SENDERO VERDE REDEVELOPMENT PROJECT – PARCEL A

NEW YORK COUNTY
NEW YORK, NEW YORK

Final Engineering Report

NYSDEC Site Number: C231135

Prepared for:

SV-A Owners LLC
551 Fifth Avenue, 23rd Floor
New York, NY 10176

Prepared by:

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209 Shafter Street
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631-232-2600

NOVEMBER 222

CERTIFICATIONS

I, *Noelle Clarke*, am currently a registered professional engineer licensed by the State of New York, I had primary direct responsibility for implementation of the remedial program activities, and I certify that the Remedial Investigation Report/Remedial Action Work Plan was implemented and that all construction activities were completed in substantial conformance with the Department-approved Remedial Investigation Report/Remedial Action Work Plan.

I certify that the data submitted to the Department with this Final Engineering Report demonstrates that the remediation requirements set forth in the Remedial Investigation Report/Remedial Action Work Plan and in all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established for the remedy.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and/or any operation and maintenance requirements applicable to the Site are contained in an environmental easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded.

I certify that a Site Management Plan has been submitted for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the Department.

I certify that all documents generated in support of this report have been submitted in accordance with the DER's electronic submission protocols and have been accepted by the Department.

I certify that all data generated in support of this report have been submitted in accordance with the Department's electronic data deliverable and have been accepted by the Department.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Noelle Clarke, of Roux Environmental Engineering and Geology, D.P.C. located at 209 Shafter Street, Islandia, New York 11749, am certifying as Owner's Designated Site Representative for the Site.

Noelle Clarke, P.E.

NYS Professional Engineer #072491 Date Signature

TABLE OF CONTENTS

TABLES

FIGURES

PLATES

APPENDICES

(Appendices Are Provided on Flash Drive in Bound Report)

LIST OF ACRONYMS

Acronym	Definition
µg/L	Micrograms per liter
µg/m^3	Micrograms per cubic meter
AOC	Area of Concern
AST	Above Ground Storage Tank
AWQSGV	Ambient Water Quality Standards and Guidance Value
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BDS	Bottom Documentation Sample
BUD	Beneficial Use Determination
C&D	Construction and Demolition
CAMP	Community Air Monitoring Plan
CCR	Construction Completion Report
COPC	Contaminant of Potential Concern
CPP	Citizen Participation Plan
CQAP	Construction Quality Assurance Plan
cy	Cubic Yard
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
EC	Engineering Control
FDNY	Fire Department of the City of New York
FER	Final Engineering Report
FRP	Fiberglass Reinforced Plastic
FSP	Field Sampling Plan
ft bls	Feet below land surface
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IC	Institutional Control

Acronym	Definition
IRM	Interim Remedial Measure
ISCO	*In Situ* Chemical Oxidation
NYC	New York City
NYCDEP	New York City Department of Environmental Protection
NYCDOB	New York City Department of Building
NYCRR	New York Codes, Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOB	New York State Department of Buildings
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
NYCRR	New York Codes, Rules and Regulations
ORP	Oxidation Reduction Potential
OSHA	Federal Occupational Safety and Health Administration
PBS	Petroleum Bulk Storage
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization Detector
PoG SCO	Protection of Groundwater Soil Cleanup Objective
PPE	Personal Protective Equipment
PPM	Parts per Million
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate

Acronym	Definition
RI	Remedial Investigation
RIR	Remedial Investigation Report
RRSCO	Restricted Residential Use Soil Cleanup Objective
SCO	Soil Cleanup Objective
SDS	Sidewall Documentation Sample
SEQRA	State Environmental Quality Review Act
SMP	Site Management Plan
SOE	Support of Excavation
SOP	Site Operations Plan
SoMP	Soil/Materials Management Plan
SPDES	State Pollutant Discharge Elimination System
SRIWP	Supplemental Remedial Investigation Work Plan
SVOCs	Semivolatile Organic Compounds
SWPPP	Stormwater Pollution Prevention Plan
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristics Leaching Procedure
TWA	Time-weighted Average
UST	Underground Storage Tank
UUSCO	Unrestricted Use Soil Cleanup Objective
VOCs	Volatile Organic Compounds

FINAL ENGINEERING REPORT

1.0 BACKGROUND AND SITE DESCRIPTION

SV-A Owners LLC entered into a Brownfield Cleanup Agreement (BCA), Index No. C231135-09-19, with the New York State Department of Environmental Conservation (NYSDEC) on November 12, 2019, to investigate and remediate an approximately 0.321-acre property located in the East Harlem section of Manhattan, New York, New York as shown on Figure 1. A Site layout map is provided as Figure 2. SV-A Owners LLC was accepted into the Brownfield Cleanup Program (BCP) as a Volunteer and Site Number C231135 was assigned. BCA Amendment No. 1 was executed on September 15, 2021 to reflect the change in legal ownership of the Site from "the City of New York acting by and through its Department of Housing Preservation and Development" (NYCHPD) to "Acacia Sendero Verde Housing Development Fund Company, Inc."

SV-A Owners LLC submitted a Supplemental Remedial Investigation Work Plan (SRIWP) in April 2019, which was subsequently revised then resubmitted on July 21, 2020. NYSDEC approved the revised SRIWP in a letter dated July 21, 2020. Remedial Investigation (RI) activities were completed in November 2020 and summarized in a Remedial Investigation Report/Remedial Action Work Plan (RIR/RAWP), dated March 30, 2021 and revised on May 19, 2021. An Interim Remedial Measure (IRM) Work Plan, dated May 13, 2020, was submitted to NYSDEC for underground storage tank (UST) removal activities and approved by NYSDEC in a letter dated May 20, 2020. Remedial construction activities in accordance with the IRM Work Plan began in November 2020 upon receiving a New York City Department of Buildings (NYCDOB) Permit for the removal. The RIR/RAWP was approved by NYSDEC on May 21, 2021. The NYSDEC Decision Document (DD) was also issued on May 21, 2021. A Fact Sheet announcing the start of the Remedial Action (RA) in accordance with the RIR/RAWP was published by NYSDEC on June 24, 2021. Approvals issued by NYSDEC are provided in Appendix D. Permits required for the IRM and RA are provided in Appendix M.

The redevelopment of the Site will consist of a 37-story tower with a gross square footage (GSF) of 372,672. The first through third floors will be utilized as commercial and community facility spaces. Floors four through 37 will contain affordable housing residential units. In the southeast portion of the Site at the second-floor level, there will be an accessible rooftop with a ramp from the ground level in the far southeast portion of the Site. The ramp to the second-floor roof will be constructed later in the redevelopment

project with no further soil disturbance required. The rooftop of the building will include a shared common area for residents as well as mechanical rooms. The majority of the Site building will contain a cellar, and the estimated depth of excavation is approximately 15 feet below grade (fbg) across a majority of the Site. The estimated depth of excavation for the elevator shaft is 26 feet below land surface (ft bls). To date, all intrusive work has been completed which included remedial excavation and engineering control (EC) installation activities. The property was remediated to combined Track 1 (Unrestricted) and Track 2 (Residential/Restricted Residential)/Track 4 (Restricted Residential) use. Ongoing development activities at the Site are limited exclusively to non-remedial building superstructure work.

The Site is located in the County of New York, New York and is identified as occupying the entirety of Lot 120 of Block 1617 on the New York County Tax Map. The Site is situated on an approximately 0.321-acre area lot. There are multiple high-rise residential buildings located to the north beyond East 112th Street; to the west, beyond Madison Avenue, is a multi-family residential building; to the south are Block 1617 Lot 21 (which includes a four-story commercial building), portions of Lots 7502 and 125, East 111th Street, and multiple mixed-use commercial and residential high-rise buildings; to the east is the main portion of the Sendero Verde Redevelopment Project – Parcel B on Lot 7502, which is currently under construction, beyond which is Park Avenue, the elevated Metro North Railroad Tracks, and a playground belonging to a public school. The boundaries of the Site are fully described in Appendix A.

An electronic copy of this FER with all supporting documentation is included as Appendix B (in hard-copy versions only).

2.0 SUMMARY OF SITE REMEDY

2.1 Remedial Action Objectives

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) were identified for this Site.

2.1.1 Groundwater RAOs

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

- Remove the source of ground or surface water contamination.

2.1.2 Soil RAOs

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Public Health Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

2.1.3 Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the Site.

2.2 Description of Selected Remedy

The Site was remediated in accordance with the remedy selected by the NYSDEC in the approved RIR/RAWP and Decision Document, both dated May 21, 2021.

The factors considered during the selection of the remedy are those listed in 6NYCRR 375-1.8, 375-3.8, and Section 4.3 of DER-10. The following are the components of the selected remedy as specified in the approved RIR/RAWP:

The elements of the combined Track 1 (Unrestricted) and Track 2 (Residential/Restricted Residential)/Track 4 (Restricted Residential) use remedy are:

1. A remedial design program was implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques were implemented to the extent feasible in the design, implementation, and Site management of the remedy as per DER-31. The major green remediation components are as follows:
    a. Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
    b. Reducing direct and indirect greenhouse gases and other emissions;
    c. Increasing energy efficiency and minimizing use of non-renewable energy;
    d. Conserving and efficiently managing resources and materials;
    e. Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
    f. Maximizing habitat value and creating habitat when possible;
    g. Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
    h. Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
    i. Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this Site, any on-Site buildings will include, at a minimum, a 20-mil vapor barrier on the underside of the foundation to improve energy efficiency as an element of construction.
2. Installation of SOE as required by the New York City Department of Buildings (NYCDOB) to reach the proposed excavation depths, which is a critical component of the remedy.
3. Excavation and off-Site disposal of a total of approximately 13,951.65 tons (9,965.46 cubic yards [cy]) of soil across the Site to achieve Track 1, Track 2, or Track 4, as described below. The limits and approximate depths of excavation are shown on Plates 6 and 7. The final excavation and disposal volumes include:
    a. Approximately 11,276.47 tons (8,054.61 cy) of soil exceeding Unrestricted Use Soil Cleanup Objectives (UUSCOs) removed to achieve a Track 1 Unrestricted Use cleanup across a majority of the Site with a cellar;

b. Approximately 1,010.11 tons (721.51 cy) of soil exceeding Restricted Residential Soil Cleanup Objectives (RRSCOs) removed to a depth of 15 feet in the northwest portion of the Site with a cellar to achieve a Track 2 Restricted Residential Use cleanup;

c. Approximately 483 tons (345 cy) of soil exceeding Residential Soil Cleanup Objectives (RSCOs) removed to a depth of 15 ft in the eastern portion of the Site with a cellar to achieve a Track 2 Residential Use cleanup; and

d. Approximately 1,182.07 tons (844.34 cy) of soil exceeding RRSCOs removed from the top two feet across the small southern slab on grade area to achieve a Track 4 Restricted Residential Use cleanup.

4. Collection and analysis of Site-wide endpoint samples to evaluate the performance of the remedy with respect to attainment of Track 1 UUSCOs, Track 2 RSCOs/RRSCOs or Track 4 RRSCOs at a rate of one endpoint sample per approximately 900 square feet. Sidewall samples were collected at the interface between the Track 1 and Track 4 areas of the Site. Sidewall samples were not required where excavation extends to the property line.

5. Approximately 1,624.4 cubic yards of clean stone were imported to the Site following approval by NYSDEC. The imported clean stone was used to backfill the excavation areas. Clean Stone import requests and approvals are provided in Appendix S.

6. Dewatering, in compliance with city, state, and federal laws and regulations during excavation activities. Extracted groundwater was treated on-Site utilizing a settling tank and discharged to the combined sewer pursuant to a de-watering permit issued by the New York City Department of Environmental Protection (NYCDEP).

7. For the Track 4 area of the Site (i.e., small southern slab-on-grade area), a site cover system was required to allow for Restricted Residential use. The site cover system consists of a concrete building foundation with slab underside and associated vapor barrier/waterproofing serving as the demarcation layer. Any fill material imported to the Track 4 portion of the Site met the requirements for cover material as set forth in 6 NYCRR Part 375-6.7(d), that being virgin stone from a permitted quarry containing less than 10% material passing a No. 80 sieve, the use of which does not require chemical analytical testing. The site cover system for the Track 4 area of the Site is comprised of approximately 1,840 square feet of concrete building foundation with the slab underside and associated vapor barrier serving as the demarcation layer.

8. As part of the Track 1 Unrestricted Use remedy, a soil vapor intrusion evaluation was completed and summarized in the May 2021 RIR/RAWP and is updated in this FER. The evaluation included a provision for implementing construction elements recommended to address exposures related to soil vapor intrusion, including the incorporation of vapor barrier systems into foundation elements during development activities.

9. Imposition of an institutional control in the form of an Environmental Easement for the portions of the Site that did not achieve a Track 1 Unrestricted Use or Track 2

Residential cleanup to ensure proper site use and to prevent future exposure to any residual contamination remaining in these areas, which:

a. requires the remedial party or Site owner to complete and submit to the NYSDEC a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);

b. allows the continued use and development of the controlled property for restricted residential (or less restrictive uses) as defined by Part 375-1.8(g), although land use is subject to local zoning laws;

c. restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or Article 141 of the NYCDOH code (i.e., groundwater restriction applies to the entire Site); and

d. requires compliance with the NYSDEC-approved SMP.

10. A SMP is required for all portions of the Site that did not achieve a Track 1 Unrestricted Use cleanup, which includes the following:

a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the Site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

i. Institutional Controls: The Environmental Easement discussed above; and

ii. Engineering Controls: The Site cover system described for the Track 4 Restricted Residential use areas of the Site above; and

b. A Monitoring Plan to assess the performance and effectiveness of the remedy. This plan includes, but may not be limited to: an Excavation Work Plan which details the provisions for management of future excavations in areas of remaining contamination; descriptions of the provisions of the environmental easement including any land use and/or groundwater use restrictions; a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion; provisions for the management and inspection of the identified engineering controls; maintaining site access controls and Department notification.

3.0 INTERIM REMEDIAL MEASURE

An IRM Work Plan dated May 13, 2020 was submitted and approved by the NYSDEC on May 20, 2020 for removal of the UST encountered on February 7, 2020. The IRM Work Plan detailed the removal of a UST identified along the northern property boundary of the Site. The UST was located immediately adjacent to the property line along 112th Street and approximately 62 feet east of the property line along Madison Avenue.

The UST removal was completed on November 16, 2020. The UST measured 3.5 feet wide by 11 feet long (with a design volume of approximately 1,080 gallons) containing an approximately 1.25 feet thick layer of heating oil, that had been likely used for on-Site consumption by the former residential buildings on-Site. Fingerprinting analysis of the oil within the tank confirmed that the contents were potentially weathered No. 4 fuel oil. A licensed tank contractor, Innovative Recycling Technologies of Lindenhurst, New York, completed the pumping/disposal of oil from the tank, tank cleaning and removal. Eight drums (approximately 400 gallons) of oil/tank bottoms were removed from the tank and disposed of off-Site as part of the IRM. No indications of petroleum product releases to the environment (e.g., staining or odor) were observed during UST removal activities. The soil sample collected immediately below the UST (SVA-SB-2, 7-9 ft bls) and the groundwater sample collected below the UST (SVA-MW-2) did not indicate any petroleum impacts. In accordance with the IRM Work Plan, photos, disposal documentation, and the UST removal affidavit were retained for inclusion in this FER.

Further information regarding the registration and closure for the UST removed during the IRM is provided in Section 4.3.4.

4.0 DESCRIPTION OF REMEDIAL ACTIONS PERFORMED

Remedial activities completed at the Site were conducted in accordance with the NYSDEC-approved RIR/RAWP for the Sendero Verde Redevelopment Project – Parcel A Site (May 2021). All deviations from the RIR/RAWP are noted below.

4.1 GOVERNING DOCUMENTS

4.1.1 Site Specific Health & Safety Plan (HASP)

The Site-specific HASP was included in Appendix N of the NYSDEC-approved RIR/RAWP, and the Site-specific CAMP was included as Appendix H within the HASP. All remedial and invasive work performed under this RIR/RAWP was in full compliance with the Site-specific HASP and with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA.

4.1.2 Field Sampling Plan (FSP)/Quality Assurance Project Plan (QAPP)

The FSP/QAPP was included as Appendix O of the NYSDEC-approved RIR/RAWP. The FSP/QAPP describes the specific policies, objectives, organization, functional activities and quality assurance/quality control activities designed to achieve the project data quality objectives. The FSP/QAPP includes all requirements outlined in DER-10 Section 2.4.

4.1.3 Construction Quality Assurance Plan (CQAP)

The CQAP included in Section 10.1.3 of the NYSDEC-approved RIR/RAWP detailed plans for managing performance of the Remedial Action (RA) tasks through designed and documented quality assurance/quality control (QA/QC) methodologies applied in the field and in the lab. The CQAP included a description of the observation and testing activities that were used to monitor construction quality and confirm that remedial construction was in conformance with the remediation objectives and specifications.

4.1.4 Soil/Materials Management Plan

The Soil/Material Management Plan (SoMP) included in Section 11.4 of the NYSDEC-approved RIR/RAWP detailed plans for managing all soils/materials that were disturbed at the Site including excavation, handling, storage, transport, and disposal. It

also included all of the controls that were applied to these efforts to assure effective, nuisance-free performance in compliance with all applicable Federal, State and local laws and regulations. The following key activities were specified in the SoMP:

- Soil screening methods;
- Stockpile methods;
- Materials excavation and load out;
- Materials transport off-Site;
- Materials disposal off-Site;
- Materials reuse on-Site;
- Fluids management;
- Demarcation;
- Backfill from off-Site sources;
- Stormwater pollution prevention;
- Contingency plan;
- Community air monitoring plan; and
- Odor, dust, and nuisance control plan.

4.1.5 Erosion and Sediment Controls

The erosion and sediment controls for all remedial construction were performed in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control and the RIR/RAWP. Erosion and sediment controls were maintained during the RA implementation. The Site was exempt from the NYSDEC SPDES General Permit for Stormwater Discharge from Construction Activity (Permit No. GP-0-15-002) requirement as it is less than one acre in size and is solely serviced by combined sewers. As such, a SWPPP was not required.

4.1.6 Community Air Monitoring Plan (CAMP)

The Site-specific CAMP was provided in the HASP as Appendix H. Roux performed real-time, continuous air monitoring for VOCs and airborne particulate matter at upwind and

downwind locations at the Site perimeter, as described in Section 3.2.4. During all phases of work, the Remediation Contractor was responsible for mitigating any vapor and particulate issues via suppression techniques defined in the CAMP. Community air monitoring results collected during the performance of the RA are summarized in Section 4.2.5.

4.1.7 Contractors Site Operations Plans (SOPs)

The Remediation Engineer reviewed all plans and submittals for this remedial project (i.e., those listed above plus contractor and subcontractor submittals) and confirmed that they were in compliance with the NYSDEC-approved RIR/RAWP. All remedial documents were submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

4.1.8 Citizen Participation Plan (CPP)

The NYSDEC-approved CPP for this Site was included as Appendix M of the RIR/RAWP. Copies of the RIR/RAWP were mailed (and/or uploaded electronically) to the project document repositories on June 4, 2021. A Fact Sheet describing the remedy proposed for the Site was mailed out on March 30, 2021 to the approved Contact List found in the CPP. A Fact Sheet announcing the start of the RA in accordance with the RIR/RAWP was issued by NYSDEC on June 24, 2021. No changes were made to the approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC.

A Fact Sheet will be distributed to announce that the certificate of completion has been issued.

4.2 REMEDIAL PROGRAM ELEMENTS

4.2.1 Contractors and Consultants

The following key contractors and consultants were involved in the site remedial activities described in this FER:

- Remedial Engineer: Roux of Islandia, New York;
- Site Legal Owner: Acacia Sendero Verde Housing Development Fund Company, Inc.;

- Site Beneficial Owner: SV-A Owners LLC;
- General Contractor/ Construction Manager: L+M Builders Group LLC of Larchmont, New York;
- SOE Contractor: Soil Solutions of West Hempstead, New York;
- Excavation/ Foundation Construction Contractor: Casino Development Group, Inc., of Maspeth, New York;
- Tank Removal Contractor: Innovative Recycling Technologies, Inc., of Lindenhurst, New York (IRT); and
- Analytical Laboratories: Alpha Analytical, Inc., of Westborough, Massachusetts (Alpha) and York Analytical Laboratory, Inc., of Stratford, Connecticut (York).

4.2.2 Site Preparation

Site preparation and mobilization began on July 28, 2021, and included test pitting, support of excavation installation, setup of the truck wash pad and erosion/sediment controls, and soil excavation.

A NYSDEC-approved project sign was not erected at the project entrance as a project sign is no longer required for BCP sites.

4.2.3 General Site Controls

Site access was controlled by two gated entrances to the property located at the corner of Madison Avenue and East 112th Street (stabilized construction entrance) and the corner of Madison Avenue and East 111th Street. The gates were closed and locked when there was no activity on the Site to prevent unauthorized entry and to protect the community from RA activities.

Construction activities were performed in modified Level D PPE, which included steel-toed work boots, hard hats, safety glasses, long sleeved shirts, gloves, and high visibility clothing (i.e., reflective vest).

Site records for all remedial work was appropriately documented by Roux. Documented activities included daily inspections to verify conformance with the RIR/RAWP, health and

safety monitoring and material tracking. These records were maintained on-Site by Roux during the performance of the RA and were available for review by the NYSDEC.

Soil Screening Methods

Visual, olfactory, and photoionization detector (PID) soil screening and assessments were performed during all intrusive remedial construction and redevelopment activities at the Site. All excavation activities involving known or potentially contaminated material were performed under the supervision of Roux personnel.

Stockpiling Methods

Soil excavated in order to achieve the target remediation depths was segregated by type (e.g., non-hazardous soil, soil meeting the lower of the RRSCOs and PGWSCOs identified for re-use, hazardous soil, and uncontaminated C&D debris) then stockpiled or placed in roll-off containers and covered with polyethylene sheeting until the excavation was completed. Excavated soils were stockpiled on double layers of 6-mil minimum poly-sheeting, were kept covered at all times with appropriately anchored polyethylene sheeting (except when material was being actively added or removed). While stockpiles were in place, they were inspected at a minimum of once each week, and before and after every storm event. Broken or ripped sheeting was promptly replaced. Stockpiles were removed as soon as practicable.

Stockpile activities were compliant with applicable laws and regulations.

Materials Excavation and Load Out

Loaded vehicles leaving the Site were appropriately tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local and NYSDOT requirements (and all other applicable transportation requirements).

Locations where vehicles enter or exit the site were inspected daily for evidence of off-Site soil tracking.

Contractor and Roux oversight personnel were responsible for ensuring that all egress points for truck and equipment transport from the Site were clean of dirt and other materials

derived from the Site during intrusive activities. Cleaning of the adjacent streets was performed as needed to maintain a clean condition with respect to Site-derived materials.

Materials Transportation and Disposal Off-Site

All materials were transported by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers were appropriately licensed, and trucks were properly placarded.

All soil/fill/solid waste excavated and removed from the Site was treated as contaminated and regulated material and was disposed in accordance with all local, State (including 6 NYCRR Part 360 and 370 to 376) and Federal regulations. Disposal of non-hazardous solid waste, hazardous soil waste, and general construction debris is discussed in Section 4.3 of this FER.

Materials Reuse On-Site

Reuse of on-Site soils did not occur during the RA.

Fluids Management

Dewatering occurred as part of the RA in order to depress the groundwater table beneath the Site to reach the required excavation depths. Extracted groundwater was treated on-Site utilizing a settling tank and discharged to the combined sewer system pursuant to a permit from NYCDEP (Appendices M and P).

4.2.4 Nuisance controls

All necessary means were employed to prevent the generation of on- and off-Site dust and odor nuisances. At a minimum, dust and odor control procedures included: (a) limiting the area of open excavations; (b) covering tops and openings of excavated USTs prior to cleaning and disposal; (c) use of water to provide suitable wetting of exposed soils; and (d) covering soil stockpiles when not actively adding soil to or removing soil from the stockpiles. Nuisance vapors and odors were not generated during the soil excavation/load out and UST excavation activities.

A hose was utilized on-Site to disperse water at a suitable supply and pressure to control any dust generated during Site activities. Stabilized construction entrances were installed

at the vehicle ingress and egress points to the Site at the corner of East 112th Street and Madison Avenue to control potential off-Site tracking of soil.

A truck wash was setup and operated, as needed. Due to the use of the stabilized construction entrance described above, dry decontamination using brushes was the preferred method of truck decontamination since truck wheels never made direct contact with impacted materials. Casino (excavation/foundation contractor) was responsible for ensuring that all outbound trucks were inspected and washed at the truck wash station, as required, to remove loose soils and/or debris before leaving the Site.

Prior to trucks leaving the Site, proper truck bed management was confirmed by visual means to ensure truck bed covers were properly used and that there were no free-standing liquids originating from excavated soils present in the truck beds.

The truck routes were the same routes utilized during the IRM implementation as described above in Section 3.2.3.5 of this FER.

No odor or dust complaints were received during construction.

4.2.5 CAMP results

Community air monitoring was performed consistent with the NYSDEC-approved CAMP during implementation of the RA.

One temporary exceedance of the particulate action level occurred during performance of the RA on March 31, 2022 due to third-party, off-site saw cutting activities unrelated to Remedial Activities at the Site. Three minor temporary CAMP exceedances for VOCs occurred during the implementation of the RA on December 28, 2021, December 29, 2021, and March 11, 2022. The two December 2021 exceedances were mitigated by recalibrating and ultimately replacing the malfunctioning meter. The March 2022 exceedance was mitigated by halting use of the nearby flammables storage cabinet shortly after the exceedance was documented. These exceedances were communicated to NYSDEC and NYSDOH within 24-hrs of occurring and individual exceedance reports were submitted documenting Site conditions and the mitigating actions taken.

Copies of all field data sheets relating to the CAMP are provided in electronic format in Appendix J of this FER.

4.2.6 Reporting

Daily reports were submitted electronically to the NYSDEC Project Manager and included:

- Date and weather;
- A summary of work activities performed;
- A summary of samples collected, if any;
- An update of the progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to a color-coded map for Site activities;
- CAMP results including action level exceedances; and
- An explanation of notable Site conditions.

In accordance with the BCA, monthly reports were submitted to the NYSDEC Project Manager summarizing the work performed during each reporting period, anticipated work activities for the following month, changes to the scope of work or schedule, sampling or other data received or generated during the reporting period, deliverables submitted during the reporting period, and remedial activities planned for the next reporting period.

All daily and monthly reports are included in electronic format in Appendix K and N, respectively.

The digital photo log required by the RIR/RAWP is included in electronic format in Appendix L.

4.3 CONTAMINATED MATERIALS REMOVAL

The following media were removed from the Site: non-hazardous soil and fill, excavation derived uncontaminated C&D debris, contents of previously unidentified USTs, and dewatering system liquid effluent.

The SCOs for the Site are Track 1 (Unrestricted), Track 2 (Residential/Restricted Residential), and Track 4 (Restricted Residential) as detailed in Section 2.2.

A list of the soil cleanup objectives (SCOs) for the contaminants of concern for this project is provided in Table 1.

A figure of the location of original sources and areas where excavations were performed is shown on Plate 1.

4.3.1 Non-Hazardous Soil and Fill Disposal

The excavation and disposal of non-hazardous Site soil and fill began shortly after the start of the RA and continued until completion of the RA. Non-hazardous soil and fill excavated during this period was transported off-Site and disposed of at approved facilities in accordance with applicable laws and regulations. Soils were excavated to depths ranging from approximately zero to 20 feet below grade across the Site and to 32 feet below grade in the localized elevator pit area.

Table 2 shows the total quantities of each category of non-hazardous soil and fill removed from the Site and the disposal facility locations. The samples collected to characterize the waste and associated analytical results are summarized in Appendix E.

In total, approximately 13,951.65 tons (9,965.46 cy) of non-hazardous soils were disposed of off-Site. Disposal documentation (manifests and weight tickets) are provided in Appendix I.

The disposal facility used during construction was Clean Earth of Bethlehem, Bethlehem, Pennsylvania, and the soil volume transported to the facility was approximately 13,951.65 tons.

4.3.2 Hazardous Soil and Fill Disposal

No areas of hazardous soil were identified during previous investigation; therefore, disposal of hazardous soil and fill did not occur during performance of the Remedial Action.

4.3.3 Excavation-Derived Uncontaminated C&D Debris Disposal

Approximately 111.25 tons of uncontaminated C&D debris derived from remedial excavation activities was transported for recycling and/or disposal at the following facilities:

- Cardella Waste located at 2400 Tonnelle Avenue, North Bergen, New Jersey, a registered New Jersey Transfer Station/Materials Recovery Facility;
- Allocco Recycling located at 540 Kingsland Avenue, Brooklyn, New York, a registered New York State C&D processing facility; and
- Westside Transload located at 5600 Westside Avenue, North Bergen, New Jersey, a registered New Jersey Class B recycling facility.

The excavation and disposal of uncontaminated C&D debris began shortly after the start of the RA and continued until completion of the RA. An uncontaminated C&D debris tracking summary table is provided in Table 3, and disposal documentation is provided in Appendix G.

4.3.4 UST Removals

Two previously unknown USTs were encountered between February 7, 2020 and August 5, 2021, during implementation of the IRM and RA. These tanks were not previously registered under the New York City Fire Department (FDNY) or NYSDEC Petroleum Bulk Storage (PBS) databases. Soil Solutions and Casino Development Group were responsible for unearthing and staging the newly discovered USTs, taking precautions not to damage or otherwise compromise the integrity of the tanks. IRT performed tank degassing, cutting, and cleaning activities. All tank removal activities, including excavation, degassing, cutting, cleaning, and waste transport and disposal, were conducted under the supervision of Roux oversight personnel. USTs encountered during implementation of the IRM and RA had no associated underground vent lines or product piping. No indications of petroleum product releases to the environment were observed during UST removal activities. The following list provides a brief description of each UST encountered during excavation activities at the Site:

- One 1,080-gallon #4 fuel oil USTs (UST UNREG-1) was encountered on February 7, 2020 and appropriately removed during IRM implementation on November 16, 2020. Approximately 4,000-pounds of non-hazardous petroleum-impacted tank bottoms were removed.

- One 3,000-gallon #4 fuel oil UST (UST UNREG-2) was encountered on August 5, 2021 and appropriately removed during the RA on August 10, 2021. Approximately 300-pounds of non-hazardous petroleum-impacted tank bottoms were removed.

The former locations of the USTs are shown on Plate 1. The PBS Registration package was submitted to the NYSDEC on February 1, 2022. The PBS Facility Information Report (PBS No. 2-613300) issued by NYSDEC shows the status of both USTs as "closed-removed". Copies of UST closure documentation submitted to the FDNY and NYSDEC are provided in Appendix O. Confirmatory soil endpoint samples were collected following excavation of the USTs. A discussion of the post-excavation UST soil endpoint results is included in Section 4.4.2 of this FER.

4.3.5 Dewatering Fluids Disposal

Groundwater extracted via the dewatering system throughout the RA was treated on-Site utilizing a settling tank prior to discharge to the combined sewer system pursuant to a permit from NYCDEP (Appendix M). Approximately 730,000-gallons of groundwater were discharged during the RA. Dewatering system documentation is provided in Appendix P.

4.3.6 Summary of Disposal Quantities

The following list includes the quantities of each type of waste described above generated during the IRM and RA:

- Non-Hazardous Soil and Fill: 13,951.65 tons;
- Excavation-Derived Uncontaminated C&D debris: 111.25 tons; and
- UST Contents: 4,300-pounds of non-hazardous petroleum-impacted tank bottoms and 1,076-gallons of non-hazardous petroleum-impacted water.

Tables 2 and 3 show the total quantities of each category of material removed from the Site and the corresponding disposal locations. A summary of the samples collected to characterize the waste and associated analytical results are summarized in Appendix E. Letters from applicants to disposal facility owners and acceptance letters from disposal

facility owners are included in Appendix F. Uncontaminated C&D debris bills of lading are included in Appendix G. UST disposal documentation is included in Appendix H. Non-hazardous manifests are included in Appendix I.

4.4 REMEDIAL PERFORMANCE/DOCUMENTATION SAMPLING

4.4.1 Post-Remediation Endpoint Soil Documentation and Confirmation Sampling

A total of 64 post-remediation endpoint documentation and confirmation soil samples (including four duplicates) were analyzed for target compound list (TCL) VOCs plus 10 tentatively identified compounds (TICs), TCL semivolatile organic compounds (SVOCs) plus 20 TICs, target analyte list (TAL) metals, TCL pesticides and herbicides, polychlorinated biphenyls (PCBs), total cyanide, and emerging contaminants (1,4-dioxane and 21 per- and polyfluoroalkyl substances [PFAS]).

Post-remediation endpoint documentation sampling was completed throughout the Site between November 19, 2020, and March 21, 2022. Soil borings (SB) collected during the November 2020 RI served as post-excavation endpoints at select locations in the Track 4 and Track 1 cleanup areas of the Site. Post-excavation endpoint samples collected during implementation of the RA included bottom documentation samples (BDS), bottom confirmation samples (BCS), and sidewall documentation samples (SDS). Post-excavation endpoint samples were collected from more than one depth at some locations. In general, the initial shallower collection depths were based on the anticipated excavation depths required to remediate Site soils to meet Track 1 SCOs outlined in the RAWP. Some of the initial shallower soil endpoint samples exceeded Track 1 SCOs; in those cases, additional sets of soil endpoint samples were collected to be representative of the revised deeper excavation depths required to achieve Track 1 SCOs after removal of shallower impacted Site soils. Where more than one sample was collected at a location, only the final (deeper) endpoint samples are shown on Plate 1, as the shallower soils were excavated and disposed in accordance with the summary in Section 4.3 of this FER.

One area of the Site in the vicinity of BCS-2 originally intended as part of the deeper cellar Track 1 cleanup area could not be excavated beyond 15 ft bls due to dewatering limitations. Attempts were made to collect samples deeper than 17 ft bls, however, they were

unsuccessful due to sidewall sloughing that did not allow the collection of samples representative of these deeper soils. As a result, this limited area reverted to a Track 2 Residential cleanup because BCS-2 (15-17 ft bls) confirmed that the applicable Track 2 RSCOs were achieved at this depth.

Included in the post-remediation endpoint sample total are 14 post-excavation UST bottom endpoints (BCS-9 [18-20 and 18.5-20.5 ft bls], BCS-10 [18-20 and 18.5-20.5 ft bls], BCS-11 [18-20 ft bls], and SVB-SB-2 [18-20 ft bls]). UST endpoint sample locations were dependent on the lengths and diameters of the tanks, the depths below grade of the tank bottoms, and the presence of adjoining SOE laybacks and/or adjacent building foundation elements. At all locations, UST sidewall endpoint samples were not required once the excavation in the area was completed due to the absence of adjacent sidewall soils. UST bottom endpoints were collected from the soils remaining after the completion of excavation to reach the final, planned excavation depths.

A summary of soil endpoint sampling results for the Track 2 (Residential/Restricted Residential) and Track 4 (Restricted Residential) areas are presented in Tables 4 through 9. Plate 1 presents exceedances of UUSCOs, RSCOs and RRSCOs in final endpoint samples collected in the Track 2 and Track 4 areas. The results of the final endpoint samples in the Track 2 Residential area are all below applicable RSCOs, and the endpoint samples in the Track 2 Restricted Residential area are all below the applicable RRSCOs.

The laboratory reported the analytical results in ASP Category B deliverable packages. An electronic data deliverable (EDD) in the required NYSDEC format was prepared and submitted electronically to NYSDEC. QA/QC procedures were used to provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and comparability associated with the sampling and analysis for this investigation. Field QA/QC procedures were used to (1) document that samples are representative of actual conditions at the Site and (2) identify possible cross-contamination from field activities or sample transit. Laboratory QA/QC procedures and analyses were used to demonstrate whether analytical results may have been biased either by interfering compounds in the sample matrix, or by laboratory techniques that may have introduced systematic or random errors to the analytical process. QA/QC samples (field and trip

blanks, duplicates, etc.) were collected and analyzed at a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory in accordance with the QAPP.

Data Usability Summary Reports (DUSRs) were prepared for all data generated in this remedial performance evaluation program. These DUSRs are included in Appendix Q, and the associated raw data is provided electronically in Appendix R.

4.5 BACKFILL

4.5.1 Imported Backfill

The following is a list of all NYSDEC-approved backfill materials and associated approximate quantities imported to the Site:

- ASTM #57 3/4-inch Clean Stone: 1,480 cy from Eastern Concrete Materials located in Wantage, New Jersey; and
- #3 Crushed Blue Stone: 104.4 cy from Evergreen Recycling of Corona/Tully Environmental located in Flushing, New York.

A table of all sources of imported backfill with quantities for each source is shown in Table 10. Backfill import requests and NYSDEC-approval documentation for each material are provided in Appendix S. Imported backfill weight tickets and documentation are provided in Appendix T.

4.5.2 On-Site Reuse of Non-Hazardous Excavated Soils

Reuse of Site soils did not occur during performance of the RA.

4.6 CONTAMINATION REMAINING AT THE SITE

The remaining contamination after the RA was completed is limited to soil in the areas of the Site where a Track 1 Unrestricted Use cleanup was not achieved. Limited northwestern and eastern portions of the Site achieved Track 2 Restricted Residential Use or Residential Use cleanups, respectively, and the southern portion of the Site achieved a Track 4 Restricted Residential Use cleanup through the implementation of EC (Site Cover System) where UUSCOs were exceeded. The remainder of the Site achieved the Track 1 UUSCOs. Based on the endpoint samples collected during the Remedial Action, the remaining

contamination is limited to a certain subset of SVOCs, metals, and pesticides. All remaining contamination is located under the building foundation slab, which is a component of the Site Cover System. For the on-Site areas where Track 1 UUSCOs were not achieved, long-term management of the EC/ICs and residual contamination will be performed in accordance with this SMP. Plate 1 presents exceedances of UUSCOs, RSCOs and RRSCOs in endpoint samples collected in Track 2 Residential/Restricted Residential and Track 4 Restricted Residential areas.

Because contaminated soil remains beneath portions of the Site after completion of the RA, Institutional and Engineering Controls are required to protect human health and the environment. These Engineering and Institutional Controls (ECs/ICs) are described in the following sections. Long-term management of these EC/ICs and residual contamination will be performed in accordance with the NYSDEC-approved Site Management Plan (SMP).

4.6.1 Soil Vapor Intrusion Evaluation

Based on the data collected and the RA completed, the following soil vapor intrusion evaluation was completed for the new buildings. On-Site soil vapor concentrations were generally low and do not represent a vapor intrusion concern for the new buildings. No on-Site source of VOCs was identified during the RA excavation. The new buildings include installation of a vapor barrier, which incorporates green remediation principles and techniques to improve energy efficiency of the building as described in the approved RIR/RAWP and meet Passive House standards. The vapor barrier system installed beneath each new building as part of the green remediation/Passive House construction, consists of:

- 47-mil Grace Construction Products Preprufe 300R that chemically bonds to the concrete foundation below the slab throughout cellar area;
- 31-mil Grace Construction Products Preprufe 160R that chemically bonds to the concrete foundation outside all sub-grade foundation sidewalls in the cellar area;
- Grace Products Bituthene 4000 (self-adhering rubberized asphalt sheet with HDPE facer) for post-applied vapor barrier in the cellar area, and their associated installation products (waterstops, tapes and edge detailing mastics, and primer for Bituthene);

- A minimum 20-mil-thick vapor barrier (Stego Wrap 20-mil vapor barrier as manufactured by Stego Industries LLC) beneath the slab for portions of the building without a cellar; and
- All welds, seams and penetrations were properly sealed to prevent preferential pathways for vapor migration, in accordance with manufacturer's recommendations.

As such, this soil vapor intrusion evaluation demonstrates that the RA has addressed potential exposures related to soil vapor intrusion.

The vapor barrier documentation is included in Appendix U.

4.7 ENGINEERED SITE COVER SYSTEM

Exposure to remaining contamination in the Track 4 area of the Site (Plate 1) will be prevented by the engineered Site Cover System constructed on the Site. This Site Cover System is comprised of concrete building foundations. Although not a required EC, to incorporate green remediation principles, a vapor barrier/waterproofing membrane was installed as an element of construction throughout the area occupied by the footprint of the new building and up the foundation sidewalls in accordance with manufacturer specifications. The Site Cover System for the concrete building foundation is comprised of a crushed stone subbase and concrete foundation slab. The concrete building foundation slab underside and associated waterproofing/vapor barrier serve as the demarcation layer.

Plate 2 presents the location of the Site cover system and applicable demarcation layer.

An Excavation Work Plan, which outlines the procedures required in the event the cover system and/or underlying residual contamination are disturbed, is provided in Appendix D of the NYSDEC-approved SMP.

4.7.1 Other Engineering Controls

The remedy for the Site did not require the construction of any other engineering control systems. Based on the RI data, groundwater is not significantly impacted and is not used for drinking or other potable uses, and there is no direct contact with or ingestion by the general public. Therefore, there is no risk of exposure to remaining groundwater contamination. Based on an evaluation of the soil vapor data from the RI, there was no soil vapor intrusion

issue prior to the remedy and there was no on-Site source identified during the remediation. Therefore, there is no on-going vapor intrusion risk requiring mitigation.

4.8 INSTITUTIONAL CONTROLS

The Site remedy requires that an environmental easement be placed on the Track 2 Restricted Residential and Track 4 Restricted Residential portions of the Site to (1) implement, maintain and monitor the Engineering Controls; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of portions of the Site to only Restricted Residential uses (and less restrictive uses) in the Track 2 and Track 4 Restricted Residential areas.

The environmental easement for the Site was executed by the Department on [date] and filed with the [Office of the City Register of the City of New York] on [date] at City Register File Number (CFRN) [######]. A copy of the easement and proof of filing is provided in Appendix A.

4.9 DEVIATIONS FROM THE REMEDIAL ACTION WORK PLAN

Deviations from the NYSDEC-approved RIR/RAWP occurred during implementation of the RA at the Site. All deviations were approved by NYSDEC and executed under the oversight of a registered professional engineer. Deviations from the RAWP included:

- The discovery of a previously unknown UST uncovered during implementation of the RA. This UST was removed in accordance with the procedures outlined in the RIR/RAWP.
- Fallback from Track 1 to Track 2 Residential cleanup in the eastern portion of the Site. RA endpoint BCS-2 (15-17 ft bls) contained 4,4-DDE and 4,4-DDT at concentrations exceeding UUSCOs but meeting RSCOs. Excavation deeper than 15 ft bls in this area to achieve the proposed Track 1 cleanup during the RA was not feasible. Post-remediation documentation samples demonstrate that the Track 2 Residential SCOs were achieved in this Track 2 fallback area.