REMEDIAL ACTION WORK PLAN
for
840 5TH AVENUE
KINGS COUNTY, NEW YORK

PROPOSED PUBLIC SCHOOL FACILITY K671
840 5TH AVENUE
BROOKLYN, NEW YORK 11232
BLOCK 693, LOT 39

NYSDEC BROWNFIELD CLEANUP PROGRAM SITE NO. C224271

SCA PROJECT ID NO. 106889
SCA CONTRACT NO. C000014345
SCA SERVICE ID NO. 67237

TRC PROJECT NO. 280794

SEPTEMBER 2018

Submitted to:
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CERTIFICATIONS

I, Daniel A. Schmidt, P.E., certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan 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).

I certify that all information and statements in this certification 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.

9/14/2018

Daniel A. Schmidt, P.E.
NYS Professional Engineer No. 093858-1

Date

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by a New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

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LIST OF ACRONYMS

Acronym	Definition
µg/m^3	Micrograms per Cubic Meter
µg/L	Micrograms per Liter
ACM	Asbestos-Containing Materials
BBS	Below Building Slab
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulations
CIS-1,2-DCE	Cis-1,2-dichloroethene
COC	Certificate of Completion
CPP	Citizen Participation Plan
CQAP	Construction Quality Assurance Plan
CVOC	Chlorinated Volatile Organic Compounds
1,1-DCE	1,1-Dichloroethene
DER	Department of Environmental Remediation
DER-10	Department of Environmental Remediation Technical Guidance for Site Investigation and Remediation
DMM	Division of Materials Management
DRO	Diesel Range Organics
DQO	Data Quality Objectives
DUSR	Data Usability Summary Report
EC/ICs	Engineering and Institutional Controls
ECL	Environmental Conservation Law
ECs	Engineering Controls
ELAP	Environmental Laboratory Approval Program
ENB	Environmental Notice Bulletin
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
FER	Final Engineering Report
FT	Feet
GPM	Gallons per Minute
GPR	Ground Penetrating Radar

Acronym	Definition
GRO	Gasoline Range Organics
HASP	Health and Safety Plan
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
Middleton	Middleton Environmental, Inc.
MTBE	Methyl Tert-Butyl Ether
ng/kg	Nanograms per Kilogram
NYCDCP	New York City Department of City Planning
NYCRR	New York Codes, Rules, and Regulations
NYCSCA	New York City School Construction Authority
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation & Maintenance
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PID	Photoionization Detector
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RRUSCO	Restricted-Residential Use Soil Cleanup Objective
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
SEQRA	State Environmental Quality Review Act
SMP	Site Management Plan
SOP	Contractor's Site Operations Plan
SoMP	Soils Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCDF	2,3,7,8-Tetrachlorodibenzofuran
TCDD	Tetrachlorodibenzo-p-dioxin
TCA	1,1,1-Trichloroethane
TCL	Target Compound List

Acronym	Definition
TCLP	Toxicity Characteristic Leaching Procedure
TIC	Tentatively Identified Compound
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

Site Description/Physical Setting/Site History

The property is located at 840 5th Avenue, Brooklyn, New York 11232 (referred to as the "Site") and encompasses approximately 0.45 acres (19,605 square feet). The legal description of the Site is Block 693, Lot 39. The NYCSCA, a New York State Public Benefit Corporation, purchased the Site for construction of a public school facility in February 2018. The Site was accepted into the Brownfield Cleanup Program (BCP) and the NYCSCA was designated a Volunteer in June 2018. The BCP Site name is "840 5th Avenue" and the Site number is C224271.

The Site is bordered to the north and northwest by Greenwood Cemetery's maintenance facility; to the east and northeast by 5th Avenue followed by Greenwood Cemetery; to the south and southeast by 5th Avenue followed by the MTA Jackie Gleason bus depot; to the south and southwest by 36th Street followed by a gasoline station, car wash and commercial offices; and to the west by a three-story residential building with a first floor church occupant. Surrounding property uses are commercial, residential, and institutional.

The Greenwood Cemetery maintenance facility and cemetery grounds have been present since prior to 1900. There is a significant change in elevation between the Site boundary and the north-adjacent property. The ground surface slopes downward from the Site to the north and northwest. The elevation change is believed to be a result of years of filling at the Site.

The eastern portion of the Site was first known to be developed in 1903 with elevated train tracks and an elevated train car repair shop. By 1926, the train car repair shop was demolished and this area was vacant with the exception of the elevated train tracks (on a platform). The current Site building was constructed in approximately 1953, and used for manufacturing purposes including jewelry fabrication. By 1997, the second floor was utilized as a garment assembly facility and by 1998, the first floor was used as a nightclub. Since at least 2004 through 2017, the building was used as a church. The Site building is currently vacant. The area north of the building is primarily asphalt-paved and enclosed with a fence. North of the asphalt-paved area is a wooded area which is steeply sloped downward toward the northwest.

The western portion of the Site was developed with a four-story residential building from at least 1903 until 1951, when it was razed. This portion of the Site is unpaved, fenced, and is currently vacant.

Summary of the Remedial Investigation

The 840 5th Avenue Remedial Investigation Report (RI Report) dated May 2018 describes the results of remedial investigation activities that were performed on the Site between late December 2016 and early January 2017 and between early February and March 2017. The findings of the RI indicate the following:

- A vaulted and inaccessible underground storage tank (UST), piping, and appurtenances are likely present.
- The primary contaminants of concern in soil include semivolatile organic compounds (SVOCs) and metals (arsenic, copper, lead, and mercury) including hazardous concentrations of leachable lead.
- Groundwater contaminants of concern include volatile organic compounds (VOCs) (1,1,1-trichloroethane (TCA), chloroform, cis-1,2-dichloroethene (cis-1,2-DCE), formaldehyde, methyl tert-butyl ether (MTBE), and toluene), SVOCs, and metals (in filtered samples).
- Sub-slab vapor/soil vapor contaminants of concern include chlorinated volatile organic compounds (CVOCs) (TCA, vinyl chloride, and 1,1-dichloroethene (1,1-DCE)).

At the request of the NYSDEC and NYSDOH, supplemental groundwater and soil samples were collected in early May 2018. The results of the sampling event were presented to the NYSDEC and NYSDOH in a supplemental RIR dated July 17, 2018.

Qualitative Human Health Exposure Assessment

Based on the findings of the RI, the principal contaminants of concern at the Site have been identified as petroleum and chlorinated VOCs in groundwater and soil vapor and SVOCs and metals in subsurface soils. A qualitative exposure assessment was prepared to evaluate the potential for exposure to these parameters. The evaluation addresses both potential on-Site and off-Site health impacts associated with the Site.

Dermal contact, ingestion of soil or groundwater, or inhalation of vapors or dust represent the potential routes of exposure. Potential receptors include construction workers during demolition and redevelopment, future on-Site occupants and visitors, future on-Site maintenance workers, and off-Site residents.

Considering the planned future remediation and redevelopment activities and engineering and institutional controls that will restrict future use, the following exposure pathways are considered incomplete:

- **Groundwater ingestion:** Use of groundwater in this area of Brooklyn is prohibited as a source of potable water; therefore, this exposure pathway is not complete for on-Site and off-Site occupants/residents. Also, an environmental easement will apply to groundwater, prohibiting its use.
- **Groundwater dermal contact by construction workers and future maintenance workers:** The depth to groundwater is approximately 50 feet below ground surface (bgs); therefore, it is unlikely that groundwater will be disturbed by the proposed future redevelopment and dermal contact with groundwater is not likely to occur. Accordingly, this exposure pathway is not complete for construction workers and future maintenance workers.
- **Soil dermal contact by future on-Site occupants:** After completion of redevelopment activities, the soil/fill material at the Site will be covered by a new building, paved surfaces, or clean cover layer and landscaping, thereby preventing future exposure of occupants to the soil.
- **Inhalation of vapors by on-Site occupants, off-Site residents, and visitors:** Future redevelopment of the Site will include the construction of a vapor barrier and sub-slab depressurization system below the proposed building that will minimize the potential for intrusion of VOCs into future building spaces and mitigate this exposure pathway. At the request of the NYSDOH, off-Site vapor intrusion sampling will be performed at the west-adjacent building located at 467 36th Street in 2018 at the start of the heating season to evaluate the potential of exposure for off-Site residents. A Supplemental Soil Vapor Intrusion Work Plan will be submitted to NYSDEC and NYSDOH for review and approval prior to sampling.

The following exposure pathways are considered potentially complete:

- **Soil dermal contact by construction workers and future maintenance workers:** Potential future construction and maintenance activities (e.g., utility repairs) could result in contact with on-Site contaminated soil.

- **Inhalation of vapors and dust by construction workers and future maintenance workers:** Potential future construction and maintenance activities (e.g., utility repairs) could result in the generation of and exposure to on-Site contaminated vapors and dust.
- **Inhalation of vapors and dust by off-site residents:** Remedial alternatives and future construction activities (e.g., utility repairs) could result in the generation of contaminated vapors and dust that have the potential to migrate off-Site during construction.

A site-specific Health and Safety Plan (HASP), Soil/Materials Management Plan (SoMP), and Community Air Monitoring Plan (CAMP) will be implemented during development and future maintenance activities when on-Site workers could become exposed to soil or soil vapor. The HASP will establish procedures for the protection of on-Site workers and off-Site residents and will address community air monitoring and dust suppression measures. A Site Management Plan (SMP) will be implemented after the completion of the Remedial Action to govern post-remediation soil and groundwater disturbances.

Summary of the Remedy

Remedial action objectives are presented in Section 2.8 and the Summary of Selected Remedial Actions are presented in Section 3.3 of this report. The following activities will be performed to achieve the remedial objectives:

1. Prepare and implement a site-specific HASP, SoMP, CAMP, and Special Requirements CAMP for the remedial activities.
2. Remove underground storage tank system.
3. Remove and dispose off-Site soil that exhibits the hazardous waste characteristics of toxicity for lead in one hot spot area delineated to an approximately 16-foot by 35-foot area, extending to approximately 18 feet in depth, in the northeast part of the Site. Efforts to remove the lead hot spot will be limited to the depth at which development sheeting and shoring extends. Efforts will be made to extend the excavation to a final depth of 18 feet bgs to the extent practical. Any residual hazardous lead will be covered by an engineered composite cover system or cover for landscaped areas and managed under the SMP.
4. Remove and dispose off-Site soil that exhibits evidence of gross contamination, if encountered.
5. Post-excavation documentation/confirmatory soil sampling in the area of the hazardous lead hot spot, in the area of the UST, and across the remainder of the Site where non-hazardous soil are to be removed for off-Site disposal.

6. Install a gas vapor barrier beneath the building and install and operate a sub-slab depressurization system beneath the building.
7. Cover landscaped areas, if any, with a minimum 2-foot thick imported clean cover layer. Install demarcation layer below clean cover layer.
8. Construct an engineered composite cover system on the Site consisting of impervious surfaces (e.g., building, paved surfaces, etc.) and cover for landscaped areas, if any, as discussed above.
9. Prepare and implement a SMP for long term maintenance of the remedial elements.
10. Record an Environmental Easement to ensure proper use of the Site.

By implementing a New York State Department of Environmental Conservation (NYSDEC) approved-RAWP and SMP, the proposed future redevelopment and use will be protective of human health and the environment.

1.0 INTRODUCTION

The New York City School Construction Authority (NYCSCA) is seeking to enter into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC), to remediate a 0.45-acre property located at 840 5th Avenue, Brooklyn, Kings County, New York (referred to as the "Site"). The NYCSCA, a New York State Public Benefit Corporation, is applying as a Volunteer to the Brownfield Cleanup Program. Restricted-Residential use is proposed for the property. The Site name is "840 5th Avenue" And the Site number is C224271. When redevelopment is completed, the Site will contain a public school facility. Refer to the Brownfield Cleanup Program (BCP) application for additional details.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between December 2016 and March 2017. Supplemental soil and groundwater sampling was completed on-Site in early May 2018 and the results of the sampling were presented to the NYSDEC in a Supplemental RIR dated July 17, 2018. Off-Site vapor intrusion sampling is proposed to be performed at the start of the heating season in 2018 and the results of the sampling will be presented to the NYSDEC and New York State Department of Health (NYSDOH) in a separate report. This RAWP provides an evaluation of a Track 1 cleanup and other applicable Remedial Action alternatives, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria, and guidance. The remedy described in this document also complies with all applicable federal, state, and local laws, regulations and requirements. The NYSDEC and NYSDOH will determine whether the Site poses a significant threat to human health and the environment. The RI for this Site did not identify fish and wildlife resources.

The urban Site is not located in close proximity to a surface water body, wetland, or other ecologically significant area. Therefore, in accordance with DER-10 Section 3.10.1(b), a Fish and Wildlife Resources Impact Analysis is not warranted.

1.1 SITE LOCATION AND DESCRIPTION

The approximately 0.45-acre Site is located in the County of Kings, Brooklyn, New York and is identified as Block 693, Lot 39. The Site was formerly known as 836-841 5th Avenue and 471 36th Street (Block 693, Lots 39 and 48). In March 2018, Lots 39 and 48 were merged and the new property identification is 840 5th Avenue (Block 693, Lot 39). A United States Geological Survey

(USGS) topographical quadrangle map (*Figure 1*) shows the Site location. The Site is bordered by Greenwood Cemetery's maintenance facility to the north and northwest, 5th Avenue followed by Greenwood Cemetery to the northeast and east, 5th Avenue followed by the MTA Jackie Gleason bus depot to the south and southeast, 36th Street followed by a gasoline station, car wash, and commercial offices to the south and southwest, and a three-story residential building with a first floor church occupant to the west (see *Figures 2 through 4*). A boundary map is attached to the BCA as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419. The 0.45-acre property is fully described in *Appendix A.* A global positioning system coordinate for the starting point is included.

1.2 CONTEMPLATED REDEVELOPMENT PLAN

The Remedial Action to be performed under the RAWP is intended to make the Site protective of human health and the environment consistent with the contemplated end use. The proposed redevelopment plan and end use is described here to provide the basis for this evaluation.

The proposed future use of the Site is a primary school. The proposed redevelopment includes a 4 to 5-story building with a basement and a playground area. The main entrance will be on 5th Avenue. The facility will be a primary school for kindergarten through fifth-grade students. The entire Site will be covered by the school building and paved surfaces, or landscaping, if any. *Figure 5* presents a conceptual design for the school facility. The conceptual design for the school facility is subject to change during the design process.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is bordered to the north and northwest by Greenwood Cemetery's maintenance facility; to the east and northeast by 5th Avenue followed by Greenwood Cemetery; to the south and southeast by 5th Avenue followed by the MTA Jackie Gleason bus depot; to the south and southwest by 36th Street followed by a gasoline station, car wash, and commercial offices; and to the west by a three-story residential building with a first floor church occupant. Surrounding property uses are commercial, residential, and institutional.

According to the New York City Department of City Planning (NYCDCP) Zoning Map 16B, the Site is zoned for manufacturing use (M1-2). The NYCSCA will coordinate zoning changes as needed. Use of the Site as a community facility (i.e., a school facility) is permitted by a special

permit in M1 districts. NYCSCA is seeking and anticipates issuance of a special permit[1] for the proposed use as a public school facility. Construction of a new primary school building and play area (including a playground area) will improve the community by providing employment opportunities, a local public school, and park-like facilities. *Figure 3* presents the surrounding land use and potential sensitive environmental receptors.

[1] Zoning Resolution, The City of New York, Article VII: Administration, Chapter 3-Special Permits by the Board of Standards and Appeals, 73-19 Special Permit Use.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with DER-10. The investigation was conducted between December 2016 and March 2017. The RI Report was submitted to NYSDEC concurrently with this RAWP as part of the BCP Application. *Figure 7* depicts the sample locations.

2.1 SUMMARY OF REMEDIAL INVESTIGATIONS PERFORMED

2.1.1 Samples Collected

The RI included the following:

1. Advancement of six soil vapor points on the eastern portion of the Site and collection and laboratory analysis of soil vapor samples;
2. Advancement of four soil vapor points on the western portion of the Site and collection and laboratory analysis of soil vapor samples;
3. Advancement of two temporary sub-slab vapor points within the Site building and collection and laboratory analysis of a sub-slab vapor sample;
4. Collection and laboratory analysis of one ambient air sample;
5. Advancement of 13 soil borings with continuous sampling to a maximum of 70 feet bgs and laboratory analysis of soil samples;
6. Advancement of two additional soil borings within the Site building, continuous soil sampling to refusal (1.5 feet and 12 feet below building slab [bbs]), and laboratory analysis of soil samples;
7. Installation of six temporary monitoring wells, and collection and laboratory analysis of groundwater samples; and,
8. Installation, development, and survey of four permanent monitoring wells and collection and laboratory analysis of two rounds of groundwater samples from each permanent well.

At the request of the NYSDEC and NYSDOH, supplemental groundwater and surface soil samples were collected from the Site in early May 2018. The results of the sampling event were presented to the NYSDEC and NYSDOH in a supplemental RIR dated July 17, 2018. Additionally, off-site vapor intrusion sampling (including the collection and laboratory analysis of co-located sub-slab vapor and indoor air samples and ambient air samples) will be performed at the west-adjacent building at the start of the heating season in 2018. A Supplemental Vapor Intrusion Work Plan will be submitted to NYSDEC and NYSDOH for review and approval prior to sampling.

2.1.2 Chemical Analytical Work Performed

2.1.2.1 Sub-Slab Vapor, Soil Vapor, and Ambient Air

The sub-slab vapor, soil vapor, and ambient air samples were analyzed for a list of 26 petroleum- and chlorinated solvent-related VOCs by United States Environmental Protection Agency (USEPA) Method TO-15. Sub-slab vapor samples, soil vapor samples collected on the eastern portion of the Site, and the ambient air sample were also analyzed for formaldehyde by USEPA Method TO-15.

2.1.2.2 Soil Borings and Subsurface Soil

The soil samples selected for laboratory analyses and the analyses performed are summarized in the following table.

Boring Depths and Soil Sample Analytical Plan

Soil Boring ID	Boring Depth (feet bgs)	Depth of Sample Intervals Selected for Analysis (feet bgs)	TCL/CP-51 VOCs+TICs	TCL/CP-51 SVOCs+TICs	TAL Metals[2]	PCBs	TCL Pesticides/ Herbicide[4]	Hex. Chromium/ Cyanide	TPH DRO/GRO RCRA Characteristics	TCLP Lead	Formaldehyde	Dioxins and Furans
GP-1	60	1-3	X	X	X	X	X	X	X	X	X	
		10-12	X	X	X	X	X	X			X	
GP-2	70	1-3	X	X	X	X	X	X			X	
		10-12	X	X	X	X	X	X	X		X	
GP-3	60	1-3	X	X	X	X	X	X	X	X	X	
		10-12	X	X	X	X	X	X			X	
GP-4	60	1-3	X	X	X	X	X	X	X	X	X	X
		10-12	X	X	X	X	X	X			X	
GP-5	60	1-3	X	X	X	X	X	X	X		X	
		10-12	X	X	X	X	X	X		X	X	X
GP-6	60	1- 3	X	X	X	X	X	X		X	X	
		10-12	X	X	X	X	X	X	X		X	
TRC-SB-1	12[1]	1-3[1]	X	X	X	X	X			X	X	
		10-12[1]	X	X	X	X	X				X	
TRC-SB-2	1.5[1]	0.5-1.5[1]	X	X	X	X	X			X	X	
TRC-MW-2	60	1-3	X	X	X	X	X			X	X	X
		10-12	X	X	X	X	X				X	
		48-50	X	X	X	X	X				X	
		1-3	X	X	X	X	X			X	X	

Soil Boring ID	Boring Depth (feet bgs)	Depth of Sample Intervals Selected for Analysis (feet bgs)	TCL/CP-51 VOCs+TICs	TCL/CP-51 SVOCs+TICs	TAL Metals[2]	PCBs	TCL Pesticides/ Herbicide[4]	Hex. Chromium/ Cyanide	TPH DRO/GRO RCRA Characteristics	TCLP Lead	Formaldehyde	Dioxins and Furans
TRC-MW-3	65	12-16	X	X	X	X	X			X	X	X
		53-55[3]	X	X	X	X	X				X	
TRC-DSB-1	20	12-14		X[5]	X[6]					X	X	
		18-20		X[5]	X[6]					X	X	
TRC-DSB-2	20	10-15		X[5]	X[6]					X	X	
		18-20		X[5]	X[6]					X	X	
TRC-DSB-3	20	10-15		X[5]	X[6]						X	
		18-20		X[5]	X[6]					X	X	

TICs: Tentatively identified compounds
X: Analysis performed
[1] Feet below building slab
[2] TAL Metals less Al, Ca, Fe, K, Mg, and Na.
[3] One duplicate soil sample TRC-DUP-1 [duplicate of TRC-MW-3(53-55')] was submitted for laboratory analysis.
[4] Samples collected from TRC-SB-1, TRC-SB-2, TRC-MW-2, and TRC-MW-3 were analyzed for TCL pesticides and the herbicide Silvex only.
[5] Dibenzofuran only
[6] Lead only

2.1.2.3 Groundwater

The groundwater samples selected for laboratory analyses and the analyses performed are summarized in the following table.

Groundwater Sample Analytical Plan

Sample ID/ Well Number	Sample Date	Depth to Water (feet bgs)[3]	Screened Interval (feet bgs)	TCL/CP-51 VOCs +TICs	TCL/CP-51 SVOCs+TICs	PCBs	TAL Metals	Formaldehyde
GW-1	01/03/17	50	47 to 62	X	X	X	X	X
GW-2	12/29/16	46	42 to 52	X	X	X	X	X
GW-3	12/28/16	51	49 to 59	X	X	X	X	X
GW-4	12/29/16	51	47 to 57	X	X	X	X	X
GW-5	01/04/17	53	44 to 64	X	X	X	X	X

Sample ID/ Well Number	Sample Date	Depth to Water (feet bgs)[3]	Screened Interval (feet bgs)	TCL/CP-51 VOCs +TICs	TCL/CP-51 SVOCs+TICs	PCBs	TAL Metals	Formaldehyde
GW-6	01/05/17	53	41 to 61	X	X	X	X	X
MW-1[1]	02/21/17	49.43	45 to 60	X				X
	03/10/17	49.43		X				
MW-2	02/21/17	51.43	45 to 55	X				X
	03/10/17	51.74		X				
MW-3	02/21/17	52.41	50 to 65	X				X
	03/10/17	52.52		X				
MW-4[2]	02/21/17	50.73	45 to 60	X				X
	03/10/17	50.81		X				

X – Sample analysis performed

[1] One duplicate groundwater sample, TRC-DUP1, was collected on March 10, 2017 from TRC-MW-1.

[2] One duplicate groundwater sample, TRC-DUP1, was collected on February 21, 2017 from TRC-MW-4.

[3] Measured from the top of polyvinyl chloride (PVC) casing.

2.1.3 Geophysical Survey

Geophysical surveys were performed to verify that the proposed sample locations were clear of subsurface structures and utilities, determine if unknown USTs are present on the Site, and to confirm the location of a suspect UST as follows:

- On December 20, 2016, boring locations on the eastern portion of the Site were cleared for subsurface structures and utilities. Due to the presence of parked cars that could not be moved in the on-Site parking area, only soil boring locations could be surveyed and a geophysical survey on the entire lot was not completed.
- On February 9 and 13, 2017 a geophysical survey was performed to confirm the presence and location of the suspect UST and to verify that proposed sample locations on the eastern portion of the Site and the adjacent sidewalks were clear of unknown USTs, subsurface structures, and utilities. A geophysical survey was not completed on the entire property due to the presence of vehicles, which restricted access to the asphalt-paved lot.

- On March 10, 2017, a geophysical survey was performed on the western portion of the Site to clear the proposed soil vapor sample locations for unknown USTs, subsurface structures, and utilities.

Sampling locations were established in areas that did not conflict with subsurface structures or utilities. Anomalies indicative of potential unknown USTs were not identified during the geophysical surveys in the surveyed areas. The results of the suspect UST location investigations are described below.

The geophysical survey reports are presented as *Appendix C* of the RI Report.

Suspect UST Investigations

The Site building, constructed in 1953, historically contained a fuel oil fired boiler system with associated fuel oil tank. The building heating system was converted to a natural gas-fired system in the early 1990s, and the boiler room currently contains a natural-gas fired hot water heater and steam boiler. The boiler room encompasses an area that is approximately 150 square feet and the floor of the boiler room is approximately 4 feet lower than the adjacent ground floor elevation. The Site is listed in the NYSDEC PBS tank database (PBS Registration No. 2-258520) for one 1,500-gallon UST with a status of "Closed prior to 03/1991." PBS records indicate the tank is vaulted with no access for inspection. During the geophysical survey and Site inspection, a sealed door that potentially leads to the tank vault was identified on the eastern façade of the Site building. A fuel oil tank fill port and vent line are present along the exterior of the northern façade of the Site building and there is a wall-mounted petrometer on the interior northern wall of the boiler room; therefore, it is suspected that there is a UST in an inaccessible vault in this portion of the Site building (i.e., the northeast corner).

Ground penetrating radar (GPR) was used on the ground floor between the northern façade of the Site building and the northern wall of the boiler room, which consists of a hallway, two bathrooms, a storage closet, and a closet with air handling equipment in order to confirm the presence of the suspect UST. Due to space limitations in the vicinity of the boiler room, it was not possible to confirm the presence or location of the UST by GPR. *Figure 2* shows the general area where the UST vault is believed to be located.

2.1.4 Asbestos Clearance

After determination via the geophysical surveys that planned boring locations were clear of underground utilities, select exterior and interior boring locations were marked for asbestos clearance. Taylor Environmental Group (Taylor) inspected the ground surface materials (concrete sidewalk and asphalt) and soil and gravel at the select boring locations to identify suspect asbestos-

containing materials (ACMs). Samples of the suspect ACMs identified (two types of asphalt) were collected for laboratory analysis on December 21, 2016. The results of the analyses for asbestos indicated that the asphalt materials do not contain asbestos.

Taylor performed two additional inspections of surface materials (floor tile and mastic) and subsequently the concrete floor slab at two boring locations within the building for ACMs on February 7, 2017 and February 9, 2017. The suspect ACMs identified (floor tile and mastic) were assumed to contain asbestos; therefore, the floor coring was performed as an asbestos project. Following the coring Taylor inspected the cores from the concrete floor slab and no suspect ACMs were identified. Based on the results of the surveys, clearance was issued to proceed with the drilling activities. The Limited Asbestos Inspection Survey Reports are presented in *Appendix I* of the RI Report.

2.1.5 Summary of Remedial Investigation Findings

Below is a summary of the RI findings.

Volatile Organic Compounds (VOCs) in Soil

A total of 21 soil samples and one duplicate soil sample were analyzed for Target Compound List (TCL) VOCs +10 tentatively identified compounds (TICs) and formaldehyde. Six additional samples, which were collected during the advancement of three delineation soil borings (TRC-DSB-1, TRC-DSB-2, and TRC-DSB-3) in the northeast portion of the Site, were analyzed for formaldehyde, to delineate the extent of formaldehyde in Site soil.

There were no VOCs detected at concentrations exceeding the Unrestricted Use Soil Cleanup Objectives (SCOs) with the exception of acetone, which was detected in soil sample TRC-SB-2 (0.5-1.5') at a concentration above the Unrestricted Use SCO but below the Restricted-Residential Use SCO. There were no VOCs detected at concentrations above the Restricted-Residential Use SCOs. Note that acetone is a common laboratory contaminant. Further, acetone was not detected in the groundwater samples and is not considered a contaminant of concern at the Site.

Results of analysis for formaldehyde ranged from non-detect to 50 mg/kg. There is no SCO for formaldehyde.

The complete results of the analyses of subsurface soil samples for VOCs are presented in *Table 2*.

Semivolatile Organic Compounds (SVOCs) in Soil

A total of 21 soil samples and one duplicate soil sample were analyzed for TCL SVOCs +20 TICs. In addition, six delineation soil samples were analyzed for dibenzofuran, as a screening tool for

waste classification purposes. A total of 18 SVOCs were detected at concentrations above the Unrestricted Use SCOs and 11 SVOCs were detected in soil at concentrations ranging from marginally to two orders of magnitude above the Restricted-Residential Use SCOs. A summary of the concentrations of SVOCs detected above the Restricted-Residential Use SCOs is presented in the table below.

SVOCs Detected in Soil at Concentrations above Restricted-Residential Use SCOs

Sample ID Sample Depth (feet) Units	GP-1 (1'-3') 1 – 3 mg/kg	GP-4 (1'-3') 1 – 3 mg/kg	GP-5 (10-12') 10 – 12 mg/kg	TRC-MW-2 1-3 mg/kg	RRUSCO mg/kg
Anthracene	0.18 J	**150**	0.40	2.48	100
Benzo(a)anthracene	1.0	**200**	0.96	**7.67**	1
Benzo(a)pyrene	0.98	**180**	0.81	**6.98**	1
Benzo(b)fluoranthene	**1.4**	**210**	**1.1**	**8.04**	1
Benzo(k)fluoranthene	0.5	**85**	0.41	3.17	3.9
Chrysene	1.0	**190**	0.87	**7.52**	3.9
Dibenzo(a,h)anthracene	0.16 J	**22**	0.13 J	**1.19**	0.33
Fluoranthene	1.7	**490**	2.4	16.4	100
Indeno(1,2,3-cd)pyrene	**0.59**	**98**	0.47	**4.80**	0.5
Phenanthrene	0.83	**560**	2.1	7.69	100
Pyrene	1.9	**590**	2.2	19.1	100

Notes:
Bold and shaded values exceed Restricted-Residential Use SCO
J: Estimated value
mg/kg: Milligrams per kilogram
RRUSCO: Restricted-Residential Use SCO

Based on the absence of field evidence of an on-Site release coupled with the presence of fill material in soil throughout the Site, the SVOCs detected in soil above Restricted-Residential Use SCOs are attributed to the characteristics of fill material present at the Site.

The complete results of the analyses of the soil samples for SVOCs are presented in *Table 3*.

Dioxins and Furans in Soil

Due to detectable concentrations of dibenzofuran in soil samples GP-4 (1'-3'), GP-5 (10'-12'), TRC-MW-2 (1'-3'), and TRC-MW-3 (12'-16') each of these samples was also analyzed for dioxins and furans as a screening tool for waste characterization purposes. Dioxin and furan results provide information regarding soil disposal options for soil excavated for construction, since regional disposal facilities typically require dioxin analyses prior to accepting soil. The following parameters were detected in soil: Total tetrachlorodibenzo-p-dioxin (TCDD) (at a highest concentration of 3.10 nanograms per kilogram (ng/kg)), 2,3,7,8-tetrachlorodibenzofuran (TCDF) (at a highest concentration of 3.14 ng/kg and total TCDF at a highest concentration of 16 ng/kg). The dioxin/furan concentrations may impact soil disposal options. Note that there are no

applicable New York State SCGs for dioxins and furans in soil[2]. The presence of these parameters in soil samples may be attributed to the characteristics of fill material at the Site.

A detailed summary of the analytical results for dioxins and furans is presented in *Table 4.*

Metals and Cyanide in Soil

A total of 21 soil samples and one duplicate soil sample were analyzed for Target Analyte List (TAL) metals. Twelve of the 21 soil samples were also analyzed for cyanide and hexavalent chromium. The analytical data is summarized in *Table 5*. Arsenic, copper, lead, mercury, nickel, zinc, and hexavalent chromium were detected at concentrations exceeding the Unrestricted Use SCOs. Arsenic, copper, lead, and mercury were detected at concentrations exceeding the Restricted-Residential Use SCOs. A summary of the concentrations of metals detected above the Restricted-Residential Use SCOs is presented in the table below.

Metals Detected in Soil at Concentrations above Restricted-Residential Use SCOs

Sample ID Sample Depth (ft) Units	GP-1 (1'-3') mg/kg	GP-4 (1'-3') mg/kg	GP-5 (1'-3') mg/kg	GP-5 (10'-12') mg/kg	TRC-MW-2 (1'-3') mg/kg	TRC-DSB-2 (10'-15') mg/kg	RRUSCO mg/kg
Arsenic	4.5	6.9	**21**	3.2	6.4	--	16
Copper	51	220	31	**1,300**	215	--	270
Lead	210	**430 J**	76	**1,200**	347	**636**	400
Mercury	**1.5**	**1.4**	0.093	0.53	**0.84**	--	0.81

Notes:
Bold and shaded values exceed Restricted-Residential Use SCO
J: Estimated value
mg/kg: Milligrams per kilogram
RRUSCO: Restricted-Residential Use SCO
--: Not analyzed

Hazardous Waste Characteristics in Soil

A total of 15 soil samples which exhibited elevated concentrations of total lead (over 100 milligrams per kilogram (mg/kg)) were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) lead. Six soil samples were analyzed for the Resource Conservation and Recovery Act (RCRA) characteristics of reactivity, corrosivity, and ignitability. None of the soil samples exhibited the characteristic of reactivity, corrosivity, or ignitibility. TCLP lead above the

[2] There are supplemental SCOs for the protection of ecological resources for select dioxin/furans (as listed in Table 1 of NYSDEC CP-51); however, these SCOs are not applicable to the Site as no ecological resources are present.

regulatory limit of 5 milligrams per liter (mg/L) was detected in the extract of sample GP-5(10'-12') at a concentration of 43 mg/L. Since one soil sample collected from boring GP-5 at a depth of 10 to 12 feet bgs (advanced in January 2017) exhibited a TCLP lead result above the regulatory limit, three additional soil borings (TRC-DSB-1 through TRC-DSB-3) were advanced in February 2017 and six additional soil samples were analyzed for lead to delineate the extent of hazardous lead in subsurface soils. TRC-DSB-1 was advanced adjacent to GP-5 to determine the vertical extent of soil containing lead above the TCLP regulatory limit. Lead above the TCLP regulatory limit was detected in the extract of sample TRC-DSB-1(12'-14') at a concentration of 13.9 mg/L. The underlying sample interval TRC-DSB-1(18'-20') was also tested by TCLP for lead and the result was below the regulatory limit. Therefore, the vertical extent of soil that exhibits the hazardous waste characteristic of toxicity has been delineated. Soil boring TRC-DSB-2 was advanced ten feet to the west of GP-5. Soil boring TRC-DSB-3 was advanced ten feet to the south of GP-5. The results of analysis for TCLP lead of the samples collected from delineation soil borings TRC-DSB-2 (10'-15') and TRC-DSB-2 (18'-20') and TRC-DSB-3 (10'-15') and TRC-DSB-3 (18'-20') were below the regulatory limit. Based on this, the limits of soil that exhibit the hazardous waste characteristic of toxicity have been delineated in the northeast part of the Site. A summary of the analytical results for the TCLP lead testing is presented in *Table 6* and on *Figure 15*.

Polychlorinated Biphenyls (PCBs) in Soil

Twenty-one soil samples and one duplicate soil samples were analyzed for polychlorinated biphenyls (PCBs). The analytical data is summarized in *Table 7*. There were no PCBs detected at concentrations greater than the Unrestricted Use SCO.

Pesticides and Herbicides in Soil

Twelve soil samples were analyzed for TCL pesticides and herbicides and eight soil samples and one duplicate soil sample were analyzed for TCL pesticides and the herbicide Silvex. The analytical data is summarized in *Table 8*. There were no pesticides or herbicides detected at concentrations greater than the Restricted-Residential Use SCOs. Additionally, there were no herbicides detected at concentrations above the Unrestricted Use SCOs. Three pesticides (4,4'-DDT, 4,4'-DDE, and 4,4'-DDT) were detected at concentrations above the Unrestricted Use SCOs, but below the Restricted-Residential Use SCO.

Waste Characterization Parameters in Soil

Six subsurface soil samples collected from either 1 to 3 feet or 10 to 12 feet below grade were analyzed for total petroleum hydrocarbons (TPH) diesel range organics (DRO)/gasoline range organics (GRO). TPH-GRO was not detected in any samples analyzed. TPH-DRO concentrations

in soil ranged from 15 to 690 mg/kg. There are no applicable regulatory comparison criteria for TPH. TPH results provide information on soil disposal options for soil excavated for construction of the new school building, since disposal facilities in the New York City metropolitan area typically require TPH analyses prior to accepting soil. The concentrations of TPH in the samples will not impact potential soil disposal options. A summary of the analytical results for TPH in soil is presented in *Table 9*.

VOCs in Groundwater

Six groundwater samples collected in January 2017 from temporary well points were analyzed for TCL VOCs +10 TICs. Additionally, one groundwater sample was collected from each of the four permanent monitoring wells on February 21, 2017 and March 10, 2017 (a total of eight groundwater samples and two duplicate samples). Six VOCs were detected at concentrations above Class GA Values in the groundwater samples. A summary of the concentrations of VOCs detected above Class GA Values in the groundwater samples is presented in the following table.

VOCs Detected in Groundwater at Concentrations Greater than Class GA Values

Sample ID	Analyte	TCA	Chloroform	cis-1,2-DCE	MTBE	Toluene	Formaldehyde
	Class GA Value (µg/L)	5	7	5	10	5	8
	Date	Results (µg/L)					
GW-1(1)	01/03/17	<1.0	5.4	<1.0	**130**	<1.0	<50
GW-2(1)	12/29/16	<1.0	0.52 J	<1.0	<1.0	0.22 J	**2,700**
GW-3	12/28/16	1.4	**9.3**	<1.0	5.8	0.24 J	**55**
GW-4	12/29/16	0.78 J	**10**	<1.0	**2,200**	0.45 J	<50
GW-5	01/04/17	1.4	**8.4**	0.58 J	<1.0	**9.1**	**66**
GW-6	01/05/17	<2.0	**8.8**	<2.0	**100**	<2.0	**1,400**
TRC-MW1(1)	02/21/17	<1.0	**9.4**	<1.0	<1.0	0.23 J	**84**
TRC-MW2	02/21/17	0.49 J	**25.9**	<1.0	<1.0	0.97 J	<50
	03/10/17	0.36 J	**20.8**	<1.0	<1.0	0.75 J	--
TRC-MW3	02/21/17	**6.6**	**8.1**	<1.0	<1.0	<1.0	<50
	03/10/17	**7.9**	4.6	<1.0	<1.0	<1.0	--
TRC-MW4(2)	02/21/17	<1.0	0.88 J	**7.4**	1.2	<1.0	<50
TRC-DUP1*	02/21/17	<1.0	0.89 J	**7.9**	1.3	<1.0	<50
TRC-MW4	03/10/17	<1.0	0.73 J	**6.4**	1.1	<1.0	--

Notes:
Bold and shaded values exceed Class GA Values
J: Estimated value.

µg/L: Micrograms per liter
<: Analyzed for but not detected
--: Not analyzed
*: TRC-DUP-1 is a duplicate of TRC-MW4
(1) These groundwater sampling locations are located in the sidewalk of 36th Street and are considered to be upgradient.
(2) This groundwater sampling location is located in the sidewalk of 5th Avenue and is considered to be cross gradient.

As shown in the table above, TCA, chloroform, cis-1,2-DCE, MTBE, toluene, and formaldehyde were detected in the groundwater samples at concentrations exceeding Class GA Values. Chloroform, MTBE, and toluene were not detected in soil samples. Formaldehyde was detected in soil samples GP-5 (10'-12') and GP-6 (1'-3') at concentrations of 50 mg/kg and 26 mg/kg, respectively.

Regarding the three chlorinated VOCs detected in groundwater at concentrations above Class GA Values:

- TCA was detected in groundwater in one on-Site monitoring well (TRC-MW-3) at a maximum concentration of 7.9 micrograms per liter (µg/L), slightly above the Class GA Value of 5 µg/L. Based on the concentration of TCA in one on-site monitoring well, the TCA concentrations in on-Site sub-slab and soil vapor, and the trace concentrations of TCA in Site soils, TCA in groundwater at the Site may be attributed to an on-Site source.
- Chloroform was detected in groundwater above the Class GA Value of 7 µg/L in samples collected from six on-Site locations and one upgradient monitoring well, at a maximum concentration of 25.9 µg/L. The source of chloroform is unknown, but may be attributable to an on-Site source based on concentration distribution in groundwater samples (i.e., highest concentration in monitoring well near the center of the Site) or an off-Site source since one upgradient off-Site monitoring well contained chloroform above the Class GA Value. A common source of chloroform in groundwater is the discharge of chlorinated water (chloroform is a byproduct of chlorinating water) from leaking potable water distribution pipes or sanitary sewers.
- Cis-1,2-DCE was detected in groundwater in the cross-gradient monitoring well (TRC-MW-4) located on the sidewalk along 5th Avenue, at a maximum concentration of 7.9 µg/L, slightly above the Class GA Value of 5 µg/L. The cis-1,2-DCE marginally above the Class GA Value is likely attributable to an off-Site source since this compound was only detected in cross-gradient well TRC-MW-4 and was not detected in Site soils.

Formaldehyde was detected in groundwater samples collected from three on-Site locations and two upgradient locations above the Class GA Value of 8 µg/L, at concentrations ranging from 55 to 2,700 µg/L. As mentioned above, formaldehyde was also detected in soil at concentrations of up to 50 mg/kg. The highest concentrations of formaldehyde in soil were detected near the northern property boundary, adjacent to the Greenwood Cemetery Maintenance Facility. The source of formaldehyde in groundwater is unknown, but may be attributable to the breakdown of MTBE associated with the open Spill Case[3] on the adjacent and upgradient gasoline station or on-Site fill material (i.e., filling activities may have been impacted by operations at the adjoining Greenwood Cemetery Maintenance Facility).

Two petroleum related VOCs, toluene (in one on-Site groundwater sample) and MTBE (in two on-Site groundwater samples and one upgradient groundwater sample) were detected in groundwater at concentrations above the Class GA Values. The petroleum related VOCs are attributed to an off-Site and upgradient gasoline station with documented releases of MTBE and other gasoline constituents to the soil and groundwater.

SVOCs in Groundwater

Six groundwater samples collected from temporary well points were analyzed for TCL SVOCs +20 TICs. Three SVOCs were detected at concentrations above Class GA Values in the groundwater samples. A summary of the concentrations of SVOCs detected above Class GA Values in the groundwater samples is presented in the table below.

SVOCs Detected in Groundwater at Concentrations Greater than Class GA Values

Sample ID Sampling Date Units	GW-5 1/4/17 ug/L	GW-6 1/5/17 ug/L	Class GA Value ug/L
Benzo(a)anthracene	**3.7 J**	<5.4	0.002
bis(2-Ethylhexyl)phthalate	**10**	**6.7 J**	5
Chrysene	**3.4 J**	<5.4	0.002

Notes:
Bold and shaded values exceed Class GA Values
<: Non-detect
J: Estimated value
ug/L: Micrograms per liter

[3] NYSDEC Spill Case No. 94-06838 with a status of "Not closed."

Benzo(a)anthracene, bis(2-ethylhexyl)phthalate, and chrysene in sample GW-5 and bis(2-ethylhexyl)phthalate in sample GW-6 were the only SVOCs detected in groundwater at concentrations exceeding the Class GA Values. These compounds were not detected in any of the other groundwater samples. With the exception of benzo(a)anthracene and chrysene detected in samples GP-4 (1'-3') at concentrations of 200 mg/kg and 190 mg/kg, respectively, and TRC-MW-2 (1'-3') at concentrations of 7.67 mg/kg and 7.52 mg/kg, respectively, SVOCs were either not detected or were detected in the soil samples at concentrations below Unrestricted Use SCOs. Evidence of contamination was not observed during field screening. The SVOCs detected in groundwater are likely attributable to the characteristics of the fill material at the Site.

Metals in Groundwater

Six groundwater samples were collected from temporary wells and analyzed for metals (unfiltered and filtered). Two metals were detected in the filtered groundwater samples at concentrations above the Class GA Values. A summary of the metals detected at concentrations greater than the Class GA Values in the filtered groundwater samples is provided in the following table.

Metals Detected in Filtered Groundwater at Concentrations above Class GA Values

Sample ID Sampling Date Unfiltered/Filtered Units	GW-1 1/3/2017 Filtered mg/L	GW-2 12/29/2016 Filtered mg/L	GW-3 12/28/2016 Filtered mg/L	GW-4 12/29/2016 Filtered mg/L	GW-5 1/4/2017 Filtered mg/L	GW-6 1/5/2017 Filtered mg/L	Class GA Value mg/L
Antimony	<0.050	<0.050	**0.047 J**	<0.050	<0.050	<0.050	0.003
Manganese	**19**	**1.0**	**0.40**	**7.0**	**2.5**	**0.34**	0.3

Notes:
Bold and shaded values exceed Class GA Values
<: Non-detect
J: Estimated value
mg/L: Milligrams per liter

Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, manganese, mercury, nickel, and zinc were detected in the unfiltered groundwater samples at concentrations exceeding Class GA Values. However, only antimony and manganese were detected in the filtered groundwater samples at concentrations exceeding the Class GA Values. Antimony and manganese were detected in soil at concentrations below the Unrestricted Use SCOs. The metals detected in groundwater, antimony and manganese, are likely attributable to local groundwater characteristics and/or the characteristics of the fill material at the Site. Note that lead was not detected in filtered groundwater samples at concentrations above the Class GA Value.

PCBs in Groundwater

PCBs were not detected in the groundwater samples.

VOCs in Soil Vapor

Ten soil vapor samples and two sub-slab vapor samples were collected at the Site and analyzed for VOCs. The results of the analyses of the sub-slab vapor and soil vapor samples were compared to NYSDOH Vapor Intrusion Matrices A, B, and C. Of the ten soil vapor samples and two sub-slab vapor samples collected, five soil vapor samples and one sub-slab vapor sample contained concentrations of one or more VOC potentially above a recommended action limit (i.e., mitigation or monitoring) for sub-slab vapor.

There are four recommendations within the NYSDOH Vapor Intrusion Matrices: no further action, identify sources(s) and resample or mitigate, monitor, and mitigate. A comparison of concentrations of detected compounds in the five soil vapor samples and one sub-slab vapor sample to the NYSDOH Vapor Intrusion Matrices indicates the following:

- Comparison of the concentrations of TCA detected in soil vapor samples SV-4 and SV-6 and vinyl chloride detected in soil vapor sample SV-1 to the NYSDOH Vapor Intrusion Matrices indicates the recommended action would be mitigation regardless of indoor air concentrations if the results are representative of sub-slab vapor concentrations.
- Comparison of the concentrations of TCA detected in sub-slab/soil vapor samples TRC-SSV-1, TRC-SV-2 (10') and SV-5 and 1,1-DCE detected in soil vapor sample SV-4 to the NYSDOH Vapor Intrusion Matrices indicates no further action, monitoring, or mitigation would be the recommended action, depending on the corresponding indoor air concentrations, if the results are representative of sub-slab vapor concentrations.

TCA was detected in nine soil vapor samples at concentrations ranging between 0.14 and 6,200 micrograms per cubic meter ($\mu g/m^3$). Additionally, TCA was detected in sub-slab vapor at concentrations of 200 $\mu g/m^3$ in TRC-SSV-1 and 31 $\mu g/m^3$ in TRC-SSV-2. Based on the presence of TCA in on-Site monitoring well TRC-MW-3 at a concentration marginally above the Class GA Value and absence of TCA in the upgradient monitoring well TRC-MW-1, the TCA in sub-slab and soil vapor is likely attributable to an on-Site source.

Additionally, petroleum-related VOCs were detected at elevated concentrations in soil vapor, most notably at soil vapor sample point SV-1. Specifically, in SV-1, benzene was detected at a concentration of 4,000 $\mu g/m^3$, toluene was detected at a concentration of 2,700 $\mu g/m^3$, ethylbenzene was detected at a concentration of 500 $\mu g/m^3$, o-xylene was detected at a concentration of 370 $\mu g/m^3$, and m&p-xylenes were detected at a concentration of 330 $\mu g/m^3$. Additionally, chloromethane (historically used for producing lead-based gasoline additives) was detected at a concentration of 10,000 $\mu g/m^3$ in SV-1. There are no applicable SCGs for these

constituents in soil vapor. The elevated concentrations of petroleum-related VOCs in soil vapor are likely attributable to an off-Site and upgradient gasoline station with documented releases of MTBE and other gasoline constituents in soil and groundwater.

2.2 SIGNIFICANT THREAT

The NYSDEC and NYSDOH will determine whether the Site poses a significant threat to human health and the environment. Notice of that determination will be provided for public review.

2.3 SITE HISTORY

2.3.1 Past Uses and Ownership

The eastern portion of the Site was first known to be developed in 1903 with elevated train tracks and an elevated train car repair shop. By 1926, the train car repair shop was demolished and the lot was vacant with the exception of the elevated train tracks. The current Site building was constructed in approximately 1953, and used for manufacturing purposes including jewelry fabrication. By 1997, the second floor was utilized as a garment assembly facility and by 1998, the first floor was used as a nightclub. Since at least 2004 through 2017, the building was used as a church.

The western portion of the Site was developed with a four-story residential building from at least 1903 until 1951, when it was razed. From 1999 through 2017, a trailer was present on the western portion of the lot and the unpaved area was utilized for storage of automobiles.

Figure 6 shows the historical uses of significance on the Site and surrounding properties.

The current owner of the Site is the NYCSCA. Previous property owners are listed below:

- Schlesinger Realty LLC (from 1999 to 2018)
- East Coast Design II Realty (from 1991 to 1999)
- De Lizza Realty (from 1972 to 1992)

2.3.2 Phase I and Phase II Reports

Refer to Appendix A of the RI Report for copies of the Phase I Environmental Site Assessments (ESAs) and Phase II Environmental Site Investigation (ESI) reports listed below. In March 2018, Lots 39 and 48 were merged and the new property identification is 840 5th Avenue (Block 693, Lot 39).

- Phase I ESA for Block 693, Lot 39 completed by Middleton Environmental Inc. (Middleton) in December 2000.
- Phase I ESA for the Block 693, Lot 39 portion of the Site completed by Dvirka & Bartilucci (D&B) in December 2016.
- Phase I ESA for the Block 693, Lot 48 portion of the Site completed by TRC in July 2017.
- Phase II ESI for the Block 693, Lot 39 portion of the Site completed by D&B in March 2017.
- Supplemental Phase II ESI for Block 693, Lot 39 completed by TRC in March 2017.

2.3.3 Sanborn Maps

Sanborn Maps available for this Site were reviewed prior to preparation of the RAWP. Copies of the Sanborn Maps are in *Appendix E*. The following summary of the history and uses of the Site is based on a review of available Sanborn Fire Insurance Maps and the Phase I ESA for Block 693, Lot 39 conducted by Middleton Environmental Inc. (Middleton) in 2000, the Phase I ESA conducted by D&B in 2016 for Block 693, Lot 39, and the Phase I ESA for Block 693, Lot 48 conducted by TRC in 2017. As noted above, in March 2018, Lots 39 and 48 were merged and the new property identification is 840 5th Avenue (Block 693, Lot 39).

Eastern Portion of the Site (formerly Block 693, Lot 39):

The Sanborn Map for 1888 shows the eastern portion of the Site vacant and subdivided into six lots. The 1906 Sanborn Map shows a building indicated as an elevated train car repair shop in the northeastern portion of the Site and elevated train tracks on a platform in the southwestern portion of the Site. The 1926 Sanborn Map shows the train car repair shop is no longer present. By 1951, the elevated platform is no longer mentioned, indicating the potential for buried structures and debris. The 1965 Sanborn Map shows a structure present consistent with the current building. Sanborn Maps for subsequent years show no significant change in use.

Western Portion of the Site (formerly Block 693, Lot 48):

The Sanborn Map for 1888 shows the western portion of the Site undeveloped. The 1906 Sanborn Map shows a low-rise dwelling occupying the southwestern portion of the Site. The 1926 Sanborn Map shows the on-Site structure as a flat (residence) and no significant changes are noted from the previous Sanborn Map. By 1951, the low-rise residential structure had been razed and this area of the Site appeared vacant. Sanborn Maps for subsequent years show no significant change in use.

Figure 6 shows the historical uses of significance on the Site and surrounding properties.

2.4 GEOLOGICAL CONDITIONS

2.4.1 Geology

Geologic cross-sections are presented on *Figures 8* and *9.* Brooklyn is located within the Atlantic Coastal lowlands physiographic province of New York State. The subsurface geology of Kings County (Brooklyn) is characterized by bedrock consisting of gneiss and schist of Precambrian age. Present day surface features and topography in New York City are primarily attributable to the most recent glaciation event. Beneath the area of the Site are deposits of glacial outwash sediments, typically comprised of sand and gravel. Soil and bedrock stratigraphy throughout Brooklyn typically consists of a layer of fill material that overlies glacial outwash sediments, decomposed unconsolidated bedrock, and bedrock. The depth to bedrock in the area is estimated to be approximately 225 feet bgs.

The topography of the Site slopes downward toward the north and northwest. There is an approximately 20-foot drop in ground surface elevation between the northern limits of the Site and the north-adjacent property.

There is a small pond approximately 0.2 miles east of the Site within Greenwood Cemetery. The nearest major surface water body is Gowanus Bay, located approximately 0.8 miles to the northwest.

2.4.2 Hydrogeology

Regional groundwater is expected to flow to the northwest. Two rounds of synoptic water level measurements were collected from four surveyed permanent monitoring wells (TRC-MW-1 through TRC-MW-4) as part of the RI. These monitoring wells (TRC-MW-1 through TRC-MW-4) are located on the eastern portion of the Site or the adjacent sidewalk. Depth to water ranged from approximately 49.4 to 52.5 feet bgs. Note that the groundwater surface elevation is approximately 3.5 feet lower on the northern portion of the Site in comparison to the southern portion of the Site. Based on the two rounds of groundwater surface elevation measurements, the apparent predominant direction of groundwater flow in the eastern portion of the Site is towards the northeast.

Further investigation of potential influences on groundwater flow revealed the presence of a water supply well at the southwest-adjacent car wash facility and one irrigation well at the east-adjacent cemetery (used for irrigation). Based on communications with Greenwood Cemetery personnel, the irrigation well is located near the 25th Street cemetery entrance off of 5th Avenue (2,700 feet northeast of the Site) and the pumping rate for the irrigation well is approximately 36 gallons per minute (gpm). Based on the distance from the Site and pumping rate, it is unlikely that the

irrigation well impacts groundwater flow at the Site. The exact location of the water supply (production) well at the car wash has not been confirmed, however, it is anticipated that this well is 50 to 75 feet upgradient of the Site. The car wash production well is reportedly eight-inches in diameter and installed to a depth of 100 feet bgs. Information regarding the pumping rate for the car wash production well was not provided by the tenant or the owner; therefore, it is not known whether or not the production well is influencing groundwater beneath the Site. Further, specific information regarding well construction details and sampling data (if any) for the irrigation well at the Greenwood cemetery and the production well at the carwash has not been obtained.

Figures 10 and *11* present inferred groundwater surface elevation contours.

2.5 CONTAMINATION CONDITIONS

2.5.1 Conceptual Model of Site Contamination

The following conceptual site model explains the nature and extent of the contaminants known to be present at the Site, the dominant fate and transport characteristics, potential exposure pathways, and potential impacts to receptors.

Based on the RI results, the primary contaminants of concern in soil include SVOCs, metals (arsenic, copper, lead and mercury), including hazardous concentrations of leachable lead; in groundwater the primary contaminants of concern are VOCs (TCA, chloroform, cis-1,2-DCE, formaldehyde, MTBE, and toluene), SVOCs, and metals (in filtered samples); and in sub-slab vapor/soil vapor the primary contaminants of concern are CVOCs (TCA, vinyl chloride, and 1,1-DCE).

SVOCs and metals in soil and groundwater are attributed to the filling of the Site during historic operations and the historic train car repair shop and elevated tracks. Fill material was found from the ground surface to depths ranging from 11.5 feet bgs to 48 feet bgs. Hazardous levels of leachable lead in soil in the northeast portion of the Site are not impacting groundwater based on results of analysis of filtered groundwater samples. The soil impacted by hazardous levels of leachable lead is currently under an impervious cap and efforts to remove the lead hot spot will be limited to the depth at which development sheeting and shoring extends as part of the development. Efforts will be made to extend the excavation to a final depth of 18 feet bgs to the extent practical. Any residual hazardous lead will be covered by an engineered composite cover system or cover for landscaped areas and managed under the SMP. Potential exposure to SVOCs and metals in soil could occur during soil disturbing activities (e.g., utility maintenance or future redevelopment); however, the frequency and duration of exposure is expected to be low.

VOCs (TCA, chloroform, cis-1,2-DCE, formaldehyde, MTBE, and toluene) were detected in groundwater at concentrations above Class GA Values. Discussion regarding the VOCs detected in groundwater is presented below.

- The primary contaminant of concern in groundwater associated with a potential on-Site source is TCA. However, based on the detected maximum concentration of TCA, which is only slightly above the Class GA Value, there does not appear to be a significant on-Site source that would require remediation. TCA was not detected in the groundwater sample collected furthest downgradient, indicating that the TCA in on-Site groundwater is not migrating off-Site.
- The source of chloroform is unknown, but may be attributable to an on-Site source based on concentration distribution in groundwater samples (i.e., highest concentration in monitoring well near the center of the Site) or an off-Site source since one upgradient off-Site monitoring well contained chloroform above the Class GA Value. A common source of chloroform in groundwater is the discharge of chlorinated water (chloroform is a byproduct of chlorinating water) from leaking potable water distribution pipes or sanitary sewers.
- Cis-1,2-DCE, detected marginally above the Class GA Value, is likely attributable to an off-Site source since this compound was only detected in a cross-gradient well and was not detected in Site soils.
- Formaldehyde was detected above the Class GA Value in groundwater samples collected from three on-Site locations and two upgradient locations. Formaldehyde was also detected in soil. The highest concentrations of formaldehyde in soil were detected near the northern property boundary, adjacent to the Greenwood Cemetery Maintenance Facility. The source of formaldehyde in groundwater is unknown, but may be attributable to the breakdown of MTBE associated with the open Spill Case on the adjacent and upgradient gasoline station or on-Site fill material (i.e., filling activities may have been impacted by operations at the adjoining Greenwood Cemetery Maintenance Facility).
- Two petroleum related VOCs, toluene (in one on-Site groundwater sample) and MTBE (in two on-Site groundwater samples and one upgradient groundwater sample) were detected in groundwater at concentrations above the Class GA Values. The petroleum related VOCs are attributed to an off-Site and upgradient gasoline station with documented releases of MTBE and other gasoline constituents to the soil and groundwater.

The limited potential for exposure to groundwater is discussed below.

Groundwater was encountered at the Site at depths of approximately 50 feet bgs and the Site is predominantly capped with an impervious cover, minimizing potential impacts from exposure to on-Site groundwater. Based on the two rounds of groundwater surface elevation measurements, the apparent predominant direction of groundwater flow in the eastern portion of the Site is towards the northeast. Although a water supply well located near the Site at the southwest-adjacent car wash facility has the potential to impact groundwater flow direction at the Site (refer to Section 5.7.1), specific information regarding the pumping rate, well construction, or sampling data was not provided by the owner or tenant. Groundwater at the Site is not utilized for potable or non-potable purposes. Therefore, under current conditions, ingestion and absorption of contaminated groundwater do not represent significant potential exposure pathways, and for this reason, the potential for exposure to contaminated groundwater by potential receptors is expected to be low.

Petroleum-related impacts were identified in groundwater and soil vapor at the Site. The adjacent MTA Jackie Gleason bus depot and gasoline station upgradient of the Site have open and historic spill cases. The gasoline station, which has been present for approximately 65 years, has documented petroleum-related impacts to soil and groundwater and an open NYSDEC Spill Case. The documented petroleum-related impacts to groundwater appear to be migrating from the gasoline station property onto the Site. Due to the close proximity of the gasoline station and the direction of groundwater flow, from the south-adjacent property towards the Site, the petroleum-related impacts in groundwater are likely from the gasoline station.

Based on the presence of TCA in on-Site monitoring well TRC-MW-3 at a concentration marginally above the Class GA Value and absence of TCA in the upgradient monitoring well TRC-MW-1, the TCA in sub-slab and soil vapor is likely attributable to an on-Site source. CVOCs in on-Site soil vapor could potentially impact the proposed future use of the Site as a public school facility; therefore, the proposed building will be constructed with a gas vapor barrier and sub-slab depressurization system (SSDS). At the request of the NYSDEC and NYSDOH, off-site vapor intrusion sampling (including the collection and laboratory analysis of co-located sub-slab vapor and indoor air samples and ambient air samples) will be performed at the west-adjacent building at the start of the heating season in 2018. A Supplemental Vapor Intrusion Work Plan will be submitted to NYSDEC and NYSDOH for review and approval prior to sampling.

2.5.2 Description of Areas of Concern

The following areas of concern have been identified:

- A vaulted and inaccessible UST, piping, and appurtenances are likely present.

- The primary contaminants of concern in soil include SVOCs and metals (arsenic, copper, lead, and mercury), including hazardous concentrations of leachable lead.
- Groundwater contaminants of concern include VOCs TCA, chloroform, cis-1,2-DCE, formaldehyde, MTBE, and toluene), SVOCs, and metals (in filtered samples).
- Sub-slab vapor/soil vapor contaminants of concern include CVOCs (TCA, vinyl chloride, and 1,1-DCE).

2.5.3 Identification of Standards, Criteria and Guidance

A criterion for remedy selection is evaluation for conformance with SCGs that are applicable, relevant and appropriate. Principal SCGs that are applicable, relevant and appropriate for evaluating the alternatives for remediation of the Site include the following:

- New York State Environmental Conservation Law (ECL) Article 27, Title 14, Brownfield Cleanup Program (ECL §27-14);
- 6 NYCRR Subpart 375-1, General Remedial Program Requirements; 6 NYCRR Subpart 375-3, Brownfield Cleanup Program; and 6 NYCRR Subpart 375-6, Remedial Program Soil Cleanup Objectives;
- NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation;
- NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Groundwater Effluent Limitations;
- NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York;
- New York State Groundwater Quality Standards – 6 NYCRR Part 703;
- NYSDEC Draft Brownfield Cleanup Program Guide;
- NYSDOH Generic Community Air Monitoring Plan; and
- NYSDEC CP-51 Soil Cleanup Guidance

Additional regulations and guidance are applicable, relevant, and appropriate to the remedial alternatives (such as 6 NYCRR Part 360, Solid Waste Management Facilities; 6 NYCRR Part 364, Waste Transporter Permits; 6 NYCRR Part 613, Handling and Storage of Petroleum, etc.), and will be complied with; however, the list above is intended to represent the principal SCGs which should be considered in evaluating the remedial alternatives for the Site.

Conformance with the appropriate standards for remediation of contaminated soil is an important criteria in evaluating the remedial alternatives for the Site. Presently, in New York State 6 NYCRR

Part 375 establishes the primary SCGs associated with remediation of contaminated soil at sites in the BCP. If proposing remediation pursuant to a Track other than Track 1 (Unrestricted Use), 6 NYCRR Part 375 requires evaluation of at least one remedial alternative pursuant to Track 1 (Unrestricted Use) and one other alternative developed by the Applicants for the proposed use of the Site[4]. The remedial alternatives analysis presented in Section 3.1 of this RAWP has been prepared in conformance with this requirement.

The preferred alternative, identified in Section 3.2 as Remedial Alternative 2: Remediate to Achieve Restricted-Residential Use, is an alternative which will satisfy the requirements of Track 4 cleanup with Engineering Controls and Institutional Controls. The Volunteer is proposing to excavate the soil that exhibits the hazardous waste characteristics of toxicity for lead in one hot spot area in the northeast part of the Site. Additional non-hazardous soil would be removed as part of Site development in support of excavation for the proposed Site building and basement. Note that the contemplated use of the Site allows for clean cover layer and imported fill material to meet the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted-Residential Use SCOs as set forth in Table 375-6.8(b) of 6 NYCRR Part 375; however, the NYCSCA's standard specifications for the clean cover layer (i.e., top two feet of exposed soil, if any) require the use of soil which meets the more stringent Unrestricted Use SCOs as further described in Section 5.4.9.

As described in detail in the following sections of this work plan, the selected alternative is being proposed in conjunction with engineering and institutional controls.

2.5.4 Soil/Fill Contamination

Investigations conducted at the Site have determined that the primary contaminants of concern in soil are SVOCs and metals (arsenic, copper, lead and mercury), including hazardous concentrations of leachable lead.

2.5.4.1 Summary of Soil/Fill Data

Summaries of the results of the analyses of the soil samples are presented in *Tables* 2 through 9. In the tables, analytical results are compared to the Unrestricted Use SCOs, Restricted-Residential Use SCOs, and Protection of Groundwater SCOs. The complete laboratory analytical data reports are presented in *Appendix I* of the RI Report.

[4] Exceptions apply to this and can be found at 6 NYCRR 375-3.8(f)(3).

A review of the results of the analyses of the soil samples is presented in Section 2.1.5.

2.5.4.2 Comparison of Soil/Fill with SCGs

Tables 2 through *9* show exceedances from Track 1 Unrestricted SCOs for all soil/fill at the Site. *Figure 13* is a spider map that shows the locations and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill. *Figure 14* is a spider map that shows the locations and summarizes exceedances of the Restricted-Residential Use SCOs. *Figure 15* is a spider map that shows the locations and summarizes exceedances of the TCLP regulatory limit for lead in soil.

2.5.5 On-Site and Off-Site Groundwater Contamination

Groundwater at the Site is impacted primarily by VOCs, SVOCs, and metals (in filtered samples).

2.5.5.1 Summary of Groundwater Data

Summaries of the results of the analyses of the groundwater samples are presented in *Tables 10* through *13*. The complete laboratory analytical data reports are presented in *Appendix I* of the RI Report. A review of the results of the analyses of the groundwater samples is presented in Section 2.1.5.

2.5.5.2 Comparison of Groundwater with SCGs

Tables 10 through *14* show exceedances of Class GA Values in groundwater samples prior to the remedy. *Figure 16* is a spider map that indicates the locations of and summarizes exceedances of Class GA Values in groundwater samples prior to the remedy.

2.5.6 On-Site and Off-Site Soil Vapor Contamination

Summaries of the results of the analyses of the sub-slab vapor and soil vapor samples are presented in *Table 1*. The complete laboratory analytical data reports are presented in *Appendix I* of the RI Report. *Figure 12* shows a comparison of sub-slab vapor and soil vapor sampling results to the NYSDOH Vapor Intrusion Matrices. A review of the results of the analyses of the soil vapor samples is presented in Section 2.1.5

2.5.6.1 Comparison of Soil Vapor with SCGs

A table of soil vapor data collected prior to the remedy is shown in *Table 1*. A spider map that indicates the locations of and summarizes sub-slab vapor and soil vapor data prior to the remedy is shown in *Figure 12*.

2.6 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS

2.6.1 Qualitative Human Health Exposure Assessment

An evaluation of potential exposure pathways and potentially exposed human populations is presented in the RI Report. The evaluation addresses both potential on-site and off-site health impacts associated with the Site.

An exposure pathway consists of five elements: (1) a contaminant source, (2) a contaminant release, and transport mechanism, (3) a point of exposure, (4) a route of exposure, and (5) a receptor population. An exposure pathway is complete when all five elements of an exposure pathway are complete.

Based on the findings of the RI, the principal contaminants of concern at the Site have been identified as petroleum and chlorinated VOCs in groundwater and soil vapor and SVOCs and metals in subsurface soils. A qualitative exposure assessment was prepared to evaluate the potential for exposure to these contaminants. The evaluation addresses both potential on-Site and off-Site health impacts associated with the Site.

Dermal contact, ingestion of soil or groundwater, or inhalation of vapors or dust represent the potential routes of exposure. Potential receptors include construction workers during demolition and redevelopment, future on-Site occupants and visitors, future on-Site maintenance workers, and off-Site residents.

Considering the planned future remediation and redevelopment activities and engineering and institutional controls that will restrict future use, the following exposure pathways are considered incomplete:

- **Groundwater ingestion:** Use of groundwater in this area of Brooklyn is prohibited as a source of potable water; therefore, this exposure pathway is not complete for on-Site and off-Site occupants/residents. Also, an environmental easement will apply to groundwater, prohibiting its use.
- **Groundwater dermal contact by construction workers and future maintenance workers:** The depth to groundwater is approximately 50 feet bgs; therefore, it is unlikely that groundwater will be disturbed by the proposed future redevelopment and dermal contact with groundwater is not likely to occur. Accordingly, this exposure pathway is not complete for construction workers and future maintenance workers.
- **Soil dermal contact by future on-Site occupants:** After completion of redevelopment activities, the soil/fill material at the Site will be covered by a new building, paved surfaces,

or clean cover layer and landscaping, thereby preventing future exposure of occupants to the soil.

- **Inhalation of vapors by on-Site occupants, off-Site residents, and visitors:** Future redevelopment of the Site will include the construction of a vapor barrier and sub-slab depressurization system below the proposed building that will minimize the potential for intrusion of VOCs into future building spaces and mitigate this exposure pathway. At the request of the NYSDOH, off-Site vapor intrusion sampling will be performed in the west-adjacent building located at 467 36th Street at the start of the heating season in 2018 to evaluate the potential of exposure for off-Site residents. A Supplemental Soil Vapor Intrusion Work Plan will be submitted to NYSDEC and NYSDOH for review and approval prior to sampling.

The following exposure pathways are considered potentially complete:

1. **Soil dermal contact by construction workers and future maintenance workers:** Potential future construction and maintenance activities (e.g., utility repairs) could result in contact with on-Site contaminated soil.
2. **Inhalation of vapors and dust by construction workers and future maintenance workers:** Potential future construction and maintenance activities (e.g., utility repairs) could result in the generation of and exposure to on-Site contaminated vapors and dust.
3. **Inhalation of vapors and dust by off-site residents:** Remedial alternatives and future construction activities (e.g., utility repairs) could result in the generation of contaminated vapors and dust that have the potential to migrate off-Site during construction.

A site-specific HASP, SoMP, and CAMP will be implemented during development and future maintenance activities when on-Site workers could become exposed to soil or soil vapor. The HASP will establish procedures for the protection of on-Site workers and off-Site residents and will address community air monitoring and dust suppression measures. A SMP will be implemented after the completion of the Remedial Action to govern post-remediation soil and groundwater disturbances.

2.6.2 Fish & Wildlife Resources Impact Analysis

The urban Site is not located in close proximity to a surface water body, wetland, or other ecologically significant area. Therefore, in accordance with DER-10 Section 3.10.1(b), a Fish and Wildlife Resources Impact Analysis is not warranted.

2.7 INTERIM REMEDIAL ACTION

No interim remedial actions have been performed or are planned at the Site.

2.8 REMEDIAL ACTION OBJECTIVES

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

1. Reduce the contaminant mass by removing contaminated soil.
2. Protect on-site workers and the surrounding community from exposure to site-related contaminants during remedial construction and development.
3. Establish engineering and institutional controls for the Site to protect future occupants, maintenance personnel, and the surrounding community from potential exposure to site-related contaminants remaining after Site redevelopment.

The RAOs for specific media consist of the following:

2.8.1 Soil Vapor

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

2.8.2 Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota due to ingestion/direct contact with contaminated soil that would cause toxicity or bioaccumulation through the terrestrial food chain.

2.8.3 Groundwater

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

- Prevent the discharge of contaminants to surface water.
- Remove the source of ground contamination.

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

3.1 EVALUATION OF REMEDIAL ALTERNATIVES

The purpose of this section is to present descriptions of and an evaluation of the remedial alternatives selected for analysis for the Site. The primary goal of this analysis is to demonstrate how the selected remedy will comply with the following nine remedy selection factors in accordance with the NYSDEC BCP regulations found at 6 NYCRR 375-1.8(f):

1. Protection of human health and the environment;
2. Compliance with standards, criteria, and guidance (SCGs);
3. Short-term effectiveness and impacts;
4. Long-term effectiveness and permanence;
5. Reduction of toxicity, mobility, or volume of contaminated material;
6. Implementability;
7. Cost effectiveness;
8. Community Acceptance; and
9. Land use.

Two remedial alternatives, consistent with the 6 NYCRR Subpart 375-3 Brownfield Cleanup Program requirements, have been developed for analysis. Descriptions of the alternatives are presented below.

Remedial Alternative 1: Remediate to Achieve Unrestricted Use

Alternative 1 consists of the excavation and removal of all soil which exceeds NYSDEC BCP Track 1 Unrestricted Use Soil Clean-up Objectives. Based on the data presented in the RI Report, the estimated volume of soil requiring removal for Alternative 1 is approximately 17,000 tons[5].

[5] This estimated soil volume excludes the removal of soil required for development. All of the estimated quantities of soil to be removed are intended solely to be estimates. The quantity estimates presented in this document are subject to change based on actual field conditions.

A suspect underground storage tank (UST), piping, and appurtenances at the Site would be removed under this alternative. Sheeting would be installed, as necessary, to stabilize the excavation.

During remedial construction, controls would be in place to minimize the potential for exposure of workers and the surrounding community to contaminants. Controls would be implemented in accordance with a site-specific HASP, SoMP, and CAMP. Following remedial activities, the Site would be backfilled to development grade using imported environmentally clean material that meets the protection of public health soil cleanup objectives for Unrestricted Use as described in 6 NYCRR Part 375-6.7(d)(1)(ii)(a) or otherwise approved by NYSDEC.

Air sparging and soil vapor extraction systems would be installed during construction of the school building and operated to treat on-Site impacted groundwater. On-Site impacted groundwater would be monitored for progress with respect to remedial objectives.

Additionally, short-term (i.e., in operation for less than five years) engineering controls are included in this alternative and would consist of the following:

1. The school building would be constructed with sub-slab vapor barriers and SSDS designed to minimize the potential for vapor intrusion into buildings. Physical performance testing (pressure field extension) and chemical confirmatory sampling (i.e., sub-slab vapor and indoor air quality sampling) would be required to determine if the system is working as designed and is effective at achieving background conditions in the indoor air. Additionally, any modifications to the SSDS would not be made without agency approval. Sub-slab and indoor air sampling will be required in order to evaluate SSDS deactivation.

Consideration of this Alternative 1 satisfies the 6 NYCRR Part 375 requirement of evaluating at least one remedial alternative pursuant to Track 1 (Unrestricted Use).

<u>Remedial Alternative 2: Remediate to Achieve Restricted-Residential Use Including the Use of Permanent Engineering Controls</u>

Alternative 2 consists of the excavation and removal of soil that exhibits the hazardous waste characteristics of toxicity for lead in one hot spot area delineated to an approximately 16-foot by 35-foot area, extending to approximately 18 feet in depth, in the northeast part of the Site. Additional non-hazardous soil would be removed as part of Site development in support of excavation for the proposed Site building and basement. The site development depth is approximately 17 to 18 feet bgs beneath the footprint of the proposed building and cellar-level playground area, and approximately 4 to 16 feet bgs at the ground level playground area located on the western portion of the Site. Soil excavation will be performed over the entire limits of the

Site and there will be no unexcavated soil areas as part of the site development. Based on the data presented in the RI Report**,** the estimated volume of soil requiring removal that exhibits the hazardous waste characteristics of toxicity for lead for Alternative 2 is approximately 600 tons. Approximately 15,500 tons of non-hazardous soil would be removed as part of Site development. In support of Site development, soil will be excavated across the entire limits of the Site (up to the Site boundary) to a minimum depth of four feet bgs. Refer to *Figure 17*, which shows the estimated extent of excavation required for removal of the lead hot spot and *Figure 18*, which shows the estimated extent of excavation across the entire limits of the Site and proposed post-excavation sample location plan.

As described above, a suspect UST, piping, and appurtenances at the Site would be removed under this alternative. Sheeting would be installed, as necessary, to stabilize the excavation.

During remedial construction, controls would be in place to minimize the potential for exposure of workers and the surrounding community to contaminants. Controls would be implemented in accordance with a site-specific HASP, SoMP, CAMP, and Special Requirements CAMP.

Engineering and institutional controls are included in this alternative and would consist of the following:

1. The final cover will consist of impervious surfaces (e.g., a building and paved surfaces, etc.) and in all other areas (i.e., landscaped areas, if any) at least two feet of clean cover layer that will meet the protection of public health soil cleanup objectives for Unrestricted Use as described in 6 NYCRR Part 375-6.7(d)(1)(ii)(a) or otherwise approved by the NYSDEC. Note that the contemplated use of the Site allows for the clean cover layer to meet the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted-Residential Use SCOs as set forth in Table 375-6.8(b) of 6 NYCRR Part 375. However, the NYCSCA's standard specifications for cover material (i.e., the upper two feet of soil in landscaped areas) require the use of soil which meets the more stringent Unrestricted Use SCOs further described in Section 5.4.9;
2. The Site building would be constructed with a gas vapor barrier and SSDS designed to minimize the potential for vapor intrusion into the building;
3. A demarcation layer would be installed beneath the building gas vapor barrier and SSDS, the playground area, and the clean cover layer in landscaped areas, if any; and
4. Preparation and implementation of a post-remediation SMP describing the requirements for engineering and institutional controls; monitoring; operation and maintenance of engineering controls; and, a reporting plan for submittal of data, information,

recommendations, and certifications to the NYSDEC. An environmental easement that references the SMP would be established. Site management is the last phase of remediation, which begins with the approval of the Final Engineering Report (FER).

3.1.1 Protection of Human Health and the Environment

The implementation of Alternative 1 – Remediate to Achieve Unrestricted Use would be protective of public health and the environment through the removal of all contaminated soil and removal of the suspect UST, piping, and appurtenances. Installation of air sparging and soil vapor extraction systems would treat on-Site impacted groundwater and installation of a gas vapor barrier and SSDS would minimize the potential for vapor intrusion into the proposed school building.

During remedial construction, on-site workers and the surrounding community would be protected from exposure to site-related contaminants through the implementation of health and safety protocols, a SoMP, and adherence to a CAMP.

Alternative 2 – Remediate to Achieve Restricted-Residential Use would be protective of public health and the environment through the removal of approximately 600 tons of soil that exhibits the hazardous waste characteristics of toxicity for lead, removal of the suspect UST, piping, and appurtenances, and the implementation of engineering and institutional controls including a composite cover system, vapor barrier, SSDS, and environmental easement. Approximately 15,500 additional tons of non-hazardous soil would be removed as part of Site development. In support of Site development, soil will be excavated across the entire limits of the Site (up to the Site boundary) to a minimum depth of four feet bgs. There will be no unexcavated areas of the Site as part of the site development.

Also, under Alternative 2, during construction, on-site workers and the surrounding community would be protected from exposure to site-related contaminants through the implementation of health and safety protocols, a SoMP, and adherence to a CAMP.

Although impacted soil would remain in place beneath the composite cover system under Alternative 2, the use of engineering and institutional controls would minimize the potential for exposure to soil and soil vapor contamination. Groundwater contamination beneath the Site would be addressed by institutional controls under Alternative 2. Therefore, both alternatives would be protective of human health and the environment.

3.1.2 Compliance with Standards, Criteria, and Guidelines (SCGs)

Alternative 1 – Remediate to Achieve Unrestricted Use would satisfy the SCGs (described in Section 2.5.3) and the RAOs (described in Section 2.8) developed for the Site. Soil which exceeds Track 1 SCOs and the suspect UST, piping, and appurtenances would be removed. Installation

and operation of air sparging and soil vapor extraction systems would satisfy the SCGs and RAOs for groundwater.

Alternative 2 – Remediate to Achieve Restricted-Residential Use would satisfy the SCGs and RAOs for soil and soil vapor developed for the Site. Soil that exhibits the hazardous waste characteristics of toxicity for lead would be excavated. In addition, the suspect UST, piping, and appurtenances would be removed. Engineering and institutional controls included as a part of Alternative 2 would protect future Site users from soil and soil vapor contamination. Groundwater contamination beneath the Site would be addressed by institutional controls under Alternative 2.

Under both alternatives, applicable environmental and health and safety laws and regulations would be followed, and waste would be managed and disposed in accordance with applicable laws and regulations. In summary, both alternatives proposed would conform to the SCGs and RAOs applicable to soil and soil vapor for remediation of the Site, however, groundwater contamination would not be actively remediated Alternative 2.

3.1.3 Short-Term Effectiveness and Impacts

Potential short-term impacts to the community associated with implementation of Alternative 1 – Remediate to Achieve Unrestricted Use include increased construction noise, increased truck traffic, and the potential creation of objectionable odors, vapors, and/or dust. Specialized excavation and construction techniques may be required for sheeting and excavating soils along the perimeter of the Site. Potential short-term impacts to on-site workers associated with Alternative 1 include exposure to site-related contaminants and physical hazards associated with working around heavy equipment and large excavations.

During the construction phase for Alternative 1, short-term impacts to the community would be minimized through remediation phase controls such as implementation of a SoMP, CAMP, and Special Requirements CAMP, use of soil erosion controls, and adherence to pre-approved truck routes. Decontamination of vehicles and equipment prior to leaving the Site would minimize the potential for off-site soil migration during remediation. Short-term exposures to on-site workers would be minimized through implementation of and adherence to a site-specific HASP, which would establish procedures and personal protective equipment requirements for site work.

The implementation of Alternative 2 – Remediate to Achieve Restricted-Residential Use represents the potential for similar short term impacts and would include the same impact mitigation strategies as those described for Alternative 1. Specialized sheeting and excavation would not be required because excavation depths would generally be less than twenty feet. The smaller volume of soil requiring removal for Alternative 2, compared to Alternative 1, represents

corresponding decreases in the impacts to the surrounding community, including decreased construction noise, decreased truck traffic, and lower potential for creation of objectionable odors, vapors, and/or dust.

In summary, both alternatives would be effective in the short term, through the removal of contaminated soil, and additionally through the implementation of engineering and institutional controls under Alternative 2. Adherence to appropriate controls would minimize potential short-term impacts to the surrounding community and on-site workers. However, the potential for short-term impacts to the community and on-site workers during construction activities associated with Alternative 1 is greater than with Alternative 2, due to the volume of soil requiring removal.

3.1.4 Long-term Effectiveness and Permanence

Alternative 1 – Remediate to Achieve Unrestricted Use would be a long-term effective and permanent alternative since all contaminated soil above Track 1 SCOs would be removed and the suspect UST, piping, and appurtenances would be removed. Removal of all contaminated soil with contaminant concentrations exceeding Track 1 SCOs would require excavations up to 50 feet deep; therefore, specialized excavators (e.g., with extension arms) and additional specialized sheeting (for support of deep excavation sidewalls) would be required for Alternative 1. Contaminated groundwater would be treated by installing and operating air sparging and soil vapor extraction systems. A vapor barrier and SSDS would be installed beneath the building and would be deactivated upon achieving RAOs for groundwater.

Alternative 2 – Remediate to Achieve Restricted-Residential Use would be an effective and permanent alternative for the Site. The removal of approximately 600 tons of soil that exhibits the hazardous waste characteristics of toxicity for lead and removal of the suspect UST, piping, and appurtenances represents an effective and permanent remedy. Approximately 15,500 additional tons of non-hazardous soil would be removed as part of Site development. In support of Site development, soil will be excavated across the entire limits of the Site (up to the Site boundary) to a minimum depth of four feet bgs. There will be no unexcavated areas of the Site as part of the site development. The remaining soil would be covered with a building and/or paved surfaces and clean cover layer in landscaped areas, if any (with a demarcation layer installed below the building, playground area, and clean cover layer in landscaped areas, if any). A vapor barrier and SSDS would be installed beneath the building. Therefore, potential for exposure to remaining soil would be minimized by long-term engineering controls. The use of institutional controls would serve to further minimize potential future exposure pathways over the long term.

Even though impacted soil would remain in place beneath the composite cover system under Alternative 2, the use of engineering and institutional controls would minimize the potential for

exposure to Site-related contaminants. Therefore, both alternatives represent long-term effective and permanent remedies for the Site that are protective of human health and the environment.

3.1.5 Reduction of Toxicity, Mobility, or Volume of Contaminated Material

The implementation of Alternative 1 – Remediate to Achieve Unrestricted Use would reduce the toxicity, mobility, and volume of contamination by removing soil with contaminant concentrations above Track 1 SCOs and removing the suspect UST, piping, and appurtenances. Installation and operation of air sparging and soil vapor extraction systems would remove contamination from on-Site impacted groundwater. The toxicity of the soil removed from the Site would be reduced by managing and disposing of the soil at appropriate permitted off-site disposal facilities.

The implementation of Alternative 2 – Remediate to Achieve Restricted-Residential Use would reduce the toxicity, mobility, and volume of contamination by removing an estimated 600 tons of soil that exhibits the hazardous waste characteristics of toxicity for lead, and the suspect UST, piping, and appurtenances. Approximately 15,500 tons of soil will be removed for off-Site disposal in the remainder of the Site (non-hazardous soil areas). In support of Site development, soil will be excavated across the entire limits of the Site (up to the Site boundary) to a minimum depth of four feet bgs. There will be no unexcavated areas of the Site as part of the site development. The toxicity of the soil removed would be reduced by management at permitted off-site treatment and disposal facilities.

Although both alternatives would serve to reduce the toxicity, mobility, and volume of contamination, Alternative 1 would be more effective since the volume of impacted soil removed would be larger as a result of the additional excavation.

3.1.6 Implementability

Alternative 1 – Remediate to Achieve Unrestricted Use can be implemented with standard construction techniques, using widely available construction equipment and materials. However, removal of all contaminated soil with contaminant concentrations exceeding Track 1 SCOs would require excavations up to 50 feet deep in the central portion of the Site; therefore, specialized excavators (e.g., with extension arms) and additional specialized sheeting (for support of deep excavation sidewalls) would be required for Alternative 1. It is expected that required permits, such as from New York City Department of Buildings for excavation could be obtained in acceptable time frames. The air sparging and soil vapor extraction systems, gas vapor barrier, and SSDS can be constructed via standard techniques during construction of the school building and operated by available trained staff.

Alternative 2 – Remediate to Achieve Restricted-Residential Use can be implemented with standard construction techniques, using widely available equipment and materials. The gas vapor barrier and SSDS can be implemented during construction of the school building. Additional specialized equipment and materials would not be required and it is expected permits would be obtained in an appropriate time frame.

Therefore, due to the need for specialized equipment and the complications of performing excavations up to 50 feet in depth, Alternative 1 would be more difficult to implement than Alternative 2. In addition, the design, construction, commissioning, and operation of the proposed SVE and AS groundwater remediation system will likely take years to complete and may not achieve objectives prior to school opening. In addition, there is an uncontrolled source of groundwater contamination emanating from an upgradient and off-Site source which will not be addressed by the remedy.

3.1.7 Cost Effectiveness

Cost estimates were prepared for both alternatives based on recent bids for remediation projects and communications with remedial contractors, material suppliers, waste transporters, and disposal facilities. Alternative 1 – Remediate to Achieve Unrestricted Use is estimated to cost $10,810,000. Alternative 2 – Remediate to Achieve Restricted-Residential Use is estimated to cost $850,000.

The cost of Alternative 1 is significantly higher than Alternative 2 due to the larger volume of soil removal and disposal and the SVE and AS groundwater remediation system required under Alternative 1.

3.1.8 Community Acceptance

Both alternatives would entail excavation of contaminated soil and include the implementation of a SoMP, Odor, Dust and Nuisance Control Plan, CAMP, and Special Requirements CAMP to minimize the potential for off-site migration of dust, which would promote community acceptance. However, the larger volume of soil requiring removal under Alternative 1 – Remediate to Achieve Unrestricted Use increases the potential for impacts to the community from increased truck traffic and fugitive odors and vapors. Since Alternative 2 – Remediate to Achieve Restricted-Residential Use has a shorter remedial timeframe, it is likely that this alternative would be more acceptable to the community.

Public comments that are provided during the public comment period on this RAWP will be evaluated, and this RAWP may be modified as appropriate in response to comments.

3.1.9 Land Use

The proposed future use of the Site is a primary school facility. The proposed redevelopment includes a 4 to 5-story building with a basement and a playground area. Both remedial alternatives allow for this future planned development by removal of contaminated soil, and under Alternative 2 implementation of engineering and institutional controls to minimize the potential for impacts from the Site to future users.

Citizens' participation in connection with the RAWP and planned future use of the Site will be described in a Citizen Participation Plan.

3.2 SELECTION OF THE PREFERRED REMEDY

Both of the remedial alternatives evaluated would be protective of human health and the environment, provide a long term and effective remedy for the Site, and allow for future development. However, Alternative 1 – Remediate to Achieve Unrestricted Use would result in greater potential short term impacts to the community due to the longer remedial time frame and larger volume of soil removed, would be more difficult to implement due to the greater excavation depths, and is less cost effective when compared to the other remedial alternative. Although Alternative 1 would be more effective in reducing the volume of contaminants at the Site and achieving the SCGs, it would not provide significant additional protection of human health or the environment.

Therefore, based on the evaluation of the remedial alternatives against the nine remedy selection factors in accordance with the requirements of 6 NYCRR 375-1.8(f), Alternative 2 – Remediate to Achieve Restricted-Residential Use is the selected remedy for the Site. Alternative 2 satisfies the soil and soil vapor remedial action objectives for the Site and will be protective of human health and the environment.

The land use factor evaluation below examines the selected alternative in comparison to the criteria required by Article 27, Title 14 of the Environmental Conservation Law 27-1415.

3.2.1 Zoning

According to the NYCDCP Zoning Map 16B, the Site is zoned for manufacturing use (M1-2). Use of the Site as a community facility (i.e., a school facility) is permitted by a special permit in

M1 districts. NYCSCA anticipates issuance of a special permit[6] for the proposed use as a public school facility. A Certificate of Completion (COC) will not be issued for the project unless conformance with zoning designation is demonstrated.

3.2.2 Applicable Comprehensive Community Master Plans or Land Use Plans

The proposed use of the Site is consistent with the allowed land use in this portion of Brooklyn. There are no available Community Master Plans or Land Use Plans for the Site.

3.2.3 Surrounding Property Uses

The surrounding property uses are commercial, residential, and institutional. The Site is located in a highly developed urban area with a cemetery maintenance facility adjacent and to the north and northwest of the Site, commercial establishments to the east and northeast, commercial buildings to the south and southwest, and residential buildings to the west. The proposed use of the Site as a primary school facility is consistent with the surrounding property uses.

3.2.4 Citizen Participation

Refer to Section 4.1.8 for information on the Citizen Participation Plan.

3.2.5 Environmental Justice Concerns

The Site is located in a potential environmental justice area with a large Hispanic-American population. Therefore, future Fact Sheets issued for this Site will be translated into Spanish. Additional details regarding the community outreach and environmental justice will be included in the Citizen Participation Plan.

3.2.6 Land Use Designations

The proposed use of the Site is consistent with the land use designation in this portion of Brooklyn.

3.2.7 Population Growth Patterns

The proposed public school facility is intended to address the need for primary school facilities within this portion of Brooklyn.

3.2.8 Accessibility to Existing Infrastructure

The proposed public school facility Site is accessible to the required infrastructure (e.g., utilities, transportation, etc.).

[6] Zoning Resolution, The City of New York, Article VII: Administration, Chapter 3-Special Permits by the Board of Standards and Appeals, 73-19 Special Permit Use.

3.2.9 Proximity to Cultural Resources

There are no cultural resources within immediate proximity of the Site identified as part of this RAWP.

3.2.10 Proximity to Natural Resources

The nearest water bodies to the Site include: several ponds located in the cemetery (at least 750 feet northeast of the Site), Gowanus Bay (approximately 2,800 feet west and northwest of the Site), Gowanus Canal (approximately 4,800 feet north of the Site), and Bay Ridge Channel (approximately 4,300 feet west of the Site). The on-site groundwater is not used as a source of potable water. The selected remedial alternative would not impact natural resources.

3.2.11 Off-Site Groundwater Impacts

The Site is predominantly capped with an impervious cover, minimizing potential off-site impacts to groundwater.

3.2.12 Proximity to Floodplains

The Site is not located in a flood zone.

3.2.13 Geography and Geology of the Site

The proposed use of the Site would alter the geology of the Site by removal of fill material.

3.2.14 Current Institutional Controls

Currently there are no institutional controls for the Site. Following the completion of the remediation, an environmental easement will be in place as described in Section 10.1.

3.3 SUMMARY OF SELECTED REMEDIAL ACTIONS

Remedial activities will be performed in accordance with this RAWP. The following activities will be performed to achieve the remedial objectives:

1. Prepare and implement a site-specific HASP, SoMP, CAMP and Special Requirements CAMP for the remedial activities.
2. Remove underground storage tank system.
3. Remove and dispose off-Site soil that exhibits the hazardous waste characteristics of toxicity for lead in one hot spot area delineated to an approximately 16-foot by 35-foot area, extending to approximately 18 feet in depth, in the northeast part of the Site. Efforts to remove the lead hot spot will be limited to the depth at which development sheeting and

shoring extends. Efforts will be made to extend the excavation to a final depth of 18 feet bgs to the extent practical. Any residual hazardous lead will be covered by an engineered composite cover system or cover for landscaped areas and managed under the SMP.

4. Remove and dispose off-Site soil that exhibits evidence of gross contamination, if encountered.
5. Post-excavation documentation/confirmatory soil sampling in the area of the hazardous lead hot spot, in the area of the UST, and across the remainder of the Site where non-hazardous soil are to be removed for off-Site disposal.
6. Install a gas vapor barrier beneath the building and install and operate a sub-slab depressurization system beneath the building.
7. Cover landscaped areas, if any, with a minimum 2-foot thick imported clean cover layer. Install demarcation layer below clean cover layer.
8. Construct an engineered composite cover system on the Site consisting of impervious surfaces (e.g., building, paved surfaces, etc.) and cover for landscaped areas, if any, as discussed above.
9. Prepare and implement a SMP for long term maintenance of the remedial elements.
10. Record an Environmental Easement to ensure proper use of the Site.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP. All deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the FER.

4.0 REMEDIAL ACTION PROGRAM

The objective of this section of the RAWP is to present a scope of work which will be approved by NYSDEC and when completely implemented will ready the Site for development for the Contemplated Use, which is Restricted-Residential Use, consistent with the requirements of the Brownfield Cleanup Program.

The following activities will be performed to achieve the remedial objectives:

1. Prepare and implement a site-specific HASP, SoMP, CAMP, and Special Requirements CAMP for the remedial activities.
2. Remove underground storage tank system.
3. Remove and dispose off-Site soil that exhibits the hazardous waste characteristics of toxicity for lead in one hot spot area delineated to an approximately 16-foot by 35-foot area, extending to approximately 18 feet in depth, in the northeast part of the Site. Efforts to remove the lead hot spot will be limited to the depth at which development sheeting and shoring extends. Efforts will be made to extend the excavation to a final depth of 18 feet bgs to the extent practical. Any residual hazardous lead will be covered by an engineered composite cover system or cover for landscaped areas and managed under the SMP.
4. Remove and dispose off-Site soil that exhibits evidence of gross contamination, if encountered.
5. Post-excavation documentation/confirmatory soil sampling in the area of the hazardous lead hot spot, in the area of the UST, and across the remainder of the Site where non-hazardous soil are to be removed for off-Site disposal.
6. Install a gas vapor barrier beneath the building and install and operate a sub-slab depressurization system beneath the building.
7. Cover landscaped areas, if any, with a minimum 2-foot thick imported clean cover layer. Install demarcation layer below clean cover layer.
8. Construct an engineered composite cover system on the Site consisting of impervious surfaces (e.g., building, paved surfaces, etc.) and cover for landscaped areas, if any, as discussed above.
9. Prepare and implement a SMP for long term maintenance of the remedial elements.
10. Record an Environmental Easement to ensure proper use of the Site.

4.1 GOVERNING DOCUMENTS

4.1.1 Site Specific Health & Safety Plan (HASP)

All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal Occupational Safety and Health Administration (OSHA).

The NYCSCA and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the preparation of an appropriate Health and Safety Plan and for the appropriate performance of work according to that plan and applicable laws.

The Health and Safety Plan (HASP) and requirements defined in this RAWP pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion.

The Site Safety Coordinator will be identified prior to the start of remedial construction. A resume will be provided to NYSDEC prior to the start of remedial construction.

Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses.

Activities performed on-site by TRC will be conducted in accordance with TRC's HASP. Refer to *Appendix B* for the TRC HASP. Construction activities performed on-site will be conducted in accordance with the Contractor's Site-Specific HASP. Updates or additions to the HASP, if necessary, will be provided to NYSDEC.

4.1.2 Quality Assurance Project Plan (QAPP)

Post-excavation confirmatory sampling in the area of the hazardous lead hot spot, in the area of the UST, and across the remainder of the Site in the non-hazardous soil areas. Laboratory analysis will be performed in accordance with the Quality Assurance Project Plan (QAPP) presented in *Appendix C*. The QAPP presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with field activities. The QAPP also describes specific protocols for field sampling, sampling handling and storage, and laboratory analysis.

4.1.3 Construction Quality Assurance Plan (CQAP)

The Construction Quality Assurance Plan (CQAP) was submitted to the NYSDEC on September 5, 2018 for approval prior to the start of work. The CQAP provides a detailed description of the observation and testing activities that will be used to monitor construction quality and confirm that

remedy construction is in conformance with the remediation objectives and specifications prepared for the environmental remediation components of the project. The CQAP includes the following:

- Responsibilities and authorities of the organizations and key personnel involved in the design and construction of the remedy.
- Qualifications of the quality assurance personnel that demonstrate that they possess the proper training and experience necessary to fulfill project-specific responsibilities.
- The observations and tests that will be used to monitor construction and the frequency of performance of such activities.
- The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for implementing corrective measures.
- Requirements for project coordination meetings between the Volunteer and its representatives, the Construction Manager, Excavation Contractor, remedial or environmental subcontractors, and other involved parties.
- Description of the final documentation retention provisions.

4.1.4 Soil/Materials Management Plan (SoMP)

The SoMP is described in Section 5.4.

4.1.5 Soil Erosion and Sediment Control Plan

The erosion and sediment controls will be in conformance with requirements presented in the New York State Standards and Specifications for Erosion and Sediment Control. A Soil Erosion and Sediment Control Plan and Details will be submitted to the NYSDEC for approval by the Remedial Engineer prior to the start of work.

4.1.6 Community Air Monitoring Plan (CAMP) and Special Requirements

CAMP

During ground-intrusive work activities, including installation of soil borings and monitoring wells, the requirements of the CAMP presented in *Appendix D* will be implemented. The CAMP requires real-time monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter of the Site. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the remediation work activities) from potential airborne contaminant releases as a direct result of remedial work activities. The action levels specified in the CAMP require increased

monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP documents that work activities did not spread contamination off-Site through the air. The CAMP in *Appendix D* includes a figure that depicts the designated monitoring location.

A Special Requirements CAMP will be implemented for any ground intrusive work activities performed within 20 feet of potentially exposed individuals or structures. For this Site, the Special Requirements CAMP pertains to ground intrusive work activities performed within 20 feet of the west-adjacent structure located at 467 36th Street. Details of the Special Requirements CAMP are provided in *Appendix D.*

4.1.7 Contractor's Site Operations Plan (SOP)

The Remedial Engineer will review all plans and submittals for this remedial project (including those listed above) and will confirm that they are in compliance with this RAWP. The Remedial Engineer is responsible to ensure that all later document submittals for this remedial project, including contractor and sub-contractor document submittals, are in compliance with this RAWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

Detailed remedial construction design documents will be submitted to NYSDEC for approval prior to the start of work.

4.1.8 Citizen Participation Plan

The NYSDEC determined the BCP Application, including the draft RI Report (dated February 2018) and the draft RAWP (dated February 2018), were complete, therefore the BCP Application was placed into the document repository and the Public Notice was published in the Environmental Notice Bulletin (ENB) and local newspaper. The Public Notice and Fact Sheet that describes the draft RAWP and announces the 45-day comment period was mailed to the site contact list.

A certification of mailing was sent by the NYCSCA to the NYSDEC project manager following the distribution of all Fact Sheets and notices that included: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet, (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all the applicable project documents.

No changes were made to the approved Fact Sheets authorized for release by NYSDEC. No other information, such as brochures and flyers, were included with the Fact Sheet mailing. All future Fact Sheets will be translated into Spanish due to the large Hispanic-American population surrounding the Site.

A draft Citizen Participation Plan (CPP) was submitted to the NYSDEC in May 2018 prior to execution of the BCA. The CPP was revised based on NYSDEC comments and the final CPP was submitted to NYSDEC on June 27, 2018.

Document repositories have been established at the following locations and contain all applicable project documents:

1. Brooklyn Public Library
   Sunset Park Interim Library
   4201 4th Avenue
   Brooklyn, NY 11220
   Telephone: (718) 567-2806
   Hours: Mon: 10 AM to 6 PM, Tues – Thu: 10 AM to 8 PM, Fri: 10 AM to 6 PM, Sat: 10 AM to 5 PM, Sun: Closed

2. Brooklyn Community Board 7
   4201 4th Avenue
   Brooklyn, NY 11201
   Attn: Jeremy Laufer
   Phone: (718) 854-0003
   Hours: Mon to Fri: 9AM to 5 PM
   (call for appointment)

Note – The Sunset Park Library at 5108 4th Avenue is closed for renovation until 2020.

4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION

4.2.1 Project Organization

The NYCSCA has contracted TRC to prepare the BCP Application, including the RI Report and RAWP, and provide remedial action design services associated with the RAWP. Site monitoring will be completed by the NYCSCA and the TRC Remedial Engineer (refer to Section 4.2.2). The Contractor, will implement the Remedial Action during construction of the proposed school facility. An organization chart and resumes of key personnel involved in the Remedial Action will be provided prior to the start of work.

4.2.2 Remedial Engineer

TRC is assigned as the Remedial Engineer responsible for overseeing the Remedial Action. The Remedial Engineer for this project will be a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the Site. The Remedial Engineer will certify in the Final Engineering Report that the remedial activities were observed by qualified environmental professionals under his/her supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other Remedial Engineer certification requirements are listed later in this RAWP.

The Remedial Engineer will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of backfill material, and management of waste transport and disposal. The Remedial Engineer will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the FER.

The Remedial Engineer will provide the certifications listed in Section 10.1 in the Final Engineering Report.

4.2.3 Remedial Action Construction Schedule

The NYCSCA will issue a design package for demolition of current site features and construction of the proposed school, which will include the proposed Remedial Actions. The demolition phase will likely start in the early fall of 2018. The remedy is anticipated to be completed and the Certificate of Completion to be obtained by August 2021 in order to allow for the start of use of the school in September 2021.

A construction schedule prepared by the contractor will be submitted to the NYSDEC prior to the start of work.

4.2.4 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings construction code requirements or according to specific variances issued by that agency. The anticipated work hours for the remedial activities will be from 7:00 AM to 3:30 PM, Monday through Friday. NYSDEC will be notified by the NYCSCA of any variances issued by

the Department of Buildings. NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

A fence will be constructed along the perimeter of the Site. Access to the Site will be through controlled locations that are staffed 24-hours per day. Visitors to the Site will be required to sign-in and will be escorted while on-Site.

4.2.6 Traffic Control

A traffic control plan will be developed by the Contractor and submitted to the NYSDEC prior to the start of work.

4.2.7 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during the remedial excavation or development related construction, sampling will be performed on product and environmental media as appropriate. Chemical analyses will be for appropriate parameters (TAL metals, TCL volatiles and semivolatiles, TCL pesticides, and/or PCBs). These analyses will not be limited to CP-51 parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during invasive work will be promptly communicated by phone to NYSDEC's Project Manager. These findings will be also included in daily and periodic reports.

4.2.8 Worker Training and Monitoring

Any individual working on the Site which could potentially be exposed to site soil must have current certifications documenting OSHA 40-hour and 8-hour refresher HAZWOPER training and medical monitoring in accordance with 29 CFR 1910.120 (for work on hazardous waste sites) and in accordance with 29 CFR 1926.62 (Lead Exposure in Construction). The Contractor will maintain a medical monitoring and respiratory protection program. Documentation that all individuals who will perform work at the Site have appropriate training and that medical monitoring is being performed in accordance with the requirements of OSHA will be included as part of the Site-Specific HASP. Additionally, the Contractor's Site-Specific HASP will include a description and documentation of training, respirator fit testing, and medical monitoring for each individual proposed for Remedial Action work.

4.2.9 Agency Approvals

The NYCSCA has addressed all State Environmental Quality Review Act (SEQRA) requirements for this Site. All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

The NYCSCA will coordinate zoning changes as needed. Use of the Site as a community facility (i.e., a school facility) is permitted by a special permit in M1 districts. NYCSCA is seeking and anticipates issuance of a special permit[7] for the proposed use as a public school facility. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

A complete list of all local, regional, and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work will be developed and submitted to the NYSDEC prior to the start of work. This list will include a citation of the law, statute or code to be complied with, the originating agency, and a contact name and phone number in that agency. This list will be updated in the Final Engineering Report.

4.2.10 NYSDEC BCP Signage

A project sign will be erected at the main entrance to the Site prior to the start of any remedial activities. The sign will indicate that the project is being performed under the New York State Brownfield Cleanup Program. The sign will meet the detailed specifications provided by the NYSDEC Project Manager.

4.2.11 Pre-Construction Meeting with NYSDEC

A Pre-Construction meeting between the NYSDEC and NYCSCA will be scheduled prior to the start of construction activities. The purpose of the meeting will be to review the environmental conditions present at the Site and review the scope of the RAWP and design documents with involved parties. No additional meetings will be scheduled prior to implementation of the RAWP, unless specifically requested by the NYSDEC.

[7] Zoning Resolution, The City of New York, Article VII: Administration, Chapter 3-Special Permits by the Board of Standards and Appeals, 73-19 Special Permit Use.

4.2.12 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in the HASP in *Appendix B.* That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.2.13 Remedial Action Costs

The total estimated cost of the Remedial Action is $850,000. An itemized and detailed summary of estimated costs for all remedial activity is attached as *Appendix F*. This will be revised based on actual costs and submitted as an Appendix to the Final Engineering Report.

4.3 SITE PREPARATION

4.3.1 Mobilization

The first step in site preparation is mobilization. Mobilization will be conducted in stages as necessary for each phase of work. Demobilization is discussed below.

4.3.2 Monitoring Well Decommissioning

Existing groundwater monitoring wells will be properly decommissioned prior to remedial construction in accordance with NYSDEC CP-43. The only exception to this is if the full length of the well is to be excavated during remediation and development.

4.3.3 Erosion and Sedimentation Controls

The erosion and sediment controls will be in conformance with requirements presented in the New York State Standards and Specifications for Erosion and Sediment Control. A Soil Erosion and Sediment Control Plan and Details will be submitted to the NYSDEC prior to the start of work.

4.3.4 Stabilized Construction Entrance(s)

A stabilized gravel construction entrance will be located near the Site exit to provide a clean and dust-free road surface prior to departure from the Site.

4.3.5 Utility Marker and Easements Layout

The NYCSCA and its contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The NYCSCA and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The NYCSCA and its contractors must obtain any local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this

RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

4.3.6 Sheeting and Shoring

Appropriate management of structural stability of on-Site or off-Site structures during on-Site activities including excavation is the sole responsibility of the NYCSCA and its contractors. The NYCSCA and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The NYCSCA and its contractors must obtain any local, State or Federal permits or approvals that may be required to perform work under this Plan. Further, the NYCSCA and its contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

Sheeting will be designed by a licensed New York State Professional Engineer and will conform to applicable building codes.

4.3.7 Equipment and Material Staging

Equipment and material will be stored and staged in a manner that is consistent with local, State, and Federal regulations, as well as in accordance with the requirements of the New York State Standards and Specifications for Erosion and Sediment Control.

4.3.8 Decontamination Area

Equipment will be delivered to the work site free of contamination. The NYCSCA's on-site representative will prohibit any equipment from the Site that in his/her opinion has not been thoroughly decontaminated prior to arrival. The Contractor is prohibited from decontaminating equipment on-Site that is not thoroughly decontaminated prior to arrival.

Decontamination will be conducted at an area within the work site that has been approved by the NYCSCA's on-site representative for such use. Frequency of decontamination will be determined by the NYCSCA's on-site representative and will be required prior to equipment and supplies leaving the Site between stages of the work. Decontamination materials will be collected, containerized, tested, labeled, and disposed in accordance with applicable laws and regulations. Transportation vehicles will be inspected, prior to leaving the Site, to ensure that no material adheres to the wheels, undercarriage, tailgates, covers or other areas of transport vehicles. Vehicles potentially in contact with contaminated material will be cleaned including tires, undercarriage, and any other contaminated parts, prior to leaving the Site.

4.3.9 Site Fencing

Site fencing will be installed around the perimeter of the Site to control Site access as indicated in Section 4.2.5 above. The fencing will be maintained throughout the construction phase and removed following completion of Site development.

4.3.10 Demobilization

Demobilization will include:

- Restoration of areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management area[s], and access area);
- Removal of temporary access areas (whether on-Site or off-Site) and restoration of disturbed access areas to pre-remediation conditions;
- Removal of sediment and erosion control measures and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination or disposal, as appropriate; and
- General refuse disposal.

4.4 REPORTING

All daily and monthly Reports will be included in the Final Engineering Report.

4.4.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of each day following the reporting period and will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to the Site Plan for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions; and,
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time

critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

Daily Reports will include a description of daily activities keyed to a map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

The NYSDEC assigned project number will appear on all reports.

4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within one week following the end of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e., tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

4.4.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area and Site structures before, during and after remediation. Photos will be included in the daily reports as needed, and a comprehensive collection of photos will be included in the Final Engineering Report.

Job-site record keeping for all remedial work will be appropriately documented. These records will be maintained on-Site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

4.4.4 Complaint Management Plan

Complaints from the public regarding nuisance or other conditions will be addressed promptly. Complaints and the response to those complaints will be recorded in the daily reports. NYSDEC and NYSDOH will be notified of all odor events and of other complaints about the project.

4.4.5 Deviations from the Remedial Action Work Plan

The process to be followed if there are any deviations from the RAWP, at a minimum, will include a written submission to the NYSDEC with the following information:

- Reasons for deviating from the approved RAWP;
- Approval process to be followed for changes/editions to the RAWP; and,
- Effect of the deviations on overall remedy.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

This section introduces plans for removal of contaminated media (soil, structures, etc.), and includes a description and identification of: the locations of planned remedial activities; the estimated volume of each environmental medium to be remediated; the location, depth, and concentration of contaminants in excess of remediation standards; and planned sample locations, depths, and parameters for post-excavation documentation soil samples and post-excavation confirmatory samples in the area of the UST. The RAWP Quality Assurance Project Plan, describing the proposed sampling and analytical methods, is provided in *Appendix C*. A complete list of all local, regional and national governmental permits required to perform the work will be developed and submitted to the NYSDEC prior to the start of work.

5.1 SOIL CLEANUP OBJECTIVES

The Soil Cleanup Objectives for this Site are listed in Table 375-6.8(b) of 6 NYCRR Part 375.

Soil and materials management will be conducted in accordance with the Soil Management Plan as described below.

A spider map that shows all soil samples that exceed the RRUSCOs proposed for this Remedial Action is shown in *Figure 14*.

UST closures will, at a minimum, conform to criteria defined in DER-10.

5.2 REMEDIAL PERFORMANCE EVALUATION (POST-EXCAVATION DOCUMENTATION SAMPLING)

5.2.1 Post-Remediation Sampling Frequency

Post-excavation documentation/confirmatory soil samples in the area of the hazardous lead hot spot, in the area of the UST, and across the remainder of the Site in the non-hazardous excavation areas will be collected to document post-remediation soil conditions. Subsurface soil samples will be collected in accordance with DER-10 requirements. Collection of post-excavation soil samples in the non-hazardous soil areas will be performed at a frequency of one (1) bottom sample every 900 square feet. Efforts will be made to collect one (1) sidewall sample every 30 linear feet at the perimeter of the excavation; however, shoring/sheeting will be installed along the perimeter of the majority of the Site for excavation support, which may prevent collection of sidewall soil samples in these areas. Soil sampling methods, analysis, and QA/QC requirements are presented in the QAPP in *Appendix C.*

5.2.2 Methodology

Post-excavation documentation soil samples in the hazardous lead hot spot area will be collected from each sidewall, where feasible, and the bottom and will be analyzed for TCLP lead. Additionally, following removal of the UST system, post-excavation confirmatory samples will be collected in accordance with DER-10 and analyzed for CP-51 Tables 2 and 3 VOCs and SVOCs. Post-excavation confirmatory soil samples will be collected throughout the remainder of the Site in the non-hazardous soil areas for analysis for TCL and CP-51 listed VOCs/SVOCs, TAL metals and cyanide, TCL pesticides, TCL herbicides, and PCBs. Efforts will be made to collect one (1) sidewall sample every 30 linear feet at the perimeter of the excavation; however, installation of shoring/sheeting along the perimeter of the Site for excavation support may prevent collection of sidewall soil samples in some areas. Proposed post-excavation soil sampling locations are shown on *Figure 18.*

5.2.3 Reporting of Results

The FER will provide a tabular and map summary of post-excavation soil sample results and exceedances of RRUSCOs and the TCLP lead regulatory limit.

5.2.4 Quality Assurance/ Quality Control (QA/QC)

A QA/QC program for the RAWP will be instituted to verify that the project analytical data objectives are met. The QA/QC program will be implemented consistent with the QAPP, which specifies the data quality objectives (DQOs) for each analytical parameter for the entire Remedial Action. During the program, the collection of QC samples will be monitored to verify that the field QC samples are collected at the proper frequency. Finally, the QA/QC program will include data validation of the analytical data, as specified in the QAPP.

5.2.5 Data Usability Summary Reports (DUSRs)

Data validation will be performed for the post-excavation documentation/confirmatory soil sample analytical data. The results of the data validation will be summarized in Data Usability Summary Reports (DUSRs).

5.2.6 Reporting of End-Point Data in FER

Chemical labs used for all end-point sample results and contingency sampling will be NYSDOH Environmental Laboratory Approval Program (ELAP) certified.

End point sampling, including bottom and side-wall sampling, will be performed in accordance with DER-10 sample frequency requirements; with the exception that bottom samples will be collected at a rate of one (1) sample for every 900 square feet in the non-hazardous excavation

areas. Additionally, efforts will be made to collect one (1) sidewall soil sample along the perimeter of the Site; however, collection of sidewall samples may not be feasible in all areas due to the installation of shoring/sheeting along the perimeter of the Site for excavation support. The FER will provide a tabular and map summary of all end-point sample results and exceedances of SCOs.

5.3 ESTIMATED MATERIAL REMOVAL QUANTITIES

The estimated quantity of soil to be removed from the Site is approximately 600 tons that exhibits the hazardous waste characteristics of toxicity for lead. Approximately 15,500 additional tons of non-hazardous soil would be removed as part of Site development. The site development depth is approximately 17 to 18 feet bgs beneath the footprint of the proposed building and cellar-level playground area, and approximately 4 to 16 feet bgs at the ground level playground area on the western portion of the Site. In support of Site development, soil will be excavated across the entire limits of the Site (up to the Site boundary) to a minimum depth of four feet bgs. There will be no unexcavated areas of the Site as part of the site development.

5.4 SOIL/MATERIALS MANAGEMENT PLAN

5.4.1 Soil Screening Methods

Visual, olfactory and photoionization detector (PID) soil screening and assessment will be performed by a qualified environmental professional or experienced field geologist under the direction of the Remedial Engineer during all remedial and development excavations into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the COC.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the Final Engineering Report.

Screening will be performed by qualified environmental professionals. Resumes will be provided for all personnel responsible for field screening (i.e., those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work.

5.4.2 Stockpile Methods

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be kept covered at all times with appropriately anchored tarps, except when materials is being removed or added and during stockpile sampling. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Water will be available on-site at suitable supply and pressure for use in dust control.

5.4.3 Materials Excavation and Load Out

The Remedial Engineer or a qualified environmental professional under his/her supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The NYCSCA and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the Site has been investigated by the Remedial Engineer. It has been determined that no risk or impediment to the planned work under this Remedial Action Work Plan is posed by utilities or easements on the Site.

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

Vehicles leaving the Site will not be overloaded. The Remedial Engineer's representative will make reasonable efforts to ensure that vehicles are not loaded beyond their NYSDOT weight rating and that all material is secured beneath the truck bed cover.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site sediment tracking.

The Remedial Engineer will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site–derived materials.

The NYCSCA and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The Remedial Engineer will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this Remedial Action Work Plan.

Each hotspot and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

Mechanical processing of historical fill and contaminated soil on-Site is prohibited.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the Final Engineering Report.

5.4.4 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Truck transport routes will be submitted to the NYSDEC for approval prior to the start of work. All trucks loaded with Site remediation materials will exit the vicinity of the Site using only these approved truck routes.

Proposed in-bound and out-bound truck routes to the Site will be submitted to the NYSDEC for approval by the Remedial Engineer prior to the start of work. The proposed truck routes will take into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off- Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; (f) overall safety in transport; and (g) community input.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Queuing of trucks will be performed on-Site in order to minimize off-Site disturbance. Off-Site queuing will be prohibited.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks potentially in contact with contaminated material will be washed prior to leaving the Site.

5.4.5 Materials Disposal Off-Site

Proposed disposal locations will be submitted to the NYSDEC for approval by the Remedial Engineer prior to the start of work. Disposal locations established at a later date will be reported to the NYSDEC Project Manager.

The total quantity of material that exhibits the hazardous waste characteristics of toxicity for lead expected to be disposed off-Site is 600 tons. Approximately 15,500 additional tons of non-hazardous soil would be removed as part of Site development, if the new building includes a basement. Disposal facilities will be selected following completion of waste characterization sampling and analysis.

Soil/fill/solid waste excavated and removed from the Site will be managed in accordance with 6NYCRR Part 360 and federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 361-5 Registration Facility).

The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws:

1. A letter from the Remedial Engineer or NYCSCA to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and

2. A letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Contaminated soils taken off-Site will be handled, at minimum, as a Regulated Waste per 6NYCRR Part 360.2.

Contaminated soils from the Site are prohibited from being disposed at Part 361-5 Registration Facilities (also known as Material Recovery Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Materials Management (DMM) in NYSDEC to be Regulated Waste with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DMM. This material is prohibited from being sent or redirected to a Part 361-5 Registered Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Final Engineering Report.

Hazardous wastes derived from on-Site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with all applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

5.4.6 Materials Reuse On-Site

Soil with contaminant concentrations that meets the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted-Residential Use as described in 6 NYCRR Part 375-6.7(d)(1)(ii)(b) will be reused to backfill excavations below the building and paved surfaces and up to 2 feet below the clean cover layer in landscaped areas, if any. A demarcation layer will be installed above existing soil throughout the Site, beneath the building, playground area, and a minimum 2-foot thick imported clean cover layer in landscaped areas, if any. Stockpiled backfill material will be maintained on-site separate from the areas of active remediation work.

Material proposed for reuse must be sampled in accordance with the requirements in DER-10 and meet the criteria listed in Appendix 5 of DER-10. The potential excavation areas for material reuse and associated soil quantities have not been established as of the date of this RAWP. However, the Remedial Engineer will coordinate with the NYSDEC for approval of reuse material during construction activities, as applicable. Samples will be collected in accordance with the frequency and analyses listed in the table below and submitted to a NYSDOH ELAP-certified laboratory.

Table 5.4(e)10
Recommended Number of Soil Samples for Soil Imported To or Exported From a Site

Contaminant	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
➢ 1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

Additional requirements regarding material reuse on-site include:

- The Remedial Engineer will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-Site.
- Acceptable demolition material proposed for reuse on-Site, if any, will be sampled for asbestos.

- Concrete crushing or processing on-Site is prohibited.
- Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-Site.
- Contaminated on-Site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the final Site Management Plan.

5.4.7 Fluids Management

All liquids to be removed from the Site, including decontamination fluids or dewatering fluids, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site.

Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without a SPDES permit.

5.4.8 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to backfilling, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils. A physical demarcation layer, consisting of orange snow fencing material or equivalent material will be placed on this surface to provide a visual reference. This demarcation layer will constitute the top of the 'Residuals Management Zone', the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in the Site Management Plan. The survey will measure the grade covered by the demarcation layer before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the 'Residuals Management Zone' in the Site Management Plan. A map showing the survey results will be included in the Final Engineering Report and the Site Management Plan.

5.4.9 Backfill from Off-Site Sources

This section presents the requirements for imported fill materials to be used as backfill and clean cover layer. Backfill material will be comprised of soil or other unregulated material. Use of

recycled concrete aggregate as backfill is prohibited. Imported material used to backfill below the building and paved surfaces and up to 2 feet below the clean cover layer in landscaped areas, if any, will meet the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted-Residential Use. Imported material for a minimum 2-foot thick clean cover layer in landscaped areas, if any, will meet the requirements of 6 NYCRR Part 375-6 Unrestricted Use SCOs.

Details regarding imported material include:

- Soil proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this RAWP prior to receipt at the Site.
- Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site.
- The Final Engineering Report will include the following certification by the Remedial Engineer: "I certify that all import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan."
- All imported soil will meet NYSDEC approved backfill or cover soil quality objectives for this Site. The NYSDEC approved backfill quality objective is the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted-Residential Use as set forth in Table 375-6.8(b) of 6 NYCRR Part 375. The NYSDEC approved cover soil quality objective is the protection of public health soil cleanup objectives for Unrestricted Use as set forth in Table 375-6.8(a) of 6 NYCRR Part 375. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.
- Solid waste will not be imported onto the Site.
- Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

5.4.10 Soil Erosion and Sediment Control

A Soil Erosion and Sediment Control Plan and Details will be submitted to the NYSDEC for approval prior to the start of work. The erosion and sediment controls will be in conformance with requirements in the New York State Standards and Specifications for Erosion and Sediment Control. Soil erosion and sediment control procedures will be in place and functional prior to

beginning any intrusive work. Additional requirements regarding stormwater pollution prevention are listed below:

- Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.
- Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.
- All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.
- Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.
- Erosion and sediment control measures identified in the RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters
- Silt fencing or hay bales will be installed around the entire perimeter of the remedial construction area, wherever there is potential for sediment transport.

5.4.11 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs). These analyses will not be limited to CP-51 parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's Project Manager. These findings will be also included in daily and periodic electronic media reports.

5.4.12 Community Air Monitoring Plan and Special Requirements CAMP

Site investigations have indicated the presence of petroleum and chlorinated VOCs in groundwater and soil vapor and SVOCs and metals in subsurface soils. The CAMP and Special

Requirements CAMP have been designed to monitor for the target contaminants (refer to *Appendix D*). Real-time air monitoring will be performed at the perimeter of remedial construction zones and west-adjacent building (467 36th Street) as necessary in accordance with the Special Requirements CAMP. The goal of the CAMP/Special Requirements CAMP is to recognize and aggressively respond to exceedances of pre-determined action levels for contaminants of concern. Corrective actions, which may include dust and vapor suppression techniques, alteration of certain work activities, or stopping work, will be taken if exceedance of pre-determined action levels are detected.

Exceedances observed in the CAMP and Special Requirements CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

5.4.13 Odor, Dust and Nuisance Control Plan

The Final Engineering Report will include the following certification by the Remedial Engineer: "I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan."

5.4.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis will include limiting the area of open excavations. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Volunteer's Remedial Engineer, who is responsible for certifying the Final Engineering Report.

All necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; and (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and

handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

5.4.13.2 Dust Control Plan

A dust suppression plan that addresses dust management during invasive on-Site work, will include, at a minimum, the items listed below:

- Water will be available on-site at suitable supply and pressure for use in dust control.
- Clearing and grubbing will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-Site roads will be limited in total area to minimize the area required for water spraying.

5.4.13.3 Other Nuisances

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and Site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work and will conform, at a minimum, to NYCDEP noise control standards.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since residual contaminated soil and groundwater/soil vapor will exist beneath the Site after the remedy is complete, Engineering and Institutional Controls (EC/ICs) are required to protect human health and the environment. These ECs and ICs are described hereafter. Long-term management of EC/ICs and of residual contamination will be executed under a Site-specific SMP that will be developed and included in the FER.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have two (2) primary EC systems. These are: (1) a composite cover system consisting of concrete building slabs and paved surfaces and (2) a vapor barrier and SSDS below the building floor slab.

The FER will report residual contamination on the Site in tabular and map form. This will include presentation of exceedances of both Track 1 and Track 4 standards.

7.0 ENGINEERING CONTROLS: COMPOSITE COVER SYSTEM

Exposure to residual contaminated soils will be prevented by an engineered, composite cover system that will be built on the Site. This composite cover system will be comprised of concrete building slabs and/or paved surfaces, and a minimum 2-foot thick imported clean cover layer in landscaped areas, if any.

An engineered composite cover system will be built on the Site consisting of impervious surfaces (e.g., building, paved surfaces, etc.) and in all other areas (e.g., landscaped areas, if any) at least two feet of clean cover material meeting the protection of public health soil cleanup objectives for Unrestricted Use as described in 6 NYCRR 375-6.7(d)(1)(ii)(a) or otherwise approved by NYSDEC. Note that the contemplated use of the Site allows for backfill material to meet the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted-Residential Use SCOs as set forth in Table 375-6.8(b) of 6 NYCRR Part 375; however, the NYCSCA's standard specifications for the clean cover layer require the use of soil which meets the more stringent Unrestricted Use SCOs further described in Section 5.4.9.

A diagram showing the design detail for each cover type is shown in *Figure 19*. A map showing the aerial distribution of each of the cover types to be built at the Site is included in *Figure 19*. The proposed playground includes installation of a rubber safety surface, which would not act as an engineering control for the Site cover. As noted previously, the final cover system will consist of impervious surfaces (e.g., a building and/or paved surfaces, etc.) and in all other areas (i.e., landscaped areas, if any) at least two feet of clean cover layer that will meet the protection of public health soil cleanup objectives for Unrestricted Use. It is anticipated that the rubber safety surface will consist of "E/Z Fall Safety Cushioning" manufactured by Mitchell Rubber Products Inc. which is not constructed of recycled tires that may contain zinc, sulfur, PAHs, and VOCs. Additional information provided for the proposed product is included in *Appendix G*.

A Soil Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual contamination are disturbed after the Remedial Action is complete.

Maintenance of this composite cover system will be described in the Site Management Plan in the FER.

8.0 ENGINEERING CONTROLS: GAS VAPOR BARRIER AND SSDS

To prevent sub-slab vapor from entering the new building, engineering controls consisting of a gas vapor barrier and SSDS will be installed. The gas vapor barrier is a continuous synthetic membrane installed below the building which is impermeable to vapors. An active SSDS will be designed and installed to minimize the potential for vapor intrusion. The principal components of the SSDS will include:

- Vapor barrier (described above);
- Suction pits beneath the floor slab;
- Pipe running horizontally beneath the slab from each suction pit to a common header or headers;
- A vertical riser or risers, at least six inches in diameter, from the common header(s) connecting to a suction fan or fans above the building roof;
- An exterior suction fan(s);
- An alarm system which will be activated on low vacuum conditions; and,
- Monitoring points at selected locations in the building floor slab.

The Operation and Maintenance (O&M) requirements for the SSDS will consist of an initial start-up testing, routine maintenance and monitoring activities, and non-routine maintenance activities to be described in the SMP.

Design plans and specifications will be submitted to NYSDEC under the SMP.

All as-built drawings, diagrams, and post-installation pressure field extensions testing results will be presented in the FER.

9.0 CRITERIA FOR COMPLETION OF REMEDIATION/TERMINATION OF REMEDIAL SYSTEMS

9.1 COMPOSITE COVER SYSTEM

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

9.2 SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS)

The active SSDS will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the active SSDS may be submitted by the property owner based on confirmatory data that justifies such request. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

10.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the Site will have residual contamination remaining in place. Engineering Controls (ECs) for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement and a Site Management Plan.

All as-built drawings and diagrams will be presented in the FER. A Site-specific Environmental Easement will be recorded with Kings County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all Engineering and Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The SMP describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

10.1 ENVIRONMENTAL EASEMENT

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-Site after the Remedial Action is complete. As part of this remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the Kings County Office of the City Register. The Environmental Easement will be submitted as part of the Final Engineering Report.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the Kings County Office of the City Register before the Certificate of Completion can be issued by NYSDEC. A series of Institutional Controls are required under this remedy to implement, maintain and monitor these Engineering Control systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to Restricted-Residential use only. These Institutional Controls are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. Institutional Controls can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on Site usage or other requirements.

Institutional Controls in both of these groups are closely integrated with the Site Management Plan, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support Engineering Controls are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- A composite cover system consisting of concrete building slabs and paved surfaces must be inspected, certified, and maintained as required in the SMP;
- The minimum 2-foot thick clean cover layer in landscaped areas, if any, must be inspected, certified, and maintained as required in the SMP;
- A soil vapor mitigation system consisting of a continuous vapor barrier and an active sub-slab depressurization system under all building structures must be inspected, certified, operated and maintained as required by the SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these Institutional Controls for the Site is mandated by the Environmental Easement and will be implemented under the Site Management Plan (discussed in the next section). The Controlled Property (Site) will also have a series of Institutional Controls in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the Site Management Plan;

- The Controlled Property may be used for Educational or Restricted-Residential use only, provided the long-term Engineering and Institutional Controls included in the Site Management Plan are employed;
- The Controlled Property may not be used for a higher level of use, such as Unrestricted use without an amendment or extinguishment of this Environmental Easement;
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable.

10.2 SITE MANAGEMENT PLAN

Site Management is the last phase of remediation and begins with the approval of the Final Engineering Report and issuance of the COC for the Remedial Action. The Site Management Plan is submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the Site Management Plan are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the Remedial Action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP will include four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The Site Management Plan will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period. The annual reports will document the annual inspections of the SSDS and engineered composite cover system. The annual reports will be prepared and filed until the NYSDEC issues notification in writing that an annual report is no longer required. Each annual report will be signed by a New York State licensed Professional Engineer and will contain a certification confirming that the engineering and institutional controls at the Site have been maintained in accordance with the SMP to protect public health and the environment.

No exclusions for handling of residual contaminated soils will be provided in the SMP. All handling of residual contaminated material will be subject to provisions contained in the SMP.

11.0 FINAL ENGINEERING REPORT

A FER will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides the documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all soil and groundwater removed from the Site including the surveyed map(s) of all sources. The FER will include as-built drawings for all constructed elements, certifications, manifests, bills of lading as well as the complete SMP. The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

Where determined to be necessary by NYSDEC, a Financial Assurance Plan will be required to ensure the sufficiency of revenue to perform long-term operations, maintenance and monitoring tasks defined in the Site Management Plan and Environmental Easement. This determination will be made by NYSDEC in the context of the Final Engineering Report review.

The FER will include written and photographic documentation of all remedial work performed under this remedy.

The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 Unrestricted Use SCOs in 6NYCRR Part 375-6. A table that shows exceedances of Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that shows the location and summarizes exceedances of Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the Site in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of Site SCOs and a map that shows residual contamination in excess of Site SCOs will be included in the FER.

The FER will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of a FER and issuance of a COC, all project reports must be submitted in digital form on electronic media (PDF).

11.1 CERTIFICATIONS

The following certification will appear in front of the Executive Summary of the Final Engineering Report. The certification will be signed by the Remedial Engineer who is a Professional Engineer registered in New York State. This certification will be appropriately signed and stamped. The certification will include the following statements:

I, _____, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 840 5th Avenue Site (NYSDEC BCA Index No. C224271-05-18, Site No. C224271).

I certify that the Site description presented in this FER is identical to the Site descriptions presented in the Environmental Easement, the Site Management Plan, and the Brownfield Cleanup Agreement for 836-841 5th Avenue and related amendments.

I certify that the Remedial Action Work Plan dated [month day year] and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and all 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. A Site Management Plan has been submitted by the NYCSCA for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, and that such plan has been approved by the NYSDEC.

I certify that the export of all contaminated soil, fill, water or other material from the property was performed in accordance with the Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

I certify that all import of soils from off-Site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology and soil screening methodology defined in the Remedial Action Work Plan.

I certify that all information and statements in this certification 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.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by a New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

12.0 SCHEDULE

The Remedial Action will be implemented during construction of the new school (scheduled to open in September 2021). Table 14 presents a schedule for proposed remediation. As the schedule for remediation and redevelopment activities become more defined, the schedule will be updated and provided to the NYSDEC.

TABLES

Table 1

New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Sub-Slab and Soil Vapor and Ambient Air Samples for Volatile Organic Compounds

SAMPLE NAME:	TRC-SSV-1		TRC-SSV-2		SV-1		SV-2		SV-3		SV-4		SV-5		SV-6		TRC-SV-1 (5')		TRC-SV-1 (10')		TRC-SV-2 (5')		TRC-SV-2 (10')		AA-1	
LABORATORY SAMPLE ID:	17B0499-01		17B0499-02		17A0112-02		17A0111-01		16L1395-01		16L1395-02		17A0112-01		17A0174-01		JC38805-1		JC38805-2		JC38805-3		JC38805-4		17A0174-02	
DATE SAMPLE COLLECTED:	2/10/2017		2/10/2017		01/03/17		12/29/16		12/27/16		12/28/16		01/03/17		01/04/17		3/11/2017		3/11/2017		3/11/2017		3/11/2017		1/4/2017	
MATRIX:	SUB-SLAB VAPOR		SUB-SLAB VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		AMBIENT AIR	
VOLATILE ORGANIC COMPOUND ($\mu g/m^3$)	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
1,1,1 - Trichloroethane (TCA)	200		31		3.5	J	0.14	J	7.9		6,200		230		1,100		2.5		0.55	U	37		213		0.034	U
1,1-Dichloroethane	0.81	U	0.81	U	2.3	U	0.11	U	0.23	U	180		0.11	U	2.3		0.81	U	0.81	U	0.81	U	0.81	U	0.04	U
1,1-Dichloroethene	0.79	U	0.79	U	2.2	J	0.097	U	0.19	U	28		0.097	U	0.87		0.79	U	0.79	U	0.79	U	0.79	U	0.034	U
1,2,4-Trimethylbenzene	9.4		6.4		18		2.8		2.5		2.4	U	4.3		2.3		0.79	J	0.98	U	0.98	U	1.7		0.62	
1,2-Dichlorobenzene	1.2	U	1.2	U	3.2	U	0.16	U	0.32	U	3.2	U	0.16	U	0.32	U	0.60	U	0.60	U	0.60	U	0.60	U	0.056	U
1,2-Dichloroethane	0.81	U	0.81	U	18		0.11	U	0.23	U	2.3	U	0.11	U	0.23	U	0.81	U	0.81	U	0.81	U	0.81	U	0.06	J
1,2-Dichloropropane	0.92	U	0.92	U	3.2	U	0.16	U	0.32	U	3.2	U	0.16	U	0.32	U	0.92	U	0.92	U	0.92	U	0.92	U	0.056	U
1,3,5-Trimethylbenzene	2.6		2.3		12		1.1		0.85	J	2	U	1.5		0.83	J	0.98	U	0.98	U	0.98	U	0.98	U	0.20	
1,3-Dichlorobenzene	1.2	U	1.2	U	3.8	J	3.6		2.7		3.6	J	5.4		4.0		0.60	U	0.60	U	0.60	U	0.60	U	0.047	U
Benzene	1.8		0.82		4,000		6.5		2.0		7.5		62		6.1		0.45	J	1.1		0.64	U	7.7		1.3	
Carbon tetrachloride	0.55	J	0.98	J	3	U	0.47	J	0.3	U	3	U	0.74		0.63	J	0.25	U	0.25	U	5.2		0.25	U	0.52	
Chlorobenzene	0.92	U	0.92	U	97		0.16	U	0.32	U	3.2	U	0.16	U	0.32	U	0.92	U	0.92	U	0.92	U	0.92	U	0.056	U
Chloroethane	0.53	U	0.53	U	580		0.1	U	0.2	U	2	U	2.2		0.2	U	0.53	U	0.53	U	0.53	U	0.53	U	0.035	U
Chloromethane	0.8	U	0.83	U	10,000		1.6		3.7	J	1.8	UJ	33		0.45	J	0.41	U	0.41	U	0.41	U	1.1		0.95	
cis-1,2-Dichloroethene	0.79	U	0.79	U	3	U	0.15	U	0.3	U	3	U	0.15	U	1.5		0.79	U	0.79	U	0.40	J	0.79	U	0.053	U
Ethylbenzene	1.6		2.1		500		6.4		3.2		5.2	J	16		4.9		4.8		0.87	U	0.87	U	1.7		0.61	
m&p-Xylenes	6.3		8.4		330		29		16		25		45		26		22		0.56	J	0.87	U	5.6		2.2	
Methyl tert-butyl ether (MTBE)	0.72	U	0.72	U	2.2	U	0.11	U	4.0		2.2	U	0.11	U	0.22	U	0.72	U	0.72	U	0.72	U	0.72	U	0.039	U
Methylene chloride	1.8	J	6.9	UJ	10	J	1.4	J	0.92	J	8.4	U	0.62	J	0.84	U	0.69	U	0.69	U	0.97		9.4		0.71	J
Naphthalene	2.2		2.3		5.7	U	0.67		0.57	U	5.7	U	0.72		0.57	U	13		3.7		3.1		3.1		0.32	
o-Xylene	2.6		3.2		370		8.8		5.6		8.7		15		7.6		8.3		0.87	U	0.87	U	2.2		0.71	
Tetrachloroethene (PCE)	0.49	J	4.3		12	J	7.2		4.6		15		11		15		1.1		1.0		4.2		2.2		0.61	
Toluene	5.1		4.0		2,700		43		17		34		140		37		0.57	J	1.2		0.75	U	4.5		4.5	
trans-1,2-Dichloroethene	0.79	U	0.79	U	2.1	U	0.1	U	0.21	U	4.9	J	0.1	U	12		0.79	U	0.79	U	0.79	U	0.79	U	0.037	U
Trichloroethene (TCE)	1.1	U	1.1	U	3.4	J	1.3		0.32	U	3.2	U	0.16	U	4.4		0.21	U	0.21	U	0.33		0.24		0.056	U
Vinyl chloride	0.51	U	0.51	U	400		0.11	U	0.22	U	2.2	U	0.85		0.22	U	0.10	U	0.10	U	0.10	U	0.10	U	0.038	U
Formaldehyde	8.9	J	6.9	J	39	U	3.9	U	3.9	U	39	U	3.9	U	3.9	U	--		--		--		--		3.9	U

Notes:
-- - Not analyzed
$\mu g/m^3$ - micrograms per cubic meter
J - Estimated value
U - Non-detect

Table 2
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Volatile Organic Compounds

				SAMPLE NAME:		GP-1 (1-3)		GP-1 (10-12)		GP-2 (1-3)		GP-2 (10-12)		GP-3 (1-3)		GP-3 (10-12)		GP-4 (1-3)		GP-4 (10-12)		GP-5 (1-3)		GP-5 (10-12)		GP-6 (1-3)		GP-6 (10-12)	
				LABORATORY SAMPLE ID:		16L1403-01		16L1403-02		16L1372-03		16L1372-04		16L1355-01		16L1355-02		16L1355-05		16L1355-06		17A0088-02		17A0088-03		17A0175-02		17A0175-03	
				DATE SAMPLE COLLECTED:		12/30/2016		12/30/2016		12/29/2016		12/29/2016		12/27/2016		12/27/2016		12/28/2016		12/28/2016		1/3/2017		1/3/2017		1/4/2017		1/4/2017	
VOLATILE ORGANIC COMPOUNDS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
1,1,1,2-Tetrachloroethene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,1,1-Trichloroethane	0.68	100	0.68	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.051		0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,1,2,2-Tetrachloroethane	NC	NC	NC	0.00079	U	0.0011	U	0.00075	U	0.00088	U	0.00096	U	0.001	U	0.00098	U	0.001	U	0.00095	U	0.001	U	0.0009	U	0.00077	U
1,1,2-Trichloroethane	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,1,2-Trichlorotrifluoroethane (Freon 113)	NC	NC	NC	0.0079	U	0.011	U	0.0075	U	0.0088	U	0.0096	U	0.01	U	0.0098	U	0.01	U	0.0095	U	0.01	U	0.009	U	0.0077	U
1,1-Dichloroethane	0.27	26	0.27	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.0062		0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,1-Dichloroethene	0.33	100	0.33	0.0031	U	0.0043	U	0.003	U	0.0035	U	0.0039	U	0.0041	U	0.0015	J	0.004	U	0.0038	U	0.0042	U	0.0036	U	0.0031	U
1,1-Dichloropropene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,2,3-Trichlorobenzene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,2,3-Trichloropropane	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,2,4-Trichlorobenzene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,2,4-Trimethylbenzene	3.6	52	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.0015	J	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,2-Dibromo-3-chloropropane	NC	NC	NC	0.0031	U	0.0043	U	0.003	U	0.0035	U	0.0039	U	0.0041	U	0.0039	U	0.004	U	0.0038	U	0.0042	U	0.0036	U	0.0031	U
1,2-Dibromoethane	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,2-Dichlorobenzene	1.1	100	1.1	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,2-Dichloroethane	0.02	3.1	0.02	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,2-Dichloropropane	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,3,5-Trichlorobenzene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,3,5-Trimethylbenzene	8.4	52	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,3-Dichlorobenzene	2.4	49	2.4	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,3-Dichloropropane	NC	NC	NC	0.00079	U	0.0011	U	0.00075	U	0.00088	U	0.00096	U	0.001	U	0.00098	U	0.001	U	0.00095	U	0.001	U	0.0009	U	0.00077	U
1,4-Dichlorobenzene	1.8	13	1.8	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
1,4-Dioxane	0.1	13	0.1	0.079	U	0.11	U	0.075	U	0.088	U	0.096	U	0.1	U	0.098	U	0.1	U	0.095	U	0.1	U	0.09	U	0.077	U
2,2-Dichloropropane	NC	NC	NC	0.0016	UJ	0.0021	UJ	0.0015	UJ	0.0018	UJ	0.0019	UJ	0.0021	UJ	0.002	UJ	0.002	UJ	0.0019	UJ	0.0021	UJ	0.0018	UJ	0.0015	UJ
2-Butanone (MEK)	0.12	100	NC	0.031	U	0.043	U	0.03	U	0.035	U	0.039	U	0.041	U	0.039	U	0.04	U	0.038	U	0.042	U	0.036	U	0.031	U
2-Chlorotoluene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
2-Hexanone	NC	NC	NC	0.016	U	0.021	U	0.015	U	0.018	U	0.019	U	0.021	U	0.02	U	0.02	U	0.019	U	0.021	U	0.018	U	0.015	U
4-Chlorotoluene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
4-Methyl-2-pentanone(MIBK)	NC	NC	NC	0.016	U	0.021	U	0.015	U	0.018	U	0.019	U	0.021	U	0.02	U	0.02	U	0.019	U	0.021	U	0.018	U	0.015	U
Acetone	0.05	100	0.05	0.079	U	0.11	U	0.075	U	0.088	U	0.035	U	0.026	U	0.028	U	0.024	U	0.029	J	0.1	U	0.09	U	0.077	U
Acrylonitrile	NC	NC	NC	0.0047	U	0.0064	U	0.0045	U	0.0053	U	0.0058	U	0.0062	U	0.0059	U	0.006	U	0.0057	U	0.0026	U	0.0054	U	0.0046	U
Benzene	0.06	4.8	0.06	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Bromobenzene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Bromochloromethane	NC	NC	NC	0.0016	U	0.0021	U	0.0015	UJ	0.0018	UJ	0.0019	UJ	0.0021	UJ	0.002	UJ	0.002	UJ	0.0019	UJ	0.0021	UJ	0.0018	U	0.0015	U
Bromodichloromethane	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Bromoform	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Bromomethane	NC	NC	NC	0.0079	U	0.011	U	0.0075	U	0.0088	U	0.0096	U	0.01	U	0.0098	U	0.01	U	0.0095	U	0.01	U	0.009	U	0.0077	U
Carbon disulfide	NC	NC	NC	0.0047	U	0.0064	U	0.0045	U	0.0053	U	0.0058	U	0.0062	U	0.0059	U	0.006	U	0.0057	U	0.0063	U	0.0053	U	0.0046	U
Carbon tetrachloride	0.76	2.4	0.76	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Chlorobenzene	1.1	100	1.1	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Chloroethane	NC	NC	NC	0.016	U	0.021	U	0.015	U	0.018	U	0.019	U	0.021	U	0.02	U	0.02	U	0.019	U	0.021	U	0.018	U	0.015	U
Chloroform	0.37	49	0.37	0.0031	U	0.0043	U	0.003	U	0.0035	U	0.0039	U	0.0041	U	0.0039	U	0.004	U	0.0038	U	0.0042	U	0.0036	U	0.0031	U
Chloromethane	NC	NC	NC	0.0079	U	0.011	U	0.0075	U	0.0088	U	0.0096	U	0.01	U	0.0098	U	0.01	U	0.0095	U	0.01	U	0.009	U	0.0077	U
cis-1,2-Dichloroethene	0.25	100	0.25	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.002	U	0.002	U	0.0019	U
cis-1,3-Dichloropropene	NC	NC	NC	0.00079	U	0.0011	U	0.00075	U	0.00088	U	0.00096	U	0.001	U	0.00098	U	0.001	U	0.00095	U	0.001	U	0.0009	U	0.00077	U
Cyclohexane	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--		--	
Dibromomethane	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Dibromochloromethane	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Dichlorodifluoromethane	NC	NC	NC	0.016	U	0.021	U	0.015	U	0.018	U	0.019	U	0.021	U	0.02	U	0.02	U	0.019	U	0.021	U	0.018	U	0.015	U
Diethyl Ether	NC	NC	NC	0.016	U	0.021	U	0.015	U	0.018	U	0.019	U	0.021	U	0.02	U	0.02	U	0.019	U	0.021	U	0.018	U	0.015	U
Diisopropyl Ether	NC	NC	NC	0.00079	U	0.0011	U	0.00075	U	0.00088	U	0.00096	U	0.001	U	0.00098	U	0.001	U	0.00095	U	0.001	U	0.0009	U	0.00077	U
Ethylbenzene	1	41	1	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.0011	J	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Hexachlorobutadiene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Isopropylbenzene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
m,p-Xylene	0.26[2]	100[1]	0.26[2]	0.0031	U	0.0043	U	0.003	U	0.0035	U	0.0039	U	0.0041	U	0.0039	U	0.004	U	0.0038	U	0.0042	U	0.0036	U	0.0031	U
Methyl acetate	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0054		0.0021	U	0.0018	U	0.0015	U
Methyl tert-butyl ether	0.93	100	0.93	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Methylcyclohexane	NC	NC	NC	0.0031	U	0.0043	U	0.003	U	0.0035	U	0.0039	U	0.0041	U	0.0039	U	0.004	U	0.0038	U	0.0042	U	0.0036	U	0.0031	U
Methylene chloride	0.05	100	0.05	0.016	U	0.021	U	0.015	U	0.018	U	0.019	U	0.021	U	0.02	U	0.02	U	0.019	U	0.021	U	0.018	U	0.015	U
n-Butylbenzene	12	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
n-Propylbenzene	3.9	100	3.9	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Naphthalene	12	NC	NC	0.0031	U	0.0043	U	0.003	U	0.0035	U	0.0039	U	0.0041	U	0.11		0.004	U	0.0038	U	0.0042	U	0.0036	U	0.0031	U
o-Xylene	0.26[2]	100[1]	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.00088	J	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
p-Isopropyltoluene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
sec-Butylbenzene	11	100	11	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Styrene	NC	NC	NC	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
tert-Amyl Methyl Ether (TAME)	NC	NC	NC	0.00079	U	0.0011	U	0.00075	U	0.00088	U	0.00096	U	0.001	U	0.00098	U	0.001	U	0.00095	U	0.001	U	0.0009	U	0.00077	U

Table 2
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Volatile Organic Compounds

			SAMPLE NAME:	GP-1 (1-3)		GP-1 (10-12)		GP-2 (1-3)		GP-2 (10-12)		GP-3 (1-3)		GP-3 (10-12)		GP-4 (1-3)		GP-4 (10-12)		GP-5 (1-3)		GP-5 (10-12)		GP-6 (1-3)		GP-6 (10-12)	
			LABORATORY SAMPLE ID:	16L1403-01		16L1403-02		16L1372-03		16L1372-04		16L1355-01		16L1355-02		16L1355-05		16L1355-06		17A0088-02		17A0088-03		17A0175-02		17A0175-03	
			DATE SAMPLE COLLECTED:	12/30/2016		12/30/2016		12/29/2016		12/29/2016		12/27/2016		12/27/2016		12/28/2016		12/28/2016		1/3/2017		1/3/2017		1/4/2017		1/4/2017	
VOLATILE ORGANIC COMPOUNDS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
tert-Butyl Alcohol (TBA)	NC	NC	NC	0.031	U	0.043	U	0.03	U	0.035	U	0.039	U	0.041	U	0.039	U	0.04	U	0.038	U	0.042	U	0.036	UJ	0.031	UJ
tert-Butyl Ethyl Ether (TBEE)	NC	NC	NC	0.00079	U	0.0011	U	0.00075	U	0.00088	U	0.00096	U	0.001	U	0.00098	U	0.001	U	0.00095	U	0.001	U	0.0009	U	0.00077	U
tert-Butylbenzene	5.9	100	5.9	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Tetrachloroethene	1.3	19	1.3	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.0054		0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Tetrahydrofuran	NC	NC	NC	0.0079	U	0.011	U	0.0075	U	0.0088	U	0.0096	U	0.01	U	0.0098	U	0.01	U	0.0095	U	0.01	U	0.009	U	0.0077	U
Toluene	0.7	100	0.7	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
trans-1,2-Dichloroethene	0.19	100	0.19	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
trans-1,3-Dichloropropene	NC	NC	NC	0.00079	U	0.0011	U	0.00075	U	0.00088	U	0.00096	U	0.001	U	0.00098	U	0.001	U	0.00095	U	0.001	U	0.0009	U	0.00077	U
trans-1,4-Dichloro-2-butene	NC	NC	NC	0.0031	U	0.0043	U	0.003	U	0.0035	U	0.0039	U	0.0041	U	0.0039	U	0.004	U	0.0038	U	0.0042	U	0.0036	U	0.0031	U
Trichloroethene	0.47	21	0.47	0.0016	U	0.0021	U	0.0015	U	0.0018	U	0.0019	U	0.0021	U	0.002	U	0.002	U	0.0019	U	0.0021	U	0.0018	U	0.0015	U
Trichlorofluoromethane	NC	NC	NC	0.0079	U	0.011	U	0.0075	U	0.0088	U	0.0096	U	0.01	U	0.0098	U	0.01	U	0.0095	U	0.01	U	0.009	U	0.0077	U
Vinyl chloride	0.02	0.9	0.02	0.0079	U	0.011	U	0.0075	U	0.0088	U	0.0096	U	0.01	U	0.0098	U	0.01	U	0.0095	U	0.01	U	0.009	U	0.0077	U
Xylene (total)	0.26[2]	100[1]	0.26[2]	--		--		--		--		--		--		--		--		--		--		--		--	
Total TICs	NC	NC	NC	ND		ND		ND		ND		0.0036	J	ND		ND		ND		ND		ND		ND		ND	
Formaldehyde	NC	NC	NC	2.3	U	2.3	U	2.3	U	2.3	U	2.4	U	2.3	U	2.3	U	2.2	U	2.2	U	50		26		2.2	U

Notes:

-- - Not analyzed

(1) - There is no Restricted Residential SCO for m,p-xylene or o-xylene. The Restricted Residential SCO for total xylenes is 100 mg/kg.

(2) - There is no Protection of Groundwater SCO for m,p-xylene or o-xylene. The Protection of Groundwater SCO total xylenes is 0.26 mg/kg.

J - Estimated value

mg/kg - milligrams per kilogram

NC - No criterion

ND - Not detected

SCO - Soil Cleanup Objective

Shaded and **bold** results exceed Unrestricted Use, Restricted Residential Use, and/or Protection of Groundwater SCOs.

TRC-DUP-1 is a duplicate of TRC-MW-3 (53-55)

U - Non-detect

Table 2
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Volatile Organic Compounds

				SAMPLE NAME:	TRC-MW-2 (1-3)	TRC-MW-2 (10-12)	TRC-MW-2 (48-50)	TRC-MW-3 (1-3)	TRC-MW-3 (12-16)	TRC-MW-3 (53-55)	TRC-DUP-1	TRC-SB-1 (1-3)	TRC-SB-1 (10-12)	TRC-SB-2 (0.5-1.5)	TRC-DSB-1 (12-14)	TRC-DSB-1 (18-20)	TRC-DSB-2 (12-14)	TRC-DSB-2 (18-20)	TRC-DSB-3 (12-14)	TRC-DSB-3 (18-20)
				LABORATORY SAMPLE ID:	JC37095-1 / BX63207	JC37095-2 / BX63208	JC37095-3 / BX63209	JC37160-1 / BX68392	JC37160-2 / BX68393	JC37160-3 / BX68394	JC37160-4 / 'BX68395	JC37164-1 / BX68396	JC37164-2 / BX68397	JC37164-3 / BX68398	JC37164-4 / BX68399	JC37164-5 / BX68400	JC37164-6 / BX68401	JC37164-7 / BX68402	JC37164-8 / BX68403	JC37164-9 / BX68404
				DATE SAMPLE COLLECTED:	2/13/2017	2/13/2017	2/13/2017	2/14/2017	2/14/2017	2/14/2017	2/14/2017	2/14/2017	2/14/2017	2/14/2017	2/14/2017	2/14/2017	2/14/2017	2/14/2017	2/14/2017	2/14/2017
VOLATILE ORGANIC COMPOUNDS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO		Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1,1,1,2-Tetrachloroethene	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	0.68	100	0.68		0.00062 J	0.0018 U	0.002 U	0.002 U	0.00053 J	0.00025 J	0.00022 J	0.0032 U	0.00034 J	0.0017 U	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
1,1,2-Trichloroethane	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
1,1,2-Trichlorotrifluoroethane (Freon 113)	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
1,1-Dichloroethane	0.27	26	0.27		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.001 U	0.00084 U	--	--	--	--	--	--
1,1-Dichloroethene	0.33	100	0.33		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.001 U	0.00084 U	--	--	--	--	--	--
1,1-Dichloropropene	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
1,2,3-Trichloropropane	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
1,2,4-Trichlorobenzene	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
1,2,4-Trimethylbenzene	3.6	52	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.00043 J	0.0021 U	0.0042	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
1,2-Dibromoethane	NC	NC	NC		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.001 U	0.00084 U	--	--	--	--	--	--
1,2-Dichlorobenzene	1.1	100	1.1		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.001 U	0.00084 U	--	--	--	--	--	--
1,2-Dichloroethane	0.02	3.1	0.02		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.001 U	0.00084 U	--	--	--	--	--	--
1,2-Dichloropropane	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
1,3,5-Trichlorobenzene	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	8.4	52	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0011 J	--	--	--	--	--	--
1,3-Dichlorobenzene	2.4	49	2.4		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.001 U	0.00084 U	--	--	--	--	--	--
1,3-Dichloropropane	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	1.8	13	1.8		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.001 U	0.00084 U	--	--	--	--	--	--
1,4-Dioxane	0.1	13	0.1		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	0.12	100	NC		0.011 U	0.0089 U	0.0099 U	0.01 U	0.01 U	0.0083 U	0.01 U	0.016 U	0.01 U	0.0084 U	--	--	--	--	--	--
2-Chlorotoluene	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
4-Chlorotoluene	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone(MIBK)	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
Acetone	0.05	100	0.05		0.0326	0.0150	0.0140	0.0096 J	0.0080 J	0.0077 J	0.0059 J	0.0122 J	0.0073 J	**0.0523**	--	--	--	--	--	--
Acrylonitrile	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzene	0.06	4.8	0.06		0.00053 U	0.00044 U	0.00049 U	0.00051 U	0.00051 U	0.00042 U	0.00051 U	0.0008 U	0.00052 U	0.00042 U	--	--	--	--	--	--
Bromobenzene	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
Bromodichloromethane	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
Bromoform	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
Bromomethane	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
Carbon disulfide	NC	NC	NC		0.0021 U	0.0018 U	0.00027 J	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
Carbon tetrachloride	0.76	2.4	0.76		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
Chlorobenzene	1.1	100	1.1		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
Chloroethane	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
Chloroform	0.37	49	0.37		0.0021 U	0.0018 U	0.002 U	0.002 U	0.00038 J	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
Chloromethane	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
cis-1,2-Dichloroethene	0.25	100	0.25		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.001 U	0.00084 U	--	--	--	--	--	--
cis-1,3-Dichloropropene	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
Cyclohexane	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
Dibromomethane	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
Dichlorodifluoromethane	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
Diethyl Ether	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl Ether	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	1	41	1		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.001 U	0.00071 J	--	--	--	--	--	--
Hexachlorobutadiene	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.00049 J	--	--	--	--	--	--
m,p-Xylene	0.26[2]	100[1]	0.26[2]		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.00045 J	0.0013	--	--	--	--	--	--
Methyl acetate	NC	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
Methyl tert-butyl ether	0.93	100	0.93		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.001 U	0.00084 U	--	--	--	--	--	--
Methylcyclohexane	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0017 U	--	--	--	--	--	--
Methylene chloride	0.05	100	0.05		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0051 U	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
n-Butylbenzene	12	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.00044 J	--	--	--	--	--	--
n-Propylbenzene	3.9	100	3.9		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.00088 J	--	--	--	--	--	--
Naphthalene	12	NC	NC		0.0053 U	0.0044 U	0.0049 U	0.0051 U	0.0012 J	0.0042 U	0.0051 U	0.008 U	0.0052 U	0.0042 U	--	--	--	--	--	--
o-Xylene	0.26[2]	100[1]	NC		0.0011 U	0.00089 U	0.00099 U	0.001 U	0.001 U	0.00083 U	0.001 U	0.0016 U	0.001 U	0.00067 J	--	--	--	--	--	--
p-Isopropyltoluene	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.00032 J	--	--	--	--	--	--
sec-Butylbenzene	11	100	11		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.00038 J	--	--	--	--	--	--
Styrene	NC	NC	NC		0.0021 U	0.0018 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.002 U	0.0032 U	0.0021 U	0.0028	--	--	--	--	--	--
tert-Amyl Methyl Ether (TAME)	NC	NC	NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Volatile Organic Compounds

				SAMPLE NAME:	TRC-MW-2 (1-3)		TRC-MW-2 (10-12)		TRC-MW-2 (48-50)		TRC-MW-3 (1-3)		TRC-MW-3 (12-16)		TRC-MW-3 (53-55)		TRC-DUP-1		TRC-SB-1 (1-3)		TRC-SB-1 (10-12)		TRC-SB-2 (0.5-1.5)		TRC-DSB-1 (12-14)		TRC-DSB-1 (18-20)		TRC-DSB-2 (12-14)		TRC-DSB-2 (18-20)		TRC-DSB-3 (12-14)		TRC-DSB-3 (18-20)	
				LABORATORY SAMPLE ID:	JC37095-1 / BX63207		JC37095-2 / BX63208		JC37095-3 / BX63209		JC37160-1 / BX68392		JC37160-2 / BX68393		JC37160-3 / BX68394		JC37160-4 / 'BX68395		JC37164-1 / BX68396		JC37164-2 / BX68397		JC37164-3 / BX68398		JC37164-4 / BX68399		JC37164-5 / BX68400		JC37164-6 / BX68401		JC37164-7 / BX68402		JC37164-8 / BX68403		JC37164-9 / BX68404	
				DATE SAMPLE COLLECTED:	2/13/2017		2/13/2017		2/13/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017	
VOLATILE ORGANIC COMPOUNDS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
tert-Butyl Alcohol (TBA)	NC	NC	NC		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
tert-Butyl Ethyl Ether (TBEE)	NC	NC	NC		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
tert-Butylbenzene	5.9	100	5.9		0.0021	U	0.0018	U	0.002	U	0.002	U	0.002	U	0.0017	U	0.002	U	0.0032	U	0.0021	U	0.0017	U	--		--		--		--		--		--		--	
Tetrachloroethene	1.3	19	1.3		0.0021	U	0.0018	U	0.002	U	0.002	U	0.002	U	0.0017	U	0.002	U	0.0032	U	0.0021	U	0.0017	U	--		--		--		--		--		--		--	
Tetrahydrofuran	NC	NC	NC		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
Toluene	0.7	100	0.7		0.0011	U	0.00089	U	0.00019	J	0.001	U	0.001	U	0.00083	U	0.001	U	0.0016	U	0.001	U	0.00028	J	--		--		--		--		--		--		--	
trans-1,2-Dichloroethene	0.19	100	0.19		0.0011	U	0.00089	U	0.00099	U	0.001	U	0.001	U	0.00083	U	0.001	U	0.0016	U	0.001	U	0.00084	U	--		--		--		--		--		--		--	
trans-1,3-Dichloropropene	NC	NC	NC		0.0021	U	0.0018	U	0.002	U	0.002	U	0.002	U	0.0017	U	0.002	U	0.0032	U	0.0021	U	0.0017	U	--		--		--		--		--		--		--	
trans-1,4-Dichloro-2-butene	NC	NC	NC		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
Trichloroethene	0.47	21	0.47		0.0011	U	0.00089	U	0.00099	U	0.001	U	0.001	U	0.00083	U	0.001	U	0.0016	U	0.001	U	0.00084	U	--		--		--		--		--		--		--	
Trichlorofluoromethane	NC	NC	NC		0.0053	U	0.0044	U	0.0049	U	0.0051	U	0.0051	U	0.0042	U	0.0051	U	0.008	U	0.0052	U	0.0042	U	--		--		--		--		--		--		--	
Vinyl chloride	0.02	0.9	0.02		0.0021	U	0.0018	U	0.002	U	0.002	U	0.002	U	0.0017	U	0.002	U	0.0032	U	0.0021	U	0.0017	U	--		--		--		--		--		--		--	
Xylene (total)	0.26[2]	100[1]	0.26[2]		0.0011	U	0.00089	U	0.00099	U	0.0010	U	0.0010	U	0.00083	U	0.0010	U	0.0016	U	0.00045	J	0.0020		--		--		--		--		--		--		--	
Total TICs	NC	NC	NC		ND		0.0048	J	0.0083	J	ND		ND		ND		ND		ND		ND		0.0063	J	--		--		--		--		--		--		--	
Formaldehyde	NC	NC	NC		3.7		8.4		2.2		2.2	U	2.4	U	2.2	U	2.1	U	2.0	U	2.3	U	2.1	U	7.4		2.7		7.1		8.6		2.2	U	2.3	U

Notes:

-- - Not analyzed

[1] - There is no Restricted Residential SCO for m,p-xylene or o-xylene. The Restricted Residential SCO for total xylenes is 100 mg/kg.

[2] - There is no Protection of Groundwater SCO for m,p-xylene or o-xylene. The Protection of Groundwater SCO total xylenes is 0.26 mg/kg.

J - Estimated value

mg/kg - milligrams per kilogram

NC - No criterion

ND - Not detected

SCO - Soil Cleanup Objective

Shaded and **bold** results exceed Unrestricted Use, Restricted Residential Use, and/or Protection of Groundwater SCOs.

TRC-DUP-1 is a duplicate of TRC-MW-3 (53-55)

U - Non-detect

Table 3
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Semivolatile Organic Compounds

			SAMPLE NAME:	GP-1 (1-3)		GP-1 (10-12)		GP-2 (1-3)		GP-2 (10-12)		GP-3 (1-3)		GP-3 (10-12)		GP-4 (1-3)		GP-4 (10-12)		GP-5 (1-3)		GP-5 (10-12)		GP-6 (1-3)		GP-6 (10-12)	
			LABORATORY SAMPLE ID:	16L1403-01		16L1403-02		16L1372-03		16L1372-04		16L1355-01		16L1355-02		16L1355-05		16L1355-06		17A0088-02		17A0088-03		17A0175-02		17A0175-03	
			DATE SAMPLE COLLECTED:	12/30/16		12/30/16		12/29/16		12/29/16		12/27/16		12/27/16		12/28/16		12/28/16		1/3/17		1/3/17		1/4/17		1/4/17	
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
1,1'-Biphenyl	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--	
1,2,4,5-Tetrachlorobenzene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
1,2,4-Trichlorobenzene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
1,2-Dichlorobenzene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
1,2-Diphenylhydrazine	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
1,3-Dichlorobenzene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
1,4-Dichlorobenzene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
1,4-Dioxane	0.1	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--	
1-Methylnaphthalene	NC	NC	NC	0.19	U	0.2	U	0.2	U	0.2	U	0.2	U	0.18	U	15		0.19	U	0.19	U	0.18	U	0.19	U	0.19	U
2,3,4,6-Tetrachlorophenol	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--	
2,4,5-Trichlorophenol	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
2,4,6-Trichlorophenol	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
2,4-Dichlorophenol	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
2,4-Dimethylphenol	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	0.80	J	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
2,4-Dinitrophenol	NC	NC	NC	0.75	UJ	0.76	UJ	0.76	UJ	0.78	UJ	0.77	UJ	0.71	UJ	3.0	UJ	0.75	UJ	0.72	UJ	0.71	UJ	0.75	U	0.72	U
2,4-Dinitrotoluene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
2,6-Dinitrotoluene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
2-Chloronaphthalene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
2-Chlorophenol	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
2-Methylnaphthalene	NC	NC	NC	0.19	U	0.2	U	0.2	U	0.2	U	0.2	U	0.18	U	30		0.19	U	0.19	U	0.18	U	0.19	U	0.19	U
2-Methylphenol	0.33	100	0.33	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	**0.75**	J	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
2-Nitroaniline	NC	NC	NC	0.38	UJ	0.39	UJ	0.39	UJ	0.4	UJ	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
2-Nitrophenol	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
3&4-Methylphenol	0.33	100	0.33	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	**2.9**		0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
3,3'-Dichlorobenzidine	NC	NC	NC	0.19	U	0.2	U	0.2	U	0.2	U	0.2	U	0.18	U	0.77	U	0.19	U	0.19	U	0.18	UJ	0.19	U	0.19	U
3-Nitroaniline	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
4,6-Dinitro-2-methylphenol	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	UJ	0.39	U	0.37	U
4-Bromophenyl phenyl ether	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
4-Chloro-3-methyl phenol	NC	NC	NC	0.75	U	0.76	U	0.76	U	0.78	U	0.77	U	0.71	U	3	U	0.75	U	0.72	U	0.71	U	0.75	U	0.72	U
4-Chloroaniline	NC	NC	NC	0.75	U	0.76	U	0.76	U	0.78	U	0.77	U	0.71	U	13		0.75	U	0.72	U	0.71	UJ	0.75	U	0.72	U
4-Chlorophenyl phenyl ether	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36		0.39	U	0.37	U
4-Nitroaniline	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36		0.39	U	0.37	U
4-Nitrophenol	NC	NC	NC	0.75	U	0.76	U	0.76	U	0.78	U	0.77	U	0.71	U	3	U	0.75	U	0.72	UJ	0.71	UJ	0.75	UJ	0.72	UJ
Acenaphthene	20	100	98	0.19	U	0.2	U	0.2	U	0.2	U	0.2	U	0.18	U	**49**		0.19	U	0.19	U	0.062	J	0.19	U	0.19	U
Acenaphthylene	100	100	107	0.11	J	0.2	U	0.2	U	0.2	U	0.088	J	0.18	U	16		0.19	U	0.19	U	0.13	J	0.19	U	0.19	U
Acetophenone	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Aniline	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Anthracene	100	100	1000	0.18	J	0.2	U	0.2	U	0.2	U	0.12	J	0.18	U	**150**		0.19	U	0.19	U	0.40		0.084	J	0.067	J
Atrazine	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--	
Benzaldehyde	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--	
Benzidine	NC	NC	NC	0.75	UJ	0.76	UJ	0.76	UJ	0.78	UJ	0.77	UJ	0.71	UJ	3	UJ	0.75	UJ	0.72	UJ		R	0.75	UJ	0.72	UJ
Benzo(a)anthracene	1	1	1	1.0		0.2	U	0.2	U	0.064	J	0.66		0.18	U	**200**		0.19	U	0.13	J	0.96		0.38		0.15	J
Benzo(a)pyrene	1	1	22	0.98		0.2	U	0.2	U	0.2	U	0.63		0.18	U	**180**		0.19	U	0.13	J	0.81		0.40		0.13	J
Benzo(b)fluoranthene	1	1	1.7	**1.4**		0.2	U	0.2	U	0.064	J	0.78		0.18	U	**210**		0.19	U	0.17	J	**1.1**		0.57		0.16	J
Benzo(g,h,i)perylene	100	100	1000	0.54		0.2	U	0.2	U	0.2	U	0.34		0.18	U	92		0.19	U	0.082	J	0.41		0.20		0.19	U
Benzo(k)fluoranthene	0.8	3.9	1.7	0.50		0.2	U	0.2	U	0.2	U	0.30		0.18	U	**85**		0.19	U	0.062	J	0.41		0.22		0.065	J
Benzoic acid	NC	NC	NC		R		R		R		R	1.2	UJ	1.1	UJ	4.5	UJ	1.1	UJ	1.1	UJ	1.1	UJ	1.1	UJ	1.1	UJ
bis(2-Chloroethoxy)methane	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.40	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
bis(2-Chloroethyl)ether	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.40	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
bis(2-Chloroisopropyl)ether	NC	NC	NC	0.38	UJ	0.39	UJ	0.39	UJ	0.40	UJ	0.39	U	0.36	U	1.5	U	0.39	U	0.37	UJ	0.36	UJ	0.39	UJ	0.37	UJ
bis(2-Ethylhexyl)phthalate	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.15	J	1.5	U	0.39	U	0.22	J	0.36	U	0.31	J	0.2	J
Butyl benzyl phthalate	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Caprolactam	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--	--	--	--
Carbazole	NC	NC	NC	0.071	J	0.2	U	0.2	U	0.2	U	0.2	U	0.18	U	30		0.19	U	0.19	U	0.16	J	0.055	J	0.19	U
Chrysene	1	3.9	1	1.0		0.2	U	0.2	U	0.2	U	0.64		0.18	U	**190**		0.19	U	0.13	J	0.87		0.43		0.14	J
Di-n-butyl phthalate	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Di-n-octyl phthalate	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Dibenzo(a,h)anthracene	0.33	0.33	1000	0.16	J	0.2	U	0.2	U	0.2	U	0.2	U	0.18	U	**22**		0.19	U	0.19	U	0.13	J	0.19	U	0.19	U
Dibenzofuran	7	59	210	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	**42**		0.39	U	0.37	U	0.13	J	0.39	U	0.37	U
Diethyl phthalate	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Dimethyl phthalate	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Fluoranthene	100	100	1000	1.7		0.2	U	0.2	U	0.14	J	1.2		0.18	U	**490**		0.19	U	0.25		2.4		0.96		0.32	
Fluorene	30	100	386	0.19	U	0.2	U	0.2	U	0.2	U	0.2	U	0.18	U	**77**		0.19	U	0.19	U	0.11	J	0.19	U	0.19	U
Hexachlorobenzene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Hexachlorobutadiene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Hexachlorocyclopentadiene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	UJ	0.39	U	0.37	U
Hexachloroethane	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	**0.59**		0.20	U	0.20	U	0.20	U	0.40		0.18	U	**98**		0.19	U	0.19	U	0.47		0.23		0.19	U
Isophorone	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
N-Nitrosodimethylamine	NC	NC	NC	0.38	UJ	0.39	UJ	0.39	UJ	0.4	UJ	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	UJ	0.37	UJ
N-Nitroso-di-n-propylamine	NC	NC	NC	0.38	UJ	0.39	UJ	0.39	UJ	0.4	UJ	0.39	U	0.36	U	1.5	U	0.39	U	0.37	UJ	0.36	UJ	0.39	UJ	0.37	UJ

Table 3
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Semivolatile Organic Compounds

			SAMPLE NAME:	GP-1 (1-3)		GP-1 (10-12)		GP-2 (1-3)		GP-2 (10-12)		GP-3 (1-3)		GP-3 (10-12)		GP-4 (1-3)		GP-4 (10-12)		GP-5 (1-3)		GP-5 (10-12)		GP-6 (1-3)		GP-6 (10-12)	
			LABORATORY SAMPLE ID:	16L1403-01		16L1403-02		16L1372-03		16L1372-04		16L1355-01		16L1355-02		16L1355-05		16L1355-06		17A0088-02		17A0088-03		17A0175-02		17A0175-03	
			DATE SAMPLE COLLECTED:	12/30/16		12/30/16		12/29/16		12/29/16		12/27/16		12/27/16		12/28/16		12/28/16		1/3/17		1/3/17		1/4/17		1/4/17	
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
N-Nitrosodiphenylamine	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Naphthalene	12	100	12	0.19	U	0.2	U	0.2	U	0.2	U	0.10	J	0.18	U	**54**		0.19	U	0.19	U	0.18	U	0.19	U	0.19	U
Nitrobenzene	NC	NC	NC	0.38	UJ	0.39	UJ	0.39	UJ	0.4	UJ	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Pentachloronitrobenzene	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Pentachlorophenol	0.8	6.7	0.8	0.38	UJ	0.39	UJ	0.39	UJ	0.4	UJ	0.39	U	0.36	U	1.5	U	0.39	U	0.37	UJ	0.36	UJ	0.39	U	0.37	U
Phenanthrene	100	100	1000	0.83		0.2	U	0.2	U	0.13	J	0.56		0.18	U	**560**		0.19	U	0.17	J	2.1		0.59		0.30	
Phenol	0.33	100	0.33	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	**2.6**		0.39	U	0.37	U	0.36	U	0.39	U	0.37	U
Pyrene	100	100	1000	1.9		0.2	U	0.2	U	0.15	J	1.1		0.18	U	**590**		0.19	U	0.25		2.2		0.82		0.29	
Pyridine	NC	NC	NC	0.38	U	0.39	U	0.39	U	0.4	U	0.39	U	0.36	U	1.5	U	0.39	U	0.37	U	0.36	UJ	0.39	U	0.37	U
Total SVOC Compounds	NC		NC	10.961		0		0.00		0.548		6.918		0.15		3,200.05		0.00		1.594		12.852		5.249		1.822	
Total TICs	NC	NC	NC	2.83	J	ND		ND		0.36	J	3.01	J	ND		108.3	J	0.22	J	0.16	J	1.42	J	1.11	J	ND	

Notes:
-- - Not analyzed
J - Estimated value
mg/kg - milligrams per kilogram
NC - No criterion
ND - Not detected
SCO - Soil Cleanup Objective
Shaded and **bold** results exceed Unrestricted Use, Restricted Residential Use, and/or Protection of Groundwater SCO.
TRC-DUP-1 is a duplicate of TRC-MW-3 (53-55)
U - Non-detect
R - The sample results are unusable because certain criteria were not met.
The analyte may or may not be present in the sample.

Table 3
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Semivolatile Organic Compounds

			SAMPLE NAME:	TRC-MW-2 (1-3)		TRC-MW-2 (10-12)		TRC-MW-2 (48-50)		TRC-MW-3 (1-3)		TRC-MW-3 (12-16)		TRC-MW-3 (53-55)		TRC-DUP-1		TRC-SB-1 (1-3)		TRC-SB-1 (10-12)		TRC-SB-2 (0.5-1.5)		TRC-DSB-1 (12-14)		TRC-DSB-1 (18-20)		TRC-DSB-2 (10-15)		TRC-DSB-2 (18-20)		TRC-DSB-3 (10-15)		TRC-DSB-3 (18-20)	
			LABORATORY SAMPLE ID:	JC37095-1		JC37095-2		JC37095-3		JC37160-1		JC37160-2		JC37160-3		JC37160-4		JC37164-1		JC37164-2		JC37164-3		JC37164-4		JC37164-5		JC37164-6		JC37164-7		JC37164-8		JC37164-9	
			DATE SAMPLE COLLECTED:	2/13/2017		2/13/2017		2/13/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017	
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
1,1'-Biphenyl	NC	NC	NC	0.0840		0.073	U	0.068	U	0.074	U	0.0226	J	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--											
1,2,4,5-Tetrachlorobenzene	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
1,2,4-Trichlorobenzene	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
1,2-Dichlorobenzene	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
1,2-Diphenylhydrazine	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
1,3-Dichlorobenzene	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
1,4-Dichlorobenzene	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
1,4-Dioxane	0.1	NC	NC	0.037	U	0.037	U	0.034	U	0.037	U	0.039	U	0.037	U	0.037	U	0.2	U	0.04	U	0.036	U	--		--		--		--		--		--	
1-Methylnaphthalene	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
2,3,4,6-Tetrachlorophenol	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
2,4,5-Trichlorophenol	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
2,4,6-Trichlorophenol	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
2,4-Dichlorophenol	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
2,4-Dimethylphenol	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
2,4-Dinitrophenol	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
2,4-Dinitrotoluene	NC	NC	NC	0.037	U	0.037	U	0.034	U	0.037	U	0.039	U	0.037	U	0.037	U	0.2	U	0.04	U	0.036	U	--		--		--		--		--		--	
2,6-Dinitrotoluene	NC	NC	NC	0.037	U	0.037	U	0.034	U	0.037	U	0.039	U	0.037	U	0.037	U	0.2	U	0.04	U	0.036	U	--		--		--		--		--		--	
2-Chloronaphthalene	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
2-Chlorophenol	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
2-Methylnaphthalene	NC	NC	NC	0.203		0.073	U	0.068	U	0.074	U	0.0883		0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
2-Methylphenol	0.33	100	0.33	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
2-Nitroaniline	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
2-Nitrophenol	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
3&4-Methylphenol	0.33	100	0.33	0.112		0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
3,3'-Dichlorobenzidine	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
3-Nitroaniline	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
4,6-Dinitro-2-methylphenol	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
4-Bromophenyl phenyl ether	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
4-Chloro-3-methyl phenol	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
4-Chloroaniline	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
4-Chlorophenyl phenyl ether	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
4-Nitroaniline	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
4-Nitrophenol	NC	NC	NC	0.37	U	0.37	U	0.34	U	0.37	U	0.39	U	0.37	U	0.37	U	2	U	0.4	U	0.36	U	--		--		--		--		--		--	
Acenaphthene	20	100	98	0.472		0.0168	J	0.034	U	0.0165	J	0.245		0.037	U	0.037	U	0.2	U	0.04	U	0.036	U	--		--		--		--		--		--	
Acenaphthylene	100	100	107	0.679		0.037	U	0.034	U	0.0401		0.0366	J	0.037	U	0.037	U	0.2	U	0.04	U	0.036	U	--		--		--		--		--		--	
Acetophenone	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
Aniline	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Anthracene	100	100	1000	2.48		0.0516		0.034	U	0.0689		0.425		0.037	U	0.037	U	0.2	U	0.04	U	0.0424		--		--		--		--		--		--	
Atrazine	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Benzaldehyde	NC	NC	NC	0.0294	J	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.0862	J	0.2	U	0.18	U	--		--		--		--		--		--	
Benzidine	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
Benzo(a)anthracene	1	1	1	**7.67**		0.146		0.034	U	0.276		0.648		0.037	U	0.037	U	0.2	U	0.04	U	0.165		--		--		--		--		--		--	
Benzo(a)pyrene	1	1	22	**6.98**		0.132		0.034	U	0.297		0.478		0.037	U	0.037	U	0.2	U	0.04	U	0.151		--		--		--		--		--		--	
Benzo(b)fluoranthene	1	1	1.7	**8.04**		0.145		0.034	U	0.359		0.634		0.037	U	0.037	U	0.2	U	0.04	U	0.201		--		--		--		--		--		--	
Benzo(g,h,i)perylene	100	100	1000	4.48		0.0969		0.034	U	0.195		0.257		0.037	U	0.037	U	0.2	U	0.04	U	0.0866		--		--		--		--		--		--	
Benzo(k)fluoranthene	0.8	3.9	1.7	**3.17**		0.0462		0.034	U	0.140		0.251		0.037	U	0.037	U	0.2	U	0.04	U	0.0719		--		--		--		--		--		--	
Benzoic acid	NC	NC	NC	0.75	U	0.73	U	0.68	U	0.74	U	0.78	U	0.73	U	0.74	U	4	U	0.8	U	0.71	U	--		--		--		--		--		--	
bis(2-Chloroethoxy)methane	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
bis(2-Chloroethyl)ether	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
bis(2-Chloroisopropyl)ether	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
bis(2-Ethylhexyl)phthalate	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.157		0.402		0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Butyl benzyl phthalate	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Caprolactam	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Carbazole	NC	NC	NC	0.469		0.073	U	0.068	U	0.0264	J	0.133		0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Chrysene	1	3.9	1	**7.52**		0.155		0.034	U	0.301		0.641		0.037	U	0.037	U	0.108	J	0.04	U	0.161		--		--		--		--		--		--	
Di-n-butyl phthalate	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.0915		0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Di-n-octyl phthalate	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Dibenzo(a,h)anthracene	0.33	0.33	1000	**1.19**		0.0249	J	0.034	U	0.0402		0.0786		0.037	U	0.037	U	0.2	U	0.04	U	0.0244	J	--		--		--		--		--		--	
Dibenzofuran	7	59	210	0.396		0.073	U	0.068	U	0.074	U	0.114		0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	0.0417	J	0.0217	J	0.0678	J	0.0271	J	0.071	U	0.074	U
Diethyl phthalate	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Dimethyl phthalate	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Fluoranthene	100	100	1000	16.4		0.266		0.034	U	0.546		1.65		0.037	U	0.037	U	0.221		0.04	U	0.294		--		--		--		--		--		--	
Fluorene	30	100	386	0.572		0.0198	J	0.034	U	0.0171	J	0.183		0.037	U	0.037	U	0.2	U	0.04	U	0.036	U	--		--		--		--		--		--	
Hexachlorobenzene	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Hexachlorobutadiene	NC	NC	NC	0.037	U	0.037	U	0.034	U	0.037	UJ	0.039	UJ	0.037	U	0.037	UJ	0.2	U	0.04	U	0.036	U	--		--		--		--		--		--	
Hexachlorocyclopentadiene	NC	NC	NC	0.37	U	0.37	U	0.34	U	0.37	U	0.39	U	0.37	U	0.37	U	2	U	0.4	U	0.36	U	--		--		--		--		--		--	
Hexachloroethane	NC	NC	NC	0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	**4.80**		0.0917		0.034	U	0.202		0.278		0.037	U	0.037	U	0.2	U	0.04	U	0.0978		--		--		--		--		--		--	
Isophorone	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
N-Nitrosodimethylamine	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
N-Nitroso-di-n-propylamine	NC	NC	NC	0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	

Table 3
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Semivolatile Organic Compounds

				SAMPLE NAME:		TRC-MW-2 (10-12)		TRC-MW-2 (48-50)		TRC-MW-3 (1-3)		TRC-MW-3 (12-16)		TRC-MW-3 (53-55)		TRC-DUP-1		TRC-SB-1 (1-3)		TRC-SB-1 (10-12)		TRC-SB-2 (0.5-1.5)		TRC-DSB-1 (12-14)		TRC-DSB-1 (18-20)		TRC-DSB-2 (10-15)		TRC-DSB-2 (18-20)		TRC-DSB-3 (10-15)		TRC-DSB-3 (18-20)	
				LABORATORY SAMPLE ID:	JC37095-1	JC37095-2		JC37095-3		JC37160-1		JC37160-2		JC37160-3		JC37160-4		JC37164-1		JC37164-2		JC37164-3		JC37164-4		JC37164-5		JC37164-6		JC37164-7		JC37164-8		JC37164-9	
				DATE SAMPLE COLLECTED:	2/13/2017	2/13/2017		2/13/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017	
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
N-Nitrosodiphenylamine	NC	NC	NC		0.19	U	0.18	U	0.17	U	0.19	U	0.19	U	0.18	U	0.18	U	0.99	U	0.2	U	0.18	U	--		--		--		--		--		--	
Naphthalene	12	100	12		0.572		0.037	U	0.034	U	0.037	U	0.101		0.037	U	0.037	U	0.219		0.04	U	0.036	U	--		--		--		--		--		--	
Nitrobenzene	NC	NC	NC		0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Pentachloronitrobenzene	NC	NC	NC		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
Pentachlorophenol	0.8	6.7	0.8		0.15	U	0.15	U	0.14	U	0.15	U	0.16	U	0.15	U	0.15	U	0.79	U	0.16	U	0.14	U	--		--		--		--		--		--	
Phenanthrene	100	100	1000		7.69		0.221		0.034	U	0.286		1.89		0.037	U	0.037	U	0.251		0.04	U	0.171		--		--		--		--		--		--	
Phenol	0.33	100	0.33		0.075	U	0.073	U	0.068	U	0.074	U	0.078	U	0.073	U	0.074	U	0.4	U	0.08	U	0.071	U	--		--		--		--		--		--	
Pyrene	100	100	1000		19.1		0.375		0.034	U	0.572		1.58		0.037	U	0.037	U	0.214		0.04	U	0.294		--		--		--		--		--		--	
Pyridine	NC	NC	NC		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
Total SVOC Compounds	NC		NC		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--		--		--		--	
Total TICs	NC	NC	NC		27.36	J	4.7	J	0.2	J	0.4	J	2.07	J	0.2	J	0.27	J	2.8	J	0.47	J	0.48	J	--		--		--		--		--		--	

Notes:
-- - Not analyzed
J - Estimated value
mg/kg - milligrams per kilogram
NC - No criterion
ND - Not detected
SCO - Soil Cleanup Objective
Shaded and **bold** results exceed Unrestricted Use, Restricted Residential Use, and/or Protection of Groundwater SCO.
TRC-DUP-1 is a duplicate of TRC-MW-3 (53-55)
U - Non-detect
R - The sample results are unusable because certain criteria were not met.
The analyte may or may not be present in the sample.

Table 4
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Dioxins and Furans

SAMPLE NAME:	GP-4 (1-3)		GP-5 (10-12)		TRC-MW-2 (1-3)		TRC-MW-3 (12-16)	
LABORATORY SAMPLE ID:	16L1355-05 / 17A1024-01		17A0088-03 / 17A1025-01		JC37095-1XA		JC37160-2XA	
DATE SAMPLE COLLECTED:	12/28/16		1/3/2017		2/13/2017		2/14/2017	
DIOXINS AND FURANS (ng/kg)	Result		Result		Result		Result	
1,2,3,4,6,7,8-HpCDD	0.420	J	29.00		20.1		79.6	
Total HpCDD	0.420	J	64.00		40.2		162	
1,2,3,4,6,7,8-HpCDF	0.073	U	8.00	J	19.1		8.34	
1,2,3,4,7,8,9-HpCDF	0.120	U	0.71	EMPC, J	0.765	EMPC, J	0.399	J
Total HpCDF	0.094	U	14.00		26.9		12.2	
1,2,3,4,7,8-HxCDD	0.084	U	0.41	J	0.805	EMPC, J	0.34	U
1,2,3,4,7,8-HxCDF	0.049	U	1.70	J	3.26		1.5	J
1,2,3,6,7,8-HxCDD	0.065	U	1.20	J	2.28	J	0.694	EMPC, J
1,2,3,6,7,8-HxCDF	0.036	U	1.2	J	3.22		1.52	J
1,2,3,7,8,9-HxCDD	0.073	U	0.82	J	1.71	J	0.631	EMPC, J
Total HxCDD	0.310	J	14.00		32.2		18.2	
1,2,3,7,8,9-HxCDF	0.057	U	0.29	J	0.183	J	0.247	U
1,2,3,7,8-PeCDD	0.042	U	0.41	J	1.24	J	0.435	EMPC, J
Total PeCDD	0.042	U	5.50		28.1		10.1	
1,2,3,7,8-PeCDF	0.048	U	0.74	J	2.26	J	0.993	J
2,3,4,6,7,8-HxCDF	0.039	U	1.50	J	4.57		1.62	J
Total HxCDF	0.045	U	18.00		46.6		18.1	
2,3,4,7,8-PeCDF	0.038	J	2.20	J	7.14		2.99	
Total PeCDF	0.100	J	28.00		69.7		28.6	
2,3,7,8-TCDD	0.078	U	0.12	J	0.436	J	0.137	U
Total TCDD	0.300	J	3.10		24.1		6.49	--
2,3,7,8-TCDF	0.064	U	1.20		3.34		1.17	
Total TCDF	0.064	U	16.00		71.9		30.4	
OCDD	45.000		680.00	J	1,170		12,000	J
OCDF	0.150	U	10.00		6.68		4.13	EMPC, J

Notes:

EMPC - Represents an estimated maximum possible concentration.
HpCDD - Heptachlorodibenzodioxin
HpCDF - Heptachlorodibenzofuran
HxCDD - Hexachlorodibenzodioxin
HxCDF - Hexachlorodibenzofuran
J - Estimated value
ng/kg - nanograms per kilogram
OCDD - Octachlorodibenzodioxin
OCDF - Octachlorodibenzofuran
PeCDD - Pentachlorodibenzodioxin
PeCDF - Pentachlorodibenzofuran
TCDD - Tetrachlorodibenzodioxin
TCDF - Tetrachlorodibenzofuran
U - Non-detect

Table 5
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Metals and Cyanide

			SAMPLE NAME:	GP-1 (1-3)		GP-1 (10-12)		GP-2 (1-3)		GP-2 (10-12)		GP-3 (1-3)		GP-3 (10-12)		GP-4 (1-3)		GP-4 (10-12)		GP-5 (1-3)		GP-5 (10-12)		GP-6 (1-3)		GP-6 (10-12)	
			LABORATORY SAMPLE ID:	16L1403-01		16L1403-02		16L1372-03		16L1372-04		16L1355-01		16L1355-02		16L1355-05		16L1355-06		17A0088-02		17A0088-03		17A0175-02		17A0175-03	
			DATE SAMPLE COLLECTED:	12/30/16		12/30/16		12/29/16		12/29/16		12/27/16		12/27/16		12/28/16		12/28/16		1/3/17		1/3/17		1/4/17		1/4/17	
METALS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
Antimony	NC	NC	NC	2.8	U	2.9	U	2.8	U	2.9	U	2.9	U	2.6	U	18		2.6	U	2.0	J	790		2.8	U	2.6	U
Arsenic	13	16	16	4.5		3.7		2.6	J	1.7	J	4.4		0.89	J	6.9		2.4	J	**21**		3.2		3.3		3.7	
Barium	350	400	820	60		45		35		39		40		33		97		28		58		61		47		48	
Beryllium	7.2	72	47	0.29		0.48		0.45		0.34		0.40		0.34		0.35		0.34		0.35		0.30		0.31		0.28	
Cadmium	2.5	4.3	7.5	0.52		0.29		0.28	U	0.16	J	0.21	J	0.26	U	0.73	U	0.26	U	0.89		1.7		1.4		0.46	
Chromium	30	180	NC	21		21		14		20		14		9.4		14		15		12		18		16		11	
Cobalt	NC	NC	NC	5.8		5.5		7.0		6.9		6.4		4.2		6.6		6.5		4.8		8.0		5.1		4.5	
Copper	50	270	1,720	**51**		29		14		17		**54**		8.7		**220**		24		31		**1,300**		**99**		29	
Lead	63	400	450	**210**	J	**77**	J	21		18		**150**	J	7.7	J	**430**	J	27	J	**76**		**1,200**		**120**		**72**	
Manganese	1,600	2,000	2,000	240		210		300		270		260		300		200		190		240		300		330		250	
Mercury	0.18	0.81	0.73	**1.5**	D	0.14		0.064		0.035		0.029		0.0084	J	**1.4**	D	0.0089	J	0.093		**0.53**		0.11		**0.42**	
Nickel	30	310	130	19		14		16		21		15		14		**69**		19		14		19		20		14	
Selenium	3.9	180	4	5.6	U	5.7	U	5.5	U	5.8	U	5.8	U	5.1	U	5.7	U	5.2	U	5.5	U	5.2	U	5.5	U	5.3	U
Silver	2	180	8.3	0.56	U	0.57	U	0.55	U	0.58	U	0.58	U	0.51	U	0.57	U	0.52	U	0.55	U	0.67		1.3		0.53	U
Thallium	NC	NC	NC	2.8	U	2.9	U	2.8	U	2.9	U	2.9	U	2.6	U	2.8	U	2.6	U	2.7	U	2.6	U	2.8	U	2.6	U
Vanadium	NC	NC	NC	25		19		20		21		21		13		19		21		23		24		21		16	
Zinc	109	10,000	2,480	**130**		94		59		73		**110**		27		**420**		52		83		**180**		**160**		60	
Chromium, Hexavalent	1	110	19	0.36	UD	0.16	J	0.15	J	0.16	J	0.18	U	0.17	U	0.35	U	0.18	U	0.26	W,J	0.84	W	0.90	W,U	0.35	U
Cyanide	27	27	40	0.57		0.47	J	0.56	U	0.49	U	0.53	U	0.48	U	0.53	U	0.54	U	1.1		0.43	J	1.6		0.35	J

Notes:
-- - Not analyzed
J - Estimated value
mg/kg - milligrams per kilogram
NC - No criterion
SCO - Soil Cleanup Objective
Shaded and **bold** results exceed Unrestricted Use, Restricted Residential Use, and/or Protection of Groundwater SCOs.
TRC-DUP-1 is a duplicate of TRC-MW-3 (53-55)
U - Non-detect
D - Dilution required
W - Elevated method reporting limit due to matrix interference.

Table 5
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Metals and Cyanide

				SAMPLE NAME:		TRC-MW-2 (1-3)		TRC-MW-2 (10-12)		TRC-MW-2 (48-50)		TRC-MW-3 (1-3)		TRC-MW-3 (12-16)		TRC-MW-3 (53-55)		TRC-DUP-1		TRC-SB-1 (1-3)		TRC-SB-1 (10-12)		TRC-SB-2 (0.5-1.5)		TRC-DSB-1 (12-14)		TRC-DSB-1 (18-20)		TRC-DSB-2 (10-15)		TRC-DSB-2 (18-20)		TRC-DSB-3 (10-15)		TRC-DSB-3 (18-20)	
				LABORATORY SAMPLE ID:		JC37095-1		JC37095-2		JC37095-3		JC37160-1		JC37160-2		JC37160-3		JC37160-4		JC37164-1		JC37164-2		JC37164-3		JC37164-4		JC37164-5		JC37164-6		JC37164-7		JC37164-8		JC37164-9	
				DATE SAMPLE COLLECTED:		2/13/2017		2/13/2017		2/13/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017	
METALS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO			Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
Antimony	NC	NC	NC			2.7		2.2	U	2.1	U	2.2	U	2.3	U	2.2	U	2.2	U	2.1	U	2.4	U	2.1	U	--		--		--		--		--		--	
Arsenic	13	16	16			6.4		3.7		4.0		6.7		8.7		3.4		3.0		10.4		2.7		4.3		--		--		--		--		--		--	
Barium	350	400	820			84.5		43.4		81.1		64.9		69.5		54.5		55.0		25.6		52.1		40.9		--		--		--		--		--		--	
Beryllium	7.2	72	47			0.35		0.48		0.36		0.49		0.60		0.48		0.48		0.38		0.59		0.44		--		--		--		--		--		--	
Cadmium	2.5	4.3	7.5			1.1		0.55	U	0.53	U	0.55	U	0.58	U	0.56	U	0.54	U	0.53	U	0.59	U	0.53	U	--		--		--		--		--		--	
Chromium	30	180	NC			12.8		18.5		14.3		19.7		20.4		15.2		16.1		11.0		17.7		17.9		--		--		--		--		--		--	
Cobalt	NC	NC	NC			7.8		5.7		5.3	U	6.2		12.8		5.6	U	5.4	U	5.3	U	5.9	U	8.1		--		--		--		--		--		--	
Copper	50	270	1,720			**215**		20.5		**122**		28.3		**186**		10.1		8.8		**59**		6.7		18.8		--		--		--		--		--		--	
Lead	63	400	450			**347**		33.8		8.8		**147**		**259**		7.7		7.4		**129**		8.9		**112**		**194**		**128**		**636**		**226**		17.0		**176**	
Manganese	1,600	2,000	2,000			274		262		232		274		324		260		247		142		73.7		299		--		--		--		--		--		--	
Mercury	0.18	0.81	0.73			**0.84**		0.035	U	0.035	U	**0.31**		0.14		0.035	U	0.033	U	**0.32**		0.039	U	0.036		--		--		--		--		--		--	
Nickel	30	310	130			20.5		17.8		7.7		22.3		25.2		12.3		11.8		13.3		20.5		24.5		--		--		--		--		--		--	
Selenium	3.9	180	4			2.3	U	2.2	U	2.1	U	2.2	U	2.3	U	2.2	U	2.2	U	2.1	U	2.4	U	2.1	U	--		--		--		--		--		--	
Silver	2	180	8.3			0.57	U	0.55	U	0.53	U	0.55	U	0.58	U	0.56	U	0.54	U	0.53	U	0.59	U	0.53	U	--		--		--		--		--		--	
Thallium	NC	NC	NC			1.1	U	1.1	U	1.1	U	1.1	U	1.2	U	1.1	U	1.1	U	1.1	U	1.2	U	1.1	U	--		--		--		--		--		--	
Vanadium	NC	NC	NC			20.6		21.9		28.5		34.5		30.6		22.5		24.3		12.6		21.7		24.8		--		--		--		--		--		--	
Zinc	109	10,000	2,480			**358**		51.5		42.2		**166**		**135**		30.1		29.6		**165**		60.6		66.9		--		--		--		--		--		--	
Chromium, Hexavalent	1	110	19			0.74	J	0.60	J	0.42	UJ	**4.6**		**2.6**		0.92		**1.2**		0.41	U	**1.1**		0.43	U	--		--		--		--		--		--	
Cyanide	27	27	40			--		--		--		--		--		--		--		--		--		--		--		--		--		--		--		--	

Notes:
-- - Not analyzed
J - Estimated value
mg/kg - milligrams per kilogram
NC - No criterion
SCO - Soil Cleanup Objective
Shaded and **bold** results exceed Unrestricted Use, Restricted Residential Use, and/or Protection of Groundwater SCOs.
TRC-DUP-1 is a duplicate of TRC-MW-3 (53-55)
U - Non-detect
D - Dilution required
W - Elevated method reporting limit due to matrix interference.

Table 6
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Hazardous Waste Characteristics

SAMPLE NAME:		GP-1 (1-3)		GP-2 (10-12)		GP-3 (1-3)		GP-4 (1-3)		GP-5 (1-3)		GP-5 (10-12)		GP-6 (1-3)		GP-6 (10-12)		TRC-MW-2 (1-3)	
LABORATORY SAMPLE ID:		17A0955-01		16L1372-04		17A0954-01		17A0954-02		17A0088-02		17A0959-01		17A0962-01		17A0175-03		JC37095-1R	
DATE SAMPLE COLLECTED:		12/30/2016		12/29/2016		12/27/2016		12/28/2016		1/3/2017		1/3/2017		1/4/2017		1/4/2017		2/13/2017	
PARAMETER (Units)	Limit	Result		Result		Result		Result		Result		Result		Result		Result		Result	
TCLP Lead	5 mg/L	0.27		--		0.11		2.7		--		**43**		0.033		--		0.50	U
Reactive Cyanide (mg/kg)	NC	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	--		--		4.0	U	--	
Reactive Sulfide (mg/kg)	NC	20	U	20	U	20	U	20	U	20	U	--		--		20	U	--	
Corrosivity as pH (SU)	<2 or >12.5	10		8.4		7.4		7.5		9.0	H	--		--		8.4		--	
Ignitability (Present/Absent)	Present	Absent		Absent		Absent		Absent		Absent		--		--		Absent		--	

Notes:
-- - Not analyzed
D - Dilution required
H - Sample analyzed outside of holding time.
mg/L - miligrams per liter
NC - No criterion
Shaded and **bold** results exceed TCLP Regulatory Level.
TCLP - Toxicity Characteristic Leaching Procedure
U - Non-detect

Table 6
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Hazardous Waste Characteristics

SAMPLE NAME:		TRC-MW-3 (1-3)		TRC-MW-3 (12-16)		TRC-SB-1 (1-3)		TRC-SB-2 (0.5-1.5)		TRC-DSB-1 (12-14)		TRC-DSB-1 (18-20)		TRC-DSB-2 (10-15)		TRC-DSB-2 (18-20)		TRC-DSB-3 (18-20)	
LABORATORY SAMPLE ID:		JC37160-1R		JC37160-2R		JC37164-1R		JC37164-3R		JC37164-4R		JC37164-5R		JC37164-6R		JC37164-7R		JC37164-9R	
DATE SAMPLE COLLECTED:		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017	
PARAMETER (Units)	Limit	Result		Result		Result		Result		Result		Result		Result		Result		Result	
TCLP Lead	5 mg/L	0.57	D	0.50	U	0.50	U	0.50	U	**13.9**		0.97		3.9		0.50	U	0.50	U
Reactive Cyanide (mg/kg)	NC	--		--		--		--		--		--		--		--		--	
Reactive Sulfide (mg/kg)	NC	--		--		--		--		--		--		--		--		--	
Corrosivity as pH (SU)	<2 or >12.5	--		--		--		--		--		--		--		--		--	
Ignitability (Present/Absent)	Present	--		--		--		--		--		--		--		--		--	

Notes:
-- - Not analyzed
D - Dilution required
H - Sample analyzed outside of holding time.
mg/L - miligrams per liter
NC - No criterion
Shaded and **bold** results exceed TCLP Regulatory Level.
TCLP - Toxicity Characteristic Leaching Procedure
U - Non-detect

Table 7
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Polychlorinated Biphenyls

			SAMPLE NAME:	GP-1 (1-3)		GP-1 (10-12)		GP-2 (1-3)		GP-2 (10-12)		GP-3 (1-3)		GP-3 (10-12)		GP-4 (1-3)		GP-4 (10-12)		GP-5 (1-3)		GP-5 (10-12)		GP-6 (1-3)		GP-6 (10-12)	
			LABORATORY SAMPLE ID:	16L1403-01		16L1403-02		16L1372-03		16L1372-04		16L1355-01		16L1355-02		16L1355-05		16L1355-06		17A0088-02		17A0088-03		17A0175-02		17A0175-03	
			DATE SAMPLE COLLECTED:	12/30/2016		12/30/2016		12/29/2016		12/29/2016		12/27/2016		12/27/2016		12/28/2016		12/28/2016		1/3/2017		1/3/2017		1/4/2017		1/4/2017	
POLYCHLORINATED BIPHENYLS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
Aroclor 1016	NC	NC	NC	0.023	U	0.023	U	0.023	U	0.024	U	0.023	U	0.021	U	0.023	U	0.023	U	0.022	U	0.021	U	0.023	U	0.022	U
Aroclor 1221	NC	NC	NC	0.023	U	0.023	U	0.023	U	0.024	U	0.023	U	0.021	U	0.023	U	0.023	U	0.022	U	0.021	U	0.023	U	0.022	U
Aroclor 1232	NC	NC	NC	0.023	U	0.023	U	0.023	U	0.024	U	0.023	U	0.021	U	0.023	U	0.023	U	0.022	U	0.021	U	0.023	U	0.022	U
Aroclor 1242	NC	NC	NC	0.023	U	0.023	U	0.023	U	0.024	U	0.023	U	0.021	U	0.023	U	0.023	U	0.022	U	0.021	U	0.023	U	0.022	U
Aroclor 1248	NC	NC	NC	0.023	U	0.023	U	0.023	U	0.024	U	0.023	U	0.021	U	0.023	U	0.023	U	0.022	U	0.021	U	0.023	U	0.022	U
Aroclor 1254	NC	NC	NC	0.023	U	0.023	U	0.023	U	0.024	U	0.023	U	0.021	U	0.023	U	0.023	U	0.022	U	0.021	U	0.020	J	0.022	U
Aroclor 1260	NC	NC	NC	0.023	U	0.023	U	0.023	U	0.024	U	0.023	U	0.021	U	0.023	U	0.023	U	0.022	U	0.021	U	0.037		0.022	U
Aroclor 1262	NC	NC	NC	0.023	U	0.023	U	0.023	U	0.024	U	0.023	U	0.021	U	0.023	U	0.023	U	0.022	U	0.021	U	0.023	U	0.022	U
Aroclor 1268	NC	NC	NC	0.023	U	0.023	U	0.023	U	0.024	U	0.023	U	0.021	U	0.023	U	0.023	U	0.022	U	0.021	U	0.023	U	0.022	U
Total PCBs	0.1	1	3.2	0.023	U	0.023	U	0.023	U	0.024	U	0.023	U	0.021	U	0.023	U	0.023	U	0.022	U	0.021	U	0.057	J	0.022	U

Notes:
J - Estimated value
mg/kg - milligrams per kilogram
NC - No criterion
SCO - Soil Cleanup Objective
Shaded and **bold** results exceed Unrestricted Use, Restricted Residential Use, and/or Protection of Groundwater SCOs.
TRC-DUP-1 is a duplicate of TRC-MW-3 (53-55)
U - Non-detect

Table 7
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Polychlorinated Biphenyls

			SAMPLE NAME:	TRC-MW-2 (1-		TRC-MW-2 (10-		TRC-MW-2 (48-		TRC-MW-3 (1-		TRC-MW-3 (12-		TRC-MW-3 (53-		TRC-DUP-1		TRC-SB-1 (1-3)		TRC-SB-1 (10-		TRC-SB-2 (0.5-	
			LABORATORY SAMPLE ID:	JC37095-1		JC37095-2		JC37095-3		JC37160-1		JC37160-2		JC37160-3		JC37160-4		JC37164-1		JC37164-2		JC37164-3	
			DATE SAMPLE COLLECTED:	2/13/2017		2/13/2017		2/13/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017	
POLYCHLORINATED BIPHENYLS (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
Aroclor 1016	NC	NC	NC	0.038	U	0.037	U	0.034	U	0.036	U	0.038	U	0.036	U	0.036	U	0.030	U	0.039	U	0.033	U
Aroclor 1221	NC	NC	NC	0.038	U	0.037	U	0.034	U	0.036	U	0.038	U	0.036	U	0.036	U	0.030	U	0.039	U	0.033	U
Aroclor 1232	NC	NC	NC	0.038	U	0.037	U	0.034	U	0.036	U	0.038	U	0.036	U	0.036	U	0.030	U	0.039	U	0.033	U
Aroclor 1242	NC	NC	NC	0.038	U	0.037	U	0.034	U	0.036	U	0.038	U	0.036	U	0.036	U	0.030	U	0.039	U	0.033	U
Aroclor 1248	NC	NC	NC	0.038	U	0.037	U	0.034	U	0.036	U	0.038	U	0.036	U	0.036	U	0.030	U	0.039	U	0.033	U
Aroclor 1254	NC	NC	NC	0.038	U	0.037	U	0.034	U	0.036	U	0.038	U	0.036	U	0.036	U	0.030	U	0.039	U	0.033	U
Aroclor 1260	NC	NC	NC	0.038	U	0.037	U	0.034	U	0.0265	J	0.038	U	0.036	U	0.036	U	0.030	U	0.039	U	0.033	U
Aroclor 1262	NC	NC	NC	0.038	U	0.037	U	0.034	U	0.036	U	0.038	U	0.036	U	0.036	U	0.030	U	0.039	U	0.033	U
Aroclor 1268	NC	NC	NC	0.038	U	0.037	U	0.034	U	0.036	U	0.038	U	0.036	U	0.036	U	0.030	U	0.039	U	0.033	U
Total PCBs	0.1	1	3.2	0.038	U	0.037	U	0.034	U	0.0265	J	0.038	U	0.036	U	0.036	U	0.030	U	0.039	U	0.033	U

Notes:
J - Estimated value
mg/kg - milligrams per kilogram
NC - No criterion
SCO - Soil Cleanup Objective
Shaded and **bold** results exceed Unrestricted Use, Restricted Residential Use, and/or Protection of Groundwater SCOs.
TRC-DUP-1 is a duplicate of TRC-MW-3 (53-55)
U - Non-detect

Table 8
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Pesticides and Herbicides

			SAMPLE NAME:	GP-1 (1-3)		GP-1 (10-12)		GP-2 (1-3)		GP-2 (10-12)		GP-3 (1-3)		GP-3 (10-12)		GP-4 (1-3)		GP-4 (10-12)		GP-5 (1-3)		GP-5 (10-12)		GP-6 (1-3)		GP-6 (10-12)	
			LABORATORY SAMPLE ID:	16L1403-01		16L1403-02		16L1372-03		16L1372-04		16L1355-01		16L1355-02		16L1355-05		16L1355-06		17A0088-02		17A0088-03		17A0175-02		17A0175-03	
			DATE SAMPLE COLLECTED:	12/30/2016		12/30/2016		12/29/2016		12/29/2016		12/27/2016		12/27/2016		12/28/2016		12/28/2016		1/3/2017		1/3/2017		1/4/2017		1/4/2017	
PESTICIDES (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
4,4'-DDD	0.0033	13	14	0.00087	J	0.0012	U	0.0012	U	0.0012	U	0.0012	U	0.0011	U	0.011	U	0.0011	U	**0.0064**		0.0011	U	0.0011	U	0.011	U
4,4'-DDE	0.0033	8.9	17	0.00056	J	0.0012	U	0.0012	U	0.0012	U	0.0012	U	0.0011	U	0.011	U	0.0011	U	**0.012**		0.0011	U	**0.0062**	J	0.011	U
4,4'-DDT	0.0033	7.9	136	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.0012	U	0.0011	U	0.011	U	0.0011	U	**0.064**		0.0011	U	**0.014**		0.0015	J
Alachlor	NC	NC	NC	0.023	U	0.023	U	0.023	U	0.024	U	0.023	U	0.021	U	0.23	U	0.023	U	0.022	U	0.021	U	0.023	U	0.23	U
Aldrin	0.005	0.097	0.19	0.0023	U	0.0023	U	0.0023	U	0.0024	U	0.0023	U	0.0021	U	0.023	U	0.0023	U	0.0022	U	0.0021	U	0.0023	U	0.023	U
alpha-BHC	0.02	0.48	0.02	0.0057	U	0.0058	U	0.0058	U	0.0059	U	0.0058	U	0.0054	U	0.057	U	0.0057	U	0.0055	U	0.0053	U	0.0057	U	0.055	U
alpha-Chlordane	0.094	NC	2.9	0.023	U	0.023	U	0.023	U	0.024	U	0.086		0.021	U	0.23	U	0.023	U	0.0076	J	0.013	U	0.013	J	0.013	J
beta-BHC	0.036	0.36	0.09	0.0057	U	0.0058	U	0.0058	U	0.0059	U	0.0058	U	0.0054	U	0.057	U	0.0057	U	0.0055	U	0.0053	U	0.0057	U	0.055	U
delta-BHC	0.04	100	0.25	0.0057	U	0.0058	U	0.0058	U	0.0059	U	0.0058	U	0.0054	U	0.057	U	0.0057	U	0.0055	U	0.0053	U	0.0057	UJ	0.0055	UJ
Dieldrin	0.005	0.2	0.1	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.0012	U	0.0011	U	0.011	U	0.0011	U	0.00044	J	0.0011	U	0.0011	U	0.0011	U
Endosulfan sulfate	2.4	24	1,000	0.0090	U	0.0093	U	0.0092	U	0.0095	U	0.0093	U	0.0086	U	0.091	U	0.0091	U	0.0088	U	0.0086	U	0.0091	U	0.0088	U
Endosulfan-I	2.4	24	102	0.0057	U	0.0058	U	0.0058	U	0.0059	U	0.0058	U	0.0054	U	0.057	U	0.0057	U	0.0055	U	0.0053	U	0.0057	U	0.0055	U
Endosulfan-II	2.4	24	102	0.00035	J	0.0093	U	0.0092	U	0.0095	U	0.0093	U	0.0086	U	0.0099	J	0.0091	U	0.0088	U	0.0086	U	0.0091	U	0.0088	U
Endrin	0.014	11	0.06	0.0090	U	0.0093	U	0.0092	U	0.0095	U	0.0093	U	0.0086	U	0.091	U	0.0091	U	0.0088	U	0.0086	U	0.0091	U	0.0088	U
Endrin aldehyde	NC	NC	NC	0.0090	U	0.0093	U	0.0092	U	0.0095	U	0.0093	U	0.0086	U	0.091	U	0.0091	U	0.0088	U	0.0086	U	0.0091	U	0.0088	U
Endrin ketone	NC	NC	NC	0.0090	U	0.0093	U	0.0092	U	0.0095	U	0.0093	U	0.0086	U	0.091	U	0.0091	U	0.0088	U	0.0086	U	0.0091	U	0.0088	U
gamma-BHC (Lindane)	0.1	1.3	NC	0.0023	U	0.0023	U	0.0023	U	0.0024	U	0.0023	U	0.0021	U	0.023	U	0.0023	U	0.0022	U	0.0021	U	0.0023	U	0.0023	U
gamma-Chlordane	NC	NC	NC	--		--		--		--		--		--		--		--		--		--		--		--	
Heptachlor	0.042	2.1	0.38	0.0057	U	0.0058	U	0.0058	U	0.0059	U	0.0058	U	0.0054	U	0.057	U	0.0057	U	0.0055	U	0.0053	U	0.0057	U	0.0055	U
Heptachlor epoxide	NC	NC	NC	0.0057	U	0.0058	U	0.0058	U	0.0059	U	0.0058	U	0.0054	U	0.057	U	0.0057	U	0.0055	U	0.0053	U	0.0057	U	0.0055	U
Hexachlorobenzene	NC	NC	NC	0.0068	U	0.0070	U	0.0069	U	0.0071	U	0.0070	U	0.0064	U	0.068	U	0.0068	U	0.00081	J	0.0064	U	0.0038	J	0.0066	U
Methoxychlor	NC	NC	NC	0.057	U	0.058	U	0.058	U	0.059	U	0.058	U	0.054	U	0.57	U	0.057	U	0.055	U	0.053	U	0.057	U	0.055	U
Toxaphene	NC	NC	NC	0.11	U	0.12	U	0.12	U	0.12	U	0.12	U	0.11	U	1.1	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U
HERBICIDES (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
2,4,5-T	NC	NC	NC	0.0028	U	0.029	U	0.0029	U	0.003	U	0.0029	U	0.0027	U	0.0028	U	0.0028	U	0.0027	U	0.0026	U	0.0029	U	0.0027	U
2,4,5-TP (Silvex)	3.8	8.9	3.8	0.0028	U	0.029	U	0.0011	J	0.003	U	0.0029	U	0.0027	U	0.0028	U	0.0028	U	0.0027	U	0.0026	U	0.0029	U	0.0027	U
2,4-D	NC	NC	NC	0.028	U	0.29	U	0.029	U	0.03	U	0.029	U	0.027	U	0.028	U	0.028	U	0.027	U	0.026	U	0.029	U	0.027	U
2,4-DB	NC	NC	NC	0.028	U	0.29	U	0.029	U	0.03	U	0.029	U	0.027	U	0.028	U	0.028	U	0.027	U	0.026	U	0.029	U	0.027	U
Dalapon	NC	NC	NC	0.071	U	0.720	U	0.072	U	0.074	U	0.072	U	0.067	U	0.07	U	0.07	U	0.068	U	0.066	U	0.071	U	0.068	U
Dicamba	NC	NC	NC	0.0028	U	0.029	U	0.0029	U	0.003	U	0.0029	U	0.0027	U	0.0028	U	0.0028	U	0.0027	U	0.0026	U	0.00064	J	0.00052	J
Dichloroprop	NC	NC	NC	0.028	U	0.290	U	0.029	U	0.03	U	0.029	U	0.027	U	0.028	U	0.028	U	0.027	U	0.026	U	0.029	U	0.027	U
Dinoseb	NC	NC	NC	0.014	U	0.140	U	0.014	U	0.015	U	0.014	U	0.013	U	0.014	U	0.014	U	0.014	U	0.013	U	0.014	U	0.014	U
MCPA	NC	NC	NC	3.9	J	29	U	2.9	U	3	U	2.9	U	2.7	U	2.8	U	2.8	U	2.7	U	2.6	U	2.9	U	2.7	U
MCPP	NC	NC	NC	2.8	U	29	U	2.9	U	3	U	2.9	U	2.7	U	2.8	U	2.8	U	2.7	U	2.6	U	2.9	U	2.7	U

Notes:
-- - Not analyzed
J - Estimated value
mg/kg - milligrams per kilogram
NC - No criterion
SCO - Soil Cleanup Objective
Shaded and **bold** results exceed Unrestricted Use, Restricted Residential Use, and/or Protection of Groundwater SCO.
TRC-DUP-1 is a duplicate of TRC-MW-3 (53-55)
U - Non-detect

Table 8
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Pesticides and Herbicides

			SAMPLE NAME:	TRC-MW-2 (1-3)		TRC-MW-2 (10-12)		TRC-MW-2 (48-50)		TRC-MW-3 (1-3)		TRC-MW-3 (12-16)		TRC-MW-3 (53-55)		TRC-DUP-1		TRC-SB-1 (1-3)		TRC-SB-1 (10-12)		TRC-SB-2 (0.5-1.5)	
			LABORATORY SAMPLE ID:	JC37095-1		JC37095-2		JC37095-3		JC37160-1		JC37160-2		JC37160-3		JC37160-4		JC37164-1		JC37164-2		JC37164-3	
			DATE SAMPLE COLLECTED:	2/13/2017		2/13/2017		2/13/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017		2/14/2017	
PESTICIDES (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
4,4'-DDD	0.0033	13	14	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
4,4'-DDE	0.0033	8.9	17	0.00076	U	0.00074	U	0.00069	U	**0.0040**		0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
4,4'-DDT	0.0033	7.9	136	0.00076	U	0.00074	U	0.00069	U	**0.0084**	J	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
Alachlor	NC	NC	NC	--		--		--		--		--		--		--		--		--		--	
Aldrin	0.005	0.097	0.19	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
alpha-BHC	0.02	0.48	0.02	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
alpha-Chlordane	0.094	NC	2.9	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
beta-BHC	0.036	0.36	0.09	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
delta-BHC	0.04	100	0.25	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
Dieldrin	0.005	0.2	0.1	0.00076	U	0.00074	U	0.00069	U	0.0018		0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
Endosulfan sulfate	2.4	24	1,000	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
Endosulfan-I	2.4	24	102	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
Endosulfan-II	2.4	24	102	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
Endrin	0.014	11	0.06	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
Endrin aldehyde	NC	NC	NC	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
Endrin ketone	NC	NC	NC	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
gamma-BHC (Lindane)	0.1	1.3	NC	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
gamma-Chlordane	NC	NC	NC	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
Heptachlor	0.042	2.1	0.38	0.00076	U	0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
Heptachlor epoxide	NC	NC	NC	0.0017		0.00074	U	0.00069	U	0.00071	U	0.00076	U	0.00072	U	0.00071	U	0.0021	U	0.00078	U	0.00065	U
Hexachlorobenzene	NC	NC	NC	--		--		--		--		--		--		--		--		--		--	
Methoxychlor	NC	NC	NC	0.0015	U	0.0015	U	0.0014	U	0.0014	U	0.0015	U	0.0014	U	0.0014	U	0.0041	U	0.0016	U	0.0013	U
Toxaphene	NC	NC	NC	0.019	U	0.019	U	0.017	U	0.018	U	0.019	U	0.018	U	0.018	U	0.051	U	0.019	U	0.016	U
HERBICIDES (mg/kg)	Unrestricted Use SCO	Restricted Residential Use SCO	Protection of Groundwater SCO	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
2,4,5-T	NC	NC	NC	--		--		--		--		--		--		--		--		--		--	
2,4,5-TP (Silvex)	3.8	8.9	3.8	0.0072	U	0.0036	U	0.0032	U	0.0037	U	0.0038	U	0.0035	U	0.0035	U	0.0033	U	0.0040	U	0.0035	U
2,4-D	NC	NC	NC	--		--		--		--		--		--		--		--		--		--	
2,4-DB	NC	NC	NC	--		--		--		--		--		--		--		--		--		--	
Dalapon	NC	NC	NC	--		--		--		--		--		--		--		--		--		--	
Dicamba	NC	NC	NC	--		--		--		--		--		--		--		--		--		--	
Dichloroprop	NC	NC	NC	--		--		--		--		--		--		--		--		--		--	
Dinoseb	NC	NC	NC	--		--		--		--		--		--		--		--		--		--	
MCPA	NC	NC	NC	--		--		--		--		--		--		--		--		--		--	
MCPP	NC	NC	NC	--		--		--		--		--		--		--		--		--		--	

Notes:
-- - Not analyzed
J - Estimated value
mg/kg - milligrams per kilogram
NC - No criterion
SCO - Soil Cleanup Objective
Shaded and **bold** results exceed Unrestricted Use, Restricted Residential Use, and/or Protection of Groundwater SCO.
TRC-DUP-1 is a duplicate of TRC-MW-3 (53-55)
U - Non-detect

Table 9
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Soil for Total Petroleum Hydrocarbons

SAMPLE NAME:	GP-1 (1-3)		GP-2 (10-12)		GP-3 (1-3)		GP-4 (1-3)		GP-5 (1-3)		GP-6 (10-12)	
LABORATORY SAMPLE ID:	16L1403-01		16L1372-04		16L1355-01		16L1355-05		17A0088-02		17A0175-03	
DATE SAMPLE COLLECTED:	12/30/16		12/29/16		12/27/16		12/28/16		1/3/17		1/4/17	
TOTAL PETROLEUM HYDROCARBONS (mg/kg)	Result		Result		Result		Result		Result		Result	
Gasoline Range Organics (GRO)	1.3	U	1.1	U	1.4	U	1.2	U	1.2	U	0.93	U
Diesel Range Organics (DRO)	91		15		38		690	D	32		16	

Notes:

mg/kg - milligrams per kilogram

U - Non-detect

D - Dilution required

Table 10
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Groundwater for Volatile Organic Compounds

SAMPLE NAME:		GW-1		GW-2		GW-3		GW-4		GW-5		GW-6		TRC-MW1		TRC-MW1		TRC-DUP1		TRC-MW2		TRC-MW2		TRC-MW3	
LABORATORY SAMPLE ID (Con-Test):		17A0088-04		16L1372-05		16L1355-03		16L1372-02		17A0175-01		17A0238-02		--		--		--		--		--		--	
LABORATORY SAMPLE ID (SGS Accutest):		--		--		--		--		--		--		JC37566-1		JC38746-1		JC38746-5		JC37566-2		JC38746-4		JC37566-3	
LABORATORY SAMPLE ID (Phoenix Environmental Laboratories,		--		--		--		--		--		--		BX73059		--		--		BX73060		--		BX73061	
DATE SAMPLE COLLECTED:		1/3/2017		12/29/2016		12/28/2016		12/29/2016		1/4/2017		1/5/2017		2/21/2017		3/10/2017		3/10/2017		2/21/2017		3/10/2017		2/21/2017	
VOLATILE ORGANIC COMPOUNDS (µg/L)	Class GA Value	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
1,1,1,2-Tetrachloroethane	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	--		--		--		--		--		--	
1,1,1-Trichloroethane	5	1.0	U	1.0	U	1.4		0.78	J	1.4		2.0	U	1.0	U	1.0	U	1.0	U	0.49	J	0.36	J	**6.6**	
1,1,2,2-Tetrachloroethane	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2-Trichloroethane	1	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethane	5	1.0	U	1.0	U	1.0	U	0.28	J	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.35	J
1,1-Dichloroethene	5	1.0	U	1.0	U	1.3		0.23	J	1.4		2.0	U	1.0	U	1.0	U	1.0	U	0.48	J	0.26	J	2.3	
1,1-Dichloropropene	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	4.0	U	--		--		--		--		--		--	
1,2,3-Trichlorobenzene	5	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2,3-Trichloropropane	0.04	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	4.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,2,4-Trichlorobenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2,4-Trimethylbenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,2-Dibromo-3-chloropropane	0.04	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,2-Dibromoethane	0.0006	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichlorobenzene	3	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethane	0.6	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloropropane	1	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3,5-Trichlorobenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	--		--		--		--		--		--	
1,3,5-Trimethylbenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,3-Dichlorobenzene	3	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-Dichloropropane	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	--		--		--		--		--		--	
1,4-Dichlorobenzene	3	0.15	J	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,4-Dioxane	NC	50	U	50	U	50	U	50	U	50	U	100	UJ	--		--		--		--		--		--	
2,2-Dichloropropane	5	1.0	U	1.0	U	1.0	UJ	1	U	1.0	U	2.0	U	--		--		--		--		--		--	
2-Butanone (MEK)	50	20	U	20	U	20.0	U	20	U	20	U	40	U	2.8	J	10	U	10	U	10	U	10	U	10	U
2-Chlorotoluene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	--		--		--		--		--		--	
2-Hexanone	50	10	U	10	U	10.0	U	10	U	10	U	20	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorotoluene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	--		--		--		--		--		--	
4-Methyl-2-pentanone(MIBK)	NC	10	U	10	U	10	U	10	U	10	U	20	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acetone	50	50	U	17	J	50	U	9.6	J	11	J	15	J	10	U	10	U	10	U	10	U	10	U	10	U
Acrylonitrile	5	5.0	U	5	U	5	U	5	U	5	U	10	U	--		--		--		--		--		--	
Benzene	1	1.0	U	0.14	J	0.21	J	0.2	J	0.87	J	2.0	U	0.21	J	0.5	U	0.5	U	0.50	U	0.50	U	0.50	U
Bromobenzene	5	1.0	U	1.0	U	1.0	U	1	U	1.0	U	2.0	U	--		--		--		--		--		--	
Bromochloromethane	5	1.0	UJ	1.0	U	1.0	U	1	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromodichloromethane	50	0.41	J	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromoform	50	1.0	U	1.0	U	1.0	U	1	U	1.0	U	2.0	UJ	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromomethane	5	2.0	UJ	2.0	UJ	2.0	U	2	UJ	2.0	U	4.0	UJ	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Carbon disulfide	60	4.0	U	4.0	U	4.0	U	4	U	4.0	U	8.0	U	2.0	U	0.37	J	2.0	U	2.0	U	2.0	U	2.0	U
Carbon tetrachloride	5	5.0	U	5.0	U	5.0	U	5	U	5.0	U	10.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chlorobenzene	5	1.0	U	1.0	U	1.0	U	1	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloroethane	5	2.0	U	2.0	U	2.0	U	2	U	2.0	U	4.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloroform	7	5.4		0.52	J	**9.3**		**10**		**8.4**		**8.8**		**9.4**		3.9		3.6		**25.9**		**20.8**		**8.1**	
Chloromethane	5	2.0	U	2.0	U	2.0	U	2.0	U	0.9	J	4.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
cis-1,2-Dichloroethene	5	1.0	U	1.0	U	1.0	U	1.0	U	0.58	J	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
cis-1,3-Dichloropropene	0.4[2]	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Cyclohexane	NC	--		--		--		--		--		--		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibromochloromethane (Freon 12)	50	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dibromomethane	5	1.0	U	1.0	U	1.0	U	1.0	U	1	U	2.0	U	--		--		--		--		--		--	
Dichlorodifluoromethane	5	2.0	U	2.0	U	2.0	U	2.0	U	2	U	4.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Diethyl Ether	NC	2.0	U	2.0	U	2.0	U	2.0	U	2	U	4.0	U	--		--		--		--		--		--	
Diisopropyl Ether (DIPE)	NC	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	--		--		--		--		--		--	
Ethylbenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2-Trichlorotrifluoroethane (Freon 113)	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobutadiene	0.5	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	1.2	U	--		--		--		--		--		--	
Isopropylbenzene	5	1	U	1.0	U	1.0	U	1	U	1.0	U	2	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
m,p-Xylene	5[1]	2	U	2.0	U	2.0	U	2	U	2.0	U	4	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Methyl acetate	NC	1	U	1.0	U	1.0	U	1	U	1.0	U	2	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Methyl tert-butyl ether	10	**130**		1.0	U	5.8		**2,200**		1.0	U	**100**		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Methylcyclohexane	NC	1	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Methylene chloride	5	5	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
n-Butylbenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
n-Propylbenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U

Table 10
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Groundwater for Volatile Organic Compounds

SAMPLE NAME:		GW-1		GW-2		GW-3		GW-4		GW-5		GW-6		TRC-MW1		TRC-MW1		TRC-DUP1		TRC-MW2		TRC-MW2		TRC-MW3	
LABORATORY SAMPLE ID (Con-Test):		17A0088-04		16L1372-05		16L1355-03		16L1372-02		17A0175-01		17A0238-02		--		--		--		--		--		--	
LABORATORY SAMPLE ID (SGS Accutest):		--		--		--		--		--		--		JC37566-1		JC38746-1		JC38746-5		JC37566-2		JC38746-4		JC37566-3	
LABORATORY SAMPLE ID (Phoenix Environmental Laboratories,		--		--		--		--		--		--		BX73059		--		--		BX73060		--		BX73061	
DATE SAMPLE COLLECTED:		1/3/2017		12/29/2016		12/28/2016		12/29/2016		1/4/2017		1/5/2017		2/21/2017		3/10/2017		3/10/2017		2/21/2017		3/10/2017		2/21/2017	
VOLATILE ORGANIC COMPOUNDS (µg/L)	Class GA Value	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
Naphthalene	10	2.0	U	0.29	J	2.0	U	7.9		2.0	U	4.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
o-Xylene	5[(1)]	1.0	U	1.0	U	1.0	U	0.15	J	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
p-Isopropyltoluene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
sec-Butylbenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Styrene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
tert-Amyl Methyl Ether (TAME)	NC	0.32	J	0.5	UJ	0.5	U	3.8	J	0.5	UJ	1.0	U	--		--		--		--		--		--	
tert-Butyl Alcohol (TBA)	NC	20	U	3.6	J	20	U	250		20	UJ	40	U	--		--		--		--		--		--	
tert-Butyl Ethyl Ether (TBEE)	NC	0.5	U	0.5	U	0.5	U	0.43		0.5	U	1.0	U	--		--		--		--		--		--	
tert-Butylbenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Tetrachloroethene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Tetrahydrofuran	50	10	U	10	U	10	U	10	U	10	U	20.0	U	--		--		--		--		--		--	
Toluene	5	1.0	U	0.22	J	0.24	J	0.45	J	**9.1**		2.0	U	0.23	J	1.0	U	1.0	U	0.97	J	0.75	J	1.0	U
trans-1,2-Dichloroethene	5	1.0	U	1.0	U	1.0	U	1	U	1	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,3-Dichloropropene	0.4[(2)]	0.5	U	0.5	U	0.5	UJ	0.5	UJ	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,4-Dichloro-2-butene	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	4.0	U	--		--		--		--		--		--	
Trichloroethene	5	1.0	U	1.0	U	0.28	J	1.0	U	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichlorofluoromethane	5	2.0	U	2.0	UJ	2.0	U	2.0	U	2.0	UJ	4.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Vinyl chloride	2	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	4.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Xylenes (total)	5[(1)]	--		--		--		--		--		--		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Total TICs	NC	ND		5.0	J	ND		ND		ND		35.4	J	ND		7.4	J	6.2	J	ND		8.5	J	ND	
Formaldehyde	8	50	U	**2,700**		**55**		50	U	**66**		**1,400**		**84**		--		--		50	U	--		50	U

Notes:

[(1)] - There is no Class GA Value for total xylenes. The standards for o-xylene, m-xylene, and p-xylene is 5 µg/L.

[(2)] - 0.4 µg/L applies to the sum of cis- and trans-1,3-dichloropropene.

-- - Not analyzed
µg/L - micrograms per liter
J - Estimated Value
NA - Not analyzed
NC - No criterion
ND - Not detected
Shaded and **bold** results exceed Class GA Standards/Guidance Values.
TICs - Tentatively Identified Compounds
TRC-DUP1 (collected 2/21/2017) is a duplicate of TRC-MW4
TRC-DUP1 (collected 3/10/2017) is a duplicate of TRC-MW1
U - Non-detect

Table 10
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Groundwater for Volatile Organic Compounds

SAMPLE NAME:		TRC-MW3		TRC-MW4		TRC-DUP1		TRC-MW4		EQUIPMENT BLANK		TRIP BLANK		TRIP BLANK		TRIP BLANK		TRIP BLANK		TRIP BLANK		TRIP BLANK		TRIP BLANK	
LABORATORY SAMPLE ID (Con-Test):		--		--		--		--		--		16L1355-04		16L1372-01		17A0088-01		17A0175-01		17A0175-01		--		--	
LABORATORY SAMPLE ID (SGS Accutest):		JC38746-3		JC37566-4		JC37566-5		JC38746-2		JC37566-6		--		--		--		--		--		JC37566-7		JC38746-6	
LABORATORY SAMPLE ID (Phoenix Environmental Laboratories,		--		BX73062		BX73063		--		BX73064		--		--		--		--		--		--		--	
DATE SAMPLE COLLECTED:		3/10/2017		2/21/2017		2/21/2017		3/10/2017		2/21/2017		12/28/2016		12/29/2016		1/3/2017		1/4/2017		1/4/2017		2/21/2017		3/10/2017	
VOLATILE ORGANIC COMPOUNDS (µg/L)	Class GA Value	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
1,1,1,2-Tetrachloroethane	5	--		--		--		--		--		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	--		--	
1,1,1-Trichloroethane	5	**7.9**		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U
1,1,2-Trichloroethane	1	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethane	5	0.46	J	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethene	5	3.2		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloropropene	5	--		--		--		--		--		2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	--		--	
1,2,3-Trichlorobenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	1.0	U	1.0	U
1,2,3-Trichloropropane	0.04	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,2,4-Trichlorobenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2,4-Trimethylbenzene	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U
1,2-Dibromo-3-chloropropane	0.04	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	2.0	U	2.0	U
1,2-Dibromoethane	0.0006	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichlorobenzene	3	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethane	0.6	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloropropane	1	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3,5-Trichlorobenzene	5	--		--		--		--		--		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	--		--	
1,3,5-Trimethylbenzene	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U
1,3-Dichlorobenzene	3	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-Dichloropropane	5	--		--		--		--		--		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	--		--	
1,4-Dichlorobenzene	3	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,4-Dioxane	NC	--		--		--		--		--		50	U	50	U	50	U	50	U	50	U	--		--	
2,2-Dichloropropane	5	--		--		--		--		--		1.0	UJ	1.0	U	1.0	U	1.0	U	1.0	U	--		--	
2-Butanone (MEK)	50	10	U	10	U	10	U	10	U	10	U	20	U	20	U	20	U	20	U	20	U	10	U	10	U
2-Chlorotoluene	5	--		--		--		--		--		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	--		--	
2-Hexanone	50	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10	U	10	U	10	U	10	U	10	U	5.0	U	5.0	U
4-Chlorotoluene	5	--		--		--		--		--		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	--		--	
4-Methyl-2-pentanone(MIBK)	NC	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10	U	10	U	10	U	10	U	10	U	5.0	U	5.0	U
Acetone	50	10	U	10	U	10	U	10	U	10	U	6.3	J	50	U	50	U	50	U	50	U	10	U	10	U
Acrylonitrile	5	--		--		--		--		--		5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	--		--	
Benzene	1	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.50	U	0.50	U
Bromobenzene	5	--		--		--		--		--		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	--		--	
Bromochloromethane	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromodichloromethane	50	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	1.0	U	1.0	U
Bromoform	50	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromomethane	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	UJ	2.0	UJ	2.0	UJ	2.0	UJ	2.0	U	2.0	U
Carbon disulfide	60	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	2.0	U	2.0	U
Carbon tetrachloride	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	1.0	U	1.0	U
Chlorobenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloroethane	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	1.0	U	1.0	U
Chloroform	7	4.6		0.88	J	0.89	J	0.73	J	1.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	1.0	U	1.0	U
Chloromethane	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	1.0	U	1.0	U
cis-1,2-Dichloroethene	5	1.0	U	**7.4**		**7.9**		**6.4**		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
cis-1,3-Dichloropropene	0.4[2]	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U
Cyclohexane	NC	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	--		--		--		--		--		5.0	U	5.0	U
Dibromochloromethane (Freon 12)	50	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U
Dibromomethane	5	--		--		--		--		--		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	--		--	
Dichlorodifluoromethane	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Diethyl Ether	NC	--		--		--		--		--		2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	--		--	
Diisopropyl Ether (DIPE)	NC	--		--		--		--		--		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	--		--	
Ethylbenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2-Trichlorotrifluoroethane (Freon 113)	5	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	5.0	U	5.0	U
Hexachlorobutadiene	0.5	--		--		--		--		--		0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	--		--	
Isopropylbenzene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1	U	1	U	1	U	1	U	1	U	1.0	U	1.0	U
m,p-Xylene	5[1]	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2	U	2	U	2	U	2	U	2	U	1.0	U	1.0	U
Methyl acetate	NC	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	1	U	1	U	1	U	1	U	1	U	5.0	U	5.0	U
Methyl tert-butyl ether	10	1.0	U	1.2		1.3		1.1		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Methylcyclohexane	NC	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	1	U	1	U	1	U	1	U	1	U	5.0	U	5.0	U
Methylene chloride	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	5	U	5	U	5	U	5	U	5	U	2.0	U	2.0	U
n-Butylbenzene	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U
n-Propylbenzene	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U

Table 10
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Groundwater for Volatile Organic Compounds

SAMPLE NAME:		TRC-MW3		TRC-MW4		TRC-DUP1		TRC-MW4		EQUIPMENT BLANK		TRIP BLANK		TRIP BLANK		TRIP BLANK		TRIP BLANK		TRIP BLANK		TRIP BLANK		TRIP BLANK	
LABORATORY SAMPLE ID (Con-Test):		--		--		--		--		--		16L1355-04		16L1372-01		17A0088-01		17A0175-01		17A0175-01		--		--	
LABORATORY SAMPLE ID (SGS Accutest):		JC38746-3		JC37566-4		JC37566-5		JC38746-2		JC37566-6		--		--		--		--		--		JC37566-7		JC38746-6	
LABORATORY SAMPLE ID (Phoenix Environmental Laboratories,		--		BX73062		BX73063		--		BX73064		--		--		--		--		--		--		--	
DATE SAMPLE COLLECTED:		3/10/2017		2/21/2017		2/21/2017		3/10/2017		2/21/2017		12/28/2016		12/29/2016		1/3/2017		1/4/2017		1/4/2017		2/21/2017		3/10/2017	
VOLATILE ORGANIC COMPOUNDS (µg/L)	Class GA Value	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
Naphthalene	10	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	5.0	U	5.0	U
o-Xylene	5[(1)]	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
p-Isopropyltoluene	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U
sec-Butylbenzene	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U
Styrene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
tert-Amyl Methyl Ether (TAME)	NC	--		--		--		--		--		0.50	U	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ	--		--	
tert-Butyl Alcohol (TBA)	NC	--		--		--		--		--		20	U	20	U	20	U	20	U	20	U	--		--	
tert-Butyl Ethyl Ether (TBEE)	NC	--		--		--		--		--		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	--		--	
tert-Butylbenzene	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U
Tetrachloroethene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Tetrahydrofuran	50	--		--		--		--		--		10	U	10	U	10	U	10	U	10	U	--		--	
Toluene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,2-Dichloroethene	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,3-Dichloropropene	0.4[(2)]	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U
trans-1,4-Dichloro-2-butene	5	--		--		--		--		--		2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	--		--	
Trichloroethene	5	1.0	U	1.7		1.7		1.5		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichlorofluoromethane	5	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	UJ	2.0	UJ	2.0	U	2.0	U
Vinyl chloride	2	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	1.0	U	1.0	U
Xylenes (total)	5[(1)]	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	--		--		--		--		--		1.0	U	1.0	U
Total TICs	NC	7.6	J	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Formaldehyde	8	--		50	U	50	U	--		50	U	NA		NA		NA		NA		NA		NA		NA	

Notes:

[(1)] - There is no Class GA Value for total xylenes. The standards for o-xylene, m-xylene, and p-xylene is 5 µg/L.

[(2)] - 0.4 µg/L applies to the sum of cis- and trans-1,3-dichloropropene.

-- - Not analyzed
µg/L - micrograms per liter
J - Estimated Value
NA - Not analyzed
NC - No criterion
ND - Not detected
Shaded and **bold** results exceed Class GA Standards/Guidance Values.
TICs - Tentatively Identified Compounds
TRC-DUP1 (collected 2/21/2017) is a duplicate of TRC-MW4
TRC-DUP1 (collected 3/10/2017) is a duplicate of TRC-MW1
U - Non-detect

Table 11
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Groundwater for Semivolatile Organic Compounds

		SAMPLE NAME:		GW-1		GW-2		GW-3		GW-4	
		LABORATORY SAMPLE ID:		17A0088-04		16L1372-05		16L1355-03		16L1372-02	
		DATE SAMPLE COLLECTED:		1/3/2017		12/29/2016		12/28/2016		12/29/2016	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/L)	Class GA Value		Result		Result		Result		Result		
1,2,4,5-Tetrachlorobenzene	5		10	U	10	U	10	U	10	U	
1,2,4-Trichlorobenzene	5		5	U	5.2	U	5	U	5	U	
1,2-Dichlorobenzene	3		5	U	5.2	U	5	U	5	U	
1,2-Diphenylhydrazine	NC		10	U	10	U	10	U	10	U	
1,3-Dichlorobenzene	3		5	U	5.2	U	5	U	5	U	
1,4-Dichlorobenzene	3		5	U	5.2	U	5	U	5	U	
1-Methylnaphthalene	NC		5	U	5.2	U	5	U	1.9	J	
2,4,5-Trichlorophenol	NC		10	U	10	U	10	U	10	U	
2,4,6-Trichlorophenol	NC		10	U	10	U	10	U	10	U	
2,4-Dichlorophenol	5		10	U	10	U	10	U	10	U	
2,4-Dimethylphenol	50		10	UJ	10	U	10	U	10	U	
2,4-Dinitrophenol	10		10	U	10	U	10	U	10	U	
2,4-Dinitrotoluene	5		10	U	10	U	10	U	10	U	
2,6-Dinitrotoluene	5		10	U	10	U	10	U	10	U	
2-Chloronaphthalene	10		10	U	10	U	10	U	10	U	
2-Chlorophenol	1		10	U	10	U	10	U	10	U	
2-Methylnaphthalene	NC		5	U	5.2	U	5	U	2.2	J	
2-Methylphenol	1		10	U	10	U	10	U	10	U	
2-Nitroaniline	5		10	U	10	U	10	U	10	U	
2-Nitrophenol	1		10	U	10	U	10	U	10	U	
3,3-Dichlorobenzidine	5		10	U	10	U	10	U	10	U	
3+4-Methylphenols	1		10	U	10	U	10	U	10	U	
3-Nitroaniline	5		10	U	10	U	10	U	10	U	
4,6-Dinitro-2-methylphenol	1		10	U	10	U	10	U	10	U	
4-Bromophenyl-phenylether	NC		2	U	10	U	10	U	10	U	
4-Chloro-3-methylphenol	1		10	U	10	U	10	U	10	U	
4-Chloroaniline	5		10	UJ	10	U	10	U	10	U	
4-Chlorophenylphenyl ether	NC		10	U	10	U	10	U	10	U	
4-Nitroaniline	5		10	U	10	U	10	U	10	U	
4-Nitrophenol	1		10	U	10	U	10	U	10	U	
Acenaphthene	20		5	U	5.2	U	5	U	5	U	
Acenaphthylene	NC		5	U	5.2	U	5	U	5	U	
Acetophenone	NC		10	U	10	U	10	U	10	U	
Aniline	5		5	UJ	5.2	U	5	U	5	U	
Anthracene	50		5	U	5.2	U	5	U	5	U	
Benzidine	NC			R	21	UJ	20	UJ	20	UJ	
Benzo(a)anthracene	0.002		5	U	5.2	U	5	U	5	U	
Benzo(a)pyrene	ND		5	U	5.2	U	5	U	5	U	
Benzo(b)fluoranthene	0.002		5	U	5.2	U	5	U	5	U	
Benzo(g,h,i)perylene	NC		5	U	5.2	U	5	U	5	U	
Benzo(k)fluoranthene	0.002		5	U	5.2	U	5	U	5	U	
Benzoic Acid	NC		5	UJ	10	U	10	U	10	U	
Bis(2-chloroethoxy)methane	5		10	U	10	U	10	U	10	U	
Bis(2-chloroethyl)ether	1		10	U	10	U	10	U	10	U	
Bis(2-chloroisopropyl)ether	NC		10	U	10	UJ	10	U	10	UJ	
Bis(2-ethylhexyl)phthalate (BEHP)	5		10	U	10	U	10	U	10	U	
Butylbenzylphthalate	50		10	U	10	U	10	U	10	U	
Carbazole	NC		10	U	10	U	10	U	10	U	
Chrysene	0.002		5	U	5.2	U	5	U	5	U	
Dibenzo(a,h)anthracene	NC		5	U	5.2	U	5	U	5	U	
Dibenzofuran	NC		5	U	5.2	U	5	U	5	U	
Diethylphthalate	50		10	U	10	U	10	U	10	U	
Dimethylphthalate	50		10	U	10	U	10	U	10	U	
Di-n-butylphthalate	50		10	U	10	U	10	U	10	U	
Di-n-octyl phthalate	50		10	U	10	U	10	U	10	U	
Fluoranthene	50		5	U	5.2	U	5	U	5	U	
Fluorene	50		5	U	5.2	U	5	U	5	U	
Hexachlorobenzene	0.04		10	U	10	U	10	U	10	U	
Hexachlorobutadiene	0.5		10	UJ	10	U	10	U	10	U	
Hexachlorocyclopentadiene	5		10	U	10	U	10	U	10	U	
Hexachloroethane	5		10	UJ	10	U	10	UJ	10	U	
Indeno(1,2,3-cd)pyrene	0.002		5	U	5.2	U	5	U	5	U	
Isophorone	50		10	U	9.2	J	10	U	7.2	J	
Naphthalene	10		5	U	5.2	U	5	U	7.7		
Nitrobenzene	0.4		10	U	10	UJ	10	U	10	UJ	
N-Nitrosodimethylamine	NC		10	UJ	10	UJ	10	U	10	UJ	
N-Nitroso-di-n-propylamine	NC		10	U	10	UJ	10	U	10	UJ	
N-Nitrosodiphenylamine	50		10	U	10	U	10	U	10	U	
Pentachloronitrobenzene	NC		10	U	10	U	10	U	10	U	
Pentachlorophenol	1		10	U	10	U	10	U	10	U	
Phenanthrene	50		5	U	5.2	U	5	U	8.7		
Phenol	1		10	U	10	U	10	U	10	U	
Pyrene	50		5	U	5.2	U	5	U	3.9	J	
Pyridine	NC		5	U	5.2	U	5	U	5	U	
Total TICs	NC		0		0		29.1		13.5		
Total Semivolatile Compounds	NC		0		9.2		0		31.6		

Notes:
µg/L - micrograms per liter
J - Estimated value
NC - No criterion

R - The sample results are unusable because certain criteria were not met. The analyte may or may not be present in the sample.

TICs - Tentatively Identified Compounds

U - Non-detect

Shaded and **bold** results exceed Class GA Standards/Guidance Values.

Table 11
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Groundwater for Semivolatile Organic Compounds

	SAMPLE NAME:	GW-5		GW-6	
	LABORATORY SAMPLE ID:	17A0175-04		17A0238-02	
	DATE SAMPLE COLLECTED:	1/4/2017		1/5/2017	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/L)	Class GA Value	Result		Result	
1,2,4,5-Tetrachlorobenzene	5	10	U	11	U
1,2,4-Trichlorobenzene	5	5	U	5.4	U
1,2-Dichlorobenzene	3	5	U	5.4	UJ
1,2-Diphenylhydrazine	NC	10	U	11	U
1,3-Dichlorobenzene	3	5	U	5.4	U
1,4-Dichlorobenzene	3	5	U	5.4	U
1-Methylnaphthalene	NC	5	U	5.4	U
2,4,5-Trichlorophenol	NC	10	U	11	U
2,4,6-Trichlorophenol	NC	10	U	11	U
2,4-Dichlorophenol	5	10	U	11	U
2,4-Dimethylphenol	50	10	U	11	U
2,4-Dinitrophenol	10	10	U	11	U
2,4-Dinitrotoluene	5	10	U	11	U
2,6-Dinitrotoluene	5	10	U	11	U
2-Chloronaphthalene	10	10	U	11	U
2-Chlorophenol	1	10	U	11	U
2-Methylnaphthalene	NC	5	U	5.4	U
2-Methylphenol	1	10	U	11	U
2-Nitroaniline	5	10	U	11	U
2-Nitrophenol	1	10	U	11	U
3,3-Dichlorobenzidine	5	10	U	11	U
3+4-Methylphenols	1	10	U	11	U
3-Nitroaniline	5	10	U	11	U
4,6-Dinitro-2-methylphenol	1	10	U	11	U
4-Bromophenyl-phenylether	NC	10	U	11	U
4-Chloro-3-methylphenol	1	10	U	11	UJ
4-Chloroaniline	5	10	UJ	11	U
4-Chlorophenylphenyl ether	NC	10	U	11	U
4-Nitroaniline	5	10	U	11	U
4-Nitrophenol	1	10	U	11	U
Acenaphthene	20	5	U	5.4	U
Acenaphthylene	NC	5	U	5.4	U
Acetophenone	NC	10	U	11	U
Aniline	5	5	UJ	5.4	U
Anthracene	50	5	U	5.4	U
Benzidine	NC	20	UJ	22	UJ
Benzo(a)anthracene	0.002	**3.7**	J	5.4	U
Benzo(a)pyrene	ND	5	U	5.4	U
Benzo(b)fluoranthene	0.002	5	U	5.4	U
Benzo(g,h,i)perylene	NC	5	U	5.4	U
Benzo(k)fluoranthene	0.002	5	U	5.4	U
Benzoic Acid	NC	10	UJ	11	U
Bis(2-chloroethoxy)methane	5	10	U	11	U
Bis(2-chloroethyl)ether	1	10	U	11	U
Bis(2-chloroisopropyl)ether	NC	10	U	11	U
Bis(2-ethylhexyl)phthalate (BEHP)	5	**10**		**6.7**	J
Butylbenzylphthalate	50	10	U	11	U
Carbazole	NC	10	U	11	U
Chrysene	0.002	**3.4**	J	5.4	U
Dibenzo(a,h)anthracene	NC	5	U	5.4	U
Dibenzofuran	NC	5	U	5.4	U
Diethylphthalate	50	10	U	11	U
Dimethylphthalate	50	10	U	11	U
Di-n-butylphthalate	50	10	U	11	U
Di-n-octyl phthalate	50	10	U	11	U
Fluoranthene	50	8.2		5.4	U
Fluorene	50	5	U	5.4	U
Hexachlorobenzene	0.04	10	U	11	U
Hexachlorobutadiene	0.5	10	U	11	UJ
Hexachlorocyclopentadiene	5	10	U	11	U
Hexachloroethane	5	10	U	11	UJ
Indeno(1,2,3-cd)pyrene	0.002	5	U	5.4	U
Isophorone	50	7	J	9.2	U
Naphthalene	10	5	U	5.4	U
Nitrobenzene	0.4	10	U	11	UJ
N-Nitrosodimethylamine	NC	10	U	11	UJ
N-Nitroso-di-n-propylamine	NC	10	UJ	11	U
N-Nitrosodiphenylamine	50	10	U	11	U
Pentachloronitrobenzene	NC	10	U	11	U
Pentachlorophenol	1	10	U	11	U
Phenanthrene	50	5.6	U	5.4	U
Phenol	1	10	U	11	U
Pyrene	50	6.8		3.4	J
Pyridine	NC	5	U	5.4	U
Total TICs	NC	93.6		317	
Total Semivolatile Compounds	NC	44.7		19.3	

Notes:
µg/L - micrograms per liter
J - Estimated value
NC - No criterion

R - The sample results are unusable because certain criteria were not met. The analyte may or may not be present in the sample.

TICs - Tentatively Identified Compounds

U - Non-detect

Shaded and **bold** results exceed Class GA Standards/Guidance Values.

Table 12
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Groundwater for Metals

		SAMPLE NAME:	GW-1		GW-1		GW-2		GW-2		GW-3	
		LABORATORY SAMPLE ID:	17A0088-04		17A0088-04		16L1372-02		16L1372-02		16L1355-03	
		DATE SAMPLE COLLECTED:	1/3/2017		1/3/2017		12/29/2016		12/29/2016		12/28/2016	
		SAMPLE PREPARATION:	UNFILTERED		FILTERED		UNFILTERED		FILTERED		UNFILTERED	
METALS (mg/L)	Class GA Value		Result		Result		Result		Result		Result	
Antimony	0.003		0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Arsenic	0.025		0.019		0.015		**0.058**		0.015		0.011	
Barium	1		0.34		0.26		**4.8**		0.12		0.27	
Beryllium	0.003		0.004	U	0.004	U	**0.078**		0.004	U	0.004	U
Cadmium	0.005		0.0024	J	0.0029	J	**0.036**		0.004	U	0.004	U
Chromium	0.05		0.032		0.01	U	**0.84**		0.01	U	**0.063**	
Cobalt	NC		0.024	J	0.014	J	0.66		0.05	U	0.05	U
Copper	0.2		0.035		0.0093	J	**2.1**		0.0062	J	0.0051	J
Lead	0.025		**0.032**		0.01	U	**1.7**		0.01	U	0.01	U
Manganese	0.3		**20**		**19**		**76**		**1.0**		**0.55**	
Mercury	0.0007		0.000066	J	0.0001	U	0.00052		0.000046	J	0.000032	J
Nickel	0.1		0.059		0.038		**1.3**		0.004	J	0.033	
Selenium	0.01		0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Silver	0.05		0.005	U	0.0050		0.005	U	0.005	U	0.005	U
Thallium	0.0005		0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Vanadium	NC		0.041		0.015		0.91		0.0092	J	0.0062	J
Zinc	2		0.096		0.019	J	**4.4**		0.0044	J	0.012	J

Notes:
mg/L - milligrams per liter
NC - No criterion
J - Estimated value
Shaded and **bold** results exceed Class GA Standards/Guidance Values.
U - Non-detect

Table 12
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Groundwater for Metals

	SAMPLE NAME:	GW-3		GW-4		GW-4		GW-5		GW-5	
	LABORATORY SAMPLE ID:	16L1355-03		16L1372-02		16L1372-02		17A0175-04		17A0175-04	
	DATE SAMPLE COLLECTED:	12/28/2016		12/29/2016		12/29/2016		1/4/2017		1/4/2017	
	SAMPLE PREPARATION:	FILTERED		UNFILTERED		FILTERED		UNFILTERED		FILTERED	
METALS (mg/L)	Class GA Value	Result		Result		Result		Result		Result	
Antimony	0.003	**0.047**	J	0.05	U	0.05	U	0.05	U	0.05	U
Arsenic	0.025	0.020		**0.030**		0.012		0.01	U	0.01	U
Barium	1	0.23		**1.6**		0.13		**1.3**		0.16	
Beryllium	0.003	0.004	U	**0.0063**		0.004	U	0.004	U	0.004	U
Cadmium	0.005	0.004	U	0.0027	J	0.0027	J	0.0021	J	0.004	U
Chromium	0.05	0.01	U	**0.30**		0.01	U	**0.26**		0.01	U
Cobalt	NC	0.05	U	0.13		0.018	J	0.14		0.05	U
Copper	0.2	0.0042	J	**0.36**		0.0063	J	**1.5**		0.0088	J
Lead	0.025	0.01	U	**0.31**		0.01	U	**1.5**		0.01	U
Manganese	0.3	**0.40**		**11**		**7.0**		**11**		**2.5**	
Mercury	0.0007	0.000042	J	0.00021		0.000044	J	**0.0024**		0.0001	U
Nickel	0.1	0.01	U	**0.24**		0.054		**0.37**		0.019	
Selenium	0.01	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Silver	0.05	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U
Thallium	0.0005	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Vanadium	NC	0.010		0.29		0.0096	J	0.12		0.01	U
Zinc	2	0.02	U	1.3		0.033		0.76		0.0055	J

Notes:
mg/L - milligrams per liter
NC - No criterion
J - Estimated value
Shaded and **bold** results exceed Class GA Standards/Guidance Values.
U - Non-detect

Table 12
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Groundwater for Metals

SAMPLE NAME:		GW-6		GW-6	
LABORATORY SAMPLE ID:		17A0238-02		17A0238-02	
DATE SAMPLE COLLECTED:		1/5/2017		1/5/2017	
SAMPLE PREPARATION:		UNFILTERED		FILTERED	
METALS (mg/L)	Class GA Value	Result		Result	
Antimony	0.003	0.05	U	0.05	U
Arsenic	0.025	**0.076**		0.0093	
Barium	1	**6.8**		0.034	
Beryllium	0.003	**0.030**		0.004	U
Cadmium	0.005	**0.039**		0.004	U
Chromium	0.05	**0.63**		0.01	U
Cobalt	NC	0.63		0.05	U
Copper	0.2	**2.5**		0.0020	U
Lead	0.025	**2.3**		0.01	U
Manganese	0.3	**74**		**0.34**	
Mercury	0.0007	**0.0045**		0.0001	U
Nickel	0.1	**1.3**		0.01	U
Selenium	0.01	0.05	U	0.05	U
Silver	0.05	0.005	U	0.005	U
Thallium	0.0005	0.05	U	0.05	U
Vanadium	NC	0.33		0.01	U
Zinc	2	**4.3**		0.020	U

Notes:
mg/L - milligrams per liter
NC - No criterion
J - Estimated value
Shaded and **bold** results exceed Class GA Standards/Guidance Values.
U - Non-detect

Table 13
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Results of Analysis of Groundwater for Polychlorinated Biphenyls

SAMPLE NAME:		GW-1		GW-2		GW-3		GW-4		GW-5		GW-6	
LABORATORY SAMPLE ID:		17A0088-04		16L1372-02		16L1355-03		16L1372-02		17A0175-04		17A0238-02	
DATE SAMPLE COLLECTED:		1/3/2017		12/29/2016		12/28/2016		12/29/2016		1/4/2017		1/5/2017	
POLYCHLORINATED BIPHENYLS (µg/L)	Class GA Value	Result		Result		Result		Result		Result		Result	
Aroclor-1016	NC	0.040	UJ	0.048	UJ	0.040	U	0.040	UJ	0.040	UJ	0.040	U
Aroclor-1221	NC	0.040	UJ	0.048	UJ	0.040	U	0.040	UJ	0.040	UJ	0.040	U
Aroclor-1232	NC	0.040	UJ	0.048	UJ	0.040	U	0.040	UJ	0.040	UJ	0.040	U
Aroclor-1242	NC	0.040	UJ	0.048	UJ	0.040	U	0.040	UJ	0.040	UJ	0.040	U
Aroclor-1248	NC	0.040	UJ	0.048	UJ	0.040	U	0.040	UJ	0.040	UJ	0.040	U
Aroclor-1254	NC	0.040	UJ	0.048	UJ	0.040	U	0.040	UJ	0.040	UJ	0.040	U
Aroclor-1260	NC	0.040	UJ	0.048	UJ	0.040	U	0.040	UJ	0.040	UJ	0.040	U
Aroclor-1262	NC	0.040	UJ	0.048	UJ	0.040	U	0.040	UJ	0.040	UJ	0.040	U
Aroclor-1268	NC	0.040	UJ	0.048	UJ	0.040	U	0.040	UJ	0.040	UJ	0.040	U
Total PCBs	0.09	0.040	UJ	0.048	UJ	0.040	U	0.040	UJ	0.040	UJ	0.040	U

Notes:
µg/L - micrograms per liter
J - Estimated value
NC - No criterion
U - Non-detect

Table 14
Remediation Schedule

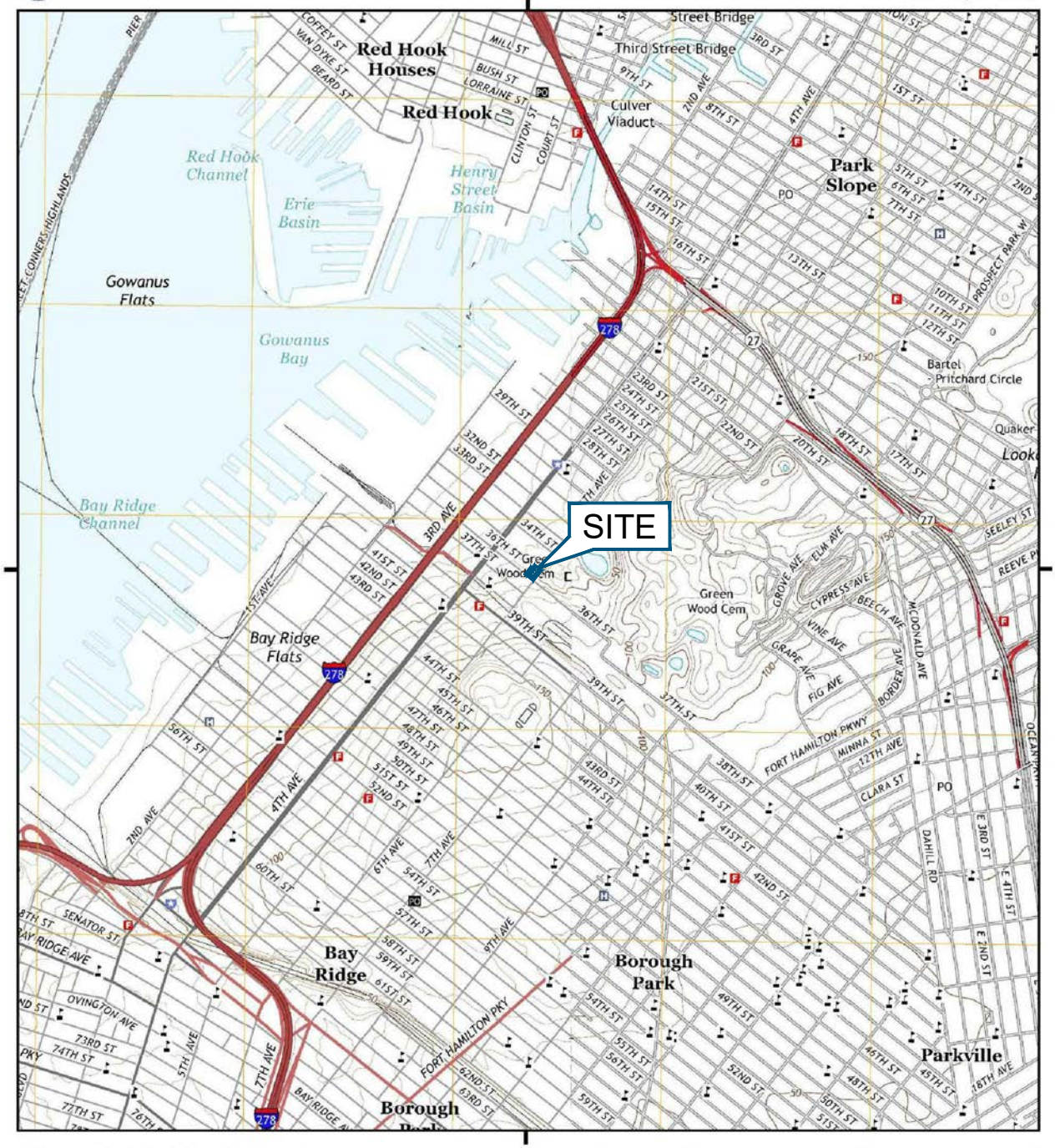
Schedule Milestone	Estimated Completion Date
NYSDEC Approval of RAWP	June 2018
Excavate and Remove Lead Hot Spot and UST	November 2018
Complete Remedial Action Activities (Up to Start-up Testing for SSDS)	May 2021
Submit Final Engineering Report/ Site Management Plan	June 2021
Certificate of Completion	August 2021
School Opening	September 2021

FIGURES

EDR

Historical Topo Map

2013, 2014



This report includes information from the following map sheet(s).

TP, Jersey City, 2014, 7.5-minute
NE, Brooklyn, 2013, 7.5-minute

NW N NE
W E
SW S SE

0 Miles 0.25 0.5 1 1.5

SITE NAME: 840 5th Avenue
ADDRESS: 840 5th Avenue
Brooklyn, NY 11232

N

TRC
1430 Broadway
10th Floor
New York, NY 10018
Phone: 212.221.7822

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

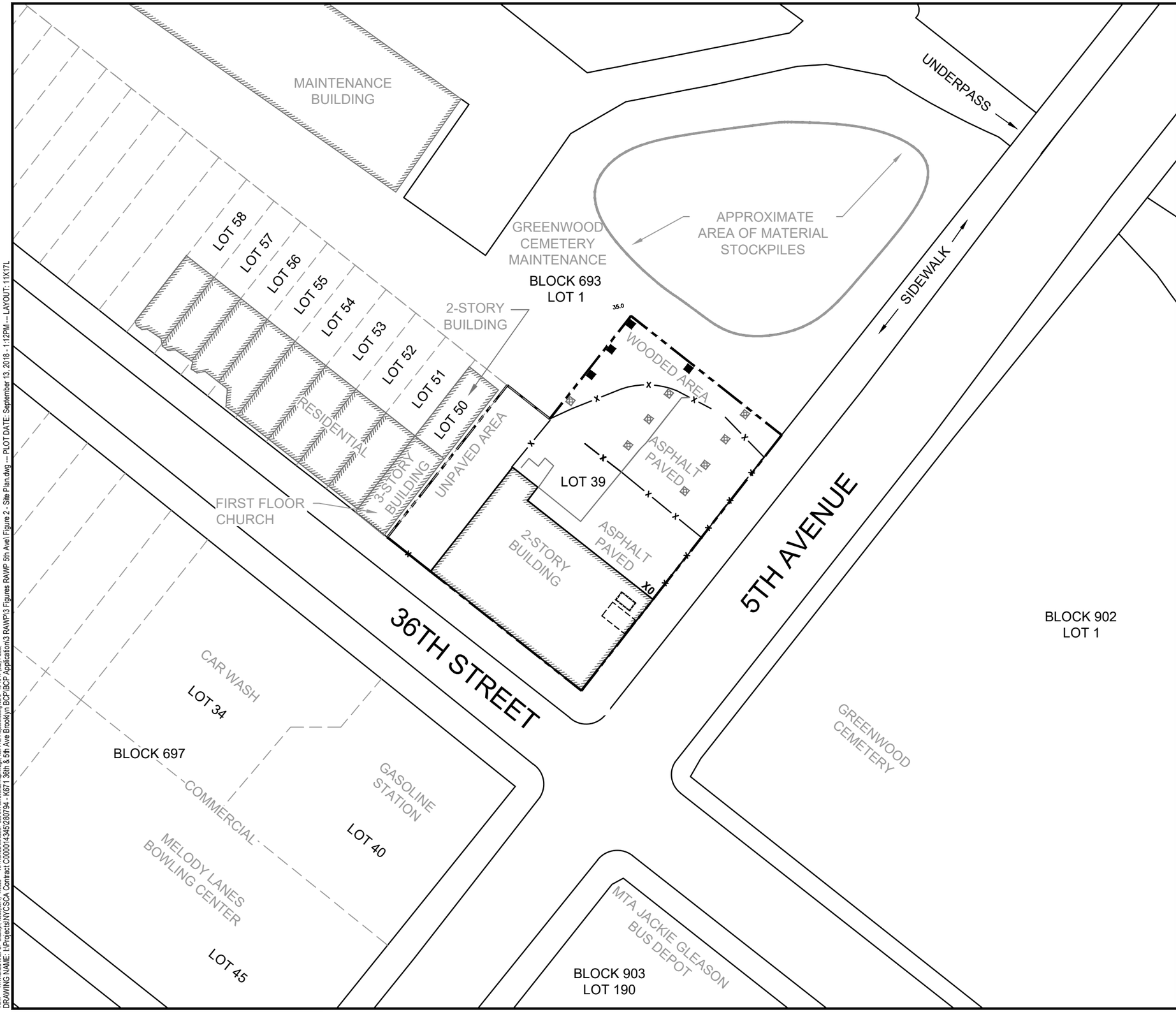
TITLE:

SITE LOCATION MAP

DRAWN BY:	H. DELGADO
CHECKED BY:	D. SCHMIDT
APPROVED BY:	D. GLASS
DATE:	SEPTEMBER 2018
PROJ. NO.:	280794
FILE:	Figure 1 - Site Location Map.dwg

FIGURE 1

8.5x11 --- ATTACHED XREFS: --- ATTACHED IMAGES: --- EDR 2013-14 Hist. Topo. Map:
DRAWING NAME: I:\Projects\NYCSCA Contract C000014345\280794 - K671 36th & 5th Ave Brooklyn BCP\BCP Application\3 RAWP\3 Figures RAWP 5th Ave\ Figure 1 - Site Location Map.dwg --- PLOT DATE: September 13, 2018 - 12:59PM --- LAYOUT: 8.5x11P



LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- X 0 — FILL/VENT LINE
- SUSPECT 1,500-GALLON UST
- BOILER ROOM
- 45.0 — GROUND SURFACE ELEVATION CONTOUR (5' INTERVAL)
- EXPOSED CONCRETE PIER (SITE SURVEY - SEE NOTE 3)
- APPROXIMATE BURIED PIER LOCATION (HISTORICAL PHOTOGRAPHY - SEE NOTE 4)

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. UST = UNDERGROUND STORAGE TANK
3. LOCATION OF EXPOSED PIERS RELATED TO HISTORIC ELEVATED TRAIN TRACKS BASED ON DRAWING TITLED "TOPOGRAPHICAL SURVEY MAP" BY EWELL W. FINLEY, P.C. CONSULTING ENGINEERS & SURVEYORS DATED SEPTEMBER 20, 2017.
4. LOCATION OF BURIED HISTORIC PIERS ARE ESTIMATED BASED ON AERIAL PHOTOGRAPHY FROM 1951. HTTP://MAPS.NYC.GOV/DOITT/NYCCITYMAP

SOURCE:
BLOCK AND LOT BOUNDARIES FROM
WWW.PROPERTYSHARK.COM

0 50' 100'

SCALE: 1" = 50'
SHEET SIZE: 11" BY 17"

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

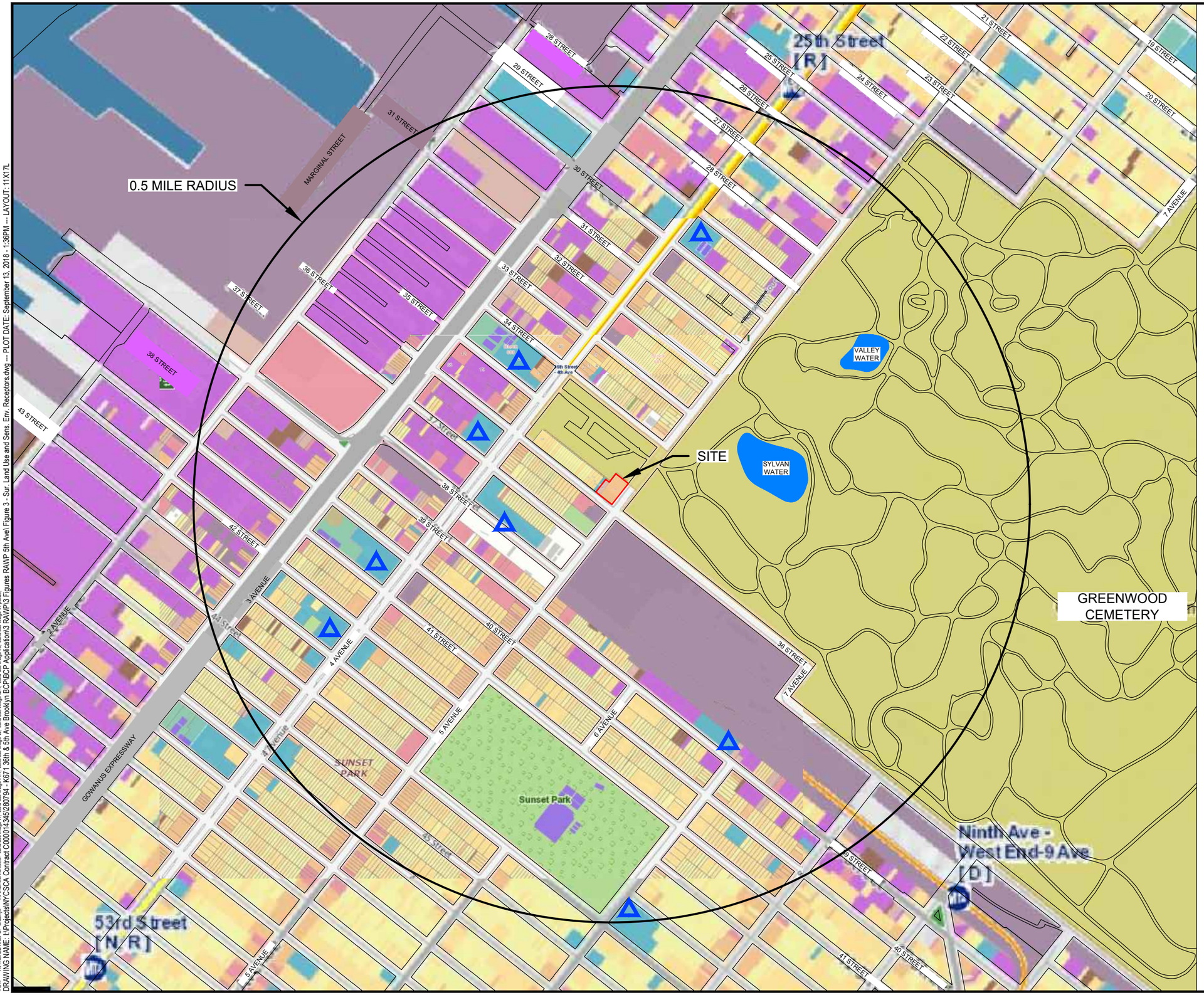
TITLE:

SITE PLAN

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 2**
DATE:	SEPTEMBER 2018		

TRC
1430 Broadway
10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO.: Figure 2 - Site P□□.dwg



LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- 1 & 2 FAMILY RESIDENTIAL
- MULTI-FAMILY RESIDENTIAL
- MIXED USE
- OPEN SPACE & OUTDOOR RECREATION
- COMMERCIAL
- INSTITUTIONS
- INDUSTRIAL
- PARKING
- TRANSPORTATION / UTILITIES
- VACANT LOTS
- CEMETERIES
- SCHOOL WITHIN 0.5 MILE RADIUS OF SITE

W – N – E

SOURCE:
IMAGE FROM WWW.OASISNYC.NET/MAP

0 600' 1200'

SCALE: 1" = 600'
SHEET SIZE: 11" BY 17"

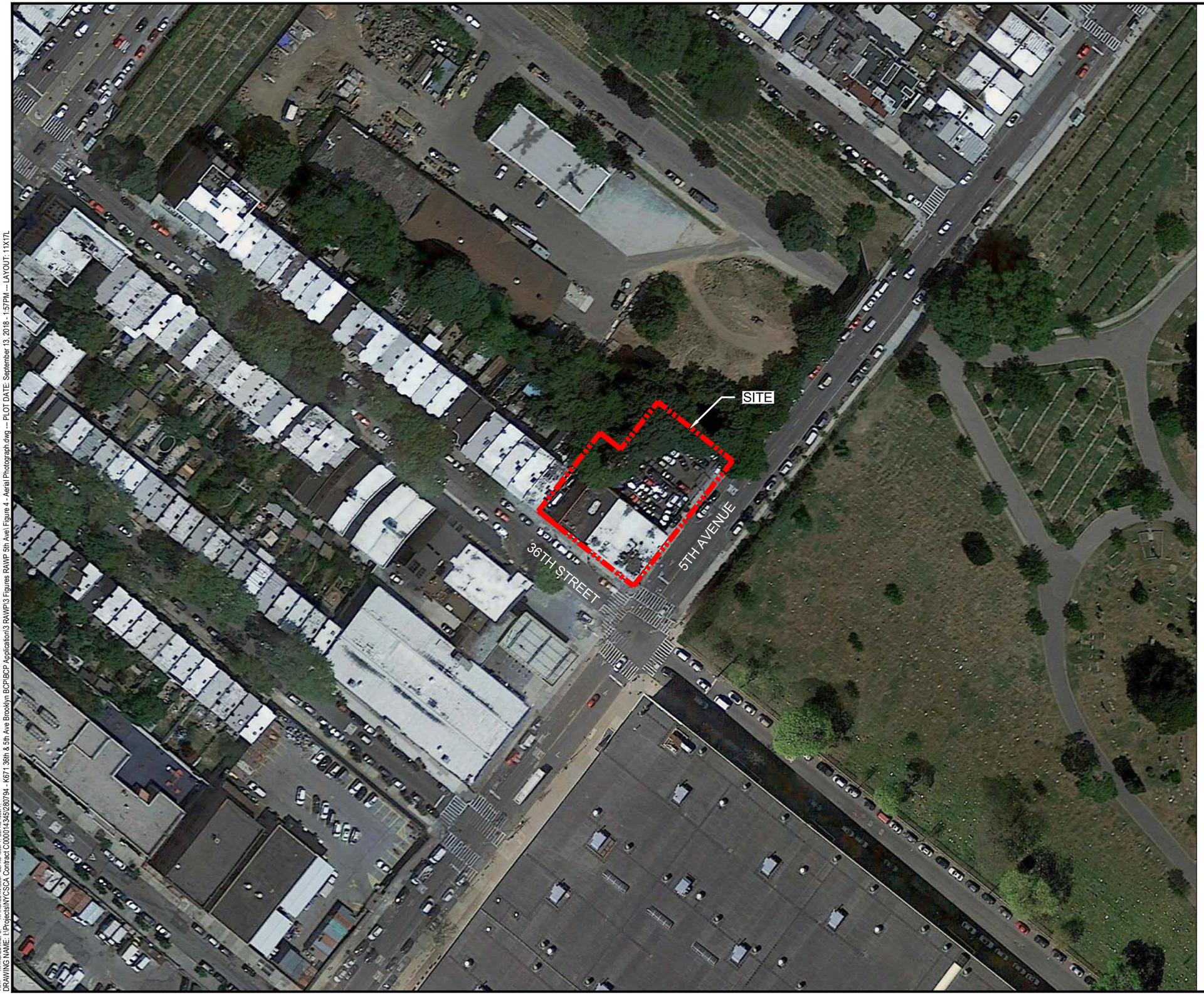
PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:
SURROUNDING LAND USE AND SENSITIVE ENVIRONMENTAL RECEPTORS

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 3**
DATE:	SEPTEMBER 2018		

TRC
1430 Broadway
10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO.: Figure 3 - Sur. L□□d Use □□d Se□s. E□□ Rece□tors.dwg



LEGEND (SYMBOLS NOT TO SCALE):

SITE BOUNDARY

W – N – E

SOURCE:
AERIAL IMAGE FROM GOOGLE EARTH PRO,
DATED JUNE 25, 2016.

0 100' 200'

SCALE: 1" = 100'
SHEET SIZE: 11" BY 17"

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:

AERIAL PHOTOGRAPH

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 4**
DATE:	SEPTEMBER 2018		

TRC
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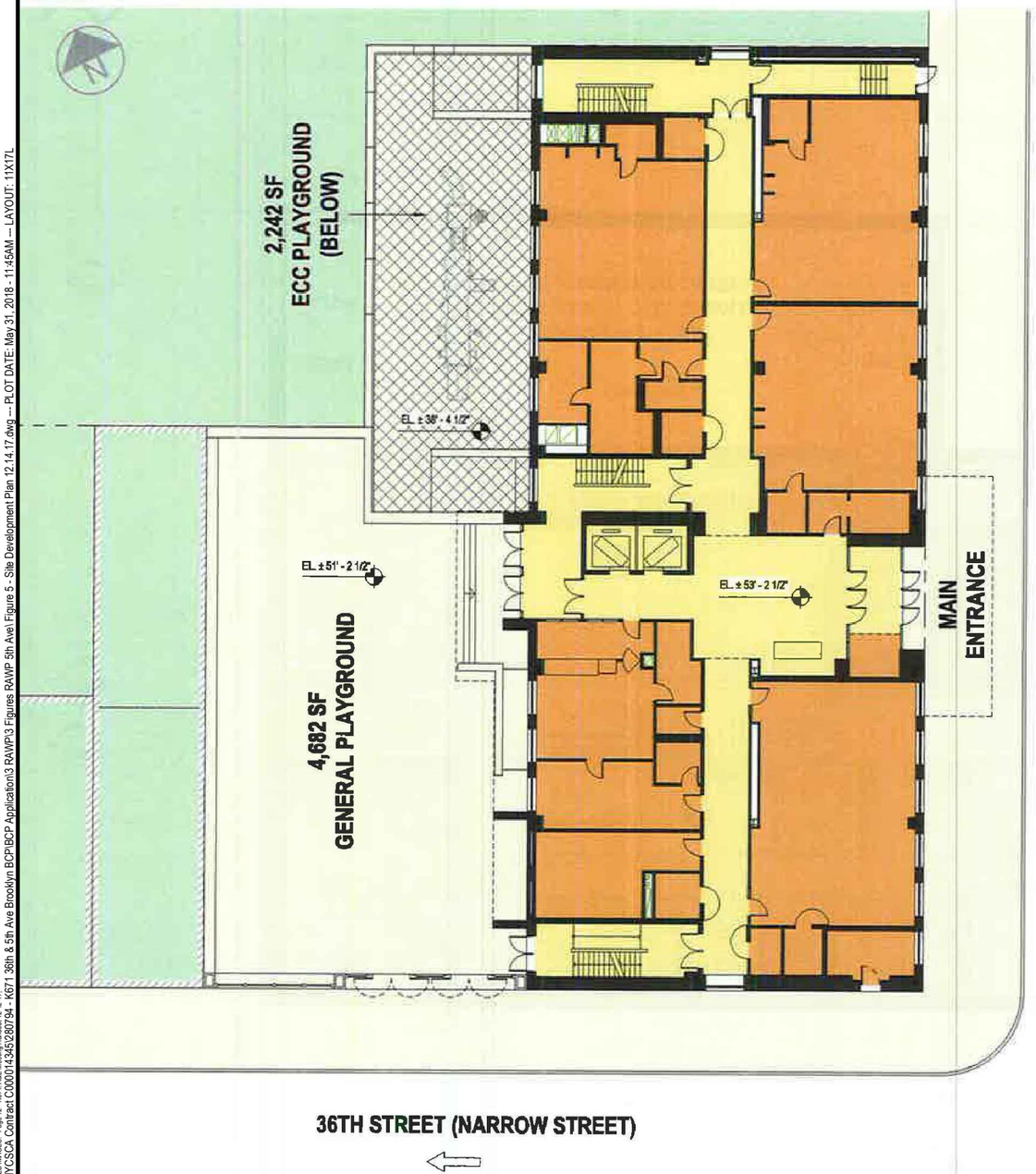
FILE NO.: Figure 4 - Aeri□P□otogr□□□.dwg

11x17 --- ATTACHED XREFS: --- ATTACHED IMAGES: GEPRO 300FT, GEPRO 1500FT:
DRAWING NAME: I:\Projects\NYCSCA Contract C000014345\280794 - K671 36th & 5th Ave Brooklyn BCP\BCP Application\3 RAWP\3 Figures RAWP 5th Ave\ Figure 4 - Aerial Photograph.dwg --- PLOT DATE: September 13, 2018 - 1:57PM --- LAYOUT: 11X17L



CAPACITY : 404	OPTION A12 - GYMATORIUM	
	PROGRAMMED AREA	GFA
ROOF	0	2659
4TH FLOOR	7223	11272
3RD FLOOR	7190	11506
2ND FLOOR	7200	11506
1ST FLOOR	7417	11600
CELLAR	8968	11834
TOTAL	37998	60377
EFFICIENCY		62.9%

NOTE:
1. ON GRADE PLAYGROUND AREA = 6,924 SF.
2. TOTAL PROGRAMMED AREA PER POR (404) = 35,405 NSF (62% GROSS)
3. TOTAL GROSS AREA PER POR (404) = 57,105 GFA
4. TOTAL REQ'D PLAY AREA PER POR (404) =
   GP + ECC = 3,450 SF + 3,000 SF = 6,450 SF

SOURCE:
NYCSCA CONCEPTUAL PLAN (OPTION A)
FOR PUBLIC SCHOOL PS671K, PREPARED BY
GRAVES-MMA JV ARCHITECTS, PLLC,
DECEMBER 12, 2017.

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:

SITE DEVELOPMENT PLAN

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D.SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 5**
DATE:	MAY 2018		

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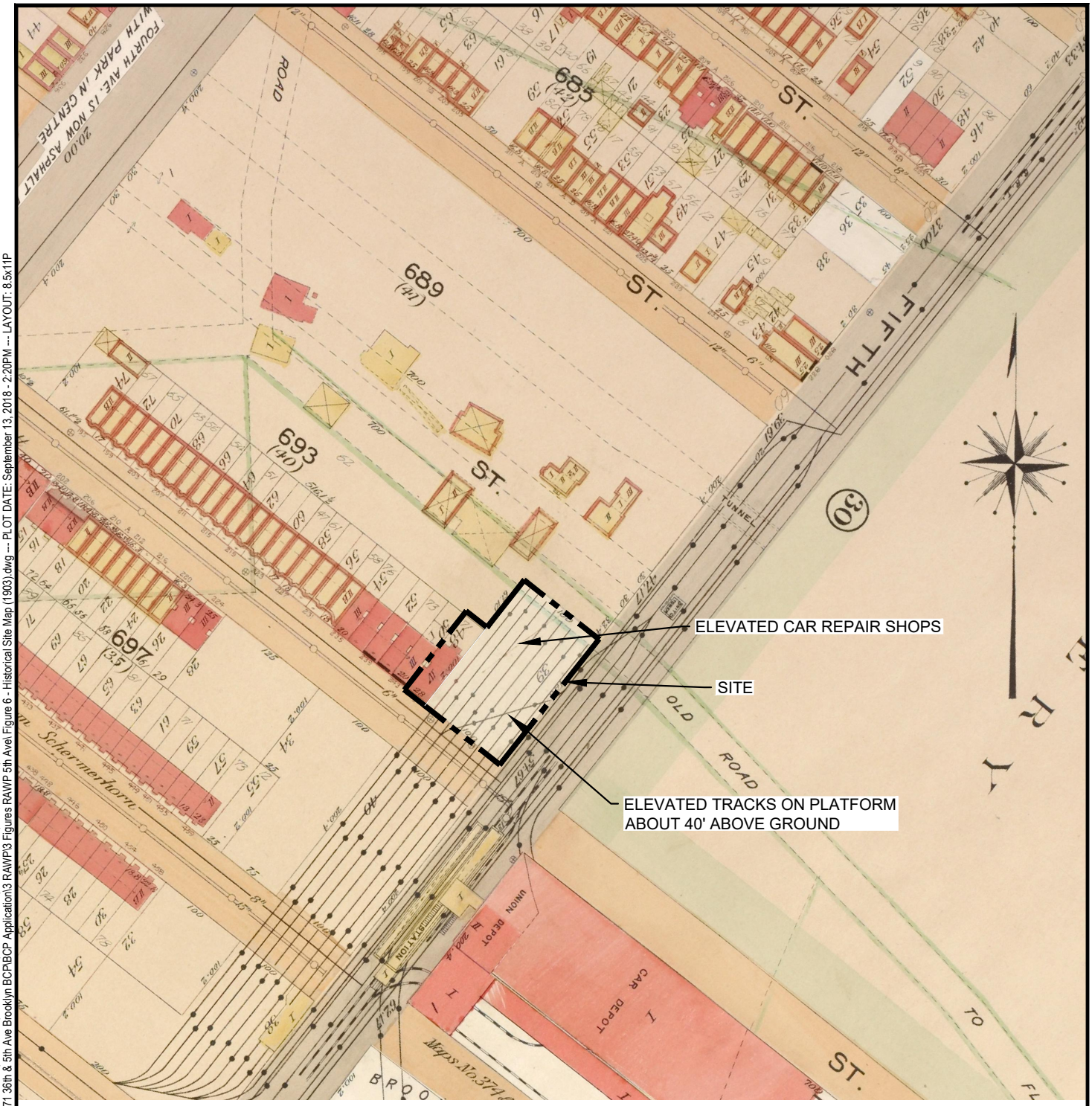
FILE NO.: Figure 5 - Site Development Plan 12.14.17.dwg



SOURCE:

LIONEL PINCUS AND PRINCESS FIRYAL MAP DIVISION, THE NEW YORK PUBLIC LIBRARY.

"BROOKLYN, VOL. 1, DOUBLE PAGE PLATE NO. 33□PART OF WARD 8, SECTION 3□

□MAP BOUNDED BY 6TH AVE., 44TH ST., 3RD AVE.□INCLUDING 32ND ST., 5TH AVE., 36TH ST.□"

THE NEW YORK PUBLIC LIBRARY DIGITAL COLLECTIONS. 1903.

HTTP:□□DIGITALCOLLECTIONS.NYPL.ORG□ITEMS□64B4ACD6-F10E-4E40-E040-E00A18063442

0 150' 300'

SCALE: 1" = 150'

SHEET SIZE: 8.5" BY 11"

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PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:

HISTORICAL SITE MAP (1903)

DRAWN BY:	H. DELGADO
CHECKED BY:	D. SCHMIDT
APPROVED BY:	D. GLASS
DATE:	SEPTEMBER 2018
PROJ. NO.:	280794
FILE:	Figure 6 - Historical Site Map (1903).dwg

FIGURE 6

GREENWOOD CEMETERY MAINTENANCE

APPROXIMATE AREA OF MATERIAL STOCKPILES

BLOCK 693
LOT 1

WOODED AREA

SIDEWALK

RESIDENTIAL

2-STORY BUILDING

3-STORY BUILDING

TRC-SV-2(10')

TRC-SV-2(5')

GP-6 / GW-6 / SV-6

TRC-MW-3

TRC-DSB-2

GP-5 / GW-5 / SV-5

TRC-DSB-1

GP-4 / GW-4 / SV-4

TRC-SV-1(10')

TRC-SV-1(5')

TRC-DSB-3

ASPHALT PAVED

ASPHALT PAVED

LOT 39

TRC-MW-2

5TH AVENUE

FIRST FLOOR CHURCH

2-STORY BUILDING

TRC-AA-XX

TRC-MW-4

GP-3 / GW-3 / SV-3

TRC-SB-1 / SSV-1

36TH STREET

GP-2 / GW-2 / SV-2

TRC-SB-2 / SSV-2

GREENWOOD CEMETERY

TRC-MW-1

GP-1 / GW-1 / SV-1

CAR WASH

GASOLINE STATION

LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- X/0 — FILL / VENT LINE
- GP-X / GW-X / SV-X — SOIL BORING, GROUNDWATER SAMPLE, AND SOIL VAPOR SAMPLE AND IDENTIFICATION NUMBER (PERFORMED BY D&B)
- TRC-SB-X / SSV-X — SOIL BORING AND SUB-SLAB VAPOR SAMPLE AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-MW-X — PERMANENT MONITORING WELL AND SOIL BORING AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-DSB-X — DELINEATION SOIL BORING AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-SV-X(X') — SOIL VAPOR SAMPLE LOCATION AND IDENTIFICATION NUMBER (DEPTH INTERVAL IN FEET) (PERFORMED BY TRC)
- TRC-AA-XX — AMBIENT AIR SAMPLE LOCATION AND IDENTIFICATION NUMBER
- SUSPECT 1,500-GALLON UST
- BOILER ROOM

W – N – E

SOURCE:
BLOCK AND LOT BOUNDARIES FROM
WWW.PROPERTYSHARK.COM

0 25' 50'

SCALE: 1" = 25'
SHEET SIZE: 11" BY 17"

NOTES:
1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. SUB-SLAB VAPOR SAMPLE TRC-SSV-1 WAS COLLECTED FROM BENEATH THE SLAB OF THE FIRST / GROUND FLOOR.
3. SUB-SLAB VAPOR SAMPLE TRC-SSV-2 WAS COLLECTED FROM BENEATH THE SLAB OF THE SUB-BASEMENT.
4. UST = UNDERGROUND STORAGE TANK
5. SOIL BORINGS TRC-DSB-1 AND GP-5 WERE CO-LOCATED. DUE TO THE SCALE OF THE FIGURE, THE SYMBOL FOR TRC-DSB-1 ONLY IS SHOWN.

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:

SAMPLE LOCATION PLAN

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 7**
DATE:	SEPTEMBER 2018		

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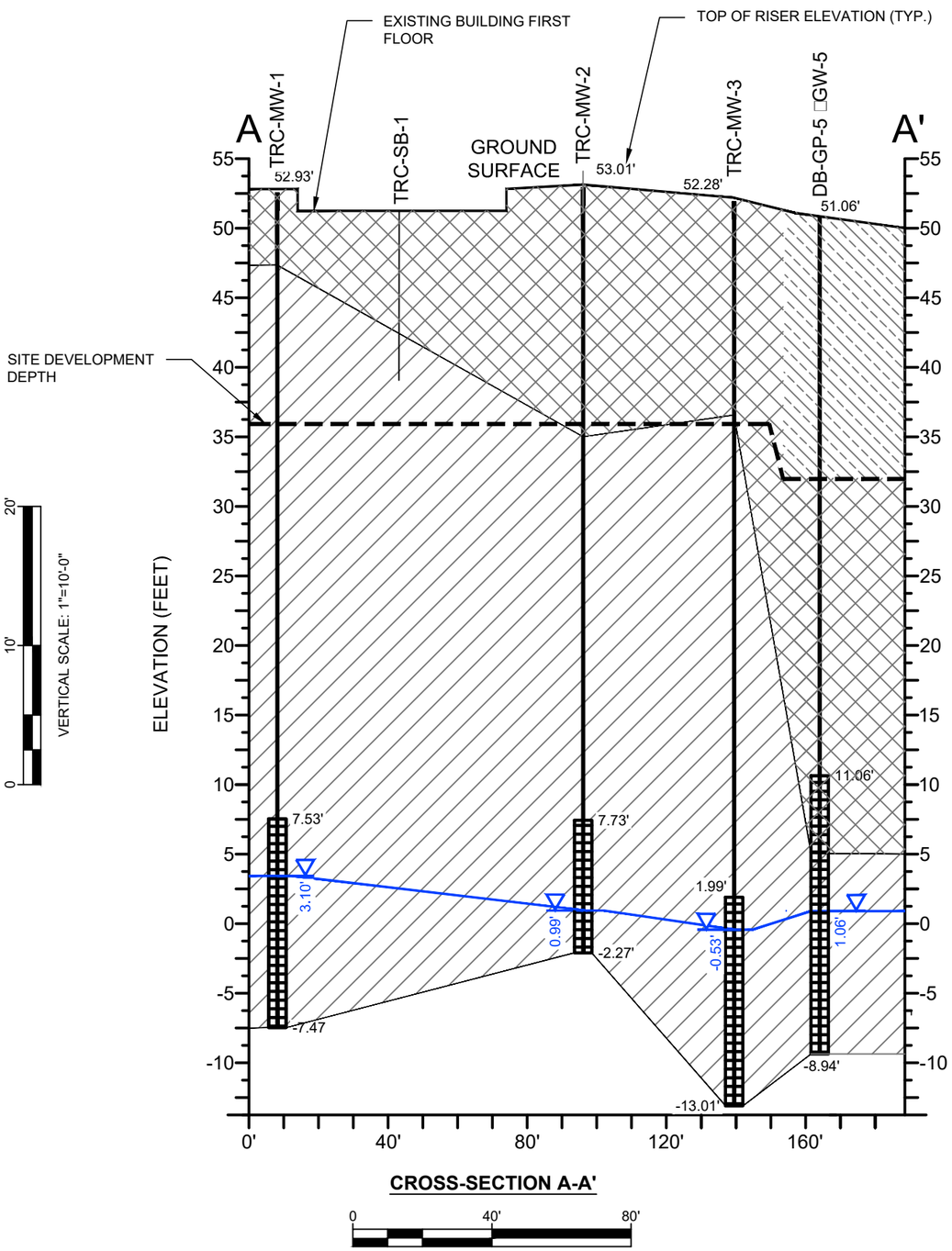
FILE NO.: Figure 7 - Sample Location Plan.dwg

11x17 --- ATTACHED XREFS: Brooklyn_ 60000(K671) - 170925 --- ATTACHED IMAGES: 838-841 5th avenue.map_image, bldg_footprints; Pages from Geophysical Engineering Survey (GES) Report - 838-841 5th Avenue Brooklyn NY - Sewer mapping - RC1654, sm; Water mapping - RC1654, sm; Figure 7 - Sample Location Plan.dwg --- PLOT DATE: September 13, 2018 - 2:31PM --- LAYOUT: 11X17L
DRAWING NAME: I:\Projects\NYCSCA Contract C000014345\280794 - K671 36th & 5th Ave Brooklyn BCP\BCP Application\3 RAWP\3 Figures RAWP 5th Ave\Figure 7 - Sample Location Plan.dwg



CROSS-SECTION A-A'

0 40' 80'

HORIZONTAL SCALE: 1"=40'-0"

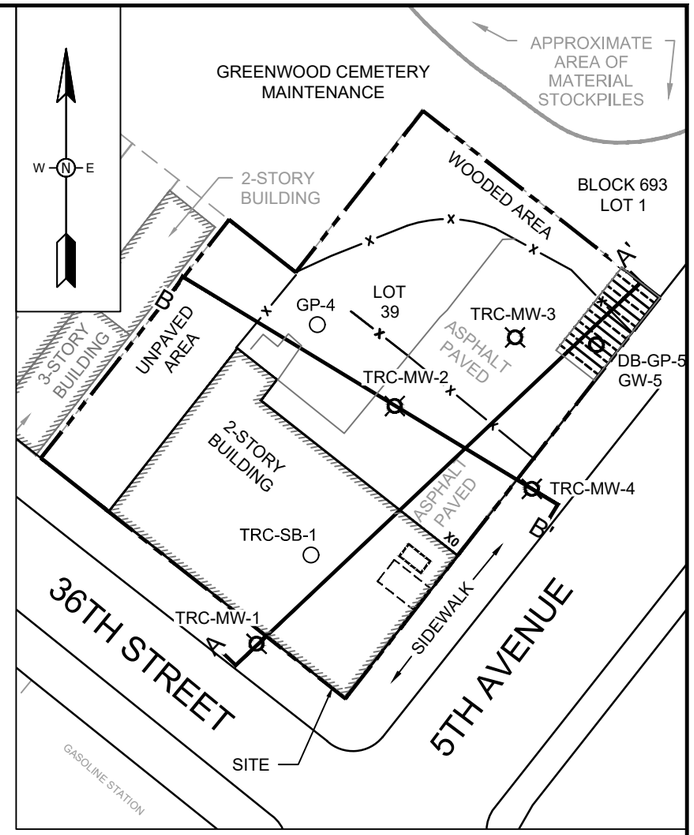
LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- DB-GP-5 / GW-5 — SOIL BORING □GROUNDWATER SAMPLE LOCATION AND IDENTIFICATION NUMBER
- TRC-MW-X — PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- SUSPECT 1,500-GALLON UST
- BOILER ROOM
- X.XX' — WATER TABLE ELEVATION
- XX.XX' — MONITORING WELL SCREEN AND ELEVATION
- FILL
- MOSTLY SAND, SILT, GRAVEL
- HAZARDOUS LEAD SOIL

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. MONITORING WELLS SURVEYED ON FEBRUARY 21, 2017 BY MEGA CONSTRUCTION MANAGEMENT, INC.
3. ELEVATIONS REFER TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
4. GROUNDWATER SURFACE ELEVATIONS MEASURED ON MARCH 10, 2017.
5. SOIL BORING □GROUNDWATER SAMPLE LOCATION DB-GP-5 □GW-5 WAS SURVEYED ON SEPTEMBER 14, 2017 BY EWELL W. FINLEY, P.C. CONSULTING ENGINEERS & LAND SURVEYORS.

SOURCE:
BLOCK AND LOT BOUNDARIES FROM WWW.PROPERTYSHARK.COM



TRANSECT LOCATION MAP

0 50' 100'

SCALE: 1" = 50'

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:

GEOLOGICAL CROSS-SECTION A-A'

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 8**
DATE:	SEPTEMBER 2018		

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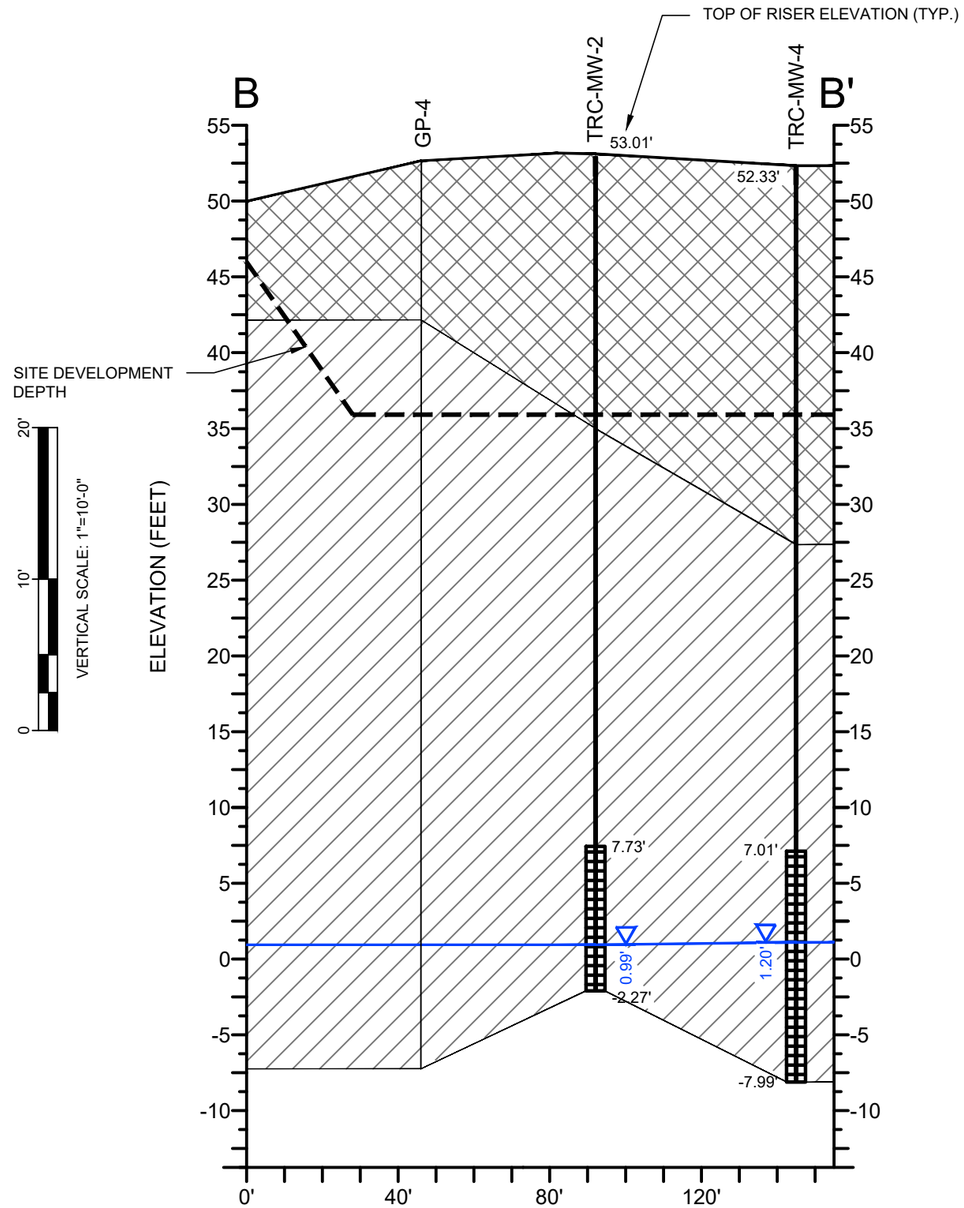
FILE NO.: Figure 8-9 - Geologi□al Cross-Se□tion A-A' & B-B'.dwg



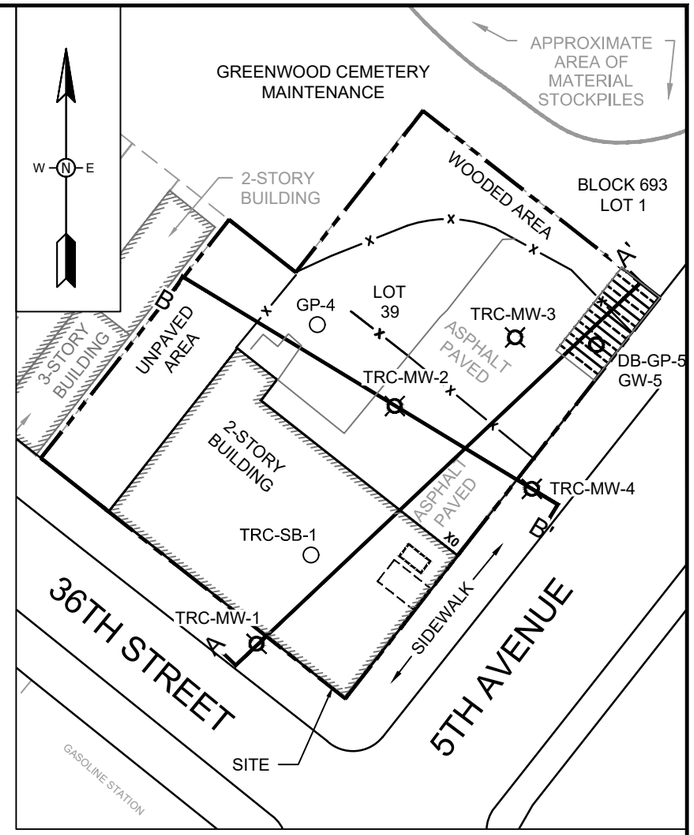
CROSS-SECTION B-B'

0 40' 80'

HORIZONTAL SCALE: 1"=40'-0"

LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- DB-GP-5 / GW-5 — SOIL BORING □GROUNDWATER SAMPLE LOCATION AND IDENTIFICATION NUMBER
- TRC-MW-X — PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- SUSPECT 1,500-GALLON UST
- BOILER ROOM
- X.XX' — WATER TABLE ELEVATION
- XX.XX' — MONITORING WELL SCREEN AND ELEVATION
- FILL
- MOSTLY SAND, SILT, GRAVEL



TRANSECT LOCATION MAP

0 50' 100'

SCALE: 1" = 50'

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. MONITORING WELLS SURVEYED ON FEBRUARY 21, 2017 BY MEGA CONSTRUCTION MANAGEMENT, INC.
3. ELEVATIONS REFER TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
4. GROUNDWATER SURFACE ELEVATIONS MEASURED ON MARCH 10, 2017.
5. SOIL BORING □GROUNDWATER SAMPLE LOCATION DB-GP-5 □GW-5 WAS SURVEYED ON SEPTEMBER 14, 2017 BY EWELL W. FINLEY, P.C. CONSULTING ENGINEERS & LAND SURVEYORS.

SOURCE:
BLOCK AND LOT BOUNDARIES FROM WWW.PROPERTYSHARK.COM

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:

GEOLOGICAL CROSS-SECTION B-B'

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 9**
DATE:	SEPTEMBER 2018		

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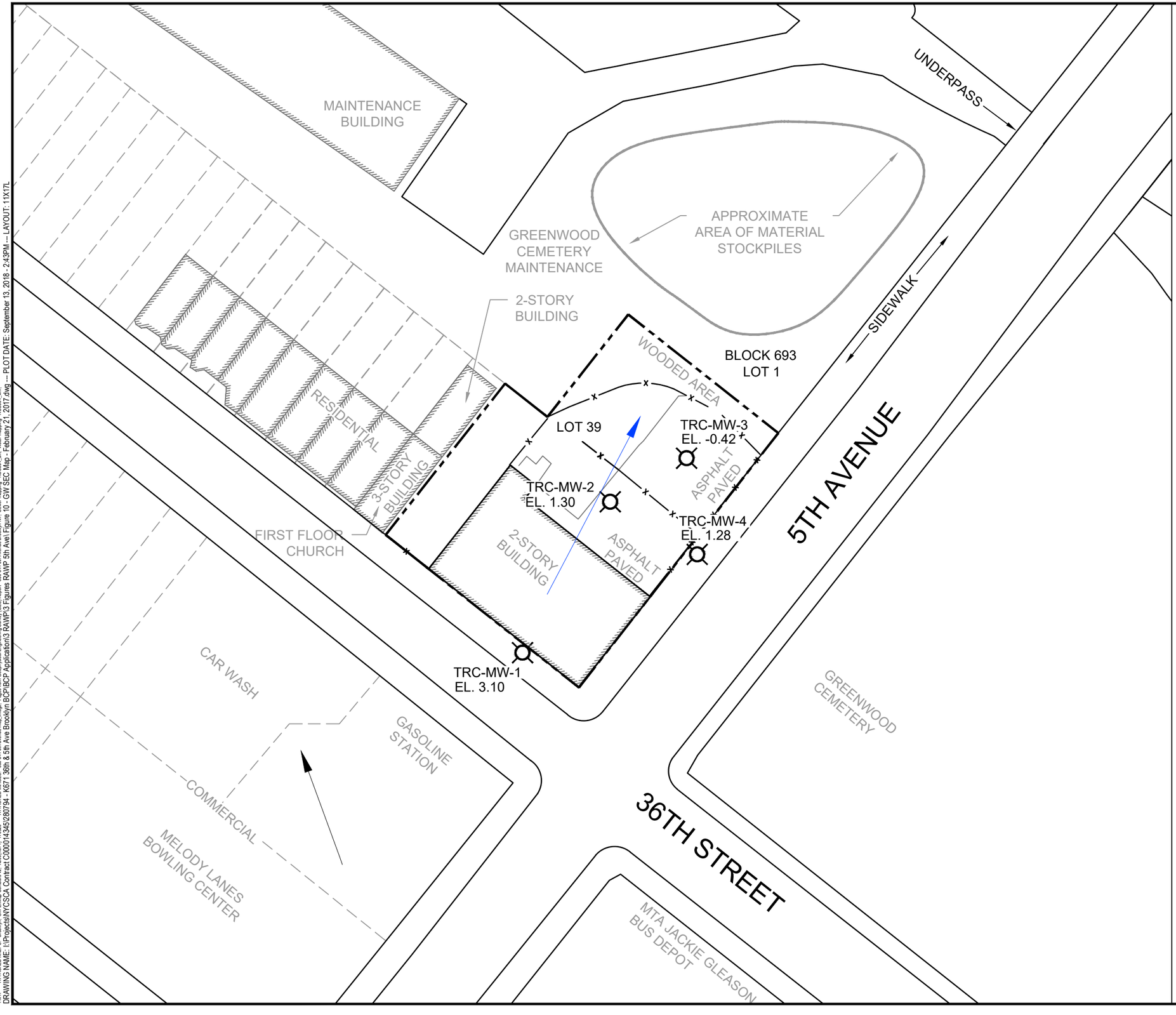
FILE NO.: Figure 8-9 - Geologi□al Cross-Se□tion A-A' & B-B'.dwg



LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- TRC-MW-X — PERMANENT MONITORING WELL AND IDENTIFICATION NUMBER
- EL. 49.43 — GROUNDWATER SURFACE ELEVATION (IN FEET)
- 49.00 — GROUNDWATER SURFACE ELEVATION CONTOUR (FEET)
- INFERRED ON-SITE GROUNDWATER FLOW DIRECTION (TRC 02.21.17)
- GROUNDWATER FLOW DIRECTION (IMPACT 01.09.16)

W – N – E

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. MONITORING WELLS SURVEYED ON FEBRUARY 21, 2017 BY MEGA CONSTRUCTION MANAGEMENT, INC.
3. ELEVATIONS REFER TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SOURCE:
BLOCK AND LOT BOUNDARIES FROM WWW.PROPERTYSHARK.COM

0 50' 100'

SCALE: 1" = 50'
SHEET SIZE: 11" BY 17"

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:
GROUNDWATER SURFACE ELEVATION CONTOUR MAP - FEBRUARY 21, 2017

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 10**
DATE:	SEPTEMBER 2018		

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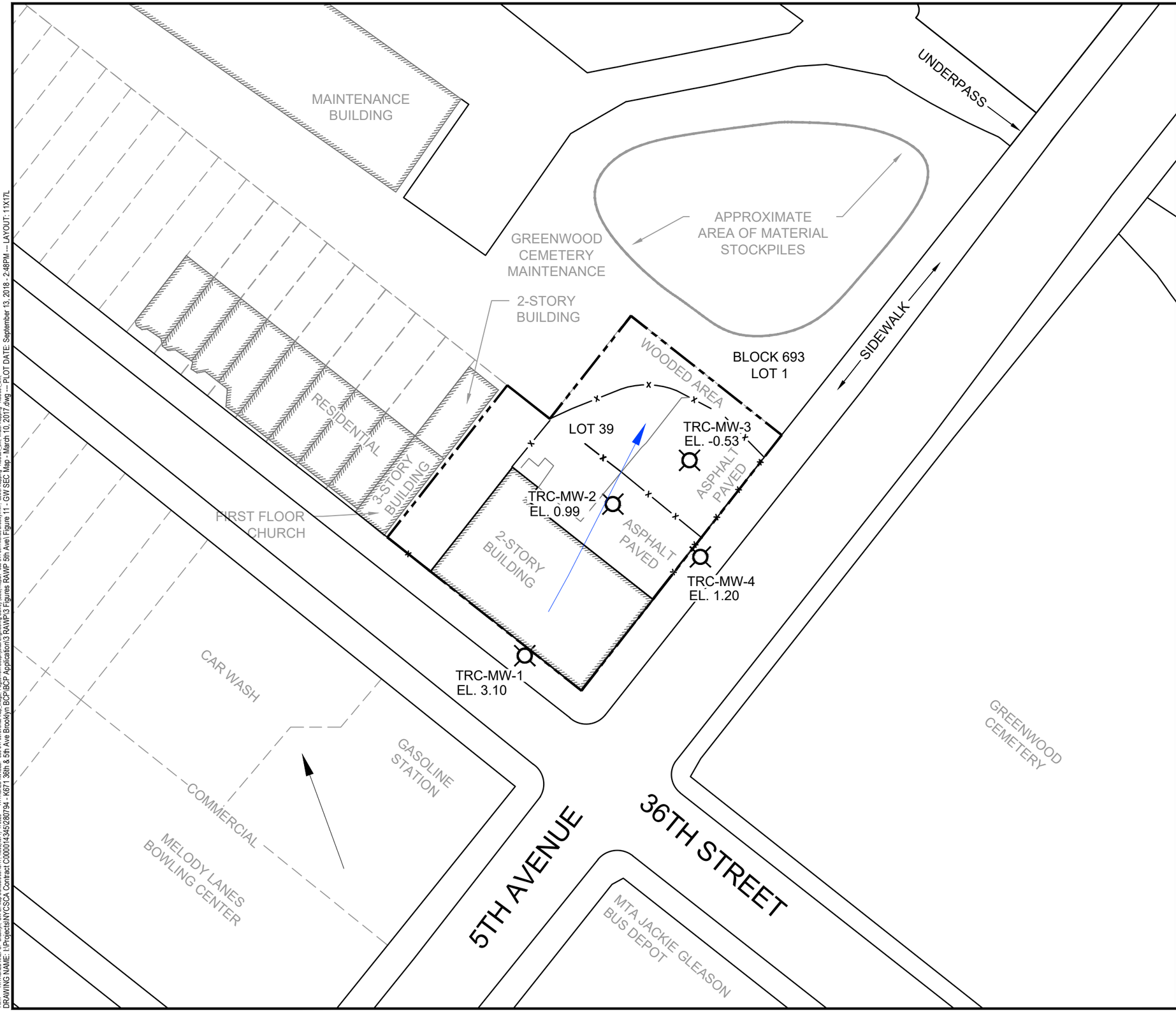
FILE NO.: Figure 10 - GW SEC Map - Fe□ruar□21, 2017.dwg



LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- TRC-MW-X — PERMANENT MONITORING WELL AND IDENTIFICATION NUMBER
- EL. 49.43 — GROUNDWATER SURFACE ELEVATION (IN FEET)
- 49.00 — GROUNDWATER SURFACE ELEVATION CONTOUR (FEET)
- INFERRED ON-SITE GROUNDWATER FLOW DIRECTION (TRC 03.10.17)
- GROUNDWATER FLOW DIRECTION (IMPACT 01.07.16)

W – N – E

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. MONITORING WELLS SURVEYED ON FEBRUARY 21, 2017 BY MEGA CONSTRUCTION MANAGEMENT, INC.
3. ELEVATIONS REFER TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SOURCE:
BLOCK AND LOT BOUNDARIES FROM
WWW.PROPERTYSHARK.COM

0 50' 100'

SCALE: 1" = 50'
SHEET SIZE: 11" BY 17"

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:
GROUNDWATER SURFACE ELEVATION CONTOUR MAP - MARCH 10, 2017

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 11**
DATE:	SEPTEMBER 2018		

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FILE NO.: Figure 11 - GW SEC Map - Mar□□ 10, 2017.dwg

	SAMPLE ID	SV-6	RECOMMENDED
	MATRIX RANGE	01/04/17	ACTION
1,1,1-TRICHLOROETHANE	1,000 AND ABOVE	1,100	MITIGATE

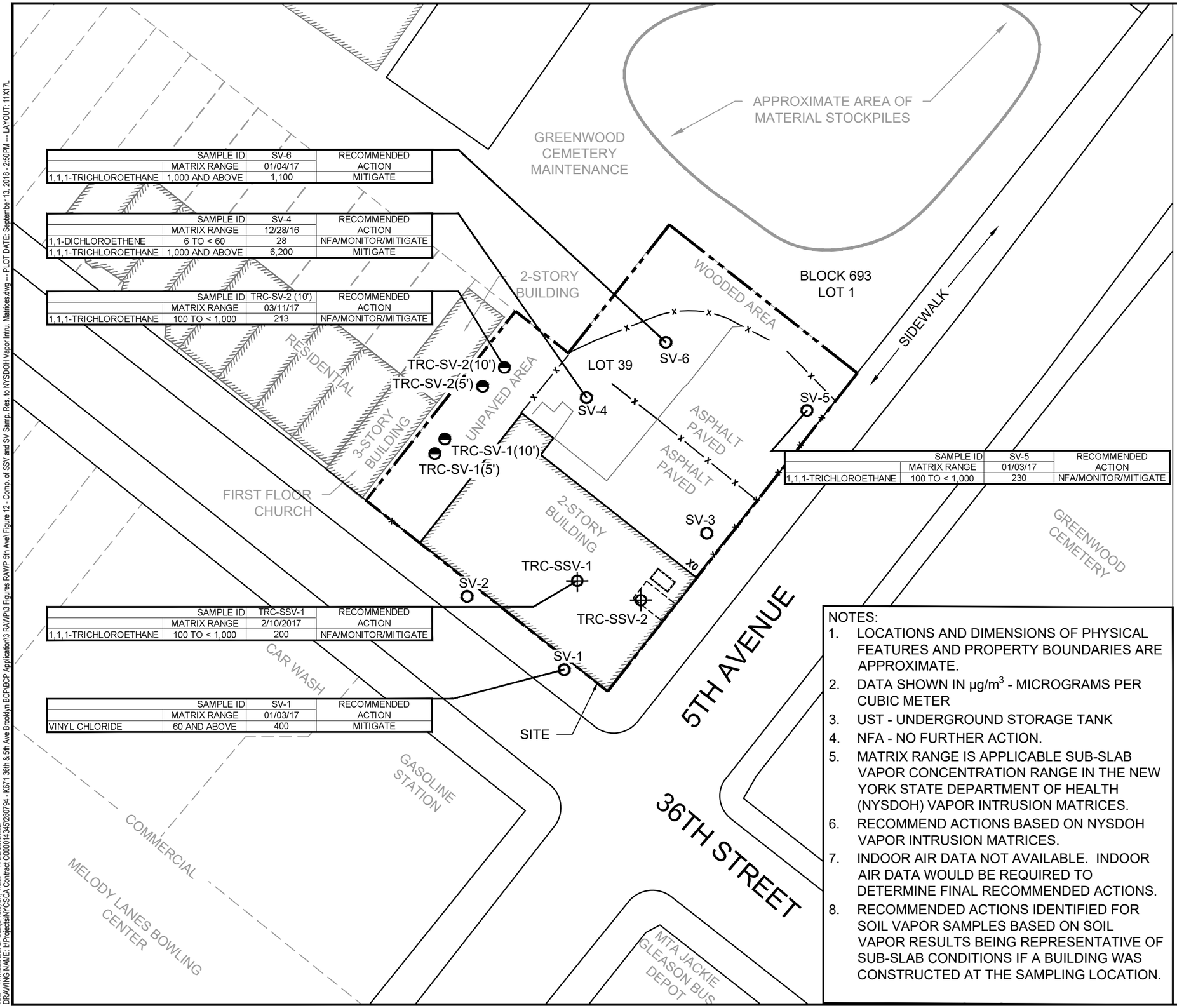
	SAMPLE ID	SV-4	RECOMMENDED
	MATRIX RANGE	12/28/16	ACTION
1,1-DICHLOROETHENE	6 TO < 60	28	NFA/MONITOR/MITIGATE
1,1,1-TRICHLOROETHANE	1,000 AND ABOVE	6,200	MITIGATE

	SAMPLE ID	TRC-SV-2 (10')	RECOMMENDED
	MATRIX RANGE	03/11/17	ACTION
1,1,1-TRICHLOROETHANE	100 TO < 1,000	213	NFA/MONITOR/MITIGATE

	SAMPLE ID	SV-5	RECOMMENDED
	MATRIX RANGE	01/03/17	ACTION
1,1,1-TRICHLOROETHANE	100 TO < 1,000	230	NFA/MONITOR/MITIGATE

	SAMPLE ID	TRC-SSV-1	RECOMMENDED
	MATRIX RANGE	2/10/2017	ACTION
1,1,1-TRICHLOROETHANE	100 TO < 1,000	200	NFA/MONITOR/MITIGATE

	SAMPLE ID	SV-1	RECOMMENDED
	MATRIX RANGE	01/03/17	ACTION
VINYL CHLORIDE	60 AND ABOVE	400	MITIGATE



LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- X/0 — FILL/VENT LINE
- SV — SOIL VAPOR
- SSV — SUB-SLAB VAPOR
- SV-X — SOIL VAPOR SAMPLE LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY D&B)
- TRC-SSV-X — SOIL BORING AND SUB-SLAB VAPOR SAMPLE LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-SV-X(X') — SOIL VAPOR SAMPLE LOCATION AND IDENTIFICATION NUMBER (DEPTH) (PERFORMED BY TRC)
- SUSPECT 1,500-GALLON UST
- BOILER ROOM

W – N – E

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. DATA SHOWN IN $\mu g/m^3$ - MICROGRAMS PER CUBIC METER
3. UST - UNDERGROUND STORAGE TANK
4. NFA - NO FURTHER ACTION.
5. MATRIX RANGE IS APPLICABLE SUB-SLAB VAPOR CONCENTRATION RANGE IN THE NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH) VAPOR INTRUSION MATRICES.
6. RECOMMEND ACTIONS BASED ON NYSDOH VAPOR INTRUSION MATRICES.
7. INDOOR AIR DATA NOT AVAILABLE. INDOOR AIR DATA WOULD BE REQUIRED TO DETERMINE FINAL RECOMMENDED ACTIONS.
8. RECOMMENDED ACTIONS IDENTIFIED FOR SOIL VAPOR SAMPLES BASED ON SOIL VAPOR RESULTS BEING REPRESENTATIVE OF SUB-SLAB CONDITIONS IF A BUILDING WAS CONSTRUCTED AT THE SAMPLING LOCATION.

SOURCE:
BLOCK AND LOT BOUNDARIES FROM
WWW.PROPERTYSHARK.COM

0 40' 80'

SCALE: 1" = 40'
SHEET SIZE: 11" BY 17"

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE: **COMPARISON OF SUB-SLAB VAPOR & SOIL VAPOR SAMPLING RESULTS TO NYSDOH VAPOR INTRUSION MATRICES**

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 12**
DATE:	SEPTEMBER 2018		

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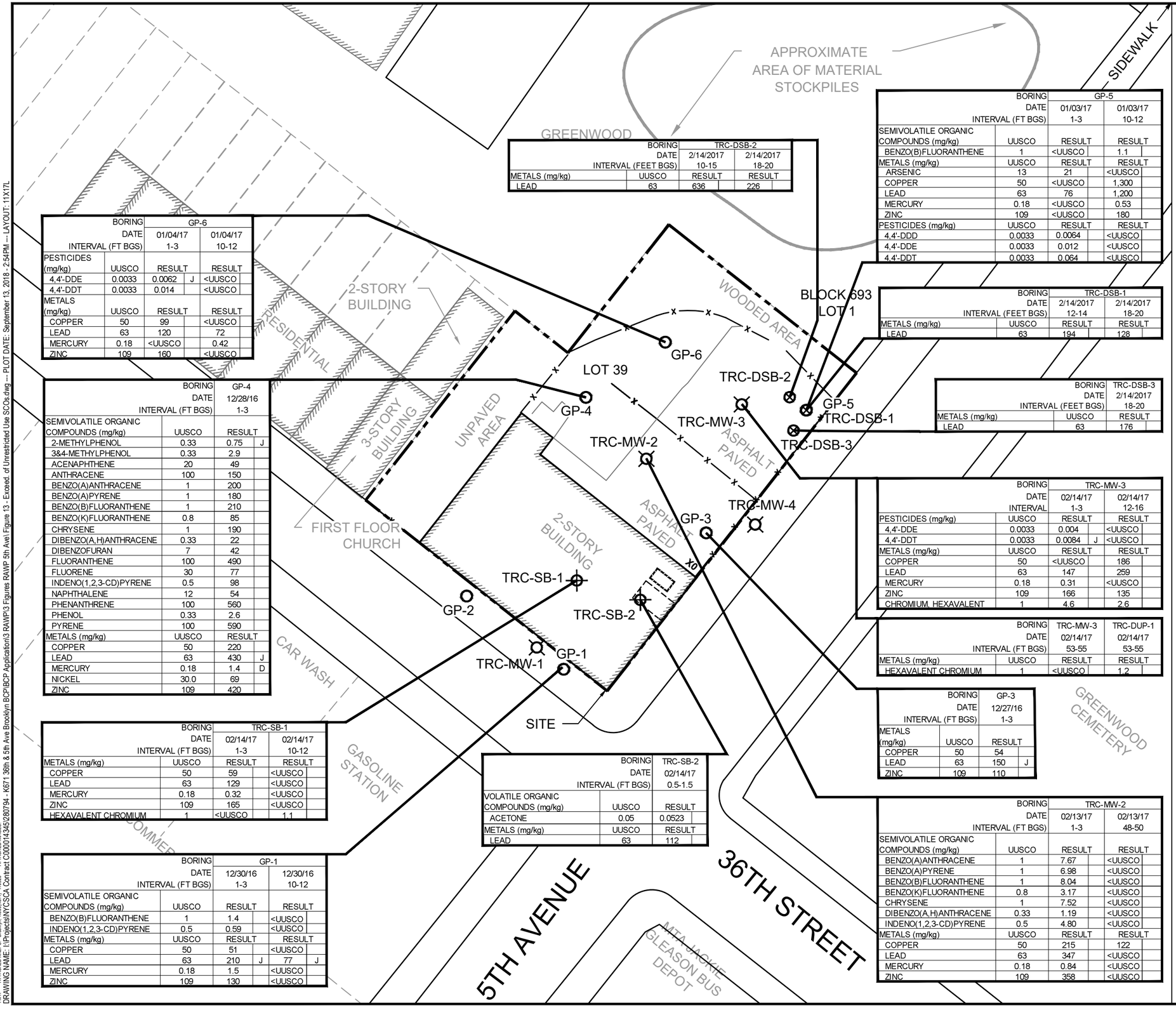
Phone: 212.221.7822

FILE NO.: Figure 12 - Comp. of SSV & SV Samp. Res. to NYSDOH Vapor Intru. Matrices.dwg



	BORING	GP-6			
	DATE	01/04/17		01/04/17	
INTERVAL (FT BGS)		1-3		10-12	
PESTICIDES (mg/kg)	UUSCO	RESULT		RESULT	
4,4'-DDE	0.0033	0.0062	J	<UUSCO	
4,4'-DDT	0.0033	0.014		<UUSCO	
METALS (mg/kg)	UUSCO	RESULT		RESULT	
COPPER	50	99		<UUSCO	
LEAD	63	120		72	
MERCURY	0.18	<UUSCO		0.42	
ZINC	109	160		<UUSCO	

	BORING	GP-4	
	DATE	12/28/16	
INTERVAL (FT BGS)		1-3	
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	UUSCO	RESULT	
2-METHYLPHENOL	0.33	0.75	J
3&4-METHYLPHENOL	0.33	2.9	
ACENAPHTHENE	20	49	
ANTHRACENE	100	150	
BENZO(A)ANTHRACENE	1	200	
BENZO(A)PYRENE	1	180	
BENZO(B)FLUORANTHENE	1	210	
BENZO(K)FLUORANTHENE	0.8	85	
CHRYSENE	1	190	
DIBENZO(A,H)ANTHRACENE	0.33	22	
DIBENZOFURAN	7	42	
FLUORANTHENE	100	490	
FLUORENE	30	77	
INDENO(1,2,3-CD)PYRENE	0.5	98	
NAPHTHALENE	12	54	
PHENANTHRENE	100	560	
PHENOL	0.33	2.6	
PYRENE	100	590	
METALS (mg/kg)	UUSCO	RESULT	
COPPER	50	220	
LEAD	63	430	J
MERCURY	0.18	1.4	D
NICKEL	30.0	69	
ZINC	109	420	

	BORING	TRC-SB-1			
	DATE	02/14/17		02/14/17	
INTERVAL (FT BGS)		1-3		10-12	
METALS (mg/kg)	UUSCO	RESULT		RESULT	
COPPER	50	59		<UUSCO	
LEAD	63	129		<UUSCO	
MERCURY	0.18	0.32		<UUSCO	
ZINC	109	165		<UUSCO	
HEXAVALENT CHROMIUM	1	<UUSCO		1.1	

	BORING	GP-1			
	DATE	12/30/16		12/30/16	
INTERVAL (FT BGS)		1-3		10-12	
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	UUSCO	RESULT		RESULT	
BENZO(B)FLUORANTHENE	1	1.4		<UUSCO	
INDENO(1,2,3-CD)PYRENE	0.5	0.59		<UUSCO	
METALS (mg/kg)	UUSCO	RESULT		RESULT	
COPPER	50	51		<UUSCO	
LEAD	63	210	J	77	J
MERCURY	0.18	1.5		<UUSCO	
ZINC	109	130		<UUSCO	

	BORING	TRC-DSB-2	
	DATE	2/14/2017	2/14/2017
INTERVAL (FEET BGS)		10-15	18-20
METALS (mg/kg)	UUSCO	RESULT	RESULT
LEAD	63	636	226

	BORING	TRC-SB-2
	DATE	02/14/17
INTERVAL (FT BGS)		0.5-1.5
VOLATILE ORGANIC COMPOUNDS (mg/kg)	UUSCO	RESULT
ACETONE	0.05	0.0523
METALS (mg/kg)	UUSCO	RESULT
LEAD	63	112

	BORING	GP-5	
	DATE	01/03/17	01/03/17
INTERVAL (FT BGS)		1-3	10-12
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	UUSCO	RESULT	RESULT
BENZO(B)FLUORANTHENE	1	<UUSCO	1.1
METALS (mg/kg)	UUSCO	RESULT	RESULT
ARSENIC	13	21	<UUSCO
COPPER	50	<UUSCO	1,300
LEAD	63	76	1,200
MERCURY	0.18	<UUSCO	0.53
ZINC	109	<UUSCO	180
PESTICIDES (mg/kg)	UUSCO	RESULT	RESULT
4,4'-DDD	0.0033	0.0064	<UUSCO
4,4'-DDE	0.0033	0.012	<UUSCO
4,4'-DDT	0.0033	0.064	<UUSCO

	BORING	TRC-DSB-1	
	DATE	2/14/2017	2/14/2017
INTERVAL (FEET BGS)		12-14	18-20
METALS (mg/kg)	UUSCO	RESULT	RESULT
LEAD	63	194	128

	BORING	TRC-DSB-3
	DATE	2/14/2017
INTERVAL (FEET BGS)		18-20
METALS (mg/kg)	UUSCO	RESULT
LEAD	63	176

	BORING	TRC-MW-3	
	DATE	02/14/17	02/14/17
INTERVAL		1-3	12-16
PESTICIDES (mg/kg)	UUSCO	RESULT	RESULT
4,4'-DDE	0.0033	0.004	<UUSCO
4,4'-DDT	0.0033	0.0084 J	<UUSCO
METALS (mg/kg)	UUSCO	RESULT	RESULT
COPPER	50	<UUSCO	186
LEAD	63	147	259
MERCURY	0.18	0.31	<UUSCO
ZINC	109	166	135
CHROMIUM, HEXAVALENT	1	4.6	2.6

	BORING	TRC-MW-3	TRC-DUP-1
	DATE	02/14/17	02/14/17
INTERVAL (FT BGS)		53-55	53-55
METALS (mg/kg)	UUSCO	RESULT	RESULT
HEXAVALENT CHROMIUM	1	<UUSCO	1.2

	BORING	GP-3
	DATE	12/27/16
INTERVAL (FT BGS)		1-3
METALS (mg/kg)	UUSCO	RESULT
COPPER	50	54
LEAD	63	150 J
ZINC	109	110

	BORING	TRC-MW-2	
	DATE	02/13/17	02/13/17
INTERVAL (FT BGS)		1-3	48-50
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	UUSCO	RESULT	RESULT
BENZO(A)ANTHRACENE	1	7.67	<UUSCO
BENZO(A)PYRENE	1	6.98	<UUSCO
BENZO(B)FLUORANTHENE	1	8.04	<UUSCO
BENZO(K)FLUORANTHENE	0.8	3.17	<UUSCO
CHRYSENE	1	7.52	<UUSCO
DIBENZO(A,H)ANTHRACENE	0.33	1.19	<UUSCO
INDENO(1,2,3-CD)PYRENE	0.5	4.80	<UUSCO
METALS (mg/kg)	UUSCO	RESULT	RESULT
COPPER	50	215	122
LEAD	63	347	<UUSCO
MERCURY	0.18	0.84	<UUSCO
ZINC	109	358	<UUSCO

LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- X/0 — FILL/VENT LINE
- GP-X — SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY D&B)
- TRC-SB-X — SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-DSB-X — DELINEATION SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-MW-X — PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- SUSPECT 1,500-GALLON UST
- BOILER ROOM

W – N – E

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. D - DILUTION REQUIRED
3. FT BGS - FEET BELOW GROUND SURFACE
4. mg/kg - MILLIGRAMS PER KILOGRAM
5. J - ESTIMATED VALUE
6. UST - UNDERGROUND STORAGE TANK
7. UUSCO - 6 NYCRR PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVE
8. SOIL BORINGS TRC-DSB-1 AND GP-5 WERE CO-LOCATED. DUE TO THE SCALE OF THE FIGURE, THE SYMBOL FOR TRC-DSB-1 ONLY IS SHOWN.

SOURCE:
BLOCK AND LOT BOUNDARIES FROM
WWW.PROPERTYSHARK.COM

0 40' 80'

SCALE: 1" = 40'
SHEET SIZE: 11" BY 17"

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:
EXCEEDANCES OF UNRESTRICTED USE SOIL CLEANUP OBJECTIVES

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D, SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 13**
DATE:	SEPTEMBER 2018		

TRC
1430 Broadway
10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO.: Figure 13 - Exceed. of U□restricted Use SCOs.dwg

	BORING	GP-4
	DATE	12/28/16
	INTERVAL (FT BGS)	1-3
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	RRUSCO	RESULT
ANTHRACENE	100	150
BENZO(A)ANTHRACENE	1	200
BENZO(A)PYRENE	1	180
BENZO(B)FLUORANTHENE	1	210
BENZO(K)FLUORANTHENE	3.9	85
CHRYSENE	3.9	190
DIBENZO(A,H)ANTHRACENE	0.33	22
FLUORANTHENE	100	490
INDENO(1,2,3-CD)PYRENE	0.5	98
PHENANTHRENE	100	560
PYRENE	100	590
METALS (mg/kg)		
LEAD	400	430 J
MERCURY	0.81	1.4 D

	BORING	TRC-DSB-2
	DATE	2/14/2017
	INTERVAL (FEET BGS)	10-15
METALS (mg/kg)	RRUSCO	RESULT
LEAD	400	636

	BORING	GP-5	
	DATE	01/03/17	01/03/17
	INTERVAL (FT BGS)	1-3	10-12
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	RRUSCO	RESULT	RESULT
BENZO(B)FLUORANTHENE	1	<RRUSCO	1.1
METALS (mg/kg)	RRUSCO	RESULT	RESULT
ARSENIC	16	21	<RRUSCO
COPPER	270	<RRUSCO	1,300
LEAD	400	<RRUSCO	1,200

	BORING	GP-1
	DATE	12/30/16
	INTERVAL (FT BGS)	1-3
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	RRUSCO	RESULT
BENZO(B)FLUORANTHENE	1	1.4
INDENO(1,2,3-CD)PYRENE	0.5	0.59
METALS (mg/kg)		
MERCURY	0.81	1.5

	BORING	TRC-MW-2
	DATE	2/13/2017
	INTERVAL (FT BGS)	1-3
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	RRUSCO	RESULT
BENZO(A)ANTHRACENE	1	7.67
BENZO(A)PYRENE	1	6.98
BENZO(B)FLUORANTHENE	1	8.04
CHRYSENE	3.9	7.52
DIBENZO(A,H)ANTHRACENE	0.33	1.19
INDENO(1,2,3-CD)PYRENE	0.5	4.80
METALS (mg/kg)		
MERCURY	0.81	0.84

APPROXIMATE AREA OF MATERIAL STOCKPILES

GREENWOOD CEMETERY MAINTENANCE

BLOCK 693
LOT 1

RESIDENTIAL

2-STORY BUILDING

WOODED AREA

SIDEWALK

LOT 39

GP-6

GP-4

TRC-DSB-2

TRC-MW-3

GP-5

TRC-DSB-1

TRC-DSB-3

TRC-MW-2

UNPAVED AREA

ASPHALT PAVED

GP-3

TRC-MW-4

5TH AVENUE

2-STORY BUILDING

TRC-SB-1

GP-2

TRC-SB-2

TRC-MW-1

GP-1

CAR WASH

SITE

COMMERCIAL

MELODY LANES BOWLING CENTER

GASOLINE STATION

36TH STREET

GREENWOOD CEMETERY

MTA JACKIE GLEASON BUS DEPOT

SOURCE:
BLOCK AND LOT BOUNDARIES FROM WWW.PROPERTYSHARK.COM

LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- X/0 — FILL/VENT LINE
- GP-X — SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY D&B)
- TRC-SB-X — SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-DSB-X — DELINEATION SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-MW-X — PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- SUSPECT 1,500-GALLON UST
- BOILER ROOM

W – N – E

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. D - DILUTION REQUIRED
3. FT BGS - FEET BELOW GROUND SURFACE
4. mg/kg - MILLIGRAMS PER KILOGRAM
5. J - ESTIMATED VALUE
6. UST - UNDERGROUND STORAGE TANK
7. RRUSCO - 6 NYCRR PART 375 RESTRICTED-RESIDENTIAL USE SOIL CLEANUP OBJECTIVE
8. SOIL BORINGS TRC-DSB-1 AND GP-5 WERE CO-LOCATED. DUE TO THE SCALE OF THE FIGURE, THE SYMBOL FOR TRC-DSB-1 ONLY IS SHOWN.

0 40' 80'

SCALE: 1" = 40'
SHEET SIZE: 11" BY 17"

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:
EXCEEDANCES OF RESTRICTED-RESIDENTIAL USE SOIL CLEANUP OBJECTIVES

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 14**
DATE:	SEPTEMBER 2018		

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New York, NY 10018
Phone: 212.221.7822

FILE NO.: Figure 14 - Exceed. of Restrict. Res. Use SCOs.dwg

BORING	GP-6	
DATE	01/04/17	01/04/17
INTERVAL (FT BGS)	1-3	10-12
TCLP LEAD (mg/L)	0.033	--

BORING	TRC-DSB-2	
DATE	02/14/17	02/14/17
INTERVAL (FT BGS)	10-15	18-20
TCLP LEAD (mg/L)	3.9	<0.50

BORING	GP-5	
DATE	01/03/17	01/03/17
INTERVAL (FT BGS)	1-3	10-12
TCLP LEAD (mg/L)	--	43

BORING	TRC-DSB-1	
DATE	2/14/2017	2/14/2017
INTERVAL (FT BGS)	12-14	18-20
TCLP LEAD (mg/L)	13.9	0.97

BORING	GP-4	
DATE	12/28/16	12/28/16
INTERVAL (FT BGS)	1-3	10-12
TCLP LEAD (mg/L)	2.7	--

BORING	TRC-DSB-3	
DATE	02/14/17	02/14/17
INTERVAL (FT BGS)	10-15	18-20
TCLP LEAD (mg/L)	--	<0.50

BORING	TRC-SB-1	
DATE	02/14/17	02/14/17
INTERVAL (FT BGS)	1-3	10-12
TCLP LEAD (mg/L)	<0.50	--

BORING	TRC-MW-3		
DATE	2/14/2017	2/14/2017	2/14/2017
INTERVAL (FT BGS)	1-3	12-16	53-55
TCLP LEAD (mg/L)	0.57 D	<0.50	--

BORING	GP-2	
DATE	12/29/16	12/29/16
INTERVAL (FT BGS)	1-3	10-12
TCLP LEAD (mg/L)	--	--

BORING	GP-3	
DATE	12/27/16	12/27/16
INTERVAL (FT BGS)	1-3	10-12
TCLP LEAD (mg/L)	0.11	--

BORING	GP-1	
DATE	12/30/16	12/30/16
INTERVAL (FT BGS)	1-3	10-12
TCLP LEAD (mg/L)	0.27	--

BORING	TRC-MW-2		
DATE	2/13/2017	2/13/2017	2/13/2017
INTERVAL (FT BGS)	1-3	10-12	48-50
TCLP LEAD (mg/L)	<0.50	--	--

BORING	TRC-SB-2
DATE	2/14/2017
INTERVAL (FT BGS)	0.5-1.5
TCLP LEAD (mg/L)	<0.50

GREENWOOD CEMETERY MAINTENANCE

APPROXIMATE AREA OF MATERIAL STOCKPILES

BLOCK 693
LOT 1

LOT 39

RESIDENTIAL

2-STORY BUILDING

FIRST FLOOR CHURCH

3-STORY BUILDING

UNPAVED AREA

WOODED AREA

SIDEWALK

ASPHALT PAVED

2-STORY BUILDING

CAR WASH

GASOLINE STATION

COMMERCIAL

MELODY LANES BOWLING CENTER

GREENWOOD CEMETERY

MTA JACKIE GLEASON BUS DEPOT

5TH AVENUE

36TH STREET

GP-1 GP-2 GP-3 GP-4 GP-5 GP-6

TRC-SB-1 TRC-SB-2

TRC-DSB-1 TRC-DSB-2 TRC-DSB-3

TRC-MW-1 TRC-MW-2 TRC-MW-3 TRC-MW-4

X/0

SITE

SOURCE:
BLOCK AND LOT BOUNDARIES FROM WWW.PROPERTYSHARK.COM

LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- X/0 — FILL/VENT LINE
- GP-X — SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY D&B)
- TRC-SB-X — SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-DSB-X — DELINEATION SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-MW-X — PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- SUSPECT 1,500-GALLON UST
- BOILER ROOM

W N E

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. D - DILUTION REQUIRED
3. FT BGS - FEET BELOW GROUND SURFACE
4. mg/L - MILLIGRAMS PER LITER
5. - - NOT ANALYZED
6. UST - UNDERGROUND STORAGE TANK
7. TCLP - TOXICITY CHARACTERISTIC LEACHING PROCEDURE
8. SHADED VALUES EXCEED THE REGULATORY LIMIT FOR LEACHABLE LEAD (5 mg/L).
9. SOIL BORINGS TRC-DSB-1 AND GP-5 WERE CO-LOCATED. DUE TO THE SCALE OF THE FIGURE, THE SYMBOL FOR TRC-DSB-1 ONLY IS SHOWN.

0 40' 80'

SCALE: 1" = 40'
SHEET SIZE: 11" BY 17"

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:

RESULTS OF TCLP ANALYSIS FOR LEAD IN SOIL

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 15**
DATE:	SEPTEMBER 2018		

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10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO.: Figure 15 - Results of TCLP Analysis for Lead in Soil.dwg

GW-6			
VOCs (µg/L)	CLASS GA VALUE	1/5/2017	
CHLOROFORM	7	8.8	
MTBE	10	100	
FORMALDEHYDE	8	1,400	
SVOC (µg/L)			
BIS(2-ETHYLHEXYL)PHTHALATE (BEHP)	5	6.7	J
METALS (mg/L)			
MANGANESE	0.3	0.34	

GW-4			
VOCs (µg/L)	CLASS GA VALUE	12/29/2016	
CHLOROFORM	7	10	
MTBE	10	2,200	
METALS (mg/L)			
MANGANESE	0.3	7.0	

TRC-MW-2					
VOCs (µg/L)	CLASS GA VALUE	2/21/2017		3/10/2017	
CHLOROFORM	7	25.9		20.8	

GW-2		
VOCs (µg/L)	CLASS GA VALUE	12/29/2016
FORMALDEHYDE	8	2,700
METALS (mg/L)		
MANGANESE	0.3	1.0

TRC-MW-1					
VOCs (µg/L)	CLASS GA VALUE	2/21/2017		3/10/2017	
CHLOROFORM	7	9.4		<CLASS GA	
FORMALDEHYDE	8	84		NA	

GW-1			
VOCs (µg/L)	CLASS GA VALUE	1/3/2017	
MTBE	10	130	
METALS (mg/L)			
MANGANESE	0.3	19	

TRC-MW-3					
VOCs (µg/L)	CLASS GA VALUE	2/21/2017		3/10/2017	
1,1,1-TRICHLOROETHANE	5	6.6		7.9	
CHLOROFORM	7	8.1		<CLASS GA	

GW-5			
VOCs (µg/L)	CLASS GA VALUE	1/4/2017	
CHLOROFORM	7	8.4	
TOLUENE	5	9.1	
FORMALDEHYDE	8	66	
SVOCs (µg/L)			
BENZO(A)ANTHRACENE	0.002	3.7	J
BIS(2-ETHYLHEXYL)PHTHALATE (BEHP)	5	10	
CHRYSENE	0.002	3.4	J
METALS (mg/L)			
MANGANESE	0.3	2.5	

TRC-MW-4					
VOCs (µg/L)	CLASS GA VALUE	2/21/2017	2/21/2017		3/10/2017
CIS-1,2-DICHLOROETHENE	5	7.4	7.9		6.4

GW-3			
VOCs (µg/L)	CLASS GA VALUE	12/28/2016	
CHLOROFORM	7	9.3	
FORMALDEHYDE	8	55	
METALS (mg/L)			
ANTIMONY	0.003	0.047	J
MANGANESE	0.3	0.40	

GREENWOOD CEMETERY MAINTENANCE

BLOCK 693
LOT 1

APPROXIMATE AREA OF MATERIAL STOCKPILES

2-STORY BUILDING

WOODED AREA

LOT 39

UNPAVED AREA

3-STORY BUILDING

FIRST FLOOR CHURCH

ASPHALT PAVED

SIDEWALK

2-STORY BUILDING

CAR WASH

COMMERCIAL

GASOLINE STATION

SITE

GREENWOOD CEMETERY

MELODY LANES BOWLING CENTER

MTA JACKIE GLEASON BUS DEPOT

5TH AVENUE

36TH STREET

GW-1 GW-2 GW-3 GW-4 GW-5 GW-6
TRC-MW-1 TRC-MW-2 TRC-MW-3 TRC-MW-4

SOURCE:
BLOCK AND LOT BOUNDARIES FROM WWW.PROPERTYSHARK.COM

LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- FILL VENT LINE
- GW-X — GROUNDWATER SAMPLE LOCATION AND IDENTIFICATION NUMBER (TEMPORARY WELL POINT PERFORMED BY D&B)
- TRC-MW-X — PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- SUSPECT 1,500-GALLON UST
- BOILER ROOM

W – N – E

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. VOC - VOLATILE ORGANIC COMPOUND
3. SVOC - SEMIVOLATILE ORGANIC COMPOUND
4. g L - MICROGRAMS PER LITER
5. mg - MILLIGRAMS PER LITER
6. J - ESTIMATED VALUE
7. NA - NOT ANALYZED
8. UST - UNDERGROUND STORAGE TANK
9. MTBE - METHYL TERT-BUTYL ETHER
10. CLASS GA VALUE - NEW YORK STATE CLASS GA GROUNDWATER STANDARDS AND GUIDANCE VALUES PUBLISHED IN THE NYSDEC TOGS 1.1.1, AMBIENT WATER UALITY STANDARDS AND GUIDANCE VALUES.
11. EXCEEDANCES OF CLASS GA VALUES FOR UNFILTERED METALS ARE NOT SHOWN.

0 40' 80'

SCALE: 1" = 40'
SHEET SIZE: 11" BY 17"

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:
EXCEEDANCES OF CLASS GA VALUES IN GROUNDWATER

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 16**
DATE:	SEPTEMBER 2018		

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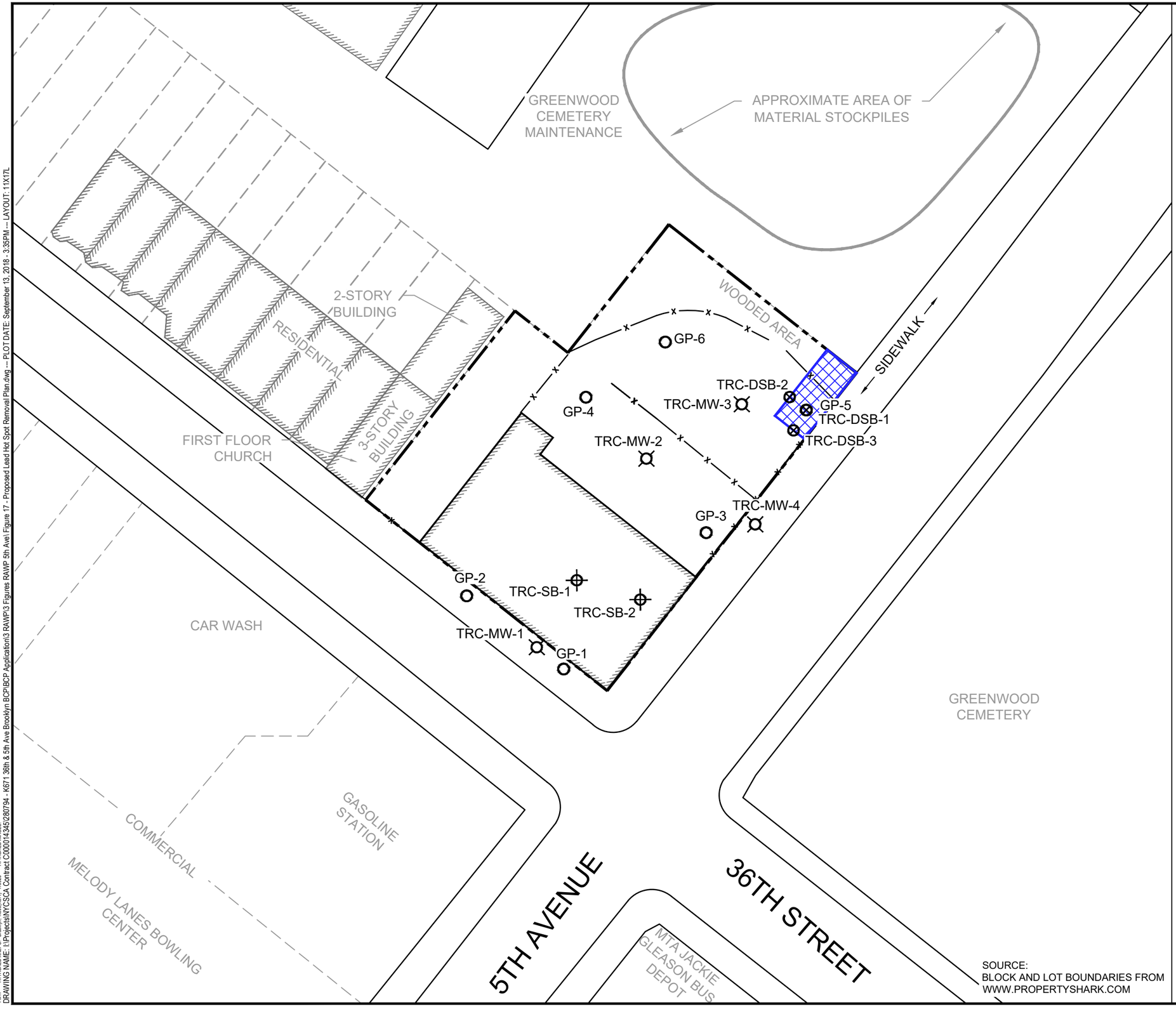
10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO.: Figure 16 - E eed. o Class GA Values in GW.dwg



SOURCE:
BLOCK AND LOT BOUNDARIES FROM WWW.PROPERTYSHARK.COM

LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- GP-X — SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY D&B)
- TRC-SB-X — SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-DSB-X — DELINEATION SOIL BORING LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- TRC-MW-X — PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (PERFORMED BY TRC)
- PROPOSED LIMITS OF EXCAVATION (18' BELOW GROUND SURFACE)

W – N – E

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. SOIL BORINGS TRC-DSB-1 AND GP-5 WERE CO-LOCATED. DUE TO THE SCALE OF THE FIGURE, THE SYMBOL FOR TRC-DSB-1 ONLY IS SHOWN.

0 40' 80'

SCALE: 1" = 40'
SHEET SIZE: 11" BY 17"

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

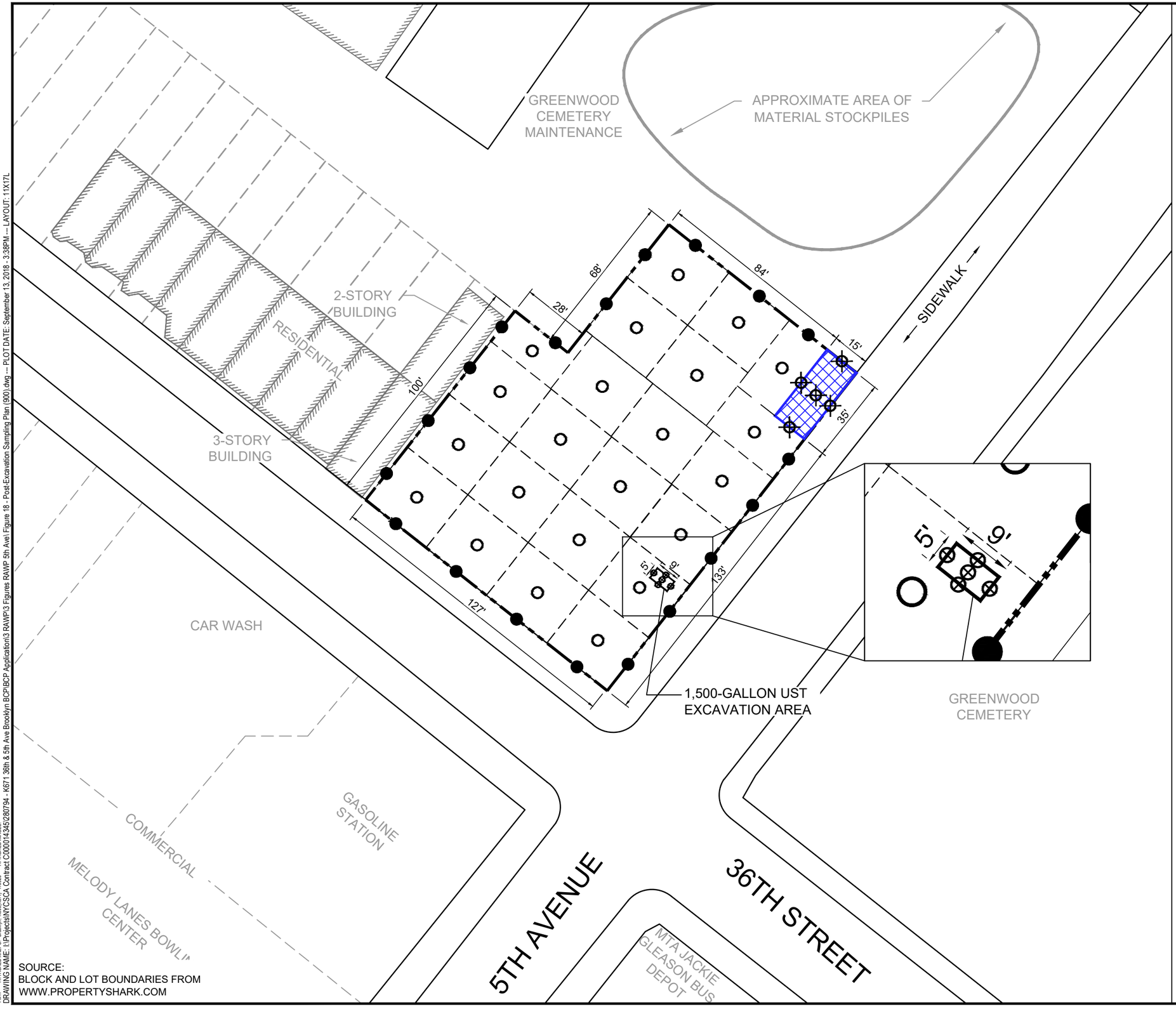
TITLE:

PROPOSED LEAD HOT SPOT REMOVAL PLAN

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 17**
DATE:	SEPTEMBER 2018		

TRC
1430 Broadway
10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO.: Figure 17 - Proposed Lead Hot Spot Removal Plan.dwg



SOURCE:
BLOCK AND LOT BOUNDARIES FROM
WWW.PROPERTYSHARK.COM

LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- FENCE
- PROPOSED NON-HAZARDOUS SOIL REMOVAL POST-EXCAVATION SAMPLE LOCATION
- PROPOSED NON-HAZARDOUS SOIL REMOVAL POST-EXCAVATION SIDEWALL SAMPLE LOCATION
- PROPOSED HAZARDOUS LEAD SOIL REMOVAL POST-EXCAVATION SAMPLE LOCATION
- PROPOSED UST EXCAVATION AREA POST-EXCAVATION SAMPLE LOCATION
- HAZARDOUS LEAD EXCAVATION AREA (18' BELOW GROUND SURFACE)
- EXCAVATION AREA REPRESENTING APPROXIMATELY 900 SQUARE FEET OF NON-HAZARDOUS MATERIAL.

W – N – E

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. THE PROPOSED HAZARDOUS SOIL EXCAVATION AREA IS APPROXIMATELY 525 SQUARE FEET. THE PROPOSED NON-HAZARDOUS SOIL EXCAVATION AREA IS APPROXIMATELY 19,000 SQUARE FEET.
3. HAZARDOUS SOIL EXCAVATION AND UST REMOVAL WILL BE COMPLETED INDEPENDENT FROM NON-HAZARDOUS SOIL EXCAVATION.
4. SHORING/SHEETING WILL BE INSTALLED ALONG THE MAJORITY OF THE PERIMETER OF THE SITE FOR EXCAVATION SUPPORT, WHICH MAY PREVENT COLLECTION OF SIDEWALL SOIL SAMPLES IN SOME AREAS. BEST EFFORTS WILL BE MAKE TO COLLECT ONE SIDEWALL SAMPLE EVERY 30 LINEAR FEET.

0 40' 80'

SCALE: 1" = 40'
SHEET SIZE: 11" BY 17"

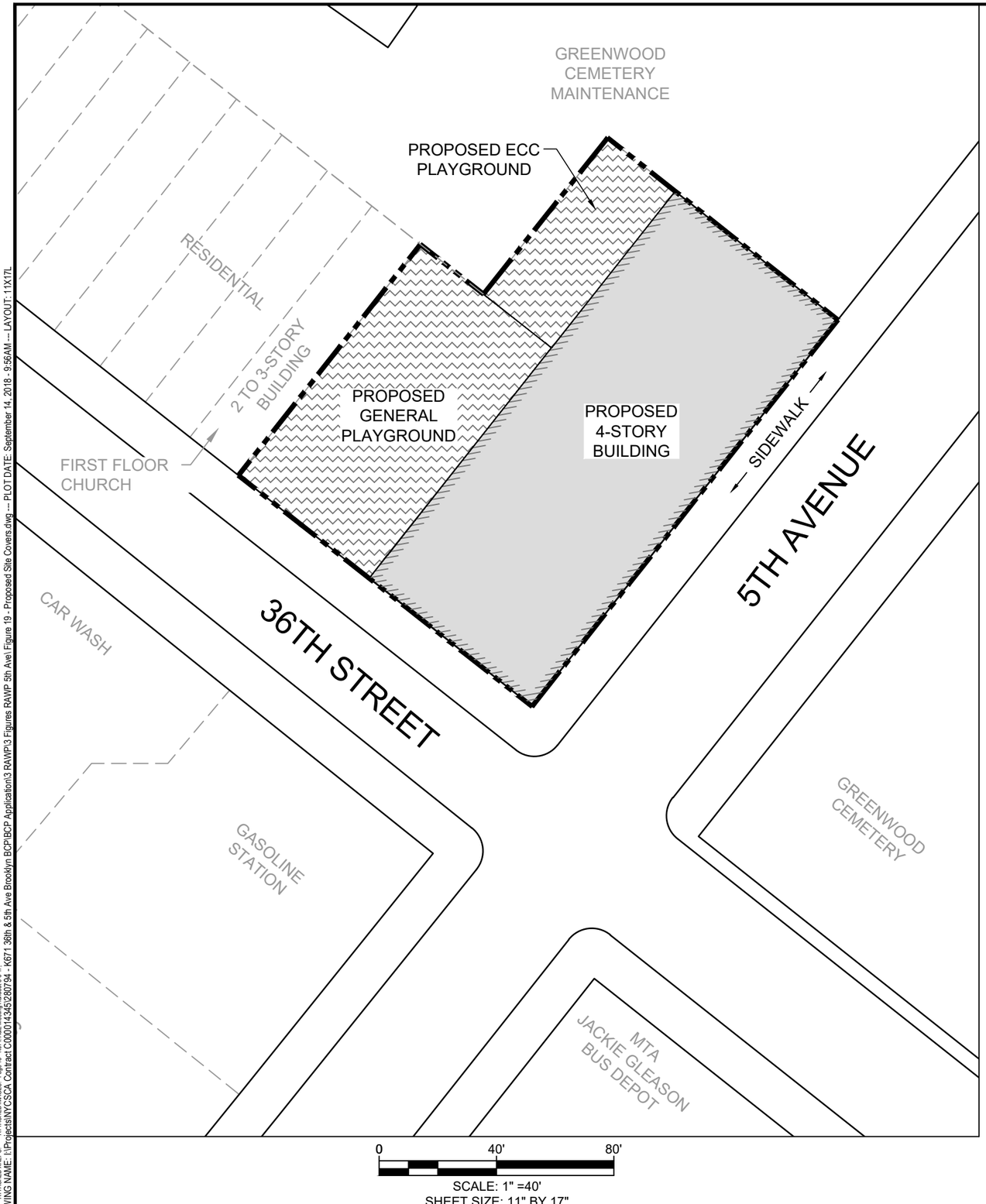
PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:
PROPOSED POST-EXCAVATION SAMPLE LOCATION PLAN

DRAWN BY:	P. CASTELLANO	PROJ NO.:	280794
CHECKED BY:	L. O'HARA		
APPROVED BY:	D. GLASS		**FIGURE 18**
DATE:	SEPTEMBER 2018		

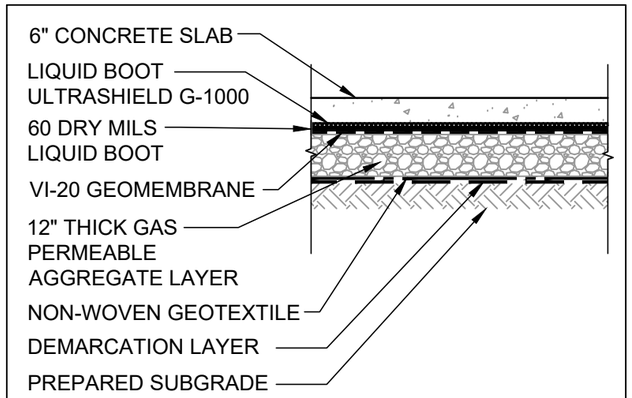
TRC
1430 Broadway
10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO.: Figure 18 - Post-Exc□□tio□ S□m□□g P□□ (900).dwg

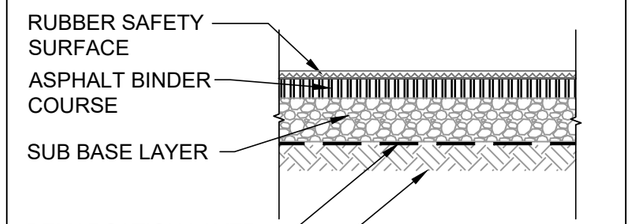


LEGEND (SYMBOLS NOT TO SCALE):

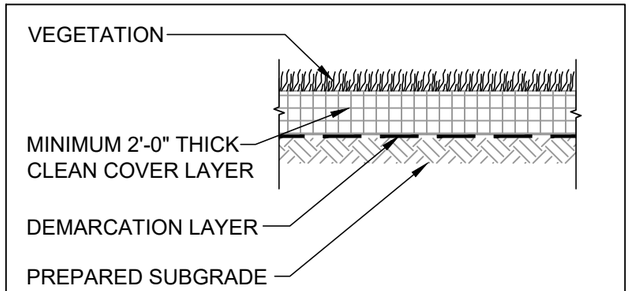
- BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- BUILDING FOOTPRINT
- LOT BOUNDARY
- STREET AND SIDEWALK BOUNDARIES
- CONCRETE BUILDING SLAB (REFER TO DETAIL A)
- RUBBER SAFETY SURFACE OVER ASPHALT (REFER TO DETAIL B)



DETAIL A - BUILDING
NTS



DETAIL B - PLAYGROUND
NTS



DETAIL C - LANDSCAPED AREAS (IF ANY)
NTS

NOTES:

1. DIMENSIONS AND LOCATIONS OF PHYSICAL FEATURES ARE APPROXIMATE.

SOURCE:
NYCSCA CONCEPTUAL PLAN (OPTION A) FOR PUBLIC SCHOOL PS671K, PREPARED BY GRAVES-MMA JV ARCHITECTS, PLLC, AUGUST 3, 2017.

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
REMEDIAL ACTION WORK PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:

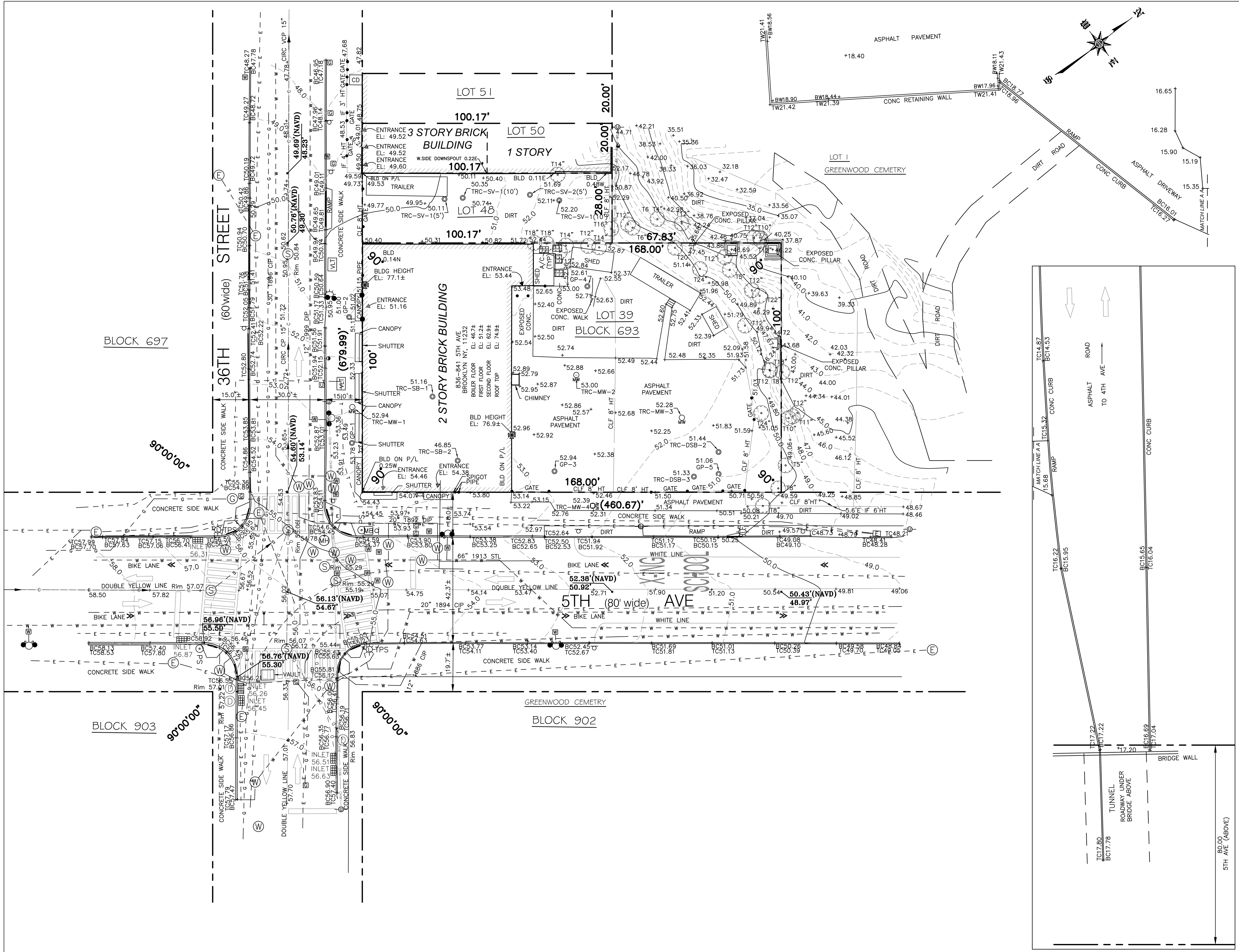
PROPOSED SITE COVERS

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 19**
DATE:	SEPTEMBER 2018		

TRC
1430 Broadway
10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO.: Figure 19 - Proposed Site Covers.dwg

APPENDIX A
SITE SURVEY



PARCEL AREA

Block 693 Lot 39 & 48
LOT AREA: 19,604.8± SQ. FT.
SURVEYED AREA: 62,173± SQ. FT.

BROOKLYN HIGHWAY DATUM
0.00 (NAVD 1988)
0.00 (NGVD 1929)
1.46 / 1.1 / 2.56

NAVD 1988 IS 1.46 FEET BELOW THE BROOKLYN HIGHWAY DATUM

0 20 40 60
Scale: 1" = 20'

GENERAL NOTES

1. PROPERTY SURVEYED IS A LOT 39 & 48 BLOCK 693 AS SHOWN ON THE NEW YORK CITY DIGITAL TAX MAP OF THE BOROUGH OF BROOKLYN AND COUNTY OF KINGS, CITY AND STATE OF NEW YORK.
2. ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM (NAVD88) WHICH IS 1.1 FEET ABOVE THE U.S. COAST AND GEODETIC SURVEY MEAN SEA LEVEL DATUM (NGVD29) AND 1.46 FEET BELOW BOROUGH OF BROOKLYN HIGHWAY DATUM
3. WATER MAINS SIZES AND LOCATIONS SHOWN HEREON WERE SUPPLIED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) RECORDS. LOCATIONS OF WATER SUPPLY MANHOLES, HYDRANTS AND WATER VALVES WERE OBTAINED FROM FIELD MEASUREMENT.
4. SIZES AND TYPES OF SEWERS SHOWN HEREON WERE OBTAINED FROM DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) RECORDS. SEWER MANHOLE RIM AND INVERT ELEVATIONS SHOWN HEREON WERE OBTAINED BY FIELD MEASUREMENTS UNLESS OTHERWISE INDICATED. THE ANNOTATION '(R)' DENOTES INFORMATION SHOWN HAS BEEN OBTAINED FROM THE DEP RECORDS.
5. LOCATIONS OF ALL UTILITIES AND SUBSTRUCTURES ARE APPROXIMATE ONLY. THE INFORMATION GIVEN ON THE SURVEY PERTAINING TO UTILITIES AND SUBSTRUCTURES IS NOT CERTIFIED AS TO ACCURACY OR COMPLETENESS. CONSULT WITH THE APPROPRIATE COMPANY OR AGENCY BEFORE DESIGNING IMPROVEMENTS.
6. ADDITIONAL UNDERGROUND UTILITIES MAY EXIST. NOT ALL SUBSURFACE INFORMATION PLOTTED.
7. THE OWNER, CONTRACTOR AND/OR HIS AGENTS MUST NOTIFY THE APPROPRIATE UTILITY COMPANIES AND/OR AGENCIES AT LEAST 72 HOURS PRIOR TO ANY CONSTRUCTION IN ACCORDANCE WITH INDUSTRIAL CODE RULE 753.
8. NO EVIDENCE OF EXISTING STREAMS, CREEKS, DITCHES OR WATER COURSES ON/OR CROSSING PROPERTY SURVEYED, OTHER THAN THOSE SHOWN.
9. NON VISIBLE EASEMENTS, RECORDED OR UNRECORDED, NOT SHOWN HEREON.
10. SECTIONS WERE TAKEN AT 25'± INTERVALS, UNLESS OTHERWISE NOTED
11. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT.
12. ENCROACHMENTS AND VAULTS, IF ANY, BELOW SURFACE NOT SHOWN HEREON.

ABBREVIATIONS

BC	BOTTOM OF CURB	I/A	INACCESSIBLE
BLD. HT	BUILDING HEIGHT	VP	VENT PIPE
CB	CATCH BASIN	MTL	METAL
C.C.	CURB CUT	OHW	OVERHEAD WIRES
CE	CELLAR ENTRANCE	PL	PROPERTY LINE
CLF	CHAIN LINK FENCE	PLAT.	PLATFORM
C.W.A.	CELLAR WINDOW AIR	PR	PEDESTRIAN RAMP
CL	CENTER LINE	R/W	RIGHT-OF-WAY
EB	ELECTRIC BOX	SQ.FT.	SQUARE FEET
EL	ELEVATION	SFC	STEEL FACE CURB
FF	FINISHED FLOOR ELEVATION	TC	TOP OF CURB
FH	FIRE HYDRANT	TW	TOP OF WALL
GV	GAS VALVE	TSP	TRAFFIC SIGNAL POLE
GP	GUARD POST	WV	WATER VALVE
LP	LIGHTING POLE	UP/UPL	UTILITY POLE/AND LIGHT
MH	MANHOLE	(R)	AS PER RECORDS
MW	MONITORING WELL	TBRW	TIMBER RETAINING WALL
OH EL	OVERHEAD ELEVATION	WB	WINDOW BOTTOM
GR	GRATE	WT	WINDOW TOP
CFC	CONCRETE FACE CURB	RL	ROOF LEADER
TOC	TOP OF CAP	CD	CELLAR DOOR
BOT	BOTTOM	A/C	AIR CONDITIONER

FLOOD HAZARD NOTE

THE PARCEL SURVEYED IS COMPRISED OF AREAS DESIGNATED AS
ZONE X (LESS THAN 0.2% CHANCE OF FLOODING)
FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
COMMUNITY PANEL NUMBER 3604970 194 G
PRELIMINARY FIRM RELEASE
EFFECTIVE DATE DECEMBER 5, 2013

LEGEND OF SYMBOLS

BICYCLE LANE /PATH
CATCH BASIN
CATCH BASIN ROUND
CATV CABLE TV BOX
DRINKING FOUNTAIN
DRAINAGE MANHOLE
ELECTRIC BOX
ELECTRIC MANHOLE
FLOODLIGHT
FLOODLIGHT WITH DIRECTION
FB FIRE BOX
FIRE MANHOLE
FLAG POLE
GAS VALVE
GAS MANHOLE
GUIDE WIRE
HYDRANT
HANDICAP RAMP
14.39 LEGAL/ESTABLISHED GRADE
14.39(I) INTERPOLATED LEGAL GRADE
MONUMENT
MB MAIL BOX
METAL POST
MW MONITORING WELL
PARK LIGHT
PS STREET LIGHT PEDESTRIAN SIGNAL
PS PEDESTRIAN SIGNAL
TPS STREET LIGHT AND TRAFFIC SIGNAL WITH PEDESTRIAN SIGNAL
WOOD UTILITY POLE WITH STREET LIGHT
PARKING METER
QC QUICK COUPLING VALVE
RAILROAD MANHOLE
STREET LIGHT
STREET LIGHT/TRAFFIC LIGHT COMBO
SEWER MANHOLE
SEWER CLEANOUT
SPRINKLER HEAD
SPRINKLER
T16" TREE WITH TRUNK DIAMETER
TRAVERSE POINT
TRAFFIC DIRECTION
TRAFFIC LIGHT
TELEPHONE BOX
SIGN POST
MULTIPLE SIGN POST
TB TELEPHONE BOOTH
TV TV MANHOLE
TELEPHONE MANHOLE
UTILITY POLE
MH UTILITY MANHOLE
UNKNOWN VALVE
WATER VALVE
WATER MANHOLE
WELL
PS WOOD UTILITY POLE WITH PEDESTRIAN SIGNAL
TPS TRAFFIC SIGNAL POST W/PEDESTRIAN SIGNAL
T STREET LIGHT AND TRAFFIC SIGNAL

W — W UNDERGROUND WATER LINE
S — S — S UNDERGROUND SANITARY LINE
C — C UNDERGROUND COMBINED SEWER
D — D — D UNDERGROUND DRAINAGE LINE
G — G — G UNDERGROUND GAS LINE
E — E — E UNDERGROUND ELECTRIC LINE
OHW — OHW OVERHEAD WIRE
97.0 MINOR CONTOUR (1' INTERVAL)
95.0 MAJOR CONTOUR (5' INTERVAL)
CURB CUT
HAND RAIL
IRON FENCE
CHAIN LINK FENCE
PROPERTY LINE

Architecture & Engineering

E. Bruce Barrett, R.A. LEED A.P., Vice President
Elan R. Abneri, P.E., Senior Director, Design Consultant Management
Stanley Dahir, R.A., Director, Quality Control & Construction Support
María A. Gómez, P.E., LEED A.P., Director, A&E In-House Design
George D. Roussey, P.E., LEED A.P., Director, Technical Standards
Stacey Spann-Thom, Director, Operations Support

Consultants:
Ewell W. Finley, P.C.
Consulting Engineers &
Land Surveyors
333 W. 39th Street,Suite 201
New York, NY 10018
LICENSED LAND SURVEYOR

NOTE Drawing may be printed at reduced scale

No.	Date	Revision
1	10/30/2017	ADDITIONAL TOPO

Key Plan: 36TH ST / 5TH AVE
Block #693 Lot #39 & #48

SCA Design Manager:	
Project Architect/Engineer:	
Discipline Lead:	
Designer:	
Drawn by:	X.HUANG
Checked by:	N.REID
Design No:	Facility Code: K671 / Date: 10/23/2017

NORMAN REID, PLS
PROFESSIONAL LAND SURVEYOR
LICENSE NO. 050225

Project: K000(K671) BROOKLYN
Address: 836-841 5TH AVE, BROOKLYN 11232
Drawing Title: TOPOGRAPHICAL SURVEY PLAN

Drawing No.:
Sheets in Contract Set: 1 of 1
Sheets in DOB Set: of XXX

LEGAL DESCRIPITION

All that certain plot, piece or parcel of land, with buildings and improvements thereon erected, situate, lying and being in the Borough of Brooklyn, County of Kings, City and State of New York, known and designated as Lots 39 and 48 in Block 693 as shown on the New York City Digital Tax Map, bounded and described as follows:

BEGINNING at the corner formed by the intersection of the northerly side of 36th Street (60 feet wide) and the westerly side of 5th Avenue (80.00 feet wide), also known as the South-easterly corner of New York City School Construction Authority Public School Number K671;

Thence run Westerly along the northerly side of 36th Street a distance of 128.00 feet to a point;

Thence run Northerly at right angle to the last-mentioned course a distance of 100.17 feet to a point on the southerly line of Greenwood Cemetery;

Thence run the following three courses along southerly and easterly lines of said Cemetery;

1) Easterly at right angle to the last-mentioned course for a distance of 28.00 feet to a point;

2) Northerly at right angle to the last-mentioned course for a distance of 67.83 feet to a point;

3) Easterly at right angle to the last-mentioned course for a distance of 100.00 feet to a point on the westerly side of 5th Avenue;

Thence run Southerly at right side angle to the last-mentioned course a distance of 168.00 feet along the westerly side of 5th Avenue to the point or place of beginning containing an area of 19,605 square feet more or less.

APPENDIX B
HEALTH AND SAFETY PLAN

SITE-SPECIFIC HEALTH AND SAFETY PLAN FOR

REMEDIATION ACTIVITIES

AT

Proposed Public School K671

Brownfield Cleanup Program Site No. C224271
840 5th Avenue
Brooklyn, New York 11232

Prepared by:

TRC Engineers, Inc.
1430 Broadway, 10th Floor
New York, New York 10018

TRC Project Number: 280794

September 2018

DISCLAIMER

STRICT ADHERENCE TO THE HEALTH AND SAFETY GUIDELINES SET FORTH HEREIN WILL REDUCE, BUT NOT ELIMINATE, THE POTENTIAL FOR INJURY AT THESE SITES. THE HEALTH AND SAFETY GUIDELINES IN THIS HEALTH AND SAFETY PLAN WERE PREPARED SPECIFICALLY FOR THIS PROJECT AND SHOULD NOT BE USED ON ANY OTHER SITE OR PROJECT WITHOUT PRIOR RESEARCH AND EVALUATION BY TRAINED HEALTH AND SAFETY SPECIALISTS.

TABLE OF CONTENTS

Section **Page**

ATTACHMENTS

1.0 SITE INFORMATION

1.1 Introduction

The following is the Health and Safety Plan (HASP) for remediation activities at the proposed public school K671 located at 840 5th Avenue, Brooklyn, New York 11232 (the "Site"). A detailed scope of work is described in the Remedial Action Work Plan (RAWP).

The site-specific safety plan was developed from Site visits and investigations as well as appropriate project documents. Revisions and/or alterations to this HASP may become necessary as more information becomes available. Any proposed changes to this HASP will be approved by the Health & Safety Coordinator prior to implementation. All on-site personnel are required to read, review, and strictly comply with the HASP as well as sign the Health and Safety Plan Acceptance in **Attachment A**. It is the responsibility of the Project Manager or designee to ensure that the HASP is implemented and enforced.

1.2 Purpose

The Site remediation tasks and objectives are the mitigation of human contact with soil vapor, groundwater, and soil impacted by volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), pesticides, and metals. Remedial measures described herein will be performed in accordance with this HASP and applicable federal, state, and local regulations.

1.3 Site Description and History

The Site formerly consisted of two separate parcels as follows: 836-841 5th Avenue (Block 693, Lot 39) and 471 36th Street (Block 693, Lot 48). In March 2018, the lots merged and the new Site address is 840 5th Avenue (Block 693, Lot 39).

Eastern portion of the Site (formerly Block 693, Lot 39)

- Phase I Environmental Site Assessment (ESA) completed by Middleton Environmental Inc. (Middleton) in December 2000;
- Phase I ESA completed by D&B Engineers and Architects, P.C. (D&B) in December 2016;
- Supplemental Phase II ESI completed by TRC in February and March 2017.

Western portion of the Site (formerly Block 693, Lot 48)

- Phase I ESA completed by TRC in June 2017.

Phase I/Phase II Findings

The Phase I ESAs identified the following on-site recognized environmental conditions (RECs) associated with the Site: historic use as a train car repair shop with elevated platform (early 1900's) and manufacturing facility (1965 to 2007); potential presence of a UST on the eastern portion of the Site and a drum on the western portion of the Site with unknown status; and, potential historic fill of unknown origin and suspect buried structures. Identified off-site RECs with the potential to impact the Site included: the historic and current use of a nearby property as a bowling alley upgradient of the Site; historic presence of an adjoining elevated railroad along 5th Avenue; the historic presence of a dyeing facility and dry cleaners in close proximity to the Site; the historic and current presence of RCRA Non-Generator facilities and reported NY Spills upgradient from the Site. Other environmental concerns include asbestos-containing material (ACM), lead-based paint (LBP) and polychlorinated biphenyls (PCBs) in buried demolition debris and fill material.

D&B completed Phase II ESI field activities on the eastern portion of the Site in December 2016 and January 2017. The field activities consisted of a geophysical survey; a pre-probe asbestos survey; the advancement of soil borings; the installation of temporary soil vapor probes and temporary groundwater monitoring wells; and, the collection and laboratory analysis of soil vapor, soil, ambient air and groundwater samples. The geophysical survey did not reveal any buried structures and did not identify the location of the registered UST. Petroleum- and chlorinated solvent-related compounds were detected in soil vapor above the range of published background concentrations. The volatile organic compound (VOC) trichloroethene (TCE) was detected in soil vapor at concentrations exceeding Air Guideline Values. There were no exceedances reported for VOCs in the ambient air samples. Multiple SVOCs, metals, and pesticides were detected in soil samples at concentrations exceeding their respective Unrestricted Use Soil Clean-Up Objectives (SCOs). However, visual evidence of contamination was not identified. A potential hotspot was identified based on the presence of a leachable lead concentration that exceeded the Resource Conservation and Recovery Act (RCRA) toxicity characteristic standard. Groundwater samples revealed VOCs, SVOCs and metals above regulatory standards.

TRC completed a Supplemental Phase II ESI in February and March 2017. The field activities consisted of a comprehensive geophysical survey; advancement of soil borings; installation and survey of permanent monitoring wells; installation of temporary soil vapor probes and soil vapor points; collection of two synoptic rounds of water level measurements; and collection and laboratory analysis of soil vapor, sub-slab vapor, soil, and groundwater samples. The geophysical survey located the suspect UST in the northeastern portion of the Site building between the partial

basement and the northern building façade. Soil vapor samples collected from the western portion of the Site and sub-slab vapor samples collected beneath the existing building indicated concentrations of trichloroethane (TCA) exceeding background concentrations. The soil vapor results were compared to the matrices in the NYSDOH Soil Vapor Intrusion Guidance document and the recommended action is monitoring or mitigation, depending on the corresponding indoor air concentrations. Multiple SVOCs, metals, and pesticides were detected in soil samples above comparison criteria; however, the concentrations are attributable to historic operations and fill material. Detectable dioxin concentrations are attributable to the characteristics of fill material at the Site and may impact soil disposal options. A hazardous waste hotspot for lead was identified in the northeast corner of the Site that covers an area of 20 feet by 30 feet and extends to 18 feet below grade. Several VOCs were detected above Class GA Values however only chloroform and TCA were determined to likely be the result of an on-Site source. The synoptic rounds of water level measurements determined that groundwater flows primarily towards the northeast.

2.0 SCOPE OF WORK

Remedial activities to be implemented as part of the RAWP include:

- UST closure and removal;
- Excavation and disposal off-Site soil that exhibits the hazardous waste characteristics of toxicity for lead in one hot spot area;
- Post-excavation documentation/confirmatory soil sampling in the area of the hazardous lead hot spot, in the area of the UST area, and across the remainder of the Site in the non-hazardous soil areas;
- Excavation and disposal off-Site soil excavated as part of the proposed redevelopment;
- Installation of a demarcation layer; and
- Installation of a gas vapor barrier and sub-slab depressurization system (SSDS).

3.0 EMERGENCY AND TRC CONTACT NUMBERS

Ambulance: **911** Fire Department: **911**

Police Department: **911 (72nd Precinct (718) 965 6300)**

Hospital: **NYU Lutheran/Calvary Medical Center**

Emergency Center No.: **(718) 630 7000**

Hospital Address: **150 55th Street, Brooklyn, NY 11220**

HOSPITAL DIRECTIONS

NOTE: FOR ANY TYPE OF SERIOUS MEDICAL EMERGENCY, CALL 911 AND REQUEST AN AMBULANCE. NEW YORK CITY STREETS ARE OFTEN CONGESTED DUE TO HEAVY TRAFFIC, CONSTRUCTION AND DOUBLE-PARKED VEHICLES AND IT MAY BE DIFFICULT TO DRIVE TO THE EMERGENCY ROOM.

Refer to **Attachment B** for Hospital Route Direction with maps.

TRC Contacts

1. Project Manager

   Name: Daniel Schmidt

   Office/Division: New York, NY

   Office Phone: 212-221-7822 ext. 117

Cell Phone: 917-714-0228

2. Certified Industrial Hygienist

   Name: Jack Springston, CIH

   Office/Division: New York, NY

   Office Phone: 212-221-7822 ext. 108

3. National Safety Director

   Name: Mike Glenn

   Office/Division: Irvine, CA

   Office Phone: 949-727-7347

   Cell Phone: 949-697-7418

4. Office Safety Coordinator (OSC)

   Name: Wes Lindemuth, CHMM, CSP

   Office/Division: New York, NY

   Office Phone: 212-221-7822 ext. 103

   Cell Phone: 347-738-1452

5. Work Care can provide assistance in providing first aid advice and directing an injured worker to non-emergency medical care. WorkCare is a service that provides 24/7 access to an Occupational Healthcare physician or clinician.

   Work Care Incident Intervention: 888-449-7787 (refer to **Attachment C)**

6. Human Resource Manager

   Name: Suzanne Micallef

   Office/Division: Administrative

   Office Telephone: 978-656-3628

Refer to **Attachment D** for an emergency contact sheet with names and phone numbers of key project personnel.

4.0 HAZARD ASSESSMENT

4.1 Contaminants of Concern

Based on our understanding of the history of the Site and the results of previous environmental investigations performed at the Site, the following chemical hazards have been identified:

- The primary contaminants of concern in soil include semivolatile organic compounds (SVOCs) and metals (arsenic, copper, lead, and mercury) including hazardous concentrations of leachable lead.
- Groundwater contaminants of concern include volatile organic compounds (VOCs) (1,1,1-trichloroethane (TCA), chloroform, cis-1,2-dichloroethene (cis-1,2-DCE), formaldehyde, methyl tert-butyl ether (MTBE), and toluene), SVOCs, and metals (in filtered samples).
- Sub-slab vapor/soil vapor contaminants of concern include chlorinated volatile organic compounds (CVOCs) (TCA, vinyl chloride, and 1,1-dichloroethene (1,1-DCE))

Safety Data Sheets (SDS) for compounds of concern are provided in **Attachment E**.

4.2 Level of Protection

The Project Manager will continually evaluate levels of protection to be utilized by on-site personnel, with assistance from the Health & Safety Coordinator and the Industrial Hygienist. The levels of protection may be downgraded or upgraded, as necessary, with approval by the Project Manager.

5.0 ON-SITE OPERATION

5.1 First Aid Procedures for Chemical Exposures

EYE: If any chemicals come in contact with eyes, immediately wash the eyes with large amounts of water, occasionally lifting lower and upper lids. Get medical attention immediately.

BREATH: If person breathes large amounts of any chemicals, remove person to fresh air. If breathing has stopped, perform artificial respiration. Keep affected person warm and rested. Get medical attention as soon as possible.

SKIN: If any chemicals except those listed below come in contact with the skin, immediately wash skin with soap and water. Get medical attention promptly. If chemical penetrates clothing, immediately remove clothing and wash with soap and water.

SWALLOW: If any chemicals are swallowed get medical attention immediately

5.2 Chemical Hazards

Based on previous investigations completed at the Site, the presence of the following contaminants is expected in soil:

- Heavy metals, specifically lead. Soil that exhibits the hazardous waste characteristics of toxicity for lead was identified in one hot spot area at the Site.
- VOCs
- SVOCs
- Pesticides

5.3 Biological Hazards

During the course of the project, there is a potential for workers to come into contact with biological hazards, such as animals and their scat.

During Site operations, wild animals such as birds, rats, stray dogs or cats, raccoons, and other rodents and their scat may be encountered. Workers will use discretion and avoid all contact with wild animals and their scat. Avoid areas and habitats inside and outside work areas that are contaminated with scat. If unsafe conditions are noted (e.g., gross accumulations of scat or vermin infestations), work in these areas will be halted and reevaluated.

5.4 Physical Hazards

The physical hazards are anticipated to be low and are outlined in Table A-1 below.

TABLE A-1

PHYSICAL HAZARDS

HAZARD TYPE	KNOWN	POTENTIAL
Heat Stress/Cold Stress		**X**
Severe Weather (lightning, snow, sleet)		**X**
Excessive Noise	**X**	
Facility Operations (machinery, structures)		**X**
Unstable ground (wet areas)		**X**
Site Operations (drilling, hand and power tool use)	**X**	
Heavy lifting/moving		**X**
Hazardous materials use & storage		**X**
Fire		**X**
Slips, trips, and falls	**X**	
Cuts, punctures		**X**

TRC personnel can avoid most of the hazards listed above including hand tools, hazardous materials use, slips, trips and falls, and punctures and cuts by remaining alert and performing safe work practices during all site activities. Other proper work practices are outlined below.

1. To avoid falling objects:
    - Do not walk or stand under suspended/overhead loads (including scaffolding).
    - Be aware of falling objects in the work area.
    - Secure overhead objects.
2. When using hand tools:
    - Hand tools will meet the manufacturer's safety standards.
    - Hand tools will not be altered in any way.
    - Makeshift tools will not be used.
    - At a minimum, eye protection will be used when working with hand tools.
    - Wrenches, including adjustable, pipe, end and socket wrenches, will not be used when jaws are sprung to the point that slippage occurs.

- Impact tools such as drift pins, wedges and chisels, will be kept free of mushroom heads.
- Wooden handles will be free of splinters or cracks and secured tightly to the tool.

3. Overhead Wires and Underground Utilities:

   If contact is possible (i.e., ladder, equipment, crane lift, etc.) one or more of the following will be done:

   - Power sources will be disconnected by the utility;
   - Power sources will be shielded by the utility; and
   - Object will get no closure than 12' to prevent arcing.

4. Slips, Trips and Falls:

   - Proper lighting will be maintained at all times.
   - Walkways will remain clear and unobstructed at all times.
   - When possible, cords, hose lines, etc., will be raised to reduce or eliminate trip hazards.

5.5 Cold Stress

The single most important aspect of hypothermia (cold stress) is the fall in the deep core temperature of the body. Workers should be protected from exposure to cold so that the deep core temperature does not fall below 36ºC (96.8ºF). Lower body temperatures will very likely result in reduced mental alertness, reduction in rational decision-making, or loss of consciousness.

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 35ºC (95ºF). This must be taken as a sign of danger to the workers and exposure to cold should be immediately terminated for all workers when severe shivering becomes evident. Useful physical, or mental work is limited when severe shivering occurs.

Since prolonged exposure to cold air at temperatures well above freezing can lead to dangerous hypothermia, whole body protection must be provided. Adequate insulating clothing to maintain core temperatures above 36ºC must be provided to workers if work is performed in air temperatures below 4ºC (40ºF). In addition, it should be kept in mind that, the higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.

To prevent cold stress, Contractor personnel will be encouraged to maintain an optimal level of physical fitness, and to maintain body fluids at normal levels. Workers will be encouraged to drink

water before beginning work and frequently during the day. TRC personnel and subcontractors will be instructed to recognize symptoms of and measures to prevent cold stress prior to the commencement of field activities.

5.6 Noise

Approved hearing protection will be required in work areas involving heavy equipment, impact tools, drilling, etc. In general, hearing protection should be worn if an individual cannot be heard in a normal speaking voice at a distance of two feet.

5.7 Electrical Utility Hazards

TRC will implement the following subsurface utility clearance procedure:

- TRC will review available site plans for work involving activities at or near utilities.
- TRC's utility mark-out subcontractor will conduct a geophysical survey around all proposed intrusive locations to identify subsurface electric utilities and mark the centerline of underground lines.
- The drilling or excavation contractor will notify the NYC One Call Center at (800) 272-4480, in accordance with Code 753, a minimum of 5 working days prior to any drilling or excavation on streets and sidewalks.

5.8 Mechanical Hazards

The mechanical hazards are anticipated to be associated with excavation activities and loading of trucks using a backhoe/excavator. The following precautions will be taken around construction equipment and excavations:

- Ensure the equipment operator is aware of the location of on-site personnel at all times to avoid potential injuries (e.g., maintain eye contact with the equipment operator). A spotter should be used to direct the movement of heavy equipment. A swing zone should be established with cones behind any excavators to prevent injury during movement of equipment.
- Exercise caution and wear protective equipment around the equipment to guard against crushing and pinching hazards. On-site personnel will maintain a distance (approximately 10 feet) from mechanical hazards associated with heavy equipment.
- Perimeter protection in the form of barricades is necessary for the protection of employees and subcontractor personnel and the public. Such protection will meet requirements set forth in 29 CFR 1926, as well as in the New York City Building Code, Article 19.

- All field team members working near/with equipment with emergency shut-off switches should be aware of the locations and situations when these switches should be used.

5.9 Air Monitoring Requirements

Real-time air monitoring for VOCs and observations of particulate levels at the perimeter of the work areas will be completed during intrusive activities. Continuous monitoring and observations will be required for all intrusive work activity. A detailed description of the Community Air Monitoring Plan (CAMP) is provided as Appendix D to the Remedial Action Work Plan (RAWP).

OSHA Permissible Exposure Limit (PEL)

The OSHA PEL, for benzene, which will be used to determine the appropriate respiratory protection, is 1 part per million (ppm) over an 8-hour time-weighted average or 5 ppm over 15 minutes. This value is based upon the OSHA PEL for benzene, which, of the VOC constituents of petroleum compounds, has the lowest PEL.

Respiratory Protection

It is unlikely that respiratory protection will be required during implementation of the work plan. TRC's health and safety goal is to avoid using respiratory protection unless it is absolutely necessary or required. Administrative controls or engineering controls should always be considered as a means to reduce potential exposures before PPE is required. If air monitoring measurements indicate that levels of organic vapors have reached 5 ppm, workers will cease work in the area until levels of organic vapors have decreased. If necessary, modifications to work practices will be implemented to reduce or avoid generating elevated levels of organic vapors.

Respiratory protection for TRC's subcontractor may be required during tank cleaning activities. Any upgrade in respiratory protection will be coordinated with the Health & Safety Coordinator and the Industrial Hygienist. For operations that may require the use of a respirator, the TRC Project Manager (and Contractor equivalent) must verify that Field Personnel are medically approved to use respiratory equipment, fit tested, and trained in the proper use of respirators. Only respirators that are NIOSH/MSHA[1] approved are to be used.

Exposure Limits: The following tables summarizes anticipated concentrations and accepted exposure limits of chemicals potentially present at the Site.

1 NIOSH – National Institute for Occupational Safety and Health; MSHA – Mine Safety and Health Administration

Known or Suspected Chemicals/Contaminants	
Chemical/Contaminant of Concern	**OSHA Permissible Exposure Limit (PEL)**
Heavy metals – lead	50 µg/m^3 (OSHA PEL for lead)

6.0 GENERAL SAFETY REQUIREMENTS

The general safety rules listed below apply to all TRC personnel present at the site.

- A tailgate health and safety meeting will be held with all field team members and subcontractors each day prior to the start of work.
- Adhere to all requirements of this health and safety plan (HASP).
- Wear protective clothing appropriate for the designated level of protection and decontaminate before entering clean areas when applicable.
- Use safety equipment in accordance with OSHA guidance and labeling instructions.
- Maintain safety equipment in good condition and proper working order and make sure that the equipment is calibrated prior to use.
- Immediately report unsafe acts or conditions to the Project Manager and OSC.
- Eating, drinking, and smoking are prohibited on site, except in designated areas.
- Maintaining a position upwind from intrusive activities is encouraged.
- The emergency shutoff switch should be demonstrated to be working prior to initiating excavation activities.
- An adequately stocked first-aid kit will be maintained at the work site.

Communication

TRC team members shall be equipped with cellular telephones. If an emergency occurs, and the team members are not in close proximity to each other, communication will occur via telephone.

7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

It is anticipated that Level D PPE will be required. Level D protection is applicable when no respiratory protection and minimal skin protection is required. Level D can be used in the following circumstances:

- The atmosphere contains no known hazard
- Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals

The Level D recommended for this Site includes:

Level D Personal Protective Equipment	
Item	**Rationale/Notes**
Hardhat	Appropriately rated hard hats will be worn by personnel for protection against overhead hazards, including electrical.
Hearing protection	Hearing protection will be worn by all personnel exposed to more than 85 dB of sound during the workday.
Safety boots	Safety boots will be worn by all personnel during project work described in this HASP and at all times on site.
Eye protection (safety glasses)	Eye protection will be worn when personnel are exposed to flying debris, chemical vapors or particulates. Chemical splash goggles will be worn for protection against chemical gases, vapors or particulates. Safety glasses will be worn for protection against flying objects.
Safety vest	Utilize in areas in or near vehicular traffic of any kind on or off property.
Gloves	Gloves to be changed between samples to avoid cross-contamination. Nitrile chemically resistant gloves will be worn when handling sample bottles.
Kevlar work gloves	As indicated herein, use Cut and Abrasion Resistance Level 4 or Level 5 gloves when necessary for hand protection during field tasks.

If excessive ionizable organic vapors containing of VOCs are detected at or above the action levels (See Section 6.3), workers will cease work in the area until organic vapor levels decrease for Level D PPE. Odor suppression techniques (i.e., water misting and foam) will be used during excavation activities as necessary.

A basic first aid kit will be provided by the contractor and readily available on-Site in the event of an emergency.

A fire extinguisher should be present with the excavator. All personnel working on or around the excavator should know the location of and how to operate the fire extinguisher. TRC will confirm the location of the first aid kid and fire extinguisher during daily tailgate safety meetings.

8.0 DECONTAMINATION PROCEDURES

8.1 Minimization of Contact with Contaminants

During the completion of all Site activities, personnel should attempt to minimize the degree of contact with contaminated materials. This involves a conscientious effort to keep "clean" during Site activities. All personnel should minimize kneeling, splash generation, and other physical contact with contamination. This may ultimately minimize the degree of decontamination required and the generation of waste materials from Site operations.

8.2 Personnel Decontamination Procedures

The following describes procedures to be employed for personnel decontamination.

PERSONNEL DECONTAMINATION PROCEDURES FOR LEVEL D PROTECTION	
1.	Decontaminate equipment used on-Site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) with moist towel.
2.	Use boot brush to remove soil from treads of shoes.
2.	Remove PPE and wipe down with moist towel.
3.	Remove gloves and deposit in waste container.
4.	If inner clothing has become contaminated, remove it and place it into a poly bag.
5.	Wash hands and face.

8.3 Decontamination Procedures

All liquids used in the decontamination procedure will be collected, stored, and disposed in accordance with federal, state, and local regulations. Personnel performing this task will wear the proper PPE as prescribed in the table in Section 7.

8.4 Emergency Decontamination

If circumstances dictate that contaminated clothing cannot be readily removed, then remove gross contamination; wrap injured personnel with clean garments/blankets to avoid contaminating other personnel or transporting equipment.

If the person cannot be moved because of the extent of the injury (a back or neck injury) provisions will be made to ensure that emergency response personnel are able to respond to victim without being exposed to potentially hazardous atmospheric conditions. If the potential for inhalation hazards exist, such as with open excavation, this area will be covered with poly to eliminate any potential inhalation hazards. All emergency personnel are to be immediately informed of the injured person's condition, potential contaminants, and provided with all pertinent chemical data.

8.5 Hand Held Equipment Decontamination

Hand held equipment includes all monitoring instruments, samples, hand tools, and field logbooks. To aid in decontamination, monitoring instruments can be sealed in plastic bags or wrapped in polyethylene. This will also protect the instruments against contaminants. The instruments will be wiped clean using wipes or paper towels if contamination is visually evident.

Decontamination procedures for sampling equipment, hand tools, etc. will include a moist towel wipe, as appropriate for the Site conditions.

9.0 REQUIRED PERSONNEL TRAINING

TRC field personnel will have the training outlined below before on-Site work activities:

Project Training Requirements

(* required for all sites; but minimum recommended)

Check "A" if training required for everyone, and check "T" if training required for specific task or per notations.

A	T	SUBJECT	REFERENCE	
			29 CFR 1910	29 CFR 1926 or Other
☒	☐	HAZWOPER 40 hour	1910.120	1926.65
☐	☐	3-Day HAZWOPER Supervised On-site	1910.120	1926.65
☒	☐	8-Hour HAZWOPER Refresher	1910.120	1926.65
☐	☒	8-Hour Supervisor HAZWOPER*	1910.120	1926.65
☐	☒	First Aid, CPR[1]	1910.151	1926.23,.50
☒	☐	Hazard Communication (HAZCOM)	1910.1200	1926.59
☐	☐	DOT / IATA Shipping Training	1910.1201	49 CFR 172.704
☒	☐	TRC Hand Protection Policy	1910.138	TRC Policy[2]
☒	☐	Defensive Driving	N/A	White Paper[3] TRC Manual[4]
Client-specific training: ☐ Not Applicable ☐ Specify				
Client-specific training: ☐ Not Applicable ☐ Specify				
Client-specific training: ☐ Not Applicable ☐ Specify				

Note:
***** The OHSO shall have OSHA 8-hour supervisor training, in addition to 40-hour HAZWOPER.
1 Per the TRC Health and Safety Policy and Procedure Manual, each TRC project will have at least one certified CPR/first aid trained person on- Site at all times. All Project Managers, and anyone acting as the on-site Health and Safety Officer, must be current in First Aid/CPR.
2 TRC RMD Hand Protection Policy, August 2012
3 Guidelines for Employers to Reduce Motor Vehicle Crashes (joint white paper by NETS, NHTSA and OSHA)
4 TRC Driver and Vehicle Management Policy and Procedure Manual, Rev 1 (April 2012)

Project training requirements beyond those provided in the above table will require a HASP revision/upgrade or concurrence of the TRC Safety Director or Practice Safety Manager.

10.0 MEDICAL MONITORING

Medical monitoring will apply routinely to all employees who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year (40 CFR 1910.120[f][2][i]). Said TRC field personnel will have the medical surveillance outlined in the table below prior to commencing on-site work activities.

Medical Surveillance Required			
*Baseline is minimum recommended.			
	29 CFR 1910	**29 CFR 1926 or Other**	**Notes**
☒ HAZWOPER Physical - Baseline	1910.120	1926.65	
☒ HAZWOPER Physical – Annual	1910.120	1926.65	
☐ HAZWOPER Physical - Biennial	1910.120	1926.65	
Client-specific drug testing[1]	☒ Not Applicable ☐ Specify		
Client-specific medical monitoring[1]	☒ Not Applicable ☐ Specify		
Site-specific medical monitoring:	☒ Not Applicable ☐ Specify		

Note:
[1] Client required drug testing or medical monitoring should be coordinated through the Project Manager.

TRC has a Drug and Alcohol-Free Workplace Policy. TRC may require employees or subcontractors to be tested upon reasonable suspicion, following accidents or incidents during work activities, or during travel to or from a project Site. Client policies may be stricter in regard to procedures following an accident. Project Managers must be aware of these and inform employees and subcontractors of any additional requirements.

11.0 TAILGATE SAFETY MEETINGS

A tailgate safety meeting will be conducted daily prior to commencement of the work day (see Daily Pre-Job Safety Briefing Form provided in **Attachment F**) or if site conditions change.

Topics covered by the tailgate safety meeting will include, but not be limited to:

- Scope of work and who will conduct each task
- Potential hazards for the scope of work
- weather forecast
- PPE
- Emergency procedures and the route to the medical facility
- Site conditions and features
- Communication guidelines related to stakeholder engagement and visitors

Safety meetings will be held to address modifications to this HASP and any addenda prepared to supplement the HASP. Subcontractors and personnel present at the tailgate safety meeting shall be required to sign an acknowledgement form after each meeting.

12.0 OBSERVATIONS

Note that the Project Manager and/or OSC may notify field staff that their site activities may be the subject of Safety Observation, an integral part of the continuous improvement safety culture promoted at TRC. If subject to an observation, please note the following:

- The Observation will tend to focus on the highest risk activity (as a general example, drilling in a public right-of-way).
- Follow-up observations may be required, depending on prior data collected.
- The observer's preparation before visiting the site will be a review of the HASP, client-specific requirements, etc., and a review of the work scope with the Project Manager to ensure the context of the work is well understood in advance.
- Review items may include PPE, body use and positioning, work environment, operating procedures, and tools and equipment (see Attachment H).
- The observation should last between 30 and 60 minutes.

Observations will be documented on the form found in Attachment H. Both positive and negative observations are candidates for documentation and later discussion. The overarching goals are to identify and correct questionable practices, and to identify and promote good, safe and efficient practices. It is a data gathering process that will allow TRC safety specialists to identify root causes for safety issues in both categories to better inform policy decisions.

In addition, TRC may record a Safe Catch which is identification and mitigation of a condition that may have created a hazard if it were not identified. The Safe Catch documentation is provided in Attachment I.

13.0 INCIDENT REPORTING

In case of an incident, TRC personnel must report the incident immediately to their project manager/supervisor and/or OHSC, and client's representative, and follow the TRC Incident Response and Reporting Process (see Attachment G). Required forms must be completed within 24 hours following the incident. If the forms are unavailable, the incident shall be reported to the TRC Safety Director (Mike Glenn). Accident/injury/exposure information must be recorded per TRC policy (see Attachment G) and will be the basis of any accident/incident investigations.

14.0 ACKNOWLEDGEMENT

All TRC personnel operating under this HASP must read the HASP and sign the acknowledgment page in Attachment A.

15.0 SUBCONTRACTORS AND HEALTH AND SAFETY PLANNING

TRC personnel must provide the complete HASP to all subcontractors for their reference in advance of the work. Subcontractors must prepare their own site-specific HASP and provide evidence of HASP preparation before the start of site work to ensure that the subcontractor has an understanding of the safety hazards associated with the work that they are performing. Subcontractor HASPs are not required to be included unless contractually/client required, of is so desired by the Project Manager or OSC.

Attachment A
Health and Safety Plan Acceptance

ATTACHMENT A
HEALTH AND SAFETY PLAN ACCEPTANCE

SITE: 836-841 5th Avenue, Brooklyn, NY 11232

I have received a copy of the Health and Safety Plan for this site and have read, understand and will abide by the procedures set forth in this Health and Safety Plan and any amendments to this plan.

Printed Name	**Signature**	**Date**

Attachment B
Hospital Route

ATTACHMENT B

HOSPITAL ROUTE

Google Maps 836 5 Avenue, Brooklyn, NY to Calvary Hospital Drive 1.6 miles, 10 min

Map data ©2017 Google 1000 ft

836 5th Ave
Brooklyn, NY 11232

1. Head southwest on 5th Ave toward 36th St/Angel Luis Gautier Way — 112 ft
2. Turn right at the 1st cross street onto 36th St — 0.3 mi
3. Turn left at the 2nd cross street onto 3rd Ave — 0.1 mi
4. Continue straight to stay on 3rd Ave — 0.6 mi
5. Turn right onto 51st St — 0.3 mi
6. Turn left at the 2nd cross street onto 1st Ave — 0.2 mi
7. Turn left onto 55th St
   Destination will be on the left — 371 ft

Calvary Hospital
NYU Lutheran, 150 55th St, Brooklyn, NY 11220

Attachment C
Work Care Information

WorkCare® Making Health Count

FACT SHEET

EARLY INCIDENT INTERVENTION®

Immediate Access to Medical Advice for Work Related Incidents

(888) 449-7787

INTRODUCTION

WorkCare, Inc. (WorkCare) and TRC have partnered together to promote Incident Intervention®, a resource designed to support company safety goals/targets—while reducing runaway-costs associated with workplace injuries and illnesses.

PURPOSE

Early Incident Intervention provides TRC employees with **IMMEDIATE** telephonic access to WorkCare clinicians at the time of a presumed, non-emergency workplace injury or illness. Clinicians provide expert guidance on the evaluation of symptoms, appropriate first aid, and the need for additional medical evaluation or treatment.

When utilizing this service within the first hour of an incident, known as the "Golden Hour," licensed medical staff can guide the case so that medical evaluation and treatment are rendered appropriately.

> ***"…helps the worker traverse the unpredictable terrain of work-related injuries and illness."***

PRINCIPLES OF EARLY INCIDENT INTERVENTION

- Utilizes principles of the "Golden Hour."
- Provides workers immediate clinician support at the time of an incident.
- Focuses on providing the right care, at the right time in the proper setting.

BENEFITS FOR EMPLOYEES

- Instant access to a medically qualified professional for evaluation of symptoms and possible outcomes.
- Professional guidance on appropriate first aid measures and medications.
- Professional advice regarding the need for additional medical evaluation or treatment.

BENEFITS FOR TRC

- Point of contact for emergency and non-emergency medical clinicians.
- Triages the incident to determine risk and urgency, delivering interventions that are consistent with medical guidelines for the specified injury and illness.
- Maintains communication with clinicians to ensure accurate and timely reporting.

Attachment D
Emergency Contact Information

ATTACHMENT D

EMERGENCY CONTACT INFORMATION

Name	Role	Phone Number
Lee Guterman, NYCSCA	NYCSCA, IEH Division	(718)-472-8502
Bob Kanaparthi, NYCSCA	NYCSCA, IEH Division	(718) 472-8620
Michael Sherwood, NYCSCA	NYCSCA, IEH Division	(718) 752-5211 cellular: (914) 400-5205
David Glass, TRC	TRC Vice President	(212) 221-7822, ext. 112
Jennifer Miranda, TRC	TRC Principal Scientist/Office Practice Leader	(212) 221-7822, ext. 102 cellular: (646) 285-8990
Lindsay O'Hara, TRC	TRC Project Manager	(203) 278-5305 cellular: (914) 420-9649
Wes Lindemuth, TRC	TRC Office Safety Coordinator	(212) 221-7822, ext. 103 cellular: (347) 738-1452
Daniel Schmidt, TRC	TRC Project Engineer	(212) 221-7822, ext. 117 cellular: (917) 714-0228
Elizabeth Denly, TRC	TRC Quality Assurance Officer	(978) 970-5600
Matt Cordova, SGS Accutest	Laboratory Services	(732) 355-4550

Attachment E
Safety Data Sheets for Potential Contaminants of Concern

SAFETY DATA SHEET

Vinyl Chloride (Chloroethylene)

Section 1. Identification

GHS product identifier : Vinyl Chloride (Chloroethylene)

Chemical name : vinyl chloride

Other means of identification : chloroethylene; Ethene, chloro-; Vinyl chloride monomer; Chloroethene; Vinyl chloride, monomer; Ethene, chloro- (vinyl chloride); VCM; VC; Monochloroethylene; Monochloroethene

Product use : Synthetic/Analytical chemistry.

Synonym : chloroethylene; Ethene, chloro-; Vinyl chloride monomer; Chloroethene; Vinyl chloride, monomer; Ethene, chloro- (vinyl chloride); VCM; VC; Monochloroethylene; Monochloroethene

SDS # : 001067

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE GASES - Category 1
GASES UNDER PRESSURE - Liquefied gas
CARCINOGENICITY - Category 1
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Extremely flammable gas.
Contains gas under pressure; may explode if heated.
May cause frostbite.
May form explosive mixtures in Air.
May displace oxygen and cause rapid suffocation.
May cause cancer.
May cause damage to organs through prolonged or repeated exposure. (liver)

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Do not breathe gas.

Section 2. Hazards identification

Response : Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage : Store locked up. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : vinyl chloride

Other means of identification : chloroethylene; Ethene, chloro-; Vinyl chloride monomer; Chloroethene; Vinyl chloride, monomer; Ethene, chloro- (vinyl chloride); VCM; VC; Monochloroethylene; Monochloroethene

CAS number/other identifiers

CAS number : 75-01-4

Product code : 001067

Ingredient name	%	CAS number
vinyl chloride	100	75-01-4

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Section 4. First aid measures

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Section 6. Accidental release measures

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Store locked up. Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
vinyl chloride	**ACGIH TLV (United States, 3/2016).** TWA: 1 ppm 8 hours. **OSHA PEL (United States, 2/2013).** STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Section 8. Exposure controls/personal protection

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [COLORLESS GAS OR LIQUID (BELOW 7 F) WITH A PLEASANT ODOR AT HIGH CONCENTRATIONS. [NOTE: SHIPPED AS A LIQUEFIED COMPRESSED GAS.]

Color : Colorless.

Molecular weight : 62.5 g/mole

Molecular formula : C2-H3-Cl

Boiling/condensation point : -13.4°C (7.9°F)

Melting/freezing point : -153.8°C (-244.8°F)

Critical temperature : 158.45°C (317.2°F)

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Flash point : Closed cup: -78°C (-108.4°F)
Open cup: -78°C (-108.4°F)

Burning time : Not applicable.

Burning rate : Not applicable.

Section 9. Physical and chemical properties

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Lower: 3.8%
Upper: 29.3%

Vapor pressure : Not available.

Vapor density : 2.2 (Air = 1)

Specific Volume (ft^3/lb) : 1.0989

Gas Density (lb/ft^3) : 0.91 (20°C / 68 to °F)

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 1.1 g/l

Partition coefficient: n-octanol/water : 1.38

Auto-ignition temperature : 472°C (881.6°F)

Decomposition temperature : Not available.

SADT : Not available.

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials : Oxidizers

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Section 11. Toxicological information

Classification

Product/ingredient name	OSHA	IARC	NTP
vinyl chloride	+	1	Known to be a human carcinogen.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
vinyl chloride	Category 2	Not determined	liver

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : May cause damage to organs through prolonged or repeated exposure.

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Section 11. Toxicological information

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
vinyl chloride	1.38	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Vinyl chloride; Ethene, chloro-	75-01-4	Listed	U043

Section 14. Transport information

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1086	UN1086	UN1086	UN1086	UN1086
UN proper shipping name	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	**Reportable quantity** 1 lbs / 0.454 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements. **Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: Forbidden. **Cargo aircraft** Quantity limitation: 150 kg **Special provisions** 21, B44, T50	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2). **Explosive Limit and Limited Quantity Index** 0.125 **ERAP Index** 3000 **Passenger Carrying Road or Rail Index** Forbidden	-	-	**Passenger and Cargo Aircraft**Quantity limitation: 0 Forbidden **Cargo Aircraft Only** Quantity limitation: 150 kg

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

United States inventory (TSCA 8b): This material is listed or exempted.

Clean Water Act (CWA) 307: vinyl chloride

Clean Air Act (CAA) 112 regulated flammable substances: vinyl chloride

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

Section 15. Regulatory information

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Sudden release of pressure
Delayed (chronic) health hazard

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
vinyl chloride	100	Yes.	Yes.	No.	No.	Yes.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	vinyl chloride	75-01-4	100
Supplier notification	vinyl chloride	75-01-4	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : This material is listed.

New York : This material is listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
vinyl chloride	Yes.	No.	Yes.	No.

International regulations

International lists

National inventory

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : This material is listed or exempted.

Malaysia : This material is listed or exempted.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Section 15. Regulatory information

Taiwan : This material is listed or exempted.

Canada

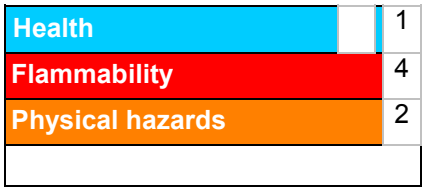
WHMIS (Canada) : Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Class F: Dangerously reactive material.

CEPA Toxic substances: This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Class F: Dangerously reactive material.

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Flam. Gas 1, H220	Expert judgment
Press. Gas Liq. Gas, H280	Expert judgment
Carc. 1, H350	Expert judgment
STOT RE 2, H373 (liver)	Expert judgment

History

Section 16. Other information

Date of printing : 10/11/2016

Date of issue/Date of revision : 10/11/2016

Date of previous issue : No previous validation

Version : 0.01

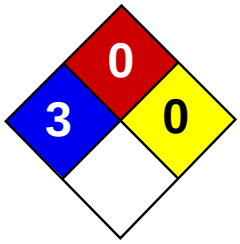
Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Material Safety Data Sheet
Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragyrum

Chemical Name: Mercury

Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:
A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 0.025 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonynickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsiliane, calcium,

Special Remarks on Corrosivity:
The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalga) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):
R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:22 PM

Last Updated: 05/21/2013 12:00 PM

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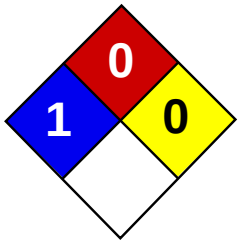

Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.05 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m3) from OSHA (PEL) [United States] TWA: 0.03 (mg/m3) from NIOSH [United States] TWA: 0.05 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

pH (1% soln/water): Not applicable.

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungsby mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually abssorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, deliriuim, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead cholic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:21 PM

Last Updated: 05/21/2013 12:00 PM

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SAFETY DATA SHEET

Nonflammable Gas Mixture: Isobutylene / Nitrogen / Oxygen

Section 1. Identification

GHS product identifier : Nonflammable Gas Mixture: Isobutylene / Nitrogen / Oxygen

Other means of identification : Not available.

Product use : Synthetic/Analytical chemistry.

SDS # : 002103

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Emergency telephone number (with hours of operation) : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Use and store only outdoors or in a well ventilated place.

Response : Not applicable.

Storage : Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

CAS number/other identifiers

CAS number : Not applicable.

Product code : 002103

Ingredient name	%	CAS number
Nitrogen	75 - 80.5	7727-37-9
oxygen	19.5 - 23.5	7782-44-7
2-methylpropene	0.0001 - 1.13	115-11-7

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Section 4. First aid measures

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Section 8. Exposure controls/personal protection

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas.

Color : Not available.

Melting/freezing point : -140.7°C (-221.3°F) This is based on data for the following ingredient: 2-methylpropene. Weighted average: -211.14°C (-348.1°F)

Critical temperature : Lowest known value: -146.95°C (-232.5°F) (nitrogen).

Odor : Not available.

Odor threshold : Not available.

pH : Not available.

Flash point : Not available.

Burning time : Not applicable.

Burning rate : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Highest known value: 1.94 (Air = 1) (2-methylpropene). Weighted average: 1.01 (Air = 1)

Gas Density (lb/ft ^{3}) : Weighted average: 0.07

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

SADT : Not available.

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatibility with various substances : Extremely reactive or incompatible with the following materials: reducing materials and combustible materials.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Section 11. Toxicological information

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Section 12. Ecological information

Not available.

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1956	UN1956	UN1956	UN1956	UN1956
UN proper shipping name	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	-	**Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75	-	-	-

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

United States inventory (TSCA 8b): All components are listed or exempted.

Clean Air Act (CAA) 112 regulated flammable substances: 2-methylpropene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

No products were found.

State regulations

Massachusetts : The following components are listed: NITROGEN; OXYGEN (LIQUID); 2-METHYLPROPENE

New York : None of the components are listed.

New Jersey : The following components are listed: NITROGEN; OXYGEN; ISOBUTYLENE; 1-PROPENE, 2-METHYL-

Pennsylvania : The following components are listed: NITROGEN; OXYGEN; 1-PROPENE, 2-METHYL-

Canada inventory : All components are listed or exempted.

International regulations

International lists : **Australia inventory (AICS)**: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: Not determined.
Korea inventory: All components are listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Section 15. Regulatory information

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Canada

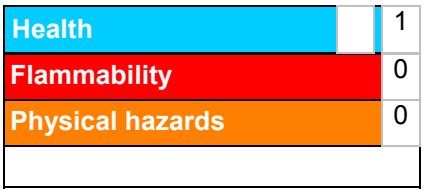
WHMIS (Canada) : Class A: Compressed gas.

CEPA Toxic substances: None of the components are listed.
Canadian ARET: None of the components are listed.
Canadian NPRI: The following components are listed: Butene (all isomers)
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 1/23/2015.

Date of issue/Date of revision : 1/23/2015.

Date of previous issue : No previous validation.

Version : 0.01

Section 16. Other information

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United NationsACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR – United States Code of Federal Regulations
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Version 4.12
Revision Date 03/23/2017
Print Date 02/10/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,1-Dichloroethene

Product Number : 48526
Brand : Supelco
Index-No. : 602-025-00-8

CAS-No. : 75-35-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 1), H224
Acute toxicity, Oral (Category 3), H301
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H224	Extremely flammable liquid and vapour.
H301	Toxic if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H351	Suspected of causing cancer.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,1-Dichloroethylene Vinylidene chloride
Formula	:	$C_2H_2Cl_2$
Molecular weight	:	96.94 g/mol
CAS-No.	:	75-35-4
EC-No.	:	200-864-0
Index-No.	:	602-025-00-8

Hazardous components

Component	Classification	Concentration
Vinylidene chloride		
	Flam. Liq. 1; Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; H224, H301, H315, H319, H351	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder Dry sand

Unsuitable extinguishing media
Do NOT use water jet.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Air and moisture sensitive. Store under inert gas.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Vinylidene chloride	75-35-4	TWA	5.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Kidney damage Not classifiable as a human carcinogen		
		Potential Occupational Carcinogen See Appendix A		
		PEL	1 ppm 4 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 30 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -122 °C (-188 °F) - lit.
f)	Initial boiling point and boiling range	30 - 32 °C (86 - 90 °F) - lit.
g)	Flash point	-19 °C (-2 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 15.5 %(V) Lower explosion limit: 6.5 %(V)
k)	Vapour pressure	658.6 hPa (494.0 mmHg) 667.3 hPa (500.5 mmHg) at 20.0 °C (68.0 °F) 2,137.4 hPa (1,603.2 mmHg) at 55.0 °C (131.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.213 g/cm3 at 20 °C (68 °F)
n)	Water solubility	0.2 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	520.0 °C (968.0 °F) 580.0 °C (1,076.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents, Copper, Aluminum, and its alloys, Peroxides, Strong bases, Oxygen

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 200.0 mg/kg

Inhalation: Lung irritation

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KV9275000

Nausea, Headache, Vomiting, Dizziness, Drowsiness, Confusion., Incoordination., Central nervous system depression, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Daphnia magna (Water flea) - 11.60 - 11.79 mg/l
	LC50 - Pimephales promelas (fathead minnow) - 108.00 - 169.00 mg/l
	LC50 - Lepomis macrochirus (Bluegill) - 74.00 - 220.00 mg/l
	LC50 - Cyprinodon variegatus (sheepshead minnow) - 249.00 mg/l
	LC50 - other fish - 250.00 mg/l
	LC50 - other fish - 224.00 mg/l
	LC50 - Pimephales promelas (fathead minnow) - 108 mg/l - 96 h
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 80 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 11.6 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1303 Class: 3 Packing group: I
Proper shipping name: Vinylidene chloride, stabilized
Reportable Quantity (RQ): 100 lbsReportable Quantity (RQ): 100 lbsMarine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 1303 Class: 3 Packing group: I EMS-No: F-E, S-D
Proper shipping name: VINYLIDENE CHLORIDE, STABILIZED
Marine pollutant:yes Marine pollutant: yes

IATA
UN number: 1303 Class: 3 Packing group: I
Proper shipping name: Vinylidene chloride, stabilized

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Vinylidene chloride	75-35-4	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Reportable Quantity : D029 lbs

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Vinylidene chloride	75-35-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Vinylidene chloride	75-35-4	2007-07-01

	CAS-No.	Revision Date
Vinylidene chloride	75-35-4	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Vinylidene chloride	75-35-4	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H224	Extremely flammable liquid and vapour.
H301	Toxic if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H351	Suspected of causing cancer.
Skin Irrit.	Skin irritation

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	4
Physical Hazard	2

NFPA Rating

Health hazard:	2
Fire Hazard:	4
Reactivity Hazard:	2

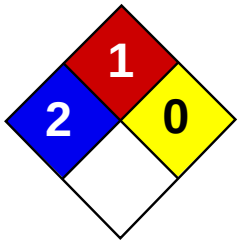
Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.12 Revision Date: 03/23/2017 Print Date: 02/10/2018



Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
1,1,1-Trichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,1,1-Trichloroethane

Catalog Codes:

CAS#: 71-55-6

RTECS: KJ2975000

TSCA: TSCA 8(b) inventory: 1,1,1-Trichloroethane

CI#: Not available.

Synonym:

Chemical Formula: CH3CCl3

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{1,1,1-}Trichloroethane	71-55-6	100

Toxicological Data on Ingredients: 1,1,1-Trichloroethane: ORAL (LD50): Acute: 9600 mg/kg [Rat]. 6000 mg/kg [Mouse]. DERMAL (LD50): Acute: 15800 mg/kg [Rabbit]. VAPOR (LC50): Acute: 18000 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of ingestion. Hazardous in case of skin contact (irritant, permeator), of inhalation. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 537°C (998.6°F)

Flash Points: Not available.

Flammable Limits: LOWER: 7.5% UPPER: 12.5%

Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds.

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of oxidizing materials, of acids, of alkalis.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive to explosive in presence of oxidizing materials, of acids, of alkalis.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 350 STEL: 440 CEIL: 440 (ppm) from ACGIH (TLV) [1995] TWA: 1900 STEL: 2460 CEIL: 2380 (mg/m3) from ACGIH [1995]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 133.41 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 74.1°C (165.4°F)

Melting Point: -32.5°C (-26.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.3376 (Water = 1)

Vapor Pressure: 100 mm of Hg (@ 20°C)

Vapor Density: 4.6 (Air = 1)

Volatility: Not available.

Odor Threshold: 400 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 6000 mg/kg [Mouse]. Acute dermal toxicity (LD50): 15800 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 18000 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant, permeator), of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : 1,1,1-Trichloroethane : UN2831 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: 1,1,1-Trichloroethane Massachusetts RTK: 1,1,1-Trichloroethane TSCA 8(b) inventory: 1,1,1-Trichloroethane SARA 313 toxic chemical notification and release reporting: 1,1,1-Trichloroethane CERCLA: Hazardous substances.: 1,1,1-Trichloroethane

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC):
R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:31 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Attachment F
Daily Pre-Job Safety Briefing Form

Daily Pre-Job Safety Briefing

Project Name: _____ Project Number: _____

Work Location: _____ Date: _____

Tasks Performed: _____ Time: _____ AM PM

Client Name: _____ Submitted By: _____

Health and Safety Plan Available Onsite: Yes ☐ No ☐ Health and Safety Plan Location: _____

Emergency Facility(s): _____ Number(s): _____

Physical Address: _____

First Aid/CPR Persons: _____

For Emergencies Dial 911/For Non-Emergencies Dial WorkCare (888) 449-7787

Personal Protective Equipment Required	Yes	No	Type
Fall Protection	☐	☐	_____
body harness, lifelines, barricades, other (specify)			
Eye/Face	☐	☐	_____
goggles, face shield, hood, other (specify)			
Respirator	☐	☐	_____
SCBA, supplied air, HEPA, dust, other (specify)			
Foot Protection	☐	☐	_____
safety toe, EH rated, rubber boots, other (specify)			
Hand Protection	☐	☐	_____
leather, cut resistant, chemical, EH, other (specify)			
Head Protection	☐	☐	_____
hard hat, helmet, electrical hazard, other (specify)			
Clothing	☐	☐	_____
coveralls, welding, sleeves, rain, FR, reflective vest, chemical, other (specify)			
Hearing Protection	☐	☐	_____

Procedures/Programs Required	Yes	No
Hot Work	☐	☐
LOTO/Energy Control	☐	☐
Trenching/Excavation	☐	☐
Signs/Barricades	☐	☐
Confined Space	☐	☐
Cranes/Critical Lifts	☐	☐
Line Breaking/Hot Tap	☐	☐
Scaffolds/Aerial Lifts	☐	☐
System Testing/ Grounding	☐	☐
Employee Certification/Training Required		
Crane Operator	☐	☐
Forklift Operator	☐	☐
Mobile Equipment Operator	☐	☐
Competent Person	☐	☐
OSHA 10/30	☐	☐
HAZWOPER	☐	☐
Clearance/Tagging Authority	☐	☐

Additional Considerations

Work Procedures: ☐ Isolation of equipment
☐ Check for potential ☐ Adequate grounding
☐ Vehicle grounds ☐ Working clearances
☐ Dig Safe/CBYD ☐ E-911 Protocol
People: ☐ Worker fatigue ☐ Other work groups
☐ Public safety ☐ Pedestrian control ☐ Experience
☐ Traffic control ☐ Other utilities ☐ Spec. Training
Tools/Equipment: ☐ Adequate cover-up
☐ Live line tools ☐ Portable Grounds
☐ Inspection of tools/equipment
☐ Specialized tools/equipment
☐ Correct tool/equipment for the job
Special Precautions: ☐ Adjacent structures
☐ Condition of structures ☐ Weather conditions
☐ Lighting conditions ☐ Terrain ☐ Water bodies
☐ Spills and leaks ☐ Environmental ☐ Cultural
Other: _____

If Conditions CHANGE…Stop Work, Review and Revise the Plan!!

Daily Pre-Job Safety Briefing

Hazards Associated with the Job (focus on the GEMS)				
Gravity	**Electrical**	**Mechanical**	**Kinetic**	**Other/Environmental**
☐ Falling from a height	☐ Electrical contact	☐ Equipment failure	☐ Traffic	☐ Asbestos/Lead
☐ Falling objects	☐ Induced voltage	☐ Conductor tension	☐ Driving conditions	☐ Animals/Insects
☐ Falling structures	☐ Back-feed	☐ Cable tension	☐ Moving/Shifting loads	☐ Confined space
☐ Climbing obstructions	☐ Flash potential	☐ Loaded springs	☐ Rotating machinery	☐ Excavations
☐ Dangerous trees	☐ Step/Touch potential	☐ Moving parts	☐ Vehicle stability	☐ Heat/Cold
☐ Aerial device operation	☐ Static charge	☐ Crane/Rigging	☐ Heavy equip. operation	☐ Pressurized fluids/gases

List all hazards associated with this task	**Signature of Crew Members Present**	**Post Task Safety Analysis**
		Did any injuries or incidents occur today? If yes, explain.
		☐ Yes ☐ No
Barriers to eliminate/control above hazards?		Was the injury or incident reported the safety department?
		☐ Yes ☐ No ☐ N/A
		What problems did you have with today's work assignment?
		What can we do tomorrow to improve performance?
Supervisor Signature		

Attachment G
Incident Reporting Forms

TRC Incident Reporting Guidelines

Incident Response:

1. For life threatening injuries and medical emergencies call 911 or go to the closest emergency room.
2. An injured worker must report an injury to their supervisor immediately.
3. Supervisor is required to complete The TRC Incident Report Form within 24 hours of the reported accident and forward to Bill Russell at Sargent & Associates with a copy to Mike Glenn.

   Bill Russell – Sargent &Associates
   Office: (978) 256-7459; Fax: (978) 256-4941
   bill@sargentandassociates.com

   Mike Glenn, National Safety Director
   Office: (949) 727-7347; Mobile: (949) 697-7418
   mglenn@trcsolutions.com

4. WorkCare can provide assistance in providing first aid advice and directing an injured worker to non-emergency medical care. WorkCare is a service that provides 24/7 access to an Occupational Healthcare physician or clinician.

   WorkCare Incident Intervention
   (888) 449-7787

Return to Work:

1. The injured worker is responsible for providing the Supervisor with a copy of the doctor's note detailing the injury and "return to work" status within 24 hours of the doctor's visit. The supervisor must email or fax the completed TRC Incident Report and Doctor's notes to Sargent & Associates.
2. Sargent & Associates will contact the injured worker and the Supervisor to confirm the facts surrounding the injury.
3. Sargent & Associates will report the injury to the workers' compensation insurance carrier, Zurich.

4. Zurich may contact the injured worker and supervisor to conduct an accident investigation.
5. Sargent & Associates will maintain communication with all parties in order to monitor the medical treatment, and the injured worker's return to work status. They will act as liaison between the injured worker, TRC, and Zurich.
6. Sargent & Associates will work with TRC's Health & Safety, Human Resources, and/or Supervisors to determine if modified duty work is an option, until the injured worker is able to return to full duty work activities.

Incident Investigation:

1. All incidents that result in injuries that require reporting for OSHA recordkeeping purposes and all high potential first aid and near miss events require an incident investigation.
2. The Supervisor with assistance from the National Safety Director and/or Safety Coordinator, must complete the incident investigation report/contributing cause analysis within 7 days of the incident and must develop a corrective action plan within 14 days of the incident.

TRC Incident Report Form

(To be completed immediately after an Injury, Illness, Incident, Accident or Significant Near Miss by Employee's Supervisor and Employee involved)

Incident Category						
☐ Employee Injury/Illness	☐ Near Miss/Loss	☐ Property Damage	☐ Vehicle Accident	☐ Fire	☐ Other: Specify	
1	Incident Location:					
2	Site Identification/Project No.:					
3	Site Address:					
4	Date Incident Occurred:					
5	Time Incident Occurred:					
6	Date Incident Reported to Supervisor:					
7	Date Report Completed:					
8	Was WorkCare Contacted? ☐ Yes ☐ No					
9	Client:					

TRC Employee Information					
10	Name:				
11	Address:				
12	Employee Phone:				
13	Title or Occupation:				
14	Sector/Practice:				
15	Supervisor Name/Phone:				
TRC Employee Information (to be completed by Worker's Compensation Claims Administrator)					
16	Employee Date of Birth:				
17	Employee Social Security Number:				
18	Employee Marital Status:	☐ Married	☐ Single		
19	Number of Dependant under the age of 18:				
20	Date of Hire:				
21	Rate of Pay:		Hours per week:		

Type of Employee Injury or Illness (To be determined by Safety Director)			
22	☐ First Aid Only	20	☐ Extended Time Away From Work (3 days or more)
23	☐ Medical Treatment Only	21	☐ Fatality
24	☐ Restricted Work-case	22	☐ Other (specify):
25	☐ Lost Workday		
26	Estimated Number of Days on Restricted Work:		
27	Estimated Number of Days Away from Work:		

Employee Injury or Illness Description	
28	Describe the Injury or Illness:
29	First Aid/Medical Treatment Administered:
30	Name of Doctor's Office, Clinic, or Hospital: Concentra
31	Address and Phone Number:

Incident Description	
32	Equipment Involved:
33	Site Description:
34	What task was being performed at time of incident?
35	Describe Incident in Detail :
36	Conditions at time of Incident: (weather, lighting, etc.):
37	Motor Vehicle Accident:
38	TRC Vehicle ID:

39	Year/Make/Model:	
☐ DOT Regulated Vehicle ☐ Towed From Scene ☐ Airbag Deployed ☐ Seatbelt in Use ☐ TRC Fleet ☐ Rental ☐ Personal Vehicle		
40	Other Vehicle License Plate	
41	Other Vehicle Year/Make/Model	
42	Other Vehicle Driver Name	
43	Other Vehicle Year/Make/Model	
44	Other Injured Parties ☐ Yes ☐ No	
43	Description of other injuries:	

Subcontractor Involvement / Description of Incident	
44	Subcontractor Involved: ☐ Yes ☐ No
45	Name of Company:
46	Address:
47	Contact Name and Phone Number:
48	Subcontractor Description of Incident:

Witness Involvement / Description of Incident	
49	Witnesses to Incident: ☐ Yes ☐ No
50	Name(s) and Address(s):
51	Phone Number(s):
52	Witness Description of Incident:

Personal Protective Equipment (PPE)	
53	List PPE required to complete the task: (glasses, gloves, shoes, hard hat, respirator, hearing protection, etc.)
54	Was the employee using the proper PPE at the time of the Incident?

Immediate Corrective Actions			
55	Describe the immediate corrective actions taken:		
56	Immediate Supervisor:	Signature:	Date:
57	Employee:	Signature:	Date:

Supervisor's Post-Incident Review and Recommendations

	Safety Violation	☐ Yes ☐ No
58	State the company safety rule, OSHA regulation, or specific training that was violated:	
59	Describe the training the employee received to prevent this violation:	

#	Root Cause Factors (RCF)
1	Lack of skill or knowledge
2	In the past, did not follow procedures or acceptable practices and no incident occurred (injury, product quality incident, equipment damage, regulatory assessment or production delay)
3	Doing the job according to procedures or acceptable practices takes more time/effort
4	Short-cutting procedures or acceptable practices are positively reinforced or tolerated
5	Lack of or inadequate operational procedures
6	Inadequate communication of expectations regarding procedures or acceptable practices
7	Inadequate tools or equipment (available, operable and safely maintained, proper task and workplace design)
8	External factors

60	Root Cause(s)	Identified Root Cause(s):							
		#1	#2	#3	#4	#5	#6	#7	#8
A		☐	☐	☐	☐	☐	☐	☐	☐
B		☐	☐	☐	☐	☐	☐	☐	☐
C		☐	☐	☐	☐	☐	☐	☐	☐
D		☐	☐	☐	☐	☐	☐	☐	☐
E		☐	☐	☐	☐	☐	☐	☐	☐
F		☐	☐	☐	☐	☐	☐	☐	☐
G		☐	☐	☐	☐	☐	☐	☐	☐
H		☐	☐	☐	☐	☐	☐	☐	☐

61 **Conclusion: Why did the Incident Occur?**

62

Item No.	RCF No.	Recommended Corrective Action(s) How to Prevent Incident from Reoccurring	Responsible Person	Due Date	Completed (date)	Verified/ Validated (date)

Supervisor: _____ Signature: _____ Date: _____

TRC Safety Director: _____ Signature: _____ Date:_____

AUTO INCIDENT REPORT

TRC DRIVER INFORMATION:

Driver's Name: _____ Driver's Phone: ( ) _____

Company Name: _____ Company Location: _____

Supervisor's Name: _____ Supervisors Phone: ( ) _____

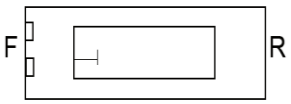
Project Name: _____ Client Name: _____

Driver's Date of Birth (MM/DD/YY): _____ Driver's License #: _____ State: _____

TRC VEHICLE INFORMATION (V-1):

Year/Make/Model of Vehicle: _____

License Plate #: _____ Vehicle ID # (VIN): _____

Circle Point of Contact: 

Was Vehicle Drivable? ☐ Yes ☐ No

Personal: ☐ Yes Rental: ☐ Yes Fleet: ☐ Yes

Rental Company

INCIDENT INFORMATION:

Date of Incident: _____ Time of Incident: _____ A.M. _____ P.M. Photos Taken: ☐ Yes ☐ No

Location of Incident: _____ City: _____

Were The Authorities Contacted? Police: ☐ Yes ☐ No Ambulance: ☐ Yes ☐ No Fire: ☐ Yes ☐ No

Name of Police Dept: _____ Case #: _____ Officer Name: _____

Were Citations Issued? ☐ Yes ☐ No If Yes, To Whom? _____

Citation Number: _____

Were There Any Witnesses? ☐ Yes ☐ No If Yes, Please Provide Name, Address and Phone Below:

Witness Name: _____ Witness Phone: ( ) _____

Witness Address: _____

Traffic Conditions (i.e., heavy, light): _____ Weather Conditions (i.e., dry, wet, ice, fog): _____

Was the TRC Driver Injured? ☐ Yes ☐ No Was Medical Treatment Received? ☐ Yes ☐ No

Describe Injuries:

Describe Damage to Property Other Than Motor Vehicles (i.e., guardrails, mailboxes, etc.):

AUTO INCIDENT REPORT

OTHER DRIVER & VEHICLE INFORMATION (V-2):

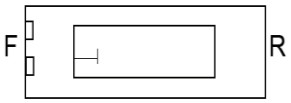
Driver's Name: _____ Driver's Phone: ( ) _____

Driver's Address: _____

Owner's Name (If different than driver): _____ Owner's Phone: ( ) _____

Owner's Address: _____

Year/Make/Model of Vehicle: _____ License Plate #: _____ State: _____

Circle Point of Contact: 

Was Vehicle Drivable? ☐ Yes ☐ No

Insurance Company Name: _____ Policy Number: _____

Insurance Company Phone: ( ) _____ Number of Passengers in Vehicle: _____

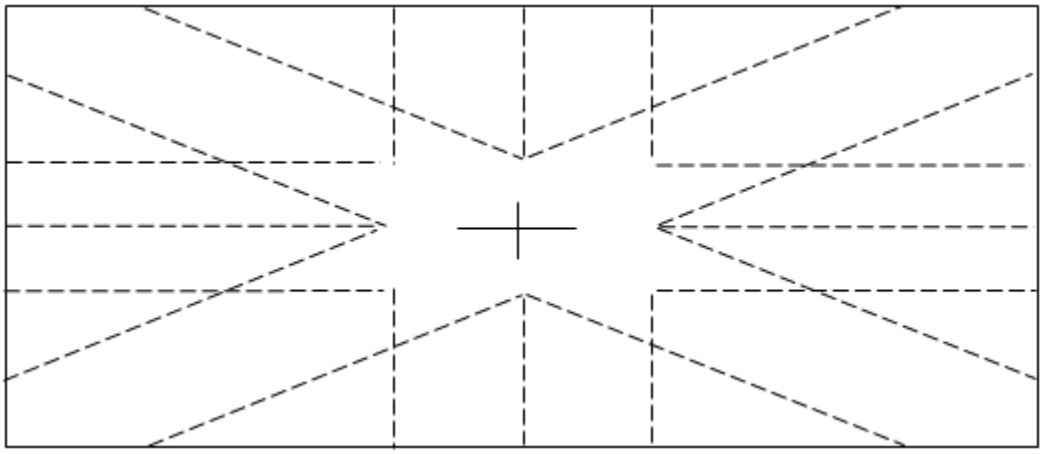
List Persons Injured: _____

Were Any Other Vehicles Involved in Incident? ☐ Yes ☐ No If yes, provide details below:

PLEASE DESCRIBE THE INCIDENT AND COMPLETE THE DIAGRAM BELOW. Be sure to indicate as many details as possible (i.e., How many lanes in each direction; Were there any turn lanes; What kind of traffic controls were there – light, stop sign, yield sign, Positions of vehicles on impact).

V-1 TRC Vehicle

V-2 Other Vehicle



Completed By: _____ Signature: _____

Attachment H
Observation Documentation Form

TRC SAFETY OBSERVATION FORM

Revised January 2014

Location/Project Name: _____ **Date:** _____

Observer Name: _____

Observee Name: _____ **Time:** _____

Task Observed

Description of Task Observed and Background Information

Positive Comments

Conclusions / Why the Questionable Items Occurred?

Feedback Session Conducted By: _____ **Date:** _____

Name of Observee's Supervisor: _____ **Time:** _____

At-Risk Observations/Root Cause Analysis

Personal Factor:
(1) Lack of skill or knowledge
(2) Correct way takes more time/requires more effort
(3) Shortcutting standard procedures is rewarded or appreciated
(4) In past, did not follow procedures or acceptable practices and no incident occurred

Job Factor:
(5) Lack of or inadequate operational procedures or work standards
(6) Inadequate communication of expectations or work standards
(7) Inadequate tools or equipment

At-Risk Observation #	Root Cause Analysis #	Solution(s) To Prevent Potential Incident from Occurring	Person Responsible	Agreed Due Date	Date Completed

Results of Verification (were solutions done?) and Validation (were solutions effective?)

Reviewed by (PM/Supervisor): _____ **Date:** _____

Approved by (Practice Safety Leader): _____ **Date:** _____

TRC SAFETY OBSERVATION FORM

Revised January 2014

PERSONAL PROTECTIVE EQUIPMENT	Safe	At-Risk	Comments
1. Hearing Protection (e.g., Ear Plugs)			
2. Head Protection (e.g., Hard Hat)			
3. ANSI Rated Eye Protection (e.g., Safety Glasses)			
4. Hand Protection (e.g., Kevlar Gloves)			
5. Foot Protection (e.g., Safety Shoes)			
6. Respiratory Protection			
7. Fall Protection Inspected (e.g., Harness)			
8. ANSI Rated Reflective Vest/High Visibility Clothing			
9. Other (Specify)			
BODY USE AND POSITIONING	**Safe**	**At-Risk**	**Comments**
10. Correct Body Use and Positioning When Lifting/Pushing/Pulling			
11. Pinch Points/Moving Equipment - Hands/Body Clear			
12. Mounts/Dismounts Using 3-Points of Contact			
13. Other (Specify)			
WORK ENVIRONMENT	**Safe**	**At-Risk**	**Comments**
14. Work/Walk Surface Free of Obstructions (e.g., Tripping Hazards)			
15. Housekeeping/Storage			
16. Defined and Secured (e.g., warning devices, barricades, cones, flags)			
17. Suspended Load, Swing Radius & Lift Area is Barricaded			
18. Safety Shutdown Devices			
19. Proper Storage & Labeling /Disposal of Sample & Waste Materials			
20. Cylinders Stored Upright, Secured, & Caps in Place			
21. Manhole/vault Inspected for Hazards			
22. Other (Specify)			
OPERATING PROCEDURES	**Safe**	**At-Risk**	**Comments**
23. Job Planning (HASP reviewed, JSAs, etc.)			
24. Fire Extinguishers Accessible and Inspections Current			
25. Work Permit/Authorization to Work (Hot, Cold, LOTO, Confined Space)			
26. JSA Reviewed & Followed			
27. Hazard Assessment - Hazard Hunt			
28. Interfaces with Other Functions (awareness with other personnel on site)			
29. Operators Looking Behind Prior to Backing Up			
30. Operators Wearing Seat Belts While Operating Equipment			
31. Subsurface Structures Identified			
32. Proper Trench Protective Equipment in Place			
33. Adequate Egress Is Available for Excavation & Trench (within 25 ft. if depth is <4 ft.)			
34. All Materials Set Back at Least 2 Feet From Edge of Trench/Excavation			
35. Other (Specify)			
TOOLS/EQUIPMENT	**Safe**	**At-Risk**	**Comments**
36. Hand Tools (Proper Equipment Selection, Condition, and Use)			
37. Power Tools (Proper Equipment Selection, Condition, and Use)			
38. Equipment, Including Heavy (Proper Equipment Selection, Condition, and Use)			
39. Hoses Inspected			
40. Required Monitoring Equipment Calibrated & Used			
41. Ladders Set up Correctly & Inspected			
42. Right Tools for the Job are Available and in Good Condition - No Fixed Open Blade Knives (FOBKs)			
43. Other (Specify)			
Total #	0	0	

Attachment I
Safe Catch Report

"Safe Catch" Report

A "Safe Catch" is a potential hazard or incident that has not resulted in any personal injury. Unsafe working conditions, unsafe employee behaviors, improper use of equipment or use of malfunctioning equipment have the potential to cause work related injuries. It is everyone's responsibility to report and/or correct these potential incidents immediately. Please complete this form as a means to report these "Good Catch" situations and submit to your local OSC Representative and Mike Glenn, National Safety Director.

Employee Name:		Date:	
Incident Location:		Office:	
Project:		Practice:	

Conditions

Please check all appropriate conditions:

☐ Unsafe Act	☐ Unsafe Condition	☐ Unsafe Equipment	☐ Unsafe Use of Equipment

Description of Incident or Potential Hazard:

Task Performed at Time of Incident:

Causes (Primary and Contributing):

Corrective Action(s) Taken (remove the hazard, replace, repair, or retrain):

Employee Signature:		Date Completed:	

Our Mission: To reduce the frequency of incidents by applying local lessons learned globally.

If you have any questions about this report or would like additional information, please reference Compliance Program CP019—TRC Incident Response and Lessons Learned Program, located on TRCNET or contact Mike Glenn, National Safety Director at mglenn@trcsolutions.com.

APPENDIX C
QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

840 5TH AVENUE, BROOKLYN, NEW YORK 11232

QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan (QAPP) presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with the field activities for the Remedial Action Work Plan (RAWP) for the 840 5th Avenue, Brooklyn, New York Site. This QAPP also describes specific protocols for field sampling, sampling handling and storage, and laboratory analysis. The data generated from the analysis of samples will be used to document post-excavation documentation/confirmatory soil sampling in the area of the hazardous lead hot spot, in the area of the UST, and across the remainder of the Site where non-hazardous soil are to be removed.

Project Organization and Responsibility

The TRC Project QA Officer, Elizabeth Denly, will coordinate and manage the sampling and analysis program, data reduction and validation, analysis, and reporting. TRC will direct the sampling activities and coordinate laboratory and drilling activities. Data validation will be completed by a third party (i.e., Environmental Data Services, Inc.) under the direction of the TRC Project QA Officer. The TRC Project QA Officer will report directly to the Project Manager, Daniel Schmidt, P.E.

The TRC Project QA Officer will ensure that the QAPP is implemented. A qualified person will provide oversight and technical support for the sampling and analytical procedures followed in this project. This individual has the broad authority to approve or disapprove project plans, specific analyses, and final reports. The Project QA Officer is independent from the data generation activities. In general, the QA officer will be responsible for reviewing and advising on all QA/QC aspects of this program.

Laboratories used will be New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratories. The laboratories will communicate directly with the sampler regarding the analytical results and reporting and will be responsible for providing all labels, sample containers, trip blanks, shipping coolers, and laboratory documentation.

QA Objectives for Data Management

New York State Analytical Services Protocol (ASP) Category B Laboratory Packages will be provided by the laboratory.

All analytical measurements will be made so that the results are representative of the media sampled and the conditions measured. Data will be reported in consistent dry weight units for solid samples [i.e., micrograms per kilogram (µg/kg) and/or milligrams per kilograms (mg/kg)]. *Table 1* presents the proposed samples, matrices, analytical parameters, analytical methods, sample preservation requirements, containers, holding times, and required QC samples.

Quantitation Limits (QLs) are laboratory-specific and reflect those values achievable by the laboratory performing the analyses. Data Quality Levels (DQLs) are those reporting limits required to meet the objectives of the program (i.e., program action levels, cleanup standards, etc.). Data Quality Objectives (DQOs) define the quality of data and documentation required to support decisions made in the various phases of the data collection activities. The DQOs are dependent on the end uses of the data to be collected and are also expressed in terms of objectives for precision, accuracy, representativeness, completeness, and comparability.

The analytical methods to be used at this site provide the highest level of data quality and can be used for purposes of risk assessment, evaluation of remedial alternatives and verification that cleanup standards have been met. However, in order to ensure that the analytical methodologies are capable of achieving the DQOs, measurement performance criteria have been set for the analytical measurements in terms of accuracy and precision.

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting which will provide results that are scientifically valid, and the levels of which are sufficient to meet DQOs.

For quantitation limits for parameters associated with soil samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits listed in 6 NYCRR Part 375 and CP-51.

The QA objectives are defined as follows:

- ***Accuracy*** is the closeness of agreement between an observed value and an accepted reference value. The difference between the observed value and the reference value includes components of both systematic error (bias) and random error.

The laboratory will assess the overall accuracy of their instruments and analytical methods (independent of sample or matrix effects) through the measurement of "standards," materials of accepted reference value. Accuracy will vary from analysis to analysis because of individual sample and matrix effects. In an individual analysis, accuracy will be measured in terms of blank results, the percent recovery (%R) of surrogate compounds in organic analyses and/or laboratory control samples (LCSs). This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds. Tables 2a and 2b summarize the laboratory accuracy requirements.

- ***Precision*** is the agreement among a set of replicate measurements without consideration of the "true" or accurate value: i.e., variability between measurements of the same material for the same analyte. Precision is measured in a variety of ways including statistically, such as calculating variance or standard deviation.

Precision in the field is assessed through the collection and measurement of field duplicates (one extra sample in addition to the original field sample). Field duplicates will be collected at a frequency of one per 20 investigative samples per matrix per analytical parameter. Precision will be measured through the calculation of relative percent differences (RPDs). The resulting information will be used to assess sampling and analytical variability. Field duplicate RPDs must be $\leq$ 50 for soil samples and $\leq$ 30 for aqueous samples. These criteria apply only if the sample and/or duplicate results are >5x the QL; if both results are $\leq$ 5x the QL, the criterion will be doubled. Due to the uncertainty of available representative soil gas volume, field duplicates will not be collected for this matrix.

Precision in the laboratory is assessed through the calculation of RPD for duplicate samples. For organic soil analyses, laboratory precision will be assessed through the analysis of field duplicates.

- ***Completeness*** is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned.

Field completeness is a measure of the amount of (1) valid measurements obtained from all the measurements taken in the project and (2) valid samples collected. The field completeness objective is greater than 90 percent.

Laboratory completeness is a measure of the amount of valid measurements obtained from all valid samples submitted to the laboratory. The laboratory completeness objective is greater than 95 percent.

- ***Representativeness*** is a qualitative parameter that expresses the degree to which data accurately and precisely represents either a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. To ensure representativeness, the sampling locations have been selected to provide coverage over a wide area and to highlight potential trends in the data. In addition, field duplicate samples will provide an additional measure of representativeness at a given location.

Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that proper sampling, sample handling, and sample preservation techniques are used.

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times.

- ***Comparability*** expresses the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Scope of Work for each proposed facility is followed and that proper sampling techniques are used. Maximization of comparability with previous data sets is expected because the sampling design and field protocols are consistent with those previously used.

Comparability is dependent on the use of recognized EPA or equivalent analytical methods and the reporting of data in standardized units. Laboratory procedures are consistent with those used for previous sampling efforts.

Table 1
Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples[1]	No. of QA/QC Samples	EPA Analytical Method	Sample Preservation	Holding Time[2]	Sample Container
Soil	TCL/CP-51 VOCs + 10 TICs	Grab	<10	Duplicate: 1/20	EPA Method 8260C	Sealed in EnCore® bag; Cool to 4^0 C	48 hours to extract: 2 EnCore® samplers extruded in 5mL DI water and freeze vials to <-7°C; 1 EnCore® sampler extruded in 5 mL methanol and Cool to 4^0 C; 14 days to analysis	3 x 5 gram EnCore® samplers
Soil	TCL/CP-51 SVOCs + 20 TICs	Grab	<45	Duplicate: 1/20	EPA Method 8270D	Cool to 4^0 C	14 days until extraction; 40 days from extraction to analysis.	1 x 4-oz. glass jar
Soil	TAL Metals	Grab	<45	Duplicate: 1/20	6010C	Cool to 4° C	Other metals: 180 days to analysis	(1) 8 oz glass jar
Soil	TCLP Lead	Grab	<10	None	EPA Methods 1311 and 6010B	Cool to 4^0 C	6 months to analysis	(2) 8-oz. glass jar
Soil	Mercury	Grab	<45	Duplicate: 1/20	7471B	Cool to 4° C	Mercury: 28 days to analysis	8 oz glass jar

Table 1
Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples[1]	No. of QA/QC Samples	EPA Analytical Method	Sample Preservation	Holding Time[2]	Sample Container
Soil	Total Cyanide	Grab	<45	Duplicate: 1/20	SW 846 9012B	Cool to 4º C	14 days to extract	8 oz glass jar
Soil	TCL Pesticides	Grab	<45	Duplicate: 1/20	8081B	Cool to 4º C	14 days to extract	8 oz glass jar
Soil	TCL Herbicides	Grab	<45	Duplicate: 1/20	8151A	Cool to 4º C	14 days to extract	8 oz glass jar
Soil	PCBs	Grab	<45	Duplicate: 1/20	8082A	Cool to 4º C	14 days to extract	8 oz glass jar

[1] Actual number of samples may vary depending on field conditions, sample material availability, and field observations.
[2] From date and time of sample collection

Table 2
Laboratory Data Quality Objectives: Precision and Accuracy: Soil Samples

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs (TCL/CP-51)	EPA Method 8260C	Soil	Surrogates % Rec. 1,2-Dichloroethane-d4 70-130 4-Bromofluorobenzene 70-130 Toluene-d8 70-130	Surrogates: All samples, standards, QC samples	Field Duplicates RPD ≤50	Field Duplicates: One per 20 per soils
SVOCs (TCL/CP-51)	EPA Method 8270D	Soil	Surrogates % Rec. 2,4,6-Tribromophenol 30-130 2-Fluorobiphenyl 30-130 2-Fluorophenol 30-130 Nitrobenzene-d5 30-130 Phenol-d6 30-130 p-Terphenyl-d14 30-130	Surrogates: All samples, standards, QC samples	Field Duplicates RPD ≤50	Field Duplicates: One per 20 per matrix
TAL Metals	6010C	Soil	Matrix Spikes: 75-125% recovery Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch Laboratory Control Samples: One per 20 samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples

Table 2
Laboratory Data Quality Objectives: Precision and Accuracy: Soil Samples

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
TCLP Lead	SW-846 Method 1311 and 6010B	Soil			Field Duplicates RPD ≤ 50	Field Duplicates: None
Mercury	7471B	Soil	Matrix Spikes: 75-125% recovery Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch Laboratory Control Samples: One per 20 samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples
Total Cyanide	SW 846-9012B	Soil	Matrix Spikes: 75-125% recovery Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch Laboratory Control Samples: One per 20 samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples

Table 2
Laboratory Data Quality Objectives: Precision and Accuracy: Soil Samples

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
TCL Pesticides	8081B	Soil	Matrix Spikes: 75-125% recovery Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch Laboratory Control Samples: One per 20 samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples
TCL Herbicides	8151A	Soil	Matrix Spikes: 75-125% recovery Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch Laboratory Control Samples: One per 20 samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples

Table 2
Laboratory Data Quality Objectives: Precision and Accuracy: Soil Samples

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
PCBs	8082A	Soil	Matrix Spikes: 75-125% recovery Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch Laboratory Control Samples: One per 20 samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples

Laboratory control limits are periodically updated. The latest control limits will be utilized at the time of sample analysis.

Sampling Plan

Environmental sampling will include post-excavation documentation/confirmatory soil sampling in the area of the hazardous lead hot spot, in the area of the UST, and across the remainder of the Site where non-hazardous soil are to be removed.. Soil samples will be collected using disposable sampling equipment.

Soil Sampling

With the exception of soil collected for VOC analysis, the samples will be collected with a disposable scoop and placed in the sample bottles. EnCore® or Terra Core® samplers will be used to collect soil samples for VOC analysis. Samplers will wear phthalate-free gloves such as nitrile (no latex will be used) and will avoid contact of the gloves with the sample. Only clean instruments will be allowed to touch the sample.

QC Sample Collection

QC samples will include field duplicates for soil samples.

Field duplicates are an additional aliquot of the same sample submitted for the same parameters as the original sample. Field duplicates will be used to assess the sampling and analytical reproducibility. Field duplicates will be collected by alternately filling sample bottles from the source being sampled. Field duplicates will be submitted at a frequency of one per 20 samples for all matrices and all parameters.

Refer to Table 1 for a summary of QC sample preservation and container requirements.

Sample Preservation and Containerization

The analytical laboratory will supply the sample containers for the chemical samples. These containers will be cleaned by the manufacturer to meet or exceed all analyte specifications established in the latest U.S. EPA's *Specifications and Guidance for Contaminant-Free Sample Containers*. Certificates of analysis are provided with each bottle lot and maintained on file to document conformance to EPA specifications. Soil samples will be placed in iced coolers immediately after collection.

Equipment Decontamination

Re-usable Teflon®, stainless steel, and aluminum sampling equipment shall be cleaned between each use in the following manner:

- Wash and scrub with Alconox and water mixture
- Tap water rinse
- Distilled/deionized water rinse
- Air dry

Field Custody Procedures

Sample chain-of-custody and packaging procedures are summarized below. These procedures are intended to ensure that the samples will arrive at the laboratory with the chain-of-custody intact.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.
- All bottles will be identified by the use of sample labels with sample numbers, sampling locations, date/time of collection, and type of analysis.
- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.
- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location.
- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and copies will be retained by the sampler and placed in the project files.

- Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory. The custody seals will be attached to the front right and back left of the cooler and covered with clear plastic tape after being signed by field personnel. The cooler will be strapped shut with strapping tape in at least two locations.
- If the samples are sent by common carrier, the air bill will be used. Air bills will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody forms since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.
- Samples remain in the custody of the sampler until transfer of custody is completed. This consists of delivery of samples to the laboratory sample custodian, and signature of the laboratory sample custodian on chain-of-custody document as receiving the samples and signature of sampler as relinquishing samples.

Field Instrument Calibration

Field instrumentation (i.e., PID and Horiba) will be calibrated in accordance with the manufacturer's specifications.

APPENDIX D
COMMUNITY AIR MONITORING PLAN

COMMUNITY AIR MONITORING PLAN

840 5TH AVENUE

BROOKLYN, NEW YORK

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INTRODUCTION

In accordance with the Remedial Action Work Plan, this Community Air Monitoring Plan (CAMP) is developed for utilization during ground intrusive work activities at 840 5th Avenue, Brooklyn, New York (referred to as the Site"). The Site is approximately 0.45 acres (19,605 square feet) and is proposed for development as a public school facility.

TRC Engineers, Inc. (TRC) developed this CAMP to describe the procedures for real-time air monitoring for volatile organic compounds (VOCs) and particulate levels which will be completed during ground intrusive activities. Continuous monitoring and observations will be required during ground intrusive activities. This CAMP was developed based on the requirements of New York State Department of Health (NYSDOH) Generic CAMP, Appendix 1A and Fugitive Dust and Particulate Monitoring, Appendix 1B, of NYSDEC DER-10.

2.0 PURPOSE

The Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of the work area at the Site. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of ground intrusive work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities do not spread contamination off-site through the air.

3.0 AIR MONITORING PROTOCOL

A qualified environmental monitor with "stop work authority" will be responsible for the air monitoring and daily calibration and maintenance of the equipment in accordance with the manufacturer's specifications. All instrumentation and equipment will be maintained at all times in proper operating condition. The qualified environmental monitor will be responsible for documenting in the dedicated project log book each calibration event, any equipment and instrument malfunctions, unusual conditions, air monitoring station locations, and any exceedances of action levels and countermeasures implemented. Copies of the manufacturers' owner's manuals for monitoring instrumentation to be used is included as *Appendix A*. The downwind CAMP station with alternative locations is shown on the attached *Figure 1D*.

3.1 VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the downwind perimeter of the work area on a continuous basis. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present (i.e., photoionization detector MiniRae 2000). The equipment will be calibrated daily and will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring. Note that odor complaints from any owner of an adjacent or nearby property will be managed by the Contractor in a manner equivalent to an exceedance of an action level in the CAMP.
- If total organic vapor levels at the downwind perimeter of the work area persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the work area or half the distance to the

nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.
- All 15-minute readings will be recorded and will be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

3.2 Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind locations of the perimeter of the Site at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level (i.e., TSI DustTrak Model 8520). The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and provided that no visible dust is migrating from the work area. Note dust complaints from any owner of an adjacent or nearby property will be managed by the Contractor in a manner equivalent to an exceedance of an action level in the CAMP.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work will be stopped and a re-evaluation of activities will be initiated. Work will be able to be resumed provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.
- All readings will be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

4.0 REPORTING

Any exceedance of a CAMP threshold or action level will be reported to the NYCSCA, NYSDEC, and NYSDOH immediately and additionally via email within 4 hours of the time it is recorded. The report will include the instrument readings; location of the monitoring station where the exceedance was recorded; readings at upwind locations; date, time, and duration of elevated readings (i.e., number of 15 minute time-weighted exceedances); activities being performed at the time of the exceedances; and descriptions of countermeasures implemented to control the exceedance and prevent future occurrences.

At the completion of each work day, the data recorded from each air monitoring station will be downloaded onto a dedicated field computer and evaluated by the qualified environmental monitor. All readings will be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

APPENDIX A

MANUFACTURERS' OWNER'S MANUALS

MiniRAE 2000

Portable VOC Monitor
PGM-7600

OPERATION AND MAINTENANCE MANUAL

(Document No.: 011-4001-000)
Revision E, May 2005

RAE SYSTEMS

ISO 9001 CERTIFIED

ATTENTION!

For European Applications

A. CE 0575 ⟨Ex⟩ II 1G/2G
   DEMKO 03 ATEX 0204759X
   Eex ia IIC T4
B. **Recharge batteries only in non-hazardous locations.**
C. **Do not connect external cable to serial interface jack in hazardous locations.**
D. **Use RAE Systems Adapter P/N 500-0072 for connection to communication port and charging jack only in a non-hazardous area.**

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Data Analysis Software

TRAKPRO™

Data Analysis Software

User's Guide

1980581, Revision D
July 2009

TRUST. SCIENCE. INNOVATION.

Part Number
1980581 / Revision D / July 2009

Address
TSI Incorporated / 500 Cardigan Road / Shoreview, MN 55126 / USA

Phone No.
1-800-874-2811 (USA) or (651) 490-2811

Fax No.
(651) 490-3824

E-mail Address
answers@tsi.com

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Seller warrants the goods sold hereunder, under normal use and service as described in the operator's manual, shall be free from defects in workmanship and material for twenty-four (24) months, or the length of time specified in the operator's manual, from the date of shipment to the customer. This warranty period is inclusive of any statutory warranty. This limited warranty is subject to the following exclusions:

a. Hot-wire or hot-film sensors used with research anemometers, and certain other components when indicated in specifications, are warranted for 90 days from the date of shipment.

b. Parts repaired or replaced as a result of repair services are warranted to be free from defects in workmanship and material, under normal use, for 90 days from the date of shipment.

c. Seller does not provide any warranty on finished goods manufactured by others or on any fuses, batteries or other consumable materials. Only the original manufacturer's warranty applies.

d. Unless specifically authorized in a separate writing by Seller, Seller makes no warranty with respect to, and shall have no liability in connection with, goods which are incorporated into other products or equipment, or which are modified by any person other than Seller.

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(effective March 1999)

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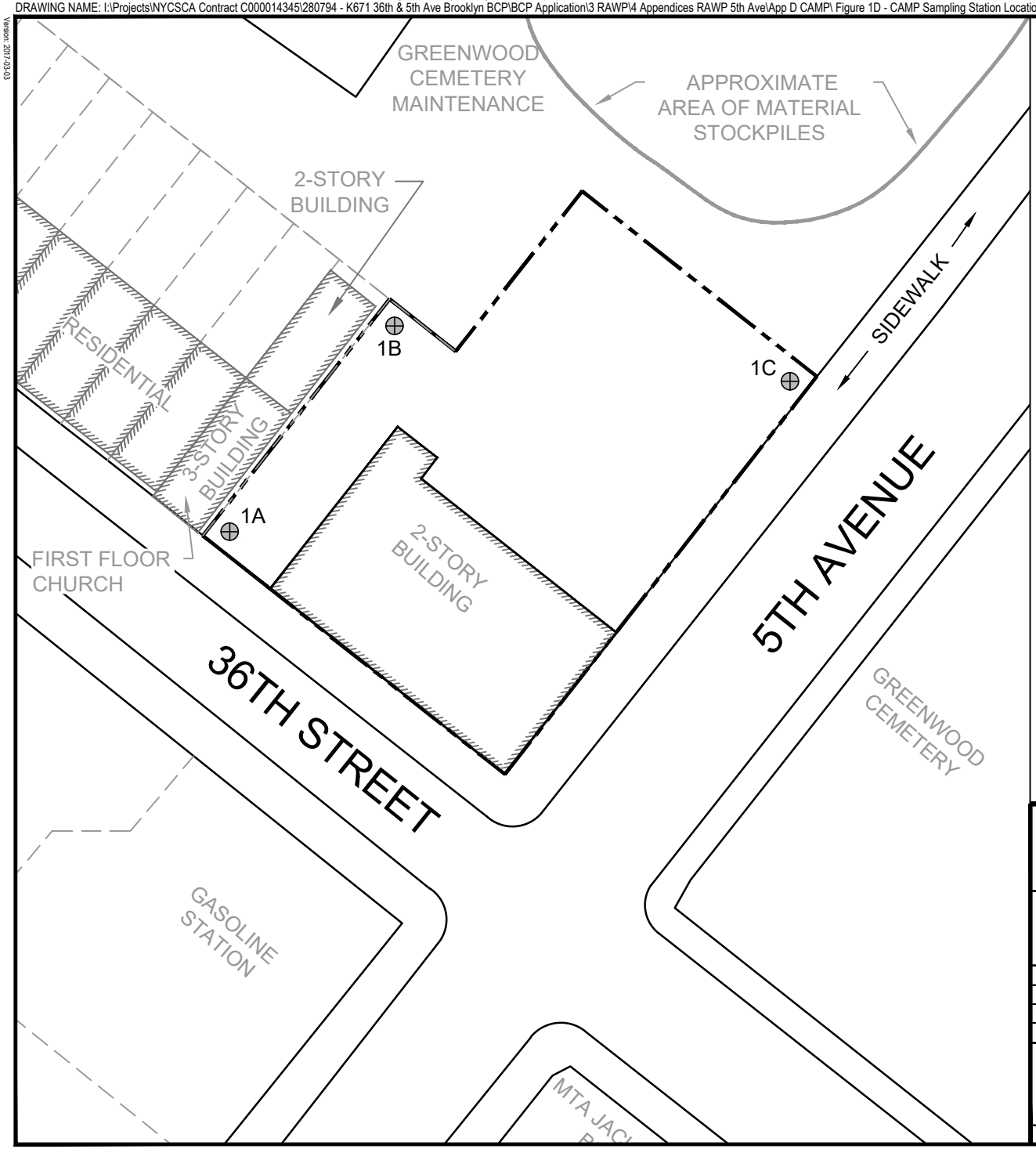
CONTENTS

FIGURE 1D

MONITORING STATION LOCATIONS



LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- BUILDING FOOTPRINT
- 1X — PROPOSED ALTERNATIVE LOCATIONS OF DOWNWIND CAMP STATION

W – N – E

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. ONE (1) DOWNWIND CAMP AIR MONITORING STATION WILL BE UTILIZED DURING REMEDIAL ACTIVITIES. LOCATION WILL BE ALTERED DUE TO CHANGES IN WIND DIRECTION.

SOURCE:
BLOCK AND LOT BOUNDARIES FROM WWW.PROPERTYSHARK.COM

0 50' 100'

SCALE: 1" = 50'
SHEET SIZE: 8.5" BY 11"

PROJECT: **NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY**
COMMUNITY AIR MONITORING PLAN
840 5TH AVENUE
BLOCK: 693, LOT: 39
BROOKLYN, NEW YORK 11232

TITLE:

MONITORING STATION LOCATIONS

DRAWN BY:	H. DELGADO	PROJ NO.:	280794
CHECKED BY:	D. SCHMIDT		
APPROVED BY:	D. GLASS		**FIGURE 1D**
DATE:	SEPTEMBER 2018		

TRC
1430 Broadway
10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO.: Figure 1D - CAMP S□m□i□g St□tio□ Loc□tio□s.dwg

SPECIAL REQUIREMENTS COMMUNITY AIR MONITORING PLAN (FOR GROUND INTRUSIVE WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUALS OR STRUCTURES)

840 5TH AVENUE
BROOKLYN, NEW YORK

The Special Requirements Community Monitoring Plan (CAMP) will be implemented when ground intrusive work activities are performed within 20 feet of potentially exposed populations or occupied structures. For the 840 5th Avenue Site, the Special CAMP will pertain to ground intrusive work activities performed within 20 feet of the west-adjacent structure located at 467 36th Street.

Details regarding the Special CAMP are presented below. Continuous on-Site monitoring locations included as part of the CAMP for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures.

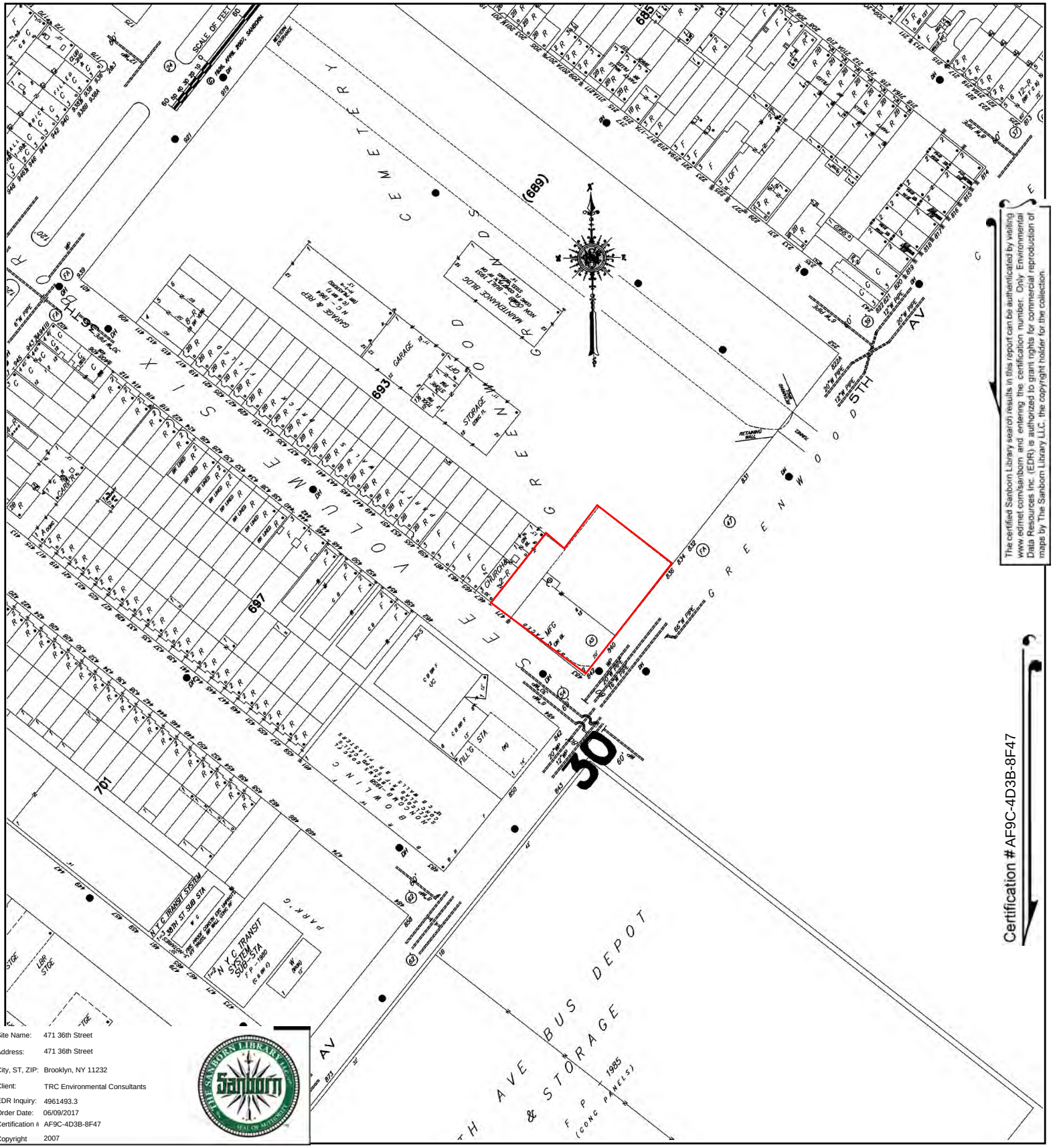
- If total VOC concentrations adjacent to the exterior walls of occupied structures (i.e., at the western perimeter of the Site) exceed 1 parts per million (ppm), monitoring should occur within the occupied structure(s), if access is granted. Background readings in the occupied spaces will be recorded prior to commencement of the planned work if access is granted. Any unusual background readings will be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations adjacent to the exterior walls of occupied structures (i.e., at the western perimeter of the Site) exceed 150 micrograms per cubic meter ($\mu g/m^3$), work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 $\mu g/m^3$ or less at the monitoring point.

The use of engineering controls such as vapor/dust barriers, temporary negative pressure enclosures, or special ventilation devices may be considered to prevent exposures related to the work activities and to control dust and odors. Since the west-adjacent building is primarily residential, it is anticipated that work will be performed on weekdays during normal working hours and not on weekends or during evening/overnight hours.

There is no indoor work expected at co-located residences or facilities. Therefore, special requirements for indoor work at co-located residences or facilities is not included in the Special CAMP.

APPENDIX E
SANBORN MAPS



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City, ST, ZIP:	Brooklyn, NY 11232
Client:	TRC Environmental Consultants
EDR Inquiry:	4961493.3
Order Date:	06/09/2017
Certification #	AF9C-4D3B-8F47
Copyright	2007

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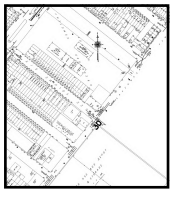

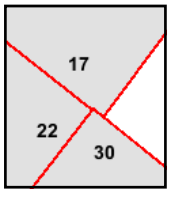

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Volume 6A, Sheet 22
Volume 6, Sheet 17

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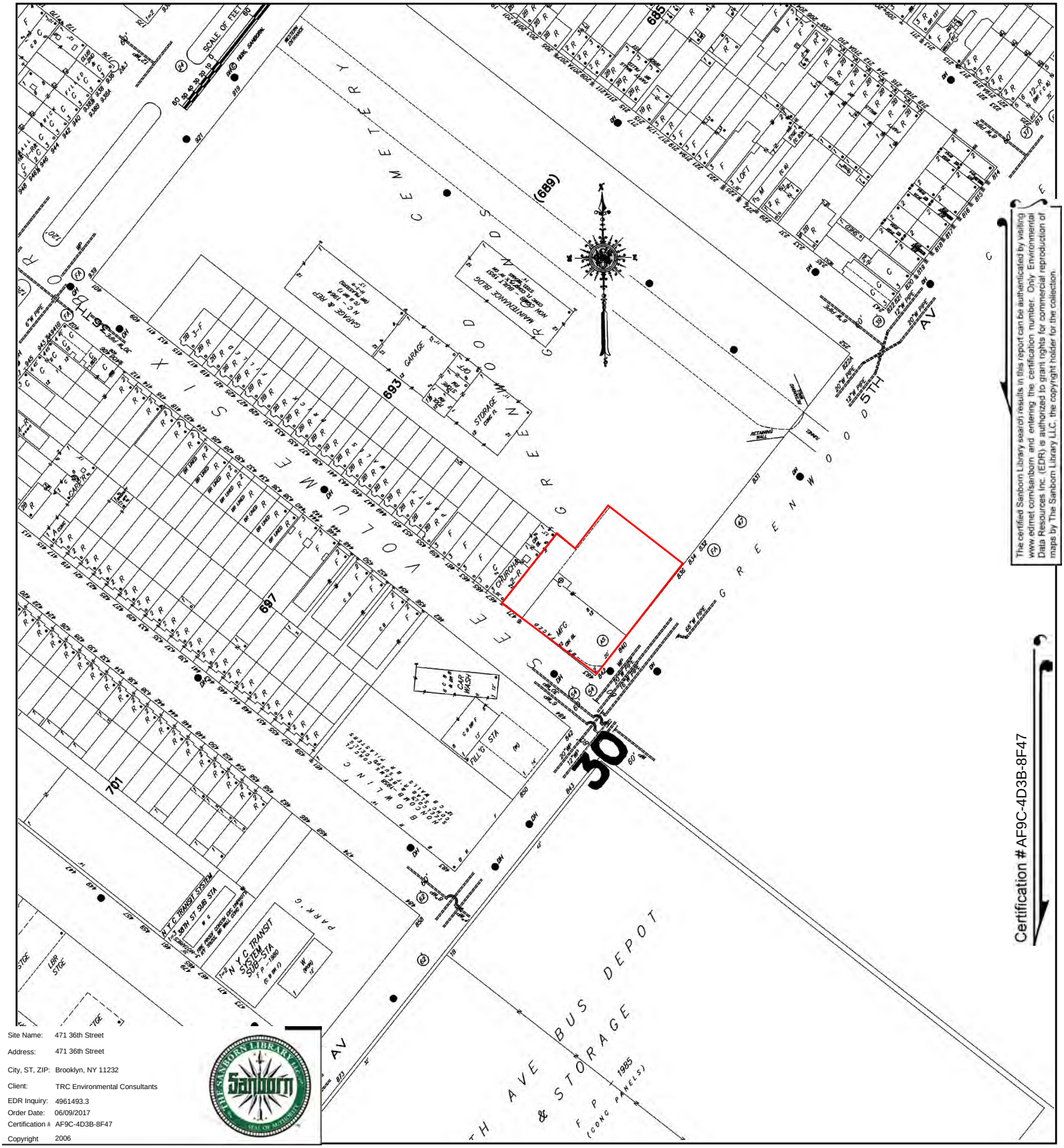

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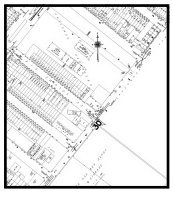

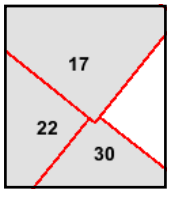

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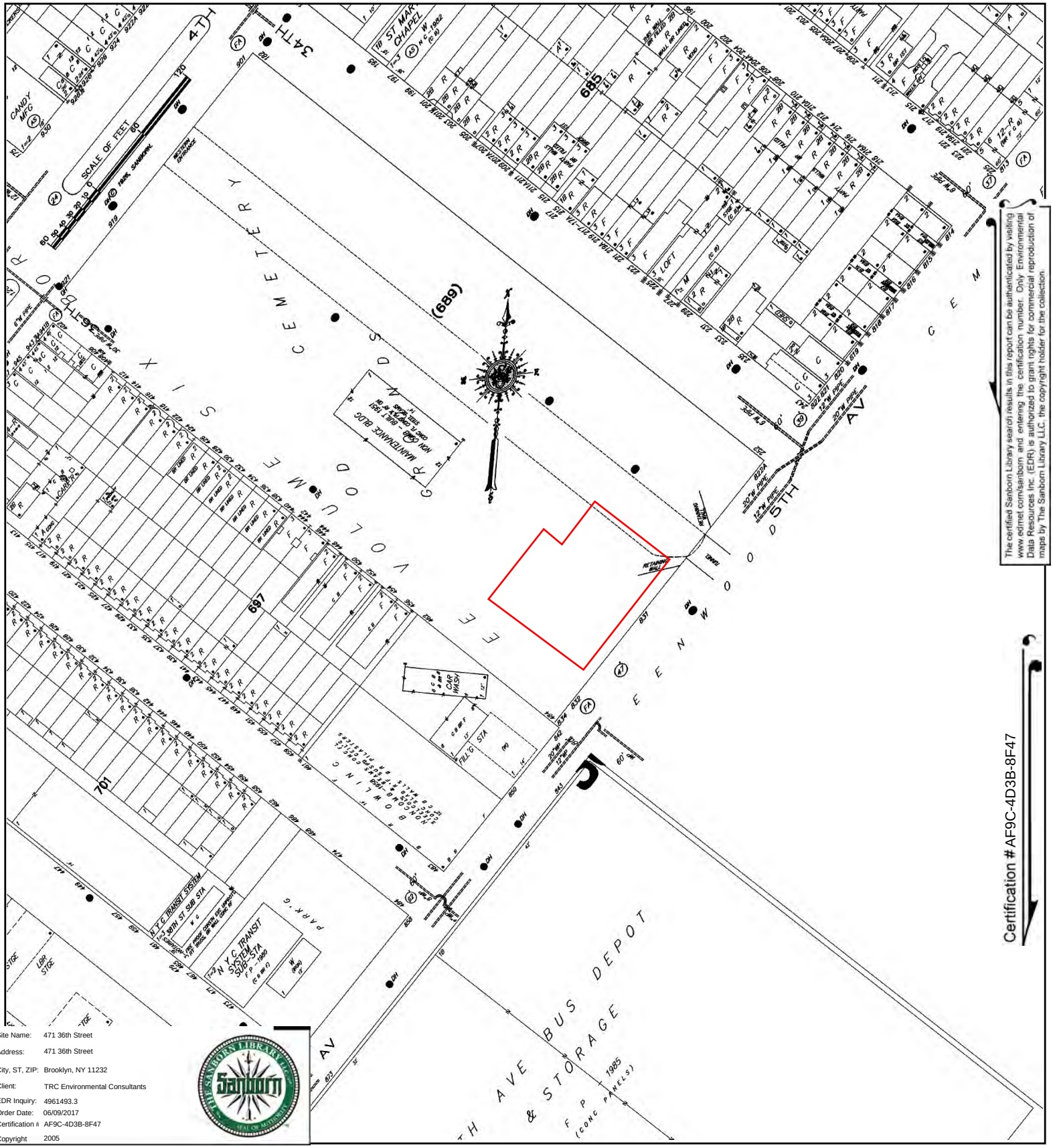

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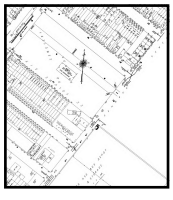

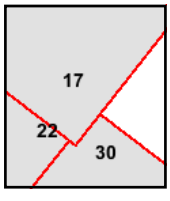

Volume 6, Sheet 17
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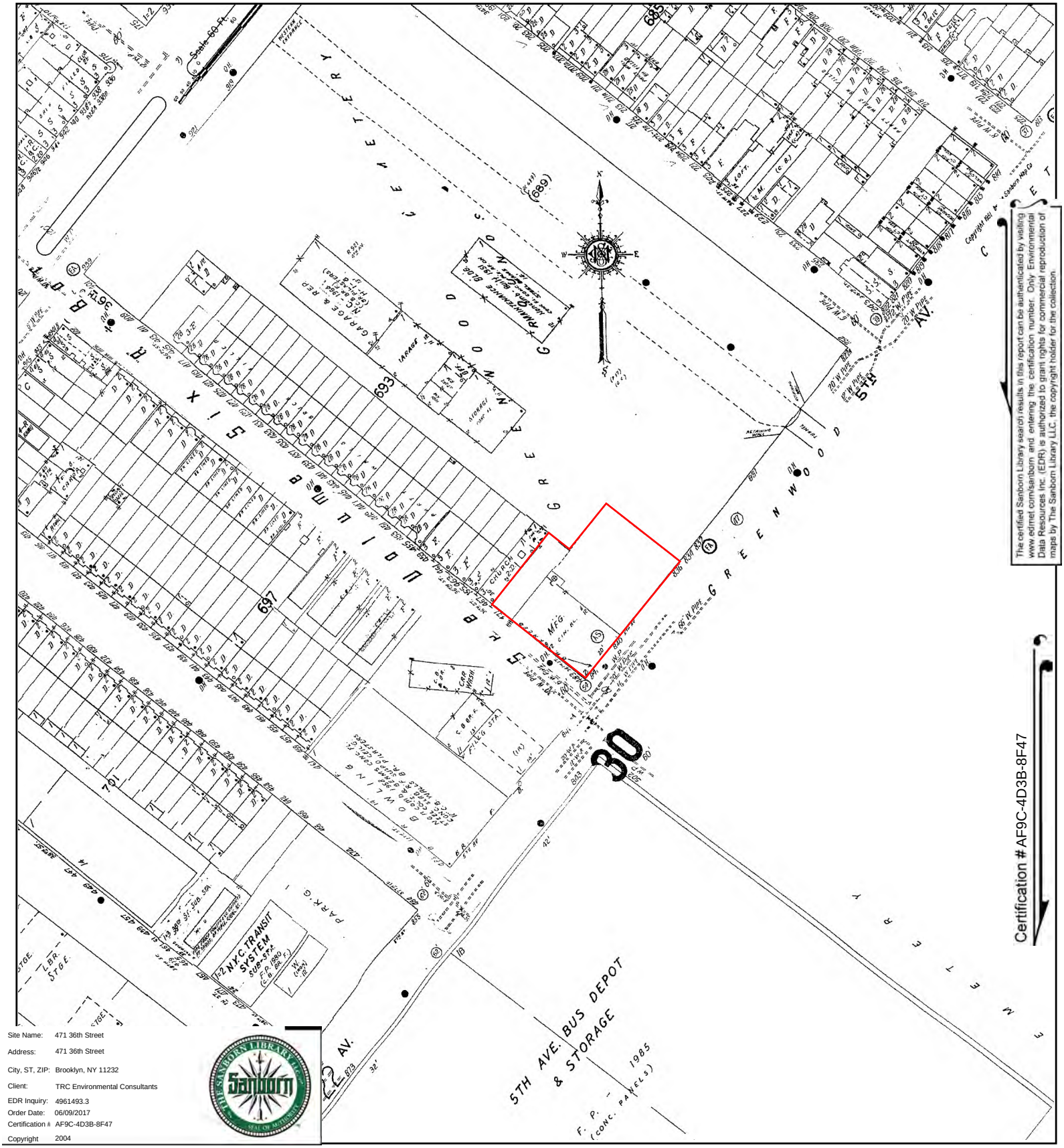

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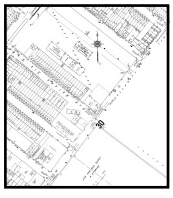

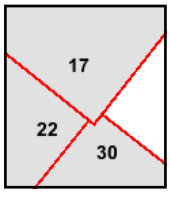

Volume 6, Sheet 17
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Volume 6A, Sheet 22

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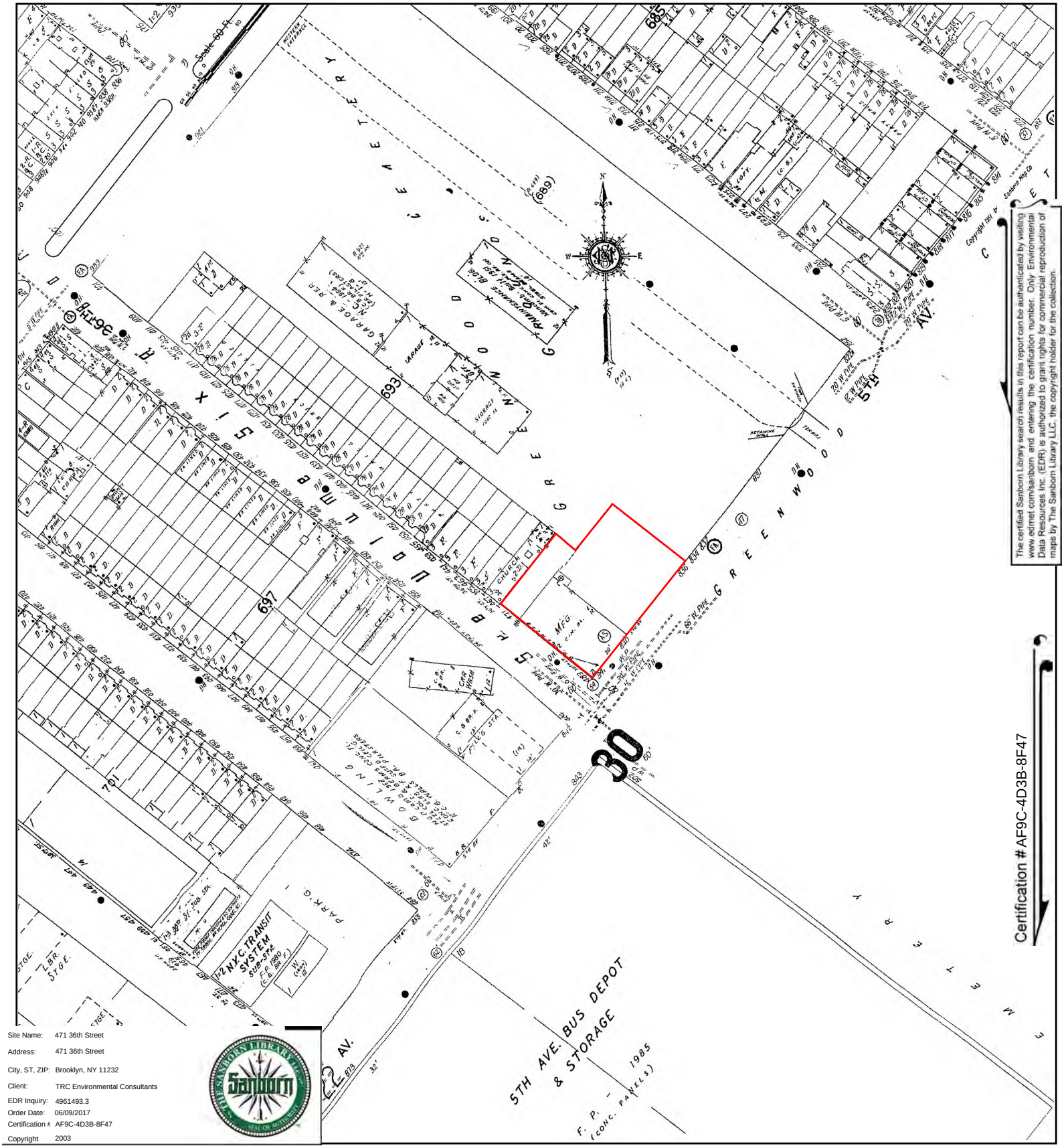

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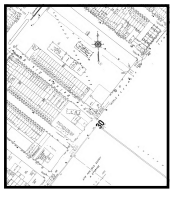

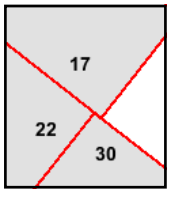

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Volume 6, Sheet 17

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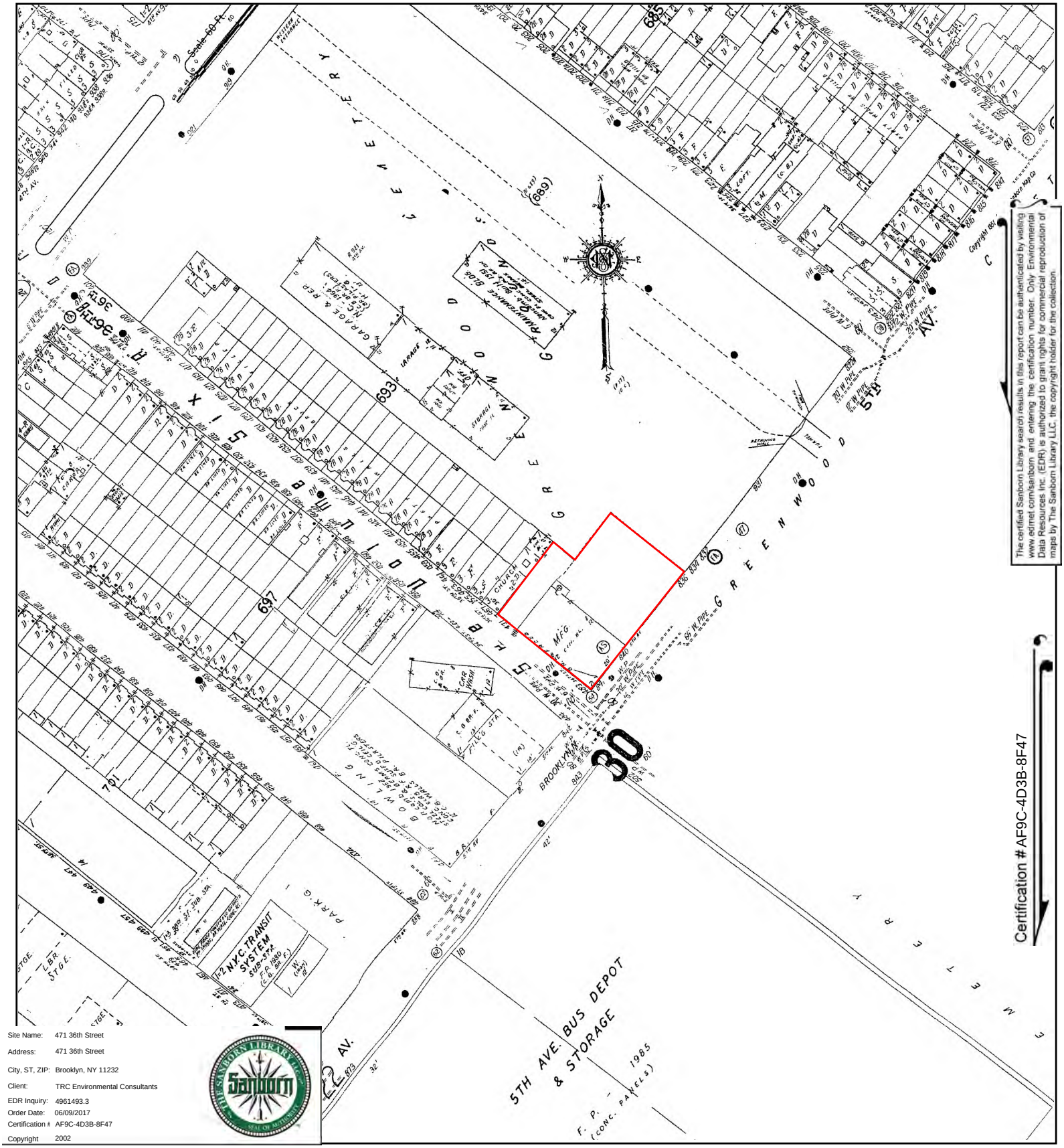

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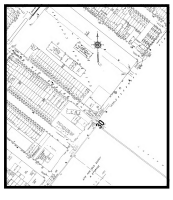

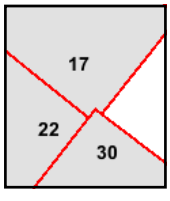

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Volume 6A, Sheet 22
Volume 6A, Sheet 30

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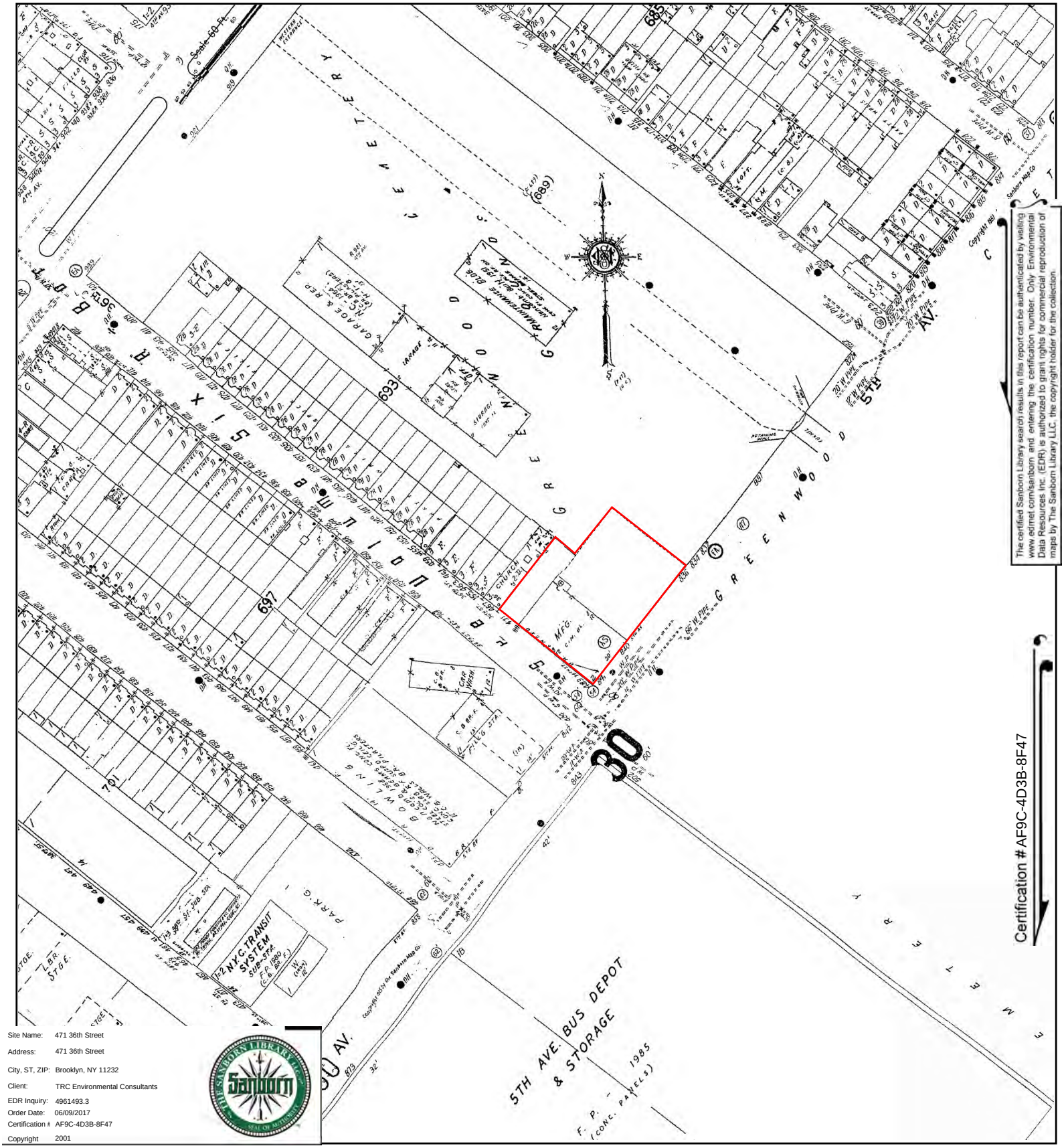

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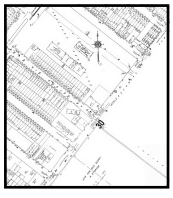

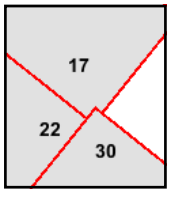

Volume 6A, Sheet 30
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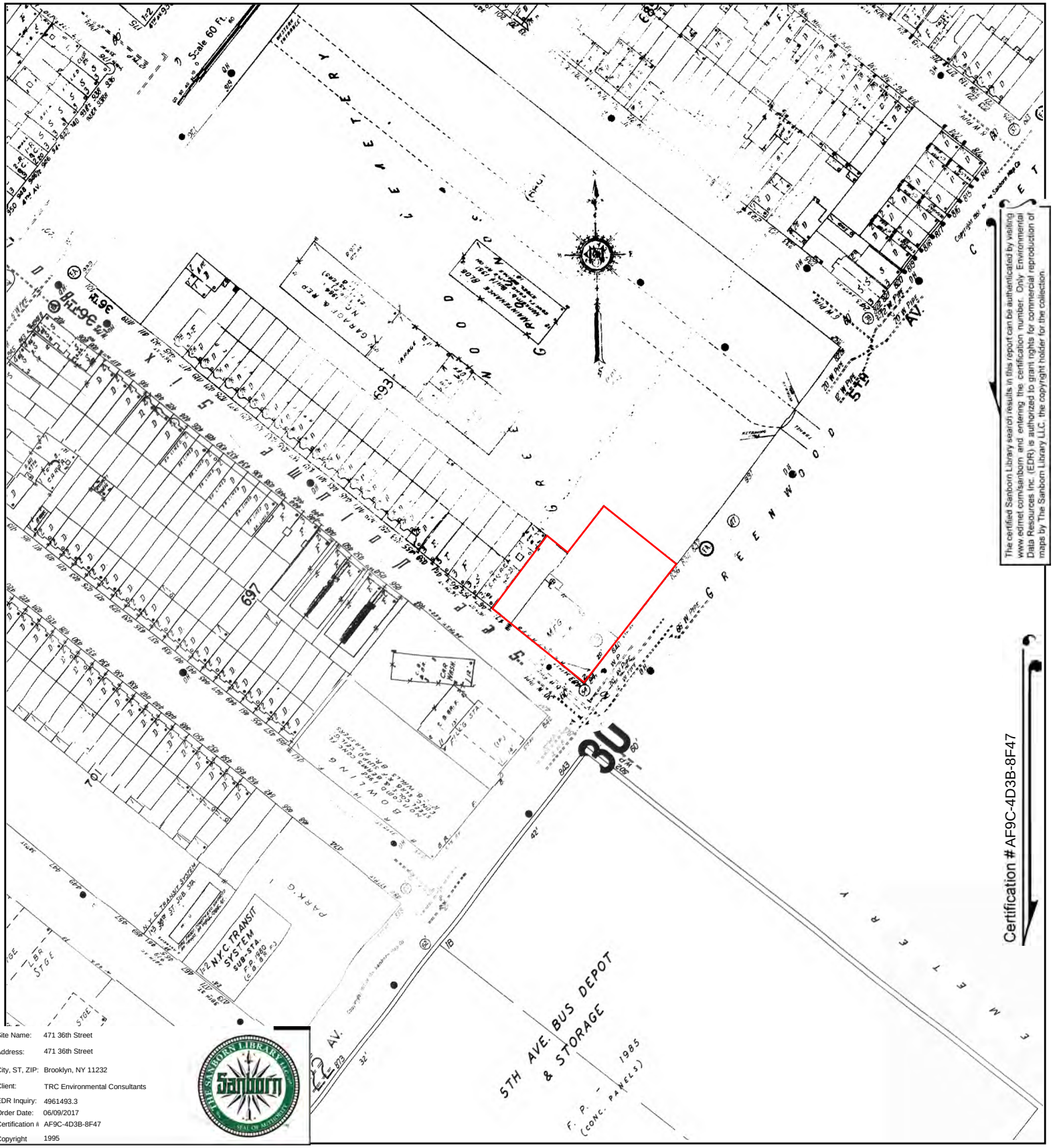

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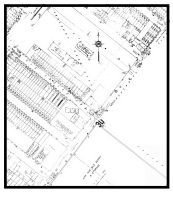

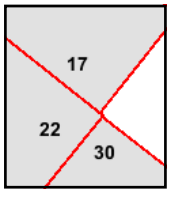

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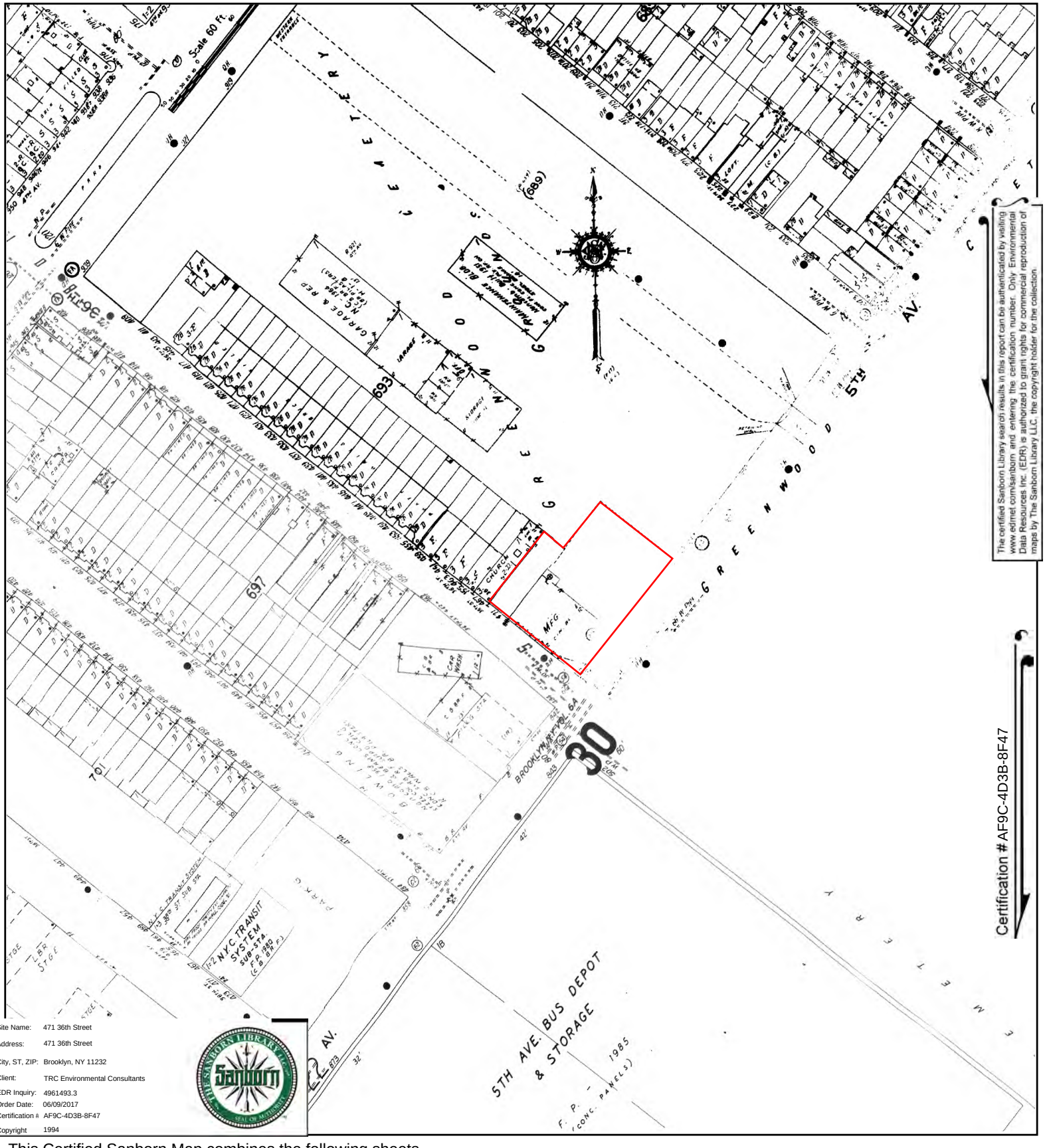

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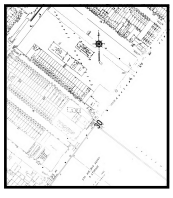

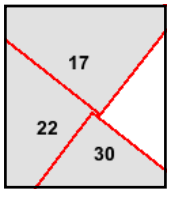

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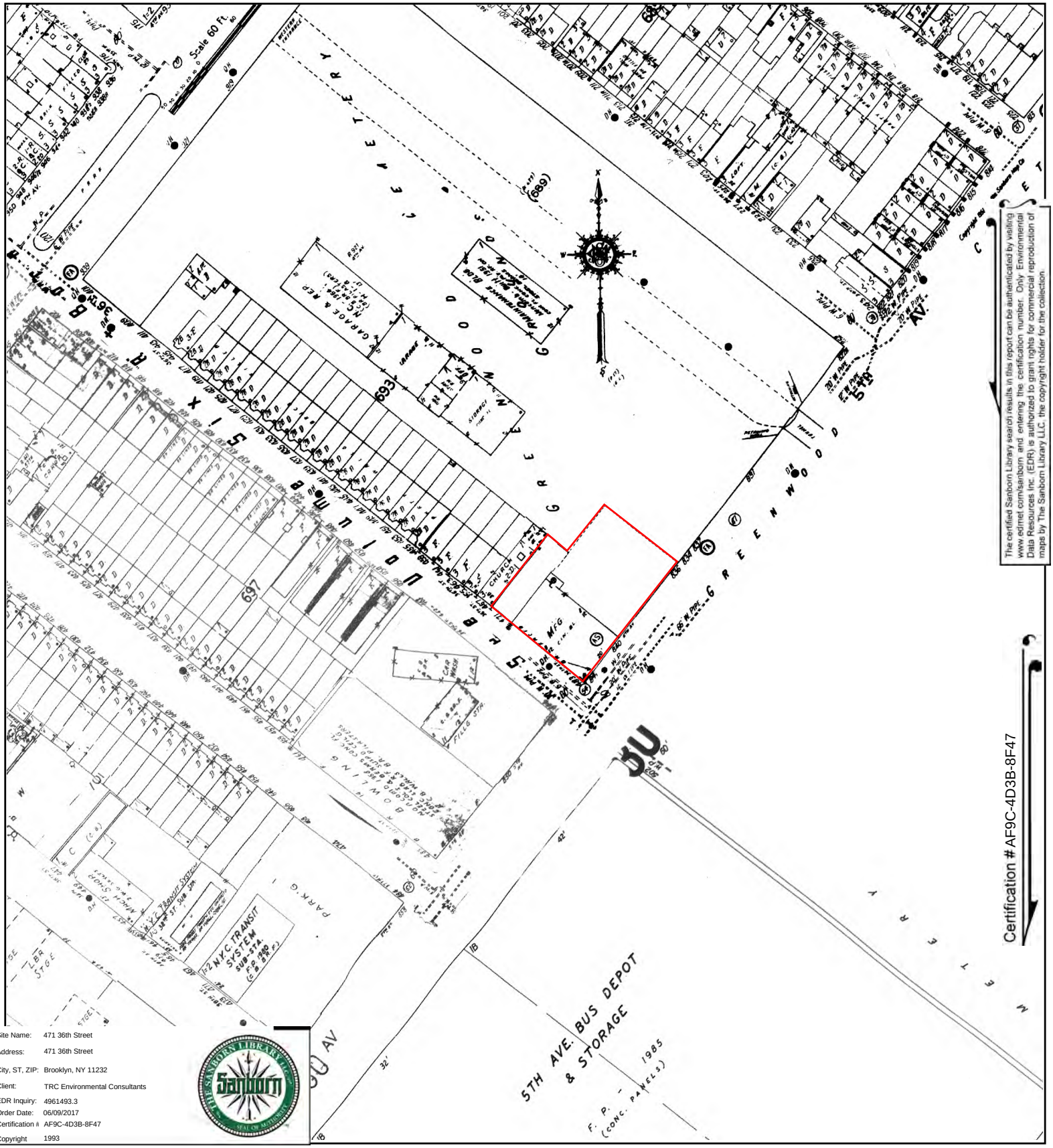

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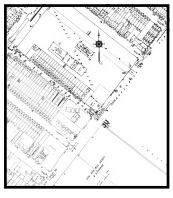

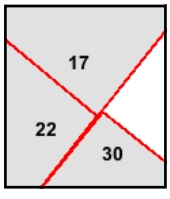

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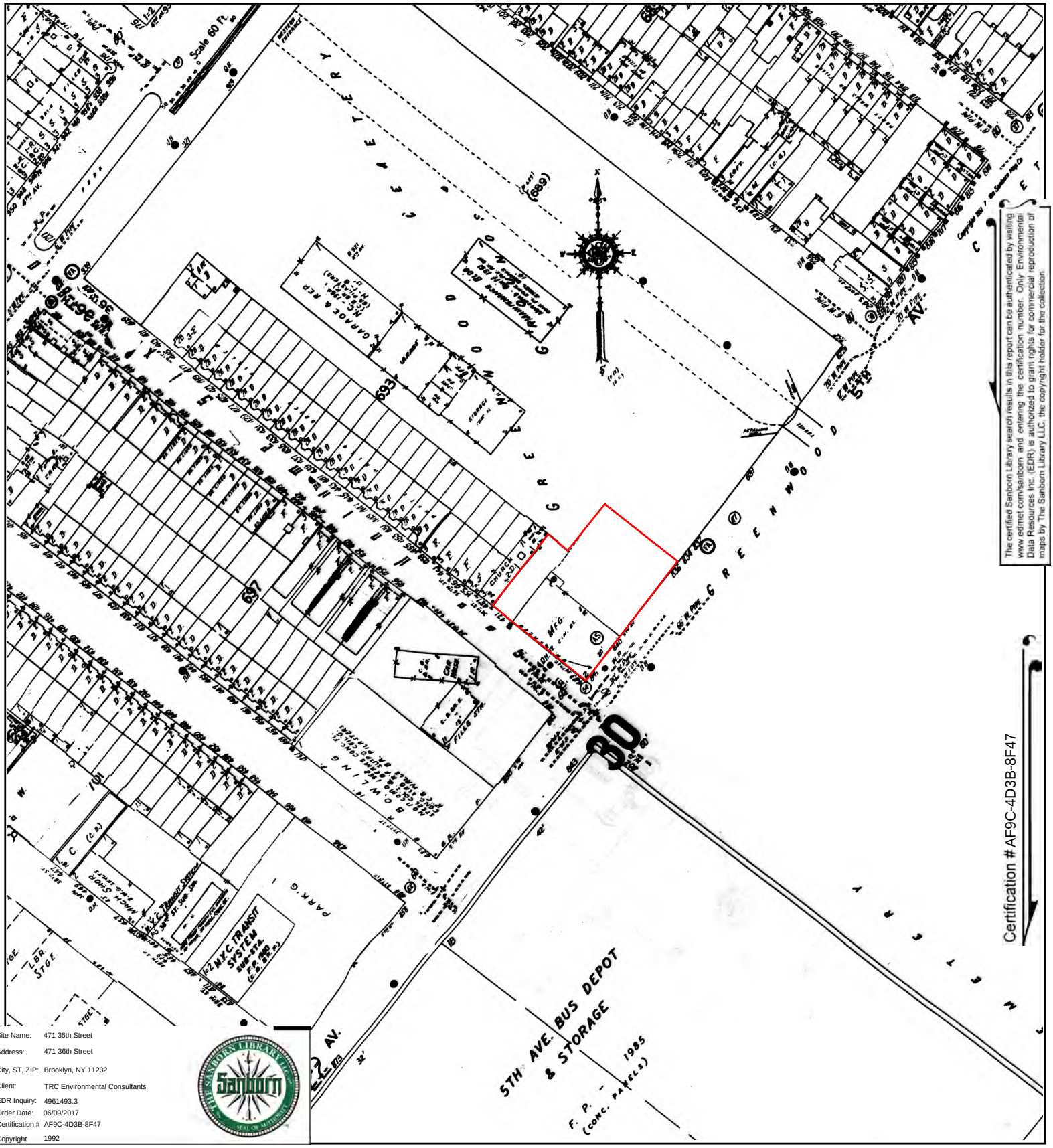

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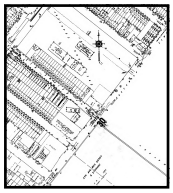

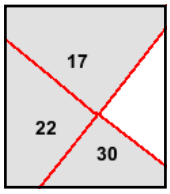

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Volume 6, Sheet 17

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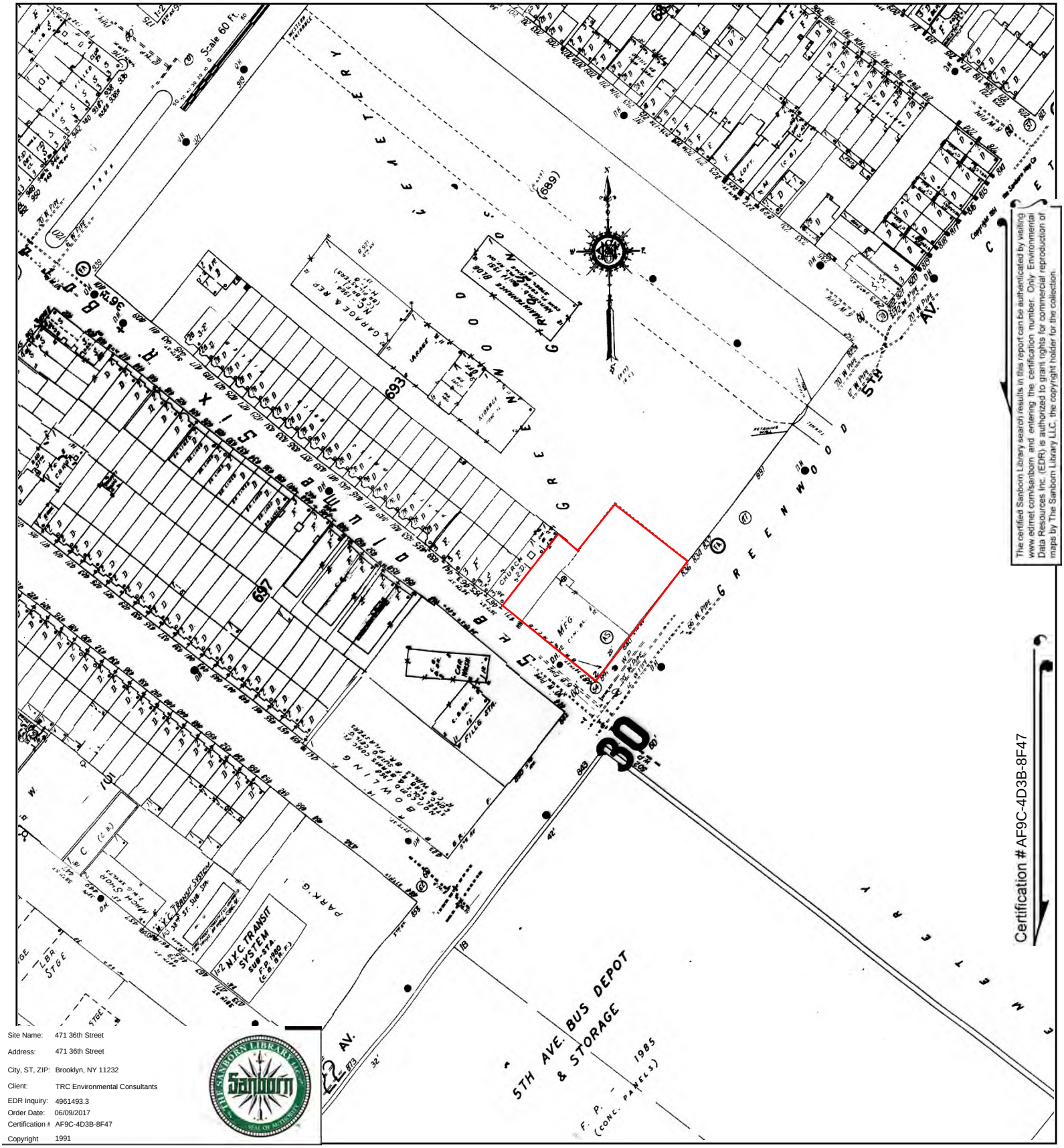

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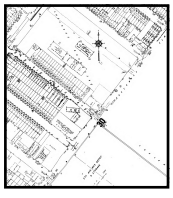

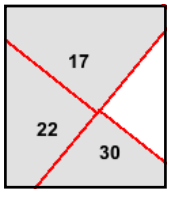

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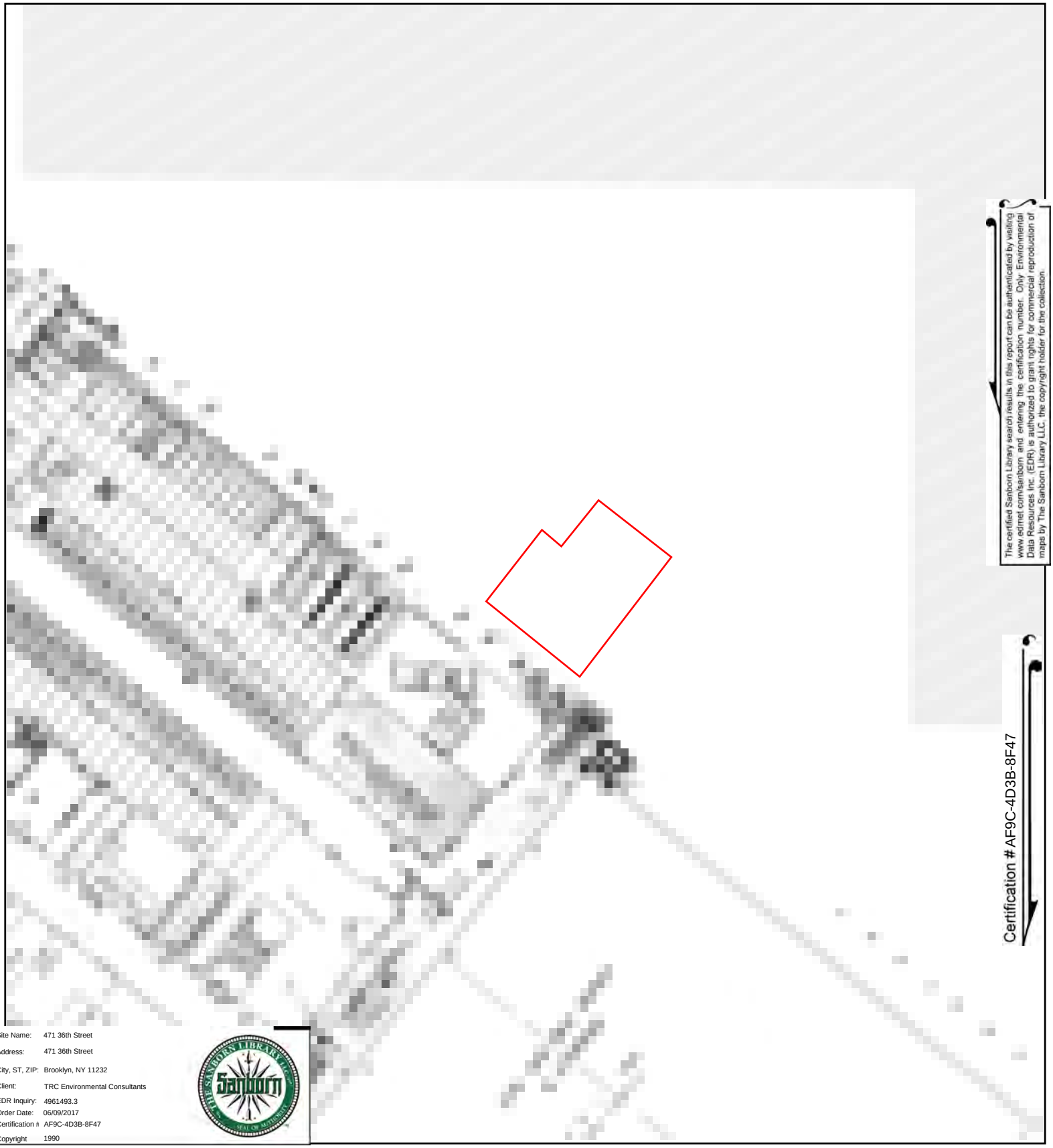

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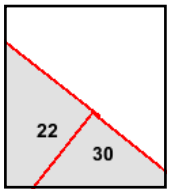

Volume 6A, Sheet 30
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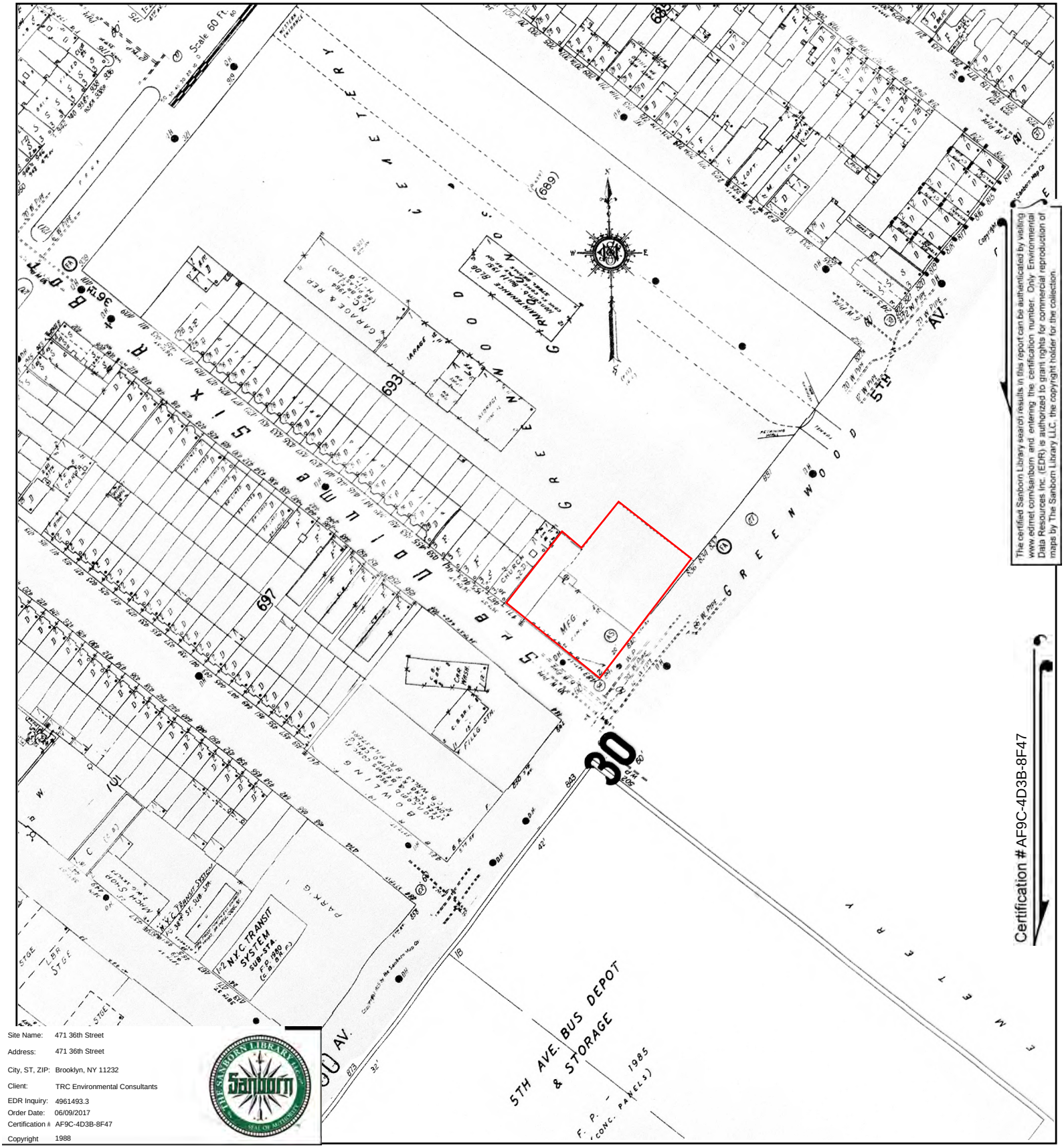

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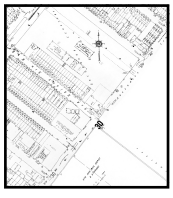

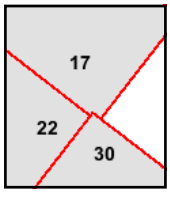

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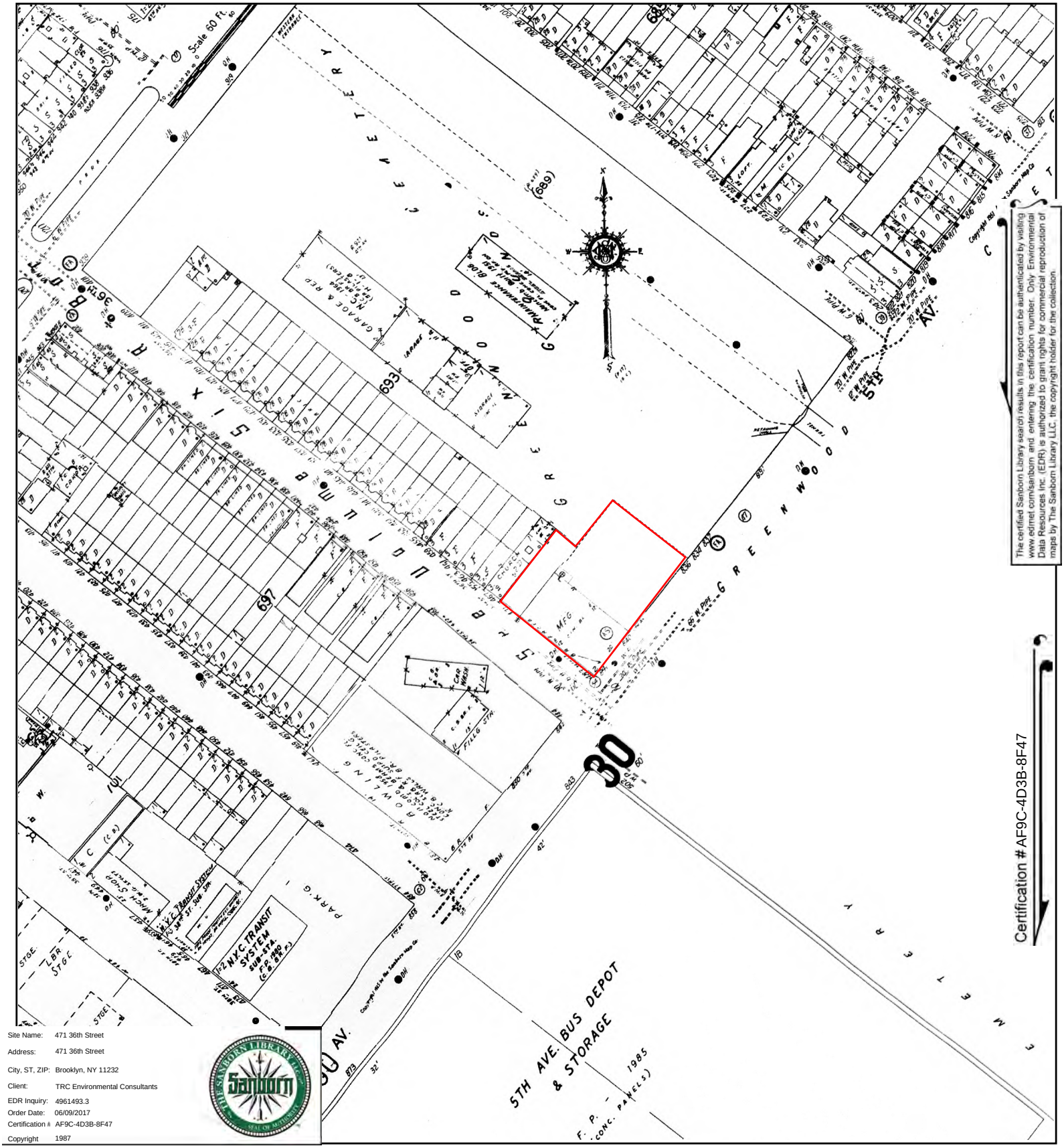

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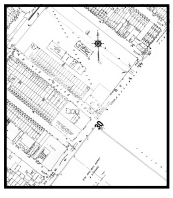

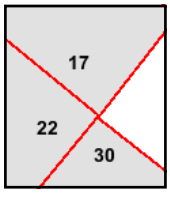

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Volume 6A, Sheet 22
Volume 6A, Sheet 30

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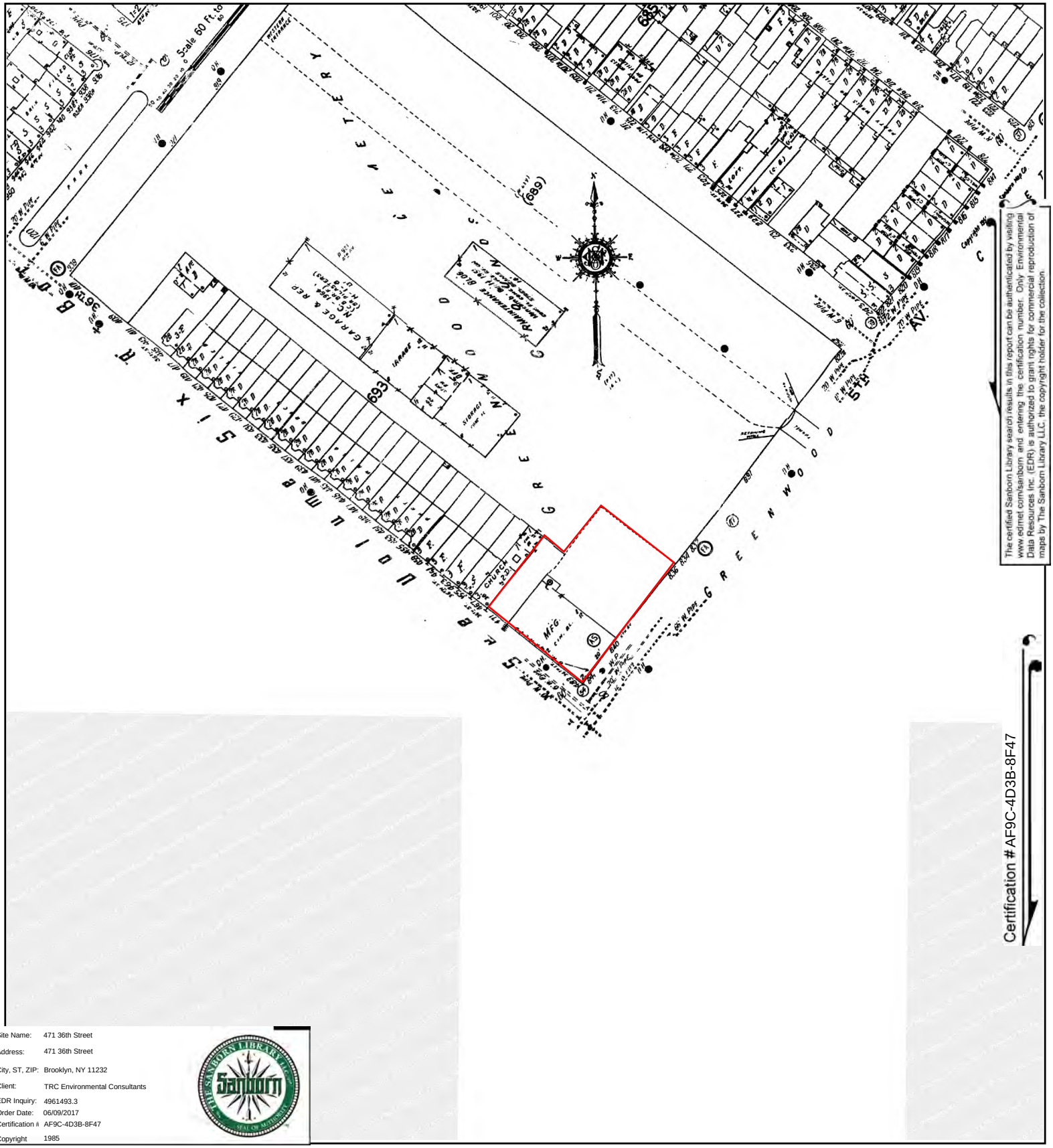

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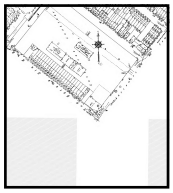

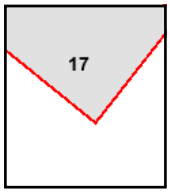

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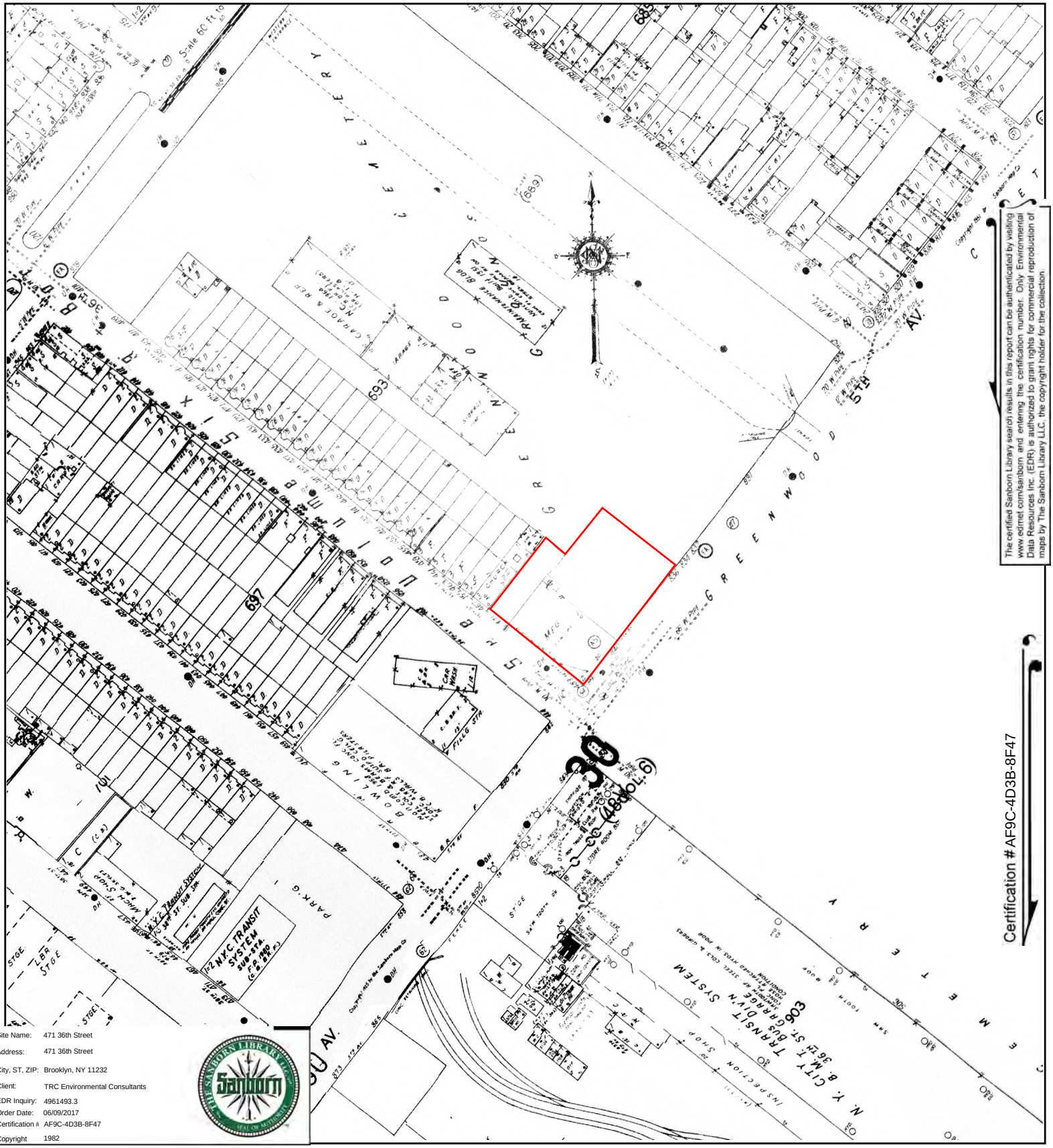

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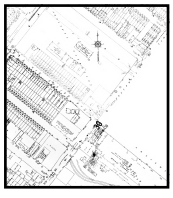

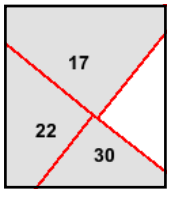

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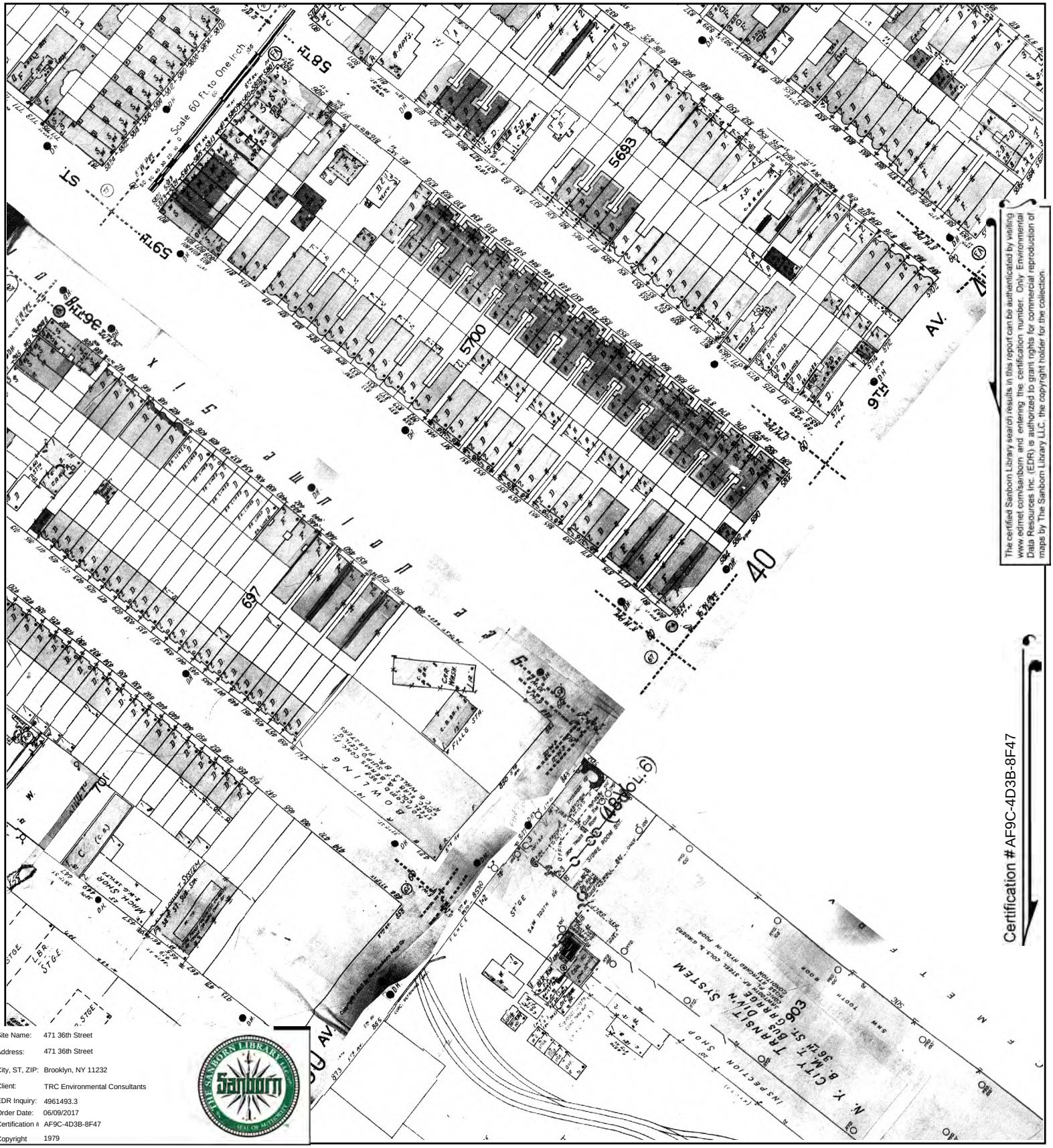

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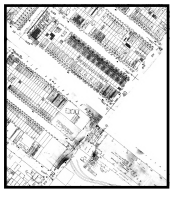

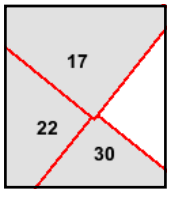

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Volume 6A, Sheet 22

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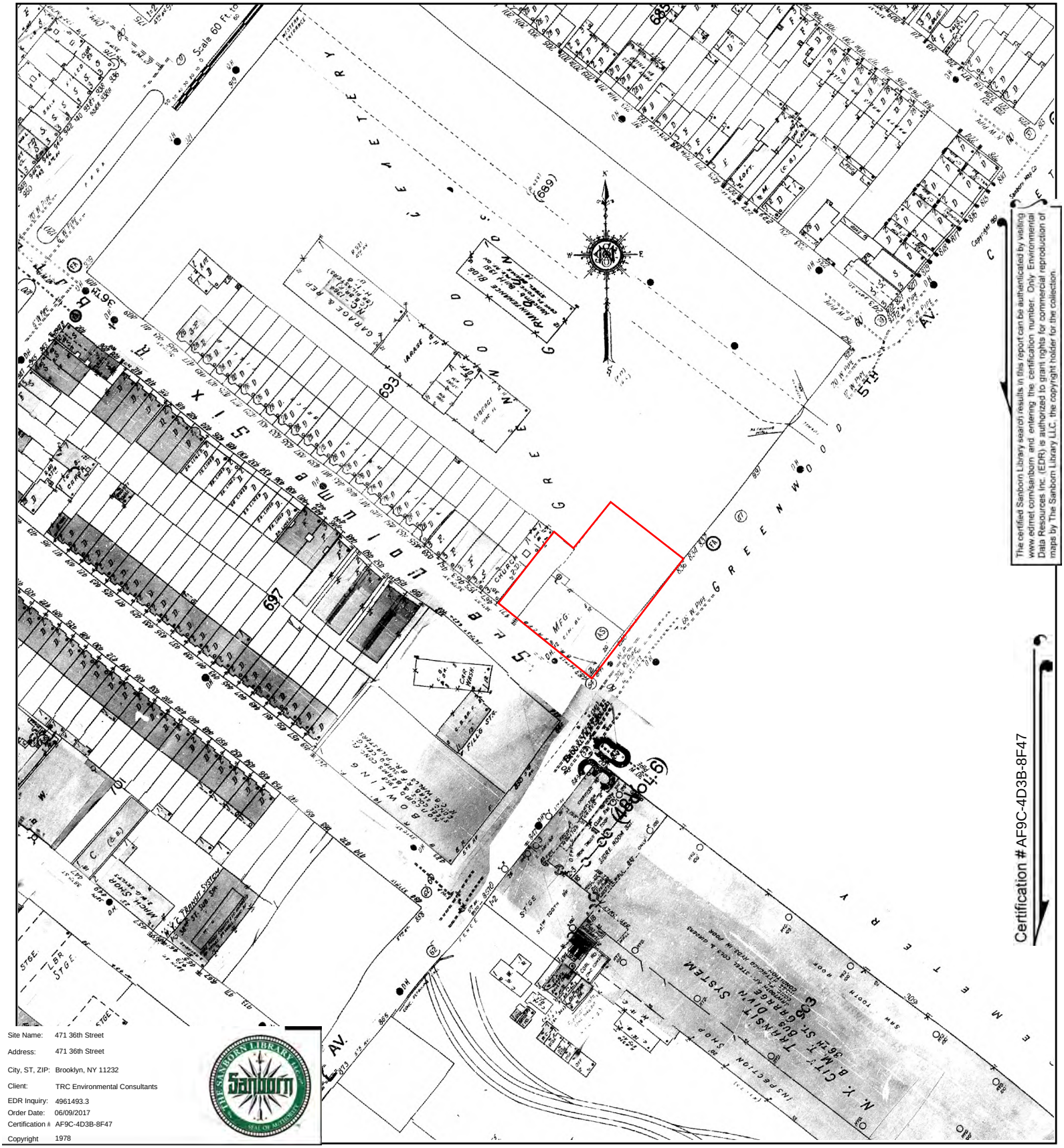

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Copyright	1978

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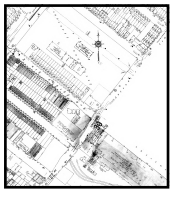

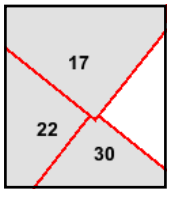

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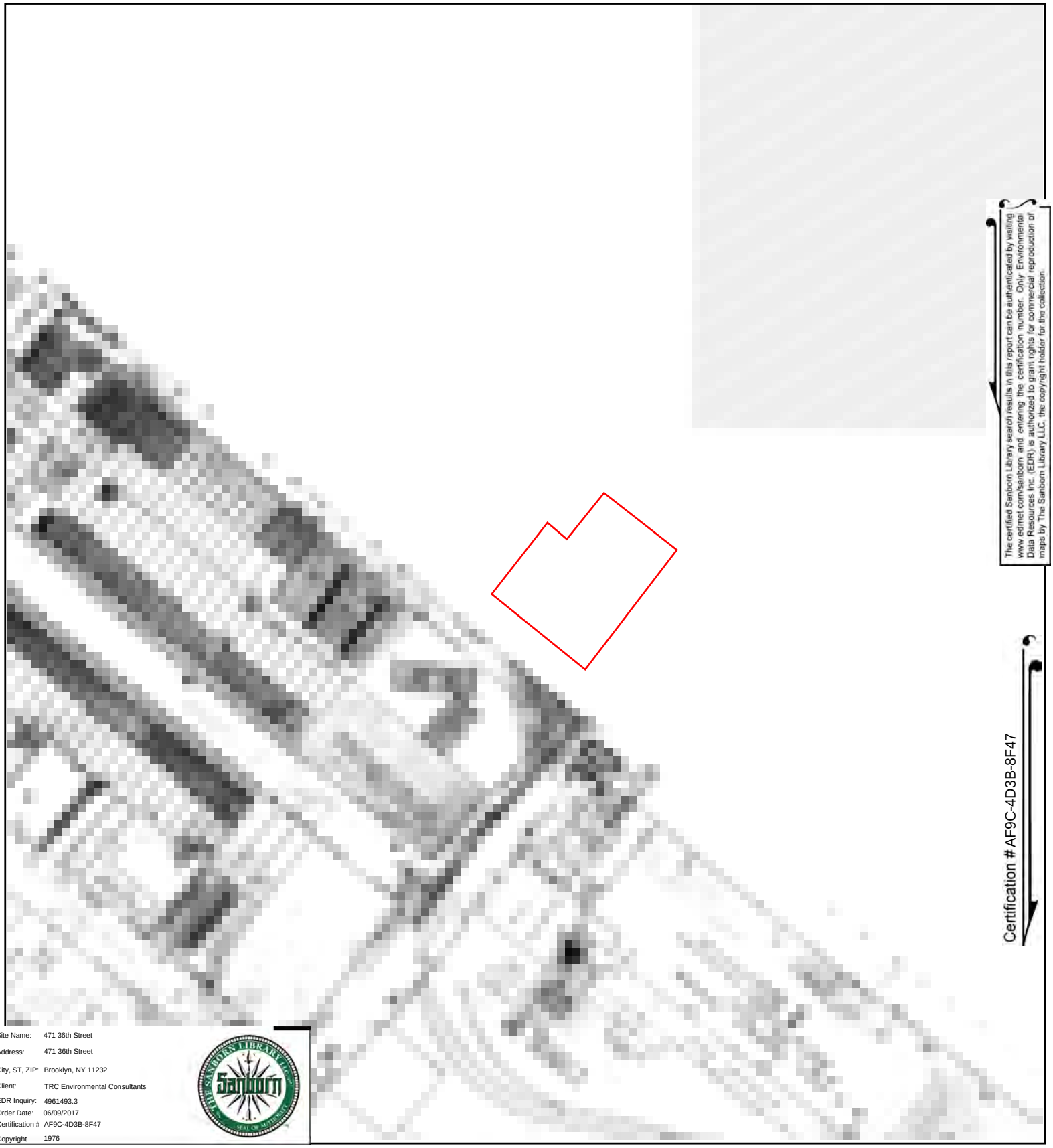

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Copyright: 1976

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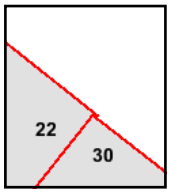

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Volume 6A, Sheet 22

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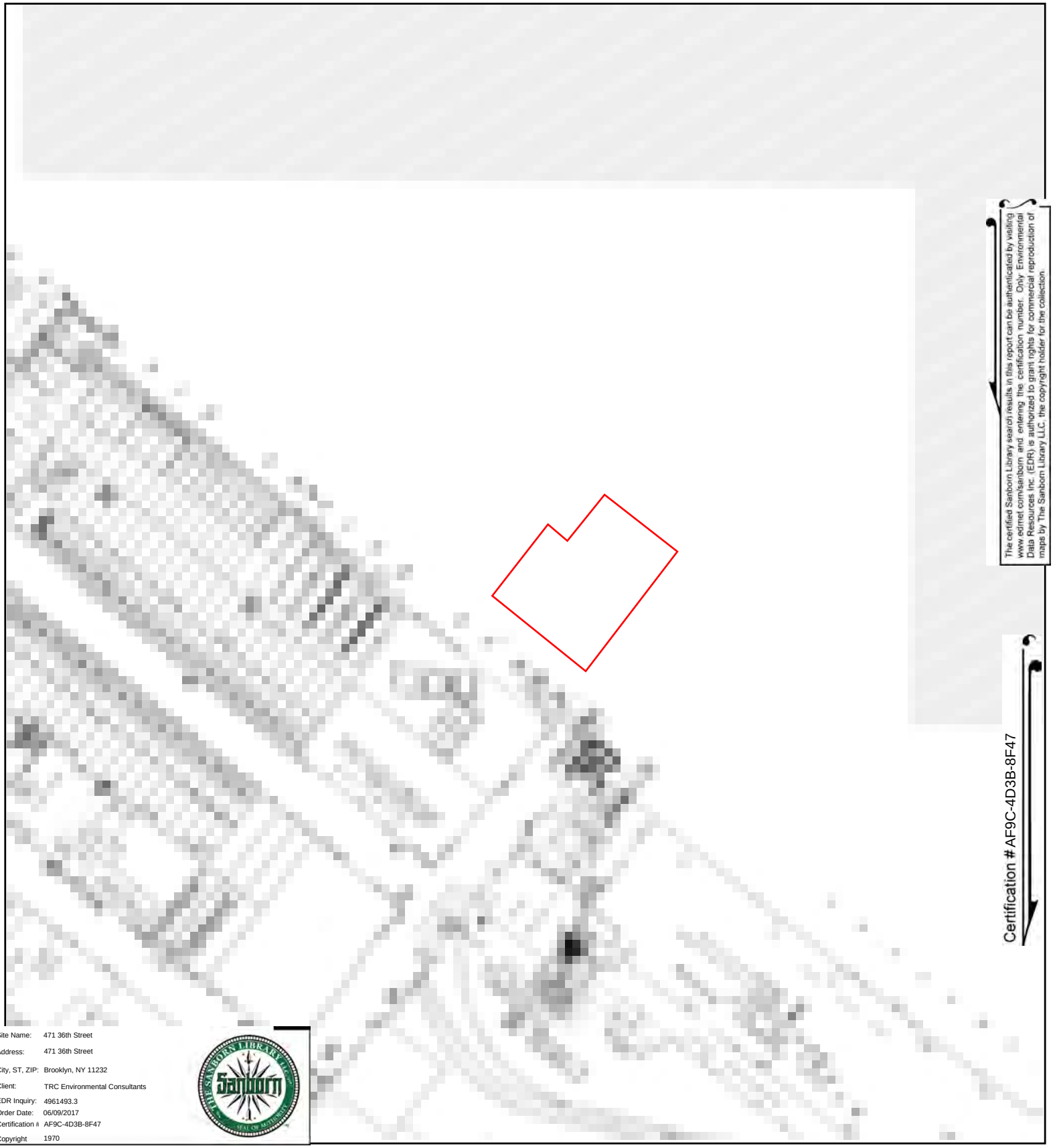

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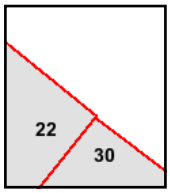

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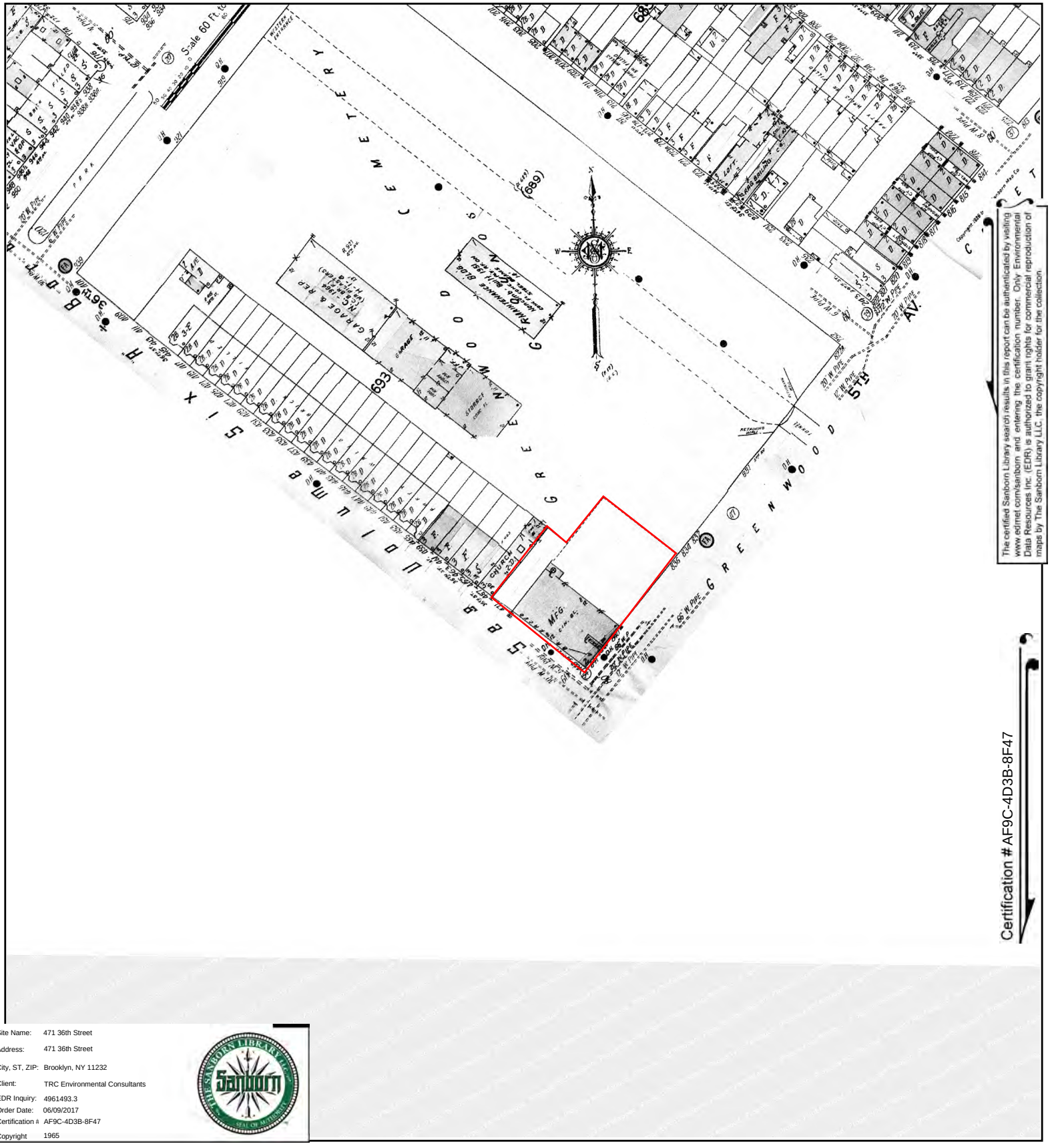

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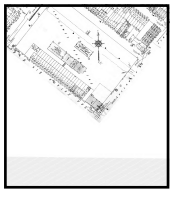

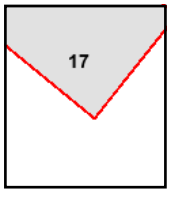

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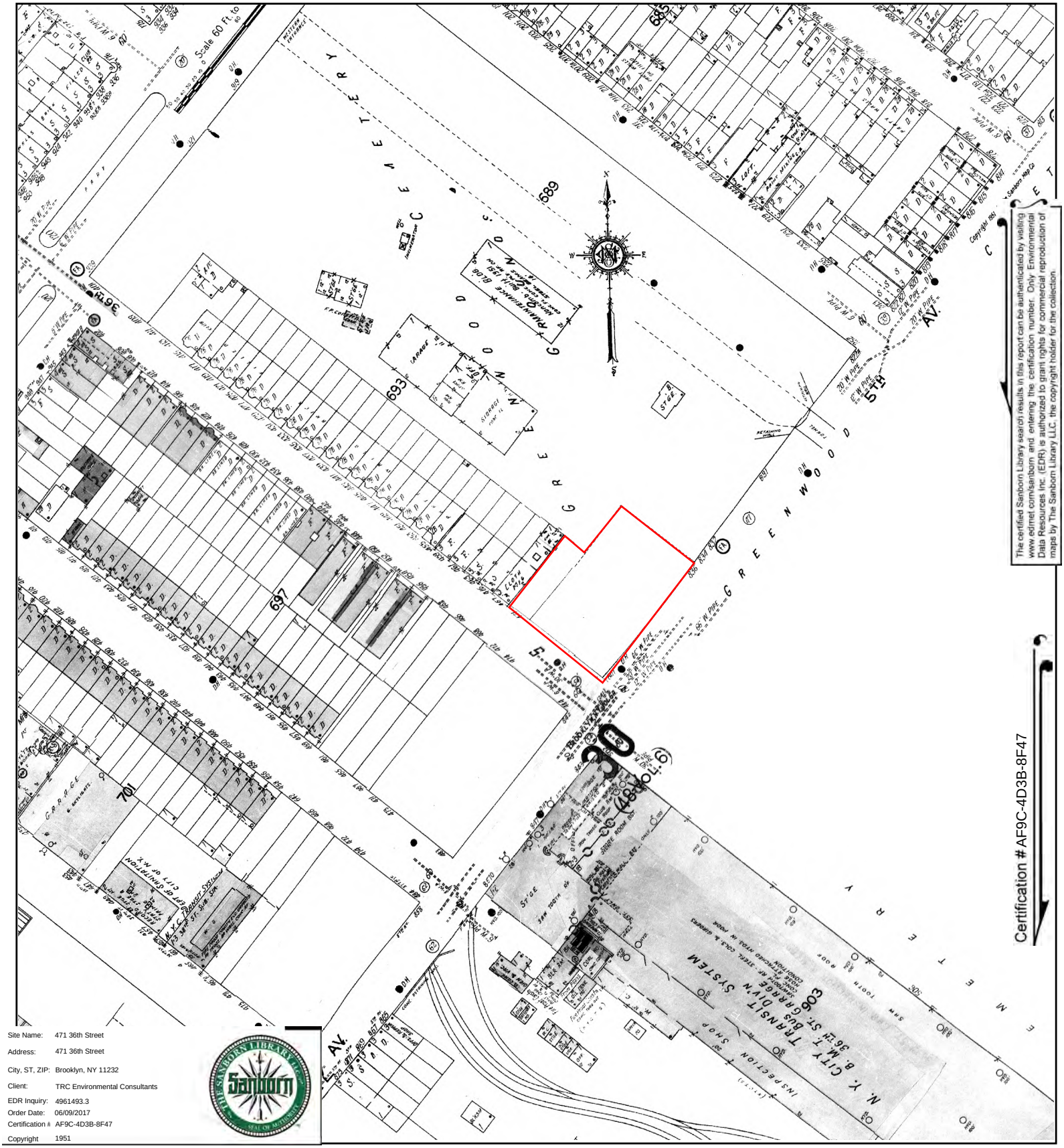

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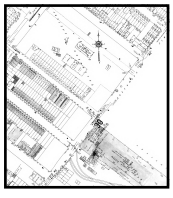

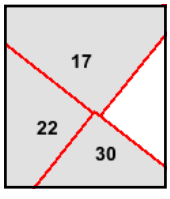

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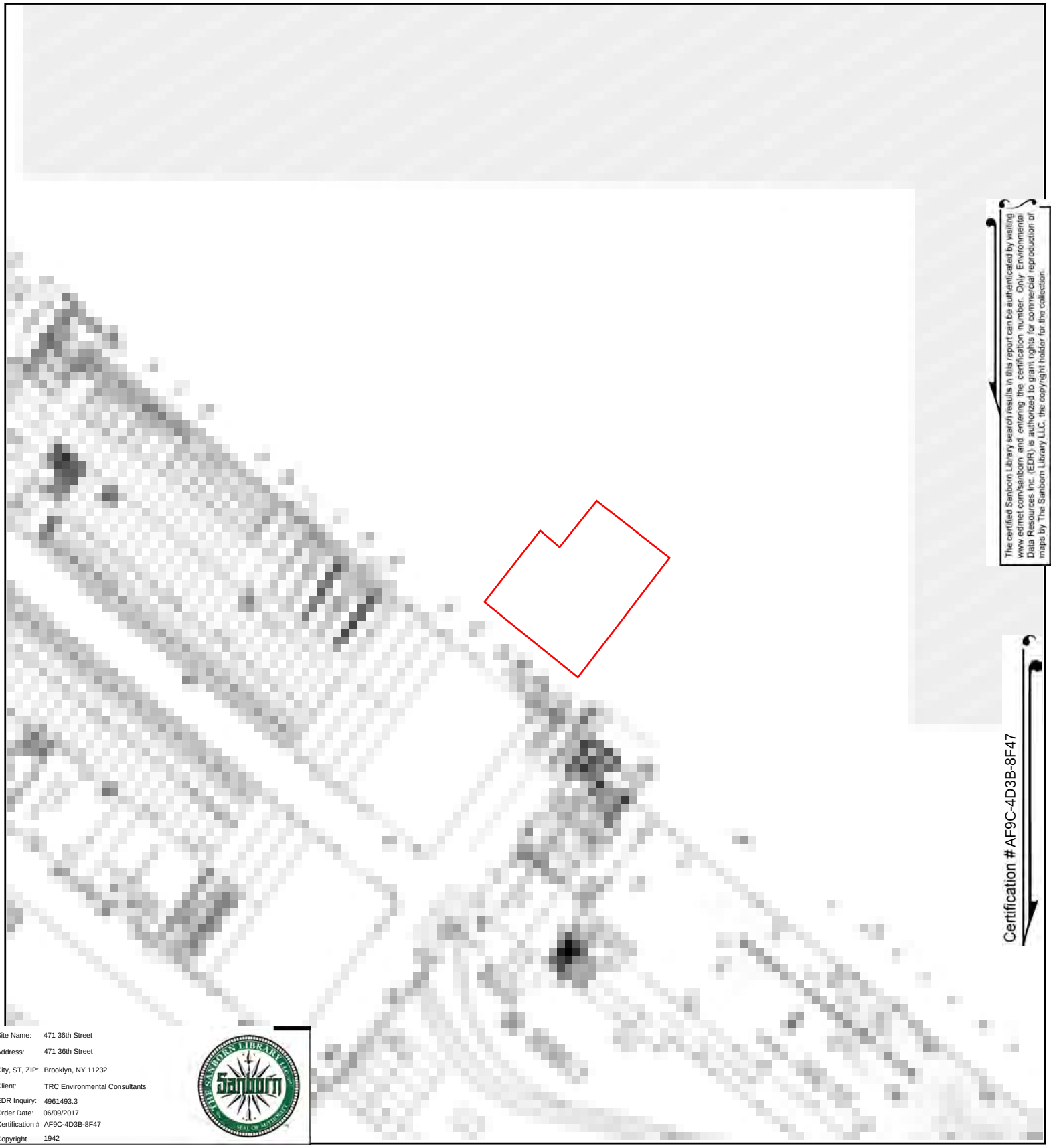

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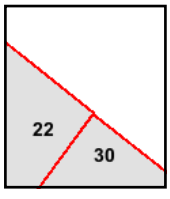

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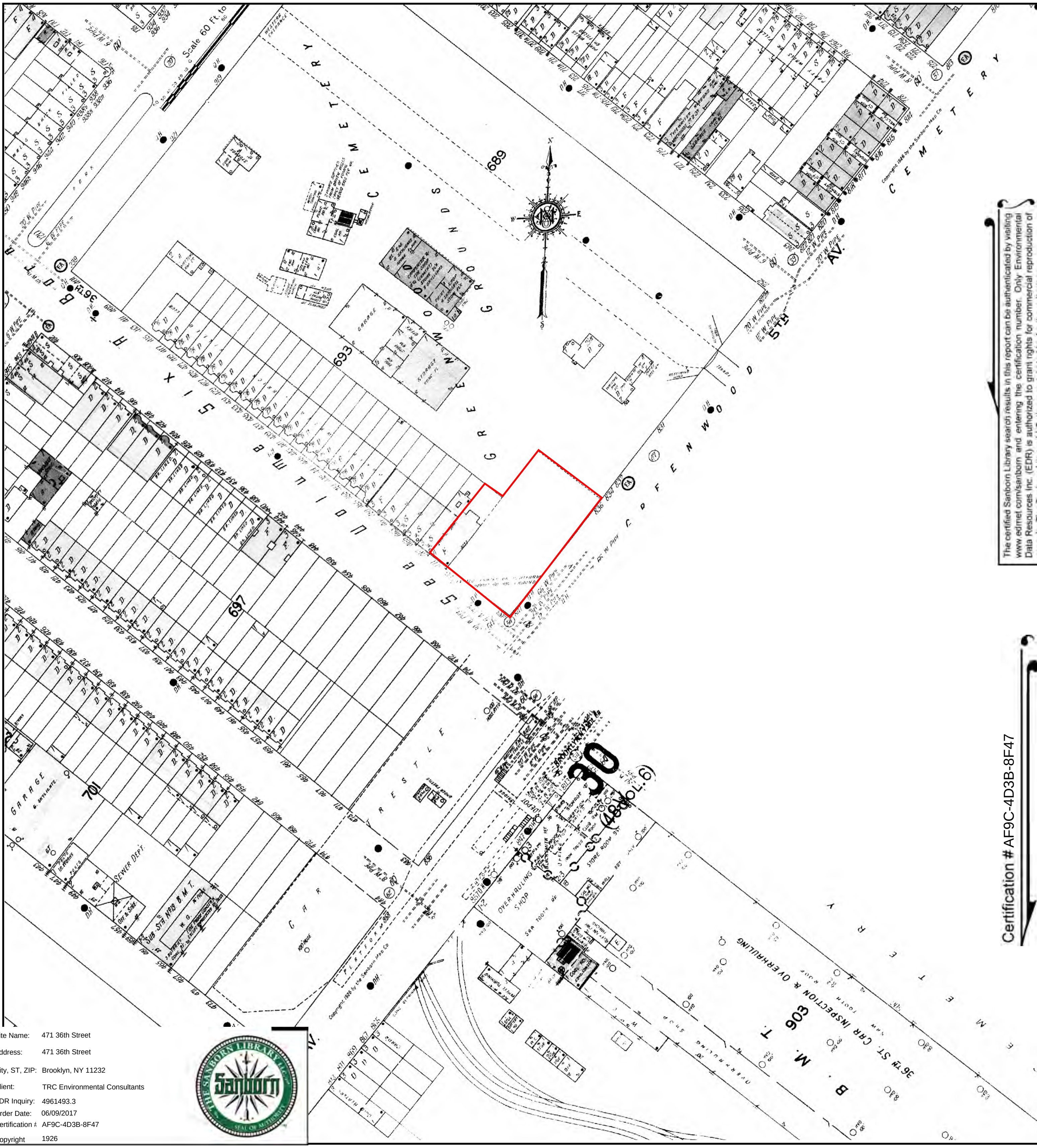

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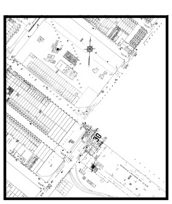

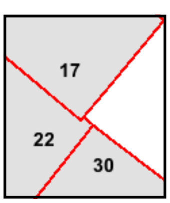

Volume 6, Sheet 17
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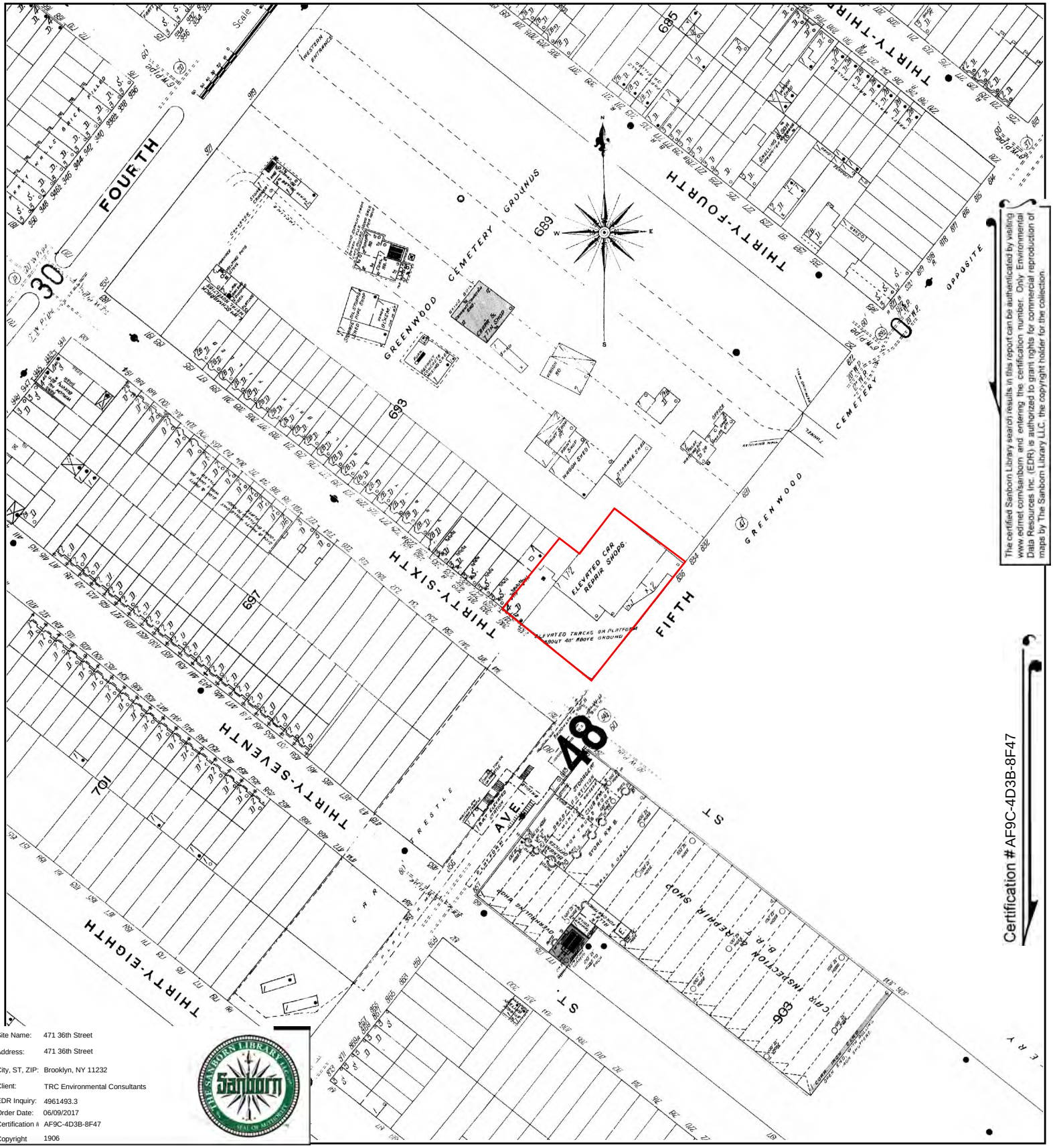

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Copyright	1906

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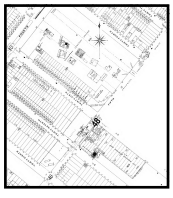

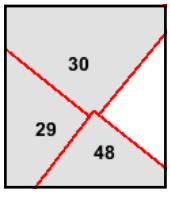

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Volume 6, Sheet 29

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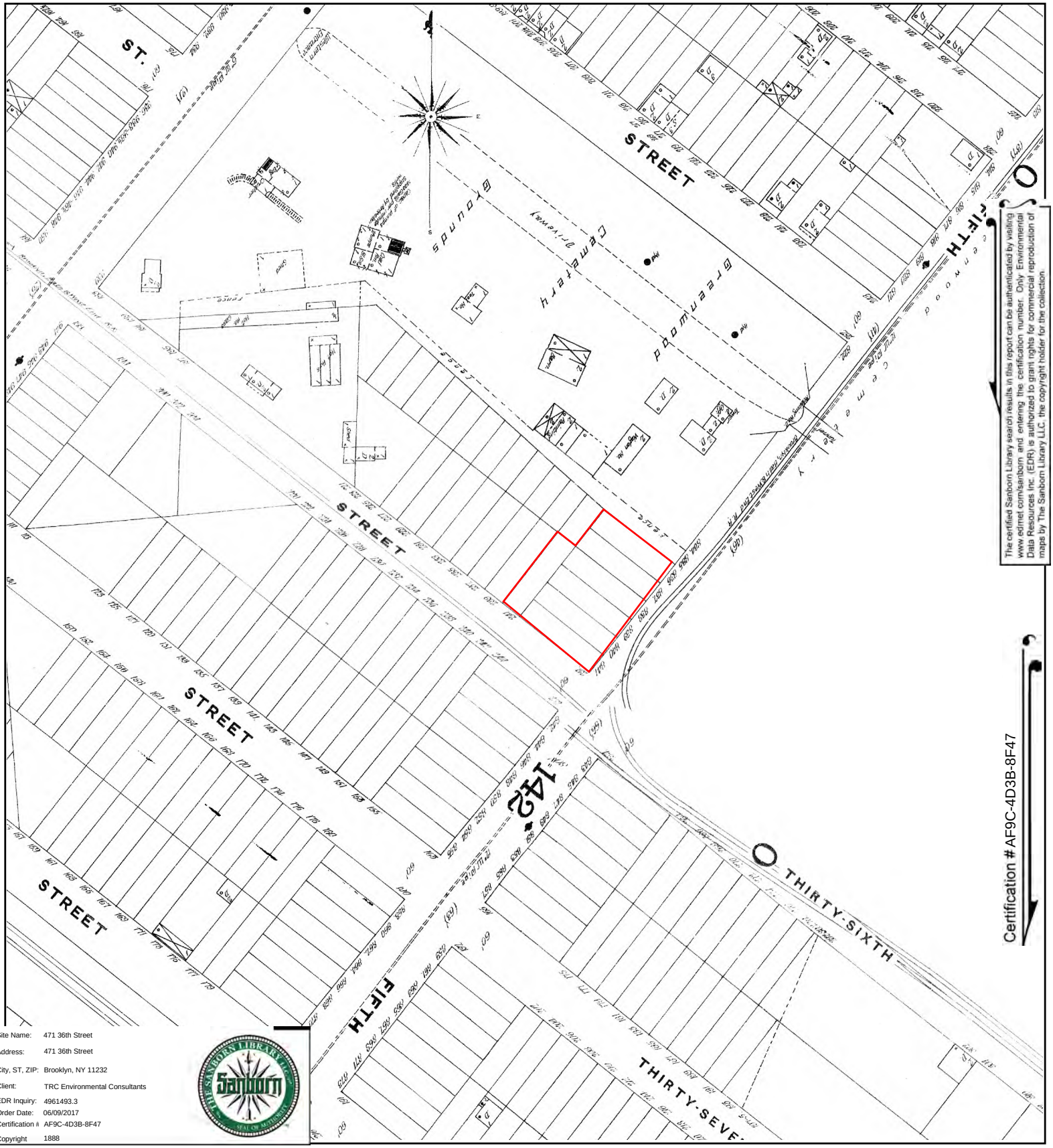

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Copyright	1888

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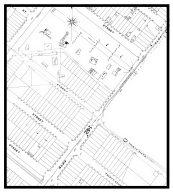

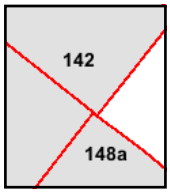

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0 Feet 150 300 600

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APPENDIX F
COST ESTIMATE

Appendix F
Table 1
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Alternative 1 - Remediate to Achieve Unrestricted Use
Cost Estimate

Item	Quantity	Units	Unit Cost	# Yrs - Future Costs	Present Value
CAPITAL COST - DIRECT					
HASP and CAMP Preparation and Implementation					
Prepare and Implement HASP and CAMP During Intrusive Remedial Actions	1	l.s.	$40,000	NA	$40,000
Underground Storage Tank Removal					
Underground Storage Tank Removal	1	l.s.	$30,000	NA	$30,000
Soil Excavation and Backfill (Unrestricted SCOs)					
Mobilization and Site Preparation	1	l.s.	$20,000	NA	$20,000
Erosion and Sediment Control	1	l.s.	$20,000	NA	$20,000
Excavation, Transportation and Disposal (Non. Haz.)	16,400	ton	$100	NA	$1,640,000
Excavation, Transportation and Disposal (Haz.)	600	ton	$200	NA	$120,000
Sheeting (Install, Remove, Salvage)	45,000	sf	$75	NA	$3,375,000
Confirmatory Samples (Analysis)	42	ea.	$500	NA	$21,000
Backfill (Place and Compact)	18,000	ton	$35	NA	$630,000
Backfill Samples (Analysis)	12	ea.	$750	NA	$9,000
Gas Vapor Barrier and Sub-Slab Depressurization System Installation					
Install Gas Vapor Barrier	18,500	s.f	$5.50	NA	$101,750
Install Sub-Slab Depressurization System	1	l.s.	$130,000	NA	$130,000
Air Sparging and SVE Systems					
AS/SVE Pilot Test	1	ea.	$25,000	NA	$25,000
4" Sch 40 PVC SVE Wells (Installed)	240	lf	$100	NA	$24,000
2" Sch 40 Steel Sparge Points (Installed)	200	lf	$120	NA	$24,000
SVE Wellhead Assemblies	8	ea.	$2,000	NA	$16,000
Air Sparge Wellhead Assemblies	4	ea.	$2,000	NA	$8,000
2" Steel Air Sparge Piping (Installed)	200	lf	$40	NA	$8,000
4" PVC SVE Piping (Installed)	150	lf	$50	NA	$7,500
6" PVC SVE Piping (Installed)	50	lf	$60	NA	$3,000
Disposal of Cuttings/Spoils (Char./Disposal)	30	drums	$250	NA	$7,500
AS/SVE Skid-Mounted System (SVE Blower, Compressor, Knock-Out Drum)	1	ea.	$60,000	NA	$60,000
AS/SVE Skid-Mounted System Housing Shed	1	ea.	$10,000	NA	$10,000
Vapor Phase GAC Vessels	1	ea.	$25,000	NA	$25,000
Misc. Piping and Mechanical Installation	1	ea.	$75,000	NA	$75,000
Electrical Subcontractor (Equipment and Labor)	1	ea.	$75,000	NA	$75,000
Controls System Subcontractor (Equipment and Labor)	1	ea.	$25,000	NA	$25,000
TOTAL DIRECT COSTS					$6,529,750

Appendix F
Table 1
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Alternative 1 - Remediate to Achieve Unrestricted Use
Cost Estimate

Item	Quantity	Units	Unit Cost	# Yrs - Future Costs	Present Value
CAPITAL COST - INDIRECT					
Engineering and Design (10%)					$652,975
Construction Phase Engineering Services (20%)					$1,305,950
Permits and Plans (5%)					$326,488
TOTAL INDIRECT COSTS					$2,285,413
TOTAL CAPITAL COSTS					$8,815,163
FUTURE ACTIONS					
AS/SVE OM+M (Years 1 through 3)	1	l.s. (per year)	50,000.00	3	$131,200
SSDS OM+M (Years 1 through 3)	1	l.s. (per year)	15,000.00	3	$39,360
Periodic Reviews	1	l.s. (per year)	5,000.00	5	$20,500
TOTAL PRESENT VALUE OF FUTURE ACTIONS					$191,060
CONTINGENCY (20%)					$1,801,245
TOTAL PRESENT VALUE COST FOR ALTERNATIVE 1					$10,807,467

Notes
1. 7% discount rate used to calculate present value cost.
2. Cost estimate intended only for the purpose of determining relative cost in comparison to other alternatives.
3. Legal and administrative costs, such as costs for implementing Institutional Controls, are not included in cost estimate.
4. Excavation for basement construction and associated soil removal not included in estimated remedial alternative costs.

Appendix F
Table 2
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Alternative 2 - Remediate to Achieve Restricted-Residential Use
Cost Estimate

Item	Quantity	Units	Unit Cost	Extended Cost	# Yrs - Future Costs	Present Value
CAPITAL COST - DIRECT						
HASP and CAMP Preparation and Implementation						
Prepare and Implement HASP and CAMP During Intrusive Remedial Actions	1	l.s.	$20,000	$20,000	NA	$20,000
Underground Storage Tank Removal						
Underground Storage Tank Removal	1	l.s.	$30,000	$30,000	NA	$30,000
Soil Excavation (Restricted-Residential SCOs)						
Mobilization and Site Preparation	1	l.s.	$10,000	$10,000	NA	$10,000
Erosion and Sediment Control	1	l.s.	$5,000	$5,000	NA	$5,000
Excavation, Transportation and Disposal (Haz.)	600	ton	$200	$120,000	NA	$120,000
Demarcation Layer (Installed)	2,200	sy	$1.25	$2,750	NA	$2,750
Confirmatory Samples (Analysis)	20	ea.	$75	$1,500	NA	$1,500
Gas Vapor Barrier and Sub-Slab Depressurization System Installation						
Install Gas Vapor Barrier	18,500	s.f	$5.50	$101,750	NA	$101,750
Install Sub-Slab Depressurization System	1	l.s.	$130,000	$130,000	NA	$130,000
TOTAL DIRECT COSTS						$421,000

Appendix F
Table 2
New York City School Construction Authority
Remedial Action Work Plan
840 5th Avenue, Brooklyn, New York
Alternative 2 - Remediate to Achieve Restricted-Residential Use
Cost Estimate

Item	Quantity	Units	Unit Cost	Extended Cost	# Yrs - Future Costs	Present Value
CAPITAL COST - INDIRECT						
Engineering and Design (10%)						$42,100
Construction Phase Engineering Services (20%)						$84,200
Permits and Plans (5%)						$21,050
TOTAL INDIRECT COSTS						$147,350
TOTAL CAPITAL COSTS						$568,350
FUTURE ACTIONS						
SSDS OM+M (Years 1 through 10)	1	l.s. (per year)	15,000.00	$15,000	10	$105,360
Periodic Reviews	1	l.s. (per year)	5,000.00	$5,000	10	$35,120
TOTAL PRESENT VALUE OF FUTURE ACTIONS						$140,480
CONTINGENCY (20%)						$141,766
TOTAL PRESENT VALUE COST FOR ALTERNATIVE 2						$850,596

Notes
1. 7% discount rate used to calculate present value cost.
2. Cost estimate intended only for the purpose of determining relative cost in comparison to other alternatives.
3. Legal and administrative costs, such as costs for implementing Institutional Controls, are not included in cost estimate.
4. Excavation for basement construction and associated soil removal not included in estimated remedial alternative costs.

APPENDIX G

PLAYGROUND SAFETY MAT COMPOSITION DETAILS

MITCHELL RUBBER PRODUCTS, INC. EXECUTIVE OFFICE

MITCHELL RUBBER PRODUCTS, INC. 10220 SAN SEVAINE WAY, MIRA LOMA, CA. 91752 PHONE (951)681-5655 FAX (951) 681-1479

MITCHELL RUBBER PRODUCTS, INC.
EZ FALL 1 ¾ SAFETY SURFACING SPECIFICATION

*Top Membrane ¼ inch thick.

*Total thickness 1 3/4 inches.

*Fully rubberized anchor 4 ¾ inches in length.

*Constructed of non-toxic, all weather rubber compounds.

*Solid one piece rubber blocks.

*Non porous, water drains freely off the top of the surface.

*Meets or exceeds all current Consumer Products Safety Commission guidelines.

*ASTM F1292-09 (Shock Absorbency), Standard Specification for Impact Attenuation of Surface Systems under and around play equipment.

*ASTM C67-11 (Weathering/Aging), Standard Test Methods for sampling and testing "Freezing and Thawing", and after material has been subjected to 200 F for 7 days in accordance with ASTM D573-04 "Rubber Deterioration in an Air Oven", the sample shall be re-tested in accordance with ASTM F1292-09.

*ASTM E303-93 (Slip Resistance), Standard Test Method for Measuring Surface Frictional Properties using the British Pendulum Tester.

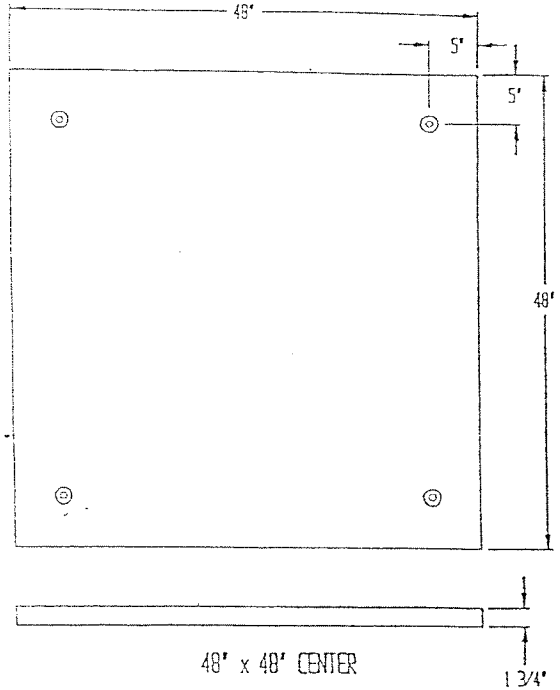
*ASTM E648 (Flammability), Standard Test Method for Critical Radiant Flux of Floor Covering Systems using a Radiant Heat Energy Source.

*Hardness (Shore A) Durometer ASTM D2240 77 degrees 62+5.

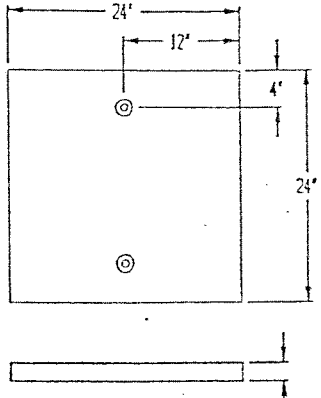
*Tensile Strength, not less than 1050 psi.

*Elongation to break point 350%
The surfacing shall be waffle-type molded mat with an abrasion resistant non-skid textured top surface and ribs underneath.

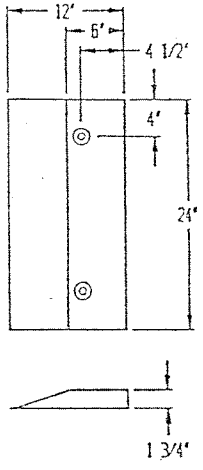
EZ Fall 1 ¾ inch safety surfacing is manufactured by Mitchell Rubber Products, Inc. Rubber tiles are high compression molded with tapered rib construction. Tiles are anchored using fully rubberized fasteners.



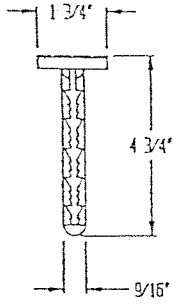
48" x 48" CENTER



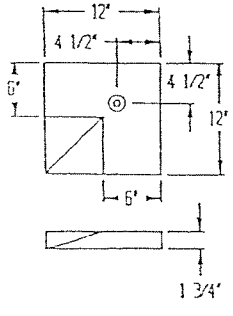
24" x 24" CENTER



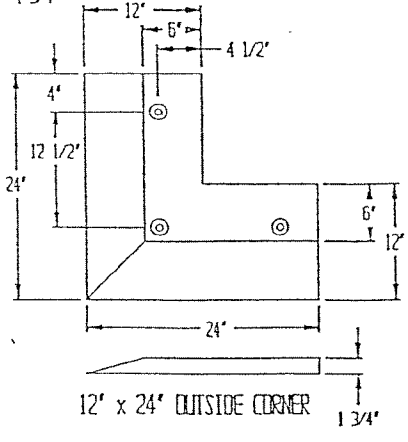
12" x 24" BORDER



4 3/4"
ANCHOR PLUG
SCALE: 1" = 3"



12" x 12" INSIDE CORNER



12" x 24" OUTSIDE CORNER

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

MITCHELL RUBBER PRODUCTS, INC. Tel:909-681-5655
10220 San Sevaine Way, Mira Loma, California 91752-1100

TITLE: EZ FALL 1 3/4" TILES & PLUG

DRAWN BY:	DATE:
MET	08-07-98
APPROVED BY:	DATE:

SIZE	CONTRACT NO.	REF.:	DWG NO.
B			EZ 1 3/4
SCALE:		SHEET 1 OF 1	

TESTING SERVICES, INC.
817 SHOWALTER AVE. • P.O. BOX 2041
DALTON, GEORGIA 30722-2041
PHONE. (706) 226-1400 • FAX: (706) 226-6118

TEST REPORT

CLIENT:	Mitchell Rubber Products	REPORT NUMBER:	53158R
	10220 San Sevaine Way	LAB TEST NUMBER:	2374-9959
	Mira Loma, CA 91752	DATE:	April 2, 2012
		PAGE:	1 of 3

Test Material: Ez-Fall 1.75"

Sub Base: Concrete

Impact Location: Center of Test Material

Date of Receipt: August 25, 2011

Testing Period: September 19-21, 2011 (Initial) April 2, 2012 (Final)

Authorization: Mike Alcala

Test Procedure: The submitted sample was evaluated for Shock Absorbing Properties in Accordance with the procedures outlined in ASTM F 1292-09; Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.

Missile: Hemispherical (Triaxial Accelerometer): Total Drop Assembly Weight (46g) 10 lbs

Test Equipment: Triax 2000 Surface Impactor
Date of Last Calibration: 3/13/2012 by Alpha Automation

Sample Pre-Condition: 50±10 RH, 70F±5F for a minimum of 24 hrs prior to testing

Sample Conditioning: 8 hrs @ each reference temperatures prior to testing

Temperature:	Maximum Drop Height That Gives a Gmax of 200 or Less and A HIC of 1000 or less
Ambient, 72°F (23°C)	6'
Hot, 120°F (49°C)	6'
Cold, 25°F (-6°C)	6'
Seam (81.3°F)	7'
Anchoring System (81.3°F)	6'
Critical Fall Height (CFH):	6'

Prepared and signed by:

Erle Miles, Jr. VP
Testing Services Inc.

TESTING SERVICES, INC.
817 SHOWALTER AVE. • P.O. BOX 2041
DALTON, GEORGIA 30722-2041
PHONE: (706) 226-1400 • FAX: (706) 226-6118

TEST REPORT

CLIENT:	Mitchell Rubber Products	REPORT NUMBER:	53158R
	10220 San Sevaine Way	LAB TEST NUMBER:	2374-9959
	Mira Loma, CA 91752	DATE:	April 2, 2012
		PAGE:	Page 2 of 3

AMBIENT Sample Condition: Dry
Temperature: 70°F (23°C)

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	18.0	6	5'	5.04	100	505
2	18.1	4	5'	5.09	113	555
3	18.1	7	5'	5.09	115	559
Average			Drops 2, 3		114	557

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	19.8	7	6'	6.09	142	809
2	19.7	3	6'	6.03	145	809
3	19.8	10	6'	6.09	137	781
Average			Drops 2, 3		141	795

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	21.3	8	7'	7.05	143	922
2	21.3	7	7'	7.05	159	1001
3	21.3	8	7'	7.05	162	1003
Average			Drops 2, 3		161	1002

HOT Sample Condition: Dry
Temperature: 120°F (49°C)

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	18.1	7	5'	5.09	108	501
2	18.1	9	5'	5.09	118	554
3	18.2	9	5'	5.15	122	576
Average			Drops 2, 3		120	565

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	19.8	1	6'	6.09	134	749
2	19.8	9	6'	6.09	139	765
3	19.8	7	6'	6.09	131	706
Average			Drops 2, 3		135	736

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	21.3	7	7'	7.05	151	899
2	21.3	4	7'	7.05	171	1067
3	21.3	4	7'	7.05	171	1075
Average			Drops 2, 3		171	1071

COLD Sample Condition: Dry
Temperature: 25°F (-6°C)

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	18.0	8	5'	5.04	118	633
2	18.1	7	5'	5.09	117	587
3	18.1	8	5'	5.09	119	592
Average			Drops 2, 3		118	590

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	19.7	6	6'	6.03	146	881
2	19.8	6	6'	6.09	144	867
3	19.8	5	6'	6.09	145	868
Average			Drops 2, 3		145	868

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	21.3	7	7'	7.05	152	1033
2	21.3	5	7'	7.05	164	1175
3	21.3	2	7'	7.05	168	1100
Average			Drops 2, 3		166	1138

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TEST REPORT

CLIENT:	Mitchell Rubber Products	REPORT NUMBER:	53158R
	10220 San Sevaine Way	LAB TEST NUMBER:	2374-9959
	Mira Loma, CA 91752	DATE:	April 2, 2012
		PAGE:	Page 3 of 3

SEAM AREA
Temperature: 81.3°F

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	19.7	6	6'	6.03	140	706
2	19.8	2	6'	6.09	128	706
3	19.7	4	6'	6.03	140	712
Average			Drops 2, 3		134	709

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	21.3	4	7'	7.05	154	921
2	21.3	3	7'	7.05	163	916
3	21.3	3	7'	7.05	137	923
Average			Drops 2, 3		150	920

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	22.7	9	8'	8.01	197	1246
2	22.8	5	8'	8.08	196	1298
3	22.8	1	8'	8.08	212	1414
Average			Drops 2, 3		204	1356

ANCHORING SYSTEM
Temperature: 81.3°F

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	18.0	7	5'	5.04	129	646
2	18.1	6	5'	5.09	134	671
3	18.1	3	5'	5.09	133	643
Average			Drops 2, 3		134	657

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	19.6	6	6'	5.97	140	851
2	19.8	1	6'	6.09	161	960
3	19.7	8	6'	6.03	138	845
Average			Drops 2, 3		150	903

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	21.3	8	7'	7.05	146	994
2	21.3	6	7'	7.05	183	1232
3	21.3	2	7'	7.05	171	1136
Average			Drops 2, 3		177	1184

TESTING SERVICES, INC.
817 SHOWALTER AVE. • P.O. BOX 2041
DALTON, GEORGIA 30722-2041
PHONE: (706) 226-1400 • FAX: (706) 226-6118

TEST REPORT

CLIENT:	Mitchell Rubber Products, Inc.	REPORT NUMBER:	54231A
	10220 San Sevaine Way	LAB TEST NUMBER:	2408-1111
	Mira Loma, CA 91752-1100	DATE:	February 9, 2012

Product Identification: EZ-Fall

SUBJECT: Testing Services Inc was instructed by the client to determine the slip resistance of submitted sample identified above.

TEST METHOD: ASTM E 303-93(2008): *Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester*

TEST PROCEDURE: The trailing edge of a three-inch-wide spring-loaded slider, which is attached to the end of a 20-inch pendulum, contacts the tested surface when the pendulum is released from a horizontal position. The slider contact path length is pre-set to five inches. The pendulum pushes a pointer that stops and stays at the high point of the pendulum's swing.

SAMPLE PREP: In order to remove traces of mold release agents, the specimen was washed with mild soap and water and completely rinsed of all soap before testing.

TEST RESULTS:

Individual BPN values:	40.2
Individual BPN values: Inverse Direction	41.2
Average of both directions- Wet BPN	40.7

Note: Under NVLAP guidelines, TSi is to report any outsourcing of testing to another laboratory facility. In the above testing, some/all of tests were outsourced to: Future Labs, LLC. Their accreditations are on file and available upon request.

Approved By:

Erle Miles Jr VP
Testing Services Inc

TESTING SERVICES, INC.
817 SHOWALTER AVE. • P.O. BOX 2041
DALTON, GEORGIA 30722-2041
PHONE: (706) 226-1400 • FAX: (706) 226-5118

TEST REPORT

CLIENT:	Mitchell Rubber Products, Inc.	REPORT NUMBER:	54230B
	10220 San Sevaine Way	LAB TEST NUMBER:	2407-1110
	Mira Loma, CA 91752-1100	DATE:	February 9, 2012

Product Identification:	EZ-Fall
Product Thickness:	1.75"

SUBJECT: Testing Services Inc was instructed by the client to perform a procedure for measuring the critical radiant flux of horizontally mounted material described above exposed to a flaming ignition source in a graded radiant heat energy environment in a test chamber.

SCOPE OF TEST: This fire test standard is designed to provide a basis for estimating one aspect of the fire exposure behavior of a floor-covering system installed in a building corridor.

TEST METHOD: *ASTM E648: Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*

TEST INFORMATION: Specimens of the sample were tested for critical radiant flux in accordance with ASTM Test Method E-648, NFPA 253 and FTM Standard 372. The value reported is the average of three specimens, reported as Critical Radiant Flux in units of watts per centimeter squared (W/cm²).

Mounting Board: Loose Lay in Metal Tray
Conditioning: Minimum 96 hrs @ 70°F 50% RH

CLASSIFICATIONS: NFPA:

Class I= 0.45 W/cm² or higher
Class II = 0.22 – 0.44 W/cm²
Non Classifiable= <0.21 W/cm²

TEST DATA:

Specimen	Time	Distance	Critical Radiant Flux
#1	55 min	40.5 cm	0.48 W/cm²
#2	52 min	39.9 cm	0.49 W/cm²
#3	35 min	34.0 cm	0.60 W/cm²
Standard Deviation: 0.07 Coefficient of Variation: 12.80%			

TEST RESULTS:

Average Critical Radiant Flux	NFPA Classification
0.52 W/cm²	I

Approved By:

Digitally signed by Erle Miles, Jr. VP
DN: cn=Erle Miles, Jr. VP, o=Testing Services Inc., c=US
Date: 2012.02.10 16:08:18 -05'00'

Erle Miles, Jr., VP
Testing Services Inc.

MITCHELL RUBBER PRODUCTS, INC.
EXECUTIVE OFFICE

MITCHELL RUBBER PRODUCTS, INC. 10220 SAN SEVAINE WAY, MIRA LOMA, CA. 91752 PHONE (951)681-5655 FAX (951) 681-1479

MITCHELL RUBBER PRODUCTS, INC.
EZ FALL 2 ¾ SAFETY SURFACING SPECIFICATION

*Top Membrane ¼ inch thick.

*Total thickness 2 3/4 inches.

*Fully rubberized anchor 5 ¾ inches in length.

*Constructed of non-toxic, all weather rubber compounds.

*Solid one piece rubber blocks.

*Non porous, water drains freely off the top of the surface.

*Meets or exceeds all current Consumer Products Safety Commission guidelines.

*ASTM F1292-09 (Shock Absorbency), Standard Specification for Impact Attenuation of Surface Systems under and around play equipment.

*ASTM C67-11 (Weathering/Aging), Standard Test Methods for sampling and testing "Freezing and Thawing", and after material has been subjected to 200 F for 7 days in accordance with ASTM D573-04 "Rubber Deterioration in an Air Oven", the sample shall be re-tested in accordance with ASTM F1292-09.

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*ASTM E648 (Flammability), Standard Test Method for Critical Radiant Flux of Floor Covering Systems using a Radiant Heat Energy Source.

*Hardness (Shore A) Durometer ASTM D2240 77 degrees 62+5.

*Tensile Strength, not less than 1050 psi.

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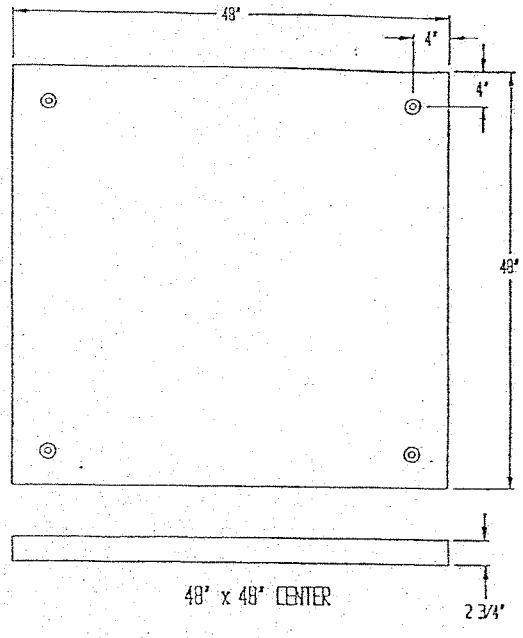
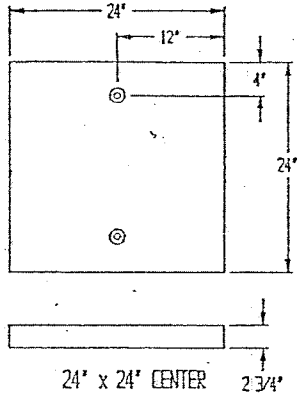
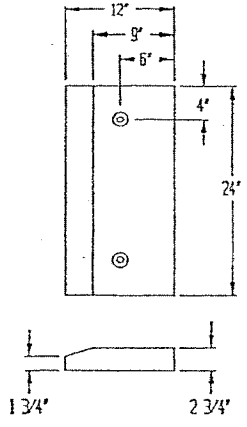
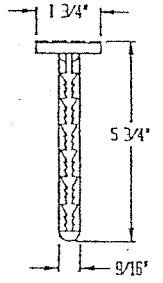
The surfacing shall be waffle-type molded mat with an abrasion resistant non-skid textured top surface and ribs underneath.

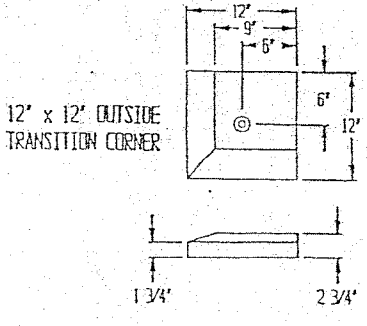
EZ Fall 2 ¾ inch safety surfacing is manufactured by Mitchell Rubber Products, Inc. Rubber tiles are high compression molded with tapered rib construction. Tiles are anchored using fully rubberized fasteners.

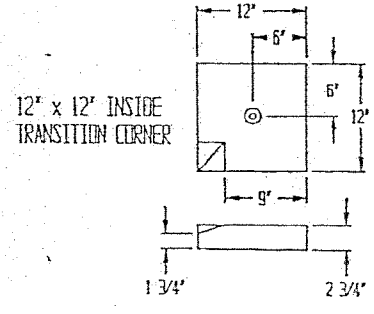












REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

DRAWN BY: MET	DATE: 08-07-98
APPROVED BY:	DATE:

MITCHELL RUBBER PRODUCTS, INC. Tel:909-681-5655
10220 San Sevaine Way, Mira Loma, California 91752-1100

TITLE: EZ FALL 2 3/4" TILES & PLUG

SIZE	CONTRACT NO.	REF.:	DWG NO.
B			EZ 2 3/4
SCALE:		SHEET 1 OF 1	

TESTING SERVICES, INC.
817 SHOWALTER AVE. • P.O. BOX 2041
DALTON, GEORGIA 30722-2041
PHONE: (706) 226-1400 • FAX: (706) 226-6118

TEST REPORT

CLIENT:	Mitchell Rubber Products	REPORT NUMBER:	53156R
	10220 San Sevaine Way	LAB TEST NUMBER:	2374-9957
	Mira Loma, CA 91752	DATE:	April 2, 2012
		PAGE:	1 of 3

Test Material: Ez-Fall 2.75"

Sub Base: Concrete

Impact Location: Center of Test Material

Date of Receipt: August 25, 2011

Testing Period: September 21-23, 2011 (Initial) April 2, 2012 (Final)

Authorization: Mike Alcala

Test Procedure: The submitted sample was evaluated for Shock Absorbing Properties in Accordance with the procedures outlined in ASTM F 1292-09; Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.

Missile: Hemispherical (Triaxial Accelerometer): Total Drop Assembly Weight (46g) 10 lbs

Test Equipment: Triax 2000 Surface Impactor
Date of Last Calibration: 3/13/2012 by Alpha Automation

Sample Pre-Condition: 50±10 RH, 70F±5F for a minimum of 24 hrs prior to testing

Sample Conditioning: 8 hrs @ each reference temperatures prior to testing

Temperature:	Maximum Drop Height That Gives a Gmax of 200 or Less and A HIC of 1000 or less
Ambient, 72°F (23°C)	10'
Hot, 120°F (49°C)	10'
Cold, 25°F (-6°C)	10'
Seam (81.3°F)	12'
Anchoring System (81.3°F)	11'
Critical Fall Height (CFH):	10'

Prepared and signed by:

Erle Miles, Jr. VP
Testing Services Inc.

TESTING SERVICES, INC.
817 SHOWALTER AVE. • P.O. BOX 2041
DALTON, GEORGIA 30722-2041
PHONE: (706) 226-1400 • FAX: (706) 226-6118

TEST REPORT

CLIENT:	Mitchell Rubber Products	REPORT NUMBER:	53156R
	10220 San Sevaine Way	LAB TEST NUMBER:	2374-9957
	Mira Loma, CA 91752	DATE:	April 2, 2012
		PAGE:	Page 2 of 3

AMBIENT Sample Condition: Dry
Temperature: 70°F (23°C)

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	24.1	4	9'	9.03	107	722
2	24.1	2	9'	9.03	120	784
3	24.1	4	9'	9.03	121	792
Average			Drops 2, 3		**121**	**788**

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	25.3	0	10'	9.95	123	794
2	25.3	4	10'	9.95	131	819
3	25.4	2	10'	10.03	131	844
Average			Drops 2, 3		**131**	**832**

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	26.6	4	11'	11.00	119	888
2	26.5	2	11'	10.91	137	1000
3	26.6	2	11'	11.00	139	1014
Average			Drops 2, 3		**138**	**1007**

HOT Sample Condition: Dry
Temperature: 120°F (49°C)

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	24.0	9	9	8.95	103	610
2	24.0	8	9	8.95	110	656
3	24.1	6	9	9.03	116	690
Average			Drops 2, 3		**113**	**673**

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	25.4	6	10'	10.03	125	794
2	25.4	2	10'	10.03	132	847
3	25.4	6	10'	10.03	132	849
Average			Drops 2, 3		**132**	**848**

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	26.6	4	11'	11.00	125	904
2	26.6	1	11'	11.00	148	1054
3	26.6	3	11'	11.00	156	1113
Average			Drops 2, 3		**152**	**1084**

COLD Sample Condition: Dry
Temperature: 25°F (-6°C)

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	24.1	5	9'	9.03	96	607
2	24.1	2	9'	9.03	103	635
3	24.1	2	9'	9.03	105	599
Average			Drops 2, 3		**104**	**617**

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	25.3	1	10'	9.95	119	882
2	25.3	3	10'	9.95	131	961
3	25.4	6	10'	10.03	131	934
Average			Drops 2, 3		**131**	**948**

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	26.6	3	11'	11.00	122	919
2	26.6	4	11'	11.00	141	1036
3	26.6	4	11'	11.00	138	1007
Average			Drops 2, 3		**140**	**1022**

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TEST REPORT

CLIENT:	Mitchell Rubber Products	REPORT NUMBER:	53156R
	10220 San Sevaine Way	LAB TEST NUMBER:	2374-9957
	Mira Loma, CA 91752	DATE:	April 2, 2012
		PAGE:	Page 3 of 3

SEAM AREA
Temperature: 81.3°F

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	26.5	4	11'	10.91	129	813
2	26.7	2	11'	11.08	121	795
3	26.5	3	11'	10.91	121	777
Average			Drops 2, 3		121	786

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	27.8	1	12'	12.01	133	900
2	27.8	0	12'	12.01	143	951
3	27.8	2	12'	12.01	143	942
Average			Drops 2, 3		143	947

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	28.8	10	13'	12.89	153	1104
2	28.8	9	13'	12.89	149	1068
3	28.9	3	13'	12.98	147	1021
Average			Drops 2, 3		148	1045

ANCHORING SYSTEM
Temperature: 81.3°F

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	25.3	2	10'	9.95	123	779
2	25.3	2	10'	9.95	116	725
3	25.3	7	10'	9.95	122	745
Average			Drops 2, 3		119	735

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	26.6	4	11'	11.00	150	979
2	26.5	1	11'	10.91	140	892
3	26.6	2	11'	11.00	156	1024
Average			Drops 2, 3		148	958

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	27.8	4	12'	12.01	183	1311
2	27.7	2	12'	11.92	176	1234
3	27.8	1	12'	12.01	180	1269
Average			Drops 2, 3		178	1252

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TEST REPORT

CLIENT:	Mitchell Rubber Products, Inc	REPORT NUMBER:	54581
	10220 San Sevaine Way	LAB TEST NUMBER:	2407-1110
	Mira Loma, CA 91752-1100	DATE:	March 21, 2012

Test Material:

Identification
EZ-Fall '2.75"

Date of Receipt: January 11, 2012

Testing Period: January 11, 2012 thru March 21, 2012

Authorization: Mike Alcala Purchase Order # 0115104

Missile: Hemispherical (Triaxial Accelerometer): Total Drop Assembly Weight (46g) 10 lbs

Test Equipment: Triax 2000 Surface Impactor
Date of Last Calibration: 3/13/2012 by Alpha Automation

Test Methods: ASTM C67-11: Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile (Freeze/Thaw)
ASTM D573-04(2010): Standard Test Method for Rubber-Deterioration in an Air (Heat Aged) Oven
ASTM F 1292-09: Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment (Gmax)

Procedure: A 24" X 24" X 2.75" " tile was submitted by the client for testing. The tile was submerged for four hours in the thawing tank, removed, and placed in a pan top surface down. Water was added to the pan until a depth of ½" of the top surface of the tile was submerged. The pan was then placed into a Thermotron Environmental Chamber at 16°F 0% RH for a duration of twenty hours. The pan was placed back into the thawing tank after removal from the Environmental Chamber for four hours. This procedure constitutes one cycle of freeze/thaw. Five cycles are conducted in a normal work week. On the last day of the week, after thaw, the tiles were placed on a rack in an environment of 70°F 65% RH. This procedure was repeated for a total of fifty (50) cycles.
After completion of the freeze/thaw, the same tile was placed on metal racks in an air circulating oven set at 200°F for a duration of 7 days. After heat aging, the tiles were cooled, 75° 65% RH, for a minimum of 16 hours but no longer than 96 hours and subjected to Gmax testing per ASTM F1292 at ambient conditions, 72°F., Three drops were made, averaging drops 2 & 3, at a height that produced < 200 g's < 1,000 HIC , to determine the maximum fall height obtainable. Additional drop heights 1' above and below maximum fall height were made as reference data.

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CLIENT:	Mitchell Rubber Products, Inc	REPORT NUMBER:	54581
	10220 San Sevaine Way	LAB TEST NUMBER:	2407-1110
	Mira Loma, CA 91752-1100	DATE:	March 21, 2012

Results:

Maximum Fall Drop Height: < 1,000 HIC	Average Gmax	Average HIC
10'	132	964

Temperature: 64°F

Sample Condition: After Freeze/Thaw/Heat Age

Drop #	Velocity Used	Angle	Drop Ht Actual	Gmax	HIC
1	24.0	5	9'	121	805
2	24.0	6	9'	120	786
3	24.0	6	9'	121	796
Average			Drops 2,3	121	791

Drop #	Velocity Used	Angle	Drop Ht Actual	Gmax	HIC
1	25.3	7	10'	125	932
2	25.3	4	10'	131	969
3	25.3	7	10'	133	959
Average			Drops 2,3	132	964

Drop #	Velocity Used	Angle	Drop Ht Actual	Gmax	HIC
1	26.6	6	11'	134	1101
2	26.6	0	11'	142	1120
3	26.6	5	11'	145	1107
Average			Drops 2,3	144	1114

Note: Impacts were made on the body of the tile

Prepared and signed by:

Erle Miles, Jr VP
Testing Services Inc

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TEST REPORT

CLIENT:	Mitchell Rubber Products, Inc.	REPORT NUMBER:	54231B
	10220 San Sevaine Way	LAB TEST NUMBER:	2408-1111
	Mira Loma, CA 91752-1100	DATE:	February 9, 2012

Product Identification:	EZ-Fall
Product Thickness:	2.75"

SUBJECT: Testing Services Inc was instructed by the client to perform a procedure for measuring the critical radiant flux of horizontally mounted material described above exposed to a flaming ignition source in a graded radiant heat energy environment in a test chamber.

SCOPE OF TEST: This fire test standard is designed to provide a basis for estimating one aspect of the fire exposure behavior of a floor-covering system installed in a building corridor.

TEST METHOD: *ASTM E648: Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*

TEST INFORMATION: Specimens of the sample were tested for critical radiant flux in accordance with ASTM Test Method E-648, NFPA 253 and FTM Standard 372. The value reported is the average of three specimens, reported as Critical Radiant Flux in units of watts per centimeter squared (W/cm²).

Mounting Board: Loose Lay in Metal Tray
Conditioning: Minimum 96 hrs @ 70°F 50% RH

CLASSIFICATIONS: NFPA:

Class I= 0.45 W/cm² or higher
Class II = 0.22 – 0.44 W/cm²
Non Classifiable= <0.21 W/cm²

TEST DATA:

Specimen	Time	Distance	Critical Radiant Flux
#1	56 min	54.3 cm	0.29 W/cm²
#2	89 min	51.0 cm	0.32 W/cm²
#3	79 min	45.0 cm	0.40 W/cm²
Standard Deviation: 0.06 Coefficient of Variation: 18.04%			

TEST RESULTS:

Average Critical Radiant Flux	NFPA Classification
0.34 W/cm²	II

Approved By:

Digitally signed by Erle Miles, Jr. VP
DN: cn=Erle Miles, Jr. VP, o=Testing Services Inc., c=US
Date: 2012.02.10 16:07:50 -05'00'

Erle Miles, Jr., VP
Testing Services Inc.

TESTING SERVICES, INC.
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TEST REPORT

CLIENT:	Mitchell Rubber Products, Inc.	REPORT NUMBER:	54231A
	10220 San Sevaine Way	LAB TEST NUMBER:	2408-1111
	Mira Loma, CA 91752-1100	DATE:	February 9, 2012

Product Identification: EZ-Fall

SUBJECT: Testing Services Inc was instructed by the client to determine the slip resistance of submitted sample identified above.

TEST METHOD: ASTM E 303-93(2008): *Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester*

TEST PROCEDURE: The trailing edge of a three-inch-wide spring-loaded slider, which is attached to the end of a 20-inch pendulum, contacts the tested surface when the pendulum is released from a horizontal position. The slider contact path length is pre-set to five inches. The pendulum pushes a pointer that stops and stays at the high point of the pendulum's swing.

SAMPLE PREP: In order to remove traces of mold release agents, the specimen was washed with mild soap and water and completely rinsed of all soap before testing.

TEST RESULTS:

Individual BPN values:	40.2
Individual BPN values: Inverse Direction	41.2
Average of both directions- Wet BPN	40.7

Note: Under NVLAP guidelines, TSi is to report any outsourcing of testing to another laboratory facility. In the above testing, some/all of tests were outsourced to: Future Labs, LLC. Their accreditations are on file and available upon request.

Approved By:

Erle Miles Jr VP
Testing Services Inc

MITCHELL RUBBER PRODUCTS, INC.
EXECUTIVE OFFICE
MITCHELL RUBBER PRODUCTS, INC. 10220 SAN SEVAINE WAY, MIRA LOMA, CA. 91752 PHONE (951)681-5655 FAX (951) 681-1479

MITCHELL RUBBER PRODUCTS, INC.
EZ FALL 3 1/3 SAFETY SURFACING SPECIFICATION

*Top Membrane ¼ inch thick.

*Total thickness 3 1/3 inches.

*Fully rubberized anchor 6 5/16 inches in length.

*Constructed of non-toxic, all weather rubber compounds.

*Solid one piece rubber blocks.

*Non porous, water drains freely off the top of the surface.

*Meets or exceeds all current Consumer Products Safety Commission guidelines.

*ASTM F1292-09 (Shock Absorbency), Standard Specification for Impact Attenuation of Surface Systems under and around play equipment.

*ASTM C67-11 (Weathering/Aging), Standard Test Methods for sampling and testing "Freezing and Thawing", and after material has been subjected to 200 F for 7 days in accordance with ASTM D573-04 "Rubber Deterioration in an Air Oven", the sample shall be re-tested in accordance with ASTM F1292-09.

*ASTM E303-93 (Slip Resistance), Standard Test Method for Measuring Surface Frictional Properties using the British Pendulum Tester.

*ASTM E648 (Flammability), Standard Test Method for Critical Radiant Flux of Floor Covering Systems using a Radiant Heat Energy Source.

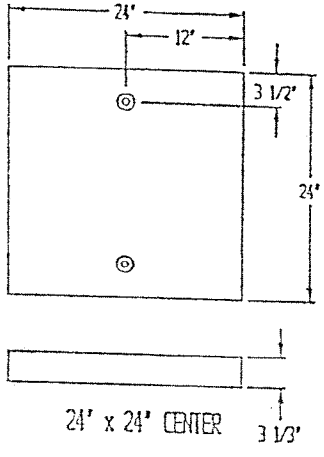
*Hardness (Shore A) Durometer ASTM D2240 77 degrees 62+5.

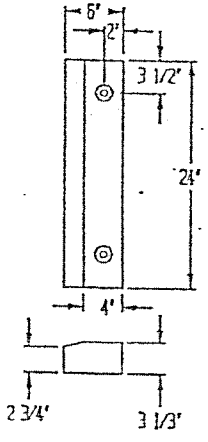
*Tensile Strength, not less than 1050 psi.

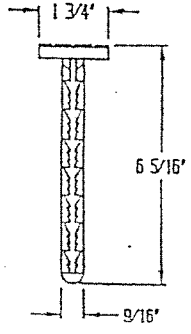
*Elongation to break point 350%
The surfacing shall be waffle-type molded mat with an abrasion resistant non-skid textured top surface and ribs underneath.

EZ Fall 3 1/3 inch safety surfacing is manufactured by Mitchell Rubber Products, Inc. Rubber tiles are high compression molded with tapered rib construction. Tiles are anchored using fully rubberized fasteners.

REV	DESCRIPTION	DATE	APPROVED







SCALE: 1" = 3"

DRAWN BY: MET	DATE: 00-07-98
APPROVED BY:	DATE:

MITCHELL RUBBER PRODUCTS, INC. Tel:909-681-5555
10220 San Sevaine Way, Mira Loma, California 91752-1100

TITLE: EZ FALL 3 1/3" TILES & PLUG

SIZE	CONTRACT NO.	REF.:	DWG NO.
B			EZ 3 1/3
SCALE:		SHEET 1 OF 1	

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TEST REPORT

CLIENT:	Mitchell Rubber Products	REPORT NUMBER:	53160
	10220 San Sevaine Way	LAB TEST NUMBER:	2374-9961
	Mira Loma, CA 91752	DATE:	September 16, 2011
		PAGE:	1 of 2

Test Material: Ez-Fall 3.33"

Sub Base: Concrete

Impact Location: Center of Test Material

Date of Receipt: August 25, 2011

Testing Period: September 19-21, 2011

Authorization: Mike Alcala

Test Procedure: The submitted sample was evaluated for Shock Absorbing Properties in Accordance with the procedures outlined in ASTM F 1292-09; Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.

Missile: Hemispherical (Triaxial Accelerometer): Total Drop Assembly Weight (46g) 10 lbs

Test Equipment: Triax 2000 Surface Impactor
Date of Last Calibration: 3/21/2011 by Alpha Automation

Sample Pre-Condition: 50±10 RH, 70F±5F for a minimum of 24 hrs prior to testing

Sample Conditioning: 8 hrs @ each reference temperatures prior to testing

Temperature:	Maximum Drop Height That Gives a Gmax of 200 or Less and A HIC of 1000 or less
Ambient, 72°F (23°C)	11'
Hot, 120°F (49°C)	12'
Cold, 25°F (-6°C)	11'
Critical Fall Height (CFH):	11'

Reference Gmax Curves Included

Prepared and signed by:

Digitally signed by Erle Miles, Jr.
DN: cn=Erle Miles, Jr., email=tsioffice@alltel.net, o=Testing Services Inc., ou=Testing Services Inc., c=US
Date: 2011.09.26 15:53:21 -04'00'

Erle Miles, Jr. VP
Testing Services Inc.

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TEST REPORT

CLIENT:	Mitchell Rubber Products	REPORT NUMBER:	53160
	10220 San Sevaine Way	LAB TEST NUMBER:	2374-9961
	Mira Loma, CA 91752	DATE:	September 16, 2011
		PAGE:	Page 2 of 2

AMBIENT Sample Condition: Dry
Temperature: 70°F (23°C)

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	25.4	1	10'	10.03	99	748
2	25.4	5	10'	10.03	110	790
3	25.4	3	10'	10.03	112	785
Average			Drops 2, 3		111	788

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	26.6	2	11'	11.00	105	809
2	26.6	9	11'	11.00	113	826
3	26.6	2	11'	11.00	117	885
Average			Drops 2, 3		115	856

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	27.8	1	12'	12.01	115	987
2	27.8	3	12'	12.01	126	1040
3	27.8	1	12'	12.01	127	1027
Average			Drops 2, 3		127	1034

HOT Sample Condition: Dry
Temperature: 120°F (49°C)

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	26.6	2	11'	11.00	100	714
2	26.7	0	11'	11.08	108	765
3	26.5	8	11'	10.91	107	747
Average			Drops 2, 3		108	756

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	27.8	3	12'	12.01	115	893
2	27.8	5	12'	12.01	118	897
3	27.8	4	12'	12.01	119	897
Average			Drops 2, 3		119	897

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	28.8	0	13'	12.89	133	1056
2	28.8	4	13'	12.89	132	1033
3	28.8	1	13'	12.89	136	1075
Average			Drops 2, 3		134	1054

COLD Sample Condition: Dry
Temperature: 25°F (-6°C)

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	25.3	3	10'	9.95	102	782
2	25.3	6	10'	9.95	111	812
3	25.4	1	10'	10.03	113	836
Average			Drops 2, 3		112	824

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	26.6	2	11'	11.00	114	948
2	26.6	4	11'	11.00	117	957
3	26.6	4	11'	11.00	118	926
Average			Drops 2, 3		118	942

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	27.8	4	12'	12.01	120	1045
2	27.8	7	12'	12.01	129	1099
3	27.8	2	12'	12.01	129	1054
Average			Drops 2, 3		129	1077

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TEST REPORT

CLIENT:	Mitchell Rubber Products, Inc.	REPORT NUMBER:	54231A
	10220 San Sevaine Way	LAB TEST NUMBER:	2408-1111
	Mira Loma, CA 91752-1100	DATE:	February 9, 2012

Product Identification:	EZ-Fall

SUBJECT: Testing Services Inc was instructed by the client to determine the slip resistance of submitted sample identified above.

TEST METHOD: ASTM E 303-93(2008): *Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester*

TEST PROCEDURE: The trailing edge of a three-inch-wide spring-loaded slider, which is attached to the end of a 20-inch pendulum, contacts the tested surface when the pendulum is released from a horizontal position. The slider contact path length is pre-set to five inches. The pendulum pushes a pointer that stops and stays at the high point of the pendulum's swing.

SAMPLE PREP: In order to remove traces of mold release agents, the specimen was washed with mild soap and water and completely rinsed of all soap before testing.

TEST RESULTS:

Individual BPN values:	40.2
Individual BPN values: Inverse Direction	41.2
Average of both directions- Wet BPN	40.7

Note: Under NVLAP guidelines, TSi is to report any outsourcing of testing to another laboratory facility. In the above testing, some/all of tests were outsourced to: Future Labs, LLC. Their accreditations are on file and available upon request.

Approved By:

Erle Miles Jr VP
Testing Services Inc

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TEST REPORT

CLIENT:	Mitchell Rubber Products, Inc	REPORT NUMBER:	54582
	10220 San Sevaine Way	LAB TEST NUMBER:	2407-1111
	Mira Loma, CA 91752-1100	DATE:	March 21, 2012

Test Material:

Identification
EZ-Fall 3.33"

Date of Receipt: January 11, 2012

Testing Period: January 11, 2012 thru March 21, 2012

Authorization: Mike Alcala Purchase Order # 0115104

Missile: Hemispherical (Triaxial Accelerometer): Total Drop Assembly Weight (46g) 10 lbs

Test Equipment: Triax 2000 Surface Impactor
Date of Last Calibration: 3/13/2012 by Alpha Automation

Test Methods: ASTM C67-11: Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile (Freeze/Thaw)
ASTM D573-04(2010): Standard Test Method for Rubber-Deterioration in an Air Oven (Heat Aged)
ASTM F 1292-09: Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment (Gmax)

Procedure: A 24" X 24" X 3.33" " tile was submitted by the client for testing. The tile was submerged for four hours in the thawing tank, removed, and placed in a pan top surface down. Water was added to the pan until a depth of ½" of the top surface of the tile was submerged. The pan was then placed into a Thermotron Environmental Chamber at 16°F 0% RH for a duration of twenty hours. The pan was placed back into the thawing tank after removal from the Environmental Chamber for four hours. This procedure constitutes one cycle of freeze/thaw. Five cycles are conducted in a normal work week. On the last day of the week, after thaw, the tiles were placed on a rack in an environment of 70°F 65% RH. This procedure was repeated for a total of fifty (50) cycles.
After completion of the freeze/thaw, the same tile was placed on metal racks in an air circulating oven set at 200°F for a duration of 7 days. After heat aging, the tiles were cooled, 75° 65% RH, for a minimum of 16 hours but no longer than 96 hours and subjected to Gmax testing per ASTM F1292 at ambient conditions, 72°F., Three drops were made, averaging drops 2 & 3, at a height that produced < 200 g's < 1,000 HIC , to determine the maximum fall height obtainable. Additional drop heights 1' above and below maximum fall height were made as reference data.

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CLIENT:	Mitchell Rubber Products, Inc	REPORT NUMBER:	54582
	10220 San Sevaine Way	LAB TEST NUMBER:	2407-1111
	Mira Loma, CA 91752-1100	DATE:	March 21, 2012

Results:

Maximum Fall Drop Height: < 1,000 HIC	Average Gmax	Average HIC
11'	112	853

Temperature: 64°F

Sample Condition: After Freeze/Thaw/Heat Age

Drop #	Velocity/sec	Impact Angle	Drop Height/Actual	Gmax	HIC
1	25.3	5	10'	109	784
2	25.4	2	10'	109	764
3	25.4	8	10'	109	774
Average			Drops 2,3	109	769

Drop #	Velocity/sec	Impact Angle	Drop Height/Actual	Gmax	HIC
1	26.6	2	11'	113	889
2	26.5	4	11'	107	826
3	26.6	1	11'	116	879
Average			Drops 2,3	112	853

Drop #	Velocity/sec	Impact Angle	Drop Height/Actual	Gmax	HIC
1	27.7	3	12'	126	1034
2	27.7	8	12'	131	1048
3	27.7	7	12'	129	1027
Average			Drops 2,3	130	1038

Note: Impacts were made on the body of the tile

Prepared and signed by:

Erle Miles, Jr VP
Testing Services Inc

TESTING SERVICES, INC.
817 SHOWALTER AVE. • P.O. BOX 2041
DALTON, GEORGIA 30722-2041
PHONE: (706) 226-1400 • FAX: (706) 226-6118

TEST REPORT

CLIENT:	Mitchell Rubber Products, Inc.	REPORT NUMBER:	54231B
	10220 San Sevaine Way	LAB TEST NUMBER:	2408-1111
	Mira Loma, CA 91752-1100	DATE:	February 9, 2012

Product Identification:	EZ-Fall
Product Thickness:	2.75"

SUBJECT: Testing Services Inc was instructed by the client to perform a procedure for measuring the critical radiant flux of horizontally mounted material described above exposed to a flaming ignition source in a graded radiant heat energy environment in a test chamber.

SCOPE OF TEST: This fire test standard is designed to provide a basis for estimating one aspect of the fire exposure behavior of a floor-covering system installed in a building corridor.

TEST METHOD: *ASTM E648: Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*

TEST INFORMATION: Specimens of the sample were tested for critical radiant flux in accordance with ASTM Test Method E-648, NFPA 253 and FTM Standard 372. The value reported is the average of three specimens, reported as Critical Radiant Flux in units of watts per centimeter squared (W/cm²).

Mounting Board: Loose Lay in Metal Tray
Conditioning: Minimum 96 hrs @ 70°F 50% RH

CLASSIFICATIONS: NFPA:

Class I= 0.45 W/cm² or higher
Class II = 0.22 – 0.44 W/cm²
Non Classifiable= <0.21 W/cm²

TEST DATA:

Specimen	Time	Distance	Critical Radiant Flux
#1	56 min	54.3 cm	0.29 W/cm²
#2	89 min	51.0 cm	0.32 W/cm²
#3	79 min	45.0 cm	0.40 W/cm²
Standard Deviation: 0.06 Coefficient of Variation: 18.04%			

TEST RESULTS:

Average Critical Radiant Flux	NFPA Classification
0.34 W/cm²	II

Approved By:

Digitally signed by Erle Miles, Jr. VP
DN: cn=Erle Miles, Jr. VP, o=Testing Services Inc., c=US
Date: 2012.02.10 16:07:50 -05'00'

Erle Miles, Jr., VP
Testing Services Inc.

MITCHELL RUBBER PRODUCTS, INC.

EXECUTIVE OFFICE

MITCHELL RUBBER PRODUCTS, INC. 10220 SAN SEVAINE WAY, MIRA LOMA, CA. 91752 PHONE (951)681-5655 FAX (951) 681-1479

INSTALLATION PROCEDURE
EZ-FALL 1 ¾", 2 ¾" and 3 1/3" SAFETY CUSHIONING PADS

Dimensions of mats:

Center Block 4' x 4'	with 4 anchors
Center Block 2' x 2'	with 2 anchors
Transition Border 1' x 2'	with 2 anchors
Border Block 1' x 2'	with 2 anchors
Trans inside corner 1' x 1'	with 1 anchor
Inside corner 1' x 1'	with 1 anchor
Trans outside corner 1' x 2'	with 1 anchor
Corner block outside 2' x 2' x 1'	with 3 anchors

Surface Preperation:

It is necessary to have a permanent hard surface, such as concrete or asphalt to support the ribbed construction of the underside of EZ-Fall 1 ¾", 2 ¾" and 3 1/3". In addition the area should be free from dirt, debris, holes and gaps in the subsurface.

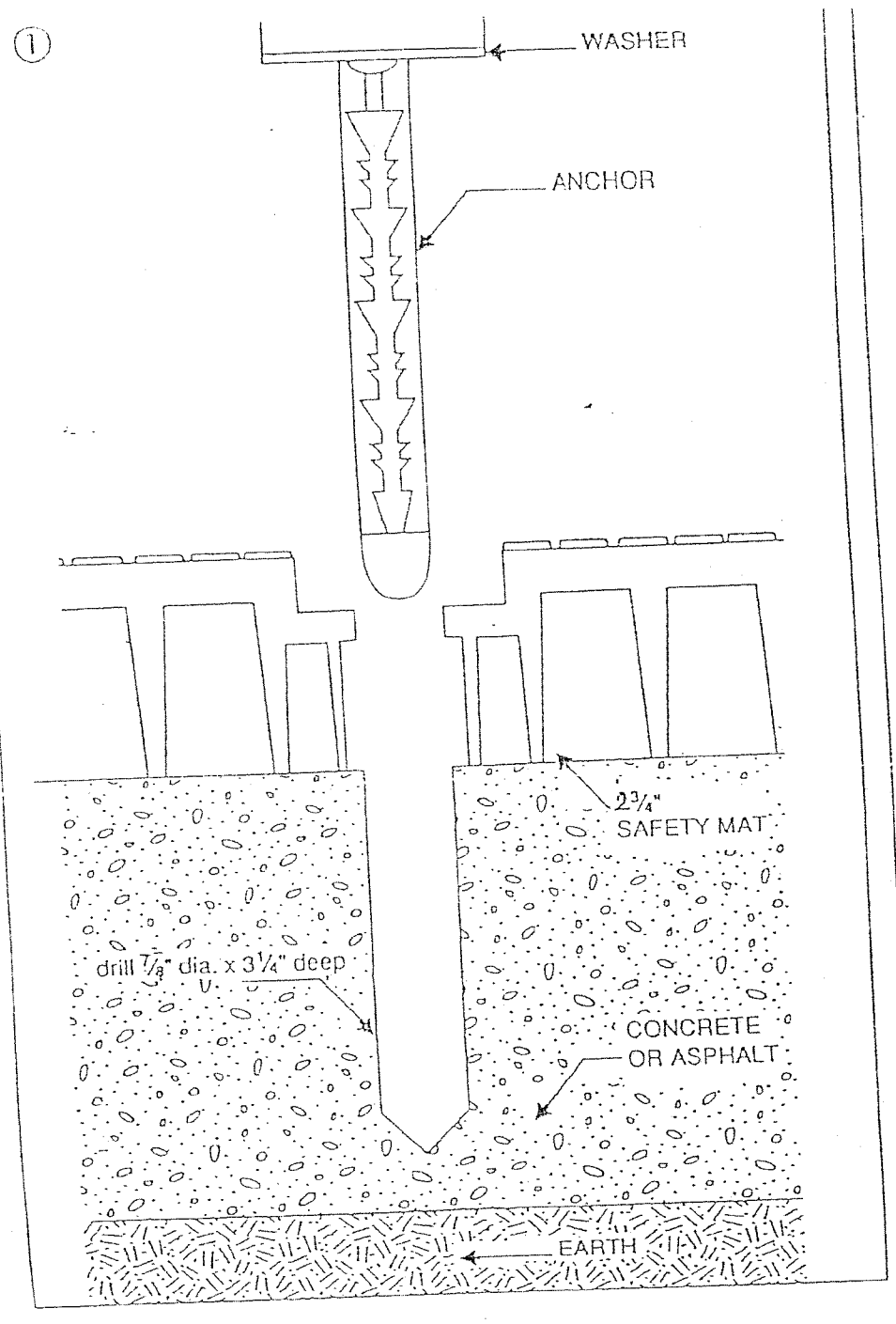
Mat Layout:

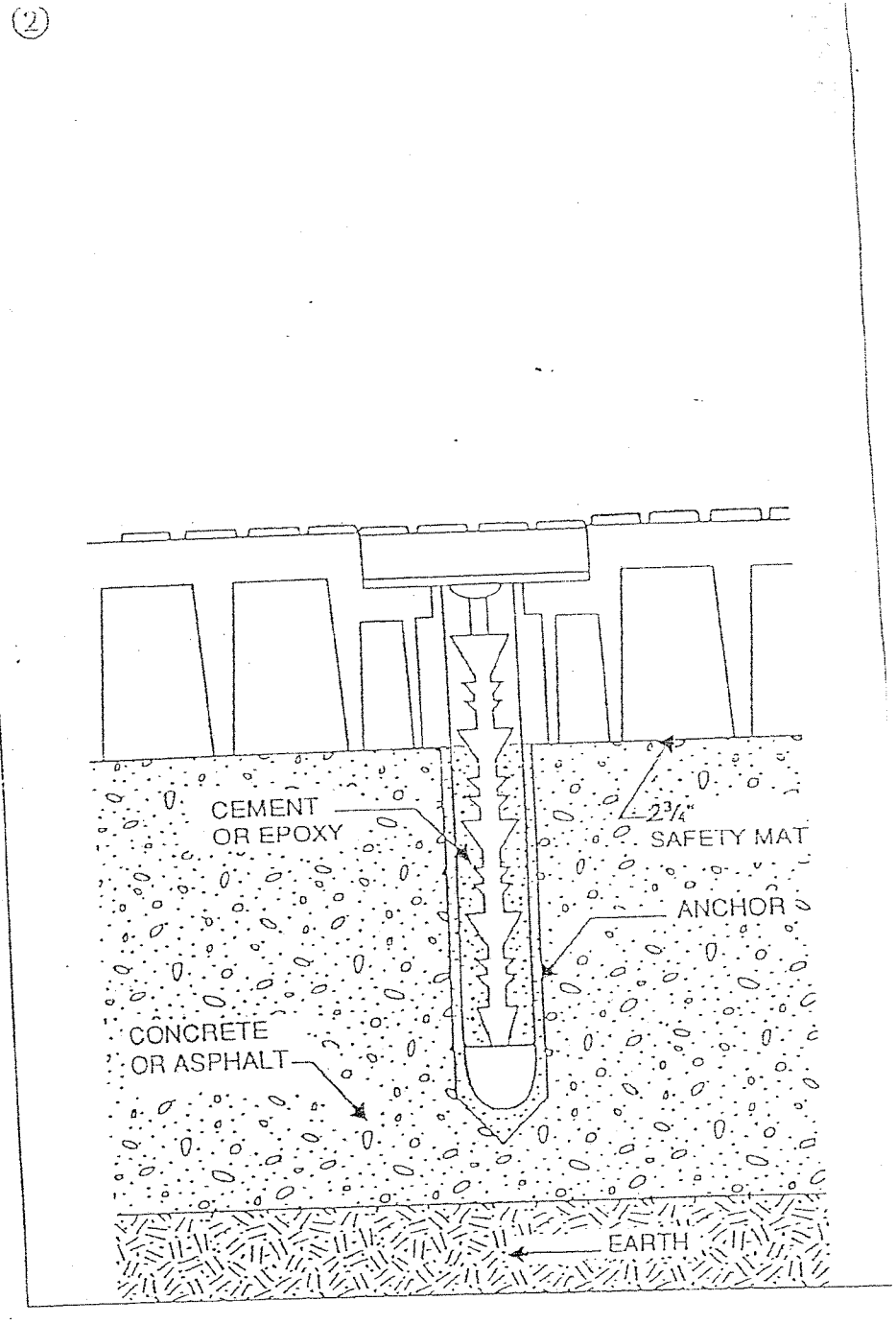
The area to be covered should first be measured and out-lined. Check area around poles for level concrete footings. If possible snap a chalk line at center and use as a guide to layout from center. If unable to start from center, snap a chalk line to one side and start there.
Start with the center block and place them side by side as tight as possible to keep gaps to a minimum. After centers are laid out, those blocks that must be cut to fit around the support poles of the apparatus or existing equipment should be cut at this time. All cuts around existing apparatus should be tight.

Drilling and Anchoring Procedure:

Permanent anchoring should begin by drilling 1" holes in the asphalt or concrete through the pre-molded cavities in each block to a minimum depth of 4". After the holes are drilled, the debris should be carefully blown or vacuumed away. After the drilled holes are free of debris, they should be filled with a non-shrinking cement grout, polymer resin, or 2 part epoxy. At this time, the 5" x ½" all rubber anchors are to be inserted through the pre-molded cavity in the top of the mat and into wet cement, resin, or 2 part epoxy. The soft rubber head of the anchor should fit snuggly into the pre-molded cavity and be recessed slightly below the safety pads level. The result is a smooth, unbroken safety pad which is vandal resistant. The procedure as outlined above will apply to all blocks including the corner block, except as follows:

Three anchors will be used on the Corner block of an 1 ¾" corner. If obstacles such as man hole covers, are in the way of making it impossible to use all three anchors, one may be eliminated. Corner blocks should never be installed with less then two anchors.


①
WASHER
ANCHOR
2¾"
SAFETY MAT
drill ⅞" dia. x 3¼" deep
CONCRETE
OR ASPHALT
EARTH


②
CEMENT
OR EPOXY
2¾"
SAFETY MAT
ANCHOR
CONCRETE
OR ASPHALT
EARTH

MITCHELL RUBBER PRODUCTS, INC.

EXECUTIVE OFFICE

MITCHELL RUBBER PRODUCTS, INC. 10220 SAN SEVAINE WAY, MIRA LOMA, CA. 91752 PHONE (951)681-5655 FAX (951) 681-5230

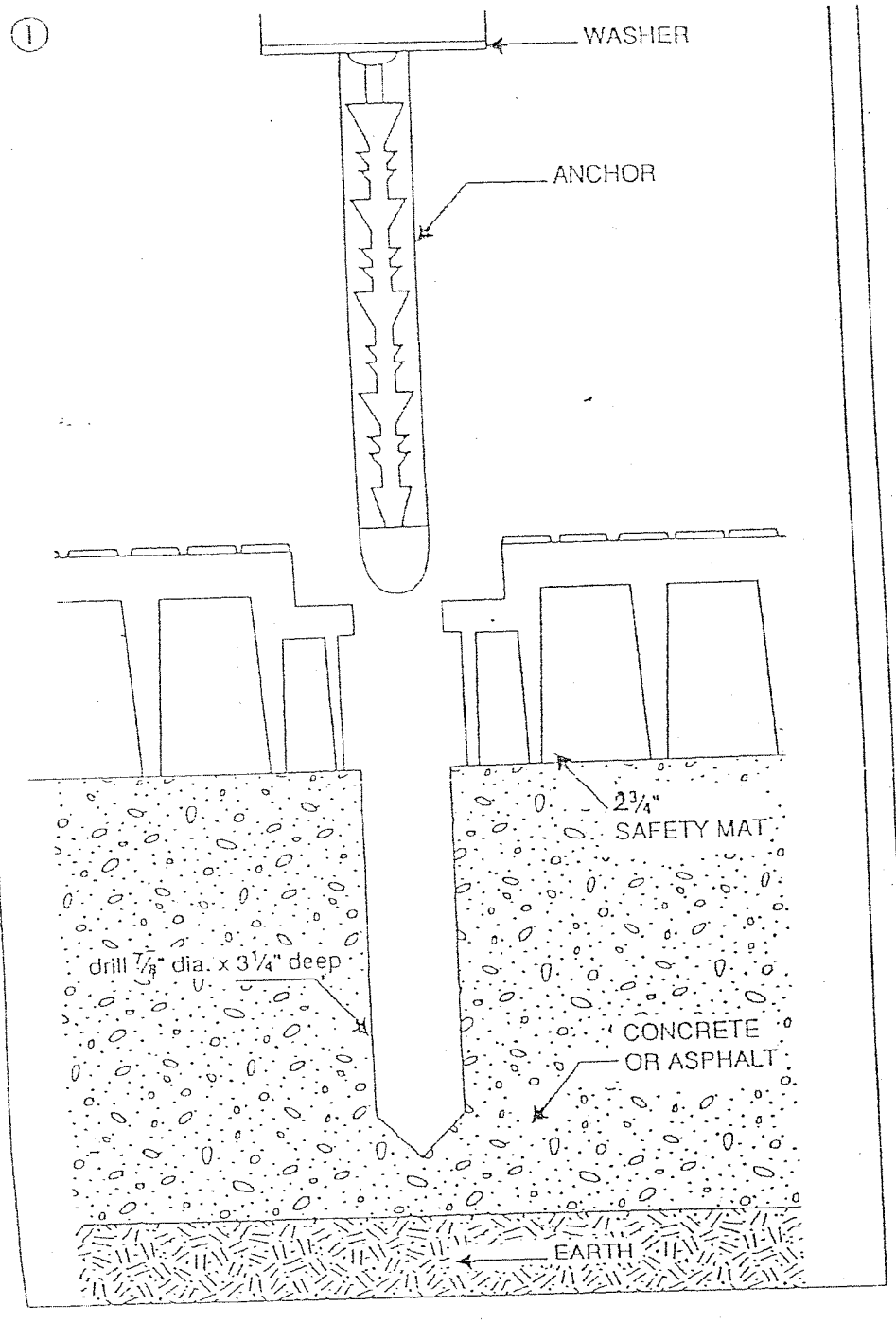
Maintenance and Repair Instructions for EZ-Fall Safety Surfacing

For maintenance use a power washer with a mild detergent.

To repair EZ-Fall, clean out the hole where the anchor was, fill the hole with a 2 part epoxy, and re-insert the anchor.

To purchase or repair EZ-Fall Safety Surfacing, please contact Michael Zeppieri, United Metro Construction Corp. 516-564-0125.

Paula Tontini _____
Title: Sales Administrator / Customer Service
Date: _____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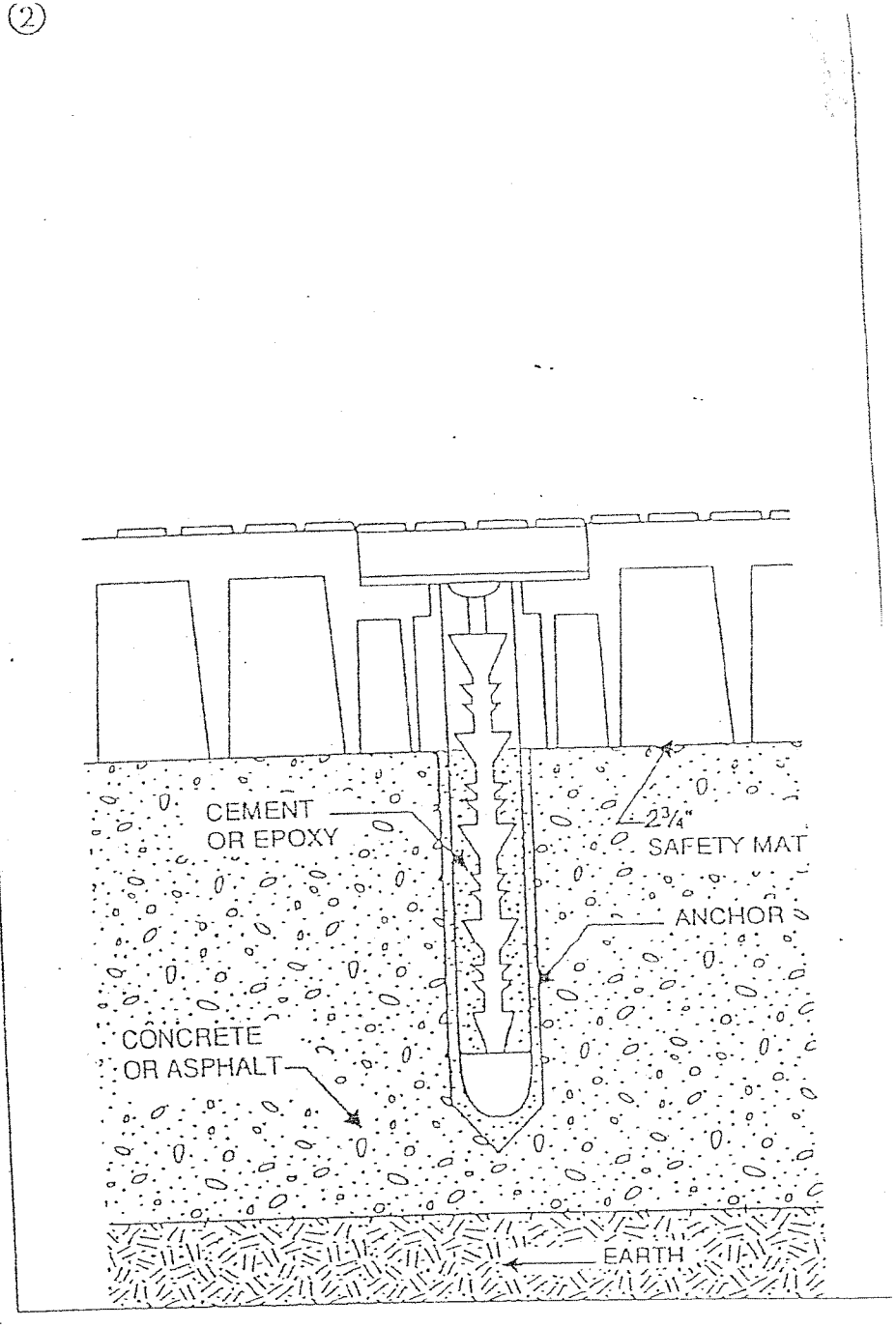
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CEMENT
OR EPOXY
2¾"
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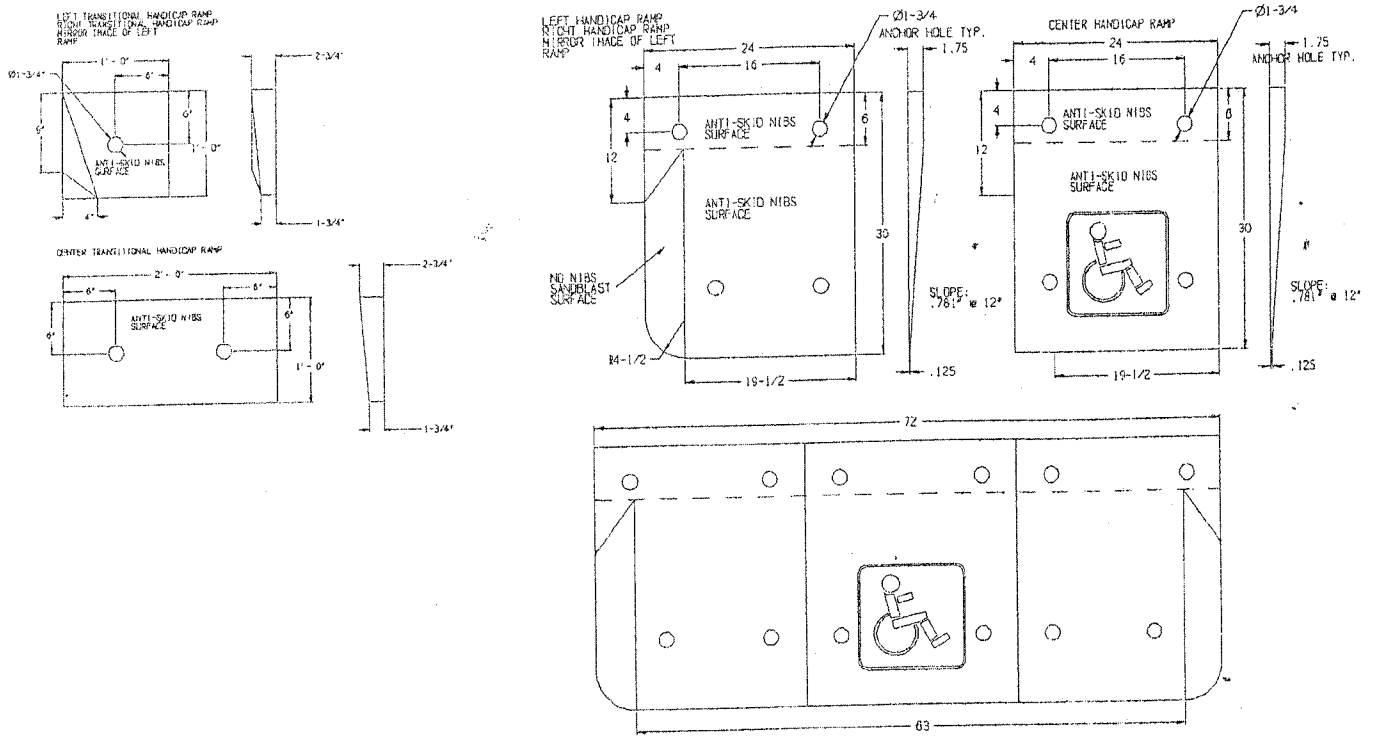
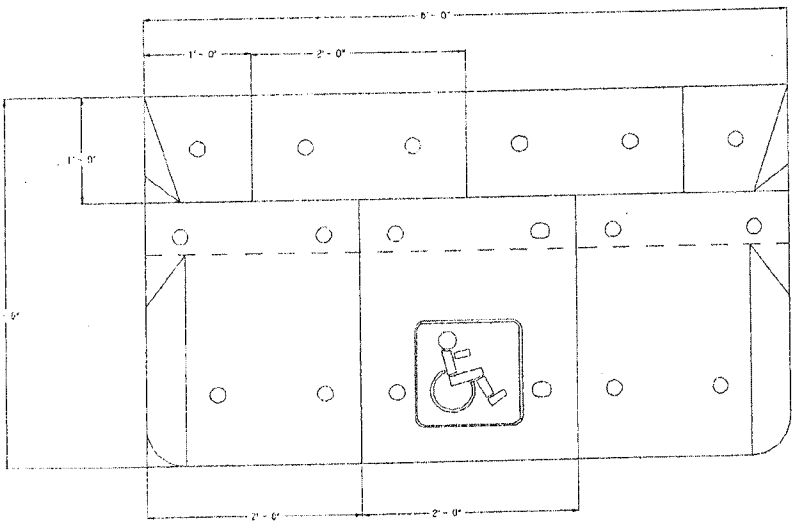
EARTH





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SIZE: B	CONTRACT NO.	DWG NO.	REV: A
DRAWN BY: JDP	DATE: 1-11-11	MITCHELL RUBBER PRODUCTS, INC.	
SCALE: N.T.S	SHEET	10220 SAN SEVAINE WAY, MIRA LOMA, CA.91752 (909)-681-5655	

SAFETY DATA SHEET

Revision Date: 11/20/2015

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Product Name: EZ Fall

Product Description: Safety Surfacing

Intended Use: Rubber Playground Matting

Supplier/Manufacturer: Mitchell Rubber Products
10220 San Sevaine Way
Mira Loma, CA 91752
Telephone: 951-681-5655

Emergency telephone: See supplier/manufacturer contact info.

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the Material in accordance with CFR 1910.1200 (d) (f):
This product does not contain any components classified as hazardous under the referenced regulation.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

SECTION 4 FIRST AID MEASURES

Description of first aid measures
If inhaled: Not applicable

If on skin: Not applicable

If in eyes: Not applicable

If swallowed: Not applicable

Most important symptoms and effects, both acute and delayed
Symptoms: Not applicable.

Indication of any immediate medical attention and special treatment needed
Note to physician
Treatment: Not applicable

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

Additional information: Use extinguishing measures to suit surroundings.

Special hazards arising from the substance or mixture

Hazards during fire-fighting: No particular hazards known.

Advice for fire-fighters Protective equipment for fire-fighting:
Wear self-contained breathing apparatus and chemical-protective clothing.

Further information: Product itself is non-combustible; fire extinguishing method of surrounding areas must be considered.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Environmental precautions

Do not discharge into the subsoil/soil. Do not discharge into drains/surface waters/groundwater.

Methods and material for containment and cleaning up

place in appropriate container for disposal.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

No special precautions necessary.

Protection against fire and explosion:

No special precautions necessary.

Conditions for safe storage, including any incompatibilities

No special precautions necessary.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protective equipment

Respiratory protection:

No special precautions necessary.

Hand protection:

No special precautions necessary.

Eye protection:
No special precautions necessary.

Body protection:
No special precautions necessary.

General safety and hygiene measures:
Handle in accordance with good industrial hygiene and safety practice.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Solid
Form: Dense Rubber
Color: Color/Black
Odor: None
Odor Threshold: Not Available

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15.6 °C): Not Available
Flammability (Solid, Gas): Not Available
Flash Point [Method]: Not Available
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Auto ignition Temperature: Not Available
Boiling Point / Range: Not Available
Decomposition Temperature: N/D
Vapor Density (Air = 1): Not Available
Vapor Pressure: Not Available
Evaporation Rate (n-butyl acetate = 1): Not Available
pH: Not Available
Log Pow (n-Octanol/Water Partition Coefficient): Not Available
Solubility in Water: Negligible
Viscosity: Not Available
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: Not Available
Melting Point: Not Available
Hygroscopic: No
Storage Temperature: [Ambient]
Storage Pressure: [Ambient]
Suitable Containers/Packing: Wooden Crates; Plastic Bags; Cardboard Cartons

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Elevated temperatures. >230 ºC (446 ºF)

MATERIALS TO AVOID: N/D

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Information on the likely routes of exposure: No specific data.

Potential acute health effects

Eye contact	No known significant effects or critical hazards.
Inhalation	No known significant effects or critical hazards.
Skin contact	No known significant effects or critical hazards.
Ingestion	No known significant effects or critical hazards.

Symptoms related to the physical. chemical and toxicological characteristics

Eye contact	No specific data.
Inhalation	No specific data.
Skin contact	No specific data.
Ingestion	No specific data.

Potential chronic health effects

Short term exposure	Not available.
Potential immediate effects	Not available.
Long term exposure	Not available.

Potential delayed effects

General

Carcinogenicity	No known significant effects or critical hazards.
Mutagenicity	No known significant effects or critical hazards.

Teratogenicity No known significant effects or critical hazards.
Developmental effects No known significant effects or critical hazards.
Fertility effects No known significant effects or critical hazards.

Information on toxicological effects
Acute toxicity estimates Route: Not available.

SECTION 12 ECOLOGICAL INFORMATION

Toxicity Not available.
Conclusion/Summary Not available.

Persistence and degradability Not available.
Conclusion/Summary Not available.

Bio accumulative potential Not available.

Mobility in soil Not available.
Soil/water partition

Other adverse effects: No known significant effects or critical hazards.

SECTION 13 DISPOSAL CONSIDERATIONS

Waste disposal of substance:

Dispose of in accordance with local authority regulations. Disposal requirements are dependent on the hazard classification and will vary by location and the type of disposal selected. This product does not possess any of the four identifying characteristics of hazardous waste (ignitability, corrosivity, reactivity, or toxicity).

RCRA: None

SECTION 14 TRANSPORT INFORMATION

Land transport
USDOT Not classified as a dangerous good under transport regulations

Sea transport
IMDG Not classified as a dangerous good under transport regulations

Air transport
IATA/ICAO Not classified as a dangerous good under transport regulations

SECTION 15 REGULATORY INFORMATION

SARA 311/312 : Not Hazardous

SARA Title III Section 302 Extremely Hazardous Substances: None

SARA Title III Section 313 Toxic Chemicals: None

US EPA CERCLA Hazardous Substances (40 CFR 302.4) Not Hazardous

SECTION 16 OTHER INFORMATION

Further information

HMIS Classification :

Health Hazard:	**0**
Flammability:	**0**
Physical hazards:	**0**

Further information

The information in this material safety data sheet should be provided to all who will use, handle, store, transport or otherwise be exposed to this product. The user must determine the appropriate measures that need to be implemented for the use and handling of this product in the context of the user's operations and use of this product. The information contained herein supersedes all previously issued bulletins on the subject matter covered. User must determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes, including mixing with other products. Nothing contained herein shall be construed as granting or extending any license under any patent. The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.