LANGAN

Technical Memorandum

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444

To: Wendi Zheng, Andre Obligado, Jane H. O'Connell (NYSDEC)

From: Jason Hayes, PE, LEED AP and Gerald Nicholls, PE, CHMM

Info: James Strobel, Aaron Lipman, Eric Saretsky, Sam Bernstein, Queens Development Group (QDG); Langan Team

Date: June 21, 2023

Re: Recovery Well Installation for Light Non-Aqueous Phase Liquid Recovery
Willets Point Development - Operable Unit 2 (OU-2)
Queens, NY
NYSDEC BCP Site No. C241146
Langan Project No.: 170197601

On behalf of the Volunteers (Queens Development Group, LLC; QDG Hotel Partners, LLC; QDG 126th Street Partners, LLC; QDG Parking Partners, LLC; and QDG Retail Partners, LLC [collectively, QDG]), Langan prepared this technical memorandum to modify the New York State Department of Environmental Conservation (NYSDEC)-approved June 7, 2022 Willets Point Development Brownfield Cleanup Program (BCP) Site No. C241146 Operable Unit 2 (OU-2) Remedial Action Work Plan (RAWP). OU-2 is a 15.084-acre portion of BCP Site No. C241146, located at Seaver Way (formerly 126th Street) and Willets Point Boulevard in Queens, New York. The overall Willets Point Development BCP Site is located in a former industrial zone in the Borough of Queens and has a total area of 22.887 acres (7.803 acres for OU-1 and 15.084 acres for OU-2).

The RAWP includes the excavation of contamination source areas (fill and soil creating nuisance conditions or that is grossly impacted) in five areas throughout OU-2, including approximately 1,800 cubic yards of fill and/or soil from Area H (Block 1823) in the central part of OU-2. This memo modifies the RAWP by adding remedial measures to address the presence of residual light non-aqueous phase liquid (LNAPL) encountered in the northwestern part of Area H (see Figure 1). This modification includes the installation of four recovery wells and implementation of dual-phase vacuum-enhanced extraction to remove petroleum-impacted groundwater and recoverable LNAPL observed in Area H (Block 1823, Lots 52 and 55) during the excavation of a fill and soil contamination source area, to be performed under the approved OU-2 RAWP. If LNAPL recovery is not finished under the RAWP, it will continue following issuance of a certificate of completion (COC) under the forthcoming Site Management Plan (SMP).

1.0 REMEDIAL ACTIONS TO DATE

OU-2 RAWP implementation began on August 9, 2022 and is currently underway. As described in the RAWP, excavation of fill and soil contamination source areas (fill and soil creating nuisance conditions or that is grossly impacted) was identified for removal by excavation in the southern

and northern parts of Area E, the southern part of Area G, the northwestern part of Area H, the northern and southern parts of Area I, and the eastern part of Area J. Remediation to date has included the excavation of fill and soil contamination source areas throughout these areas in OU-2, and excavation of fill material site-wide to a depth of 2 feet below grade surface (bgs). Source material excavation of grossly-impacted soil exhibiting petroleum-like impacts extended to about 1 to 2 feet below the groundwater table in each excavation and was expanded laterally to remove encountered source material.

2.0 PROPOSED REMEDIATION MODIFICATION

During excavation of a fill and soil contamination source area in the northwestern part of Area H, five underground storage tanks (USTs) were encountered; two 1,500 gallon USTs, one 500 gallon UST, and two 275 gallon USTs. In addition, LNAPL was observed floating on top of groundwater in the excavation area during and following UST removal. The USTs were removed and the previously identified source area excavation was extended to remove additional source material to the maximum extent practical. The excavation was limited to the north and west by the OU-2 boundary, and was taken to the furthest extent practical while avoiding risk of undermining adjoining property and structures.

Once excavation was complete, oil-only absorbent booms and a vacuum truck were used to remove LNAPL from the groundwater within the excavation area. A total of about 6,973 gallons of LNAPL and petroleum-impacted groundwater were removed throughout the excavation between April 17 and May 9, 2023. Field observations indicated residual LNAPL continuing to enter the open excavation, likely from the western property boundary where the source excavation could not continue and likely residual from the removed onsite USTs and LNPAL-impacted soil. The residual LNAPL was less than 0.1 inches thick but more than a sheen based on field measurements. After the last vacuum event, the excavation was backfilled with ¾-inch quarry stone to the groundwater table and capped with NYSDEC-approved clean fill and quarry stone in accordance with the RAWP.

To remove remaining recoverable LNAPL, Langan proposes the following scope of work:

- Installation of four new 4-inch-diameter polyvinyl chloride (PVC) recovery wells;
- Active recovery of LNAPL and petroleum-contaminated groundwater from the four recovery wells (up to 12 recovery events are initially planned) via vacuum-enhanced dual-phase extraction;
- Passive recovery of LNAPL via oil-only absorbent socks, which will be placed in the wells with recoverable LNAPL in between vacuum recovery events (LNAPL accumulation on the socks will also be used to quantify LNAPL recoverable progress and endpoint); and
- Disposal of LNAPL and petroleum-contaminated groundwater at a facility permitted to accept the waste.

2.1 Geophysical Survey and Recovery Well Installation

To confirm additional USTs do not exist to the south and east of the source area excavation, we will complete a geophysical survey of the northwest part of Area H (Block 1823, Lots 52 and 55). Geophysical survey results will be reported in the following monthly progress report; if additional anomalies indicative of a UST are identified, appropriate action will be taken in accordance with the RAWP.

After the geophysical survey, four, 4-inch-diameter recovery wells will be installed. The wells will be installed along the western boundary of Area H and in the western part of the excavation area. The proposed recovery well locations are shown on Figure 1.

Soil cuttings generated during well installation will be screened continuously with a photoionization detector (PID) equipped with a 10.6 electron volt bulb and for visual and olfactory evidence of environmental impacts (e.g., staining and odor). Drilling observations will be recorded in field notes. Soil cuttings will be containerized into 55-gallon steel drums pending off-site disposal to a permitted facility.

The wells will be constructed with 10-foot-long, 4-inch-diameter, 0.030-slot PVC well screens from about 2 to 12 feet below grade surface (bgs) and schedule 40 solid PVC riser to grade. The annulus of each borehole will be backfilled with No. 2 sand to about 1 foot above the screened interval (about 1 foot bgs), followed by about 6 inches of hydrated bentonite, and about 6 inches of Portland cement to surface. Wells will be developed following installation using a surge block with inertial pump to agitate and remove fines and develop the filter pack. The wells will be finished above grade with a 6-inch diameter steel stick-up well casing. A typical recovery well construction diagram is included as Attachment 1.

2.2 LNAPL Extraction

LNAPL recovery will be performed at the four recovery wells beginning one week after recovery well development. LNAPL will be recovered via a NYSDEC Part 364-permitted vacuum truck and will continue until LNAPL is no longer recoverable. Langan proposes eight weekly recovery events, followed by four monthly recovery events (for a total of 12 recovery events). This schedule may be shortened with approval by the NYSDEC if asymptotic recovery is achieved early, or lengthened if recoverable LNAPL is still present after the planned twelve events have been completed.

In between recovery events and following recovery well development, oil-only absorbent socks will be placed in the four recovery wells primarily for evaluating LNAPL accumulation and secondarily for passive recovery between vacuum events. Absorbent socks will be replaced in the well after each vacuum event until saturated, at which time they will be disposed of off-site at a facility permitted to accept the waste. The oil-only only absorbent socks will be photo documented and, to measure LNAPL accumulation, weighed and product thickness measured. Following each recovery event, the recovered petroleum-contaminated groundwater and LNAPL will be disposed of off-site at a facility permitted to accept the waste. Waste manifests will be

included in the Final Engineering Report, or in periodic review reports if LNAPL recovery continues beyond COC.

This memo does not modify reporting requirements; LNAPL recovery activities will be documented in daily and monthly reports and the Final Engineering Report and, if needed, Periodic Review Reports.

2.3 Post-Recovery Groundwater Monitoring

To document LNAPL recovery performance, a groundwater sample will be collected from one groundwater monitoring well installed within the remedial excavation area. The monitoring well screen will be constructed across the observed groundwater table, encountered during the RI at approximately elevation 5 feet, using two-inch diameter, threaded, flush-joint, polyvinyl chloride (PVC) casing, and 0.01-inch slot well screen. The well will be constructed with a ten-foot-long screen. Clean sand (e.g., Morie No. 0) will be used to fill the annulus around the screen up to about two feet above the top of the screened interval. A one-foot-thick bentonite seal will be installed above the sand, and the remaining borehole annulus will be grouted to the surface with bentonite and cement slurry. The monitoring well will be finished at the surface with steel stickup covers. The proposed monitoring well location is provided in Figure 1.

Prior to post-recovery sampling, the head space of the well will be monitored with a PID and an interface probe will be used to measure depth to water. A post-recovery groundwater sample will be analyzed for Part 375 and Target Compound List (TCL)-listed volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

Geochemical parameters (e.g., dissolved oxygen [DO], oxidation reduction potential [ORP], specific conductivity, pH, temperature, turbidity) will be recorded during sampling and results will be reported to the NYSDEC with the groundwater sample analytical data results. If residual groundwater concentrations of fuel-related compounds exceed NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water (SGVs), additional groundwater monitoring and/or groundwater treatment may be required during site management, subject to NYSDEC review.

3.0 SCHEDULE

Recovery well installation and the first recovery event is scheduled for June 26 and 27, 2023. Subsequent recovery events will be conducted between July and December 2023, with the final event scheduled to be completed during the week of December 25, 2023.

4.0 CERTIFICATION

I, Jason J. Hayes, PE, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Technical Memorandum was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

Jason Hayes	6-21-2023	
NYS Professional Engineer 089491	Date	Signature

Figures
Figure 1: Alternative II – Track 4 Remedial Excavation and Site Cover Plan Block 1823 (H) Modification

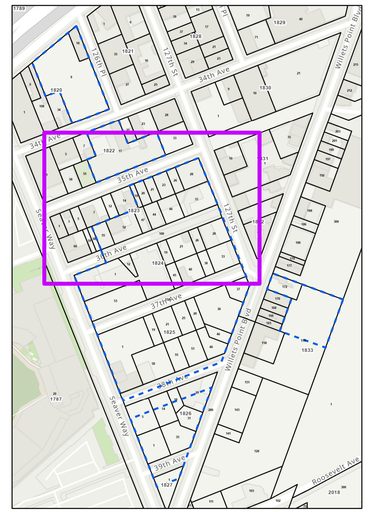
Attachments
Attachment 1: Typical Recovery Well Construction Diagram

FIGURES

Legend

- Approximate Location of Proposed Monitoring Well
- Proposed Recovery Well Location
- Limit of Remediation (OU-2 Boundary)
- Approximate Planned Area of Remedial Excavation to about 1 foot below groundwater and backfilled with environmentally clean fill per project specifications to site grade (about 8 feet bgs)
- Approximate Area of Remedial Excavation to 2 feet bgs and Backfill with Environmentally Clean Fill per Project Specifications
- Tax Lots
- Approximate Final Extents of Remedial Excavation Based on Field Impacts Observed
- Approximate Extents of Building Footprint

Notes:
1. Base map is referenced from tax parcel data provided by the New York City Department of City Planning.
2. Light Gray Base basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online.
3. Sample locations are approximate.
4. An engineered composite cover system consisting of a minimum of 2-feet certified clean backfill will be installed across the entire site footprint. See text for backfill requirements.
5. bgs = Below Grade Surface
6. Excavation extents are approximate. The excavation depths corresponding to the bottom of the excavation are approximated, provided for reference only, and vary based on existing site grade and depth to groundwater.
7. Remedial excavation extents and depths are subject to change based on field observations. Source material encountered outside of the remedial excavation extents on this figure will be removed as part of the remedy.
8. The buildings shown are estimates based on the Light Gray Base basemap and on-site observations.



30 0 30
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project
WILLETS POINT DEVELOPMENT
OU-2 (PHASE 2)
REMEDIAL ACTION WORK PLAN
BCP SITE NO C241146
QUEENS NEW YORK

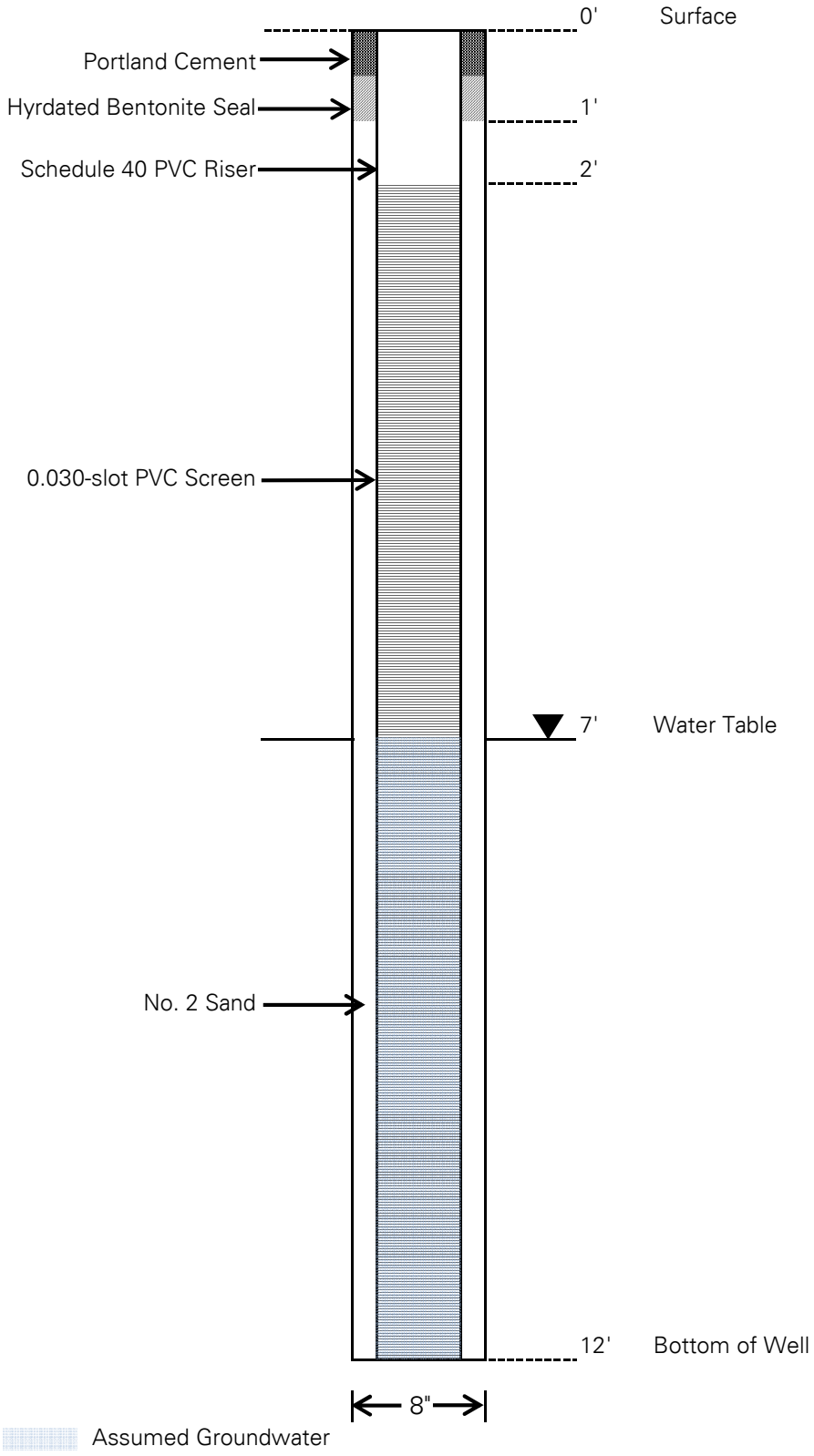
Figure Title
ALTERNATIVE II -
TRACK 4 REMEDIAL EXCAVATION AND SITE COVER PLAN
BLOCK 1823 (H)
MODIFICATION

Project No.	170197601
Date	6/9/2023
Scale	1" = 30 feet
Drawn By	PDT
Submission Date	12/22/2021

Figure. 1

ATTACHMENT 1
TYPICAL RECOVERY WELL CONSTRUCTION DIAGRAM

Typical Recovery Well Construction Diagram



Notes:

1. Not to scale.
2. All measurements are approximate and do not reflect site conditions.