

**SECOND FIVE-YEAR REVIEW REPORT FOR
PJP LANDFILL SUPERFUND SITE
JERSEY CITY, HUDSON COUNTY, NEW JERSEY**

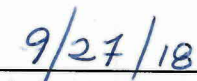


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LIST OF ABBREVIATIONS & ACRONYMS

ACO	Administrative Consent Order
CCS	Waste Management of New Jersey, Inc. and CWM Chemical Service, LLC
CEA	Classification Exception Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FYR	Five-Year Review
GWQC	Ground Water Quality Criteria
IC	Institutional Control
IRM	Interim Remedial Measure
MW	Monitoring Well
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDOT	New Jersey Department of Transportation
NJDEP	New Jersey Department of Environmental Protection
NJGWQS	New Jersey Ground Water Quality Standard
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
PCBs	Polychlorinated Biphenols
PDI	Pre-Design Investigation
PFAS	Perfluoroalkyl acids and polyfluoroalkyl acids
ppb	part per billion
ppm	part per million
RI	Remedial Investigation
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
ROD	Record of Decision
RPM	Remedial Project Manager
Truck Stop	Area along Route 1 and 9 that was a gas station and other businesses and is also referred to as the JCTruckST+CheckCash+FuelST
SVOC	Semi-Volatile Organic Compound
UU/UE	Unlimited Use and Unrestricted Exposure
VOC	Volatile Organic Compound
WRA	Well Restriction Area
VISL	Vapor Intrusion Screening Level

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the second FYR for the PJP Landfill Superfund Site. The triggering action for this statutory review is the completion date of the previous FYR on September 30, 2013. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one operable unit (OU) which will be addressed in this FYR. OU1 addresses the entire site including soil, sediment, surface water and groundwater. Note that the New Jersey Department of Environmental Protection (NJDEP) is the lead agency for the PJP Landfill Superfund Site.

The PJP Landfill Superfund Site FYR was led by Renee Gelblat (EPA, Remedial Project Manager (RPM)). Participants included Haiyesh Shah (NJDEP Project Manager), Rachel Griffith (EPA Hydrogeologist), Abbey States (EPA Risk Assessor), Michael VanItallie (EPA Lawyer), Mindy Pensak (EPA Ecological Risk Assessor) and Wanda Ayala (EPA Community Coordinator). The relevant entities such as the PRPs and NJDEP were notified of the initiation of the FYR. The FYR began on 11/14/2017.

Site Background

Physical Characteristics

The PJP Landfill Superfund Site (Site) is an inactive landfill located at 400 Sip Avenue, Jersey City, Hudson County, New Jersey. The Site occupies approximately 87 acres and is bordered on the north and west by the Hackensack River and on the southeast by Truck Route 1 and 9. The Site is bisected by the Sip Avenue Ditch which runs roughly northwest-southeast and conveys run-off from the Site property and the Jersey City stormwater/sewer system into the Hackensack River. The Pulaski Skyway, an elevated highway with support structures on the Site, runs roughly east-west above it. (Figure 1)

There are various light industries along the other borders and multiple-dwelling housing units located northeast and southeast of the Site.

Land and Resource Use

The Site was originally a salt marsh, part of which was condemned in 1932 for construction of an elevated portion of the Pulaski Skyway.

From 1970 to 1974, the PJP Sanitary Landfill Company operated a commercial landfill which accepted chemical and industrial wastes (Figure 1 labelled as IRM cap).

A truck stop and several other commercial establishments were located along Truck Route 1 and 9 just north of the Sip Avenue Ditch. This area has operated as a gas station since 1942 and predates operation of the landfill. As of March 2018, all business in this area have been closed or relocated.

Since closure of the landfill in 1974, operations on the Site have been industrial and commercial with a variety of owners. Most were located on the northern portion of the Site (north of the Sip Avenue Ditch). A material staging area (referred to during the remedial investigation (RI) as the RV Salvage Yard) was located adjacent to the Hackensack River on the northwest corner of the Site. The truck stop and RV Salvage Area were owned by Edwin Siegel and are referred to in documents as the "Siegel property". Property owned by the Archdiocese of Newark (Archdiocese Property) was located in the southeast side of the Sip Avenue Ditch from the Hackensack River to Route 1 and 9, and included the area where the PJP Sanitary Landfill company operated. The elevated Pulaski Skyway passes over the Site in a west-east direction. (Figure 1)

By the time of the Record of Decision (ROD) in 1995, a large portion (45 acres) of the Site consisted of the Interim Remedial Measure (IRM) cap which covered the portion of the Site where the landfill and illegal dumping occurred and where the fires were located (shown on Figure 1 and more fully described in the Initial Response section).

The Site had various areas of wetlands, including along the Hackensack River, the Sip Avenue Ditch, and a portion of the IRM perimeter ditch. There was also a separate small freshwater wetland (less than one acre in size) in the southeast corner of the Site. The Site was fenced along the southeast, south, and southwest with a vehicle entrance along Route 1 and 9.

On March 7, 2008, AMB Property, L.P. and AMB Pulaski Distribution Center, LLC (together known as AMB), purchased about 52 acres of the Site including most of the IRM cap (see section Initial Response, below) and the area formerly owned by the Archdiocese of Newark for construction of a warehouse and transfer station and agreed to construct the remedy on their portion of the Site. Construction of the warehouse and transfer station began in July 2008 and was completed in July 2016. In June 2011, AMB merged with Prologis (hereafter referred to as Prologis for all activities after June 2011). The Prologis warehouse and transfer station is currently fully leased and their property along the Hackensack River is now a green space which is accessible from their property.

Under an agreement between Jersey City and Waste Management of New Jersey, Inc. and CWM Chemical Services, LLC (together known as CCS), Jersey City agreed to take over the remainder of the Site after construction of the landfill cap was completed by CCS. Construction of the cap by CCS began in August 2010 and was completed in January 2012. Jersey City took control of the property in June 2012. At that time, Jersey City became responsible for all activities required by the ROD, including operation and maintenance of the selected remedy. (Figure 2). Eventually, Jersey City plans to construct a pedestrian bridge to connect the Jersey City park area on the other side of the Sip Avenue Ditch to the green space on the Prologis property.

The current land use for the area surrounding the Site is light industrial, parks and residences, and is expected to remain so in the future. Hartz Mountain, adjacent to the Site on the northeast side, remains in operation. In addition, Jay Dee Trucking borders the Site on the south side and a portion of their operation (about three acres) is located on the IRM cap portion the Site. (Figure 2)

History of Contamination

From about 1970 to 1974, the PJP Sanitary Landfill Company operated a commercial landfill which accepted chemical and industrial wastes. Although the landfill was closed in 1974, allegations of illegal dumping continued until 1984. As a result of the material in and dumped on top of the landfill, there were frequent fires which produced a lot of smoke. (See Initial Response section below)

Geology/Hydrogeology

The PJP Landfill Site is located in the Hackensack Meadowlands which is in the Piedmont Lowland section of the Piedmont physiographic province of northeastern New Jersey. The Site is located on man-made fill deposits which are approximately 10 to 30 feet thick. The fill material is underlain by a discontinuous layer of peat called "meadow mat" that was the original land surface. Below the peat is a layer of unconsolidated glaciolacustrine silts and sand. These are underlain by bedrock which begins approximately 60 to 90 feet below the ground surface.

There are two aquifers in the vicinity of the PJP Landfill. They are the unconsolidated glaciolacustrine silts and sand deposits and the underlying Passaic Formation bedrock aquifer.

Groundwater in the unconsolidated materials is divided into the shallow water-bearing zone (in the man-made fill above the meadow mat) and the deep water-bearing zone (below the meadow mat). Groundwater flow in the shallow zone generally flows toward the Sip Avenue Ditch and Hackensack River and is controlled by precipitation, topography, tides and manmade structures. The shallow zone has a very high permeability and transmissivity.

Groundwater in the deep zone is semi-confined and less likely to be influenced by precipitation. Data from the deep wells show that some of them are interconnected with the Hackensack River. North of the Sip Avenue Ditch, the water flows west to the Hackensack River. In areas, south of the Sip Avenue Ditch, the deep groundwater aquifer flows south-southwest, also toward the Hackensack River. Recent groundwater sampling events show that there is an area of groundwater flow toward Route 1 and 9 near the Truck Stop Area.

The principle source of groundwater in the area is from rock units in the Passaic Formation. This groundwater is not used for potable water in the lower Hackensack River Basin but might be used for commercial and industrial purposes. The area near the Site is served by the Jersey City municipal water supply system, whose water comes from the Boonton Reservoir.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: PJP Landfill		
EPA ID: NJD980505648		
Region: 2	State: NJ	City/County: Jersey City/Hudson County
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	Has the site achieved construction completion? No	
REVIEW STATUS		
Lead agency: State NJDEP		
Author name (Federal or State Project Manager): Renee Gelblat		
Author affiliation: EPA		
Review period: 10/1/2013 - 8/24/2018		
Date of site inspection: 7/18/2018		
Type of review: Statutory		
Review number: 2		
Triggering action date: 9/30/2013		
Due date (five years after triggering action date): 9/30/2018		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Samples taken during the RI and a post-RI sitewide sampling event in 1993 showed the presence of contaminants above the existing NJDEP cleanup criteria in surface soil, subsurface soil, sediment from the Sip Avenue Ditch, groundwater and air.

Soil

The main contaminants in the surface soil were volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) along with petroleum hydrocarbons, pesticides and inorganic compounds. The main contaminants in the subsurface soil were benzene, bis(2-ethylhexyl) phthalate and chlorobenzene, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs) and inorganics. The

levels of benzene, dieldrin, tetrachloroethene and total xylenes exceeded the NJDEP impact to groundwater soil cleanup criteria.

Sediment

Sediment samples were collected from the sediment in Sip Avenue Ditch, Hackensack River and a leachate seep area. Sediment samples from the Hackensack River showed the presence of VOCs, SVOCs, pesticide, PCBs, and inorganics (metals) both upstream and downstream of the Site and the predominant chemicals include PAHs, PCBs, lead and mercury. In the Sip Avenue Ditch, tetrachloroethane, toluene, numerous PAHs, copper, lead and zinc were detected.

Surface Water

Surface water from the Sip Avenue Ditch showed the presence of VOCs (benzene, 1,1,1-trichloroethane, tetrachloroethene, chlorobenzene and chloroform), SVOCs (bis (2-chloroethyl) ether and bis (2-chloroisopropyl) ether) and metals (arsenic, copper, iron, lead, manganese and zinc). Surface water samples from the Hackensack River, taken both upstream and downstream of the Site, were found to contain benzene, arsenic, aluminum, copper, iron, manganese, mercury, zinc and beryllium.

Groundwater

The groundwater was sampled to characterize contamination in the shallow and deep zones of the aquifer, as well as to evaluate potential impacts to the Hackensack River. Generally, the highest levels were found in both the shallow and deep zones of the unconsolidated material under the IRM cap and in the former RV storage yard. Groundwater VOC levels increased as groundwater moved toward the Hackensack River.

In the shallow zone, the most common VOCs were total xylenes, benzene, and chlorobenzene. The most common SVOCs found were naphthalene, phenanthrene, 2-methyl naphthalene and 4-methylphenol (highest concentration) were found. The metals found were aluminum, antimony, arsenic, cadmium, mercury, thallium, lead, chromium, manganese, nickel, and iron.

In the deep zone, VOCs such as methylene chloride and chloroform were found. SVOCs found were di-n-butyl phthalate, benzoic acid, acenaphthene, benzyl alcohol, dibenzofuran, phenol, bis (2-chloroethyl) ether and bis (2-chloroisopropyl) ether were. The metals found were aluminum, arsenic, iron, lead, manganese, silver, and sodium.

The shallow and deep zones did not contain pesticides, PCBs or dioxins.

Air

Air samples from the gas vents on site showed the presence of benzene, chlorobenzene, toluene, vinyl chloride and xylene along with other compounds found in gasoline.

Human Health Risk

Various exposure scenarios were evaluated based on current and potential future land use. Based on the baseline risk assessment, the greatest risk associated with the Site was the incidental ingestion and dermal absorption of chemicals in sediment by trespassing children wading in the Sip Avenue Ditch.

If the Site was developed, on-site construction workers could be exposed via direct contact with contaminated sediment, subsurface soil, materials in test pits or air from gas vents. Generally, the concentrations of chemicals detected in test pits and subsurface soil are substantially higher than

in sediment which could result in unacceptable risks to on-site workers.

Ecological Risk

The ecological risk assessment was conducted to provide a qualitative evaluation of the actual or potential impacts from the Site on plants and animals. The ecological risk assessment identified several endangered species and sensitive habitats in the vicinity of the Site and showed that chemical contamination at the Site was not expected to have significant impacts on plants or terrestrial wildlife, but may be impacting aquatic life.

Aquatic life was exposed to contaminated surface water and sediment and potential impacts were evaluated. There was a potential for food chain effects to occur due to predation on aquatic species since several of the contaminants, such as cadmium and mercury, bioconcentrate. Several contaminants in surface water and sediment in the Sip Avenue Ditch and Hackensack River exceeded their respective toxicity values and their Federal Ambient Water Quality Standards, suggesting that aquatic life may be impacted.

Response Actions

Initial Response

In July 1973, the New Jersey Department of Transportation uncovered steel and plastic drums containing chemicals under the Pulaski Skyway. In 1977, NJDEP issued an order to the PJP Sanitary Landfill Company to properly cover and grade the landfill and to remove wastes which were in contact with the Hackensack River and the Sip Avenue Ditch. The PJP Sanitary Landfill Company did not comply with that order.

From 1970 to 1985, there were frequent subsurface fires in a 45-acre portion of the area near the Hackensack River and under the Pulaski Skyway. The fires were attributed to spontaneous combustion of subsurface drums and decomposition of landfill materials. The fires also produced substantial amounts of smoke which resulted in periodic closure of the Pulaski Skyway.

Throughout the early 1980s, NJDEP and the Hudson Regional Health Commission inspected the Site, took samples, and conducted air monitoring. The Site was put on the National Priorities List (NPL) on September 8, 1983. NJDEP was and remains the lead agency for remedial investigations and remedial activities at the Site.

From 1985 to 1986, NJDEP took actions to mitigate the immediate threats. The landfill fires were extinguished, over one million cubic yards of material were recompact; and grossly contaminated soils were removed as were cylinders and drums containing hazardous materials. These hazardous materials were properly disposed of off-site at secure landfills or destroyed in hazardous waste incinerators. A fire break trench was installed and 45 acres were regraded, capped, and reseeded. This 45-acre area is covered by the IRM cap. The IRM cap is comprised of one foot of clay soil compacted over the 45 acres of the landfill and covered by one foot of vegetated topsoil. The IRM area was surrounded by a stone lined perimeter ditch which conveyed storm water runoff from the cap to the Hackensack River. A gas venting system consisting of 49 vents was also installed. The IRM cap was completed in May 1986 and no fires have occurred since then.

In 1988, NJDEP contracted with ICF Technology, Inc. to perform a remedial investigation/feasibility study (RI/FS) on the entire 87-acre Site. The RI was designed to: determine the nature and extent of

contamination resulting from historic Site activities, identify potential contamination migration routes, identify potential receptors of Site contaminants, characterize potential human health risks and related environmental impacts, and evaluate any impacts the Site may have on the adjacent Hackensack River. The RI was completed in 1990. A supplemental sitewide monitoring event took place in 1993.

Remedy Selection

NJDEP, with EPA's concurrence, issued a ROD on September 28, 1995.

The Remedial Action Objectives (RAOs) for the remedy are:

- Eliminate exposure to contaminated sediments in the Sip Avenue Ditch;
- Prevent additional contaminant influx into the groundwater via infiltration of rain water;
- Removal of contaminant sources that may impact groundwater; and
- Evaluate if future actions are necessary to mitigate the leaching of Site contaminants into the Hackensack River through monitoring and modeling to check the effectiveness of the remedy. If significant adverse impact is found, NJDEP and EPA will evaluate remedial alternatives and select an appropriate remedy in accordance with CERCLA and the NCP.

The major components of the ROD include:

- Removal of all known and suspected buried drum materials and associated visibly contaminated soil;
- Capping of the remaining landfill area of the site with a multi-layer modified solid waste cap in accordance with the NJDEP Bureau of Landfill Engineering Guidance with gas venting;
- Extension of the existing gravel lined ditch around the perimeter of the site to collect the surface water runoff;
- A passive or active gas venting system installed in the new portion of the cap (if an active system is deemed necessary, however, both areas will be included);
- Site fencing and institutional controls (e.g., declaration of environmental restriction and public information program);
- Quarterly inspection and maintenance, and a re-evaluation of the previously capped area;
- Replacement of the Sip Avenue ditch with an alternate form of drainage;
- Quarterly ground water monitoring to evaluate the reduction of contaminant concentrations over time;
- Modeling to demonstrate the effectiveness of the cap by predicting the impact of ground water leachate migrating to the Hackensack River from the landfill;

- Because contamination levels in the ground water are above the Class IIA Ground Water Quality Criteria (GWQC), a Classification Exemption Area(CEA)/Well Restriction Area (WRA) will be established; and
- Implementation of a wetlands assessment and restoration plan. (The wetlands assessment will be performed prior to implementation of any of the remedial actions).

Status of Implementation

In June 1997, NJDEP and two potentially responsible parties (PRPs), CWM Chemical Services, L.L.C. (CCSL) and Waste Management of New Jersey (WMNJ) collectively referred to as "CCS", entered into an administrative consent order (ACO). This ACO was amended in September 1997 and together these agreements are referred to as the original ACO for remedial design and remedial action (RD/RA).

The original ACO was amended in June 2000 (First Amendment) to implement the remedy selected in the ROD, as more specifically defined in the statement of work. The ACO was further amended in March 2008 (Second Amendment) to reflect the purchase of a portion of the Site by AMB, and again in June 2011 (Third Amendment), to reflect the purchase of another portion of the Site by Jersey City.

During the preliminary design investigation (PDI), the nature and extent of contamination at the PJP Landfill was better defined so that the sitewide land fill cap could be designed. This included better defining the extent of contamination in the soil, sediment, surface water and groundwater, delineation of the wetlands, determining the boundaries of the IRM cap, and showing that the rate of landfill gas emission was low enough that an active gas removal system was not necessary. A passive gas sampling system has been determined to be sufficient. In addition, additional contaminated material, including over 10,000 full and partial drums were removed.

A series of historical aerial photos were analyzed which showed that the Truck Stop along Route 1 and 9 (included in the NPL listing), trucking operations along Duncan Avenue (south of the Site) and the Truck Stop/Hartz Mountain warehouse to the north of the Site existed before landfill operations began at the Site in 1968. Therefore, it is unlikely that landfill material underlies these areas and they were not included in the landfill cap required by the ROD.

The Final Design Report for the cap and other elements of the remedy was submitted by CCS on April 4, 2007 and approved by NJDEP and EPA on July 26, 2007. The beginning of construction of the remedy was delayed because outside parties began to show interest in purchasing and redeveloping the Site.

Changes in Ownership of the Site and Implementation of the Remedy

1) Area remediated and owned by AMB/Prologis

On March 7, 2008, AMB Property, L.P. and AMB Pulaski Distribution Center, LLC together known as AMB, bought approximately 52 acres of the Site (formerly owned by the Archdiocese of Newark) (Figure 2). At that time, AMB assumed remedial obligations. On March 7, 2008, NJDEP modified their

existing ACO with CCS to reflect the change in ownership. CCS remained responsible for implementation of the remedy on the portion of the Site not owned by AMB.

Under the modified agreements, part of the cap on the AMB property would be built into the foundation of the warehouse and transfer station and the rest of the cap would underlie the parking lots and landscaped areas. A portion of their property, which borders the Hackensack River, was to be given to Jersey City as green space. AMB submitted a revised design for the cap which was approved by EPA and NJDEP on July 24, 2008. AMB first mobilized to implement the remedy in July 2008. In June 2011, AMB was purchased by Prologis, who assumed full responsibility for their portion of the Site. The revised construction complete was approved by NJDEP and EPA on July 29, 2016

2) Area remediated by CCS and now owned by Jersey City

Shortly after AMB purchased a portion of the Site, the government of Jersey City, where the Site is located, expressed interest in obtaining the remaining 32 acres of the Site then owned by Edwin Siegel (Figure 2). In order to do so, NJDEP, Jersey City and CCS agreed that CCS would construct the landfill cap on the 32 acres, including underneath the Sip Avenue Ditch. Upon completion of the cap, Jersey City would take possession of the area and become responsible for all operation and maintenance activities.

In November 2009, Malcolm Pirnie, the contractor for Jersey City, submitted a plan to modify the landfill cap plan previously submitted by CCS and approved by NJDEP and EPA. This modification changed the slopes of the landfill cap in order to maximize the amount of the level surface at the top of the landfill for the proposed beneficial reuse of the Jersey City property as a public park. This new plan was called the "Closure Equivalency Engineering Report" and was approved by NJDEP and EPA on February 5, 2010.

CCS began construction of this portion of the cap on August 18, 2010 and was completed on January 5, 2012. The construction completion report (titled "Construction Quality Assurance Final Report") was approved by NJDEP and EPA on May 18, 2012. The final Operation and Maintenance Plan was approved on September 11, 2012.

Areas of Wetlands Mitigation

The entire Sip Avenue Ditch is located on the portion of the Site currently owned by Jersey City. As part of the remedy, the entire ditch was lined with the same material as the landfill, widened and native vegetation was planted along its slopes. Wetlands were also restored along the Hackensack River. As noted during the wetlands mitigation and assessment portion of the PDI, the 0.8-acre freshwater wetland was removed from its location near Route 1 and 9 on what is now the Prologis portion of the Site. The 0.8 acres of wetland were added to the junction of the redesigned Sip Avenue Ditch and the Hackensack River which is now also on the Jersey City portion of the Site. Wetlands restoration along the Hackensack River on the Prologis portion of the Site took place after their construction activities were completed.

Under the Third Amendment to the ACO with CCS and the City of Jersey City's Memorandum of Understanding with NJDEP, both dated June 21, 2011, Jersey City assumed environmental obligations associated with this portion of the Site upon CCS's completion of the final capping activities.

Truck Stop Area

The final portion of the original Site, as defined in the NPL listing, is the former Truck Stop area located adjacent to Route 1 and 9. The Truck Stop and other businesses along Route 1 and 9 were included in the NPL listing even though this area has operated as a gas station since 1942 and predates operation of the landfill. The area covered by landfill cap, as required by the ROD, was not constructed to underlie the Truck Stop area. Since the Truck Stop was included in the original NPL listing, it must be investigated.

On June 18, 2010 Jersey City condemned and took possession of the entire Truck Stop area. This portion of the PJP Landfill Site is now referred to as JCTruckST+CheckCash+FuelST. As of March 2018, all the businesses on the property have either been closed or relocated and all of the underground storage tanks on the property have been removed. Currently, a Remedial Investigation is underway to determine if this area has impacted the landfill or been impacted by the landfill activities.

Incursion by Hartz Mountain onto the Landfill

In early 2017, Jersey City notice that the Hartz Mountain Corporation (which shares a property line with the Jersey City portion of the Site) had built a fence on the Jersey City portion of the Site. Thirty-eight fence posts had pierced the landfill cap. Hartz Mountain was required to restore the integrity of the landfill cap. Hartz Mountain submitted a restoration plan which was approved on October 11, 2017. Construction began the week of October 23, 2017 and was completed on November 2, 2017. Hartz Mountain, under the supervision of Jersey City's contractor (Boswell Engineering), dug out material around each fence post and refilled it with material which repaired the landfill cap and sealed it to each fence post. By doing so, a water tight seal was created around each fence post and the integrity of the landfill cap was restored.

NJDEP and EPA reviewed the November 10, 2017 restoration report submitted by the Hartz Mountain Corporation, Jersey City's report (Hartz Mountain Encroachment Cap Penetration Repair Report) dated December 22, 2017. NJDEP and EPA approved the report and the actions taken to repair the landfill cap on May 16, 2017.

3) New Jersey Department of Transportation (NJDOT) and the Pulaski Skyway

The elevated Pulaski Skyway crosses over the PJP Landfill and supporting structures are located on both the Prologis and Jersey City portions the Site. Therefore, NJDOT periodically requires access to the area under the Pulaski Skyway for maintenance. NJDOT owns the area under the Pulaski Skyway that crosses the Prologis property. As noted in the Institutional Controls section, below, Prologis has agreed to conduct routine inspection and monitoring in this area. Jersey City and NJDOT continue to work on agreements to determine ownership and maintenance responsibilities.

4) Area now owned by Jay Dee Trucking

The Jay Dee Trucking operation is located adjacent to the southeast corner of the Site. They began storing empty trailers on approximately three acres of the IRM cap. In addition, NJDEP found that during an inspection conducted on May 6, 2008 Jay Dee Trucking had installed light poles, a fence and additional capping material, destroyed groundwater monitoring wells and removed gas vents. Therefore, Jay Dee Trucking was named a PRP for the three acres and became responsible for that portion of the Site remedy. They are not responsible for historic soil and groundwater under the IRM cap. However, they would be responsible for any new contamination.

Based on the June 2010 Gas Vent Sampling and Analysis Report, NJDEP and EPA agreed that no further monitoring of the gas vents (from the IRM cap) on the Jay Dee Trucking property is necessary. A surface water sampling location is located on their property (Figure 3)

Institutional Controls for the Site

Since waste is left in place throughout the PJP Landfill Site, each current owner of a portion of the Site (Prologis, Jersey City, NJDOT and Jay Dee Trucking) is required to file a deed notice to inform the public of the presence of waste. They are also required to file paperwork to define a Classification Exception Area (CEA) and a Well Restriction Area (WRA) to restrict uses of the groundwater. Each owner must also obtain Remedial Action Permits for soil and for groundwater, as well as file any necessary future reports.

The CEA/WRA for the entire PJP landfill Site (prior to purchase of portions of the site) was established on April 26, 2001 and modified by CCS on July 29, 2008, after AMB purchased a portion of the Site. The CEA/WRA has since been revised to reflect changes in ownership to Prologis. The current status of these institutional control documents are:

1) Institutional Controls by Jersey City

On January 21, 2016, NJDEP approved the CEA/WRA for their portion of the Site.

The Deed Notice for Jersey City was recorded on May 30, 2013.

Jersey City and NJDOT are working to resolve issues related to the boundaries of their properties and, specifically, who is responsible for O&M for the area under the Pulaski Skyway on the Jersey City portion of the Site. Once these issues are resolved, the owners will file the appropriate documents.

2) Institutional Controls by Prologis

The CEA/WRA for the AMB/Prologis portion of the Site was approved on May 24, 2016. A Deed Notice was recorded for Prologis on June 21, 2016.

3) Institutional Controls by NJDOT

A Deed Notice was filed by NJDOT for their portion of the area under the Pulaski Skyway on the Prologis property on December 21, 2017. Prologis is working with NJDOT on a final access agreement so that NJDOT can access the property when necessary. Currently the cap in the area below the Pulaski Skyway is being included Prologis's routine inspection and monitoring. The Biennial Certification will also be included as part of their reporting. Long-term O&M items will be addressed in the access agreement that is being finalized between Prologis and NJDOT.

Pending the outcome of discussions with Jersey City, a Deed Notice for the area under the Pulaski Skyway on the Jersey City portion of the Site will be filed and an O&M plan submitted.

NJDOT is not required to establish CEAs for their properties. These areas are covered by exiting CEAs.

4) Institutional Controls by Jay Dee Trucking

The CEA/WRA for Jay Dee Trucking was approved on August 24, 2015 and the Deed Notice was recorded on February 16, 2011. A Remedial Action Soil Permit was issued by NJDEP on July 14, 2011 by NJDEP.

IC Summary Table

Table 1: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	Sitewide	Restrict installation of ground water wells and ground water use	Three CEAs were established between August 18, 2010 and January 21, 2016 (see above for details)
Soil	Yes	Yes	Sitewide	Protect the integrity of the cap	Four Deed Notices were filed between January 20, 2011 and December 21, 2017. One is pending. (See above for details)

Systems Operations/Operation & Maintenance

Approved O&M plans are in place by the owners of the Site where construction activities have been completed. These plans include quarterly sampling of groundwater, sediment and surface water. Groundwater is sampled for VOCs, SVOCs and metals. Sediment and surface water are sampled for metals and PAHs. Landfill gas is monitored using a passive system on both portions of the Site. Other activities include visual inspection of the vegetation covering the landfill, of the Sip Avenue Ditch and the wetland areas.

Potential site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the Site.

III. PROGRESS SINCE THE LAST REVIEW

Table 2: Protectiveness Determinations/Statements from the 2013 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Will be Protective	The remedy is expected to be protective of human health and the environment upon completion. In the interim, response activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

There were no issues or recommendations in the last FYR. However, the 2013 FYR did include one comment and suggestion:

Comment: On the Jersey City Portion of the Site, MW-18S has benzene and vinyl chloride levels above the NJ Groundwater Screening Levels. This could result in a vapor intrusion problem in the nearby and off-Site Hartz Mountain Facility.

Suggestion: Jersey City proposed evaluating two additional rounds of groundwater sampling before making a determination to conduct any further vapor intrusion evaluation. NJDEP and EPA agreed with this proposal.

Status: In 2014, a vapor intrusion evaluation was completed for this Hartz Mountain building. Samples collected from well MW-18S showed benzene concentrations which exceeded the NJGWQS and VISLs. Therefore, in 2015, a new shallow monitoring well was installed 30 feet from the Hartz Mountain building to further evaluate the potential for vapor intrusion from Site groundwater. MW-19S was sampled in 2015 and 2016 and the results showed that the shallow groundwater did not exceed the EPA VISLs (using a target risk of 10^{-6} and a hazard quotient of 1) and therefore vapor intrusion is unlikely. Monitoring of MW-19S will continue in order to detect any potential groundwater contaminant migration which could result in vapor intrusion.

After the July 18 FYR Site visit, the O&M consultants for Jersey City evaluated the potential for vapor intrusion impacts at the Hartz Mountain building. Based upon the results of the June 2018 quarterly sampling event at the PJP Landfill, no VOCs were reported in groundwater at concentrations exceeding the 2018 Vapor Intrusion Screening Levels within 100-feet of the Hartz Mountain building. The potential for vapor intrusion will continue to be evaluated as a part of the quarterly monitoring tasks.

Since the last FYR:

- Construction of the landfill cap on the Prologis portion of the PJP Landfill has been completed;
- A Remedial Investigation is ongoing at the Truck Stop area along Route 1 and 9. This is the last portion of the Site that requires an investigation; and
- Sampling for PFAS from firefighting activities has begun.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 2, 2017, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 31 Superfund sites in New York and New Jersey, including the PJP Landfill Superfund site. The announcement can be found at the following web address:

https://wcms.epa.gov/sites/production/files/2017-10/documents/five_year_reviews_fy2018_final.pdf

The results of the review and the report will be made available at the Site information repository located at U.S.EPA Records Center, Region 2, 290 Broadway, 18th Floor, New York, New York, 10007-1866 or online at <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0200569>

Site Inspection

The inspection of the Site was conducted on 7/18/2018. In attendance were Renee Gelblat (EPA RPM), Haiyesh Shah (NJDEP Project Manager), Lahbib Chibani (Sadat Associates, Consultant for Prologis), Justina Cheng (Jersey City), Abbey States (EPA Project Human Health Risk Assessor), Mindy Pensak

(EPA Project Ecological Risk Assessor), Julie McPherson (EPA Human Health Risk Assessor), Ryan Slager (Maser Consulting, Jersey City O&M Consultant) and Jennifer Morganti (Maser Consulting, Jersey City O&M Consultant).

The purpose of the inspection was to assess the protectiveness of the remedy. Fences surrounding the Site, the landfill cap and vegetation along the Sip Avenue Ditch were found to be in good condition. Monitoring wells also appeared to be in good condition.

Data Review

In general, the contaminants found in the groundwater, surface water, and sediments have been found throughout the Site. The Contaminants of Concern (COCs) in groundwater include: benzene, chlorobenzene, PCE, iron, manganese, and 1,4-dioxane. The COCs found in surface water and sediments include PAHs and inorganics, principally benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluorine, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, arsenic, manganese and copper. The details of recent sampling on each portion of the Site are described below.

Groundwater

The ROD requires quarterly sampling of the groundwater monitoring wells (Figure 3). The timing of the groundwater sampling is coordinated between the Site owners to provide synoptic data. Synoptic water level data show that the average groundwater flow on Site has radial components that flow towards the Hackensack River to the west, the Sip Avenue Ditch to the north, and Route 9 to the east. The groundwater at the Site nearest the Hackensack River is tidally influenced and the tidal influence appears to affect the magnitude, not the direction, of flow on the majority of the Site.

Groundwater Sampling on the Jersey City Property

The groundwater monitoring plan for the Jersey City portion of the Site includes quarterly sampling of 9 wells (Figure 3). As of December 2016, overall contaminant exceedances of NJGWQS on the Jersey City property include benzene, 1,4-dioxane, manganese, iron, and sporadic chlorobenzene.

Benzene concentrations on the property are generally lower than the last review period, and have been stable at around 5 parts per billion (ppb) across the majority of the Site. Chlorobenzene has been detected sporadically above its NJGWQS of 50 parts per billion (ppb) in two wells and are generally consistent with levels found during the 2013 FYR. The maximum concentration of chlorobenzene concentration measured was 60 ppb in MW-7S during the March 2016 sampling event.

Concentrations of 1,4-dioxane in exceedance of the NJGWQS level of 0.4 ppb were found throughout the Site. The measured levels ranged from approximately 4 ppb to nearly 500 ppb. The westernmost monitoring wells on the Site, nearest the Hackensack River, contain the highest concentrations of 1,4-dioxane, though concentrations have decreased significantly since the 2013 FYR.

Groundwater samples are not collected from MW-12S due to the presence of a dense non-aqueous phase liquid (DNAPL). The DNAPL was analyzed in 2012 and contains quinolines and other polar oxygen containing compounds. This combination of compounds is likely from a combination of industrial and medical waste. Monthly DNAPL recovery events are performed at this well, and the mixture of water

and free product are stored in 55-gallon drums before being removed from the Site and properly disposed. Approximately 5 gallons of product are recovered from this well each year.

Groundwater Sampling on the Prologis Property

The groundwater monitoring plan for the Prologis property includes quarterly sampling of 5 shallow monitoring wells and 3 deeper monitoring wells (Figure 3). As of December 2016, primary contaminant exceedances of NJGWQS on the property include benzene, chlorobenzene, 1,4-dioxane, manganese, and iron.

Overall benzene concentrations are stable. Benzene has been primarily detected above its NJGWQS of 1 ppb at three shallow wells on the Prologis Property and the maximum detection during this review period was of 10 ppb at MW-4S in 2014.

Concentrations of 1,4-dioxane remain above the NJGWQS in the majority of wells, but exhibit a strong decreasing trend. Concentrations of 1,4-dioxane were significantly elevated in MW-5SR at approximately 3,500 ppb until 2015, and are currently reported to be around 40 ppb.

Chlorobenzene concentrations exceeding the NJGWQS of 50 ppb were reported at two locations and concentrations have been fluctuating with a maximum concentration of approximately 90 ppb. These two monitoring well locations are proximal to the portion of the Jersey City property exhibiting similar chlorobenzene trends.

Well MW-8SR2 exhibits elevated concentrations of benzene, toluene, ethylbenzene, xylene (collectively referred to as BTEX), and lead which have been determined to be indicative of a gasoline source. This well is the only location on Site with BTEX. Though concentrations here remain above NJGWQS, the overall concentrations have decreased since monitoring began in 2013 and the BTEX remains localized.

Surface Water and Sediment

Surface water and sediment samples are collected quarterly from five co-located locations, three of which are along the remediated Sip Avenue Ditch and two of which are in the Hackensack River adjacent to the Site (Figure 3). Sampling locations in the Hackensack River include one upgradient of the Site (north of the Jersey City property) and one downgradient of the Site (southwest of the Prologis property).

The Sip Avenue Ditch was redesigned as part of the Site-wide remediation. The landfill cap underlies the newly widened Sip Avenue Ditch, thereby minimizing migration of contaminants from the landfill into the ditch. The Sip Avenue Ditch runs from Route 1 and 9 to the Hackensack River as part of the Jersey City storm water/sewer overflow system and is tidal to the Hackensack River for its entire length. Therefore, the water and sediment currently in the Sip Avenue Ditch is likely from the Hackensack River or, entered the ditch during storm events as part of the Jersey City stormwater/sewer overflow system.

The principal contaminants of concern that have been detected in surface water include PAHs and inorganics. PAHs most commonly detected include: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluorine, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene. Common metal exceedances of arsenic, manganese, and copper have been found above Surface Water Quality Standards (SWQS).

PAHs exceeding the SWQS were primarily found at the sample location within the Hackensack River downgradient of the Site. Detections of PAHs within the Sip Avenue Ditch were sporadic but most commonly found nearest the Hackensack River. Metal concentrations (arsenic and manganese) exceeding SWQS were found in all five sampling locations and varied significantly among quarterly sampling events. Sporadic detections of elemental mercury exceeding SWQS have been noted at both locations within the Hackensack River and at the mouth of the Sip Avenue Ditch, indicating an upgradient source in the Hackensack.

Sediment samples are compared to the NJDEP ecological screening criteria for saline water. Exceedances of the screening criteria were found for PAHs (most commonly benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene) and several metals (including arsenic, copper, lead, mercury, and zinc) at all five sampling locations. The sediment contaminant levels show no clear trends and metals in the sediments appear to be primarily sorbed to sediments making them largely immobile.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

The remedy called for eliminating exposure to contaminated sediments in the Sip Avenue Ditch and preventing additional contaminant influx into the groundwater via infiltration. The removal of sources of contamination and installation of a low-permeability cap across the Site, including beneath the Sip Avenue Ditch, effectively eliminates all current and future direct contact exposure pathways and minimizes infiltration of contaminants into the groundwater.

As discussed in the 2007 Final Design Report, drums were discovered and removed from beneath the Pulaski Skyway in 2001, north of the Sip Avenue ditch (Jersey City portion). Along with the drums, soil was removed and soil determined to be hazardous was disposed of off Site. The area was backfilled with a foot of clean fill above the shallow water-bearing unit. Soil which was removed during the drum removal event and determined to be non-hazardous was placed above the clean fill. The Construction Quality Assurance Final Report shows that this area was capped as part of the remedy.

The NJGWQS are used to evaluate the effectiveness of the cap at preventing groundwater infiltration. Groundwater concentration trends on Site are stable or decreasing, and areas of localized contamination have not migrated far from their source. Concentrations of some contaminants remain above these standards. Therefore, CEAs for the shallow groundwater are in place, ensuring that groundwater will not be available for consumption. Surface water and sediment samples are collected quarterly and serve as compliance monitoring points to determine if contaminated groundwater is impacting the Hackensack River and the Sip Avenue ditch. An evaluation of existing surface water data indicates that although Site-related compounds (primarily PAHs) are present in surface water, there does not appear to be widespread impacts from the Site.

The landfill cap is expected to eliminate any potential ecological risks from surface soil contaminants to terrestrial receptors. The Sip Avenue Ditch, which is underlain by the landfill cap, is similarly expected to eliminate risk to aquatic receptors (from sediment and surface water) as identified during the remedial investigation process.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

The exposure assumptions and toxicity values that were used to estimate potential cancer risks and noncancer hazards for the pathways evaluated in the 1995 ROD followed the Superfund risk assessment process at the time. Although specific parameters may have changed since the time the risk assessment was completed, the process that was used remains valid and is not expected to affect the remedy. The cleanup levels and remedial action objectives used at the time of the remedial action also remain valid.

After the 1995 ROD was issued, 1,4-dioxane was found at the Site and was added to the sampling list in 2010. It has been included in recent sampling events for groundwater and surface water and will continue to be evaluated.

Aqueous Fire Fighting Foam was used to extinguish the subterranean fire at the PJP Site in the 1980s. The foam at that time most likely contained perfluoroalkyl acids and polyfluoroalkyl acids (PFAS). NJDEP is requiring that landfills and chemical waste sites be screened for PFAS. Therefore, screening level sampling and analyses for PFAS will be included in the next scheduled sampling event for the PJP Landfill. Sampling will include shallow groundwater wells. In addition, the PRPs will re-examine previously generated chromatographs for samples of groundwater and surface water for evidence of PFAS.

Vapor Intrusion

Prologis

Since the last five-year review, construction of a large warehouse and transfer station has been completed on the Prologis portion of the property. The as-built building specifications include a low permeability cap built into its foundation to act as a barrier to vapor intrusion and a gas venting system built into its walls

Groundwater concentrations of VOCs including ethylbenzene, trichloroethylene, and xylenes measured in monitoring well MW-8SR2 (in the northwest corner of the Prologis property, near the building) exceeded EPA's commercial vapor intrusion screening levels (VISLs). The commercial vapor intrusion screening levels (VSLs) were set to a target risk of 10^{-4} and a hazard quotient of 1. Due to the elevated concentrations of VOCs in MW-8SR, it is important that the vapor barrier and venting systems be appropriately maintained to ensure protectiveness. Any future development within 100 feet of the Prologis property should incorporate vapor intrusion protections into the building plans.

Jersey City

The Jersey City portion of the Site has been fully capped. A large warehouse and trucking facility on the Hartz Mountain property is located adjacent to the Site on the northeast side (Figure 3). It is the only existing structure close enough to the Jersey City portion of the Site to be potentially affected by vapors from the Site groundwater. The building is located within 100 feet of site monitoring well MW-18S.

In 2014, a vapor intrusion evaluation was completed for this building. Samples collected from well MW-18S showed benzene concentrations which exceeded the NJGWQS and VISLs. Therefore, in 2015, a new shallow monitoring well was installed 30 feet from the Hartz Mountain building to further

evaluate the potential for vapor intrusion from Site groundwater. MW-19S was sampled in 2015 and 2016 and the results showed that the shallow groundwater did not exceed the EPA VISLs (using a target risk of 10^{-6} and a hazard quotient of 1) and therefore vapor intrusion is unlikely. Monitoring of MW-19S will continue in order to detect any potential groundwater contaminant migration which could result in vapor intrusion.

After the July 18 FYR Site visit, the O&M consultants for Jersey City evaluated the potential for vapor intrusion impacts at the Hartz Mountain building. Based upon the results of the June 2018 quarterly sampling event at the PJP Landfill, no volatile organic compounds (VOC) were reported in groundwater at concentrations exceeding the 2018 Vapor Intrusion Screening Levels within 100-feet of the Hartz Mountain building. The potential for vapor intrusion will continue to be evaluated as a part of the quarterly monitoring tasks.

For the PJP Check Cashing and Truck Stop portion of the Site, there currently are no VOCs present in groundwater at concentrations above the Vapor Intrusion Screening Levels within 100-feet of the area. In addition, there are no exceedances of petroleum compounds (including free product or residual NAPL) within 30-feet of the remaining buildings from on-site sources. The need for vapor intrusion investigations in this area will continue to be evaluated and JC will verify that the site meets the current vapor intrusion requirements as part of the Remedial Investigation. Therefore, there is currently no vapor intrusion investigation trigger for the buildings on-site.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations	
OU(s) without Issues/Recommendations Identified in the Five-Year Review:	
OU1	

Other:

Sampling has begun for PFAS related to firefighting activities.

Jersey City and NJDOT are working to resolve issues related to the boundaries of their properties and, specifically, who is responsible for O&M for the area under the Pulaski Skyway on the Jersey City portion of the Site. Once these issues are resolved, the owners will file the appropriate documents.

Protectiveness Statement(s)		
<i>Operable Unit:</i> OU1	<i>Protectiveness Determination:</i> Will be Protective	<i>Planned Addendum Completion Date:</i> Click here to enter a date

Protectiveness Statement:

The remedy at OU1 is expected to be protective of human health and the environment upon completion. In the interim, response activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

VIII. NEXT REVIEW

The next FYR report for the PJP Landfill Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

1995 ROD

Five Year Review Report, Prepared by EPA, September 30, 2013

Revised Vapor Intrusion Assessment Report for the PJP Landfill Site (Jersey City Marion Greenway Park), 400 Sip Avenue, Route 1&9, Jersey City, Hudson County, New Jersey, Prepared by Dresden Robin for Jersey City, August 14, 2014.

Preliminary Assessment Report for the PJP Landfill Site- JCTruckST+CheckCash+FuelST 325-353 Route 1 and 9, Jersey City, Hudson County. Prepared by Arcadis February 18, 2015.

Remedial Action and As-Built Closure Certification Report for Prologis Ports Jersey City Distribution Center, Part of the Former PJP Landfill Site, Jersey City, Hudson County, NJ, Prepared by Sadat Associates, October 30, 2015.

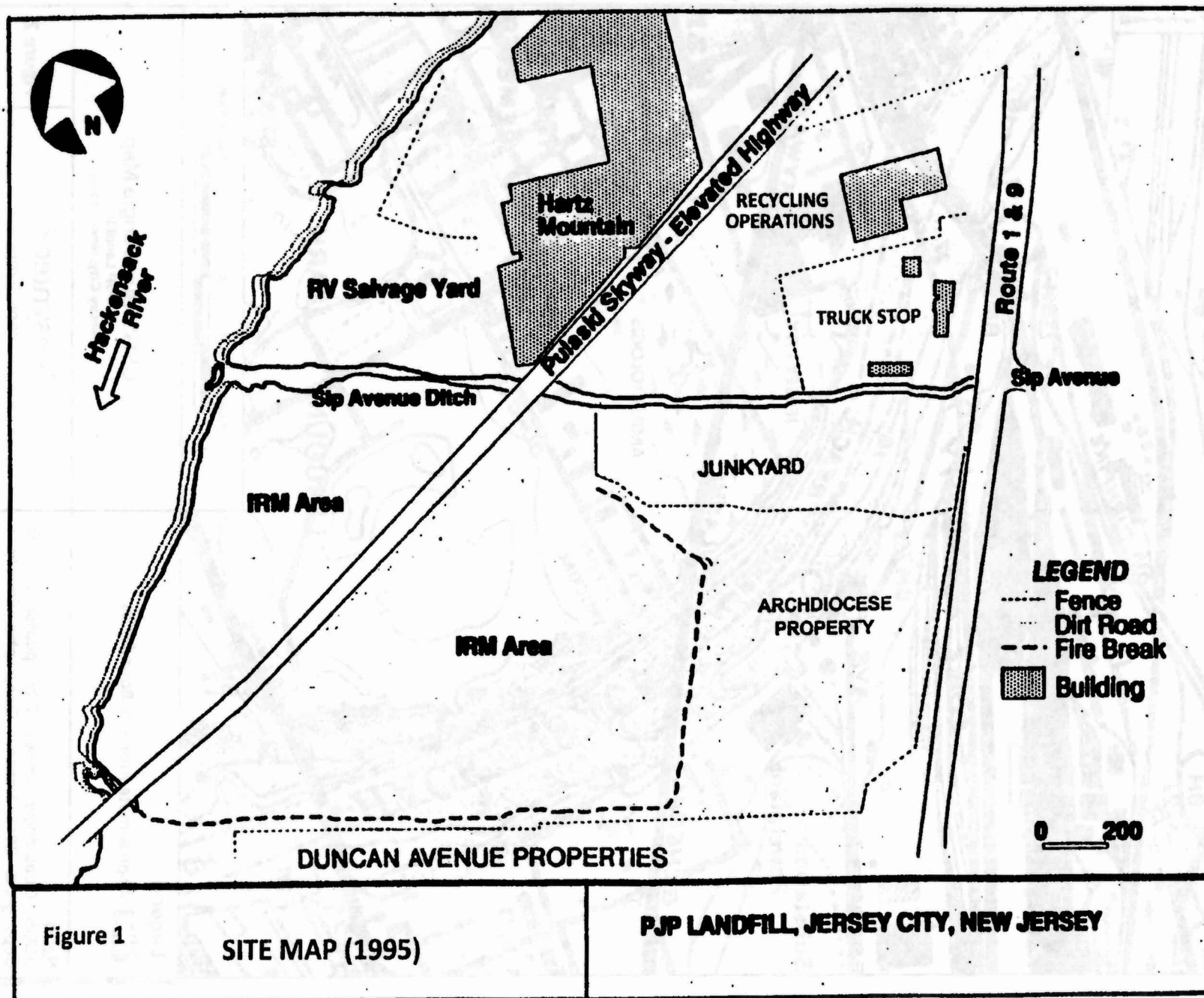
Annual Groundwater Monitoring Report (2014, 2015, 2016) for Groundwater Classification Exception Area/Well Restriction Area, Prologis Ports Jersey City, Distribution Center, Part of the Former PJP Landfill Site, Jersey City, Hudson County, New Jersey, Prepared by Sadat Associates, Inc. (submitted 2015, 2016, 2017)

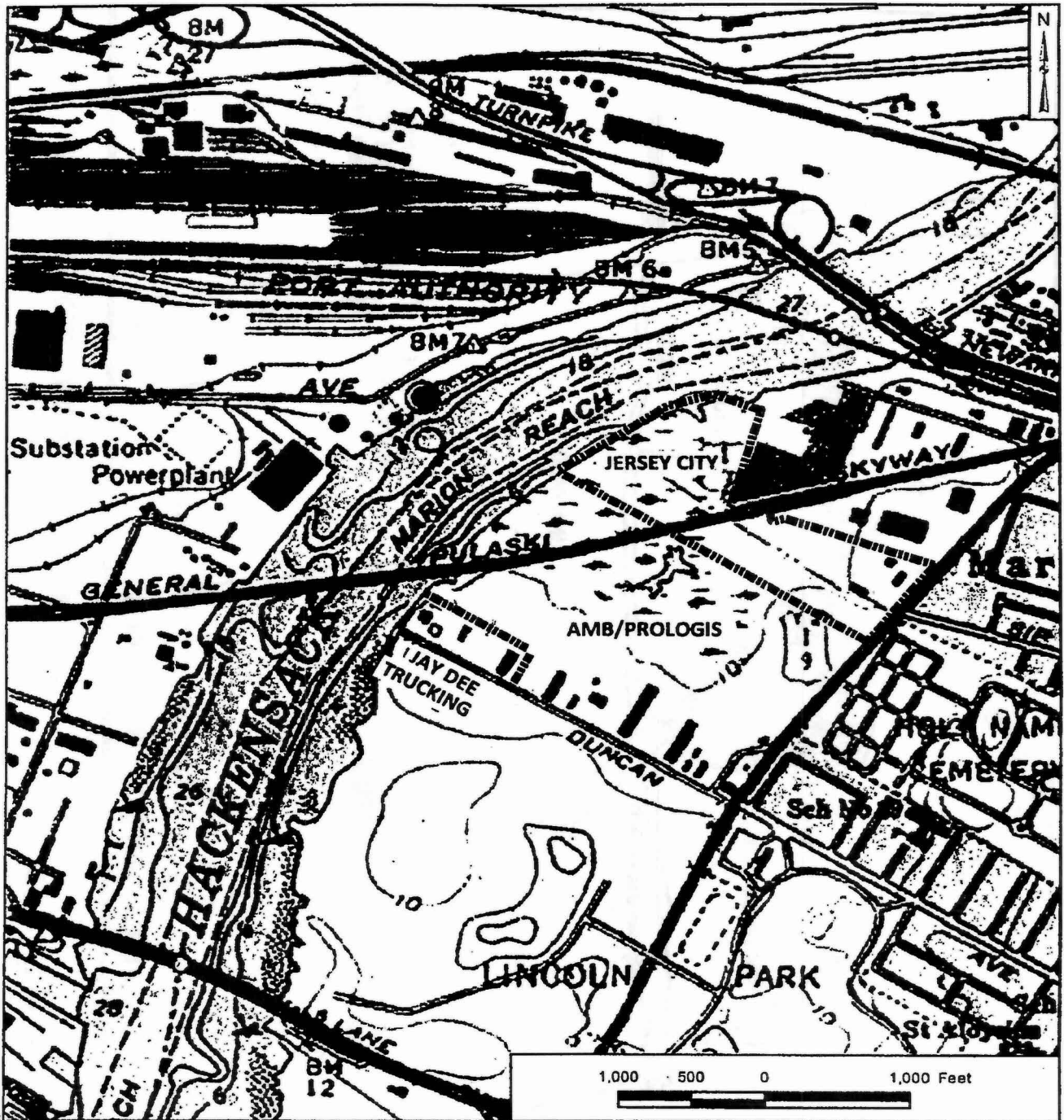
Annual Monitoring Report for the Jersey City Portion of the PJP Landfill (AKA Jersey City Skyway Park) for 2014, 2015, 2016, 400 Sip Avenue, The City of Jersey City, Hudson County, New Jersey, Prepared by Boswell Engineering, (submitted 2105, 2106, 2017)

PJP Landfill Cap Penetration Repair, Liquid Boot Application, 301 Broadway Way, City of Jersey City, Hudson County, New Jersey, Prepared by Boswell Engineering for Jersey City, November 30, 2017.

Monthly progress reports by Jersey City

APPENDIX B Figures





Legend



Approximate Property Boundaries

Notes

USGS Quadrangle Jersey City, published 1982.
Copyright:© 2011 National Geographic Society, i-cubed.

1,000 500 0 1,000 Feet

USGS Quadrangle Map
PJP Landfill
Jersey City, New Jersey

Geosyntec[®]
consultants

Columbia, Maryland

April 2012

Figure 2

