NJTRANSIT
The Way To Go.

Hudson-Bergen Light Rail Transit System
Minimal Operational System - 1 Project

electronic -
Remedial Action Report

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EXECUTIVE SUMMARY

To comply with the New Jersey Department of Environmental Protection (NJDEP) *Technical Requirements for Site Remediation* (*TRSR*), New Jersey Administrative Code (N.J.A.C.) 7:26E, Section 6.7 (Amended February 2003), the New Jersey Transit Corporation (NJ TRANSIT), Office of New Light Rail Construction (NLRC) has prepared the following Remedial Action Report (RAR) for the Hudson-Bergen Light Rail Transit System (H-BLRTS) project. The RAR was also prepared pursuant to the Memorandum of Agreement (MOA), dated 20 April 1992, between NJ TRANSIT and the NJDEP for this project. The H-BLRTS is identified by NJDEP as Program Interest No. G000008447, Known Contaminated Site List (KCSL) Case No. NJD986619146, and Site Identifier No. NJL800031478.

The Minimal Operational System – 1 (MOS-1) segment of the H-BLRTS is a 10.5-mile corridor currently operating between Bayonne and Jersey City. MOS-1 traverses through Jersey City from Newport Mall to Liberty State Park. From Liberty State Park, one spur extends west along an abandoned rail track to West Side Avenue in western Jersey City and another spur extends south to 32nd Street in Bayonne. The MOS-1 segment was built under a Design, Build, Operate and Maintain (DBOM) contract between NJ TRANSIT and Twenty-First Century Rail Corporation (TFCRC), the DBOM contractor. As part of the construction MOS-1, TFCRC constructed a yard and shop facility, 15 station stops and four park and ride facilities along the alignment. In addition, TFCRC constructed and rehabilitated tracks, installed a corridor-wide catenary system, signaling and control systems, upgraded grade crossings, and constructed and rehabilitated bridges along the MOS-1 alignment.

BEM Systems, Inc. (BEM), on behalf of NJ TRANSIT, has prepared an electronic-Remedial Action Report (e-RAR) for the H-BLRTS MOS-1 segment of the project. NJ TRANSIT, in an effort to facilitate and expedite the environmental regulatory review process, has developed this innovative method of preparing and presenting the project data in an electronic manner via this e-RAR. The e-RAR consists of the text in hypertext markup language (HTML) format and portable document format (PDF) for printing. The compact disc (CD) included in this submission also includes a help guide to navigate the e-RAR. In addition, a project-specific Geographic Information System (GIS) Viewer was developed as a means of reporting spatial project data in place of the extensive number of hard copy maps to graphically present the various types of the project data. All pre- and post-remedial action data are included in this report. This e-RAR can also create electronic analytical data files complying with the NJDEP Site Remediation Program's "Hazsite" Electronic Data Interchange Manual requirements.

Need this

Pursuant to the above-mentioned MOA and for the purpose of performing remedial investigations and implementing remedial actions, the entire project corridor was considered as one "site". In addition, due to historical land use the soils along the corridor were considered non-residential land-use.

Remedial investigations conducted by NJ TRANSIT along the project corridor identified soil exceedances above the NJDEP Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC) for metals (including Chromium VI), semi-volatile organic compounds (SVOCs), consisting of polycyclic aromatic hydrocarbons (PAHs), and in some instances, volatile organic compounds (VOCs). In addition, 43 highly contaminated locations, "hot spots," were identified

with contamination more than one order of magnitude (i.e., greater than 10 times) above the NJDEP NRDCSCC. The impacted soil contamination was the result of former land use, such as railroad operations and historic filling with construction and demolition debris. The chromium contamination was related to the use of chromate processing waste as fill material throughout Bayonne and Jersey City. A soil reuse plan (SRP) was prepared and approved by the NJDEP under the precedent set by the NJDEP's 1 February 1994 approval of NJ TRANSIT's Gateway (Liberty Harbor) Station Stop and Park & Ride SRP, which proposed the reuse of low-level contaminated soils as construction fill beneath engineering controls and off-site disposal of "hot spot" soils. Based on this, soil management activities were subsequently implemented by NJ TRANSIT during construction of the H-BLRTS MOS-1 project.

The remedial activities also included off-site soil management, groundwater management, removal and closure of underground storage tanks (USTs) and asbestos abatement. During the construction activities, NJ TRANSIT permanently closed by removal, 25 regulated and unregulated USTs within the MOS-1 project area. The UST closures were documented in UST Closure Site Investigation reports. It is important to note that the UST Registration No. 0320069 is listed in the NJDEP database as being owned by NJ TRANSIT. However, as NJ TRANSIT does not operate the facility owned by S.A. Wald located in Jersey City, NJTRANSIT requests that NJDEP remove NJ TRANSIT's name as the facility name from the regulated UST database. In addition, five UST facilities are still listed on the NJDEP Regulated UST list. NJ TRANSIT is, therefore, requesting the NJDEP to delist these facilities from the NJDEP database. The following table provides information related to the above-mentioned UST facilities recommended for closure.

Table I River LINE UST Facility Registration Number

Facility Name (NJ TRANSIT Property Parcel No.)	UST Facility Registration No.	Former Owner Street Address	Municipality	County
NJ TRANSIT H-BLRTS Initial Operating System (52)	0035057	Y & T Realty Co 48 Pollock Avenue	Jersey City	Hudson
NJ TRANSIT H-BLRTS Initial Operating System (202)	0320096	Amon Yahel	Jersey City	Hudson
NJ TRANSIT H-BLRTS Initial Operating System (53)	0048125	Lasser Fuel Services, Inc. 30 Pollock Avenue	Jersey City	Hudson
NJ TRANSIT H-BLRTS Initial Operating System (18)	0329024	Steve Hyman	Jersey City	Hudson
NJ TRANSIT H-BLRTS Initial Operating System (201A)	0320087	Eden Wood Realty Co.	Jersey City	Hudson

The remedial investigations also detected groundwater contamination with exceedances for metals (including Chromium VI), low levels of SVOCs and VOCs above the NJDEP Class II-A Groundwater Quality Standards (GWQS). The impacted groundwater contamination was the result of former land-use, such as railroad operations and historic filling with construction and demolition debris. The chromium contamination was related to the use of chromate processing waste as fill material throughout Bayonne and Jersey City. Since the construction activities did not impact the local groundwater quality, which is documented to be regionally degraded, NJ TRANSIT is requesting an administrative Classification Exception Area (CEA) for the H-BLRTS MOS-1 right-of-way (ROW) corridor consisting of NJ TRANSIT's ROW and property acquisition areas. As per the NJDEP requirements, an administrative CEA for the H-BLRTS

MOS-1 project corridor, consisting of NJ TRANSIT's ROW and property acquisition areas, will require no further groundwater investigation, sampling, monitoring or delineation. All groundwater monitoring wells were closed and abandoned as per the NJDEP requirements during the construction activities. Impacted groundwater encountered during construction activities was disposed of off-site, recharged on-site or discharged to the publicly owned treatment works (POTW).

In accordance with the NJDEP-approved SRP, a total of 653,818 cubic yards (CY) of regulated soil was reused on-site under engineering controls. These engineering controls included low-permeability sub-ballast and ballast, asphalt/concrete pavement, engineered structures (building foundations) and vegetated/landscaped areas. During construction activities, approximately 4,104 CY of excess regulated soil were remediated by excavation and placement off-site at regulated facilities. Forty-three hot spot locations were delineated, excavated and disposed of off-site at regulated facilities. In addition, 5,632 CY of non-hazardous and 650 CY of hazardous soil were disposed of off-site at regulated facilities.

Soil Re-Use

Based on the soil remedial action, NJ TRANSIT recommends that the NJDEP render a "No Further Action" determination for soil at the former Hicor Associates property (34th Street Station Stop Park and Ride) located in Bayonne. In addition, NJ TRANSIT requests that the NJDEP de-list the site from the UST Registration Database (UST Registration No. 0242886) and UST Contaminated Case List (ID No. 93-06-11-1506) currently listed for Hicor Associates, as well as de-list it from the Known Contaminated Site List (No. NJD980776058) for the Bayonne Nipple Company. A separate report addressing the petroleum-contaminated groundwater at the 34th Street Station Stop Park and Ride will be submitted after completion of the remediation activities.

The restoration of the H-BLRTS MOS-1 alignment area is considered in the context of its ultimate land use. Restoration of the project area was achieved by the completion of the NJ TRANSIT transportation improvement program. NJ TRANSIT's ROW and associated properties are indicated as non-residential land-use areas. As part of the construction, engineering controls (i.e., capping) consisting of track ballast, asphalt/concrete pavement, engineered structures and vegetated/landscaped areas were placed throughout the project area in accordance with the NJDEP-approved SRP. In addition, a project-wide Deed Notice for NJ TRANSIT's acquisition areas located within Hudson County will be recorded for the H-BLRTS MOS-1 project as an institutional control, where soil exists above the NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC). NJ TRANSIT will ensure the scheduled operation and maintenance of the H-BLRTS MOS-1 project area, as part of the responsibilities for the River LINE project.

Based on the completion of NJ TRANSIT's remedial action and construction activities within the H-BLRTS MOS-1 project corridor, NJ TRANSIT requests that the NJDEP issue a "Conditional No Further Action" letter with Covenant Not to Sue for the entire H-BLRTS MOS-1 project corridor.

3.0 SUMMARY OF REMEDIAL INVESTIGATION FINDINGS, REMEDIAL APPROACH AND REMEDIAL ACTION

3.1 Soil Remedial Investigation Findings, Remedial Approach and Remedial Action

3.1.1 Remedial Investigation Findings for Soil

3.1.1.1 Group 1: Bayview Avenue to Johnston Avenue with Yard and Shop

S.L 202 is in Group 1

NJ TRANSIT designed and implemented a soil sampling program for Group 1 by collecting samples from test pits or borings. The locations are presented in the project GIS Viewer. Soil samples were collected between January and August 1995 and submitted to Accutest Laboratories, Inc. (Accutest) or Chemtech Consulting Group, Inc. (Chemtech), State of New Jersey-certified and NJDEP-approved laboratories, for chemical analysis. Soil samples were collected from multiple depths within the borings, and sample depths varied based upon the proposed construction in corresponding areas. All soil samples were analyzed for the USEPA Target Compound List /Target Analyte List (TCL/TAL) parameters:

- TCL Volatile Organic Compounds with a library search of the 10 highest peaks (TCL-VOC+10);
- TCL Base/Neutral/Acid extractable organic compounds with a library search of the 20 highest peaks (TCL-BNA+20);
- TAL Metals;
- Pesticides;
- Polychlorinated Biphenyls (PCBs);
- Cyanide; and
- Herbicides (additional to the TCL+30 parameters).

Additionally, some soil samples were analyzed for chromium VI and Total Petroleum Hydrocarbons (TPHC), based upon historical use/known contamination, or field observations. All surface soil sample (0-2' bgs) analytical results were compared to the NJDEP Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC) and subsurface soil sample (2 or more feet bgs) analytical results were compared to the NJDEP Impact to Groundwater Soil Cleanup Criteria (IGWSCC). The Chemical Data Report button can be utilized to generate chemical data reports.

The detailed study of the distribution and frequency of predominant contaminants detected in Group 1 in surface and subsurface soil was included in the NJDEP-approved RI/RAA report. As described in the RI/RAA report, the majority of the detected compounds were heavy metals and a limited range of organic compounds (polycyclic aromatic hydrocarbons [PAHs]) detected at low to moderate levels. Given the large number of samples included in the analysis, the probability of encountering significantly contaminated soils during construction activities at levels higher than were encountered during the environmental investigation was generally low. Consequently, during construction activities, no confirmatory sampling was performed prior to reuse of the excavated soil. The PA/SI data was used to delineate the site conditions during construction. Due to the type and nature of the metal contaminants predominantly detected in the subsurface of the Group 1 area, it was apparent that soil contamination was the result of

former land-uses as well as historic fill including construction and demolition debris previously used as fill material in the area. The chromium contamination was related to the use of chromate processing waste as fill material throughout Jersey City.

At several locations in the Group 1 area, the concentrations of metal contaminants (e.g. beryllium, copper and zinc) exceeded the NJDEP NRDCSCC by over an order of magnitude (greater that 10 times) and chromium VI exceeded the NJDEP NRDCSCC. These locations therefore qualified as "hot spots". A total of twelve hot spots were identified in Group 1. Table 3.1 below presents the locations of the hot spots and the contaminants of concern.

Table 3.1 Group 1 Hot Spot Locations

- Site 202 is in Group 1

Hot Spot Location	Contaminant of Concern	Concentration (mg/kg)	Depth of Contaminant of Concern	NJDEP NRDCSCC (mg/kg)
G01-B60	Chromium VI	23.1	0' – 1.5'	10
SA2-04	Beryllium	60.5	1' – 3'	1
	Copper	74.6	1' – 3'	600
	Zinc	24,900	1' – 3'	1,500
G01-B76	Chromium VI	42.2	0' – 1.5'	10
G01-B61	Chromium VI	10.9	0' – 1.5'	10
G01-B64	Chromium VI	23.1	0' – 2'	10
G01-B12	Zinc	24,100	2' – 4'	1,500
G01-B77	Chromium VI	12.8	0' – 1.5'	10
G01-B13	Chromium VI	23.3	0' – 2'	10
G01-B14	Copper	7,660	2' – 3.5'	600
	Zinc	19,300	8' – 9.5'	1,500
SA2-16	Chromium VI	12	2' – 4'	10
G01-B71	Chromium VI	10.6	0.5' – 2'	10
G04-B01	Chromium VI	17.2	0' – 1.5'	10

Site 202 (G01-B12, G01-B77, G01-B13)

Site 202

3.1.1.2 Group 1A: Johnston Avenue to Jersey Avenue

Site 204 is in Group 1A

NJ TRANSIT designed and implemented a soil sampling program for Group 1A by collecting samples from test pits or borings. The locations are presented in the project GIS Viewer. Soil samples were collected between August and September 1995 and were submitted to Accutest or Chemtech for chemical analysis. Soil samples were collected from multiple depths within the borings, and sample depths varied based upon the proposed construction in corresponding areas. All soil samples were analyzed for the USEPA TCL+30/TAL parameters. In addition to these analyses, all soil samples were analyzed for chromium VI because of the known/suspected contamination associated with the extensive historical use of chromate waste as fill material throughout Jersey City. TPHC was also analyzed for in some soil samples based upon historical land use or field evidence of contamination. All surface soil sample (0-2' bgs) analytical results were compared to the NJDEP NRDCSCC and subsurface soil sample (2 or more feet bgs) analytical results were compared to the NJDEP IGWSCC. The Chemical Data Report button can be utilized to generate chemical data reports.

The detailed study of the distribution and frequency of predominant contaminants detected in Group 1A in surface and subsurface soil was included in the NJDEP-approved RI/RAA report. As described in the RI/RAA report, the majority of the detected compounds were heavy metals and a limited range of organic compounds at low to moderate levels. Given the large number of samples included in the analysis, the probability of encountering significantly contaminated soils

during construction activities at levels higher than were encountered during the environmental investigation was generally low. Consequently, during construction activities, no confirmatory sampling was performed prior to reuse of the excavated soil. The PA/SI data was used to delineate the site conditions during construction. Due to the type and nature of the metal contaminants predominantly detected in the subsurface of Group 1A, it was apparent that soil contamination was the result of former land-uses as well as the construction and demolition debris previously used as fill material in the area.

At several locations the concentration of inorganic contaminants (lead, copper and zinc) exceeded the NJDEP NRDCSCC by over an order of magnitude and chromium VI exceeded the NJDEP NRDCSCC. These areas were considered "hot spots". Four hot spot locations were identified in Group 1A. Table 3.2 below presents the hot spot locations and contaminants of concern.

Site 204 is in Group 1A

Table 3.2 Group 1A Hot Spot Locations

Hot Spot Location	Contaminant of Concern	Concentration (mg/kg)	Depth of Contaminant of Concern	NJDEP NRDCSCC (mg/kg)
G01A-TP07	Copper	11,300	4' – 6'	600
G01A-TP05	Chromium VI	10.1	0' – 1.5'	10
G01A-TP04	Chromium VI	10.7	0' – 1.5'	10
	Copper	20,300	3' – 3.5'	600
	Lead	37,100	0' – 1.5'	600
	Zinc	32,600	0' – 1.5'	1,500
G01A-B01	Chromium VI	20.4	0' – 1.5'	10

3.1.1.3 Group 2: Jersey Avenue to Luis Muñoz Marin Boulevard

NJ TRANSIT designed and implemented a soil sampling program for Group 1 by collecting samples from test pits or borings. The locations are presented in the project GIS Viewer. Soil samples were collected between and submitted to Accutest or Chemtech for chemical analysis. Soil samples were collected from multiple depths within the borings, and sample depths varied based upon the proposed construction in corresponding areas. All soil samples were analyzed for the USEPA TCL+30/TAL parameters. Additionally some soil samples were analyzed for chromium VI because of the known/suspected contamination associated with chromate fill material and TPHC based upon historical usage or field evidence of contamination. All surface soil sample (0-2' bgs) analytical results were compared to the NJDEP NRDCSCC and subsurface soil sample (2 or more feet bgs) analytical results were compared to the NJDEP IGWSCC. The Chemical Data Report button can be utilized to generate chemical data reports.

The detailed study of the distribution and frequency of predominant contaminants detected in the Group 2 segment in surface and subsurface soil was included in the NJDEP-approved RI/RAA report. As described in the RI/RAA report, the majority of the detected compounds were heavy metals and a limited range of organic compounds consisting of PAHs. Of the organic compounds, only benzo(a) pyrene was detected with a high frequency. Given the large number of samples included in the analysis, the probability of encountering significantly contaminated soils during construction activities at levels higher than were encountered during the environmental investigation was generally low. Consequently, during construction activities, no confirmatory sampling was performed prior to reuse of the excavated soil. The PA/SI data was

used to delineate the site conditions during construction. Due to the type and nature of the metal and organic contaminants predominantly detected in the subsurface of this group, it was apparent that soil contamination was the result of former land-uses as well as the construction and demolition debris previously used as fill material in the area.

In addition, at two locations the concentration of lead was observed over an order of magnitude above the NJDEP NRDCSCC. Therefore, these sampling locations qualified as "hot spots". Table 3.3 below presents the hot spot locations and contaminants of concern.

Table 3.3 Group 2 Hot Spot Locations

Hot Spot Location	Contaminant of Concern	Concentration (mg/kg)	Depth of Contaminant of Concern	NJDEP NRDCSCC (mg/kg)
SA4J-TP15	Lead	10,100	0' – 2'	600
G02-B15	Lead	7,850	8' – 9.5'	600

3.1.1.4 Group 3: Pacific Avenue to West Side Avenue

NJ TRANSIT designed and implemented a soil sampling program for Group 3 by collecting samples from test pits or borings. The locations are presented in the project GIS Viewer. Soil samples were collected and submitted to Accutest or Chemtech for chemical analysis. Soil samples were collected from multiple depths within the borings, and sample depths varied based upon the proposed construction in corresponding areas. All soil samples were analyzed for the USEPA TCL+30/TAL parameters. Based upon available environmental information from previous investigations and field observations, some soil samples were also analyzed for TPHC and chromium VI. All surface soil sample (0-2' bgs) analytical results were compared to the NJDEP NRDCSCC and subsurface soil sample (2 or more feet bgs) analytical results were compared to the NJDEP IGWSCC. The Chemical Data Report button can be utilized to generate chemical data reports.

The detailed study of the distribution and frequency of the predominant contaminants detected in surface and subsurface soil in Group 3 was included in the NJDEP-approved RI/RAA report. As described in the RI/RAA report, the majority of the detected compounds were heavy metals with a limited range of organic compounds (PAHs) limited to the surface samples. The organic and inorganic compounds were detected at low to moderate levels. Given the large number of samples included in the analysis, the probability of encountering significantly contaminated soils during construction activities at levels higher than were encountered during the environmental investigation was generally low. Consequently, during construction activities, no confirmatory sampling was performed prior to reuse of the excavated soil. The PA/SI data was used to delineate the site conditions during construction. Due to the type and nature of the metal contaminants predominantly detected in the subsurface of Group 3, it was apparent that soil contamination was the result of former land-uses as well as the construction and demolition debris previously used as fill material in the area.

At several locations, lead and organic contaminants (TPHC and benzene) were found at concentrations over an order of magnitude above the NJDEP NRDCSCC or IGWSCC criteria, and concentrations of chromium VI were found above the NJDEP NRDCSCC. These locations were defined as "hot spot" locations. A total of nine hot spots were identified in Group 3. Table 3.4 below presents the hot spot locations and contaminants of concern.

Site 203 is in Group 3

Table 3.4 Group 3 Hot Spot Locations

Hot Spot Location	Contaminant of Concern	Concentration (mg/kg)	Depth of Contaminant of Concern	NJDEP NRDCSCC (mg/kg)	NJDEP IGWSCC (mg/kg)
SA3I-TP17	Chromium VI	48.1	2' – 4'	10	N/A
G03-B03.1	Chromium VI	11,800	10' – 12'	10	N/A
	Arsenic	1,000	2' – 4'	20	N/A
	Copper	7,130	2' – 4'	600	N/A
	Lead	8,500	2' – 4'	600	N/A
	Thallium	123	2' – 4'	2	N/A
	Zinc	31,500	2' – 4'	1,500	N/A
G03-TP66	Chromium VI	16.2	2' – 4'	10	N/A
G03-B04	Chromium VI	304	8' – 9.5'	10	N/A
G03-B58	Chromium VI	17	0' – 1.5'	10	N/A
G03-B47	Benzene	36	2' – 3.5'	13	1
SA3I-TP13	Chromium VI	13.8	2' – 4'	10	N/A
G03-B10	Benzo(a)pyrene	7.6	0' – 1.5'	0.66	100
G03-D12-B01	Lead	35,800	0' – 2'	600	N/A
	TPHC	628,000	0' – 2'	10,000	10,000

3.1.1.5 Group 4: 32nd Street to Bayview Avenue

NJ TRANSIT designed and implemented a soil sampling program for Group 1 by collecting samples from test pits or borings. The locations are presented in the project GIS Viewer. Soil samples were collected and submitted to Accutest or Chemtech for chemical analysis. Soil samples were collected from multiple depths within the borings, and samples depths varied based upon the proposed construction in corresponding areas. All soil samples were analyzed for the USEPA TCL+30/TAL parameters. In addition, based upon historical land-use and known contamination, or field observations, soil samples were analyzed for chromium VI and TPHC. All surface soil sample (0-2' bgs) analytical results were compared to the NJDEP NRDCSCC and subsurface soil sample (2 or more feet bgs) analytical results were compared to the NJDEP IGWSCC. The Chemical Data Report button can be utilized to generate chemical data reports.

A detailed study of the distribution and frequency of predominant contaminants detected in Group 4 in surface and subsurface soils was presented in the NJDEP-approved RI/RAA report. As described in the RI/RAA report, the majority of the detected compounds were heavy metals with a limited range of organic compounds (PAH) detected at low to moderate levels. Given the large number of samples included in the analysis, the probability of encountering significantly contaminated soils during construction activities at levels higher than were encountered during the environmental investigation was generally low. Consequently, during construction activities, no confirmatory sampling was performed prior to reusing the excavated soil. The PA/SI data was used to delineate the site conditions during construction. Due to the type and nature of the metal and organic contaminants predominantly detected in the subsurface of Group 4, it was apparent that soil contamination was the result of former land-uses as well as the construction and demolition debris previously used as fill material in the area.

At several locations, lead and organic contaminants (benzo(a)pyrene, xylene and TPHC) were found at concentrations over an order of magnitude above the NJDEP NRDCSCC and chromium VI contamination was exceeding the NJDEP NRDCSCC. Therefore, these locations were

These 46 RASPRs covered the period from November 1996 through October 2000. These reports contained detailed information regarding remedial action, soil excavation and reuse, soil disposal, where necessary, on-site delineation, monitoring well abandonment, sealing of abandoned wells, dust control and post-excavation soil sampling activities. In addition, BEM on behalf of NJ TRANSIT submitted separate UST Closure and Site Investigation reports for a total of 25 USTs permanently removed as part of the remediation activities for the H-BLRTS MOS-1 project. The post-excavation soil samples and off-site disposal manifests were submitted along with the reports. All reports containing analytical results were separately submitted to the NJDEP Case Manager for review, comments and record purposes and are consequently not included in this RAR. Rather, they are incorporated into this report by reference. The fully executed waste manifests are presented in Appendix C. In this e-RAR, each group-specific remedial action for project soil and UST removals is discussed in detail in sections 3.1.3 and 3.3, respectively.

3.1.3 Remedial Action for Excavated Material

The data presented in NJ TRANSIT's PA, SI, RI and PAECE reports were used in the development of the RAWP consisting of the SRP for the H-BLRTS MOS-1 project. NJ TRANSIT's material management consisted of soil, rock, asphalt, concrete, wooden railroad ties, drums, etc. In addition, reuse materials consisted of sand, dense graded aggregate (DGA) and solite (light, non-hazardous backfill material). The H-BLRTS MOS-1 alignment was constructed in accordance with the final construction design plans and the NJDEP-approved SRP. The following sections summarize the soil remedial actions performed during construction activities within NJ TRANSIT's light rail Right-of-Way (ROW) and property acquisition areas. During light rail construction activities, project soil was excavated and reused on-site under engineering controls. The hazardous and non-hazardous soil encountered during remediation and construction activities were disposed of off-site. The Material Data Report button can be utilized to generate material movement summary and details reports.

3.1.3.1 Group 1: Bayview Avenue to Johnston Avenue with Yard and Shop

On-Site Soil Excavation

A total volume of 134,120.3 cubic yards (CY) of soil was excavated within Group 1 as presented below in Table 3.8.

Table 3.8 Summary of Soil Excavated from Group 1

Location	Total Volume of Soil Excavated (CY)		
	Non-Hazardous Soil	Regulated Soil	Non-Regulated Soil
458 – 514	281.7	122,131	0
2448 – 2466	0	8,410	0
Temporary Stockpiles	55.6	0	3,242
Eden Wood Realty (201A)	200	0	0
SUB TOTAL	**537.3**	**130,541**	**3,242**
TOTAL		**134,120.3**	

Thirteen hot spot locations identified during the remedial investigation were delineated and excavated for off-site disposal. Post-excavation soil samples were collected from the bottom and sidewalls of each excavation to ensure that the entire hot spot was removed. Table 3.9 below

presents summary of hot spot remedial action. The locations of the delineation soil samples, excavation limits and post-excavation soil samples are presented in the project GIS Viewer.

Table 3.9 Summary of Hot Spot Remedial Action in Group 1

Hot Spot Location (Construction Station Cell No.)	Contaminant(s) of Concern	Number of Delineation Soil Samples Collected	Volume Excavated (CY)	Date of Excavation	Number of Post-Excavation Soil Samples Collected
G01-B59 (466-L1)	Chromium VI	17 from 9 borings	25	5/20/97	3
G01-B60 (468-R0)	Chromium VI	12 from 9 borings	13.8	5/20/97	3
SA2-04 (470-R0)	Beryllium, Copper, Zinc	18 from 9 borings	54	5/20/97	3
G01-B76 (474-R2)	Chromium VI	18 from 9 borings	24	5/20/97	4
G01-B61 (476-R0)	Chromium VI	18 from 9 borings	8.8	5/20/97	2
G01-B64 (480-R0)	Chromium VI	18 from 9 borings	20	5/20/97	3
G01-B12 (484-L4)	Zinc	31 from 9 borings	11	8/8/97	2
G01-B77 (486-L3)	Chromium VI	13 from 7 borings	12.2	8/7/97	2
G01-B13 (486-L3)	Chromium VI	14 from 7 borings	8.3	8/7/97	2
G01-B14 (486-L2)	Copper and Zinc	42 from 21 borings	30	7/8/97	5
			16	8/11/97	2
			8	9/4/97	1
SA2-16 (494-L1)	Chromium VI	17 from 9 borings	46	5/20/97	3
G01-B71 (490-R0)	Chromium VI	17 from 9 borings	4.6	5/20/97	6
G04-B01 (464-R0)	Chromium VI	18 from 9 borings	23	5/22/97	3

On-Site Soil Reuse

A total volume of 154,620.7 CY of project soil was reused in accordance with the NJDEP-approved SRP as presented below in Table 3.10. The engineering controls used to cap the project soil include building concrete foundations, asphalt/concrete pavement, vegetated/landscaped areas and the light rail tracks with track ballast (sub-ballast and ballast).

Table 3.10 Summary of On-Site Soil Reuse from Group 1

Location	Total Volume of Soil Excavated (CY)	
	Regulated Soil	Non-Regulated Soil
458 – 514	90,113	32,676
2448 – 2466	11,642	700
Temporary Stockpiles	11,007	8,482
SUB TOTAL	**112,762**	**41,858**
TOTAL	**154,620.7**	

Off-Site Disposal of Non-Hazardous Waste

As part of UST closure activities and hot spot excavations, non-hazardous soil was disposed of off-site to a regulated facility as presented below in Table 3.11. In addition, during construction activities, non-hazardous soil was excavated and temporarily stockpiled for off-site disposal. A total of 537.3 CY of beryllium, copper, chromium VI, TPHC and zinc contaminated non-hazardous soil was excavated and disposed of off-site at Clean Earth of New Castle located in New Castle, Delaware. Details regarding the UST closure are presented below in Section 3.3. The waste manifests are presented in Appendix C.

Table 3.11 Summary of Off-Site Soil Disposal from Group 1

Off-Site Disposal Facility	Total Volume of Off-Site Soil Disposal (CY)
	Non-Hazardous
Clean Earth of New Castle	537.3
SUB-TOTAL	**537.3**
TOTAL	**537.3**

3.1.3.2 Group 1A: Johnston Avenue to Jersey Avenue

On-Site Soil Excavation

A total volume of 64,206.5 CY of project soil was excavated within Group 1A as presented below in Table 3.12.

Table 3.12 Summary of Soil Excavated from Group 1A

Location	Total Volume of Soil Excavated (CY)			
	Hazardous Soil	Non-Hazardous Soil	Regulated Soil	Non-Regulated Soil
516 to 542	14.8	75.5	22,170	15,591
JA-62 to JA-64	0	0	305	56
Temporary Stockpiles	0	688.3	0	24,801
SUB-TOTAL	**14.8**	**763.7**	**22,980**	**40,448**
TOTAL	**64,206.5**			

Four hot spot locations identified during the remedial investigation were delineated and excavated for off-site disposal. Post-excavation soil samples were collected from the bottom and sidewalls of each excavation to ensure that the entire hot spot was removed. Table 3.13 below presents summary of hot spot remedial action. The locations of the delineation soil samples, excavation limits and post-excavation soil samples are presented in the project GIS Viewer.

Table 3.13 Summary of Hot Spot Remedial Action in Group 1A

Hot Spot Location (Construction Station Cell No.)	Contaminant(s) of Concern	Number of Delineation Soil Samples Collected	Volume Excavated (CY)	Date of Excavation	Number of Post-Excavation Soil Samples Collected
G01A-TP07 (530)	Copper	17 from 9 borings	6.3	5/12/97	3
G01A-TP05 (532)	Chromium VI	12 from 6 borings	3.1	5/12/97	2
G01A-TP04 (534)	Chromium VI, Copper, Lead and Zinc	24 from 8 borings	14.8	5/12/97	None because of Chromate Sites 91 and 92 and only construction-impacted soil was excavated for off-site disposal
G01A-B01 (540)	Chromium VI	13 from 7 borings	6	5/12/97	3

On-Site Soil Reuse

A total volume of 120,185 CY of project soil was reused in accordance with the NJDEP-approved SRP as presented below in Table 3.14. The engineering controls used to cap the project soil include asphalt/concrete pavement, vegetated/landscaped areas and the light rail tracks with track ballast (sub-ballast and ballast).

Table 3.14 Summary of On-Site Soil Reuse from Group 1A

Location	Total Volume of On-Site Soil Reuse (CY)	
	Regulated Soil	Non-Regulated Soil
516 to 542	28,025	14,549
JA-62 to JA-64	305	4,285
Temporary Stockpiles	38,222	34,799
SUB-TOTAL	**66,552**	**53,633**
TOTAL	**120,185**	

Off-Site Disposal of Hazardous and Non-Hazardous Waste

As part of hot spot excavations, hazardous and non-hazardous soil was disposed of off-site to regulated facilities as presented in Table 3.15 below. In addition, during construction activities, non-hazardous soil was excavated and temporarily stockpiled for off-site disposal. A total of 778.5 CY of lead, copper, chromium VI and zinc contaminated soil was excavated and disposed of off-site at Clean Earth of New Castle and CWM Chemical Services, Inc., located in Model City Pennsylvania. The waste manifests are presented in Appendix C.

Table 3.15 Summary of Off-Site Soil Disposal from Group 1A

Off-Site Disposal Facility	Total Volume of Off-Site Soil Disposal (CY)	
	Hazardous Soil	Non-Hazardous
Clean Earth of New Castle	0	763.7
CWM Chemical Services	14.8	0
SUB-TOTAL	**14.8**	**763.7**
TOTAL	**778.5**	

3.1.3.3 Group 2: Jersey Avenue to Luis Muñoz Marin Boulevard

On-Site Soil Excavation

A total volume of 54,133 CY of project soil was excavated within Group 2 as presented below in Table 3.16.

Table 3.16 Summary of Soil Excavated from Group 2

Location	Total Volume of Soil Excavated (CY)			
	Hazardous Soil	Non-Hazardous Soil	Regulated Soil	Non-Regulated Soil
544 to 566	17	8	42,465	8,773
JA-66 to JA-70	0	0	0	275
Temporary Stockpiles	0	0	0	2,595
SUB-TOTAL	**17**	**8**	**42,465**	**11,643**
TOTAL	**54,133**			

Two hot spot locations identified during the remedial investigation were delineated and excavated for off-site disposal. Post-excavation soil samples were collected from the bottom and sidewalls of each excavation to ensure that the entire hot spot was removed. The following table presents summary of hot spot remedial action. The locations of the delineation soil samples, excavation limits and post-excavation soil samples are presented in the project GIS Viewer.

Table 3.17 Summary of Hot Spot Remedial Action in Group 2

Hot Spot Location (Construction Station Cell No.)	Contaminant(s) of Concern	Number of Delineation Soil Samples Collected	Volume Excavated (CY)	Date of Excavation	Number of Post-Excavation Soil Samples Collected
SA4J-TP15 (560)	Lead	17 from 9 borings	17	7/8/97	3
G02-B15 (564)	Lead	19 from 7 borings	8	7/8/97	2

On-Site Soil Reuse

A total volume of 15,930 CY of project soil was reused in accordance with the NJDEP-approved SRP as presented below in Table 3.18. The engineering controls used to cap the project soil include asphalt/concrete pavement, vegetated/landscaped areas and the light rail tracks with track ballast (sub-ballast and ballast).

Table 3.18 Summary of On-Site Soil Reuse from Group 2

Location	Total Volume of On-Site Soil Reuse (CY)	
	Regulated Soil	Non-Regulated Soil
544 to 566	5,015	3,400
JA-66 to JA-70	990	3,830
Temporary Stockpiles	2,695	0
SUB-TOTAL	**8,700**	**7,230**
TOTAL	**15,930**	

Off-Site Disposal of Hazardous and Non-Hazardous Waste

As part of hot spot excavations, hazardous and non-hazardous soil was disposed of off-site to regulated facilities as presented in Table 3.19 below. A total of 25 CY of lead contaminated soil was excavated and disposed of off-site at Clean Earth of New Castle and S & W Waste, Inc. located in South Kearny, New Jersey. The waste manifests are presented in Appendix C.

Table 3.19 Summary of Off-Site Soil Disposal from Group 2

Off-Site Disposal Facility	Total Volume of Off-Site Soil Disposal (CY)	
	Hazardous Soil	Non-Hazardous
Clean Earth of New Castle	0	8
S & W Waste	17	0
SUB-TOTAL	**17**	**8**
TOTAL	**25**	

3.1.3.4 Group 3: Pacific Avenue to West Side Avenue

On-Site Soil Excavation

A total volume of 185,929.1 CY of project soil was excavated within Group 3 as presented below in Table 3.20.

Table 3.20 Summary of Soil Excavated from Group 3

Location	Total Volume of Soil Excavated (CY)			
	Hazardous Soil	Non-Hazardous Soil	Regulated Soil	Non-Regulated Soil
2385 to 2446	633	712.1	67,205	6,860
West Side Avenue Park and Ride	0	0	107,466	0
Temporary Stockpiles	0	0	0	3,053
SUB-TOTAL	**633**	**712.1**	**174,671**	**9,913**
TOTAL	**185,929.1**			

Eight hot spot locations identified during the remedial investigation were delineated and excavated for off-site disposal. Post-excavation soil samples were collected from the bottom and sidewalls of each excavation to ensure that the entire hot spot was removed. The following table presents summary of hot spot remedial action. The locations of the delineation soil samples, excavation limits and post-excavation soil samples are presented in the project GIS Viewer.

Table 3.21 Summary of Hot Spot Remedial Action in Group 3

Hot Spot Location (Construction Station Cell No.)	Contaminant(s) of Concern	Number of Delineation Soil Samples Collected	Volume Excavated (CY)	Date of Excavation	Number of Post-Excavation Soil Samples Collected
SA3I-TP17 (2438)	Chromium VI	20 from 7 borings	6	12/23/97	None because of Chromate Site 183 and only construction-impacted soil was excavated for off-site disposal
G03-B03.1 (2436)	Chromium VI, Arsenic, Copper, Lead and Zinc	55 from 11 borings and 47 from 14 test pits	197	3/26/97	None because of Chromate Site 183 and only construction-impacted soil was excavated and directly loaded out
			416	3/27/97	
			193	4/20/97	
			247	4/21/97	
			165.4	4/22/97	
			27.6	4/23/97	
G03-TP66 (2436)	Chromium VI	0	38	12/9/97	2
G03-B58, G03-DB100 (2386)	Chromium VI	21 from 9 borings and 13 from 7 test pits	20.2	3/27/98	5
G03-B47 (2432)	Benzene	19 from 5 borings	12	3/21/97	5
SA3I-TP13 (2422)	Chromium VI	17 from 6 borings	4.5	5/13/97	2
G03-B10 (2386)	Benzo(a)pyrene	16 from 11	1.1	5/13/97	2

Hot Spot Location (Construction Station Cell No.)	Contaminant(s) of Concern	Number of Delineation Soil Samples Collected	Volume Excavated (CY)	Date of Excavation	Number of Post-Excavation Soil Samples Collected
G03-D12-B01 (2418)	Lead and TPHC	7 from 4 borings	2.2	7/8/97	None because of Chromate Site 200 and only construction-impacted soil was excavated for off-site disposal

On-Site Soil Reuse

A total volume of 138,307 CY of project soil was reused in accordance with the NJDEP-approved SRP as presented below in Table 3.22. The engineering controls used to cap the project soil include asphalt/concrete pavement, vegetated/landscaped areas and the light rail tracks with track ballast (sub-ballast and ballast).

Table 3.22 Summary of On-Site Soil Reuse from Group 3

Location	Total Volume of On-Site Soil Reuse (CY)	
	Regulated Soil	Non-Regulated Soil
2398 to 2446	58,786	9,499
West Side Avenue Park and Ride	47,014	10,962
Temporary Stockpiles	10,004	2,042
SUB-TOTAL	**115,804**	**22,503**
TOTAL	**138,307**	

Offsite Disposal of Hazardous and Non-Hazardous Waste

As part of hot spot excavations, hazardous and non-hazardous soil was disposed of off-site to regulated facilities as presented in Table 3.23 below. A total of 1345.1 CY of arsenic, copper, lead, zinc, chromium VI, TPHC, benzene and benzo(a)pyrene contaminated soil was excavated and disposed of off-site at Clean Earth of New Castle and Republic Environmental System, Inc., located in Hatfield, Pennsylvania. The waste manifests are presented in Appendix C.

Table 3.23 Summary of Off-Site Soil Disposal from Group 3

Off-Site Disposal Facility	Total Volume of Off-Site Soil Disposal (CY)	
	Hazardous Soil	Non-Hazardous
Clean Earth of New Castle	0	712.1
Republic Environmental System	633	0
SUB-TOTAL	**633**	**712.1**
TOTAL	**1,345.1**	

3.1.3.5 Group 4: 32nd Street to Bayview Avenue

On-Site Soil Excavation

A total volume of 151,895.7 CY of project soil was excavated within Group 4 as presented below in Table 3.24.

4.0 PROJECT AREA RESTORATION

The restoration of the H-BLRTS MOS-1 project area is considered in the context of its ultimate land use. The project is a site of non-residential area. Engineering and institutional restrictions are placed on the project area in accordance with the NJDEP-approved SRP. A total of approximately 664,204 CY of project soil was excavated and reused or disposed of off-site during the MOS-1 project construction activities. The soil movement summary is presented in Table 4.1a (summary of excavated soil), Table 4.1b (summary of reused soil) and Table 4.1c (summary of the soil disposed of off-site). The excavated soil total is the sum of the soil reuse and disposal totals (Table 4.1a = Table 4.1b + Table 4.1c). Transportation improvements for the MOS-1 corridor consisted of a 10.5-mile light rail track, which begins at 34th Street in Bayonne and ends at the Newport Mall in Jersey City. During construction activities, NJ TRANSIT also built paved access grade roadway crossings and parking lots, retaining walls, bridge construction or rehabilitation, drainage systems, buildings and H-BLRTS power systems. The H-BLRTS MOS-1 design as is presented in the GIS Viewer.

The entire construction complied with the conditions specified in the NJDEP-approved SRP and in the environmental specifications for groundwater management. Consequently, the restoration of the MOS-1 project was achieved through the construction of engineering capping (track ballast consisting of low-permeability sub-ballast and ballast, asphalt/concrete pavement and engineered structure [concrete foundation for building]) that effectively isolates the reused project soil from direct human contact and exposure. In addition, capping with vegetated/landscaped areas for the detention basins and parking lot islands was constructed as per the final construction design requirements of the project. The project soil was placed beneath the capping only at locations where the shallowest groundwater level was at least 2 feet below the lowest level of the emplaced contaminated soil. This method of placement effectively isolated the project soil from the groundwater and ensures that the existing regional groundwater contamination is not further impacted by the reused regulated project soil.

The capped areas was properly graded and adequately drained to prevent infiltration, and therefore contact between storm runoff and the impacted soil. The storm runoff would be drained into under drains, ditches, stormwater runoff inlet, catch basins and detention ponds to preclude saturation and transport of contaminants below the capped areas. The scheduled Operation and Maintenance of the MOS-1 corridor, which is part of the "Design, Build, Operate and Maintain" Contract for the entire H-BLRTS, will ensure that any deterioration of the protective capping is identified and repaired in a timely manner so as to preclude compromising the integrity of the capping. Similarly, the contract will ensure that any damage or vandalism to the engineering controls will be promptly repaired, precluding any negative impact to the area. The results of the inspections of the property relative to the institutional control, and the results of the inspection and maintenance of the engineering controls and an evaluation of the effectiveness of the engineering and institutional controls, as well as any recommendation regarding additional remediation, will be included in the Biennial Certification Report, in accordance with the *TRSR*, N.J.A.C. 7:26E, Subchapter 8.

Table 4.1a Summary of Soil Excavated at the MOS-1 Project

Group	Design Unit	Hazardous (CY)	Non-Hazardous (CY)	Regulated (CY)	Non-Regulated (CY)	Sub-Total (CY)	Total (CY)
Group 1	S-10/S-11, C-10	337.3	0	130,541	3,242	134,120.3	
Group 1A	C-10	779.2	46.6	22,980	40,448	64,528.8	
Group 2	C-10, C-20	8	17	42,465	11,643	53,858	
Group 3	W-10, W-20	783	633	174,671	9,913	186,000	
Group 4	S-20	3,888.9	0	62,717	85,292	151,897.9	**664,204**
Group 5	C-20	218	0	18,109	6,026	24,353	
Group 6	C-30	10	0	20,176	4,467	24,653	
MOS-2	C-41, N-15, N-25	24	0	17,795	6,974	24,793	
TOTAL		**6,048.4**	**696.6**	**489,454**	**168,005**	**664,204**	

Table 4.1b Summary of On-Site Soil Reuse at the MOS-1 Project

Group	Design Unit	Hazardous (CY)	Non-Hazardous (CY)	Regulated (CY)	Non-Regulated (CY)	Sub-Total (CY)	Total (CY)
Group 1	S-10/S-11, C-10	32.7	0	112,762	41,858	154,652.7	
Group 1A	C-10	305.5	31.8	66,552	53,633	125,342.3	
Group 2	C-10, C-20	0	0	8,700	7,230	11,110	
Group 3	W-10, W-20	70.9	0	115,804	22,503	138,377.9	
Group 4	S-20	2.2	0	50,444	38,732	89,178.2	**653,818.1**
Group 5	C-20	8	0	17,948	1,253	19,209	
Group 6	C-30	0	0	17,687	268	17,955	
MOS-2	C-41, N-15, N-25	12	0	95,453	2,528	97,993	
TOTAL		**431.8**	**31.8**	**485,350**	**168,005**	**653,818.1**	

Table 4.1c Summary of Off-Site Disposal of Soil at the MOS-1 Project

Off-Site Disposal Facility	Hazardous (CY)	Non-Hazardous (CY)	Regulated (CY)	Sub-Total (CY)	Total (CY)
Clean Earth of New Castle, Inc.	0	1,204.9	0	1,204.9	
CWM Chemical Services, Inc.	0	14.8	0	14.8	
S & W Waste, Inc.	17	5	0	22	
Republic Environmental Service, Inc.	633	0	0	633	**10,386**
Carteret Biocycle, Inc.	0	3,649	0	3,649	
OENJ Cherokee, Inc	0	360	4,104	4,464	
Clean Rock Industries	0	398.3	0	398.3	
TOTAL	**650**	**5,632**	**4,104**	**10,386**	

4.1 Capping with Track Ballast

The light rail tracks were constructed within NJ TRANSIT's ROW and acquisition areas. As previously described, project soil excavated from the alignment was reused as construction fill underneath the tracks. After construction of drains, scuppers and a duct bank, the compacted area was capped with track bed preparation. The track bed preparation consisted of the placement of 6 inches of DGA for sub-ballast and 12 inches of 1.5-inch stone ballast for track bed construction designed to rapidly drain stormwater from the rail alignment to underdrains and basins along the track alignment. The track bed preparation was completed with the installation of railroad ties and tracks. The areas of the alignment capped with track ballast are presented in Table 4.2. The locations are presented in the project GIS Viewer.

Table 4.2 Summary of Areas Capped with Track Ballast

Group	Construction Station Numbers	Engineering and Institutional Controls
Group 1: Bayview Avenue to Johnston Avenue with Yard and Shop	458+00-R0 to 500+00-R0, 476+00-L1 to 481+00-L1, 480+00-L2, 482+00-L2 to 485+00-L3, 484+00-L4 to 485+00-L4, 500+00 to 508+40, 2448+00 to 2448+60, 2449+60 to 2468+00	Capping as Engineering Control with Track Ballast and Recording of a Deed Notice as Institutional Control
Group 1A: Johnston Avenue to Jersey Avenue	517+60 to 530+20, 530+70 to 534+00, 535+00 to 545+00	
Group 2: Mill Creek to Luis Muñoz Marin Boulevard	549+00 to 567+00, 567+70 to 568+00	
Group 3: Pacific Avenue to West Side Avenue	2389+30 to 2414+00, 2147+15 to 2431+75, 2434+00 to 2445+60, 2446+50 to 2448+00	
Group 4: 32nd Street to Bayview Avenue	303+00 to 361+80, 365+00 to 458+00	
Group 5: Luis Muñoz Marin Boulevard to Christopher Columbus Drive	568+00 to 571+50	
Group 6: Christopher Columbus Drive to Newport Mall	610+15 to 615+85, 622+50 to 625+30	

4.2 Capping with Asphalt Concrete Pavement

The site restoration activities at the station stops, park and ride facilities, grade crossings, and yard and shop parking lots consisted of a sub-ballast layer and placement of asphalt or concrete pavement. To accomplish this, soil reuse areas were backfilled with project soil, leveled, graded and compacted, prior to the placement of 2 feet of DGA and asphalt or concrete pavement. The slopes designed to enable stormwater to flow to the stormwater drains. The construction of the light rail along Essex and Hudson Streets (street running or urban tracks) consisted of the placement of 12 inches of concrete foundation embedded with asphalt roadway. The street-level ROW was excavated, leveled, graded and compacted before placement of concrete foundation. Similarly, asphalt pavement was also placed at the roadway crossings along the MOS-1 alignment. The areas of the MOS-1 alignment capped with asphalt/concrete pavement are presented in Table 4.3. The locations are presented in the project GIS Viewer.

Table 4.3 Summary of Areas Capped with Asphalt/Concrete Pavement

Group	Construction Station Numbers	Engineering and Institutional Controls
Group 1: Bayview Avenue to Johnston Avenue with Yard and Shop	464+00-L1 to 476+00-L1, 476+00-L2 to 480+00-L2, 484+00-L5 to 492+00-L5, 484+00-L6 to 492+00-L6	Capping as Engineering Control with Asphalt/Concrete Pavement and Recording of a Deed Notice as Institutional Control
Group 1A: Johnston Avenue to Jersey Avenue	516+00 to 517+00, 530+20 to 530+70, 534+00to 535+00, 542+00 to 543+00, JA-62+00 to JA-68+00	
Group 2: Mill Creek to Luis Muñoz Marin Boulevard	543+00 to 549+00, 567+00 to 567+70	
Group 3: Pacific Avenue to West Side Avenue	2385+00 to 2389+30, 2414+00 to 2417+15, 2431+75 to 2434+00, 2445+60 to 2446+50	
Group 4: 32nd Street to Bayview Avenue	361+80 to 365+00, 34th Street Park and Ride and 45th Street Park and Ride	
Group 5: Luis Muñoz Marin Boulevard to Christopher Columbus Drive	571+50 to 608+00	
Group 6: Christopher Columbus Drive to Newport Mall	608+00 to 610+15, 615+85 to 622+50, 625+30 to 653+00	

4.3 Capping with Engineered Structure

Two engineered structures (i.e., building foundation) were constructed at the yard and shop in Jersey City at Communipaw and Pacific Avenues. In addition, an existing building at the yard and shop is also included as an engineered structure cap with building foundation. Project soil was reused as backfill underneath the concrete foundation of the buildings. The locations are presented in the project GIS Viewer. Table 4.4 below presents the areas of the project capped with a building foundation.

Table 4.4 Summary of Areas Capped with Engineered Structures

Group	Design Unit	Engineered Structures	Engineering and Institutional Controls
Group 1	S-11	Maintenance Building at Yard and Shop	Capping as Engineering Control of Building Foot-Print Area with Concrete Foundation and Recording of a Deed Notice as Institutional Control
		LRV Storage Building at Yard and Shop	

4.4 Capping with Landscaped Vegetated Areas

During construction activities at the station stop park and ride facilities and the yard and shop, detention basins were constructed for the storm water drainage system and landscaped areas were constructed. Due to collection of storm water in the detention basin, vegetation has grown inside the detention basins. Similarly, park and ride islands were vegetated, planted, seeded or mulched as per the landscaping requirements of the project. These areas will be maintained as per the drainage and landscaping requirements of the project. The locations are presented in the project GIS Viewer.

5.0 CLASSIFICATION EXCEPTION AREA

Based on the groundwater analytical results, VOCs, SVOCs and metals in groundwater were detected above the NJDEP II-A GWQS within the NJ TRANSIT's ROW and property acquisition areas. Therefore, it was necessary to address the remediation of the groundwater. In order to establish a CEA for natural attenuation, the NJDEP requires that computations be submitted that predict the transport distance of the contaminants (CEA longevity) and the length of time (CEA duration) that the contaminants would remain above the respective NJDEP GWQS. The CEA provides notice that the constituent standards for a given aquifer classification are not or will not be met in a localized area due to natural water quality or anthropogenic influences, and that designated aquifer uses are suspended in the affected area for the term of the CEA. With regard to the groundwater beneath the MOS-1 alignment, the results of the RI and other investigations at the site demonstrate as follows:

- The MOS-1 project corridor, consisting of NJ TRANSIT's ROW and property acquisition areas, is underlain by historic fill material, which ranges in thickness from 2 to 25 feet bgs.
- The historic fill material is not comprised of chromate waste. The isolated areas found to contain hexavalent chromium contamination in surface and subsurface samples exceeding the clean up criteria and that were to be impacted by the construction activities were remediated during the construction activities.
- On-site hot spots have been remediated in accordance with the NJDEP-approved SRP.

- Based on the implementation of the NJDEP-approved SRP, no areas of concern due to industrial activities remain on the site.
- The most predominant soil contamination in the historic fill is metals and PAHs contamination.
- The inorganic contaminants detected in the groundwater were associated with those found in the historic fill overlying the on-site groundwater.
- The MOS-1 site is capped with engineering controls such as track ballast, concrete/asphalt pavement, engineering structure and vegetated/landscaped areas.
- Groundwater management was performed during the H-BLRTS MOS-1 project construction activities.
- The contaminated soil reused beneath the engineering controls was placed at least 2 feet above the highest static groundwater table at the site.
- The MOS-1 alignment site is an area of non-groundwater use. There are no sensitive receptors immediately downgradient of the site.
- Storm water is managed through a network drainage system.
- NJ TRANSIT has prepared a draft Deed Notice for the site.

Since the construction activities did not impact the local groundwater quality, which is documented, to be regionally degraded, NJ TRANSIT established an administrative CEA for this MOS-1 project corridor, consisting of NJ TRANSIT's ROW and property acquisition areas. As per the NJDEP requirements for an administrative CEA, no further groundwater investigation, sampling, monitoring or delineation is required. The administrative CEA is presented in Appendix D. In addition, all groundwater-monitoring wells were abandoned and sealed as per the NJDEP requirements during the construction activities.

6.0 DEED NOTICE

In accordance with the NJDEP's *TRSR*, N.J.A.C. 7:26E, Subchapter 8, a Deed Notice for Hudson county will be recorded for the project as an appropriate remedial action (i.e., institutional control), where soil contamination exists above the NJDEP Residential Direct Contact Cleanup Criteria (RDCSCC). The institution of a Deed Notice will limit any alteration, improvement, or disturbance in, to, or about the MOS-1 project area, which creates an unacceptable risk of exposure, or release of site contamination, without first obtaining the express written consent of the NJDEP. The Deed Notice will record contaminants of concern in soil, which will serve as the legal instrument for the notification to potential future property owners, documenting the specific and site-wide locations of soil contamination above the NJDEP RDCSCC within the property limits.

The Deed Notice includes provisions and/or controls that would be protective of human health and the environment, in a manner consistent with the requirements of the NJDEP's *TRSR*, N.J.A.C. 7:26E, Subchapter 8. The long-term monitoring plan, engineering control maintenance plan, provisions for NJDEP inspection and the requirements for Biennial Certification will be addressed in the Deed Notice. NJ TRANSIT will record the Deed Notice for ROW and acquisition areas with the Hudson County Register's Office.

The following summarizes the minimum NJDEP requirements for a Deed Notice, which is also applicable to the H-BLRTS MOS-1 project:

- Adequate investigation and characterization data delineating and identifying the nature and extent of the on-site soil exceedances;
- Identification and mapping of "Affected Areas" where soil concentrations (horizontal and vertical) remain above the NJDEP RDCSCC;
- Identification and mapping of horizontal extent of the areas requiring Engineering Control where concentrations remains above NJDEP NRDCSCC, along with the identification of the nature of Engineering Control (e.g., capping) to be used;
- Areas requiring the placement of Institutional Control (Deed Notice) and Engineering Control (capping) with Metes and Bounds description of the area;
- Documentation of the completion of all remedial activities (if required) and placement of Engineering Control (e.g., capping) prior to the placement of the Deed Notice;
- Preparation and filing of the Deed Notice, to include at a minimum, the following:
- Site location and tax map showing the block and lots for the subject property;
- Graphical representation of the metes and bounds of the areas requiring the placement of Institutional Control (Deed Notice) and Engineering Control (e.g. capping);
- Summary of the analytical data for the areas of concern presented on the maps;
- Narrative description of the Institutional and Engineering Controls, health and safety requirements, and associated monitoring and maintenance activities;
- Submission of a draft Deed Notice to NJDEP for review and incorporation of any comments prior to final submittal;
- Recording of Final Deed Notice with Hudson County Clerk's Office;
- Submittal to the NJDEP of four copies of the filed Deed Notice with exhibits, which has been stamped with the county docket number;
- Submittal of the NJDEP, a electronic copy in read only format, including all exhibits;
- Submittal of GIS polygon data set covering Deed Notice areas subject to institutional and engineering controls for soil remediation; and
- Long-term monitoring and maintenance of different Engineering Controls associated with the institution of a Deed Notice, Health and Safety, NJDEP inspections, and Biennial Certification requirements.

As per design of the MOS-1 project, capped areas were properly graded and adequately drained to prevent infiltration, and therefore contact between storm runoff and the contaminated soil. The scheduled Operation and Maintenance of the MOS-1 corridor by NJ TRANSIT will ensure that any deterioration of the protective capping is identified and repaired in a timely manner so as to preclude compromising the integrity of the capping. The project-wide HASP and Operations and Maintenance Plan (O&MP) for the maintenance related construction activities of the capped areas are presented along with the Deed Notice document. Similarly, NJ TRANSIT will ensure that any damage or vandalism to the access controls will be promptly repaired, precluding any negative impact to the area. The results of the inspections of the engineering controls and the evaluation of the effectiveness, as well as any recommendation regarding additional remediation, will be included in the Biennial Certification form as prepared by NJ TRANSIT, in accordance with the *TRSR*, N.J.A.C. 7:26E, Subchapter 8.

NJ TRANSIT's ROW (formerly Bayonne Industrial Track) and property acquisition areas (collectively referred to as parcels consisting of full or partial acquisition areas) were established by NJ TRANSIT from blocks and lots located within the limits of the MOS-1 project area. The permanent and temporary easement areas not owned by NJ TRANSIT are not included in the Deed Notice. Based on the on-site reuse of soil with contamination above the NJDEP RDCSCC and historic railroad operations, an institutional control in the form of a Deed Notice is applicable to the entire MOS-1 site. Due to the size and complexity of the MOS-1 project, the entire project area is considered as one contiguous site traversing through two municipalities. Also, due to the ultimate non-residential land-use nature of the MOS-1 project, the project construction itself constitutes an effective engineering control. The NJDEP-approved RAWP proposed that soil containing contaminants above their respective NJDEP NRDCSCC be reused on-site; and further that the entire MOS-1 corridor be considered as one "area of concern" and one contiguous site. Therefore, NJ TRANSIT has created a Deed Notice for Hudson County to be recorded with the county register's office.

The MOS-1 alignment in Hudson County begins at 32nd Street in the City of Bayonne to Newport Mall in Jersey City including the western extension to West Side Avenue. A summary of NJ TRANSIT property parcels in Hudson County is presented in Table 6.1. A draft Deed Notice for NJ TRANSIT's acquisition areas in Hudson County is presented with this report as Appendix E. After review and approval by NJ TRANSIT and the NJDEP, the Deed Notice for Hudson County will be recorded with the Hudson County Register's Office located at 595 Newark Avenue, Jersey City, New Jersey 07306.

H-BLRTS MOS-1 Project
Deed Notice

000002285
RECEIVED
AND
RECORDED
BFS

02/02/2006 03:10P
BARBARA A. DONNELLY
HUDSON COUNTY
REGISTER OF DEEDS
Deed Bk No. 305646

IN ACCORDANCE WITH N.J.S.A. 58:10B-13, THIS DOCUMENT IS TO BE RECORDED IN THE SAME MANNER AS ARE DEEDS AND OTHER INTERESTS IN REAL PROPERTY.

Prepared by:
[Signature]

Nicholas Marton
Nicholas Marton, Project Director, New Jersey Transit Corporation

Recorded by:

[Signature, Officer of County Recording Office]

[Print name below signature]

DEED NOTICE

This Deed Notice is made as of the 23rd day of Jan., 2006, by the New Jersey Transit Corporation (NJ TRANSIT), Office of New Light Rail Construction (NLRC), One Penn Plaza East, 12th Floor, Newark, New Jersey 07105 (together with its successors and assigns, collectively "Owner").

1. THE PROPERTY. NJ TRANSIT, One Penn Plaza East, 12th Floor, Newark, New Jersey 07105 is the owner in fee simple of certain real properties designated as listed below in Table 1: Summary of NJ TRANSIT Property Parcels in Hudson County.

Table 1: Summary of NJ TRANSIT Property Parcels in Hudson County

NJ TRANSIT Property Parcel Number	Previous Owner Name	Block	Lot	Area (Acre)	Municipality	General Site Description
Bay. Ind. Track	Conrail (Bayonne Industrial Track)	504	1, 2, Portion of 3	41.271	Bayonne	NJ TRANSIT ROW for Light Rail Alignment and 34th Street Station Stop, 45th Street Station Stop, Danforth Avenue Station Stop, Richard Street Station Stop and Yard and Shop
		1507	22		Jersey City	
		2154.4	5, 6, 7B, 8A			
		2020	4			
		2033	8			
75A (R75)	Hicor Associates	407	1, 2, 3	3.115	Bayonne	E. 34th Street Park and Ride
75B	Hicor Associates	408	1, 2	1.409	Bayonne	E. 34th Street Park and Ride
E35A	American Legion Post 165/F.A. Mackenzie	406	Portion of 32	0.034	Bayonne	E. 34th Street Station Stop

NJ TRANSIT Property Parcel Number	Previous Owner Name	Block	Lot	Area (Acre)	Municipality	General Site Description
52	Y & T Realty, Inc	1297.5	M7	1.200	Jersey City	West Side Avenue Park and Ride
55	H & B Realty	1297.5	M6, M9	1.186	Jersey City	West Side Avenue Park and Ride
15	Robush Corporation	1776	2	2.021	Jersey City	West Side Avenue Park and Ride
3L	City of Jersey City (Grant Avenue)	NA	NA	0.035	Jersey City	West Side Avenue Park and Ride
1C	NJDEP	2048	6, 9	0.036	Jersey City	Wilson Street Grade Crossing
E5M	Conrail	2048	J	0.215	Jersey City	Wilson Street Grade Crossing
E5B	Conrail	2048	J, Part J	0.142	Jersey City	Wilson Street Grade Crossing
5L	Conrail	2048	Portion of B1	0.02	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
5S	Conrail	2095.5	Portions of A1, B1	0.012	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
5E	Conrail	2144 2145	B4 41C, 41U, 56, 62	9.255	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
E2D	NJ Turnpike Authority	NA	NA	0.268	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
E3F	City of Jersey City	60	19H	0.208	Jersey City	Arch Pipe Drainage
RE3D	City of Jersey City	60	19H, 19Q, 19R, 20B	2.585	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
E3H	City of Jersey City	60	19R, 20B	0.046	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
17B	Conrail	60	26A, 26F	0.691	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
17A	Peter Mocco	60	Portions of 21D, 22B, 23A, 24B, 41	0.955	Jersey City	NJ TRANSIT ROW for Light Rail Alignment and Marin Boulevard Station Stop
18	Steve Hyman	60	Portions of 28D, 28H	0.537	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
3K	City of Jersey City	60	40	0.148	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
19	Employees Retirement System of Jersey City	60	27A, 27C	0.340	Jersey City	NJ TRANSIT ROW for Light Rail Alignment and Marin Boulevard Station Stop
E45A	Liberty Harbor Marina, Inc.	60	Portions of 26A, 27, 27B, 27D	0.117	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
45	Liberty Harbor Marina, Inc.	60	Portions of 26A, 27, 27B, 27D	0.324	Jersey City	Luis Muñoz Marin Boulevard Grade Crossing
44A	Maritime Power Corporation	60	28E	0.102	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
44B	Maritime Power Corporation	165	1C, 1H	0.313	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
E47	Colgate Palmolive, Inc.	3 34	Portion of S1 Portions of N2, S1	0.836	Jersey City	NJ TRANSIT ROW for Light Rail Alignment
E49	Cali-Harborside Associates, L.P.	10	Portions of 4, 5, 16	1.290	Jersey City	NJ TRANSIT ROW for Light Rail Alignment and

3. SOIL CONTAMINATION. New Jersey Transit Corporation has remediated contaminated soil at the Property, and the New Jersey Department of Environmental Protection approved remedial actions between 1995 and 1996, such that soil contamination remains in certain areas of the Property which contains contaminants in concentrations that do not allow for the unrestricted use of the Property; this soil contamination is described, including the type, concentration and specific location of such contaminants, in Exhibit B, which is attached hereto and made a part hereof. As a result, there is a statutory requirement for this Deed Notice (Institutional Control) and Engineering Controls (Capping) in accordance with N.J.S.A. 58:10B-13.

4. CONSIDERATION. In accordance with the New Jersey Department of Environmental Protection's approval of the remedial action work plan for the remediation of the site which included the Property, and in consideration of the terms and conditions of that approval, and other good and valuable consideration, Owner has agreed to subject the Property to certain statutory and regulatory requirements which impose restrictions upon the use of the Property, to restrict certain uses of the Property, and to provide notice to subsequent owners, lessees and operators of the restrictions and the monitoring, maintenance, and biennial certification requirements outlined in this Deed Notice and required by law, as set forth herein.

5A. RESTRICTED AREAS. Due to the presence of these contaminants, the Owner has agreed, as part of the remedial action for the site, to restrict the use of certain parts of the Property (the "Restricted Areas"); a narrative description of these restrictions, along with the associated monitoring and maintenance activities and the biennial certification requirements are provided in Exhibit C, which is attached hereto and made a part hereof. The Owner has also agreed to maintain a list of these restrictions on site for inspection by governmental enforcement officials.

5B. ENGINEERING CONTROLS. Due to the presence and concentration of these contaminants, the Owner has also agreed, as part of the remedial action for the Property, to the placement of certain engineering controls on the Property; a narrative description of these engineering controls, along with the associated monitoring and maintenance activities and the biennial certification requirements are provided in Exhibit C.]

6A. ALTERATIONS, IMPROVEMENTS, AND DISTURBANCES.

i. Except as provided in Paragraph 6B, below, no person shall make, or allow to be made, any alteration, improvement, or disturbance in, to, or about the Property which disturbs any engineering control at the Property without first obtaining the express written consent of the Department of Environmental Protection. Nothing herein shall constitute a waiver of the obligation of any person to comply with all applicable laws and regulations including, without limitation, the applicable rules of the Occupational Safety and Health

P.O. Box 413
401 E. State Street
Trenton, NJ 08625-0413

6B. EMERGENCIES. In the event of an emergency, which presents, or may present, an unacceptable risk to the public health and safety, or to the environment, any person may temporarily breach any engineering control provided that that person complies with each of the following:

i. Immediately notifies the Department of Environmental Protection of the emergency, by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337;

ii. Limits both the actual disturbance and the time needed for the disturbance to the minimum reasonably necessary to adequately respond to the emergency;

iii. Implements all measures necessary to limit actual or potential, present or future risk of exposure to humans or the environment to the contamination;

iv. Notifies the Department of Environmental Protection when the emergency has ended by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337;

v. Restores the engineering control to the pre-emergency conditions as soon as possible, and provides a written report to the Department of Environmental Protection of such emergency and restoration efforts within sixty (60) calendar days after completion of the restoration of the engineering control. The report must include all information pertinent to the emergency, potential discharges of contaminants, and restoration measures that were implemented, which, at a minimum, should specify: (a) the nature and likely cause of the emergency, (b) the potential discharges of or exposures to contaminants, if any, that may have occurred, (c) the measures that have been taken to mitigate the effects of the emergency on human health and the environment, (d) the measures completed or implemented to restore the engineering control, and (e) the changes to the engineering control or site operation and maintenance plan to prevent reoccurrence of such conditions in the future. The owner, lessee, or operator shall submit the report to:

Department of Environmental Protection
Division of Remediation Management and Response
Bureau of Operation, Maintenance, and Monitoring
Deed Notice Inspection Program
P.O. Box 413
401 E. State Street
Trenton, NJ 08625-0413]

i. Monitoring and maintaining each engineering control according to the requirements in Exhibit C, to ensure that the remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment;

ii. Conducting any additional remedial investigations and implement any additional remedial actions, that are necessary to correct, mitigate, or abate each problem related to the protectiveness of the remedial action for the site prior to the date that the certification is due to the Department pursuant to iii, below, in order to ensure that the remedial action that includes the engineering control remains protective of the public health and safety and of the environment.

iii. Certify to the Department of Environmental Protection as to the continued protectiveness of the remedial action that includes the engineering control, on a form provided by the Department and consistent with N.J.A.C. 7:26C-1.2 (a)1, every two years on the anniversary of the date the Department issued the no further action letter for the first soil remedial action that included a Deed Notice.]

8. ACCESS. The Owner and the subsequent owners, lessees and operators agree to allow the Department, its agents and representatives access to the Property to inspect and evaluate the continued protectiveness of the remedial action that includes this Deed Notice and to conduct additional remediation to ensure the protection of the public health and safety and of the environment if persons responsible for monitoring the protectiveness of the remedial action, as described in Paragraph 7, above, fail to conduct such remediation pursuant to this Deed Notice as required by law. The Owner, and the subsequent owners and lessees, shall also cause all leases, subleases, grants, and other written transfers of an interest in the Restricted Areas to contain a provision expressly requiring that all holders thereof provide such access to the Department.

9. NOTICES.

i. The Owner and the subsequent owners and lessees, shall cause all leases, grants, and other written transfers of an interest in the Restricted Areas to contain a provision expressly requiring all holders thereof to take the Property subject to the restrictions contained herein and to comply with all, and not to violate any of the conditions of this Deed Notice. Nothing contained in this Paragraph shall be construed as limiting any obligation of any person to provide any notice required by any law, regulation, or order of any governmental authority.

ii. Owner and all subsequent owners and lessees shall notify any person intending to conduct invasive work or excavate within the Restricted Area at the property, including, without limitation, tenants, employees of tenants, and contractors of the nature and location of contamination in the Restricted Area,

13. MODIFICATION AND TERMINATION.

i. Any person may request in writing, at any time, that the Department modify this Deed Notice where performance of subsequent remedial actions, a change of conditions at the site, or the adoption of revised remediation standards suggest that modification of the Deed Notice would be appropriate.

ii. Any person may request in writing, at any time, that the Department terminate this Deed Notice because the conditions, which triggered the need for this Deed Notice, are no longer applicable.

iii. This Deed Notice may revised or terminated only upon filing of an instrument, executed by the Department, in the office of the County Clerk of the Hudson County, New Jersey, expressly modifying or terminating this Deed Notice.

14A. EXHIBIT A. Exhibit A includes the following maps of the Property and the vicinity:

i. Exhibit A-1: Figure 1 – H-BLRTS MOS-1 Corridor Map (Vicinity Map) - A map that identifies by name the roads, and other important geographical features in the vicinity of the property (for example, Hagstrom County Maps);

ii. Exhibit A-2: Metes and Bounds Description - A metes and bounds description of the property, including reference to tax lot and block numbers for the property;

iii. Exhibit A-3: Figure 2 - Property Map - A scaled map of the property, scaled at one inch to 200 feet or less, and if more than one map is submitted, the maps shall be presented as overlays, keyed to a base map; and the property map shall include diagrams of major surface topographical features such as buildings, roads, and parking lots.

14B. EXHIBIT B. Exhibit B includes the following descriptions of the Restricted Areas:

i. Exhibit B-1: Figure 3 - Restricted Area Map - A separate map for each Restricted Area that includes:

(A) As-built diagrams of each engineering control, including caps, fences, slurry walls, ground water monitoring wells, and ground water pumping system;

(B) As-built diagrams of any buildings, roads, parking lots and other structures that function as engineering controls; and

(C) Designation of all soil and sediment sample locations within the Restricted Areas that exceed any soil or sediment standard that are keyed into one of the tables described in the following paragraph.

(5) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling; and

(C) Description of the following items that will be included in the biennial certification:

(1) A monitoring report that describes the specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice;

(2) Land use at the site is consistent with the restrictions in this Deed Notice; and

(3) The remedial action that includes this Deed Notice continues to be protective of the public health and safety and of the environment.

ii. Exhibit C-2: Capping with Track Ballast as Engineering Control: Exhibit C-2 includes a narrative description of Capping with Track Ballast as follows:

(A) General Description of the engineering control:

(1) Description of the engineering control;

(2) The objective of the engineering control; and

(3) How the engineering control is intended to function.

(B) Description of the operation and maintenance necessary to ensure that:

(1) Periodic inspections of each engineering control are performed in order to determine its integrity, operability, and effectiveness;

(2) Each engineering control continues as designed and intended to protect the public health and safety and the environment;

(3) Each alteration, excavation or disturbance of any engineering control is timely and appropriately addressed to maintain the integrity of the engineering control;

(4) This engineering control is being inspected and maintained and its integrity remains so that the remedial action continues to be protective of the public health and safety and of the environment;

(3) Each alteration, excavation or disturbance of any engineering control is timely and appropriately addressed to maintain the integrity of the engineering control;

(4) This engineering control is being inspected and maintained and its integrity remains so that the remedial action continues to be protective of the public health and safety and of the environment;

(5) A record of the self-inspection dates, name of the inspector, results of the inspection and condition(s) of this engineering control. Sampling, for example, may be necessary if it is not possible to visually evaluate the integrity/ performance of this engineering control; and

(6) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling; and

(C) Description of the following items that will be included in the biennial certification:

(1) A monitoring report that describes the specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice;

(2) The engineering controls continues to operate as designed; and

(3) The remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment.

iv. Exhibit C-4: Capping with Engineered Structure (Building Foundation) as Engineering Control: Exhibit C-4 includes a narrative description of Capping with Engineered Structure (Building Foundation) as follows:

(A) General Description of the engineering control:

(1) Description of the engineering control;

(2) The objective of the engineering control; and

(3) How the engineering control is intended to function.

(B) Description of the operation and maintenance necessary to ensure that:

(3) How the engineering control is intended to function.

(B) Description of the operation and maintenance necessary to ensure that:

(1) Periodic inspections of each engineering control are performed in order to determine its integrity, operability, and effectiveness;

(2) Each engineering control continues as designed and intended to protect the public health and safety and the environment;

(3) Each alteration, excavation or disturbance of any engineering control is timely and appropriately addressed to maintain the integrity of the engineering control;

(4) This engineering control is being inspected and maintained and its integrity remains so that the remedial action continues to be protective of the public health and safety and of the environment;

(5) A record of the self-inspection dates, name of the inspector, results of the inspection and condition(s) of this engineering control. Sampling, for example, may be necessary if it is not possible to visually evaluate the integrity/ performance of this engineering control; and

(6) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling; and

(C) Description of the following items that will be included in the biennial certification:

(1) A monitoring report that describes the specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice;

(2) The engineering controls continues to operate as designed; and

(3) The remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment.

2.13 NJ TRANSIT Property Parcel No. 205

NJ TRANSIT acquired property parcel 205 consisting of Block 2020, Lot 3 and Block 2033, Lots 7, 7A and 9. The property parcel was previously owned by Caven Point Realty. A metes and bounds description for the property is included with the deed presented at the end of Exhibit A-2.

The area of property parcel 205 requiring engineering controls due to soil contamination above the NJDEP NRDCSCC (Restricted Area) consists of approximately 2.643 acres and is shown in Exhibit B-1: Figure 3 – Restricted Area Map. The coordinate points listed in the table below and presented in Exhibit B-1 delineate the location of the restricted area.

Coordinate Point	Northing	Easting
205 (A)	682580.0184	612305.2984
205 (B)	682780.7870	612690.9583
205 (C)	682796.5187	612688.8945
205 (D)	683074.5840	613247.8728
205 (E)	682495.2039	612359.2040

2.13.1 Geographic Location

The property parcel is located between Communipaw Avenue and Caven Point Avenue at the Yard and Shop in Jersey City.

2.13.1 Engineering Control

The engineering control consists of track ballast with low-permeability sub-ballast and ballast, asphalt/concrete pavement, engineered structure (building foundation) and vegetated/landscaped area.

Coordinate Point	Northing	Easting
7 (A)	685553.5243	606386.5278
7 (B)	685605.7686	606438.1405
7 (C)	685505.9326	606754.3277
7 (D)	685620.6088	606830.7462
7 (E)	685413.9851	607137.0038
7 (F)	685328.2651	607109.5597
7 (G)	685435.2768	606775.1545
7 (H)	685430.2716	606771.6690

2.24.1 Geographic Location

The property parcel is located north the light rail alignment at the intersection of West Side Avenue and Claremont in Jersey City.

2.24.2 Engineering Control

The engineering control consists of track ballast with low-permeability sub-ballast and ballast and vegetated/landscaped area.

2.25 NJ TRANSIT Property Parcel No. 76

NJ TRANSIT acquired property parcel 76 consisting of Block 1781, Portion of lot A.1. The property parcel was previously owned by 346 Claremont Associates (Jersey City Board of Education). A metes and bounds description for the property is included with the deed presented at the end of Exhibit A-2.

The area of property parcel 76 requiring engineering controls due to soil contamination above the NJDEP NRDCSCC (Restricted Area) consists of approximately 0.289 acres and is shown in Exhibit B-1: Figure 3 – Restricted Area Map. The coordinate points listed in the table below and presented in Exhibit B-1 delineate the location of the restricted area.

Coordinate Point	Northing	Easting
76 (A)	685493.6031	606326.7973
76 (B)	685517.7028	606350.8046
76 (C)	685394.2967	606736.4404
76 (D)	685364.5144	606726.9099

2.25.1 Geographic Location

The property parcel is located south of the light rail alignment at 346 Claremont Avenue in Jersey City.

2.25.2 Engineering Control

The engineering control consists of track ballast with low-permeability sub-ballast and ballast and asphalt/concrete pavement.

2.39 NJ TRANSIT Property Parcel No. 5E

NJ TRANSIT acquired property parcel 5E consisting of Block 2144, Lot B4 and Block 2145, Lots 41C, 41U, 56 and 62. The property parcel was previously owned by Conrail. A metes and bounds description for the property is included with the deed presented at the end of Exhibit A-2.

The area of property parcel 5E requiring engineering controls due to soil contamination above the NJDEP NRDCSCC (Restricted Area) consists of approximately 9.255 acres and is shown in Exhibit B-1: Figure 3 – Restricted Area Map. The coordinate points listed in the table below and presented in Exhibit B-1 delineate the location of the restricted area.

Coordinate Point	Northing	Easting
5E (A)	685953.0871	615096.8323
5E (B)	686048.3876	615197.8071
5E (C)	685733.6062	615324.4481
5E (D)	685740.0240	615337.5336
5E (E)	685380.7099	615493.0004
5E (F)	685341.1523	615493.8877
5E (G)	685316.5369	615504.5082
5E (H)	685283.8454	615510.0120
5E (I)	685128.1684	615562.5970
5E (J)	685005.9534	615635.2403
5E (K)	684919.8065	615648.6814
5E (L)	684837.1674	615754.3785
5E (M)	684466.0710	615723.5069
5E (N)	684362.2150	615750.3988
5E (O)	684157.4196	615516.7628
5E (P)	684173.3234	615501.4764
5E (Q)	684212.6711	615507.9450
5E (R)	684358.0070	615514.3027
5E (S)	684573.6190	615474.8033

2.39.1 Geographic Location

The property parcel is located adjacent to the NJ Turnpike extension between Johnston Avenue and Pacific Avenue in Jersey City.

2.39.2 Engineering Control

The engineering control consists of track ballast with low-permeability sub-ballast and ballast, asphalt/concrete pavement and vegetated/landscaped area.

Municipality: City of Jersey City
Block 2020, Lot 3 and Block 2033, Lots 7, 7A & 9
NJ TRANSIT Property Parcel No. 205

BK:07807 PG:00120

Commencing at a point having coordinates of North 681609.1 East 611215.48 in the New Jersey State Plane Coordinate System (NAD83), said point being in the easterly line of Caven Point Road (60' wide), at a point being 100.00' west and parallel to the filed center line of the main line of the Central Railroad of New Jersey, filed April 27th 1863, Running from said point; Thence

A) N58°27'54"E 1444.64' to a point being common corner of Lot 7 and 9 at the north line of Lot 8, Thence
B) N31°32'06"W 144.97' along a line common to Lots 7 and 9 to a point being in the southerly line of Lot 5 at the westerly Taking Line, said point being the Point Of Beginning; Thence

1) N58°27'54"E 25.00' along the common line between Lot 5 and 9 to a point in the easterly line of Lot 5; Thence
2) Along the same on a non-tangent curve to the right having a radius of 5674.65' an arc length of 567.84' being suspended by a chord having a bearing of N61°19'54"E and a distance of 567.60' to a point being the in the common line between Lots 11 and 10; Thence
3) Along the same N64°11'54"E 410.39' to a point at the northeaterly corner of Lot 11; Thence
4) Along the common line of Lot 11 and 5, along a non-tangent curve to the left having a radius of 361.00' an arc length of 129.21' being suspended by a chord having a bearing of N00°42'49"E and a length of 128.52' to a point in the dividing line between Lot 11 and 13; Thence
5) Along the northerly lot line of Lot 11 and the southerly line of Lots 13 and 3, S64°11'54"W 467.77' to a point in the dividing line between Lots 3 and 11; Thence
6) Along the same on a curve to the left having a radius of 5789.65' and an arc length of 170.34 to a point common to Lots 12, 11, 9 and 3, Thence;
7) Along a line common to Lots 12 and 11 S09°05'18"E 10.54' to a corner in the same; Thence
8) Along the same S61°39'14"W 179.87' to a point being common to Block 2033 Lots 12 and 11, Block 2020 Lots 5 and 10; Thence
9) Along the common line of Lot 5 and 10, S59°10'27"W 250.06' to the afore mentioned taking line; Thence
10) Along the taking line S31°32'06"E 103.92' to a point in the common line between lots 5 and 9, to the Point Of Beginning.

CONTAINING 2.643 AC MORE OR LESS
LOT NUMBERS REFER TO THE N.J. STATE DESIGNATIONS, BEARINGS REFER TO N.J.S.P.C.S. (NAD83)

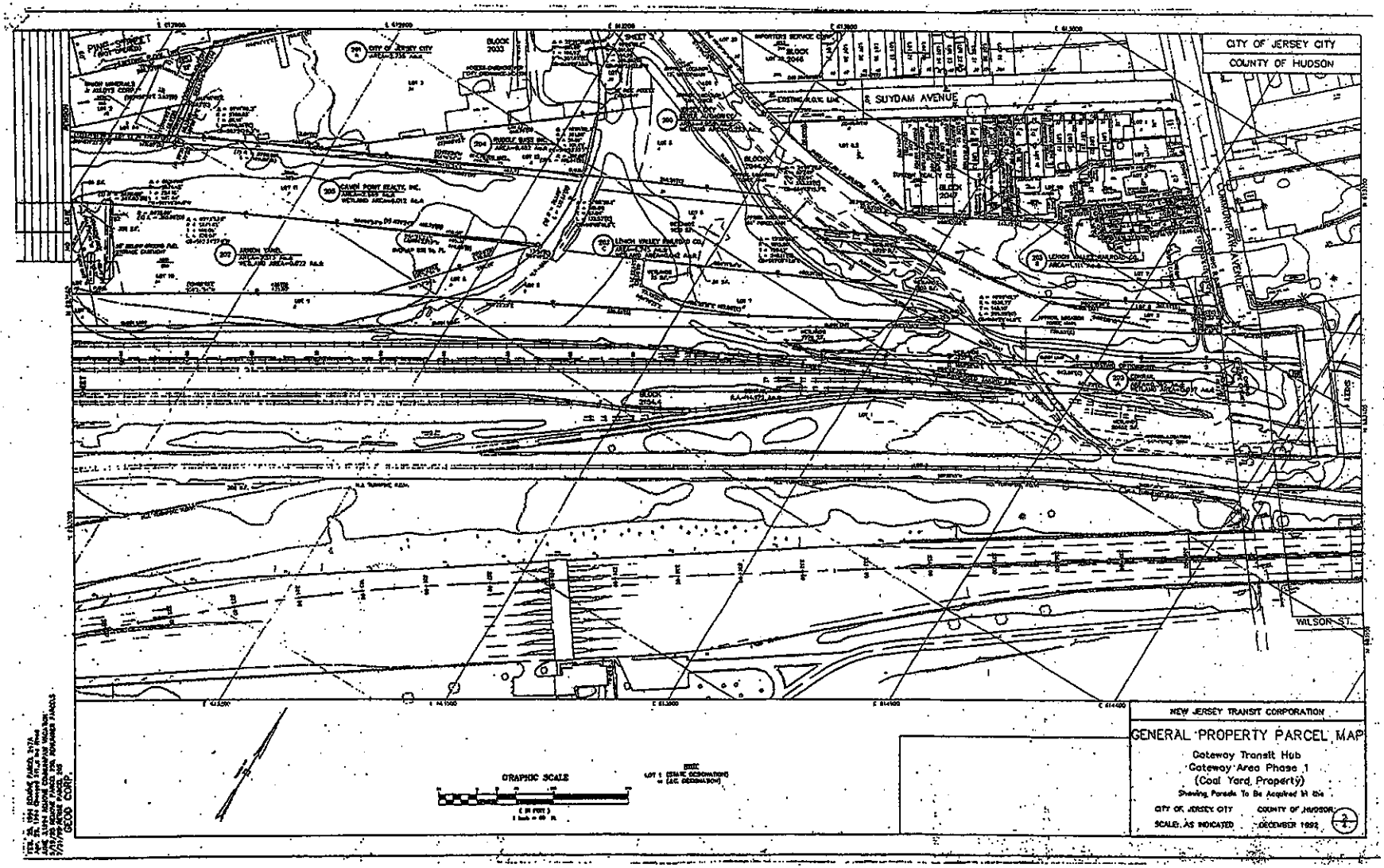
THIS DESCRIPTION HAS BEEN PREPARED IN ACCORDANCE WITH A SURVEY BY GEOD CORPORATION

EXHIBIT A

Paul J. Gmitus Jr. P.L.S.
N.J. License No. 37186

	PARCEL AREA : 2.643AC EASEMENTS 290SF AREA OF TAKING: 2.643AC REMAINING PARCEL AREA: 0.0SF AC
NJ TRANSIT	PROPERTY PARCEL MAP
	PARCEL No 205 DATE July 17 1997
	OWNER: CAVEN POINT REALTY
HUDSON-BERGEN LIGHT RAIL TRANSIT SYSTEM	BLOCK No.: 2020,2033 LOT No.: 5&11
	CITY OF JERSEY CITY HUDSON CO., N.J.

BK=07807 PG=00121



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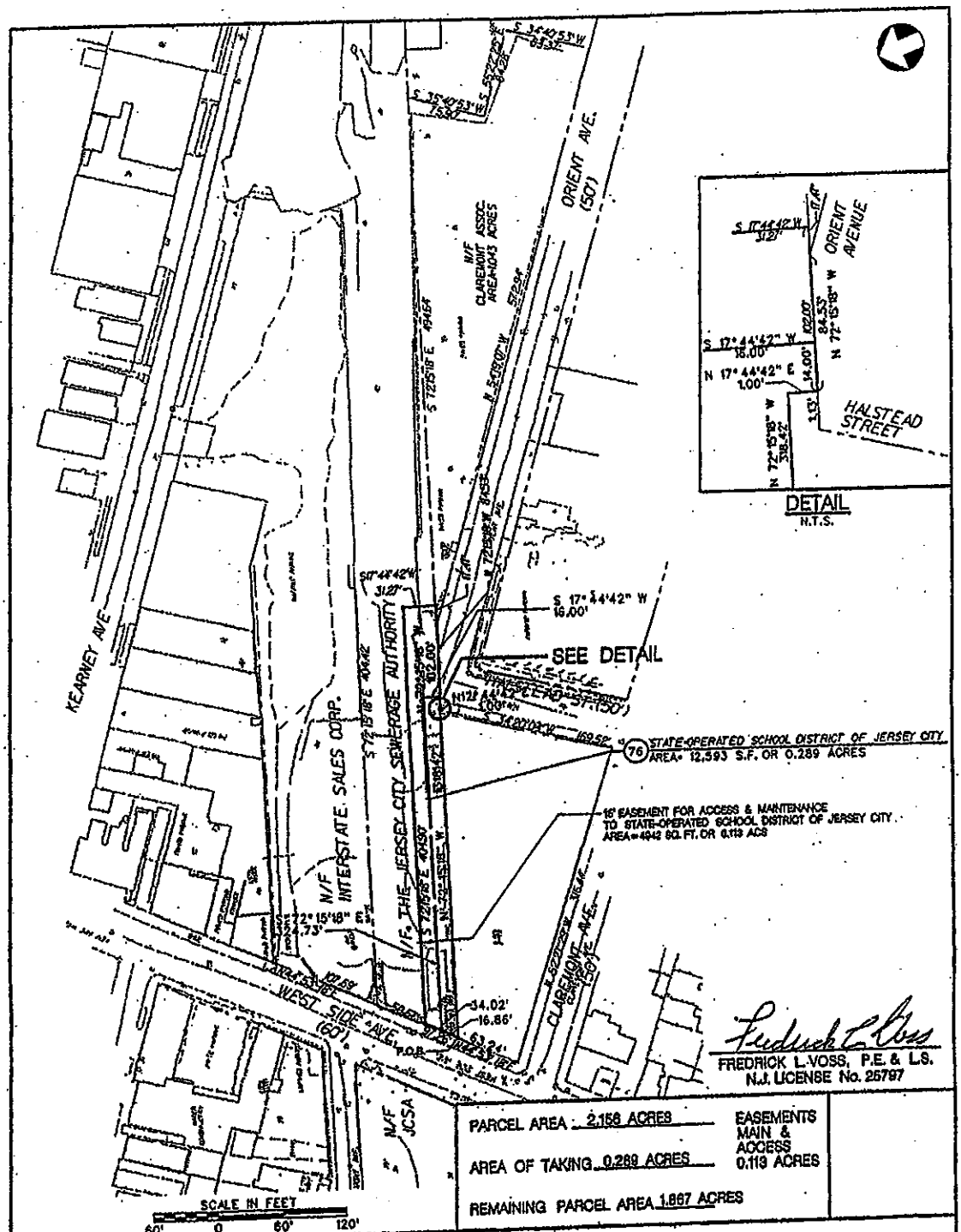
Municipality: City of Jersey City
Block 1781, Portion of Lot A.1
NJ TRANSIT Property Parcel No. 76

BK=07807 PG=00161



Fredrick L. Voss

FREDRICK L. VOSS, P.E. & L.S.
N.J. LICENSE No. 25797

PARCEL AREA : 2.156 ACRES
EASEMENTS MAIN & ACCESS 0.113 ACRES
AREA OF TAKING 0.289 ACRES
REMAINING PARCEL AREA 1.867 ACRES

NJTRANSIT

HUDSON–BERGEN LIGHT RAIL TRANSIT SYSTEM

PROPERTY PARCEL MAP

REV: JULY 18, 1997
DATE: MARCH 21, 1996

PARCEL No. 76
OWNER: STATE-OPERATED SCHOOL DISTRICT OF JERSEY CITY
BLOCK No. 1781 / 1788
LOT No. A1 / A, G7
CITY OF JERSEY CITY
HUDSON CO., N.J.

f:\4739\parcel\par76_a.dgn Fri Jul 18 09:40:25 1997 BK=07807 PG=00162 SHEET 1 OF 2

PARCEL 76

Beginning at a point, said point being the following course from the intersection of the easterly right-of-way line of West Side Avenue (60' feet wide), and the northerly right-of-way line of Claremont Avenue (50 feet wide), as they exist today; N 44° 53' 18" E, a distance of 63.24 feet.

Thence, by the said easterly right-of-way line of West Side Avenue, N 44° 53' 18" E, a distance of 34.02 feet to a point, said point being on the common line of lands N/F of the Jersey City Sewerage Authority and lands of State-Operated School District Of Jersey City; thence by said common line, S 72° 15' 18" E, a distance of 404.90 feet to a point; thence by the same, S 17° 44' 42" W, a distance of 31.27 feet to a point; thence, through the lands of State-Operated School District Of Jersey City, by the common line of Block 1781 - Lot A1, and Block 1786 - Lot A, N 72° 15' 18" W, a distance of 17.47 feet to a point; thence, along the right-of-way line of Orient Avenue, N 72° 15' 18" W, a distance of 84.53 feet to a point; thence through the lands of State-Operated School District Of Jersey City, N 17° 44' 42" E, 1.00 foot to a point; thence through the same, N 72° 15' 18" W, a distance of 318.42 feet, to the Point of Beginning.

Containing 12,593 square feet or 0.289 acres, more or less.

ACCESS AND MAINTENANCE EASEMENT

Reserving unto State-Operated School District Of Jersey City it's heirs, assigns, and successors, the following described Access and Maintenance Easement:

Beginning at a point, said point being the following course from the intersection of the easterly right-of-way line of West Side Avenue (60' feet wide) and the northerly right-of-way line of Claremont Avenue (50 feet wide) as they exist today; N 44° 53' 18" E, a distance of 63.24 feet.

Thence, by the said easterly right-of-way line of West Side Avenue, N 44° 53' 18" E, a distance of 16.86 feet to a point; thence, leaving said right-of way line and through the lands now conveyed to New Jersey Transit Corporation, S 72° 15' 18" E, a distance of 324.73 feet to a point; thence, by the same, S 17° 44' 42" W, 16.00 feet to a point, said point being on the northerly right-of-way line of Orient Avenue; thence, by said right-of-way line N 72° 15' 18" W, a distance of 14.00 feet to a point; thence, along the boundary line of lands herein being conveyed to New Jersey Transit Corporation, N 17° 44' 42" E, a distance of 1.00 foot to a point; thence, by the same, N 72° 15' 18" W, a distance of 318.42 feet, to the Point of Beginning.

Containing 4,843 square feet or 0.113 acres, more or less.

Exercise of the above described Access and Maintenance Easement by State-Operated School District Of Jersey City, its heirs, assigns, and successors is not to interfere with ingress/egress of transit patrons, without prior written approval of New Jersey Transit Corporation.

THIS MAP AND DESCRIPTIONS ARE BASED ON SURVEYS BY BET CONSULTANTS, EAST HANOVER, NEW JERSEY.

Fredrick L. Voss

FREDRICK L. VOSS, P.E. & L.S.
N.J. LICENSE NO. 25797

	PARCEL AREA : 2.156 Acres AREA OF TAKING: 0.289 Acres REMAINING PARCEL AREA: 1.867 Acres	EASEMENTS RETAINED ACCESS AND MAINTENANCE ESM'T 0.113 Acres
NJ TRANSIT	PROPERTY PARCEL MAP	
	PARCEL No. 76	DATE: March 21, 1996 REV.: JULY 16, 1997
	OWNER: STATE-OPERATED SCHOOL DISTRICT OF JERSEY CITY	
HUDSON-BERGEN LIGHT RAIL TRANSIT SYSTEM	BLOCK No.: 1781 1786	LOT No.: A1 A, G7
	CITY OF JERSEY CITY	HUDSON CO., N.J.

Municipality: City of Jersey City
Block 2144, Lot B4 and Block 2145, Lots 41C, 41U, 56 & 62
NJ TRANSIT Property Parcel No. 5E

BK=07807 PG=00203

CASE NO. 72014

DEED TO

NEW JERSEY TRANSIT CORPORATION

EXHIBIT "A"

Hudson County, New Jersey

Parcel 5E - Line Code 0509

MAPS referred to in the description are on file in the office of New Jersey Transit Corporation, One Penn Plaza, Newark, New Jersey 07105-2246.

BEING a part or portion of the same premises which Robert C. Haldeman, as Trustee of the property of the Lehigh Valley Railroad Company, Debtor, by Conveyance Document LV-CRC-RP-2, dated March 29, 1976 and filed and recorded in the Office of the Secretary of State of New Jersey on October 12, 1978 and in the County of Hudson Registrar's office on February 11, 1980, granted and conveyed unto Consolidated Rail Corporation.

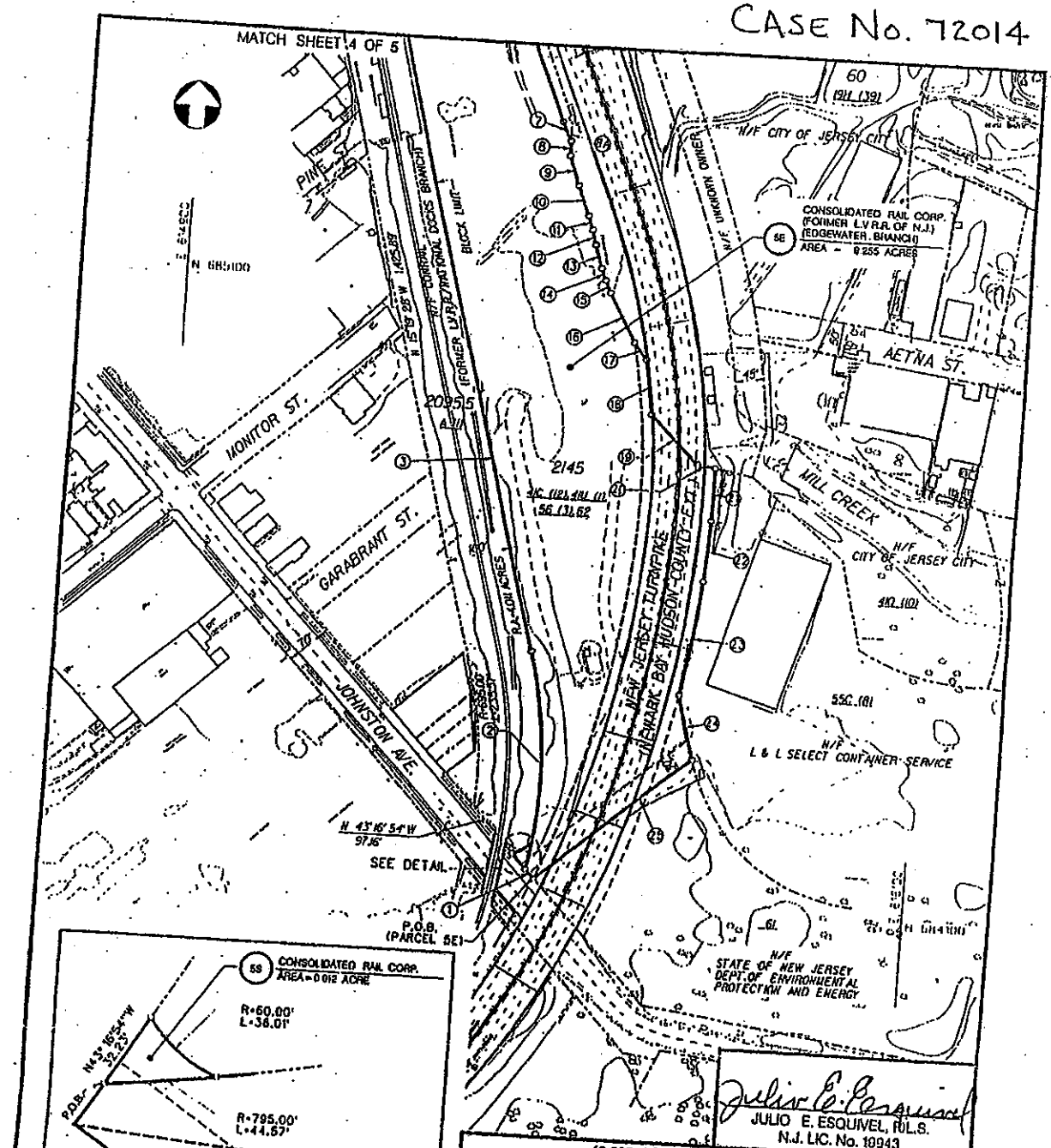
ALL THAT CERTAIN piece or parcel of land of the Grantor, being a portion of the line of railroad know as the Edgewater Branch, and identified as Line Code 0509, situate in the City of Jersey City, County of Hudson and State of New Jersey, which is bounded and described in accordance with a Plat of Survey, identified as "NJ TRANSIT, HUDSON-BERGEN LIGHT RAIL TRANSIT SYSTEM, AREA OF TAKING 9.255 ACRES (5E), SCALE AS INDICATED", Sheets 3 through 5 of 5 dated March 14, 1996, revised August 26, 1996, prepared by Julio E. Esquivel, PLS, License No. 19943, of the State of New Jersey, and described as follows:

EXHIBIT "A" CONTAINS 4PAGES, OF WHICH THIS IS PAGE 1.

V1 (8201) / 2 & 14

LC 0509

CASE No. 72014



JULIO E. ESQUIVEL, P.L.S.
N.J. LIC. No. 19943

PARCEL AREA	10.589 ACRES (5E) 4.011 ACRES (5S)	EASEMENTS N/A
AREA OF TAKING	9.255 ACRES (5E) 0.012 ACRE (5S)	
REMAINING PARCEL AREA	1.334 ACRES (5E) 3.999 ACRES (5S)	

NJ TRANSIT

HUDSON-BERGEN
LIGHT RAIL TRANSIT SYSTEM

PROPERTY PARCEL MAP

PARCEL No. 5E, 5S
REV: AUGUST 26, 1996
DATE: MARCH 14, 1996

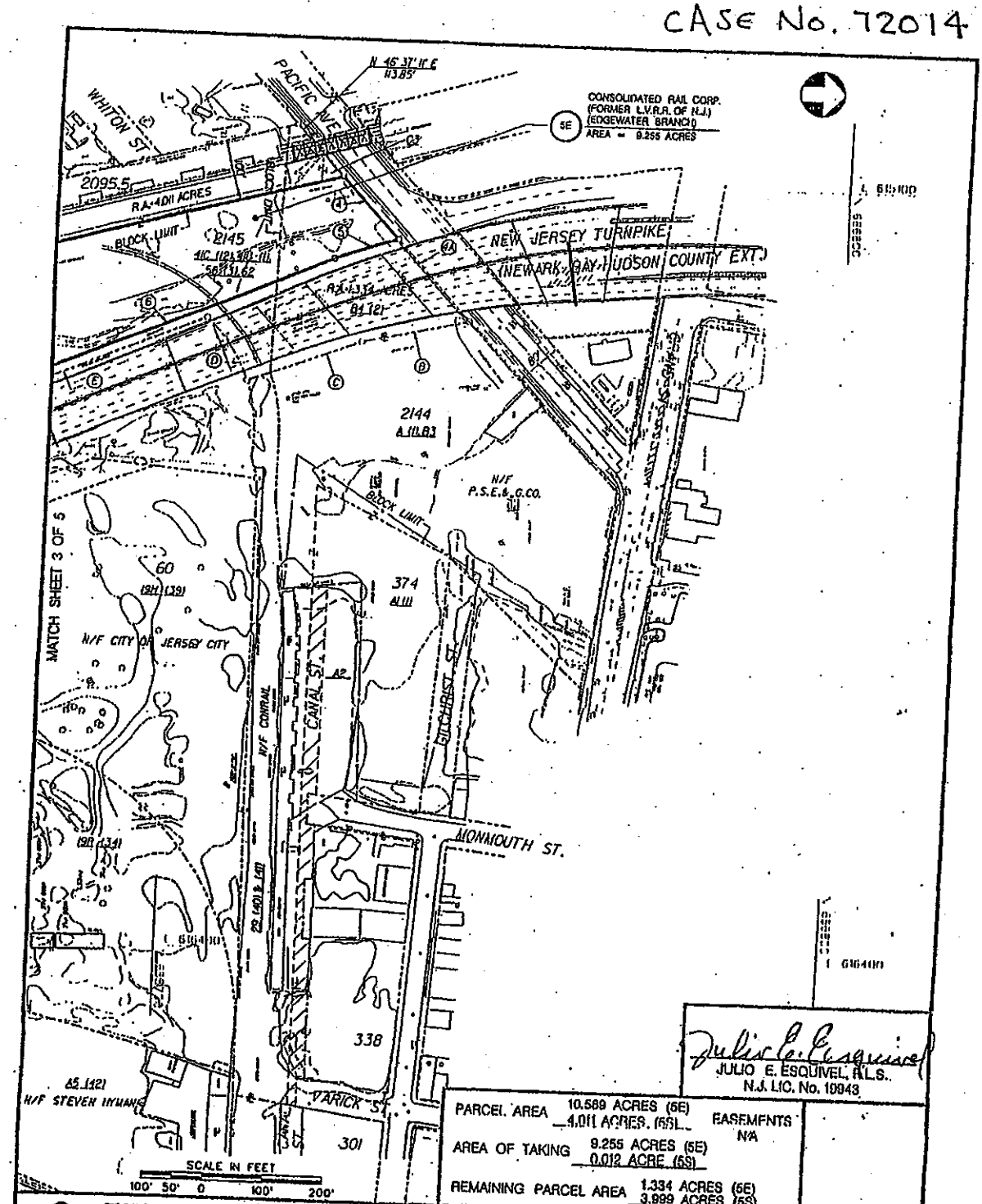
OWNER CONSOLIDATED RAIL CORPORATION (EDGEWATER BRANCH)

BLOCK No. 5E { 2144, 2145 } 5S 2095.5
LOT No. 62, 56, 41C, 41U
B4

CITY OF JERSEY CITY
BK 507807 PG 00205
HUDSON CO., N.J.

BK5079PG202

CASE No. 72014



Julio E. Esquivel
JULIO E. ESQUIVEL, P.L.S.
N.J. LIC. No. 19943

PARCEL AREA	10.589 ACRES (5E) 4.011 ACRES (5S)	EASEMENTS N/A
AREA OF TAKING	9.255 ACRES (5E) 0.012 ACRE (5S)	
REMAINING PARCEL AREA	1.334 ACRES (5E) 3.999 ACRES (5S)	

NJ TRANSIT

HUDSON-BERGEN
LIGHT RAIL TRANSIT SYSTEM

PROPERTY PARCEL MAP

PARCEL No. 5E, 5S
REV: AUGUST 26, 1996
DATE: MARCH 14, 1996

OWNER CONSOLIDATED RAIL CORPORATION (EDGEWATER BRANCH)

BLOCK No. 5E { 2144, 2145 } 5S 2095.5
LOT No. 62, 56, 41C, 41U
B4
A

CITY OF JERSEY CITY
HUDSON CO., N.J.
BK=07807 PG=00206

B#5070662023