath the warehouse and truck loading rack areas. The LNAPL occurred in the groundwater “smear” zone, which was an approximately 4-foot-thick zone of soils and groundwater containing LNAPL above cleanup levels. The LNAPL in the smear zone, caused by seasonal and daily fluctuations in the water table, was largely contained by subsurface infrastructure installed during development of Harbor Island and of the Site. This infrastructure installed along the waterfront consists of subsurface island bulkheads and warehouse foundation walls. These barriers act as “hanging walls” allowing groundwater to flow to surface water through a narrow zone beneath the barriers while trapping the lighter LNAPL. Because the soil in these areas was inaccessible for excavation, the selected remedies included a combination of groundwater/LNAPL pumping and recovery, Soil Vapor Extraction (SVE), and air sparging. Any remaining residual LNAPL was to be treated using intrinsic bioremediation/natural attenuation, which was enhanced by operation of the air sparging system.

Soil containing residual LNAPL above cleanup levels was also detected inland from the waterfront at Plant 1 within the southeastern portion of the main tank farm. The accessible soil was excavated in 2000 and transported off-site for disposal. Inaccessible soil was to be treated through natural attenuation. Groundwater monitoring and additional investigations conducted indicated that inaccessible soil containing weathered residual LNAPL was present beneath the paved area between the southern tank farm and the southern property boundary. An additional SVE system was subsequently installed in this area (referred to as the "inland SVE system") and operated from 2008 through 2014 to improve soil and groundwater conditions in this area. Groundwater monitoring results show that the combined remedial actions of the inland soils and the waterfront remedial actions have been successful at removing the LNAPL sources, improving groundwater quality, and providing protection for the Duwamish River. The monitoring results, supplemented with the results of several additional subsurface investigations, also show that the waterfront remedial actions and inland remedial actions have achieved the cleanup goals of the Consent Decree.

Soil and groundwater remedial actions have been conducted along the waterfront at Plant 1 since the installation of an interim groundwater/LNAPL recovery system in 1992. An interim SVE system was added to the waterfront remedial actions and operated through 2002. The final remediation was designed based on the success of these interim systems and was installed in 2002. The final remediation system has been operating since completion of the installation activities and has been adjusted and modified as needed to optimize performance. The active groundwater/LNAPL recovery is currently ongoing; however, Ecology has been petitioned to discontinue operation of this system based on the results of extensive Compliance Monitoring. All of the piping and wells associated with the different system elements will remain in place following discontinuing of active operation should they be needed again in the future.

Per Ecology's request, a study to re-evaluate the Site hydrology was conducted in April and May of 2021 to evaluate the effects of the recent installation of a new seawall from the warehouse to the northern property boundary. Installation of the new seawall was completed in 2018 to enhance the seismic stability of the Site. The new seawall was installed much deeper (approximately 80 feet below ground surface [bgs]) than the previously existing island bulkhead (extending to approximately 15 to 20 feet bgs) and is "keyed into" the native island-wide low-permeability subsurface soil layer. The study also evaluated whether established points of compliance (POCs) remain appropriate and if continuation of, or revisions to, the remedial actions are needed to further meet cleanup goals of the Consent Decree. A summary report presenting the findings of the study was prepared and submitted to Ecology in February 2022, and discussions are ongoing.

The results of the study indicated that the new seawall has not significantly altered groundwater gradients or flow directions at the Site. The new seawall appears to have enhanced the attenuation of both daily tidal impacts to the adjacent water table elevations and the groundwater/surface water exchange. The findings of the study also support the applicability of the established POCs at the Site.

Additional activities conducted during 2022 included assisting Ecology during replacement of the previous Project Coordinator. Following the new Coordinator's assignment, a meeting was conducted with the project team to familiarize the new Coordinator with the Site history, terminal operations, remedial actions conducted to date, and status of compliance with the Consent Decree. Follow-up conference calls and other correspondence have also been ongoing.

A potential source for cross-contamination of the Site marine sediments along the northern waterfront from an off-site source was observed in 2022 and reported to Ecology. This potential source included extensive LNAPL sheens and highly turbid water associated with the sediment dredging and marine habitat restoration being conducted at the adjacent Vigor Shipyards. Similar potential sources have been observed and recorded in the past that were associated with similar sediment remedial actions conducted at the former Lockheed site. Other potential sources also include the two stormwater outfalls located immediately north and south of the Site where heavy sheens have been observed and recorded periodically.

Unusually high king tides occurred at the end of 2022 and early 2023 that caused some temporary flooding of the near-shore portions of the terminal. The occurrence and potential effects of these tides on the waterfront has been discussed with Ecology and will continue to be evaluated in 2023.

A small area of previously undetected LNAPL soil staining was observed near the northwestern corner of the waterfront following the king tides. Excavations were immediately conducted to expose the terminal product pipelines (located at depths of approximately 4.5 feet bgs) in the immediate area of the staining. Soil samples were collected from the excavation and groundwater samples were immediately collected from the wells surrounding this area and submitted to the laboratory for analysis and characterization of the LNAPL. Product samples from the pipelines were also analyzed by the laboratory for comparison to the soil and groundwater samples. Pressure testing of the product pipelines in the soil staining area was also subsequently conducted. The laboratory results and the results of the pressure testing did not indicate evidence of a new pipeline release. The residual LNAPL is weathered diesel-range hydrocarbons, similar to the LNAPL characteristics that have been detected across the Site. The laboratory results also indicate that the residual LNAPL has not impacted groundwater beyond the immediate area beneath the staining. This area is located behind the new seawall, so any potential impacts to groundwater are well contained. Additional investigations will be conducted to further define the nature and extent of this new area of staining.

A review of the Institutional Controls for the Site that provide ongoing protection to Site workers and the Duwamish Waterway was requested by Ecology and completed in early 2023. The Institutional Controls for the Site include the Restrictive Covenant attached to the Consent Decree, and Ecology's designation of groundwater on Harbor Island as "non-potable." Other Institutional Controls include the existing remediation systems that will be available should they be needed again in the future. There are also multiple resources available to the terminal in the event of a future release, including Ecology, the Coast Guard, the terminal's spill response contractor, and Techsolve.

Discussions were initiated with Ecology to determine a clear path forward towards discontinuing active remedial actions, implementing Confirmation Monitoring, and Site closure. Additional shallow groundwater analytical data requested by Ecology will be collected from the temporary piezometers that exist in the warehouse and loading rack areas. The results of these activities will be presented to Ecology.

1. Introduction

Techsolve Environmental Inc. (Techsolve, formerly TechSolv Consulting Group, Inc.) has prepared this report on behalf of TLP Management Services, LLC (TMS) to summarize remedial investigation (RI) and cleanup activities conducted through 2022 at the SeaPort Seattle Terminal (formerly BP West Coast Products [BP] and Atlantic Richfield Company [ARCO] Terminal 21T) (the Site) located on Harbor Island in Seattle, Washington. This report was prepared to satisfy Annual Reporting Requirements of Consent Decree No. 00-2-05714-8SEA, cooperatively entered into between ARCO and the Washington State Department of Ecology (Ecology). The Consent Decree was entered into court on March 24, 2000 (Ecology, 2000b) by the Washington State Attorney General.

This report is organized into seven sections and includes four appendices. Many of the required background and general discussion components summarized in this Annual Site Report have been further explained in previous documents submitted to Ecology and are referenced in appropriate sections. The report is organized as follows:

- Section 1 – Provides a summary of the project, describes Site reporting requirements, and summarizes the organization of this report.
- Section 2 – Provides descriptions of Site history, regulatory status, historical investigations, selection of remedial actions, Site cleanup action levels, monitoring requirements, and cleanup requirements.
- Section 3 – Summarizes remedial actions that have occurred at the Site and associated monitoring activities.
- Section 4 – Summarizes groundwater monitoring activities conducted at the Site and provides results and findings of these activities.
- Section 5 – Summarizes additional activities conducted in 2022, including submitting the results of the Hydraulic Evaluation Study, assisting Ecology during the replacement of the Ecology Project Coordinator, evaluating potential cross-contamination of the marine sediments from off-site sources, and evaluating Site impacts from seasonally high king tides.
- Section 6 – Summarizes the information and conclusions presented in this report.
- Section 7 – Documents the references cited in this report.
- Appendix A: Sanitary Sewer Discharge Reports – Provides the two 2022 semi-annual discharge reports provided to the King County Department of Natural Resources (KCDNR).

- Appendix B: Sheen Observations – Documents the occurrence of sheens within booms located on the Duwamish Waterway from 1996 through 2022.
- Appendix C: Groundwater Monitoring Hydrocarbon Results – Presents graphs of hydrocarbon analytical results for active groundwater monitoring wells.
- Appendix D: Seattle Terminal North Bulkhead Replacement Project Typical Sections.

2. Site Description, History, and Cleanup Standards

The Site is located on Harbor Island and consists of two separate bulk fuel storage plants (Figure 1). Harbor Island is a 455-acre man-made island that lies between the East and West Waterways of the Duwamish River. Plant 1 occupies about 12 acres on the western portion of the island, along the West Waterway of the Duwamish River. Plant 2 occupies about 3.5 acres in the north-central part of the island. Both plants were constructed in the 1930s and have operated as bulk fuel storage and transfer facilities under several owners since that time. In 2017, SeaPort Midstream Partners, LLC purchased the facilities and TMS assumed operation and the ongoing environmental responsibility that is within Ecology's jurisdiction.

Harbor Island was created primarily from marine sediments dredged from the Duwamish River. The island was substantially redeveloped in the early 2000s to accommodate additional shipping container off-loading and transportation and distribution. As such, the island is currently about 95 percent covered with industrial buildings, paved roads, or other impervious surfaces. The island's pervious surfaces consist primarily of land located adjacent to above-ground storage tanks and railroad tracks.

In the northern portion of the island, where the Site is located, groundwater flows radially outward from the island center and enters marine surface waters (the East and West Duwamish Waterways, Figure 1) at the island's edge. This flow pattern was reconfirmed in 2022, as discussed in Section 4.1.6. Local groundwater is recharged from precipitation and, possibly, leaking underground utilities (e.g., storm sewers and public water supply piping). Recharge of groundwater from precipitation has decreased over past decades due to increases in impermeable surfaces during island redevelopment. Ecology and the United States Environmental Protection Agency (EPA) have determined that groundwater beneath Harbor Island is "non-potable," which is unlikely to change due to the island's extensive industrial land usage.

The subsurface infrastructure installed during the development of Harbor Island and the Site affect the groundwater-to-surface water exchange at the island edge and thus provide substantial protection of the Duwamish Waterway. The island was constructed in approximately 1900 by hydraulic dredging of the Duwamish Waterways, and from the downtown Seattle Denny Hill Regrade project, by creating large multi-acre settling ponds using timber bulkheads. The bulkheads were constructed on top of the native deltaic sediments to heights of approximately 20 feet and ultimately formed the shape and configuration of the island (Fowler, 1924). These bulkheads are still in place beneath the Site and still have substantial structural integrity.

When the Site was developed, the western warehouse foundation of a vertical concrete wall (mostly below grade) with nearly 7-foot-wide concrete footings was installed on top of, and incorporated with, driven interlocking sheet pilings. The warehouse foundation and sheet piling were installed inside (landward) of the original island waterfront bulkhead. The sheet piling was driven many feet into the native sediments for structural stability (the exact depth is uncertain). The warehouse foundation, footings, and sheet piling were incorporated into an uninterrupted

subsurface wall by continuing the foundation concrete down the several inch-wide spaces on either side of the sheet piling to depths of approximately 10 feet into the native sediments. Based on many hydraulic investigations conducted during and since the RI, and on observations and strain measurements collected for the warehouse western foundation during and following the February 28, 2001, Nisqually Earthquake (magnitude 6.7), the sheet piling/warehouse subsurface wall/barrier was determined to still have sufficient structural integrity.

As determined during the Remedial Investigation/Feasibility Study (RI/FS) and Engineering Design for the groundwater remedy (discussed in Section 3.1), the significance of these subsurface barriers is that both the original bulkhead and sheet piling significantly retard the exchange of groundwater and surface water. These barriers also have contained light non-aqueous phase liquid (LNAPL) along the waterfront and assisted with the success of the groundwater remedies in achieving the Consent Decree cleanup goals, as further discussed in Sections 3.1 and 5.1. These barriers, therefore, also serve as part of the "Institutional and Engineering Controls" that provide ongoing protection for the Site, as referenced in Section 5.6.

2.1. Site Regulatory Status

Harbor Island was placed on the National Priorities List in 1983 as a Superfund Site due to elevated levels of hazardous substances in soil, primarily lead. The Harbor Island Superfund Site consists of seven original operable units (OUs). The Former BP Harbor Island Terminal Site is part of the Tank Farm OU, which includes the adjacent Shell (formerly Equiva Services, LLC, Equilon, and Texaco) and Kinder Morgan (formerly GATX and Shell) terminals. Ecology is the lead regulatory agency for the Tank Farm OU.

ARCO and Ecology cooperatively entered into Agreed Order No. DE 92 TC-N158 in 1992 (Ecology, 1992) to conduct Site characterization activities and develop remedial actions. An RI/FS completed in 1997 (Geraghty & Miller, 1994, 1996, and 1997) showed hazardous substances present in groundwater and soil at the Site were primarily highly weathered total petroleum hydrocarbons (TPH) as diesel (TPH-D), with lesser amounts of weathered TPH as gasoline (TPH-G) and heavier TPH as oil (TPH-O). The weathered TPH likely resulted from historic spills at the Site. The RI/FS showed the primary area of impact at the Site was a plume of LNAPL located beneath the warehouse and loading rack areas adjacent to the Duwamish Waterway at Plant 1. Secondary areas of concern included LNAPL impacted soils located within the Plant 1 and Plant 2 tank farms (Figures 2 and 3). Site-specific cleanup alternatives for groundwater and soil were then developed to protect human health and the environment at the Site.

ARCO entered into Consent Decree No. 00-2-05714-8SEA with Ecology in 2000 for implementing remedial actions at the Site. Separate cleanup actions for the Plant 1 waterfront area and for the inland Plant 1 and 2 soils were developed and specified in the Cleanup Action Plan (CAP) (Ecology, 1999) and in the Engineering Design Report (EDR) (TechSolv and AG&M], 2000a). Cleanup actions were selected from site-specific cleanup action alternatives developed as part of the Focused Feasibility Study (Geraghty & Miller, 1997). Elements of the selected cleanup actions include:

- Pumping and treatment for containment of an LNAPL plume that affected shallow groundwater along the waterfront of Plant 1.
- Excavation of accessible TPH impacted soil "hot spots" in the inland portions of Plant 1 and Plant 2.
- Intrinsic bioremediation/natural attenuation of residual LNAPL in inaccessible soils.
- Air sparging and soil vapor extraction (SVE) for accelerated mass removal of residual hydrocarbons in inaccessible soils at Plant 1.
- Groundwater compliance monitoring.
- Deed restrictions.
- Institutional controls.

A target period of 18 months was established for removal of LNAPL beneath the warehouse at Plant 1, and a target period of 5 years was set for groundwater restoration as measured at the property and surface water boundaries. Due to Site complexities, additional contingency actions have been implemented at the Site with Ecology's concurrence. These actions have included continuing operation of the waterfront recovery system beyond 5 years, and operation of an SVE system to address inaccessible hot spot soils inland from the waterfront at Plant 1, as further discussed in Section 3.

2.2. Cleanup Levels

Cleanup levels for indicator hazardous substances (IHSs) at the Site were identified and defined in the CAP and are summarized below.

The TPH cleanup action level for subsurface soil at the primary area of concern (Plant 1) was established to meet remedial objectives for protecting surface water at property boundaries and shorelines of the Duwamish Waterway. The Total TPH (TPH-G+TPH-D+TPH-O) cleanup level is also protective for other chemical constituents in petroleum product (i.e., benzene, toluene, ethylbenzene, xylenes [BTEX]) and is:

Total TPH	10,000 milligrams/kilogram (mg/kg)

The TPH cleanup action level for subsurface soil at the secondary area of concern (Plant 2) was set to meet remedial objectives of protecting surface water at property boundaries by improving general groundwater conditions at the source. This cleanup level was also set to enhance the timely restoration of impacted areas through natural attenuation, and is:

Total TPH	20,000 mg/kg

Site groundwater cleanup levels established by Ecology were based on surface water standards, to be protective of aquatic organisms in the Duwamish River. These standards were

based on adopted ambient water quality criteria (Washington Administrative Code 173-201A and Section 304 of the Federal Clean Water Act). Surface water standards were not established for TPH when the CAP was approved; therefore, groundwater cleanup levels for TPH-G, TPH-D, and TPH-O were selected by Ecology as protective cleanup goals. Site groundwater cleanup levels are:

Product (LNAPL)	No sheen
Benzene	71 micrograms/liter (µg/L)
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)	0.031 µg/L
Copper	2.9 µg/L
TPH-G	1,000 µg/L
TPH-D	10,000 µg/L
TPH-O	10,000 µg/L

2.3. Points of Compliance

The cleanup criteria are to be met at conditional points of compliance (POCs), which were established in the Groundwater Compliance Monitoring and Contingency Program (GWCMCP) (TechSolv, 1999b), Exhibit F of the Consent Decree.

The soil cleanup standards for TPH are intended to protect the beneficial use of groundwater (surface water quality and associated ecosystem). The cleanup actions have resulted in substantive compliance with the soil cleanup standards by reducing concentrations of contaminants in soils to levels that support and maintain compliance with groundwater quality standards.

The achievement of cleanup levels in groundwater is measured at compliance points of performance and confirmation located within LNAPL plume areas, at the down-gradient edge of the Site, and where groundwater primarily discharges to surface water. The discharge occurs through a narrow, roughly 10-foot-thick zone of groundwater located between the base of the bulkheads and the underlying saltwater (the typical subsurface water stratification for an island in a saltwater setting). These conditions were consistent along the entire waterfront but have been markedly improved north of the warehouse with the installation of the new seawall (Section 5.1).

2.4. Compliance Monitoring Types and Criteria

Three types of compliance monitoring are required to be performed at the Site, as specified in the GWCMCP to meet the monitoring program objectives, and include the following:

- Protection Monitoring. Protection monitoring is performed to confirm that human health and the environment are protected during all phases of the cleanup actions. Protection monitoring is addressed in the health and safety plan (HASP) that was prepared in conjunction with the EDR, construction plans and specifications, and operation and maintenance (O&M) plans. The HASP is a working field document and is maintained on-site. The HASP is updated as system operations or procedures change.

- Performance Monitoring. Performance Monitoring is performed to confirm that the cleanup actions are attaining cleanup standards and other performance standards.

- Confirmation Monitoring. Confirmation Monitoring is performed to confirm the long-term effectiveness of the cleanup action once cleanup actions and other performance standards have been attained.

2.4.1. Performance Monitoring

The objective of performance monitoring is to confirm that the cleanup actions have attained cleanup standards and other performance standards as appropriate. Performance monitoring requires monitoring of LNAPL presence/thickness in the recovery wells during LNAPL recovery activities. Groundwater sampling to evaluate the effectiveness of soil and groundwater cleanup actions and natural attenuation is also part of performance monitoring.

The results of performance monitoring are discussed in Sections 3 and 4. The criteria established in the GWCMCP to be used to determine if compliance performance standards have been met include the following:

- Plant 1 Separate-Phase Hydrocarbons (LNAPL): Removal to the maximum extent practicable or a lack of measurable LNAPL thickness in compliance monitoring wells, LNAPL recovery systems and until a persistent sheen is no longer observed on the waterway. A measurable thickness of free LNAPL is defined as greater than or equal to 0.01 feet thick.

- Plant 1 Dissolved TPH Constituents: Groundwater cleanup levels (Section 2.2.) are based on protection of aquatic organisms and on human ingestion of such organisms. The Point of Compliance (POC) for the Site groundwater is the property boundary and is represented by the Confirmation Monitoring Wells (Section 2.4.2.).

- Plant 1 Intrinsic Biodegredation/Natural Attenuation: To demonstrate that natural attenuation is occurring to reduce contaminant concentrations, the performance criteria is periodic monitoring of constituent plume data (i.e., benzene and TPH) and other indicators of natural attenuation processes. Evaluations will focus primarily on documenting loss of contaminant mass in groundwater and monitoring trends in biogeochemical parameters.

- Plant 1 SVE System Performance Criteria: Operation of an SVE system will continue until volatile petroleum hydrocarbons are recovered and residual hydrocarbons are degraded to a level that ensures continued compliance with cleanup criteria in the warehouse area Confirmation Wells.

- Plant 1 Air Sparging Performance Criteria: An air sparging system will be operated until the effect on LNAPL recovery becomes negligible (i.e., no measurable LNAPL thickness), and residual hydrocarbons are degraded to a level that ensures continued compliance with cleanup criteria in the warehouse area Confirmation Wells.

- Plant 1 Surface Water Boom Monitoring: The presence of sheens on the waterway will be monitored by visual observation. The results of sheen monitoring will be used to determine the effectiveness of remedial actions on reducing sheen and evaluate whether adjustments to remedial actions are necessary along the waterfront. Booms will be maintained until no persistent sheens associated with the terminal are detected.

- Plant 2 Performance Criteria: Removal of free LNAPL to the maximum extent practicable or a lack of measurable LNAPL thickness in compliance monitoring well(s). A measurable thickness of free LNAPL is defined as greater than or equal to 0.01 feet thick. Additionally, the effectiveness of continued natural attenuation at the Site will be evaluated as part of the performance monitoring program. This evaluation will focus primarily on documenting loss of contaminant mass in groundwater and monitoring trends in biogeochemical parameters.

2.4.2. Confirmation Monitoring

The objective of confirmation monitoring is to confirm the long-term effectiveness of the cleanup actions once performance standards have been met. Confirmation Monitoring Wells at Plant 1 consist of six wells (five waterfront wells: AMW-01, AMW-02, AMW-03, AMW-04, and AMW-05, and one inland “Sentry Well” [Well AR-03] located at the southern property boundary). Confirmation Monitoring Wells at Plant 2 consist of five wells (GM-19S, GM-19D, GM-21S, GM-22S, and MW-03R).

The results of confirmation monitoring are discussed In Sections 3 and 4. The compliance criteria for confirmation monitoring established in the GWCMCP to be used to determine the long-term effectiveness of cleanup actions include the following:

- Plant 1 and Plant 2 Separate-Phase Hydrocarbons: To demonstrate that free LNAPL removal has been accomplished, the confirmation criterion will be a lack of sheen in compliance monitoring wells for a period of 1 year.

- Plant 1 and Plant 2 Groundwater: The POC where cleanup levels (Section 2.2.) will be met is at the property boundary of the Site and is represented by the Confirmation Monitoring Wells listed above. Groundwater samples shall be collected from the Confirmation Monitoring Wells for a maximum of five years following attainment of cleanup levels, or until the concentrations are determined as no longer being affected by on-site sources. Indications of that criterion are groundwater concentrations below cleanup levels for four quarters, or concentrations of analytes have stabilized and reached equilibrium. Groundwater quality is evaluated based on trends and not based on a single event or cleanup exceedance in a single well. Equilibrium concentrations of each analyte may be determined using statistical methods or another method approved by Ecology. If groundwater quality data indicate that at least 95 percent of the wells are below cleanup levels for four or more consecutive quarters, Ecology can be petitioned for Site delisting.

3. Summary of Selected Remedial Actions and Implementation

The following sections summarize remedial actions selected for the Site based on the RI/FS and subsequent investigations, and their implementation status. Accessible soil remedies have been completed, as detailed in the referenced documents. The remedies for inaccessible soil and groundwater are ongoing and, therefore, discussed at greater length than completed remedies.

3.1. Waterfront Remedial Actions

Groundwater remedial actions have been conducted along the waterfront at Plant 1 (Figure 2) since 1992. An interim groundwater/LNAPL recovery system operated from 1992 through 2002, and an interim SVE system operated from 1996 through 2002. Final remediation systems were installed in 2002, as described in the EDR, and are summarized below.

Final remediation system designs were based upon the success of interim systems that exploited the containment benefits of the subsurface waterfront barriers, and consisted of a combination of SVE, groundwater/LNAPL recovery, and air sparging. The groundwater/LNAPL recovery system was designed to capture LNAPL and dissolved hydrocarbons in groundwater and provide hydraulic control along the waterfront. The air sparging system was designed to mobilize LNAPL to aid in its capture, to enhance in-situ biodegradation of residual hydrocarbons, and to strip volatile hydrocarbons from groundwater. The SVE system was designed to capture volatile hydrocarbon vapors and enhance in-situ biodegradation of residual hydrocarbons in the vadose zone. System components are located along the waterfront, in the warehouse, and by the truck loading rack areas of Plant 1 (Figure 4) and are further discussed in the following sections.

The 2001 Nisqually earthquake (magnitude 6.7) damaged the warehouse, delaying installation of final remediation systems until repairs were completed (TechSolv, 2002). System construction activities were completed in 2003 and were detailed in the Construction Completion Report (CCR) (TechSolv, 2003c). The CCR was prepared following system testing and startup and documented that requirements of the Consent Decree and EDR were followed during system construction. The CCR was approved by Ecology in 2004 (Ecology, 2004a).

The O&M requirements for the final remediation system were presented in the Final O&M Manual (TechSolv, 2003d), which was approved by Ecology in 2004 (Ecology, 2004a). The O&M Manual presents system descriptions, startup and shutdown procedures, alarm conditions and remedies, normal operating conditions, system safety features, waste handling, and vendor-supplied literature. The O&M manual is a working field document, maintained on-site, and updated as system operations or procedures change or as equipment is replaced.

3.1.1. Waterfront Groundwater/LNAPL Recovery System

The waterfront groundwater/LNAPL recovery system depresses groundwater and captures LNAPL and shallow groundwater containing dissolved hydrocarbons. The system utilizes total-fluid pumps in recovery wells to pump LNAPL and groundwater to the remediation system

treatment area. The system currently consists of 9 recovery wells (RW-1, RW-2, RW-4, RW-5, RW-6, RW-7, RW-8, RW-9, RW-10) located along the waterfront at Plant 1 (Figure 4). Recovered LNAPL and groundwater are pumped into an oil water separator (OWS), which separates LNAPL from groundwater. Recovered LNAPL was historically recycled off-site; however, LNAPL has not been recovered since 2008, as detailed in the following sections. Separated groundwater enters a diffused air stripper (DAS), which strips dissolved volatile hydrocarbons from wastewater. Treated groundwater flows through a totalizing flowmeter prior to discharge to the sanitary sewer. The OWS, DAS, and flowmeter are utilized to comply with KCDNR sanitary sewer discharge requirements, as detailed in Table 1 and Appendix A.

3.1.1.1. Recovery System History

Well RW-1 has been utilized for groundwater recovery since startup of the interim system in 1992. Well RW-4 was brought online as part of the interim system in 1998. Wells RW-2, RW-5, and RW-6 have operated since 2001, following system installation activities north of the warehouse. Wells RW-7, RW-8, RW-9, and RW-10 were completed during final system construction and brought online in 2002.

GM-11S was converted from a monitoring well to a recovery well in 2000 after LNAPL was observed in the well. Well GM-11S was taken offline in May 2013 and has remained offline through 2022 as conveyance line blockages prevent operation of this well. Due to measured improvements in groundwater quality at Well GM-11S, groundwater pumping is no longer performed. LNAPL is no longer measurable in Well GM-11S. Observed sheen in well GM-11S is infrequent, with only a slight sheen observed once in 2021 and a sheen previously observed in August 2018 (Section 4.1.5.). Voluntary groundwater monitoring at recovery wells (Table 2) shows that dissolved phase hydrocarbons at GM-11S have been below cleanup levels, applicable at conditional POCs, since 2014.

In 2003, decreased LNAPL recovery triggered a soil investigation at Plant 1 (TechSolv, 2003b). Soil cores evaluated for LNAPL presence showed no LNAPL existing outside the capture zone of the recovery wells, supporting data that show most of the LNAPL has been recovered from the warehouse area.

A probing investigation was completed in 2019 (Techsolve, 2020a) that involved collecting and analyzing soil and groundwater samples along the waterfront to further evaluate the success of the recovery actions. The investigation results further support the conclusion that the groundwater/LNAPL recovery system has recovered LNAPL to the maximum extent practicable and has met the performance criterion listed in the GWCMCP for the discontinuation of system operation (discussed above in Section 2.4.1).

3.1.1.2. Recovery System Permit Compliance

The groundwater/LNAPL recovery system is monitored weekly and maintenance is performed as needed to maintain system operation in accordance with permit requirements. Testing of influent and effluent streams (Table 1) is conducted monthly to ensure compliance

with groundwater discharge requirements under a sanitary sewer permit (KCDNR Permit 7592-05 for Sample Site A43262) and an air discharge permit (Puget Sound Clean Air Agency [PSCAA] Discharge Authorization No. 9817).

PSCAA Notice of Construction No. 9817 allows for continued air discharge from the DAS portion of the groundwater/LNAPL recovery system. Air monitoring data are collected to verify compliance with PSCAA's air discharge limits and are provided to PSCAA upon request. In 2022, air discharges from the DAS were below permitted levels and below PSCAA's exemption thresholds for soil and groundwater remediation projects listed in PSCAA Regulation I, Article 6, Section 6.03(c)(94), indicating air permitting is no longer required. Permits and air data are retained by Techsolve and are available upon request.

In 2022, the sanitary sewer discharge permit (KCDNR Permit 7592-06) required semi-annual submittal of monitoring data and monthly submittal of total gallons of processed groundwater discharged to sanitary sewer. The two 2022 semi-annual KCDNR Waste Discharge Self-Monitoring Reports are included in Appendix A. Results from testing (Table 1, Figures 5 through 7) show that the treatment system effectively met discharge permit requirements. Should discharges exceed permit guidelines, recovery systems will be shut down and KCDNR contacted regarding the exceedance.

The 2022 monitoring results from testing recovered and treated groundwater (Table 1) show that concentrations of benzene and TPH in both influent (recovered groundwater that has not been treated with the DAS) and effluent (wastewater sampled following OWS and DAS treatment and prior to sanitary sewer discharge) water were below both the permitted discharge limits and the IHS cleanup levels (Section 2.2.) during all monitoring periods. These data provide an additional line of evidence that the groundwater/LNAPL recovery system has recovered LNAPL to the maximum extent practicable, and dissolved phase hydrocarbons within the system's capture zone are below cleanup levels applicable at the POC.

3.1.1.3. Recovery System Drawdown and Capture

The groundwater/LNAPL recovery system pumps shallow groundwater, with water table drawdown at recovery wells designed not to extend deeper than the bottom of the LNAPL smear zone (approximately 4 feet in total height, which was created by seasonal and tidal fluctuations in water table elevation). Pumping tests (TechSolv, 1999a) showed that an appropriate capture zone could be achieved with pumping rates from 0.7 to 0.9 gallons per minute (GPM) per well. Recovery system startup testing confirmed these pumping rates achieved desired groundwater drawdown and capture.

Operation data for the groundwater/LNAPL recovery system collected through 2022 (Table 1) show that desired hydraulic capture/control has been achieved. During the first five years of system operation following startup (2002-2006), the average annual system flow rates ranged from 4 to 11 GPM, which represents the combined total pumping rate from operating 10 recovery wells. From 2007 through 2010 average annual flow rates ranged from 2.2 to 3.2 GPM. The average annual flow rates have ranged from 1.0 to 1.9 GPM since 2011. While some of the

reduction in recovery rates is attributable to system downtime for O&M and the elimination of pumping well GM-11S, as discussed in the previous section, these data and observations indicate fouling in soil formations surrounding the recovery wells has decreased recovery over time. Fouling is mainly from biological and mineral deposits generated by high iron and manganese concentrations in groundwater. Deposits are routinely cleaned from wells, pumps, and piping to prevent fouling and blockages. Preventative maintenance and redevelopment activities were performed on groundwater recovery wells in 2022 to remove fouling and attempt to improve pumping rates, as further discussed in Section 3.1.1.6. While fouling may reduce pumping rates, desired capture appears to have achieved the performance criterion for the system, which is to recover LNAPL to the maximum extent practicable.

Groundwater elevations vary daily in groundwater/LNAPL recovery wells due to tidal fluctuations in the adjacent Duwamish Waterway. Testing has shown that, while the Duwamish Waterway fluctuates up to 16 feet during a daily tidal cycle, shallow groundwater only fluctuates about 1 foot over the same period (TechSolv, 2004). The RI determined that the difference in tidal response for shallow groundwater versus deeper groundwater is due to the dampening effect of the western warehouse foundation (driven interlocking sheet piling underlying the warehouse foundation), bulkheads at the island edge, and decreased seepage through a silty/clay layer that partially separates upper and lower water tables in some areas (Figure 8). A hydraulic investigation (Techsolve, 2022a), conducted in 2021 and summarized in Section 5.1, re-evaluated site hydrologic conditions and showed current hydrologic conditions at the site are consistent with those observed during the RI.

Pumping rate data, collected multiple times daily during various tidal stages, have shown that fluctuations in tidal elevation affect groundwater/LNAPL recovery system pumping. Data show correlation between tidal elevation and groundwater recovery rates, which indicates that groundwater/LNAPL recovery system operation affects deeper groundwater and that the desired capture is achieved without adjustment to account for tidal fluctuations (i.e., total fluid pumps automatically pump faster during high tides).

3.1.1.4. LNAPL/Groundwater Recovery

LNAPL and groundwater recovery data collected from the operation of the groundwater/LNAPL recovery system provide another line of evidence that free LNAPL has been recovered to the maximum extent practicable within the capture zone of the system, (beneath the warehouse paved drive areas, and loading rack areas along the Plant 1 waterfront) and have met associated performance criteria (Section 2.4.1.). Table 1 details quantities of LNAPL and dissolved hydrocarbon concentrations recovered since final groundwater/LNAPL recovery system startup in 2002. LNAPL collection data, shown in Table 1, are recorded when a sufficient quantity has been generated to warrant off-site recycling, which has not occurred since 2008.

Low LNAPL and dissolved hydrocarbon recovery rates (Section 3.1.1.3.) over the past decade of system operation indicate little to no recoverable LNAPL remains within the capture zone of

the groundwater/LNAPL recovery system. Additional lines of evidence provided in the 2019 Plant 1 Probing Investigation Report (Techsolve, 2020a) support this assertion.

The cumulative amount of LNAPL recovered by both interim and final groundwater/LNAPL recovery systems is approximately 10,125 gallons (Figure 9 and Table 3). The final system has recovered 395 gallons of LNAPL from October 2002 through December 2022, and 418 gallons of dissolved hydrocarbons (Tables 1 and 3). The total combined recovery including recovered LNAPL, dissolved hydrocarbons, historical SVE recovery, and biodegradation processes (discussed in Section 3.1.2.), is about 29,782 gallons to date (Tables 1 and 3). Influent concentrations of IHSs in recovered groundwater for 2022 are shown on Figures 5 through 7, and listed in Table 1.

Influent concentrations of dissolved IHSs in recovered groundwater have decreased over time (Section 3.1.1.3.), which is consistent with decreasing IHS concentrations seen in individual recovery wells. Groundwater samples are voluntarily collected semi-annually from individual recovery wells to evaluate trends in IHS concentrations in shallow groundwater (Table 2). This voluntary monitoring is intended to evaluate the attainment of the groundwater/LNAPL recovery system performance criterion, which is LNAPL removal to the maximum extent practicable (Section 2.4.1.), as elevated IHS concentration are an indicator of LNAPL above residual saturation levels that may be recoverable. The dissolved phase IHS cleanup levels for groundwater, listed in Section 2.2. and referenced in Table 2, are applicable at the POC established for the Site. The cleanup levels apply to the deeper groundwater where groundwater and surface water exchange occurs and where Confirmation Monitoring Wells located along the waterfront (Section 2.4.2.) are screened. These IHS cleanup levels are not applicable to recovery wells, as detailed in the GWCMCP, and are included in Table 2 for reference purposes only.

In 2022, a sample from one well (RW-2) exceeded the benzene cleanup level. Samples from one well (RW-2) exceeded the gasoline (TPH-G) cleanup level. Samples from three wells (RW-2, RW-4, and RW-8) exceeded the diesel (TPH-D) cleanup level. TPH and benzene concentrations detected in samples from six active recovery wells (RW-1, RW-5, RW-6, RW-7, RW-9, and RW-10) and one former recovery well (GM-11S) were below all IHS cleanup levels in 2022. These results show that recovery wells with groundwater concentrations of dissolved IHSs above cleanup levels appear to be limited to the northern end of the recovery system located south of the truck loading rack area (Wells RW-2 and RW-4) and in the southern portion of the warehouse area (Well RW-8). These data have been consistent over the past several years and are also consistent with the results of the Waterfront Probing Investigation (Techsolve, 2020a), which show a marked improvement in groundwater quality along the waterfront and that recoverable LNAPL is no longer present.

3.1.1.5. Recovery System Maintenance and Repairs

Since startup, the groundwater/LNAPL recovery system has remained operational to date. The system, or portions of the system, were taken off-line periodically in 2022 for maintenance or repair activities. Portions of the system were also temporarily shut down to address sediment,

scale, and biofouling buildup on pumps and in groundwater piping, attributed to high concentrations of iron and manganese in groundwater.

Independent corrosion engineers have performed annual integrity inspections on steel total fluids piping since 2003. Piping is also inspected as part of routine system O&M activities. Inspections evaluate piping at recovery wellheads, along the waterway, and at other accessible areas. Corrosion inspections monitor losses in pipe wall thickness and serve to confirm that systems can safely continue operation, and also identify portions of the system that may need replacement. Annual reports, prepared by corrosion engineers, summarize the inspections. Reports are kept on file at Techsolve's office and are available for review upon request.

The most recent corrosion inspection was conducted in May 2022. The results of this inspection are similar to past inspections, which have determined that while steel total fluids piping is susceptible to corrosion, the thickness of system piping is adequate to safely convey recovered remediation fluids.

3.1.1.6. Recovery Well Redevelopment

Well redevelopment is conducted as needed to maintain recovery well productivity by cleaning and removing sediment, scale, and biofouling from well screens and surrounding sand packs. Redevelopment activities have been conducted during previous years, as discussed in past reports (Techsolve, 2012 and Techsolve, 2013). The most recent redevelopment activities were conducted in June 2022 and consisted of recovery wells being jetted and pumped to remove sediment and fouling. Redevelopment activities will be conducted if needed in 2023 to maintain productivity from groundwater recovery wells.

3.1.2. Waterfront Soil Vapor Extraction System

Operation of the waterfront SVE system was discontinued in May 2008 as the system had met associated performance criteria (Section 2.4.1.), no longer recovered measurable concentrations of hydrocarbons, and no longer enhanced biodegradation in inaccessible hot spot soils. SVE system shutdown was approved by Ecology during a 5-year review (Ecology, 2008).

About 3,582 gallons of TPH-G (as vapor) was recovered by the waterfront SVE system. Additionally, enhanced biodegradation from SVE system operation added about 16,075 gallons, for a total of 19,657 gallons of petroleum hydrocarbons recovered by SVE (Table 3, Figure 9), as calculated from SVE vapor stream monitoring data. Waterfront SVE system operation was discussed in greater detail in previous Annual Reports prepared during system operation (e.g. TechSolv, 2009).

3.1.3. Waterfront Air Sparging System

Air sparging along the waterfront was discontinued in 2008 as the system had met the associated performance criteria (Section 2.4.1.) and SVE air monitoring data indicated air sparging operations no longer volatilized measurable quantities of hydrocarbons. Additionally,

air sparging operations likely contributed to fouling in the groundwater/LNAPL recovery system. Information on air sparging system operation was presented in previous Annual Reports prepared during system operation (e.g., TechSolv, 2009).

3.2. Containment Boom Monitoring

Oil sorbent booms have been maintained on the West Duwamish Waterway adjacent to Plant 1 to contain oil sheens that appeared on surface water. Booms are currently located alongside the warehouse (Figure 4). Boom locations are selected to best contain occasional sheens observed on the Western Duwamish Waterway that appear to emanate from marine sediments directly adjacent to the Site. The occurrence of these sheens has decreased markedly in frequency and extent over time as the recovery systems have substantially improved the subsurface LNAPL conditions.

The Western Duwamish Waterway adjacent to the Terminal is also monitored for "orphan" sheens from off-site sources, occurring outside boomed areas. Orphan sheen occurrences often cannot be correlated to specific sources; however, some sheens appear to emanate from the Lander Street and Florida Street stormwater outfalls (Figure 2). The Terminal does not connect to storm sewer systems that feed these outfalls. The Terminal and Techsolve continue to monitor for orphan sheens and these sheens are reported when observed to the City of Seattle's and Ecology's spill response hotlines.

Booms and the waterway are monitored weekly, at a minimum, for the presence of oil sheens and boom integrity, and augmented by checks made by Terminal personnel. Booms are replaced, as necessary. A Containment Boom Log (Table 4) is maintained to document sheen occurrences, or lack thereof, within boomed areas and the adjacent waterway. The extent of observed sheens are recorded on a scale from zero to two, with zero representing no sheen, one representing a light sheen visible in a portion of the boom, and two representing a heavy sheen visible throughout the boom. The Duwamish Waterway tidal stage is also recorded to evaluate if sheen occurrences correlate with tidal stage. Table 4 includes all observances from 1996 through March 2023. Yearly charts of waterway sheen monitoring from 1996 through 2022 are presented in Appendix B.

Sheens were historically observed in the waterway adjacent to the loading rack but were not observed from February 2009 through July 2017. Ecology was petitioned to discontinue the use of recovery booms in this area in 2016 (Techsolve, 2016), which Ecology subsequently approved (Ecology, 2016). During seawall construction (2017-2018) sheens were detected, contained, and captured in this area, and were directly attributable to sediment and ground disturbance activities associated with construction of a new seawall, as detailed in the Water Quality Monitoring Summary Report (ERM and Techsolve 2018). No sheen has been observed on the waterway adjacent to the loading rack area following completion of seawall construction activities. Sheen inspections will continue to occur in the loading rack area and a recovery boom will be reinstalled if sheens are observed in this area.

Sheen monitoring results (Table 4 and Appendix B) show that sheens observed in the waterway adjacent to the warehouse have been infrequent and minor since startup of the final system in October 2002. No sheens were observed within the Northern Warehouse Boom or the Southern Warehouse Boom during 2022 or to date in 2023. The northern and southern portions of the warehouse (the Northern and Southern Warehouse Booms) have been monitored separately since sheens were first detected in two distinctly separate areas in 2016, to provide a more detailed evaluation of trends in this area of the Site. A single sheen detected in 2021 dissipated quickly and appeared to be from a third-party source, a creosote piling, and not from terminal activities. It did not reappear in 2022. The booms have been relocated or discontinued over time based on the results of the sheen monitoring and with approval from Ecology.

The Waterfront Probing Investigation completed in 2019 (Techsolve, 2020a) evaluated whether there was a LNAPL source or pathway for migration from inland soils and groundwater to surface water in locations where a sheen has historically been observed on surface water. Figure 8 provides a cross-sectional depiction of the typical tidal stage and location of sheens observed in the waterway and the construction details for the island bulkhead and warehouse foundation. It has been theorized in previous reports that the observed sheens on surface water originated from small cracks and discontinuities in the concrete warehouse foundation and underlying sheet piling, or island bulkhead. The foundation and bulkhead act as a "hanging" wall, trapping LNAPL while allowing groundwater to flow beneath the base of the foundation and bulkhead, as depicted in Figure 8.

The Waterfront Probing Investigation showed no free LNAPL existed on groundwater adjacent to the locations where surface water sheens have been observed (Figure 4). The investigation also showed that detected TPH in soil appears to be below residual LNAPL saturation limits and that remaining LNAPL is no longer mobile.

Sheen observances have occurred in what has been historically referred to as "targeting" where small bubbles create a sheen in the waterway, several feet away from the shoreline. The mechanism for sheen occurrence most closely resembles what has been defined by others (ITRC, 2018) as ebullition, where:

> "Biodegradation of naturally-occurring organic compounds or of the petroleum itself that is affecting sediments, can generate gases that migrate upward through sediments due to buoyancy. NAPLs are hydrophobic and preferentially attach to the surface of a gas bubble passing through, which subsequently transports the NAPL to the air-water interface. NAPL-coated bubbles reaching the surface of a water body yield a sheen because the surface tension of water is much higher than petroleum."

Determining the source of the observed sheens in the waterway was beyond the scope of the Waterfront Probing investigation. Sources for observed sheen could be from the adjacent island bulkhead, which was created with creosote timbers, or from a historic release that migrated or

occurred waterward of the existing warehouse foundation, underlying sheet piling, and island bulkhead. The source is assumed to be limited, as sheen has been observed in less than 5% of the monitoring conducted over the last decade, the observed sheens have been light to very light in strength, are not widespread, and have occurred in limited and defined locations that have been contained and captured with booms. The appearance of just two observable sheens on the waterway since October 2020, with one of the sheens appearing to originate from an off-site source, indicates that the performance criterion for there to be no detected persistent sheens associated with the terminal (Section 2.4.1.) has been met. Due to the lack of sheen in the southern warehouse boom for over two- and one-half years, Ecology was notified that the use of the Southern Warehouse Boom will be discontinued going forward (Techsolve, 2022b). The boom was removed in April 2022 and can be reinstalled if a persistent sheen is observed in this area in the future. Shoreline waterway monitoring will continue in 2023 to further evaluate the obtainment of this performance criterion.

3.3. Inland Soil and Groundwater Remedial Actions

Excavation of accessible "hot spot" soils was the primary remedy for soils above IHS soil cleanup action levels (Section 2.2.). In-situ treatment methods, including natural attenuation and SVE, were also selected to treat remaining inaccessible hot spot soils located beneath buildings, paved drive areas, etc. Areas identified for cleanup actions are shown in Figures 2 and 3. Additionally, a Restrictive Covenant, effective May 30, 2000, restricts property to "industrial use" only and imposes restrictions on activities in selected areas of the Site (primarily soil disturbance activities or those that create new exposure routes in identified areas). Excavation and in-situ soil remedy plans were described in the EDR (TechSolv and AG&M, 2000a) and in the Inland Soils Plans and Specifications (TechSolv and AG&M, 2000b).

Cleanup actions for inland soils accessible to excavation at Plants 1 and 2 were completed in 2000. Excavations focused on predetermined areas with additional areas excavated as needed. A total of 3,470 cubic yards of contaminated soil was removed from Plant 1 and Plant 2, detailed the TPH Hot Spot Soils Excavation Completion Report (TechSolv and AG&M, 2001).

Inaccessible hot spot soils were identified at Plant 2 following soil excavations activities (Figure 10). Natural attenuation is treating these remaining soils. Ongoing performance and confirmation groundwater monitoring, conducted following the soil excavations, showed that both the performance and confirmation cleanup criteria (Sections 2.4.1. and 2.4.2.) for inland groundwater at Plant 2 had been met. In 2004, Ecology concurred that "remedial actions appear to be complete at Plant 2" (Ecology, 2004a).

Inaccessible hot spot soils were identified at Plant 1 following soil excavation activities (Figure 11). At the southern property boundary of Plant 1 groundwater monitoring indicated that excavations had not restored groundwater quality to meet cleanup levels within the 5-year restoration period. Groundwater monitoring showed that detected concentrations of benzene and TPH-G fluctuated and exceeded cleanup levels, most notably in Performance/Confirmation Well AR-03 (Section 4., Appendix C). The historically fluctuating concentrations of TPH detected

in Well AR-03 correlated to seasonal fluctuations in water table elevation, indicating the source was in the vadose zone.

A 2005 soil probing investigation showed TPH-G and benzene to exist within an approximate one-acre source area (Figure 12), which was responsible for continued groundwater impacts at the southern property boundary (TechSolv, 2006). Additional wells were installed in this area to monitor groundwater conditions, as discussed in Section 4.1.2.2., and contingency remedial actions were implemented as discussed below.

3.3.1. Inland SVE System

Contingency remedial actions for soil and groundwater were evaluated in 2007 to address the hydrocarbon source area at the southern property boundary of Plant 1 described in the previous section. SVE was selected as the preferred remedial alternative. SVE system designs (Figure 13) were submitted to Ecology (TechSolv, 2007b), and Ecology subsequently approved system installation (Ecology, 2007). Installation, pilot testing, and SVE system startup occurred in 2008 (TechSolv, 2009). Pilot testing showed the SVE system had a radius of influence that obtained capture throughout the source zone (Figure 12). The Inland SVE System operated from August 2008 through December 2014.

Air samples from the SVE vapor stream showed that the system recovered 1,291 gallons of TPH-G and 2.5 gallons of benzene (Table 5, Figure 14) over 6 years of operation. Concentrations of TPH-G and benzene in recovered vapor streams decreased rapidly after startup (Figure 15), as anticipated, as soil investigations (TechSolv, 2006) showed homogeneity and high porosity of shallow unsaturated soils in the source zone.

SVE induced airflow within soils enhanced the biodegradation of residual hydrocarbons. Calculations estimated that an additional 4,355 gallons of hydrocarbons were reduced by enhanced biodegradation, bringing combined biodegradation and vapor recovery of petroleum hydrocarbons to 5,642 gallons (Table 5 and Figure 16). Reductions in biodegradation rates occurred over time as the source zone was recovered and degraded, as shown by decreasing monthly carbon dioxide concentrations (Figure 15). From 2012 through 2014, carbon dioxide concentrations in the recovered SVE vapor stream were not detected above atmospheric levels.

SVE system operation was discontinued in December 2014 as the system had met the associated performance criteria (Section 2.4.1.) and capture data indicated the bulk of available hydrocarbons to direct capture or enhanced biodegradation had been captured or reduced, respectively. While SVE system operation was discontinued, the system was maintained in an operative state through 2017. Ecology was petitioned in 2017 to decommission the Inland SVE system (Techsolve 2017). Based upon subsequent negotiations, Ecology approved (Ecology, 2018) a proposed limited SVE decommissioning (Techsolve, 2018) where system operation could be resumed in the future if warranted, which was completed in 2018.

Groundwater conditions have improved at the southern property boundary since the Inland SVE System began operation. TPH-G and benzene concentrations measured in groundwater are

now mainly below IHS cleanup levels listed in Section 2.2., as discussed in the following sections. The remedial actions conducted for the inland soils at Plant 1 have significantly contributed to protection of the Duwamish Waterway and reduced the potential for off-site migration of dissolved LNAPL along the southern property boundary.

4. Groundwater Monitoring Activities

Groundwater monitoring activities have been conducted at the Site since 1997 on a network of selected wells. Monitoring activities were conducted voluntarily from 1997 through 1999. Since 2000, groundwater monitoring has been conducted per the requirements of the Consent Decree's GWCMCP, with periodic revisions as noted below, and in accordance with the methods and procedures described in the Sampling and Analysis Plan included with the RI.

Groundwater samples are analyzed for selected IHSs including TPH-G, TPH-D, TPH-O, benzene, and cPAHs. Monitoring activities also include monthly inspections for the presence of LNAPL in selected wells. Analytes and selected wells have been periodically removed from the monitoring program with Ecology's approval, due to analyte concentrations consistently below cleanup levels. Wells have also been installed and added to the program. Compliance groundwater monitoring data and some voluntary data are included in Tables 6 through 9. Note that, due to winter weather conditions, collection of samples for the 4th quarter of 2022 was delayed until January 2023. The results of groundwater monitoring activities are summarized in the following sections.

4.1. Plant 1 Compliance Monitoring

Compliance monitoring at Plant 1 has included quarterly groundwater monitoring for TPH-G, TPH-D, TPH-O, benzene, cPAHs, biochemical parameters, groundwater elevations, and monthly monitoring for the presence of LNAPL. While many of the confirmation compliance monitoring criteria (Section 2.4.2.) have been met, Plant 1 is in the performance phase (Section 2.4.1.) of compliance monitoring as remedial actions are ongoing. Monitoring results at Plant 1 (Tables 6 through 9) and revisions to the monitoring program are discussed in the following sections.

4.1.1. Plant 1 Monitoring Well Network

In 2021, the Plant 1 Performance Monitoring Well Network (Figure 17) included Wells AMW-01 through AMW-05, GM-14S, GM-15S, GM-16S, GM-17S, GM-24S, AR-03, and MW-1-T9 through MW-3-T9. The monitoring history and rationale for these wells is based on the following:

- Monitoring Wells AMW-01 through AMW-05 are the Performance/Confirmation Monitoring Wells for the Plant 1 waterfront. These wells were installed and first sampled in 2000 as Performance/Confirmation Wells along the waterfront, per requirements of the Consent Decree. These wells are screened to allow representative sampling in the zone of groundwater discharge located beneath the existing warehouse foundation and Island bulkhead and above brackish groundwater. These wells are screened deeper than other wells in the monitoring well network utilized to monitor shallower groundwater conditions.

- Monitoring Well GM-14S is an inland Performance Monitoring Well that was added to the Performance Monitoring Well Network in 2007, as requested by Ecology. GM-14S

was originally utilized to monitor for sheen presence on groundwater. As sheens are no longer being detected in this well, performance monitoring was initiated to monitor water quality in this area of the Site.

- Well GM-15S is a Performance Monitoring Well that is located down-gradient from Plant 1 soil remedy excavations (Figure 2) and was within the Inland SVE System's capture zone. Based upon limited hydrocarbon detections, the monitoring frequency of GM-15S was reduced, with concurrence from Ecology (Ecology, 2009), from quarterly to semi-annually. Following detections of IHSs (TPH-G and benzene) above cleanup levels in 2013, the monitoring frequency of GM-15S was voluntarily increased to quarterly. By the fourth quarter of 2013, concentrations of IHSs fell to historic levels and below cleanup levels. In 2018, Ecology agreed (Ecology, 2018) to a plan (Techsolve, 2018) to resume monitoring Well GM-15S on a semi-annual frequency in the first and third quarters, if concentrations of IHSs remain below cleanup levels.

- Wells GM-16S and GM-17S are Performance Monitoring Wells that are hydraulically up-gradient of the Site. Monitoring for IHSs was discontinued, with Ecology's approval in 2000 (Ecology, 2000a), as enough background data had been collected from these wells. Monitoring for IHSs resumed in 2007, as recommended by Ecology, to monitor for IHSs potentially migrating onto the property from up-gradient, off-site sources. The groundwater sampling frequency in these wells was reduced in 2009, with concurrence from Ecology (Ecology, 2009), from quarterly to semi-annually as IHS concentrations have been below cleanup levels since resuming sampling.

- Well GM-24S is a Performance Monitoring Well that is located within the Plant 1 soil remedy excavation area.

- Well AR-03 was established as a "Sentry Well" in the GWCMCP as it is located south of the southern property boundary, down-gradient from the Plant 1 soil remedy excavations, and is within the Inland SVE System's capture zone. Well AR-03 is essentially part of the performance/confirmation well network. In 2018, Ecology agreed (Ecology, 2018) to a plan (Techsolve, 2018) to monitor Well AR-03 on a semi-annual frequency in in the first and third quarters, provided that concentrations of IHSs remain below cleanup levels.

- Wells MW-1-T9 through MW-4-T9 were installed and added to the Performance Monitoring Well Network in 2005 to further evaluate groundwater quality down-gradient from Plant 1 soil remedy excavations (TechSolv, 2007a). These wells were located within the Inland SVE system's capture zone. In 2018, Ecology agreed (Ecology, 2018) to a plan (Techsolve, 2018) to discontinue monitoring of Well MW-4-T9 and to monitor Wells MW-1-T9, MW-2-T9, and MW-3-T9 on a semi-annual frequency in in the first and third quarters, provided that concentrations of IHSs remain below cleanup levels.

4.1.2. Petroleum Hydrocarbon Monitoring

IHS monitoring results for benzene, TPH-G, TPH-D, and TPH-O in groundwater from Plant 1 Monitoring wells are documented in Table 6, Figures 18-21, and Appendix C. Table 6 provides all monitoring results from all wells since project inception. Figures 18-21 provide groundwater concentration maps of petroleum hydrocarbon results for each quarter in 2022 at Plant 1. Appendix C provides hydrocarbon concentration vs. time graphs for all Performance and Confirmation Monitoring Wells.

4.1.2.1. Point of Compliance Petroleum Hydrocarbon Monitoring

The GWCMCP identified that IHS cleanup levels are to be met at the POC for the Site, which at Plant 1 are Performance/Confirmation Monitoring Wells AMW-01 through AMW-05 located along the waterfront, and the Sentry Well AR-03 located along the southern property boundary.

Analyses of all groundwater samples from Performance/Confirmation Monitoring Wells AMW-01 through AMW-05, located along the waterfront, were below cleanup levels for all petroleum hydrocarbon IHSs in 2022 (Table 6 and Appendix C). These wells have been below cleanup levels for TPH-G, TPH-D, and TPH-O for all quarterly groundwater monitoring events since installation and been below the benzene cleanup level since March 2014.

Wells AMW-03, AMW-04, and AMW-05 have never exceeded the 71 µg/L cleanup level for benzene (Table 6 and Appendix C). Well AMW-01 has exceeded the benzene cleanup level in 40 of 85 quarters since monitoring began in 2000. However, benzene has been below the cleanup level in AMW-01 for the last 31 quarters, since June 2014. Well AMW-02 exceeded the benzene cleanup level in 13 of 85 quarters. However, benzene has been below the cleanup level in AMW-02 for the last 38 quarters, since September 2012. Remedial actions to mitigate the sources of benzene have been successful in reducing groundwater benzene concentrations in the area of Wells AMW-01 and AMW-02. The Inland SVE system, which operated from 2008 to 2014 (Section 3.3.1.), improved up-gradient groundwater quality. Additionally, improvements in shallow groundwater quality above these wells have been observed due to ongoing waterfront remedial actions (Section 3.1.).

Well AR-03 along the southern property boundary was below the cleanup levels for all IHSs in 2022. This well has been below the cleanup levels for benzene, TPH-G, TPH-D, and TPH-O for over a decade, since September 2010 (Table 6 and Appendix C).

4.1.2.2. Performance Petroleum Hydrocarbon Monitoring Results

Petroleum hydrocarbon monitoring is performed in additional wells throughout Plant 1 to evaluate the effectiveness of ongoing remedial actions, in accordance with Performance Monitoring requirements (Section 2.4.1.).

In the up-gradient area of Plant 1, groundwater concentrations in Performance Wells GM-16S and GM-17S were below cleanup levels for all IHSs in 2022, indicating that up-gradient

sources have not been impacting these wells. IHSs have not been detected at or above cleanup levels in Wells GM-16S and GM-17S since monitoring was resumed in 2007. These wells will be monitored semi-annually in the first and third quarters of 2023 to evaluate for the potential migration of IHSs onto the Site from up-gradient off-site sources.

In 2022 near the middle of Plant 1, groundwater concentrations detected in Performance Well GM-14S exceeded the TPH-G cleanup level in two of four quarters and exceeded the benzene cleanup level in all four quarters. Monitoring Well GM-14S is located immediately down-gradient of the old OWS in Plant 1. Concentrations of TPH-G have been detected above the cleanup level in 40 of 62 quarters since monitoring resumed in this well in 2007. TPH-G concentrations detected in Well GM-14S appear stable, and this well is located hydraulically up-gradient from the groundwater/LNAPL recovery system operating along the waterfront. A benzene exceedance in the third quarter of 2021 was the first benzene exceedance in this well since 2007. Benzene was again detected above the cleanup level in all four quarters of 2022. Groundwater concentrations in Well GM-14S have been below cleanup levels for TPH-D and TPH-O (Table 6 and Appendix C) since sampling resumed in 2007.

Results of groundwater monitoring from wells in and down-gradient of the former soil hot spot area in Plant 1 (Performance Wells GM-24S, GM-15S, MW-1-T9, MW-2-T9, MW-3-T9, MW-4-T9, and Performance/Confirmation Well AR-03,) show that soil excavations completed in 2000 (Section 3.3.) stabilized concentrations of dissolved hydrocarbons in this area. Groundwater quality improved further in this area from the operation of the Inland SVE System from 2008 through 2014, (Section 3.3.1.). Groundwater quality improvements due to SVE operation can be seen in the decreasing concentrations of benzene and TPH-G in monitoring wells located within the SVE capture zone (Appendix C: Wells AR-03, GM-15S, MW-1-T9, MW-2-T9, MW-3-T9). Data presented in Table 6 show concentrations of IHSs detected in groundwater in 2022 were below cleanup levels in the wells listed above except for TPH-G in Well GM-24S in the third quarter of 2022. Concentrations of TPH-G detected in Well GM-24S in 2022 were within historic ranges and appear to be stable (Appendix C).

The performance monitoring exceedances of IHSs in groundwater at Plant 1 in 2022, limited to TPH-G and benzene in Well GM-14S and TPH-G in Well GM-24S, indicate that IHSs have been stabilized or reduced by the remedial actions listed in Section 3. Monitoring data will continue to be evaluated in 2023 and trends will be discussed in future reports.

4.1.3. cPAH Monitoring

Groundwater from selected wells at Plant 1 has been monitored for cPAHs. Monitoring for cPAHs was discontinued in 2003, per Ecology's approval (Ecology, 2003), as historical monitoring rarely detected these compounds (Table 7). Monitoring for cPAHs was voluntarily resumed in waterfront Performance/Confirmation Wells AMW-01 through AMW-05 in 2004 following a recommendation by Ecology and to assist in determining when cleanup objectives have been met. Since resuming monitoring, concentrations of cPAHs have rarely been detected, and occasional detections have often been associated with laboratory quality control deficiencies

that affect the validity of reported data. These laboratory issues have been discussed in more detail in previous Annual Site Reports. The limited detections of cPAHs in these wells have only slightly exceeded laboratory detection limits (typically 0.02 to 0.025 µg/L) for these compounds. Based upon these findings, the cPAH sampling frequency was decreased in 2009 to an annual basis, with concurrence from Ecology (Ecology, 2009).

There were exceedances of the cPAH cleanup level for two cPAH compounds in Well AMW-01 in 2022 (Table 7). The last prior exceedances of the cPAH cleanup level were in 2007 in Well AMW-01 and in 2017 in Wells AMW-02, AMW-03, AMW-04, and AMW-05. The 2017 exceedances of the cPAH cleanup level established in the Consent Decree, and most of the historical exceedances, have been low concentration exceedances that are below the current Model Toxics Control Act (MTCA) Method A Cleanup Level for Groundwater (WAC-173-340-900, Table 720-1). The current MTCA method A Cleanup Level for cPAH considers the varying toxicities of individual cPAH compounds in determining if a cPAH mixture meets the cleanup level (WAC 173-340-708(8)(e)). The cPAH cleanup level agreed upon in the Consent Decree predated this policy and set a single cleanup level applicable to all cPAH compounds in a cPAH mixture.

Monitoring for cPAHs in Performance/Confirmation Wells AMW-01 through AMW-05 is scheduled to next occur in December 2023.

4.1.4. Biochemical Parameter Monitoring

Performance monitoring for biochemical parameters has been conducted at the Site to determine the effectiveness of natural attenuation in inaccessible soils containing TPH above cleanup levels. Monitoring of biochemical parameters has been suspended. Results of the last biochemical sampling were included in the 2006 Annual Site Report (TechSolv, 2007a).

4.1.5. LNAPL Monitoring

The performance monitoring program includes monthly inspection for LNAPL presence by visual observation in three monitoring wells in Plant 1 (Wells GM-11S, GM-12S, and GM-13S). Monitoring Well GM-14S (located inside the main Plant 1 tank farm) was removed from the monthly LNAPL monitoring program in 2004, with concurrence from Ecology (Ecology, 2004b), as this well had been free of LNAPL and sheens since June 1999.

Results of LNAPL monitoring have shown a general reduction in LNAPL occurrence at Plant 1 (Table 8) over time. No sheen was observed in Wells GM-11S and GM-12S in 2022. A slight sheen, but no recoverable LNAPL, was observed in well GM-13S in 4 of the 12 monitoring events in 2022.

No sheens or LNAPL have ever been observed in Well GM-12S (located up-gradient from the warehouse), indicating no continuing or ongoing sources of LNAPL in this area. Sheens have been periodically observed in Well GM-13S (located inside the southern end of the warehouse). Prior to 2022, a sheen was last observed in Well GM-13S in 2018 and 2021. Measurable LNAPL was

historically detected in Well GM-11S (located outside the northeast end of the warehouse) in 1999 and the well was subsequently converted to an LNAPL recovery well in April 2000. Only a sheen was detected in this well after it was converted for recovery. A sheen was last observed in Well GM-11S in 2018 and 2021. Voluntary sampling for concentrations of IHSs in groundwater from Well GM-11S (Table 2) show that it has been below the cleanup levels, applicable at conditional POCs, over the last 17 semi-annual sampling events, since 2014.

4.1.6. Groundwater Elevation Monitoring

Water table elevations were recorded quarterly in 2022 for Plant 1 (Table 9) and corresponding water table elevation maps were prepared to show overall groundwater flow patterns for 2021 (Figures 18 through 21). Plant 2 monitoring has been discontinued as discussed in the following section. Monitoring Well MW-06, located in Plant 1 east of the northeast corner of the warehouse, is not part of the groundwater monitoring program but is used to provide water level data in this area. Wells closest to the waterfront that are part of the monitoring program (GM-13S, and AMW-01 through AMW-05) are not used for water table elevation maps due to tidal fluctuations that affect these wells. Additionally along the waterfront, startup testing showed that groundwater elevation is depressed by operation of the groundwater/LNAPL recovery system, affecting wells such as GM-13S.

Groundwater contour maps for the four quarters of 2022 (Figures 18 through 21) show that the third and fourth quarters represent the lowest and highest groundwater elevations recorded, respectively. Groundwater elevations and flow patterns shown for 2022 are similar to those observed during the RI and in previous years. Groundwater contour maps are no longer required for this report (Ecology, 2009) due to consistent yearly flow patterns and are included voluntarily. Site flow directions can vary seasonally but are generally west towards the waterway, and south to southwest along the southern property boundary. Groundwater gradients are similar each year and in 2022 ranged from approximately 0.0010 feet per foot (ft./ft.) from the main tank farm to the waterfront in the Third Quarter 2022 (Figure 21), to 0.00033 ft./ft. at the southern boundary of Plant 1.

Hydrographs for selected wells in the waterfront area (Figure 22) and in the southern boundary area of Plant 1 (Figure 23) show trends in water table elevations over time for the Site. Data for both areas show similar seasonal fluctuations of the water table and show that all wells respond to these fluctuations (i.e., no wells are screened in groundwater isolated from the groundwater monitored by other wells, such as would occur with “perched” groundwater). Hydrographs show higher water table elevations occur during wetter winter and spring periods, when compared to the drier summer and fall periods. Groundwater elevations appear to have trended upward slightly over the past decade. These variations and trends in water table elevation coincide with precipitation data for the area. Groundwater elevation data will continue to be monitored in 2023 to evaluate ongoing trends.

4.2. Plant 2 Performance and Confirmation Monitoring

At the Plant 2 diesel tank farm (the tank farm is only used for diesel storage and does not store gasoline or lighter hydrocarbon products), ongoing performance and confirmation groundwater monitoring, conducted following soil excavations, showed that cleanup objectives for diesel impacted inland soils had been met (see Section 3.3.). However, concentrations of TPH-G and benzene in groundwater were detected above cleanup levels following excavation activities in well GM-19S. A subsequent investigation conducted in 2002 (TechSolv, 2003a) concluded that TPH-G and benzene detected in Well GM-19S was from an unidentified off-site source of gasoline. The Confirmation Compliance Criteria for Plant 2 (Section 2.4.2.) were achieved once the TPH-G and benzene cleanup levels exceedances were determined to be from an off-site source. As such, monitoring at Plant 2 was discontinued except for TPH-G and benzene in Monitoring Well GM-19S (Figure 24), as agreed to by Ecology (Ecology, 2004b). This monitoring was considered voluntary and was conducted to evaluate how the off-site gasoline source was affecting the Site. Additional details regarding discontinuing Plant 2 monitoring were included in previous reports (e.g. TechSolv, 2009). The voluntary monitoring of Well GM-19S for TPH-G and benzene was discontinued in 2018, as detected concentrations of benzene and TPH-G were below cleanup levels for 5-years. Benzene concentrations last exceeded the cleanup level in September 2013. TPH-G concentrations last exceeded the cleanup level in March 2007.

4.3. Data Validation

Laboratory analytical results were reported with associated laboratory quality assurance/quality control data. The analytical reports were reviewed and the data were validated per the requirements of the CAP. Data validation resulted in qualification of some analytical results. Data qualifiers modify the values reported by the laboratory, but do not affect the understanding of Site conditions. The data qualifiers are included in Tables 6 and 7. Laboratory reports and additional information regarding the justification for data qualification are retained by Techsolve and are available upon request. Minimal data from the four quarters of 2022 were qualified as estimated values or as undetected at an estimated reporting limit, and the qualifiers were detailed in the associated quarterly progress report submitted to Ecology. Qualifiers from 2022 did not affect the interpretation of data.

5. Additional Activities

Notable additional activities that occurred in 2022 included:

- Submitting the Hydraulic Evaluation Summary Report to Ecology in February and discussing the results with the new Project Coordinator.
- Maintaining project continuity, including ongoing remediation activities, monitoring, and reporting during the several-month interim between the assigned Ecology Project Coordinators.
- Evaluating potential impacts to the terminal from marine sediment excavations at the adjacent Vigor Shipyards property and evaluating potential impacts from seasonally high winter "king tides."
- Re-evaluating the Institutional Controls for the Site that continue to provide protection to Site workers and the Duwamish Waterway.
- Negotiating with Ecology to determine the path forward to Site closure.

These activities are further discussed below.

5.1. Plant 1 Hydraulic Investigation

A hydraulic study was conducted in 2021 at the Site, as requested by Ecology. The results of the study were submitted to Ecology in February 2022 (Techsolve, 2022a) and further discussed with Ecology during a meeting the following September. The study was conducted to evaluate potential changes in the Site hydrology due to the installation of a new seawall, installed in 2017 and 2018 along the northern half of the waterfront of Plant 1 from the warehouse to the property boundary (Figure 17). The wall was installed based on observations/measurements collected following the Nisqually Earthquake (discussed in Section 2) to enhance the seismic stability of the Site. The study was based upon a work plan (Techsolve, 2019b), which was approved by Ecology with some modifications (Ecology, 2021). In addition to evaluating changes to Site hydrology, this study was intended to aid in determining if established POCs remain appropriate and if continuation of, or revisions to, remedial actions are needed to meet the Site cleanup objectives.

The Site Conceptual Site Model (the infrastructure for which is shown in Figure 8) was developed during the RI/FS activities and has been continuously re-evaluated based on investigations conducted since then, such as the pumping tests conducted for the Engineering Design. The model was based on the effects on groundwater-to-surface water exchange caused by the subsurface barriers of the island-construction bulkheads and the western warehouse foundation. The Site hydraulic conditions have remained consistent until the installation of the new seawall.

As determined during the RI/FS and Engineering Design for the groundwater remedy (discussed in Section 3.1), the significance of these subsurface barriers is that both the original bulkhead and existing sheet piling significantly retarded the exchange of groundwater and surface water. For the groundwater remedy, the barriers serve as "hanging walls" allowing groundwater to flow in a narrow zone beneath the barriers (where the compliance wells are screened) while trapping floating and residual LNAPL from entering the Duwamish Waterway (previously detailed in Section 2). These conditions existed beneath the warehouse area and along the waterfront north of the warehouse, where these conditions have been substantially improved due to construction of the new seawall. These barriers, therefore, also serve as part of the ongoing Institutional Controls for the site as referenced in Section 5.6.

The study results showed some localized impacts of the new seawall on Site hydrology and some limited changes to hydrology, not related to seawall construction, which may have occurred since the RI was completed in the early 1990s. The results also show that the performance criteria from the Consent Decree and GWCMCP for both recoverable and dissolved LNAPL IHSs have been met. Shutting down of the waterfront recovery system is therefore warranted (Techsolve, 2022b), as further discussed in Section 5.7.

5.2 Ecology Project Coordinator Transition

Ecology informed Techsolve in late March that the Project Coordinator, Mr. Jerome Cruz, had left Ecology and that they were working on finding a replacement. His Supervisor, Mr. Dhroov Shivjiani, served as interim Project Coordinator and Techsolve continued conducting the current Site business, activities, and reporting through him. The new Project Coordinator, Mr. Vance Atkins, was assigned in late July (Ecology, 2022c), and a meeting between the TransMontaigne Project Coordinator, Mr. Doug Hall, and Techsolve, Mr. Atkins, and Mr. Shivjiani was conducted on September 13, 2022. The purpose of the meeting was to review the progress of implementing the cleanup actions defined in the Consent Decree, including subsequent revisions and compliance with the Consent Decree. The meeting was also intended to initiate defining a clear path forward towards Site monitoring and closure. The meeting included review of the following project elements:

- The Site setting and construction history/hydrogeology of Harbor Island, and the results of the RI/FS and other additional investigations that support the design and implementation of the Site remedial actions.
- The remedial actions conducted to date for soil and groundwater and their demonstrated protectiveness per the requirements of the Consent Decree.
- Results of the Hydraulic Evaluation and the basis for recommending that operation of the recovery system be discontinued and that activities at the Site transition from active remediation activities to monitoring and Site closure.

- The locations and depths of the groundwater POCs along the waterfront and sampling data trends that support shutting down the recovery system.

5.3 Potential Marine Sediment Cross-Contamination

Substantial LNAPL sheens and marked increases of turbidity of the adjacent surface water were noticed and recorded along the northern portion of the terminal in September 2022 and were reported to Ecology (Techsolve, 2022c). These effects apparently resulted from sediment dredging and marine habitat restoration as part of the adjacent property owner's (Vigor Shipyards) Natural Resource Damage (NRD) settlement for the West Duwamish Waterway. The heavy to moderate LNAPL sheens and highly turbid waters observed are a concern because incidents like this may negatively impact nearshore sediments at the Site. Sediment/biota sampling will be required at the Site as part of site delisting per the Consent Decree. Though the Vigor Shipyards property is located adjacent to the northern Site boundary and is thus "down-gradient" of the overall flow of the Duwamish, there is often a "back-eddy" that locally reverses the surface water flow direction near the shoreline, as was observed at the time of the incident.

Sampling of the marine sediments along the Site waterfront was conducted in 1995 to determine if activities/conditions at the terminal have potentially impacted the sediments/marine biota. The results were discussed with Ecology and included in a subsequent report (Geraghty & Miller, 1996). The results of the sampling indicated that the terminal operations "…does not appear to have impacted sediments above levels that would cause adverse effects to aquatic life…" (Ecology, 1996). Similar potentials for cross-contamination of the Site's waterfront were observed during sediment dredging and extensive dock-piling removal activities in 2003 associated with the NRD settlement for the former Lockheed site (Techsolve, 2004). The former Lockheed property is adjacent to the southern Site boundary and is consistently up-gradient of the Site sediments.

Potential sources of cross-contamination of Site sediments also include LNAPL sheens that have been observed in the waterway emanating from the two public stormwater outfalls located adjacent to the Site northern and southern boundaries. The terminal is not, and has not historically been, connected to either of these outfalls. The terminal and Techsolve (or its predecessors) have assisted the City of Seattle each time one of these sheens has been observed over the past 30+ years to evaluate potential sources. Some of these sheens have been sampled and characterized by a laboratory to assist with these evaluations. Summaries of these sheen observances have been kept on file and, for those that have occurred since the Consent Decree, have been included in the various Annual Site Reports prepared since 2000.

5.4 King Tide Waterfront Impacts

A "super king tide" occurred in late December that caused some temporary flooding of the Site waterfront, which lasted a few hours. King tides can occur any time of the year but tend to occur during the fall or spring near the full moon tides surrounding the winter equinox. This king tide occurred coincident with a strong storm system that caused high runoff flow rates in the Duwamish Waterway and was further accentuated by very low atmospheric pressures that were sufficient to raise the tide an additional approximately 2 feet. The combined tide and storm effects temporarily flooded the waterfront area of the terminal (other than the warehouse area, which was built on a 3- to 4-foot raised foundation). Another king tide occurred in late January, but it was not coincident with a storm system so there was no repeat flooding. Similar terminal flooding occurred approximately 10 years ago when the winter king tide coincided with a strong windstorm that blew towards Harbor Island. The potential for impacts of king tides on the terminal will be further evaluated as part of the additional investigations planned along the waterfront and will be included in associated reports.

5.5 Additional Area of LNAPL Soil Staining

A new area of LNAPL staining was detected in early March in a small surface area (about 1 to 2 square feet) near the northwestern corner of the terminal near the waterfront. The heavy staining occurred approximately 20 feet south of Monitoring Well GM-10D (Figure 17) at the junction of the asphalt paving and concrete curbing. The stained area was located landward of the new subsurface interlocking sheet piling wall, and behind the original wooden bulkhead that was installed as part of creation of Harbor Island in the early 1900s. As discussed in Section 2, this original bulkhead was installed to approximately 15 to 20 feet below current ground surface (bgs) and still provides a subsurface barrier to groundwater/surface water exchange. The new seawall was installed approximately 10 feet to the west and was driven to depths of approximately 80 feet bgs and into the deep low-permeability soil layer that occurs throughout the island (Weston, 1993). These two seawalls provide a substantial barrier to the groundwater/surface water exchange and thus serve as a substantial protective barrier for the Duwamish Waterway.

It is likely that this staining was a result of some old and very localized, previously undetected, small pocket of residual LNAPL being liberated by the king tides (discussed above). An investigation was immediately launched upon discovery of the staining to determine the source. The stained soils were excavated to a depth of 4.5 feet bgs to expose two buried product pipelines. The excavation created a small pit approximately 5 to 6 feet across. Approximately 10 cubic yards of stained soil were excavated, placed in a roll-off bin, and covered pending proper disposal. Groundwater accumulated at the excavation base and stabilized at a depth of approximately 4.5 feet bgs.

There were no immediate signs of a new pipeline release. The heaviest stained soils were sampled near the ground surface and at the basal area of the excavation and submitted to the laboratory for characterization. Samples from the LNAPL transported by the pipelines (light fuel diesel and heavier diesel that is used for stove oil) were also collected and submitted to the laboratory for characterization. The results showed that the soil was stained with weathered diesel that has consistent characteristics with the LNAPL that has been detected across the Site. The excavation remained open for over a month while the pipelines were pressure tested. No LNAPL, other than a light sheen on the groundwater, was detected in the excavation and the pipelines passed the pressure testing. The monitoring wells surrounding the stained area (Figure 17) were also sampled for TPH analyses. The laboratory results for the groundwater samples were all non-detect. The adjacent surface water has been regularly monitored for LNAPL sheens since discovery of the staining; no sheens have been detected. The discovery of the stained area and results of sampling were discussed with Ecology. The results of the discovery investigation are being used to develop additional investigations that will further define the extent of the stained soil (suspected to be a few tens of feet laterally from the discovery area at the most). The results will be discussed with Ecology and a written report will be prepared and submitted to Ecology, which will include more discussion of the discovery investigation, including laboratory analysis results for the initial soil, groundwater, and pipeline product sampling.

5.6 Institutional Controls

Ecology requested that the Institution Controls for the Site be re-evaluated to ensure continuing protection for Site workers and off-site receptors. There are several institutional controls in place for the Site that have been providing added protection during implementation of the remedial actions and will continue to provide protection following completion of the active remedies. These institutional controls will continue to provide protection from any residual, dissolved, or vaporized LNAPL that may remain in place or in the event of discovery of a previously undetected source. These controls will also serve as a primary protection in the event of a new LNAPL release. The Institutional Controls include the waterfront and inland remediation systems, which will remain on-site after completion of the remedial actions, and the existing monitoring well networks. The institutional controls that were included in the Consent Decree are summarized as follows:

- Access Restrictions: The Site is an active operating facility and has restricted access (fences, signs, work permit requirements, etc.) as part of standard operations. These restrictions are in place 24 hours/day and 7 days/week.

- Deed Restrictions: The Site is currently an “industrial” site and has been zoned for and used as an industrial facility. A Restrictive Covenant for the Site was included in the Consent Decree to restrict the property use to industrial purposes and to prevent property uses from interfering with any remedial actions. Groundwater beneath Harbor

Island has been determined by Ecology to be "non-potable" and serves as the "type-example" designated under MTCA.

These Site restrictions are not likely to change in the foreseeable future. There are also Institutional Controls in place at the Site that were not included in the Consent Decree but that continue to provide protection. This includes spill response planning, training, and equipment.

Site spill response plans are maintained by terminal personnel and regular "spill drills" are conducted that include associated agencies (e.g. representatives of Ecology Spill Response and the Coast Guard). Sorbent booms are currently maintained in the Duwamish Waterway as part of the Consent Decree and are regularly monitored for the presence of sheens; the locations have been revised over time with Ecology's approval based on locations of sheens. Sorbent booms and pads are available in the event of an LNAPL spill, as are portable pumps and vacuum trucks, if needed. Existing Health and Safety plans are maintained by terminal personnel and Techsolve and are updated, as needed. Vapor monitoring equipment is also maintained by terminal personnel and Techsolve. In the event of a large spill, the terminal would contact the Coast Guard, Ecology, and their cleanup contractors.

5.7 Path Towards Site Closure

The results of the Hydraulic Evaluation Study and all remedial actions and monitoring actions to date were presented to Ecology during the introduction meeting with the new Ecology Project Coordinator in September 2022. The focus of this meeting was to summarize the history of the island and Site construction, terminal operations, the status of the remedial actions completed to date, and to report on compliance with the Consent Decree. The data that demonstrate that the cleanup goals of the Consent Decree have been met were also discussed, as well as recommendations that active remediation be discontinued as LNAPL has been recovered to the maximum extent practicable. Based on the results of all the monitoring presented in Section 4, the project should move forward towards final confirmation monitoring and Site closure. These recommendations and the supporting data/evaluations were subsequently forwarded to Ecology in a letter report/petition for system shutdown (Techsolve, 2022d).

It was highlighted to Ecology that the Consent Decree specified that groundwater recovery was required only until groundwater in the deeper wells did not exceed the surface water cleanup standards. It did not specify this cleanup goal for the shallow groundwater/wells. As previously discussed in Section 3, the recovery wells were designed and installed to remove LNAPL, and to a lesser extent dissolved-phase hydrocarbons, trapped behind the "hanging-wall" bulkheads (Figure 8). The wells were screened to depths that accommodated the daily and seasonal LNAPL 4- foot "smear zone" (initially containing both free-phase and residual LNAPL), while minimizing the pumping and capture of saline surface water. As such, the pumping wells

are screened much shallower (to total depths of approximately 11 feet below the average water table elevation) than the 10-foot-thick freshwater zone below the base of the bulkheads (Figure 8) and the top of the underlying saline layer. This is the zone of primary groundwater-to-surface water exchange and is where the Compliance Wells are screened. The depth of this zone is approximately 30 to 40 feet bgs, which is approximately 22 to 32 feet below the average water table elevation.

Ecology acknowledged that there has been sufficient site improvement to warrant at least partial shutting down of the recovery system (e.g., shutdown of those recovery wells that have the longest trends of the lowest concentrations of dissolved hydrocarbons). However, Ecology said that further comparison of the report/petition with the results of the Hydraulic Evaluation is needed, and that additional sampling and analyses of the shallow groundwater within the warehouse waterfront area is also needed. Per the discussions with Ecology, there are 11 temporary shallow piezometer wells located along the waterfront from the south side of the warehouse north to near the loading rack (from south to north, Wells B-01/W-01 to B-42/W-11 on Figure 26) that are available for the requested sampling. These wells were installed as part of the Waterfront Probing activities (Techsolve, 2020a), were used for the Hydraulic Evaluation Study (Techsolve, 2022a), and will be sampled in early 2023 to collect the requested additional data. The results will then be presented to, and discussed with, Ecology to develop a clear path forward towards confirmation monitoring and achieving Site closure.

6. Summary of Activities/Conclusions

Activities completed at the Site during 2022, resulting conclusions, and the current status of the Site are summarized below.

- Operation of the groundwater/LNAPL recovery system along the waterfront, and recovery of residual LNAPL sources inland from the waterfront, have protected the Duwamish Waterway by removing LNAPL from soil and groundwater at the Site. The groundwater/LNAPL pumping and recovery system along the waterfront is the only ongoing active remediation action and appears to have achieved the cleanup goals established in the Consent Decree.

- Maintenance and inspection of the groundwater/LNAPL pumping and recovery system indicate the system operates as designed, is intact, and can continue operation, if needed (e.g. in the event of a new spill at the terminal). Routine inspection and maintenance activities continue to be conducted to ensure the system integrity and that system components are replaced or upgraded, as necessary.

- The groundwater/LNAPL recovery system has removed recoverable LNAPL to the maximum extent practicable from beneath the warehouse and truck loading rack areas. No measurable free LNAPL (>0.01 feet) was detected in any of the wells (monitoring or recovery) in 2022 nor has any been detected for many years.

- Monitoring results show that recovery systems have reduced both dissolved LNAPL IHSs in groundwater and the frequency of LNAPL sheens in the Duwamish Waterway. Detected concentrations of IHSs in the Compliance Wells located along the waterfront (AMW-01 through AMW-05) were below cleanup levels in 2022. No sheens were observed on surface water during 2022 or to date in 2023. As part of the Consent Decree, sorbent booms have been maintained in the Duwamish Waterway for over 30 years in two areas where very minor, but consistent LNAPL sheens were once detected. The booms have been moved or discontinued based on the results of regular sheen monitoring, with concurrence from Ecology.

- Groundwater data collected in, and down-gradient of, a former soil hot-spot at Plant 1 indicate that remedial actions completed in this area have reduced residual LNAPL and improved groundwater conditions in this area. The soil excavations and SVE operations conducted in this area have captured or reduced the bulk of any remaining residual hydrocarbons and have provided additional protection of the Duwamish Waterway. These actions have also met the cleanup goals of preventing LNAPL from migrating off-site to adjacent properties. Operation of the Inland SVE system was discontinued in December 2014 due to marked decreases in the vapor-phase LNAPL captured and in calculated biodegradation rates. The Sentry Well (AR-03) located immediately down-gradient of this area and on the southern property boundary has been below cleanup levels in every quarterly or semi-annual monitoring event since June 2010.

- Voluntary groundwater monitoring at Plant 2 was discontinued in 2018 after Monitoring Well GM-19S, which was impacted by an off-site source of gasoline, was at or below TPH-G and benzene cleanup levels for five years. All other remediation and monitoring activities required for Plant 2 have been successfully completed and Ecology has previously determined that remedial actions at Plant 2 appear complete.

- Ongoing quarterly monitoring of Wells GM-14S and GM-24S, located within the main Plant 1 tank farm, show that these two wells continue to have gasoline-related IHSs above cleanup levels. Well GM-24S is located in the area of an old reported gasoline spill summarized in the RI/FS, and the accessible soils with LNAPL above cleanup levels were excavated from this area in 2000. Some inaccessible soils located directly next to the above-ground storage tanks had to be left in place and appear to still be impacting the groundwater around this well. Well GM-14S is located directly adjacent to the down-gradient side of the old OWS. The trends in water quality measured at these wells will continue to be evaluated and discussed with Ecology.

- A study was conducted in 2021 to evaluate potential changes in the Site hydrology due to the installation of a new seawall along the northern half of the waterfront at Plant 1. The results of the study show that the new seawall has had some localized and relatively minor impacts to the Site hydrology. While some effects to the groundwater flow mechanics were observed, the results of this study have not substantially changed the Site hydraulic Conceptual Model developed as part of the RI/FS. The findings of this investigation will continue to be discussed with Ecology to evaluate whether any revisions to the POCs are warranted. The study results will also continue to be discussed with Ecology to support discontinuing active remediation activities along the waterfront.

- The Ecology Project Coordinator was replaced in 2022. A meeting was subsequently conducted with the project team, along with follow-up conference calls and correspondence, to familiarize the new Coordinator and Supervisor with the Site history and status of compliance with the Consent Decree.

- The potential for cross-contamination of the Site marine sediments from an observed off-site source was conveyed to Ecology. This potential source included LNAPL sheens and highly turbid water detected in 2022 that was associated with sediment dredging and marine habitat restoration being conducted at the adjacent Vigor Shipyards. Similar potential sources have been observed and recorded in the past that were associated with sediment dredging and extensive dock-piling removal activities conducted at the former Lockheed site. Other potential sources include the two stormwater outfalls located immediately north and south of the Site where heavy sheens have periodically been observed and recorded.

- Unusually high king tides occurred at the end of 2022 and early 2023 that caused some temporary flooding of the near-shore portions of the terminal. The occurrence and

potential impacts of these tides on the waterfront have been discussed with Ecology and will continue to be evaluated in 2023.

- A small area of previously undetected LNAPL soil staining was observed near the northwestern corner of the waterfront following the king tides. Excavations were immediately conducted to expose the terminal product pipelines (located at depths of approximately 4.5 feet bgs) in the immediate area of the staining. No evidence of a new pipeline release was detected. Results of laboratory analysis of samples of the stained soils indicate the residual LNAPL is weathered diesel-range hydrocarbons (which is consistent with the LNAPL characteristics detected across the Site). Results of laboratory analysis of groundwater samples collected from the wells surrounding this area indicate the residual LNAPL has not impacted groundwater beyond the immediate area beneath the staining. This area is located behind the new, deeper seawall; therefore, any potential impacts to groundwater are well contained. Additional investigations will be conducted in early 2023 to further define the nature and extent of this new area of staining.

- Product pipelines in the soil staining area were subsequently pressure tested, and samples of the product from the pipelines were analyzed by the laboratory for comparison to the soils. All testing and observations confirmed that there has not been a new release associated with the staining. The laboratory results suggest that the staining is a localized "pocket" of old weathered LNAPL, with similar characteristics as LNAPL detected and remediated since the first interim remediation system was installed along the waterfront. The new detection of this source may be associated with the unusually high king tides and will be further evaluated and discussed with Ecology in 2023.

- A review of the Institutional Controls for the Site that provide ongoing protection to Site workers and the Duwamish Waterway was requested by Ecology and completed in early 2023. The Institutional Controls include the Restrictive Covenant attached to the Consent Decree and Ecology's designation of groundwater on Harbor Island as "non-potable." Other Institutional Controls include the existing remediation systems that were installed along the waterfront in the warehouse and truck loading rack areas and inland near the southern property boundary. These systems will remain in place after the active remediation actions are discontinued and can be used to provide immediate protection should a future spill occur at the terminal. There are multiple resources available to the terminal in the event of a future release, including Ecology, the Coast Guard, and the terminal's spill response contractor.

- Discussions were initiated with Ecology to determine a clear path forward towards discontinuing active remediation, implementing final confirmation monitoring, and achieving Site closure. Additional shallow groundwater analytical data requested by Ecology will be collected in early 2023 from the temporary piezometers that exist in the warehouse and loading rack areas. The results of these activities will be discussed with Ecology.

7. References

ERM West (ERM) and Techsolve Environmental, Inc. (Techsolve). 2018. Water Quality Monitoring Summary Report, North Bulkhead Replacement Project, Site: BP Harbor Island Terminal, Cleanup Site ID: 4426. June 27, 2018.

Geraghty & Miller, Inc. (Geraghty & Miller). 1994. Remedial Investigation, ARCO Harbor Island Terminal 21T, Seattle, Washington. July 6, 1994.

_____. 1996. Technical Memorandum Summarizing Supplemental Remedial Investigation Activities and Results, ARCO Harbor Island Terminal 21T, Seattle, Washington. June 28, 1996.

_____. 1997. Final Focused Feasibility Study, ARCO Harbor Island Terminal 21T, Seattle, Washington. April 17, 1997.

Interstate Technology Regulatory Council (ITRC). 2018. LNAPL-3: LNAPL Site Management: LCSM Evolution, Decision Process, and Remedial Technologies. Appendix E–LNAPL Sheens Appendix. March 2018.

TechSolv Consulting Group, Inc. (TechSolv) (now Techsolve Environmental Inc. [Techsolve]). 1999a Air Sparging Pilot Test and Groundwater Pumping Test Report, ARCO Harbor Island Terminal 21T, Seattle, Washington. January 1999

_____. 1999b. Groundwater Compliance Monitoring and Contingency Program, ARCO Harbor Island Terminal 21T, Seattle, Washington. November 19, 1999.

_____. 2002. Annual Site Report, BP/ARCO Harbor Island Terminal, 1652 SW Lander Street, Seattle, Washington. April 2002

_____. 2003a. Plant 2 Gasoline Investigation, BP Harbor Island Terminal, Seattle, Washington. January 9, 2003

_____. 2003b. Plant 1 Soil Probing Investigation, BP Harbor Island Terminal, Seattle, Washington. September 16, 2003

_____. 2003c. Groundwater Remedy Final Construction Completion Report, BP West Coast Products Company 21T. September 2003.

_____. 2003d. Final Operations and Maintenance Manual, BP West Coast Products Terminal 21T. December 2003

_____. 2004. Final 2003 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. May 2004

_____. 2005. 2004 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. July 2005

_____. 2006. 2005 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. May 2006.

_____. 2007a. 2006 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. April 2007.

_____. 2007b. Tank 9 Soil Vapor Extraction (SVE) System Expansion. Atlantic Richfield Company. BP Terminal

_____. 2009. 2008 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. April 2009.

_____. 2012. 2011 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. April 2012.

_____. 2013. 2012 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. April 2013.

_____. 2016. Email from Scott Larsen to Jerome Cruz. Subject: FW: BP Seattle Terminal Proposed Loading Rack Area Boom Discontinuation. March 21, 2016.

_____. 2017. Email from Scott Larsen to Jerome Cruz. Subject: RE: RE: BP Harbor Island SVE decommissioning petition (SL 11/17). November 11, 2017.

_____. 2018. Plan for Inland SVE Partial Decommissioning, Groundwater Monitoring Revisions, Contingency Actions. SeaPort Midstream Partners LLC, Seattle Terminal, Harbor Island. February 15, 2018.

_____. 2019a. Plant 1 Waterfront Probing Work Plan. Site: Former BP Harbor Island Terminal. Cleanup Site ID: 4426. Dated December 2018. Submitted January 3, 2019.

_____. 2019b. Hydraulic Evaluation Work Plan. Site: Former BP Harbor Island Terminal. Cleanup Site ID: 4426. Dated December 2018. Submitted April 16, 2019.

_____. 2020a. Plant 1 Waterfront Probing Summary Report. Site: Former BP Harbor Island Terminal. Cleanup Site ID: 4426. February 2020.

_____. 2020b. 2019 Annual Site Report, Site: Former BP Harbor Island Terminal. Cleanup Site ID: 4426. April 2020.

_____. 2022a. Hydraulic Evaluation Summary Report, Site: Former BP Harbor Island Terminal, Cleanup Site ID: 4426. February 2022.

_____. 2022b. Email from Scott Larsen to Jerome Cruz. RE: Partial waterway booming suspension at Former BP Harbor Island Terminal. March 18, 2022.

_____. 2022c. Email from Scott Larsen to Vance Atkins. RE: Potential offsite impacts to sediments on 9-14-22 at Former BP Harbor Island Terminal. September 16, 2022.

_____. 2022d. Petition for Waterfront Groundwater/LNAPL Recovery System Shutdown, Former ARCO/BP Harbor Island Terminal Site, October 17, 2022.

TechSolv Consulting Group, Inc. and ARCADIS Geraghty & Miller. (TechSolv and AG&M). 2000a. Engineering Design Report, ARCO Harbor Island Terminal 21T, Seattle, Washington. September 2000.

_____. 2000b. Inland Soils Plans and Specifications, ARCO Harbor Island Terminal 21T, Seattle, Washington. September 2000.

_____. 2001. Excavation Completion Report, ARCO Harbor Island Terminal, Seattle, Washington. March 19, 2001.

Washington State Department of Ecology. (Ecology). 1992. Final Agreed Order No. DE 92 TC-N158. March 30, 1992.

_____. 1996a. Email Sediment Sampling Results, ARCO Harbor Island Terminal 21T, Seattle, Washington. September 4, 1996.

_____. 1999. Cleanup Action Plan (CAP), ARCO Terminal 21T, Seattle, Washington. November 19, 1999.

_____. 2000a. Meeting with Nnamdi Madakor, Project Manager, Northwest Regional Office. Personal communication to L. Roberts and C. Lybeer, TechSolv Consulting Group, Inc. March 16, 2000.

_____. 2000b. Consent Decree No. 00-2-05714-8SEA. March 24, 2000.

_____. 2003. Meeting with Roger Nye, Project Manager, Northwest Regional Office. Personal communication to L. Roberts, TechSolv Consulting Group, Inc. March 14, 2003.

_____. 2004a. Letter from Roger Nye to Ralph Moran. Certified Mail # 7003-0500-0005-0582-7356. June 8, 2004.

_____. 2004b. Email from Roger Nye to Larry Roberts. Subject: Proposals. June 15, 2004.

_____. 2007. Email from Roger Nye to Larry Roberts. Subject: Tank 9 Soil Remediation System. August 23, 2007.

_____. 2008. Five-Year Review Meeting with Roger Nye, Project Manager, Northwest Regional Office. Personal communication to D. White, Atlantic Richfield Co. and L. Roberts, S. Larsen, and M. Roberts TechSolv Consulting Group, Inc. October 8, 2008.

_____. 2009. Letter from Roger Nye to Larry E. Roberts. RE: Revisions to Monitoring. April 3, 2009.

_____. 2015. Letter from Maura S. O'Brien to Paul Supple. Subject: Ecology Comments for Proposed Bulkhead Replacement at BP West Coast Products Terminal Harbor Island, former ARCO Site at 1652 SW Lander Street, Seattle, WA Consent Decree No. 00-2-05714-8SEA and Cleanup Id No. 4426. September 3, 2015.

_____. 2016. Letter from Jerome B. Cruz to Scott Larsen. Subject: BP Harbor Island Site Northern Boom. September 8, 2016.

_____. 2018. Email from Jerome Cruz to Scott Larsen. Subject: RE: BP Harbor Island SVE decommissioning petition (SL 2/2). February 15, 2018.

_____. 2021. Letter from Jerome B. Cruz to Larry Roberts and Scott Larsen. RE: Plant 1 Hydraulic Evaluation, BP Harbor Island Site. March 4, 2021.

_____. 2022. Letter from Dhroov M. Shivjiani to J. Douglas Hall. RE: Change of Project Coordinator for BP Harbor Island. July 28, 2022.

Weston, Roy F., Inc. (Weston). 1993. Remedial Investigation and Feasibility Study, Harbor Island. Prepared for U.S. Environmental Protection Agency, Contract No. 68-W9-0046, February 1993.

Fowler, Charles Evan, 1924, Great Seattle Tide Flats Fill, Engineering and Contracting, Vol. 62, September 17, 1924, pp. 651-653.

TABLES

Table 1. Waterfront Groundwater System Petroleum Hydrocarbon Recovery Rates
Site: Former BP Harbor Island Terminal

GROUNDWATER SYSTEM EFFICIENCIES

SAMPLE DATE	UNITS	Influent Benzene	Effluent Benzene	% Reduction	Influent Diesel	Effluent Diesel	% Reduction	Influent Ethylbenzene	Effluent Ethylbenzene	% Reduction	Influent Gasoline	Effluent Gasoline	% Reduction	Influent Oil	Effluent Oil	% Reduction	Influent Toluene	Effluent Toluene	% Reduction	Influent Xylenes	Effluent Xylenes	% Reduction
2002 Averages	µg/L	**225.3**	14.3	91%	7,315	7,020	NA	55.2	6.2	75%	**1,770**	336	82%	831	804	NA	17.0	2.5	88%	88.8	9.9	87%
2003 Averages	µg/L	**137.7**	19.5	76%	4,945	4,648	NA	44.5	12.9	69%	**1,854**	678	62%	760	763	NA	42.7	5.4	61%	154.1	50.3	68%
2004 Averages	µg/L	**93.5**	3.2	82%	**10,285**	9,342	NA	76.8	4.7	79%	**4,383**	840	59%	762	1,026	NA	116.6	2.2	82%	356.6	23.0	75%
2005 Averages	µg/L	**76.7**	14.5	84%	4,162	5,987	NA	170.8	45.4	81%	**10,090**	3,229	70%	864	750	NA	566.9	121.0	84%	1,327.7	367.9	78%
2006 Averages	µg/L	38.9	1.2	89%	**11,263**	2,174	NA	42.1	0.9	90%	**4,944**	202	94%	665	666	NA	55.6	0.8	77%	485.1	5.2	96%
2007 Averages	µg/L	8.8	1.5	60%	1,223	906	NA	6.6	0.8	56%	407	115	63%	598	598	NA	1.0	0.5	21%	19.8	1.9	50%
2008 Averages	µg/L	10.0	1.1	70%	540	468	NA	5.5	0.7	39%	279	76	61%	505	504	NA	0.7	0.5	40%	10.6	1.6	65%
2009 Averages	µg/L	5.2	1.0	48%	369	561	NA	4.1	1.6	31%	407	182	46%	497	489	NA	0.8	0.7	44%	15.2	7.4	33%
2010 Averages	µg/L	3.9	0.7	76%		2,193	NA	6.8	1.7	78%	915	336	*65%*		*410*	NA	*0.9*	*0.9*	NA	26.3	6.7	69%
2011 Averages	µg/L	3.2	0.5	80%		1,714	NA	2.4	1.0	53%	439	89	*69%*		*492*	NA	*1.0*	*1.0*	NA	7.1	3.0	29%
2012 Averages	µg/L	3.6	1.3	48%		2,787	NA	1.9	1.2	37%	362	144	*61%*		*636*	NA	*1.0*	*1.0*	NA	5.7	3.4	48%
2013 Averages	µg/L	1.0	0.5	45%		1,333	NA	1.1	0.5	49%	356	124	*57%*		*433*	NA	*0.5*	*0.5*	NA	2.4	1.0	78%
2014 Averages	µg/L	1.7	0.3	61%		1,699	NA	0.6	0.3	46%	539	122	*79%*		*236*	NA	*0.5*	*0.3*	NA	1.5	0.5	61%
2015 Averages	µg/L	2.3	0.4	66%		5,175	NA	1.6	0.4	60%	**1,146**	406	*64%*		*396*	NA	*0.5*	*0.4*	NA	2.8	0.5	74%
2016 Averages	µg/L	2.2	0.6	76%		2,292	NA	2.3	0.5	81%	**1,282**	582	*50%*		*248*	NA	*0.4*	*0.4*	NA	2.9	1.0	62%
2017 Averages	µg/L	1.9	0.4	74%		4,325	NA	1.0	0.4	63%	**1,421**	641	*56%*		*349*	NA	*0.5*	*0.4*	NA	1.0	0.7	55%
2018 Averages	µg/L	1.1	0.7	60%		1,673	NA	0.7	0.7	7%	359	136	*62%*		*346*	NA	*0.5*	*0.5*	NA	1.3	0.9	30%
2019 Averages	µg/L	0.5	0.4	50%		1,539	NA	0.7	0.7	NA	231	68	*60%*		*584*	NA	*0.7*	*0.7*	NA	2.0	2.0	NA
2020 Averages	µg/L	0.7	*0.5*	NA		588	NA	*1.0*	*1.0*	NA	100	51	*65%*		*750*	NA	*1.0*	*1.0*	NA	*3.0*	*3.0*	NA
2021 Averages	µg/L	1.6	0.5	*NA*		756	NA	*1.0*	*1.0*	*NA*	110	50	NA		750	*NA*	*1.0*	*1.0*	*NA*	3.3	*3.0*	*NA*
1/20/2022	µg/L	1.8	*0.5*	*NA*		710	*NA*	*1.0*	*1.0*	*NA*	120	*50*	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
2/17/2022	µg/L	1.2	*0.5*	*NA*		*250*	*NA*	*1.0*	*1.0*	*NA*	*50*	*50*	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
3/17/2022	µg/L	1.4	*0.5*	*NA*		440	*NA*	*1.0*	*1.0*	*NA*	100	*50*	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
4/21/2022	µg/L	1.0	*0.5*	*NA*		380	*NA*	*1.0*	*1.0*	*NA*	100	*50*	*NA*		*750*	*NA*	*1.2*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
5/19/2022	µg/L	1.6	*0.5*	*NA*		300	*NA*	*1.0*	*1.0*	*NA*	100	*50*	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
6/16/2022	µg/L	0.8	*0.5*	*NA*		290	*NA*	*1.0*	*1.0*	*NA*	86	*50*	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
7/21/2022	µg/L	0.61	*0.5*	*NA*		*250*	*NA*	*1.0*	*1.0*	*NA*	100	*50*	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
8/18/2022	µg/L	0.66	*0.5*	*NA*		*250*	*NA*	*1.0*	*1.0*	*NA*	78	*50*	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
9/29/2022	µg/L	0.9	*0.5*	*NA*		250	*NA*	*1.0*	*1.0*	*NA*	130	51	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
10/27/2022	µg/L	0.5	*0.5*	*NA*		760	*NA*	*1.0*	*1.0*	*NA*	*50*	*50*	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
11/23/2022	µg/L	*0.5*	*0.5*	*NA*		340	*NA*	*1.0*	*1.0*	*NA*	*50*	*50*	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
12/22/2022	µg/L	1.5	*0.5*	*NA*		310	*NA*	*1.0*	*1.0*	*NA*	180	*50*	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
2022 Averages	µg/L	1.0	0.5	*NA*		378	*NA*	*1.0*	*1.0*	*NA*	95	50	*NA*		*750*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	*NA*
SURFACE WATER CLEANUP LEVELS		71 µg/L			10,000 µg/L			NA			1,000 µg/L			10,000 µg/L			NA			NA		
KCDNR DISCHARGE LIMITS			70 µg/L			100,000 µg/L			1,700 µg/L			NA			100,000 µg/L			1,400 µg/L			NA	

METRO DISCHARGE DATA

Observation Date	Days since last monitoring reading	Average flow (GPM)	Total Flow Between Observation dates (gallons)	Pounds of Benzene Removed	Pounds of Gasoline Removed	Pounds of Diesel Removed	Pounds of Oil Removed	Pounds of Toluene Removed	Pounds of Ethylbenzene Removed	Pounds of Xylenes Recovered	Total Gallons Gas, Diesel, and Oil
2002 Totals and Averages	65	4.18	322,785	0.62	4.99	19.42	2.30	0.05	0.13	0.22	**3.90**
2003 Totals and Averages	361	8.03	4,114,867	4.43	62.20	169.14	26.05	1.18	1.47	5.05	**37.76**
2004 Totals and Averages	338	9.58	4,570,461	3.54	175.70	419.25	28.95	5.35	3.16	14.66	**92.43**
2005 Totals and Averages	359	11.17	5,827,144	3.43	447.43	155.78	41.55	25.29	7.69	59.98	**100.52**
2006 Totals and Averages	365	6.40	3,220,733	0.80	192.72	663.65	19.09	2.85	1.89	20.04	**128.92**
2007 Totals and Averages	360	3.17	1,599,607	0.15	9.08	18.30	8.40	0.02	0.11	0.48	**5.20**
2008 Totals and Averages	363	3.19	1,645,810	0.14	3.95	7.21	6.95	0.01	0.08	0.15	**2.59**
2009 Totals and Averages	369	2.98	1,569,390	0.07	5.75	7.81	6.40	0.01	0.06	0.22	**2.89**
2010 Totals and Averages	372	2.17	1,185,127	0.037	8.62	18.84	4.26	0.01	0.05	0.19	**4.66**
2011 Totals and Averages	356	1.90	949,880	0.026	5.13	17.55	3.54	0.01	0.03	0.13	**3.81**
2012 Totals and Averages	371	1.89	948,600	0.034	3.97	25.92	3.47	0.01	0.02	0.04	**4.81**
2013 Totals and Averages	365	1.33	700,450	0.014	2.26	8.80	3.43	0.003	0.01	0.02	**2.08**
2014 Totals and Averages	332	1.62	761,480	0.010	3.43	10.95	1.55	0.003	0.00	0.01	**2.33**
2015 Totals and Averages	358	1.71	874,680	0.015	6.56	36.53	2.92	0.004	0.01	0.02	**6.68**
2016 Totals and Averages	370	1.90	999,770	0.021	13.12	20.02	1.94	0.004	0.03	0.03	**5.26**
2017 Totals and Averages	364	1.65	866,030	0.014	11.96	33.39	2.62	0.004	0.01	0.01	**7.52**
2018 Totals and Averages	371	1.20	641,740	0.006	2.16	9.61	1.79	0.002	0.004	0.007	**1.96**
2019 Totals and Averages	357	1.26	611,500	0.002	1.30	8.72	2.89	0.003	0.003	0.009	**1.84**
2020 Totals and Averages	378	1.06	572,320	0.003	0.46	2.70	3.58	0.005	0.005	0.014	**0.93**
2021 Totals and Averages	358	1.01	572,321	0.008	0.47	3.72	3.19	0.004	0.004	0.014	**1.03**
January-22	35	1.01	50,750	0.0005	0.04	0.33	0.32	0.0004	0.0004	0.0013	**0.10**
February-22	28	1.09	43,810	0.0005	0.03	0.18	0.27	0.0004	0.0004	0.0011	**0.07**
March-22	28	0.73	29,330	0.0003	0.02	0.08	0.18	0.0002	0.0002	0.0007	**0.04**
April-22	35	0.73	36,890	0.0004	0.03	0.13	0.23	0.0003	0.0003	0.0009	**0.05**
May-22	28	0.56	22,700	0.0002	0.02	0.06	0.14	0.0002	0.0002	0.0006	**0.03**
June-22	28	0.79	32,010	0.0003	0.02	0.08	0.20	0.0003	0.0003	0.0008	**0.04**
July-22	35	0.94	47,610	0.0003	0.04	0.11	0.30	0.0004	0.0004	0.0012	**0.06**
August-22	28	1.00	40,120	0.0002	0.03	0.08	0.25	0.0003	0.0003	0.0010	**0.05**
September-22	42	0.93	56,400	0.0004	0.05	0.12	0.35	0.0005	0.0005	0.0014	**0.07**
October-22	29	0.84	34,700	0.0002	0.03	0.15	0.22	0.0003	0.0003	0.0009	**0.05**
November-22	29	0.99	39,230	0.0002	0.03	0.17	0.25	0.0003	0.0003	0.0010	**0.06**
December-22	30	1.24	52,970	0.0004	0.05	0.14	0.33	0.0004	0.0004	0.0013	**0.07**
2022 Totals and Averages	375	0.90	303,220	0.004	0.382	1.628	3.045	0.004	0.004	0.012	**0.69**
		TOTALS:	**32,857,915 gal**	**13.4**	**961.6**	**1658.9**	**177.9**	**34.8**	**14.8**	**101.3**	
Maximum permitted GPM:		**17.5**	**Gallons Gas, Diesel, & Oil Recovered:**		**156.4**	**237.7**	**23.3**		**Total Gallons Recovered:**		**417.79**

Oil Water Separator Data

Observation Date	Monthly LNAPL Recovery (gal)
February-03	19.6
April-03	6.9
May-03	2.5
July-03	2
December-03	20
January-04	25
June-04	35
August-04	50
September-04	8
November-04	10
December-04	3.5
January-05	0
February-05	35
July-05	110
February-06	5
March-06	2
December-06	30
March-08	30
Total Gallons LNAPL Recovered:	**395**

TOTAL PETROLEUM RECOVERY

Total lbs. Dissolved Gas, Diesel, and Oil Recovered in Groundwater (2002-Present)	2,799 lbs
Total Gallons Dissolved Gas, Diesel, and Oil Recovered in Groundwater (2002-Present)*	**418 gal**
Total Gallons LNAPL Recovered by Final Recovery System (2002-Present)	**395 gal**
Total Gallons LNAPL Recovered by Interim Recovery System (1992-2002)	**9,312 gal**
Total Gallons of TPH Vapor Recovered by Final SVE System (2003-2008)**	**2,334 gal**
Total Gallons of TPH Vapor Recovered by Interim SVE System (1996-2002)**	**1,248 gal**
Total Gallons TPH Recovered from Final SVE System due to Biodegradation (2003-2008)***	**11,411 gal**
Total Gallons TPH Recovered from Interim SVE System due to Biodegradation (1996-2002)***	**4,664 gal**
Total Gallons Recovered by Final Recovery Systems (2002-Present)	**14,558 gal**
Total Gallons Recovered by Interim Recovery Systems (1992-2002)	**15,223 gal**
Total Gallons of Petroleum Removed (1992-Present)	**29,782 gal**

Definitions:

gal - gallons
GPM - Gallons per minute
NA - Not available or could not be calculated due to non-detection
LNAPL - Light non-aqueous phase liquid (oil)
SVE - Soil vapor extraction
TPH - Total petroleum hydrocarbons
µg/L - micrograms per liter

Notes:

LNAPL recovery is recorded periodically when sufficient product has been accumulated to be transported off-site for disposal.
Influent diesel and oil samples are no longer analyzed. Influent and effluent samples are collected before and after, respectively, a diffused air stripper, which does not remove diesel or oil.
Effluent sample data are representative of the outflow water to King County Metro sanitary sewer.
The average µg/L of the preceding month and the month of reference are used to calculate pounds of compound removed.
Data presented in *italicized text* represent non-detections. The listed *italicized value* is the laboratory reporting limit
If influent concentrations are below the laboratories reporting limit, the percent reduction is calculated using the reporting limit. The actual percent reduction is ≥ the reported value.

* Calculation of lbs. of Recovered Product:
To convert µg/L to lbs./gallon - (µg/L)x(3.785l/gal)=ug/gal, (ug/gal)x(ug/(2.2046x10-9lbs))=lbs./gal
lbs./gal of chemical constituent x total gallons recovered =lbs. of chemical recovered
Density of Gasoline utilized for conversions from pounds to gallons is 6.15 lbs./gal
Density of Diesel utilized for conversions from pounds to gallons 6.98 lbs./gal
Density of Oil utilized for conversions from pounds to gallons 7.63 lbs./gal
Benzene, toluene, ethylbenzene, and xylenes volumes are not included in the Total Gallons calculations, as they are assumed to be included in TPH as gasoline.

** / *** SVE Recovery Calculations for TPH and Biodegradation, which are maintained in separate tables.
C = Average Influent TPH concentration (ppmv)
Q = Influent Flow Rate (SCFM)
Mc = Molecular wt. of Carbon Dioxide = 44
Mg = Molecular wt. of Gasoline = 87
Density of Gasoline for conversions is 6.15 lbs./gal

** TPH recovered by SVE system was calculated in lbs./hr. = C x Q x Mg x 1.583 x 10^{-7}
1.583 x 10^{-7} is a constant and is derived as follows:
10^{-6} ppmv x 60min/1hr x 1 lb. Mole/379 cu.ft.
SVE TPH recovery calculations are based on TPH concentrations in the SVE stream, SVE hrs. of operation, and SVE measured flow rates.

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
Site: Former BP Harbor Island Terminal

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene µg/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes (total) ug/l
RW-10	Nov-03	0.625			1.2	0.892	2.42	3.07
RW-10	Aug-04	0.661	**36.2**	3.46	0.5	0.5	0.653	1.99
RW-10	Feb-05	0.473	1.21	0.75	0.5	0.5	0.5	1.41
RW-10	Nov-05	0.420	13.3	1.63	0.5	0.5	0.5	1
RW-10	Mar-06	0.066	4.14	0.75	0.5	0.5	0.5	1
RW-10	Nov-06	0.930	3.48	1.09	0.5	0.5	0.5	1
RW-10	May-07	0.073	0.255	*0.5*	0.5	0.5	0.5	1
RW-10	Nov-07	0.246	4.65	0.841	0.5	0.5	0.5	1
RW-10	Apr-08	0.235	1.91	*0.515*	0.5	0.5	0.5	1
RW-10	Nov-08	0.347	8.21	0.946	0.5	0.5	0.5	1
RW-10	Apr-09	0.448	5.95	0.804	0.5	0.5	0.5	1.36
RW-10	Nov-09	0.320	5.2	0.78	*0.5*	*1*	*1*	*2*
RW-10	Apr-10	0.460	2.3	*0.49*	*0.5*	*1*	*1*	*2*
RW-10	Nov-10	0.251	2.4	0.65	*0.5*	*1*	*1*	*3*
RW-10	Apr-11	0.6	1.5	0.68	*0.5*	*1*	*1*	*3*
RW-10	Nov-11	0.171	0.22	*0.39*	*0.5*	*1*	*1*	*3*
RW-10	Apr-12	0.366	0.51	0.46	*0.5*	*1*	*1*	*3*
RW-10	Nov-12	*0.1*	*0.11*	*0.11*	*0.5*	*0.5*	*0.5*	*1.5*
RW-10	Apr-13	0.2	0.36	*0.49*	*0.5*	*0.5*	*0.5*	*0.5*
RW-10	Nov-13	0.13	*0.25*	*0.25*	*0.5*	*0.5*	*0.5*	*1*
RW-10	Apr-14	0.16	1.6	0.73	*0.14*	*0.16*	*0.13*	0.13
RW-10	Nov-14	0.11	0.78	0.36	*1.0*	*1.0*	*1.0*	*3.0*
RW-10	Apr-15	0.091	0.97	0.8	*2.0*	*2.0*	*3.0*	*3.0*
RW-10	Nov-15	0.67	1.5	0.28	4.3	*2.0*	*3.0*	0.73
RW-10	Apr-16	0.28	1.9	1.4	*2.0*	*2.0*	*3.0*	*3.0*
RW-10	Nov-16	0.069	0.77	0.32	*0.2*	*0.2*	*0.2*	*0.5*
RW-10	Apr-17	*0.5*	*0.11*	*0.25*	*2.0*	*2.0*	*3.0*	*3.0*
RW-10	Nov-17	0.069	0.36	*0.25*	*0.2*	*0.2*	*0.2*	*0.5*
RW-10	Apr-18	0.12	0.33	*0.26*	*0.2*	*0.2*	*0.2*	*0.5*
RW-10	Nov-18	0.12	3.4	2.8	*0.2*	*0.2*	*0.2*	*0.5*
RW-10	Apr-19	0.073	1.6	0.96	*0.2*	*0.2*	*0.2*	*0.5*
RW-10	Nov-19	0.053	1.7	0.84	*0.5*	*2.0*	*2.0*	*4.0*
RW-10	Jul-20	0.062	1.8	1.00	*0.5*			
RW-10	Dec-20	*0.05*	0.34	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-10	Jun-21	0.077	1.6	0.79	*0.5*	*1.0*	*1.0*	*3.0*
RW-10	Dec-21	*0.05*	7.30	2.80	*0.5*	*1.0*	*1.0*	*3.0*
RW-10	Jun-22	0.053	0.28	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-10	Jan-23	*0.5*	0.67	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-10	Average	0.3	3.2	0.9	0.7	0.8	1.0	1.8
RW-9	Nov-03	**13.1**			5	43.2	146	1180
RW-9	Aug-04	**1.24**	**94.9**	2.19	0.5	0.5	1.23	1.64
RW-9	Feb-05	0.907	**22.1**	<15	0.5	0.5	3.64	4.74
RW-9	Nov-05	0.568	4.31	0.708	0.5	0.5	0.968	1.45
RW-9	Mar-06	0.166	1.68	0.75	0.5	0.5	0.5	1
RW-9	Nov-06	0.359	5.98	1.17	0.5	0.5	0.647	1.09
RW-9	May-07	0.402	2.08	*0.5*	5.43	0.5	1.4	1.49
RW-9	Nov-07	0.184	**70.1**	**11.6**	0.5	*0.5*	*0.5*	*1*
RW-9	Apr-08	0.170	**18.2**	2.94	3.21	*0.5*	*0.5*	*1*
RW-9	Nov-08	0.130	**49.5**	8.21	0.5	*0.5*	*0.5*	*1*
RW-9	Apr-09	0.280	**45.1**	6.71	0.5	*0.5*	*0.5*	*1*
RW-9	Nov-09	0.670	**32**	6.8	1.5	*1*	*1*	*2*
RW-9	Apr-10	**6.0**	**110**	**24**	*0.5*	*1*	*1*	*2*
RW-9	Nov-10	0.207	2.0	0.53	*0.5*	*1*	*1*	*3*
RW-9	Apr-11	**1.12**	**276**	**45.9**	*0.5*	*1*	*1*	*3*

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
Site: Former BP Harbor Island Terminal

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene µg/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes (total) ug/l
RW-9	Nov-11	0.289	2.3	*0.39*	*0.5*	*1*	*1*	*3*
RW-9	Apr-12	0.113	**33.2**	5.3	0.72	*1*	*1*	*3*
RW-9	Nov-12	*0.1*	8.2	8.4	0.5	*0.5*	*0.5*	*1.5*
RW-9	Apr-13	0.1	**44.0**	8.5	*0.5*	*0.5*	*0.5*	*0.5*
RW-9	Nov-13	0.062	**14.0**	2.6	*0.5*	*0.5*	*0.5*	*1*
RW-9	Apr-14	0.14	**56.0**	**16**	*0.14*	*0.16*	*0.13*	*0.12*
RW-9	Nov-14	0.14	7.1	2.7	*1.0*	*1.0*	*1.0*	*3.0*
RW-9	Apr-15	0.18	**14.0**	4.9	*2.0*	*2.0*	*3.0*	*3.0*
RW-9	Nov-15	0.32	**7.6**	3.0	*2.0*	*2.0*	*3.0*	*3.0*
RW-9	Apr-16	**1.5**	**180.0**	**38.0**	*2.0*	*2.0*	*3.0*	*3.0*
RW-9	Nov-16	0.17	**12.0**	3.8	*0.2*	*0.2*	*0.2*	*0.5*
RW-9	Apr-17	0.5	**64.0**	**17.0**	*2.0*	*2.0*	*3.0*	*3.0*
RW-9	Nov-17	0.14	**14.0**	4.4	*0.2*	*0.2*	*0.2*	*0.5*
RW-9	Apr-18	0.068	**11.0**	3.3	*0.2*	*0.2*	*0.2*	*0.5*
RW-9	Nov-18	0.093	**17.0**	7.2	*0.2*	*0.2*	*0.2*	*0.5*
RW-9	Apr-19	*0.05*	8.7	2.8	*0.2*	*0.2*	*0.2*	*0.5*
RW-9	Nov-19	0.054	7.5	2.4	*0.2*	*2.0*	*2.0*	*4.0*
RW-9	Jul-20	*0.05*	**11.0**	*3.8*	*0.5*	*1.0*	*1.0*	*3.0*
RW-9	Dec-20	*0.05*	**13.0**	*3.8*	*0.5*	*1.0*	*1.0*	*3.0*
RW-9	Jun-21	*0.05*	**66.0**	***19.0***	*0.5*	*1.0*	*1.0*	*3.0*
RW-9	Dec-21	*0.05*	**360.0**	***25.0***	*0.5*	*1.0*	*1.0*	*3.0*
RW-9	Jun-22	*0.05*	3.8	0.99	*0.5*	*1.0*	*1.0*	*3.0*
RW-9	Jan-23	*0.05*	6.8	1.6	*0.5*	*1.0*	*1.0*	*3.0*
RW-9	Average	**0.8**	**45.8**	8.2	1.0	1.9	4.9	33.0
Groundwater Cleanup Level		**1.0**	**10.0**	**10.0**	**71**			
Reporting Limits/Units		0.05 mg/l	0.25 mg/l	.750 mg/l	0.5 ug/l	Varies	Varies	Varies
RW-8	Nov-03	0.367			0.5	0.5	0.787	2.23
RW-8	Aug-04	0.181	**19.8**	2.19	0.5	0.5	0.53	2.13
RW-8	Feb-05	0.218	2.58	0.75	0.5	0.5	0.564	3.04
RW-8	Nov-05	0.099	0.575	0.721	0.5	0.5	0.5	1
RW-8	Mar-06	0.050	1.44	0.75	0.5	0.5	0.5	1
RW-8	Nov-06	0.050	3.58	0.762	0.5	0.5	0.5	1
RW-8	May-07	0.068	0.273	*0.5*	0.5	0.5	0.5	1
RW-8	Nov-07	0.065	0.29	0.543	0.5	0.5	0.5	1
RW-8	Apr-08	0.067	0.279	*0.529*	0.5	0.5	0.5	1
RW-8	Nov-08	0.088	3.85	0.492	0.5	0.5	0.5	1
RW-8	Apr-09	0.091	0.255	*0.476*	0.5	0.5	0.5	1
RW-8	Nov-09	0.140	1.3	*0.47*	*0.5*	*1*	*1*	*2*
RW-8	Apr-10	0.150	1.1	*0.49*	*0.5*	*1*	*1*	*2*
RW-8	Nov-10	0.105	1.0	*0.39*	*0.5*	*1*	*1*	*3*
RW-8	Apr-11	0.0995	2.6	0.59	*0.5*	*1*	*1*	*3*
RW-8	Nov-11	0.183	1.7	*0.39*	*0.5*	*1*	*1*	*3*
RW-8	Apr-12	*0.05*	1.3	*0.39*	*0.5*	*1*	*1*	*3*
RW-8	Nov-12	0.185	4.0	3.6	*0.5*	*0.5*	*0.5*	*1.5*
RW-8	Apr-13	0.062	2.7	0.52	*0.5*	*0.5*	*0.5*	*0.5*
RW-8	Nov-13	0.1	0.82	*0.25*	*0.5*	*0.5*	*0.5*	*1*
RW-8	Apr-14	0.13	3.40	0.91	0.15	*0.16*	*0.13*	0.52
RW-8	Nov-14	0.14	**10.0**	3.2	*1.0*	*1.0*	*1.0*	*3.0*
RW-8	Apr-15	0.13	5.2	2.0	*2.0*	*2.0*	*3.0*	*3.0*
RW-8	Nov-15	0.39	5.5	1.5	0.91	*2.0*	*3.0*	*3.0*
RW-8	Apr-16	0.28	**18.0**	7.7	*2.0*	*2.0*	*3.0*	*3.0*
RW-8	Nov-16	0.25	7.6	0.64	0.64	*0.2*	*0.2*	*0.5*
RW-8	Apr-17	0.5	2.0	0.37	2.00	*2.0*	*3.0*	*3.0*
RW-8	Nov-17	0.12	3.8	1.30	*0.20*	*0.2*	*0.2*	*0.5*

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
Site: Former BP Harbor Island Terminal

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene µg/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes (total) ug/l
RW-8	Apr-18	0.11	4.0	1.20	*0.20*	*0.2*	*0.2*	*0.5*
RW-8	Nov-18	0.16	3.0	1.10	*0.20*	*0.2*	0.44	2.0
RW-8	Apr-19	0.091	0.95	*0.26*	*0.20*	*0.2*	*0.2*	*0.5*
RW-8	Nov-19	0.081	0.7	*0.75*	*0.50*	*2.0*	*2.00*	*4.0*
RW-8	Jul-20	0.087	1.1	*0.75*	*0.50*	*1.0*	*1.00*	*3.0*
RW-8	Dec-20	0.072	0.78	*0.75*	*0.50*	*1.0*	*1.00*	*3.0*
RW-8	Jun-21	0.11	2.10	*0.75*	*0.50*	*1.0*	*1.00*	*3.0*
RW-8	Dec-21	0.13	2.60	*0.75*	*0.50*	*1.0*	*1.00*	*3.0*
RW-8	Jun-22	0.051	**12.0**	3.80	*0.50*	*1.0*	*1.0*	*3.0*
RW-8	Jan-23	*0.05*	3.0	0.77	*0.50*	*1.0*	*1.0*	*3.0*
RW-8	Average	0.1	3.7	1.1	0.6	0.8	0.9	1.8
RW-7	Nov-03	0.148			0.5	0.5	0.518	2.87
RW-7	Aug-04	0.050	7.6	1.2	0.5	0.5	0.5	1.09
RW-7	Feb-05	0.050	1.21	0.75	0.5	0.5	0.5	1
RW-7	Nov-05	0.050	0.35	0.728	0.5	0.5	0.5	1
RW-7	Mar-06	0.050	0.25	0.75	0.5	0.5	0.5	1
RW-7	Nov-06	0.063	3.16	1.34	0.5	0.5	0.5	1
RW-7	May-07	0.414	0.49	*0.515*	0.5	0.5	0.5	1
RW-7	Nov-07	0.187	0.25	*0.5*	0.5	0.5	0.5	1
RW-7	Apr-08	0.063	0.25	*0.5*	0.5	0.5	0.5	1
RW-7	Nov-08	0.071	0.236	*0.472*	0.5	0.5	0.5	1
RW-7	Apr-09	0.123	0.238	*0.476*	0.5	0.5	0.5	1
RW-7	Nov-09	0.075	0.69	*0.47*	*0.5*	*1*	*1*	*2*
RW-7	Apr-10	0.140	0.85	*0.49*	*0.5*	*1*	*1*	*2*
RW-7	Nov-10	0.11	0.46	*0.4*	*0.5*	*1*	*1*	*3*
RW-7	Apr-11	0.207	1.1	*0.41*	*0.5*	*1*	*1*	*3*
RW-7	Nov-11	*0.05*	0.13	*0.4*	*0.5*	*1*	*1*	*3*
RW-7	Apr-12	*0.05*	0.21	*0.42*	*0.5*	*1*	*1*	*3*
RW-7	Nov-12	*0.1*	0.32	0.37	*0.5*	*0.5*	*0.5*	*1.5*
RW-7	Apr-13	0.081	0.63	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
RW-7	Nov-13	*0.05*	0.45	*0.24*	*0.5*	*0.5*	*0.5*	*1*
RW-7	Apr-14	0.07	2.4	0.6	0.17	*0.16*	0.17	0.23
RW-7	Nov-14	0.064	0.92	*0.25*	*1.0*	*1.0*	*1.0*	*3.0*
RW-7	Apr-15	0.073	5.2	1.6	*2.0*	*2.0*	*3.0*	*3.0*
RW-7	Nov-15	0.11	0.41	0.88	*2.0*	*2.0*	*3.0*	*3.0*
RW-7	Apr-16	0.26	7.9	2.5	*2.0*	*2.0*	*3.0*	*3.0*
RW-7	Nov-16	0.11	0.89	*0.25*	*0.2*	*0.2*	*0.2*	*0.5*
RW-7	Apr-17	0.5	0.75	*0.27*	*2.0*	*2.0*	*3.0*	*3.0*
RW-7	Nov-17	0.05	0.21	*0.26*	*0.2*	*0.2*	*0.2*	*0.5*
RW-7	Apr-18	0.061	1.2	*0.26*	*0.2*	*0.2*	*0.2*	*0.5*
RW-7	Nov-18	0.065	0.48	*0.26*	*0.2*	*0.2*	*0.2*	*0.5*
RW-7	Apr-19	*0.05*	0.25	*0.26*	*0.2*	*0.2*	*0.2*	*0.5*
RW-7	Nov-19	*0.05*	*0.25*	*0.75*	*0.2*	*2.0*	*2.0*	*4.0*
RW-7	Jul-20	*0.05*	0.76	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-7	Dec-20	*0.05*	1.0	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-7	Jun-21	*0.05*	0.67	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-7	Dec-21	*0.05*	2.50	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-7	Jun-22	0.07	0.53	*0.75*	0.65	*1.0*	*1.0*	*3.0*
RW-7	Jan-23	*0.05*	0.46	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-7	Average	0.1	1.2	0.6	0.6	0.8	0.9	1.9
Groundwater Cleanup Level		**1.0**	**10.0**	**10.0**	**71**			
Reporting Limits/Units		0.05 mg/l	0.25 mg/l	.750 mg/l	0.5 ug/l	Varies	Varies	Varies
RW-1	Nov-03	0.858	8.73	1.34	1.03	0.758	2.71	3.39
RW-1	Aug-04	**1.00**	**31.6**	2.08	0.685	0.787	2.1	4.18

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
Site: Former BP Harbor Island Terminal

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene µg/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes (total) ug/l
RW-1	Feb-05	**1.03**	**18.9**	0.75	10.5	4.66	4.06	20.2
RW-1	Nov-05	0.547	2.19	0.708	0.5	0.5	0.5	1.67
RW-1	Mar-06	0.144	4.78	0.802	0.5	0.5	0.5	1
RW-1	Nov-06	0.173	3.28	*0.487*	0.5	0.5	0.5	1
RW-1	May-07	0.081	0.972	*0.526*	0.5	0.5	0.5	1
RW-1	Nov-07	0.056	0.596	*0.505*	0.5	0.5	0.5	1
RW-1	Apr-08	0.068	0.25	*0.5*	0.5	0.5	0.5	1
RW-1	Nov-08	0.050	0.274	*0.472*	0.5	0.5	0.5	1
RW-1	Apr-09	0.074	0.332	*0.481*	0.5	0.5	0.5	1
RW-1	Nov-09	0.073	0.44	*0.47*	*0.5*	*1*	*1*	*2*
RW-1	Apr-10	0.071	0.31	*0.49*	*0.5*	*1*	*1*	*2*
RW-1	Nov-10	0.143	0.32	*0.39*	*0.5*	*1*	*1*	*3*
RW-1	Apr-11	0.0991	0.95	*0.39*	*0.5*	*1*	*1*	*3*
RW-1	Nov-11	0.14	6.9	1.6	*0.5*	*1*	*1*	*3*
RW-1	Apr-12	0.131	0.86	*0.4*	0.53	*1*	*1*	*3*
RW-1	Nov-12	*0.1*	0.23	0.35	*0.5*	*0.5*	*0.5*	*1.5*
RW-1	Apr-13	0.15	0.47	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
RW-1	Nov-13	0.12	0.4	*0.25*	*0.5*	*0.5*	*0.5*	*1*
RW-1	Apr-14	0.17	0.9	0.34	0.3	*0.16*	0.35	0.44
RW-1	Nov-14	0.19	0.72	*0.25*	*1.0*	*1.0*	*1.0*	*3.0*
RW-1	Apr-15	0.18	5.0	1.2	*2.0*	*2.0*	*3.0*	*3.0*
RW-1	Nov-15	0.52	0.96	0.18	2.6	*2.0*	*3.0*	*3.0*
RW-1	Apr-16	0.24	2.5	0.69	*2.0*	*2.0*	*3.0*	*3.0*
RW-1	Nov-16	0.16	0.63	0.078	0.22	*0.2*	0.25	*0.5*
RW-1	Apr-17	0.5	0.17	0.26	*2.00*	*2.0*	*3.00*	*3.0*
RW-1	Nov-17	0.086	0.85	0.078	0.26	*0.2*	*0.20*	*0.5*
RW-1	Apr-18	0.2	0.69	*0.26*	0.23	*0.2*	0.31	*0.5*
RW-1	Nov-18	0.16	1.5	0.36	*0.20*	*0.2*	*0.20*	*0.5*
RW-1	Apr-19	0.11	0.73	*0.25*	*0.20*	*0.2*	0.25	*0.5*
RW-1	Nov-19	0.11	*0.25*	*0.75*	*0.50*	*2.0*	*2.00*	*4.0*
RW-1	Jul-20	0.15	1.3	*0.75*	*0.54*	*1.0*	*1.00*	*3.0*
RW-1	Dec-20	0.15	7.9	*1.5*	*0.50*	*1.0*	*1.00*	*3.0*
RW-1	Jun-21	0.11	0.29	*0.75*	*0.50*	*1.0*	*1.00*	*3.0*
RW-1	Dec-21	0.11	0.27	*0.75*	*0.50*	*1.0*	*1.00*	*3.0*
RW-1	Jun-22	*0.05*	1.5	*0.75*	*0.50*	*1.0*	*1.00*	*3.0*
RW-1	Jan-23	0..067	1.1	*0.75*	*0.50*	*1.0*	*1.00*	*3.0*
RW-1	Average	0.2	2.9	0.6	0.9	0.9	1.1	2.5
RW-6	Nov-03	**1.81**			**569**	23.1	10	116
RW-6	Aug-04	0.067	0.25	0.75	0.5	0.5	0.5	1
RW-6	Feb-05	0.101	0.25	0.75	0.5	0.5	0.788	1.3
RW-6	Nov-05	**8.19**	**115**	**14.7**	7.62	2.56	53.6	524
RW-6	Mar-06	**31.80**	**560**	**300**	12.7	9.15	96.7	568
RW-6	Nov-06	**1.14**	**26.8**	*1.05*	0.591	0.5	0.636	10
RW-6	May-07	**1.02**	**38.9**	*5.05*	34	1.44	16.6	15.2
RW-6	Nov-07	0.05	1.9	*5.32*	0.5	0.5	0.5	1
RW-6	Apr-08	0.33	5.56	0.542	10.2	1.22	9.56	6.9
RW-6	Nov-08	0.05	0.734	*0.472*	0.5	0.5	0.5	1
RW-6	Apr-09	0.175	1.14	*0.476*	6.93	0.5	3.08	3.32
RW-6	Nov-09	*0.050*	0.73	*0.47*	*0.5*	*1*	*1*	*2*
RW-6	Apr-10	**1.10**	3.2	*0.49*	53	2	9.4	6.7
RW-6	Nov-10	0.266	2.5	*0.39*	*0.5*	*1*	*1*	*3*
RW-6	Apr-11	0.595	*0.37*	*0.41*	15.1	*1*	9.5	6.7
RW-6	Nov-11	*0.05*	0.21	*0.38*	*0.5*	*1*	*1*	*3*
RW-6	Apr-12	*0.05*	0.98	*0.4*	1.1	*1*	*1*	*3*

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
Site: Former BP Harbor Island Terminal

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene µg/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes (total) ug/l
RW-6	Nov-12	*0.1*	*0.11*	*0.11*	*0.5*	*0.5*	*0.5*	*1.5*
RW-6	Apr-13	0.18	1.1	*0.49*	0.82	*0.5*	*0.5*	0.55
RW-6	Nov-13	0.052	0.29	*0.25*	*0.5*	*0.5*	*0.5*	*1*
RW-6	Apr-14	0.19	1.4	0.36	2.1	0.34	1.3	0.64
RW-6	Nov-14	0.068	0.46	*0.25*	*1.0*	*1.0*	*1.0*	*3.0*
RW-6	Apr-15	0.13	0.46	*0.26*	*2.0*	*2.0*	*3.0*	*3.0*
RW-6	Nov-15	0.097	0.6	0.14	*2.0*	*2.0*	*3.0*	*3.0*
RW-6	Apr-16	0.21	6.3	2.4	*2.0*	*2.0*	*3.0*	*3.0*
RW-6	Nov-16	0.18	1.3	0.32	*0.2*	*0.2*	*0.2*	*0.5*
RW-6	Apr-17	0.5	0.66	0.51	*2.0*	*2.0*	*3.0*	*3.0*
RW-6	Nov-17	0.05	0.22	0.27	*0.2*	*0.2*	*0.2*	*0.5*
RW-6	Apr-18	0.11	0.54	*0.25*	*0.2*	*0.2*	*0.2*	*0.5*
RW-6	Nov-18	0.086	0.58	*0.25*	*0.2*	*0.2*	*0.2*	*0.5*
RW-6	Apr-19	0.053	0.14	*0.25*	*0.2*	*0.2*	*0.2*	*0.5*
RW-6	Nov-19	*0.05*	0.46	*0.75*	*0.5*	*2.0*	*2.0*	*4.0*
RW-6	Jul-20	0.081	0.26	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-6	Dec-20	*0.05*	*0.25*	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-6	Jun-21	*0.05*	0.32	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-6	Dec-21	*0.05*	*0.25*	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
RW-6	Jun-22	0.2	*0.25*	0.75	1.3	*1.0*	*1.0*	*3.0*
RW-6	Jan-23	0.08	0.31	*0.75*	0.6	*1.0*	*1.0*	*3.0*
RW-6	Average	**1.3**	**20.9**	**9.3**	19.3	1.8	6.3	34.6
Groundwater Cleanup Level		**1.0**	**10.0**	**10.0**	**71**			
Reporting Limits/Units		0.05 mg/l	0.25 mg/l	.750 mg/l	0.5 ug/l	Varies	Varies	Varies
RW-5	Nov-03	**2.10**	4.13	0.75	5.21	0.657	83.5	186
RW-5	Aug-04	**7.60**	**14.5**	1.55	1.93	1.67	324	630
RW-5	Feb-05	**3.18**	**17.4**	**15**	**37.8**	40	38.5	287
RW-5	Nov-05	**19.60**	**1240**	**361**	**43.2**	42	66.2	879
RW-5	Mar-06	**1.79**	**13.3**	7.5	1.06	24.2	8.03	129
RW-5	Nov-06	0.741	8	1.67	0.5	0.5	0.732	4.23
RW-5	May-07	**2.920**	**13.9**	2.01	22.1	0.705	16.7	60.1
RW-5	Nov-07	1.430	2.16	0.639	1.08	0.5	1.87	2.07
RW-5	Apr-08	0.240	7.71	2.17	5.64	0.5	1.19	1.48
RW-5	Nov-08	**1.520**	0.916	*0.472*	6.32	0.5	2.85	3.55
RW-5	Apr-09	0.873	**11.7**	2.45	**93.3**	2.42	8.74	16.5
RW-5	Nov-09	0.066	0.4	*0.47*	*0.5*	*1*	*1*	*2*
RW-5	Apr-10	0.570	1.4	*0.49*	7.3	*1*	15	29
RW-5	Nov-10	0.785	0.9	*0.39*	30.5	*1*	2	5.3
RW-5	Apr-11	0.801	1.3	*0.41*	10.3	*1*	3.5	7
RW-5	Nov-11	0.18	1.2	*0.39*	9.2	*1*	5.6	3.9
RW-5	Apr-12	0.746	0.35	*0.41*	14.1	*1*	6.8	26
RW-5	Nov-12	*0.1*	0.38	0.41	1.6	*0.5*	*0.5*	*1.5*
RW-5	Apr-13	0.18	**26**	2.2	0.57	*0.5*	*0.5*	*0.5*
RW-5	Nov-13	0.22	*0.25*	*0.25*	0.83	*0.5*	*0.5*	*1*
RW-5	Apr-14	0.46	2.8	0.79	5.2	0.55	1.9	4.1
RW-5	Nov-14	0.28	1.7	0.56	*1.0*	*1.0*	*1.0*	*3.0*
RW-5	Apr-15	0.45	2.4	0.89	3.2	*2.0*	*3.0*	*3.0*
RW-5	Nov-15	0.39	2.2	0.36	*2.0*	*2.0*	*3.0*	*3.0*
RW-5	Apr-16	0.63	2.4	0.82	*2.0*	*2.0*	*3.0*	3.3
RW-5	Nov-16	0.72	4.4	1.00	0.59	*0.2*	0.40	0.41
RW-5	Apr-17	0.5	0.51	0.26	*2.00*	*2.0*	*3.00*	*3.00*
RW-5	Nov-17	0.32	1	0.26	1.10	*0.3*	2.60	0.74
RW-5	Apr-18	0.45	0.56	0.28	1.30	0.3	1.30	1.20
RW-5	Nov-18	0.25	4.2	2.10	1.40	*0.2*	0.76	4.50

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
Site: Former BP Harbor Island Terminal

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene µg/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes (total) ug/l
RW-5	Apr-19	0.4	0.62	*0.26*	1.40	0.33	1.10	0.73
RW-5	Nov-19	*0.05*	0.55	*0.75*	0.50	*2.0*	*2.0*	*4.0*
RW-5	Jul-20	0.32	0.59	*0.75*	2.50	*1.0*	3.7	*3.0*
RW-5	Dec-20	0.94	0.31	*0.75*	0.82	*1.0*	*1.0*	*3.0*
RW-5	Jun-21	0.25	0.38	*0.75*	1.50	*1.0*	*1.0*	*3.0*
RW-5	Dec-21	0.23	*0.25*	*0.75*	*0.50*	*1.0*	*1.0*	*3.0*
RW-5	Jun-22	0.13	*0.25*	*0.75*	1.4	*1.0*	*1.0*	*3.0*
RW-5	Jan-23	0.11	*0.25*	*0.75*	1.1	*1.0*	*1.0*	*3.0*
RW-5	Average	**1.4**	**36.6**	**10.9**	8.5	3.7	16.3	61.2
RW-4	Nov-03	**4.89**			36.1	44.3	337	281
RW-4	Aug-04	**182.0**	**681**	**150**	**617**	7740	2750	15,200
RW-4	Feb-05	**49.4**	**2,610**	**765**	**347**	2830	834	7,210
RW-4	Nov-05	**77.5**	**3,650**	**1820**	**341**	6940	1100	8,010
RW-4	Mar-06	**26.1**	**440**	**150**	30.2	654	346	3,340
RW-4	Nov-06	**7.23**	**139**	*5.26*	65.2	157	47	1,090
RW-4	May-07	0.82	8.08	*0.543*	3.97	0.547	3.89	77.5
RW-4	Nov-07	**1.29**	0.553	*0.543*	1.97	0.536	3.5	106
RW-4	Apr-08	0.07	2.91	*0.532*	0.5	0.5	0.5	4.57
RW-4	Nov-08	0.73	6.43	*0.472*	6.86	0.5	3.6	28.2
RW-4	Apr-09	0.565	7.93	*0.481*	8.17	0.5	1.43	18.3
RW-4	Nov-09	**5.5**	**25**	1.2	22	1.9	30	310
RW-4	Apr-10	**4.2**	**10**	*0.49*	46	1.6	24	155
RW-4	Nov-10	**2.61**	**20**	0.86	39.9	*1.0*	15	47.9
RW-4	Apr-11	**5.73**	**29.5**	1.2	67.9	1.2	44.8	158
RW-4	Nov-11	**4.51**	**56.2**	1.4	48.5	*1.0*	43.6	98.3
RW-4	Apr-12	**6.24**	**38.1**	1.4	56.8	*1.2*	45.3	106
RW-4	Nov-12	0.771	**10.7**	9.2	7.5	*0.5*	3.9	10.1
RW-4	Apr-13	**1.1**	7.1	*0.5*	16	*0.5*	5.4	2.32
RW-4	Nov-13	0.77	0.63	*0.25*	12	*0.5*	6.2	12
RW-4	Apr-14	**3.7**	**50**	2.7	14	0.49	14	22
RW-4	Nov-14	**1.9**	8.7	0.57	15	*1.0*	16	23
RW-4	Apr-15	**3.0**	4.1	0.35	13	*2.0*	18	18
RW-4	Nov-15	**2.3**	**18**	0.95	13	0.45	5.3	7.6
RW-4	Apr-16	**3.1**	**22**	1.4	12	*2.0*	7	*3.0*
RW-4	Nov-16	0.86	**50**	2.9	1.9	*0.2*	0.41	*0.5*
RW-4	Apr-17	**2.2**	**22**	0.96	8.4	*2.0*	4	*3.0*
RW-4	Nov-17	**1.3**	**20**	1.2	22	1.2	2.7	1.3
RW-4	Apr-18	**1.3**	**24**	1.2	4.3	0.26	2.3	0.6
RW-4	Nov-18	**1.2**	**33**	1.9	12	0.34	0.45	1.1
RW-4	Apr-19	0.77	**28**	1.1	5.5	*0.20*	2.9	0.74
RW-4	Nov-19	0.48	**35**	*3.8*	10	*2.0*	*2.0*	*4.0*
RW-4	Jul-20	*0.5*	**390**	*4.3*	27	*10.0*	19.0	*30.0*
RW-4	Dec-20	***8.4***	**38**	***10.0***	42	*1.0*	1.0	*3.0*
RW-4	Jun-21	***2.4***	**47**	***15.0***	15.0	16.0	12.0	*30.0*
RW-4	Dec-21	**24.0**	**120**	***25.0***	7.9	*1.0*	*1.0*	*3.0*
RW-4	Jun-22	0.55	**16**	*3.80*	15	*1.0*	7.9	*3.0*
RW-4	Jan-23	0.66	3.5	*0.75*	34	1.6	1.8	*3.0*
RW-4	Average	**11.6**	**234**	**81**	53.9	484.7	151.7	958.5
Groundwater Cleanup Level		**1.0**	**10.0**	**10.0**	**71**			
Reporting Limits/Units		0.05 mg/l	0.25 mg/l	.750 mg/l	0.5 ug/l	Varies	Varies	Varies
RW-2	Nov-03	**2.07**			**820**	369	34.5	124
RW-2	Aug-04	**7.03**	46	1.41	**2,270**	382	354	1,180
RW-2	Feb-05	**4.65**	1.02	0.75	**1,690**	450	296	752
RW-2	Nov-05	**2.82**	0.76	0.708	**1,540**	299	159	353

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
Site: Former BP Harbor Island Terminal

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene µg/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes (total) ug/l
RW-2	Mar-06	**2.39**	6.84	3.75	**1,120**	112	138	224
RW-2	Nov-06	**13.10**	**14.3**	1.05	**1,830**	516	410	1,810
RW-2	May-07	**8.25**	6.35	*0.505*	**254**	33.1	237	1,150
RW-2	Nov-07	**3.55**	3.32	*0.538*	**895**	5	79.4	172
RW-2	Apr-08	**2.06**	**10.0**	*0.515*	**245**	5	58	190
RW-2	Nov-08	**1.42**	1.1	*0.481*	**360**	4.04	17.6	40
RW-2	Apr-09	0.497	0.864	*0.476*	49	1.78	9.49	*22*
RW-2	Nov-09	**2.4**	2.6	*0.48*	**400**	23	150	410
RW-2	Apr-10	**1.5**	1.0	*0.49*	**200**	1.5	66	98
RW-2	Nov-10	0.36	8.1	*0.6*	34.9	*1.0*	7.7	23.3
RW-2	Apr-11	**1.0**	1.5	*0.39*	**146**	1.3	27.8	51.7
RW-2	Nov-11	0.96	0.69	*0.39*	**363**	4.7	36.5	63.8
RW-2	Apr-12	0.57	**13.9**	*0.74*	**139**	*1.0*	13.7	17.4
RW-2	Nov-12	0.71	1.0	*0.91*	**196**	1.2	11.2	8.3
RW-2	Apr-13	0.47	3.0	*0.49*	**230**	2.0	20	6.6
RW-2	Nov-13	0.40	4.6	*0.25*	**80**	2.9	6.2	5.5
RW-2	Apr-14	**2.20**	7.2	0.53	**290**	100	84	79
RW-2	Nov-14	**2.30**	3.2	0.29	**460**	10	140	140
RW-2	Apr-15	**2.20**	2.7	0.3	**340**	28	77	55
RW-2	Nov-15	**1.6**	2.4	0.15	**330**	1.9	20	19
RW-2	Apr-16	**4.1**	**50**	2.3	**250**	16	40	31
RW-2	Nov-16	**3.6**	**170**	7.2	**330**	0.98	5.20	1.4
RW-2	Apr-17	**1.7**	7.4	0.28	**150**	130	29	15
RW-2	Nov-17	0.89	4.2	0.25	**390**	2.8	22	9.2
RW-2	Apr-18	**1.1**	**52**	2.2	**130**	6.6	4.9	2.2
RW-2	Nov-18	**2.4**	**16**	0.76	**180**	36	13	59
RW-2	Apr-19	0.66	8.1	0.32	26	0.49	5.4	1.2
RW-2	Nov-19	0.92	**20**	*3.8*	16	*2.0*	*2.0*	*4.0*
RW-2	Jul-20	**1.8**	9.4	*0.75*	**91**	170	16	*3.0*
RW-2	Dec-20	**1.1**	**76**	***20.0***	31	5.1	7.1	*47*
RW-2	Jun-21	**2.5**	**200**	***38.0***	11	*10*	11.0	*40*
RW-2	Dec-21	**4.4**	**220**	***38.0***	**320**	2.1	40	15
RW-2	Jun-22	**2.3**	**59**	*7.5*	65	*10*	89	*30*
RW-2	Jan-23	**4.3**	**120**	*38.0*	**450**	560.0	*76*	41
RW-2	Average	**2.5**	**31.2**	4.7	**440**	87.0	74.0	191.9
GM-11S	Nov-03	**2.28**			**614**	38.3	67.2	141
GM-11S	Aug-04	**2.06**	**57**	3.93	**506**	2.17	49.3	84.1
GM-11S	Feb-05	**2.42**	**25.1**	<15	55.6	0.848	25.5	17.3
GM-11S	Nov-05	**2.15**	**37.4**	<7.14	**124**	3.66	13.7	5.34
GM-11S	Mar-06	**1.41**	**17.8**	7.5	**218**	2.5	24.5	5
GM-11S	Nov-06	0.131	**10.8**	*1.05*	13.5	0.5	2.86	1.59
GM-11S	May-07	**1.68**	1.1	*0.556*	**175**	2.5	81.2	35.1
GM-11S	Nov-07	**2.20**	2.34	*0.505*	56.2	4.16	48.4	34.3
GM-11S	Apr-08	**1.93**	0.319	*0.532*	65.7	1.76	185	132
GM-11S	Nov-08	**1.66**	1.23	*0.472*	**95.3**	1.76	44.5	14.8
GM-11S	Apr-09	**1.26**	0.942	*0.481*	5.34	0.898	19.1	11.1
GM-11S	Aug-09	**1.90**	1.2	*0.48*	71	2.4	37	6.3
GM-11S	Nov-09	**1.50**	3.6	*0.48*	36	1.1	48	24
GM-11S	Apr-10	**3.00**	5	0.5	46	1.6	93	156
GM-11S	Nov-10	**1.39**	1.8	*0.48*	42	1.9	64.9	37.1
GM-11S	Apr-11	**1.42**	0.52	*0.4*	18.4	*1*	26.5	20.1
GM-11S	Nov-11	**2.28**	0.47	*0.38*	30.9	1.7	22.9	10.3
GM-11S	Apr-12	**2.24**	1.1	*0.38*	33	1.7	59.2	40.4
GM-11S	Nov-12	0.671	0.83	0.62	11.4	0.86	44.6	27.9

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
Site: Former BP Harbor Island Terminal

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene µg/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes (total) ug/l
GM-11S	Apr-13	0.5	0.35	*0.49*	20	0.52	23	9.1
GM-11S pumping discontinued in May 2013 due to line blockage and concentrations mainly below cleanup levels.								
GM-11S	Nov-13	0.33	0.47	0.58	4.1	0.6	10	1
GM-11S	Apr-14	**1.2**	3.9	1.4	10	0.82	23	2.7
GM-11S	Nov-14	0.72	0.83	0.4	6.5	8.7	*1.0*	*3.0*
GM-11S	Apr-15	0.2	0.51	0.35	*2.0*	*2.0*	*3.0*	*3.0*
GM-11S	Nov-15	0.5	0.77	0.41	1.6	0.54	0.52	0.70
GM-11S	Apr-16	0.52	7.1	1.8	14.0	*2.0*	*3.0*	*3.0*
GM-11S	Nov-16	0.078	0.34	0.21	*0.2*	*0.2*	*0.2*	*0.5*
GM-11S	Apr-17	0.5	0.11	0.25	*2.0*	*2.0*	*3.0*	*3.0*
GM-11S	Nov-17	0.83	1.4	0.37	3.8	2.5	0.4	1.7
GM-11S	Apr-18	0.22	1.4	0.98	*0.2*	0.2	*0.2*	*0.5*
GM-11S	Nov-18	0.48	4.8	4.0	*0.2*	*0.2*	*0.2*	*0.5*
GM-11S	Apr-19	0.3	2.0	0.57	2.0	1.2	0.27	*0.5*
GM-11S	Nov-19	0.66	2.1	*0.75*	*0.5*	*2.0*	*2.0*	*4.0*
GM-11S	Jul-20	0.99	3.0	*0.75*	2.5	1.6	*1.0*	*3.0*
GM-11S	Dec-20	0.84	3.6	1.00	3.5	*1.0*	*1.0*	*3.0*
GM-11S	Jun-21	0.95	2.7	*0.75*	2.9	1.1	*1.0*	*3.0*
GM-11S	Dec-21	0.66	2.4	*0.75*	*0.5*	*1.0*	*1.0*	*3.0*
GM-11S	Jun-22	0.64	3.1	0.79	4.5	*1.0*	*1.0*	*3.0*
GM-11S	Jan-23	0.57	2.3	*0.75*	1.9	*1.0*	*1.0*	*3.0*
GM-11S	Average	**1.2**	5.6	1.0	**59.0**	2.6	26.5	21.9
Groundwater Cleanup Level		**1.0**	**10.0**	**10.0**	**71**			
Reporting Limits/Units		0.05 mg/l	0.25 mg/l	.750 mg/l	0.5 ug/l	Varies	Varies	Varies

Notes:

Detection limits for many of the Oil analyses were raised due to sample dilution for diesel analyses.
These samples are listed with a "<" notation.

Values in italics were not detected at the listed reporting limit.

Values in bold exceed the cleanup level for confirmational wells.

Note that the groundwater cleanup levels are included for reference only.
Cleanup levels are applicable to confirmational wells, which are more deeply screened than the recovery wells included in this table. The deeper groundwater represents the conditional point of compliance for the Site, where groundwater/surface water exchange is occurring.

Table 3. Waterfront Systems Recovered Petroleum Hydrocarbon History
Site: Former BP Harbor Island Terminal

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
9-Aug-92	0.0	NA	0	NA	NA	NA	0
10-Aug-92	1.2	NA	1	NA	NA	NA	1
11-Aug-92	27.4	NA	29	NA	NA	NA	29
19-Aug-92	43.6	NA	72	NA	NA	NA	72
25-Aug-92	7.3	NA	80	NA	NA	NA	80
26-Aug-92	19.0	NA	99	NA	NA	NA	99
27-Aug-92	19.4	NA	118	NA	NA	NA	118
11-Sep-92	5.4	NA	123	NA	NA	NA	123
13-Sep-92	31.8	NA	155	NA	NA	NA	155
18-Dec-92	17.8	NA	173	NA	NA	NA	173
4-Jan-93	45.0	NA	218	NA	NA	NA	218
3-Feb-93	120.3	NA	338	NA	NA	NA	338
4-Feb-93	11.1	NA	349	NA	NA	NA	349
5-Feb-93	14.8	NA	364	NA	NA	NA	364
8-Feb-93	38.9	NA	403	NA	NA	NA	403
16-Feb-93	72.7	NA	476	NA	NA	NA	476
18-Feb-93	23.5	NA	499	NA	NA	NA	499
1-Mar-93	89.4	NA	589	NA	NA	NA	589
15-Mar-93	253.8	NA	842	NA	NA	NA	842
16-Mar-93	20.2	NA	863	NA	NA	NA	863
25-Mar-93	98.0	NA	961	NA	NA	NA	961
31-Mar-93	52.1	NA	1,013	NA	NA	NA	1,013
8-Apr-93	108.6	NA	1,121	NA	NA	NA	1,121
12-Apr-93	86.5	NA	1,208	NA	NA	NA	1,208
14-Apr-93	37.5	NA	1,245	NA	NA	NA	1,245
15-Apr-93	21.8	NA	1,267	NA	NA	NA	1,267
29-Apr-93	114.0	NA	1,381	NA	NA	NA	1,381
5-May-93	57.9	NA	1,439	NA	NA	NA	1,439
10-May-93	128.9	NA	1,568	NA	NA	NA	1,568
14-May-93	175.4	NA	1,743	NA	NA	NA	1,743
19-May-93	236.7	NA	1,980	NA	NA	NA	1,980
28-May-93	279.7	NA	2,260	NA	NA	NA	2,260
3-Jun-93	2.4	NA	2,262	NA	NA	NA	2,262
4-Jun-93	78.0	NA	2,340	NA	NA	NA	2,340
11-Jun-93	40.5	NA	2,380	NA	NA	NA	2,380
25-Jun-93	216.6	NA	2,597	NA	NA	NA	2,597
6-Jul-93	167.9	NA	2,765	NA	NA	NA	2,765
9-Jul-93	15.1	NA	2,780	NA	NA	NA	2,780
16-Jul-93	3.3	NA	2,783	NA	NA	NA	2,783
29-Jul-93	9.2	NA	2,792	NA	NA	NA	2,792
30-Oct-93	1007.6	NA	3,800	NA	NA	NA	3,800
15-Mar-94	900.0	NA	4,700	NA	NA	NA	4,700
30-Jun-94	900.0	NA	5,600	NA	NA	NA	5,600
28-Sep-94	300.0	NA	5,900	NA	NA	NA	5,900
27-Dec-94	300.0	NA	6,200	NA	NA	NA	6,200
27-Mar-95	300.0	NA	6,500	NA	NA	NA	6,500
25-Jun-95	300.0	NA	6,800	NA	NA	NA	6,800
23-Sep-95	100.0	NA	6,900	NA	NA	NA	6,900
22-Dec-95	98.0	NA	6,998	NA	NA	NA	6,998
1-Jan-96	103.0	NA	7,101	11.4	24.8	36	7,137
28-Feb-96	140.0	NA	7,241	22.7	49.6	108	7,349
28-Mar-96	229.0	NA	7,470	88.5	155.4	352	7,822
24-Apr-96	60.5	NA	7,531	64.9	126.4	544	8,074
31-May-96	56.0	NA	7,586	54.4	150.8	749	8,335

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
26-Jun-96	61.0	NA	7,648	60.7	139.8	949	8,597
17-Jul-96	201.9	NA	7,849	62.9	158.0	1,170	9,020
16-Aug-96	312.9	NA	8,162	85.3	242.3	1,498	9,660
18-Sep-96	216.2	NA	8,379	23.8	74.8	1,596	9,975
16-Oct-96	120.5	NA	8,499	72.9	248.3	1,918	10,417
20-Nov-96	99.3	NA	8,598	30.8	155.2	2,104	10,702
12-Dec-96	17.2	NA	8,615	8.4	79.5	2,192	10,807
16-Jan-97	38.9	NA	8,654	8.3	75.8	2,276	10,930
14-Feb-97	2.3	NA	8,657	6.4	53.8	2,336	10,993
13-Mar-97	23.1	NA	8,680	7.5	42.4	2,386	11,066
14-Apr-97	86.6	NA	8,766	14.3	16.3	2,417	11,183
15-May-97	164.9	NA	8,931	18.2	42.0	2,477	11,408
24-Jun-97	70.2	NA	9,001	0.0	0.0	2,477	11,478
24-Jul-97	41.1	NA	9,043	2.7	13.9	2,493	11,536
24-Aug-97	0.0	NA	9,043	1.9	9.6	2,505	11,547
30-Sep-97	6.26	NA	9,049	2.2	11.4	2,518	11,567
31-Oct-97	23.68	NA	9,072	0.0	0.0	2,518	11,591
30-Nov-97	9.04	NA	9,081	0.0	0.0	2,518	11,600
15-Dec-97	7.19	NA	9,089	0.5	2.5	2,521	11,610
14-Jan-98	10.29	NA	9,099	1.0	5.0	2,527	11,626
13-Feb-98	6.5	NA	9,105	3.4	17.5	2,548	11,654
16-Mar-98	5.72	NA	9,111	2.4	12.2	2,563	11,674
14-Apr-98	0.01	NA	9,111	4.1	20.9	2,588	11,699
19-May-98	0.0	NA	9,111	5.1	25.9	2,619	11,730
15-Jun-98	0.0	NA	9,111	0.6	3.1	2,622	11,734
15-Jul-98	0.0	NA	9,111	0.0	0.0	2,622	11,734
15-Aug-98	0.0	NA	9,111	0.0	0.0	2,622	11,734
15-Sep-98	0.0	NA	9,111	0.0	0.0	2,622	11,734
15-Oct-98	7.7	NA	9,119	2.6	13.1	2,638	11,757
18-Nov-98	0.33	NA	9,119	4.8	24.5	2,667	11,787
13-Dec-98	0.0	NA	9,119	3.5	18.0	2,689	11,808
14-Jan-99	0.08	NA	9,119	3.3	16.9	2,709	11,828
17-Feb-99	0.0	NA	9,119	4.6	23.8	2,737	11,857
15-Mar-99	0.0	NA	9,119	3.8	19.4	2,761	11,880
15-Apr-99	0.0	NA	9,119	4.0	20.6	2,785	11,905
13-May-99	0.0	NA	9,119	3.9	20.2	2,809	11,929
15-Jun-99	0.0	NA	9,119	3.9	19.7	2,833	11,952
15-Jul-99	0.0	NA	9,119	4.1	21.2	2,858	11,978
17-Aug-99	0.0	NA	9,119	4.0	20.6	2,883	12,002
16-Sep-99	0.0	NA	9,119	3.9	19.8	2,907	12,026
20-Oct-99	0.0	NA	9,119	4.1	20.8	2,932	12,051
19-Nov-99	0.0	NA	9,119	3.7	18.8	2,954	12,073
21-Dec-99	0.0	NA	9,119	3.7	18.9	2,977	12,096
21-Jan-00	0.0	NA	9,119	3.5	18.1	2,998	12,118
16-Feb-00	0.0	NA	9,119	3.2	16.6	3,018	12,137
21-Mar-00	0.0	NA	9,119	4.4	22.6	3,045	12,164
14-Apr-00	0.0	NA	9,119	4.5	23.2	3,073	12,192
15-May-00	0.0	NA	9,119	2.6	13.5	3,089	12,208
15-Jun-00	0.1	NA	9,119	4.2	21.3	3,114	12,234
19-Jul-00	0.0	NA	9,119	3.9	20.2	3,138	12,258
18-Aug-00	0.1	NA	9,119	1.5	7.7	3,148	12,267
20-Sep-00	7.3	NA	9,127	2.8	14.1	3,165	12,291
12-Oct-00	0.0	NA	9,127	2.4	12.3	3,179	12,306
14-Nov-00	32.9	NA	9,160	2.9	14.8	3,197	12,357

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
14-Dec-00	20.1	NA	9,180	2.6	13.5	3,213	12,393
11-Jan-01	0.9	NA	9,181	2.5	12.6	3,228	12,409
15-Feb-01	0.0	NA	9,181	0.5	2.5	3,231	12,412
15-Mar-01	0.2	NA	9,181	0.0	0.0	3,231	12,412
20-Apr-01	0.0	NA	9,181	0.0	0.1	3,231	12,412
18-May-01	0.0	NA	9,181	6.8	35.0	3,273	12,454
11-Jun-01	0.8	NA	9,182	10.8	55.1	3,339	12,520
24-Jul-01	0.1	NA	9,182	43.9	224.4	3,607	12,789
21-Aug-01	0.3	NA	9,182	0.0	0.0	3,607	12,789
6-Sep-01	0.1	NA	9,182	0.0	0.0	3,607	12,789
19-Oct-01	0.0	NA	9,182	13.5	69.2	3,690	12,872
15-Nov-01	106.9	NA	9,289	33.7	172.2	3,896	13,185
10-Dec-01	17.5	NA	9,306	0.0	0.0	3,896	13,202
16-Jan-02	5.6	NA	9,312	34.6	177.0	4,107	13,419
21-Feb-02	0.0	NA	9,312	39.5	202.1	4,349	13,661
15-Mar-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-Apr-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-May-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-Jun-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-Jul-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-Aug-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
24-Sep-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-Oct-02	0.0	0.0	9,312	68.5	254.2	4,672	13,984
26-Nov-02	0.0	1.2	9,313	137.6	525.5	5,335	14,648
26-Dec-02	0.0	2.7	9,316	94.0	482.8	5,912	15,227
16-Jan-03	19.6	2.6	9,338	49.5	451.8	6,413	15,751
20-Feb-03	0.0	3.7	9,342	33.5	320.1	6,766	16,108
11-Mar-03	0.0	4.6	9,346	27.5	328.1	7,122	16,468
15-Apr-03	6.9	3.9	9,357	15.4	423.1	7,560	16,918
15-May-03	2.5	2.8	9,362	18.3	346.5	7,925	17,288
17-Jun-03	0.0	1.8	9,364	18.6	353.4	8,297	17,661
15-Jul-03	2.0	1.3	9,367	32.4	290.4	8,620	17,987
13-Aug-03	0.0	2.4	9,370	49.2	295.0	8,964	18,334
16-Sep-03	0.0	2.6	9,373	26.5	364.0	9,355	18,727
14-Oct-03	0.0	2.5	9,375	23.0	316.1	9,694	19,069
19-Nov-03	0.0	3.2	9,378	36.6	404.9	10,135	19,514
17-Dec-03	20.0	6.4	9,405	12.0	317.3	10,465	19,869
13-Jan-04	25.0	31.3	9,461	2.8	293.2	10,761	20,222
10-Feb-04	0.0	19.7	9,481	3.8	186.1	10,951	20,431
17-Mar-04	0.0	1.5	9,482	5.2	297.0	11,253	20,735
15-Apr-04	0.0	0.8	9,483	11.0	198.0	11,462	20,945
25-May-04	0.0	3.0	9,486	40.4	356.7	11,859	21,345
17-Jun-04	35.0	2.7	9,524	57.1	103.2	12,019	21,543
13-Jul-04	0.0	8.2	9,532	64.7	260.4	12,344	21,876
13-Aug-04	50.0	11.9	9,594	22.1	233.1	12,599	22,193
16-Sep-04	8.0	6.3	9,608	32.0	147.8	12,779	22,387
13-Oct-04	0.0	1.8	9,610	62.2	117.5	12,959	22,568
19-Nov-04	10.0	3.1	9,623	118.5	156.7	13,234	22,856
15-Dec-04	3.5	2.0	9,629	84.4	124.7	13,443	23,071
13-Jan-05	0.0	3.7	9,632	80.6	90.3	13,614	23,245
15-Feb-05	35.0	5.3	9,673	83.4	128.0	13,825	23,494
15-Mar-05	0.0	2.7	9,675	121.9	162.7	14,110	23,781
15-Apr-05	0.0	6.2	9,681	136.0	170.8	14,417	24,094
20-May-05	0.0	13.6	9,695	83.0	156.7	14,656	24,347

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Table 3. Waterfront Systems Recovered Petroleum Hydrocarbon History
Site: Former BP Harbor Island Terminal

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
16-Jun-05	0.0	13.6	9,709	61.6	106.7	14,825	24,529
15-Jul-05	110.0	15.9	9,835	86.0	168.1	15,079	24,909
12-Aug-05	0.0	7.9	9,842	100.3	142.0	15,321	25,159
15-Sep-05	0.0	10.2	9,853	96.4	145.9	15,564	25,412
14-Oct-05	0.0	7.7	9,860	66.3	179.5	15,809	25,671
17-Nov-05	0.0	5.8	9,866	92.2	188.9	16,090	25,958
19-Dec-05	0.0	7.8	9,874	49.2	104.0	16,244	26,119
25-Jan-06	0.0	77.0	9,951	83.8	152.8	16,480	26,433
14-Feb-06	5.0	35.5	9,992	40.3	74.2	16,595	26,629
15-Mar-06	2.0	3.1	9,997	59.4	112.3	16,766	26,838
14-Apr-06	0.0	4.0	10,001	47.3	116.2	16,930	27,005
17-May-06	0.0	4.9	10,005	37.9	132.2	17,100	27,179
14-Jun-06	0.0	1.1	10,007	20.7	93.2	17,214	27,298
12-Jul-06	0.0	0.2	10,007	13.8	76.5	17,304	27,389
08-Aug-06	0.0	0.0	10,007	9.2	28.7	17,342	27,427
16-Aug-06	0.0	0.2	10,007	2.4	20.9	17,365	27,451
13-Sep-06	0.0	0.7	10,008	6.4	70.7	17,442	27,528
12-Oct-06	0.0	0.5	10,008	5.2	71.9	17,519	27,606
17-Nov-06	0.0	0.6	10,009	2.8	100.3	17,622	27,710
19-Dec-06	30.0	1.1	10,040	0.6	97.3	17,720	27,839
19-Jan-07	0.0	1.2	10,041	0.0	93.0	17,813	27,933
16-Feb-07	0.0	0.7	10,042	0.8	81.7	17,896	28,016
16-Mar-07	0.0	0.5	10,042	1.8	89.2	17,987	28,108
19-Apr-07	0.0	0.8	10,043	2.8	123.9	18,113	28,235
03-May-07	0.0	0.0	10,043	1.9	52.2	18,168	28,289
17-May-07	0.0	0.7	10,044	2.6	47.2	18,217	28,286
14-Jun-07	0.0	0.4	10,044	7.8	96.2	18,321	28,390
13-Jul-07	0.0	0.3	10,044	7.3	107.5	18,436	28,505
16-Aug-07	0.0	0.2	10,045	5.2	139.9	18,581	28,650
10-Sep-07	0.0	0.1	10,045	4.4	116.7	18,703	28,772
17-Oct-07	0.0	0.1	10,045	6.4	160.4	18,869	28,939
16-Nov-07	0.0	0.2	10,045	5.1	112.7	18,987	29,056
14-Dec-07	0.0	0.1	10,045	12.6	103.2	19,103	29,172
22-Jan-08	0.0	0.4	10,046	22.0	143.0	19,268	29,337
14-Feb-08	0.0	0.4	10,046	5.9	83.5	19,357	29,427
14-Mar-08	30.0	0.3	10,076	5.1	86.1	19,448	29,518
18-Apr-08	0.0	0.2	10,076	5.4	111.5	19,565	29,642
16-May-08	0.0	0.1	10,077	4.1	88.0	19,657	29,734
18-Jun-08	0.0	0.1	10,077	0.0	0.0	19,657	29,734
16-Jul-08	0.0	0.2	10,077	0.0	0.0	19,657	29,734
18-Aug-08	0.0	0.2	10,077	0.0	0.0	19,657	29,735
16-Sep-08	0.0	0.1	10,077	0.0	0.0	19,657	29,735
15-Oct-08	0.0	0.1	10,077	0.0	0.0	19,657	29,735
14-Nov-08	0.0	0.2	10,078	0.0	0.0	19,657	29,735
11-Dec-08	0.0	0.1	10,078	0.0	0.0	19,657	29,735
14-Jan-09	0.0	0.2	10,078	0.0	0.0	19,657	29,735
18-Feb-09	0.0	0.1	10,078	0.0	0.0	19,657	29,736
17-Mar-09	0.0	0.1	10,078	0.0	0.0	19,657	29,736
16-Apr-09	0.0	0.1	10,078	0.0	0.0	19,657	29,736
14-May-09	0.0	0.1	10,078	0.0	0.0	19,657	29,736
16-Jun-09	0.0	0.1	10,079	0.0	0.0	19,657	29,736
22-Jul-09	0.0	0.3	10,079	0.0	0.0	19,657	29,736
17-Aug-09	0.0	0.4	10,079	0.0	0.0	19,657	29,737
14-Sep-09	0.0	0.3	10,080	0.0	0.0	19,657	29,737

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
20-Oct-09	0.0	0.2	10,080	0.0	0.0	19,657	29,737
18-Nov-09	0.0	0.6	10,080	0.0	0.0	19,657	29,738
15-Dec-09	0.0	0.3	10,081	0.0	0.0	19,657	29,738
21-Jan-10	0.0	1.7	10,082	0.0	0.0	19,657	29,740
17-Feb-10	0.0	0.8	10,083	0.0	0.0	19,657	29,740
17-Mar-10	0.0	0.4	10,084	0.0	0.0	19,657	29,741
15-Apr-10	0.0	0.3	10,084	0.0	0.0	19,657	29,741
19-May-10	0.0	0.3	10,084	0.0	0.0	19,657	29,741
16-Jun-10	0.0	0.1	10,084	0.0	0.0	19,657	29,742
28-Jul-10	0.0	0.1	10,084	0.0	0.0	19,657	29,742
18-Aug-10	0.0	0.0	10,084	0.0	0.0	19,657	29,742
21-Sep-10	0.0	0.1	10,084	0.0	0.0	19,657	29,742
19-Oct-10	0.0	0.1	10,084	0.0	0.0	19,657	29,742
29-Nov-10	0.0	0.1	10,085	0.0	0.0	19,657	29,742
22-Dec-10	0.0	0.7	10,085	0.0	0.0	19,657	29,743
19-Jan-11	0.0	1.2	10,087	0.0	0.0	19,657	29,744
15-Feb-11	0.0	0.5	10,087	0.0	0.0	19,657	29,744
29-Mar-11	0.0	0.5	10,088	0.0	0.0	19,657	29,745
21-Apr-11	0.0	0.2	10,088	0.0	0.0	19,657	29,745
18-May-11	0.0	0.5	10,088	0.0	0.0	19,657	29,746
14-Jun-11	0.0	0.3	10,088	0.0	0.0	19,657	29,746
20-Jul-11	0.0	0.1	10,089	0.0	0.0	19,657	29,746
17-Aug-11	0.0	0.0	10,089	0.0	0.0	19,657	29,746
14-Sep-11	0.0	0.0	10,089	0.0	0.0	19,657	29,746
11-Oct-11	0.0	0.1	10,089	0.0	0.0	19,657	29,746
22-Nov-11	0.0	0.3	10,089	0.0	0.0	19,657	29,746
13-Dec-11	0.0	0.1	10,089	0.0	0.0	19,657	29,747
23-Jan-12	0.0	1.8	10,091	0.0	0.0	19,657	29,748
14-Feb-12	0.0	0.9	10,092	0.0	0.0	19,657	29,749
13-Mar-12	0.0	0.2	10,092	0.0	0.0	19,657	29,749
16-Apr-12	0.0	0.8	10,093	0.0	0.0	19,657	29,750
16-May-12	0.0	0.5	10,093	0.0	0.0	19,657	29,751
13-Jun-12	0.0	0.1	10,093	0.0	0.0	19,657	29,751
20-Jul-12	0.0	0.1	10,093	0.0	0.0	19,657	29,751
23-Aug-12	0.0	0.2	10,094	0.0	0.0	19,657	29,751
5-Sep-12	0.0	0.1	10,094	0.0	0.0	19,657	29,751
24-Oct-12	0.0	0.2	10,094	0.0	0.0	19,657	29,751
18-Dec-12	0.0	0.0	10,094	0.0	0.0	19,657	29,751
23-Jan-13	0.0	0.5	10,094	0.0	0.0	19,657	29,752
21-Feb-13	0.0	0.1	10,095	0.0	0.0	19,657	29,752
13-Mar-13	0.0	0.1	10,095	0.0	0.0	19,657	29,752
17-Apr-13	0.0	0.2	10,095	0.0	0.0	19,657	29,752
22-May-13	0.0	0.1	10,095	0.0	0.0	19,657	29,752
12-Jun-13	0.0	0.1	10,095	0.0	0.0	19,657	29,752
24-Jul-13	0.0	0.3	10,095	0.0	0.0	19,657	29,753
20-Aug-13	0.0	0.2	10,095	0.0	0.0	19,657	29,753
24-Sep-13	0.0	0.1	10,096	0.0	0.0	19,657	29,753
15-Oct-13	0.0	0.0	10,096	0.0	0.0	19,657	29,753
20-Nov-13	0.0	0.2	10,096	0.0	0.0	19,657	29,753
18-Dec-13	0.0	0.2	10,096	0.0	0.0	19,657	29,753
14-Jan-14	0.0	0.1	10,096	0.0	0.0	19,657	29,754
11-Feb-14	0.0	0.1	10,096	0.0	0.0	19,657	29,754
20-Mar-14	0.0	0.3	10,097	0.0	0.0	19,657	29,754
16-Apr-14	0.0	0.2	10,097	0.0	0.0	19,657	29,754

Note: NA - The soil vapor extraction system was not brought online until January of 1996

* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
21-May-14	0.0	0.2	10,097	0.0	0.0	19,657	29,754
19-Jun-14	0.0	0.1	10,097	0.0	0.0	19,657	29,754
24-Jul-14	0.0	0.0	10,097	0.0	0.0	19,657	29,755
13-Aug-14	0.0	0.2	10,097	0.0	0.0	19,657	29,755
17-Sep-14	0.0	0.4	10,098	0.0	0.0	19,657	29,755
15-Oct-14	0.0	0.2	10,098	0.0	0.0	19,657	29,755
19-Nov-14	0.0	0.2	10,098	0.0	0.0	19,657	29,755
17-Dec-14	0.0	0.4	10,098	0.0	0.0	19,657	29,756
14-Jan-15	0.0	0.8	10,099	0.0	0.0	19,657	29,757
11-Feb-15	0.0	0.7	10,100	0.0	0.0	19,657	29,757
18-Mar-15	0.0	0.3	10,100	0.0	0.0	19,657	29,758
15-Apr-15	0.0	0.3	10,101	0.0	0.0	19,657	29,758
15-May-15	0.0	0.2	10,101	0.0	0.0	19,657	29,758
17-Jun-15	0.0	0.3	10,101	0.0	0.0	19,657	29,758
15-Jul-15	0.0	0.4	10,101	0.0	0.0	19,657	29,759
12-Aug-15	0.0	0.5	10,102	0.0	0.0	19,657	29,759
16-Sep-16	0.0	0.4	10,102	0.0	0.0	19,657	29,760
14-Oct-16	0.0	0.4	10,103	0.0	0.0	19,657	29,760
18-Nov-15	0.0	1.1	10,104	0.0	0.0	19,657	29,761
10-Dec-15	0.0	1.2	10,105	0.0	0.0	19,657	29,762
13-Jan-16	0.0	1.67	10,107	0.0	0.0	19,657	29,764
10-Feb-16	0.0	0.45	10,107	0.0	0.0	19,657	29,765
16-Mar-16	0.0	0.41	10,108	0.0	0.0	19,657	29,765
13-Apr-16	0.0	0.27	10,108	0.0	0.0	19,657	29,765
18-May-16	0.0	0.25	10,108	0.0	0.0	19,657	29,765
16-Jun-16	0.0	0.21	10,108	0.0	0.0	19,657	29,766
12-Jul-16	0.0	0.17	10,108	0.0	0.0	19,657	29,766
18-Aug-16	0.0	0.26	10,109	0.0	0.0	19,657	29,766
21-Sep-16	0.0	0.20	10,109	0.0	0.0	19,657	29,766
19-Oct-16	0.0	0.22	10,109	0.0	0.0	19,657	29,767
16-Nov-16	0.0	0.67	10,110	0.0	0.0	19,657	29,767
14-Dec-16	0.0	0.92	10,111	0.0	0.0	19,657	29,768
18-Jan-17	0.0	1.22	10,112	0.0	0.0	19,657	29,769
15-Feb-17	0.0	1.36	10,113	0.0	0.0	19,657	29,771
15-Mar-17	0.0	1.10	10,114	0.0	0.0	19,657	29,772
12-Apr-17	0.0	0.55	10,115	0.0	0.0	19,657	29,772
17-May-17	0.0	0.49	10,115	0.0	0.0	19,657	29,773
14-Jun-17	0.0	0.35	10,116	0.0	0.0	19,657	29,773
19-Jul-17	0.0	0.39	10,116	0.0	0.0	19,657	29,774
16-Aug-17	0.0	0.31	10,116	0.0	0.0	19,657	29,774
20-Sep-17	0.0	0.35	10,117	0.0	0.0	19,657	29,774
18-Oct-17	0.0	0.28	10,117	0.0	0.0	19,657	29,775
15-Nov-17	0.0	0.35	10,117	0.0	0.0	19,657	29,775
13-Dec-17	0.0	0.32	10,118	0.0	0.0	19,657	29,775
17-Jan-18	0.0	0.45	10,118	0.0	0.0	19,657	29,776
14-Feb-18	0.0	0.33	10,119	0.0	0.0	19,657	29,776
14-Mar-18	0.0	0.10	10,119	0.0	0.0	19,657	29,776
18-Apr-18	0.0	0.12	10,119	0.0	0.0	19,657	29,776
16-May-18	0.0	0.09	10,119	0.0	0.0	19,657	29,776
13-Jun-18	0.0	0.09	10,119	0.0	0.0	19,657	29,776
18-Jul-18	0.0	0.10	10,119	0.0	0.0	19,657	29,776
15-Aug-18	0.0	0.07	10,119	0.0	0.0	19,657	29,777
19-Sep-18	0.0	0.16	10,119	0.0	0.0	19,657	29,777
17-Oct-18	0.0	0.14	10,119	0.0	0.0	19,657	29,777

Note: NA - The soil vapor extraction system was not brought online until January of 1996

* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
14-Nov-18	0.0	0.07	10,120	0.0	0.0	19,657	29,777
19-Dec-18	0.0	0.25	10,120	0.0	0.0	19,657	29,777
16-Jan-19	0.0	0.23	10,120	0.0	0.0	19657.4	29,777
13-Feb-19	0.0	0.21	10,120	0.0	0.0	19657.4	29,778
20-Mar-19	0.0	0.16	10,120	0.0	0.0	19657.4	29,778
24-Apr-19	0.0	0.11	10,120	0.0	0.0	19657.4	29,778
15-May-19	0.0	0.04	10,121	0.0	0.0	19657.4	29,778
11-Jun-19	0.0	0.09	10,121	0.0	0.0	19657.4	29,778
10-Jul-19	0.0	0.22	10,121	0.0	0.0	19657.4	29,778
14-Aug-19	0.0	0.23	10,121	0.0	0.0	19657.4	29,778
11-Sep-19	0.0	0.10	10,121	0.0	0.0	19657.4	29,779
17-Oct-19	0.0	0.15	10,121	0.0	0.0	19657.4	29,779
21-Nov-19	0.0	0.18	10,121	0.0	0.0	19657.4	29,779
11-Dec-19	0.0	0.12	10,122	0.0	0.0	19657.4	29,779
23-Jan-20	0.0	0.09	10,122	0.0	0.0	19657.4	29,779
20-Feb-20	0.0	0.08	10,122	0.0	0.0	19657.4	29,779
24-Mar-20	0.0	0.07	10,122	0.0	0.0	19657.4	29,779
23-Apr-20	0.0	0.06	10,122	0.0	0.0	19657.4	29,779
28-May-20	0.0	0.11	10,122	0.0	0.0	19657.4	29,779
18-Jun-20	0.0	0.06	10,122	0.0	0.0	19657.4	29,779
23-Jul-20	0.0	0.08	10,122	0.0	0.0	19657.4	29,780
20-Aug-20	0.0	0.07	10,122	0.0	0.0	19657.4	29,780
24-Sep-20	0.0	0.08	10,122	0.0	0.0	19657.4	29,780
22-Oct-20	0.0	0.04	10,122	0.0	0.0	19657.4	29,780
19-Nov-20	0.0	0.07	10,122	0.0	0.0	19657.4	29,780
23-Dec-20	0.0	0.12	10,123	0.0	0.0	19657.4	29,780
21-Jan-21	0.0	0.23	10,123	0.0	0.0	19657.4	29,780
18-Feb-21	0.0	0.20	10,123	0.0	0.0	19657.4	29,780
18-Mar-21	0.0	0.08	10,123	0.0	0.0	19657.4	29,780
15-Apr-21	0.0	0.06	10,123	0.0	0.0	19657.4	29,780
20-May-21	0.0	0.03	10,123	0.0	0.0	19657.4	29,781
24-Jun-21	0.0	0.05	10,123	0.0	0.0	19657.4	29,781
22-Jul-21	0.0	0.05	10,123	0.0	0.0	19657.4	29,781
26-Aug-21	0.0	0.06	10,123	0.0	0.0	19657.4	29,781
16-Sep-21	0.0	0.03	10,123	0.0	0.0	19657.4	29,781
21-Oct-21	0.0	0.06	10,123	0.0	0.0	19657.4	29,781
18-Nov-21	0.0	0.08	10,123	0.0	0.0	19657.4	29,781
16-Dec-21	0.0	0.10	10,124	0.0	0.0	19657.4	29,781
20-Jan-22	0.0	0.10	10,124	0.0	0.0	19657.4	29,781
17-Feb-22	0.0	0.07	10,124	0.0	0.0	19657.4	29,781
17-Mar-22	0.0	0.04	10,124	0.0	0.0	19657.4	29,781
21-Apr-22	0.0	0.05	10,124	0.0	0.0	19657.4	29,781
19-May-22	0.0	0.03	10,124	0.0	0.0	19657.4	29,781
16-Jun-22	0.0	0.04	10,124	0.0	0.0	19657.4	29,781
21-Jul-22	0.0	0.06	10,124	0.0	0.0	19657.4	29,781
18-Aug-22	0.0	0.05	10,124	0.0	0.0	19657.4	29,781
29-Sep-22	0.0	0.07	10,124	0.0	0.0	19657.4	29,781
26-Oct-22	0.0	0.05	10,124	0.0	0.0	19657.4	29,781
22-Nov-22	0.0	0.06	10,124	0.0	0.0	19657.4	29,781
22-Dec-22	0.0	0.07	10,125	0.0	0.0	19657.4	29,782

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
	Total LNAPL Recovery (gal)	Total Dissolved LNAPL Recovery* (gal)	Total LNAPL Recovery (gal)	Total SVE Recovery (vapor phase) (gal)	Total SVE Recovery (biodegredation) (gal)	Total SVE Recovery (gal)	Total Recovery (gal)
	9,706	418	10,125	3,582	16,075	19,657	29,782

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
4/29/1996	high	2			**Yes**	2.0		
4/30/1996	low	0			**Yes**	1.0		
4/30/1996	flood	1			**Yes**	2.0		
5/15/1996	low	0			No	0.0		
5/20/1996					No	0.0		
5/22/1996	ebb	1			**Yes**	1.0		
5/24/1996					**Yes**	1.0		
6/7/1996	ebb	1			**Yes**	1.0		
6/10/1996					**Yes**	0.5		
6/13/1996					No	0.0		
6/19/1996	high	2			No	0.0		
6/24/1996	medium	1			No	0.0		
7/30/1996	ebb	1			No	0.0		
8/14/1996	medium	1			No	0.0		
8/16/1996	ebb	1			**Yes**	1.0		
8/19/1996	ebb	1			**Yes**	1.0		
8/29/1996	ebb	1			**Yes**	1.0		
10/3/1996	low	0			**Yes**	1.0		
10/4/1996	ebb	1			**Yes**	0.5		
10/7/1996	flood	1	No	0.0	**Yes**	2.0		
10/10/1996	low	0	No	0.0	No	0.0		
10/11/1996	low	0	No	0.0	No	0.0		
10/23/1996	low	0	No	0.0	No	0.0		
10/25/1996	high	2	No	0.0	No	0.0		
10/30/1996	high	2	No	0.0	**Yes**	2.0		
11/1/1996	medium	1	No	0.0	**Yes**	2.0		
11/4/1996	medium	1	No	0.0	No	0.0		
11/5/1996			No	0.0	No	0.0		
11/6/1996	low	0	No	0.0	**Yes**	2.0		
11/7/1996	low	0	No	0.0	**Yes**	2.0		
11/12/1996			No	0.0	**Yes**	0.5		
11/13/1996			No	0.0	No	0.0		
11/14/1996			No	0.0	**Yes**	1.0		
11/18/1996	high	2	No	0.0	No	0.0		
11/19/1996	low	0	No	0.0	**Yes**	1.0		
11/20/1996	low	0	No	0.0	**Yes**	1.0		
11/21/1996	low	0	No	0.0	**Yes**	1.0		
12/6/1996	ebb	1	No	0.0	No	0.0		
12/9/1996	medium	1	No	0.0	No	0.0		
12/10/1996	flood	1	**Yes**	0.5	No	0.0		
12/12/1996	flood	1	No	0.0	No	0.0		
12/13/1996	flood	1	No	0.0	No	0.0		
12/16/1996	flood	1	**Yes**	2.0	**Yes**	1.0		
12/17/1996	flood	1	No	0.0	**Yes**	1.0		
12/18/1996	flood	1	**Yes**	3.0	**Yes**	1.0		
1/2/1997	high	2	**Yes**	1.0	No	0.0		
1/8/1997	high	2	**Yes**	3.0	No	0.0		
1/9/1997			**Yes**	3.0	**Yes**	1.0		
1/9/1997	ebb	1	**Yes**	3.0	**Yes**	1.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
1/9/1997	high	2	**Yes**	3.0	**Yes**	3.0		
1/14/1997	low	0	**Yes**	1.0	**Yes**	1.0		
1/15/1997	low	0	**Yes**	2.0	No	0.0		
1/16/1997	low	0	**Yes**	3.0	**Yes**	1.0		
1/17/1997			**Yes**	2.0	No	0.0		
1/20/1997	low	0	**Yes**	3.0	No	0.0		
1/20/1997	high	2	**Yes**	2.0	**Yes**	1.0		
1/21/1997	high	2	**Yes**	3.0	**Yes**	0.5		
1/22/1997	flood	1	**Yes**	1.0	No	0.0		
1/23/1997	flood	1	**Yes**	1.0	No	0.0		
1/24/1997	flood	1	**Yes**	2.0	**Yes**	0.5		
1/27/1997	low	0	**Yes**	1.0	**Yes**	1.0		
1/27/1997	low	0	**Yes**	3.0	No	0.0		
1/28/1997	low	0	No	0.0	**Yes**	1.0		
1/28/1997	high	2	**Yes**	2.0	No	0.0		
1/30/1997	low	0	**Yes**	0.5	**Yes**	1.0		
1/31/1997	low	0	**Yes**	0.5	**Yes**	0.5		
2/3/1997	flood	1	**Yes**	1.0	**Yes**	0.5		
2/4/1997	flood	1	**Yes**	3.0	**Yes**	3.0		
2/5/1997	high	2	**Yes**	0.5	**Yes**	0.5		
2/6/1997	flood	1	**Yes**	2.0	**Yes**	0.5		
2/7/1997	flood	1	**Yes**	2.0	**Yes**	1.0		
2/10/1997	low	0	No	0.0	No	0.0		
2/11/1997	low	0	No	0.0	No	0.0		
2/12/1997	low	0	No	0.0	No	0.0		
2/14/1997	low	0	**Yes**	0.5	**Yes**	0.5		
2/14/1997	flood	1	**Yes**	0.5	No	0.0		
2/20/1997	ebb	1	**Yes**	2.0	**Yes**	2.0		
12/3/1997	high	2	No	0.0	No	0		
12/4/1997	ebb	1	No	0.0	No	0		
1/11/2000	medium	1	**Yes**	1.0	No	0.0		
1/21/2000	high	2	No	0.0	No	0.0		
2/16/2000	medium	1	No	0.0	No	0.0		
2/22/2000	high	2	No	0.0	No	0.0		
2/23/2000	medium	1	No	0.0	No	0.0		
2/24/2000	low	0	No	0.0	No	0.0		
3/15/2000	medium	1	No	0.0	No	0.0		
3/16/2000	medium	1	No	0.0	No	0.0		
3/21/2000	low	0	**Yes**	**1.0**	No	0.0		
4/14/2000	medium	1	**Yes**	**1.0**	No	0.0		
6/15/2000	low	0	No	0.0	No	0.0		
6/28/2000	low	0	No	0.0	**Yes**	**1.0**		
6/29/2000	low	0	No	0.0	No	0.0		
7/11/2000	high	2	No	0.0	No	0.0		
7/19/2000	low	0	No	0.0	No	0.0		
8/15/2000	low	0	No	0.0	No	0.0		
10/12/2000	low	0	No	0.0	No	0.0		
11/14/2000	medium	1	No	0.0	No	0.0		
12/14/2000	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
1/11/2001	medium	1	No	0.0	No	0.0		
2/15/2001	medium	1	No	0.0	No	0.0		
4/12/2001	medium	1	No	0.0	**Yes**	**1.0**		
4/13/2001	medium	1	No	0.0	No	0.0		
5/16/2001	low	0	No	0.0	No	0.0		
5/17/2001	low	0	No	0.0	No	0.0		
5/18/2001	low	0	No	0.0	No	0.0		
5/21/2001	low	0	No	0.0	No	0.0		
5/23/2001	low	0	No	0.0	No	0.0		
5/29/2001	low	0	No	0.0	No	0.0		
6/11/2001	medium	1	No	0.0	No	0.0		
7/23/2001	low	0	No	0.0	No	0.0		
8/21/2001	medium	1	No	0.0	No	0.0		
9/6/2001	high	2	No	0.0	No	0.0		
10/16/2001	low	0	No	0.0	No	0.0		
11/15/2001	medium	1	No	0.0	No	0.0		
12/10/2001	medium	1	No	0.0	No	0.0		
1/4/2002	high	2	No	0.0	No	0.0		
1/9/2002	medium	1	**Yes**	**1.0**	No	0.0		
1/11/2002	medium	1	**Yes**	**1.0**	No	0.0		
1/16/2002	high	2	**Yes**	**1.0**	No	0.0		
1/22/2002	medium	1	**Yes**	**1.0**	No	0.0		
1/23/2002	low	0	**Yes**	**1.0**	No	0.0		
2/4/2002	high	2	No	0.0	No	0.0		
2/18/2002	medium	1	No	0.0	**Yes**	**1.0**		
2/21/2002	medium	1	**Yes**	**2.0**	No	0.0		
3/21/2002	medium	1	**Yes**	**1.0**	No	0.0		
3/25/2002	medium	1	No	0.0	No	0.0		
3/26/2002	medium	1	No	0.0	No	0.0		
3/27/2002	medium	1	**Yes**	2.0	No	0.0		
4/4/2002	high	2	No	0.0	No	0.0		
5/3/2002	low	0	No	0.0	No	0.0		
5/7/2002	medium	1	No	0.0	**Yes**	**1.0**		
5/21/2002	medium	1	**Yes**	**1.0**	**Yes**	**1.0**		
6/6/2002	medium	1	No	0.0	**Yes**	**1.0**		
6/18/2002	low	0	No	0.0	No	0.0		
6/27/2002	high	2	**Yes**	**1.0**	**Yes**	**1.0**		
7/10/2002	medium	1	**Yes**	**1.0**	**Yes**	**1.0**		
7/29/2002	medium	1	No	0.0	**Yes**	**1.0**		
8/21/2002	low	0	No	0.0	No	0.0		
9/9/2002	high	2	**Yes**	**1.0**	**Yes**	**1.0**		
9/20/2002	medium	1	No	0.0	**Yes**	**1.0**		
10/9/2002	high	2	No	0.0	No	0.0		
11/25/2002	high	2	No	0.0	No	0.0		
11/27/2002	high	2	No	0.0	No	0.0		
12/19/2002	medium	1	No	0.0	No	0.0		
12/20/2002	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
1/16/2003	medium	1	No	0.0	No	0.0		
2/3/2003	medium	1	No	0.0	No	0.0		
2/10/2003	medium	1	No	0.0	No	0.0		
2/10/2003	low	0	No	0.0	No	0.0		
2/11/2003	medium	1	No	0.0	No	0.0		
2/11/2003	high	2	No	0.0	No	0.0		
2/11/2003	low	0	No	0.0	No	0.0		
2/12/2003	medium	1	No	0.0	No	0.0		
2/13/2003	high	2	No	0.0	No	0.0		
2/13/2003	medium	1	No	0.0	No	0.0		
2/14/2003	high	2	No	0.0	No	0.0		
2/20/2003	high	2	No	0.0	No	0.0		
2/20/2003	medium	1	No	0.0	No	0.0		
2/20/2003	low	0	No	0.0	No	0.0		
2/21/2003	high	2	No	0.0	No	0.0		
2/21/2003	medium	1	No	0.0	No	0.0		
3/3/2003	medium	1	No	0.0	No	0.0		
3/10/2003	medium	1	No	0.0	No	0.0		
3/11/2003	high	2	No	0.0	No	0.0		
3/18/2003	medium	1	No	0.0	No	0.0		
4/1/2003	low	0	No	0.0	No	0.0		
4/8/2003	high	2	**Yes**	**2.0**	No	0.0		
4/15/2003	low	0	**Yes**	**2.0**	No	0.0		
4/21/2003	high	2	No	0.0	No	0.0		
5/15/2003	low	0	No	0.0	No	0.0		
5/20/2003	medium	1	No	0.0	No	0.0		
5/21/2003	medium	1	No	0.0	No	0.0		
5/27/2003	low	0	No	0.0	No	0.0		
6/3/2003	medium	1	No	0.0	No	0.0		
6/17/2003	medium	1	No	0.0	No	0.0		
7/15/2003	medium	1	No	0.0	No	0.0		
7/21/2003	low	0	No	0.0	No	0.0		
8/7/2003	low	0	No	0.0	No	0.0		
8/13/2003	medium	1	No	0.0	No	0.0		
9/15/2003	high	2	No	0.0	No	0.0		
9/16/2003	high	2	No	0.0	No	0.0		
9/17/2003	medium	1	No	0.0	No	0.0		
9/19/2003	medium	1	No	0.0	No	0.0		
10/9/2003	medium	1	No	0.0	**Yes**	**1.0**		
10/14/2003	high	2	No	0.0	No	0.0		
11/12/2003	high	2	No	0.0	No	0.0		
11/19/2003	high	2	No	0.0	No	0.0		
12/17/2003	medium	1	No	0.0	No	0.0		
12/23/2003	medium	1	No	0.0	No	0.0		
1/13/2004	medium	1	**Yes**	**1.0**	No	0.0		
1/24/2004	high	2	No	0.0	No	0.0		
2/10/2004	medium	1	**Yes**	**1.0**	No	0.0		
2/23/2004	medium	1	No	0.0	**Yes**	**1.0**		
3/17/2004	medium	1	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
3/19/2004	medium	1	No	0.0	No	0.0		
4/15/2004	medium	1	No	0.0	**Yes**	**1.0**		
4/19/2004	medium	1	No	0.0	No	0.0		
4/22/2004	medium	1	No	0.0	No	0.0		
5/24/2004	medium	1	No	0.0	No	0.0		
5/25/2004	medium	1	No	0.0	No	0.0		
6/14/2004	medium	1	No	0.0	No	0.0		
6/15/2004	low	0	No	0.0	No	0.0		
6/23/2004	high	2	No	0.0	No	0.0		
6/28/2004	low	0	No	0.0	No	0.0		
6/29/2004	medium	1	No	0.0	No	0.0		
6/30/2004	medium	1	No	0.0	No	0.0		
7/12/2004	low	0	No	0.0	No	0.0		
7/13/2004	low	0	No	0.0	No	0.0		
8/11/2004	high	2	No	0.0	No	0.0		
8/12/2004	low	0	No	0.0	No	0.0		
8/24/2004	medium	1	No	0.0	No	0.0		
9/2/2004	high	2	No	0.0	No	0.0		
9/3/2004	high	2	No	0.0	No	0.0		
9/7/2004	medium	1	No	0.0	No	0.0		
9/10/2004	low	0	No	0.0	No	0.0		
9/16/2004	high	2	No	0.0	No	0.0		
9/21/2004	medium	1	No	0.0	No	0.0		
9/22/2004	medium	1	No	0.0	No	0.0		
9/23/2004	medium	1	No	0.0	No	0.0		
10/5/2004	medium	1	No	0.0	No	0.0		
10/13/2004	medium	1	No	0.0	**Yes**	**1.0**		
10/15/2004	high	2	No	0.0	No	0.0		
10/18/2004	high	2	No	0.0	No	0.0		
10/25/2004	low	0	No	0.0	No	0.0		
11/4/2004	medium	1	No	0.0	No	0.0		
11/18/2004	high	2	No	0.0	No	0.0		
11/23/2004	medium	1	No	0.0	No	0.0		
12/3/2004	low	0	No	0.0	No	0.0		
12/15/2004	high	2	No	0.0	No	0.0		
12/23/2004	medium	1	No	0.0	No	0.0		
1/4/2005	high	2	No	0.0	No	0.0		
1/13/2005	high	2	No	0.0	No	0.0		
1/21/2005	low	0	No	0.0	No	0.0		
2/1/2005	high	**2**	**Yes**	**1.0**	**No**	**0.0**		
2/2/2005	high	**2**	**Yes**	**2.0**	**No**	**0.0**		
2/3/2005	medium	**1**	**Yes**	**1.0**	**No**	**0.0**		
2/4/2005	medium	**1**	**Yes**	**1.0**	**No**	**0.0**		
2/7/2005	low	**0**	**Yes**	**1.0**	**No**	**0.0**		
2/8/2005	low	0	No	0.0	No	0.0		
2/15/2005	high	2	No	0.0	No	0.0		
2/25/2005	high	2	No	0.0	No	0.0		
3/2/2005	high	2	No	0.0	No	0.0		
3/8/2005	low	0	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
3/15/2005	high	2	No	0.0	No	0.0		
4/4/2005	low	0	No	0.0	No	0.0		
4/11/2015	high	**2**	**Yes**	**1.0**	**No**	**0.0**		
4/13/2005	medium	**1**	**Yes**	**2.0**	**No**	**0.0**		
4/14/2005	high	**2**	**Yes**	**1.0**	**No**	**0.0**		
4/15/2005	medium	**1**	**Yes**	**2.0**	**No**	**0.0**		
4/18/2005	low	0	No	0.0	No	0.0		
4/25/2005	medium	1	No	0.0	No	0.0		
5/2/2005	low	0	No	0.0	No	0.0		
5/9/2005	medium	1	No	0.0	No	0.0		
5/16/2005	low	0	No	0.0	No	0.0		
5/20/2005	low	0	No	0.0	No	0.0		
5/23/2005	medium	1	No	0.0	No	0.0		
5/30/2005	medium	1	No	0.0	No	0.0		
6/6/2005	medium	1	No	0.0	No	0.0		
6/10/2005	medium	1	No	0.0	No	0.0		
6/13/2005	high	2	No	0.0	No	0.0		
6/20/2005	low	0	No	0.0	No	0.0		
6/27/2005	high	2	No	0.0	No	0.0		
7/4/2005	medium	1	No	0.0	No	0.0		
7/11/2005	high	**2**	**Yes**	**1.0**	No	0.0		
7/15/2005	medium	1	No	0.0	No	0.0		
7/18/2005	low	0	No	0.0	No	0.0		
7/25/2005	high	2	No	0.0	No	0.0		
8/1/2005	low	0	No	0.0	No	0.0		
8/8/2005	high	2	No	0.0	No	0.0		
8/12/2005	medium	1	No	0.0	No	0.0		
8/15/2005	low	0	No	0.0	No	0.0		
8/22/2005	medium	1	No	0.0	No	0.0		
8/29/2005	low	0	No	0.0	No	0.0		
9/5/2005	medium	1	No	0.0	No	0.0		
9/12/2005	medium	1	No	0.0	No	0.0		
9/14/2005	low	0	No	0.0	No	0.0		
9/19/2005	medium	1	No	0.0	No	0.0		
9/26/2005	low	0	No	0.0	No	0.0		
10/3/2005	medium	1	No	0.0	No	0.0		
10/10/2005	medium	1	No	0.0	No	0.0		
10/14/2005	low	0	No	0.0	No	0.0		
10/17/2005	medium	1	No	0.0	No	0.0		
10/24/2005	medium	1	No	0.0	No	0.0		
10/31/2005	low	0	No	0.0	No	0.0		
11/7/2005	high	2	No	0.0	No	0.0		
11/14/2005	low	0	No	0.0	No	0.0		
11/21/2005	high	2	No	0.0	No	0.0		
11/23/2005	medium	1	No	0.0	No	0.0		
11/28/2005	low	0	No	0.0	No	0.0		
11/29/2005	medium	1	No	0.0	No	0.0		
11/30/2005	medium	1	No	0.0	No	0.0		
12/1/2005	high	2	No	0.0	No	0.0		
12/2/2005	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
12/5/2005	high	2	No	0.0	No	0.0		
12/6/2005	medium	1	No	0.0	No	0.0		
12/7/2005	high	2	No	0.0	No	0.0		
12/9/2005	high	2	No	0.0	No	0.0		
12/15/2005	high	**2**	**Yes**	**1.0**	No	0.0		
12/19/2005	high	**2**	**Yes**	**1.0**	No	0.0		
1/25/2006	low	0	**Yes**	**2.0**	**Yes**	**2.0**		
2/8/2006			**Yes**	**1.0**	No	0.0		
2/9/2006			**Yes**	**1.0**	No	0.0		
2/10/2006			**Yes**	**1.0**	No	0.0		
2/13/2006	medium	1	**Yes**	**1.0**	No	0.0		
2/14/2006	medium	1	**Yes**	**1.0**	No	0.0		
3/15/2006	low	0	No	0.0	No	0.0		
3/17/2006	low	0	No	0.0	No	0.0		
3/21/2006	high	2	No	0.0	No	0.0		
3/27/2006	low	0	No	0.0	No	0.0		
4/3/2006	high	2	No	0.0	No	0.0		
4/11/2006	medium	1	No	0.0	No	0.0		
4/14/2006	medium	1	No	0.0	No	0.0		
4/17/2006	high	2	No	0.0	No	0.0		
4/24/2006	low	0	No	0.0	No	0.0		
4/25/2006	medium	1	No	0.0	No	0.0		
4/26/2006	medium	1	No	0.0	No	0.0		
4/27/2006	medium	1	No	0.0	No	0.0		
4/28/2006	medium	1	No	0.0	No	0.0		
5/1/2006	medium	1	No	0.0	No	0.0		
5/9/2006	low	0	No	0.0	No	0.0		
5/17/2006	high	2	No	0.0	No	0.0		
5/18/2006	high	2	No	0.0	No	0.0		
5/22/2006	low	0	No	0.0	No	0.0		
5/30/2006	medium	1	No	0.0	No	0.0		
5/31/2006	high	2	No	0.0	No	0.0		
6/1/2006	high	2	No	0.0	No	0.0		
6/5/2006	medium	1	No	0.0	**Yes**	**0.5**		
6/12/2006	low	0	No	0.0	No	0.0		
6/14/2006	medium	1	No	0.0	No	0.0		
7/12/2006	low	0	No	0.0	No	0.0		
7/19/2006	medium	1	No	0.0	**Yes**	**1.0**		
7/24/2006	high	2	No	0.0	No	0.0		
7/25/2006	low	0	No	0.0	**Yes**	**1.0**		
7/31/2006	high	2	**Yes**	**1.0**	No	0.0		
8/2/2006	high	2	No	0.0	No	0.0		
8/8/2006	high	2	No	0.0	No	0.0		
8/14/2006	high	2	**Yes**	**1.0**	**Yes**	**1.0**		
8/16/2006	medium	1	**Yes**	**1.0**	**Yes**	**2.0**		
8/21/2006	low	0	No	0.0	No	0.0		
8/25/2006	high	2	**Yes**	**0.5**	**Yes**	**0.5**		
8/28/2006	high	2	No	0.0	**Yes**	**0.5**		
8/29/2006	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
9/1/2006	medium	1	No	0.0	No	0.0		
9/5/2006	low	0	No	0.0	No	0.0		
9/6/2006	low	0	No	0.0	No	0.0		
9/11/2006	high	2	No	0.0	No	0.0		
9/13/2006	high	2	**Yes**	**1.0**	**Yes**	**1.0**		
9/18/2006	low	0	**Yes**	**1.0**	No	0.0		
9/19/2006	low	0	No	0.0	**Yes**	**2.0**		
9/22/2006	high	2	No	0.0	No	0.0		
9/25/2006	high	2	**Yes**	**1.0**	No	0.0		
9/27/2006	high	2	No	0.0	No	0.0		
10/2/2006	medium	1	No	0.0	No	0.0		
10/5/2006	low	0	No	0.0	No	0.0		
10/6/2006	high	2	No	0.0	No	0.0		
10/9/2006	high	2	No	0.0	No	0.0		
10/12/2006	high	2	No	0.0	No	0.0		
10/16/2006	medium	1	No	0.0	No	0.0		
10/17/2006	high	2	No	0.0	**Yes**	**1.0**		
10/23/2006	high	2	No	0.0	No	0.0		
10/25/2006	high	2	No	0.0	No	0.0		
10/30/2006	high	2	No	0.0	No	0.0		
10/31/2006	high	2	No	0.0	**Yes**	**1.0**		
11/1/2006	medium	1	No	0.0	No	0.0		
11/6/2006	high	2	No	0.0	No	0.0		
11/7/2006	high	2	No	0.0	No	0.0		
11/8/2006	high	2	No	0.0	No	0.0		
11/9/2006	high	2	No	0.0	No	0.0		
11/13/2006	high	2	**Yes**	**1.0**	No	0.0		
11/17/2006	medium	1	No	0.0	No	0.0		
11/20/2006	high	2	No	0.0	No	0.0		
11/27/2006	high	2	No	0.0	No	0.0		
11/30/2006	high	2	No	0.0	No	0.0		
12/4/2006	medium	1	**Yes**	**1.0**	No	0.0		
12/5/2006	high	2	No	0.0	**Yes**	**1.0**		
12/11/2006	high	2	No	0.0	No	0.0		
12/12/2006	medium	1	No	0.0	No	0.0		
12/13/2006	high	2	No	0.0	No	0.0		
12/14/2006	high	2	No	0.0	No	0.0		
12/15/2006	medium	1	No	0.0	**Yes**	**1.0**		
12/16/2006	medium	1	No	0.0	No	0.0		
12/18/2006	medium	1	No	0.0	No	0.0		
12/19/2006	high	2	**Yes**	**1.0**	No	0.0		
12/21/2006	high	2	No	0.0	No	0.0		
12/22/2006	high	2	No	0.0	No	0.0		
1/2/2007	high	2	No	0.0	No	0.0		
1/5/2007	high	2	No	0.0	No	0.0		
1/8/2007	high	2	No	0.0	No	0.0		
1/9/2007	high	2	No	0.0	No	0.0		
1/10/2007	high	2	No	0.0	No	0.0		
1/15/2007	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
1/19/2007	high	2	**Yes**	**1.0**	No	0.0		
1/22/2007	high	2	**Yes**	**0.5**	No	0.0		
1/29/2007	high	2	**Yes**	**1.0**	No	0.0		
1/31/2007	high	2	No	0.0	**Yes**	**1.0**		
2/2/2007	high	2	No	0.0	No	0.0		
2/5/2007	high	2	No	0.0	No	0.0		
2/6/2007	high	2	No	0.0	No	0.0		
2/7/2007	high	2	No	0.0	No	0.0		
2/12/2007	high	2	No	0.0	No	0.0		
2/14/2007	high	2	No	0.0	No	0.0		
2/16/2007	high	2	No	0.0	No	0.0		
2/20/2007	high	2	No	0.0	No	0.0		
2/26/2007	high	2	No	0.0	No	0.0		
3/5/2007	medium	1	No	0.0	No	0.0		
3/7/2007	medium	1	No	0.0	No	0.0		
3/13/2007	high	2	No	0.0	No	0.0		
3/16/2007	medium	1	No	0.0	No	0.0		
3/19/2007	low	0	No	0.0	No	0.0		
3/20/2007	medium	1	No	0.0	No	0.0		
3/21/2007	high	2	No	0.0	No	0.0		
3/22/2007	high	2	No	0.0	No	0.0		
3/26/2007	high	2	No	0.0	No	0.0		
3/30/2007	medium	1	No	0.0	No	0.0		
4/2/2007	high	2	No	0.0	No	0.0		
4/6/2007	high	2	No	0.0	**Yes**	**1.0**		
4/9/2007	high	2	No	0.0	No	0.0		
4/12/2007	high	2	No	0.0	No	0.0		
4/13/2007	medium	1	No	0.0	No	0.0		
4/16/2007	low	0	No	0.0	No	0.0		
4/19/2007	medium	1	No	0.0	No	0.0		
4/23/2007	high	2	No	0.0	No	0.0		
4/24/2007	high	2	No	0.0	**Yes**	**1.0**		
4/26/2007	medium	1	No	0.0	No	0.0		
4/27/2007	high	2	No	0.0	No	0.0		
4/30/2007	low	0	No	0.0	No	0.0		
5/3/2007	medium	1	No	0.0	No	0.0		
5/8/2007	high	2	No	0.0	No	0.0		
5/9/2007	high	2	No	0.0	No	0.0		
5/14/2007	low	0	No	0.0	No	0.0		
5/17/2007	medium	1	No	0.0	No	0.0		
5/21/2007	high	2	No	0.0	No	0.0		
5/23/2007	medium	1	No	0.0	No	0.0		
6/1/2007	medium	1	No	0.0	No	0.0		
6/4/2007	high	2	**Yes**	**1.0**	**Yes**	**1.0**		
6/6/2007	high	2	No	0.0	No	0.0		
6/7/2007	medium	1	No	0.0	**Yes**	**1.0**		
6/11/2007	low	0	No	0.0	No	0.0		
6/13/2007	low	0	No	0.0	No	0.0		
6/14/2007	low	0	No	0.0	No	0.0		
6/18/2007	medium	1	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
6/19/2007	high	2	No	0.0	No	0.0		
6/25/2007	low	0	No	0.0	No	0.0		
7/2/2007	high	2	No	0.0	**Yes**	**2.0**		
7/9/2007	low	0	No	0.0	No	0.0		
7/13/2007	low	0	No	0.0	No	0.0		
7/16/2007	low	0	No	0.0	No	0.0		
7/23/2007	low	0	No	0.0	No	0.0		
7/30/2007	medium	1	No	0.0	No	0.0		
7/31/2007	high	2	No	0.0	**Yes**	**1.0**		
8/6/2007	medium	1	No	0.0	No	0.0		
8/8/2007	low	0	No	0.0	No	0.0		
8/13/2007	medium	1	No	0.0	No	0.0		
8/16/2007	high	2	No	0.0	No	0.0		
8/20/2007	high	2	No	0.0	No	0.0		
8/22/2007	medium	1	No	0.0	No	0.0		
8/23/2007	medium	1	No	0.0	No	0.0		
8/24/2007	low	0	No	0.0	No	0.0		
8/27/2007	low	0	No	0.0	No	0.0		
8/30/2007	low	0	No	0.0	No	0.0		
9/4/2007	medium	1	No	0.0	No	0.0		
9/10/2007	medium	1	No	0.0	No	0.0		
9/13/2007	medium	1	No	0.0	No	0.0		
9/14/2007	high	2	No	0.0	No	0.0		
9/17/2007	high	2	No	0.0	No	0.0		
9/18/2007	high	2	No	0.0	No	0.0		
9/19/2007	high	2	No	0.0	No	0.0		
9/20/2007	medium	1	No	0.0	No	0.0		
9/24/2007	low	0	No	0.0	No	0.0		
10/1/2007	high	2	No	0.0	No	0.0		
10/2/2007	high	2	No	0.0	No	0.0		
10/3/2007	medium	1	No	0.0	No	0.0		
10/5/2007	low	0	No	0.0	No	0.0		
10/8/2007	medium	1	No	0.0	No	0.0		
10/9/2007	high	2	No	0.0	No	0.0		
10/11/2007	high	2	No	0.0	No	0.0		
10/15/2007	high	2	No	0.0	No	0.0		
10/17/2007	medium	1	No	0.0	No	0.0		
10/22/2007	low	0	No	0.0	No	0.0		
10/24/2007	medium	1	No	0.0	No	0.0		
10/25/2007	high	2	No	0.0	No	0.0		
10/29/2007	high	2	No	0.0	No	0.0		
10/31/2007	low	0	No	0.0	No	0.0		
11/1/2007	low	0	No	0.0	No	0.0		
11/2/2007	low	0	No	0.0	No	0.0		
11/5/2007	low	0	No	0.0	No	0.0		
11/6/2007	low	0	No	0.0	No	0.0		
11/12/2007	high	2	No	0.0	No	0.0		
11/13/2007	high	2	No	0.0	No	0.0		
11/15/2007	high	2	No	0.0	No	0.0		
11/16/2007	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
11/19/2007	medium	1	No	0.0	No	0.0		
11/26/2007	high	2	No	0.0	No	0.0		
11/27/2007	high	2	No	0.0	**Yes**	**0.5**		
12/3/2007	high	2	No	0.0	No	0.0		
12/10/2007	high	2	No	0.0	No	0.0		
12/11/2007	high	2	No	0.0	No	0.0		
12/14/2007	high	2	No	0.0	No	0.0		
12/17/2007	high	2	No	0.0	No	0.0		
12/19/2007	high	2	No	0.0	No	0.0		
12/20/2007	high	2	No	0.0	No	0.0		
12/24/2007	medium	1	No	0.0	No	0.0		
1/2/2008	high	2	Yes	1.0	No	0.0		
1/7/2008	high	2	No	0.0	No	0.0		
1/11/2008	high	2	No	0.0	No	0.0		
1/14/2008	high	2	No	0.0	No	0.0		
1/21/2008	high	2	No	0.0	No	0.0		
1/22/2008	high	2	No	0.0	No	0.0		
1/28/2008	high	2	No	0.0	No	0.0		
1/29/2008	high	2	No	0.0	No	0.0		
2/4/2008	high	2	No	0.0	**Yes**	**0.5**		
2/11/2008	medium	1	No	0.0	No	0.0		
2/12/2008	high	2	No	0.0	No	0.0		
2/14/2008	high	2	No	0.0	No	0.0		
2/19/2008	high	2	No	0.0	No	0.0		
2/20/2008	high	2	No	0.0	No	0.0		
2/25/2008	high	2	No	0.0	No	0.0		
2/28/2008	high	2	No	0.0	No	0.0		
3/3/2008	medium	1	No	0.0	No	0.0		
3/4/2008	medium	1	No	0.0	No	0.0		
3/10/2008	high	2	No	0.0	No	0.0		
3/11/2008	high	2	No	0.0	No	0.0		
3/12/2008	high	2	No	0.0	No	0.0		
3/14/2008	high	2	No	0.0	No	0.0		
3/17/2008	medium	1	No	0.0	No	0.0		
3/24/2008	high	2	No	0.0	No	0.0		
3/26/2008	high	2	No	0.0	No	0.0		
3/31/2008	medium	1	No	0.0	No	0.0		
4/1/2008	medium	1	No	0.0	No	0.0		
4/7/2008	high	2	No	0.0	No	0.0		
4/10/2008	medium	1	No	0.0	**Yes**	**0.5**		
4/11/2008	medium	1	No	0.0	No	0.0		
4/15/2008	medium	1	No	0.0	No	0.0		
4/16/2008	low	0	No	0.0	No	0.0		
4/18/2008	low	0	No	0.0	No	0.0		
4/21/2008	medium	1	No	0.0	No	0.0		
4/22/2008	medium	1	No	0.0	No	0.0		
4/28/2008	medium	1	No	0.0	No	0.0		
5/2/2008	low	0	No	0.0	No	0.0		
5/5/2008	medium	1	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
5/12/2008	medium	1	No	0.0	No	0.0		
5/16/2008	medium	1	No	0.0	No	0.0		
5/19/2008	low	0	No	0.0	No	0.0		
5/21/2008	low	0	No	0.0	No	0.0		
5/23/2008	high	2	No	0.0	No	0.0		
5/27/2008	medium	1	No	0.0	**Yes**	**0.5**		
5/29/2008	medium	1	No	0.0	No	0.0		
6/2/2008	low	0	No	0.0	No	0.0		
6/9/2008	medium	1	No	0.0	No	0.0		
6/12/2008	medium	1	No	0.0	No	0.0		
6/17/2008	low	0	No	0.0	No	0.0		
6/18/2008	low	0	No	0.0	No	0.0		
6/19/2008	medium	1	No	0.0	No	0.0		
6/23/2008	high	2	No	0.0	Yes	1.0		
6/25/2008	medium	1	No	0.0	No	0.0		
6/26/2008	medium	1	No	0.0	No	0.0		
6/27/2008	low	0	No	0.0	No	0.0		
6/30/2008	low	0	No	0.0	No	0.0		
7/7/2008	high	2	No	0.0	No	0.0		
7/8/2008	high	2	No	0.0	No	0.0		
7/14/2008	low	0	No	0.0	No	0.0		
7/16/2008	medium	1	**Yes**	**1.0**	**Yes**	**1.0**		
7/21/2008	high	2	No	0.0	No	0.0		
7/22/2008	high	2	No	0.0	No	0.0		
7/23/2008	high	2	No	0.0	No	0.0		
7/28/2008	low	0	No	0.0	No	0.0		
7/30/2008	low	0	No	0.0	No	0.0		
7/31/2008	low	0	No	0.0	No	0.0		
8/4/2008	high	2	No	0.0	No	0.0		
8/5/2008	high	2	No	0.0	No	0.0		
8/6/2008	high	2	No	0.0	No	0.0		
8/7/2008	high	2	No	0.0	No	0.0		
8/8/2008	medium	1	No	0.0	No	0.0		
8/11/2008	low	0	No	0.0	No	0.0		
8/12/2008	low	0	No	0.0	No	0.0		
8/13/2008	low	0	No	0.0	No	0.0		
8/18/2008	medium	1	No	0.0	No	0.0		
8/19/2008	high	2	No	0.0	Yes	1.0		
8/20/2008	high	2	No	0.0	No	0.0		
8/21/2008	high	2	No	0.0	No	0.0		
8/25/2008	medium	1	No	0.0	No	0.0		
8/27/2008	low	0	No	0.0	No	0.0		
9/2/2008	medium	1	No	0.0	No	0.0		
9/8/2008	medium	1	No	0.0	No	0.0		
9/16/2008	medium	1	No	0.0	No	0.0		
9/17/2008	high	2	No	0.0	No	0.0		
9/18/2008	high	2	No	0.0	No	0.0		
9/19/2008	high	2	No	0.0	No	0.0		
9/22/2008	high	2	No	0.0	No	0.0		
9/23/2008	medium	1	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
9/24/2008	low	0	No	0.0	No	0.0		
9/29/2008	high	2	No	0.0	No	0.0		
9/30/2008	high	2	No	0.0	No	0.0		
10/1/2008	high	2	No	0.0	No	0.0		
10/2/2008	high	2	No	0.0	No	0.0		
10/6/2008	high	2	No	0.0	No	0.0		
10/13/2008	medium	1	No	0.0	No	0.0		
10/15/2008	medium	1	No	0.0	No	0.0		
10/17/2008	high	2	No	0.0	No	0.0		
10/20/2008	high	2	No	0.0	No	0.0		
10/21/2008	high	2	No	0.0	No	0.0		
10/24/2008	low	0	No	0.0	No	0.0		
10/25/2008	medium	1	No	0.0	No	0.0		
10/27/2008	high	2	No	0.0	No	0.0		
11/3/2008	high	2	No	0.0	No	0.0		
11/6/2008	high	2	No	0.0	No	0.0		
11/10/2008	medium	1	No	0.0	No	0.0		
11/14/2008	high	2	No	0.0	No	0.0		
11/17/2008	high	2	No	0.0	No	0.0		
11/18/2008	high	2	No	0.0	No	0.0		
11/21/2008	medium	1	No	0.0	No	0.0		
11/24/2008	medium	1	No	0.0	No	0.0		
11/25/2008	high	2	No	0.0	No	0.0		
12/1/2008	high	2	No	0.0	No	0.0		
12/2/2008	high	2	No	0.0	No	0.0		
12/3/2008	high	2	No	0.0	No	0.0		
12/8/2008	high	2	No	0.0	No	0.0		
12/11/2008	high	2	No	0.0	No	0.0		
12/12/2008	high	2	No	0.0	No	0.0		
12/15/2008	high	2	No	0.0	No	0.0		
12/16/2008	high	2	No	0.0	No	0.0		
12/17/2008	high	2	No	0.0	No	0.0		
12/23/2008	high	2	No	0.0	No	0.0		
12/29/2008	high	2	No	0.0	No	0.0		
1/5/2009	high	2	No	0.0	No	0.0		
1/12/2009	high	2	No	0.0	No	0.0		
1/14/2009	high	2	No	0.0	No	0.0		
1/15/2009	high	2	No	0.0	No	0.0		
1/16/2009	high	2	No	0.0	No	0.0		
1/20/2009	high	2	No	0.0	No	0.0		
1/22/2009	high	2	No	0.0	No	0.0		
1/26/2009	medium	1	No	0.0	No	0.0		
1/27/2009	high	2	No	0.0	No	0.0		
1/28/2009	medium	1	No	0.0	No	0.0		
1/29/2009	medium	1	No	0.0	No	0.0		
1/30/2009	medium	1	No	0.0	No	0.0		
2/2/2009	high	2	No	0.0	No	0.0		
2/5/2009	high	2	**Yes**	**0.5**	No	0.0		
2/9/2009	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
2/11/2009	medium	1	No	0.0	No	0.0		
2/17/2009	high	2	No	0.0	**Yes**	**0.5**		
2/18/2009	high	2	No	0.0	No	0.0		
2/23/2009	high	2	No	0.0	No	0.0		
2/26/2009	medium	1	No	0.0	No	0.0		
3/3/2009	high	2	No	0.0	No	0.0		
3/9/2009	medium	1	No	0.0	No	0.0		
3/11/2009	medium	1	No	0.0	No	0.0		
3/16/2009	medium	1	No	0.0	No	0.0		
3/17/2009	high	2	No	0.0	No	0.0		
3/18/2009	high	2	No	0.0	No	0.0		
3/23/2009	medium	1	No	0.0	No	0.0		
3/30/2009	high	2	No	0.0	No	0.0		
3/31/2009	high	2	No	0.0	No	0.0		
4/6/2009	medium	1	No	0.0	No	0.0		
4/7/2009	medium	1	No	0.0	No	0.0		
4/13/2009	high	2	No	0.0	No	0.0		
4/15/2009	high	2	No	0.0	No	0.0		
4/16/2009	low	0	No	0.0	No	0.0		
4/21/2009	low	0	No	0.0	No	0.0		
4/27/2009	medium	1	No	0.0	No	0.0		
4/28/2009	high	2	No	0.0	No	0.0		
4/29/2009	high	2	No	0.0	No	0.0		
5/4/2009	low	0	No	0.0	No	0.0		
5/11/2009	medium	1	No	0.0	No	0.0		
5/14/0009	high	2	No	0.0	No	0.0		
5/15/2009	high	2	No	0.0	No	0.0		
5/18/2009	medium	1	No	0.0	No	0.0		
5/26/2009	medium	1	No	0.0	No	0.0		
5/27/2009	medium	1	No	0.0	No	0.0		
6/1/2009	medium	1	No	0.0	No	0.0		
6/2/2009	medium	1	No	0.0	No	0.0		
6/4/2009	low	0	No	0.0	No	0.0		
6/8/2009	medium	1	No	0.0	No	0.0		
6/10/2009	high	2	No	0.0	No	0.0		
6/11/2009	medium	1	No	0.0	No	0.0		
6/15/2009	high	2	No	0.0	No	0.0		
6/16/2009	medium	1	No	0.0	No	0.0		
6/19/2009	high	2	No	0.0	No	0.0		
6/22/2009	low	0	No	0.0	No	0.0		
6/25/2009	high	2	No	0.0	No	0.0		
6/29/2009	high	2	No	0.0	No	0.0		
7/6/2009	low	0	No	0.0	No	0.0		
7/13/2009	high	2	No	0.0	No	0.0		
7/15/2009	high	2	No	0.0	No	0.0		
7/16/2009	low	0	No	0.0	No	0.0		
7/20/2009	low	0	No	0.0	No	0.0		
7/22/2009	low	0	No	0.0	No	0.0		
7/27/2009	high	2	No	0.0	No	0.0		
8/3/2009	low	0	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
8/10/2009	high	2	No	0.0	**Yes**	**0.5**		
8/14/2009	low	0	No	0.0	No	0.0		
8/17/2009	low	0	No	0.0	No	0.0		
8/18/2009	low	0	No	0.0	No	0.0		
8/24/2009	high	2	No	0.0	No	0.0		
8/31/2009	low	0	No	0.0	No	0.0		
9/1/2009	medium	1	No	0.0	No	0.0		
9/8/2009	high	2	No	0.0	No	0.0		
9/11/2009	high	2	No	0.0	No	0.0		
9/14/2009	medium	1	No	0.0	No	0.0		
9/16/2009	medium	1	No	0.0	No	0.0		
9/17/2009	medium	1	No	0.0	No	0.0		
9/18/2009	high	2	No	0.0	No	0.0		
9/21/2009	high	2	No	0.0	No	0.0		
9/28/2009	low	0	No	0.0	No	0.0		
10/1/2009	medium	1	No	0.0	No	0.0		
10/7/2009	high	2	No	0.0	No	0.0		
10/12/2009	medium	1	No	0.0	No	0.0		
10/20/2009	high	2	No	0.0	**Yes**	**0.5**		
10/21/2009	high	2	No	0.0	No	0.0		
10/26/2009	medium	1	No	0.0	No	0.0		
10/27/2009	medium	1	No	0.0	No	0.0		
11/2/2009	medium	1	No	0.0	No	0.0		
11/3/2009	high	2	No	0.0	No	0.0		
11/10/2009	medium	1	No	0.0	No	0.0		
11/16/2009	high	2	No	0.0	No	0.0		
11/17/2009	high	2	No	0.0	No	0.0		
11/18/2009	high	2	No	0.0	No	0.0		
11/23/2009	high	2	No	0.0	No	0.0		
11/24/2009	high	2	No	0.0	No	0.0		
11/30/2009	high	2	No	0.0	No	0.0		
12/3/2009	high	2	No	0.0	No	0.0		
12/4/2009	high	2	No	0.0	No	0.0		
12/7/2009	high	2	No	0.0	No	0.0		
12/8/2009	high	2	No	0.0	No	0.0		
12/9/2009	high	2	No	0.0	No	0.0		
12/10/2009	medium	1	No	0.0	No	0.0		
12/11/2009	high	2	No	0.0	No	0.0		
12/14/2009	high	2	No	0.0	**Yes**	**1.0**		
12/15/2009	high	2	No	0.0	No	0.0		
12/16/2009	high	2	No	0.0	No	0.0		
12/17/2009	high	2	No	0.0	No	0.0		
12/21/2009	high	2	No	0.0	No	0.0		
12/28/2009	high	2	No	0.0	No	0.0		
1/4/2010	high	2	No	0.0	No	0.0		
1/5/2010	high	2	No	0.0	No	0.0		
1/6/2010	high	2	No	0.0	No	0.0		
1/7/2010	high	2	No	0.0	No	0.0		
1/11/2010	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
1/14/2010	high	2	No	0.0	No	0.0		
1/19/2010	high	2	No	0.0	No	0.0		
1/20/2010	high	2	No	0.0	No	0.0		
1/21/2010	high	2	No	0.0	No	0.0		
1/25/2010	high	2	No	0.0	No	0.0		
1/27/2010	high	2	No	0.0	No	0.0		
2/1/2010	high	2	No	0.0	No	0.0		
2/2/2010	high	2	No	0.0	No	0.0		
2/8/2010	high	2	No	0.0	No	0.0		
2/9/2010	high	2	No	0.0	No	0.0		
2/16/2010	high	2	No	0.0	No	0.0		
2/17/2010	high	2	No	0.0	No	0.0		
2/18/2010	high	2	No	0.0	No	0.0		
2/19/2010	high	2	No	0.0	No	0.0		
2/22/2010	high	2	No	0.0	No	0.0		
3/1/2010	high	2	No	0.0	**Yes**	**1.0**		
3/8/2010	high	2	No	0.0	No	0.0		
3/12/2010	high	2	No	0.0	No	0.0		
3/16/2010	high	2	No	0.0	No	0.0		
3/17/2010	medium	1	No	0.0	No	0.0		
3/19/2010	high	2	No	0.0	No	0.0		
3/22/2010	high	2	No	0.0	No	0.0		
3/25/2010	high	2	No	0.0	No	0.0		
3/30/2010	high	2	No	0.0	No	0.0		
3/31/2010	high	2	No	0.0	No	0.0		
4/1/2010	high	2	No	0.0	No	0.0		
4/2/2010	high	2	No	0.0	No	0.0		
4/5/2010	high	2	No	0.0	No	0.0		
4/6/2010	high	2	No	0.0	No	0.0		
4/9/2010	medium	1	No	0.0	No	0.0		
4/12/2010	medium	1	No	0.0	No	0.0		
4/14/2010	medium	1	No	0.0	No	0.0		
4/15/2010	medium	1	No	0.0	No	0.0		
4/16/2010	medium	1	No	0.0	No	0.0		
4/19/2010	high	2	No	0.0	No	0.0		
4/20/2010	high	2	No	0.0	No	0.0		
4/27/2010	high	2	No	0.0	No	0.0		
4/28/2010	high	2	No	0.0	No	0.0		
4/29/2010	high	2	No	0.0	No	0.0		
5/3/2010	high	2	No	0.0	No	0.0		
5/5/2010	medium	1	No	0.0	No	0.0		
5/6/2010	medium	1	No	0.0	No	0.0		
5/7/2010	medium	1	No	0.0	No	0.0		
5/10/2010	medium	1	No	0.0	No	0.0		
5/17/2010	high	2	No	0.0	No	0.0		
5/18/2010	high	2	No	0.0	No	0.0		
5/24/2010	low	0	No	0.0	No	0.0		
6/1/2010	medium	1	No	0.0	No	0.0		
6/7/2010	low	0	No	0.0	No	0.0		
6/9/2010	low	0	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
6/10/2010	low	0	No	0.0	No	0.0		
6/14/2010	high	2	No	0.0	No	0.0		
6/16/2010	high	2	No	0.0	No	0.0		
6/17/2010	medium	1	No	0.0	No	0.0		
6/21/2010	low	0	No	0.0	No	0.0		
6/24/2010	low	0	No	0.0	No	0.0		
6/28/2010	high	2	No	0.0	No	0.0		
7/6/2010	low	0	No	0.0	No	0.0		
7/8/2010	low	0	No	0.0	No	0.0		
7/12/2010	medium	1	No	0.0	No	0.0		
7/13/2010	medium	1	No	0.0	No	0.0		
7/14/2010	medium	1	No	0.0	No	0.0		
7/15/2010	high	2	No	0.0	No	0.0		
7/16/2010	high	2	No	0.0	No	0.0		
7/19/2010	low	0	No	0.0	**Yes**	**1.0**		
7/20/2010	medium	1	No	0.0	**Yes**	**1.0**		
7/21/2010	low	0	No	0.0	No	0.0		
7/22/2010	low	0	No	0.0	No	0.0		
7/26/2010	high	1	No	0.0	No	0.0		
7/28/2010	medium	1	No	0.0	No	0.0		
7/29/2010	medium	1	No	0.0	No	0.0		
8/2/2010	medium	1	No	0.0	No	0.0		
8/3/2010	low	0	No	0.0	No	0.0		
8/9/2010	medium	1	No	0.0	No	0.0		
8/11/2010	high	2	No	0.0	No	0.0		
8/16/2010	medium	1	No	0.0	No	0.0		
8/18/2010	low	0	No	0.0	No	0.0		
8/19/2010	low	0	No	0.0	No	0.0		
8/23/2010	medium	1	No	0.0	No	0.0		
8/24/2010	high	2	No	0.0	No	0.0		
8/30/2010	high	2	No	0.0	No	0.0		
8/31/2010	high	2	No	0.0	No	0.0		
9/1/2010	high	2	No	0.0	No	0.0		
9/2/2010	low	0	No	0.0	No	0.0		
9/3/2010	low	0	No	0.0	No	0.0		
9/7/2010	low	0	No	0.0	No	0.0		
9/14/2010	medium	1	No	0.0	No	0.0		
9/15/2010	low	0	No	0.0	No	0.0		
9/16/2010	low	0	No	0.0	No	0.0		
9/20/2010	medium	1	No	0.0	No	0.0		
9/21/2010	medium	1	No	0.0	No	0.0		
9/22/2010	medium	1	No	0.0	No	0.0		
9/27/2010	high	2	No	0.0	No	0.0		
9/30/2010	high	2	No	0.0	No	0.0		
10/4/2010	low	0	No	0.0	No	0.0		
10/7/2010	medium	1	No	0.0	No	0.0		
10/11/2010	high	2	No	0.0	No	0.0		
10/14/2010	medium	1	No	0.0	No	0.0		
10/18/2010	medium	1	No	0.0	No	0.0		
10/19/2010	medium	1	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
10/20/2010	medium	1	No	0.0	No	0.0		
10/21/2010	medium	1	No	0.0	No	0.0		
10/25/2010	high	2	No	0.0	No	0.0		
10/29/2010	high	2	No	0.0	No	0.0		
11/1/2010	low	0	No	0.0	No	0.0		
11/2/2010	medium	1	No	0.0	No	0.0		
11/8/2010	high	2	No	0.0	No	0.0		
11/11/2010	high	2	No	0.0	No	0.0		
11/15/2010	medium	1	No	0.0	No	0.0		
11/16/2010	medium	1	No	0.0	No	0.0		
11/17/2010	medium	1	No	0.0	No	0.0		
11/18/2010	medium	1	No	0.0	No	0.0		
11/22/2010	high	2	No	0.0	No	0.0		
11/29/2010	high	2	No	0.0	No	0.0		
11/30/2010	medium	1	No	0.0	No	0.0		
12/1/2010	medium	1	No	0.0	No	0.0		
12/2/2010	medium	1	No	0.0	No	0.0		
12/3/2010	medium	1	No	0.0	No	0.0		
12/6/2010	high	2	No	0.0	No	0.0		
12/7/2010	high	2	No	0.0	No	0.0		
12/8/2010	high	2	No	0.0	No	0.0		
12/13/2010	high	2	No	0.0	No	0.0		
12/14/2010	high	2	No	0.0	No	0.0		
12/15/2010	high	2	No	0.0	No	0.0		
12/16/2010	high	2	No	0.0	No	0.0		
12/20/2010	high	2	No	0.0	No	0.0		
12/22/2010	high	2	No	0.0	No	0.0		
12/23/2010	high	2	No	0.0	No	0.0		
12/24/2010	high	2	No	0.0	No	0.0		
12/27/2010	high	2	No	0.0	No	0.0		
1/3/2011	high	2	No	0.0	No	0.0		
1/10/2011	high	2	No	0.0	No	0.0		
1/17/2011	high	2	No	0.0	No	0.0		
1/18/2011	high	2	No	0.0	No	0.0		
1/19/2011	high	2	No	0.0	No	0.0		
1/24/2011	high	2	No	0.0	No	0.0		
1/27/2011	high	2	No	0.0	No	0.0		
1/31/2011	high	2	No	0.0	No	0.0		
2/4/2011	high	2	No	0.0	No	0.0		
2/7/2011	high	2	No	0.0	No	0.0		
2/8/2011	high	2	No	0.0	No	0.0		
2/14/2011	high	2	No	0.0	No	0.0		
2/15/2011	high	2	No	0.0	No	0.0		
2/16/2011	high	2	No	0.0	No	0.0		
2/22/2011	high	2	No	0.0	No	0.0		
2/25/2011	high	2	No	0.0	No	0.0		
2/28/2011	high	2	No	0.0	No	0.0		
3/2/2011	high	2	No	0.0	No	0.0		
3/9/2011	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
3/10/2011	high	2	No	0.0	No	0.0		
3/11/2011	high	2	No	0.0	No	0.0		
3/14/2011	high	2	No	0.0	No	0.0		
3/21/2011	high	2	No	0.0	No	0.0		
3/22/2011	high	2	No	0.0	No	0.0		
3/23/2011	high	2	No	0.0	No	0.0		
3/24/2011	high	2	No	0.0	No	0.0		
3/28/2011	high	2	No	0.0	No	0.0		
3/29/2011	high	2	No	0.0	No	0.0		
4/4/2011	high	2	No	0.0	No	0.0		
4/5/2011	high	2	No	0.0	No	0.0		
4/11/2011	high	2	No	0.0	No	0.0		
4/12/2011	high	2	No	0.0	No	0.0		
4/13/2011	high	2	No	0.0	No	0.0		
4/19/2011	high	2	No	0.0	No	0.0		
4/20/2011	high	2	No	0.0	No	0.0		
4/21/2011	high	2	No	0.0	No	0.0		
4/22/2011	high	2	No	0.0	No	0.0		
4/25/2011	medium	1	No	0.0	No	0.0		
4/27/2011	medium	1	No	0.0	**Yes**	**1.0**		
5/2/2011	high	2	No	0.0	No	0.0		
5/9/2011	high	2	No	0.0	No	0.0		
5/16/2011	medium	1	No	0.0	No	0.0		
5/18/2011	high	2	No	0.0	No	0.0		
5/19/2011	high	2	No	0.0	No	0.0		
5/23/2011	high	2	No	0.0	No	0.0		
6/1/2011	medium	1	No	0.0	No	0.0		
6/6/2011	high	2	No	0.0	No	0.0		
6/10/2011	medium	1	No	0.0	**Yes**	**1.0**		
6/13/2011	low	0	No	0.0	No	0.0		
6/14/2011	low	0	No	0.0	No	0.0		
6/15/2011	low	0	No	0.0	No	0.0		
6/20/2011	high	2	No	0.0	No	0.0		
6/22/2011	medium	1	No	0.0	**Yes**	**0.5**		
6/23/2011	medium	1	No	0.0	No	0.0		
6/27/2011	low	0	No	0.0	No	0.0		
6/30/2011	medium	1	No	0.0	No	0.0		
7/6/2011	high	2	No	0.0	No	0.0		
7/11/2011	low	0	No	0.0	No	0.0		
7/18/2011	high	2	No	0.0	No	0.0		
7/19/2011	high	2	No	0.0	No	0.0		
7/20/2011	high	2	No	0.0	No	0.0		
7/25/2011	low	0	No	0.0	No	0.0		
7/29/2011	medium	1	No	0.0	No	0.0		
8/1/2011	high	2	No	0.0	No	0.0		
8/8/2011	low	0	No	0.0	No	0.0		
8/15/2011	high	2	No	0.0	No	0.0		
8/16/2011	high	2	No	0.0	No	0.0		
8/17/2011	high	2	No	0.0	No	0.0		
8/22/2011	low	0	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
8/24/2011	high	2	No	0.0	No	0.0		
8/29/2011	medium	1	No	0.0	No	0.0		
8/31/2011	medium	1	No	0.0	No	0.0		
9/6/2011	medium	1	No	0.0	No	0.0		
9/12/2011	high	2	No	0.0	No	0.0		
9/13/2011	high	2	No	0.0	No	0.0		
9/14/2011	high	2	No	0.0	No	0.0		
9/20/2011	medium	1	No	0.0	No	0.0		
9/26/2011	medium	1	No	0.0	No	0.0		
9/27/2011	high	2	No	0.0	No	0.0		
9/28/2011	high	2	No	0.0	No	0.0		
9/29/2011	high	2	No	0.0	No	0.0		
10/3/2011	high	2	No	0.0	No	0.0		
10/10/2011	high	2	No	0.0	No	0.0		
10/11/2011	high	2	No	0.0	No	0.0		
10/12/2011	high	2	No	0.0	No	0.0		
10/17/2011	high	2	No	0.0	No	0.0		
10/18/2011	high	2	No	0.0	No	0.0		
10/19/2011	high	2	No	0.0	No	0.0		
10/20/2011	high	2	No	0.0	No	0.0		
10/24/2011	medium	1	No	0.0	No	0.0		
10/31/2011	high	2	No	0.0	No	0.0		
11/8/2011	medium	1	No	0.0	No	0.0		
11/14/2011	high	2	No	0.0	No	0.0		
11/21/2011	medium	1	No	0.0	No	0.0		
11/22/2011	high	2	No	0.0	No	0.0		
11/23/2011	high	2	No	0.0	No	0.0		
11/28/2011	high	2	No	0.0	No	0.0		
11/29/2011	high	2	No	0.0	No	0.0		
12/5/2011	medium	1	No	0.0	No	0.0		
12/12/2011	high	2	No	0.0	No	0.0		
12/13/2011	high	2	No	0.0	No	0.0		
12/14/2011	high	2	No	0.0	No	0.0		
12/19/2011	high	2	No	0.0	No	0.0		
12/20/2011	high	2	No	0.0	No	0.0		
12/21/2011	high	2	No	0.0	No	0.0		
12/27/2011	high	2	No	0.0	No	0.0		
1/3/2012	high	2	No	0.0	No	0.0		
1/9/2012	high	2	No	0.0	No	0.0		
1/17/2012	high	2	No	0.0	No	0.0		
1/23/2012	high	2	No	0.0	No	0.0		
1/24/2012	high	2	No	0.0	No	0.0		
1/25/2012	high	2	No	0.0	No	0.0		
1/27/2012	high	2	No	0.0	No	0.0		
1/30/2012	high	2	No	0.0	No	0.0		
2/6/2012	high	2	No	0.0	No	0.0		
2/13/2012	high	2	No	0.0	No	0.0		
2/21/2012	medium	1	No	0.0	No	0.0		
2/27/2012	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
2/24/2012	high	2	No	0.0	No	0.0		
3/1/2012	medium	1	No	0.0	No	0.0		
3/2/2012	high	2	No	0.0	No	0.0		
3/5/2012	high	2	No	0.0	No	0.0		
3/12/2012	high	2	No	0.0	No	0.0		
3/13/2012	high	2	No	0.0	No	0.0		
3/14/2012	medium	1	No	0.0	No	0.0		
3/15/2012	high	2	No	0.0	No	0.0		
3/19/2012	high	2	No	0.0	No	0.0		
3/20/2012	high	2	No	0.0	No	0.0		
.3/21/2012	high	2	No	0.0	No	0.0		
3/22/2012	high	2	No	0.0	No	0.0		
3/26/2012	high	2	No	0.0	No	0.0		
3/28/2012	high	2	No	0.0	No	0.0		
4/2/2012	medium	1	No	0.0	No	0.0		
4/5/2012	medium	1	No	0.0	No	0.0		
4/9/2012	high	2	No	0.0	No	0.0		
4/16/2012	medium	1	No	0.0	No	0.0		
4/17/2012	medium	1	No	0.0	No	0.0		
4/18/2012	high	2	No	0.0	No	0.0		
4/19/2012	medium	1	No	0.0	No	0.0		
4/23/2012	medium	1	No	0.0	No	0.0		
4/30/2012	medium	1	No	0.0	No	0.0		
5/2/2012	medium	1	No	0.0	No	0.0		
5/7/2012	high	2	No	0.0	No	0.0		
5/8/2012	high	2	No	0.0	No	0.0		
5/14/2012	medium	1	No	0.0	No	0.0		
5/15/2012	low	0	No	0.0	No	0.0		
5/16/2012	medium	1	No	0.0	No	0.0		
5/21/2012	high	2	No	0.0	No	0.0		
5/22/2012	high	2	No	0.0	No	0.0		
5/23/2012	high	2	No	0.0	No	0.0		
5/24/2012	high	2	No	0.0	No	0.0		
5/29/2012	high	2	No	0.0	No	0.0		
5/31/2012	low	0	No	0.0	No	0.0		
6/4/2012	medium	1	No	0.0	No	0.0		
6/11/2012	medium	1	No	0.0	No	0.0		
6/12/2012	medium	1	No	0.0	No	0.0		
6/13/2012	medium	1	No	0.0	No	0.0		
6/20/2012	high	2	No	0.0	No	0.0		
6/25/2012	medium	1	No	0.0	No	0.0		
7/2/2012	low	0	No	0.0	No	0.0		
7/9/2012	medium	1	No	0.0	**Yes**	**0.5**		
7/10/2012	high	2	No	0.0	No	0.0		
7/11/2012	high	2	No	0.0	No	0.0		
7/12/2012	high	2	No	0.0	**Yes**	**0.5**		
7/16/2012	low	0	No	0.0	No	0.0		
7/17/2012	low	0	No	0.0	No	0.0		
7/19/2012	low	0	No	0.0	No	0.0		
7/20/2012	low	0	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
7/23/2012	high	2	No	0.0	No	0.0		
7/30/2012	low	0	No	0.0	No	0.0		
8/6/2012	high	2	No	0.0	No	0.0		
8/7/2012	medium	1	No	0.0	No	0.0		
8/10/2012	medium	1	No	0.0	No	0.0		
8/13/2012	low	0	No	0.0	No	0.0		
8/14/2012	low	0	No	0.0	No	0.0		
8/15/2012	low	0	No	0.0	No	0.0		
8/20/2012	high	2	No	0.0	No	0.0		
8/23/2012	high	2	No	0.0	No	0.0		
8/28/2012	low	0	No	0.0	No	0.0		
8/29/2012	low	0	No	0.0	No	0.0		
9/4/2012	high	2	No	0.0	No	0.0		
9/5/2012	high	2	No	0.0	No	0.0		
9/7/2012	high	2	No	0.0	No	0.0		
9/10/2012	low	0	No	0.0	No	0.0		
9/11/2012	low	0	No	0.0	No	0.0		
9/17/2012	high	2	No	0.0	No	0.0		
9/18/2012	high	2	No	0.0	No	0.0		
9/19/2012	high	2	No	0.0	No	0.0		
9/20/2012	high	2	No	0.0	No	0.0		
9/21/2012	high	2	No	0.0	No	0.0		
9/25/2102	low	0	No	0.0	No	0.0		
9/26/2012	low	0	No	0.0	No	0.0		
9/27/2012	low	0	No	0.0	No	0.0		
10/1/2012	high	2	No	0.0	No	0.0		
10/9/2012	low	0	No	0.0	No	0.0		
10/15/2012	high	2	No	0.0	No	0.0		
10/16/2012	high	2	No	0.0	No	0.0		
10/22/2012	high	2	No	0.0	No	0.0		
10/23/2012	high	2	No	0.0	No	0.0		
10/24/2012	high	2	No	0.0	No	0.0		
10/25/2012	high	2	No	0.0	No	0.0		
10/26/2012	high	2	No	0.0	No	0.0		
10/29/2012	high	2	No	0.0	No	0.0		
11/7/2012	high	2	No	0.0	**Yes**	**0.5**		
11/12/2012	high	2	No	0.0	No	0.0		
11/13/2012	medium	1	No	0.0	No	0.0		
11/19/2012	high	2	No	0.0	No	0.0		
11/27/2012	high	2	No	0.0	**Yes**	**0.5**		
11/28/2012	high	2	No	0.0	No	0.0		
12/5/2012	high	2	No	0.0	No	0.0		
12/6/2012	high	2	No	0.0	**Yes**	**0.5**		
12/7/2012	high	2	No	0.0	No	0.0		
12/12/2012	medium	1	No	0.0	**Yes**	**0.5**		
12/13/2012	medium	1	No	0.0	No	0.0		
12/14/2012	medium	1	No	0.0	No	0.0		
12/17/2012	high	2	No	0.0	No	0.0		
12/18/2012	high	2	No	0.0	No	0.0		
12/19/2012	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
12/20/2012	high	2	No	0.0	No	0.0		
12/24/2012	high	2	No	0.0	No	0.0		
1/2/2013	high	2	No	0.0	No	0.0		
1/3/2013	high	2	No	0.0	No	0.0		
1/7/2013	high	2	No	0.0	No	0.0		
1/14/2013	high	2	No	0.0	No	0.0		
1/22/2013	high	2	No	0.0	No	0.0		
1/23/2013	high	2	No	0.0	No	0.0		
1/28/2013	high	2	No	0.0	No	0.0		
1/30/2013	high	2	No	0.0	No	0.0		
1/31/2013	high	2	No	0.0	No	0.0		
2/1/2013	high	2	No	0.0	No	0.0		
2/4/2013	high	2	No	0.0	No	0.0		
2/11/2013	high	2	No	0.0	No	0.0		
2/19/2013	high	2	No	0.0	No	0.0		
2/20/2013	high	2	No	0.0	No	0.0		
2/21/2013	high	2	No	0.0	No	0.0		
2/25/2013	high	2	No	0.0	No	0.0		
3/5/2013	high	2	No	0.0	No	0.0		
3/6/2013	medium	1	No	0.0	No	0.0		
3/11/2013	medium	1	No	0.0	No	0.0		
3/12/2013	high	2	No	0.0	No	0.0		
3/13/2013	high	2	No	0.0	No	0.0		
3/18/2013	high	2	No	0.0	No	0.0		
3/25/2013	high	2	No	0.0	No	0.0		
4/1/2013	high	2	No	0.0	No	0.0		
4/2/2013	high	2	No	0.0	No	0.0		
4/8/2013	medium	1	No	0.0	No	0.0		
4/9/2013	medium	1	No	0.0	No	0.0		
4/10/2013	high	2	No	0.0	No	0.0		
4/15/2013	high	2	No	0.0	No	0.0		
4/16/2013	high	2	No	0.0	No	0.0		
4/18/2013	high	2	No	0.0	No	0.0		
4/22/2013	medium	1	No	0.0	No	0.0		
4/23/2013	medium	1	No	0.0	No	0.0		
4/24/2013	low	0	No	0.0	No	0.0		
4/25/2013	medium	1	No	0.0	No	0.0		
4/29/2013	high	2	No	0.0	No	0.0		
4/30/2013	high	2	No	0.0	No	0.0		
5/6/2013	low	0	No	0.0	No	0.0		
5/7/2013	medium	1	No	0.0	No	0.0		
5/13/2013	high	2	No	0.0	No	0.0		
5/17/2013	medium	1	No	0.0	No	0.0		
5/20/2013	medium	1	No	0.0	No	0.0		
5/21/2013	medium	1	No	0.0	No	0.0		
5/22/2013	medium	1	No	0.0	No	0.0		
5/23/2013	medium	1	No	0.0	No	0.0		
5/28/2013	high	2	No	0.0	No	0.0		
6/3/2013	medium	1	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
6/5/2013	low	0	No	0.0	No	0.0		
6/10/2013	high	2	No	0.0	No	0.0		
6/11/2013	high	2	No	0.0	No	0.0		
6/12/2013	high	2	No	0.0	No	0.0		
6/17/2013	medium	1	No	0.0	No	0.0		
6/18/2013	medium	1	No	0.0	No	0.0		
6/19/2013	medium	1	No	0.0	No	0.0		
6/24/2013	high	2	No	0.0	No	0.0		
6/25/2013	high	2	No	0.0	No	0.0		
6/26/2013	high	2	No	0.0	No	0.0		
7/1/2013	medium	1	No	0.0	No	0.0		
7/8/2013	medium	1	No	0.0	No	0.0		
7/15/2013	medium	1	No	0.0	No	0.0		
7/18/2013	high	2	No	0.0	No	0.0		
7/22/2013	medium	1	No	0.0	No	0.0		
7/23/2013	medium	1	No	0.0	No	0.0		
7/24/2013	high	2	No	0.0	No	0.0		
7/29/2013	medium	1	No	0.0	No	0.0		
8/5/2013	medium	1	No	0.0	No	0.0		
8/12/2013	high	2	No	0.0	No	0.0		
8/19/2013	low	0	No	0.0	No	0.0		
8/20/2013	medium	1	No	0.0	No	0.0		
8/21/2013	high	2	No	0.0	No	0.0		
8/26/2013	high	2	No	0.0	No	0.0		
8/27/2013	medium	1	No	0.0	No	0.0		
9/3/2013	medium	1	No	0.0	No	0.0		
9/9/2013	high	2	No	0.0	No	0.0		
9/10/2013	high	2	No	0.0	No	0.0		
9/11/2013	medium	1	No	0.0	No	0.0		
9/12/2013	medium	1	No	0.0	No	0.0		
9/16/2013	low	0	No	0.0	No	0.0		
9/17/2013	medium	1	No	0.0	No	0.0		
9/23/2013	high	2	No	0.0	No	0.0		
9/24/2013	high	2	No	0.0	**Yes**	**0.5**		
9/25/2013	high	2	No	0.0	No	0.0		
9/27/2013	high	2	No	0.0	No	0.0		
9/30/2013	medium	1	No	0.0	No	0.0		
10/2/2013	medium	1	No	0.0	No	0.0		
10/7/2013	high	2	No	0.0	No	0.0		
10/9/2013	high	2	No	0.0	No	0.0		
10/14/2013	low	0	No	0.0	No	0.0		
10/15/2013	low	0	No	0.0	No	0.0		
10/21/2013	high	2	No	0.0	No	0.0		
10/28/2013	high	2	No	0.0	No	0.0		
10/29/2013	medium	1	No	0.0	No	0.0		
10/30/2013	medium	1	No	0.0	**Yes**	**0.5**		
10/31/2013	medium	1	No	0.0	No	0.0		
11/4/2013	high	2	No	0.0	No	0.0		
11/11/2013	high	2	No	0.0	No	0.0		
11/13/2013	medium	1	No	0.0	**Yes**	**0.5**		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
11/18/2013	medium	1	No	0.0	No	0.0		
11/19/2013	high	2	No	0.0	No	0.0		
11/20/2013	high	2	No	0.0	No	0.0		
11/25/2013	high	2	No	0.0	No	0.0		
12/2/2013	high	2	No	0.0	No	0.0		
12/3/2013	high	2	No	0.0	No	0.0		
12/9/2013	high	2	No	0.0	No	0.0		
12/16/2013	high	2	No	0.0	No	0.0		
12/17/2013	high	2	No	0.0	No	0.0		
12/18/2013	high	2	No	0.0	No	0.0		
12/23/2013	high	2	No	0.0	No	0.0		
12/30/2013	medium	1	No	0.0	No	0.0		
1/3/2014	high	2	No	0.0	No	0.0		
1/6/2014	high	2	No	0.0	No	0.0		
1/13/2014	high	2	No	0.0	No	0.0		
1/14/2014	high	2	No	0.0	No	0.0		
1/15/2014	high	2	No	0.0	No	0.0		
1/21/2014	high	2	No	0.0	No	0.0		
1/27/2014	high	2	No	0.0	No	0.0		
1/28/2014	high	2	No	0.0	No	0.0		
2/4/2014	high	2	No	0.0	No	0.0		
2/10/2014	high	2	No	0.0	No	0.0		
2/11/2014	high	2	No	0.0	No	0.0		
2/12/2014	high	2	No	0.0	No	0.0		
2/18/2014	high	2	No	0.0	No	0.0		
2/21/2014	high	2	No	0.0	No	0.0		
2/24/2014	high	2	No	0.0	No	0.0		
3/3/2014	high	2	No	0.0	No	0.0		
3/10/2014	high	2	No	0.0	No	0.0		
3/11/2014	high	2	No	0.0	No	0.0		
3/12/2014	high	2	No	0.0	No	0.0		
3/17/2014	high	2	No	0.0	No	0.0		
3/19/2014	high	2	No	0.0	No	0.0		
3/20/2014	high	2	No	0.0	No	0.0		
3/24/2014	high	2	No	0.0	No	0.0		
3/26/2014	high	2	No	0.0	No	0.0		
3/27/2014	high	2	No	0.0	No	0.0		
3/31/2014	high	2	No	0.0	No	0.0		
4/2/2014	high	2	No	0.0	No	0.0		
4/7/2014	high	2	No	0.0	No	0.0		
4/14/2014	medium	1	No	0.0	No	0.0		
4/15/2014	medium	1	No	0.0	No	0.0		
4/16/2014	high	2	No	0.0	No	0.0		
4/17/2014	high	2	No	0.0	No	0.0		
4/21/2014	high	2	No	0.0	No	0.0		
4/22/2014	medium	1	No	0.0	No	0.0		
4/23/2014	medium	1	No	0.0	No	0.0		
4/28/2014	medium	1	No	0.0	No	0.0		
4/29/2014	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
5/5/2014	high	2	No	0.0	**Yes**	**0.5**		
5/12/2014	medium	1	No	0.0	No	0.0		
5/13/2014	medium	1	No	0.0	No	0.0		
5/14/2014	medium	1	No	0.0	No	0.0		
5/19/2014	high	2	No	0.0	No	0.0		
5/20/2014	high	2	No	0.0	No	0.0		
5/21/2014	medium	1	No	0.0	No	0.0		
5/27/2014	low	0	No	0.0	No	0.0		
6/2/2014	high	2	No	0.0	No	0.0		
6/9/2014	low	0	No	0.0	No	0.0		
6/10/2014	medium	1	No	0.0	No	0.0		
6/16/2014	high	2	No	0.0	No	0.0		
6/17/2014	high	2	No	0.0	No	0.0		
6/18/2014	high	2	No	0.0	No	0.0		
6/23/2014	low	0	No	0.0	No	0.0		
6/24/2014	low	0	No	0.0	**Yes**	**1.0**		
6/30/2014	high	2	No	0.0	No	0.0		
7/72014	medium	1	No	0.0	No	0.0		
7/8/2014	medium	1	No	0.0	No	0.0		
7/14/2014	high	2	No	0.0	No	0.0		
7/15/2014	high	2	No	0.0	No	0.0		
7/21/2014	low	0	No	0.0	No	0.0		
7/25/2014	medium	1	No	0.0	No	0.0		
7/28/2014	high	2	No	0.0	No	0.0		
7/30/2014	low	0	No	0.0	No	0.0		
8/4/2014	medium	1	No	0.0	No	0.0		
8/11/2014	medium	1	No	0.0	No	0.0		
8/12/2014	high	2	No	0.0	No	0.0		
8/13/2014	high	2	No	0.0	No	0.0		
8/18/2014	low	0	No	0.0	No	0.0		
8/20/2014	medium	1	No	0.0	No	0.0		
8/25/2014	high	2	No	0.0	No	0.0		
9/2/2014	low	0	No	0.0	No	0.0		
9/8/2014	medium	1	No	0.0	No	0.0		
9/9/2014	high	2	No	0.0	No	0.0		
9/10/2014	high	2	No	0.0	No	0.0		
9/16/2014	medium	1	No	0.0	No	0.0		
9/17/2014	medium	1	No	0.0	No	0.0		
9/22/2014	medium	1	No	0.0	No	0.0		
9/29/2014	high	2	No	0.0	No	0.0		
10/6/2014	medium	1	No	0.0	No	0.0		
10/9/2014	high	2	No	0.0	No	0.0		
10/14/2014	high	2	No	0.0	No	0.0		
10/15/2014	high	2	No	0.0	No	0.0		
10/20/2014	medium	1	No	0.0	No	0.0		
10/21/2014	medium	1	No	0.0	No	0.0		
10/27/2014	high	2	No	0.0	No	0.0		
10/28/2014	high	2	No	0.0	No	0.0		
11/3/2014	medium	1	No	0.0	No	0.0		
11/10/2014	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
11/17/2014	medium	1	No	0.0	No	0.0		
11/18/2014	medium	1	No	0.0	No	0.0		
11/19/2014	medium	1	No	0.0	No	0.0		
11/24/2014	high	2	No	0.0	No	0.0		
12/1/2014	high	2	No	0.0	No	0.0		
12/2/2014	high	2	No	0.0	No	0.0		
12/3/2014	medium	1	No	0.0	No	0.0		
12/4/2014	high	2	No	0.0	No	0.0		
12/8/2014	high	2	No	0.0	No	0.0		
12/9/2014	high	2	No	0.0	No	0.0		
12/10/2014	high	2	No	0.0	No	0.0		
12/15/2014	high	2	No	0.0	No	0.0		
12/16/2014	high	2	No	0.0	No	0.0		
12/17/2014	high	2	No	0.0	No	0.0		
12/22/2014	high	2	No	0.0	No	0.0		
12/29/2014	high	2	No	0.0	No	0.0		
1/5/2015	high	2	No	0.0	No	0.0		
1/12/2015	high	2	No	0.0	No	0.0		
1/13/2015	high	2	No	0.0	No	0.0		
1/14/2015	high	2	No	0.0	No	0.0		
1/20/2015	high	2	No	0.0	No	0.0		
1/26/2015	high	2	No	0.0	No	0.0		
1/27/2015	high	2	No	0.0	No	0.0		
2/3/2015	high	2	No	0.0	No	0.0		
2/4/2015	medium	1	No	0.0	No	0.0		
2/9/2015	high	2	No	0.0	No	0.0		
2/10/2015	high	2	No	0.0	No	0.0		
2/11/2015	high	2	No	0.0	No	0.0		
2/17/2015	medium	1	No	0.0	No	0.0		
2/18/2015	medium	1	No	0.0	No	0.0		
2/23/2015	high	2	No	0.0	No	0.0		
2/27/2015	high	2	No	0.0	No	0.0		
3/2/2015	medium	1	No	0.0	No	0.0		
3/9/2015	high	2	No	0.0	No	0.0		
3/16/2015	medium	1	No	0.0	No	0.0		
3/17/2015	medium	1	No	0.0	No	0.0		
3/18/2015	high	2	No	0.0	No	0.0		
3/19/2015	high	2	No	0.0	No	0.0		
3/23/2015	high	2	No	0.0	**Yes**	**0.5**		
3/24/2015	high	2	No	0.0	No	0.0		
3/25/2015	high	2	No	0.0	No	0.0		
3/30/2015	medium	1	No	0.0	No	0.0		
4/1/2015	medium	1	No	0.0	No	0.0		
4/6/2015	high	2	No	0.0	No	0.0		
4/7/2015	high	2	No	0.0	No	0.0		
4/13/2015	medium	1	No	0.0	**Yes**	**0.5**		
4/14/2015	low	0	No	0.0	No	0.0		
4/15/2015	low	0	No	0.0	No	0.0		
4/20/2015	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
4/21/2015	high	2	No	0.0	No	0.0		
4/27/2015	medium	1	No	0.0	No	0.0		
4/28/2015	medium	1	No	0.0	No	0.0		
5/4/2015	medium	1	No	0.0	No	0.0		
5/5/2015	high	2	No	0.0	No	0.0		
5/12/2015	high	2	No	0.0	No	0.0		
5/13/2015	medium	1	No	0.0	No	0.0		
5/14/2015	medium	1	No	0.0	No	0.0		
5/18/2015	high	2	No	0.0	No	0.0		
5/26/2015	low	0	No	0.0	No	0.0		
6/1/2015	low	0	No	0.0	No	0.0		
6/8/2015	high	2	No	0.0	No	0.0		
6/9/2015	high	2	No	0.0	No	0.0		
6/10/2015	high	2	No	0.0	No	0.0		
6/15/2015	medium	1	No	0.0	No	0.0		
6/16/2015	low	0	No	0.0	No	0.0		
6/17/2015	medium	1	No	0.0	No	0.0		
6/22/2015	medium	1	No	0.0	No	0.0		
6/29/2015	low	0	No	0.0	No	0.0		
7/6/2015	high	2	No	0.0	No	0.0		
7/13/2015	low	0	No	0.0	No	0.0		
7/14/2015	low	0	No	0.0	No	0.0		
7/15/2015	low	0	No	0.0	No	0.0		
7/20/2015	high	2	No	0.0	No	0.0		
7/21/2015	high	2	No	0.0	No	0.0		
7/22/2015	medium	1	No	0.0	No	0.0		
7/27/2015	low	0	No	0.0	No	0.0		
7/28/2015	low	0	No	0.0	No	0.0		
7/29/2015	low	0	No	0.0	No	0.0		
8/3/2015	high	2	No	0.0	No	0.0		
8/10/2015	low	0	No	0.0	No	0.0		
8/11/2015	low	0	No	0.0	No	0.0		
8/17/2015	high	2	No	0.0	No	0.0		
8/24/2015	low	0	No	0.0	No	0.0		
8/31/2015	high	2	No	0.0	No	0.0		
9/1/2015	high	2	No	0.0	No	0.0		
9/8/2015	low	0	No	0.0	No	0.0		
9/14/2015	high	2	No	0.0	No	0.0		
9/15/2015	high	2	No	0.0	No	0.0		
9/16/2015	high	2	No	0.0	No	0.0		
9/17/2015	high	2	No	0.0	No	0.0		
9/21/2015	medium	1	No	0.0	**Yes**	**0.5**		
9/28/2015	high	2	No	0.0	No	0.0		
9/29/2015	high	2	No	0.0	No	0.0		
10/5/2015	medium	1	No	0.0	No	0.0		
10/8/2015	low	0	No	0.0	No	0.0		
10/12/2015	high	2	No	0.0	No	0.0		
10/13/2015	high	2	No	0.0	No	0.0		
10/14/2015	high	2	No	0.0	No	0.0		
10/19/2015	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
10/20/2015	high	2	No	0.0	No	0.0		
10/26/2015	high	2	No	0.0	No	0.0		
11/2/2015	high	2	No	0.0	No	0.0		
11/10/2015	medium	1	No	0.0	No	0.0		
11/11/2015	medium	1	No	0.0	No	0.0		
11/13/2015	high	2	No	0.0	No	0.0		
11/16/2015	high	2	No	0.0	No	0.0		
11/17/2015	high	2	No	0.0	No	0.0		
11/18/2015	high	2	No	0.0	No	0.0		
11/23/2015	medium	1	No	0.0	No	0.0		
11/30/2015	high	2	No	0.0	No	0.0		
12/2/2015	medium	1	No	0.0	No	0.0		
12/3/2015	medium	1	No	0.0	No	0.0		
12/7/2015	high	2	No	0.0	No	0.0		
12/9/2015	high	2	No	0.0	No	0.0		
12/10/2015	high	2	No	0.0	No	0.0		
12/14/2015	high	2	No	0.0	No	0.0		
12/15/2015	high	2	No	0.0	No	0.0		
12/16/2015	high	2	No	0.0	No	0.0		
12/21/2015	high	2	No	0.0	No	0.0		
12/28/2015	high	2	No	0.0	No	0.0		
1/4/2016	high	2	No	0.0	No	0.0		
1/11/2016	high	2	No	0.0	No	0.0		
1/12/2016	high	2	No	0.0	No	0.0		
1/13/2016	high	2	No	0.0	No	0.0		
1/19/2016	high	2	No	0.0	No	0.0		
1/20/2016	medium	2	No	0.0	No	0.0		
1/25/2016	high	2	No	0.0	No	0.0		
2/1/2016	high	2	No	0.0	No	0.0		
2/8/2016	high	2	No	0.0	No	0.0		
2/9/2016	high	2	No	0.0	No	0.0		
2/10/2016	high	2	No	0.0	No	0.0		
2/16/2016	high	2	No	0.0	No	0.0		
2/22/2016	medium	1	No	0.0	No	0.0		
2/23/2016	high	2	No	0.0	No	0.0		
2/29/2016	high	2	No	0.0	**Yes**	**0.5**		
3/7/2016	high	2	No	0.0	No	0.0		
3/8/2016	high	2	No	0.0	No	0.0		
3/9/2016	high	2	No	0.0	No	0.0		
3/10/2016	high	2	No	0.0	No	0.0		
3/14/2016	high	2	No	0.0	No	0.0		
3/15/2016	high	2	No	0.0	No	0.0		
3/16/2016	high	2	No	0.0	No	0.0		
3/21/2016	high	2	No	0.0	No	0.0		
3/22/2016	high	2	No	0.0	No	0.0		
3/29/2016	high	2	No	0.0	No	0.0		
3/30/2016	high	2	No	0.0	No	0.0		
3/31/2016	high	2	No	0.0	No	0.0		
4/4/2016	medium	1	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
4/5/2016	medium	1	No	0.0	No	0.0		
4/11/2016	high	2	No	0.0	No	0.0		
4/12/2016	high	2	No	0.0	No	0.0		
4/13/2016	medium	1	No	0.0	No	0.0		
4/18/2016	medium	1	No	0.0	No	0.0		
4/19/2016	medium	1	No	0.0	No	0.0		
4/20/2016	medium	1	No	0.0	No	0.0		
4/25/2016	high	2	No	0.0	**Yes**	**0.5**		
4/26/2016	high	2	No	0.0	No	0.0		
5/2/2016	medium	1	No	0.0	No	0.0		
5/3/2016	medium	1	No	0.0	No	0.0		
5/4/2016	medium	1	No	0.0	No	0.0		
5/9/2016	high	2	No	0.0	No	0.0		
5/10/2016	high	2	No	0.0	No	0.0		
5/11/2016	high	2	No	0.0	No	0.0		
5/16/2016	medium	1	No	0.0	No	0.0		
5/17/2016	medium	1	No	0.0	No	0.0		
5/18/2016	medium	1	No	0.0	No	0.0		
5/23/2016	high	2	No	0.0	No	0.0		
5/24/2016	high	2	No	0.0	No	0.0		
5/31/2016	low	0	No	0.0	No	0.0		
6/7/2016	high	2	No	0.0	No	0.0		
6/8/2016	high	2	No	0.0	No	0.0		
6/9/2016	high	2	No	0.0	No	0.0		
6/13/2016	low	0	No	0.0	No	0.0		
6/14/2016	low	0	No	0.0	No	0.0		
6/15/2016	medium	1	No	0.0	No	0.0		
6/20/2016	medium	1	No	0.0	No	0.0		
6/26/2016	medium	1	No	0.0	**Yes**	**0.5**		
7/6/2016	medium	1	No	0.0	No	0.0		
7/11/2016	medium	1	No	0.0	No	0.0		
7/12/2016	medium	1	No	0.0	No	0.0		
7/21/2016	high	2	No	0.0	No	0.0		
7/25/2016	high	2	No	0.0	No	0.0		
8/2/2016	low	0	No	0.0	No	0.0		
8/8/2016	high	2	No	0.0	No	0.0		
8/15/2016	low	0	No	0.0	No	0.0		
8/17/2016	medium	1	No	0.0	No	0.0		
8/18/2016	medium	1	No	0.0	No	0.0		
8/22/2016	high	2	No	0.0	No	0.0		
8/23/2016	high	2	No	0.0	No	0.0		
8/24/2016	high	2	No	0.0	No	0.0		
8/25/2016	high	2	No	0.0	No	0.0		
8/29/2016	low	0	No	0.0	No	0.0		
9/6/2016	high	2	No	0.0	No	0.0		
9/8/2016	high	2	No	0.0	No	0.0		
9/9/2016	high	2	No	0.0	No	0.0		
9/12/2016	low	0	No	0.0	No	0.0		
9/19/2016	high	2	No	0.0	No	0.0		
9/20/2016	high	2	No	0.0	No	0.0		

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
9/21/2016	high	2	No	0.0	No	0.0		
9/26/2016	low	0	No	0.0	No	0.0		
9/28/2016	medium	1	No	0.0	No	0.0		
9/29/2016	medium	1	No	0.0	No	0.0		
10/3/2016	high	2	No	0.0	**Yes**	**0.5**		
10/6/2016	high	2	No	0.0	No	0.0		
10/10/2016	high	2	No	0.0	No	0.0		
10/17/2016	high	2	No	0.0	No	0.0		
10/18/2016	high	2	No	0.0	No	0.0		
10/19/2016	high	2	No	0.0	**Yes**	**0.5**		
10/24/2016	medium	1	No	0.0	No	0.0		
10/26/2016	medium	1	No	0.0	No	0.0	**Yes**	**1.0**
10/27/2016	medium	1	No	0.0	No	0.0	**Yes**	**1.0**
10/31/2016	high	2	No	0.0	No	0.0	No	0.0
11/1/2016	high	2	No	0.0	No	0.0	No	0.0
11/2/2016	high	2	No	0.0	No	0.0	**Yes**	**1.0**
11/7/2016	high	2	No	0.0	No	0.0	**Yes**	**1.0**
11/9/2016	high	2	No	0.0	No	0.0	**Yes**	**1.0**
11/14/2016	high	2	No	0.0	No	0.0	**Yes**	**1.0**
11/15/2016	high	2	No	0.0	No	0.0	**Yes**	**1.0**
11/16/2016	high	2	No	0.0	No	0.0	**Yes**	**1.0**
11/21/2016	high	2	No	0.0	No	0.0	**Yes**	**1.0**
11/22/2016	high	2	No	0.0	No	0.0	**Yes**	**1.0**
11/28/2016	high	2	No	0.0	No	0.0	No	0.0
12/5/2016	high	2	No	0.0	No	0.0	No	0.0
12/6/2016	high	2	No	0.0	No	0.0	No	0.0
12/7/2016	medium	1	No	0.0	No	0.0	No	0.0
12/12/2016	medium	1	No	0.0	No	0.0	No	0.0
12/13/2016	high	2	No	0.0	No	0.0	No	0.0
12/14/2016	medium	1	No	0.0	No	0.0	No	0.0
12/19/2016	high	2	No	0.0	No	0.0	No	0.0
12/27/2016	high	2	No	0.0	No	0.0	No	0.0
1/2/2017	high	2	No	0.0	No	0.0	No	0.0
1/9/2017	medium	1	No	0.0	No	0.0	No	0.0
1/17/2017	high	2	No	0.0	No	0.0	No	0.0
1/18/2017	high	2	No	0.0	No	0.0	No	0.0
1/23/2017	high	2	No	0.0	No	0.0	No	0.0
1/24/2017	medium	1	No	0.0	**Yes**	**0.5**	**Yes**	**0.5**
1/27/2017	medium	1	No	0.0	No	0.0	No	0.0
1/30/2017	high	2	No	0.0	No	0.0	No	0.0
2/7/2017	medium	1	No	0.0	No	0.0	No	0.0
2/8/2017	medium	1	No	0.0	No	0.0	No	0.0
2/13/2017	high	2	No	0.0	No	0.0	No	0.0
2/14/2017	high	2	No	0.0	No	0.0	No	0.0
2/15/2017	high	2	No	0.0	No	0.0	No	0.0
2/21/2017	medium	1	No	0.0	No	0.0	No	0.0
2/27/2017	high	2	No	0.0	No	0.0	No	0.0
3/6/2017	high	2	No	0.0	No	0.0	No	0.0
3/7/2017	high	2	No	0.0	No	0.0	No	0.0

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
3/8/2017	high	2	No	0.0	No	0.0	No	0.0
3/13/2017	high	2	No	0.0	**Yes**	**0.5**	**Yes**	**0.5**
3/14/2017	high	2	No	0.0	No	0.0	No	0.0
3/15/2017	high	2	No	0.0	No	0.0	No	0.0
3/20/2017	medium	1	No	0.0	No	0.0	No	0.0
3/22/2017	medium	1	No	0.0	No	0.0	No	0.0
3/27/2017	high	2	No	0.0	No	0.0	No	0.0
4/3/2017	medium	1	No	0.0	No	0.0	No	0.0
4/5/2017	medium	1	No	0.0	No	0.0	No	0.0
4/10/2017	high	2	No	0.0	No	0.0	No	0.0
4/11/2017	high	2	No	0.0	No	0.0	No	0.0
4/12/2017	low	0	No	0.0	No	0.0	No	0.0
4/17/2017	medium	1	No	0.0	No	0.0	No	0.0
4/24/2017	medium	1	No	0.0	No	0.0	No	0.0
5/1/2017	high	2	No	0.0	No	0.0	No	0.0
5/8/2017	low	0	No	0.0	No	0.0	No	0.0
5/15/2017	high	2	No	0.0	No	0.0	No	0.0
5/16/2017	high	2	No	0.0	No	0.0	No	0.0
5/17/2017	high	2	No	0.0	No	0.0	No	0.0
5/22/2017	low	0	No	0.0	No	0.0	No	0.0
5/23/2017	low	0	No	0.0	No	0.0	No	0.0
5/30/2017	high	2	No	0.0	No	0.0	No	0.0
6/5/2017	medium	1	No	0.0	No	0.0	No	0.0
6/6/2017	medium	1	No	0.0	No	0.0	No	0.0
6/7/2017	medium	1	No	0.0	No	0.0	No	0.0
6/12/2017	high	2	No	0.0	**Yes**	**0.5**	**Yes**	**0.5**
6/13/2017	high	2	No	0.0	**Yes**	**0.5**	No	0.0
6/14/2017	high	2	No	0.0	No	0.0	No	0.0
6/19/2017	low	0	No	0.0	No	0.0	No	0.0
6/26/2017	high	2	No	0.0	**Yes**	**0.5**	No	0.0
6/27/2017	high	2	No	0.0	No	0.0	No	0.0
7/6/2017	low	0	No	0.0	No	0.0	No	0.0
7/10/2017	medium	1	No	0.0	No	0.0	No	0.0
7/11/2017	medium	1	No	0.0	No	0.0	No	0.0
7/17/2017	low	0	No	0.0	No	0.0	No	0.0
7/18/2017	low	0	No	0.0	No	0.0	No	0.0
7/19/2017	low	0	No	0.0	No	0.0	No	0.0
7/20/2017	low	0	No	0.0	No	0.0	No	0.0
7/24/2017	high	2	No	0.0	No	0.0	No	0.0
7/31/2017	low	0	No	0.0	No	0.0	No	0.0
8/2/2017	medium	1	No	0.0	No	0.0	No	0.0
8/3/2017	low	0	No	0.0	No	0.0	No	0.0
8/4/2017	low	0	No	0.0	No	0.0	No	0.0
8/5/2017	low	0	No	0.0	No	0.0	No	0.0
8/7/2017	medium	1	No	0.0	No	0.0	No	0.0
8/8/2017	high	2	No	0.0	No	0.0	No	0.0
8//9/2017	high	2	No	0.0	No	0.0	No	0.0
8/10/2017	high	2	No	0.0	No	0.0	No	0.0
8/14/2017	medium	1	No	0.0	No	0.0	No	0.0
8/18/2017	medium	1	No	0.0	No	0.0	No	0.0

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
8/23/2017	high	2	No	0.0	No	0.0	No	0.0
8/24/2017	high	2	No	0.0	No	0.0	No	0.0
8/28/2017	high	2	No	0.0	No	0.0	No	0.0
8/29/2017	high	2	No	0.0	No	0.0	No	0.0
9/5/2017	medium	1	No	0.0	No	0.0	No	0.0
9/11/2017	medium	1	No	0.0	No	0.0	No	0.0
9/12/2017	medium	1	No	0.0	No	0.0	No	0.0
9/13/2017	medium	1	No	0.0	No	0.0	No	0.0
9/18/2017	low	0	No	0.0	No	0.0	No	0.0
9/19/2017	medium	1	No	0.0	No	0.0	No	0.0
9/20/2017	high	2	No	0.0	No	0.0	No	0.0
9/25/2017	high	2	No	0.0	No	0.0	No	0.0
9/27/2017	high	2	No	0.0	No	0.0	No	0.0
10/2/2017	low	0	No	0.0	No	0.0	No	0.0
10/3/2017	low	0	No	0.0	No	0.0	No	0.0
10/5/2017	low	0	No	0.0	No	0.0	No	0.0
10/9/2017	high	2	No	0.0	No	0.0	No	0.0
10/10/2017	high	2	No	0.0	No	0.0	No	0.0
10/11/2017	high	2	No	0.0	No	0.0	No	0.0
10/12/2017	high	2	No	0.0	No	0.0	No	0.0
10/16/2017	low	0	No	0.0	No	0.0	No	0.0
10/17/2017	low	0	No	0.0	No	0.0	No	0.0
10/18/2017	low	0	No	0.0	No	0.0	No	0.0
10/19/2017	high	2	No	0.0	No	0.0	No	0.0
10/24/2017	high	2	No	0.0	No	0.0	No	0.0
10/25/2017	high	2	No	0.0	No	0.0	No	0.0
10/26/2017	high	2	No	0.0	No	0.0	No	0.0
10/30/2017	medium	1	No	0.0	No	0.0	No	0.0
11/2/2017	medium	1	No	0.0	No	0.0	No	0.0
11/6/2017	high	2	No	0.0	No	0.0	No	0.0
11/13/2017	medium	1	No	0.0	No	0.0	No	0.0
11/14/2017	low	0	No	0.0	No	0.0	No	0.0
11/15/2017	medium	1	No	0.0	No	0.0	**Yes**	**1.0**
11/20/2017	high	2	No	0.0	**Yes**	**0.5**	No	0.0
11/21/2017	high	2	No	0.0	No	0.0	No	0.0
11/22/2017	medium	1	No	0.0	No	0.0	No	0.0
11/27/2017	medium	1	No	0.0	No	0.0	**Yes**	**0.5**
11/30/2017	medium	1	No	0.0	No	0.0	**Yes**	**0.5**
12/4/2017	high	2	No	0.0	No	0.0	No	0.0
12/5/2017	high	2	No	0.0	No	0.0	No	0.0
12/11/2017	medium	1	No	0.0	No	0.0	No	0.0
12/12/2017	medium	1	No	0.0	No	0.0	No	0.0
12/13/2017	medium	1	No	0.0	No	0.0	No	0.0
12/15/2017	medium	1	No	0.0	No	0.0	No	0.0
12/18/2017	high	2	No	0.0	No	0.0	No	0.0
12/19/2017	high	2	No	0.0	No	0.0	No	0.0
12/20/2017	high	2	No	0.0	No	0.0	No	0.0
12/26/2017	high	2	No	0.0	No	0.0	No	0.0
1/2/2018	high	2	No	0.0	No	0.0	No	0.0

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
1/8/2018	high	2	No	0.0	No	0.0	No	0.0
1/9/2018	high	2	No	0.0	No	0.0	No	0.0
1/11/2018	high	2	No	0.0	No	0.0	No	0.0
1/16/2018	high	2	No	0.0	No	0.0	No	0.0
1/17/2018	medium	1	No	0.0	No	0.0	No	0.0
1/18/2018	high	2	No	0.0	No	0.0	No	0.0
1/22/2018	high	2	No	0.0	No	0.0	No	0.0
1/29/2018	high	2	No	0.0	No	0.0	No	0.0
2/5/2018	high	2	No	0.0	No	0.0	No	0.0
2/12/2018	medium	1	No	0.0	No	0.0	No	0.0
2/13/2018	medium	1	No	0.0	No	0.0	No	0.0
2/14/2018	medium	1	No	0.0	No	0.0	No	0.0
2/20/2018	high	2	No	0.0	No	0.0	No	0.0
2/21/2018	medium	1	No	0.0	No	0.0	No	0.0
2/22/2018	medium	1	No	0.0	No	0.0	No	0.0
2/26/2018	medium	1	No	0.0	No	0.0	No	0.0
3/1/2018	medium	1	No	0.0	No	0.0	No	0.0
3/5/2018	high	2	No	0.0	No	0.0	No	0.0
3/12/2018	high	2	No	0.0	**Yes**	**0.5**	No	0.0
3/13/2018	high	2	No	0.0	No	0.0	No	0.0
3/14/2018	high	2	No	0.0	No	0.0	No	0.0
3/19/2018	high	2	No	0.0	No	0.0	No	0.0
3/22/2018	high	2	No	0.0	No	0.0	No	0.0
3/23/2018	high	2	No	0.0	No	0.0	No	0.0
3/26/2018	medium	1	No	0.0	No	0.0	No	0.0
3/28/2018	medium	1	No	0.0	No	0.0	No	0.0
4/2/2018	high	2	No	0.0	No	0.0	No	0.0
4/9/2018	high	2	No	0.0	No	0.0	No	0.0
4/10/2018	medium	1	No	0.0	No	0.0	No	0.0
4/16/2018	high	2	No	0.0	No	0.0	No	0.0
4/17/2018	high	2	No	0.0	No	0.0	No	0.0
4/18/2018	high	2	No	0.0	No	0.0	No	0.0
4/23/2018	medium	1	No	0.0	No	0.0	No	0.0
4/25/2018	medium	1	No	0.0	No	0.0	No	0.0
4/26/2018	medium	1	No	0.0	No	0.0	No	0.0
4/27/2018	medium	1	No	0.0	No	0.0	No	0.0
4/30/2018	medium	1	No	0.0	No	0.0	No	0.0
5/2/2018	medium	1	No	0.0	**Yes**	**0.5**	No	0.0
5/7/2018	high	2	No	0.0	No	0.0	No	0.0
5/10/2018	high	2	No	0.0	No	0.0	No	0.0
5/14/2018	medium	1	No	0.0	No	0.0	No	0.0
5/15/2018	high	2	No	0.0	No	0.0	No	0.0
5/16/2018	high	2	No	0.0	No	0.0	No	0.0
5/17/2018	high	2	No	0.0	No	0.0	No	0.0
5/21/2018	medium	1	No	0.0	**Yes**	**0.5**	No	0.0
5/31/2018	high	2	No	0.0	No	0.0	No	0.0
6/4/2018	medium	1	No	0.0	No	0.0	No	0.0
6/5/2018	medium	1	No	0.0	No	0.0	No	0.0
6/11/2018	low	0	No	0.0	No	0.0	No	0.0
6/12/2018	low	0	No	0.0	No	0.0	No	0.0

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
6/13/2018	low	0	No	0.0	No	0.0	No	0.0
6/18/2018	high	2	No	0.0	No	0.0	No	0.0
6/19/2018	high	2	No	0.0	No	0.0	No	0.0
6/20/2018	medium	1	No	0.0	No	0.0	No	0.0
6/25/2018	low	0	No	0.0	No	0.0	No	0.0
7/6/2018	medium	1	No	0.0	No	0.0	No	0.0
7/11/2018	low	0	No	0.0	No	0.0	No	0.0
7/12/2018	medium	1	No	0.0	No	0.0	No	0.0
7/16/2018	high	2	No	0.0	No	0.0	No	0.0
7/17/2018	high	2	No	0.0	No	0.0	No	0.0
7/18/2018	high	2	No	0.0	No	0.0	No	0.0
7/23/2018	low	0	No	0.0	No	0.0	No	0.0
7/26/2018	low	0	No	0.0	No	0.0	No	0.0
7/31/2018	high	2	No	0.0	**Yes**	**0.5**	No	0.0
8/6/2018	low	0	No	0.0	No	0.0	No	0.0
8/14/2018	high	2	No	0.0	No	0.0	No	0.0
8/15/2018	high	2	No	0.0	**Yes**	**0.5**	No	0.0
8/21/2018	low	0	No	0.0	No	0.0	No	0.0
8/27/2018	high	2	No	0.0	No	0.0	No	0.0
8/28/2018	high	2	No	0.0	No	0.0	No	0.0
8/31/2018	medium	1	No	0.0	No	0.0	No	0.0
9/4/2018	low	0	No	0.0	No	0.0	No	0.0
9/10/2018	high	2	No	0.0	**Yes**	**0.5**	**Yes**	**0.5**
9/11/2018	high	2	No	0.0	No	0.0	No	0.0
9/12/2018	high	2	No	0.0	No	0.0	No	0.0
9/17/2018	low	0	No	0.0	No	0.0	No	0.0
9/18/2018	low	0	No	0.0	No	0.0	No	0.0
9/19/2018	low	0	No	0.0	No	0.0	No	0.0
9/24/2018	medium	1	No	0.0	No	0.0	No	0.0
9/26/2018	high	2	No	0.0	No	0.0	No	0.0
9/27/2018	high	2	No	0.0	No	0.0	No	0.0
10/1/2018	medium	1	No	0.0	No	0.0	No	0.0
10/8/2018	medium	1	No	0.0	No	0.0	No	0.0
10/15/2018	high	2	No	0.0	No	0.0	No	0.0
10/16/2018	high	2	No	0.0	No	0.0	No	0.0
10/17/2018	medium	1	No	0.0	No	0.0	No	0.0
10/23/2018	medium	1	No	0.0	No	0.0	No	0.0
10/24/2018	high	2	No	0.0	No	0.0	No	0.0
10/30/2018	high	2	No	0.0	No	0.0	No	0.0
11/5/2018	medium	1	No	0.0	No	0.0	No	0.0
11/8/2018	high	2	No	0.0	No	0.0	No	0.0
11/12/2018	high	2	No	0.0	No	0.0	No	0.0
11/13/2018	high	2	No	0.0	No	0.0	No	0.0
11/14/2018	high	2	No	0.0	No	0.0	No	0.0
11/19/2018	medium	1	No	0.0	No	0.0	No	0.0
11/26/2018	high	2	No	0.0	No	0.0	No	0.0
11/27/2018	high	2	No	0.0	No	0.0	No	0.0
12/5/2018	high	2	No	0.0	No	0.0	No	0.0
12/6/2018	high	2	No	0.0	No	0.0	No	0.0

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
12/10/2018	high	2	No	0.0	No	0.0	No	0.0
12/11/2018	high	2	No	0.0	**Yes**	**0.5**	**Yes**	**0.5**
12/12/2018	high	2	No	0.0	No	0.0	No	0.0
12/17/2018	medium	1	No	0.0	No	0.0	**Yes**	**1.0**
12/18/2018	medium	1	No	0.0	No	0.0	**Yes**	**0.5**
12/19/2018	medium	1	No	0.0	No	0.0	**Yes**	**1.0**
12/21/2018	high	2	No	0.0	No	0.0	No	0.0
12/26/2018	high	2	No	0.0	No	0.0	No	0.0
1/2/2019	medium	1	No	0.0	No	0.0	No	0.0
1/7/2019	high	2	No	0.0	No	0.0	No	0.0
1/14/2019	high	2	No	0.0	No	0.0	No	0.0
1/15/2019	high	2	No	0.0	No	0.0	No	0.0
1/16/2019	high	2	No	0.0	**Yes**	**0.5**	**Yes**	**0.5**
1/22/2019	high	2	No	0.0	No	0.0	No	0.0
1/28/2019	high	2	No	0.0	No	0.0	No	0.0
2/6/2019	high	2	No	0.0	No	0.0	No	0.0
2/13/2019	high	2	No	0.0	No	0.0	No	0.0
2/14/2019	high	2	No	0.0	No	0.0	No	0.0
2/15/2019	high	2	No	0.0	No	0.0	No	0.0
2/18/2019	medium	1	No	0.0	No	0.0	**Yes**	**0.5**
2/19/2019	low	0	No	0.0	No	0.0	No	0.0
2/26/2019	high	2	No	0.0	**Yes**	**0.5**	**Yes**	**0.5**
2/27/2019	high	2	No	0.0	No	0.0	No	0.0
3/4/2019	high	2	No	0.0	No	0.0	No	0.0
3/11/2019	high	2	No	0.0	No	0.0	No	0.0
3/12/2019	high	2	No	0.0	No	0.0	No	0.0
3/13/2019	high	2	No	0.0	No	0.0	No	0.0
3/18/20119	medium	1	No	0.0	No	0.0	No	0.0
3/19/2019	medium	1	No	0.0	**Yes**	**1.0**	No	0.0
3/20/2019	medium	1	No	0.0	No	0.0	No	0.0
3/25/2019	high	2	No	0.0	No	0.0	No	0.0
4/1/2019	medium	1	No	0.0	No	0.0	No	0.0
4/8/2019	high	2	No	0.0	**Yes**	**0.5**	**Yes**	**1.0**
4/10/2019	high	2	No	0.0	No	0.0	No	0.0
4/17/2019	medium	1	No	0.0	No	0.0	No	0.0
4/22/2019	high	2	No	0.0	**Yes**	**0.5**	No	0.0
4/23/2019	high	2	No	0.0	No	0.0	No	0.0
4/24/2019	medium	1	No	0.0	No	0.0	No	0.0
4/29/2019	medium	1	No	0.0	No	0.0	No	0.0
5/3/2019	low	0	No	0.0	No	0.0	No	0.0
5/6/2019	high	2	No	0.0	**Yes**	**0.5**	No	0.0
5/8/2019	high	2	No	0.0	No	0.0	No	0.0
5/13/2019	low	0	No	0.0	No	0.0	No	0.0
5/14/2019	low	0	No	0.0	No	0.0	No	0.0
5/15/2019	low	0	No	0.0	No	0.0	No	0.0
5/20/2019	high	2	No	0.0	**Yes**	**1.0**	**Yes**	**0.5**
5/28/2019	low	0	No	0.0	No	0.0	No	0.0
5/29/2019	low	0	No	0.0	No	0.0	No	0.0
5/30/2019	low	0	No	0.0	No	0.0	No	0.0

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
6/3/2019	medium	1	No	0.0	No	0.0	No	0.0
6/10/2019	medium	1	No	0.0	No	0.0	No	0.0
6/11/2019	low	0	No	0.0	No	0.0	No	0.0
6/17/2019	medium	1	No	0.0	**Yes**	**0.5**	No	0.0
6/18/2019	medium	1	No	0.0	No	0.0	No	0.0
6/19/2019	high	2	No	0.0	No	0.0	No	0.0
6/24/2019	medium	1	No	0.0	No	0.0	No	0.0
7/1/2019	low	0	No	0.0	No	0.0	No	0.0
7/8/2019	high	2	No	0.0	No	0.0	No	0.0
7/9/2019	medium	1	No	0.0	**Yes**	**0.5**	No	0.0
7/10/2019	low	0	No	0.0	No	0.0	No	0.0
7/11/2019	low	0	No	0.0	No	0.0	No	0.0
7/22/2019	high	2	No	0.0	No	0.0	No	0.0
7/23/2019	high	2	No	0.0	No	0.0	No	0.0
7/24/2019	high	2	No	0.0	No	0.0	No	0.0
7/25/2019	high	2	No	0.0	No	0.0	No	0.0
7/26/2019	low	0	No	0.0	No	0.0	No	0.0
7/29/2019	low	0	No	0.0	No	0.0	No	0.0
7/30/2019	low	0	No	0.0	No	0.0	No	0.0
7/31/2019	low	0	No	0.0	No	0.0	No	0.0
8/5/2019	high	2	No	0.0	No	0.0	No	0.0
8/12/2019	low	0	No	0.0	No	0.0	No	0.0
8/13/2019	low	0	No	0.0	No	0.0	No	0.0
8/14/2019	medium	1	No	0.0	**Yes**	**0.5**	No	0.0
8/19/2019	high	2	No	0.0	No	0.0	**Yes**	**0.5**
8/26/2019	low	0	No	0.0	No	0.0	No	0.0
9/3/2019	medium	1	No	0.0	No	0.0	No	0.0
9/9/2019	low	0	No	0.0	No	0.0	No	0.0
9/10/2019	low	0	No	0.0	No	0.0	No	0.0
9/26/2019	medium	1	No	0.0	No	0.0	No	0.0
10/1/2019	high	2	No	0.0	No	0.0	No	0.0
10/8/2019	low	0	No	0.0	No	0.0	No	0.0
10/15/2019	high	2	No	0.0	No	0.0	No	0.0
10/16/2019	high	2	No	0.0	No	0.0	No	0.0
10/17/2019	high	2	No	0.0	No	0.0	No	0.0
10/22/2019	low	0	No	0.0	No	0.0	No	0.0
10/29/2019	high	2	No	0.0	No	0.0	No	0.0
11/5/2019	medium	1	No	0.0	No	0.0	No	0.0
11/12/2019	medium	1	No	0.0	No	0.0	No	0.0
11/20/2019	medium	1	No	0.0	No	0.0	No	0.0
11/25/2019	high	2	No	0.0	No	0.0	No	0.0
11/26/2019	medium	1	No	0.0	No	0.0	No	0.0
12/3/2019	medium	1	No	0.0	No	0.0	No	0.0
12/9/2019	high	2	No	0.0	No	0.0	No	0.0
12/10/2019	medium	1	No	0.0	No	0.0	No	0.0
12/11/2019	high	2	No	0.0	No	0.0	No	0.0
12/19/2019	medium	1	No	0.0	No	0.0	No	0.0
12/23/2019	low	0	No	0.0	No	0.0	No	0.0
12/27/2019	high	2	No	0.0	No	0.0	No	0.0

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
1/3/2020	medium	1	No	0.0	No	0.0	No	0.0
1/8/2020	medium	1	No	0.0	No	0.0	No	0.0
1/14/2020	high	2	No	0.0	No	0.0	No	0.0
1/17/2020	high	2	No	0.0	No	0.0	No	0.0
1/21/2020	low	0	No	0.0	No	0.0	No	0.0
1/23/2020	medium	1	No	0.0	No	0.0	No	0.0
1/28/2020	high	2	No	0.0	No	0.0	No	0.0
2/4/2020	medium	1	No	0.0	No	0.0	No	0.0
2/11/2020	high	2	No	0.0	No	0.0	No	0.0
2/14/2020	low	0	No	0.0	No	0.0	No	0.0
2/18/2020	low	0	No	0.0	No	0.0	No	0.0
2/20/2020	low	0	No	0.0	No	0.0	No	0.0
2/25/2020	high	2	No	0.0	No	0.0	No	0.0
3/3/2020	medium	1	No	0.0	No	0.0	No	0.0
3/10/2020	high	2	No	0.0	No	0.0	No	0.0
3/17/2020	medium	1	No	0.0	No	0.0	No	0.0
3/24/2020	high	2	No	0.0	No	0.0	No	0.0
3/25/2020	high	2	No	0.0	No	0.0	No	0.0
3/31/2020	medium	1	No	0.0	No	0.0	No	0.0
4/7/2020	high	2	No	0.0	No	0.0	No	0.0
4/14/2020	high	2	No	0.0	No	0.0	No	0.0
4/22/2020	medium	1	No	0.0	No	0.0	No	0.0
4/23/2020	high	2	No	0.0	No	0.0	No	0.0
4/28/2020	high	2	No	0.0	No	0.0	No	0.0
5/5/2020	medium	1	No	0.0	No	0.0	No	0.0
5/12/2020	high	2	No	0.0	No	0.0	No	0.0
5/19/2020	medium	1	No	0.0	No	0.0	No	0.0
5/26/2020	high	2	No	0.0	No	0.0	No	0.0
5/27/2020	high	2	No	0.0	No	0.0	No	0.0
5/28/2020	high	2	No	0.0	No	0.0	No	0.0
6/2/2020	low	0	No	0.0	No	0.0	No	0.0
6/9/2020	high	2	No	0.0	No	0.0	No	0.0
6/16/2020	medium	1	No	0.0	No	0.0	No	0.0
6/17/2020	low	0	No	0.0	No	0.0	No	0.0
6/23/2020	low	0	No	0.0	No	0.0	No	0.0
6/30/2020	low	0	No	0.0	No	0.0	No	0.0
7/7/2020	high	2	No	0.0	No	0.0	No	0.0
7/8/2020	medium	1	No	0.0	No	0.0	No	0.0
7/14/2020	low	0	No	0.0	No	0.0	No	0.0
7/21/2020	medium	1	No	0.0	No	0.0	No	0.0
7/22/2020	high	2	No	0.0	No	0.0	No	0.0
7/23/2020	high	2	No	0.0	No	0.0	No	0.0
7/28/2020	low	0	No	0.0	No	0.0	No	0.0
7/31/2020	low	0	No	0.0	No	0.0	No	0.0
8/4/2020	high	2	No	0.0	No	0.0	No	0.0
8/11/2020	medium	1	No	0.0	No	0.0	No	0.0
8/18/2020	low	0	No	0.0	No	0.0	No	0.0
8/20/2020	high	2	No	0.0	No	0.0	No	0.0
8/25/2020	medium	1	No	0.0	No	0.0	No	0.0
9/1/2020	medium	1	No	0.0	No	0.0	No	0.0

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
9/8/2020	medium	1	No	0.0	No	0.0	No	0.0
9/15/2020	low	0	No	0.0	No	0.0	No	0.0
9/22/2020	high	2	No	0.0	No	0.0	No	0.0
9/24/2020	medium	1	No	0.0	No	0.0	No	0.0
9/29/2020	medium	1	No	0.0	No	0.0	No	0.0
10/6/2020	high	2	No	0.0	No	0.0	No	0.0
10/13/2020	low	0	No	0.0	No	0.0	No	0.0
10/20/2020	high	2	No	0.0	No	0.0	No	0.0
10/21/2020	high	2	No	0.0	No	0.0	No	0.0
10/27/2020	low	0	No	0.0	**Yes**	**1.0**	No	0.0
11/3/2020	high	2	No	0.0	No	0.0	No	0.0
11/10/2020	medium	1	No	0.0	No	0.0	No	0.0
11/17/2020	high	2	No	0.0	No	0.0	No	0.0
11/18/2020	high	2	No	0.0	No	0.0	No	0.0
11/19/2020	high	2	No	0.0	No	0.0	No	0.0
11/24/2020	low	0	No	0.0	No	0.0	No	0.0
12/1/2020	high	2	No	0.0	No	0.0	No	0.0
12/8/2020	medium	1	No	0.0	No	0.0	No	0.0
12/15/2020	high	2	No	0.0	No	0.0	No	0.0
12/21/2020	high	2	No	0.0	No	0.0	No	0.0
12/22/2020	high	2	No	0.0	No	0.0	No	0.0
12/29/2020	medium	1	No	0.0	No	0.0	No	0.0
1/5/2021	high	2	No	0.0	No	0.0	No	0.0
1/12/2021	high	2	No	0.0	No	0.0	No	0.0
1/19/2021	high	2	No	0.0	No	0.0	No	0.0
1/20/2021	medium	1	No	0.0	No	0.0	No	0.0
1/26/2021	medium	1	No	0.0	No	0.0	No	0.0
2/2/2021	high	2	No	0.0	No	0.0	No	0.0
2/9/2021	medium	1	No	0.0	No	0.0	No	0.0
2/16/2021	high	2	No	0.0	No	0.0	No	0.0
2/18/2021	high	2	No	0.0	No	0.0	No	0.0
2/23/2021	medium	1	No	0.0	No	0.0	No	0.0
3/2/2021	medium	1	No	0.0	No	0.0	No	0.0
3/9/2021	medium	1	No	0.0	No	0.0	No	0.0
3/16/2021	high	2	No	0.0	No	0.0	No	0.0
3/23/2021	medium	1	No	0.0	No	0.0	No	0.0
3/30/2021	high	2	No	0.0	No	0.0	No	0.0
4/6/2021	medium	1	No	0.0	No	0.0	No	0.0
4/13/2021	high	2	No	0.0	No	0.0	No	0.0
4/20/2021	high	2	No	0.0	No	0.0	No	0.0
4/26/2021	medium	1	No	0.0	No	0.0	No	0.0
5/4/2021	medium	1	No	0.0	No	0.0	No	0.0
5/7/2021	medium	1	No	0.0	No	0.0	No	0.0
5/11/2021	low	0	No	0.0	No	0.0	No	0.0
5/18/2021	high	2	No	0.0	No	0.0	No	0.0
5/25/2021	low	0	No	0.0	No	0.0	No	0.0
6/1/2021	medium	1	No	0.0	No	0.0	No	0.0
6/8/2021	low	0	No	0.0	No	0.0	No	0.0
6/15/2021	high	2	No	0.0	No	0.0	No	0.0

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
6/22/2021	low	0	No	0.0	No	0.0	No	0.0
6/29/2021	high	2	No	0.0	No	0.0	No	0.0
7/6/2021	low	0	No	0.0	No	0.0	No	0.0
7/13/2021	high	2	No	0.0	No	0.0	No	0.0
7/20/2021	low	0	No	0.0	No	0.0	No	0.0
7/27/2021	high	2	No	0.0	No	0.0	No	0.0
8/3/2021	low	0	No	0.0	No	0.0	No	0.0
8/10/2021	high	2	No	0.0	**Yes**	**0.5**	No	0.0
8/17/2021	low	0	No	0.0	No	0.0	No	0.0
8/24/2021	high	2	No	0.0	No	0.0	No	0.0
8/25/2021	high	2	No	0.0	No	0.0	No	0.0
8/26/2021	high	2	No	0.0	No	0.0	No	0.0
9/7/2021	high	2	No	0.0	No	0.0	No	0.0
9/14/2021	low	0	No	0.0	No	0.0	No	0.0
9/15/2021	high	2	No	0.0	No	0.0	No	0.0
9/21/2021	high	2	No	0.0	No	0.0	No	0.0
9/28/2021	medium	1	No	0.0	No	0.0	No	0.0
10/5/2021	medium	1	No	0.0	No	0.0	No	0.0
10/12/2021	high	2	No	0.0	No	0.0	No	0.0
10/19/2021	low	0	No	0.0	No	0.0	No	0.0
10/21/2021	high	2	No	0.0	No	0.0	No	0.0
10/26/2021	high	2	No	0.0	No	0.0	No	0.0
11/2/2021	medium	1	No	0.0	No	0.0	No	0.0
11/5/2021	high	2	No	0.0	No	0.0	No	0.0
11/9/2021	high	2	No	0.0	No	0.0	No	0.0
11/16/2021	medium	1	No	0.0	No	0.0	No	0.0
11/18/2021	medium	1	No	0.0	No	0.0	No	0.0
11/23/2021	high	2	No	0.0	No	0.0	No	0.0
11/30/2021	low	0	No	0.0	No	0.0	No	0.0
12/7/2021	high	2	No	0.0	No	0.0	No	0.0
12/14/2021	medium	1	No	0.0	No	0.0	No	0.0
12/15/2021	medium	1	No	0.0	No	0.0	No	0.0
12/16/2021	medium	1	No	0.0	No	0.0	No	0.0
12/21/2021	high	2	No	0.0	No	0.0	No	0.0
12/28/2021	high	2	No	0.0	No	0.0	No	0.0
1/4/2022	high	2	No	0.0	No	0.0	No	0.0
1/11/2022	high	2	No	0.0	No	0.0	No	0.0
1/18/2022	high	2	No	0.0	No	0.0	No	0.0
1/20/2022	high	2	No	0.0	No	0.0	No	0.0
1/25/2022	high	2	No	0.0	No	0.0	No	0.0
2/8/2022	medium	1	No	0.0	No	0.0	No	0.0
2/15/2000	high	2	No	0.0	No	0.0	No	0.0
2/22/2022	medium	1	No	0.0	No	0.0	No	0.0
3/1/2022	low	0	No	0.0	No	0.0	No	0.0
3/8/2022	high	2	No	0.0	No	0.0	No	0.0
3/15/2022	high	2	No	0.0	No	0.0	No	0.0
3/16/2022	high	2	No	0.0	No	0.0	No	0.0
3/17/2022	high	2	No	0.0	No	0.0	No	0.0
3/22/2022	high	2	No	0.0	No	0.0	No	0.0

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
3/29/2022	high	2	No	0.0	No	0.0	No	0.0
4/5/2022	medium	1	No	0.0	No	0.0	No	0.0
4/12/2022	medium	1	No	0.0	No	0.0	No	0.0
4/19/2022	high	2	No	0.0	No	0.0	No	0.0
4/21/2022	high	2	No	0.0	No	0.0	No	0.0
4/26/2022	medium	1	No	0.0	No	0.0	No	0.0
5/3/2022	low	0	No	0.0	No	0.0	No	0.0
5/10/2022	medium	1	No	0.0	No	0.0	No	0.0
5/12/2022	high	2	No	0.0	No	0.0	No	0.0
5/18/2022	low	0	No	0.0	No	0.0	No	0.0
5/19/2022	high	2	No	0.0	No	0.0	No	0.0
5/24/2022	medium	1	No	0.0	No	0.0	No	0.0
5/31/2022	low	0	No	0.0	No	0.0	No	0.0
6/7/2022	medium	1	No	0.0	No	0.0	No	0.0
6/14/2022	low	0	No	0.0	No	0.0	No	0.0
6/21/2022	high	2	No	0.0	No	0.0	No	0.0
6/28/2022	low	0	No	0.0	No	0.0	No	0.0
7/6/2022	high	2	No	0.0	No	0.0	No	0.0
7/12/2022	low	0	No	0.0	No	0.0	No	0.0
7/19/2022	medium	1	No	0.0	No	0.0	No	0.0
7/26/2022	low	0	No	0.0	No	0.0	No	0.0
8/2/2022	high	2	No	0.0	No	0.0	No	0.0
8/9/2022	low	0	No	0.0	No	0.0	No	0.0
8/16/2022	high	2	No	0.0	No	0.0	No	0.0
8/24/2022	low	0	No	0.0	No	0.0	No	0.0
8/30/2022	high	2	No	0.0	No	0.0	No	0.0
9/6/2022	low	0	No	0.0	No	0.0	No	0.0
9/14/2022	high	2	No	0.0	No	0.0	No	0.0
9/20/2022	low	0	No	0.0	No	0.0	No	0.0
9/27/2022	high	2	No	0.0	No	0.0	No	0.0
10/4/2022	low	0	No	0.0	No	0.0	No	0.0
10/11/2022	high	2	No	0.0	No	0.0	No	0.0
10/18/2022	low	0	No	0.0	No	0.0	No	0.0
10/25/2022	high	2	No	0.0	No	0.0	No	0.0
10/26/2022	high	2	No	0.0	No	0.0	No	0.0
10/27/2022	high	2	No	0.0	No	0.0	No	0.0
11/1/2022	high	2	No	0.0	No	0.0	No	0.0
11/8/2022	high	2	No	0.0	No	0.0	No	0.0
11/15/2022	medium	1	No	0.0	No	0.0	No	0.0
11/21/2022	low	0	No	0.0	No	0.0	No	0.0
11/30/2022	high	2	No	0.0	No	0.0	No	0.0
12/6/2022	high	2	No	0.0	No	0.0	No	0.0
12/13/2022	medium	1	No	0.0	No	0.0	No	0.0
12/20/2022	high	2	No	0.0	No	0.0	No	0.0
12/21/2022	high	2	No	0.0	No	0.0	No	0.0
12/27/2022	high	2	No	0.0	No	0.0	No	0.0
1/3/2023	medium	1	No	0.0	No	0.0	No	0.0
1/10/2023	high	2	No	0.0	No	0.0	No	0.0
1/12/2023	high	2	No	0.0	No	0.0	No	0.0

Table 4. Duwamish Waterway and Containment Boom Surface Water Sheen Monitoring
Site: Former BP Harbor Island Terminal

Date	Tidal Stage		Loading Rack Area Boom Sheen Observations		Warehouse Area North Boom Sheen Observations		Warehouse Area South Boom Sheen Observations	
	Low, Medium (ebb & flood), High	Tide Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)	Sheen (**Yes**/No)	Sheen Rating (See Notes)
1/24/2023	high	2	No	0.0	No	0.0	No	0.0
1/31/2023	medium	1	No	0.0	No	0.0	No	0.0
2/7/2023	high	2	No	0.0	No	0.0	No	0.0
2/16/2023	medium	1	No	0.0	No	0.0	No	0.0
2/21/2023	high	2	No	0.0	No	0.0	No	0.0
2/22/2023	low	0	No	0.0	No	0.0	No	0.0
2/23/2023	high	2	No	0.0	No	0.0	No	0.0
2/28/2023	medium	1	No	0.0	No	0.0	No	0.0
3/1/2023	high	2	No	0.0	No	0.0	No	0.0
3/7/2023	low	0	No	0.0	No	0.0	No	0.0
3/14/2023	medium	1	No	0.0	No	0.0	No	0.0
3/21/2023	high	2	No	0.0	No	0.0	No	0.0

Notes:
Bold entries represent sheen detections.
Loading Rack Area Boom removed in August 2017 with concurrance from Ecology due to persistent lack of sheens.
South Boom removed in April 2022 with concurrance from Ecology due to persistent lack of sheens.

* Sheen Appearance is rated from 0.0 to 3.0 using criteria below;
0.0 No sheen present
0.5 Very light , sheen that rapidly dissapates
1.0 Light sheen visible in one location
2.0 Sheen visible in several locations and is brightly colored
3.0 Sheen covers large areas of boom, outside boom, and/or LNAPL floating on surface

Notes Continued:
** Tide Level is rated from 0.0 to 2.0 using the criteria below;
0.0 Low Tide
1.0 Medium Tide (Ebb Tide & Flood Tide)
2.0 High Tide

Table 5. Inland SVE System Petroleum Hydrocarbon Recovery Rates
BP West Coast Products Terminal 21T, Seattle, Washington

Date	Hours of Operation	Hours operated over period	Total HSVE Flow Rate from wells (SCFM)	Influent Gasoline Range Organics (GRO) (mg/m^3)	GRO recovered over period (lbs)	Cumulative GRO recovery (lbs)	GRO avg lbs/day over period	Influent Benzene (mg/m^3)	Benzene recovered over period (lbs)	Cumulative benzene recovery (lbs)	Avg CO2 %- Atmospheric concentration (0.04%)	Pounds GRO Destruction due to Enhanced Biodegredation over period (lbs)	Cumulative GRO Destruction due to Enhanced Biodegredation (gal)
8/22/2008	31	18	45	24,500	68.9	924	93.4	79.4	0.22	1.07	0.66	12	2
8/27/2008	152	50	43	19,500	164.7	1,349	79.7	62.9	0.53	2.45	0.635	78	15
9/2/2008	296	92	39	19,600	290.3	1,807	75.6	57.7	0.90	3.86	0.585	80	28
9/8/2008	440	68	94	13,200	376.6	2,399	133.7	24.2	0.94	5.34	0.41	92	43
9/15/2008	611	71	207	11,700	590.0	3,557	199.5	7.59	0.75	6.82	0.285	171	70
9/22/2008	777	117	239	5,240	905.1	4,825	186.4	0.37	0.43	7.41	0.285	246	110
9/30/2008	965	188	252	3,260	732.7	5,558	93.8	0.154	0.05	7.46	0.285	305	160
10/13/2008	1,277	169	273	1,050	372.6	6,236	53.0	0.154	0.03	7.51	0.26	495	240
10/20/2008	1,445	168	277	746	155.0	6,391	22.2	0.149	0.03	7.53	0.26	278	285
11/17/2008	2,118	169	277	295	96.0	6,773	13.6	*0.129*	0.03	7.63	0.26	283	331
12/11/2008	2,690	572	273	230	154.8	6,928	6.5	*0.5*	0.19	7.82	0.26	951	486
1/16/2009	3,556	866	224	40	108.6	7,036	3.0	*0.1*	0.24	8.06	0.26	1,298	697
2/18/2009	4,347	792	257	59	35.1	7,072	1.1	*0.1*	0.07	8.13	0.26	1,149	884
3/17/2009	4,993	646	270	42	32.2	7,104	1.2	*0.1*	0.06	8.20	0.335	1,324	1,099
4/16/2009	5,709	716	271	59	36.5	7,140	1.2	*0.1*	0.07	8.27	0.055	247	1,139
5/14/2009	6,384	674	263	11	23.4	7,164	0.8	*0.1*	0.07	8.34	0.135	563	1,231
6/16/2009	7,027	643	231	133	42.8	7,207	1.6	*0.1*	0.06	8.40	0.26	959	1,387
7/27/2009	7,864	837	249	190	121.7	7,328	3.5	*0.061*	0.06	8.46	0.36	1,681	1,660
8/18/2009	8,391	527	264	63	64.0	7,392	2.9	*0.14*	0.05	8.51	0.285	894	1,806
9/14/2009	9,065	674	264	30	31.0	7,423	1.1	*0.14*	0.09	8.60	0.235	970	1,963
10/20/2009	9,901	836	262	38	28.0	7,451	0.8	*0.13*	0.11	8.71	0.235	1,198	2,158
11/17/2009	10,577	676	286	17.0	19.1	7,470	0.7	*0.14*	0.09	8.81	0.185	796	2,288
12/15/2009	11,245	668	253	*9.0*	8.8	7,479	0.3	*0.14*	0.09	8.90	0.16	668	2,396
1/22/2010	12,152	907	221	*7.9*	6.8	7,486	0.2	*0.12*	0.10	9.00	0.21	1,048	2,567
2/18/2010	12,757	605	284	*7.2*	4.3	7,490	0.2	*0.11*	0.07	9.07	0.21	746	2,688
3/17/2010	13,404	647	264	2.7	3.3	7,493	0.1	*0.112*	0.07	9.14	0.21	864	2,828
4/14/2010	14,098	694	253	9.0	3.9	7,497	0.1	*0.14*	0.08	9.23	0.21	873	2,970
5/19/2010	14,887	789	234	*8.7*	*6.4*	7,504	0.2	*0.14*	0.10	9.33	0.21	936	3,123
6/17/2010	15,582	695	245	*8.5*	*5.4*	7,509	0.2	*0.13*	0.08	9.41	0.21	812	3,255
7/28/2010	16,590	1,009	269	9.1	*8.6*	7,518	0.2	*0.064*	0.09	9.51	0.21	1,266	3,460
8/19/2010	17,332	742	265	10.9	7.4	7,525	0.2	*0.52*	0.22	9.72	0.18	832	3,596
9/27/2010	18,028	695	232	*7.4*	5.9	7,531	0.2	*0.55*	0.35	10.07	0.205	827	3,730
10/20/2010	18,578	551	251	*6.5*	3.5	7,534	0.2	*0.49*	0.26	10.33	0.16	494	3,811
11/30/2010	19,562	984	280	15.6	10.8	7,545	0.3	*0.49*	0.48	10.81	0.075	455	3,884
12/13/2010	19,872	310	280	15.6	4.9	7,550	0.4	*1.49*	0.31	11.12	0.04	81	3,898
System shutdown due to high groundwater elevation on 12/13/2010. As measurements could not be collected, recovery calculations were based off data collected from the 11/30/2010 O&M event.													
6/6/2011	19,920	0	238	250	0.0	7,550	0.0	*0.52*	0.00	11.12	0.12	0	3,898
6/15/2011	20,136	216	266	250	50.9	7,601	5.7	*0.52*	0.11	11.22	0.12	151	3,922
7/20/2011	20,425	289	248	*8.2*	35.9	7,637	3.0	*0.62*	0.16	11.38	0.39	671	4,031
8/8/2011	20,434	9	256	*8.2*	0.1	7,637	0.2	*0.62*	0.01	11.39	0.39	20	4,035
8/16/2011	20,651	217	230	*7.4*	1.5	7,638	0.2	*0.55*	0.12	11.50	0.25	303	4,084
9/14/2011	21,320	670	268	11.3	5.8	7,644	0.2	*0.55*	0.34	11.85	0.11	426	4,153
10/12/2011	21,997	677	240	*9.1*	6.6	7,651	0.2	*0.68*	0.40	12.24	0.11	438	4,225
11/23/2011	23,000	1,003	226	14.3	10.2	7,661	0.2	*0.52*	0.53	12.77	0.11	597	4,322
12/14/2011	23,503	503	252	10.4	5.6	7,667	0.3	*0.45*	0.22	12.99	0.05	140	4,344
1/24/2012	24,344	841	222	47.3	21.5	7,688	0.6	*0.52*	0.36	13.35	0	0	4,344
2/15/2012	24,869	525	229	9.6	12.6	7,701	0.6	*0.55*	0.24	13.59	0	0	4,344

Table 5. Inland SVE System Petroleum Hydrocarbon Recovery Rates
BP West Coast Products Terminal 21T, Seattle, Washington

Date	Hours of Operation	Hours operated over period	Total HSVE Flow Rate from wells (SCFM)	Influent Gasoline Range Organics (GRO) (mg/m^3)	GRO recovered over period (lbs)	Cumulative GRO recovery (lbs)	GRO avg lbs/day over period	Influent Benzene (mg/m^3)	Benzene recovered over period (lbs)	Cumulative benzene recovery (lbs)	Avg CO2 %- Atmospheric concentration (0.04%)	Pounds GRO Destruction due to Enhanced Biodegredation over period (lbs)	Cumulative GRO Destruction due to Enhanced Biodegredation (gal)
3/14/2012	25,537	668	260	*6.5*	4.9	7,706	0.2	*0.49*	0.32	13.90	0	0	4,344
4/18/2012	26,376	840	248	*6.9*	5.4	7,711	0.2	*0.52*	0.40	14.31	0	0	4,344
5/16/2012	27,046	670	251	*6.9*	4.3	7,715	0.2	*0.52*	0.33	14.63	0	0	4,344
6/13/2012	27,718	672	259	*6.1*	4.2	7,720	0.1	*0.45*	0.31	14.94	0	0	4,344
7/20/2012	28,608	891	237	10.0	6.6	7,726	0.2	*0.58*	0.43	15.37	0	0	4,344
8/15/2012	29,229	621	250.6	*7.8*	5.2	7,731	0.2	*0.58*	0.34	15.71	0.01	35	4,350
9/6/2012	29,753	524	249.0	*10.0*	4.3	7,736	0.2	*0.78*	0.33	16.04	0.01	30	4,355
10/24/2012	30,906	1,153	261.6	*6.1*	8.9	7,745	0.2	*0.45*	0.68	16.72	0	0	4,355
11/28/2012	31,631	725	244.1	21.3	9.4	7,754	0.3	*0.52*	0.33	17.05	0	0	4,355
System shutdown due to high groundwater elevation on 11/28/2012. System will be restarted once groundwater elevations fall to a level that will not interfere with system operation.													
4/17/2013	31,764	133	267.7	*22*	2.8	7,757	0.5	*NA*	0.03	17.08	0	0	4,355
5/17/2013	32,484	721	270.8	*37*	21.4	7,778	0.7	*0.00076*	0.19	17.27	0	0	4,355
6/12/2013	33,106	621	258.3	*28*	20.0	7,798	0.8	*0.00079*	0.0005	17.27	0	0	4,355
7/24/2013	34,114	1,009	236.8	*24*	24.3	7,823	0.6	*0.00013*	0.0004	17.27	0	0	4,355
8/21/2013	34,786	672	265.9	*35*	18.7	7,841	0.7	*0.00097*	0.0003	17.27	0	0	4,355
9/25/2013	35,625	839	260.7	*27*	21.1	7,862	0.6	*0.00075*	0.0007	17.28	0	0	4,355
10/15/2013	36,104	479	258.7	*35*	14.4	7,877	0.7	*0.00097*	0.0004	17.28	0	0	4,355
11/20/2013	36,967	863	259.2	*27*	26.0	7,903	0.7	*0.00074*	0.0007	17.28	0	0	4,355
12/18/2013	37,638	670.7	234	4.4	9.7	7,912	0.3	0.04	0.0126	17.29	0	0	4,355
1/15/2014	38,308	670.6	235.4	12.0	4.8	7,917	0.2	0.99	0.3037	17.59	0	0	4,355
2/12/2014	38,979	671.0	266.7	2.3	4.5	7,922	0.2	*0.017*	0.3177	17.91	0	0	4,355
3/20/2014	39,620	641	260.4	*1.8*	1.3	7,923	0.05	*0.017*	0.0108	17.92	0	0	4,355
4/16/2014	40,263	643	262.8	*1.5*	1.0	7,924	0.04	0.017	0.0107	17.93	0	0	4,355
5/21/2014	41,101	838	249.2	5.9	3.0	7,927	0.09	*0.017*	0.0137	17.95	0	0	4,355
6/18/2014	41,771	670	251.0	*1.9*	2.4	7,929	0.09	*0.017*	0.0107	17.96	0	0	4,355
7/25/2014	42,657	886	267.6	*0.82*	1.2	7,931	0.0	*0.0013*	0.0079	17.96	0	0	4,355
8/13/2014	43,113	456	252.8	NR	1.9	7,933	0.10	*0.029*	0.0067	17.97	0	0	4,355
9/17/2014	43,953	840	241.8	7.9	3.4	7,936	0.10	*0.087*	0.0451	18.02	0	0	4,355
10/14/2014	44,625	672	260.3	1.4	2.9	7,939	0.10	*0.0013*	0.0279	18.04	0	0	4,355
11/18/2014	45,464	839	257.6	*0.82*	0.9	7,940	0.03	*0.0013*	0.0011	18.05	0	0	4,355
12/17/2014	46,135	670	250.6	*0.82*	0.5	7,940	0.02	*0.0013*	0.0008	18.05	0	0	4,355
Total Combined Recovery lbs (Bio+GRO): 34,723				**Total lbs of Gasoline (GRO): 7,940**					**Total lbs Benzene: 18.05**		**Total lbs due to Biodegredation: 26,783**		
Total Combined Recovery gal (Bio+GRO): 5,646				**Total gal of Gasoline (GRO): 1,291**					**Total gal of Benzene: 2.46**		**Total gal due to Biodegredation: 4,355**		

Table 5. Inland SVE System Petroleum Hydrocarbon Recovery Rates
BP West Coast Products Terminal 21T, Seattle, Washington

Date	Hours of Operation	Hours operated over period	Total HSVE Flow Rate from wells (SCFM)	Influent Gasoline Range Organics (GRO) (mg/m^3)	GRO recovered over period (lbs)	Cumulative GRO recovery (lbs)	GRO avg lbs/day over period	Influent Benzene (mg/m^3)	Benzene recovered over period (lbs)	Cumulative benzene recovery (lbs)	Avg CO2 %- Atmospheric concentration (0.04%)	Pounds GRO Destruction due to Enhanced Biodegredation over period (lbs)	Cumulative GRO Destruction due to Enhanced Biodegredation (gal)

Notes:

System operation was discontinued in December 2014, as monitoring data showed that the system was no longer recovering hydrocarbons and or enhancing biodegredation.

Samples were collected from the SVE influent vapor stream (air) for all analyses.

Samples were analyzed for concentrations of gasoline range organics (GRO) and benzene, toluene, ethylbenzene, & xylenes (BTEX) at an accredited lab.

Samples analysis methodologies utilized included TO-3 or NWTPH-Gx for GRO and TO-15, TO-3, or 8021b for BTEX.

Pounds of gasoline were converted to gallons by assuming that 6.15 lbs. equals 1.0 gallons.

Pounds of benzene were converted to gallons by assuming that 7.33 lbs. equals 1.0 gallons.

Total pounds of recovered gasoline started at 839 pounds, as this was the amount recovered during pilot testing.

Total pounds of recovered benzene started at 0.80 pounds, as this was the amount recovered during pilot testing.

Benzene and Gasoline recovery were biased high, as recoveries were calculated assuming analytes were present at associated detection limits. This provides a protective estimate of analyte concentrations below detection limits.

Analytes were not detected from analyses for all values listed in *italic*. The associated detection limits for the analyses are the value listed in *italic*.

The SVE system was shutdown from December 2010 through June 2011 and November 2012 through April 2013 due to high groundwater elevations that submerged horizontal SVE screens. The SVE system was restarted once the groundwater elevation had fallen to a save level for system operation.

Due to a laboratory oversight, benzene concentrations could not be quantified for the April 17, 2013 air sample. The May 17, 2013 air sample was analyzed for benzene using EPA Method TO-15, which generated data to a much lower detection limit than historically reported. No benzene was detected in this sample.

August 2014 GRO concentrations were not utilized to calculate GRO recovery. Laboratory analyses for GRO were biased high by the presence of non-target analytes, identified as siloxane compounds not typically found in gasoline and is not present at the site. This data was excluded to avoid artificially elevating gasoline capture.

Definitions:

Avg - average
Bio - biodegradation of petroleum hydrocarbons
CO_2 - carbon dioxide
gal - gallons
GRO - gasoline range organics (gasoline range petroleum hydrocarbons)
hr. - hour
HSVE - horizontal soil vapor extraction
lbs. - pounds
mg/m^3 - milligrams per cubic meter
NA - not available (see reasons above)
NR - not reported
SCFM - standard cubic feet per minute
SVE - soil vapor extraction
TPH - total petroleum hydrocarbons

Enhanced Biodegradation Calculations:

C = Average Influent CO_2 concentration (%)
Q = Influent Flow Rate (SCFM)
Mc = Molecular wt. of Carbon Dioxide = 44
CO_2 recovery (lbs./hr.) = C x Q x Mc x 5.277 x 10-4
5.277 x 10-4 is a constant and is derived as follows:
1/100% x 60min/1hr x 1 lb. Mole/379 cu.ft. x 1/3
Note: SVE TPH as CO_2 recovery rates were calculated by assuming that for every 3 lbs. of CO_2 detected, 1 lb. of TPH is metabolized, and that all CO_2 present in vapor stream above background atmospheric concentrations (0.04%) is attributable to microbial degradation of hydrocarbons in soil.

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1					
AMW-01	12/21/2000	ND	1,310	ND	14.0
AMW-01	3/28/2001	59.3	2,600	ND	69.6
AMW-01	6/13/2001	105 U	944	ND	**470**
AMW-01	10/4/2001	ND	851	ND	**152**
AMW-01	12/12/2001	ND	1700 J	ND UJ	**1,260**
AMW-01	3/7/2002	153	1,410	ND	**1,410**
AMW-01	6/12/2002	143 J	2,100	ND	**1,680**
AMW-01	9/19/2002	139 J	571 J	ND UJ	**1,180**
AMW-01	12/17/2002	196	2,190	ND	**74.6**
AMW-01	3/26/2003	101	2,100	ND	**933**
AMW-01	6/27/2003	ND	2,090	ND	**1,260**
AMW-01	9/18/2003	55	2,140	ND	48.5
AMW-01	12/22/2003	136	1750 J	ND	**571**
AMW-01	3/8/2004	ND UJ	ND	ND	**961**
AMW-01	6/16/2004	138	386	ND	**1,540**
AMW-01	9/28/2004	83	ND	ND	**292**
AMW-01	12/6/2004	103	ND	ND	**411**
AMW-01	3/10/2005	113	ND	ND	**812**
AMW-01	6/21/2005	129	ND	ND	**1,130**
AMW-01	9/27/2005	77	ND UJ	ND	**181 J**
AMW-01	12/13/2005	ND UJ	342	ND	**132**
AMW-01	3/21/2006	88	ND	ND	**363**
AMW-01	7/6/2006	ND UJ	ND	ND	**912**
AMW-01	9/18/2006	91.7	ND	ND	7.38
AMW-01	12/12/2006	**1,650 J**	ND UJ	ND UJ	**539 J**
AMW-01	3/21/2007	89.9	ND	ND	**457**
AMW-01	6/6/2007	61	ND	ND	**486**
AMW-01	9/12/2007	65	ND	ND	**157**
AMW-01	12/18/2007	ND	ND	ND	10.6 J
AMW-01	3/25/2008	ND	ND	ND	**76**
AMW-01	6/25/2008	64.9	ND	ND	**370**
AMW-01	9/17/2008	55.0	ND	ND	**162**
AMW-01	12/16/2008	ND	ND	ND	**330**
AMW-01	3/11/2009	ND	ND	ND	**374**
AMW-01	6/10/2009	ND	R	R	**240 J**
AMW-01	9/16/2009	ND	ND	ND	7.4
AMW-01	12/16/2009	ND	ND	ND	**280**
AMW-01	3/30/2010	ND	ND	ND	**310**
AMW-01	6/9/2010	ND	720	ND	**280**
AMW-01	9/14/2010	ND	ND	ND	69.7
AMW-01	12/14/2010	ND	ND	ND	**282**
AMW-01	3/22/2011	ND	ND	ND	**247**
AMW-01	6/22/2011	ND	300 J	ND	39.6
AMW-01	9/27/2011	ND	ND	ND	22.2
AMW-01	12/20/2011	ND	ND	ND UJ	**151**
AMW-01	3/20/2012	ND	ND	ND	**178**
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-01	6/21/2012	ND	ND	ND	**77**
AMW-01	9/10/2012	ND	ND	ND	38.7 J
AMW-01	12/19/2012	ND	ND	ND	61.2
AMW-01	3/19/2013	ND	ND	ND	**110**
AMW-01	6/25/2013	ND	ND	ND	12
AMW-01	9/10/2013	ND	ND	ND	17
AMW-01	12/10/2013	ND	ND	ND	17
AMW-01	3/11/2014	ND	990 J	ND	**77**
AMW-01	6/10/2014	ND UJ	1,100	ND	7.3
AMW-01	9/9/2014	ND	440 J	ND UJ	8.4
AMW-01	12/9/2014	ND	1,500	ND	20
AMW-01	3/10/2015	ND U	1,200 J	ND	68
AMW-01	6/9/2015	ND	450	ND	50
AMW-01	9/22/2015	ND	250	ND	12
AMW-01	12/15/2015	ND	430 J	ND UJ	38 J
AMW-01	3/8/2016	ND	320 J	ND UJ	24
AMW-01	6/8/2016	ND	1,200 J	ND UJ	4.1
AMW-01	9/8/2016	ND	1,300	ND	5.1
AMW-01	12/6/2016	ND U	800 J	ND	7.3
AMW-01	3/7/2017	230 J	1,300 J	1,100 J	1.0
AMW-01	6/7/2017	ND	ND UJ	ND	1.9
AMW-01	9/12/2017	ND	ND	ND	2.4
AMW-01	12/5/2017	ND	ND	ND	1.0
AMW-01	3/20/2018	240	ND	ND	ND
AMW-01	6/19/2018	ND UJ	480	710	ND
AMW-01	9/11/2018	ND	ND UJ	ND UJ	ND
AMW-01	12/11/2018	ND	610	ND	ND
AMW-01	3/12/2019	ND	ND	ND	ND
AMW-01	6/18/2019	ND	270	ND	ND
AMW-01	9/24/2019	ND	350 J	ND UJ	ND
AMW-01	12/17/2019	ND	ND	ND	ND
AMW-01	3/18/2020	ND	ND	ND	ND
AMW-01	6/10/2020	ND	420	ND	ND
AMW-01	9/16/2020	ND	300	ND	ND
AMW-01	12/16/2020	ND	ND	ND	ND
AMW-01	3/10/2021	ND	ND	ND	ND
AMW-01	6/17/2021	ND	ND	ND	ND
AMW-01	9/22/2021	ND	ND	ND	ND
AMW-01	12/8/2021	ND	ND	ND	ND
AMW-01	3/23/2022	ND	ND	ND	ND
AMW-01	6/22/2022	ND	ND	ND	ND
AMW-01	9/21/2022	ND	270	ND	ND
AMW-01	1/11/2023	ND	320 J	ND	ND
AMW-02	12/21/2000	ND	803	ND	3.14
AMW-02	3/28/2001	Not accessible due to earthquake damage to warehouse.			
AMW-02	6/13/2001	ND	999	ND	3.88 U
AMW-02	10/4/2001	ND	1,200	ND	10.90
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-02	12/12/2001	ND	1,500 J	ND UJ	5.47
AMW-02	3/7/2002	Not accessible due to repair of earthquake damage to warehouse.			
AMW-02	6/12/2002	ND	2,420	ND	1.49
AMW-02	9/19/2002	ND UJ	495 J	ND UJ	1.61
AMW-02	12/17/2002	ND	1,890	ND	4.08
AMW-02	3/26/2003	ND	2,200	ND	5.23
AMW-02	6/27/2003	ND	1,680	ND	1.11
AMW-02	9/18/2003	ND	2,430	790	2.01
AMW-02	12/22/2003	ND	1,880 J	ND	ND
AMW-02	3/8/2004	ND	ND	ND	ND
AMW-02	6/16/2004	ND	ND	ND	2.40
AMW-02	9/28/2004	ND	ND	ND	0.85
AMW-02	12/8/2004	ND	ND	ND	23.2
AMW-02	3/10/2005	ND	ND	ND	38.4
AMW-02	6/21/2005	ND	ND	ND	16.1
AMW-02	9/27/2005	ND	ND	ND	9.04
AMW-02	12/13/2005	ND	366	ND	7.26
AMW-02	3/21/2006	ND	ND	ND	2.16
AMW-02	7/6/2006	ND	ND	ND	41.1
AMW-02	9/18/2006	ND	ND	ND	3.18
AMW-02	12/12/2006	84.5 UJ	ND UJ	ND UJ	25.8 J
AMW-02	3/21/2007	ND	ND	ND	**92.2**
AMW-02	6/6/2007	ND	ND	ND	**442**
AMW-02	9/12/2007	ND	ND	ND	4.03 J
AMW-02	12/18/2007	ND	ND	ND	66.2
AMW-02	3/25/2008	75.9	ND	ND	**343**
AMW-02	6/25/2008	ND	ND	ND	**125**
AMW-02	9/17/2008	ND	ND	ND	30.7
AMW-02	12/16/2008	ND	ND	ND	**189**
AMW-02	3/11/2009	ND	ND	ND	**421**
AMW-02	6/10/2009	ND	R	R	**100**
AMW-02	9/16/2009	ND	ND	ND	12
AMW-02	12/16/2009	ND	ND	ND	**110**
AMW-02	3/30/2010	ND	1,000	ND	**210**
AMW-02	6/9/2010	ND	1,000	260	**130**
AMW-02	9/14/2010	ND	ND	ND	22.6
AMW-02	12/14/2010	ND	ND	ND	**96.2 J**
AMW-02	3/22/2011	ND	ND	ND	**149**
AMW-02	6/22/2011	ND	ND	ND	20.0
AMW-02	9/27/2011	ND	ND	ND	6.5
AMW-02	12/20/2011	ND	ND	ND	12.2
AMW-02	3/20/2012	ND	ND	ND	31.6
AMW-02	6/21/2012	ND	ND	ND	**82.5**
AMW-02	9/10/2012	ND	ND	ND	12.7 J
AMW-02	12/19/2012	ND	ND	ND	12.4
AMW-02	3/19/2013	ND	ND	ND	9.3
AMW-02	6/25/2013	ND	ND	ND	13.0
AMW-02	9/10/2013	ND	ND	ND	8.1
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-02	12/10/2013	ND	ND	ND	5.7
AMW-02	3/11/2014	ND	ND	ND	19.0
AMW-02	6/10/2014	ND UJ	320	ND	12.0
AMW-02	9/9/2014	ND	270	ND	29.0
AMW-02	12/9/2014	ND	530	ND	15.0
AMW-02	3/10/2015	ND U	370	ND	ND
AMW-02	6/9/2015	ND	ND	ND	3.1
AMW-02	9/22/2015	ND	ND	ND	2.0
AMW-02	12/15/2015	ND	ND	ND	4.4
AMW-02	3/8/2016	ND	290	ND	1.9
AMW-02	6/8/2016	ND	840	ND	3.0
AMW-02	9/8/2016	ND	810	ND	15.0
AMW-02	12/6/2016	ND	510	ND	4.4
AMW-02	3/7/2017	ND	850	740	ND
AMW-02	6/6/2017	ND	ND	ND	2.7
AMW-02	9/12/2017	ND	ND	ND	1.1
AMW-02	12/5/2017	ND	ND	ND UJ	0.96
AMW-02	3/20/2018	53.0	ND	ND	2.30
AMW-02	6/19/2018	ND	ND	ND	0.92
AMW-02	9/11/2018	ND	300	ND	1.20
AMW-02	12/11/2018	ND	560	ND	1.50
AMW-02	3/12/2019	ND	ND	ND	ND
AMW-02	6/18/2019	ND	630	ND	2.40
AMW-02	9/24/2019	ND	260	ND	12.0
AMW-02	12/17/2019	ND	ND	ND	(69.75 Average)**
AMW-02	3/18/2020	ND	ND	ND	30 J
AMW-02	6/10/2020	ND	330	ND	28
AMW-02	9/16/2020	ND	380	ND	14
AMW-02	12/16/2020	ND	ND	ND	1.9
AMW-02	3/10/2021	ND	ND	ND	0.92
AMW-02	6/17/2021	ND	ND	ND	0.58
AMW-02	9/22/2021	ND	ND	ND	ND
AMW-02	12/8/2021	ND	ND	ND	ND
AMW-02	3/23/2022	ND	ND	ND	0.63
AMW-02	6/22/2022	ND	ND	ND	0.53
AMW-02	9/21/2022	ND	ND	ND	0.56
AMW-02	1/11/2023	ND	ND	ND	0.51
AMW-03	12/21/2000	127	1,420	ND	ND
AMW-03	3/28/2001	Not accessible due to earthquake damage to warehouse.			
AMW-03	6/13/2001	ND	745	ND	ND
AMW-03	10/4/2001	ND	1,210	ND	ND
AMW-03	12/12/2001	ND	1,080 J	ND UJ	ND
AMW-03	3/7/2002	Not accessible due to earthquake damage to warehouse.			
AMW-03	6/12/2002	ND	1,070	ND	ND
AMW-03	9/19/2002	ND UJ	643 J	ND UJ	ND UJ
AMW-03	12/17/2002	ND	1,160	ND	ND
AMW-03	3/26/2003	ND	1,240	ND	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-03	6/27/2003	ND	713	ND	ND
AMW-03	9/18/2003	ND	1,050	ND	ND
AMW-03	12/22/2003	ND	374 J	ND	ND
AMW-03	3/8/2004	ND	ND	ND	ND
AMW-03	6/16/2004	ND	ND	ND	1.02
AMW-03	9/28/2004	ND	ND	ND	ND
AMW-03	12/8/2004	ND	ND UJ	ND UJ	ND
AMW-03	3/10/2005	ND	ND	ND	1.56
AMW-03	6/21/2005	ND	ND	ND	0.99
AMW-03	9/27/2005	ND	ND UJ	ND	0.997
AMW-03	12/13/2005	ND	ND	ND	0.828
AMW-03	3/21/2006	ND	ND	ND	2.770
AMW-03	7/6/2006	ND	ND	ND	2.28
AMW-03	9/18/2006	ND	ND	ND	ND
AMW-03	12/12/2006	ND UJ	ND UJ	ND UJ	0.974 J
AMW-03	3/21/2007	ND	ND	ND	ND
AMW-03	6/6/2007	ND	ND	ND	ND
AMW-03	9/12/2007	ND	ND	ND	ND UJ
AMW-03	12/18/2007	ND	ND	ND	ND
AMW-03	3/25/2008	ND	ND	ND	ND
AMW-03	6/25/2008	ND	ND	ND	ND
AMW-03	9/17/2008	ND	ND	ND	ND
AMW-03	12/16/2008	ND	ND	ND	ND
AMW-03	3/11/2009	ND	ND	ND	ND
AMW-03	6/10/2009	ND	R	R	ND
AMW-03	9/16/2009	ND	ND	ND	ND
AMW-03	12/16/2009	ND	ND	ND	ND
AMW-03	3/30/2010	ND	400	ND	ND
AMW-03	6/9/2010	ND	230	ND	ND
AMW-03	9/14/2010	ND	ND	ND	ND
AMW-03	12/14/2010	ND	ND	ND	ND
AMW-03	3/22/2011	ND	ND	ND	0.54
AMW-03	6/22/2011	ND	ND	ND	ND
AMW-03	9/27/2011	ND	ND	ND	ND
AMW-03	12/20/2011	ND	ND	ND	ND
AMW-03	3/20/2012	ND	ND	ND	0.52
AMW-03	6/21/2012	ND	ND	ND	ND
AMW-03	9/10/2012	ND	ND	ND	ND
AMW-03	12/19/2012	ND	ND	ND	ND
AMW-03	3/19/2013	ND	ND	ND	ND
AMW-03	6/25/2013	ND	ND	ND	ND
AMW-03	9/10/2013	ND	ND	ND	ND
AMW-03	12/10/2013	ND	ND	ND	ND
AMW-03	3/11/2014	ND	320 J	ND	ND
AMW-03	6/10/2014	ND UJ	430	ND	ND
AMW-03	9/9/2014	ND	360	ND	ND
AMW-03	12/9/2014	ND	570	ND	ND
AMW-03	3/10/2015	ND U	650	ND	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-03	6/9/2015	ND	410	ND	ND
AMW-03	9/22/2015	ND	ND	ND	ND
AMW-03	12/15/2015	ND	ND	ND	ND
AMW-03	3/8/2016	ND	250	ND U	ND
AMW-03	6/8/2016	ND	840	ND	ND
AMW-03	9/7/2016	ND	330	ND	ND
AMW-03	12/6/2016	ND	820	ND	ND U
AMW-03	3/7/2017	ND	890	510	ND
AMW-03	6/6/2017	ND	ND	ND	ND
AMW-03	9/12/2017	ND	ND	ND	ND
AMW-03	12/5/2017	ND	ND	ND	ND
AMW-03	3/20/2018	ND	ND	390	ND
AMW-03	6/19/2018	ND	ND	ND	ND
AMW-03	9/11/2018	ND	ND	ND	ND
AMW-03	12/11/2018	ND	370	ND	ND
AMW-03	3/12/2019	ND	ND	ND	ND
AMW-03	6/18/2019	ND	ND	ND	ND
AMW-03	9/24/2019	ND	ND	ND	ND
AMW-03	12/17/2019	ND	ND	ND	ND
AMW-03	3/18/2020	ND	ND	ND	ND
AMW-03	6/10/2020	ND	ND	ND	ND
AMW-03	9/16/2020	ND	ND	ND	ND
AMW-03	12/16/2020	ND	ND	ND	ND
AMW-03	3/10/2021	ND	ND	ND	ND
AMW-03	6/17/2021	ND	ND	ND	ND
AMW-03	9/22/2021	ND	ND	ND	ND
AMW-03	12/8/2021	ND	ND	ND	ND
AMW-03	3/23/2022	ND	ND	ND	ND
AMW-03	6/22/2022	ND	ND	ND	ND
AMW-03	9/21/2022	ND	ND	ND	ND
AMW-03	1/11/2023	ND	ND	ND	ND
AMW-04	12/21/2000	ND	1,570	ND	0.66
AMW-04	3/28/2001	ND	1,660	ND	0.766
AMW-04	6/13/2001	ND	987	ND	ND
AMW-04	10/4/2001	ND	379	ND	ND
AMW-04	12/12/2001	ND	930 J	ND UJ	ND
AMW-04	3/7/2002	ND	519	ND	2.94
AMW-04	6/12/2002	ND	1,200	ND	0.63
AMW-04	9/19/2002	ND UJ	760 J	ND UJ	1.45 J
AMW-04	12/17/2002	ND	1,070	ND	ND
AMW-04	3/26/2003	ND	1,240	ND	0.84
AMW-04	6/27/2003	ND	875	ND	ND
AMW-04	9/18/2003	ND	1,660	ND	ND
AMW-04	12/22/2003	ND	686 J	ND	1.73
AMW-04	3/8/2004	ND	ND	ND	ND
AMW-04	6/16/2004	ND	ND	ND	ND
AMW-04	9/27/2004	ND	ND	ND	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-04	12/6/2004	ND	ND	ND	ND
AMW-04	3/10/2005	ND	ND	ND	ND
AMW-04	6/21/2005	ND	ND	ND	ND
AMW-04	9/27/2005	ND	ND UJ	ND	ND
AMW-04	12/13/2005	ND UJ	ND	ND	ND UJ
AMW-04	3/21/2006	ND	ND	ND	0.65
AMW-04	7/6/2006	ND UJ	ND	ND	ND UJ
AMW-04	9/18/2006	ND	ND	ND	ND
AMW-04	12/12/2006	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	3/21/2007	ND	ND	ND	0.64
AMW-04	6/6/2007	ND	ND	ND	ND
AMW-04	9/12/2007	ND	ND	ND	ND UJ
AMW-04	12/18/2007	ND	ND	ND	ND
AMW-04	3/26/2008	ND	ND	ND	ND
AMW-04	6/25/2008	ND	ND	ND	ND
AMW-04	9/17/2008	ND	ND	ND	ND
AMW-04	12/16/2008	ND	ND	ND	0.63
AMW-04	3/11/2009	ND	ND	ND	ND
AMW-04	6/10/2009	ND	R	R	ND
AMW-04	9/16/2009	ND	ND	ND	ND
AMW-04	12/16/2009	ND UJ	ND	ND	ND
AMW-04	3/30/2010	ND	610	ND	0.57
AMW-04	6/9/2010	ND	430	ND	ND
AMW-04	9/14/2010	ND	ND	ND	ND
AMW-04	12/14/2010	ND	ND	ND	ND
AMW-04	3/22/2011	ND	ND	ND	ND
AMW-04	6/22/2011	ND	ND	ND	ND
AMW-04	9/27/2011	ND	ND	ND	ND
AMW-04	12/27/2011	ND	ND	ND	ND
AMW-04	3/20/2012	ND	ND	ND	ND
AMW-04	6/21/2012	ND	ND	ND	ND
AMW-04	9/10/2012	ND	ND	ND	ND
AMW-04	12/19/2012	ND	ND	ND	ND
AMW-04	3/19/2013	ND	ND	ND	ND
AMW-04	6/25/2013	ND	ND	ND	ND
AMW-04	9/10/2013	ND	ND	ND	ND
AMW-04	12/10/2013	ND	ND	ND	ND
AMW-04	3/11/2014	ND	780 J	ND	ND
AMW-04	6/10/2014	ND UJ	400	ND	ND
AMW-04	9/9/2014	ND	480	ND	ND
AMW-04	12/9/2014	ND	630	ND	ND
AMW-04	3/10/2015	ND U	590	ND	ND
AMW-04	6/9/2015	ND	420	ND	ND
AMW-04	9/22/2015	ND	ND	ND	ND
AMW-04	12/15/2015	ND	ND	ND	ND
AMW-04	3/8/2016	ND	390	ND U	ND
AMW-04	6/8/2016	ND	860	ND	ND
AMW-04	9/8/2016	ND	800	ND	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-04	12/6/2016	ND	830	ND	ND U
AMW-04	3/7/2017	ND	830	640	ND
AMW-04	6/6/2017	ND	ND	ND	ND
AMW-04	9/12/2017	ND	ND	ND	ND
AMW-04	12/5/2017	ND	ND	ND	ND
AMW-04	3/20/2018	74 J	ND	ND	ND
AMW-04	6/19/2018	ND	300	ND	ND
AMW-04	9/11/2018	ND	ND	ND	ND
AMW-04	12/11/2018	ND	500	ND	ND
AMW-04	3/12/2019	59	ND	ND	ND
AMW-04	6/18/2019	ND	ND	ND	ND
AMW-04	9/24/2019	ND	ND	ND	ND
AMW-04	12/17/2019	ND	ND	ND	ND
AMW-04	3/18/2020	ND	ND	ND	ND
AMW-04	6/10/2020	ND	ND	ND	ND
AMW-04	9/16/2020	ND	ND	ND	ND
AMW-04	12/16/2020	ND	ND	ND	ND
AMW-04	3/10/2021	ND	ND	ND	ND
AMW-04	6/17/2021	ND	ND	ND	ND
AMW-04	9/22/2021	ND	ND	ND	ND
AMW-04	12/8/2021	ND	ND	ND	ND
AMW-04	3/23/2022	ND	ND	ND	ND
AMW-04	6/22/2022	ND	ND	ND	ND
AMW-04	9/21/2022	ND	260	ND	ND
AMW-04	1/11/2023	ND	ND	ND	ND
AMW-05	12/21/2000	ND	1,450	ND	ND
AMW-05	3/28/2001	ND	1,360	ND	ND
AMW-05	6/13/2001	ND	440	ND	ND
AMW-05	10/4/2001	71.4 U	318	ND	ND
AMW-05	12/12/2001	ND	940 J	ND UJ	ND
AMW-05	3/7/2002	ND	1,100	ND	2.12
AMW-05	6/12/2002	78	1,180	ND	0.701
AMW-05	9/19/2002	ND UJ	760 J	ND UJ	1.45 J
AMW-05	12/17/2002	ND	1,820	ND	ND
AMW-05	3/26/2003	ND	1,900	ND	0.577
AMW-05	3/27/2003	ND	381 J	ND UJ	ND
AMW-05	9/19/2003	ND	2,150	ND	ND
AMW-05	12/22/2003	ND	1,420 J	ND	0.833
AMW-05	3/8/2004	ND	ND	ND	ND
AMW-05	6/16/2004	ND	ND	ND	ND
AMW-05	9/27/2004	ND	ND	ND	ND
AMW-05	12/6/2004	ND	ND	ND	ND
AMW-05	3/10/2005	ND	ND	ND	ND
AMW-05	6/21/2005	ND	ND	ND	ND
AMW-05	9/27/2005	ND	ND UJ	ND	ND
AMW-05	12/13/2005	ND	ND	ND	0.727
AMW-05	3/21/2006	ND	ND	ND	0.692
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-05	7/6/2006	ND	ND	ND	ND
AMW-05	9/18/2006	ND	ND	ND	ND
AMW-05	12/12/2006	ND UJ	ND UJ	ND UJ	0.565 J
AMW-05	3/21/2007	ND	ND	ND	1.11
AMW-05	6/6/2007	ND	ND	ND	ND
AMW-05	9/12/2007	ND	ND	ND	ND UJ
AMW-05	12/18/2007	ND	ND	ND	ND
AMW-05	3/26/2008	ND	ND	ND	ND
AMW-05	6/25/2008	ND	ND	ND UJ	ND
AMW-05	9/17/2008	ND	ND	ND UJ	ND
AMW-05	12/16/2008	ND	ND	ND	0.768
AMW-05	3/11/2009	ND	ND	ND	0.885
AMW-05	6/10/2009	ND	R	R	ND
AMW-05	9/16/2009	54	ND	ND	ND
AMW-05	12/16/2009	ND UJ	ND	ND	ND
AMW-05	3/30/2010	ND	890	ND	1.3
AMW-05	6/9/2010	ND	640	ND	ND
AMW-05	9/14/2010	ND	ND	ND	ND
AMW-05	12/14/2010	ND	ND	ND	ND
AMW-05	3/22/2011	ND	ND	ND	ND
AMW-05	6/22/2011	ND	ND	ND	ND
AMW-05	9/27/2011	ND	ND	ND	ND
AMW-05	12/20/2011	ND	ND	ND	ND
AMW-05	3/20/2012	ND	ND	ND	ND
AMW-05	6/21/2012	ND	ND	ND	ND
AMW-05	9/10/2012	ND	ND	ND	ND
AMW-05	12/19/2012	ND	ND	ND	ND
AMW-05	3/19/2013	ND	ND	ND	ND
AMW-05	6/25/2013	ND	ND	ND	ND
AMW-05	9/10/2013	ND	ND	ND	ND
AMW-05	12/10/2013	ND	ND	ND	ND
AMW-05	3/11/2014	ND	ND	ND	ND
AMW-05	6/10/2014	ND UJ	560	ND	ND
AMW-05	9/9/2014	ND	300	ND	ND
AMW-05	12/9/2014	ND	460	ND	ND
AMW-05	3/10/2015	ND	480	ND	ND
AMW-05	6/9/2015	ND	300	ND	ND
AMW-05	9/22/2015	ND	ND	ND	ND
AMW-05	12/15/2015	ND	ND	ND	ND
AMW-05	3/8/2016	ND	ND	ND U	ND
AMW-05	6/8/2016	ND	850	ND	ND
AMW-05	9/8/2016	ND	1,300	ND	2.0
AMW-05	12/6/2016	ND	420	ND	ND U
AMW-05	3/7/2017	ND	910	1,000	ND
AMW-05	6/6/2017	ND	ND	ND	ND
AMW-05	9/12/2017	ND	ND	ND	ND
AMW-05	12/5/2017	ND	ND	ND	ND
AMW-05	3/20/2018	ND	ND	340	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-05	6/19/2018	ND	ND	ND	ND
AMW-05	9/11/2018	ND	ND	ND	ND
AMW-05	12/11/2018	ND	320	ND	ND
AMW-05	3/12/2019	51	ND	ND	ND
AMW-05	6/18/2019	ND	ND	ND	ND
AMW-05	9/24/2019	ND	ND	ND	ND
AMW-05	12/17/2019	ND	ND	ND	ND
AMW-05	3/18/2020	ND	ND	ND	ND
AMW-05	6/10/2020	ND	ND	ND	ND
AMW-05	9/16/2020	ND	ND	ND	ND
AMW-05	12/16/2020	ND	ND	ND	ND
AMW-05	3/10/2021	ND	ND	ND	ND
AMW-05	6/17/2021	ND	ND	ND	ND
AMW-05	9/22/2021	ND	ND	ND	ND
AMW-05	12/8/2021	ND	ND	ND	ND
AMW-05	3/23/2022	ND	ND UJ	ND	ND
AMW-05	6/22/2022	ND	ND UJ	ND UJ	ND
AMW-05	9/21/2022	ND	ND	ND	ND
AMW-05	1/11/2023	ND	ND	ND	ND
GM-11S	4/10/1997	**3,910**	2,210	1,230	**616 J**
GM-11S	7/8/1997	960 J	1,090	ND	46.9 J
GM-11S	10/21/1997	**1,570**	1,260	ND	**126**
GM-11S	1/21/1998	390	788	ND	**250**
GM-11S	3/11/1998	**1,800**	776	ND	**640**
GM-11S	7/6/1998	680	470 J	ND	41
GM-11S	10/20/1998	260	584	ND	27
GM-11S	12/15/1998	**1,300**	1,090	ND	**500**
GM-11S	3/26/1999	**1,100**	779	ND	**220**
GM-11S	6/23/1999	710	520	ND	**92**
GM-11S	CONVERTED TO RECOVERY WELL - SAMPLING DISCONTINUED				
GM-12S	4/10/1997	140	4,500	2,720	42.9
GM-12S	7/8/1997	160	4,590	3,450	ND
GM-12S	10/20/1997	ND	600	1,630	ND
GM-12S	1/21/1998	ND	1,210	2,040	ND
GM-12S	3/10/1998	ND	2,040	ND	ND
GM-12S	7/6/1998	140	2,830	1,980	0.8
GM-12S	10/20/1998	77	1,200	775	ND
GM-12S	3/26/1999	280	2,080 J	1,100 J	0.5
GM-12S	6/23/1999	260	1,530	ND	ND
GM-12S	WELL DELETED FROM MONITORING PROGRAM				
GM-14S	9/13/2007	608	1020	ND	0.97
GM-14S	12/20/2007	389	341	ND	1.02
GM-14S	3/27/2008	172	ND	ND	0.538
GM-14S	6/27/2008	**2,680 J**	577	ND	2.5 J
GM-14S	9/19/2008	**1,440**	719	ND	1.32
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-14S	12/17/2008	**1,630 J**	963	ND	1.6
GM-14S	3/12/2009	**1,300**	562	ND	7.98
GM-14S	6/11/2009	**2,500**	R	R	ND
GM-14S	9/18/2009	**2,300**	1,600	ND	ND
GM-14S	12/17/2009	750	870	ND	ND
GM-14S	4/1/2010	**2,000**	880	ND	ND
GM-14S	6/10/2010	**1,900 J**	3,200	560	11 J
GM-14S	9/16/2010	**2,070**	690	ND	ND
GM-14S	12/15/2010	245	400	ND	ND
GM-14S	3/23/2011	748	350	ND	ND
GM-14S	6/23/2011	**2,190**	590	ND	ND
GM-14S	9/28/2011	**3,660**	840	ND	ND
GM-14S	12/21/2011	**3,150**	1,200	ND	ND
GM-14S	3/21/2012	903	480	ND	ND
GM-14S	6/22/2012	**3,050**	500	ND	ND
GM-14S	9/11/2012	**3,330**	920	ND	ND
GM-14S	12/20/2012	464	480	ND	ND
GM-14S	3/20/2013	**1,400**	340	ND	ND
GM-14S	6/26/2013	**2,200**	770	ND	1.3
GM-14S	9/11/2013	**1,700**	810	ND	0.77
GM-14S	12/11/2013	**3,300**	570	ND	ND
GM-14S	3/12/2014	760	1,600	940	0.53
GM-14S	6/11/2014	**2,000 J**	1,300	ND	1.2
GM-14S	9/10/2014	**2,900 J**	1,100	ND	0.87
GM-14S	12/10/2014	1,000	1,800	1,200	0.84
GM-14S	3/11/2015	**2,000 J**	1,300	ND	1.0
GM-14S	6/9/2015	**2,500 J**	2,000	ND	1.6
GM-14S	9/23/2015	**2,500**	1,600	ND	1.0
GM-14S	12/16/2015	450	1,200	850	1.0
GM-14S	3/9/2016	150	710	ND	ND
GM-14S	6/9/2016	**2,700 J**	2,200	ND	0.51
GM-14S	9/9/2016	**2,400 J**	1,900	ND	ND
GM-14S	12/7/2016	550	1,300	ND	ND U
GM-14S	3/8/2017	180	1,400	1000	ND
GM-14S	6/7/2017	**1,200 J**	630	ND	ND
GM-14S	9/13/2017	**2,100**	1,000	ND	ND
GM-14S	12/6/2017	870	890	ND	ND
GM-14S	3/21/2018	870 J	590	ND	ND
GM-14S	6/19/2018	950 J	960	ND	ND
GM-14S	9/12/2018	**2,200 J**	1,200	ND	ND
GM-14S	12/12/2018	**1,600**	930	ND	ND
GM-14S	3/13/2019	760	680	ND	ND
GM-14S	6/19/2019	**2,500**	1,400	ND	ND
GM-14S	9/25/2019	**1,800**	1,500	ND	ND
GM-14S	12/18/2019	**2,300**	1,000	ND	ND
GM-14S	3/19/2020	**1,200**	490 J	ND UJ	ND
GM-14S	6/10/2020	**1,200**	1,300	ND	ND
GM-14S	9/17/2020	**3,000**	950	ND	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-14S	12/16/2020	**1,900**	880	ND	ND
GM-14S	3/11/2021	700	440	ND	ND
GM-14S	6/17/2021	**2,000**	830	ND	6.5
GM-14S	9/23/2021	**1,700**	3,900	930	**220**
GM-14S	12/8/2021	460	380	ND	27
GM-14S	3/24/2022	680	330	ND	**220**
GM-14S	6/22/2022	**1,100**	650	ND	**850**
GM-14S	9/22/2022	**1,900**	1,200	ND	**1,900**
GM-14S	1/12/2023	280 J	500	ND	**200**
GM-15S	4/9/1997	ND	290	ND	ND
GM-15S	7/8/1997	170	800	ND	1.4
GM-15S	10/21/1997	ND	ND	ND	ND
GM-15S	1/21/1998	ND	293	ND	ND
GM-15S	3/11/1998	ND	ND	ND	ND
GM-15S	7/7/1998	54	253	ND	ND
GM-15S	10/21/1998	310	550	ND	ND
GM-15S	12/15/1998	120	342	ND	ND
GM-15S	3/25/1999	ND	ND	ND	ND
GM-15S	6/23/1999	76	ND	ND	ND
GM-15S	9/27/1999	NS	NS	NS	NS
GM-15S	12/14/1999	160 U	316	ND	ND
GM-15S	3/24/2000	ND	451	ND	ND
GM-15S	6/30/2000	167	1,200	ND	ND
GM-15S	9/27/2000	355 J	1,130 J	ND	ND UJ
GM-15S	12/21/2000	801	1,990	ND	ND
GM-15S	3/27/2001	548	2,810	ND	0.747 J
GM-15S	6/12/2001	909	1,040	ND	2.58 U
GM-15S	10/3/2001	955	1,220	ND	10.9 J
GM-15S	12/11/2001	578	1,100	ND	9.62
GM-15S	3/6/2002	434	1,430	ND	12.1
GM-15S	6/10/2002	786	2,530	ND	14.7
GM-15S	9/18/2002	825 J	1,320 J	ND UJ	9.38 J
GM-15S	12/16/2002	738	1,690 J	ND	4.16
GM-15S	3/25/2003	833 J	2,920	ND	3.57 J
GM-15S	6/26/2003	616	2,940 J	ND	2.49 J
GM-15S	9/19/2003	636	1,530	ND	1.58
GM-15S	12/22/2003	672	647 J	ND	1.47 J
GM-15S	3/8/2004	458 J	ND	ND	2.83 J
GM-15S	6/17/2004	836 J	356	ND	1.26
GM-15S	9/28/2004	655	ND	ND	1.62 J
GM-15S	12/8/2004	847	ND	ND	1.53
GM-15S	3/11/2005	587	ND	ND	1.07 J
GM-15S	6/22/2005	984 J	ND	ND	0.682
GM-15S	9/28/2005	840	ND	ND	1.43 J
GM-15S	12/14/2005	702	ND	ND	1.27
GM-15S	3/22/2006	317	ND	ND	0.614
GM-15S	7/7/2006	647	ND	ND	0.767
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-15S	9/19/2006	533	ND	ND	0.836
GM-15S	12/13/2006	494 J	ND UJ	ND UJ	ND UJ
GM-15S	3/22/2007	420	ND	ND	ND
GM-15S	6/7/2007	404	ND	ND	0.505
GM-15S	9/13/2007	180	ND	ND	ND UJ
GM-15S	12/19/2007	549	ND	ND	0.943
GM-15S	3/26/2008	404	ND	ND	0.613
GM-15S	6/26/2008	480	ND	ND	0.665
GM-15S	9/18/2008	445	ND	ND	0.599
GM-15S	12/17/2008	Well not sampled, sampling reduced to a semi-annual event			
GM-15S	3/12/2009	695	ND	ND	19.6
GM-15S	9/16/2009	390	ND	ND	ND
GM-15S	3/30/2010	670	520	ND	1.1
GM-15S	9/15/2010	269	ND	ND	6.6
GM-15S	3/23/2011	ND	ND	ND	ND
GM-15S	9/27/2011	427	ND	ND	0.79
GM-15S	3/20/2012	143	ND	ND	ND
GM-15S	9/10/2012	ND	ND	ND	ND
GM-15S	3/19/2013	92	ND	ND	**100**
GM-15S	6/25/2013	**1,300**	ND	ND	**400**
GM-15S	9/10/2013	270	ND	ND	**110**
GM-15S	12/11/2013	320	ND	ND	1.3
GM-15S	3/12/2014	110	430 J	ND	ND
GM-15S	6/11/2014	ND	ND	ND	ND
GM-15S	9/9/2014	180	870	ND	ND
GM-15S	12/9/2014	250	520	ND	ND
GM-15S	3/10/2015	ND	340	ND	ND
GM-15S	6/9/2015	72	400	ND	ND
GM-15S	9/22/2015	430	ND	ND	ND
GM-15S	12/15/2015	370	ND	ND	ND
GM-15S	3/8/2016	100	ND	ND	ND
GM-15S	6/8/2016	ND	600	ND	ND
GM-15S	9/8/2016	240	660	ND	ND
GM-15S	12/6/2016	ND	ND	ND UJ	ND U
GM-15S	3/7/2017	ND	350	210	ND
GM-15S	6/6/2017	ND	ND	ND	ND
GM-15S	9/12/2017	140	ND	ND	ND
GM-15S	12/6/2017	100	ND	ND	ND
GM-15S	9/11/2018	310	460	ND	ND
GM-15S	3/12/2019	150	ND	ND	ND
GM-15S	9/24/2019	250	ND	ND	ND
GM-15S	3/18/2020	ND	ND	ND	ND
GM-15S	9/16/2020	190	320	ND	ND
GM-15S	3/10/2021	ND	ND	ND	ND
GM-15S	9/22/2021	180	ND	ND	ND
GM-15S	3/23/2022	ND	ND	ND	ND
GM-15S	9/21/2022	300	260	ND	1.7
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-16S	4/9/1997	ND	3,980	1,630	
GM-16S	7/8/1997	ND	3,890	1,710	ND
GM-16S	10/21/1997	ND	720	ND	ND
GM-16S	1/21/1998	ND	1,390	ND	ND
GM-16S	3/12/1998	ND	5,780	1,620	ND
GM-16S	7/7/1998	ND	1,310	ND	ND
GM-16S	10/20/1998	ND	ND	ND	ND
GM-16S	12/17/1998	ND	2,170	871	ND
GM-16S	3/26/1999	NS	1,990	960	NS
GM-16S	6/28/1999	NS	480	ND	NS
GM-16S	WELL DELETED FROM MONITORING PROGRAM / REINITIATED 3RD QUARTER 2007				
GM-16S	9/13/2007	ND	ND	ND	ND UJ
GM-16S	12/20/2007	ND	ND	ND	ND
GM-16S	3/27/2008	65.3	ND	ND	ND
GM-16S	6/27/2008	81.1	ND	ND	ND
GM-16S	9/19/2008	72.7	ND	ND	ND
GM-16S	12/17/2008	Well not sampled, sampling has been reduced to a semi-annual event			
GM-16S	3/12/2009	ND	456	ND	ND
GM-16S	9/18/2009	300	750	ND	ND
GM-16S	3/31/2010	390	1,800	ND	ND
GM-16S	9/16/2010	263	490	ND	ND
GM-16S	3/23/2011	193	350	ND	ND
GM-16S	9/28/2011	377	400	ND	ND
GM-16S	3/21/2012	ND	290	ND	ND
GM-16S	9/11/2012	ND	ND	ND	ND
GM-16S	3/20/2013	79	ND	ND	ND
GM-16S	9/11/2013	62	ND	ND	ND
GM-16S	3/12/2014	ND	1,600	ND	ND
GM-16S	9/10/2014	960	1,200	ND	ND
GM-16S	3/11/2015	400	2,200	970	ND
GM-16S	9/23/2015	170	910	ND	ND
GM-16S	3/9/2016	170	660	ND U	ND
GM-16S	9/9/2016	340	1,900	ND	ND
GM-16S	3/8/2017	91	1,500	680	ND
GM-16S	9/13/2017	380	1,300	ND	ND
GM-16S	3/21/2018	160	350	ND	ND
GM-16S	9/12/2018	260	700	ND	ND
GM-16S	3/13/2019	200	700	ND	ND
GM-16S	9/25/2019	130	970	ND	ND
GM-16S	3/19/2020	89	550	ND	ND
GM-16S	9/17/2020	140	670	ND	ND
GM-16S	3/11/2021	59	460	ND	ND
GM-16S	9/23/2021	80	490	ND	ND
GM-16S	3/24/2022	ND	ND	ND	ND
GM-16S	9/22/2022	ND	640	ND	ND
GM-17S	4/9/1997	ND	1,720	900	ND
GM-17S	7/9/1997	ND	720	ND	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-17S	10/21/1997	ND	ND	ND	ND
GM-17S	1/22/1998	ND	320	ND	ND
GM-17S	3/11/1998	ND	926	ND	ND
GM-17S	7/7/1998	52 J	410 J	ND UJ	ND UJ
GM-17S	10/21/1998	ND	ND	ND	ND
GM-17S	12/15/1998	ND	1,060	ND	ND
GM-17S	3/26/1999	NS	851	ND	NS
GM-17S	6/28/1999	NS	393	ND	NS
GM-17S	WELL DELETED FROM MONITORING PROGRAM / REINITIATED 3RD QUARTER 2007				
GM-17S	9/13/2007	ND	ND	ND	ND UJ
GM-17S	12/20/2007	ND	ND	ND	ND
GM-17S	3/27/2008	ND	ND	ND	ND
GM-17S	6/27/2008	ND	ND	ND	ND
GM-17S	9/19/2008	ND	ND	ND	ND
GM-17S	12/17/2008	Well not sampled, sampling has been reduced to a semi-annual event			
GM-17S	3/12/2009	ND	ND	ND	ND
GM-17S	9/18/2009	53	ND	ND	ND
GM-17S	3/31/2010	ND	ND	ND	ND
GM-17S	9/16/2010	ND	ND	ND	ND
GM-17S	3/23/2011	ND	ND	ND	ND
GM-17S	9/28/2011	ND	ND	ND	ND
GM-17S	3/21/2012	ND	ND	ND	ND
GM-17S	9/11/2012	ND	ND	ND	ND
GM-17S	3/20/2013	ND	ND	ND	ND
GM-17S	9/11/2013	ND	ND	ND	ND
GM-17S	3/12/2014	ND	420	ND	ND
GM-17S	9/10/2014	ND	ND	ND	ND
GM-17S	3/11/2015	ND U	ND	ND	ND
GM-17S	9/23/2015	ND	250	ND	ND
GM-17S	3/9/2016	ND	ND	ND U	ND
GM-17S	9/9/2016	ND	710	ND	ND
GM-17S	3/8/2017	ND	450	430	ND
GM-17S	9/13/2017	63	ND	ND	ND
GM-17S	3/21/2018	56	ND	ND	ND
GM-17S	9/12/2018	63	ND	ND	ND
GM-17S	3/13/2019	71	ND	ND	ND
GM-17S	9/25/2019	ND	ND	ND	ND
GM-17S	3/19/2020	ND	ND	ND	ND
GM-17S	9/17/2020	ND	ND	ND	ND
GM-17S	3/11/2021	ND	ND	ND	ND
GM-17S	9/23/2021	ND	ND	ND	ND
GM-17S	3/24/2022	ND	ND	ND	ND
GM-17S	9/22/2022	ND	ND	ND	ND
GM-24S	4/9/1997	970	2,180	1,070	ND
GM-24S	7/9/1997	**4,040**	1,200	ND	ND
GM-24S	10/22/1997	**2,760**	710	ND	1.1
GM-24S	1/22/1998	**1,300**	841	ND	2.1
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-24S	3/11/1998	370	765	ND	ND
GM-24S	7/7/1998	**1,500 J**	762 J	ND UJ	ND UJ
GM-24S	10/20/1998	800	929	ND	1.6
GM-24S	12/17/1998	**1,100**	867	ND	ND
GM-24S	3/26/1999	**3,500**	1,470	ND	ND
GM-24S	6/28/1999	**2,600**	1,390	ND	**2,600**
GM-24S	9/29/1999	**2,200**	1,030	ND	0.8
GM-24S	12/14/1999	**1,900**	857	ND	1.3 U
GM-24S	3/24/2000	**2,860**	1,230	ND	ND
GM-24S	6/30/2000	**4,570**	2,110	ND	ND
GM-24S	9/27/2000	**3,080 J**	2,690 J	ND	ND UJ
GM-24S	12/21/2000	**3,420**	4,100	947	ND
GM-24S	3/27/2001	**2,570**	3,120	884	0.704 J
GM-24S	6/12/2001	Tank Farm was inaccessible to sampling activities			
GM-24S	10/3/2001	**2,820**	1,800	ND	3.88 J
GM-24S	12/11/2001	**1,560**	2,250	ND	1.13 J
GM-24S	3/6/2002	**2,180**	2,170	ND	12.1
GM-24S	6/10/2002	**2,230**	1,800	ND	2.2 J
GM-24S	9/18/2002	**1,930 J**	1,130 J	ND UJ	3.79 J
GM-24S	12/16/2002	**1,330**	4,250	949	2.32
GM-24S	3/25/2003	**1,510**	1,930	850	0.667 J
GM-24S	6/25/2003	**3,510 J**	ND UJ	ND UJ	3.38 J
GM-24S	9/19/2003	**2,490**	1,610	ND	3.49
GM-24S	12/23/2003	**2,890**	2,220 J	ND	1.66 J
GM-24S	3/9/2004	**2,850**	345	ND	0.928 J
GM-24S	6/17/2004	**2,800**	567	ND	1.66
GM-24S	9/29/2004	**2,190**	0.365	ND	2.25
GM-24S	12/9/2004	**1,910**	ND	ND	2.34
GM-24S	3/11/2005	**2,670**	0.365	ND	1.61
GM-24S	6/22/2005	**3,990**	261	ND	3.68
GM-24S	9/28/2005	**4,190**	296	ND	3.23 J
GM-24S	12/14/2005	**2,430**	293	ND	2.79
GM-24S	3/22/2006	**2,310**	303	ND	1.95 J
GM-24S	7/7/2006	**2,700**	ND	ND	1.82
GM-24S	9/19/2006	**2,480**	535	ND	2.03
GM-24S	12/14/2006	**1,070 J**	ND UJ	ND UJ	ND UJ
GM-24S	3/22/2007	**2,750 J**	427 J	ND	2.97 J
GM-24S	6/7/2007	**2,600 J**	429	ND	2.25
GM-24S	9/13/2007	**1,390 J**	346 J	ND	1.16 J
GM-24S	12/20/2007	**ND UJ**	ND	ND	ND
GM-24S	3/27/2008	578	ND	ND	0.59
GM-24S	6/26/2008	**1,980**	439	ND	2.13
GM-24S	9/19/2008	**1,210**	252	ND	1.34
GM-24S	12/17/2008	**1,260**	ND	ND	1.32 J
GM-24S	3/12/2009	**1,260**	309	ND	1.35
GM-24S	6/11/2009	**1,200**	R	R	ND
GM-24S	9/17/2009	**1,600 J**	850	ND	ND
GM-24S	12/17/2009	620 J	430	ND	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-24S	4/1/2010	990 J	370	ND	ND
GM-24S	6/10/2010	**1,200**	760 J	ND	2.9 J
GM-24S	9/16/2010	**1,480 J**	460 J	ND	ND
GM-24S	12/15/2010	448	ND	ND	ND
GM-24S	3/23/2011	**2,260**	350	ND	ND
GM-24S	6/23/2011	**1,140 J**	380	ND	ND
GM-24S	9/28/2011	806 J	710 J	ND	ND
GM-24S	12/21/2011	**2,080**	260	ND	ND
GM-24S	3/21/2012	462 J	260	ND	ND
GM-24S	6/22/2012	**1,220**	270	ND	ND
GM-24S	9/11/2012	**2,460**	550	ND	ND
GM-24S	12/20/2012	244	ND	ND	ND
GM-24S	3/20/2013	**1,100**	270	ND	ND
GM-24S	6/26/2013	850 J	390	ND	ND
GM-24S	9/11/2013	500 J	470	ND	ND UJ
GM-24S	12/11/2013	**1,700**	450 J	ND	ND
GM-24S	3/12/2014	200 J	300 J	ND	ND
GM-24S	6/11/2014	1,000	450	ND	ND
GM-24S	9/10/2014	620 J	720	ND	ND
GM-24S	12/10/2014	840 J	320	ND	ND
GM-24S	3/11/2015	**1,400**	610	ND	ND
GM-24S	6/10/2015	**1,100**	500	ND	ND
GM-24S	9/23/2015	490 J	630 J	ND	ND
GM-24S	12/16/2015	170 J	ND	ND	ND UJ
GM-24S	3/9/2016	440	290 J	ND UJ	ND
GM-24S	6/9/2016	750 J	590	ND UJ	ND
GM-24S	9/9/2016	**1,800**	1,000	ND	ND
GM-24S	12/7/2016	450 J	350	ND UJ	ND
GM-24S	3/8/2017	550 J	430	290	ND
GM-24S	6/7/2017	560 J	280	ND	ND
GM-24S	9/13/2017	**1,500**	670	ND	ND
GM-24S	12/6/2017	440	ND	ND	ND
GM-24S	3/21/2018	790	370	270	ND
GM-24S	6/20/2018	310	170	ND	ND
GM-24S	9/12/2018	530 J	990 J	410 J	ND
GM-24S	12/12/2018	460 J	310	ND	ND
GM-24S	3/13/2019	510	250	ND	ND
GM-24S	6/19/2019	580	470	ND	ND
GM-24S	9/25/2019	920 J	900	ND	ND
GM-24S	12/18/2019	**1,200 J**	580	ND	ND
GM-24S	3/19/2020	750	300	ND	ND
GM-24S	6/10/2020	870 J	470	ND	ND
GM-24S	9/17/2020	**2,100 J**	800	ND	ND
GM-24S	12/16/2020	**1,200 J**	390	ND	ND
GM-24S	3/11/2021	**2,300 J**	680 J	ND	0.59
GM-24S	6/17/2021	530 J	350 J	ND	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-24S	9/23/2021	640	470 J	ND	ND
GM-24S	12/8/2021	450	280	ND	ND
GM-24S	3/24/2022	590 J	270 J	ND	ND
GM-24S	6/22/2022	380	520	ND	ND
GM-24S	9/22/2022	**1,500**	600	ND	ND
GM-24S	1/12/2023	420 J	560 J	ND	ND
AR-03	4/9/1997	**4,560**	5,890 J	1,070 J	**2,780 J**
AR-03	7/8/1997	**2,690**	7,600	1,640	**311**
AR-03	10/21/1997	**2,460**	730	ND	**204**
AR-03	1/21/1998	570	1,740	ND	41
AR-03	3/10/1998	**2,800**	2,490	ND	**850**
AR-03	7/6/1998	**2,900**	2,030	ND	35
AR-03	10/20/1998	990	2,230	ND	ND
AR-03	12/15/1998	780	1,200	ND	50
AR-03	3/25/1999	**3,800**	2,480	ND	**1,600**
AR-03	6/23/1999	**3,300**	2,390	ND	**290**
AR-03	9/29/1999	**3,400**	2,570	ND	10
AR-03	12/14/1999	**2,400**	1,390	ND	**340**
AR-03	3/24/2000	**1,380**	3,600	ND	**574**
AR-03	6/30/2000	**3,230**	7,980	1,040	**523**
AR-03	9/27/2000	**2,320 J**	3,700 J	772	ND UJ
AR-03	12/21/2000	**2,480**	5,140	ND	41.9
AR-03	3/27/2001	**2,050**	3,500	812	**583**
AR-03	6/14/2001	**1,330 J**	2,220	ND	1.59 R
AR-03	10/3/2001	533	1,640	ND	ND
AR-03	12/11/2001	**1,870**	1,790	ND	**661**
AR-03	3/6/2002	**2,890**	4,520	ND	**1800**
AR-03	6/10/2002	**2280 J**	5,590	794	**160 J**
AR-03	9/18/2002	484 J	1,890 J	ND UJ	6.01 J
AR-03	12/16/2002	321	2,830	ND	ND
AR-03	3/26/2003	**2,090**	6,190	ND	**1070 J**
AR-03	6/26/2003	610 J	2,790	ND	28.1
AR-03	9/19/2003	297	1,630	ND	ND
AR-03	12/23/2003	918	1640 J	ND	**228**
AR-03	3/9/2004	**2,350**	ND	ND	**659**
AR-03	6/17/2004	769 J	675	ND	34.3
AR-03	9/29/2004	332	ND	ND	ND
AR-03	12/8/2004	344	ND	ND	6.65
AR-03	3/11/2005	454	ND	ND	12.6
AR-03	6/22/2005	288	ND	ND	1.47
AR-03	9/28/2005	389	ND	ND	ND
AR-03	12/14/2005	520	408	ND	32.7
AR-03	3/22/2006	**2,450**	947	ND	**451**
AR-03	7/7/2006	860	ND	ND	67.3
AR-03	9/19/2006	323	ND	ND	ND
AR-03	12/13/2006	**1,210 J**	ND UJ	ND UJ	**134 J**
AR-03	3/22/2007	**1,880 J**	518	ND	**304**
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1 Continued					
AR-03	6/7/2007	**1,503**	ND	ND	**148**
AR-03	9/13/2007	186	ND	ND	ND
AR-03	12/19/2007	317	ND	ND	1.59
AR-03	3/26/2008	**2,010**	263	ND	172
AR-03	6/26/2008	**2,580**	ND	ND	**72.0**
AR-03	9/17/2008	758	ND	ND	0.79
AR-03	12/17/2008	**1,030 J**	384	ND	0.94
AR-03	3/13/2009	157	462	ND	ND
AR-03	6/11/2009	940	R	R	3.30
AR-03	9/17/2009	**1,200**	590	ND	ND
AR-03	12/16/2009	160	1,100	ND	ND
AR-03	3/31/2010	230	3,700	ND	ND
AR-03	6/10/2010	810	**14,000**	930	ND
AR-03	9/15/2010	676	180	ND	ND
AR-03	12/15/2010	ND	130	ND	ND
AR-03	3/24/2011	ND	390	ND	ND
AR-03	6/23/2011	297	380	ND	ND
AR-03	9/28/2011	821	270	ND	ND
AR-03	12/21/2011	940	170	ND	ND
AR-03	3/21/2012	ND	ND	ND	ND
AR-03	6/21/2012	ND	340	ND	ND
AR-03	9/10/2012	815 J	650 J	ND	ND
AR-03	12/20/2012	ND	460	ND	ND
AR-03	3/20/2013	78	ND	ND	ND
AR-03	6/26/2013	370	ND	ND	ND
AR-03	9/11/2013	540	280	ND	ND
AR-03	12/11/2013	390	560	ND	ND
AR-03	3/12/2014	ND	1,100 J	ND	ND
AR-03	6/10/2014	ND UJ	2,700	ND	ND
AR-03	9/9/2014	260	3,100	850	ND
AR-03	12/10/2014	ND	2,100	1,100	ND
AR-03	3/10/2015	ND U	1,800	ND	ND
AR-03	6/10/2015	330	3,100	860	ND
AR-03	9/23/2015	620	390	ND	ND
AR-03	12/16/2015	ND	1,100	ND	ND
AR-03	3/8/2016	ND	680	ND U	ND
AR-03	6/9/2016	390	3,500	1,200	ND
AR-03	9/7/2016	780 J	2,200	760	ND
AR-03	12/7/2016	ND U	1,800	ND	ND U
AR-03	3/8/2017	ND	2,100	920	ND
AR-03	6/7/2017	ND	740	ND	ND
AR-03	9/13/2017	420	940	ND	ND
AR-03	12/5/2017	140 J	ND	ND	ND
AR-03	3/21/2018	66	ND	ND	ND
AR-03	9/11/2018	690 J	690	ND	ND
AR-03	3/13/2019	540	ND	ND	ND
AR-03	9/24/2019	480	570	ND	ND
AR-03	3/18/2020	59	410	ND	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1 Continued					
AR-03	9/16/2020	680	490	ND	ND
AR-03	3/10/2021	ND	430	ND	ND
AR-03	9/22/2021	390	330	ND	ND
AR-03	3/23/2022	110	270	ND	ND
AR-03	9/21/2022	740	500	ND	ND
MW-1-T9	12/15/2005	434	785	ND	ND
MW-1-T9	3/22/2006	**1,600**	214	ND	**78.9**
MW-1-T9	7/7/2006	816	ND	ND	0.852
MW-1-T9	9/19/2006	236	ND	ND	ND
MW-1-T9	12/13/2006	307 J	ND UJ	ND UJ	ND UJ
MW-1-T9	3/22/2007	922 J	510	ND	15.8 J
MW-1-T9	6/7/2007	**1,130**	428	ND	0.779
MW-1-T9	9/14/2007	536	ND	ND	ND
MW-1-T9	12/19/2007	120	ND	ND	ND
MW-1-T9	3/26/2008	879	467	ND	18.3
MW-1-T9	6/26/2008	**1,050 J**	ND	ND	7.02
MW-1-T9	9/18/2008	919	ND	ND	0.5
MW-1-T9	12/17/2008	374	ND	ND	ND
MW-1-T9	3/13/2009	377	445	ND	0.666
MW-1-T9	6/11/2009	1,000	R	R	1.7
MW-1-T9	9/17/2009	980	770	ND	0.5
MW-1-T9	12/17/2009	98	590	ND	ND
MW-1-T9	3/31/2010	**1,300 J**	**11,000**	ND	1.4
MW-1-T9	6/10/2010	820	**14,000**	1,200	0.7
MW-1-T9	9/15/2010	473	160	ND	ND
MW-1-T9	12/15/2010	147	120	ND	ND
MW-1-T9	3/24/2011	256	440	ND	ND
MW-1-T9	6/22/2011	437	370	ND	ND
MW-1-T9	9/29/2011	338	ND	ND	ND
MW-1-T9	12/21/2011	438	110	ND	ND
MW-1-T9	3/22/2012	121	ND	ND	ND
MW-1-T9	6/22/2012	268	260	ND	ND
MW-1-T9	9/10/2012	338	580	ND	ND
MW-1-T9	12/20/2012	170	530	ND	ND
MW-1-T9	3/20/2013	300	ND	ND	ND
MW-1-T9	6/26/2013	380	ND	ND	ND
MW-1-T9	9/11/2013	270	ND	ND	ND
MW-1-T9	12/11/2013	560	160	ND	ND
MW-1-T9	3/12/2014	160	3,700 J	890 J	ND
MW-1-T9	6/11/2014	360	5,800	940	ND
MW-1-T9	9/10/2014	350	3,700	700	ND
MW-1-T9	12/10/2014	160	1,600	ND	ND
MW-1-T9	3/11/2015	250	**12,000**	2,500	ND
MW-1-T9	6/10/2015	320	5,300	1,400	ND
MW-1-T9	9/23/2015	250	540	ND	ND
MW-1-T9	12/16/2015	170	1,100	ND	ND
MW-1-T9	3/9/2016	310	2,900	ND	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1 Continued					
MW-1-T9	6/9/2016	490	7,900	3,200	ND
MW-1-T9	9/7/2016	320	1,600	ND	ND
MW-1-T9	12/7/2016	150	4,200	1,200	ND U
MW-1-T9	3/8/2017	140	7,100	1,900	ND
MW-1-T9	6/7/2017	260	2,400	ND	ND
MW-1-T9	9/13/2017	280	830	ND	ND
MW-1-T9	12/6/2017	290	ND	ND	ND
MW-1-T9	3/21/2018	200	ND	ND	ND
MW-1-T9	9/12/2018	320	1,000	ND	ND
MW-1-T9	3/13/2019	370	620	ND	ND
MW-1-T9	9/25/2019	220	470	ND	ND
MW-1-T9	3/19/2020	120	1,000	ND	ND
MW-1-T9	9/17/2020	380	500	ND	ND
MW-1-T9	3/11/2021	170	330	ND	ND
MW-1-T9	9/23/2021	290	580	ND	ND
MW-1-T9	3/24/2022	87	ND	ND	ND
MW-1-T9	9/22/2022	260	380	ND	ND
MW-2-T9	12/15/2005	**7,870**	2,270	ND	63.9
MW-2-T9	3/22/2006	**8,070**	212	ND	49.6
MW-2-T9	7/7/2006	**2,670 J**	ND	ND	17.8
MW-2-T9	9/19/2006	**1,280**	ND	ND	13.4
MW-2-T9	12/13/2006	**1,980 J**	ND UJ	ND UJ	7.17 J
MW-2-T9	3/22/2007	**3,700 J**	ND	ND	24.1 J
MW-2-T9	6/7/2007	**2830 J**	0.261	ND	16.6 J
MW-2-T9	9/14/2007	748	ND	ND	4.69 J
MW-2-T9	12/19/2007	869	ND	ND	3.82
MW-2-T9	3/26/2008	**3,420**	ND	ND	21.5
MW-2-T9	6/26/2008	**1,170 J**	ND	ND	7.1
MW-2-T9	9/18/2008	**1,100**	ND	ND	1.62
MW-2-T9	12/17/2008	**1,110**	ND	ND	1.93
MW-2-T9	3/13/2009	**1,140**	ND	ND	2.92
MW-2-T9	6/11/2009	**2,200**	R	R	0.75
MW-2-T9	9/17/2009	940	370	ND	ND
MW-2-T9	12/17/2009	**1,200**	1,500	ND	ND
MW-2-T9	3/31/2010	**2,200 J**	1,100	ND	0.75
MW-2-T9	6/10/2010	**1500 J**	3,100	340	1.5
MW-2-T9	9/15/2010	683	ND	ND	ND
MW-2-T9	12/15/2010	**1,810**	390	ND	0.53
MW-2-T9	3/24/2011	**2,000**	430	ND	ND
MW-2-T9	6/23/2011	**1,400**	250	ND	ND
MW-2-T9	9/29/2011	962	320	ND	ND
MW-2-T9	12/21/2011	**1,280**	120	ND	ND
MW-2-T9	3/22/2012	426	ND	ND	ND
MW-2-T9	6/22/2012	766	270	ND	ND
MW-2-T9	9/10/2012	**1,710**	460	ND	ND
MW-2-T9	12/20/2012	513	ND UJ	ND UJ	ND
MW-2-T9	3/20/2013	580	ND	ND	ND
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
MW-2-T9	6/26/2013	650	ND	ND	ND
MW-2-T9	9/10/2013	700	ND	ND	ND
MW-2-T9	12/11/2013	700	240	ND	ND
MW-2-T9	3/12/2014	740	1,400 J	ND	ND
MW-2-T9	6/11/2014	380	1,000	ND	ND
MW-2-T9	9/10/2014	520	680	ND	ND
MW-2-T9	12/10/2014	360	1,100	ND	ND
MW-2-T9	3/11/2015	270	1,000	ND	ND
MW-2-T9	6/10/2015	620	1,100	ND	ND
MW-2-T9	9/23/2015	410	680	ND	ND
MW-2-T9	12/16/2015	770	830	ND	ND
MW-2-T9	3/9/2016	660	960	ND	ND
MW-2-T9	6/9/2016	670	1,600	ND	ND
MW-2-T9	9/7/2016	620	1,100	ND	ND
MW-2-T9	12/7/2016	480	1,300	ND	ND U
MW-2-T9	3/8/2017	520	1,800	730	ND
MW-2-T9	6/7/2017	630 J	370	ND	ND
MW-2-T9	9/13/2017	610	420	ND	ND
MW-2-T9	12/6/2017	480	ND	ND	ND
MW-2-T9	3/21/2018	490	190	ND	ND
MW-2-T9	9/12/2018	660	1,000	270	ND
MW-2-T9	3/13/2019	470	350	ND	ND
MW-2-T9	9/25/2019	440	480	ND	ND
MW-2-T9	3/19/2020	470	970	ND	ND
MW-2-T9	9/17/2020	480	610	ND	ND
MW-2-T9	3/11/2021	260	ND	ND	ND
MW-2-T9	9/23/2021	310	480	ND	ND
MW-2-T9	3/24/2022	170	250	ND	ND
MW-2-T9	9/22/2022	290	540	ND	ND
MW-3-T9	12/15/2005	509	860	ND	2.08
MW-3-T9	3/22/2006	572	543	ND	2.67
MW-3-T9	7/7/2006	749	ND	ND	3.48
MW-3-T9	9/19/2006	609	317	ND	1.48
MW-3-T9	12/13/2006	541	ND	ND	1.33
MW-3-T9	3/22/2007	722	ND	ND	2.33
MW-3-T9	6/7/2007	603	ND	ND	2.1
MW-3-T9	9/14/2007	536	ND	ND	1.68 J
MW-3-T9	12/19/2007	578	ND	ND	1.61
MW-3-T9	3/26/2008	522	ND	ND	1.36
MW-3-T9	6/26/2008	711	ND	ND	4.78
MW-3-T9	9/17/2008	502	ND	ND	0.585
MW-3-T9	12/17/2008	668	ND	ND	5.35
MW-3-T9	3/13/2009	275	ND	ND	0.553
MW-3-T9	6/11/2009	630	2,400	1,800	7
MW-3-T9	9/17/2009	490	ND	ND	ND
MW-3-T9	12/17/2009	580	1,000	ND	ND
MW-3-T9	3/31/2010	690 J	790	ND	5.1
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
MW-3-T9	6/10/2010	500	2,500	ND	5.2
MW-3-T9	9/15/2010	331	ND	ND	3.8
MW-3-T9	12/15/2010	449	ND	ND	15
MW-3-T9	3/24/2011	826	270	ND	**87.7**
MW-3-T9	6/23/2011	632	ND	ND	69.6
MW-3-T9	9/29/2011	468	ND	ND	40.1
MW-3-T9	12/21/2011	788	ND	ND	58.2
MW-3-T9	3/22/2012	825	ND	ND	**191**
MW-3-T9	6/21/2012	596	ND	ND	**113**
MW-3-T9	9/10/2012	679	ND	ND	**94.9**
MW-3-T9	12/20/2012	617	760	ND	**172**
MW-3-T9	3/20/2013	700	ND	ND	68
MW-3-T9	6/26/2013	520	ND	ND	55
MW-3-T9	9/10/2013	490	ND	ND	39
MW-3-T9	12/11/2013	980	ND	ND	39
MW-3-T9	3/12/2014	1,000	1,400 J	ND	28
MW-3-T9	6/11/2014	670	1,300	ND	14
MW-3-T9	9/10/2014	650	1,400	ND	14
MW-3-T9	12/10/2014	800	1,000	ND	13
MW-3-T9	3/11/2015	1,000	2,100	ND	2.1
MW-3-T9	6/10/2015	760	1,100	ND	0.74
MW-3-T9	9/22/2015	560	250	ND	0.62
MW-3-T9	12/16/2015	930	590	ND	2.4
MW-3-T9	3/9/2016	1,000	1,400	ND U	0.87
MW-3-T9	6/9/2016	810	2,000	ND	ND
MW-3-T9	9/7/2016	820	1,500	ND	0.53
MW-3-T9	12/7/2016	970	1,700	ND	1.50
MW-3-T9	3/8/2017	900	2,700	540	2.50
MW-3-T9	6/7/2017	750	780	ND	1.50
MW-3-T9	9/13/2017	740	290	ND	0.53
MW-3-T9	12/6/2017	800	ND	ND	1.3
MW-3-T9	3/21/2018	750	160	ND	1.9
MW-3-T9	9/12/2018	960	690	ND	ND
MW-3-T9	3/13/2019	880	950	ND	2.3
MW-3-T9	9/25/2019	770	530	ND	ND
MW-3-T9	3/19/2020	710	810	ND	1.1
MW-3-T9	9/17/2020	620	690	ND	ND
MW-3-T9	3/11/2021	740	280	ND	ND
MW-3-T9	9/23/2021	570	ND	ND	ND
MW-3-T9	3/24/2022	720	ND	ND	0.52
MW-3-T9	9/22/2022	570	280	ND	ND
MW-4-T9	12/15/2005	ND	ND	ND	1.26
MW-4-T9	3/22/2006	ND	ND	ND	0.836
MW-4-T9	7/7/2006	ND	ND	ND	0.745
MW-4-T9	9/19/2006	ND	ND	ND	1.53
MW-4-T9	12/13/2006	ND UJ	ND UJ	ND UJ	1.46
MW-4-T9	3/22/2007	ND	ND	ND	0.625
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
MW-4-T9	6/7/2007	81	ND	ND	ND
MW-4-T9	9/14/2007	ND	ND	ND	0.599 J
MW-4-T9	12/19/2007	ND	ND	ND	1.55
MW-4-T9	3/26/2008	ND	ND	ND	ND
MW-4-T9	6/26/2008	ND	ND	ND	ND
MW-4-T9	9/18/2008	ND	ND	ND	0.92
MW-4-T9	12/17/2008	ND	ND	ND	1.1
MW-4-T9	3/13/2009	ND	ND	ND	0.506
MW-4-T9	6/11/2009	ND	R	R	ND
MW-4-T9	9/17/2009	60	ND	ND	ND
MW-4-T9	12/16/2009	ND	ND	ND	ND
MW-4-T9	3/31/2010	ND	ND	ND	ND
MW-4-T9	6/10/2010	ND	210	ND	ND
MW-4-T9	9/15/2010	ND	ND	ND	ND
MW-4-T9	12/15/2010	ND	ND	ND	ND
MW-4-T9	3/24/2011	ND	ND	ND	ND
MW-4-T9	6/23/2011	ND	ND	ND	ND
MW-4-T9	9/28/2011	ND	ND	ND	ND
MW-4-T9	12/21/2011	ND	ND	ND	ND
MW-4-T9	3/21/2012	ND	ND	ND	ND
MW-4-T9	6/21/2012	ND	ND	ND	ND
MW-4-T9	9/10/2012	ND	ND	ND	ND
MW-4-T9	12/20/2012	ND	ND	ND	ND
MW-4-T9	3/20/2013	ND	ND	ND	ND
MW-4-T9	6/26/2013	ND	ND	ND	ND
MW-4-T9	9/10/2013	ND	ND	ND	ND
MW-4-T9	12/11/2013	ND	ND	ND	ND
MW-4-T9	3/12/2014	ND	290 J	ND	ND
MW-4-T9	6/11/2014	ND	480	ND	ND
MW-4-T9	9/9/2014	ND	400	ND	ND
MW-4-T9	12/10/2014	ND	360	ND	ND
MW-4-T9	3/10/2015	ND U	ND	ND	ND
MW-4-T9	6/10/2015	ND	300	ND	ND
MW-4-T9	9/23/2015	ND	320	ND	ND
MW-4-T9	12/16/2015	ND	320	ND	ND
MW-4-T9	3/8/2016	ND	ND	ND U	ND
MW-4-T9	6/9/2016	ND	680	ND	ND
MW-4-T9	9/9/2016	ND	460	ND	ND
MW-4-T9	12/7/2016	ND U	ND	ND	ND U
MW-4-T9	3/8/2017	ND	350	160	ND
MW-4-T9	6/7/2017	ND	ND	ND	ND
MW-4-T9	9/13/2017	ND	ND	ND	ND
MW-4-T9	12/6/2017	ND	ND	ND	ND
MW-4-T9	WELL DELETED FROM MONITORING PROGRAM				
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 2					
GM-19S	4/10/1997	**1,070**	4,260	1,840	1.3
GM-19S	7/9/1997	**1,030**	1,840	1,150	0.9 J
GM-19S	10/22/1997	800	370	ND	3.6
GM-19S	1/22/1998	400 J	1,320	ND	1.8
GM-19S	3/12/1998	180	1,860	ND	ND
GM-19S	7/8/1998	1,000 J	1,660 J	ND UJ	ND UJ
GM-19S	10/21/1998	570	1,260	ND	2.5
GM-19S	12/17/1998	650	1,970	ND	0.9
GM-19S	3/25/1999	72	1,420	793	ND
GM-19S	6/22/1999	**1,600**	1,100	ND	1.5
GM-19S	9/27/1999	**1,900 J**	NS	NS	44 J
GM-19S	12/13/1999	**1,500 J**	1,160	ND	**470**
GM-19S	3/24/2000	ND	1,530	ND	**955**
GM-19S	7/3/2000	771	1,380	ND	**2,330 J**
GM-19S	9/29/2000	ND UJ	2,290 J	776 J	**4,010 J**
GM-19S	12/21/2000	ND	3,150	806	**2,660**
GM-19S	3/28/2001	**2,940**	2,320	994	**1,730**
GM-19S	6/15/2001	**3,270**	1,230	ND	**3,390**
GM-19S	10/5/2001	Not accessible due to island redevelopment activities			
GM-19S	12/13/2001	**5,140**	2,350	985	**1,990**
GM-19S	3/8/2002	**11,000**	1,940	NS	**723**
GM-19S	6/11/2002	**2,720 J**	3,210	810	**710 J**
GM-19S	9/18/2002	**1,320 J**	2,430 J	ND UJ	**1,960 J**
GM-19S	12/16/2002	730	4590 J	1,770	**2,320 J**
GM-19S	3/25/2003	**9,540**	3,350	960	**1,960**
GM-19S	6/25/2003	**3,640**	3,740 J	1,380 J	**596**
GM-19S	9/19/2003	**1,290**	2,010	ND	**469**
GM-19S	12/23/2003	**1,070 J**	2,190 J	ND	**496**
GM-19S	3/9/2004	**1,450**	ND	ND	**832**
GM-19S	6/17/2004	**1,150**	498	ND	**307**
GM-19S	9/29/2004	679 J	NS	NS	**87.8**
GM-19S	12/9/2004	501	NS	NS	47
GM-19S	3/11/2005	649	NS	NS	**210.0**
GM-19S	6/22/2005	NS	NS	NS	**99.7**
GM-19S	9/28/2005	467	NS	NS	43.9
GM-19S	12/14/2005	581	NS	NS	**508**
GM-19S	3/22/2006	**1,710**	NR	NR	**853**
GM-19S	7/7/2006	850	NR	NR	**426**
GM-19S	9/19/2006	389	NS	NS	63
GM-19S	12/13/2006	445 J	NS	NS	**167 J**
GM-19S	3/22/2007	**1,070 J**	NS	NS	**1,400**
GM-19S	6/7/2007	200 J	NS	NS	15
GM-19S	9/13/2007	484	NS	NS	**956**
GM-19S	12/19/2007	88	NS	NS	**140**
GM-19S	3/27/2008	560	NS	NS	**869**
GM-19S	6/26/2008	958	NS	NS	**164**
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 2, continued					
GM-19S	9/19/2008	530	NS	NS	**178**
GM-19S	12/18/2008	Well not sampled, sampling has been reduced to a semi-annual event			
GM-19S	3/12/2009	261	NS	NS	**186**
GM-19S	9/17/2009	510	NS	NS	**140**
GM-19S	3/31/2010	220	NS	NS	**110**
GM-19S	9/15/2010	372	NS	NS	**111**
GM-19S	3/23/2011	56.5	NS	NS	26.9
GM-19S	9/28/2011	709	NS	NS	31.0
GM-19S	3/21/2012	355	NS	NS	8.4
GM-19S	9/11/2012	312	NS	NS	47.0
GM-19S	3/20/2013	330	NR	NR	38.0
GM-19S	9/11/2013	750	NR	NR	**160**
GM-19S	3/12/2014	ND	NR	NR	10
GM-19S	9/10/2014	53	NR	NR	44
GM-19S	3/11/2015	1,000 J	NR	NR	4.6
GM-19S	9/23/2015	860	NR	NR	5.8
GM-19S	3/9/2016	ND	NR	NR	ND
GM-19S	9/8/2016	340	NR	NR	ND
GM-19S	3/8/2017	ND	NR	NR	ND
GM-19S	9/13/2017	220	NR	NR	ND
GM-19S	3/21/2018	140	NR	NR	ND
GM-19S		WELL DELETED FROM MONITORING PROGRAM			
GM-19D	4/10/1997	ND	6,680	2,050	**234**
GM-19D	7/9/1997	ND	5,910	1,780	**330**
GM-19D	10/22/1997	70	ND	ND	**263**
GM-19D	1/22/1998	ND	1,820	ND	**260**
GM-19D	3/12/1998	ND	2,630	ND	**140**
GM-19D	7/8/1998	ND UJ	2,120 J	ND UJ	**360 J**
GM-19D	10/21/1998	ND	1,930	ND	**180**
GM-19D	12/17/1998	ND	2,260	ND	**170**
GM-19D	3/25/1999	57	2,280	ND	**150**
GM-19D	6/22/1999	150	1,520	ND	**150**
GM-19D	9/27/1999	75 J	2,460 J	ND UJ	**120 J**
GM-19D	12/13/1999	550 J	1,930	ND	**170**
GM-19D	3/22/2000	ND	2,490	ND	**208**
GM-19D	7/3/2000	ND	5,260	1,280	**225**
GM-19D	9/29/2000	ND UJ	6,490 J	1,470 J	**210 J**
GM-19D	12/21/2000	ND	8,700	984	**225**
GM-19D	3/28/2001	ND	8,100	1,990	**163**
GM-19D	6/12/2001	ND	2,650	ND	**278**
GM-19D	10/5/2001	Not accessible due to island redevelopment activities			
GM-19D	12/13/2001	ND	7,830	1,880	**265**
GM-19D	3/8/2002	ND	3,400	ND	**281**
GM-19D	6/11/2002	63	7,810	1,470	**220**
GM-19D	9/18/2002	59.8 J	1,960 UJ	ND UJ	**215**
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 2, continued					
GM-19D	12/16/2002	52 J	6880 J	1,020	**263**
GM-19D	3/26/2003	ND	2,880	ND UJ	**270**
GM-19D	6/25/2003	ND	6,930	1,770	**222**
GM-19D	9/19/2003	ND	2,300	ND	**241**
GM-19D	12/23/2003	ND	7710 J	1,140	**261**
GM-19D	3/9/2004	82	ND	ND	**173**
GM-19D	6/17/2004	56.1	3,430	ND	**169**
GM-19D		WELL DELETED FROM MONITORING PROGRAM			
GM-21S	4/10/1997	ND	4,640	2,960	ND
GM-21S	7/9/1997	ND	5,080	2,420	ND
GM-21S	10/23/1997	ND	ND	ND	ND
GM-21S	1/23/1998	ND	1,710	ND	ND
GM-21S	3/12/1998	ND	615	ND	ND
GM-21S	7/9/1998	ND	2,190	ND	ND
GM-21S	10/21/1998	ND	694	ND	ND
GM-21S	12/17/1998	ND	1,050	ND	ND
GM-21S	3/25/1999	NS	793	ND	NS
GM-21S	6/22/1999	NS	875	ND	NS
GM-21S	9/27/1999	NS	3,330 J	ND UJ	NS
GM-21S	12/13/1999	NS	648	ND	NS
GM-21S	3/23/2000	ND	1,480	ND	ND
GM-21S	7/6/2000	ND	3,020	ND	ND
GM-21S	9/29/2000	ND UJ	3,310 J	924 J	ND UJ
GM-21S	12/21/2000	NS	NS	NS	NS
GM-21S	3/28/2001	Not accessible due to island redevelopment activities			
GM-21S	6/12/2001	Not accessible due to island redevelopment activities			
GM-21S	10/5/2001	Not accessible due to island redevelopment activities			
GM-21S	12/13/2001	Not accessible due to island redevelopment activities			
GM-21S	3/6/2002	ND	454	ND	ND
GM-21S		WELL DELETED FROM MONITORING PROGRAM			
GM-21D	4/10/1997	ND	1,730 J	810 J	ND
GM-21D	7/9/1997	ND	1,860	ND	ND
GM-21D	10/23/1997	ND	ND	ND	ND
GM-21D	1/23/1998	ND	744	ND	ND
GM-21D	3/12/1998	ND	1,830	ND	ND
GM-21D	7/9/1998	ND	1,030 J	ND UJ	ND
GM-21D	10/21/1998	ND	684	ND	ND
GM-21D	12/17/1998	ND	926	ND	ND
GM-21D	6/22/1999	NS	1,100	ND	NS
GM-21D	9/27/1999	NS	2,330 J	ND UJ	NS
GM-21D	12/13/1999	NS	986	ND	NS
GM-21D		WELL DELETED FROM MONITORING PROGRAM			
GM-22S		WELL NOT SAMPLED BETWEEN 1997 AND 2000			
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 2, continued					
GM-22S	3/23/2000	ND	5,060	841	0.538
GM-22S	7/6/2000	ND	8,930	1,050	ND
GM-22S	9/29/2000	ND UJ	3,130 J	1,620 J	2.04 J
GM-22S	12/21/2000	ND	5,070	1,720	ND
GM-22S	3/28/2001	ND	5,430	2,500	ND
GM-22S	6/15/2001	ND	3,110	ND	ND
GM-22S	10/5/2001	Not accessible due to island redevelopment activities			
GM-22S	12/13/2001	55.3	4,780	2,320	ND
GM-22S	3/8/2002	ND	2,710	831	ND
GM-22S		WELL DELETED FROM MONITORING PROGRAM			
GM-23S	4/10/1997	NS	NS	NS	NS
GM-23S	7/9/1997	750	1,830	1,010	ND
GM-23S	10/22/1997	400	ND	ND	ND
GM-23S	1/23/1998	NS	NS	NS	NS
GM-23S	3/12/1998	NS	NS	NS	NS
GM-23S	7/8/1998	480 J	467 J	ND UJ	ND UJ
GM-23S	10/21/1998	500	1,250	ND	ND
GM-23S	12/17/1998	NS	NS	NS	NS
GM-23S	3/25/1999	NS	NS	NS	NS
GM-23S	6/22/1999	680	801	ND	ND
GM-23S	9/28/1999	940	682	ND	ND
GM-23S		WELL DELETED FROM MONITORING PROGRAM			
T-18-1	6/14/2001	ND	1,670	ND	ND
T-18-1	10/5/2001	ND	1,270	ND	ND
T-18-1	12/13/2001	ND	365	ND	ND
T-18-1	3/6/2002	ND	357	ND	ND
T-18-1		WELL DELETED FROM MONITORING PROGRAM			
T-18-2a	6/14/2001	ND	385	ND	ND
T-18-2a	10/5/2001	ND	339	ND	ND
T-18-2a	12/13/2001	ND	323	ND	ND
T-18-2a	3/6/2002	ND	256	ND	ND
T-18-2a		WELL DELETED FROM MONITORING PROGRAM			
MW-03R	6/11/2002	NS	**20,700**	ND	NS
MW-03R	9/18/2002	NS	9,690 J	1,990 J	NS
MW-03R	12/16/2002	NS	NS	NS	NS
MW-03R	3/25/2003	NS	ND	ND UJ	NS
MW-03R	6/26/2003	NS	**10,200**	2,500	NS
MW-03R	9/19/2003	NS	831	ND	NS
MW-03R	12/23/2003	NS	472 J	ND	NS
MW-03R	3/9/2004	NS	645	ND	NS
MW-03R	6/17/2004	NS	935	ND	NS
MW-03R		WELL DELETED FROM MONITORING PROGRAM			
Cleanup Level		1,000	10,000	10,000	71
Method Reporting Limit		50	250	750	0.5

Table 6. Groundwater Monitoring Analytical Results for TPH and Benzene
Site: Former BP Harbor Island Terminal

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)

Note: Values in **bold** exceed the cleanup level.

J	Estimated value.
µg/L	Micrograms per liter.
NA	Not analyzed.
ND	Constituent not detected above reporting limit.
NS	Not sampled.
TPH	Total petroleum hydrocarbons.
TPH-D	Total petroleum hydrocarbons as diesel.
TPH-G	Total petroleum hydrocarbons as gasoline.
TPH-O	Total petroleum hydrocarbons as oil.
U	Undetected.
WTPH-DX	Washington State Method for Analysis of Diesel and Oil in Water - Extended.
WTPH-G	Washington State Method for Analysis of Gasoline in Water.

EPA 8021 or EPA 9260 - EPA Methods for Analysis of Benzene in Water.

** AMW-02 benzene result from 12/17/2019 of 69.75 is the average of 4 analyses performed from the sample, which were 87, 67 J, 61 J, 64 J.

Table 7. Groundwater Monitoring Analytical Results for cPAHs
Site: Former BP Harbor Island Terminal

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1								
GM-11S	4/10/1997	ND	ND	ND	ND	0.01	ND	ND
GM-11S	7/8/1997	ND	ND	ND	ND	0.01 J	ND	0.01 J
GM-11S	10/21/1997	0.02	0.01	0.02	0.01	0.02	0.01	0.01
GM-11S	1/21/1998	ND	ND	ND	ND	0.01 U	ND	ND
GM-11S				WELL DELETED FROM cPAH MONITORING PROGRAM				
GM-12S	4/10/1997	0.02	0.03	**0.04**	**0.04**	**0.06**	ND	**0.04**
GM-12S	7/8/1997	**0.06 J**	**0.07 J**	**0.11 J**	**0.09 J**	**0.13 J**	0.01 J	**0.06 J**
GM-12S	10/20/1997	**0.07 J**	**0.06 J**	**0.1 J**	**0.09 J**	**0.15 J**	0.01	**0.08 J**
GM-12S	1/21/1998	0.1 U	**0.11**	**0.12**	**0.12 U**	**0.16 U**	**0.04**	**0.11**
GM-12S	3/10/1998	**0.05**	**0.06**	**0.1**	**0.07**	**0.12**	0.02	**0.09**
GM-12S	7/6/1998	0.01	0.01	0.03	0.02	**0.04**	ND	0.03
GM-12S	10/20/1998	0.03	0.03	**0.05**	**0.04**	**0.07 J**	0.01	**0.05**
GM-12S	3/26/1999	0.01	0.01	0.02	0.02	0.02	ND	0.02 U
GM-12S	6/23/1999	ND	0.01	0.01	0.01	0.01	ND	0.01
GM-12S				WELL DELETED FROM cPAH MONITORING PROGRAM				
GM-15S	4/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-15S	7/8/1997	ND	0.01 J	0.02 J	0.01 J	ND	ND	0.01 J
GM-15S	10/21/1997	ND	ND	ND	ND	ND	ND	ND
GM-15S	1/21/1998	ND	ND	ND	ND	ND	ND	ND
GM-15S				WELL DELETED FROM cPAH MONITORING PROGRAM				
GM-16S	4/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-16S	7/8/1997	ND	ND	ND	ND	ND	ND	ND
GM-16S	10/21/1997	ND	ND	ND	ND	ND	ND	ND
GM-16S	1/21/1998	ND	ND	ND	ND	ND	ND	ND
GM-16S				WELL DELETED FROM cPAH MONITORING PROGRAM				
GM-17S	4/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-17S	7/9/1997	0.01 J	ND	0.01 J	0.01 J	0.02 J	0.01 J	0.01 J
GM-17S	10/21/1997	ND	ND	ND	ND	ND	ND	ND
GM-17S	1/22/1998	ND	ND	ND	ND	ND	ND	ND
GM-17S				WELL DELETED FROM cPAH MONITORING PROGRAM				
GM-24S	4/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-24S	7/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-24S	10/22/1997	ND	ND	ND	ND	ND	ND	ND
GM-24S	1/22/1998	ND	ND	ND	ND	ND	ND	ND
GM-24S				WELL DELETED FROM cPAH MONITORING PROGRAM				
AR-03	4/9/1997	ND R	ND R	ND R	ND R	ND R	ND R	ND R
AR-03	7/8/1997	ND	ND	ND	ND	ND	ND	ND
AR-03	10/21/1997	ND	ND	ND	ND	ND	ND	ND
AR-03	1/21/1998	ND	ND	ND	ND	ND	ND	ND
AR-03				WELL DELETED FROM cPAH MONITORING PROGRAM				
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 7. Groundwater Monitoring Analytical Results for cPAHs
Site: Former BP Harbor Island Terminal

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1, continued								
AMW-01	12/21/2000	ND	ND	0.116	ND	ND	ND	ND
AMW-01	3/28/2001	**0.0372 J**	**0.0821 J**	**0.04585 * J**	**0.04585 * J**	**0.0347 J**	ND UJ	ND UJ
AMW-01	6/13/2001	ND	ND	ND *	ND *	ND	**0.052**	ND
AMW-01	10/4/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/12/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	3/7/2002	ND	ND	ND	ND	ND	ND	ND
AMW-01	6/12/2002	ND	ND	ND	ND	ND	ND	ND
AMW-01	9/19/2002	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/17/2002	0.0292 J	ND	ND	ND	ND	ND	ND
AMW-01	6/16/2004	ND	ND	ND	ND	ND	ND	ND
AMW-01	9/28/2004	ND	ND	ND	ND	ND	ND	ND
AMW-01	12/6/2004	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	3/10/2005	U	U	**0.0509**	U	**0.0637**	**0.0483**	**0.0506**
AMW-01	6/21/2005	0.024	ND	**0.0411**	**0.0502**	**0.0322**	ND	0.0222
AMW-01	9/27/2005	ND	ND	ND	ND	ND	ND	ND
AMW-01	12/13/2005	ND	ND	ND	ND	ND	ND	ND
AMW-01	3/21/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	7/6/2006	ND	ND	ND	ND	ND	ND	ND
AMW-01	9/18/2006	ND	ND	ND	ND	ND	ND	ND
AMW-01	12/12/2006	ND R	ND R	ND R	ND R	ND R	NDR	ND R
AMW-01	3/21/2007	**0.212 J**	**0.177 J**	**0.22 J**	**0.29 J**	**0.215 J**	**0.237 J**	**0.229 J**
AMW-01	6/6/2007	ND	ND	ND	ND	ND	ND	ND
AMW-01	9/12/2007	0.0124 J	ND UJ	ND UJ	ND UJ	0.0133 J	ND UJ	ND UJ
AMW-01	12/18/2007	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	3/25/2008	ND	ND	ND	ND	ND	ND	ND
AMW-01	6/25/2008	cPAH Sampling Reduced to an Annual Event						
AMW-01	12/16/2008	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/16/2009	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/14/2010	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/21/2011	ND	ND	0.018	ND	ND	ND	ND
AMW-01	12/19/2012	ND	ND	ND	ND	ND	ND	ND
AMW-01	12/10/2013	ND	ND	ND	ND	ND	ND	ND
AMW-01	12/9/2014	ND	ND	ND	ND	ND	ND	ND
AMW-01	12/15/2015	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/6/2016	ND	ND U	ND	ND	ND	ND U	ND
AMW-01	12/5/2017	ND	ND UJ	ND UJ	ND	ND	ND	ND UJ
AMW-01	12/11/2018	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/17/2019	ND	ND	ND	ND	ND	ND	ND
AMW-01	12/16/2020	ND	ND	0.022	ND	ND	ND	ND
AMW-01	12/8/2021	ND	ND	ND	ND	ND	ND	ND
AMW-01	1/11/2023	0.023	0.031	**0.057 J**	0.031	0.024	0.026 J	**0.038**
AMW-02	12/21/2000	ND	ND	ND	ND	ND	ND	ND
AMW-02	3/28/2001	Warehouse not accessible due to earthquake damage.						
AMW-02	6/13/2001	ND UJ	ND UJ	ND UJ *	ND UJ *	ND UJ	**0.052 J**	ND UJ
AMW-02	10/4/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 7. Groundwater Monitoring Analytical Results for cPAHs
Site: Former BP Harbor Island Terminal

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1, continued								
AMW-02	12/12/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	6/12/2002	ND	ND	ND	ND	ND	ND	ND
AMW-02	9/19/2002	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	12/17/2002	ND	ND	ND	ND	ND	ND	ND
AMW-02	6/16/2004	ND	ND	ND	ND	**0.0322**	ND	ND
AMW-02	9/28/2004	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/8/2004	ND	ND	ND	ND	ND	ND	ND
AMW-02	3/10/2005	U	U	0.136	U	U	0.0153	0.0143
AMW-02	6/21/2005	ND	ND	ND	ND	ND	ND	ND
AMW-02	9/27/2005	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/13/2005	ND	ND	ND	ND	ND	ND	ND
AMW-02	3/21/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	7/6/2006	ND	ND	ND	ND	ND	ND	ND
AMW-02	9/18/2006	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/12/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	NDUJ
AMW-02	3/21/2007	**0.201**	**0.191**	**0.207**	**0.237**	**0.215**	**0.226**	**0.232**
AMW-02	6/6/2007	ND	ND	ND	ND	ND	ND	ND
AMW-02	9/12/2007	ND UJ	ND UJ	ND UJ	ND UJ	0.0117 J	ND UJ	ND UJ
AMW-02	12/18/2008	ND	ND	ND	ND	ND	ND	ND
AMW-02	3/25/2008	ND	ND	ND	ND	ND	ND	ND
AMW-02	6/25/2008	cPAH Sampling Reduced to an Annual Event						
AMW-02	12/16/2008	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/16/2009	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	12/14/2010	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	12/21/2011	ND	ND	ND	0.017	ND	ND	ND
AMW-02	12/19/2012	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/10/2013	0.016	ND	ND	ND	ND	ND	ND
AMW-02	12/9/2014	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/15/2015	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	12/6/2016	ND	ND U	ND	ND	ND	ND	ND
AMW-02	12/5/2017	0.029	**0.041**	**0.068**	ND	**0.045**	ND	**0.042**
AMW-02	12/11/2018	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/17/2019	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/16/2020	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/8/2021	ND	ND	ND	ND	ND	ND	ND
AMW-02	1/11/2023	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/21/2000	ND	ND	ND	ND	ND	ND	ND
AMW-03	3/28/2001	Warehouse not accessible due to earthquake damage.						
AMW-03	6/13/2001	ND	ND	ND *	ND *	ND	**0.051**	ND
AMW-03	10/4/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	12/12/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	6/12/2002	ND	ND	ND	ND	ND	ND	ND
AMW-03	9/19/2002	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	12/17/2002	ND	ND	ND	ND	ND	ND	ND
AMW-03	6/16/2004	ND	ND	ND	ND	ND	ND	ND
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 7. Groundwater Monitoring Analytical Results for cPAHs
Site: Former BP Harbor Island Terminal

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1, continued								
AMW-03	9/28/2004	ND	ND	ND	ND	ND	ND	ND
AMW-03	1/20/2005	ND	ND	ND	ND	ND	ND	ND
AMW-03	3/10/2005	U	ND	0.142	U	U	ND	ND
AMW-03	6/21/2005	ND	ND	ND	ND	ND	ND	ND
AMW-03	9/27/2005	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/13/2005	ND	ND	ND	ND	ND	ND	ND
AMW-03	3/21/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	7/6/2006	ND	ND	ND	ND	ND	ND	ND
AMW-03	9/18/2006	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/12/2006	**0.0835J**	NDUJ	0.157J	**0.0387J**	**0.0784J**	**0.116J**	**0.125J**
AMW-03	3/21/2007	**0.0714**	**0.0689**	**0.0583**	**0.0773**	**0.0851**	**0.0823**	**0.0752**
AMW-03	6/6/2007	ND	ND	ND	ND	ND	ND	ND
AMW-03	9/12/2007	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	12/18/2007	ND	ND	ND	ND	ND	ND	ND
AMW-03	3/25/2008	ND	ND	ND	ND	ND	ND	ND
AMW-03	6/25/2008	cPAH Sampling Reduced to an Annual Event						
AMW-03	12/16/2008	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/16/2009	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/14/2010	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/21/2011	0.017	0.028	**0.051**	0.017	0.030	ND	0.030
AMW-03	12/19/2012	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/10/2013	ND	ND	ND	0.019	0.016	ND	ND
AMW-03	12/9/2014	ND	ND	0.024	ND	0.027	ND	ND
AMW-03	12/15/2015	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	12/6/2016	ND	ND U	ND	ND	ND	ND	ND
AMW-03	12/5/2017	0.029	0.028	**0.049**	ND	**0.037**	ND	**0.036**
AMW-03	12/11/2018	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	12/17/2019	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/16/2020	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/8/2021	ND	ND	ND	ND	ND	ND	ND
AMW-03	1/11/2023	ND	ND	0.051	ND	ND	ND	0.021
AMW-04	12/21/2000	ND	ND	ND	ND	ND	ND	ND
AMW-04	3/28/2001	**0.0497**	**0.0762 J**	**0.04325 * J**	**0.04325 * J**	**0.0451 J**	ND UJ	ND UJ
AMW-04	6/13/2001	ND	ND	ND *	ND *	ND	**0.054**	ND
AMW-04	10/4/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	12/12/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	3/7/2002	0.0264	ND	0.0276	ND	**0.0350**	ND	ND
AMW-04	6/12/2002	ND	ND	ND	ND	ND	ND	ND
AMW-04	9/19/2002	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	12/17/2002	**0.0396 J**	ND	ND	ND	ND	ND	ND
AMW-04	6/16/2004	ND	ND	ND	ND	ND	ND	ND
AMW-04	9/27/2004	**0.0338**	ND	0.0116	0.0152	**0.0343**	ND	ND
AMW-04	12/6/2004	ND	ND	ND	ND	ND	ND	ND
AMW-04	3/10/2005	ND	ND	ND	ND	ND	ND	ND
AMW-04	6/21/2005	ND R	ND R	ND R	ND R	ND R	ND R	ND R
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 7. Groundwater Monitoring Analytical Results for cPAHs
Site: Former BP Harbor Island Terminal

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1, continued								
AMW-04	9/27/2005	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/13/2005	ND	ND	ND	ND	ND	ND	ND
AMW-04	3/21/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	7/6/2006	ND	ND	ND	ND	ND	ND	ND
AMW-04	9/18/2006	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/12/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	3/21/2007	ND	ND	ND	ND	ND	ND	ND
AMW-04	6/6/2007	ND	ND	ND	ND	ND	ND	ND
AMW-04	9/12/2007	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	12/18/2007	ND	ND	ND	ND	ND	ND	ND
AMW-04	3/26/2008	ND	ND	ND	ND	ND	ND	ND
AMW-04	6/25/2008	cPAH Sampling Reduced to an Annual Event						
AMW-04	12/16/2008	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/16/2009	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	12/14/2010	**0.031 J**	0.023 J	**0.034 J**	**0.044 J**	**0.043 J**	**0.085 J**	**0.076 J**
AMW-04	12/21/2011	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	12/19/2012	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/10/2013	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/9/2014	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/15/2015	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	12/6/2016	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	12/5/2017	0.021	0.025	**0.041**	ND	**0.035**	ND	0.028
AMW-04	12/11/2018	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/17/2019	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/16/2020	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/8/2021	ND	ND	ND	ND	ND	ND	ND
AMW-04	1/11/2023	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/21/2000	ND	ND	ND	ND	ND	ND	ND
AMW-05	3/28/2001	0.0280 J	**0.0750 J**	**0.0431 * J**	**0.0431 * J**	0.0301 J	ND UJ	ND UJ
AMW-05	6/13/2001	ND UJ	ND UJ	ND UJ *	ND UJ *	ND UJ	ND UJ	ND UJ
AMW-05	10/4/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	12/12/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	3/7/2002	ND	ND	ND	ND	ND	ND	ND
AMW-05	6/12/2002	ND	ND	ND	ND	ND	ND	ND
AMW-05	9/19/2002	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	12/17/2002	ND	ND	ND	ND	ND	ND	ND
AMW-05	6/16/2004	ND	ND	ND	ND	ND	ND	ND
AMW-05	6/16/2004	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/6/2004	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	3/10/2005	ND	ND	ND	ND	ND	ND	ND
AMW-05	6/21/2005	0.0132	ND	0.0189	0.0185	0.0178	ND	0.0142
AMW-05	9/27/2005	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/13/2005	ND	ND	ND	ND	ND	ND	ND
AMW-05	3/21/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	7/6/2006	ND	ND	ND	ND	ND	ND	ND
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 7. Groundwater Monitoring Analytical Results for cPAHs
Site: Former BP Harbor Island Terminal

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1, continued								
AMW-05	9/18/2006	ND	ND	ND	ND	**0.0832 J**	ND	ND
AMW-05	12/12/2006	**0.0771J**	ND UJ	**0.157J**	**0.0397J**	**0.0768J**	**0.121J**	**0.129J**
AMW-05	3/21/2007	**0.0499**	**0.0534**	**0.0551**	**0.51**	**0.0562**	**0.051**	**0.0633**
AMW-05	6/6/2007	ND	ND	ND	ND	ND	ND	ND
AMW-05	9/12/2007	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	12/18/2007	ND	ND	ND	ND	ND	ND	ND
AMW-05	3/26/2008	0.0159	ND	ND	ND	0.0116	ND	ND
AMW-05	6/25/2008	cPAH Sampling Reduced to an Annual Event						
AMW-05	12/16/2008	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/16/2009	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	12/14/2010	0.019 J	0.018 J	0.021 J	0.020 J	0.025 J	ND UJ	ND UJ
AMW-05	12/21/2011	ND	ND	0.018	ND	ND	ND	ND
AMW-05	12/19/2012	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/10/2013	**0.037**	**0.031**	**0.053**	ND	**0.051**	ND	0.030
AMW-05	12/9/2014	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/15/2015	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	12/6/2016	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	12/5/2017	0.023	**0.032**	**0.049**	ND	**0.035**	ND	**0.034**
AMW-05	12/11/2018	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	12/17/2019	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/16/2020	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/8/2021	ND	ND	ND	ND	ND	ND	ND
AMW-05	1/11/2023	ND	ND	ND	ND	ND	ND	ND
Plant 2								
GM-19S	4/10/1997	ND	ND	ND	ND	ND	ND	ND
GM-19S	7/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-19S	10/22/1997	ND	ND	ND	ND	ND	ND	ND
GM-19S	1/22/1998	ND	ND	ND	ND	ND	ND	ND
GM-19S	WELL DELETED FROM cPAH MONITORING PROGRAM							
GM-19D	4/10/1997	ND	ND	ND	ND	ND	ND	ND
GM-19D	7/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-19D	10/22/1997	ND	ND	ND	ND	ND	ND	ND
GM-19D	1/22/1998	ND	ND	ND	ND	ND	ND	ND
GM-19D	WELL DELETED FROM cPAH MONITORING PROGRAM							
GM-21S	4/10/1997	ND	ND	ND	ND	ND	ND	ND
GM-21S	7/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-21S	10/23/1997	ND	ND	ND	ND	ND	ND	ND
GM-21S	1/23/1998	ND	ND	ND	ND	ND	ND	ND
GM-21S	WELL DELETED FROM cPAH MONITORING PROGRAM							
GM-21D	4/10/1997	ND	ND	ND	ND	ND	ND	ND
GM-21D	7/9/1997	0.01 J	0.01 J	0.02 J	0.02 J	0.02 UJ	ND	0.01 J
GM-21D	10/23/1997	ND	ND	ND	ND	ND	ND	ND
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 7. Groundwater Monitoring Analytical Results for cPAHs
Site: Former BP Harbor Island Terminal

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 2, continued								
GM-21D	1/23/1998	ND	ND	ND	ND	ND	ND	ND
GM-21D		WELL DELETED FROM cPAH MONITORING PROGRAM						
GM-23S	7/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-23S	10/22/1997	ND	ND	ND	ND	ND	ND	ND
GM-23S		WELL DELETED FROM cPAH MONITORING PROGRAM						
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Note: Values in **bold** exceed the cleanup level.

cPAHs Carcinogenic polynuclear aromatic hydrocarbons.
J Estimated value.
µg/L Micrograms per liter.
NA Not analyzed.
ND Constituent not detected above reporting limit.
R Rejected; the presence or absence of the constituent cannot be verified.
U Undetected.

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1		
GM-11S	9/29/1999	**~0.29 foot**
GM-11S	10/19/1999	**~0.59 foot**
GM-11S	11/19/1999	**~0.51 foot**
GM-11S	12/28/1999	**~0.10 foot**
GM-11S	1/21/2000	**~0.01 foot**
GM-11S	2/16/2000	**~0.01 foot**
GM-11S	3/27/2000	**~0.01 foot**
GM-11S	4/14/2000	**~0.01 foot**
GM-11S	5/15/2000	**~0.34 foot**
GM-11S	6/26/2000	**~0.07 foot**
GM-11S	7/19/2000	None
GM-11S	8/15/2000	None
GM-11S	9/29/2000	**Sheen**
GM-11S	10/12/2000	None
GM-11S	11/14/2000	**~0.03 foot**
GM-11S	12/14/2000	None
GM-11S	1/11/2001	**~0.01 foot**
GM-11S	2/15/2001	None
GM-11S	3/15/2001	None
GM-11S	4/13/2001	None
GM-11S	5/16/2001	**~0.13 foot**
GM-11S	6/11/2001	None
GM-11S	7/24/2001	None
GM-11S	8/21/2001	None
GM-11S	9/6/2001	**Sheen**
GM-11S	10/19/2001	None
GM-11S	11/15/2001	**Sheen**
GM-11S	12/10/2001	**Sheen**
GM-11S	1/16/2002	**Sheen**
GM-11S	2/21/2002	**Sheen**
GM-11S	3/18/2002	**Sheen**
GM-11S	4/18/2002	**Sheen**
GM-11S	5/20/2002	**Sheen**
GM-11S	6/19/2002	**Sheen**
GM-11S	7/15/2002	**Sheen**
GM-11S	8/20/2002	**Sheen**
GM-11S	9/20/2002	**Sheen**
GM-11S	10/15/2002	**Sheen**
GM-11S	11/27/2002	**Sheen**
GM-11S	12/18/2002	**Sheen**
GM-11S	1/16/2003	**Sheen**
GM-11S	2/11/2003	**Sheen**
GM-11S	3/11/2003	**Sheen**
GM-11S	4/15/2003	**Sheen**
GM-11S	5/15/2003	**Sheen**
GM-11S	6/17/2003	**Sheen**
GM-11S	7/15/2003	**Sheen**
GM-11S	8/13/2003	**Sheen**
GM-11S	9/16/2003	**Sheen**
GM-11S	10/14/2003	**Sheen**
Cleanup Level		No Sheen

Well	Date	Free Product
Plant 1, continued		
GM-11S	11/19/2003	**Sheen**
GM-11S	12/17/2003	**Sheen**
GM-11S	1/13/2004	**Sheen**
GM-11S	2/10/2004	**Sheen**
GM-11S	3/17/2004	**Sheen**
GM-11S	4/15/2004	**Sheen**
GM-11S	5/25/2004	**Sheen**
GM-11S	6/13/2004	**Sheen**
GM-11S	7/13/2004	**Sheen**
GM-11S	8/12/2004	**Sheen**
GM-11S	9/16/2004	**Sheen**
GM-11S	10/13/2004	**Sheen**
GM-11S	11/18/2004	**Sheen**
GM-11S	12/16/2004	**Sheen**
GM-11S	1/13/2005	**Sheen**
GM-11S	2/15/2005	**Sheen**
GM-11S	3/15/2005	**Sheen**
GM-11S	4/15/2005	**Sheen**
GM-11S	5/20/2005	**Sheen**
GM-11S	6/10/2005	**Sheen**
GM-11S	7/15/2005	**Sheen**
GM-11S	8/12/2005	**Sheen**
GM-11S	9/14/2005	**Sheen**
GM-11S	10/14/2005	**Sheen**
GM-11S	11/23/2005	**Sheen**
GM-11S	12/19/2005	**Sheen**
GM-11S	1/25/2006	**Sheen**
GM-11S	2/14/2006	**Sheen**
GM-11S	3/15/2006	**Sheen**
GM-11S	4/14/2006	**Sheen**
GM-11S	5/17/2006	**Sheen**
GM-11S	6/14/2006	**Sheen**
GM-11S	7/12/2006	**Sheen**
GM-11S	8/16/2006	**Sheen**
GM-11S	9/13/2006	**Sheen**
GM-11S	10/12/2006	**Sheen**
GM-11S	11/17/2006	**Sheen**
GM-11S	12/19/2006	**Sheen**
GM-11S	1/19/2007	**Sheen**
GM-11S	2/16/2007	**Sheen**
GM-11S	3/19/2007	**Sheen**
GM-11S	4/19/2007	**Sheen**
GM-11S	5/17/2007	**Sheen**
GM-11S	6/14/2007	**Sheen**
GM-11S	7/13/2007	**Sheen**
GM-11S	8/16/2007	**Sheen**
GM-11S	9/10/2007	**Sheen**
GM-11S	10/17/2007	**Sheen**
GM-11S	11/16/2007	**Sheen**
GM-11S	12/14/2007	**Sheen**
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-11S	1/22/2008	**Sheen**
GM-11S	2/14/2008	**Sheen**
GM-11S	3/14/2008	**Sheen**
GM-11S	4/18/2008	**Sheen**
GM-11S	5/16/2008	**Sheen**
GM-11S	6/18/2008	**Sheen**
GM-11S	7/16/2008	**Sheen**
GM-11S	8/18/2008	**Sheen**
GM-11S	9/16/2008	**Sheen**
GM-11S	10/15/2008	**Sheen**
GM-11S	11/14/2008	**Sheen**
GM-11S	12/11/2008	**Sheen**
GM-11S	1/14/2009	**Sheen**
GM-11S	2/18/2009	**Sheen**
GM-11S	3/17/2009	**Sheen**
GM-11S	4/16/2009	None
GM-11S	5/14/2009	None
GM-11S	6/16/2009	None
GM-11S	7/22/2009	**Sheen**
GM-11S	8/18/2009	**Sheen**
GM-11S	9/14/2009	**Sheen**
GM-11S	10/20/2009	**Sheen**
GM-11S	11/18/2009	None
GM-11S	12/15/2009	None
GM-11S	1/21/2010	**Sheen**
GM-11S	2/17/2010	**Sheen**
GM-11S	3/16/2010	**Sheen**
GM-11S	4/15/2010	None
GM-11S	5/18/2010	**Sheen**
GM-11S	6/17/2010	**Sheen**
GM-11S	7/29/2010	**Sheen**
GM-11S	8/19/2010	**Sheen**
GM-11S	9/22/2010	**Sheen**
GM-11S	10/20/2010	**Sheen**
GM-11S	11/30/2010	**Sheen**
GM-11S	12/23/2010	**Sheen**
GM-11S	1/19/2011	**Sheen**
GM-11S	2/16/2011	**Sheen**
GM-11S	3/29/2011	**Sheen**
GM-11S	4/21/2011	**Sheen**
GM-11S	5/19/2011	**Sheen**
GM-11S	6/15/2011	**Sheen**
GM-11S	7/20/2011	None
GM-11S	8/17/2011	None
GM-11S	9/14/2011	None
GM-11S	10/12/2011	None
GM-11S	11/23/2011	None
GM-11S	12/14/2011	None
GM-11S	1/24/2012	None
GM-11S	2/15/2012	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-11S	3/16/2012	None
GM-11S	4/18/2012	None
GM-11S	5/16/2012	None
GM-11S	6/13/2012	None
GM-11S	7/20/2012	None
GM-11S	9/6/2012	None
GM-11S	8/15/2012	None
GM-11S	10/24/2012	None
GM-11S	11/28/2012	None
GM-11S	12/18/2012	None
GM-11S	1/23/2013	**Sheen**
GM-11S	2/21/2013	**Sheen**
GM-11S	3/13/2013	None
GM-11S	4/17/2013	None
GM-11S	5/22/2013	None
GM-11S	6/12/2013	None
GM-11S	7/24/2013	**Sheen**
GM-11S	8/21/2013	None
GM-11S	9/25/2013	**Sheen**
GM-11S	10/15/2013	None
GM-11S	11/20/2013	None
GM-11S	12/18/2013	None
GM-11S	1/15/2014	None
GM-11S	2/12/2014	None
GM-11S	3/20/2014	None
GM-11S	4/16/2014	None
GM-11S	5/21/2014	None
GM-11S	6/18/2014	None
GM-11S	7/25/2014	None
GM-11S	8/13/2014	None
GM-11S	9/17/2014	None
GM-11S	10/15/2014	None
GM-11S	11/18/2014	None
GM-11S	12/17/2014	None
GM-11S	1/14/2015	None
GM-11S	2/11/2015	None
GM-11S	3/18/2015	None
GM-11S	4/15/2015	None
GM-11S	5/14/2015	None
GM-11S	6/17/2015	None
GM-11S	7/15/2015	None
GM-11S	8/12/2015	None
GM-11S	9/16/2015	None
GM-11S	10/14/2015	None
GM-11S	11/18/2015	None
GM-11S	12/10/2015	None
GM-11S	1/13/2016	None
GM-11S	2/10/2016	None
GM-11S	3/16/2016	None
GM-11S	4/13/2016	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-11S	5/18/2016	None
GM-11S	6/15/2016	None
GM-11S	7/12/2016	None
GM-11S	8/18/2016	None
GM-11S	9/21/2016	None
GM-11S	10/19/2016	None
GM-11S	11/16/2016	None
GM-11S	12/14/2016	None
GM-11S	1/18/2017	None
GM-11S	2/15/2017	None
GM-11S	3/15/2017	None
GM-11S	4/12/2017	None
GM-11S	5/17/2017	None
GM-11S	6/14/2017	None
GM-11S	7/19/2017	None
GM-11S	8/16/2017	None
GM-11S	9/20/2017	None
GM-11S	10/18/2017	**Sheen**
GM-11S	11/15/2017	**Sheen**
GM-11S	12/13/2017	None
GM-11S	1/17/2018	None
GM-11S	2/14/2018	None
GM-11S	3/14/2018	None
GM-11S	4/18/2018	None
GM-11S	5/16/2018	**Sheen**
GM-11S	6/13/2018	**Sheen**
GM-11S	7/18/2018	**Sheen**
GM-11S	8/15/2018	**Sheen**
GM-11S	9/19/2018	None
GM-11S	10/17/2018	None
GM-11S	11/14/2018	None
GM-11S	12/19/2018	None
GM-11S	1/16/2019	None
GM-11S	2/15/2019	None
GM-11S	3/20/2019	None
GM-11S	4/24/2019	None
GM-11S	5/14/2019	None
GM-11S	6/10/2019	None
GM-11S	7/10/2019	None
GM-11S	8/13/2019	None
GM-11S	9/10/2019	None
GM-11S	10/16/2019	None
GM-11S	11/20/2019	None
GM-11S	12/11/2019	None
GM-11S	1/23/2020	None
GM-11S	2/20/2020	None
GM-11S	3/24/2020	None
GM-11S	4/23/2020	None
GM-11S	5/28/2020	None
GM-11S	6/18/2020	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-11S	7/23/2020	None
GM-11S	8/20/2020	None
GM-11S	9/24/2020	None
GM-11S	10/22/2020	None
GM-11S	11/19/2020	None
GM-11S	12/23/2020	None
GM-11S	1/21/2021	None
GM-11S	2/18/2021	None
GM-11S	3/18/2021	None
GM-11S	4/15/2021	None
GM-11S	5/20/2021	None
GM-11S	6/24/2021	None
GM-11S	7/22/2021	None
GM-11S	8/26/2021	None
GM-11S	9/16/2021	None
GM-11S	10/21/2021	**Slight Sheen**
GM-11S	11/18/2021	None
GM-11S	12/16/2021	None
GM-11S	1/20/2022	None
GM-11S	2/17/2022	None
GM-11S	3/17/2022	None
GM-11S	4/21/2022	None
GM-11S	5/19/2022	None
GM-11S	6/16/2022	None
GM-11S	7/21/2022	None
GM-11S	8/18/2022	None
GM-11S	9/29/2022	None
GM-11S	10/27/2022	None
GM-11S	11/23/2022	None
GM-11S	12/22/2022	None
GM-12S	4/14/2000	None
GM-12S	5/15/2000	NM
GM-12S	6/15/2000	NM
GM-12S	7/19/2000	NM
GM-12S	8/15/2000	NM
GM-12S	9/29/2000	None
GM-12S	10/12/2000	None
GM-12S	11/14/2000	None
GM-12S	12/14/2000	None
GM-12S	1/11/2001	None
GM-12S	2/15/2001	None
GM-12S	3/15/2001	None
GM-12S	4/13/2001	None
GM-12S	5/16/2001	None
GM-12S	6/11/2001	None
GM-12S	7/24/2001	None
GM-12S	8/21/2001	None
GM-12S	9/6/2001	None
GM-12S	10/19/2001	None
GM-12S	11/15/2001	None
Cleanup Level		No Sheen

Well	Date	Free Product
Plant 1, continued		
GM-12S	12/10/2001	None
GM-12S	1/16/2002	NM
GM-12S	2/21/2002	None
GM-12S	3/18/2002	None
GM-12S	4/18/2002	None
GM-12S	5/20/2002	None
GM-12S	6/19/2002	None
GM-12S	7/15/2002	None
GM-12S	8/20/2002	None
GM-12S	9/20/2002	None
GM-12S	10/15/2002	None
GM-12S	11/27/2002	None
GM-12S	12/18/2002	None
GM-12S	1/16/2003	None
GM-12S	2/11/2003	None
GM-12S	3/11/2003	None
GM-12S	4/15/2003	None
GM-12S	5/15/2003	None
GM-12S	6/17/2003	None
GM-12S	7/15/2003	None
GM-12S	8/13/2003	None
GM-12S	9/16/2003	None
GM-12S	10/14/2003	None
GM-12S	11/19/2003	None
GM-12S	12/17/2003	None
GM-12S	1/13/2004	None
GM-12S	2/10/2004	None
GM-12S	3/17/2004	None
GM-12S	4/15/2004	None
GM-12S	5/25/2004	None
GM-12S	6/13/2004	None
GM-12S	7/13/2004	None
GM-12S	8/12/2004	None
GM-12S	9/16/2004	None
GM-12S	10/13/2004	None
GM-12S	11/18/2004	None
GM-12S	12/16/2004	None
GM-12S	1/13/2005	None
GM-12S	2/15/2005	None
GM-12S	3/15/2005	None
GM-12S	4/15/2005	None
GM-12S	5/20/2005	None
GM-12S	6/10/2005	None
GM-12S	7/15/2005	None
GM-12S	8/12/2005	None
GM-12S	9/14/2005	None
GM-12S	10/14/2005	None
GM-12S	11/23/2005	None
GM-12S	12/19/2005	None
GM-12S	1/25/2006	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-12S	2/14/2006	None
GM-12S	3/15/2006	None
GM-12S	4/14/2006	None
GM-12S	5/17/2006	None
GM-12S	6/14/2006	None
GM-12S	7/12/2006	None
GM-12S	8/16/2006	None
GM-12S	9/13/2006	None
GM-12S	10/12/2006	None
GM-12S	11/17/2006	None
GM-12S	12/19/2006	None
GM-12S	1/19/2007	None
GM-12S	2/16/2007	None
GM-12S	3/19/2007	None
GM-12S	4/19/2007	None
GM-12S	5/17/2007	None
GM-12S	6/14/2007	None
GM-12S	7/13/2007	None
GM-12S	8/16/2007	None
GM-12S	9/10/2007	None
GM-12S	10/17/2007	None
GM-12S	11/16/2007	None
GM-12S	12/14/2007	None
GM-12S	1/22/2008	None
GM-12S	2/14/2008	None
GM-12S	3/14/2008	None
GM-12S	4/18/2008	None
GM-12S	5/16/2008	None
GM-12S	6/18/2008	None
GM-12S	7/16/2008	None
GM-12S	8/18/2008	None
GM-12S	9/16/2008	None
GM-12S	10/15/2008	None
GM-12S	11/14/2008	None
GM-12S	12/11/2008	None
GM-12S	1/14/2009	None
GM-12S	2/18/2009	None
GM-12S	3/17/2009	None
GM-12S	4/16/2009	None
GM-12S	5/14/2009	None
GM-12S	6/16/2009	None
GM-12S	7/22/2009	None
GM-12S	8/18/2009	None
GM-12S	9/14/2009	None
GM-12S	10/20/2009	None
GM-12S	11/18/2009	None
GM-12S	12/15/2009	None
GM-12S	1/21/2010	None
GM-12S	2/17/2010	None
GM-12S	3/16/2010	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-12S	4/15/2010	None
GM-12S	5/18/2010	None
GM-12S	6/17/2010	None
GM-12S	7/29/2010	None
GM-12S	8/19/2010	None
GM-12S	9/22/2010	None
GM-12S	10/20/2010	None
GM-12S	11/30/2010	None
GM-12S	12/23/2010	None
GM-12S	1/19/2011	None
GM-12S	2/16/2011	None
GM-12S	3/29/2011	None
GM-12S	4/21/2011	None
GM-12S	5/19/2011	None
GM-12S	6/15/2011	None
GM-12S	7/20/2011	None
GM-12S	8/17/2011	None
GM-12S	9/14/2011	None
GM-12S	10/12/2011	None
GM-12S	11/23/2011	None
GM-12S	12/14/2011	None
GM-12S	1/24/2012	None
GM-12S	2/15/2012	None
GM-12S	3/16/2012	None
GM-12S	4/18/2012	None
GM-12S	5/16/2012	None
GM-12S	6/13/2012	None
GM-12S	7/20/2012	None
GM-12S	8/15/2012	None
GM-12S	9/6/2012	None
GM-12S	10/24/2012	None
GM-12S	11/28/2012	None
GM-12S	12/18/2012	None
GM-12S	1/23/2012	None
GM-12S	2/21/2013	None
GM-12S	3/13/2013	None
GM-12S	4/17/2013	None
GM-12S	5/22/2013	None
GM-12S	6/12/2013	None
GM-12S	7/24/2013	None
GM-12S	8/21/2013	None
GM-12S	9/25/2013	None
GM-12S	10/15/2013	None
GM-12S	11/20/2013	None
GM-12S	12/18/2013	None
GM-12S	1/15/2014	None
GM-12S	2/12/2014	None
GM-12S	3/20/2014	None
GM-12S	4/16/2014	None
GM-12S	5/21/2014	None
GM-12S	6/18/2014	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-12S	7/25/2014	None
GM-12S	8/13/2014	None
GM-12S	9/17/2014	None
GM-12S	10/15/2014	None
GM-12S	11/18/2014	None
GM-12S	12/17/2014	None
GM-12S	1/14/2015	None
GM-12S	2/11/2015	None
GM-12S	3/18/2015	None
GM-12S	4/15/2015	None
GM-12S	5/14/2015	None
GM-12S	6/17/2015	None
GM-12S	7/15/2015	None
GM-12S	8/12/2015	None
GM-12S	9/16/2015	None
GM-12S	10/14/2015	None
GM-12S	11/18/2015	None
GM-12S	12/10/2015	None
GM-12S	1/13/2016	None
GM-12S	2/10/2016	None
GM-12S	3/16/2016	None
GM-12S	4/13/2016	None
GM-12S	5/18/2016	None
GM-12S	6/15/2016	None
GM-12S	7/12/2016	None
GM-12S	8/18/2016	None
GM-12S	9/21/2016	None
GM-12S	10/19/2016	None
GM-12S	11/16/2016	None
GM-12S	12/14/2016	None
GM-12S	1/18/2017	None
GM-12S	2/15/2017	None
GM-12S	3/15/2017	Noine
GM-12S	4/12/2017	None
GM-12S	5/17/2017	None
GM-12S	6/14/2017	None
GM-12S	7/19/2017	None
GM-12S	8/16/2017	None
GM-12S	9/20/2017	Noine
GM-12S	10/18/2017	None
GM-12S	11/15/2017	None
GM-12S	12/13/2017	None
GM-12S	1/17/2018	None
GM-12S	2/14/2018	None
GM-12S	3/14/2018	None
GM-12S	4/18/2018	None
GM-12S	5/16/2018	None
GM-12S	6/13/2018	None
GM-12S	7/18/2018	None
GM-12S	8/15/2018	None
GM-12S	9/19/2018	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-12S	10/17/2018	None
GM-12S	11/14/2018	None
GM-12S	12/19/2018	None
GM-12S	1/16/2019	None
GM-12S	2/15/2019	None
GM-12S	3/20/2019	None
GM-12S	4/24/2019	None
GM-12S	5/14/2019	None
GM-12S	6/10/2019	None
GM-12S	7/10/2019	None
GM-12S	8/13/2019	None
GM-12S	9/10/2019	None
GM-12S	10/16/2019	None
GM-12S	11/20/2019	None
GM-12S	12/11/2019	None
GM-12S	1/23/2020	None
GM-12S	2/20/2020	None
GM-12S	3/24/2020	None
GM-12S	4/23/2020	None
GM-12S	5/28/2020	None
GM-12S	6/18/2020	None
GM-12S	7/23/2020	None
GM-12S	8/20/2020	None
GM-12S	9/24/2020	None
GM-12S	10/22/2020	None
GM-12S	11/19/2020	None
GM-12S	12/23/2020	None
GM-12S	1/21/2021	None
GM-12S	2/18/2021	None
GM-12S	3/18/2021	None
GM-12S	4/15/2021	None
GM-12S	5/20/2021	None
GM-12S	6/24/2021	None
GM-12S	7/22/2021	None
GM-12S	8/26/2021	None
GM-12S	9/16/2021	None
GM-12S	10/21/2021	None
GM-12S	11/18/2021	None
GM-12S	12/16/2021	None
GM-12S	1/20/2022	None
GM-12S	2/17/2022	None
GM-12S	3/17/2022	None
GM-12S	4/21/2022	None
GM-12S	5/19/2022	None
GM-12S	6/16/2022	None
GM-12S	7/21/2022	None
GM-12S	8/18/2022	None
GM-12S	9/29/2022	None
GM-12S	10/27/2022	None
GM-12S	11/23/2022	None
GM-12S	12/22/2022	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-13S	7/6/1998	**Yes***
GM-13S	10/20/1998	**~0.08 foot**
GM-13S	11/18/1998	**~0.08 foot**
GM-13S	12/15/1998	**~0.01 foot**
GM-13S	2/17/1999	**~0.08 foot**
GM-13S	3/15/1999	**~0.34 foot**
GM-13S	4/14/1999	**~0.20 foot**
GM-13S	5/13/1999	**~0.44 foot**
GM-13S	6/15/1999	**~0.35 foot**
GM-13S	7/15/1999	**~0.31 foot**
GM-13S	8/17/1999	**~0.19 foot**
GM-13S	9/16/1999	**~0.09 foot**
GM-13S	10/19/1999	**~0.10 foot**
GM-13S	11/19/1999	**~0.11 foot**
GM-13S	12/28/1999	**~0.12 foot**
GM-13S	1/21/2000	**~0.11 foot**
GM-13S	2/16/2000	
GM-13S	3/21/2000	**~0.11 foot**
GM-13S	4/14/2000	**~0.13 foot**
GM-13S	5/15/2000	**~0.10 foot**
GM-13S	6/16/2000	**Sheen**
GM-13S	7/19/2000	**Sheen**
GM-13S	8/15/2000	**Sheen**
GM-13S	9/29/2000	None
GM-13S	10/12/2000	**Sheen**
GM-13S	11/14/2000	**~0.01 foot**
GM-13S	12/14/2000	NM
GM-13S	1/11/2001	NM
GM-13S	2/15/2001	NM
GM-13S	3/15/2001	NM
GM-13S	4/13/2001	NM
GM-13S	5/16/2001	None
GM-13S	6/11/2001	None
GM-13S	7/24/2001	None
GM-13S	8/21/2001	None
GM-13S	9/6/2001	**Sheen**
GM-13S	10/19/2001	None
GM-13S	11/15/2001	None
GM-13S	12/10/2001	**Sheen**
GM-13S	1/16/2002	**Sheen**
GM-13S	2/21/2002	NM
GM-13S	3/18/2002	None
GM-13S	4/18/2002	None
GM-13S	5/20/2002	None
GM-13S	6/19/2002	None
GM-13S	7/15/2002	None
GM-13S	8/20/2002	None
GM-13S	9/20/2002	None
GM-13S	10/15/2002	None
GM-13S	11/27/2002	None
GM-13S	12/18/2002	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-13S	1/16/2003	None
GM-13S	2/11/2003	None
GM-13S	3/11/2003	**Sheen**
GM-13S	4/15/2003	**Sheen**
GM-13S	5/15/2003	**Sheen**
GM-13S	6/17/2003	None
GM-13S	7/15/2003	None
GM-13S	8/13/2003	None
GM-13S	9/16/2003	None
GM-13S	10/14/2003	None
GM-13S	11/19/2003	None
GM-13S	12/17/2003	None
GM-13S	1/13/2004	None
GM-13S	2/10/2004	None
GM-13S	3/17/2004	None
GM-13S	4/15/2004	None
GM-13S	5/25/2004	**Sheen**
GM-13S	6/13/2004	**Sheen**
GM-13S	7/13/2004	**Sheen**
GM-13S	8/12/2004	None
GM-13S	9/16/2004	None
GM-13S	10/13/2004	None
GM-13S	11/18/2004	None
GM-13S	12/16/2004	None
GM-13S	1/13/2005	None
GM-13S	2/15/2005	None
GM-13S	3/15/2005	None
GM-13S	4/15/2005	None
GM-13S	5/20/2005	None
GM-13S	6/10/2005	None
GM-13S	7/15/2005	None
GM-13S	8/12/2005	None
GM-13S	9/14/2005	None
GM-13S	10/14/2005	None
GM-13S	11/23/2005	None
GM-13S	12/19/2005	None
GM-13S	1/25/2006	None
GM-13S	2/14/2006	None
GM-13S	3/15/2006	None
GM-13S	4/14/2006	None
GM-13S	5/17/2006	None
GM-13S	6/14/2006	None
GM-13S	7/12/2006	None
GM-13S	8/16/2006	**Sheen**
GM-13S	9/13/2006	**Sheen**
GM-13S	10/12/2006	None
GM-13S	11/17/2006	None
GM-13S	12/19/2006	None
GM-13S	1/19/2007	None
GM-13S	2/16/2007	None
GM-13S	3/19/2007	**Sheen**
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-13S	4/19/2007	None
GM-13S	5/17/2007	None
GM-13S	6/14/2007	None
GM-13S	7/13/2007	None
GM-13S	8/16/2007	None
GM-13S	9/10/2007	None
GM-13S	10/17/2007	None
GM-13S	11/16/2007	None
GM-13S	12/14/2007	None
GM-13S	1/22/2008	None
GM-13S	2/14/2008	None
GM-13S	3/14/2008	None
GM-13S	4/18/2008	None
GM-13S	5/16/2008	None
GM-13S	6/18/2008	None
GM-13S	7/16/2008	None
GM-13S	8/18/2008	None
GM-13S	9/16/2008	None
GM-13S	10/15/2008	None
GM-13S	11/14/2008	None
GM-13S	12/11/2008	None
GM-13S	1/14/2009	None
GM-13S	2/18/2009	None
GM-13S	3/17/2009	None
GM-13S	4/16/2009	None
GM-13S	5/14/2009	None
GM-13S	6/16/2009	None
GM-13S	7/22/2009	None
GM-13S	8/18/2009	None
GM-13S	9/14/2009	None
GM-13S	10/20/2009	None
GM-13S	11/18/2009	None
GM-13S	12/15/2009	None
GM-13S	1/21/2010	None
GM-13S	2/17/2010	**Sheen**
GM-13S	3/16/2010	**Film**
GM-13S	4/15/2010	**Film**
GM-13S	5/18/2010	**Film**
GM-13S	6/17/2010	**Film**
GM-13S	7/29/2010	**Sheen**
GM-13S	8/19/2010	None
GM-13S	9/22/2010	**Film**
GM-13S	10/20/2010	None
GM-13S	11/30/2010	None
GM-13S	12/23/2010	None
GM-13S	1/19/2011	None
GM-13S	2/16/2011	None
GM-13S	3/29/2011	**Film**
GM-13S	4/21/2011	**~0.01 foot**
GM-13S	5/19/2011	**Film**
GM-13S	6/15/2011	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-13S	7/20/2011	**Film**
GM-13S	8/17/2011	None
GM-13S	9/14/2011	None
GM-13S	10/12/2011	None
GM-13S	11/23/2011	None
GM-13S	12/14/2011	None
GM-13S	1/24/2012	None
GM-13S	2/15/2012	None
GM-13S	3/16/2012	None
GM-13S	4/18/2012	None
GM-13S	5/16/2012	None
GM-13S	6/13/2012	None
GM-13S	7/20/2012	**Film**
GM-13S	8/15/2012	**Film**
GM-13S	9/6/2012	**Film**
GM-13S	10/24/2012	**Film**
GM-13S	11/28/2012	**Film**
GM-13S	12/18/2012	None
GM-13S	1/23/2013	None
GM-13S	2/21/2013	None
GM-13S	3/13/2013	None
GM-13S	4/17/2013	None
GM-13S	5/22/2013	None
GM-13S	6/13/2013	None
GM-13S	7/24/2013	None
GM-13S	8/21/2013	None
GM-13S	9/25/213	None
GM-13S	10/15/2013	None
GM-13S	11/20/2013	None
GM-13S	12/18/2013	None
GM-13S	1/15/2014	None
GM-13S	2/12/2014	None
GM-13S	3/20/2014	None
GM-13S	4/16/2014	None
GM-13S	5/21/2014	None
GM-13S	6/18/2014	None
GM-13S	7/25/2014	None
GM-13S	8/13/2014	None
GM-13S	9/17/2014	None
GM-13S	10/15/2014	None
GM-13S	11/18/2014	None
GM-13S	12/17/2014	None
GM-13S	1/14/2015	None
GM-13S	2/11/2015	None
GM-13S	3/18/2015	None
GM-13S	4/15/2015	None
GM-13S	5/14/2015	None
GM-13S	6/17/2015	None
GM-13S	7/15/2015	None
GM-13S	8/12/2015	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-13S	9/16/2015	None
GM-13S	10/14/2015	None
GM-13S	11/18/2015	None
GM-13S	12/10/2015	None
GM-13S	1/13/2016	None
GM-13S	2/10/2016	None
GM-13S	3/16/2016	None
GM-13S	4/13/2016	**Sheen**
GM-13S	5/18/2016	None
GM-13S	6/15/2016	None
GM-13S	7/12/2016	None
GM-13S	8/18/2016	None
GM-13S	9/21/2016	**Sheen**
GM-13S	10/19/2016	None
GM-13S	11/16/2016	None
GM-13S	12/14/2016	None
GM-13S	1/18/2017	None
GM-13S	2/15/2017	None
GM-13S	3/15/2017	None
GM-13S	4/12/2017	None
GM-13S	5/17/2017	None
GM-13S	6/14/2017	None
GM-13S	7/19/2017	None
GM-13S	8/16/2017	**Sheen**
GM-13S	9/20/2017	None
GM-13S	10/18/2017	None
GM-13S	11/15/2017	None
GM-13S	12/13/2017	None
GM-13S	1/17/2018	**Sheen**
GM-13S	2/14/2018	None
GM-13S	3/14/2018	None
GM-13S	4/18/2018	None
GM-13S	5/16/2018	**Sheen**
GM-13S	6/13/2018	None
GM-13S	7/18/2018	None
GM-13S	8/15/2018	None
GM-13S	9/19/2018	None
GM-13S	10/17/2018	**Sheen**
GM-13S	11/14/2018	None
GM-13S	12/19/2018	None
GM-13S	1/16/2019	None
GM-13S	2/15/2019	None
GM-13S	3/20/2019	None
GM-13S	4/24/2019	None
GM-13S	5/14/2019	None
GM-13S	6/10/2019	None
GM-13S	7/10/2019	None
GM-13S	8/13/2019	None
GM-13S	9/10/2019	None
GM-13S	10/16/2019	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-13S	11/20/2019	None
GM-13S	12/11/2019	None
GM-13S	1/23/2020	None
GM-13S	2/20/2020	None
GM-13S	3/24/2020	None
GM-13S	4/23/2020	None
GM-13S	5/28/2020	None
GM-13S	6/18/2020	None
GM-13S	7/23/2020	None
GM-13S	8/20/2020	None
GM-13S	9/24/2020	None
GM-13S	10/22/2020	None
GM-13S	11/19/2020	None
GM-13S	12/23/2020	None
GM-13S	1/21/2021	None
GM-13S	2/18/2021	None
GM-13S	3/18/2021	None
GM-13S	4/15/2021	None
GM-13S	5/20/2021	None
GM-13S	6/24/2021	None
GM-13S	7/22/2021	None
GM-13S	8/26/2021	None
GM-13S	9/16/2021	**Slight Sheen**
GM-13S	10/21/2021	**Slight Sheen**
GM-13S	11/18/2021	None
GM-13S	12/16/2021	None
GM-13S	1/20/2022	**Slight Sheen**
GM-13S	2/17/2022	None
GM-13S	3/17/2022	**Slight Sheen**
GM-13S	4/21/2022	None
GM-13S	5/19/2022	None
GM-13S	6/16/2022	**Slight Sheen**
GM-13S	7/21/2022	**Slight Sheen**
GM-13S	8/18/2022	None
GM-13S	9/29/2022	None
GM-13S	10/27/2022	None
GM-13S	11/23/2022	None
GM-13S	12/22/2022	None
GM-14S	4/9/1997	**Sheen**
GM-14S	7/9/1997	**Sheen**
GM-14S	10/22/1997	**Sheen**
GM-14S	1/22/1998	**Sheen**
GM-14S	3/12/1998	**Sheen**
GM-14S	7/6/1998	**Sheen**
GM-14S	10/20/1998	**Sheen**
GM-14S	12/15/1998	**Sheen**
GM-14S	3/26/1999	**Sheen**
GM-14S	6/28/1999	**Sheen**
GM-14S	9/28/1999	None
GM-14S	8/15/2000	None
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product
Plant 1, continued		
GM-14S	9/29/2000	None
GM-14S	10/12/2000	None
GM-14S	11/14/2000	None
GM-14S	12/14/2000	None
GM-14S	1/11/2001	None
GM-14S	2/15/2001	None
GM-14S	3/15/2001	None
GM-14S	4/13/2001	None
GM-14S	5/16/2001	None
GM-14S	6/11/2001	None
GM-14S	7/24/2001	None
GM-14S	8/21/2001	None
GM-14S	9/6/2001	None
GM-14S	10/19/2001	None
GM-14S	11/15/2001	None
GM-14S	12/10/2001	None
GM-14S	1/16/2002	None
GM-14S	2/21/2002	None
GM-14S	3/18/2002	None
GM-14S	4/18/2002	None
GM-14S	5/20/2002	None
GM-14S	6/19/2002	None
GM-14S	7/15/2002	None
GM-14S	8/20/2002	None
GM-14S	9/20/2002	None
GM-14S	10/15/2002	None
GM-14S	11/27/2002	None
GM-14S	12/18/2002	None
GM-14S	1/16/2003	None
GM-14S	2/11/2003	None
GM-14S	3/11/2003	None
GM-14S	4/15/2003	None
GM-14S	5/15/2003	None
GM-14S	6/17/2003	None
GM-14S	7/15/2003	None
GM-14S	8/13/2003	None
GM-14S	9/16/2003	None
GM-14S	10/14/2003	None
GM-14S	11/19/2003	None
GM-14S	12/17/2003	None
GM-14S	1/13/2004	None
GM-14S	2/10/2004	None
GM-14S	3/17/2004	None
GM-14S	4/15/2004	None
GM-14S	5/25/2004	None
Converted to Compliance Monitoring		
Cleanup Level		No Sheen

Table 8. Plant 1 Shallow Groundwater LNAPL and Sheen Monitoring
Site: Former BP Harbor Island Terminal

Well	Date	Free Product

Notes: Values in **bold** exceed the cleanup level.

Due to maintenance of a sorbent "sock" placed in GM-13S and MW-03, these measurements do not necessarily reflect actual product thicknesses in the wells.

Active product recovery from GM-11S began in April 2000. Product thickness recorded in GM-11S after that date is not representative of static conditions.

MW-03 was destroyed during Island redevelopment activities and was replaced by MW-03R.

* Free product present, thickness not measured.

~ Approximately.

NM Not measured due to inaccessibility.

Table 9. 2022 Quarterly Performance Monitoring Groundwater Elevations
Site: Former BP Harbor Island Terminal

Well	Date	TOC Elevation (feet)	Depth to Water (ft below TOC)	Groundwater Elevation (feet)
Plant 1				
GM-14S	3/24/2022	11.77	3.45	8.32
GM-14S	6/22/2022		4.02	7.75
GM-14S	9/22/2022		5.00	6.77
GM-14S	1/12/2023		2.85	8.92
GM-15S	3/23/2022	12.32	4.64	7.68
GM-15S	9/29/2022		5.91	6.41
GM-16S	3/24/2022	11.99	4.04	7.95
GM-16S	6/22/2022		4.62	7.37
GM-16S	9/22/2022		5.51	6.48
GM-16S	1/12/2023		3.49	8.50
GM-17S	3/24/2022	12.56	3.71	8.85
GM-17S	6/22/2022		4.21	8.35
GM-17S	9/22/2022		5.59	6.97
GM-17S	1/12/2023		2.85	9.71
GM-24S	3/24/2022	11.11	2.38	8.73
GM-24S	6/22/2022		3.21	7.90
GM-24S	9/22/2022		4.31	6.80
GM-24S	1/12/2023		1.32	9.79
AR-03	3/23/2022	12.49	5.28	7.21
AR-03	9/21/2022		6.51	5.98
AMW-01	3/23/2022	12.17	4.03	8.14
AMW-01	6/22/2022		9.32	2.85
AMW-01	9/21/2022		10.58	1.59
AMW-01	1/11/2023		3.85	8.32
AMW-02	3/23/2022	15.36	7.48	7.88
AMW-02	6/22/2022		12.53	2.83
AMW-02	9/21/2022		13.43	1.93
AMW-02	1/11/2012		6.56	8.80
AMW-03	3/23/2022	15.29	7.76	7.53
AMW-03	6/22/2022		12.54	2.75
AMW-03	9/21/2022		13.08	2.21
AMW-03	1/11/2023		6.36	8.93
AMW-04	3/23/2022	11.42	4.14	7.28
AMW-04	6/22/2022		7.46	3.96
AMW-04	9/21/2022		8.61	2.81
AMW-04	1/11/2023		4.81	6.61

Table 9. 2022 Quarterly Performance Monitoring Groundwater Elevations
Site: Former BP Harbor Island Terminal

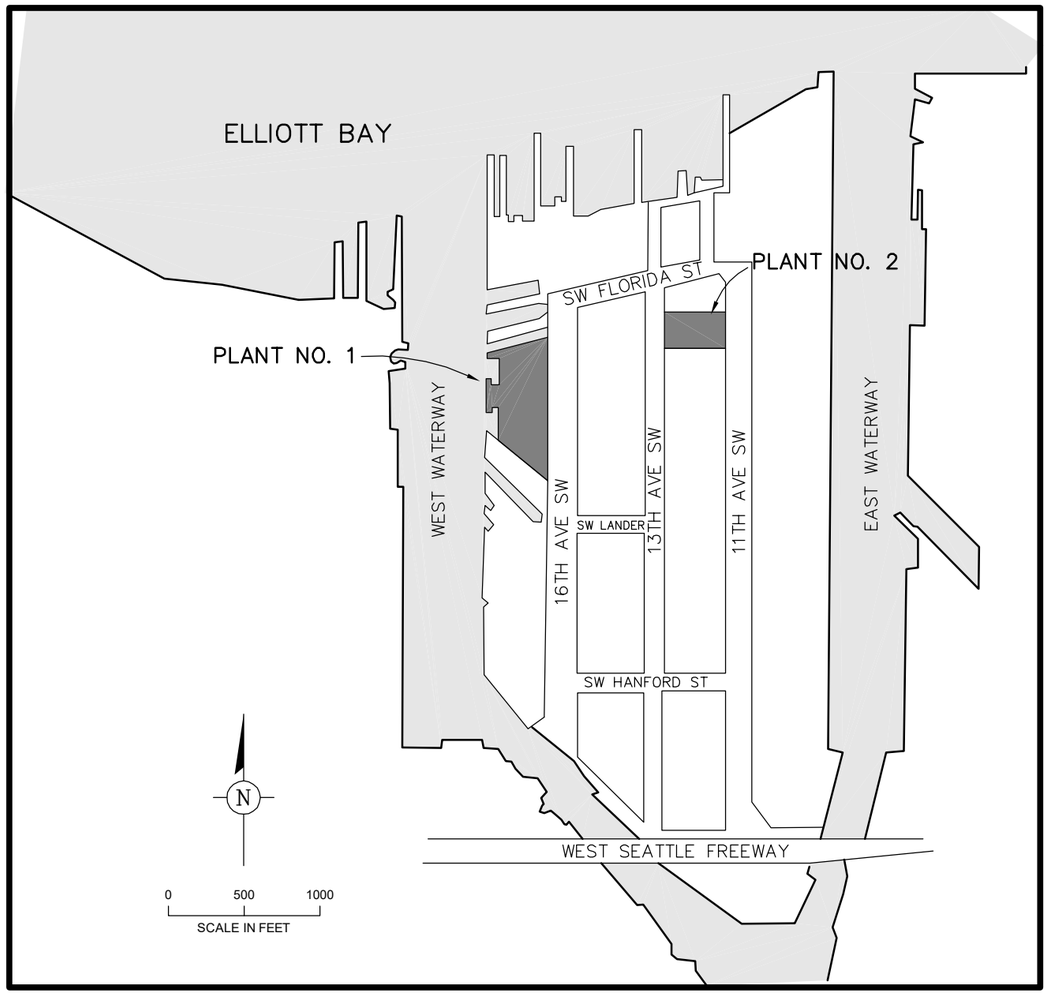
Well	Date	TOC Elevation (feet)	Depth to Water (ft below TOC)	Groundwater Elevation (feet)
Plant 1 Continued				
AMW-05	3/23/2022	11.05	3.61	7.44
AMW-05	6/22/2022		7.13	3.92
AMW-05	9/21/2022		8.23	2.82
AMW-05	1/11/2023		4.14	6.91
MW-06	3/23/2022	11.66	4.06	7.60
MW-06	6/22/2022		4.41	7.25
MW-06	9/21/2022		5.11	6.55
MW-06	1/12/2023		3.06	8.60
MW-1-T9	3/24/2022	12.21	5.08	7.13
MW-1-T9	9/22/2022		6.31	5.90
MW-2-T9	2/24/2022	12.37	4.83	7.54
MW-2-T9	9/22/2022		6.21	6.16
MW-3-T9	3/24/2022	11.87	4.51	7.36
MW-3-T9	9/22/2022		5.71	6.16

Definitions:

ft	Feet
Elevation	Elevations listed are in feet to North American Vertical Datum of 1988 (NAVD88) . Subtract approximately 3.4 feet to listed NAVD88 elevations to convert to the National Geodetic Vertical Datum of 1929 (NGVD 29) elevations for comparison to historic elevations provided in previous reports.
TOC	Top of casing

FIGURES

AREA PLAN



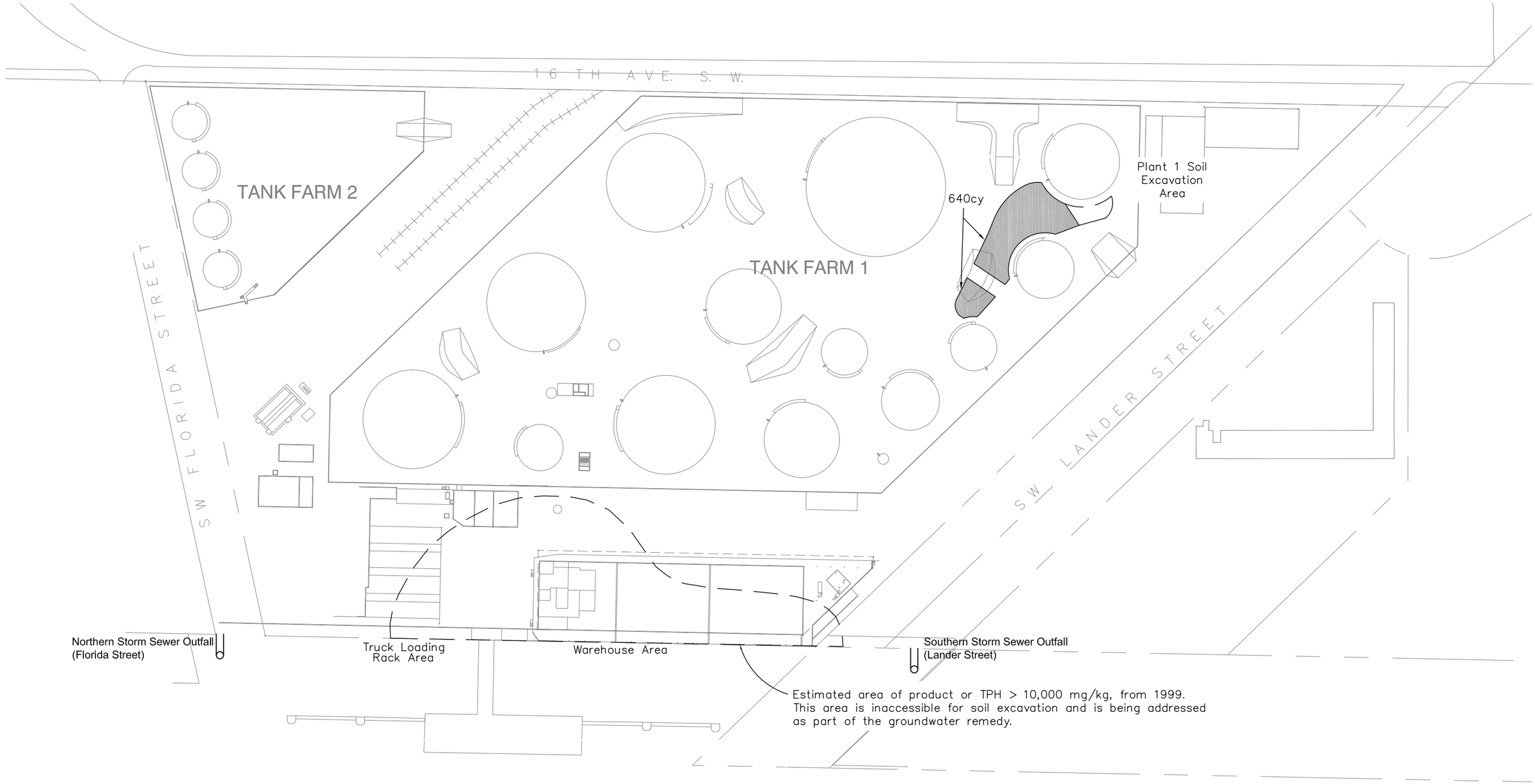
SITE PLAN

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore WA 98028
(425) 402-8277 FAX (425) 402-7917

Site Location Map

Site: Former BP Harbor Island Terminal
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE
1



LEGEND

FROM 1999: ESTIMATED AREA OF INACCESSIBLE SOILS WITH PRODUCT OR TPH > 20,000 ppm.

EXCAVATED REMEDIATION AREAS

640cy = AMOUNT OF TPH CONTAMINATED SOIL REMOVED (CUBIC YARDS)

N

0 50 100

SCALE IN FEET

TECHSOLVE ENVIRONMENTAL

Areas of Remediation - Plant 1

Site: Former BP Harbor Island Terminal
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE

2

C:\Data\CAD\Projects\TechSolv\ARCO 21T\dwg\ARCO21T.dwg << Areas of Remediation - P1 >> 11/26/2018 (SL)

EAST OF
PLANT 2 FIREWALL
EXCAVATION AREA

1,646cy

5.1cy

1,110cy

NORTH OF
PLANT 2
EXCAVATION AREA

PLANT 2
TANK FARM
EXCAVATION AREA

58cy

2.2cy

9cy

LEGEND

FROM 1999: ESTIMATED AREA OF INACCESSIBLE SOILS WITH PRODUCT OR TPH > 20,000 ppm.

EXCAVATED REMEDIATION AREAS

N

0 50 100

SCALE IN FEET

TECHSOLVE ENVIRONMENTAL

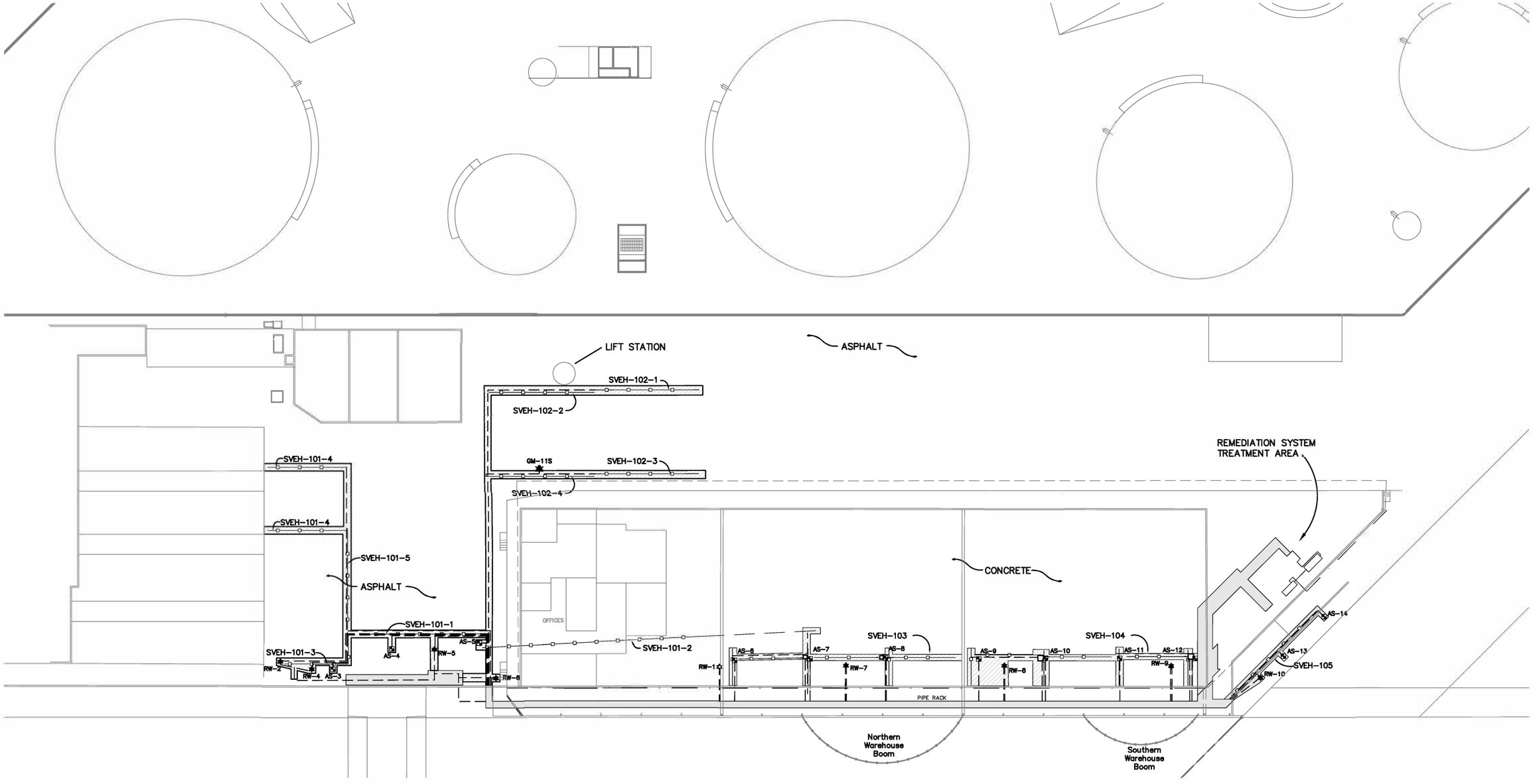
Areas of Remediation - Plant 2

Site: Former BP Harbor Island Terminal
2406 13th Avenue SW
Seattle, WA 98134

FIGURE

3

C:\Data\CAD\Projects\TechSolv\ARCO 21T\dwg\ARCO21T.dwg << Areas for Remediation - P2 >> OCT 07 2008 09:48:43 (bCAD)



LEGEND

RW-1	GROUNDWATER RECOVERY WELL
RW-5	GROUNDWATER RECOVERY WELL
SVE-1	SOIL VAPOR EXTRACTION WELL
MW-2	GROUNDWATER MONITORING WELL
AS-1	AIR SPARGE WELL
	SVE LINES
	AS LINES
	WATERWAY BOOMS

N

0 20 40

SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street
Kenmore, WA 98028
Phone: 425.402.8277

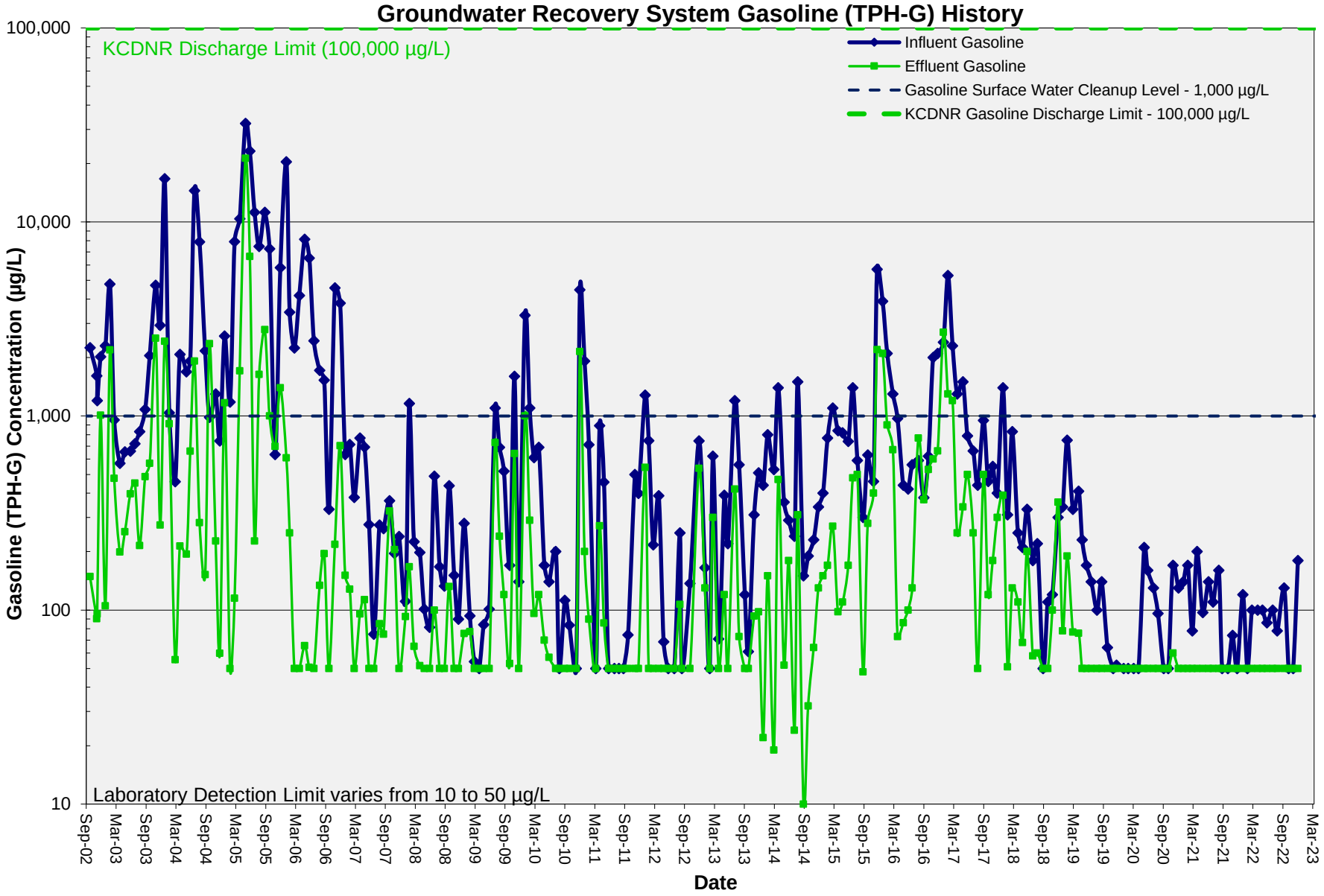
Remediation System Plant 1 Waterfront

Site: Former BP Harbor Island Terminal
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE

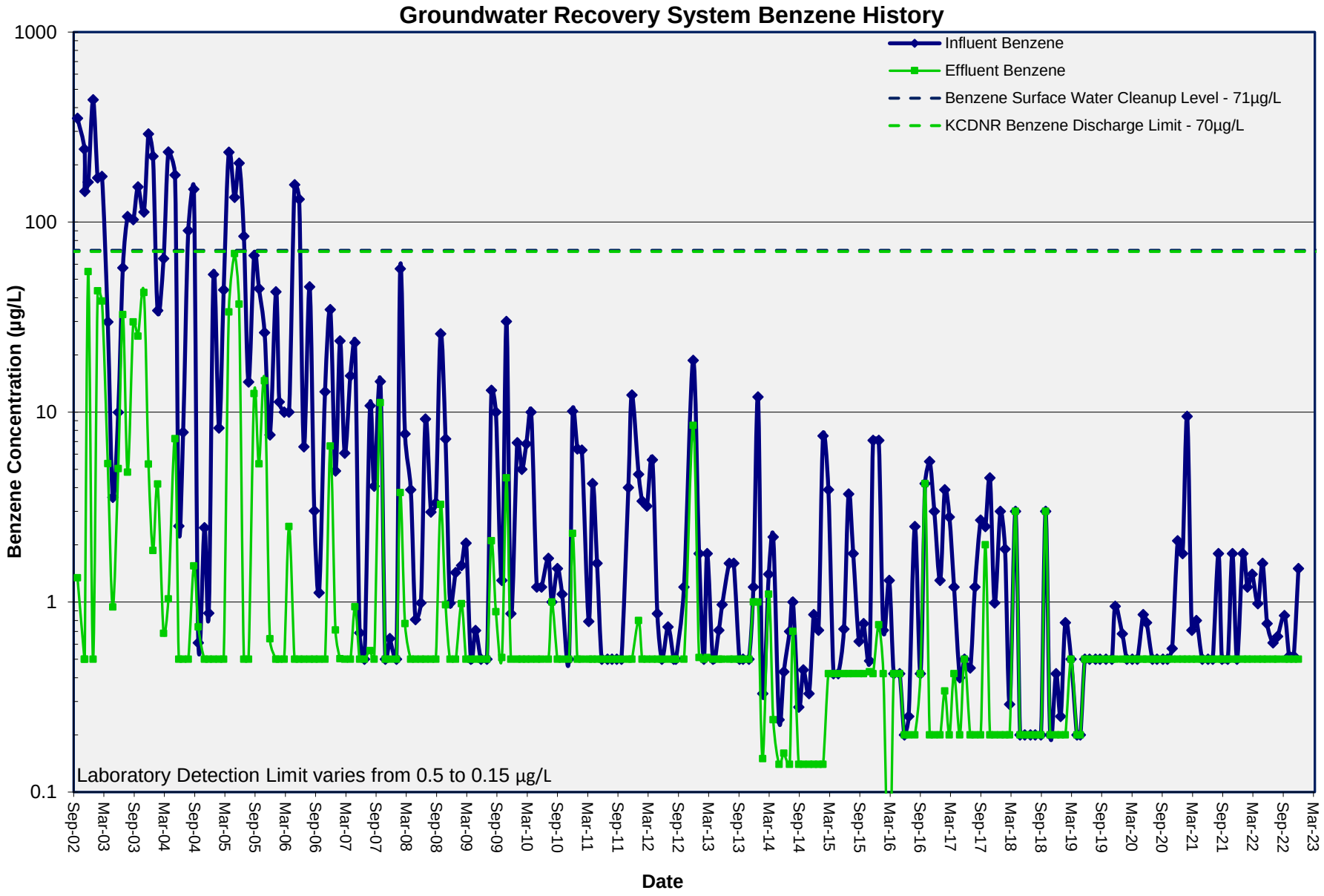
4

Figure 5. Final System Influent vs. Effluent Gasoline Concentrations
October 2002 through December 2022
Site: Former BP Harbor Island Terminal



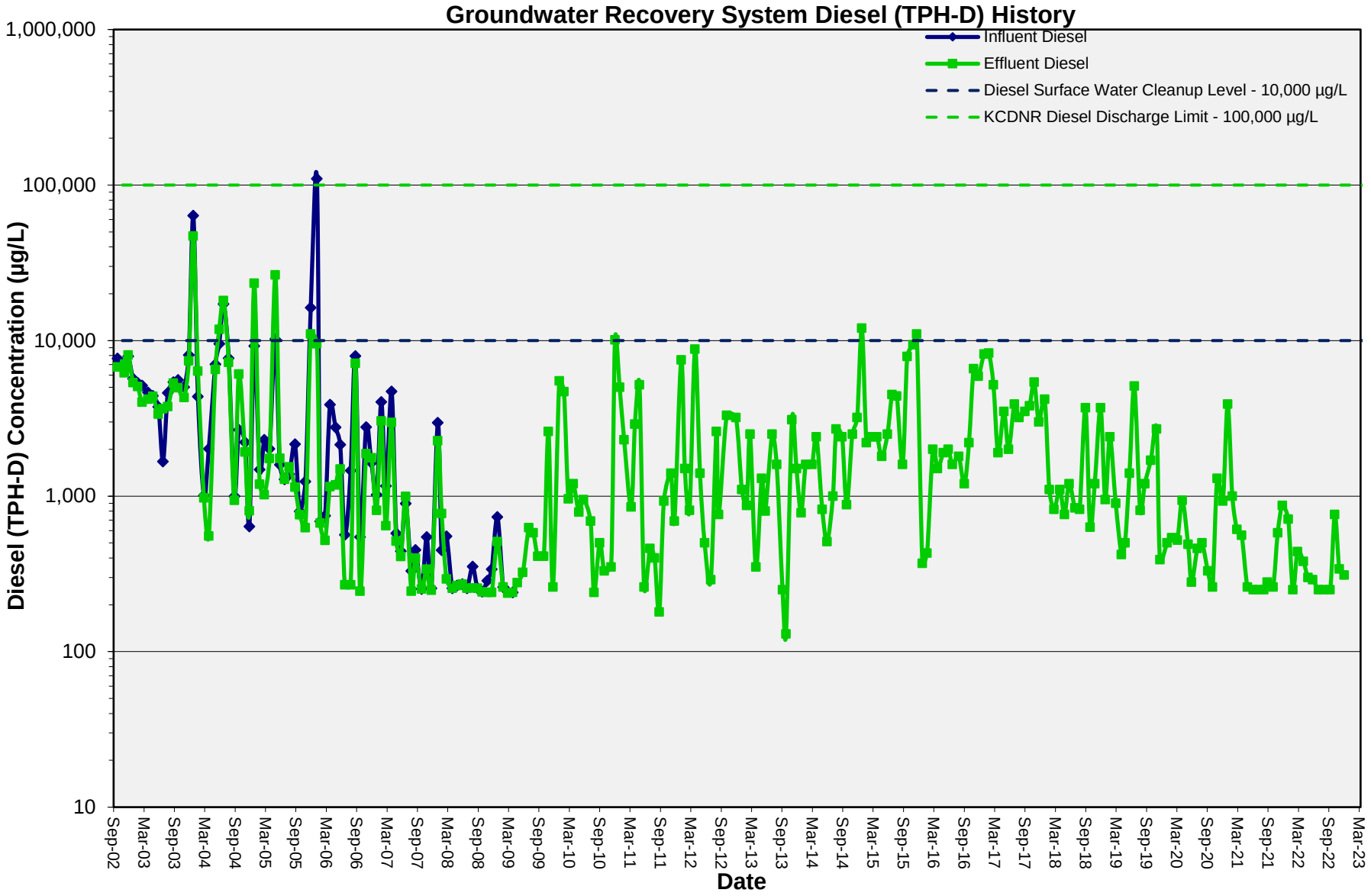
Note: Data is included since startup of the final groundwater and product recovery system in 2002.

Figure 6. Final System Influent vs. Effluent Benzene Concentrations
October 2002 through December 2022
Site: Former BP Harbor Island Terminal



Note: Data is included since startup of the final groundwater and product recovery system in 2002.

Figure 7. Final System Influent vs. Effluent Diesel Concentrations
October 2002 through December 2022
Site: Former BP Harbor Island Terminal



Note: Data is included since startup of the final groundwater and product recovery system in 2002.

West

East

NOAA TIDAL DATUMS FOR 9447110

Max Tide= +13.94' (11.56' NAVD88)

MHHW = +11.38' (9.00' NAVD88)

MHW = +10.52' (8.14' NAVD88)

MSL = +6.65' (4.27' NAVD88)

MLW = +2.84' (0.46 NAVD88)

MLLW = +0.00'(−2.38' NAVD88)

Min Tide = −4.19'(−6.57' NAVD88)

Concrete Apron (Walkway)

Warehouse Building

Warehouse Concrete Slab
Average Elevation = 15.35' NAVD88

Steel H Piling

Timber Piling

Timber Lagging

Timber Piling

Concrete Foundation

Silty Sand (Fill)

Recovery Well
(RW−8)

Performance/Confirmation Well
(AMW−02)

Typical Tidal Elevation & Location
Range of Historically Observed
Sheen on Surface Water.

Groundwater Elevation Maximum (8.57')

Groundwater Elevation Average (6.86')

Groundwater Elevation Minimum (5.17')

Western Duwamish Waterway

Riprap

Sediment

Sandy Silt & Clay (Native Soils)

Warehouse Concrete
Foundation Tip
Elev = −7'

Steel Sheetpile

Warehouse Sheetpile
Est. Tip Elev = −14'

Zone of Groundwater /
Surface Water Exchange

Well AMW−02
Screened Interval

LEGEND

Average Groundwater Surface

Approximate Fill/Native Soil Interface

Elevation range of warehouse area soils sampled during the 2019 Probing Investigation that exceeded the Total TPH cleanup level (CUL) of 10,000 mg/kg. Note that this zone of TPH impacted soil is discontinuous and does not extend throughout the warehouse. See TPH contour figures for specific locations and depths of soil exceeding the CUL.

Groundwater Elevation Maximum, Average, and Minimum values are based upon 2000−2019 monthly gauging data (230 individual gauging events) collected from Monitoring Well GM−13S, which is screened in shallow groundwater.

NOAA Tidal Datums for Station 9447110 (Lockheed Shipyard, Harbor Island) are to Mean Low Low Water (MLLW). Subtract 2.38' from MLLW elevations to convert to North American Vertical Datum of 1988 (NAVD88).

0 2.5 5
SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 N.E. 169th Street
Kenmore, WA 98028
P:(425) 402-8277 F:(425) 402-7917

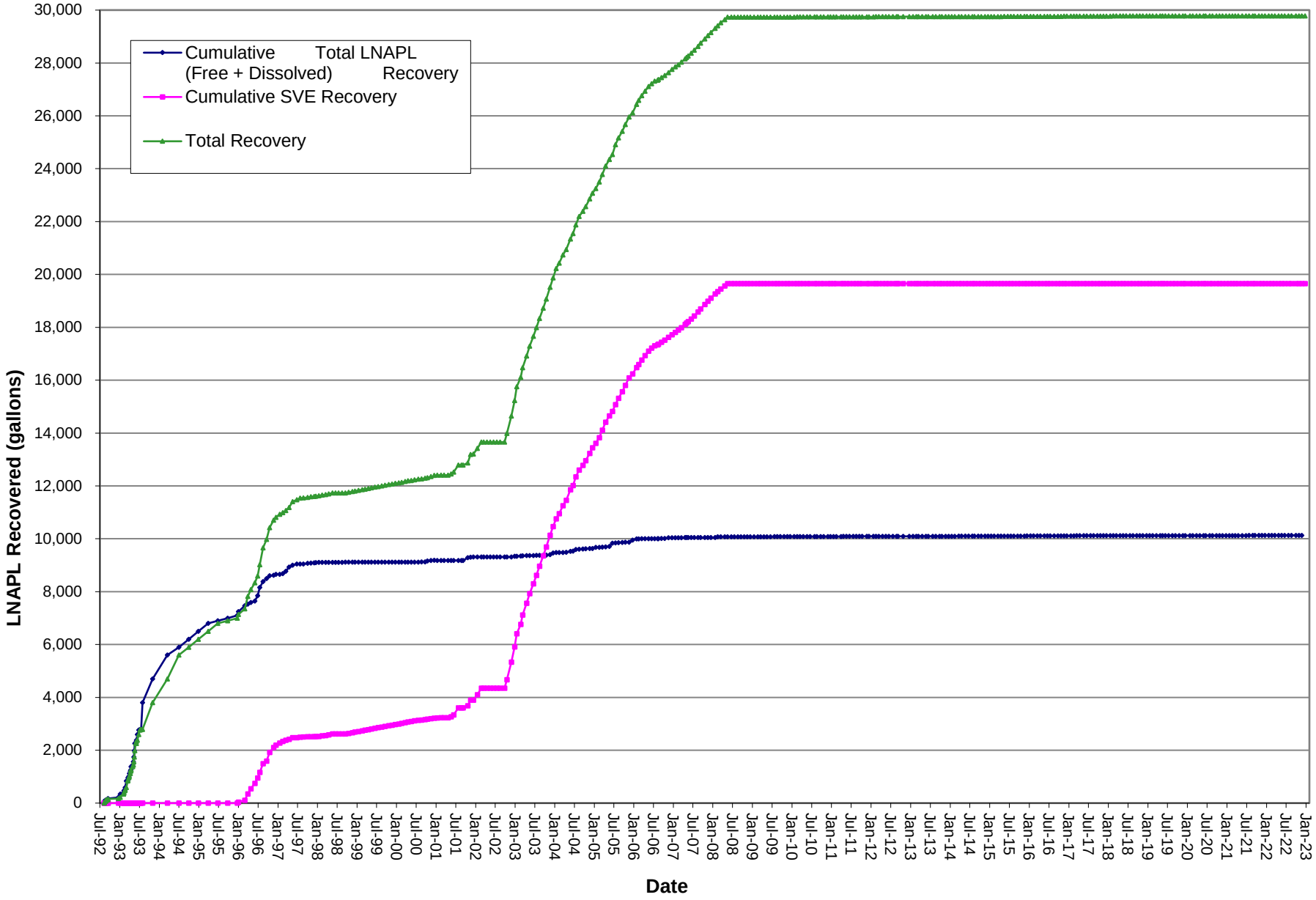
Plant 1 East/West Cross Section
Warehouse Construction & Waterway Details

BP West Coast Products Terminal 21T
1652 Southwest Lander Street
Seattle, WA 98134

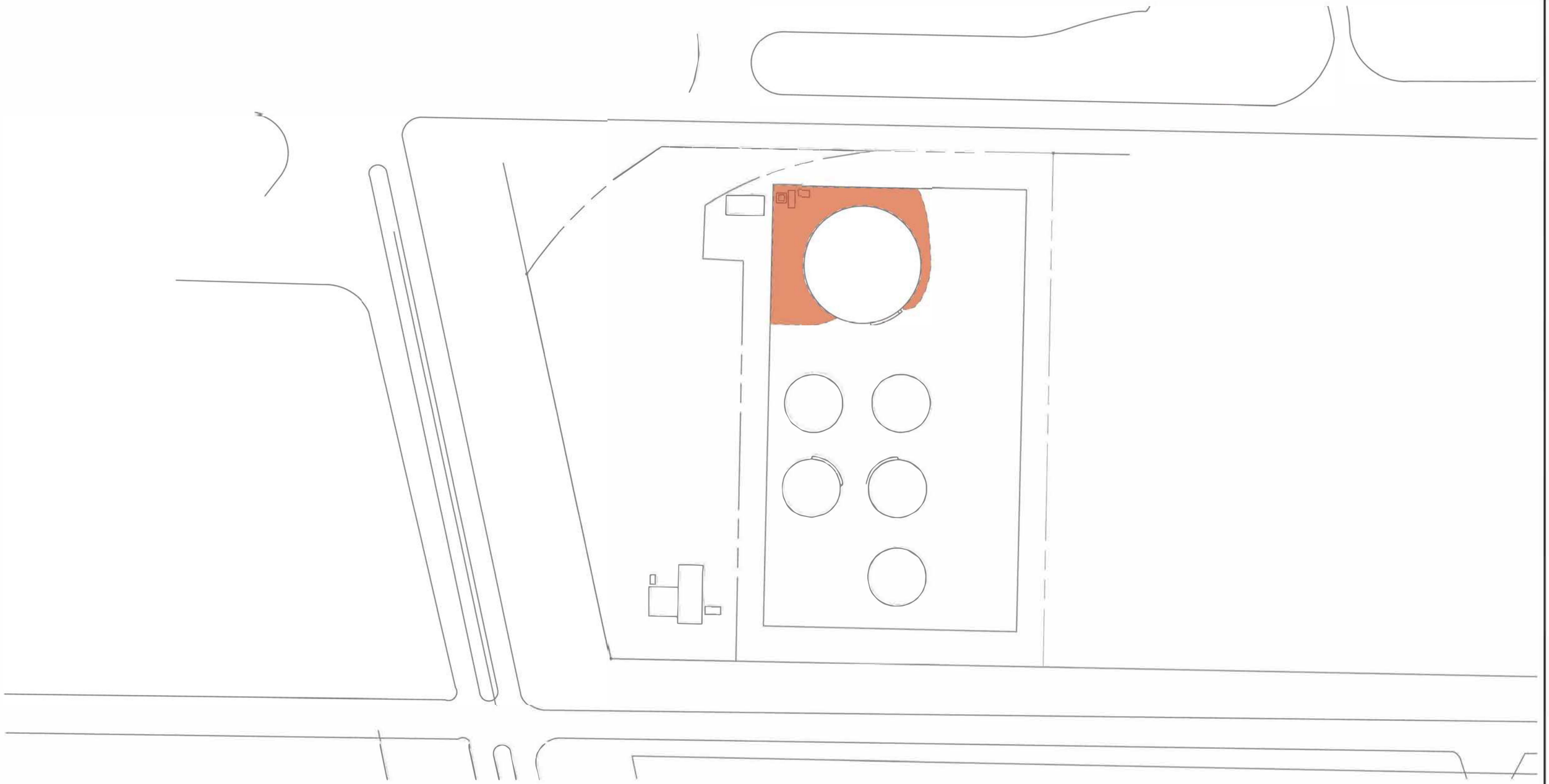
FIGURE
8

\\server\ServerData\data\Aproject\ARCO 21T\Drawings and CAD files\Autocad files\Quarterly GWM Figures

Figure 9. **Cumulative Waterfront LNAPL Recovery Through December 2022**
Site: Former BP Harbor Island Terminal



Note: Soil vapor extraction recovery occurred January 1996 through May 2008.



LEGEND

Areas where construction or soil excavation activities are regulated by the Restrictive Covenant of the Consent Decree due to total petroleum hydrocarbons potentially above cleanup levels.

N

0 50 100

SCALE IN FEET

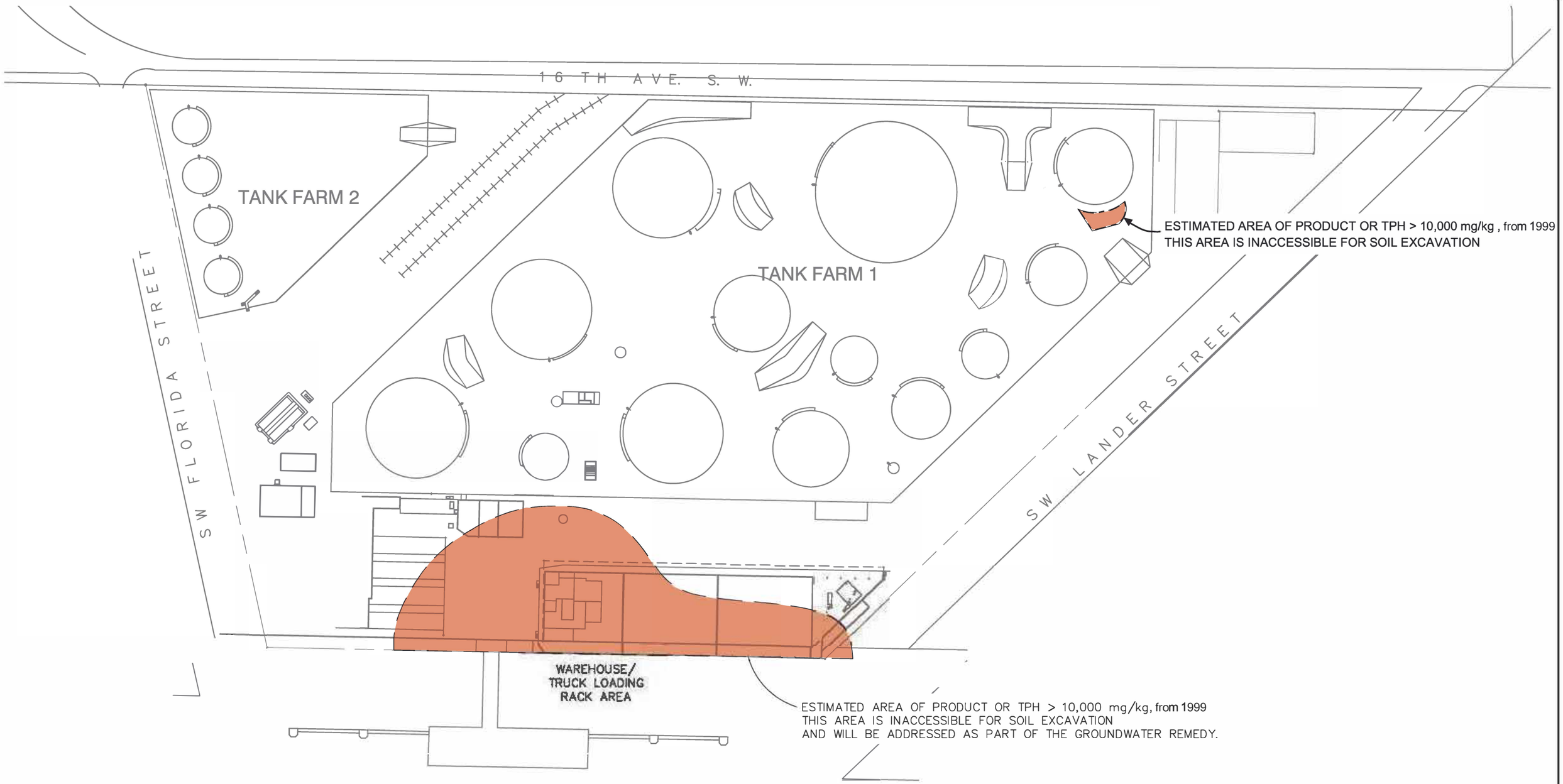
TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore, WA 98126
(425) 402 – 8277 Fax: (425) 402 - 7917

Areas of Restriction - Plant 2

Site: Former BP Harbor Island Terminal
2406 13th Avenue SW
Seattle, WA 98134

FIGURE

10



LEGEND

Areas where construction or soil excavation activities are regulated by the Restrictive Covenant of the Consent Decree due to total petroleum hydrocarbons potentially above cleanup levels.

N

0 50 100

SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore, WA 98126
(425) 402 – 8277 Fax: (425) 402 - 7917

Areas of Restriction - Plant 1

Site: Former BP Harbor Island Terminal
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE

11

TANK 9

TANK 13

TANK 10

NK 14

4.32
WALL RET COR..

B-004
10
ND

MW-1-T9
B-012
ND
ND

B-005
12
0.0845

B-003
3290
4.32

MW-2-T9

P1

B-011
13900
16.8

B-006
5750
1.4.4

B-002
59
0.185

P2

AR03

B-010
8510
8.53

B-007
55
0.217

B-001
904
1.21

P3

MW-3-T9

B-009
1760
ND

B-008
ND
ND

GM-15S

MW-4-T9

10,000 mg/kg

1,000 mg/kg

100 mg/kg

10 mg/kg

2,685 sq.ft.

14,185 sq.ft.

26,560 sq.ft.

46,900 sq.ft.

LANDERS

LEGEND

B-002 BORING LOCATION

59 TOTAL PETROLEUM HYDROCARBONS (MG/KG)
0.185 BENZENE (MG/KG)

GRAPHIC SCALE

0 15 30
(IN FEET)

TECHSOLVE ENVIRONMENTAL
(425) 402-8277 FAX (425) 402-7917

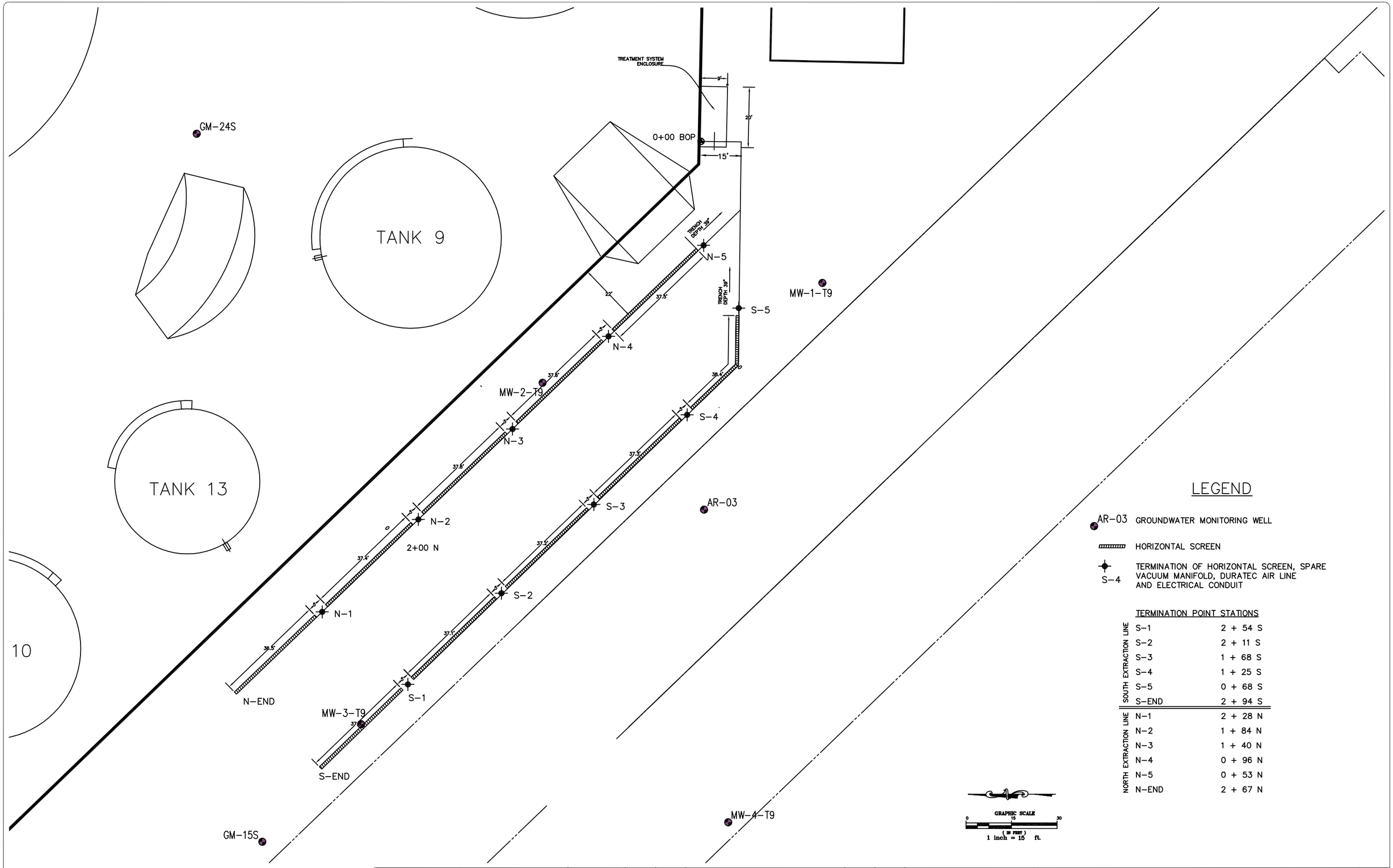
SCALE VERIFICATION
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING
USE TO VERIFY FIGURE REPRODUCTION SCALE

REV. NO.	DATE	DESCRIPTION	BY	APPR.

DWG DATE: DWGDATE
PRJCT NO.: PRJCTNO
DRAWING: DRAWING2
CHECKED: CHECKER
APPROVED: APPROVED
DRAFTER: DRAFTER

Former Hydrocarbon Mass Distribution
Plant 1 Southern Property Boundary
Site: Former BP Harbor Island Terminal

FIGURE
12



TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street
Kenmore, WA 98082

SCALE VERIFICATION
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING
USE TO VERIFY FIGURE REPRODUCTION SCALE

REV. NO.	DATE	DESCRIPTION	BY	APPR.

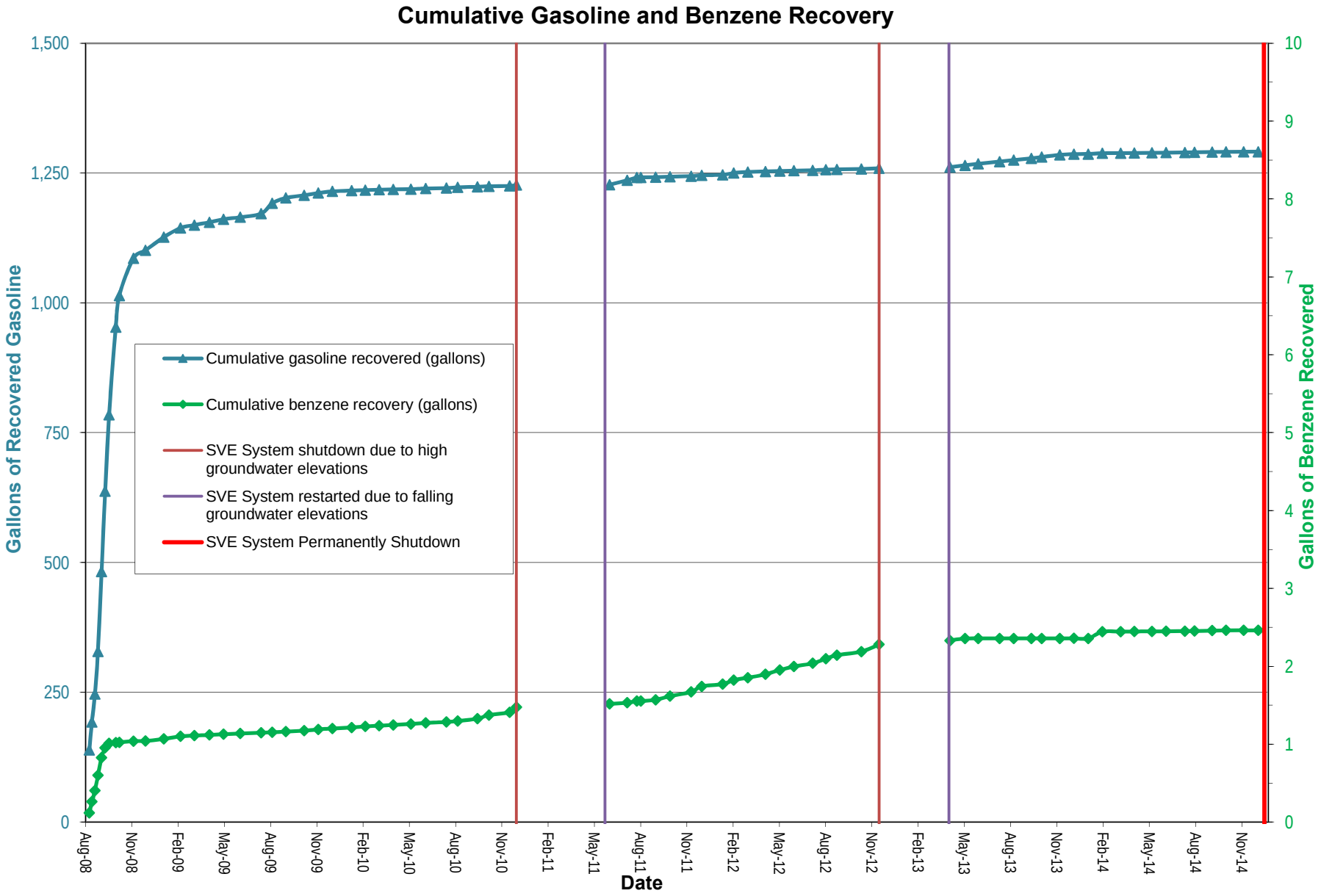
DWG DATE: 2/1/2018
PRJCT NO.: ATR110066.02.G
DRAWING: SVEDESIGN-AS-BUILT.DWG
CHECKED: LARSEN
APPROVED: NA
DESIGNER: NA

INLAND SVE REMEDIATION SYSTEM LAYOUT
VICINITY GROUNDWATER MONITORING WELLS

Site: Former BP Harbor Island Terminal

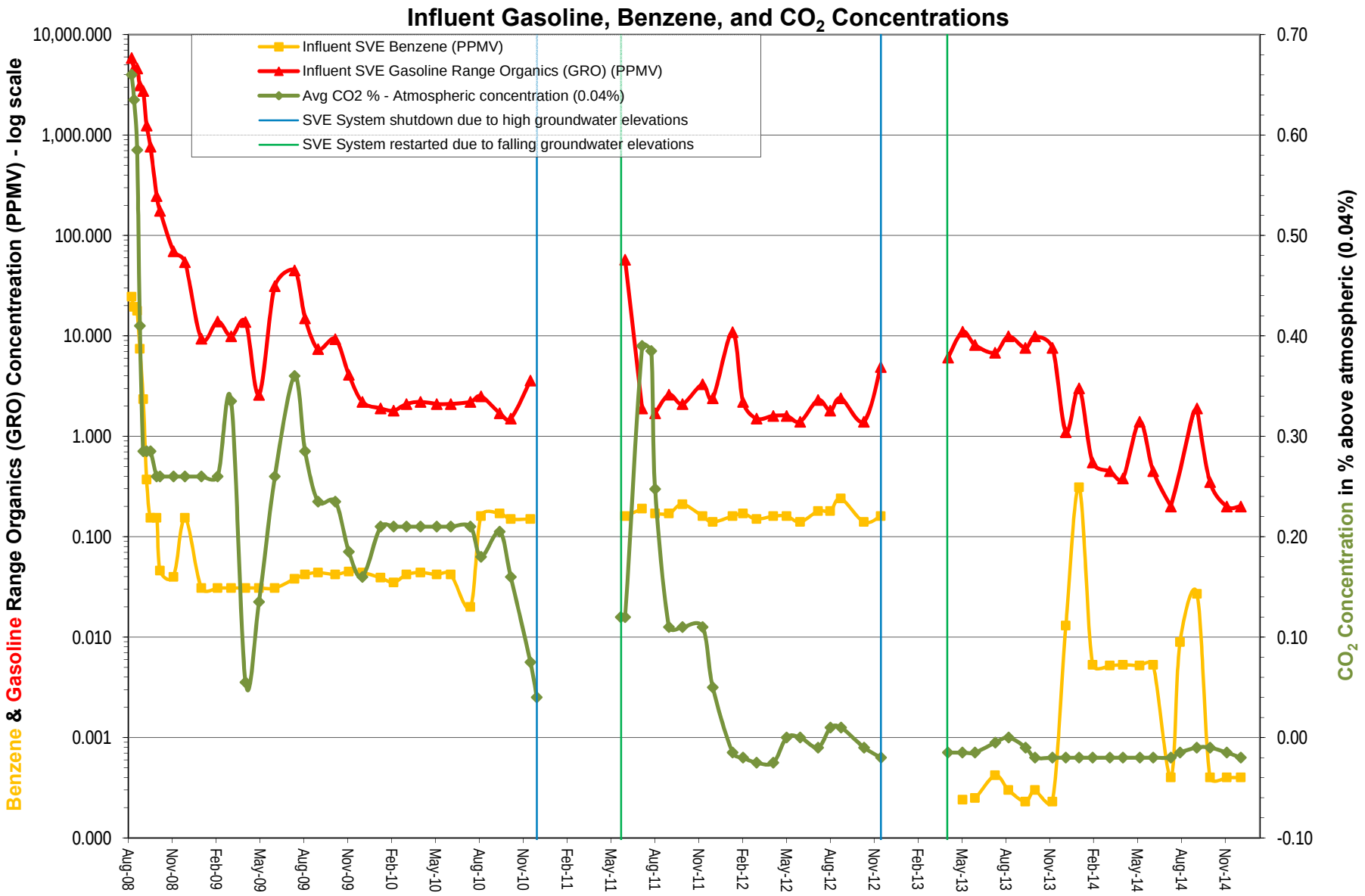
FIGURE
13

Figure 14. Inland SVE System Cumulative Hydrocarbon Recovery
Site: Former BP Harbor Island Terminal



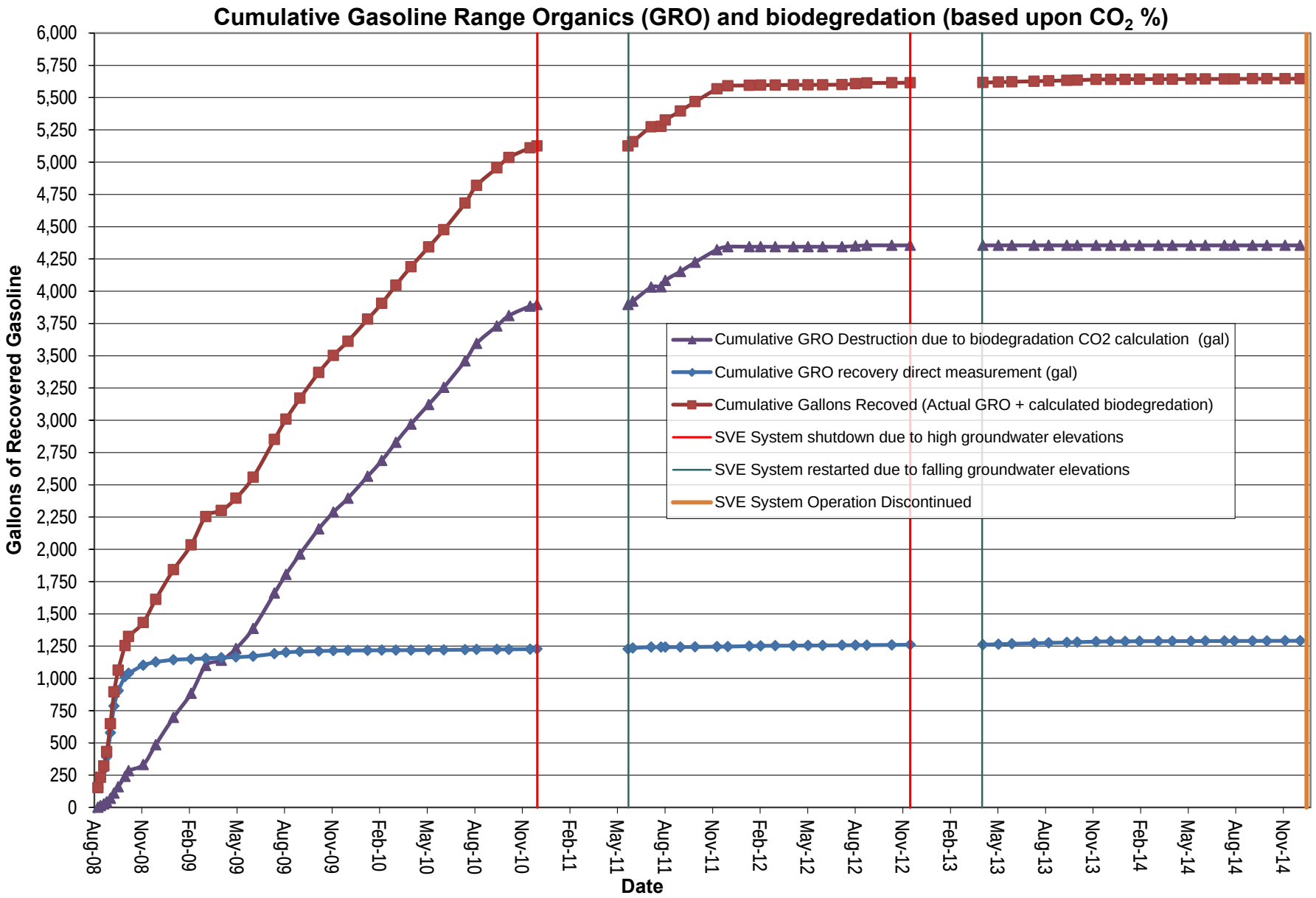
Note: Benzene and gasoline recovery are biased high as recovery is calculated assuming that benzene and gasoline are present at the laboratory decection limit for all samples reported as non detections from the laboratory.

Figure 15. Inland SVE System Gasoline, Benzene, and Carbon Dioxide History
Site: Former BP Harbor Island Terminal



Notes:
GRO - Gasoline Range Organic concentration by EPA TO-3
CO_2 - Concentration by detector tube minus atmospheric CO_2 concentration of 0.04%
PPMV - Parts Per Million Volume

Figure 16. Inland SVE Biodegradation and Vapor Recovery
Site: Former BP Harbor Island Terminal



LEGEND

GM-16S	MONITORING WELL
AMW-01	PERFORMANCE/CONFIRMATION WELL
GM-13D	PERFORMANCE WELL
GM-13S	PRODUCT PERFORMANCE WELL

N

0 50 100
SCALE IN FEET

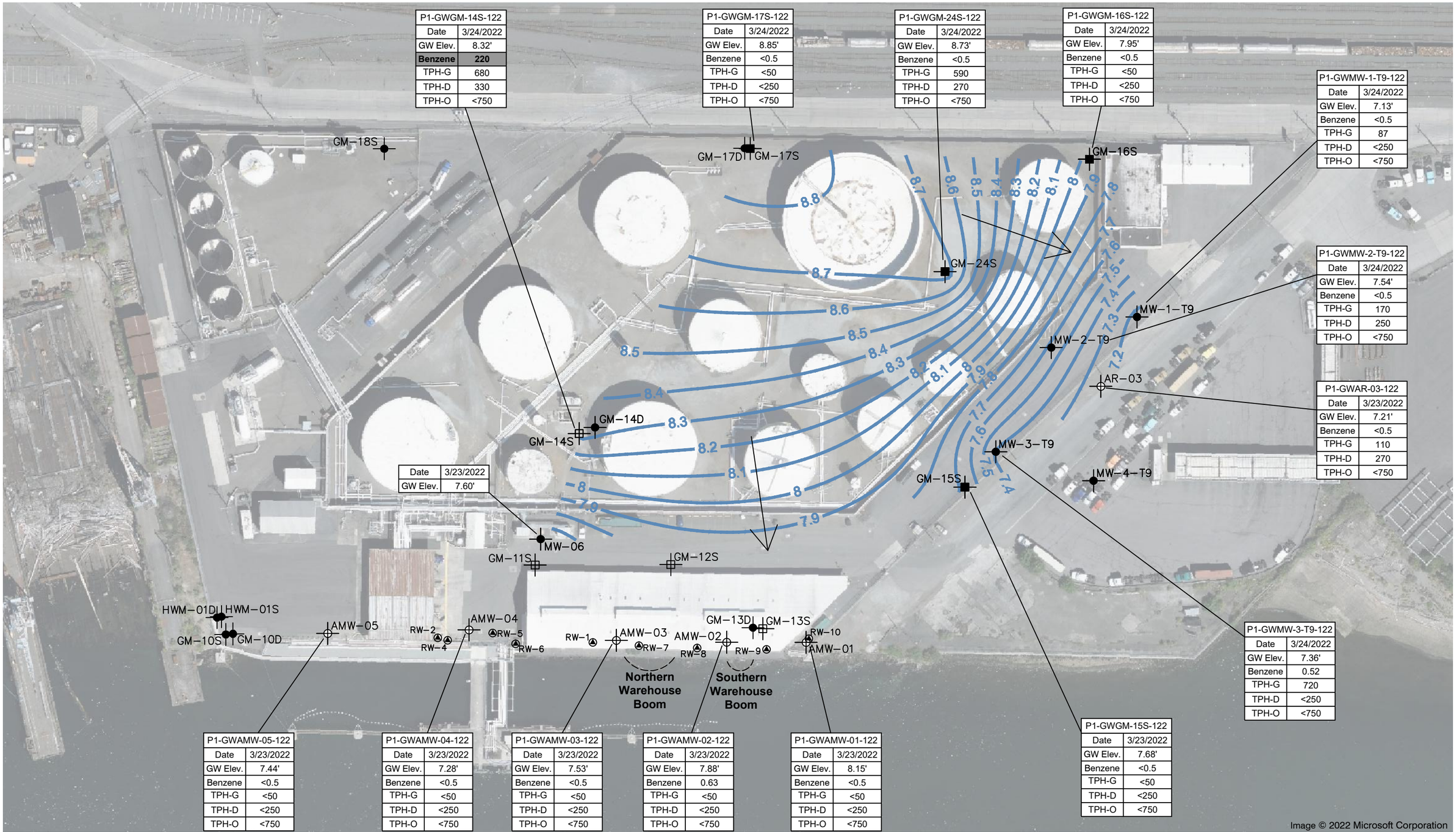
TECHSOLVE ENVIRONMENTAL
7518 N.E. 169th Street
Kenmore, WA 98028
P:(425) 402-8277 F:(425) 402-7917

Plant 1 Monitoring Well Network

Site: Former BP Harbor Island Terminal
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE
17

\\server\ServerData\data\AproJect\ARCO 21T\Drawings and CAD files\Autocad files\Quarterly GWM Figures



LEGEND

- GM-16S Monitoring Well
- AMW-01 Performance/Confirmation Well
- GM-13D Performance Well
- GM-13S Product Performance Well
- 8.1 Groundwater Contour (Feet NAVD88)
- RW-5 Recovery Well
- Groundwater Flow Direction

Sample ID	
Date	Date Sample Collected
GW Elev.	Groundwater Elevation in Feet NAVD88
Benzene	Benzene (EPA 8260) in µg/L
TPH-G	Total Petroleum Hydrocarbons as Gasoline (NWTPH-GX) in µg/L
TPH-D	Total Petroleum Hydrocarbons as Diesel (NWTPH-DX) in µg/L
TPH-O	Total Petroleum Hydrocarbons as Oil (NWTPH-DX) in µg/L

Notes: **Bold** - Detected concentration exceeds site specific cleanup level
< = Not detected at listed laboratory reporting limit

N

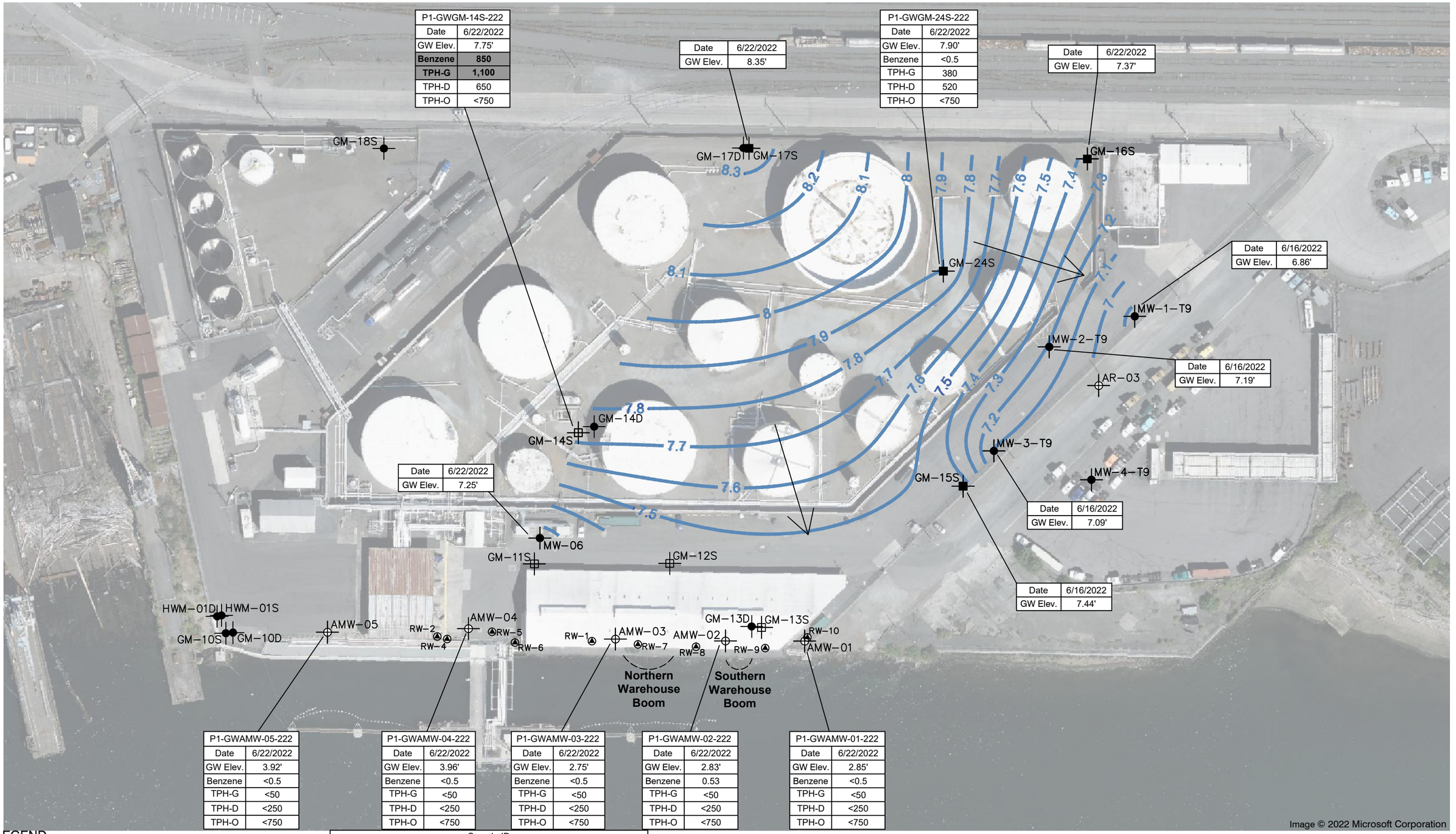
0 50 100
SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 N.E. 169th Street
Kenmore, WA 98028
P:(425) 402-8277 F:(425) 402-7917

Plant 1 First Quarter 2022 Groundwater Monitoring Analytical Results

Site: Former BP Harbor Island Terminal
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE
18



LEGEND

- GM-16S Monitoring Well
- AMW-01 Performance/Confirmation Well
- GM-13D Performance Well
- GM-13S Product Performance Well
- 8.1 Groundwater Contour (Feet NAVD88)
- RW-5 Recovery Well
- Groundwater Flow Direction

Sample ID	
Date	Date Sample Collected
GW Elev.	Groundwater Elevation in Feet NAVD88
Benzene	Benzene (EPA 8260) in µg/L
TPH-G	Total Petroleum Hydrocarbons as Gasoline (NWTPH-GX) in µg/L
TPH-D	Total Petroleum Hydrocarbons as Diesel (NWTPH-DX) in µg/L
TPH-O	Total Petroleum Hydrocarbons as Oil (NWTPH-DX) in µg/L

Notes: **Bold** - Detected concentration exceeds site specific cleanup level
< = Not detected at listed laboratory reporting limit

N

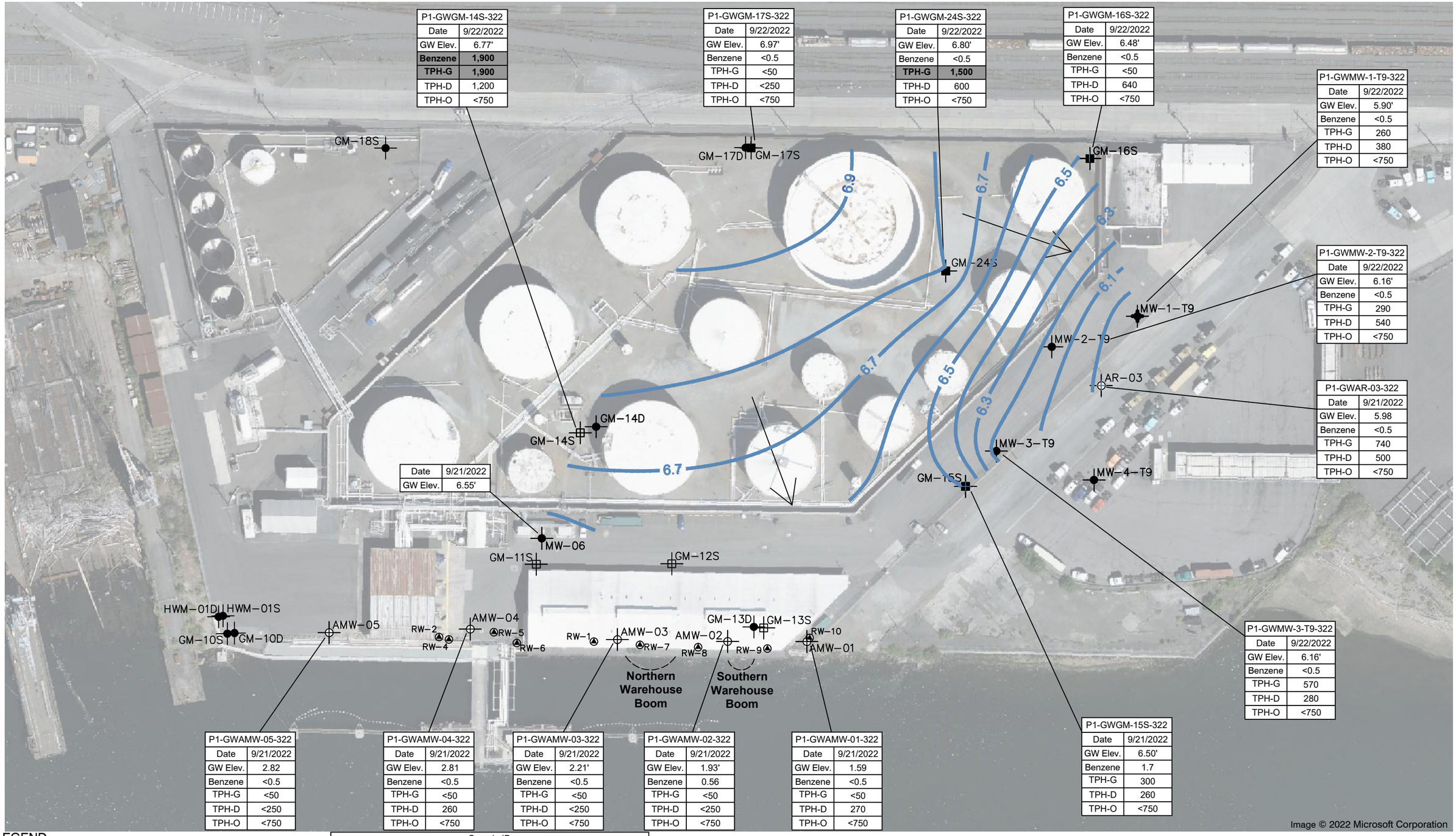
0 50 100
SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 N.E. 169th Street
Kenmore, WA 98028
P:(425) 402-8277 F:(425) 402-7917

Plant 1 Second Quarter 2022 Groundwater Monitoring Analytical Results

Site: Former BP Harbor Island Terminal
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE
19



LEGEND

- GM-16S Monitoring Well
- AMW-01 Performance/Confirmation Well
- GM-13D Performance Well
- GM-13S Product Performance Well
- 8.1 Groundwater Contour (Feet NAVD88)
- RW-5 Recovery Well
- Groundwater Flow Direction

Sample ID	
Date	Date Sample Collected
GW Elev.	Groundwater Elevation in Feet NAVD88
Benzene	Benzene (EPA 8260) in µg/L
TPH-G	Total Petroleum Hydrocarbons as Gasoline (NWTPH-GX) in µg/L
TPH-D	Total Petroleum Hydrocarbons as Diesel (NWTPH-DX) in µg/L
TPH-O	Total Petroleum Hydrocarbons as Oil (NWTPH-DX) in µg/L

Notes: **Bold** - Detected concentration exceeds site specific cleanup level
< = Not detected at listed laboratory reporting limit

N

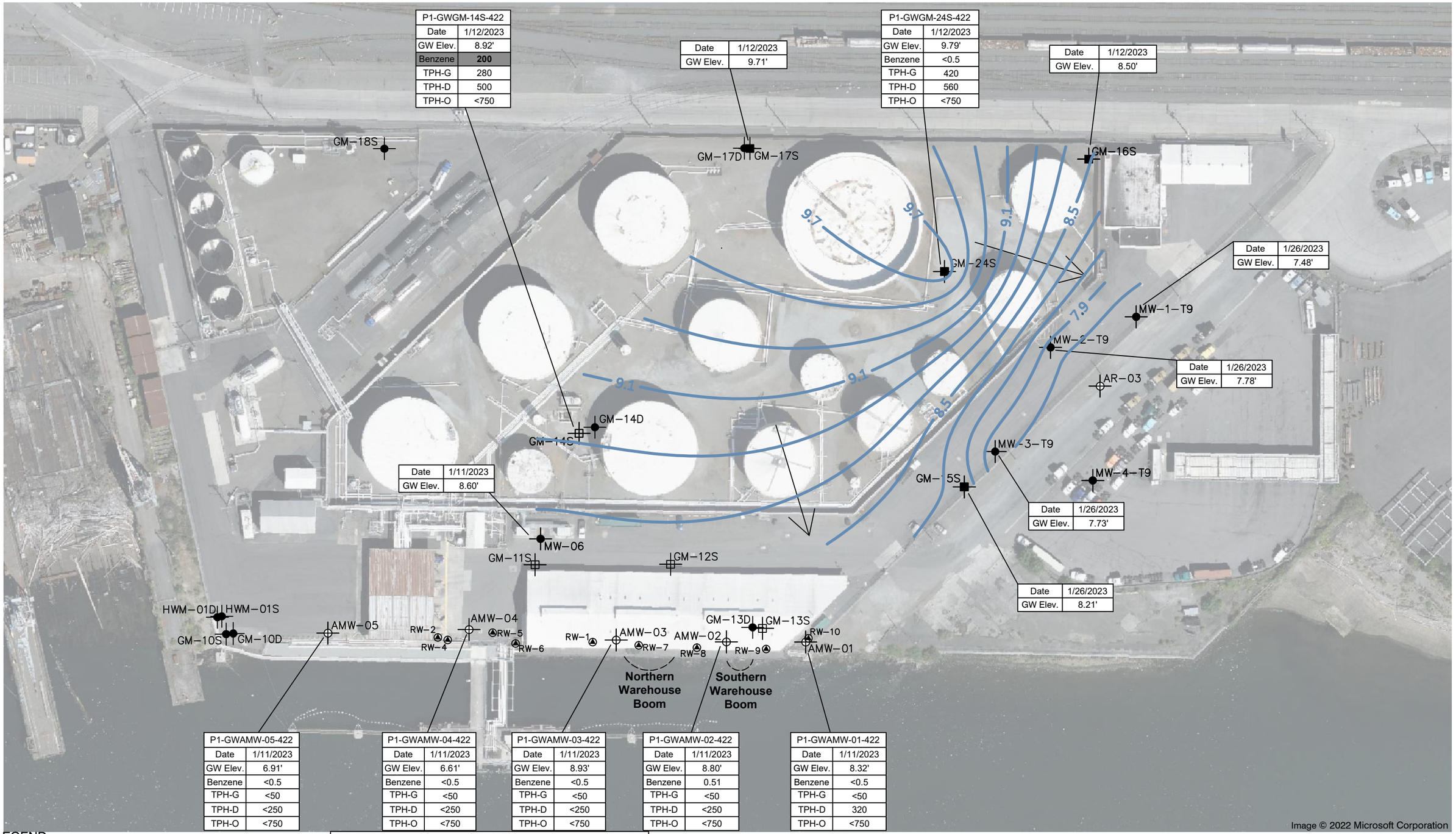
0 50 100
SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 N.E. 169th Street
Kenmore, WA 98028
P:(425) 402-8277 F:(425) 402-7917

Plant 1 Third Quarter 2022 Groundwater Monitoring Analytical Results

Site: Former BP Harbor Island Terminal
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE
20



LEGEND

- GM-16S Monitoring Well
- AMW-01 Performance/Confirmation Well
- GM-13D Performance Well
- GM-13S Product Performance Well
- 8.1 Groundwater Contour (Feet NAVD88)
- RW-5 Recovery Well
- Groundwater Flow Direction

Sample ID	
Date	Date Sample Collected
GW Elev.	Groundwater Elevation in Feet NAVD88
Benzene	Benzene (EPA 8260) in µg/L
TPH-G	Total Petroleum Hydrocarbons as Gasoline (NWTPH-GX) in µg/L
TPH-D	Total Petroleum Hydrocarbons as Diesel (NWTPH-DX) in µg/L
TPH-O	Total Petroleum Hydrocarbons as Oil (NWTPH-DX) in µg/L

Notes: **Bold** - Detected concentration exceeds site specific cleanup level
< = Not detected at listed laboratory reporting limit

N

0 50 100
SCALE IN FEET

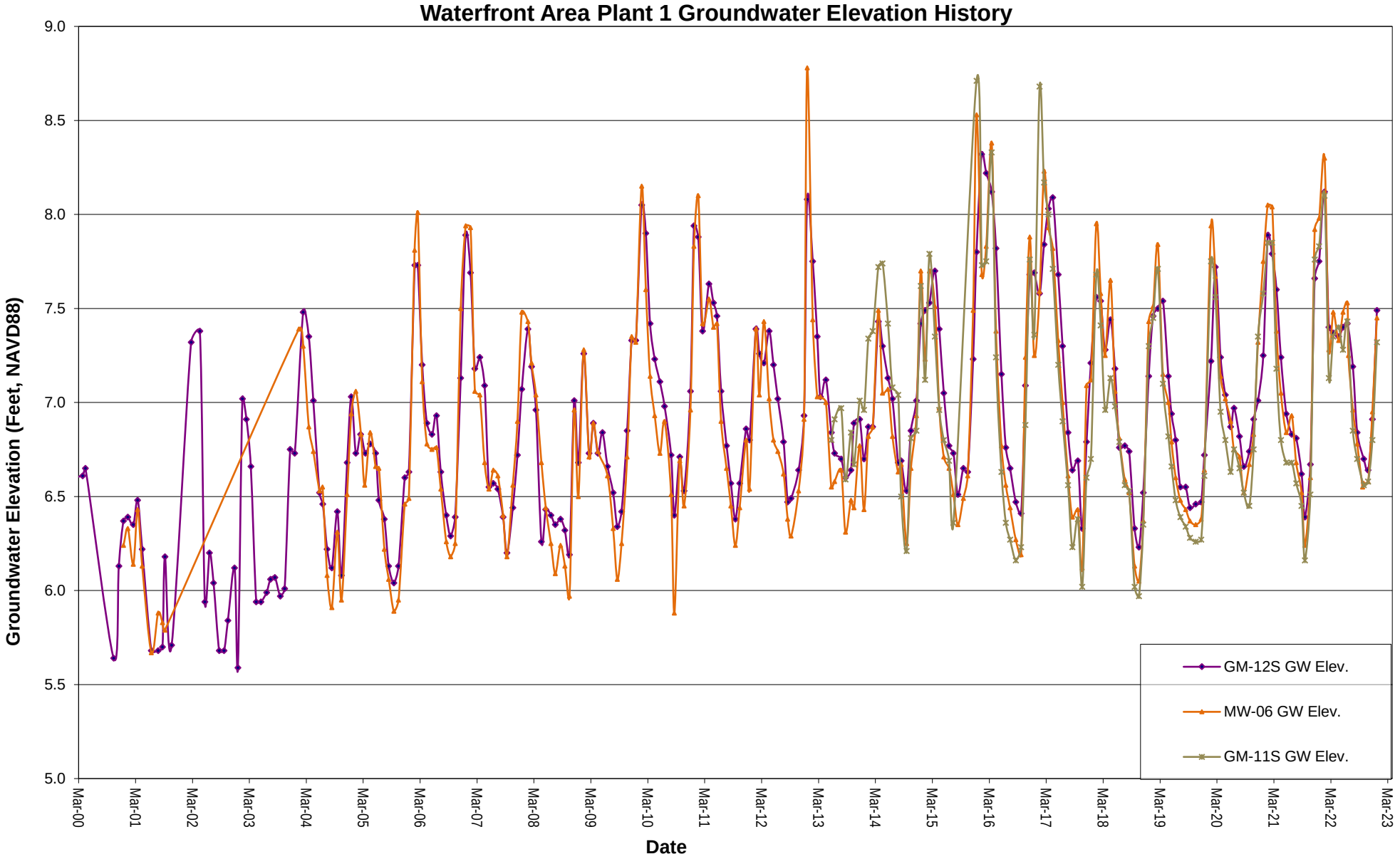
TECHSOLVE ENVIRONMENTAL
7518 N.E. 169th Street
Kenmore, WA 98028
P:(425) 402-8277 F:(425) 402-7917

Plant 1 Fourth Quarter 2022 Groundwater Monitoring Analytical Results

Site: Former BP Harbor Island Terminal
1652 Southwest Lander Street
Seattle, WA 98134

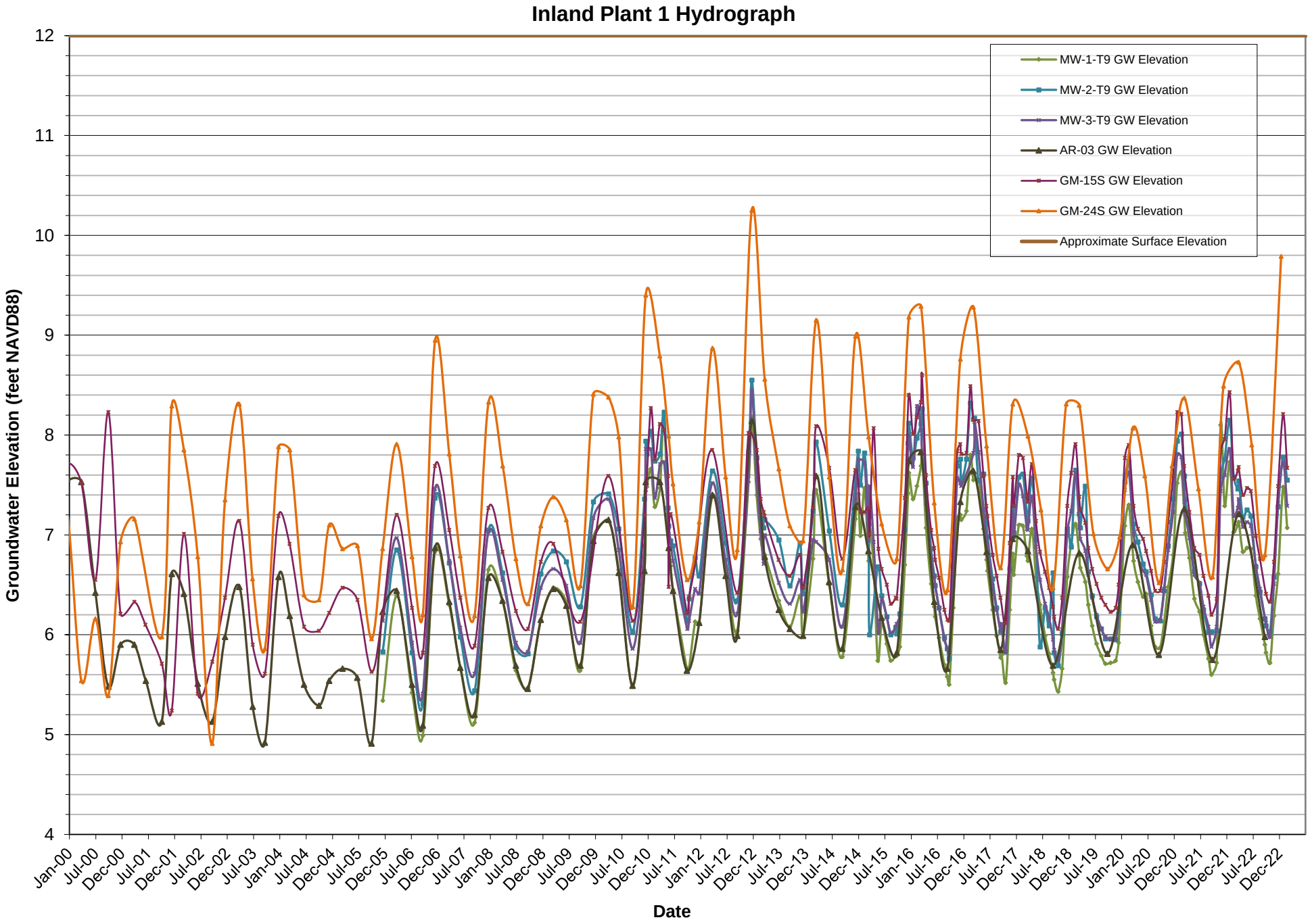
FIGURE
21

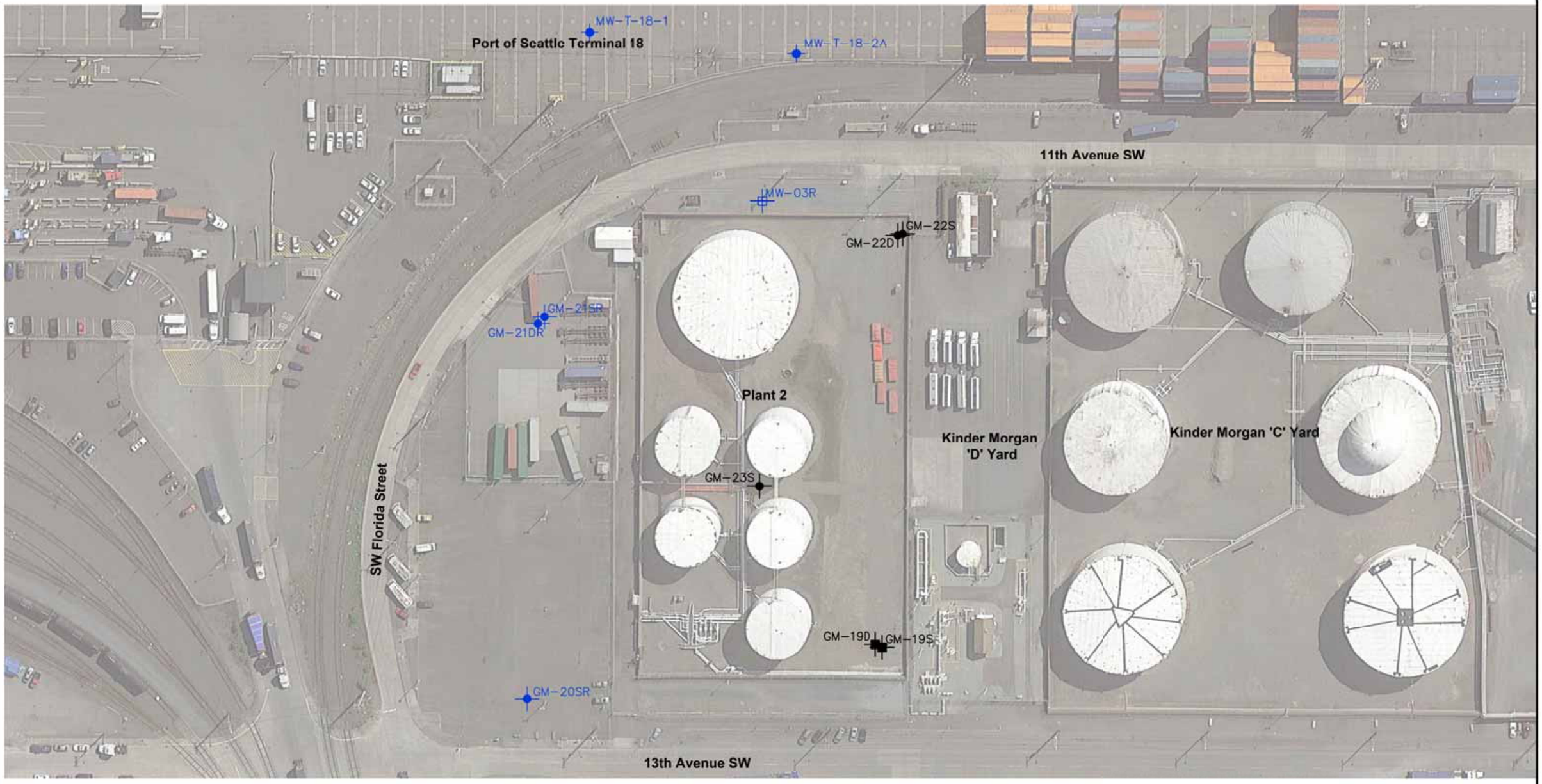
Figure 22. Plant 1 Waterfront Hydrograph
March 2000 through December 2022
Site: Former BP Harbor Island Terminal



Note: Groundwater monitoring in well MW-06 is conducted voluntarily by TechSolve and is not part of the required monitoring program. Well GM-13S is excluded from the hydrograph as it has been shown to be tidally affected and within the recovery system capture zone. Data for well GM-11S is only included after May 2013, when it was no longer used as a recovery well.

Figure 23. Plant 1 Southern Boundary Area Hydrograph
January 2000 through December 2022
Site: Former BP Harbor Island Terminal





LEGEND

- GROUNDWATER MONITORING WELL
- PRODUCT PERFORMANCE WELL
- PERFORMANCE WELL
- WELLS HIGHLIGHTED IN BLUE HAVE BEEN DECOMMISSIONED

N

0 50 100
SCALE IN FEET

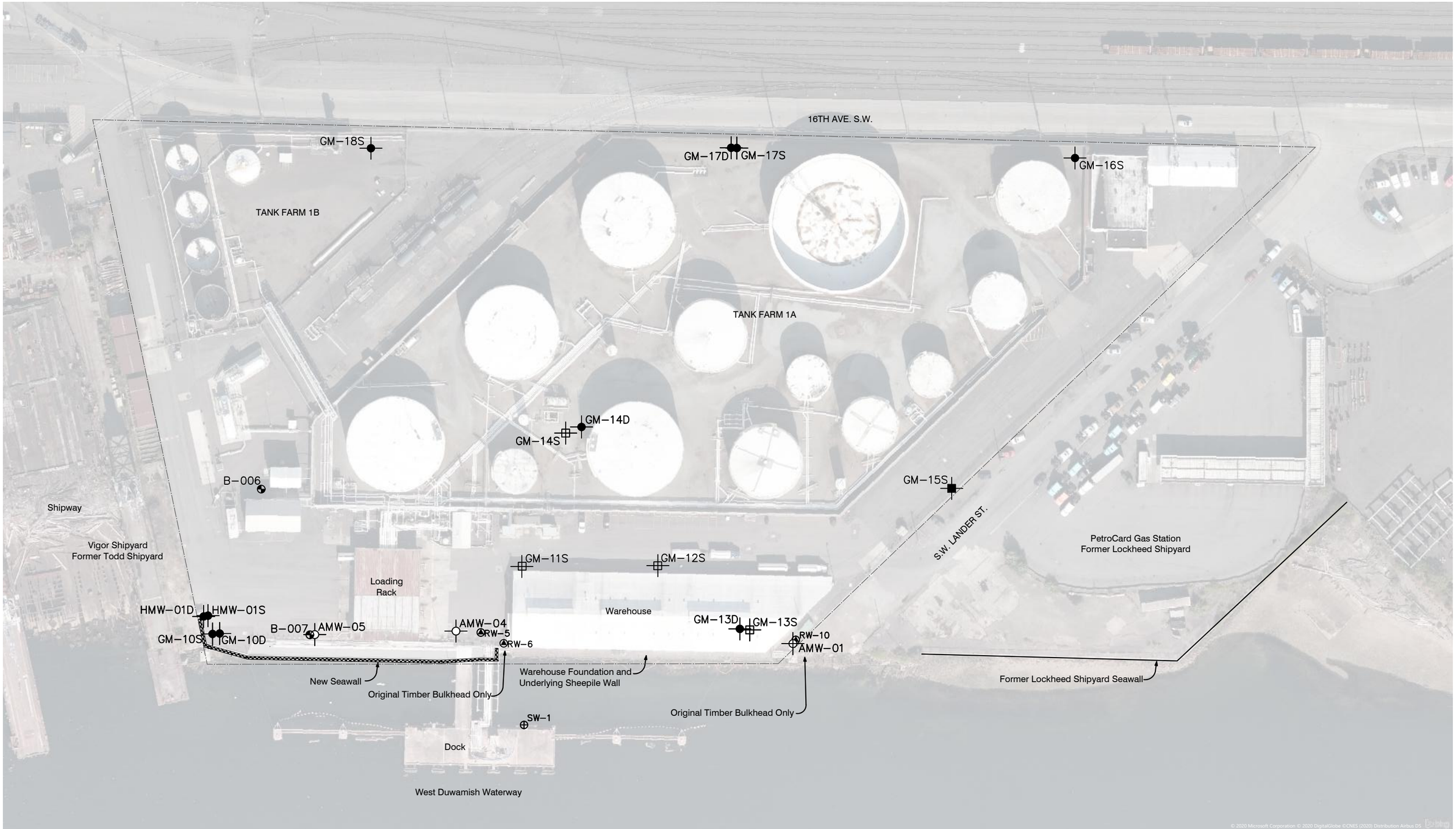
TECHSOLVE ENVIRONMENTAL
7518 N.E. 169th Street,
Kenmore, WA 98028
P:(425) 402-8277 F:(425) 402-7917

Plant 2 Monitoring Well Network

BP Harbor Island Terminal
2406 13th Avenue SW
Seattle, WA 98134

FIGURE
24

C:\Data\CAD\Projects\TechSolv\ARCO 21T\dwg\ARCO21T.dwg << Plant 2 Monitoring Well Network >> OCT 07 2008 09:48:43 (bCAD)



LEGEND

GM-16S	Monitoring Well	RW-6	Recovery Well
AMW-01	Performance/Confirmation Well	SW-1	Stilling Well
GM-13D	Performance Well	B-006	Piezometer Well
GM-13S	Product Performance Well		Property Line

N

0 50 100
SCALE IN FEET

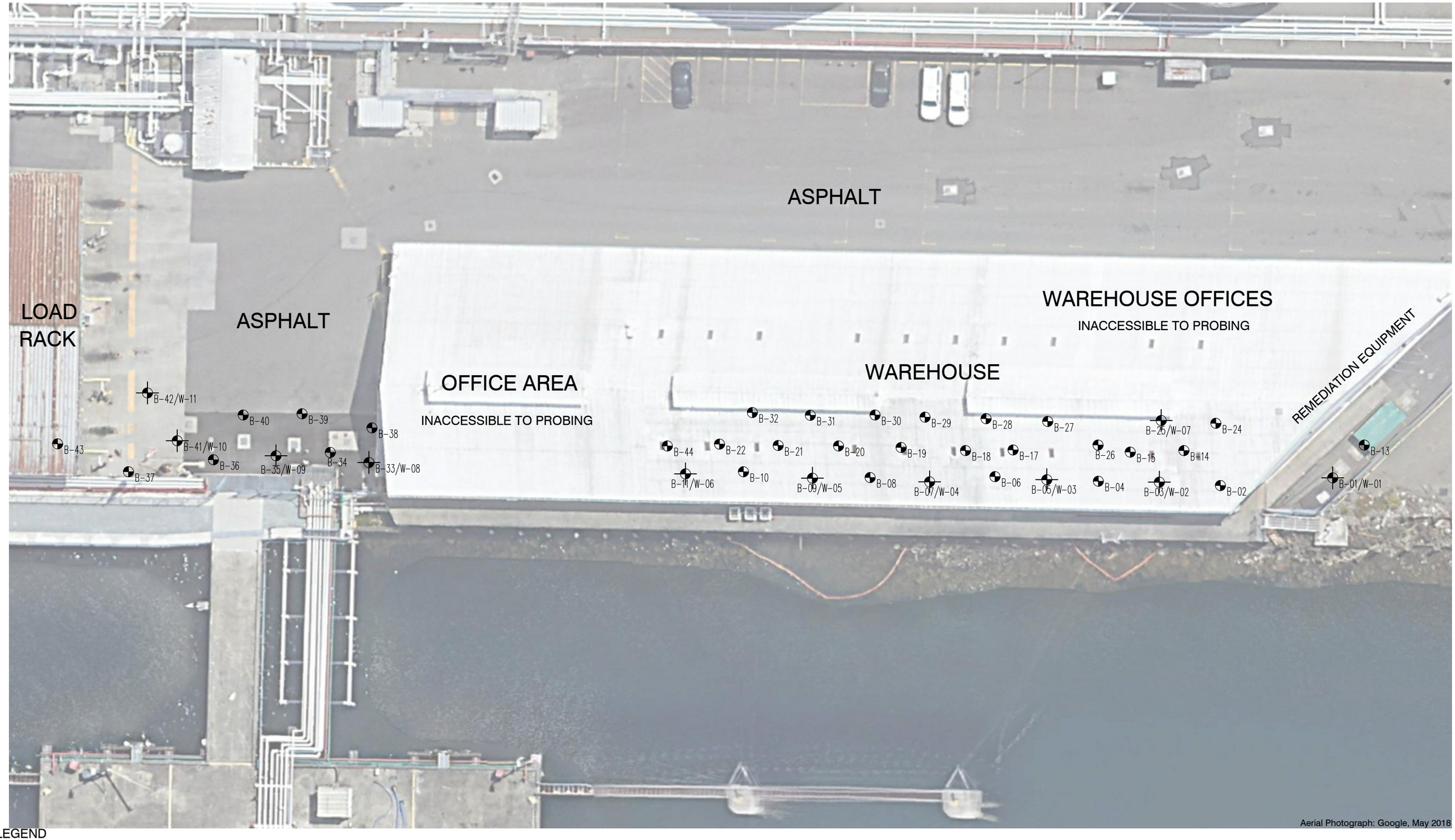
TECHSOLVE ENVIRONMENTAL
7518 N.E. 169th Street
Kenmore, WA 98028
P:(425) 402-8277 F:(425) 402-7917

Plant 1 Hydraulic Evaluation Study Wells

Site: BP Harbor Island Terminal
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE
25

\\server\ServerData\data\Aproject\ARCO 21T\Drawings and CAD files\Autocad files\Quarterly GWM Figures: P1 Hyd Eval Wells Mods (6/29/21)



Aerial Photograph: Google, May 2018

LEGEND

B-01 PROBING BORING LOCATION

B-01/W-01 PROBING BORING LOCATION / TEMPORARY PIEZOMETER WELL

N

0 15 30

SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 N.E. 169th Street
Kenmore, WA 98028
P:(425) 402-8277 F:(425) 402-7917

Plant 1 Probing Investigation Boring Locations

Site: Former BP Harbor Island Terminal
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE 26

APPENDIX A

King County Industrial Waste Semi-Annual Self-Monitoring Reports

King County

Industrial Waste Program Semi-Annual Self-Monitoring Report

TECHSOLVE GROUNDWATER REMEDIATION PROJECT

Send to: King County Industrial Waste Program
201 S. Jackson Street, Suite 513
Seattle, WA 98104-3855
Phone 206-477-5300 / FAX 206-263-3001
Email: info.KCIW@kingcounty.gov

This form is available at www.kingcounty.gov/industrialwaste

Company Name: TLP Management Services, LLC

Please specify year: **2022** **Semi-Annual Report for Semester 1** **Sample Site No.:** **A43262** **Permit/DA No.:** **7592-06**

All units are mg/l unless otherwise noted. Note: Write in self-monitoring parameters, if not provided, e.g. Silver (Ag) or settleable solids (ml/L).

	Sample Date month/day	Sample Type C (Composite) G (Grab) BC (Batch)	Benzene (CAS # 71-43-2)	Ethylbenzene (CAS # 100-41-4)	Toluene (CAS# 108-88-3)	Xylenes, Total (1330-20-7)	Nonpolar fats, oils & grease (FOG) (Record average of 3 grabs only)	Discharge Volume on sample day (gallons)	Total Monthly Flow (gallons)
Semester 1	JAN/20	G	<0.0005	<0.001	<0.001	<0.003	Diesel: 0.71 Oil: <0.75	2,090	50,750
	FEB/17	G	<0.0005	<0.001	<0.001	<0.003	Diesel: <0.25 Oil: <0.75	1,160	43,810
	MAR/17	G	<0.0005	<0.001	<0.001	<0.003	Diesel: 0.44 Oil: <0.75	1,230	29,330
	APR/21	G and C for FOG	<0.0005	<0.001	<0.001	<0.003	FOG (non-polar): <5.0	1,170	36,890
	MAY/19	G	<0.0005	<0.001	<0.001	<0.003	Diesel: 0.30 Oil: <0.75	1,150	22,700
	JUN/16	G	<0.0005	<0.001	<0.001	<0.003	Diesel: 0.29 Oil: <0.75	2,120	32,010
		—►							**Total Volume Semester 1: 215,490 gallons**

—► Maximum daily flow from Semester 1: **5,400 gallons.** Date on which maximum daily flow occurred: **01/07/2022**

NOTES: **Page 1 of 2. Daily discharge volumes reported based upon flowmeter readings sent from telemetry unit. All analyses referenced in this report were performed by ALS Environmental of Everett, Washington. All laboratory reports are retained by TechSolve Environmental, Inc. TPH-D = Total Petroleum Hydrocarbons as Diesel. TPH-O = Total Petroleum Hydrocarbons as Oil.**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested.

Signature of Principal Executive or Authorized Agent

Date 7/13/2022

Due Date: Semi-annual report for **Semester 1** is due by **July15** each year. **Please Note:** Do not include original laboratory reports with this form unless otherwise requested. Keep the original laboratory reports on file and available for inspection for at least three years.

King County

Industrial Waste Program Semi-Annual Self-Monitoring Report

TECHSOLVE GROUNDWATER REMEDIATION PROJECT

Send to: King County Industrial Waste Program
201 S. Jackson Street, Suite 513
Seattle, WA 98104-3855
Phone 206-477-5300 / FAX 206-263-3001
Email: info.KCIW@kingcounty.gov

This form is available at www.kingcounty.gov/industrialwaste

Company Name: TLP Management Services, LLC

Please specify year: **2022** **Semi-Annual Report for Semester 2** **Sample Site No.: A43262** **Permit/DA No.: 7592-06**

All units are mg/l unless otherwise noted. Note: Write in self-monitoring parameters, if not provided, e.g. Silver (Ag) or settleable solids (ml/L).

	Sample Date month/day	Sample Type C (Composite) G (Grab) BC (Batch)	Benzene (CAS # 71-43-2)	Ethylbenzene (CAS # 100-41-4)	Toluene (CAS# 108-88-3)	Xylenes, Total (1330-20-7)	Nonpolar fats, oils & grease (FOG) (Record average of 3 grabs only)	Discharge Volume on sample day (gallons)	Total Monthly Flow (gallons)
Semester 2	JUL/21	G	<0.0005	<0.001	<0.001	<0.003	Diesel: <0.25 Oil: <0.75 Gas: <0.050	1,050	47,610
	AUG/18	G	<0.0005	<0.001	<0.001	<0.003	Diesel: <0.25 Oil: <0.75 Gas: <0.050	1,300	40,120
	SEP/29	G	<0.0005	<0.001	<0.001	<0.003	Diesel: <0.25 Oil: <0.75 Gas: <0.050	1,470	56,400
	OCT/27	G	<0.0005	<0.001	<0.001	<0.003	Diesel: 0.76 Oil: <0.75 Gas: <0.050	1,520	34,700
	NOV/23	G and C for FOG	<0.0014	<0.001	<0.001	<0.003	FOG : <5.0 Diesel: 0.340 Oil: <0.75 Gas: 0.070	1,450	39,230
	DEC/22	G	<0.0005	<0.001	<0.001	<0.003	Diesel: <0.31 Oil: <0.75 Gas: <0.050	1,610	52,970
		—▶						**Total Volume Semester 2: 271,030 gallons**	
		—▶ Maximum daily flow from Semester 2: **4,020 gallons.** Date on which maximum daily flow occurred: **12/10/2022**							
		NOTES:							

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested.

Signature of Principal Executive or Authorized Agent

1/10/23
Date

Due Date: Semi-annual report for **Semester 2** is due by **January 15** each year. **Please Note:** Do not include original laboratory reports with this form unless otherwise requested. Keep the original laboratory reports on file and available for inspection for at least three years.

King County

Industrial Waste Program Semi-Annual Self-Monitoring Report

TECHSOLVE GROUNDWATER REMEDIATION PROJECT

Send to: King County Industrial Waste Program
201 S. Jackson Street, Suite 513
Seattle, WA 98104-3855
Phone 206-477-5300 / FAX 206-263-3001
Email: info.KCIW@kingcounty.gov

This form is available at www.kingcounty.gov/industrialwaste

Company Name: TLP Management Services, LLC

Please specify year: **2022** **Semi-Annual Report for Semester 2** **Sample Site No.:** **A43262** **Permit/DA No.:** **7592-06**

All units are mg/l unless otherwise noted. Note: Write in self-monitoring parameters, if not provided, e.g. Silver (Ag) or settleable solids (ml/L).

	Sample Date month/day	Sample Type C (Composite) G (Grab) BC (Batch)	Arsenic, Total Self Monitoring	Cadmium, Total Self Monitoring	Chromium, Total Self Monitoring	Copper, Total Self Monitoring	Lead, Total Self Monitoring	Mercury, Total Self Monitoring	Nickel, Total Self Monitoring	Silver, Total Self Monitoring	Zinc, Total Self Monitoring
Semester 2	JUL/____										
	AUG/____										
	SEP/____										
	OCT/____										
	NOV/23	G	0.076	0.0019	0.480	0.330	0.065	<0.0002	0.650	<0.001	0.520
	DEC/____										

→ **Total Volume Semester 2: 271,030 gallons**

→ Maximum daily flow from Semester 2: **4,020 gallons.**
Date on which maximum daily flow occurred: **12/10/2022**

NOTES:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested.

Signature of Principal Executive or Authorized Agent

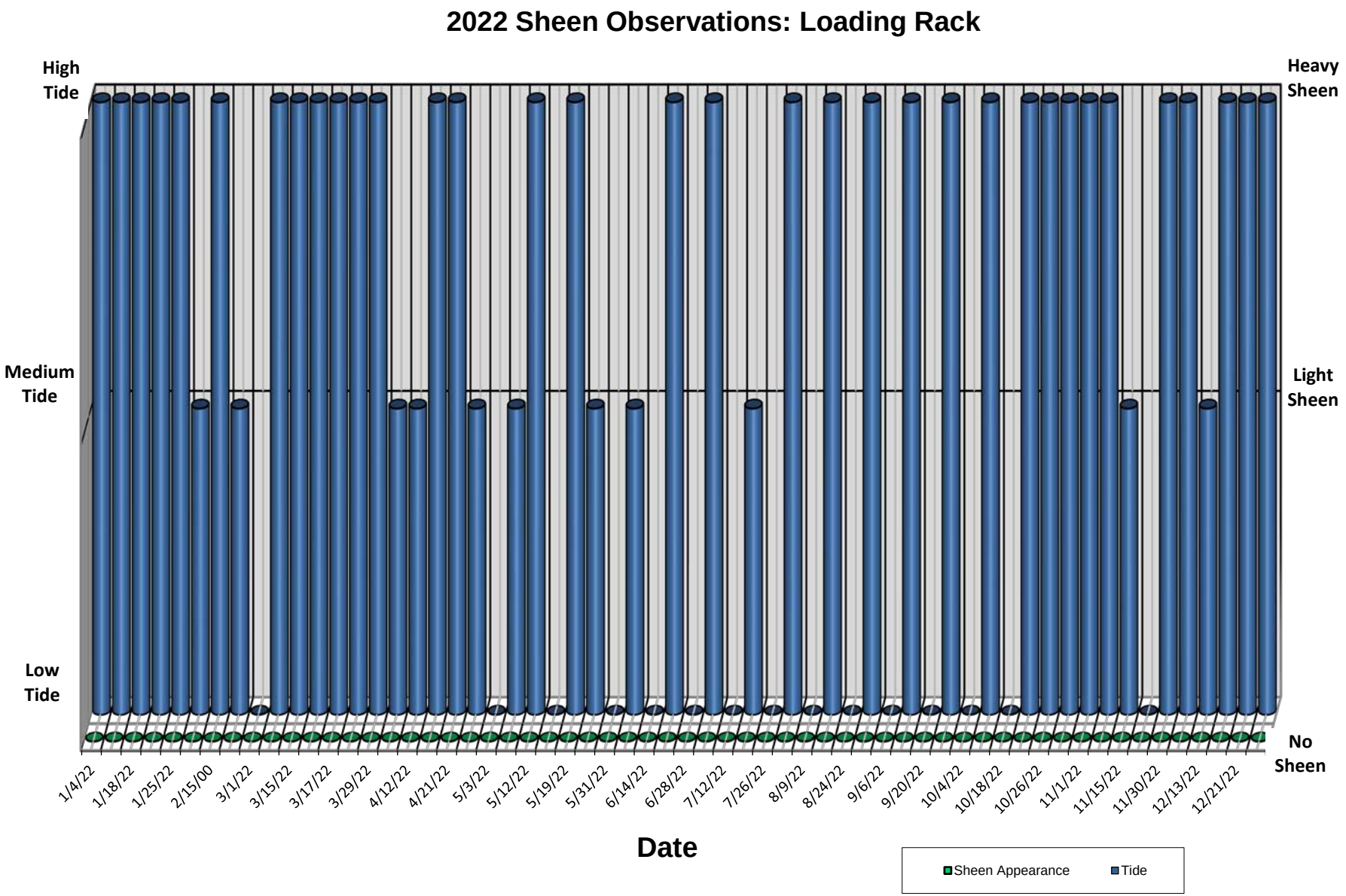
Date 1/10/23

Due Date: Semi-annual report for **Semester 2** is due by **January 15** each year. **Please Note:** Do not include original laboratory reports with this form unless otherwise requested. Keep the original laboratory reports on file and available for inspection for at least three years.

APPENDIX B

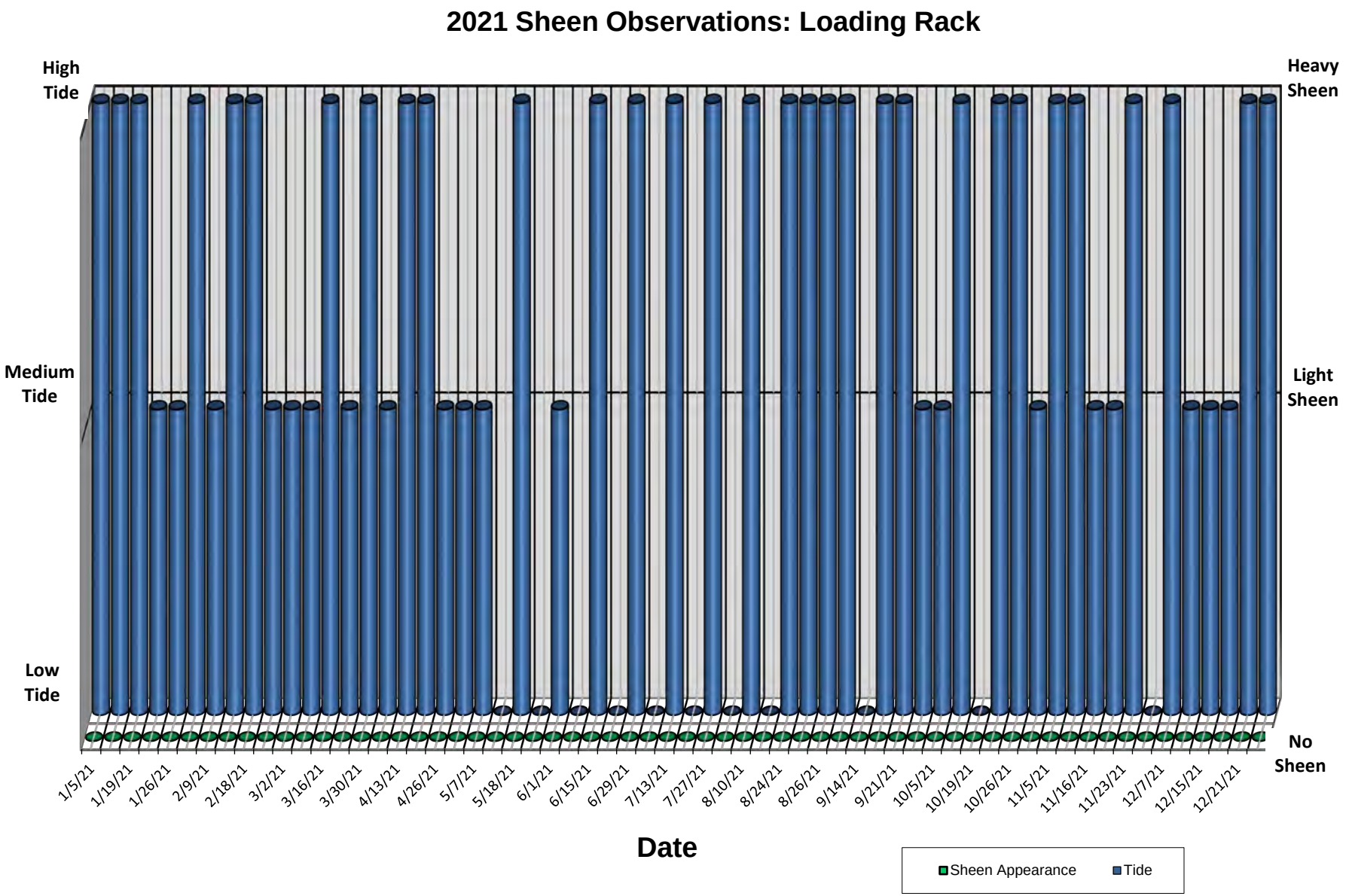
Sheen Observations – Loading Rack & Warehouse 2022 Through 1996

Sheen Observations - Loading Rack Area
Seaport Midstream Partners LLC Seattle Terminal



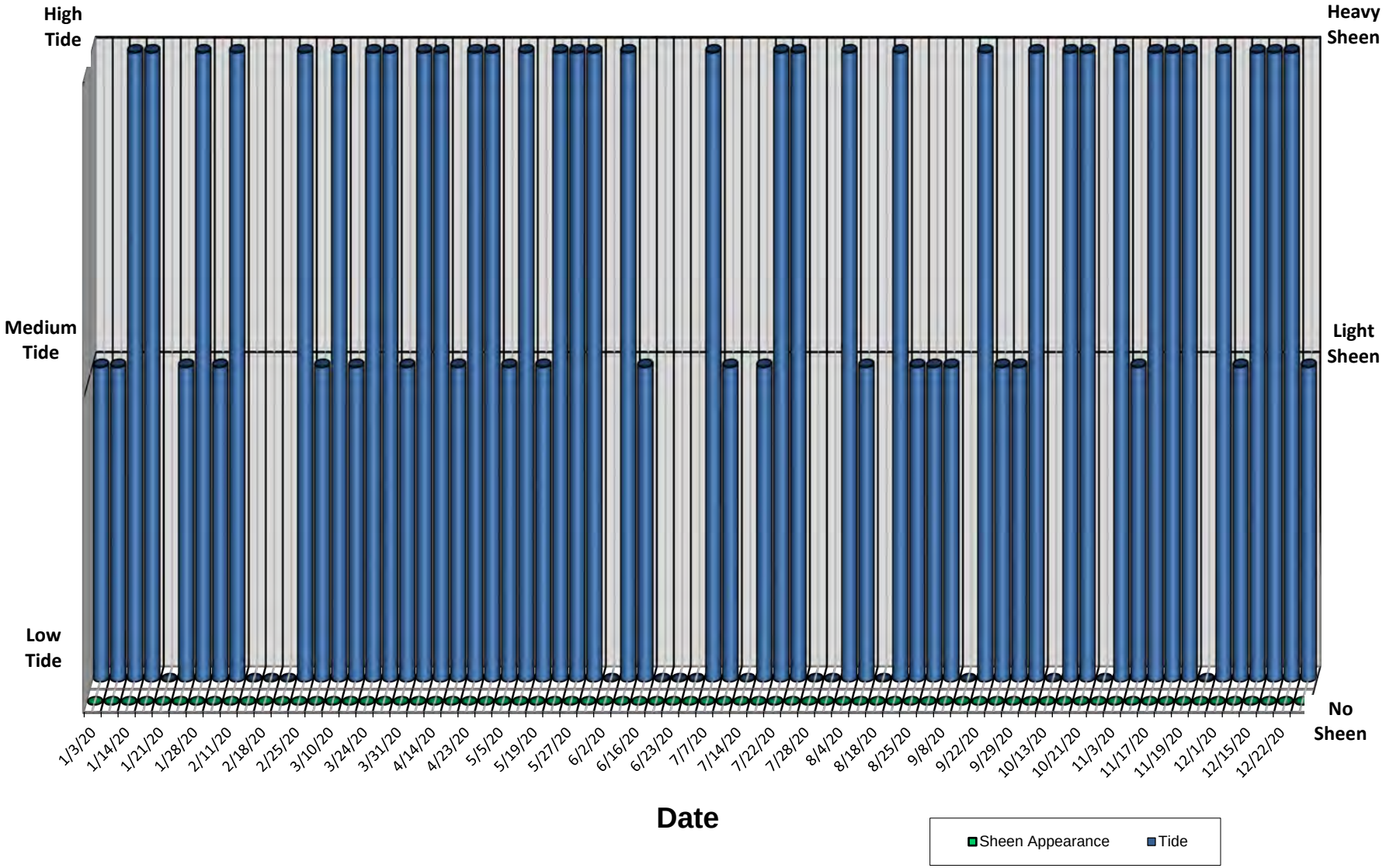
Loading Rack Area Boom removed in August 2017 with concurrence from Ecology due to persistent lack of sheens.

Sheen Observations - Loading Rack Area
Seaport Midstream Partners LLC Seattle Terminal

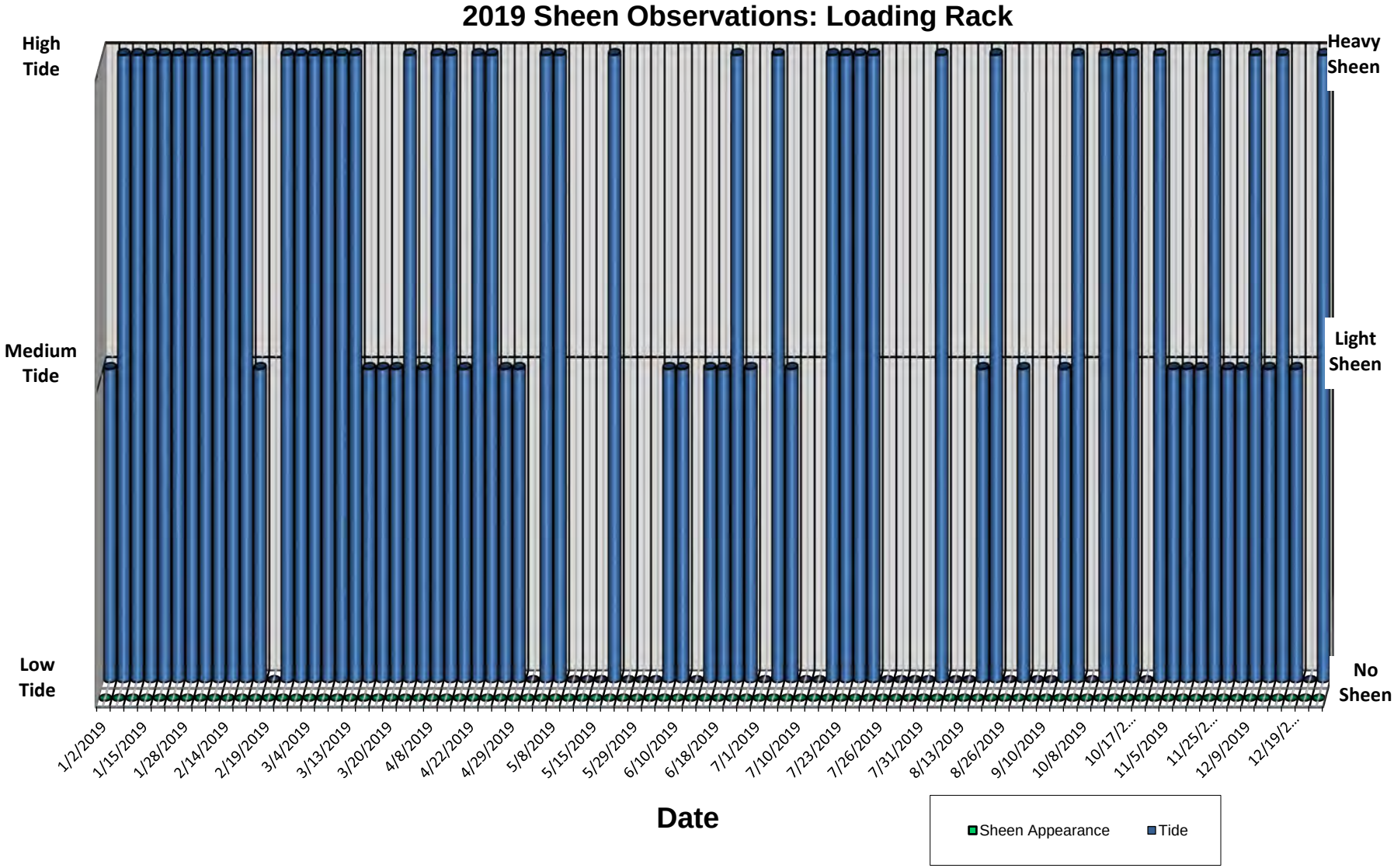


Loading Rack Area Boom removed in August 2017 with concurrance from Ecology due to persistent lack of sheens.

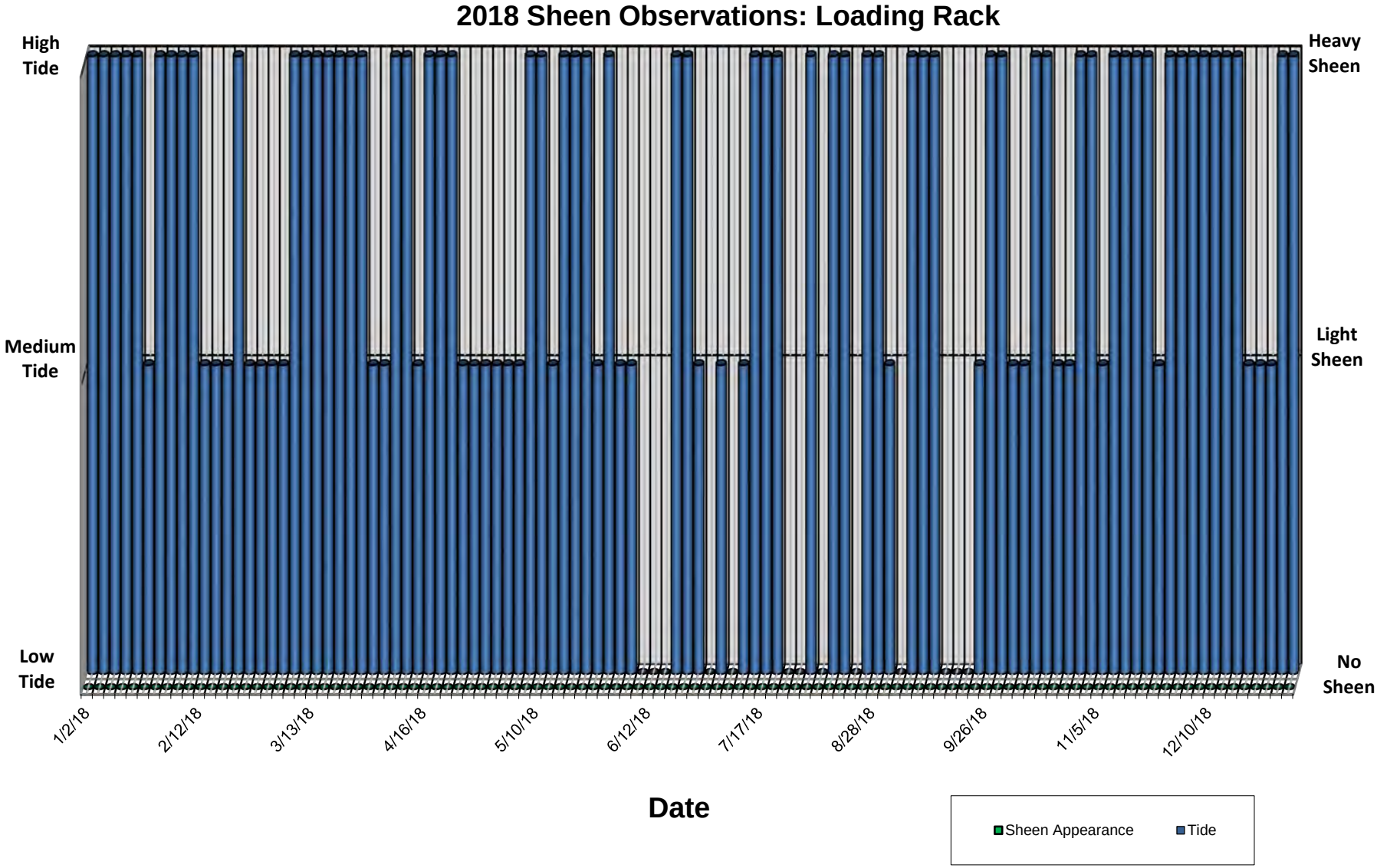
2020 Sheen Observations: Loading Rack



Loading Rack Area Boom removed in August 2017 with concurrance from Ecology due to persistent lack of sheens.

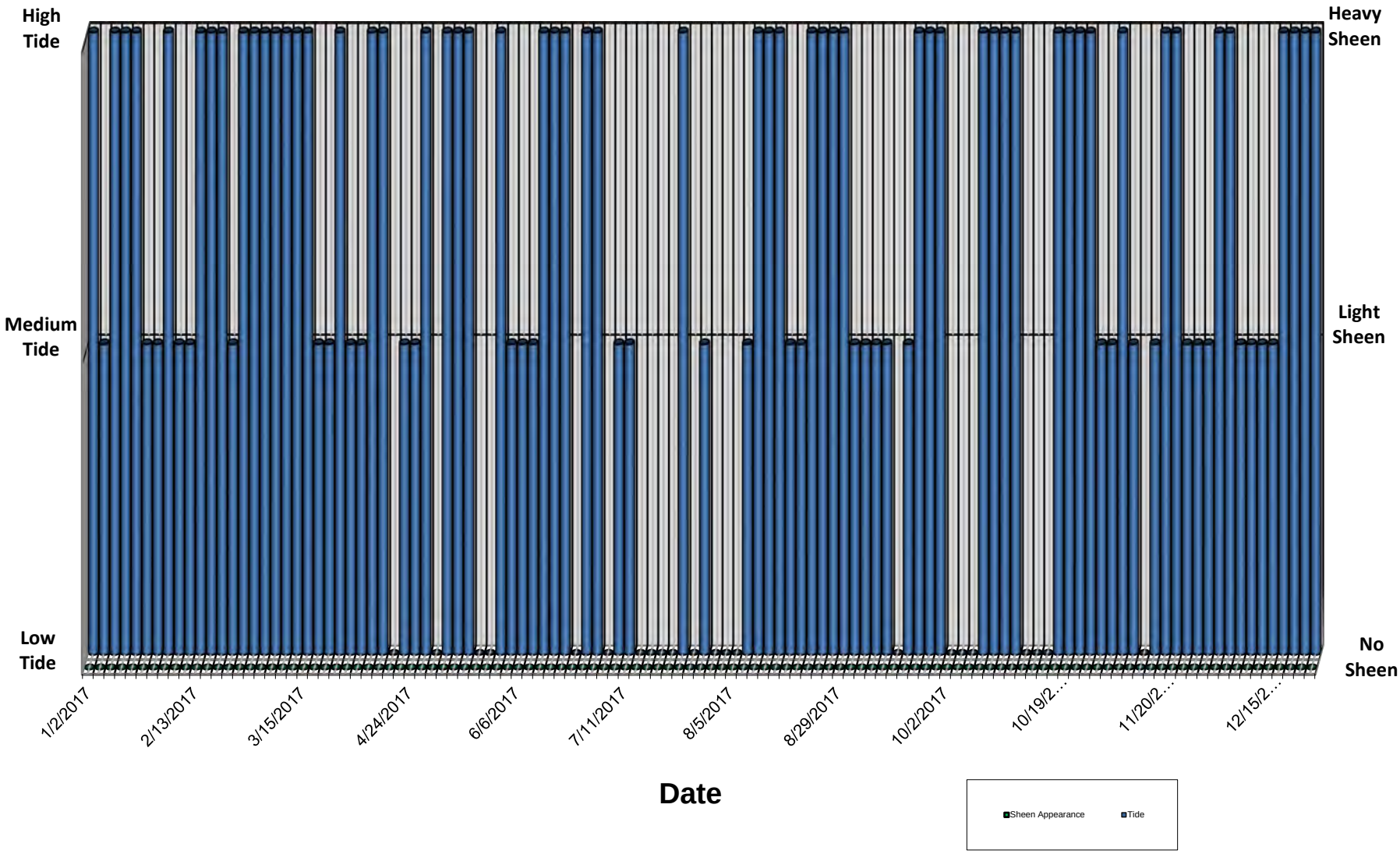


Loading Rack Area Boom removed in August 2017 with concurrance from Ecology due to persistent lack of sheens.



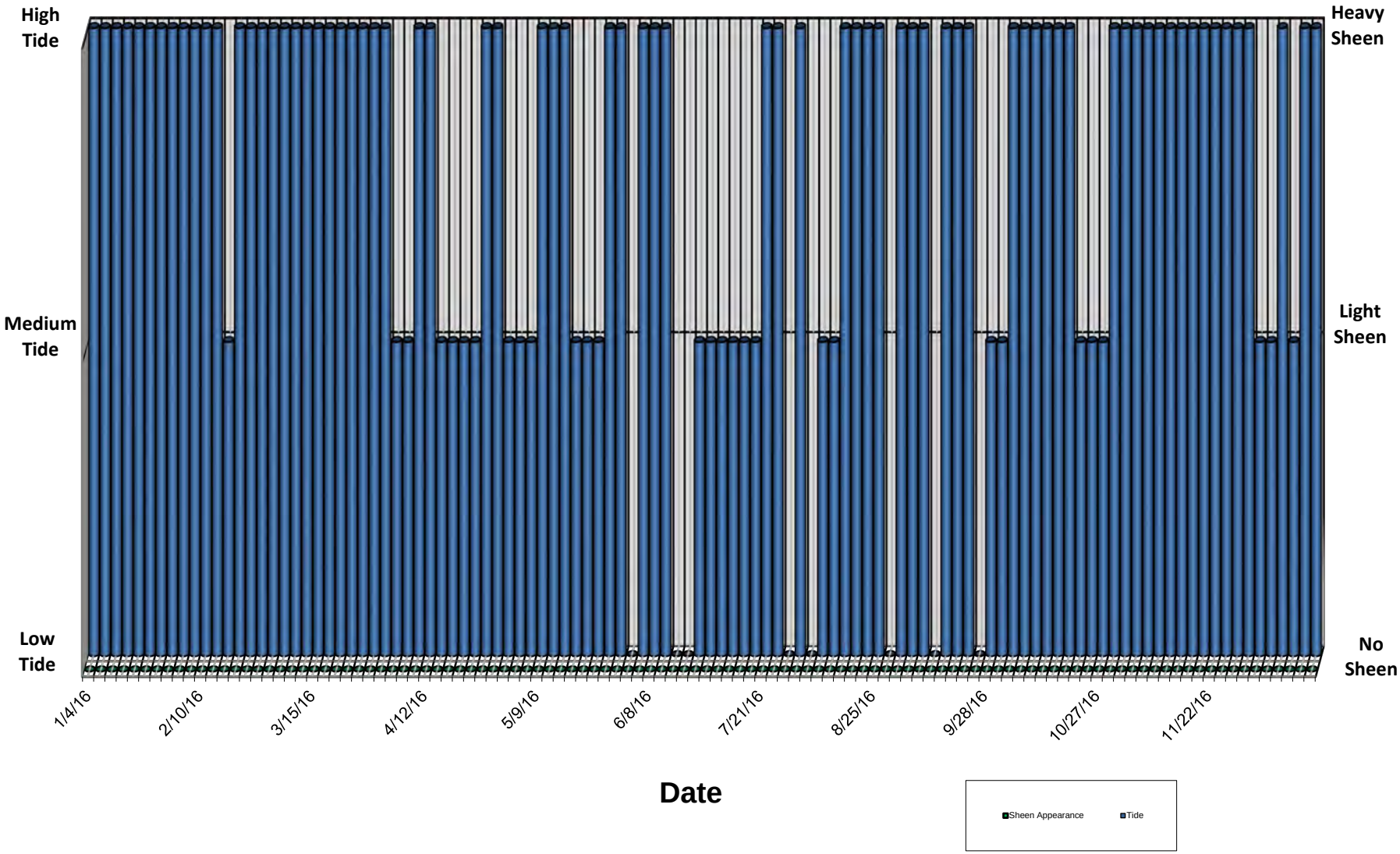
Loading Rack Area Boom removed in August 2017 with concurrance from Ecology due to persistent lack of sheens.

2017 Sheen Observations: Loading Rack

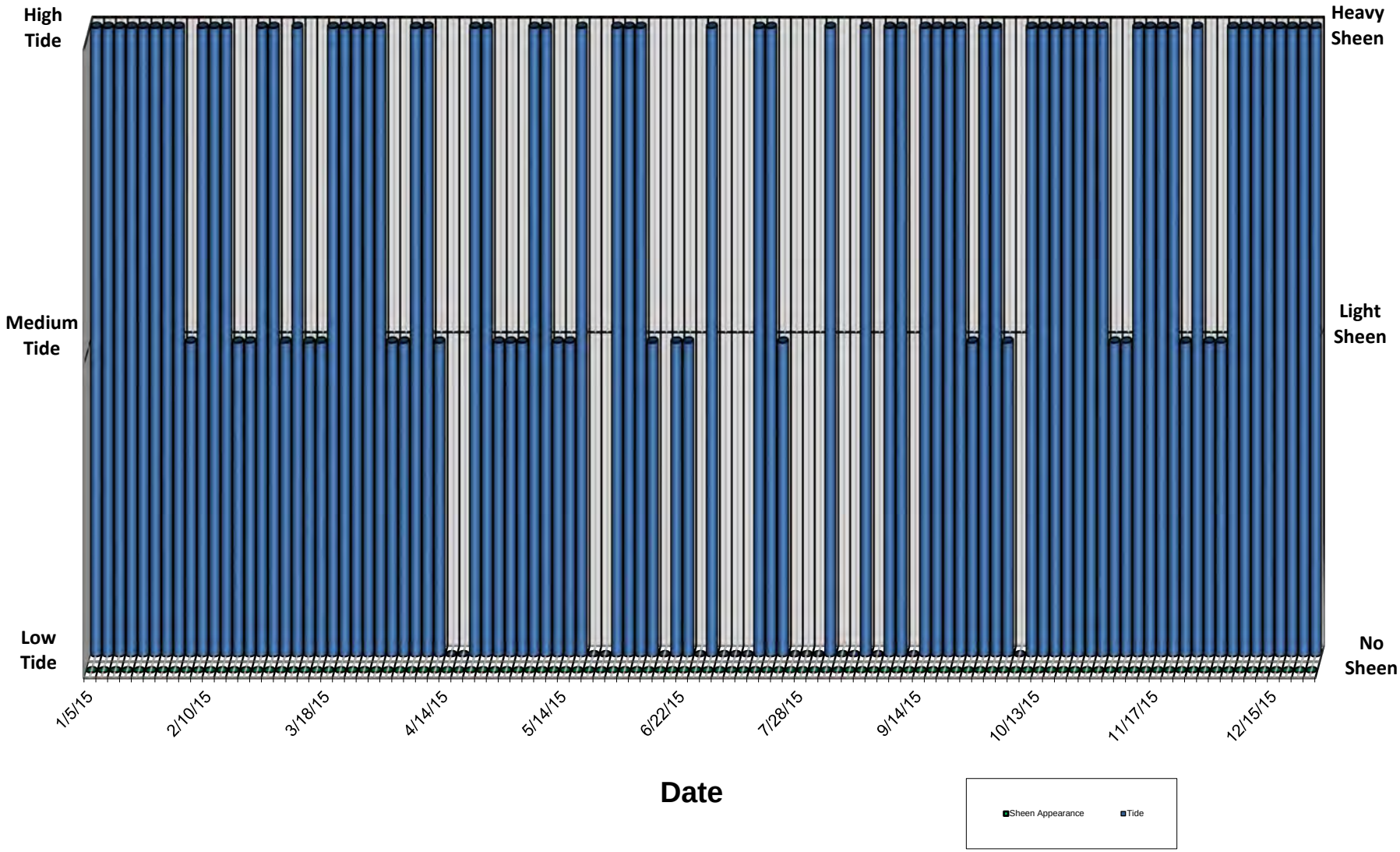


Loading Rack Area Boom removed in August 2017 with concurrance from Ecology due to persistent lack of sheens.

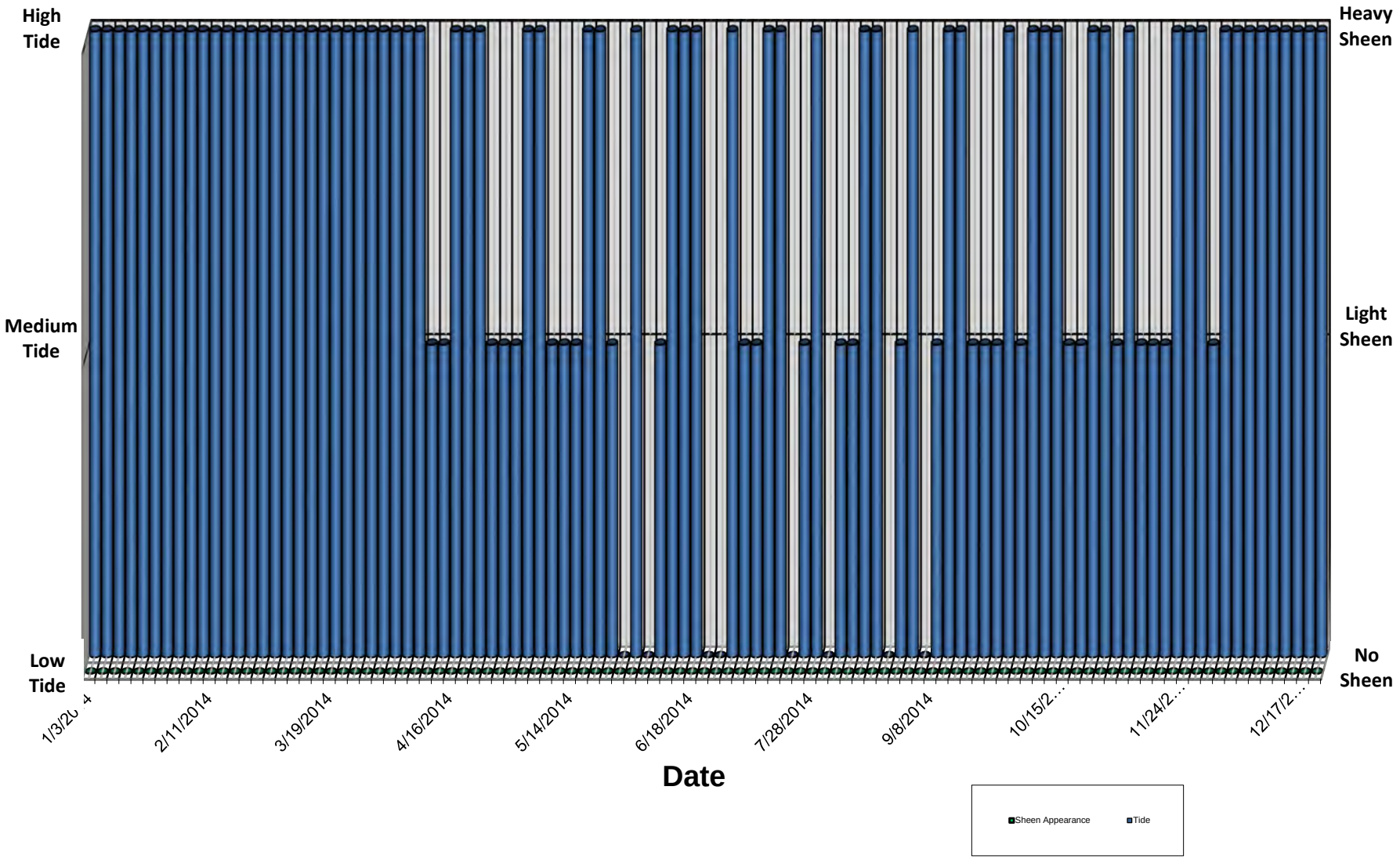
2016 Sheen Observations: Loading Rack



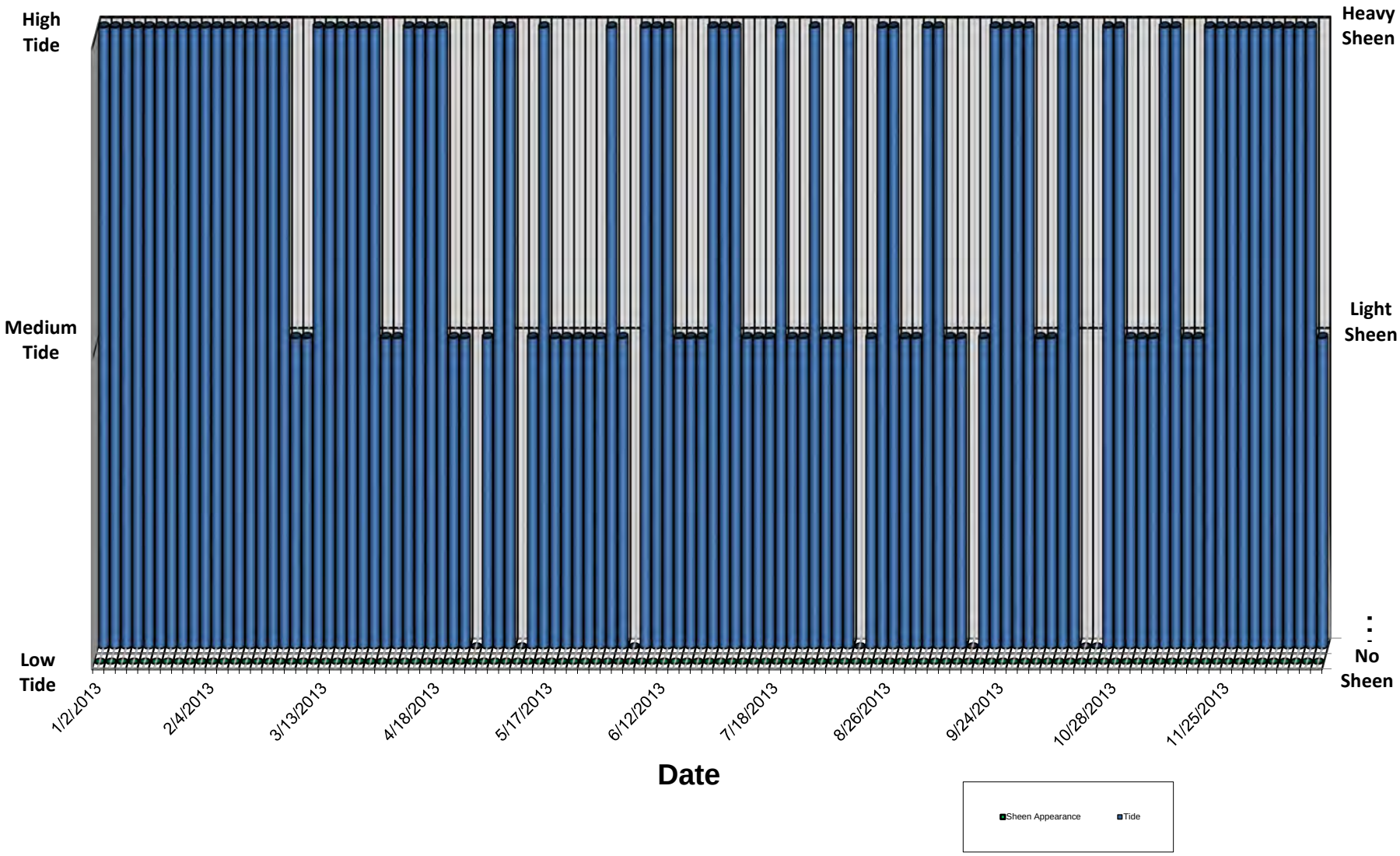
2015 Sheen Observations: Loading Rack



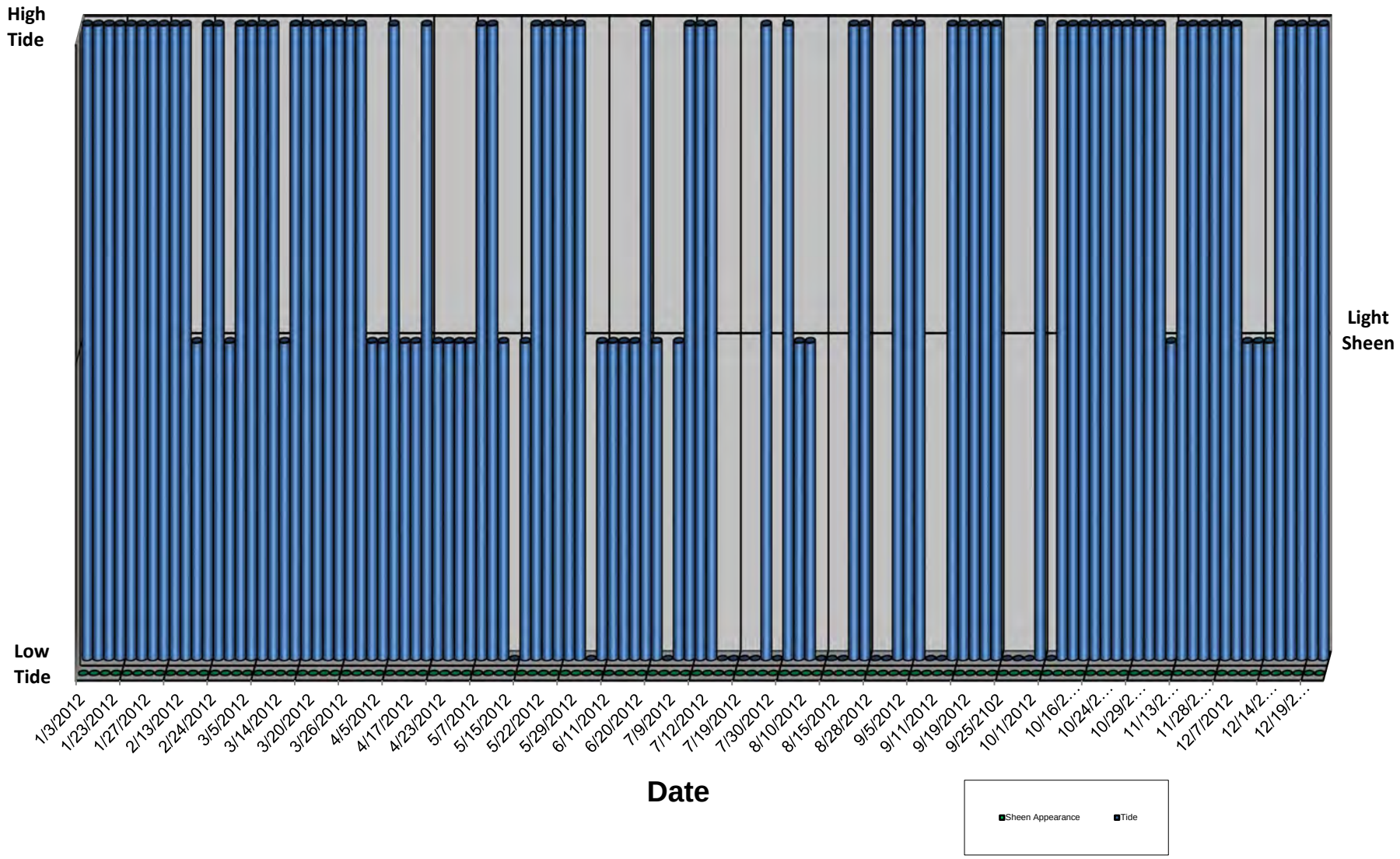
2014 Sheen Observations: Loading Rack



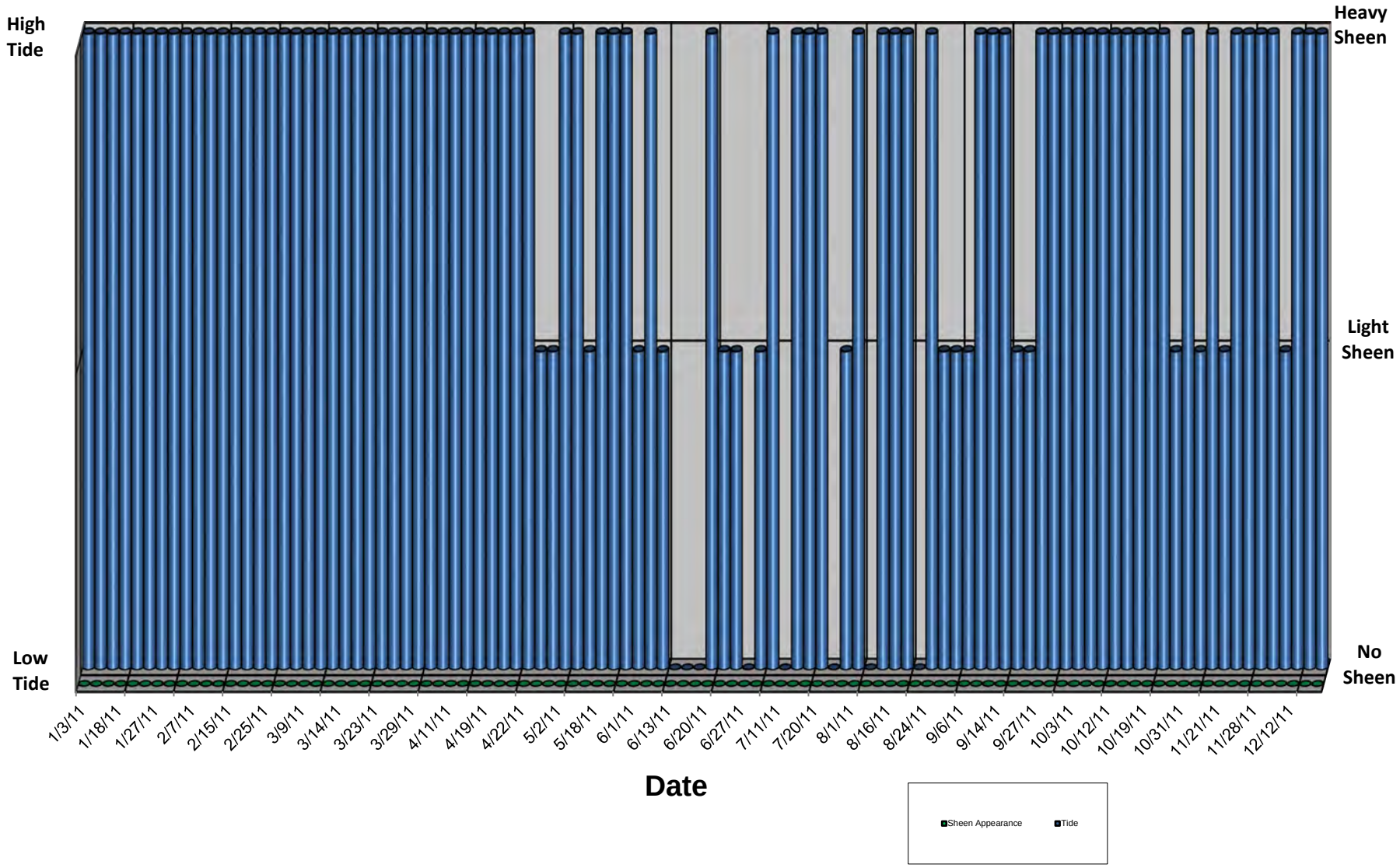
2013 Sheen Observations: Loading Rack



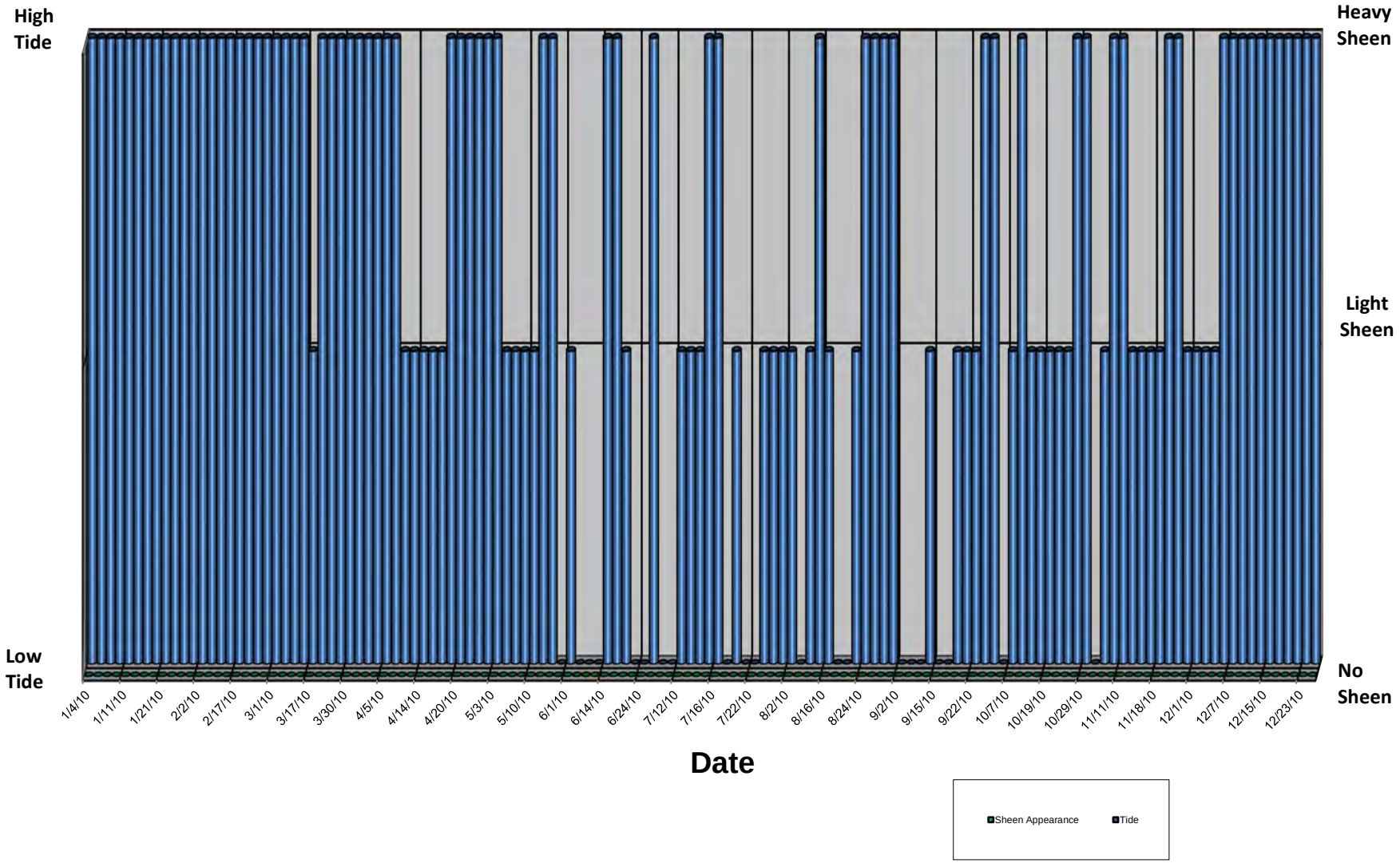
2012 Sheen Observations: Loading Rack

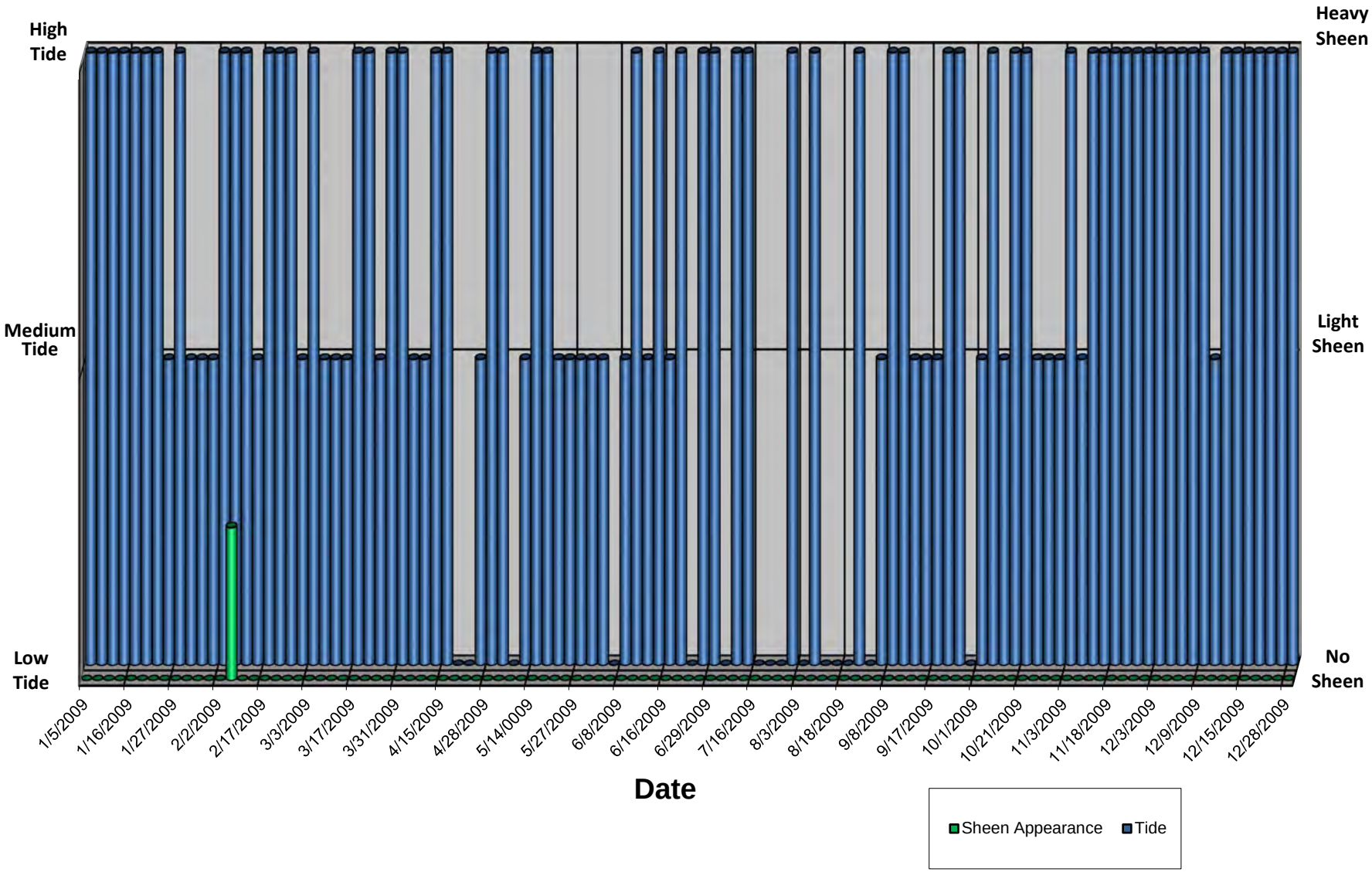


2011 Sheen Observations: Loading Rack

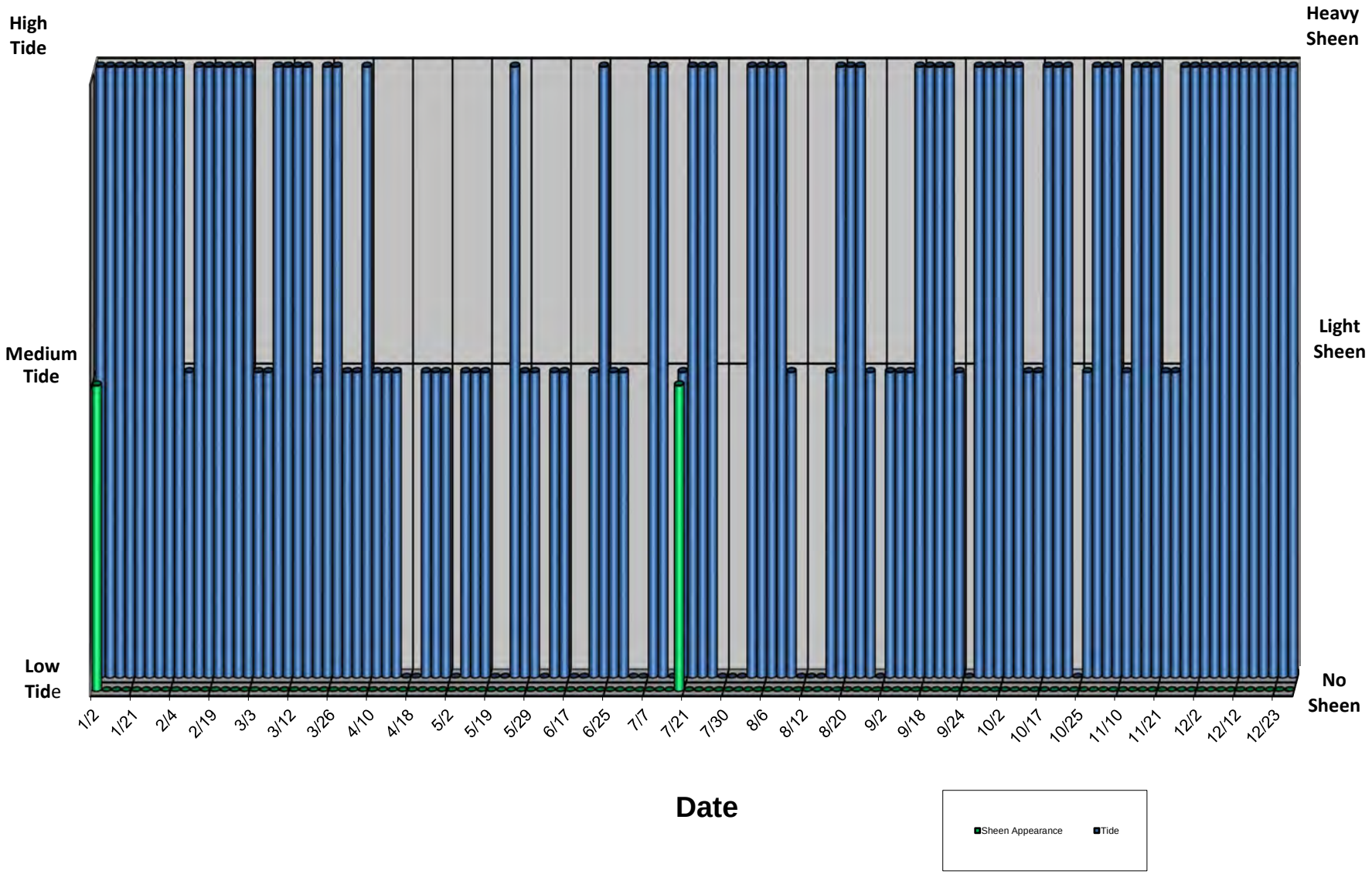


2010 Sheen Observations: Loading Rack

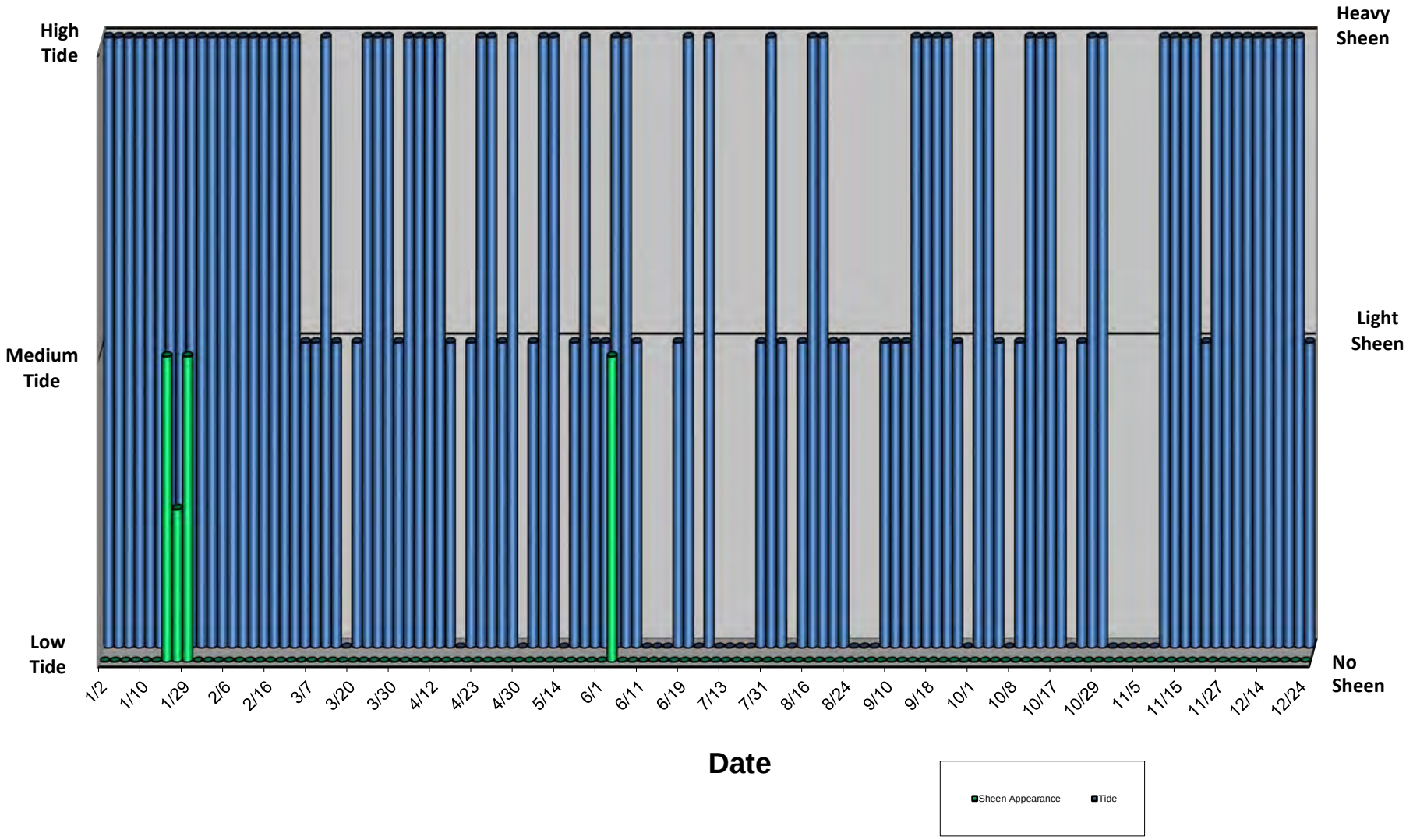



2009 Sheen Observations: Loading Rack
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/5/2009
1/16/2009
1/27/2009
2/2/2009
2/17/2009
3/3/2009
3/17/2009
3/31/2009
4/15/2009
4/28/2009
5/14/0009
5/27/2009
6/8/2009
6/16/2009
6/29/2009
7/16/2009
8/3/2009
8/18/2009
9/8/2009
9/17/2009
10/1/2009
10/21/2009
11/3/2009
11/18/2009
12/3/2009
12/9/2009
12/15/2009
12/28/2009
Date
Sheen Appearance
Tide

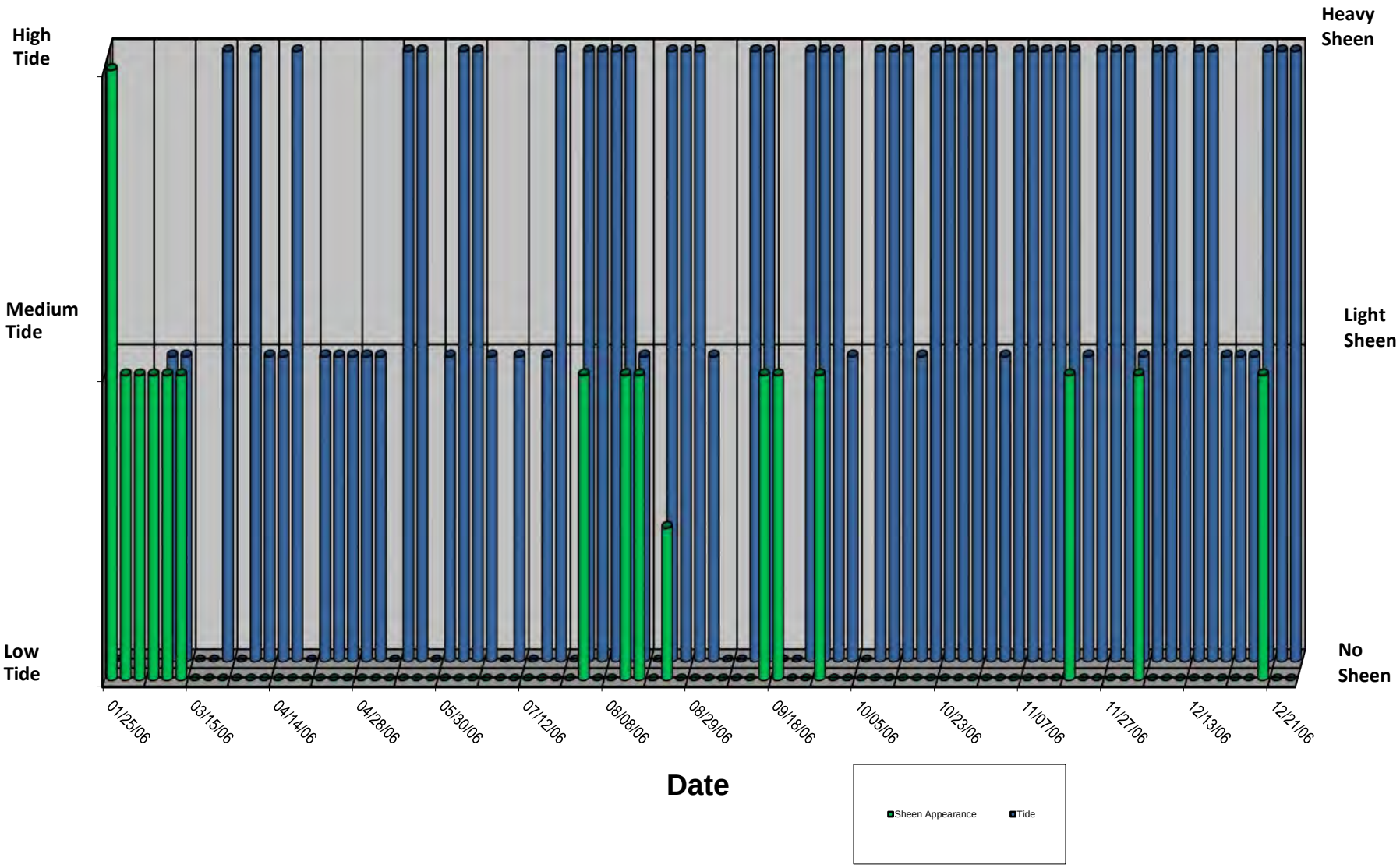
2008 Sheen Observations: Loading Rack



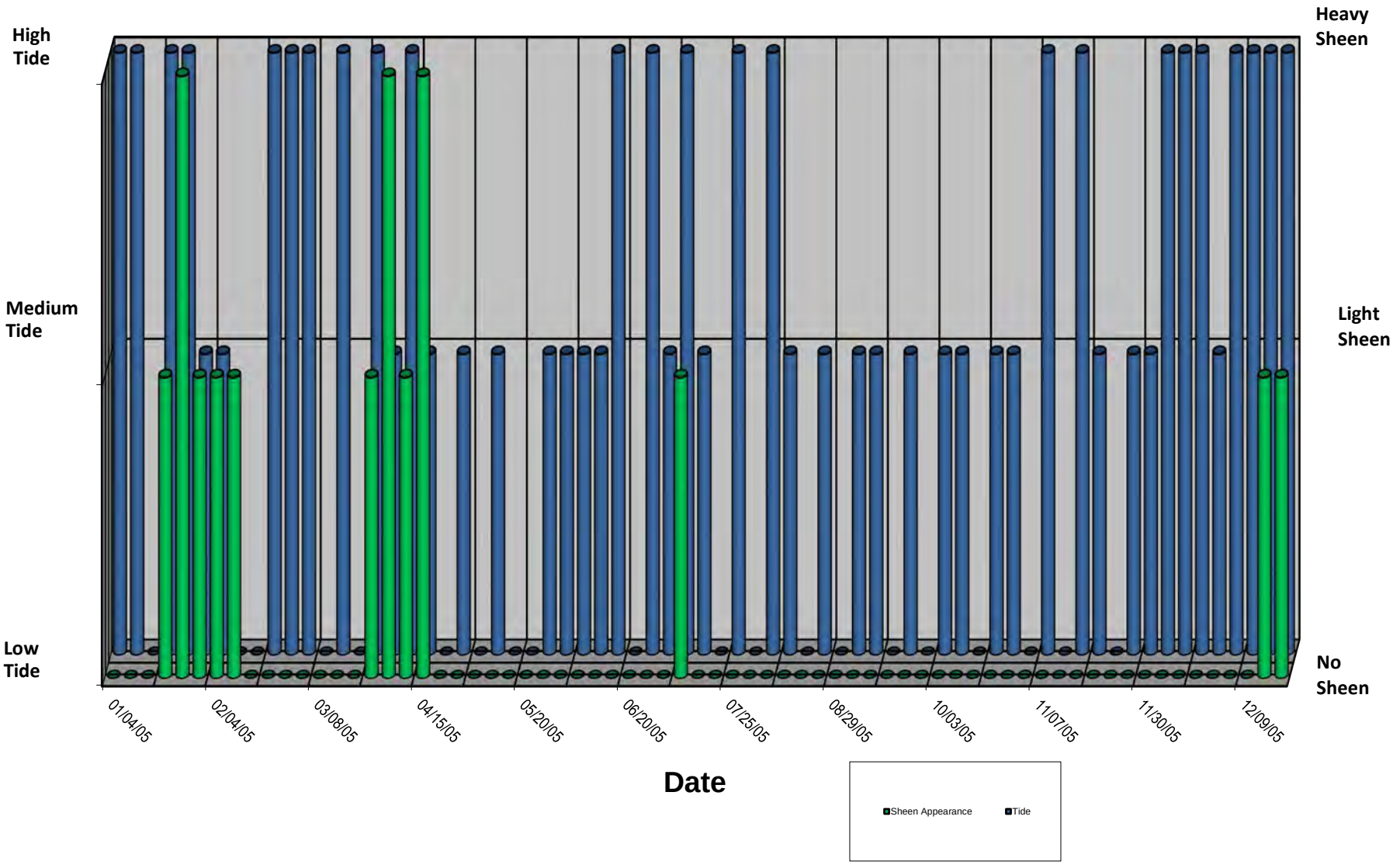
2007 Sheen Observations: Loading Rack



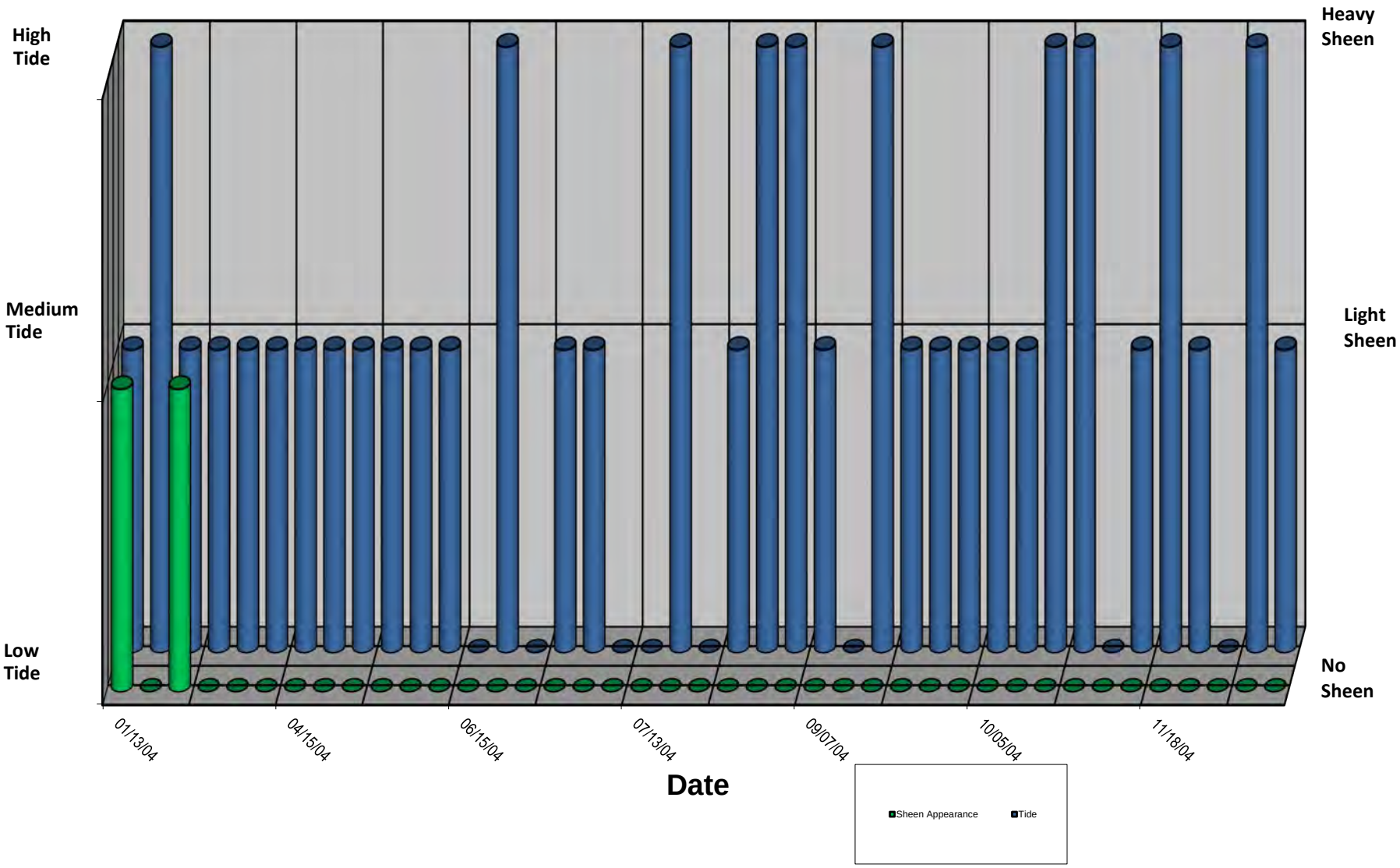
2006 Sheen Observations: Loading Rack



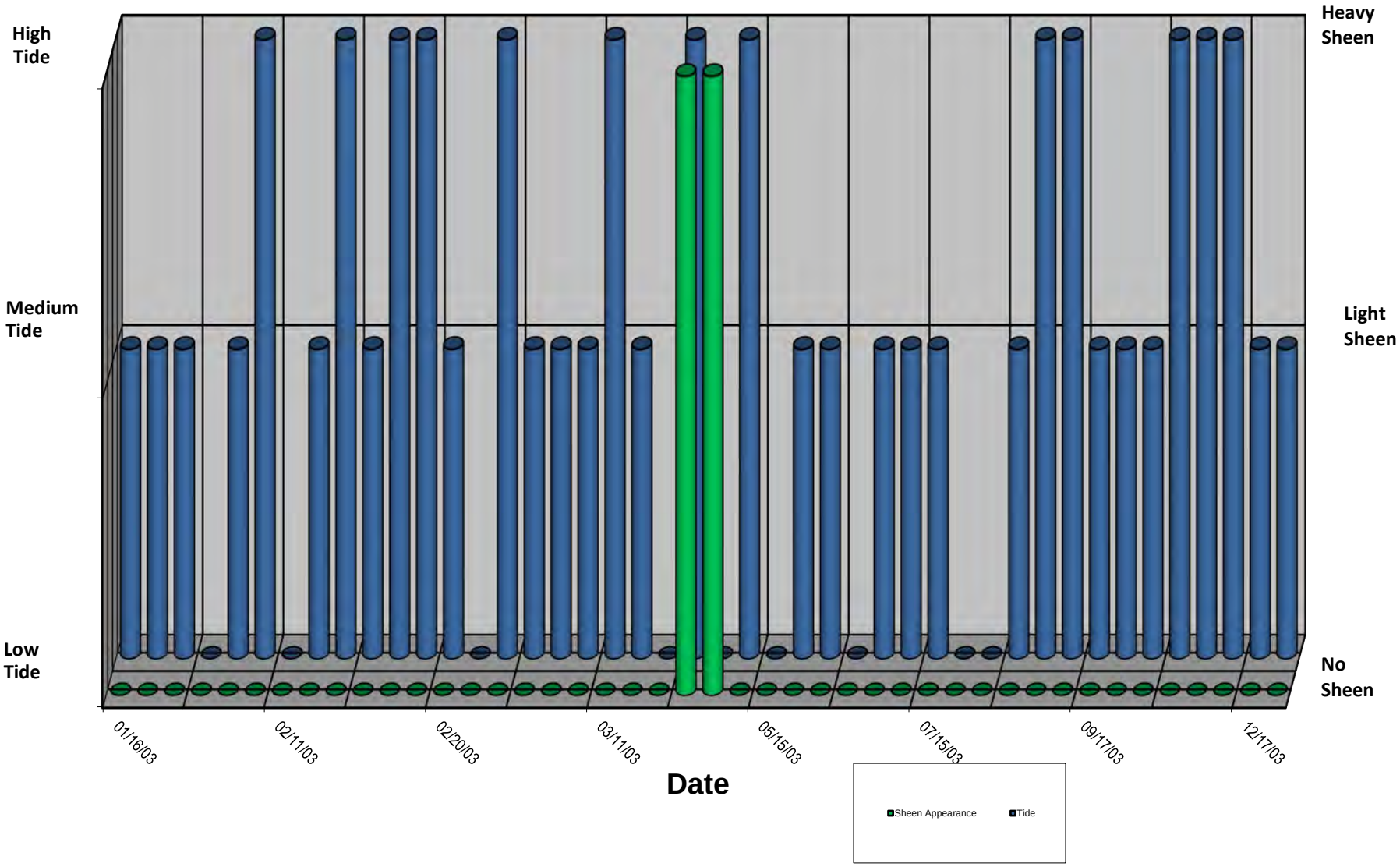
2005 Sheen Observations: Loading Rack

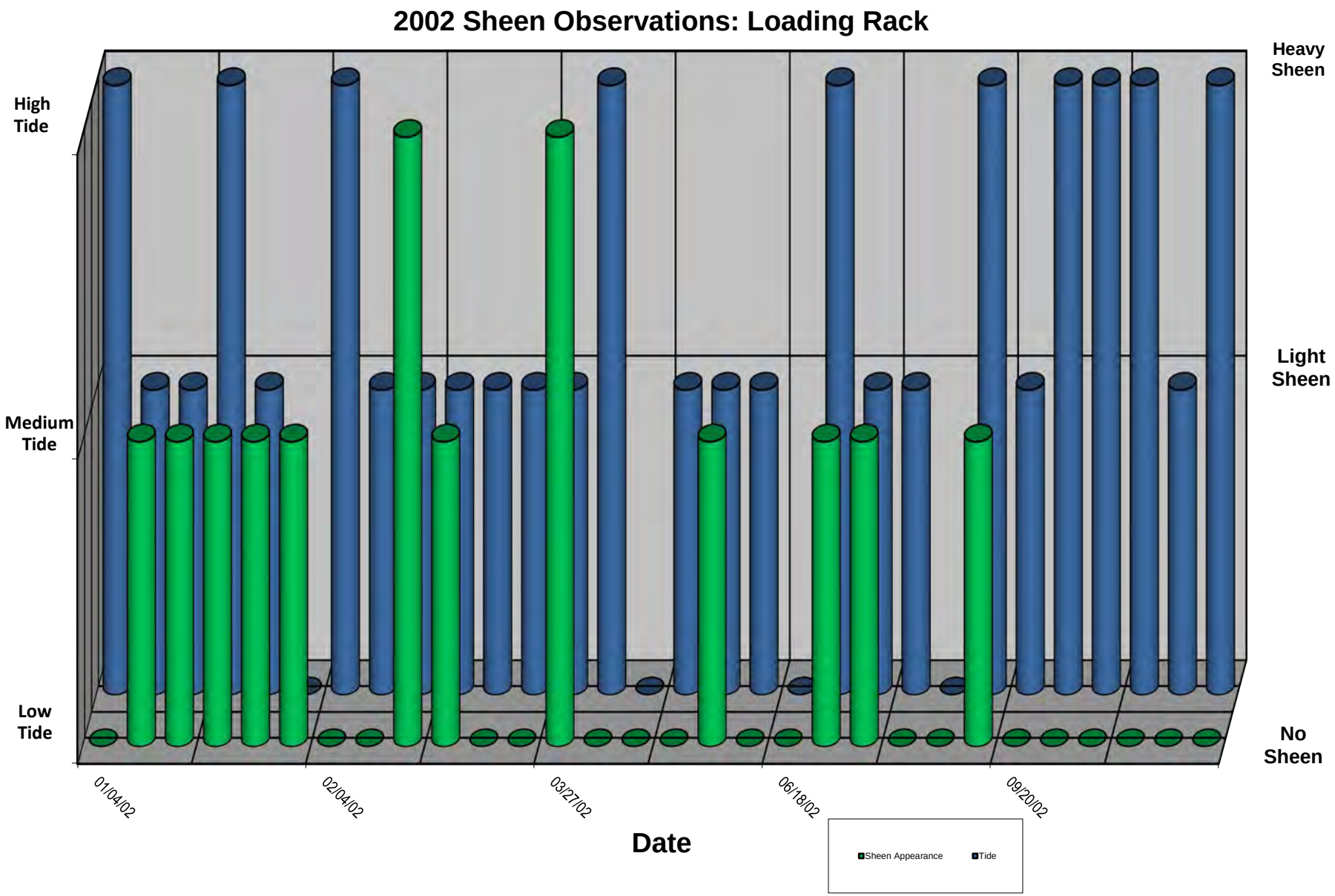


2004 Sheen Observations: Loading Rack

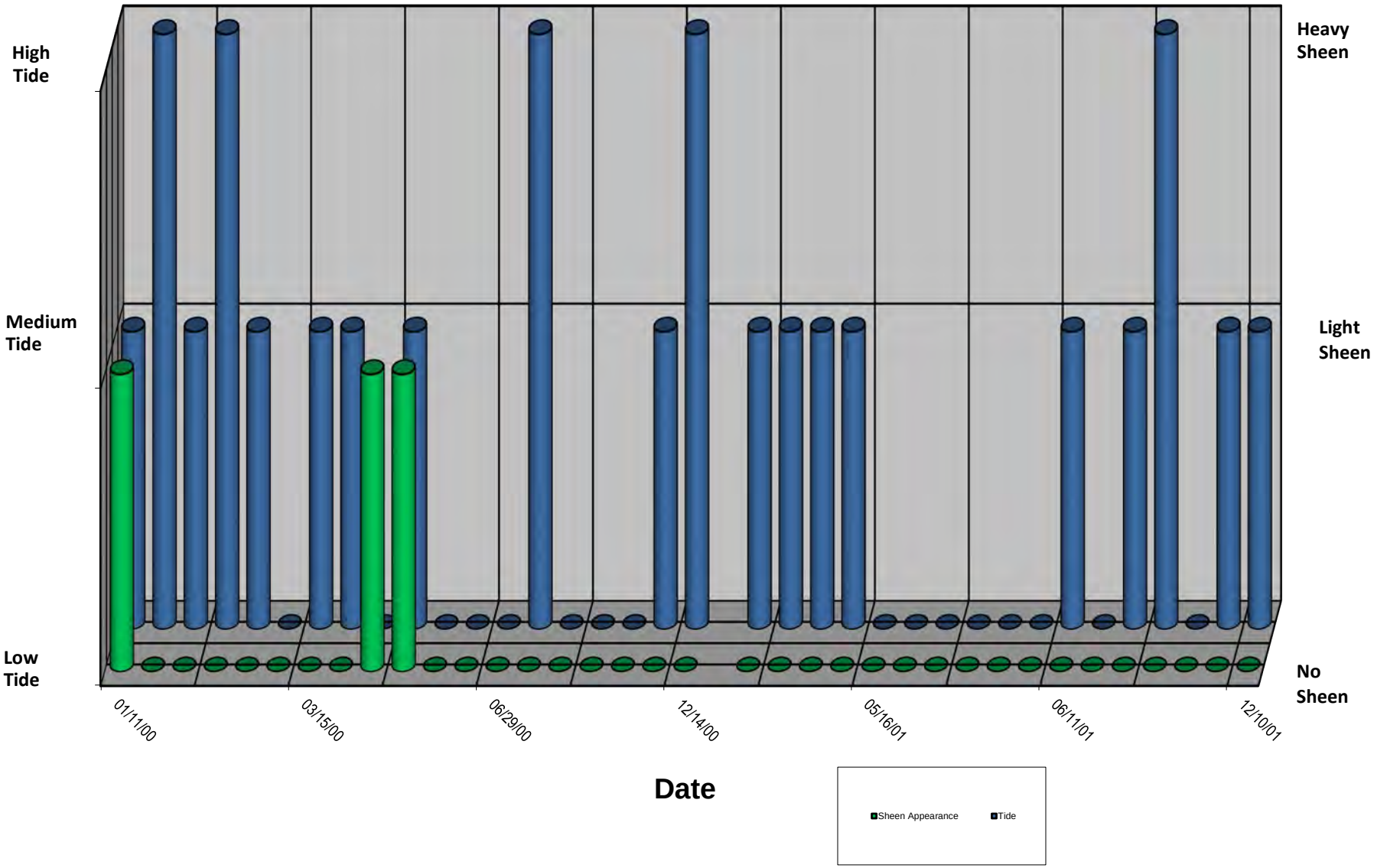


2003 Sheen Observations: Loading Rack

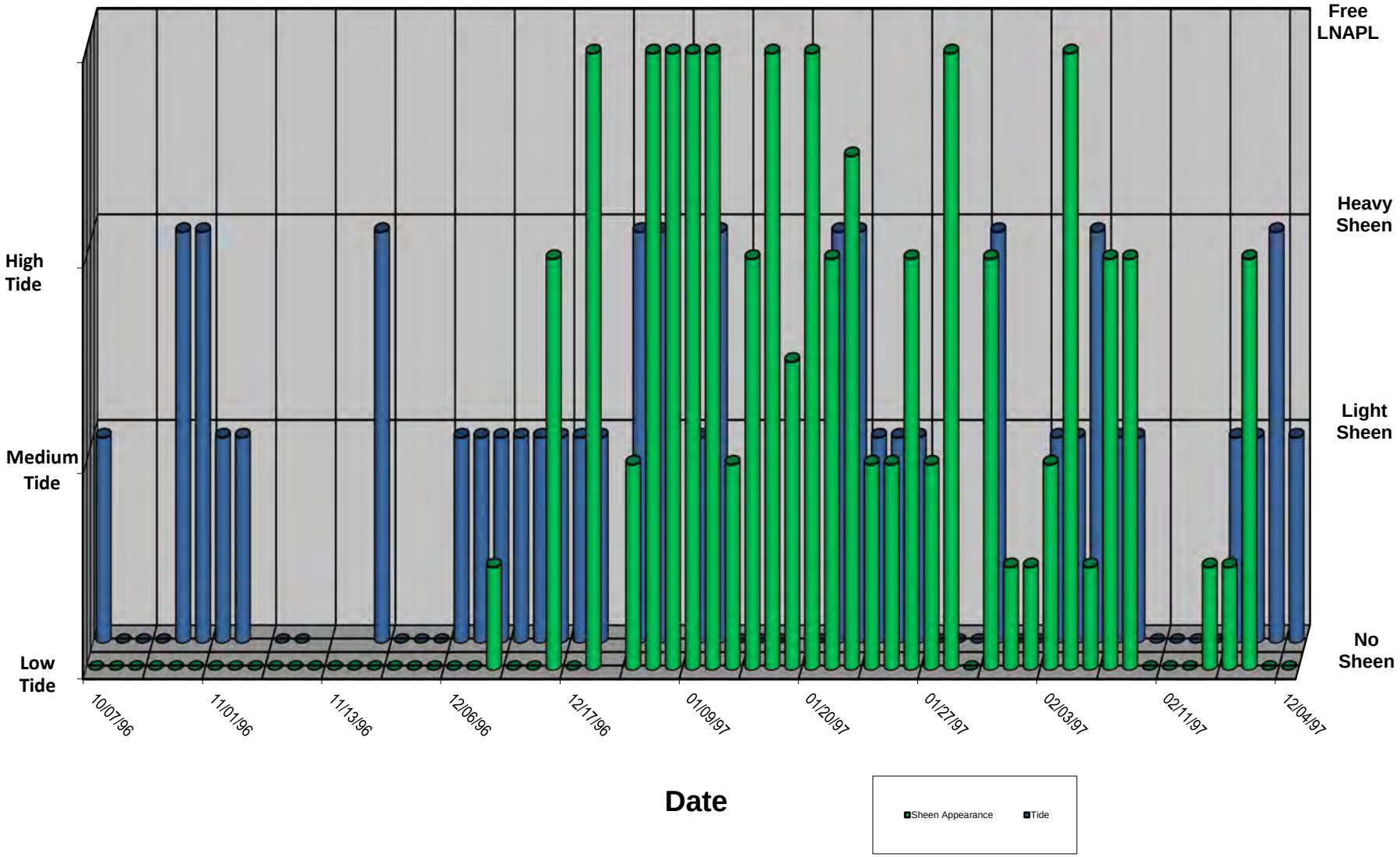



2002 Sheen Observations: Loading Rack
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
01/04/02
02/04/02
03/27/02
06/18/02
09/20/02
Date
Sheen Appearance
Tide

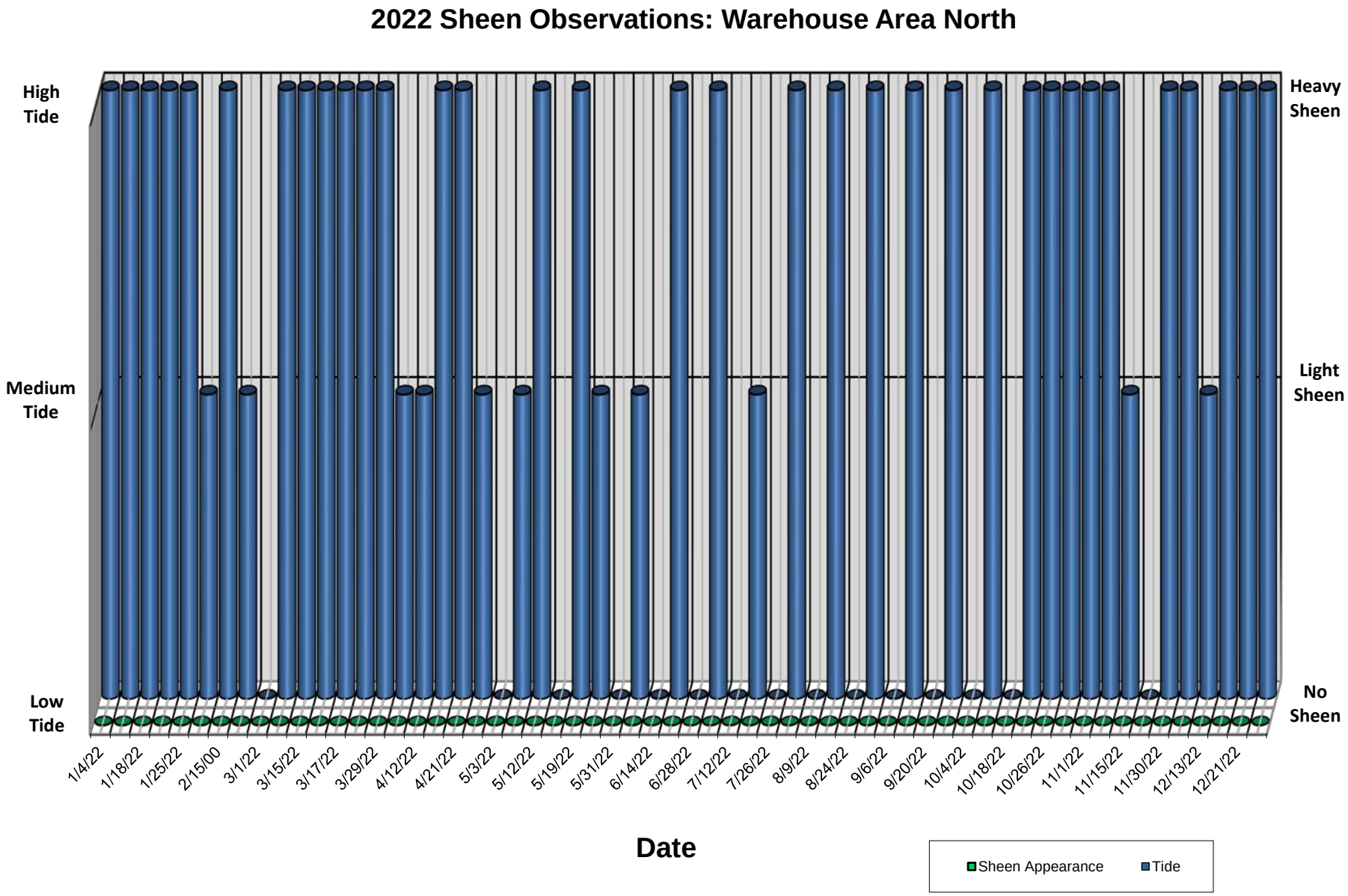
2000-2001 Sheen Observations: Loading Rack



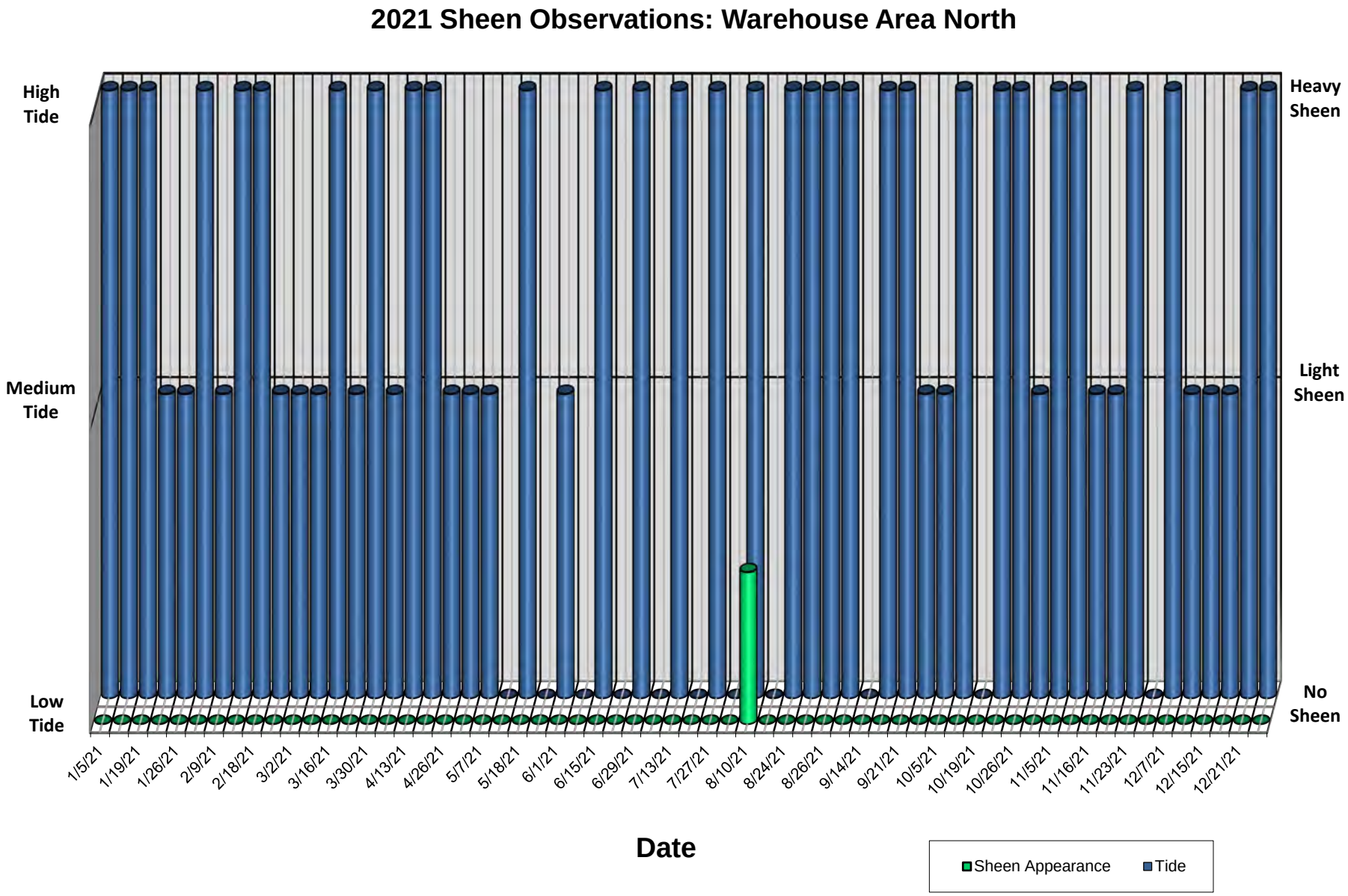
1996-1997 Sheen Observations: Loading Rack



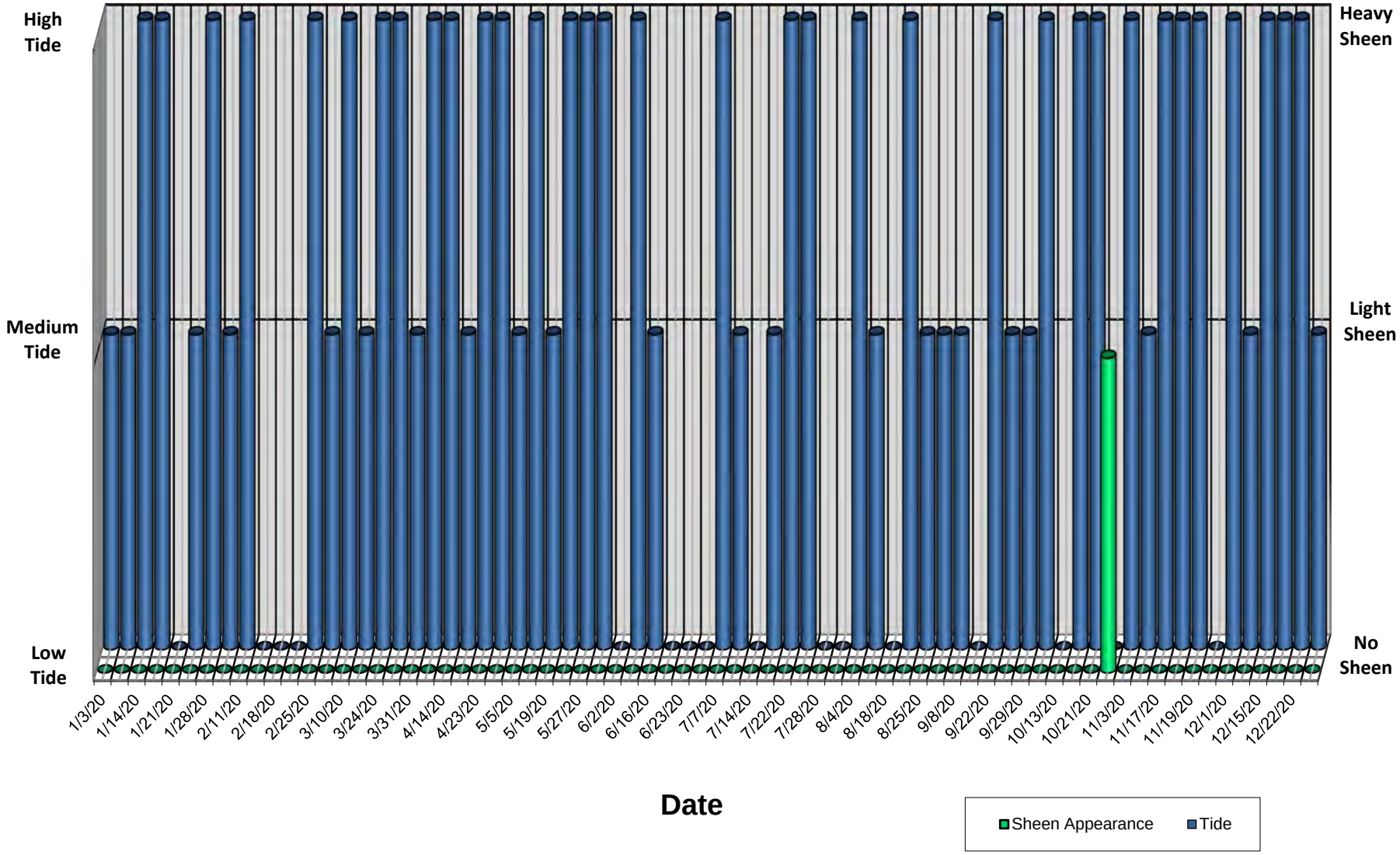
Sheen Observations - Northern Warehouse Boom
Seaport Midstream Partners LLC Seattle Terminal

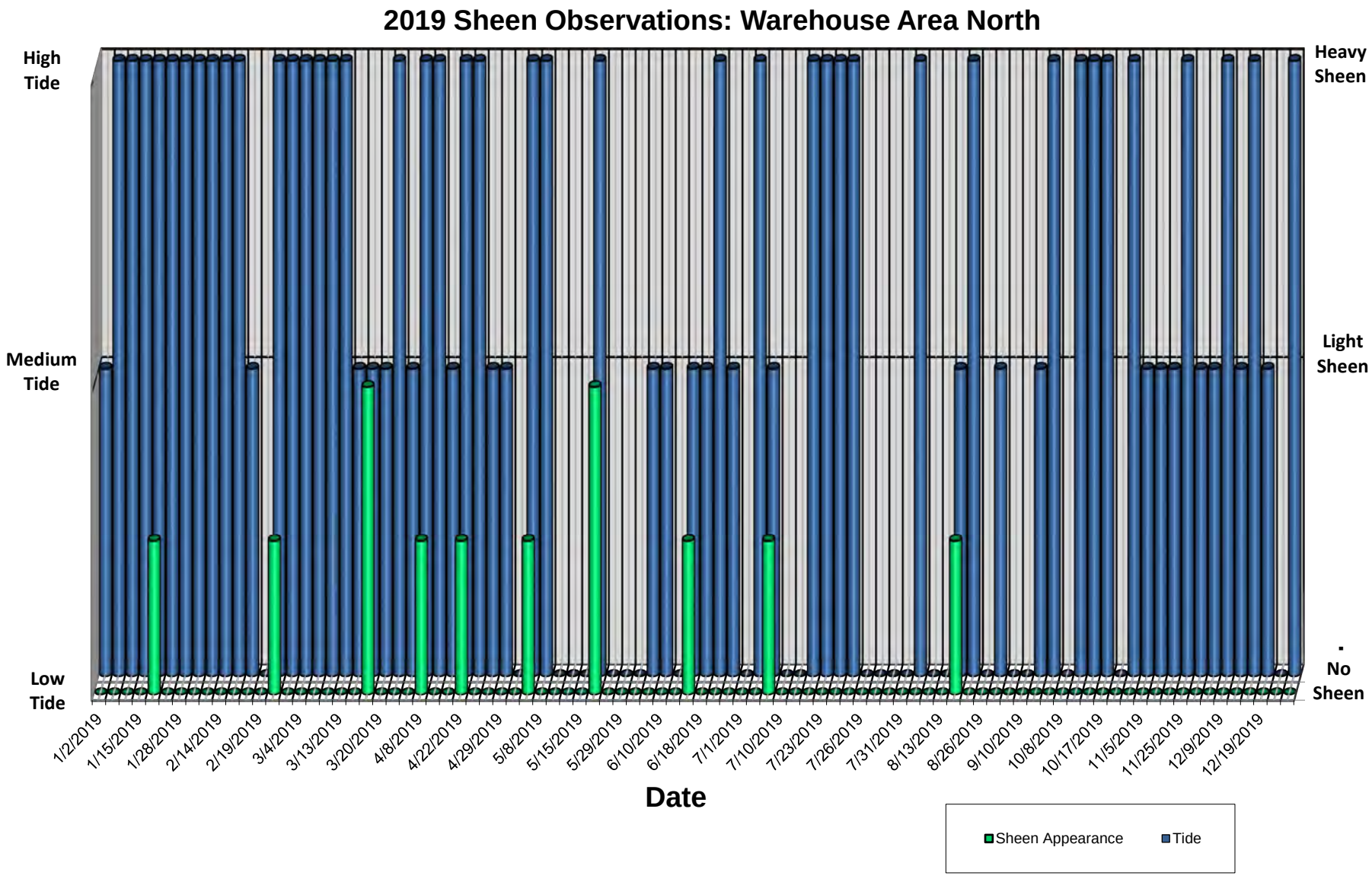


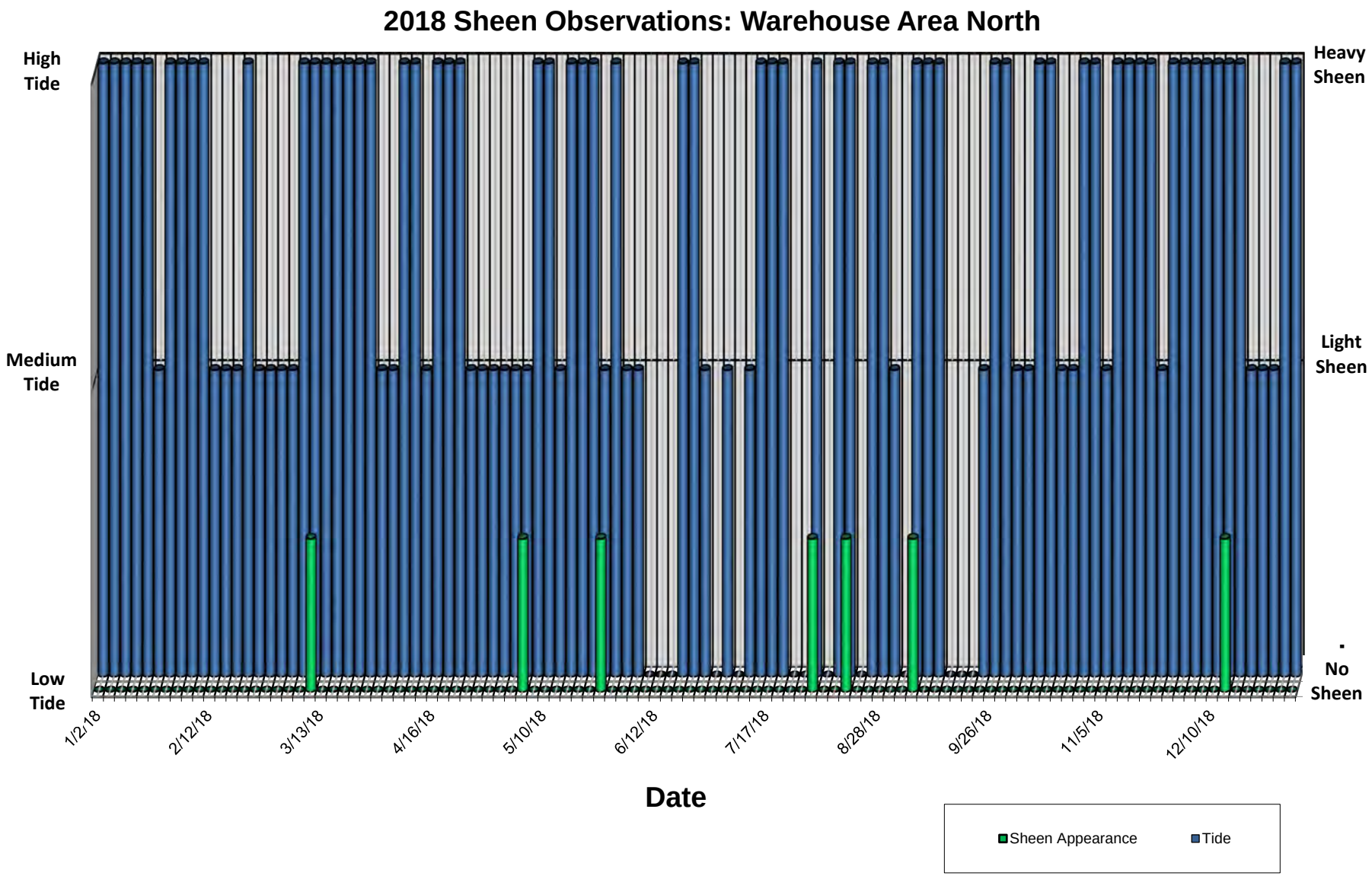
Sheen Observations - Northern Warehouse Boom
Seaport Midstream Partners LLC Seattle Terminal

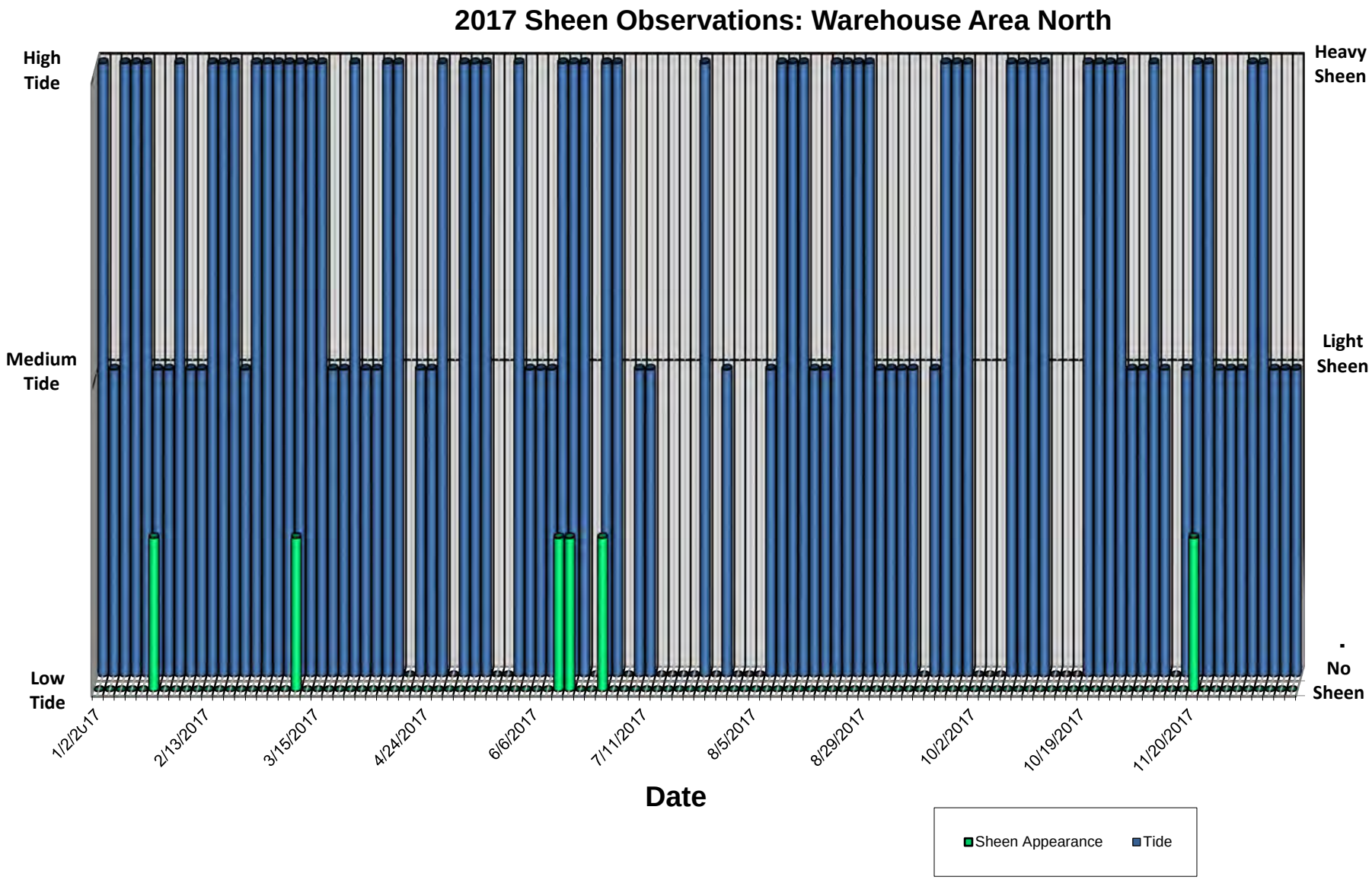


2020 Sheen Observations: Warehouse Area North



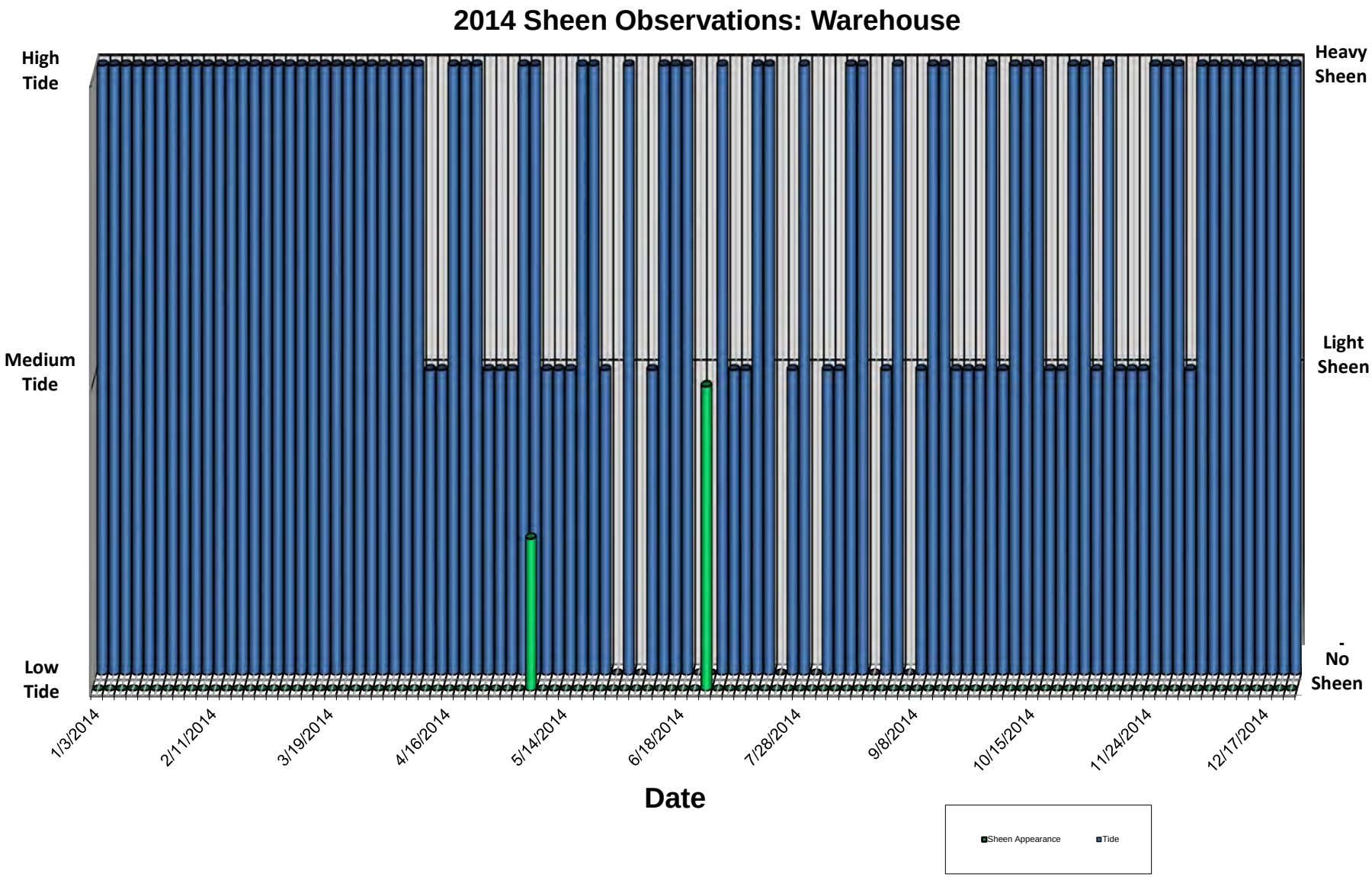

2019 Sheen Observations: Warehouse Area North
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/2/2019
1/15/2019
1/28/2019
2/14/2019
2/19/2019
3/4/2019
3/13/2019
3/20/2019
4/8/2019
4/22/2019
4/29/2019
5/8/2019
5/15/2019
5/29/2019
6/10/2019
6/18/2019
7/1/2019
7/10/2019
7/23/2019
7/26/2019
7/31/2019
8/13/2019
8/26/2019
9/10/2019
10/8/2019
10/17/2019
11/5/2019
11/25/2019
12/9/2019
12/19/2019
Date
Sheen Appearance
Tide


2018 Sheen Observations: Warehouse Area North
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/2/18
2/12/18
3/13/18
4/16/18
5/10/18
6/12/18
7/17/18
8/28/18
9/26/18
11/5/18
12/10/18
Date
Sheen Appearance
Tide

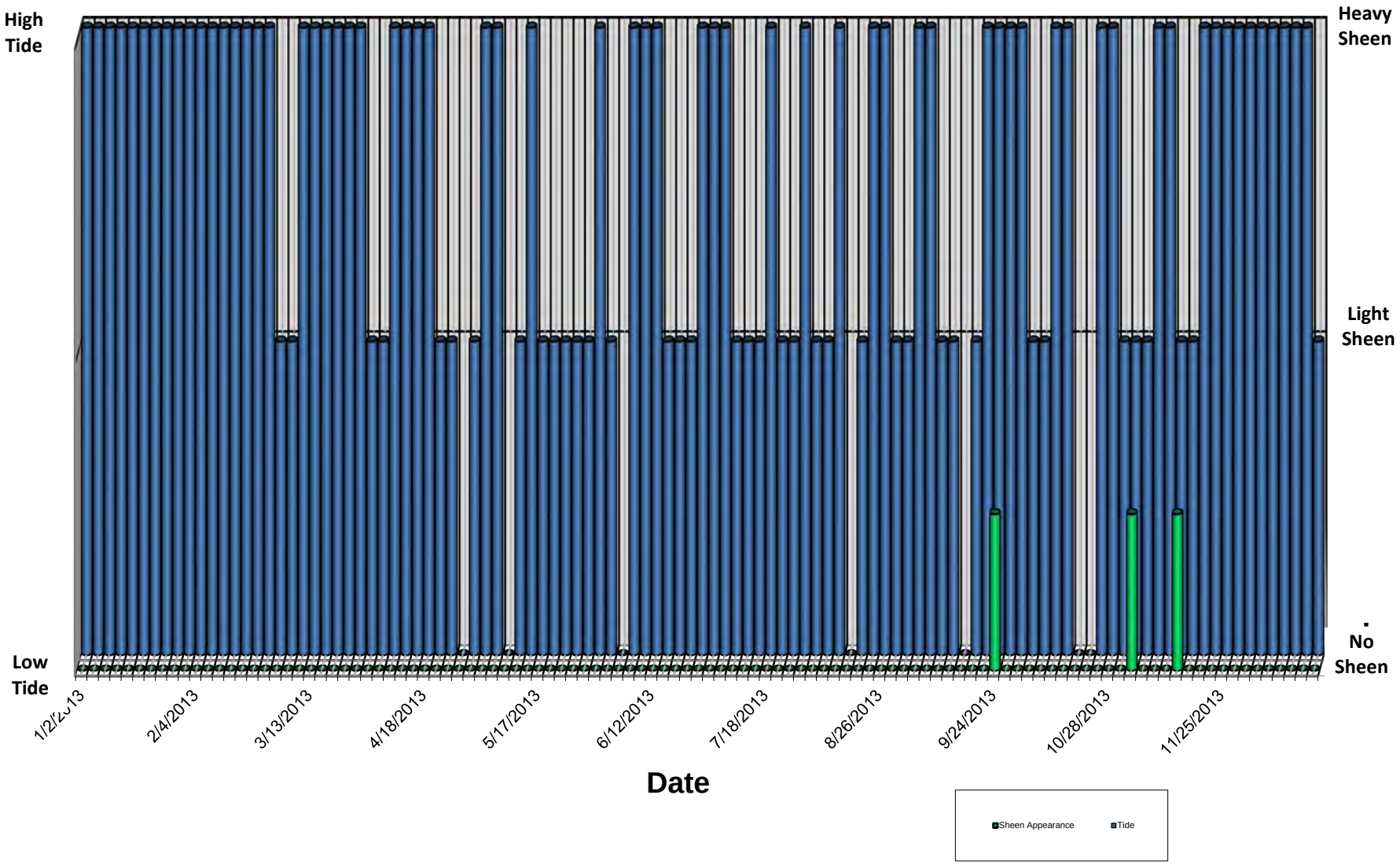

2017 Sheen Observations: Warehouse Area North
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/2/2017
2/13/2017
3/15/2017
4/24/2017
6/6/2017
7/11/2017
8/5/2017
8/29/2017
10/2/2017
10/19/2017
11/20/2017
Date
Sheen Appearance
Tide


2016 Sheen Observations: Warehouse Area North
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/4/16
2/10/16
3/15/16
4/12/16
5/9/16
6/8/16
7/21/16
8/25/16
9/28/16
10/27/16
11/22/16
Date
Sheen Appearance
Tide

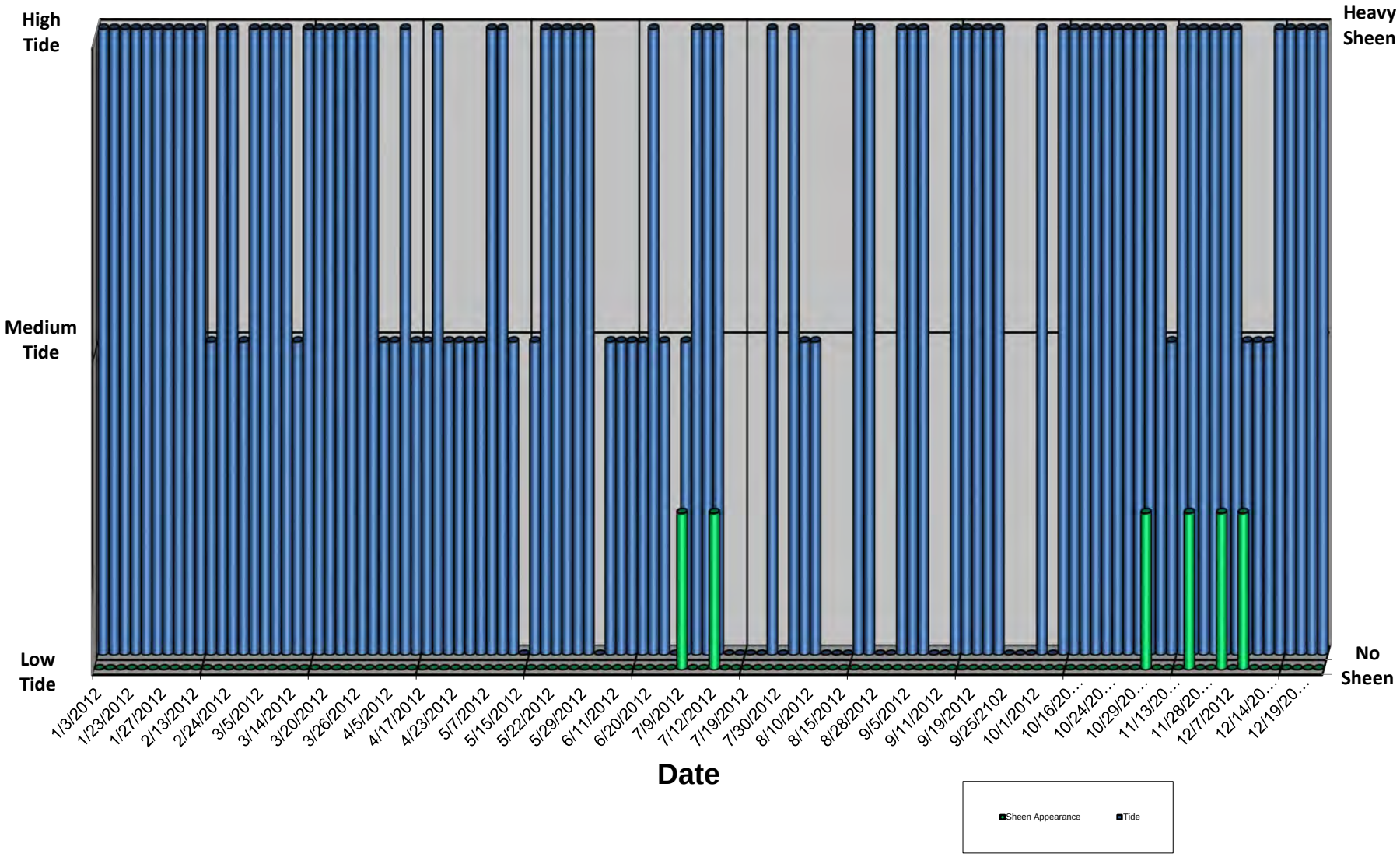

2015 Sheen Observations: Warehouse
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/5/15
2/10/15
3/18/15
4/14/15
5/14/15
6/22/15
7/28/15
9/14/15
10/13/15
11/17/15
12/15/15
Date
Sheen Appearance
Tide


2014 Sheen Observations: Warehouse
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/3/2014
2/11/2014
3/19/2014
4/16/2014
5/14/2014
6/18/2014
7/28/2014
9/8/2014
10/15/2014
11/24/2014
12/17/2014
Date
Sheen Appearance
Tide

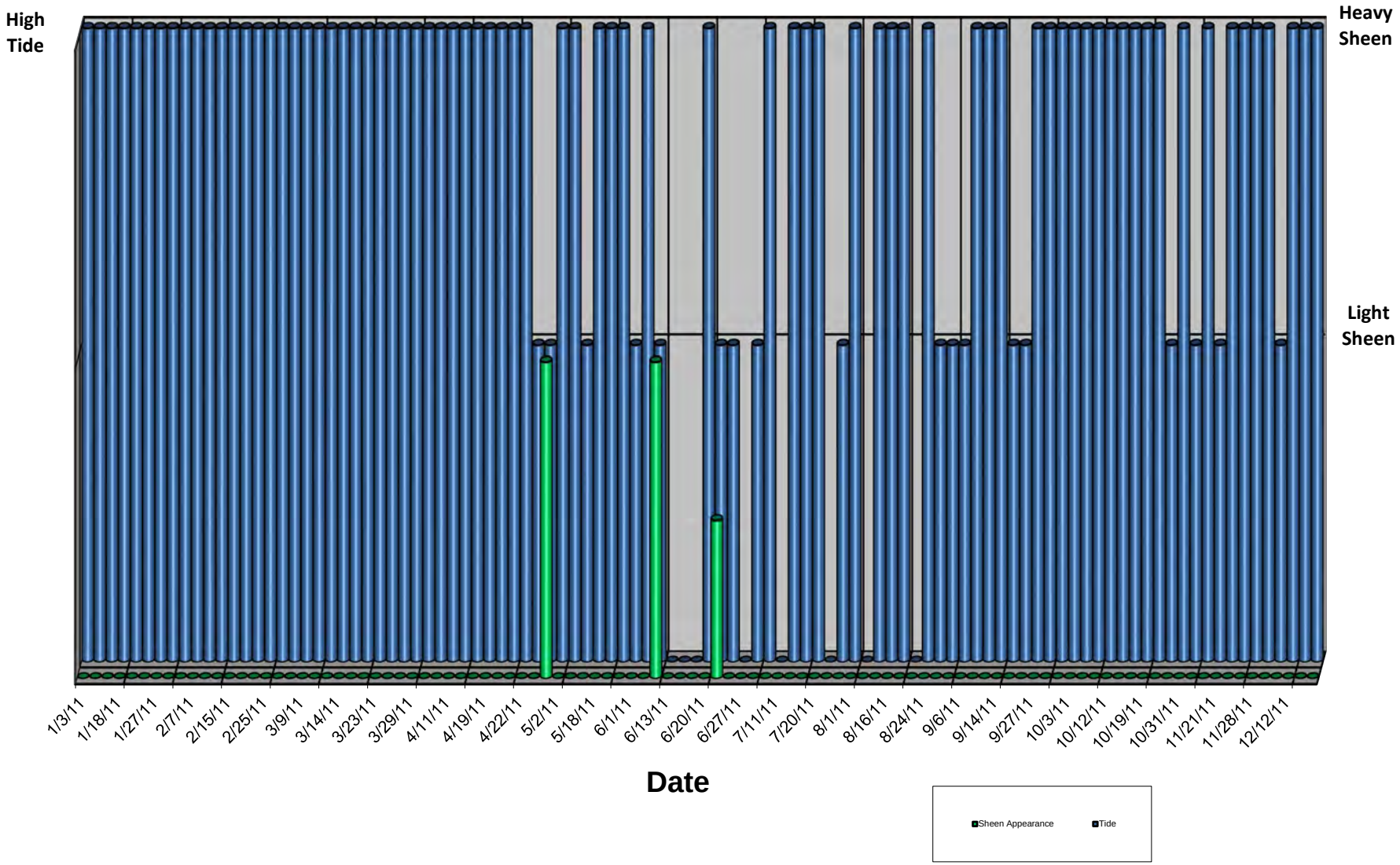
2013 Sheen Observations: Warehouse



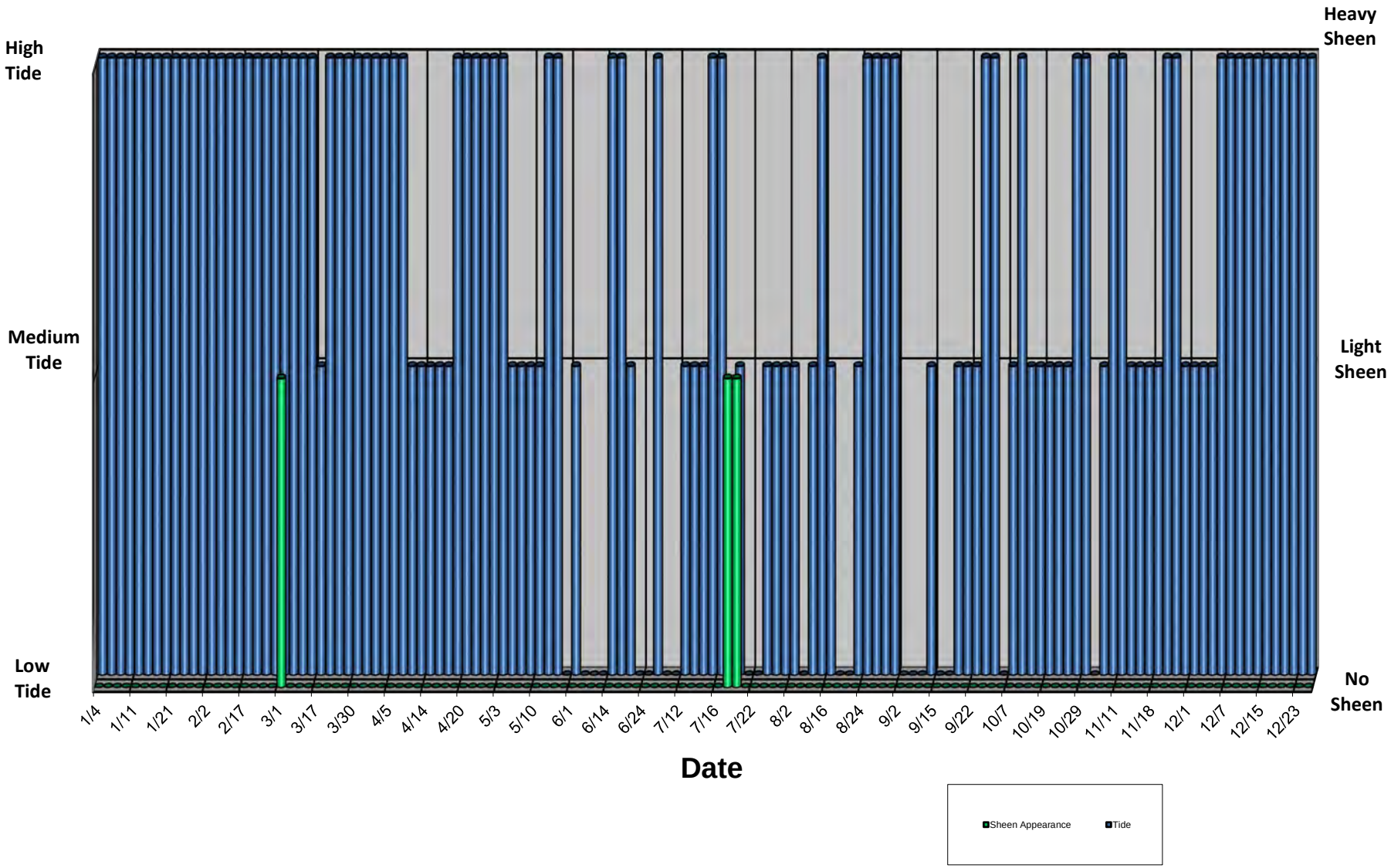
2012 Sheen Observations: Warehouse



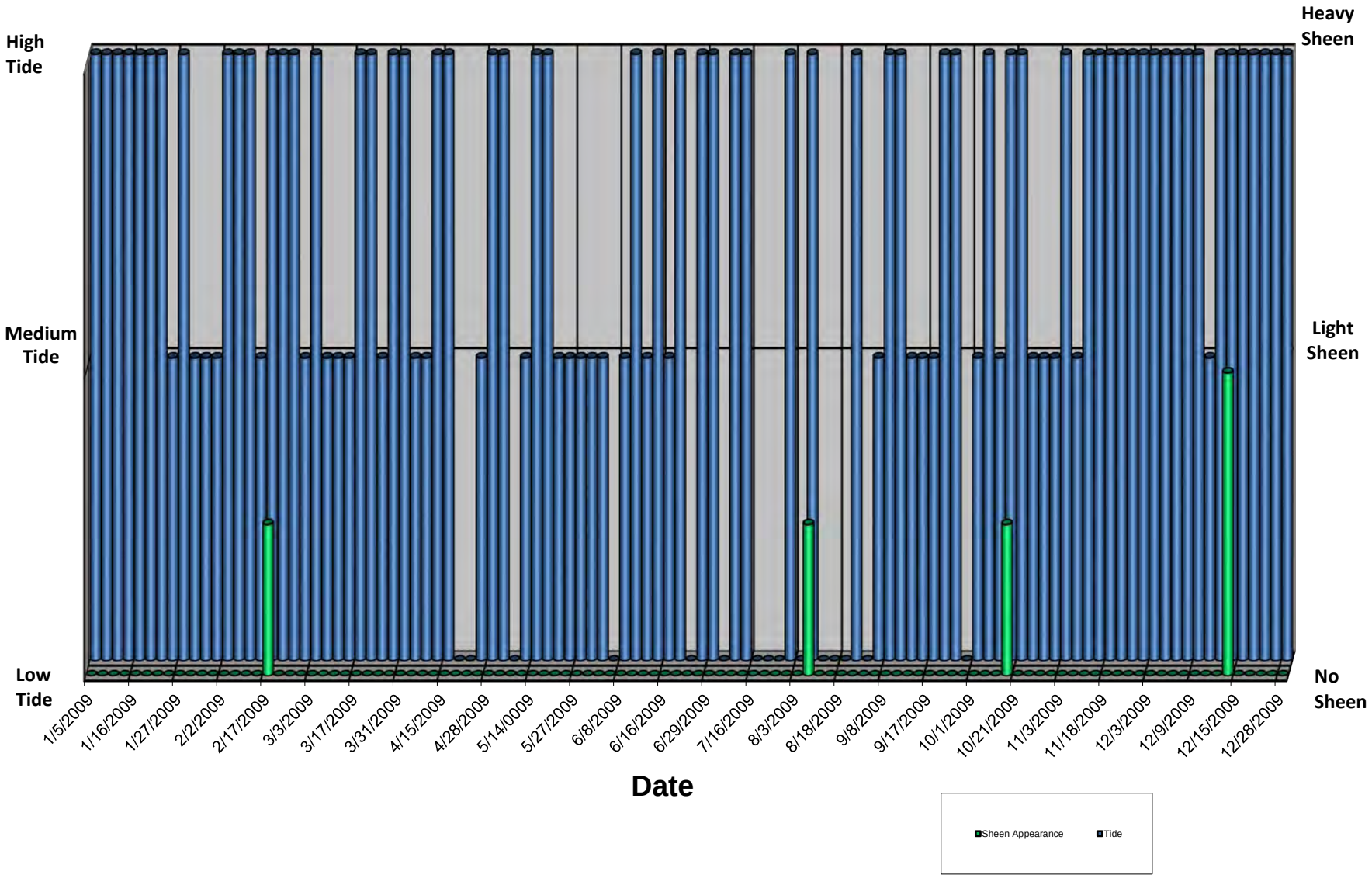
2011 Sheen Observations: Warehouse



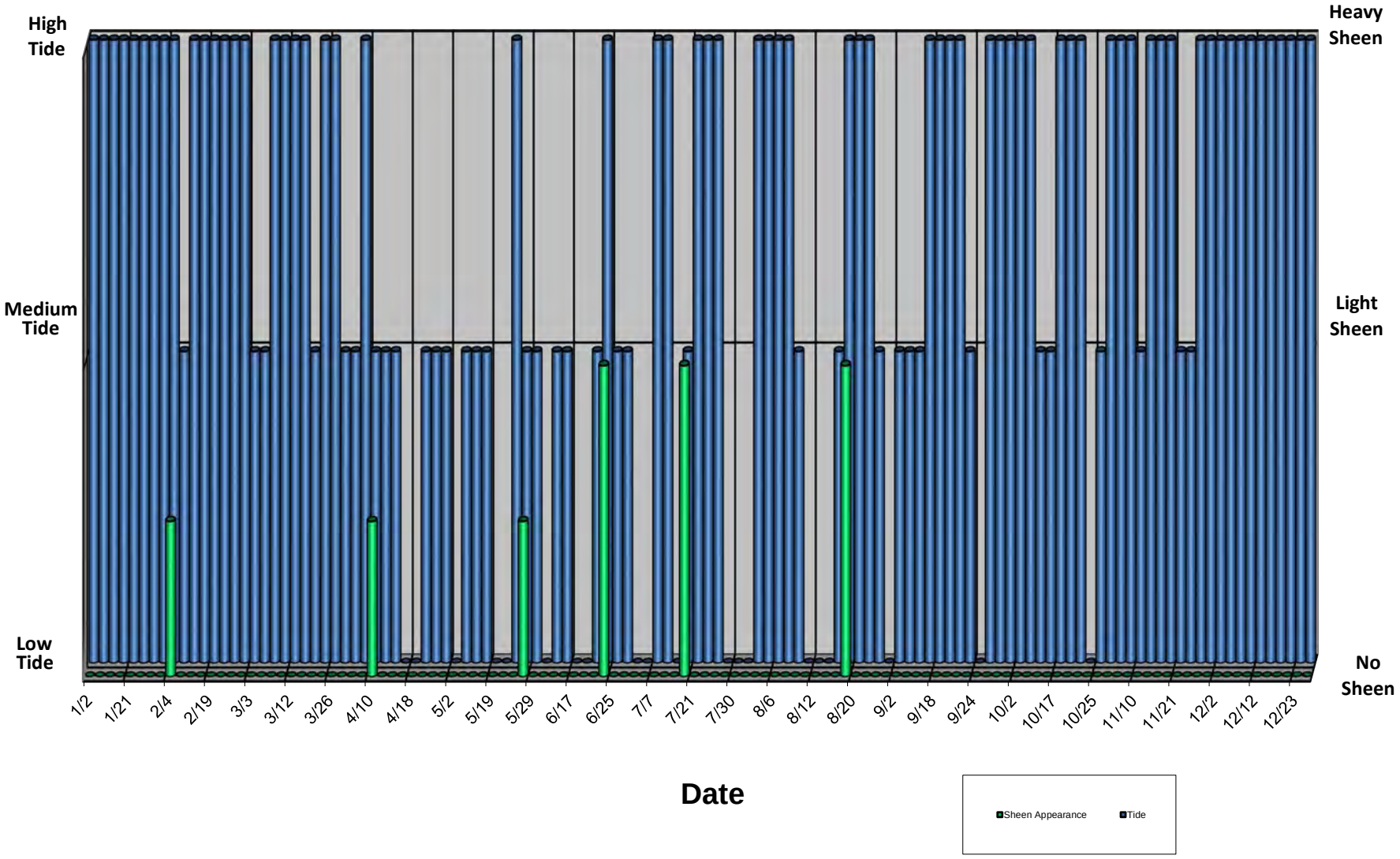
2010 Sheen Observations: Warehouse



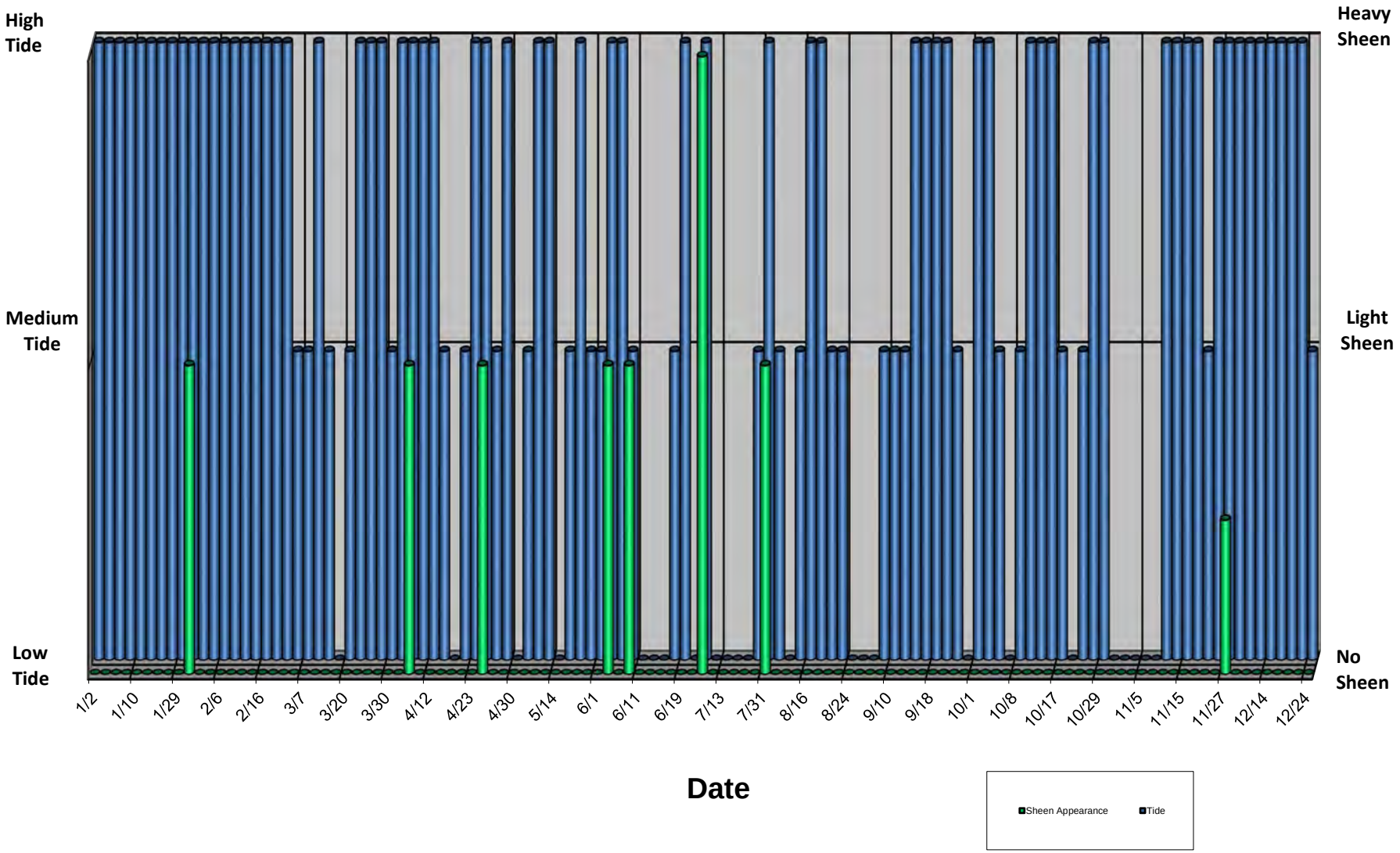
2009 Sheen Observations: Warehouse



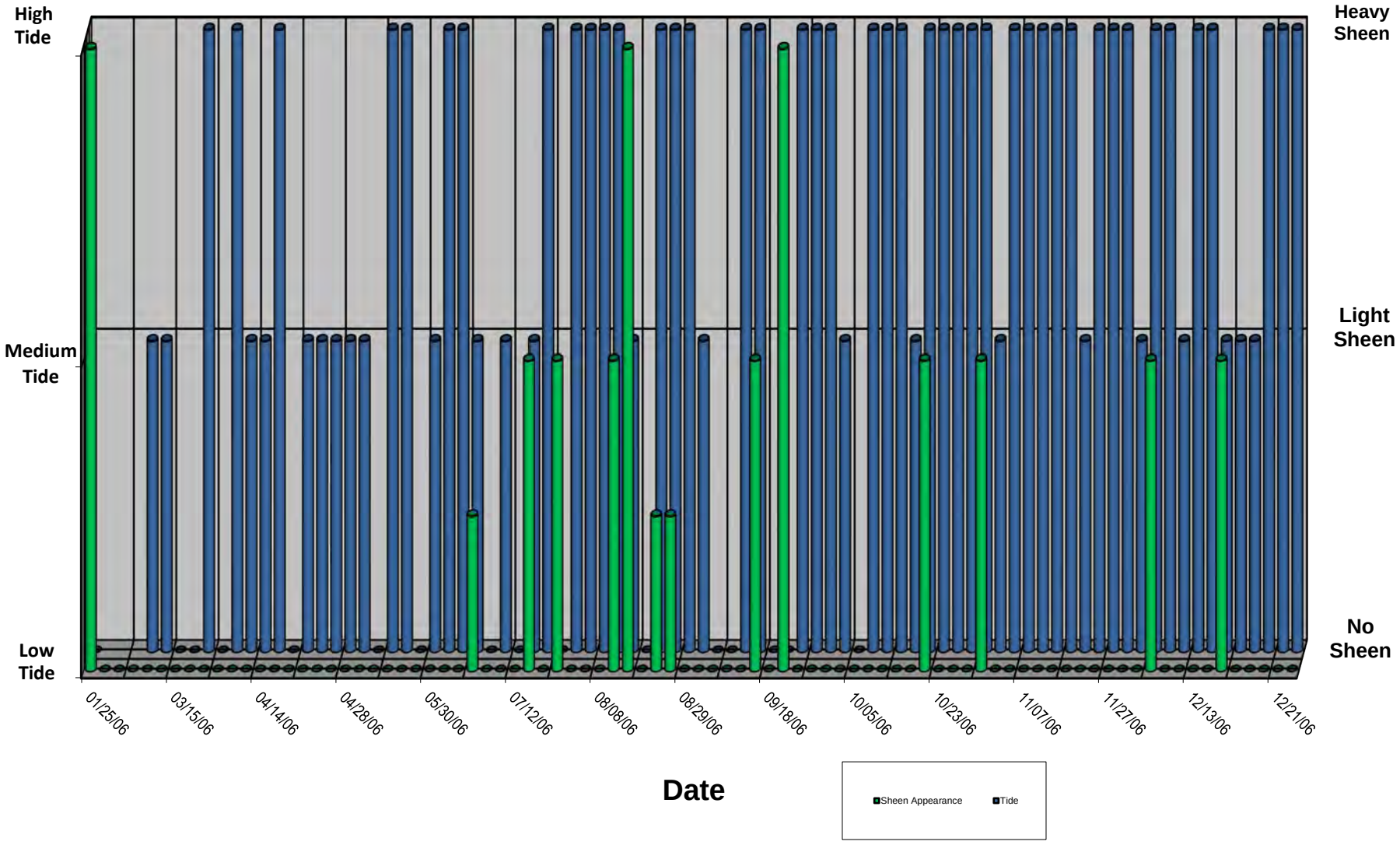
2008 Sheen Observations: Warehouse



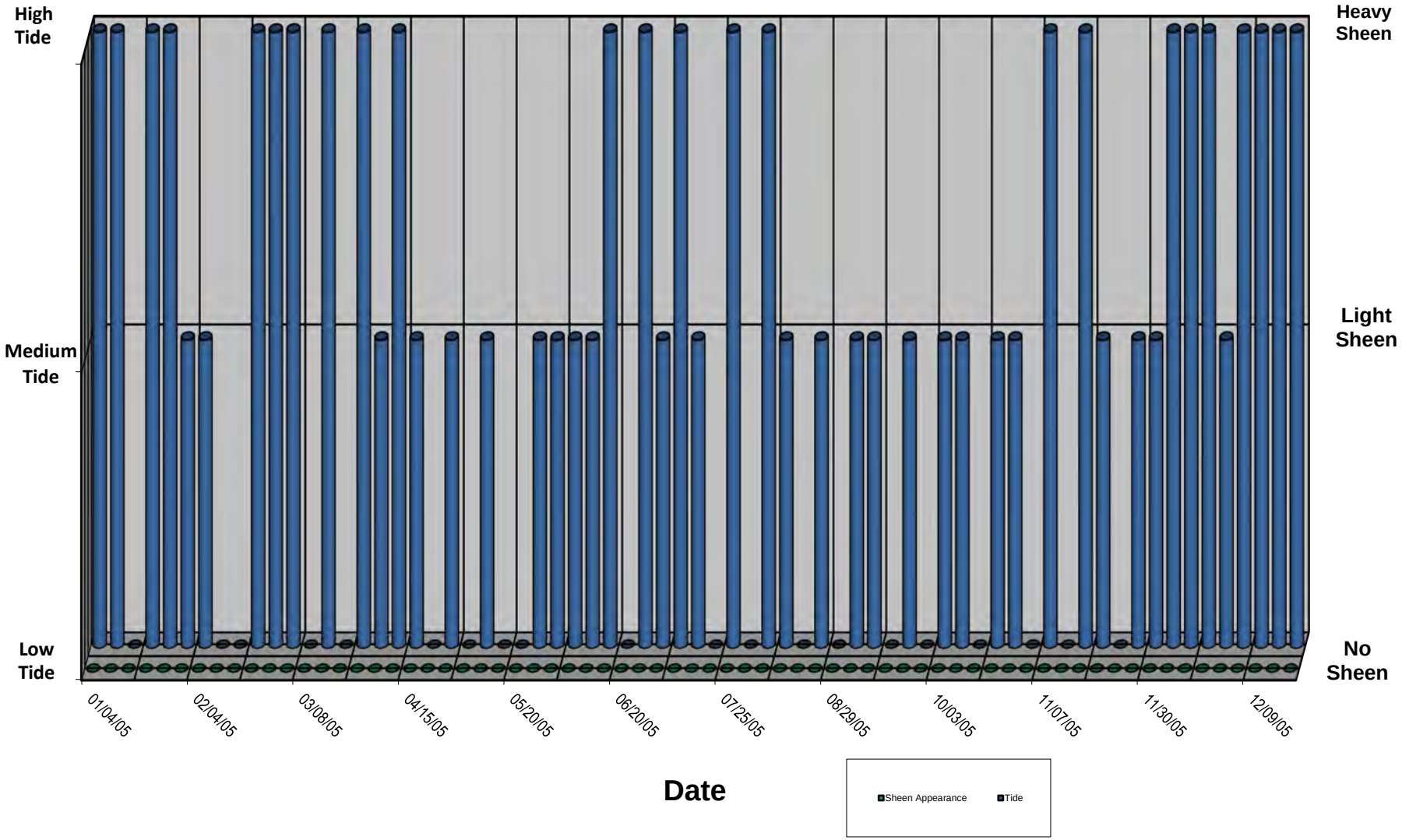
2007 Sheen Observations: Warehouse



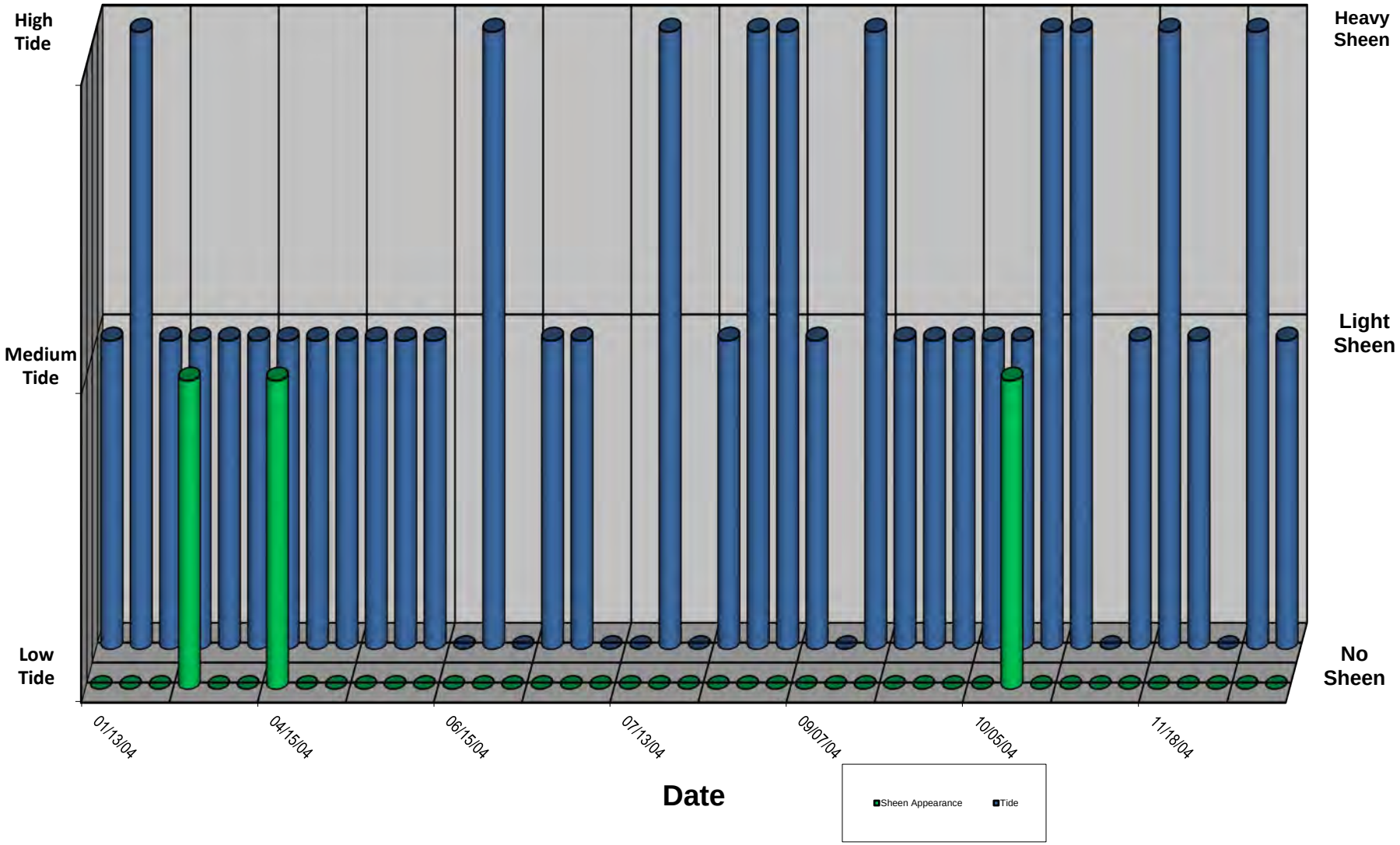
2006 Sheen Observations: Warehouse

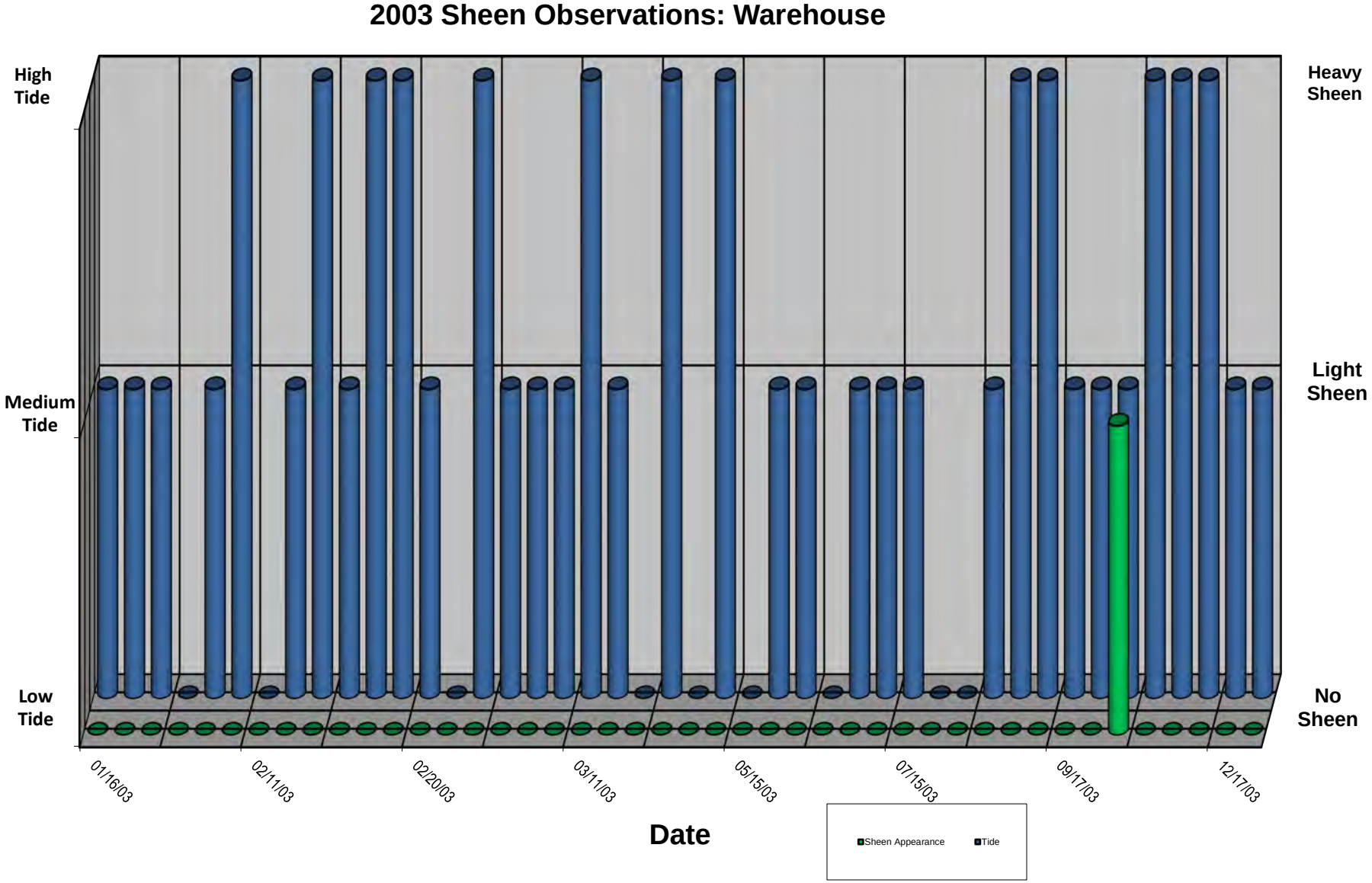


2005 Sheen Observations: Warehouse



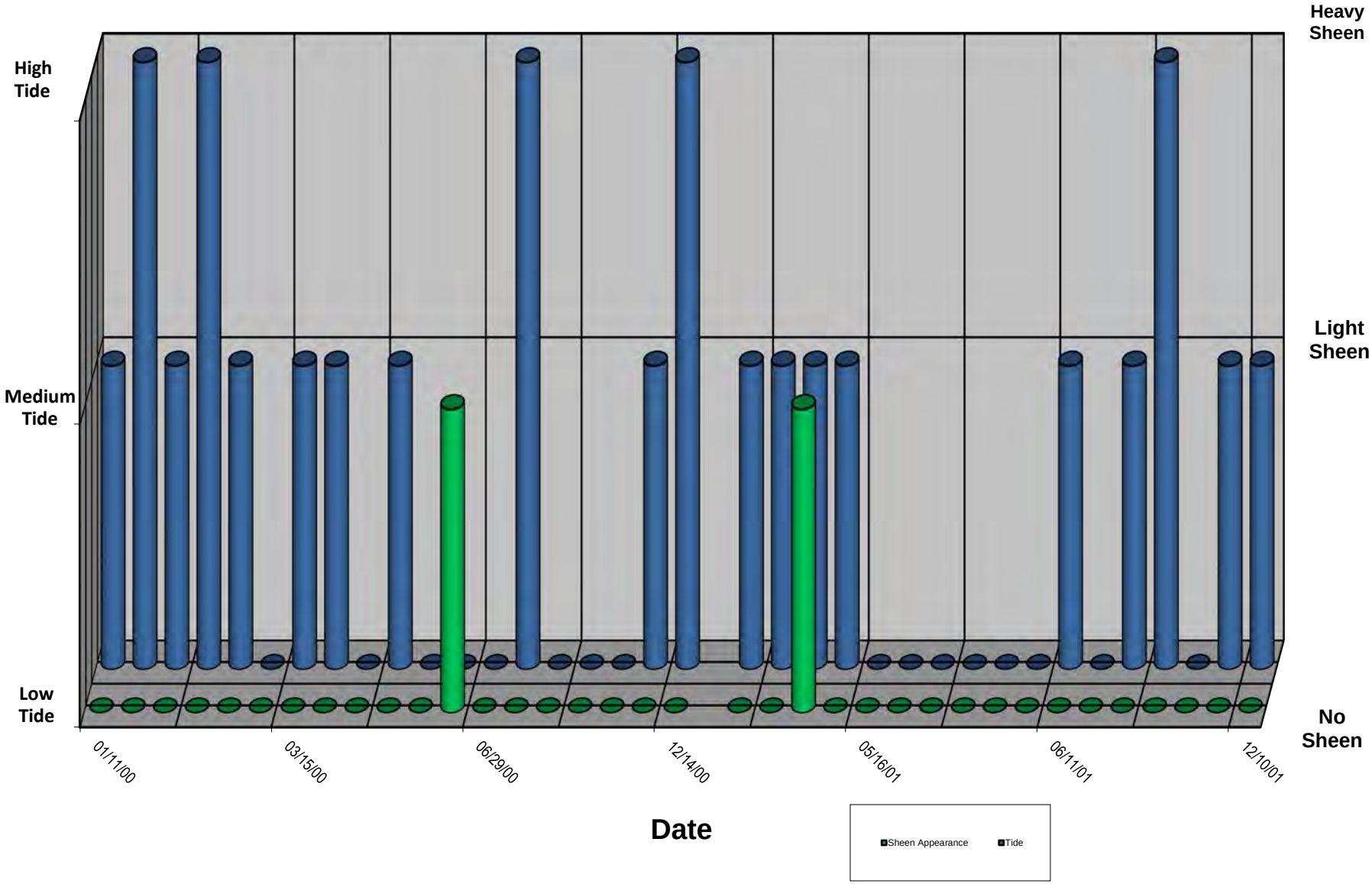
2004 Sheen Observations: Warehouse



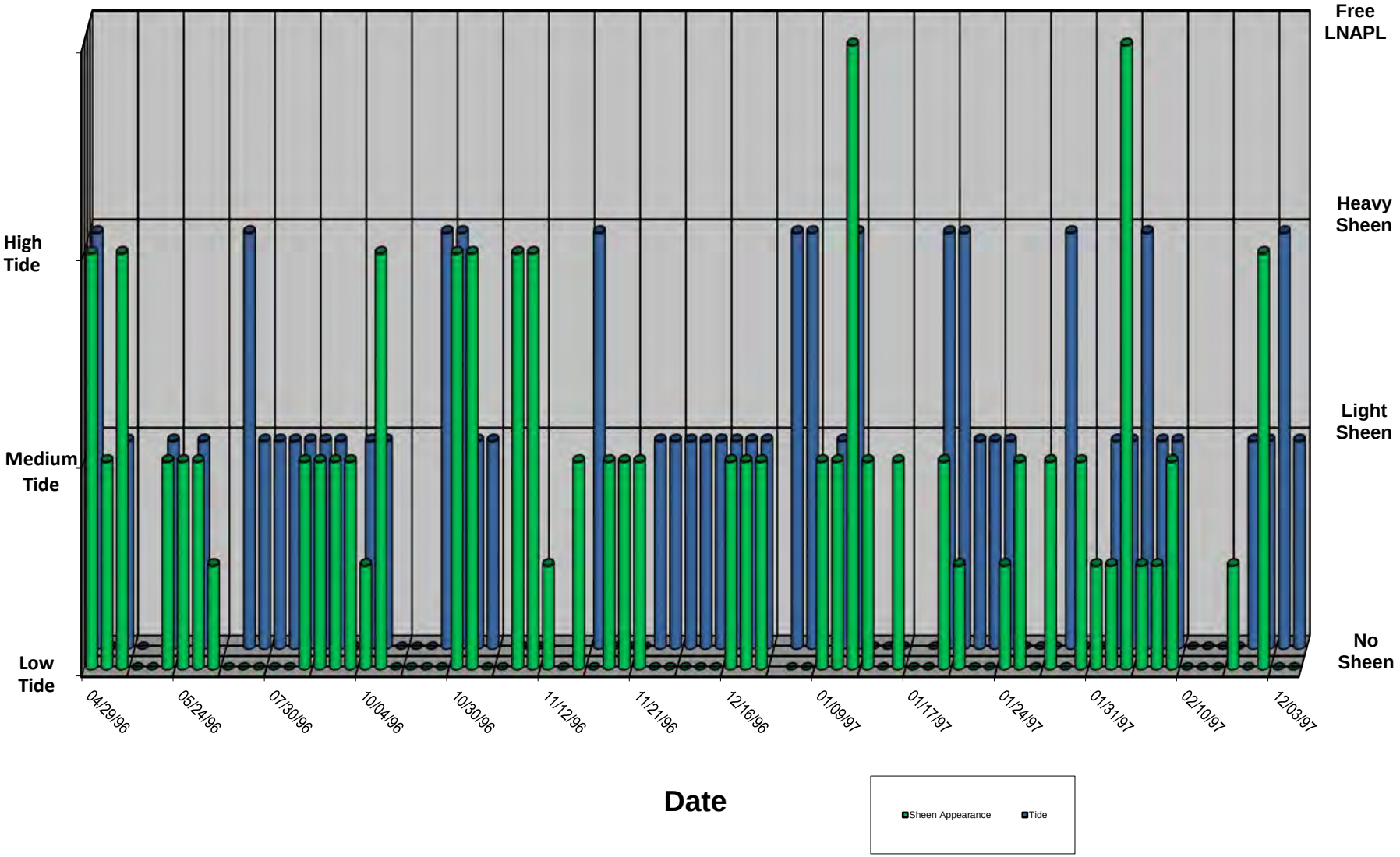

2003 Sheen Observations: Warehouse
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
01/16/03
02/11/03
02/20/03
03/11/03
05/15/03
07/15/03
09/17/03
12/17/03
Date
Sheen Appearance
Tide


2002 Sheen Observations: Warehouse
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
01/04/02
02/04/02
03/27/02
06/18/02
09/20/02
Date
Sheen Appearance
Tide

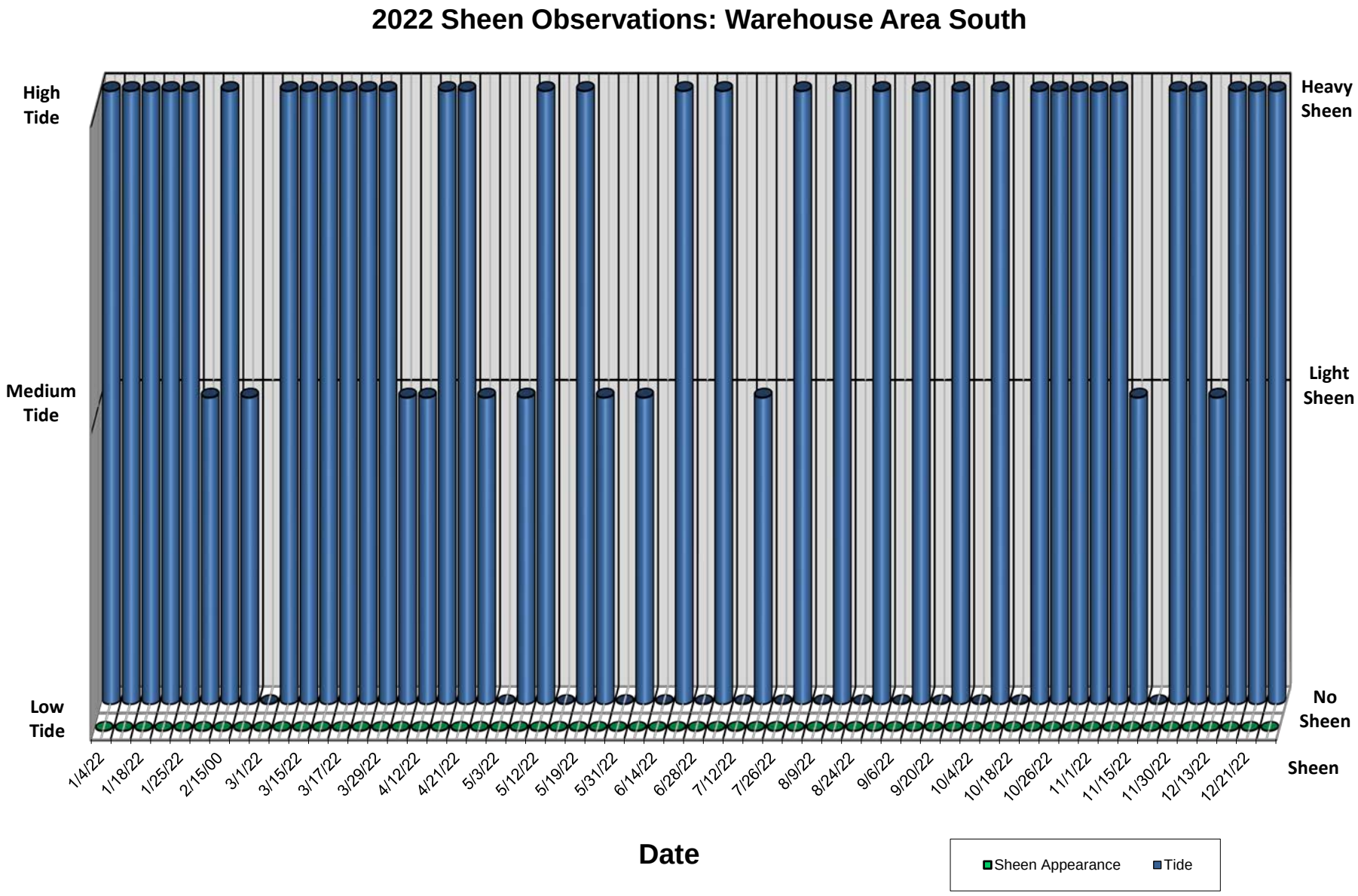
2000-2001 Sheen Observations: Warehouse



1996-1997 Sheen Observations: Warehouse

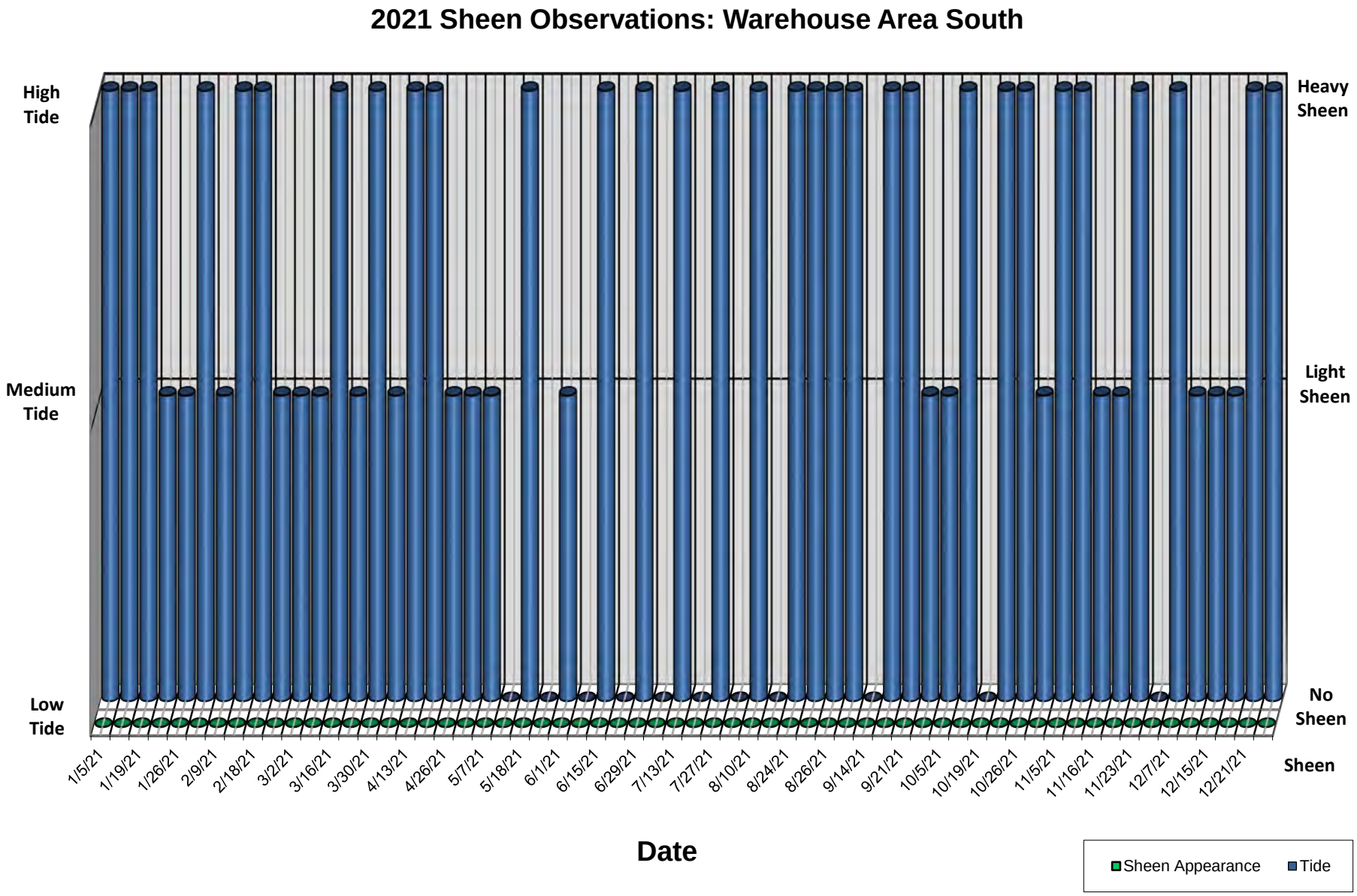


Sheen Observations - Southern Warehouse Boom
Seaport Midstream Partners LLC Seattle Terminal

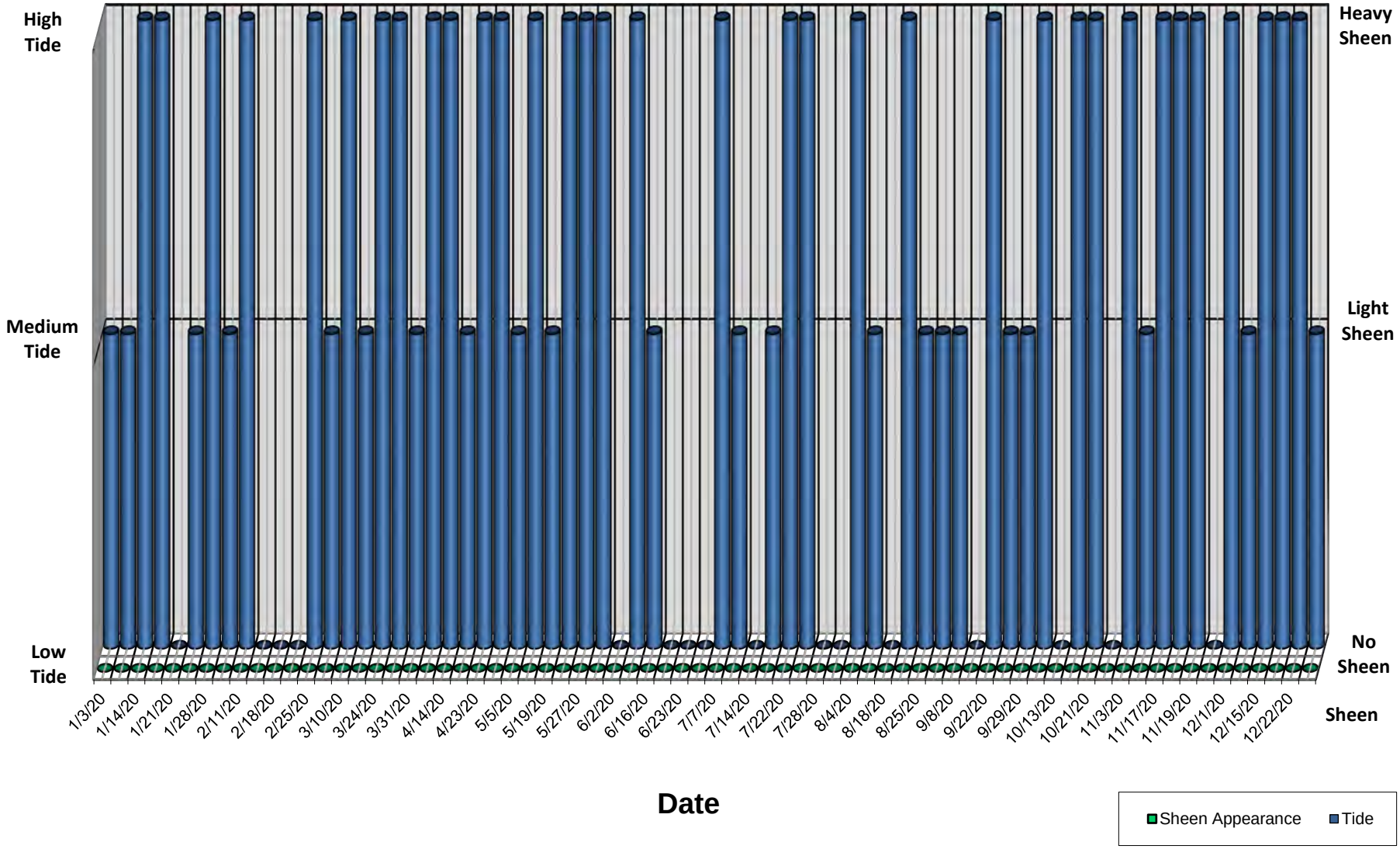


Southern Warehouse Boom removed in April 2022 with concurrence from Ecology due to persistent lack of sheens.

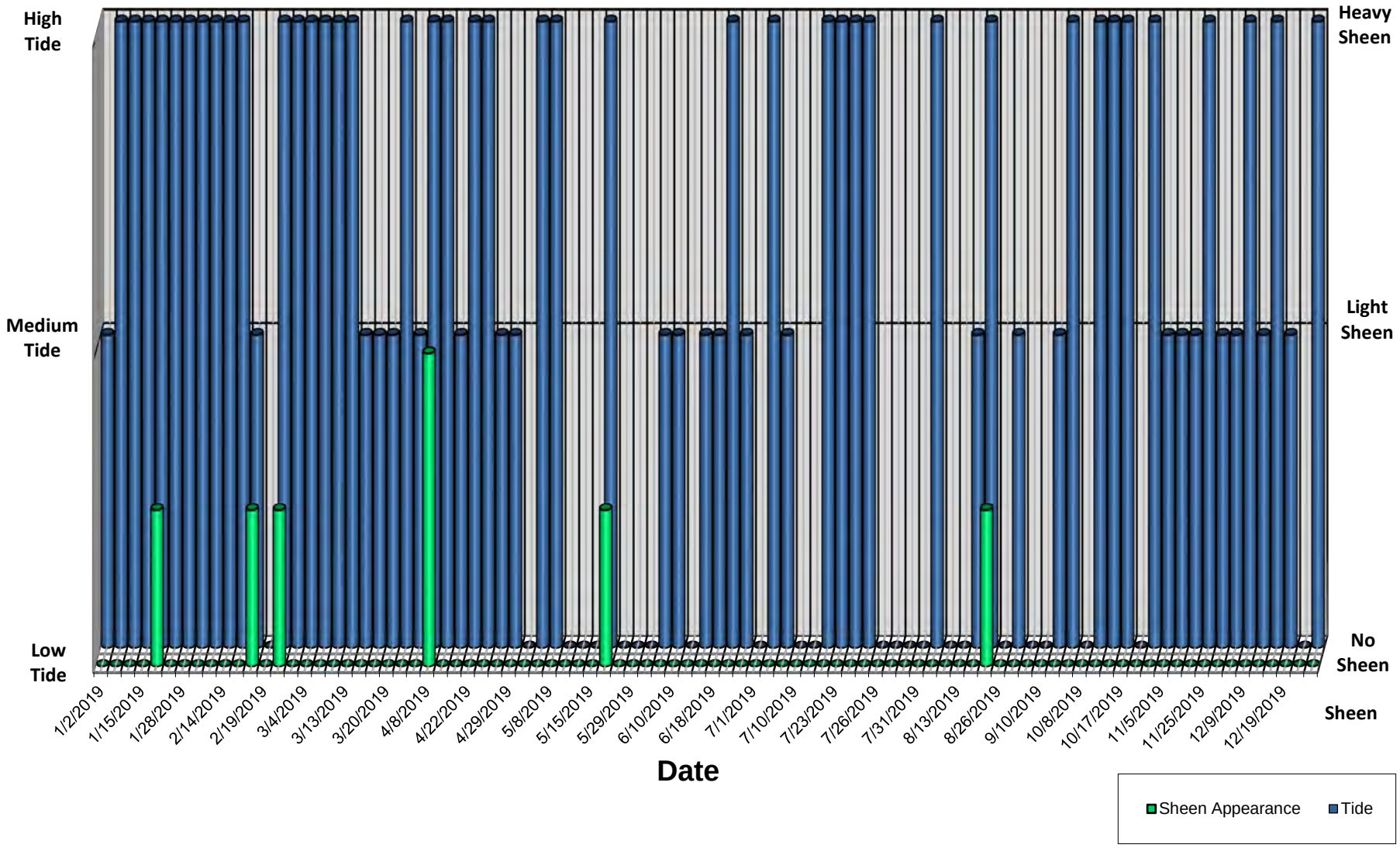
Sheen Observations - Southern Warehouse Boom
Seaport Midstream Partners LLC Seattle Terminal

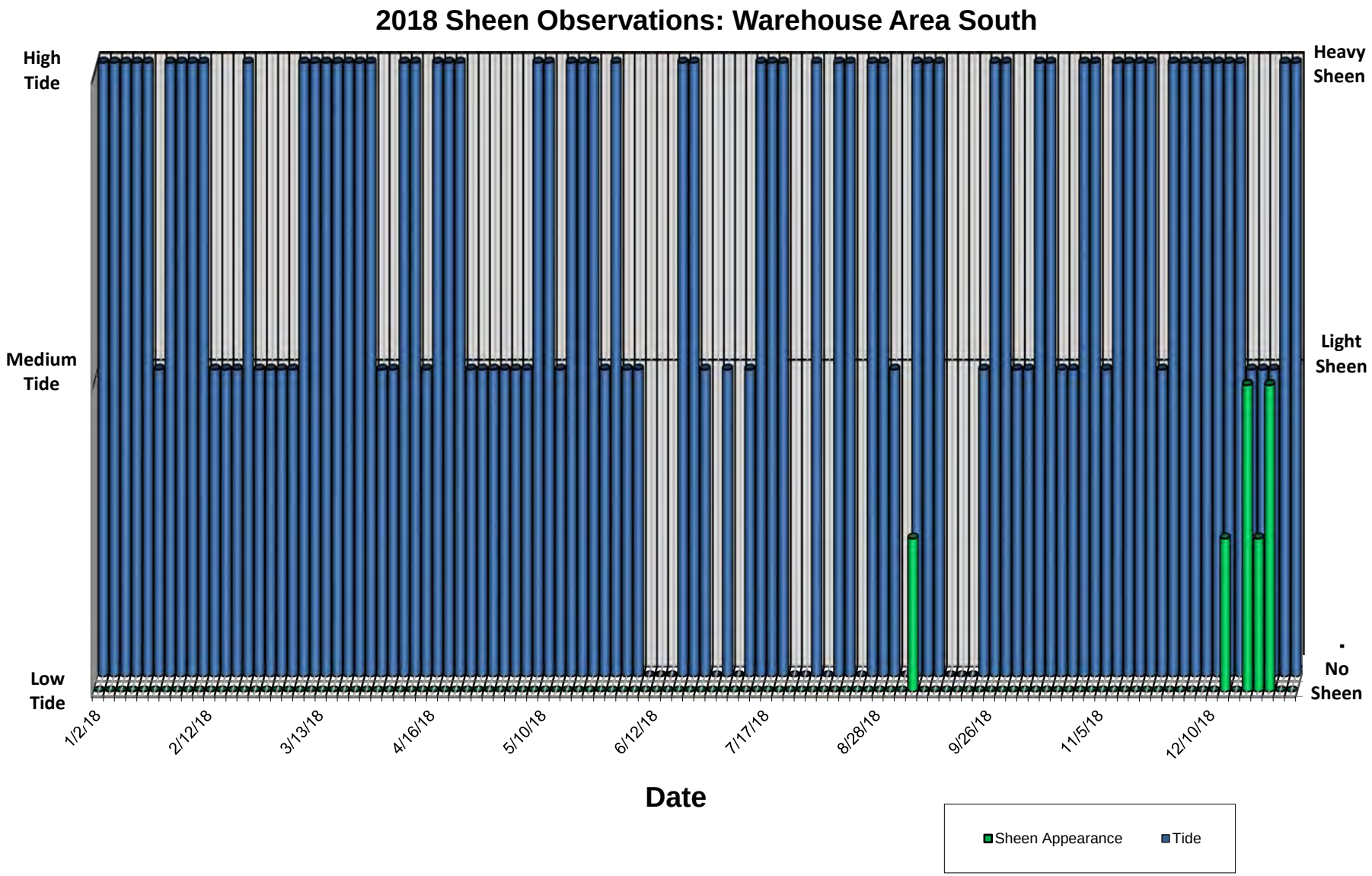


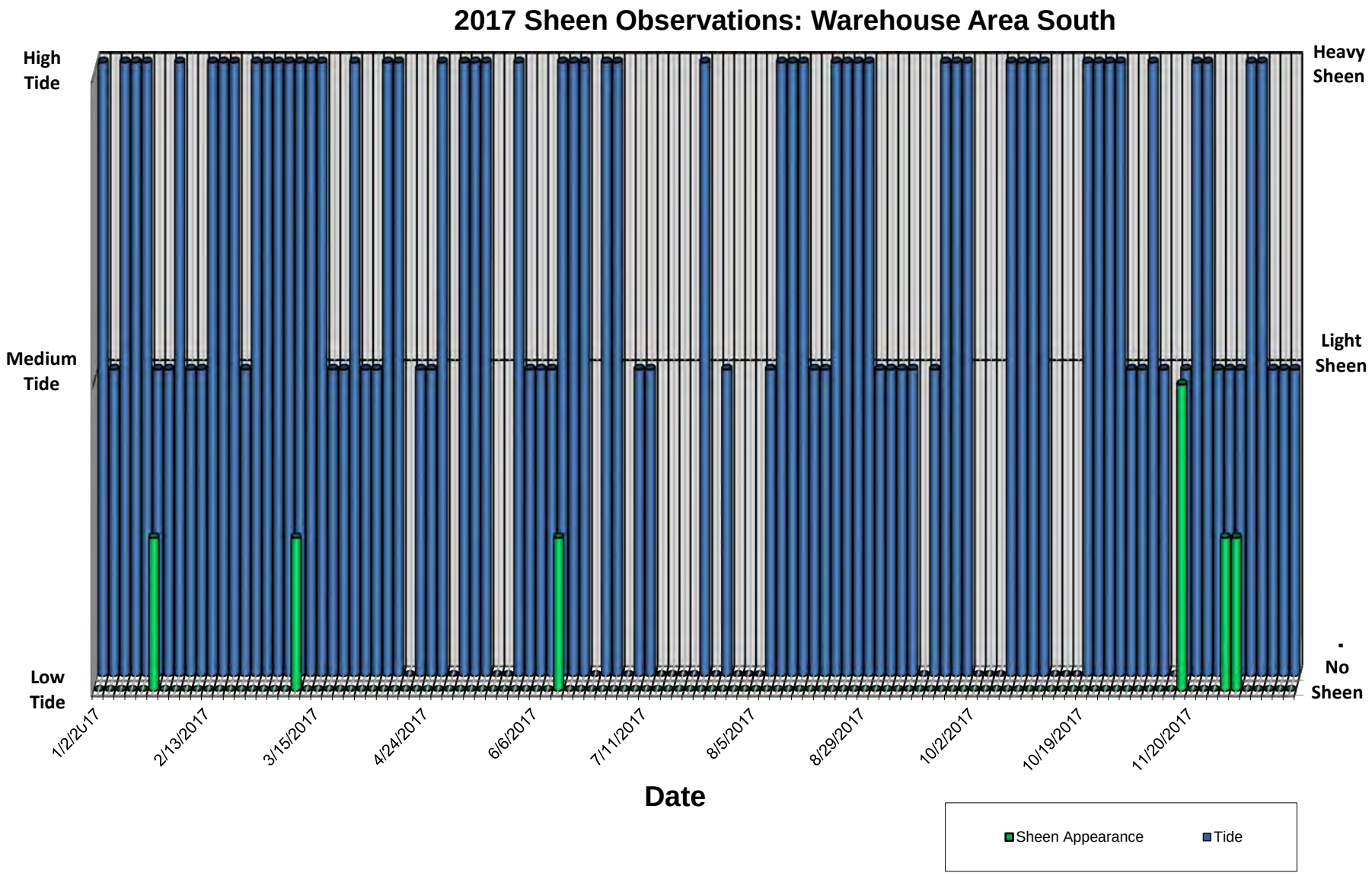
2020 Sheen Observations: Warehouse Area South

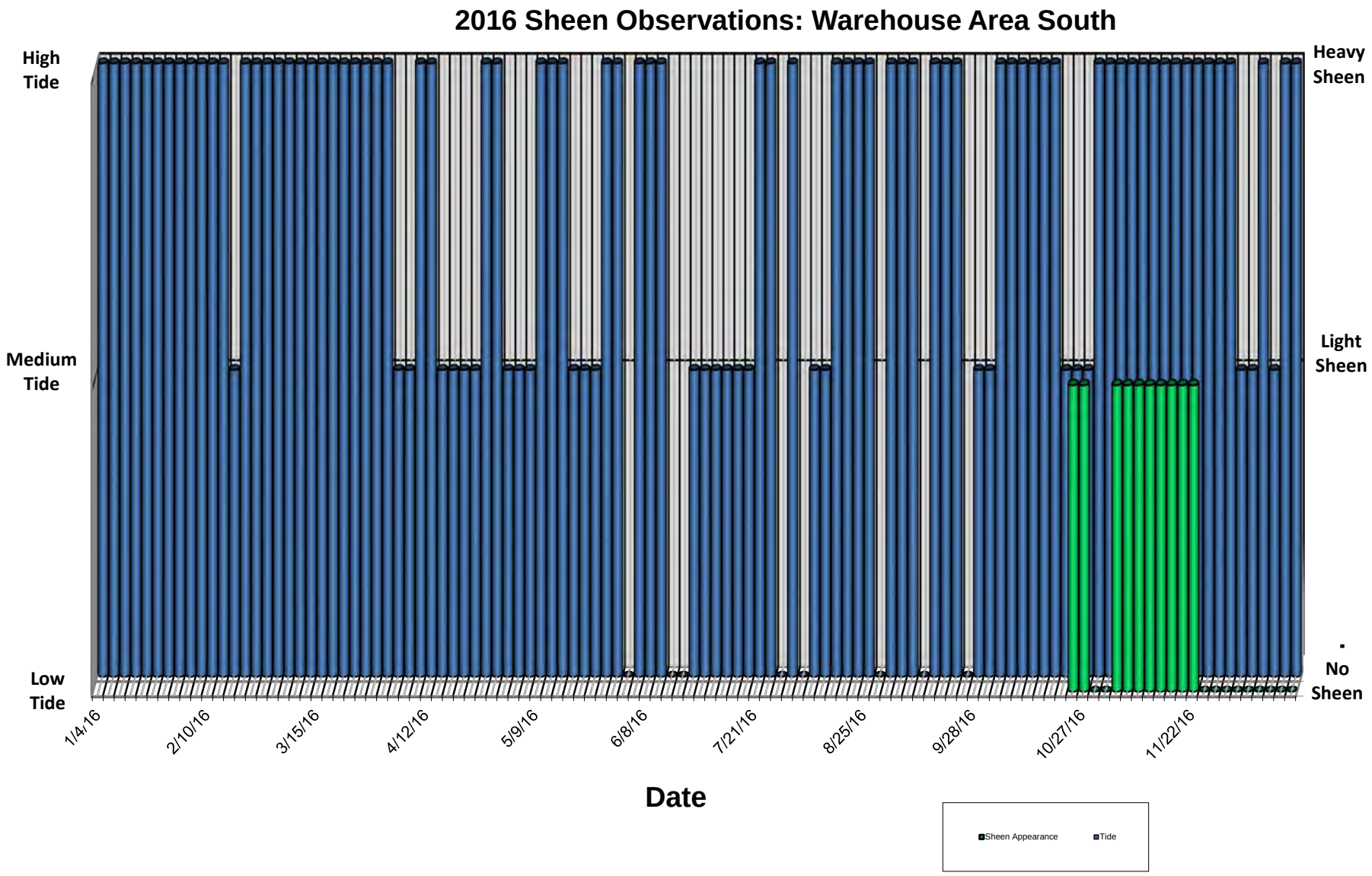


2019 Sheen Observations: Warehouse Area South



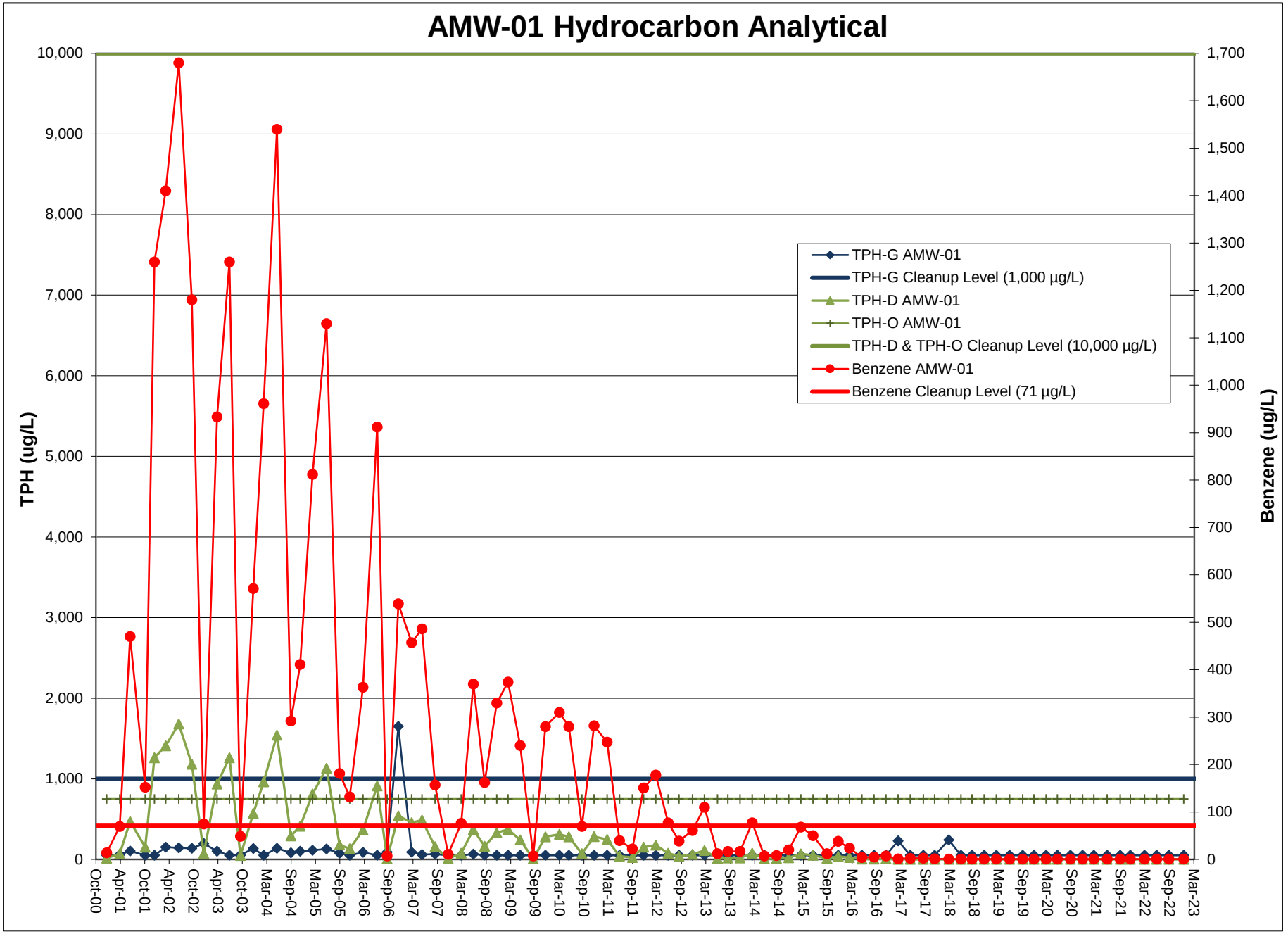

2018 Sheen Observations: Warehouse Area South
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/2/18
2/12/18
3/13/18
4/16/18
5/10/18
6/12/18
7/17/18
8/28/18
9/26/18
11/5/18
12/10/18
Date
Sheen Appearance
Tide

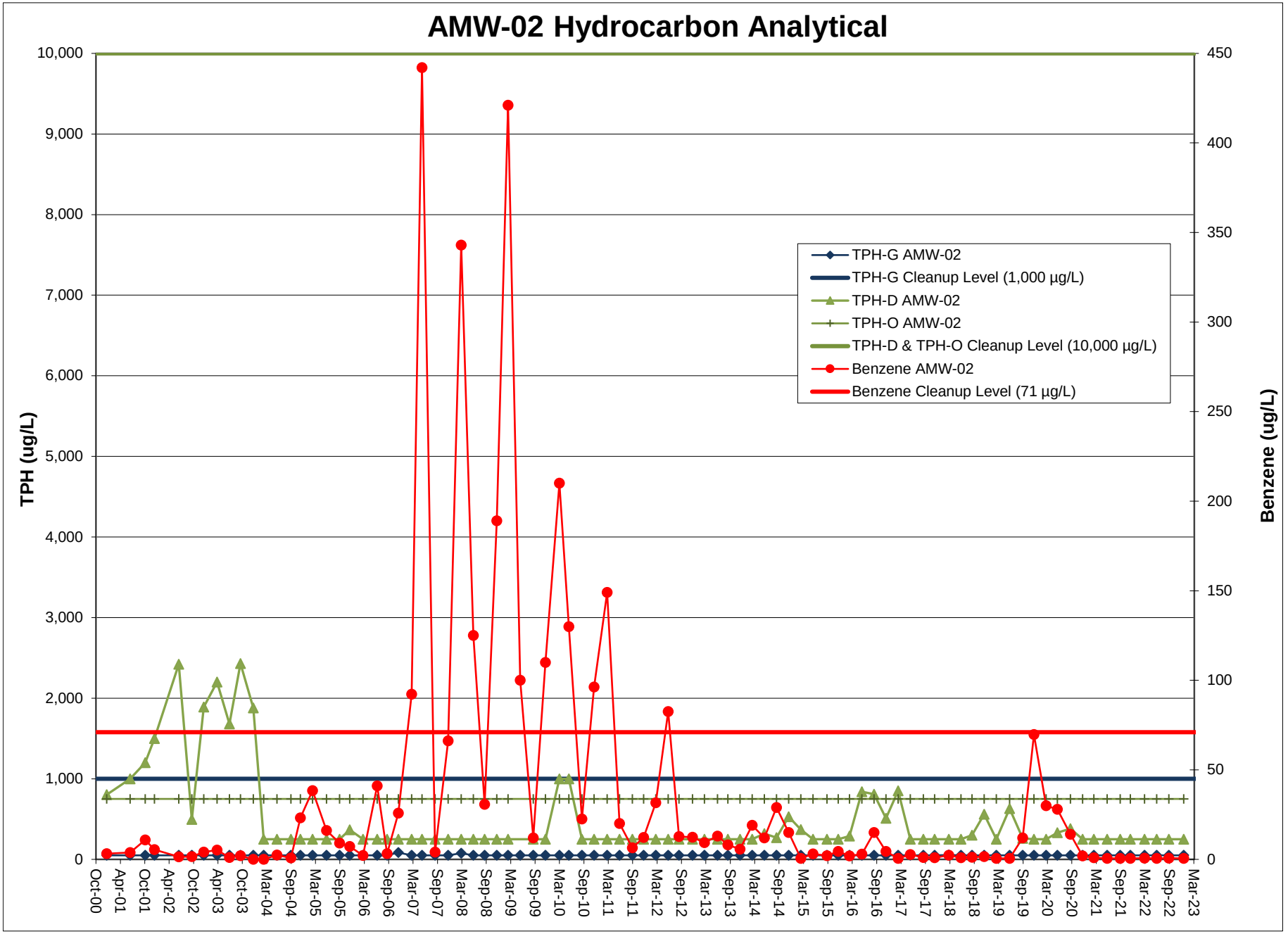

2017 Sheen Observations: Warehouse Area South
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/2/2017
2/13/2017
3/15/2017
4/24/2017
6/6/2017
7/11/2017
8/5/2017
8/29/2017
10/2/2017
10/19/2017
11/20/2017
Date
Sheen Appearance
Tide

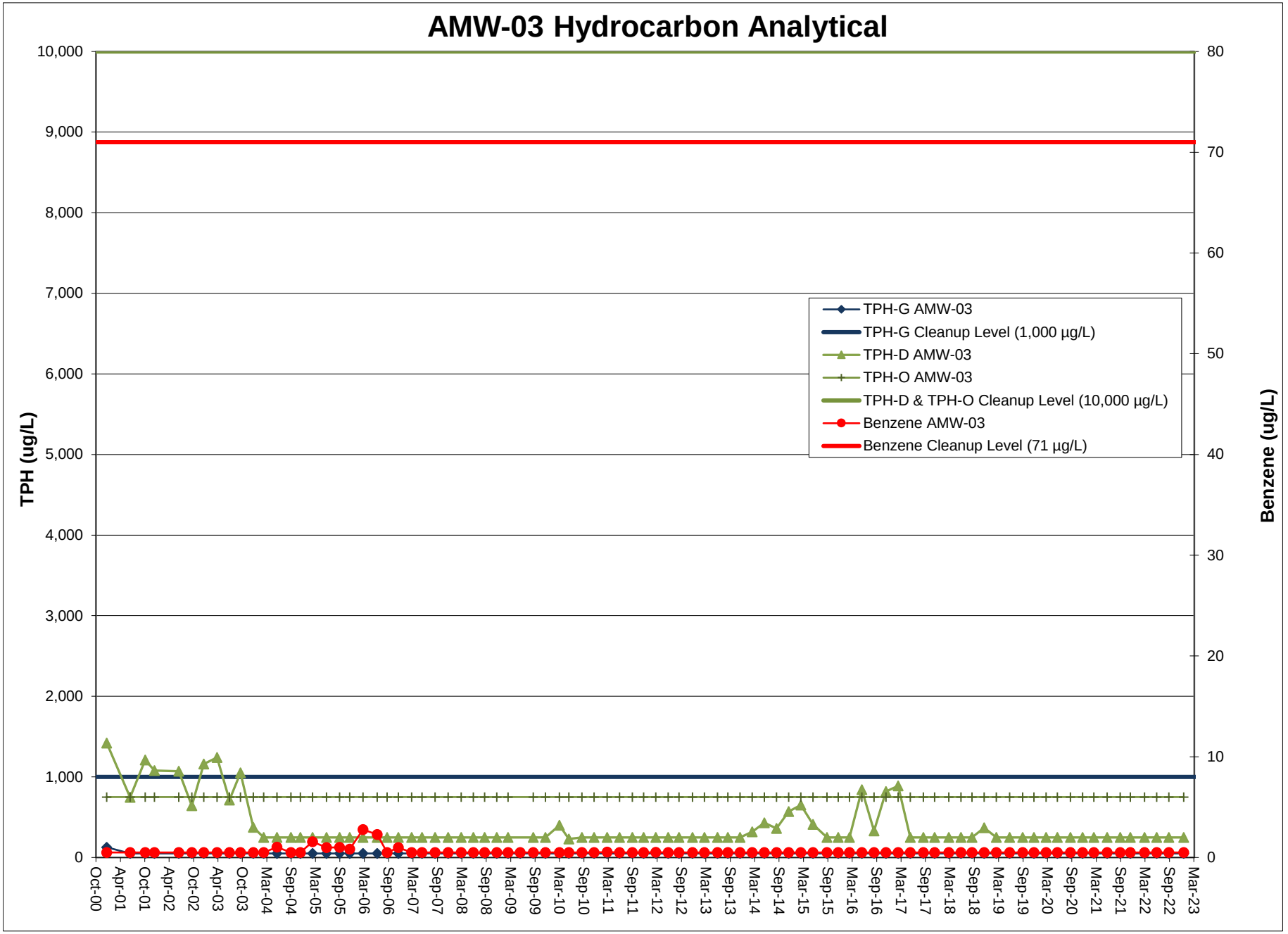

2016 Sheen Observations: Warehouse Area South
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/4/16
2/10/16
3/15/16
4/12/16
5/9/16
6/8/16
7/21/16
8/25/16
9/28/16
10/27/16
11/22/16
Date
Sheen Appearance
Tide

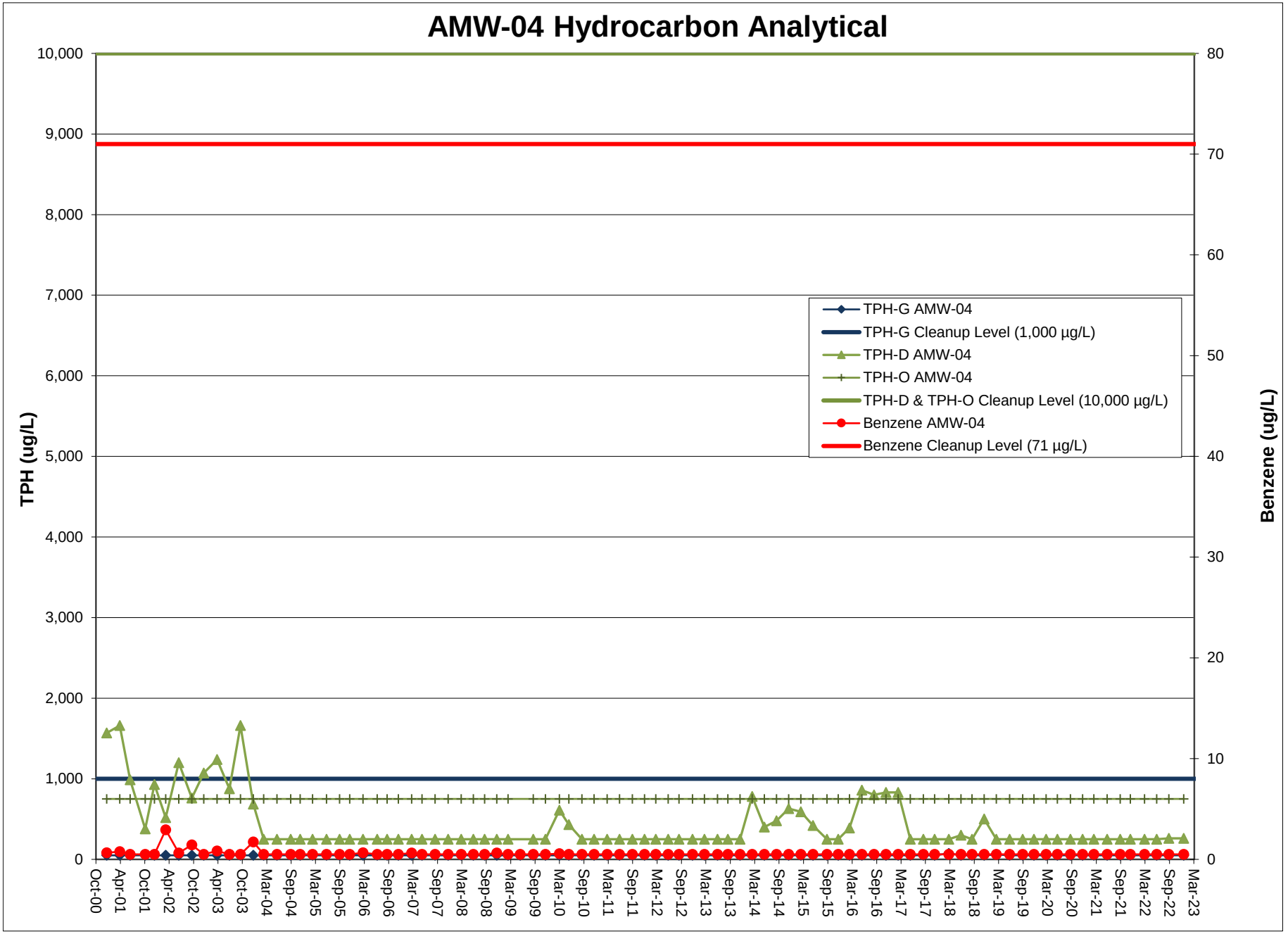
APPENDIX C

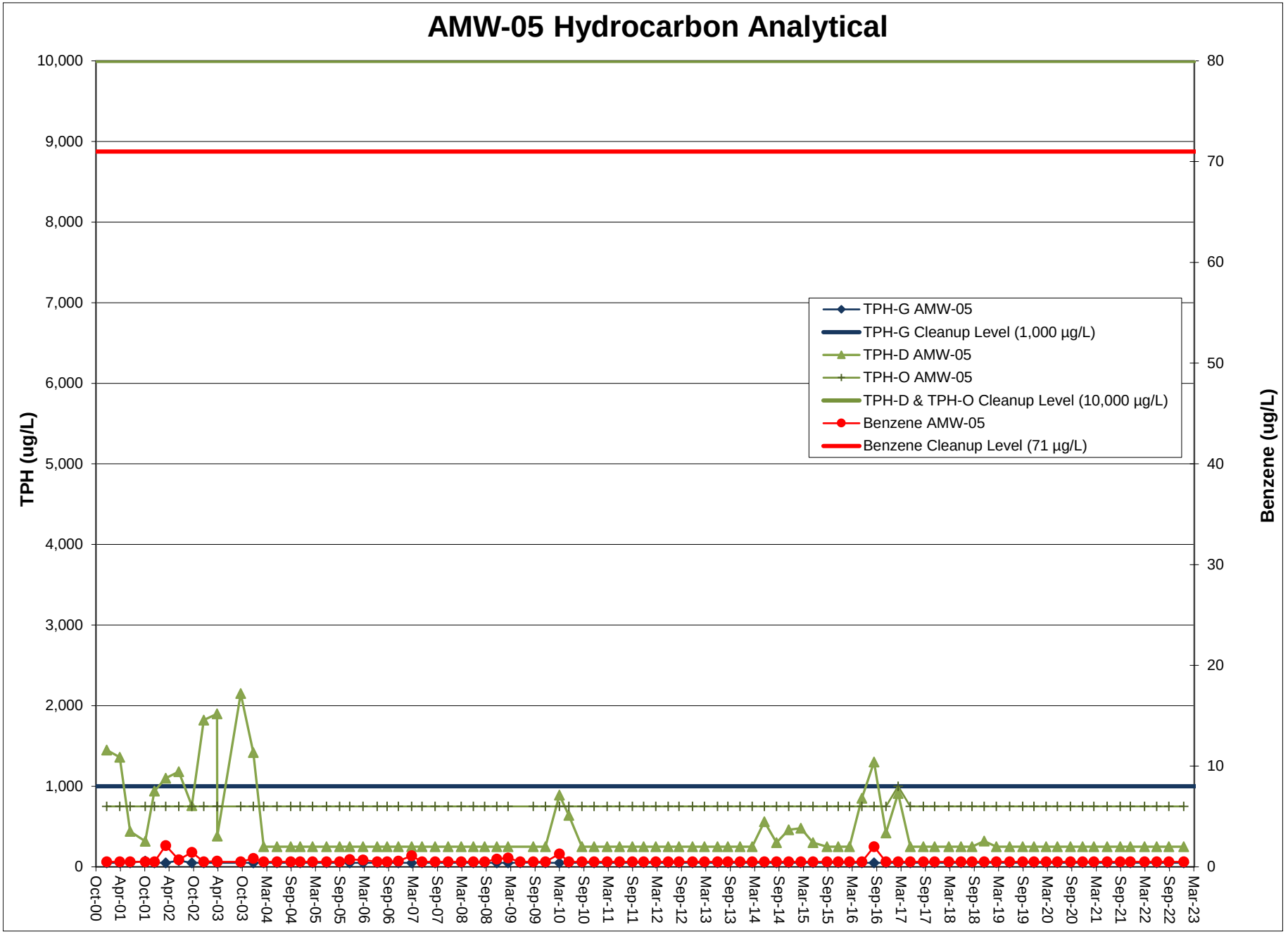
Groundwater Monitoring Wells Hydrocarbon Analytical Graphs

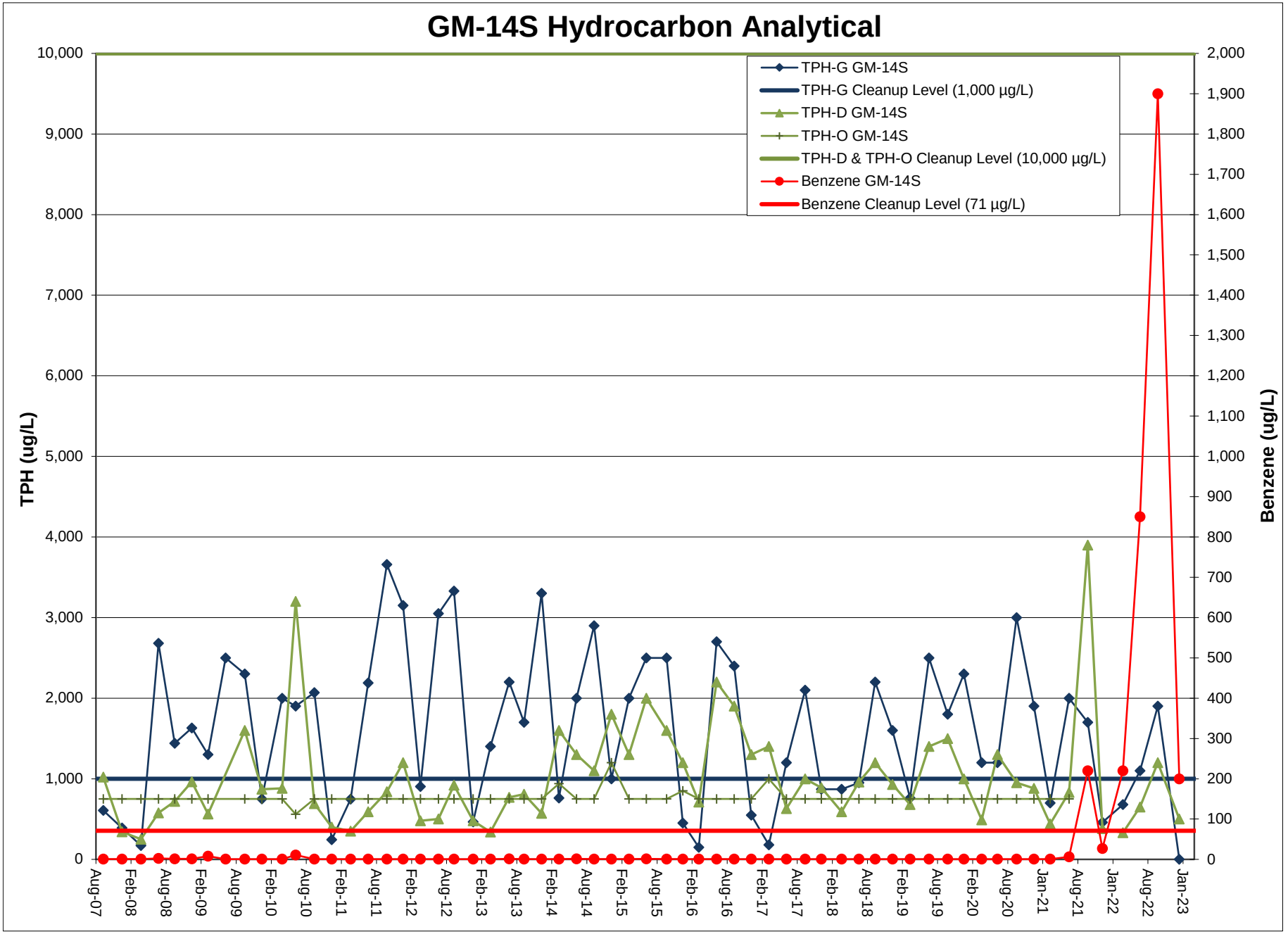

AMW-01 Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
Oct-00
Apr-01
Oct-01
Apr-02
Oct-02
Apr-03
Oct-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
Sep-09
Mar-10
Sep-10
Mar-11
Sep-11
Mar-12
Sep-12
Mar-13
Sep-13
Mar-14
Sep-14
Mar-15
Sep-15
Mar-16
Sep-16
Mar-17
Sep-17
Mar-18
Sep-18
Mar-19
Sep-19
Mar-20
Sep-20
Mar-21
Sep-21
Mar-22
Sep-22
Mar-23
TPH-G AMW-01
TPH-G Cleanup Level (1,000 µg/L)
TPH-D AMW-01
TPH-O AMW-01
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene AMW-01
Benzene Cleanup Level (71 µg/L)

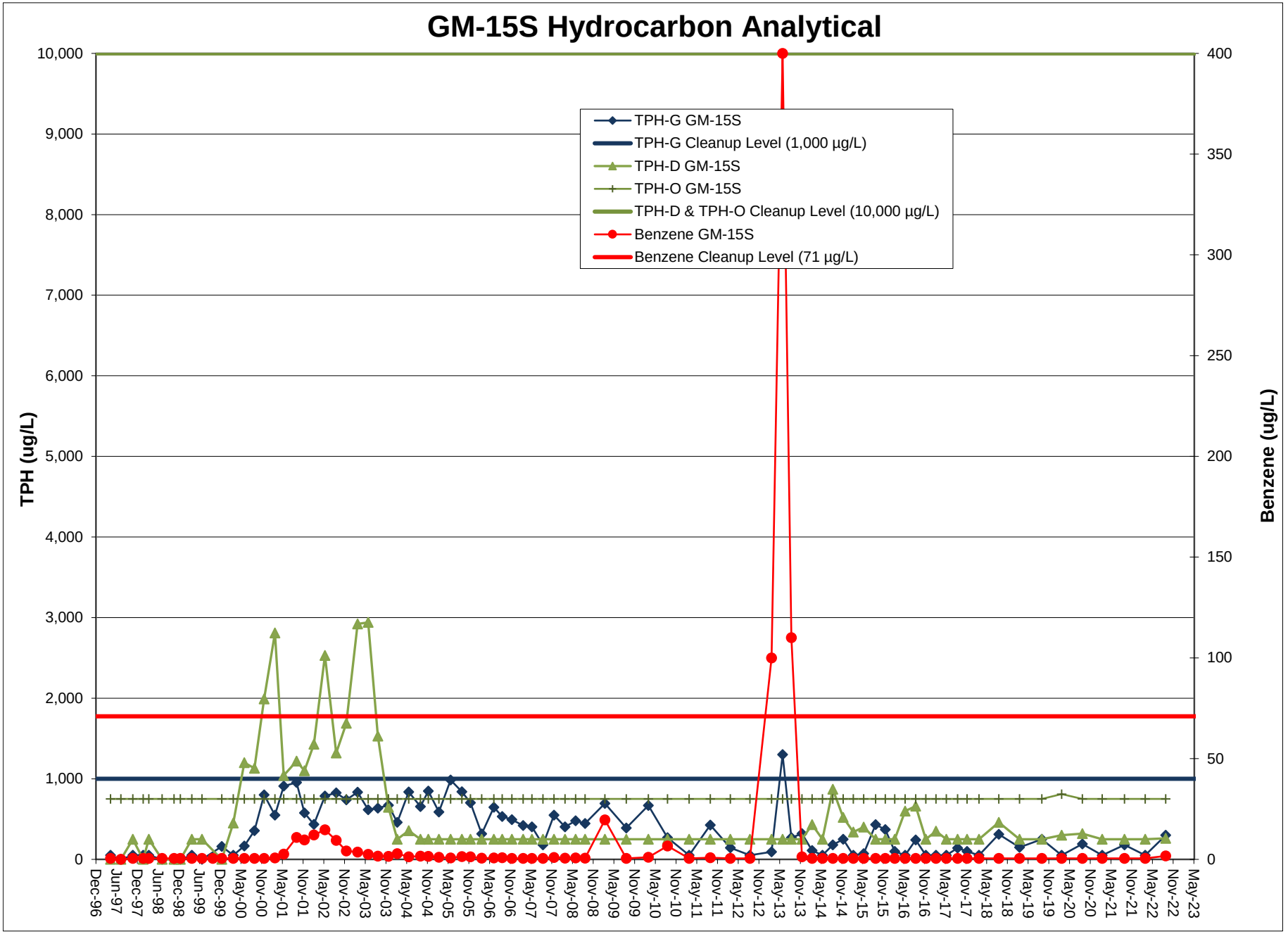

AMW-02 Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
450
400
350
300
250
200
150
100
50
0
TPH-G AMW-02
TPH-G Cleanup Level (1,000 µg/L)
TPH-D AMW-02
TPH-O AMW-02
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene AMW-02
Benzene Cleanup Level (71 µg/L)
Oct-00
Apr-01
Oct-01
Apr-02
Oct-02
Apr-03
Oct-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
Sep-09
Mar-10
Sep-10
Mar-11
Sep-11
Mar-12
Sep-12
Mar-13
Sep-13
Mar-14
Sep-14
Mar-15
Sep-15
Mar-16
Sep-16
Mar-17
Sep-17
Mar-18
Sep-18
Mar-19
Sep-19
Mar-20
Sep-20
Mar-21
Sep-21
Mar-22
Sep-22
Mar-23

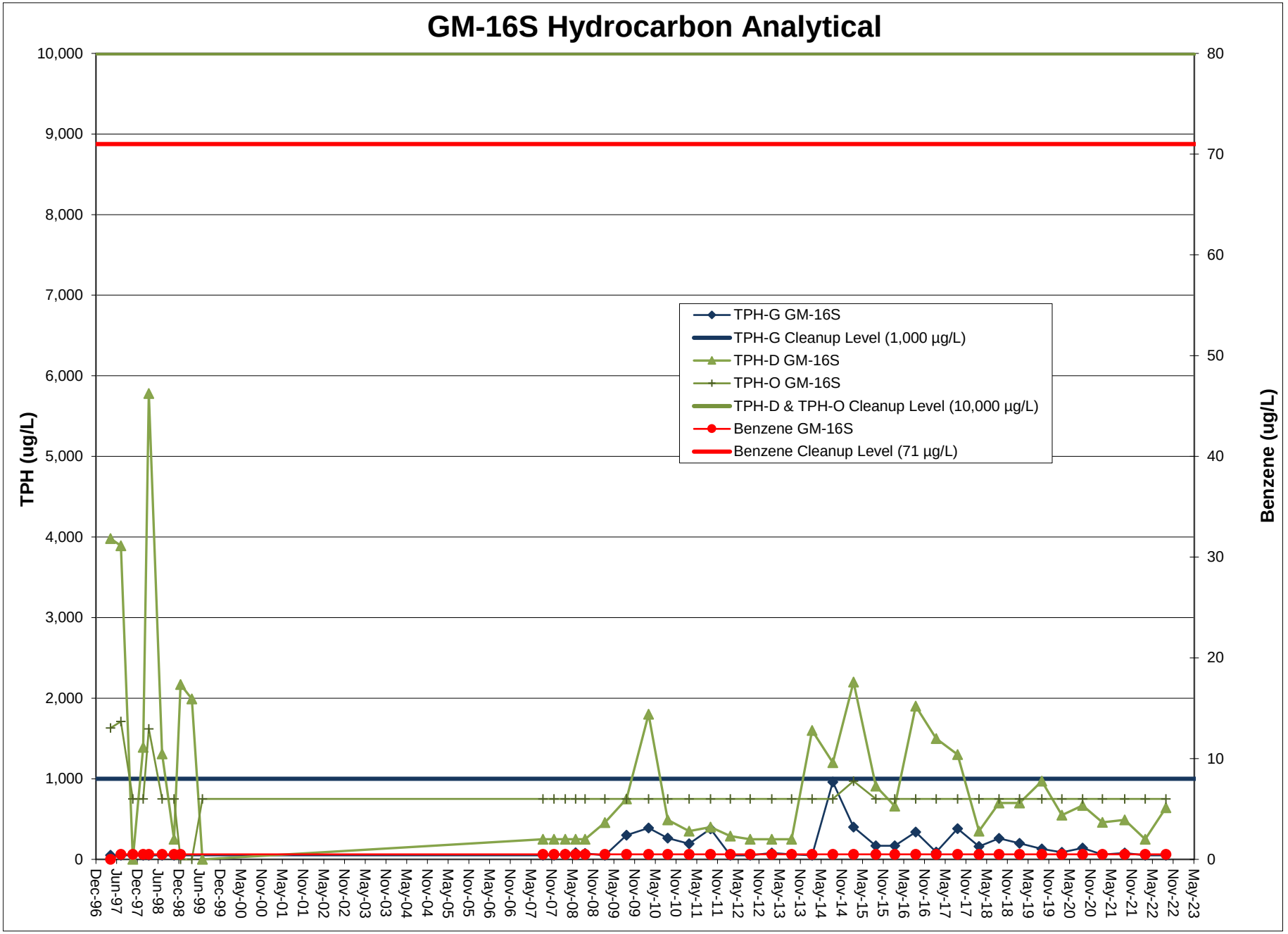

AMW-03 Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
80
70
60
50
40
30
20
10
0
TPH-G AMW-03
TPH-G Cleanup Level (1,000 µg/L)
TPH-D AMW-03
TPH-O AMW-03
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene AMW-03
Benzene Cleanup Level (71 µg/L)
Oct-00
Apr-01
Oct-01
Apr-02
Oct-02
Apr-03
Oct-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
Sep-09
Mar-10
Sep-10
Mar-11
Sep-11
Mar-12
Sep-12
Mar-13
Sep-13
Mar-14
Sep-14
Mar-15
Sep-15
Mar-16
Sep-16
Mar-17
Sep-17
Mar-18
Sep-18
Mar-19
Sep-19
Mar-20
Sep-20
Mar-21
Sep-21
Mar-22
Sep-22
Mar-23

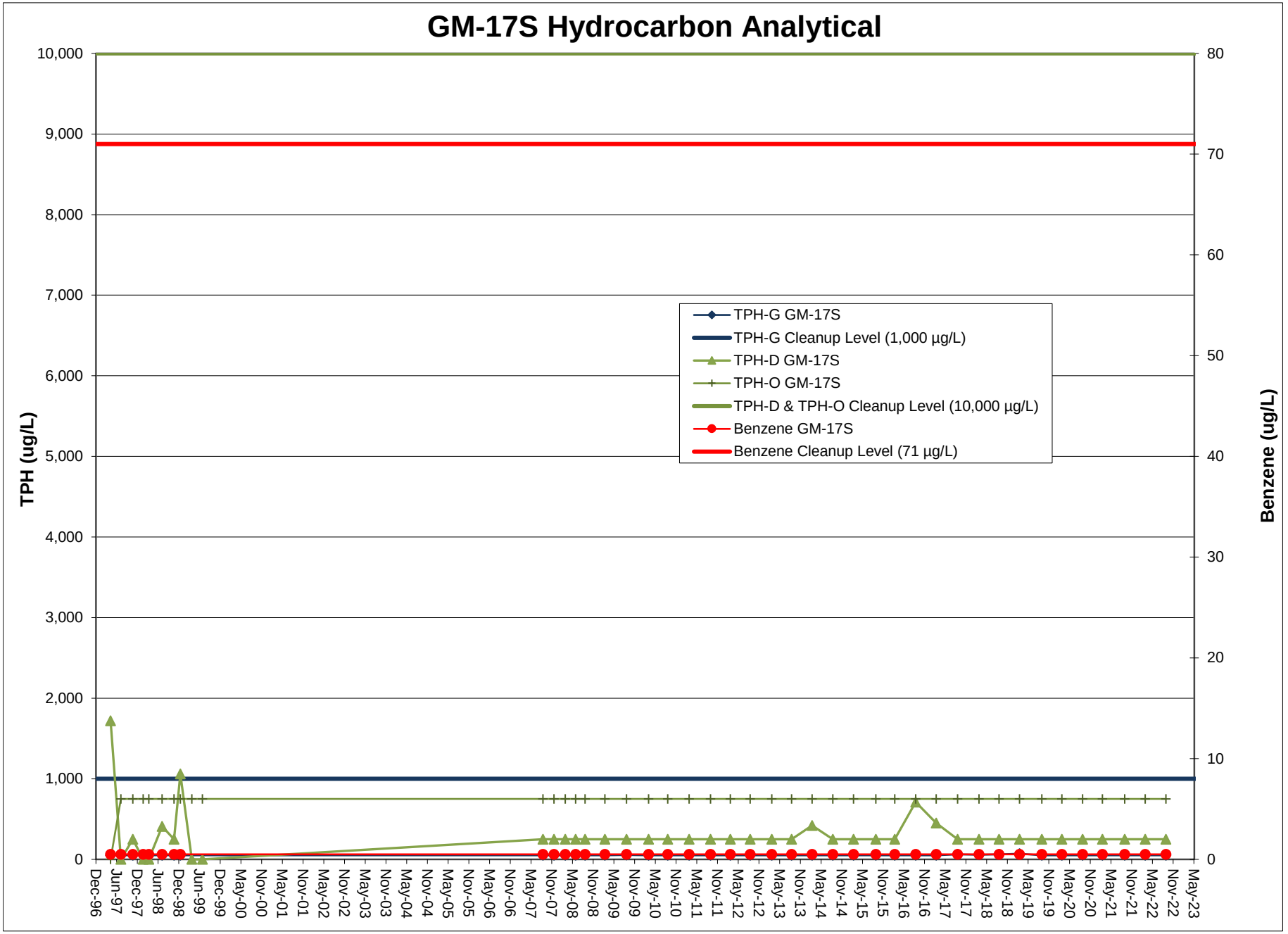

AMW-04 Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
80
70
60
50
40
30
20
10
0
TPH-G AMW-04
TPH-G Cleanup Level (1,000 µg/L)
TPH-D AMW-04
TPH-O AMW-04
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene AMW-04
Benzene Cleanup Level (71 µg/L)
Oct-00
Apr-01
Oct-01
Apr-02
Oct-02
Apr-03
Oct-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
Sep-09
Mar-10
Sep-10
Mar-11
Sep-11
Mar-12
Sep-12
Mar-13
Sep-13
Mar-14
Sep-14
Mar-15
Sep-15
Mar-16
Sep-16
Mar-17
Sep-17
Mar-18
Sep-18
Mar-19
Sep-19
Mar-20
Sep-20
Mar-21
Sep-21
Mar-22
Sep-22
Mar-23

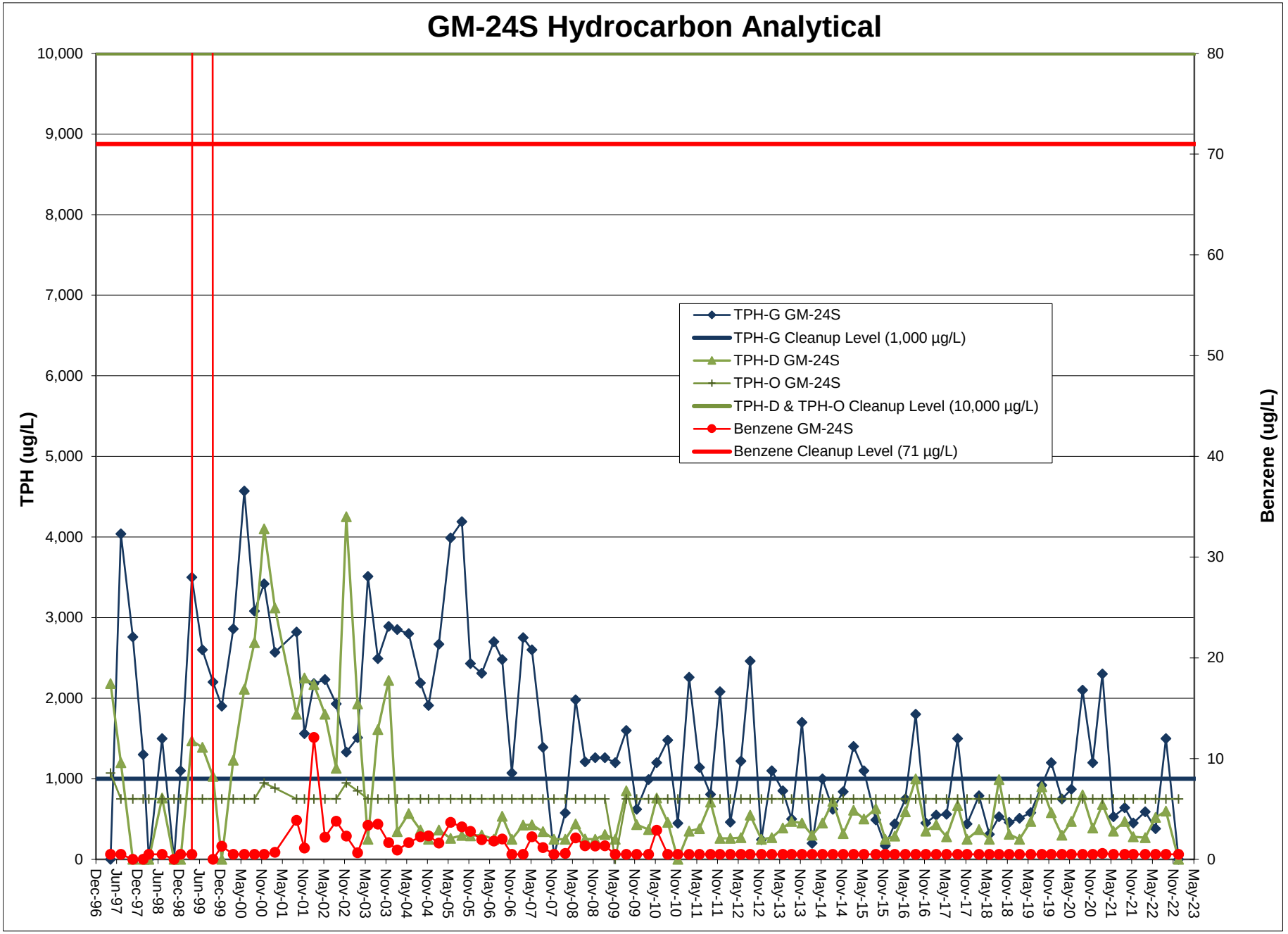

AMW-05 Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
80
70
60
50
40
30
20
10
0
TPH-G AMW-05
TPH-G Cleanup Level (1,000 µg/L)
TPH-D AMW-05
TPH-O AMW-05
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene AMW-05
Benzene Cleanup Level (71 µg/L)
Oct-00
Apr-01
Oct-01
Apr-02
Oct-02
Apr-03
Oct-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
Sep-09
Mar-10
Sep-10
Mar-11
Sep-11
Mar-12
Sep-12
Mar-13
Sep-13
Mar-14
Sep-14
Mar-15
Sep-15
Mar-16
Sep-16
Mar-17
Sep-17
Mar-18
Sep-18
Mar-19
Sep-19
Mar-20
Sep-20
Mar-21
Sep-21
Mar-22
Sep-22
Mar-23

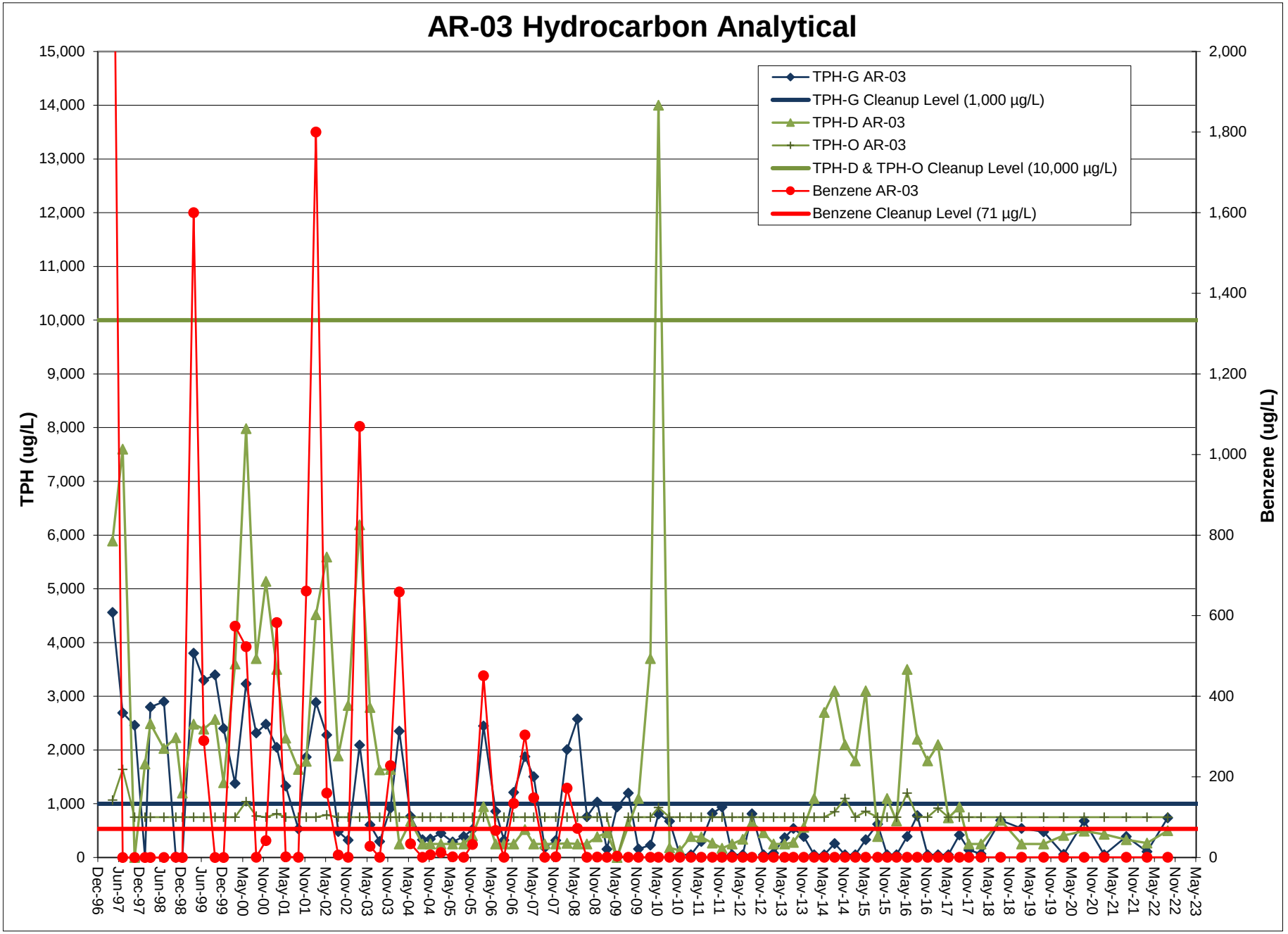

GM-14S Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
TPH-G GM-14S
TPH-G Cleanup Level (1,000 µg/L)
TPH-D GM-14S
TPH-O GM-14S
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene GM-14S
Benzene Cleanup Level (71 µg/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
Aug-07
Feb-08
Aug-08
Feb-09
Aug-09
Feb-10
Aug-10
Feb-11
Aug-11
Feb-12
Aug-12
Feb-13
Aug-13
Feb-14
Aug-14
Feb-15
Aug-15
Feb-16
Aug-16
Feb-17
Aug-17
Feb-18
Aug-18
Feb-19
Aug-19
Feb-20
Aug-20
Jan-21
Aug-21
Jan-22
Aug-22
Jan-23

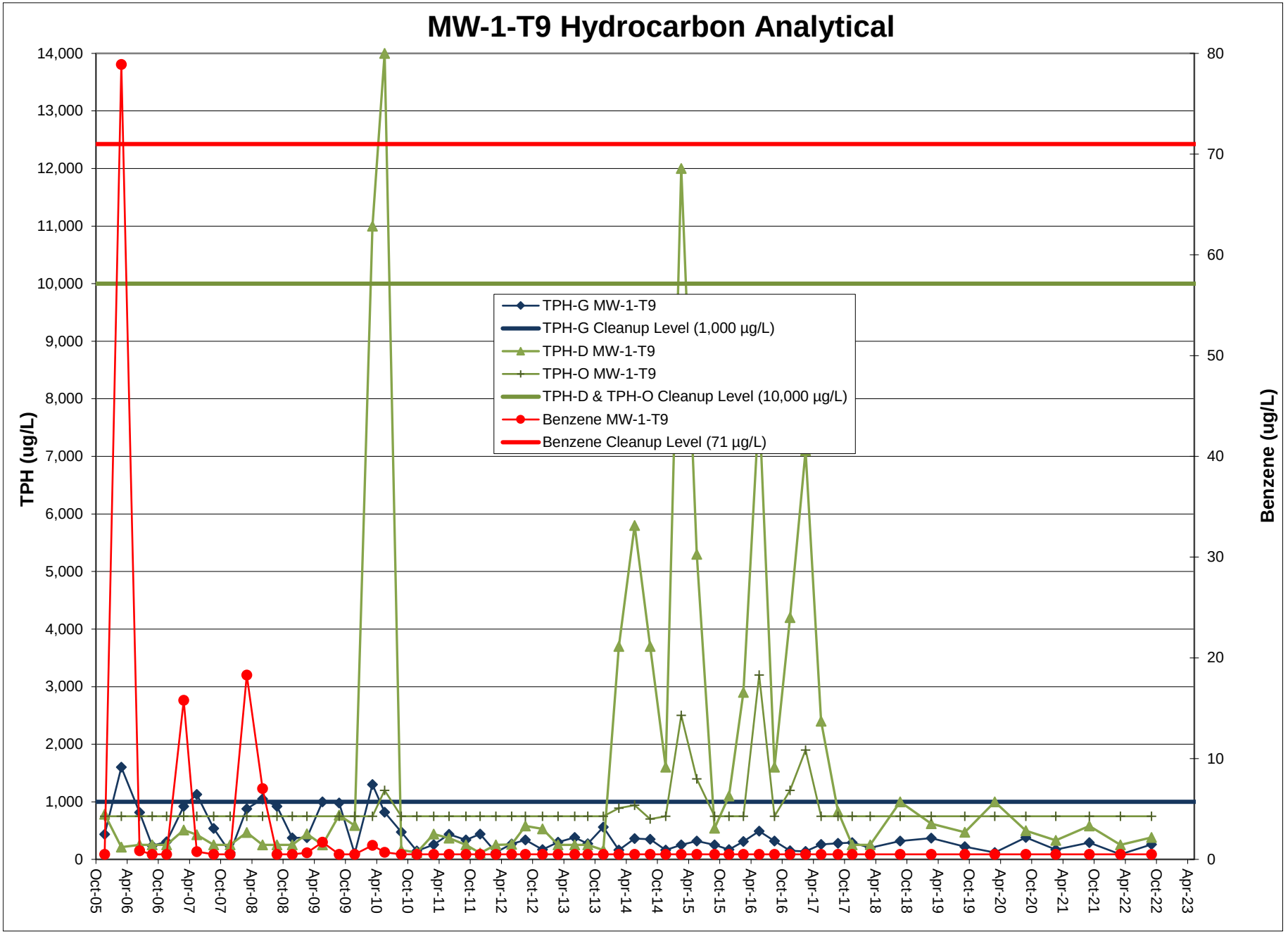

GM-15S Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
TPH-G GM-15S
TPH-G Cleanup Level (1,000 µg/L)
TPH-D GM-15S
TPH-O GM-15S
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene GM-15S
Benzene Cleanup Level (71 µg/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
400
350
300
250
200
150
100
50
0
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Jun-99
Dec-99
May-00
Nov-00
May-01
Nov-01
May-02
Nov-02
May-03
Nov-03
May-04
Nov-04
May-05
Nov-05
May-06
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Nov-14
May-15
Nov-15
May-16
Nov-16
May-17
Nov-17
May-18
Nov-18
May-19
Nov-19
May-20
Nov-20
May-21
Nov-21
May-22
Nov-22
May-23

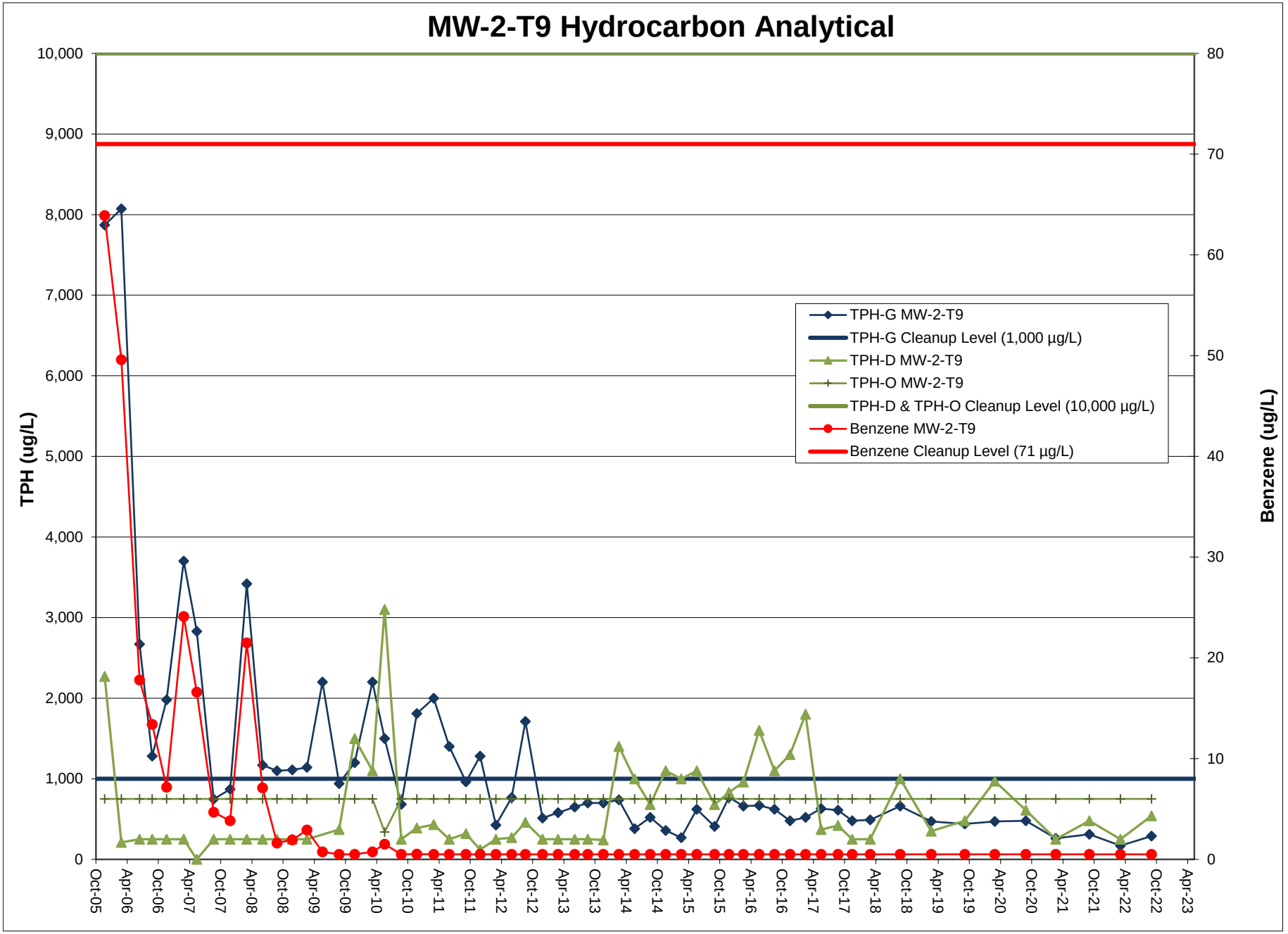

GM-16S Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
80
70
60
50
40
30
20
10
0
TPH-G GM-16S
TPH-G Cleanup Level (1,000 µg/L)
TPH-D GM-16S
TPH-O GM-16S
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene GM-16S
Benzene Cleanup Level (71 µg/L)
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Jun-99
Dec-99
May-00
Nov-00
May-01
Nov-01
May-02
Nov-02
May-03
Nov-03
May-04
Nov-04
May-05
Nov-05
May-06
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Nov-14
May-15
Nov-15
May-16
Nov-16
May-17
Nov-17
May-18
Nov-18
May-19
Nov-19
May-20
Nov-20
May-21
Nov-21
May-22
Nov-22
May-23

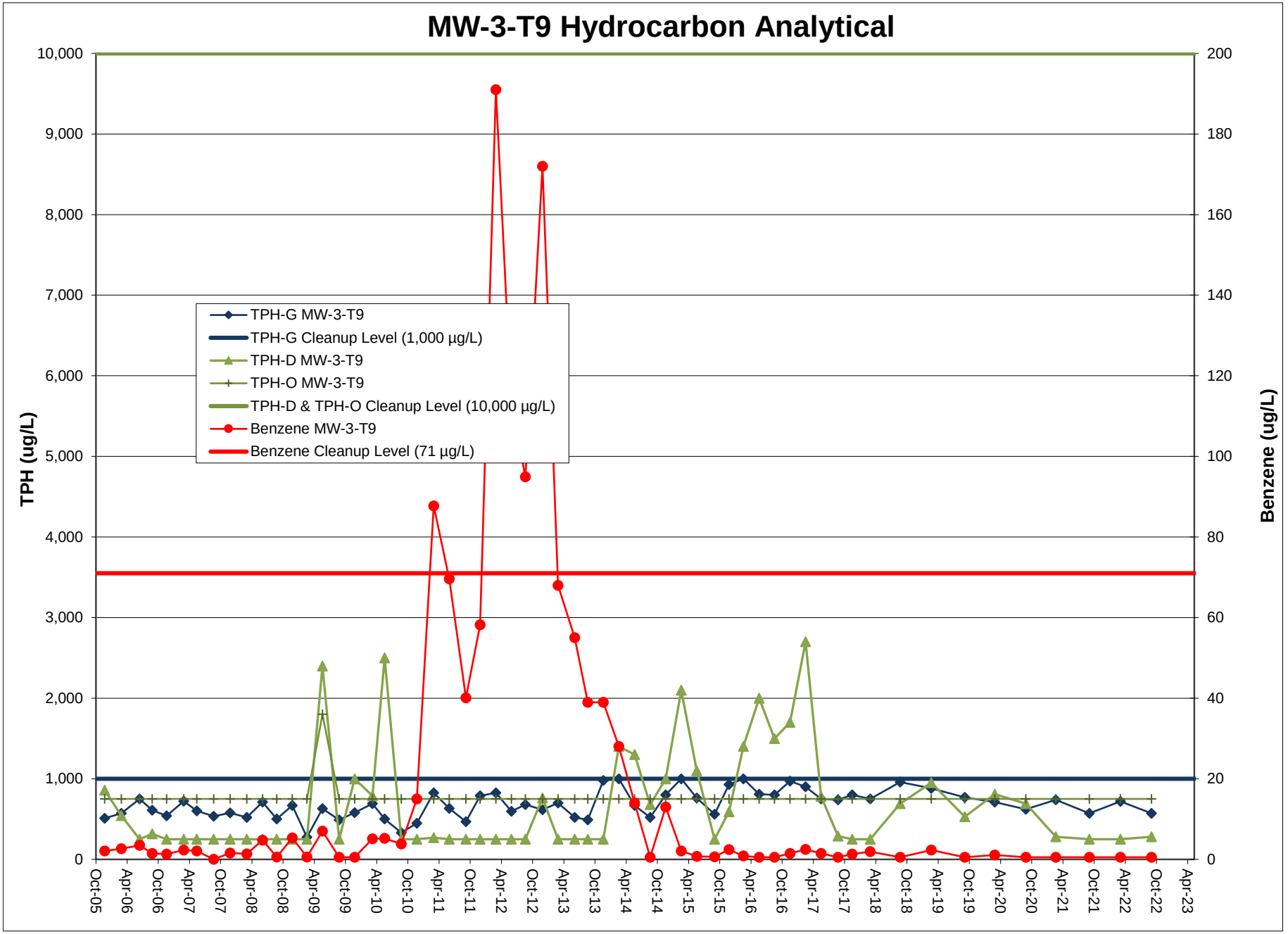

GM-17S Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
80
70
60
50
40
30
20
10
0
TPH-G GM-17S
TPH-G Cleanup Level (1,000 µg/L)
TPH-D GM-17S
TPH-O GM-17S
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene GM-17S
Benzene Cleanup Level (71 µg/L)
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Jun-99
Dec-99
May-00
Nov-00
May-01
Nov-01
May-02
Nov-02
May-03
Nov-03
May-04
Nov-04
May-05
Nov-05
May-06
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Nov-14
May-15
Nov-15
May-16
Nov-16
May-17
Nov-17
May-18
Nov-18
May-19
Nov-19
May-20
Nov-20
May-21
Nov-21
May-22
Nov-22
May-23


GM-24S Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
80
70
60
50
40
30
20
10
0
TPH-G GM-24S
TPH-G Cleanup Level (1,000 µg/L)
TPH-D GM-24S
TPH-O GM-24S
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene GM-24S
Benzene Cleanup Level (71 µg/L)
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Jun-99
Dec-99
May-00
Nov-00
May-01
Nov-01
May-02
Nov-02
May-03
Nov-03
May-04
Nov-04
May-05
Nov-05
May-06
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Nov-14
May-15
Nov-15
May-16
Nov-16
May-17
Nov-17
May-18
Nov-18
May-19
Nov-19
May-20
Nov-20
May-21
Nov-21
May-22
Nov-22
May-23


AR-03 Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
TPH-G AR-03
TPH-G Cleanup Level (1,000 µg/L)
TPH-D AR-03
TPH-O AR-03
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene AR-03
Benzene Cleanup Level (71 µg/L)
15,000
14,000
13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Jun-99
Dec-99
May-00
Nov-00
May-01
Nov-01
May-02
Nov-02
May-03
Nov-03
May-04
Nov-04
May-05
Nov-05
May-06
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Nov-14
May-15
Nov-15
May-16
Nov-16
May-17
Nov-17
May-18
Nov-18
May-19
Nov-19
May-20
Nov-20
May-21
Nov-21
May-22
Nov-22
May-23

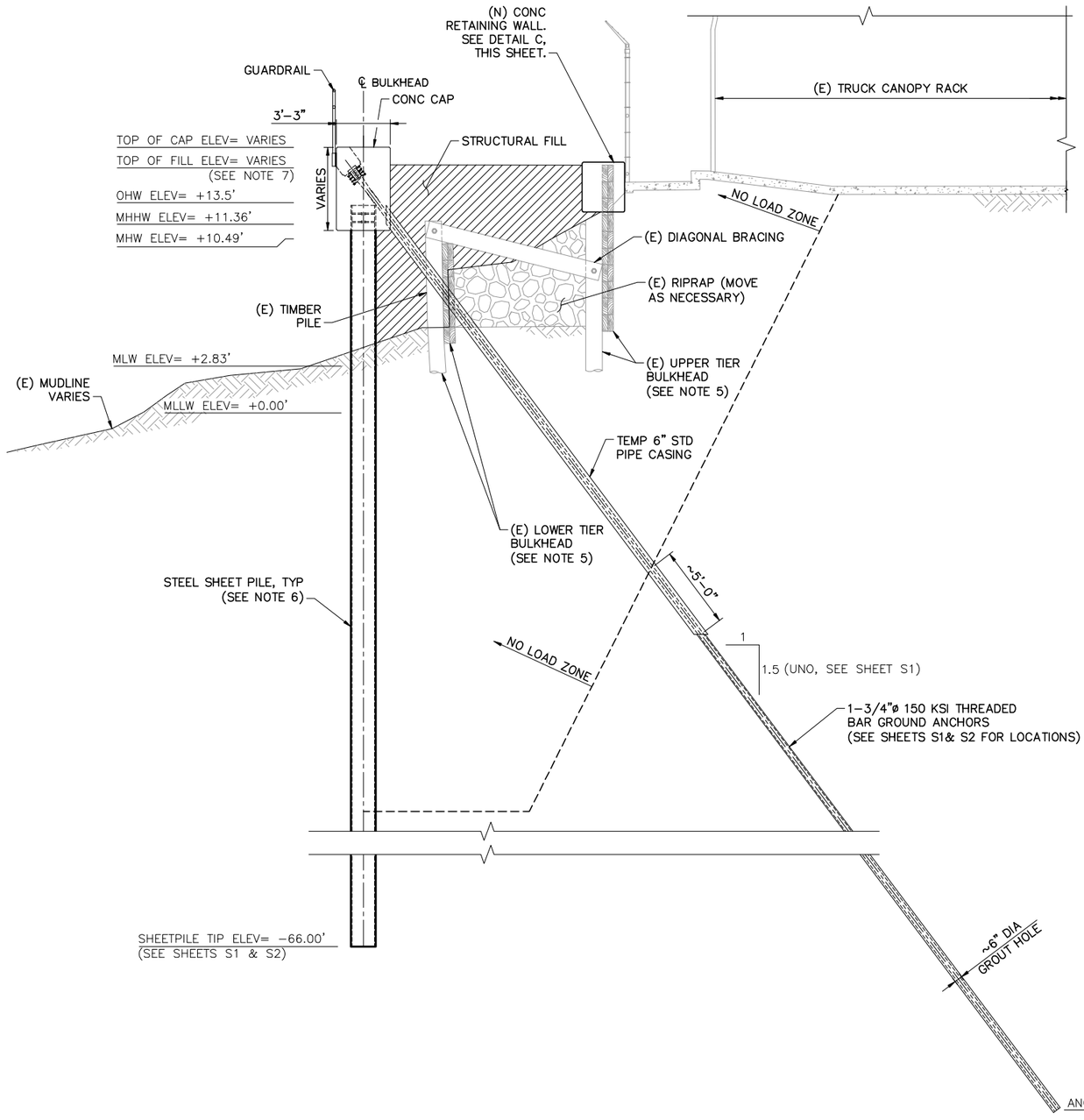

MW-1-T9 Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
TPH-G MW-1-T9
TPH-G Cleanup Level (1,000 µg/L)
TPH-D MW-1-T9
TPH-O MW-1-T9
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene MW-1-T9
Benzene Cleanup Level (71 µg/L)
14,000
13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
80
70
60
50
40
30
20
10
0
Oct-05
Apr-06
Oct-06
Apr-07
Oct-07
Apr-08
Oct-08
Apr-09
Oct-09
Apr-10
Oct-10
Apr-11
Oct-11
Apr-12
Oct-12
Apr-13
Oct-13
Apr-14
Oct-14
Apr-15
Oct-15
Apr-16
Oct-16
Apr-17
Oct-17
Apr-18
Oct-18
Apr-19
Oct-19
Apr-20
Oct-20
Apr-21
Oct-21
Apr-22
Oct-22
Apr-23


MW-2-T9 Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
80
70
60
50
40
30
20
10
0
Oct-05
Apr-06
Oct-06
Apr-07
Oct-07
Apr-08
Oct-08
Apr-09
Oct-09
Apr-10
Oct-10
Apr-11
Oct-11
Apr-12
Oct-12
Apr-13
Oct-13
Apr-14
Oct-14
Apr-15
Oct-15
Apr-16
Oct-16
Apr-17
Oct-17
Apr-18
Oct-18
Apr-19
Oct-19
Apr-20
Oct-20
Apr-21
Oct-21
Apr-22
Oct-22
Apr-23
TPH-G MW-2-T9
TPH-G Cleanup Level (1,000 µg/L)
TPH-D MW-2-T9
TPH-O MW-2-T9
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene MW-2-T9
Benzene Cleanup Level (71 µg/L)

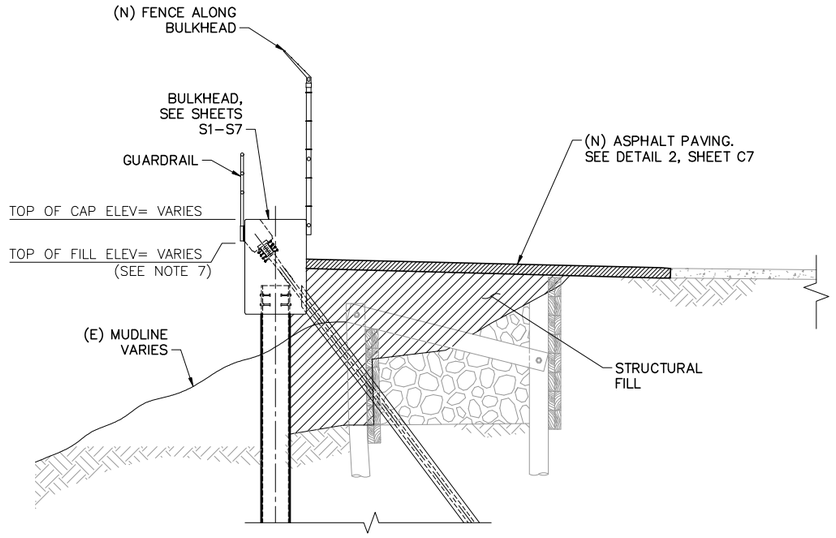

MW-3-T9 Hydrocarbon Analytical
TPH (ug/L)
Benzene (ug/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
200
180
160
140
120
100
80
60
40
20
0
TPH-G MW-3-T9
TPH-G Cleanup Level (1,000 µg/L)
TPH-D MW-3-T9
TPH-O MW-3-T9
TPH-D & TPH-O Cleanup Level (10,000 µg/L)
Benzene MW-3-T9
Benzene Cleanup Level (71 µg/L)
Oct-05
Apr-06
Oct-06
Apr-07
Oct-07
Apr-08
Oct-08
Apr-09
Oct-09
Apr-10
Oct-10
Apr-11
Oct-11
Apr-12
Oct-12
Apr-13
Oct-13
Apr-14
Oct-14
Apr-15
Oct-15
Apr-16
Oct-16
Apr-17
Oct-17
Apr-18
Oct-18
Apr-19
Oct-19
Apr-20
Oct-20
Apr-21
Oct-21
Apr-22
Oct-22
Apr-23

APPENDIX D

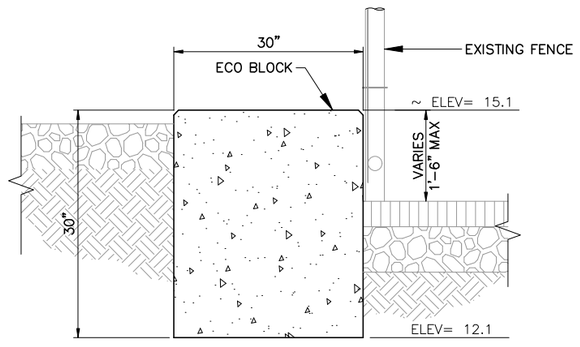
Seattle Terminal North Bulkhead Replacement Project Typical Sections



A / S1 & S2 **TYPICAL SECTION**
SCALE: 1/4"=1'-0"



B / S1 **TYPICAL SECTION**
SCALE: 1/4" = 1'-0"
(FOR OTHER DETAILS SEE SECTION A)



C / - **TYPICAL RETAINING WALL SECTION**
SCALE: 1" = 1'-0"

NOTES:

1. SEE ELEVATIONS ON SHEETS S1 THRU S2 FOR THE TOP OF PILE CAP ELEVATIONS, APPROX MUDLINE ELEVATIONS, & ANCHOR LOCATIONS.
2. ANCHOR TIP ELEVATION IS SUBJECT TO CHANGE BASED ON TEST ANCHOR RESULTS.
3. EXPECTED MAXIMUM ANCHOR LOAD = 240 kips
4. REFER TO SPECIFICATION FOR ANCHOR TESTING PROCEDURES.
5. TIP OF TIMBER PILES IS UNKNOWN.
6. SHEET PILES TO BE PROVIDED BY THE OWNER.
7. SEE GRADING PLAN ON SHEET C6.

RECORD DRAWING

This record drawing has been prepared, in part, based upon information furnished by others. While this information is believed to be reliable, the Engineer cannot assure its accuracy, and thus is not responsible for the accuracy of this record drawing or for any errors or omissions which may have been incorporated into it as a result. Those relying on this record drawing are advised to obtain independent verification of its accuracy before applying it for any purpose.

moffatt & nichol **DATE : 8/24/2018**

1'-0" 0'-0" 1'-0" 2'-0"
SCALE: 1"=1'-0"

4'-0" 0'-0" 4'-0" 8'-0"
SCALE: 1/4"=1'-0"

SHT NO.: S3

moffatt & nichol
600 UNIVERSITY STREET
SUITE# 610
SEATTLE, WA 98101
(206) 622-0222

INDEX REV	REF DWG NO	DESCRIPTION

REV	DATE	PROJ#	R&I NO.	REVISION	CONTRACTOR	CKD	PIC

OLD DWG. NO.: N/A

BP West Coast Products LLC
U.S. Pipelines & Logistics

SEATTLE TERMINAL
NORTH BULKHEAD REPLACEMENT PROJECT
TYPICAL SECTIONS

SCALE: AS NOTED TYPE: 14 SUBTYPE: 75

DWG NO. SE-1-S-10197417 REVISION -

10197417