

Date: December 12, 2025

To: Ms. Marlen Salazar, NYSDEC Project Manager

From: Omar Ramotar, P.E. - Roux Environmental Engineering and Geology, D.P.C.

CC: Frank Cherena – Roux Environmental Engineering and Geology, D.P.C.
 Wendy Shen – Roux Environmental Engineering and Geology, D.P.C.
 Mordy Fulop, Bergen St Equity LLC
 Jacob Katz, Bergen St Equity LLC
 Linda Shaw, Esq., Knauf Shaw LLP

Subject: In-Situ Chemical Oxidation Design
 BCP Site Number C224403
 270 Bergen Street, 280 Bergen Street, 290-298 Bergen Street & 265 Wyckoff Street
 Brooklyn, New York
 Tax Block 388, Lots 19-21 and 57

1. Site Description/Physical Setting/Site History

Bergen St Equity LLC entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) on March 19, 2024, to investigate and remediate a 1.163-acre property located at the former addresses of 268 Bergen St, 287 Wyckoff St and N/A Wyckoff St (f/k/a 273 Wyckoff St) in Brooklyn, Kings County, New York (Site). Bergen St Equity LLC is a Volunteer in the Brownfield Cleanup Program.

The Site is located in the County of Kings, Brooklyn, New York when it entered the program it was identified as Block 388, Lots 19, 42, and 51 and was still owned by BMW3 RE-GEN, LLC. A BCA Amendment was sent to the NYSDEC on July 14, 2025 to advise that the current Volunteer Bergen St Equity LLC became the title owner the entire BCP Site and that the tax lots were reapportioned. The former tax lots known as 268 Bergen Street (Block 388, Lot 19), 287 Wyckoff Street (Block 388, Lot 42), and N/A Wyckoff Street (Block 388, Lot 51) were reapportioned into 270 Bergen Street (Block 388, Lot 19), 280 Bergen Street (Block 388, Lot 20), 290-298 Bergen Street (Block 388, Lot 21) and 265 Wyckoff Street (Block 388, Lot 57).

A United States Geological Survey (USGS) topographical quadrangle map (Figure 1) shows the Site location. The Site is situated in an approximately 1.163-acre area bounded by (see Figure 2):

- Bergen Street, one- and two-story commercial buildings, a four-story residential building, a church, and a parking lot to the north;
- Wyckoff Street, a three-story residential building and a three-story industrial building to the south;
- multiple one- and two-story commercial buildings, a parking facility, and a gas station to the east; and
- multiple four-story residential buildings to the west.

The Site is currently located in the R7-A District, R7-D District and the C4-2 Overlay District. The closest water body, the Gowanus Canal, is located approximately 1,100 feet from the Site.

Based on a review of previous environmental reports and documentation, including historic aerial photographs, the Site was first developed prior to 1886 with multiple residences and a lumber facility.

By 1904, the lumber facility was replaced by a facility operated by the Federal Brewing Company. By 1915, the Federal Brewing Company was replaced by the R.F. Stevens Milk Company as a milk distribution depot. By 1938, the depot was used as a private automobile parking facility. In the 1960s, the Site was operated by the Diagravure Film Corporation as a screen-printing facility. By 2010, the screen-printing facility was operated by Ulano Corp. The Site is currently vacant, and all buildings have been demolished.

2. Proposed Treatment Area

The target treatment area is shown in Figure 13 from the RAWP (refer to Attachment 1) and comprises of the extent of the current basement area within the site building encompassing sample locations RXSB-9/RXMW-9 sample location, and to a lesser extent, the area surrounding RXSB-12/RXMW-12. Petroleum related volatile organic compounds (VOCs) and some semi volatile organic compounds (SVOCs) are present in soil and groundwater from a potential former release at the Site. Boring log information from the impacted area indicates PID readings detecting VOCs as shallow as 1 foot (ft) below basement grade (bbg) and as deep as 5 ft bbg. Depth to groundwater is also shallow in the basement area detected at 3.25 ft bbg (or ~18-20 feet below street grade).

3. Treatment Objective

In-situ groundwater remediation is proposed to treat residual VOC impacts on the eastern portion of Lot 21. In-situ chemical oxidation (ISCO) reagents will be injected within the proposed treatment area to demonstrate attainment of New York State Department of Environmental Conservation (NYSDEC) Ambient Water Quality Standards and Guidance Values (AWQSGVs) or bulk reduction in groundwater concentrations.

4. Sequence of Work

The following describes the anticipated sequence of work (SOW) for performing the ISCO treatment program:

1. Obtain necessary Fire Department of New York (FDNY) approvals to store oxidizers and corrosive materials on-site;
2. NYSDEC approval of ISCO design program;
3. Contractor mobilization;
4. Collect baseline groundwater samples from RXMW-9 and RXMW-12 if the wells exist and are not damaged;
5. Steel sheeting installation;
6. Excavation to approximately 15 feet below grade within limits of target treatment area;
7. Collection and analysis of endpoint post-excavation samples¹ within limits of target treatment area; endpoint samples will be collected at 15-17 feet below grade;
8. Additional excavation, and subsequent collection and analysis of endpoint post-excavation soil samples, within limits of target treatment area, if applicable, until additional post-excavation sample analytical results are confirmed to be below NYSDEC Protection to Groundwater standards;
9. Install temporary monitoring well;
10. Collect pre-treatment groundwater sample from temporary monitoring well;
11. Perform 1st ISCO event;

¹ 2 Day laboratory turn around time.

12. Collect post-treatment groundwater sample from temporary well point approximately 4 weeks after completion of 1st ISCO event;
13. Perform 2nd ISCO event (If required²) approximately 4 to 6 weeks after performance of 1st ISCO event;
14. Installation of four (4) new post-remediation monitoring wells in accordance with the NYSDEC-approved RAWP; and
15. A minimum³ of 4 quarterly monitoring events will be performed following remediation.

5. ISCO Design

See memorandum from ISOTEC dated October 3, 2025 provided as Attachment 1.

077995

NYS Professional Engineer #

12/12/2025

Date



² If analytical results do not demonstrate attainment of NYSDEC AWQSGVs or bulk reduction in groundwater concentrations.

³ Groundwater monitoring activities to assess the performance of the remedy, or natural attenuation following the removal of contaminant sources, will continue, as determined by NYSDOH and NYSDEC, until residual groundwater concentrations are found to be below NYSDEC standards or have become asymptotic over an extended period. Monitoring will continue until permission to discontinue is granted in writing by NYSDEC and NYSDOH. Monitoring activities will be outlined in the Monitoring Plan of the SMP.



MEMORANDUM

To:	Omar Ramotar (Roux Associates)
Subject:	In-Situ Chemical Oxidation Conceptual Treatment Program 286 Bergen Street Site, Brooklyn, NY
From:	Mike Temple and Prasad Kakarla
Date:	October 3, 2025

ISOTEC evaluated Roux provided information for in-situ remediation at a Site located at 286 Bergen Street in Brooklyn, New York. The target treatment area is shown in **Figure 1** and comprises of the extent of the current basement area within the site building encompassing sample locations RXSB-9/RXMW-9, and to a lesser extent, the area surrounding RXSB-12/RXMW-12. Petroleum related volatile organic compounds (VOCs) and semi volatile organic compounds (SVOCs) are present in soil and groundwater from a former release at the Site. Boring log information from the impacted area indicates PID readings detecting VOCs as shallow as 1 feet (ft) below basement grade (bbg). Depth to groundwater is also shallow in the basement area detected at 2-4 ft bbg. The proposed remedial plan is to inject in-situ chemical oxidation (ISCO) reagents across the impacted subsurface soils and shallow groundwater beneath the current basement area to address petroleum related impacts.

The objective of the in-situ chemical oxidation (ISCO) treatment program is to reduce soil and groundwater concentrations of VOCs/SVOCs with a single injection event, but a second injection event may also be required.

Treatment Considerations

- The Site is undergoing redevelopment work including removal of the existing building and subsequent excavation of soils down to ~ 15 ft below street grade (bsg). Any required excavation or other earth work is assumed to be completed prior to ISOTEC's arrival at the Site (by others).
- Depth to water at the site following excavation is anticipated to be shallow at approximately 2-4 ft bbg. Review of boring log information lists the geology as brown, fine to coarse sand with some gravel in the shallow saturated zone from ~3-13 ft bbg.
- There are two sampling locations (RXSB-9/RXMW-9 and RXSB-12/RXMW-12) located in the target area with VOC concentrations above criteria. Soil data indicates relatively low levels of individual COCs currently remain in the target area.

- PID readings ranging from 200-718 parts per million (PPM) were detected in the boring log readings for RXSB-9/RXMW-9 at depths between 1-5 ft bbg (no readings were collected below 5 ft bbg).
- The area of impact is estimated to be approximately 75' x 40' square feet (ft²), or 3,000 ft². The target treatment interval is from ~3 to 13 ft bbg. The actual target interval and thickness will be verified by Roux, based on the actual depth of the excavation limits. ***For planning purposes however, the target treatment interval is assumed to be 10 ft thick within the saturated soils/groundwater impacted interval, below the excavation grade or current basement grade level.***
- Additional information about site access and equipment/ chemical storage will need to be provided prior to mobilization.
- If the Site has active construction work being performed during the planned injection work, coordination with Roux and the general contractor will need to be planned ahead of time to ensure the work can be performed in a safe manner. ISOTEC will require an adequately sized area for safe storage of vehicles, materials and equipment. Complete access to the target area will need to be maintained for the ISOTEC crew and subcontracted driller. ISOTEC crew members will all have the SST cards required for working on active construction sites in NYC.
- For ISCO projects in the NYC area, submittal of a TM-1 application to secure a permit to store oxidizers and corrosive materials will need to be handled by Roux (or property owner). This process can typically take up to 4-8 weeks to secure approval from FDNY and requires an inspection of the Site by an FDNY representative before starting the injections (or on one of the first few days). ISOTEC personnel will have the required W-42 certification that allows handling of oxidizers and corrosive materials at the Site.
- ISOTEC is assuming that Roux (or others) will handle any required field monitoring (air quality or groundwater parameter), provide bathroom facilities, provide access to a water source (via a permitted hydrant connection or existing water line connection at the Site), provide site security and adequately sized area for storage of chemicals and equipment required to complete the injection event(s).
- ISOTEC is assuming that vehicles will be allowed to park on the Site during the injection work.

Conceptual Remediation Design

ISOTEC's remediation design consists of a single injection event, but a second injection event may be required to inject the full mass of oxidant estimated for the project. The first injection event is proposed using a combination of modified Fenton's reagent (MFR) and activated sodium persulfate (ASP). Advantages of MFR include rapid desorption and degradation of petroleum related COCs. Additionally, dissolved oxygen produced can enhance activity of aerobic hydrocarbon degrading bacteria. ASP will be achieved via activation by food grade carbohydrates in the presence of alkalinity (i.e. sodium hydroxide). Sodium persulfate produces sulfate free radicals that can attack petroleum hydrocarbons to produce benign end products. The oxidation reaction product of sodium persulfate is sulfate which can enhance activity of anaerobic bacteria that biodegrade petroleum hydrocarbons.

Total size of the target treatment area is ~3,000 ft². The injection points will be placed on approximate 12-ft centers, for an assumed radius of influence (ROI) of 6.0 feet. Total volume injected per event will be ~18% of the estimated pore volume, or ~10,080 gallons. If the proposed volume cannot be injected due to surfacing issues, or other site constraints, the total volume injected may need to be reduced, with a subsequent increase in concentration for the oxidants required, to be able to inject the proposed mass of oxidants calculated for the injection program. If needed, additional injection points may also need to be installed to try and deliver the proposed volumes.

Table 1. Conceptual ISCO Remediation Quantities

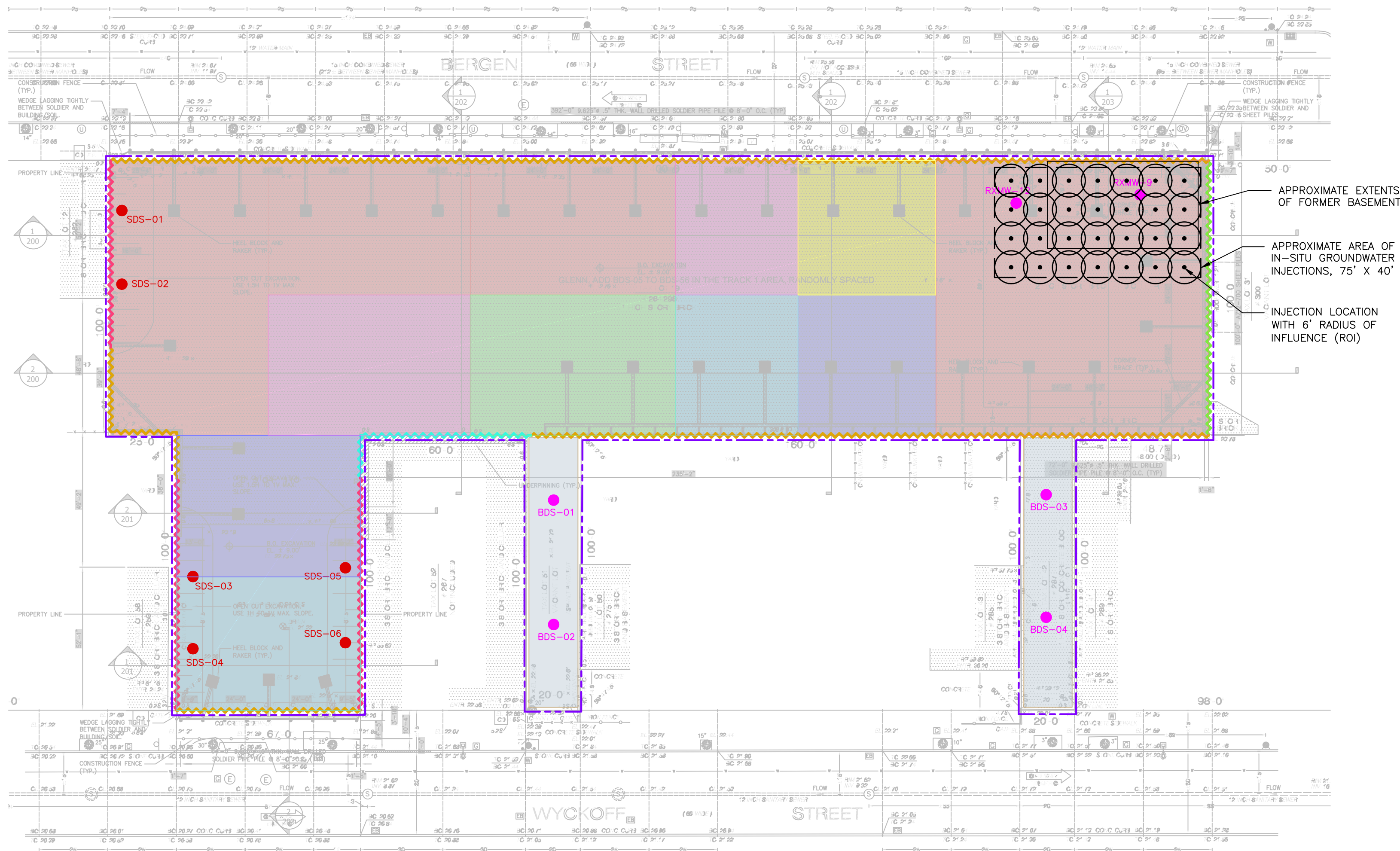
Area (ft ²)	Injection Point Screen Interval (ft bbg)	Injection Locations	No. Intervals/ Locations	Injection Volume/ Point (gallons)	Injection Volume/ Interval (gallons)	Total Injection Volume (gallons)	Injection Days
3,000	3 –13	28	2	270-360	135-180	7,560-10,080	9

Note: MFR assumed to be at an ~9-10% concentration (stabilized hydrogen peroxide concentration) and ASP assumed to be at an ~9-10% concentration (sodium persulfate concentration).

For any subsequent injection events required following the initial application, either the combined approach can be utilized again, or MFR and/or ASP can be used as the stand alone ISCO technology. Field observations on how well each ISCO technology can be injected into

the shallow subsurface will help dictate the best approach for any follow-up injection events. MFR can sometimes be difficult to inject at sites with shallow groundwater due to off-gassing from associated reactions that can lead to reagent short-circuiting/ daylighting to the surface, but does offer a more robust desorption capability compared to ASP alone, to degrade residual sorbed soil impacts that still exist at the Site.

Any subsequent injection events will be performed, if necessary, based on field observations and sample data collected from the previous injection events. If additional injections are required, the injection points will be placed in between the original injection point locations.

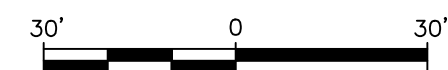


LEGEND

- | | | | | |
|--|---|--|--------|--|
| | SITE BOUNDARY | | BDS-01 | PROPOSED LOCATION OF TRACK 4 BOTTOM DOCUMENTATION SAMPLE |
| | PROPOSED TRACK 2 REMEDIAL EXCAVATION DEPTH TO 2 FT BLS | | BDS-05 | PROPOSED LOCATION OF TRACK 2 BOTTOM DOCUMENTATION SAMPLE |
| | PROPOSED TRACK 2 REMEDIAL EXCAVATION DEPTH TO 4 FT BLS | | SDS-03 | PROPOSED LOCATION OF TRACK 2 SIDEWALL DOCUMENTATION SAMPLE |
| | PROPOSED TRACK 2 REMEDIAL EXCAVATION DEPTH TO 6 FT BLS | | | SOE - DRILLED SOLDIER PILE |
| | PROPOSED TRACK 2 REMEDIAL EXCAVATION DEPTH TO 12 FT BLS | | | SOE - UNDERPINNING |
| | PROPOSED TRACK 2 REMEDIAL EXCAVATION DEPTH TO 14 FT BLS | | | SOE - STEEL SHEETING |
| | PROPOSED TRACK 2 REMEDIAL EXCAVATION DEPTH TO 15 FT BLS | | | SOE - SLOPED SOIL BERM |
| | PROPOSED TRACK 4 REMEDIAL EXCAVATION DEPTH TO 2 FT BLS | | | |

NOTE

1. THE REMEDIAL EXCAVATION SHOWN IS BASED ON THE EXISTING DATASET FROM ROUX'S 2024 REMEDIAL INVESTIGATION. A PRE-DESIGN INVESTIGATION WILL BE PERFORMED PRIOR TO CONSTRUCTION TO FURTHER DELINEATE SPECIFIC HORIZONS OF ONSITE CONTAMINATION IN ORDER TO CONFIRM FINAL REMEDIAL EXCAVATION DEPTHS.



Title: REMEDIAL ALTERNATIVE 2 TRACK 2/4 RESTRICTED RESIDENTIAL USE CLEANUP 268 BERGEN ST., 287 WYCKOFF ST., N/A WYCKOFF ST. BROOKLYN, NEW YORK			
Prepared for: BERGEN ST EQUITY LLC			
	Compiled by: J.M.	Date: 31MAR25	FIGURE 13
	Prepared by: O.R.	Scale: AS SHOWN	
	Project Mgr: J.M.	Project: 4442.0001Y000	
	File: 4442.0001Y115.07.DWG		