Remedial Action Report – Site 107 Material Staging Area Soil (AOC-1B)

Site 107 Fashionland
18 Chapel Avenue
Jersey City, New Jersey

NJDEP Program Interest Number: G000008728

November 8, 2021

Remedial Action Report –

Site 107 Material Staging Area Soil (AOC-1B)

Site 107 Fashionland, 18 Chapel Avenue, Jersey City, New Jersey

November 8, 2021

Prepared By:
Arcadis U.S., Inc.
10 Friends Lane
Suite 100
Newtown PA 18940
Phone: 267 685 1800
Fax: 267 685 1801

Prepared for:
PPG
440 College Park Dr
Monroeville PA 15146

NJDEP Program Interest Number:
G000008728

Krista Hankins Mastrocola, PE
Senior Civil Engineer

James McLaughlin, PG, CSP
Project Manager

David A. Caballero, PE
Technical Expert, PE-NJ 24GE04919300

Contents

Tables

Figures

Appendices

ATTACHMENTS

Acronyms and Abbreviations

ACO	Administrative Consent Order
AMP	Air Monitoring Plan
AMP Amendment	Air Monitoring Plan Amendment
AOC-1A	Area of Concern 1A
AOC-1B	Area of Concern 1B
AOC-2	Area of Concern 2
Arcadis	Arcadis U.S. Inc.
ARS	Alternative Remediation Standards
bgs	below ground surface
BOL	bill of lading
CB&I	CB&I Environmental and Infrastructure, Inc.
CCIA	Cumberland County Improvements Authority
CCPW	chromate chemical production waste
Chromium Policy	Memorandum from Lisa P. Jackson to Irene Kropp, Subject: Chromium Moratorium
Conrail	Consolidated Rail Corporation
COPR	chromite ore processing residue
CrSCC	Chromium Soil Cleanup Criteria
Emilcott	Emilcott, located in Florham Park, New Jersey
ENTACT	ENTACT Environmental Services, located in Latrobe, Pennsylvania
FSP/QAPP	Field Sampling Plan/Quality Assurance Project Plan
HCC	Hudson County Chrome
HEPSCD	Hudson Essex Passaic Soil Conservation District
IGWSRS	Impact to Groundwater Soil Remediation Standards
IGWSSL	Impact to Groundwater Soil Screening Levels
IRM	interim remedial measure
JCO	Partial Consent Judgment Concerning the PPG Sites (Judicial Consent Order)
mg/kg	milligram per kilogram
MSA	Material Staging Area
msl	mean sea level
NA	not applicable

N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
PPE	personal protective equipment
PVSC	Passaic Valley Sewerage Commission
QAPP Addendum	Quality Assurance Project Plan Addendum
QC	quality control
RAR	Remedial Action Report – Site 107 Material Staging Area Soil (AOC-1B)
RAWP	Remedial Action Work Plan
RDCSRS	Residential Direct Contact Soil Remediation Standard
RE Form	Receptor Evaluation Form
RI	remedial investigation
RIR	Remedial Investigation Report
ROW	right-of-way
Sampling Plan	Sampling Plan for Vanadium-Only Area
SESC	soil erosion and sediment control
SESC Plan	Soil Erosion and Sediment Control Plan
Site	Site 107 Fashionland, 18 Chapel Avenue, Jersey City, New Jersey
Site 137	Garfield Avenue Group Site 137, 24-45 Halladay Street, Jersey City, New Jersey
SOP	standard operating procedure
SRP	Site Remediation Program
TEP	Technical Execution Plan
TRSR	Technical Requirements for Site Remediation
USEPA	United States Environmental Protection Agency
USGS	U.S. Geological Survey
Vanadium Memo	Vanadium Exceedances in Fill Unrelated to CCPW Fill

Executive Summary

On behalf of PPG, Arcadis U.S., Inc. (Arcadis) has prepared this Remedial Action Report – Site 107 Material Staging Area Soil (AOC-1B; RAR) for Site 107 Fashionland, located at 18 Chapel Avenue, Jersey City, New Jersey (Site). This RAR discusses the remedial action performed, which consisted of the excavation or compliance averaging of materials within the "Vanadium-Only" area containing chromate chemical production waste (CCPW) related metals (antimony, chromium, hexavalent chromium, nickel, thallium, or vanadium) at concentrations exceeding the New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS), Chromium Soil Cleanup Criteria (CrSCC), Impact to Groundwater Soil Screening Levels (IGWSSL), Impact to Groundwater Soil Remediation Standards (IGWSRS), or site-specific Alternative Remediation Standard (ARS).

This RAR details the remedial action specific to the Material Staging Area (MSA) soil identified as Area of Concern 1B (AOC-1B). The MSA soil (AOC-1B), formerly referred to as the "Vanadium-Only" area, was previously utilized for staging impacted material for characterization prior to off-site disposal during implementation of the remedial action associated with the Majority Site Area (AOC-1A). The remedial action performed in association with the Majority Site Area was reported under a separate Remedial Action Report (Arcadis 2021). The recommended remedial action presented in the Remedial Action Work Plan (CB&I Environmental and Infrastructure, Inc. 2016) was for CCPW-impacted soils to be excavated and transported off site for disposal at landfills permitted to accept the excavated materials.

To determine the extent of the remedial action, MSA characterization sampling was conducted in December 2020. Remedial action was conducted in February 2021 which consisted of hotspot removal of hexavalent chromium exceedances. Following completion of the remedial action, three historical antimony soil sample exceedances remain greater than the IGWSSL. Antimony was detected in historical boring locations 107_M040, 107_M042, and 107_M046 at respective concentrations of 14.7, 7.2, and 10.1 milligrams per kilogram (mg/kg), greater than the IGWSSL of 6 mg/kg. The elevation intervals of the three samples ranged from 9.9 to 10.5 feet mean sea level. Arcadis performed compliance averaging which confirmed that these samples are in compliance.

This RAR documents that the soil remedial action performed at AOC-1B is effective in protecting public health and safety and the environment, and that remedial objectives have been achieved as follows:

- Excavation of soil containing hexavalent chromium met the requirements specified in the Memorandum from Lisa P. Jackson to Irene Kropp, Subject: Chromium Moratorium (Chromium Policy; NJDEP 2007).
- CCPW metals concentrations in remaining soil comply with the CrSCC, RDCSRS, and ARS.
- Remaining soil concentrations of CCPW metals in the unsaturated zone comply with the IGWSSLs for antimony and thallium, and the IGWSRS for nickel.

On this basis, PPG (the responsible party) has demonstrated compliance with the applicable remediation requirements for AOC-1B soils at the Site and no further action is required. PPG requests the closure of AOC-1B by the NJDEP through the issuance of a Consent Judgment Compliance Letter.

1 Introduction

On behalf of PPG, Arcadis U.S, Inc. (Arcadis) prepared this Remedial Action Report – Site 107 Material Staging Area Soil (AOC-1B; RAR) for the Site 107 Fashionland, located at 18 Chapel Avenue, Jersey City, New Jersey (Site; Figure 1). This RAR discusses the remedial action performed, which consisted of the excavation or compliance averaging of materials within the "Vanadium-Only" area containing chromate chemical production waste (CCPW) related metals (antimony, chromium, hexavalent chromium, nickel, thallium, or vanadium) at concentrations exceeding the New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS), Chromium Soil Cleanup Criteria (CrSCC), Impact to Groundwater Soil Screening Levels (IGWSSL), Impact to Groundwater Soil Remediation Standards (IGWSRS), or site-specific Alternative Remediation Standard (ARS).

The remediation boundary for the area of concern presented in this RAR is shown on Figure 2. This RAR documents soil remediation within the Material Staging Area (MSA [AOC-1B]), formerly referred to as the "Vanadium-Only" area and formerly utilized for staging impacted material for characterization prior to off-site disposal during implementation of the remedial action associated with the Majority Site Area (Area of Concern 1A [AOC-1A]). The Majority Site Area (AOC-1A) was reported under a separate Remedial Action Report (Arcadis 2021). Site 107 groundwater (Area of Concern 2 [AOC-2]) will be separately investigated and reported by PPG.

Additionally, PPG will present details of the remedial action performed on adjacent properties Consolidated Rail Corporation (Conrail) right-of-way (ROW; Block 27401, Lot 45) under separate cover.

1.1 Regulatory References

This RAR was prepared in accordance with the requirements set forth in the Technical Requirements for Site Remediation (TRSR), New Jersey Administrative Code (N.J.A.C.), Title 7, Chapter 26E, Subchapter 5.5 (N.J.A.C. 7:26E-5.5; NJDEP 2018b); the Administrative Consent Order (ACO) between the NJDEP and PPG (NJDEP 1990); and the Partial Consent Judgment Concerning the PPG Sites (Judicial Consent Order [JCO]) between the NJDEP, PPG, and the City of Jersey City (Superior Court of New Jersey Law Division – Hudson County 2009). Under the NJDEP Site Remediation Program, the Site was assigned Program Interest Number G000008728.

As part of the JCO (Superior Court of New Jersey Law Division – Hudson County 2009), a judicially enforceable Master Schedule was created to establish remedial action milestone dates for the New Jersey Chrome Remediation Sites, including the Site. Since its establishment in 2009, the Master Schedule has been revised several times. The most recent revision to the Master Schedule was finalized on July 30, 2021 (Riccio 2021).

Regulatory cross references for N.J.A.C. 7:26E, Subchapter 5.5 are presented in Table 1.

1.2 Report Organization

The remainder of this RAR is organized as follows:

- Section 2 presents a project description and a summary of the historical soil remedial investigation (RI) findings and recommendations.
- Section 3 identifies the applicable remedial standards and criteria.
- Section 4 summarizes the pre-remedial action design activities.

- Section 5 describes sampling conducted prior to implementation of the remedial action.
- Section 6 summarizes the remedial action implemented.
- Section 7 identifies the reliability of the data, including data validation and usability.
- Section 8 documents the protectiveness of the remedy.
- Section 9 provides an update to the receptor evaluation.
- Section 10 presents the conclusions and recommendations.
- Section 11 identifies the references cited in this RAR.

Supporting information is provided in appendices to this RAR. Additional regulatory submittals provided with this RAR include an updated Case Inventory Document (Attachment 1), a copy of the completed Cover Certification Form (Attachment 2), an updated Receptor Evaluation Form (RE Form; Attachment 3), and a Full Laboratory Data Deliverables Form (Attachment 4).

2 Project Description, Remedial Investigation Findings, and Recommendations

The MSA (AOC-1B) is an approximately 0.7-acre area located in the northern corner of the Site (Figure 2). The Site area is approximately 5-acres and identified on the New Jersey tax map as Block 27401, Lot 42 with a street address of 18 Chapel Avenue in Jersey City, Hudson County, New Jersey. The surrounding land use is light industrial occupied by commuter rail (NJ Transit), commercial rail (Conrail), and commercial properties. The MSA (AOC-1B) is bounded to the south by the Majority Site (AOC-1A), to the west-northwest by a Conrail ROW (Block 27401, Lot 45), and to the east-northeast by HCC Site 067 (Block 27401, Lot 41).

2.1 Physical Setting of the Site

The U.S. Geological Survey (USGS) topographic map presents the regional topography in the area (Figure 1). The Site is generally flat, with little topographic relief and an average ground surface elevation of approximately 20 feet above mean sea level (msl).

2.1.1 Regional Geology

The Site is located in the Piedmont Physiographic Province of New Jersey along the eastern edge of the Newark Basin (Dresdner Robin 2013). The regional geology is summarized below:

- The Piedmont is described as a rolling plain that extends south and east from the southeastern edge of the New Jersey Highlands to the Hudson River in the northern portion of New Jersey.
- The Newark Basin was formed during the Late Triassic and Early Jurassic periods and extends locally from the west of the first Watchung Mountain in northern-central New Jersey to the Hudson River. The Triassic Newark Supergroup consists of nonmarine sedimentary rocks and diabase intrusions.
- The Newark Supergroup is divided into three formations on the basis of distinctive lithology: lower unit (Stockton Formation), middle unit (Lockatong Formation), and upper unit (Passaic Formation).
- The Bedrock Geology Map of Northern New Jersey (USGS 1996) indicates that bedrock at the Site is composed of the Lockatong Formation. The Stockton Formation is found east of the Site, and diabase to the west of the Site. The Lockatong Formation is composed of light to dark gray, greenish-gray, and black dolomitic or silty argillite, mudstone, sandstone, siltstone, and minor silty limestone.

2.1.2 Site Geology

Generally, the subsurface conditions at the Site consist of the following strata listed in order of increasing depth (Dresdner Robin 2013; AECOM 2020):

- *Fill material*. The thickness and composition of the fill material varies. The fill material generally rests on top of marine deposits, glacial deposits, and bedrock. The fill material is composed of a mixture of cinders, sand, and gravel with a trace of silt and clay; construction demolition debris (e.g., concrete, brick, glass, metal, shingles); wood; slag; and miscellaneous debris. Additionally, some areas of fill include CCPW and or CCPW-impacted material. The fill was often placed to raise surface elevations above the existing water level in an

effort to reclaim wetlands and flood-prone areas for development, and thicknesses can range from 8.5 to 17 feet on site. Deeply occurring subsurface fill is common in Jersey City.

- *Natural marine and estuarine marsh deposits*. Generally, these deposits are composed of organic silt and clay (clayey silt), fine sand, traces of shells, traces of wood, and peat. These deposits, referred to as meadow mat, can range in thickness from 5 to 40 feet, and thickness varies regionally. Organic sediments are not continuous throughout the Site and, where present, are not expected to be greater than 5 feet thick. In several borings, the interval where the meadow mat would be expected is characterized by a black, gray, or brown silty clay indicative of marine or estuarine marsh depositional environments.
- *Glacial deposits (undifferentiated)*. Glacial deposits generally consist of a thin layer of glacial till deposited on top of the bedrock and beneath the fill or estuarine deposits. Glacial till comprises either reddish-brown, brown or gray-brown coarse to fine sand and gravel with some silt and/or clayey silt with gravel and sand. The thickness of these materials is variable, depending on the depth to the underlying bedrock surface. The glacial deposits beneath the Site and its vicinity may not be continuous.
- *Bedrock*. The Site is underlain by the Lockatong Formation. Several soil borings were advanced to refusal during previous investigations, but bedrock was not logged and it is likely that refusal depths are indicative of the depth to the top of till, or some other subsurface obstruction within the fill (for shallow occurrences of refusal), rather than depth to bedrock. Depth to bedrock at the Site is expected to be approximately 25 to 35 feet below ground surface (bgs).

2.1.3 Hydrogeology

Groundwater in the fill is encountered at approximately 9.5 feet msl, as observed during remedial excavation of the Majority Site Area (AOC-1A). This is the elevation that defines the saturated zone on site. Insufficient historical groundwater elevation data exist to perform a 50th percentile water table evaluation. In general, the shallow groundwater flow pattern on site mimics land surface topography. Variations from this can be attributed to factors such as heterogeneities in the fill, subsurface structures, exfiltration from and infiltration to subsurface utilities, and spatially variable recharge due to the presence of impervious surfaces (Dresdner Robin 2013).

2.2 Project History

On July 19, 1990, PPG and the NJDEP entered into an ACO (NJDEP 1990) to investigate and remediate locations where CCPW-impacted materials related to former PPG operations may be present. On June 26, 2009, the NJDEP, PPG, and the City of Jersey City entered into a JCO (Superior Court of New Jersey Law Division – Hudson County 2009) with the purpose of remediating the soils and sources of contamination at the HCC sites as expeditiously as possible (CB&I 2016).

In September 2010, AECOM performed a site investigation to characterize the presence of CCPW and CCPW-impacted soils and groundwater under the slab of the former commercial warehouse. Results identified CCPW-related yellow-green staining and chromite ore processing residue (COPR) nodules in the soils or fill beneath the slab (CB&I 2016).

2.2.1 Remedial Investigations

Dresdner Robin performed an RI between January 2011 and November 2012. The RI focused on three areas: HCC Site 107, the adjacent Conrail Property to the northwest, and the HCC Site 108 hot spot located immediately adjoining the Site to the south-southwest. In general, RI results for the Site showed:

- COPR nodules or staining of the soil beneath the Site's one-story masonry building from 0.5 foot to 8 feet bgs.
- COPR ranging from 3 to 17 feet bgs in the undeveloped lot in the east-central portion of the Site.
- Areas of soils in the north-northwest portion of the undeveloped area of the Site where vanadium is the only constituent of potential concern. This "Vanadium-Only" area is now referred to as the MSA (AOC-1B) as it was used for staging of impacted material to be characterized prior to transportation for off-site disposal during the remedial action associated with the Majority Site Area (AOC-1A; Arcadis 2021).

The results outlined above are further discussed in the Remedial Investigation Report (RIR) (Dresdner Robin 2013)and a Vanadium Exceedances in Fill Unrelated to CCPW Fill (Vanadium Memo) dated May 2013 (CB&I 2013). The Vanadium Memo concluded that the MSA contained historic fill material determined not to be PPG's responsibility to remediate. A copy of the Vanadium Memo is provided as Appendix A-1.

2.2.2 Previous Interim Remedial Measures

Prior to the RI, a series of interim remedial measures (IRMs) were implemented at the Site. The IRMs were conducted from 1990 to 1992 and 1999 to 2003 (CB&I 2016). Following implementation of the IRMs, IRM inspections and maintenance continued until demolition of the one-story masonry building, which PPG commenced in May 2018.

2.2.3 Majority Site Area Remedial Action

Soil remediation within the Majority Site Area (AOC-1A) was performed from May 2018 to October 2019. The remedial action consisted of excavation and off-site disposal of CCPW and CCPW-impacted soils and backfilling the excavation with licensed quarry material in accordance with the Remedial Action Work Plan (RAWP; CB&I 2016) and the TEP (Arcadis 2018b). The MSA (AOC-1B) was not excavated as part of remediation of the Majority Site Area (AOC-1A) as it was determined at the time not to be PPG's responsibility to remediation.

As part of the excavation of the Majority Site Area (AOC-1A), a portion of the sidewalls exposed along the MSA were observed to contain sparse COPR nodules. The Majority Site Area (AOC-1A) excavation was backfilled to grade while the remedial action for the MSA (AOC-1B) was being determined. MSA sidewalls were lined with plastic and demarcation fabric prior to backfill. Following months of discussion with the NJDEP, remedial characterization and a path forward for the MSA (AOC-1B) was approved via the Sampling Plan for Vanadium-Only Area (Sampling Plan; Arcadis 2020).

2.3 Recommended Remedial Action

The recommended remedial action for the MSA consisted of excavation and removal of COPR-soil mixture material with concentrations exceeding NJDEP CrSCC as defined by historical soil samples and soil samples collected along the MSA sidewalls and within the interior of the MSA in December 2020. Exceedances of the

IGWSSL would be managed via development of a site-specific standard or compliance averaging. Historical interior MSA samples were also used to dictate remedial action.

3 Identification of Applicable Remedial Standards/ Criteria

The remedial action for the MSA was performed in accordance with the Sampling Plan (Arcadis 2020) accepted by the NJDEP via email on November 24, 2020 (Appendix A-2). The Sampling Plan (Arcadis 2020) deviated from the RAWP (CB&I 2016) and TEP (Arcadis 2018b) because the COPR-soil mixture material was sampled and compared to applicable remedial criteria.

3.1 Regulatory Requirements, Guidance, and Alternatives/ Site-Specific Determinations

The recommended remedial action was performed in accordance with the following regulatory requirements and NJDEP Guidance and site-specific determinations:

- N.J.A.C. 2:90 – Standards for Soil Erosion and Sediment Control in New Jersey (NJDEP 2017).
- N.J.A.C. 7:14 – Water Pollution Control Act (NJDEP 2010).
- N.J.A.C. 7:26C – Administrative Requirements for the Remediation of Contaminated Sites (NJDEP 2018a).
- N.J.A.C. 7:26D – Soil Remediation Standards (NJDEP 2008a).
- TRSR (NJDEP 2018b).
- Field Sampling Procedures Manual (NJDEP 2011).
- Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria, dated September 2012 (NJDEP 2012).
- Alternative and Clean Fill Guidance for Site Remediation Program (SRP) Sites (NJDEP 2015).
- Chromium Policy (NJDEP 2007).
- Chromium Soil Cleanup Criteria (NJDEP 2008b).
- ACO (NJDEP 1990).
- JCO (Superior Court of New Jersey Law Division – Hudson County 2009).
- Sampling Plan (Arcadis 2020).

3.2 Soil Remediation Standards/Criteria

Under the ACO (NJDEP 1990) and JCO (Superior Court of New Jersey Law Division – Hudson County 2009), PPG is responsible to address CCPW and CCPW-impacted soils; PPG is not responsible for any other constituents at concentrations exceeding the RDCSRS, CrSCC, or IGWSSL that may be present in soil. This RAR addresses only the soil impacts for which PPG is responsible. The RDCSRS and other criteria relevant to remediation at the Site are presented in Table 2, below.

Table 2. Soil Remediation Standards for CCPW Metals

Constituent	RDCSRS (mg/kg) (G1)	CrSCC (mg/kg) (G2)	IGWSSL (mg/kg) (G3)	Site-Specific IGWSRS (mg/kg) (G4)	ARS (mg/kg) (G5)
Antimony	31	NA	6	NA	NA
Hexavalent Chromium	NA	20	NA	NA	NA
Nickel	1600	NA	NA	855	NA
Thallium	NA	NA	3	NA	NA
Chromium (total) (G6)	NA	120,000	NA	NA	NA
Vanadium	NA	NA	NA	NA	390

Notes:
G1. The RDCSRS is reflective of the NJDEP Remediation Standards presented in N.J.A.C. 7:26D, last amended September 18, 2017.
G2. The CrSCC is reflective of the NJDEP CrSCC, revised April 2010.
G3. The IGWSSL is reflective of the Development of Impact to Groundwater Soil Remediation Standards using the Soil Water Partition Equation (NJDEP 2013).
G4. The site-specific IGWSRS for nickel is an alternative to the IGWSSL approved by the NJDEP on April 25, 2019 (Appendix A-3).
G5. The ARS for vanadium is an alternative to the RDCSRS included as Appendix G of the TEP (Arcadis 2018b) and accepted by the NJDEP on September 27, 2018 (Appendix A-4).
G6. There is currently no CrSCC for chromium (total); therefore, total chromium results are compared to the CrSCC for trivalent chromium of 120,000 milligrams per kilogram (mg/kg).
NA = not applicable

4 Summary of Pre-Remedial Action Design Activities

Based on the findings of the RIR (Dresdner Robin 2013) and as summarized in Section 2.2.1, the recommended remedial action for the Site included excavation and off-site disposal of CCPW and CCPW-impacted soils. The Vanadium Memo (CB&I 2013) concluded that the MSA contained historic fill material determined not to be PPG's responsibility to remediate.

4.1 Summary of Remedial Action Work Plan/Technical Execution Plan

Arcadis (2021) discusses the pre-remedial action design activities associated with the RAWP (CB&I 2016). Key submittal/approval history is as follows:

- On October 14, 2016, PPG/CB&I issued the RAWP (CB&I 2016), addressing the NJDEP's general comments from June 27, 2013.
- On February 21, 2017, the NJDEP approved the RAWP (CB&I 2016) submitted on October 14, 2016 in a letter from Thomas J. Cozzi to M. Michael McCabe (NJDEP 2017).

Following approval of the RAWP (CB&I 2016), Arcadis (on behalf of PPG) prepared the TEP (Arcadis 2018b). Arcadis (2021) discusses the pre-remedial action design activities associated with the TEP (Arcadis 2018b). The TEP (Arcadis 2018b) defined the scope of remedial excavation up to (but not including) the MSA, which at the time was deemed not PPG's responsibility to remediate (CB&I 2013). Key TEP submittal/approval dates are as follows:

- On October 5, 2018, PPG/Arcadis issued the TEP (Arcadis 2018b).
- On November 7, 2018, Weston, on behalf of the NJDEP, accepted PPG/Arcadis Revised Site 107 TEP (Version 4) via email.

4.2 Summary of Sampling Plan for Vanadium-Only Area

In September 2019, following removal of CCPW and CCPW-impacted soils in the Majority Site Area (AOC-1A), the remaining MSA sidewalls were observed to contain COPR nodules.

On October 16, 2019, PPG/Arcadis proposed an initial sampling plan to confirm that concentrations of hexavalent chromium in COPR-soil mixture material along and within the MSA were less than the CRSCC. Numerous informal revisions to the Sampling Plan (Arcadis 2020) were developed based on discussions with the NJDEP.

On November 11, 2020, PPG/Arcadis issued the Sampling Plan (Arcadis 2020), which defined the methods for characterization of COPR-soil mixture material within the MSA sidewalls and interior, and subsequent remedial options based on analytical results. On November 24, 2020, Weston, on behalf of the NJDEP, accepted the Sampling Plan (Arcadis 2020) on behalf of the NJDEP via email (Appendix A-2).

5 Description of Material Staging Area Sampling

In December 2020, following the NJDEP's approval of the Sampling Plan (Arcadis 2020), the following contractors were employed to perform the scope required to collect sidewall and interior MSA samples to confirm the presence or absence of COPR nodules and to collect confirmatory samples for analysis of hexavalent chromium within the MSA:

- Arcadis served as the Project Coordinator and provided the field sampling team. Arcadis managed and coordinated all supporting contractors.
- ENTACT Environmental Services, located in Latrobe, Pennsylvania (ENTACT) served as the Remediation Contractor to clear the MSA surface of vegetation and excavate licensed quarry material to expose the MSA sidewalls to allow access for sampling.
- Emilcott, located in Florham Park, New Jersey (Emilcott) performed air monitoring at the Site during excavation and backfill in accordance with the Air Monitoring Plan (AMP; Appendix B of the TEP [Arcadis 2018b]).
- Colliers (formerly known as Maser), a licensed surveyor in the State of New Jersey, located in Hamilton, New Jersey performed all surveying activities at the Site.
- Cascade, a licensed drill in the State of New Jersey, located in Jackson, New Jersey performed drilling activities for the interior borings and angled sidewall borings at the Site.
- SGS (National Environmental Laboratory Accreditation Program #12028), located in Dayton, New Jersey served as the analytical testing laboratory for all collected samples.

The MSA soil (AOC-1B) was not remediated during implementation of the remedial action for the Majority Site Area (AOC-1A) as the MSA was used for the staging of impacted material for characterization prior to off-site disposal (Arcadis 2021). This area was selected for these activities as it was formerly referred to as the "Vanadium-Only" area and not PPG's responsibility. The MSA sampling is discussed below.

5.1 Sidewall Sampling

Sampling of sidewalls was performed following ENTACT's removal of licensed quarry material to locate plastic sheeting and demarcation fabric atop the previously completed limits of excavation associated with the Majority Site Area (AOC-1A). Sidewalls were sampled via vertical transects spaced 30 linear feet apart and collected at 2-foot depth intervals along each transect, in accordance with the Sampling Plan (Arcadis 2020). Any deviations from the approved procedure are discussed in Section 6.3.

The sidewall sampling resulted in the collection of 67 samples within 11 vertical sample transects (Figure 3). At each 2-foot sidewall depth interval, an approximate 6-inch discrete volume of soil material (including COPR nodules, if present) were removed using a sterile disposable plastic scoop. Sidewall samples were collected at every 2-foot sidewall depth interval, regardless of the presence or absence of COPR. The selected 6-inch sample interval was biased toward material containing COPR, if visually present on the surface at the time of sample collection within each 2-foot sidewall sample interval.

Deep sidewall samples within five transects were located below the groundwater table and were not able to be safely accessed for grab sample collection. These samples were located at a depth greater than 9.5 ft msl where standing water pooled within the open trench. Approximately 9,000 gallons of water were pumped from the

excavation into frac tanks on site to facilitate safe access to the sidewall base for sample collection; however, pumping could not sufficiently lower the water table to safely access the grab sample locations. The deepest samples in these five transects were collected using angled borings (Figure 3). The borings were angled to match the pitch of the sidewall, and samples were collected at every 2-foot sidewall depth interval regardless of the presence or absence of COPR. The selected 6-inch sample interval within a 2-foot interval was biased toward material containing COPR, if visually present.

5.2 Interior Sampling

Prior to interior boring advancement, all vegetation within the MSA was cleared and two areas covered with fabric and stone were removed to allow a visual survey of the presence of COPR to be conducted on the MSA surface. Arcadis conducted the survey, accompanied by Weston oversight personnel. Sparse nodules were detected on the ground surface, but none were indicative of a subsurface source area. Therefore, interior boring locations were not biased toward locations of the sparse nodules observed.

Fifteen borings were advanced within the interior of the MSA in December 2020 (Figure 3). These interior sample borings were spaced in a grid pattern that offset the historical soil borings advanced as part of the RIR (Dresdner Robin 2013) such that the 15 proposed locations and 12 historical locations combined provide approximately one boring per 900-square-foot coverage within the interior of the MSA. As interior sampling borings were advanced, each 2-foot depth interval was screened for the presence of COPR nodule. Discrete samples were collected in any 6-inch soil core interval containing COPR nodule(s). If no COPR nodules were observed, no samples were collected.

Historical MSA soil boring logs and the December 2020 MSA soil boring logs are provided in Appendix B-1 and Appendix B-2, respectively. None of the historical soil borings contained COPR nodules at any depth interval. Four of the 15 boring locations associated with the December 2020 event did not contain COPR nodules; therefore, no samples were collected from those borings.

5.3 Sample Processing and Laboratory Analysis

Samples collected from sidewalls and interior borings were processed in the field by homogenizing the sample and collecting an aliquot from the homogenized material. COPR nodules were counted, logged, and segregated from the remainder of the sample matrix and placed in a separate zip-type plastic bag. The plastic bag was sent to the laboratory along with each sample jar. Quality assurance samples were collected from homogenized soil volumes in accordance with the Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP; AECOM 2010).

All MSA sidewall and interior samples were analyzed for hexavalent chromium via United States Environmental Protection Agency (USEPA) Method SW826 3060A/7196A. All samples were processed in the laboratory in accordance with applicable laboratory standard operating procedures (SOPs) developed specifically for the scope of work and approved by the NJDEP as part of the Sampling Plan (Arcadis 2020). COPR nodules sent with a sample were crushed into a fine powder using a mortar and pestle, sieved through a No. 200 sieve, and homogenized with the jarred sample prior to hexavalent chromium analysis. Photographs were taken of the crushed nodules and the entire sample aliquot once the crushed COPR was homogenized into the bulk sample prior to analysis.

5.4 Material Staging Area Sample Results

A total of 67 MSA sidewall samples were collected during the December 2020 investigation. A total of 89 samples were collected from the MSA interior during historical investigation and the December 2020 investigation. Of these 156 samples, 34 contained a COPR nodule count ranging from 1 to greater than 100 within a given 6-inch sample interval.

Only two of the 156 samples collected during historical investigation and the MSA sampling event in December 2020, SW-B35 (0.0-0.5) and SW-B35 (4.0-4.5), slightly exceeded the CrSCC with hexavalent chromium concentrations of 26.7 and 25.9 mg/kg, respectively (Table 3). Laboratory analytical reports for historical and December 2020 MSA samples are provided in Appendices C-1 and C-2, respectively. The laboratory electronic data deliverable passed submission and was logged into the NJDEP database, as documented in Appendix C-3.

Both samples exceeding the CrSCC were relatively shallow and were along the same sidewall sampling transect; therefore, PPG elected to excavate the area of the exceedances down to the confirmed clean depth interval of that transect as explained in Section 6.

5.5 Compliance Averaging of Historical Exceedances

Results of all analytical data collected where soil remains in-situ are presented in Table 3. This includes historical samples which were analyzed for hexavalent chromium and CCPW-related metals (antimony, total chromium, nickel, thallium, and vanadium). Review of historical soil samples identified antimony at 107_M040, 107_M042, and 107_M046 at respective concentrations of 14.7, 7.2, and 10.1 mg/kg, greater than the IGWSSL of 6 mg/kg. To confirm that all data were in compliance and the remedial standards were attained, Arcadis performed compliance averaging for antimony within the vadose zone.

Antimony impacts identified within the MSA soil were horizontally delineated to the southwest by historical soil sample 107_M038 and to the southeast by soil samples 107_K040, 107_K042 and 107_K046. Impacts at soil samples 107_M040, 107_M042, and 107_M046 were localized between 9.9 and 10.5 feet MSL. Vertical delineation was achieved via deeper soil samples collected in these same borings between 8.9 to 9.6 feet MSL. As historical antimony exceedances are delineated, any of the following compliance options can be used to determine if the remediation is complete for the impact to ground water exposure pathway:

- Single-point compliance
- Compliance averaging by calculating the arithmetic mean (in areas with less than nine data points)
- Compliance averaging at the 95 percent upper confidence limit (UCL) of the mean
- Compliance averaging using a spatially weighted average (e.g., Thiessen polygons).

For purposes of compliance averaging, the functional area established uses the length of the AOC in the direction parallel to ground water flow (approximately 100 ft) to the southeast and horizontal delineation points to the southwest. Since soil impacts were localized in the vadose zone between 9.9 and 10.5 feet msl, the vertical functional area utilized was 9.5 to 11.5 feet msl. Within the functional area, seven soil samples were identified. Locations of these seven samples are shown on Figure 4.

The arithmetic mean compliance averaging method was used to demonstrate that antimony has been remediated to an average concentration less than the IGWSSL in accordance with the Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria (NJDEP 2012).

Compliance average calculations are shown in Table 4. The calculated compliance average concentration for antimony is 4.6 mg/kg, which is less than the IGWSSL of 6 mg/kg. No additional remedial action is required for antimony in subsurface soil at MSA.

6 Description of Remedial Action

The remedial action for the MSA (AOC-1B) consisted of excavation and removal COPR-soil mixture material with concentrations exceeding the NJDEP CrSCC, and backfilling the excavation with licensed quarry material. While delineation of the material to be remediated was performed in accordance with the Sampling Plan (Arcadis 2020), the remedial action was performed in accordance with the NJDEP-approved RAWP (CB&I 2016) and the TEP (Arcadis 2018b), as described in Section 4.1.

Preparation began in 2017 while obtaining regulatory permits and/or approval to facilitate implementation of the Majority Site Area (AOC-1A) remedial action. Mobilization for the MSA (AOC-1B) remedial action work occurred in February 2021. During remediation, Arcadis served as the Construction Manager to manage and coordinate the work of multiple contractors hired by PPG to perform the required remediation and support work. The following contractors were employed to perform the required remediation and support work:

- ENTACT served as the Remediation Contractor.
- Emilcott performed air monitoring at the Site during excavation and backfill in accordance with the AMP (Arcadis 2018b).
- WTS Transportation Services, LLC and Clean Earth served as transportation and disposal brokers and provided facilities for the waste streams.

The remedial action activities implemented are summarized below.

6.1 Pre-Remediation Activities

The following activities were conducted prior to commencing remedial action:

- Provided notifications of resumption of work associated with permit applications and plans approved by the state and local agencies
- Implemented the Soil Erosion and Sediment Control Plan (SESC Plan)
- Implemented the AMP (Arcadis 2018b)
- Performed site utility clearance
- Mobilized equipment to the Site
- Established work zones.

6.1.1 Approval of Permits and Plans

All applicable regulatory permits from the Majority Site Area remedial activity remained open; therefore, notifications were made to the appropriate authorities before resuming activities at the Site to complete the MSA remedial action as discussed in Section 8.5. Copies of applicable regulatory permit approvals and notifications are provided in Appendix A.

6.1.2 Soil Erosion and Sediment Controls

Soil erosion and sediment control (SESC) measures were installed in accordance with the SESC Plan, approved by the Hudson Essex Passaic Soil Conservation District (HEPSCD; Appendix A-5), and the Discharge to Surface

Water General Permit for Construction Activity - Stormwater (5G3; Appendix A-6). In general, the SESC measures consisted of straw wattle around the site perimeter, inlet protection on stormwater grates, and a temporary construction entrance. All SESC measures were either still in place from the prior mobilization (i.e., temporary construction entrance and inlet protection) or installed before initiating the remedial action.

SESC measures were monitored and inspected daily to verify they were functioning properly and positioned adequately to be effective during use. Deficiencies were immediately corrected.

6.1.3 Air Monitoring

Emilcott performed air monitoring at the Site during excavation in accordance with the AMP (Arcadis 2018b) and a subsequent Air Monitoring Plan Amendment (AMP Amendment; Arcadis 2019) accepted by the NJDEP on November 19, 2019. The AMP Amendment (Arcadis 2019) was issued to revise the acceptable air concentration to account for extended remedial duration. Results of the air monitoring and sampling during implementation of the remedial action were documented in weekly and monthly reports provided in Appendices D-1 and D-2, which are also available on the Chromium Cleanup Partnership Website: (http://www.chromecleanup.com/air_monitoring/air_monitoring_107.aspx). The concentrations and short-duration metrics demonstrate that dust control measures were effective at maintaining hexavalent chromium in dust at concentrations lower than the acceptable ambient concentration.

6.1.4 Mobilization of Equipment

ENTACT mobilized the appropriate type and quantity of major heavy equipment needed to complete the remedial action. Upon arrival at the Site, all machines and facilities were inspected and equipped with sufficient supplies (e.g., spill response kits, fire extinguishers). Equipment was inspected daily when in use and decontaminated as required to move about the Site. Before demobilization, all equipment was decontaminated and inspected.

6.1.5 Establishment of Work Zones

ENTACT established work zones using high-visibility construction fence throughout implementation of the remedial action. The work zones for excavation included:

- An exclusion zone was established in areas where heavy equipment was being used to address COPR-soil mixture material. No one was allowed to enter the exclusion zone without proper health and safety training and personal protective equipment (PPE).
- Contaminant reduction zones were established as a transition from the exclusion zone to support zones. The contaminant reduction zone was set up to allow personnel to don and doff PPE, and to facilitate decontamination.
- A support zone was established in an approved location. The support zone housed portable toilets and washing stations.

6.2 Excavation

Remedial excavation was conducted on February 15 and 16, 2021 and resulted in a total volume of 250 tons of soil being removed from the Site. Excavation was performed at the Site by ENTACT using an excavator. During coordination of the MSA sampling, Arcadis coordinated with ENTACT to establish grid-like cells to be used for confirmation sampling. Based on the results of the MSA sampling, SW-B35 (0.0-0.5) and SW-B35 (4.0-4.5)

exceeding the NJDEP CrSCC, Grid MSA-B2021 was required to be remediated to the targeted excavation depth of 14 feet above mean sea level (approximately 6 feet bgs). This depth represented the top of clean soil as defined by MSA sample collection (SW-B35 (6.0-6.5)). Neighboring clean soil sampling grids and the site property line defined the horizontal limits of excavation (Figure 3).

6.2.1 Dust Controls

ENTACT implemented dust control during the remedial action to prevent the spread of contamination and maintain the particulate level at the permissible exposure level specified in 29 Code of Federal Regulations 1926.55. To obtain this goal, the dust control program consisted of dust suppression measures and work zone/perimeter air monitoring to verify the success of dust suppression. The following dust controls were implemented for all equipment-moving activities throughout the project:

- As-needed wetting of equipment in the active excavation area
- Hauling wastes/debris leaving the Site in covered or closed containers
- Keeping vehicles speeds to less than 10 miles per hour on unpaved surfaces.

6.2.2 Verification of Excavation Extents

ENTACT verified that horizontal and vertical excavation extents were achieved using global positioning system survey equipment. Confirmatory sidewall and base samples were not required because these were collected as part of the MSA sampling performed in December 2020.

Once the vertical excavation extents were finalized, Colliers performed the necessary as-built surveying, which included a topographical survey of the excavation base. Colliers developed as-built drawings (described in Section 8.1) at the conclusion of the surveying activities.

6.2.3 Backfill

The MSA excavation was backfilled with licensed quarry material from Tilcon's Mount Hope and Pompton Lakes licensed quarries. Licensed quarry material was imported in accordance with the Alternative and Clean Fill Guidance for SRP Sites (NJDEP 2015). Licensed quarry material was delivered to the Site and directly placed within the open excavation in 10- to 12-inch loose lifts and compacted to 95 percent of the maximum dry density per ASTM International D-1557.

Details regarding final grades and restoration are presented in Arcadis (2021). Final grades were established to promote positive drainage and to avoid ponding of surface water at the Site. Specifically, the surface was restored with 6 inches of dense graded aggregate in all areas of remedial excavation to provide a stabilized ground surface in accordance with the SESC Plan.

6.3 Field Change Notifications

Field change notification forms relevant to remedial action completed are presented in Table 5, below. All field changes were approved by Weston, on behalf of the NJDEP, prior to implementation.

Table 5. Field Determination Notification Tracking Sheet

Date of Transmittal	Description of Field Change Notification
12/8/2020	Disposable aluminum trays will be used for sample homogenization instead of stainless-steel bowls.
12/11/2020	Angled borings will be advanced for deep MSA sidewall samples located beneath the groundwater table.

7 Reliability of Data

7.1 Data Validation

Arcadis performed data validation to evaluate whether the collected analytical data were scientifically defensible, properly documented, of known quality, and met RAWP objectives. Data validation included the review of analytical procedures, quality control (QC) results, calibration procedures, data reduction, and completeness of the laboratory data packages as specified in the FSP/QAPP (AECOM 2010), Sampling Plan (Arcadis 2020), and Quality Assurance Project Plan Addendum (QAPP Addendum; Arcadis 2018a). During validation, the data validator qualified the data to determine whether the data were affected by deviations from the analytical protocols set forth in the FSP/QAPP (AECOM 2010), QAPP Addendum (Arcadis 2018a), and guidance documents. The laboratory analytical data packages (Appendices C-1 and C-2) were reviewed in accordance with the following:

- USEPA Region 2 SOP HW-2b, Revision 15, ICP-MS Data Validation (December 2012)
- New Jersey Division of Remediation Management and Response Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium (September 2009)
- NJDEP Data Quality Assessment and Data Usability Evaluation Technical Guidance (NJDEP 2014)
- Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey (AECOM 2010)
- Arcadis Quality Assurance Project Plan – Addendum, Site 107 Fashionland, Jersey City, New Jersey (Arcadis 2018a).

Validation was conducted as a Tier III evaluation and included review of data package completeness according to the NJDEP laboratory data deliverable guidelines. Field documentation was not included in this review.

Validation reports were prepared for each data package validated. The validation reports for historical and MSA samples are provided in Appendices E-1 and E-2, respectively. The reports summarize the samples reviewed, parameters reviewed, nonconformance with the established criteria, and validation actions (including application of data qualifiers). As applicable, sample result sheets were marked up with validation qualifiers and attached to the data validation reports. Data validation qualifiers are consistent with the USEPA National Functional Guidelines and the NJDEP validation SOPs. The following qualifiers are used in data validation:

Concentration (C) qualifiers:

- U: The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

Validation qualifiers:

- J: The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
- UJ: The analyte was not detected above the reporting limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
- RA: The sample result was rejected due to NJDEP-specific data validation QC requirements; however, the result is usable for project objectives. Refer to the Data Quality and Usability section of the data validation report for further information.

Sample results that were qualified as estimated (J, UJ) due to QC exceedances are usable with caution. Results where validation qualifiers were not added are presented as reported by the laboratory.

7.2 Data Quality/Data Usability Conclusions

The findings of the data quality assessment and data usability evaluation indicate that the data used to demonstrate compliance with the RA objectives are sufficiently representative of actual conditions and may be used to support decisions, with one consideration:

- Hexavalent chromium results qualified RA due to matrix spike recoveries outside the range of 50 to 150 percent, but having evidence of a reducing matrix, may provide useful information for site decisions, but should be used with an understanding of the data limitations.

8 Documentation of the Protectiveness of the Remedial Action

Soil analytical results from the RI and MSA sampling program were used to pre-determine the depths and limits of the MSA (AOC-1B) excavation. These sampling results were used to document the effectiveness and completeness of the soil remediation.

- As summarized in Section 5.4, the locations of samples used to demonstrate compliance with the remediation goals for the Site are shown on Figure 3. Table 3 presents the analytical results for samples used to demonstrate compliance with the remediation goals.
- As presented in Section 7.1, laboratory analytical reports and data validation reports for the data presented in these tables are included in Appendices C and E, respectively. As discussed in Section 7, the laboratory analytical data for the collected samples was found to be usable for the purposes of defining the extents of the remedial excavation.
- As discussed in Section 5.5, compliance averaging was used to attain compliance for antimony present at concentrations above the IGWSSL in vadose zone soil. Compliance averaging results are provided in Table 4 and sample locations are presented on Figure 4.
- As mentioned in Section 6.2.2, as-builts prepared by a professional land surveyor to verify the excavation extent are provided in Appendix F.
- As discussed in Section 8.3, waste manifests for soil, groundwater, and miscellaneous materials that were loaded for off-site disposal are provided in Appendices G-1, G-2, and G-3, respectively.
- As summarized in Section 8.4, clean fill documentation is provided in Appendix H.

8.1 As-Built Drawings

The following as-built diagrams are included in Appendix F:

- An as-built diagram depicting the final extents of the excavation for the MSA (AOC-1B).
- An as-built diagram depicting the locations of in-place samples associated with the RI and MSA sampling programs.
- An as-built diagram of the final site grades following restoration of the MSA (AOC-1B).

8.2 Total Remedial Action Cost

PPG's total remediation cost for implementation of the MSA (AOC-1B) remedial action was estimated at approximately $668,000. This includes costs for characterization, engineering, excavation and backfilling, air monitoring, construction, management, groundwater management, waste transportation and disposal, and overall project management and reporting.

8.3 Documentation of Waste Generation and Disposal

The approximate weight of solid material excavated from the Site and disposed of off site is 250 tons, based on estimates from the bills of lading (BOLs). The approximate volume of liquid material exported from the Site for off-site disposal is 9,000 gallons, based on estimates from the BOLs. Waste profiles and BOLs for the site excavation are provided in Appendix G.

The quantities and BOLs included in this RAR represent all waste generated from December 2020 to February 2021. Creosote timbers were also generated as a result of the remedial action and disposed of offsite. The following facilities were used for the off-site disposal of waste materials generated during the remedial action:

- Nonhazardous liquid waste (water):
    - Groundwater was transferred to the on-site treatment plant located at the Garfield Avenue Group Site 137, located at 24-45 Halladay Street, Jersey City, New Jersey (Site 137) for pre-treatment and was discharged to the public sewer system (conveyed via the Jersey City Municipal Utilities Authority system) to the Passaic Valley Sewerage Commission (PVSC) wastewater treatment plant in Newark, New Jersey for final treatment and discharge in accordance with the PVSC Sewer Use Permit # 31630035.
- Nonhazardous solid waste:
    - Clean Earth of New Jersey, Inc., treatment, storage, and disposal facility located in Kearny, New Jersey
    - Cumberland County Improvement Authority (CCIA) landfill located in Deerfield Township, New Jersey.

As part of the COVID protocol put in place by the CCIA, the solid waste manifests provided in Appendix G were not signed upon receipt. Entry of the scaled weights were considered to be the receipt and acknowledgement for the BOLs.

8.4 Documentation of Source, Type, Quantities, and Location of Fill

Backfill consisted of licensed quarry material supplied by Tilcon (from their licensed mine facilities: Mt. Hope Road in Wharton, New Jersey and Broad Street in Pompton Lakes, New Jersey), a licensed quarry facility permitted to operate as a commercial quarry by the NJDEP. Backfilling of the MSA remedial excavation commenced on February 15, 2021 and was completed on February 16, 2021.

To meet the minimum requirements of the Alternative and Clean Fill Guidance for SRP Sites (NJDEP 2015), sources of imported fill were:

- Certified by the supplier as clean from a virgin source, based on their knowledge of the place of origin and history.
- A representative sample of fines was analyzed to confirm that concentrations of volatile organic compounds, semi-volatile organic compounds, pesticides, polychlorinated biphenyls, metals, extractable petroleum hydrocarbons, cyanide, and hexavalent chromium were less than the NJDEP RDCSRS and the licensed quarry material did not pose a potential impact to groundwater.

In addition, the Site Construction Manager implemented a stringent visual inspection process, by on-site personnel, to verify the quality of the backfill. Visual inspection criteria included the presence of foreign debris, the ratio of fines in the material, and significant differences in color.

Quarry material load reports and analytical reports with mine certifications are provided in Appendices H-1 and H-2. Documentation is presented based on mine facility (Mount Hope and Pompton Lakes).

8.5 Identification of Required Permits and Authorizations

The permits and approvals needed for the MSA (AOC-1B) remedial action are listed below:

- SESCP approvals from the HEPSCD (Appendix A-5)
- Discharge to Surface Water General Permit for Construction Activity - Stormwater (5G3) from the NJDEP, Division of Water Quality (Appendix A-6)
- PVSC Sewer Use Permit #31630035 (Site 137 groundwater treatment plant; Appendix A-7).

The necessary permits were obtained from and approved by state, local, and county agencies before initiating the activities for the Majority Site Area (AOC-1A).

9 Receptor Evaluation Update

The purpose of a receptor evaluation is to document the existence of human or ecological receptors, and the actions taken to protect those receptors, at contaminated sites. Pursuant to N.J.A.C. 7:25E-1.12, RE Forms must include general site information, an evaluation of surrounding land use, a description of contamination, a discussion of groundwater use in the area, an evaluation of vapor intrusion potential, and an ecological evaluation.

The Receptor Evaluation Report was submitted as part of the RIR (Dresdner Robin 2013) and updated in Arcadis (2021). The RE Form and required attachments are provided as Attachment 3.

10 Conclusions and Recommendations

10.1 Area of Concern 1A Soil

Soil remedial action specific to the Majority Site Area, or AOC-1A, was reported by PPG in a separate RAR (Arcadis 2021).

10.2 Area of Concern 1B Soil

This RAR documents that the soil remedial action performed at AOC-1B is effective in protecting public health and safety, and the environment, and that remedial objectives have been achieved as follows:

- Excavation of soil containing hexavalent chromium met the requirements specified in the Chromium Policy (NJDEP 2007).
- CCPW metals concentrations in remaining soil comply with the NJDEP RDCSRS, CrSCC, or ARS.
- Remaining soil concentrations of CCPW metals in the unsaturated zone comply with the IGWSSLs for antimony and thallium, and the IGWSRS for nickel.

On this basis, PPG (the responsible party) has demonstrated compliance with the applicable remediation requirements for AOC-1B soils and no further action is required. PPG requests the closure of AOC-1B soil by the NJDEP through the issuance of a Consent Judgment Compliance Letter.

10.3 Area of Concern 2 Groundwater

Site groundwater is being investigated and reported separately by PPG.

11 References

AECOM. 2010. Field Sampling Plan/Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey. June.

AECOM. 2020. Groundwater Remedial Investigation Work Plan. July.

Arcadis. 2018a. Quality Assurance Project Plan Addendum. Prepared for PPG. June.

Arcadis. 2018b. Technical Execution Plan. Prepared for PPG. October.

Arcadis. 2019. Air Monitoring Plan Amendment. Prepared for PPG. November.

Arcadis. 2020. Sampling Plan for Vanadium-Only Area. November.

Arcadis. 2021. Remedial Action Report Site 107 Majority Site Area Soil (AOC-1A). October.

CBI. 2013. Vanadium Exceedances in Fill Unrelated to CCPW Fill Memo. May.

CB&I. 2016. Remedial Action Work Plan. Prepared for PPG. September.

Dresdner Robin. 2013. Remedial Investigation Report. Prepared for PPG. March.

NJDEP. 1990. Administrative Consent Order. July.

NJDEP. 2007. NJDEP Memorandum from Lisa P. Jackson to Irene Kropp, Subject: Chromium Moratorium. February 8.

NJDEP. 2008a. N.J.A.C. 7:26D – Soil Remediation Standards. Adopted effective June 2, 2008. Readopted effective April 27, 2015. Last amended September 18, 2017.

NJDEP. 2008b. NJDEP Chromium Soil Cleanup Criteria. September 2008, revised April 2010.

NJDEP. 2010. Water Pollution Control Act. October.

NJDEP. 2011. NJDEP Field Sampling Procedures Manual. April.

NJDEP. 2012. Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria. September.

NJDEP. 2015. Alternative and Clean Fill Guidance for SRP Sites. April.

NJDEP. 2017. Standards for Soil Erosion and Sediment Control in New Jersey. July.

NJDEP. 2018a. N.J.A. C. 7:26C, Administrative Requirements for the Remediation of Contaminated Sites. Statutory authority N.J.S.A. 13:1D-1 et seq., 13:1K-6, 58:10-23.11 et seq., 58:10A-1 et seq., 58:10A-21 et seq., 58:10B-1 et seq., and 58:10C-1 et seq. August 6.

NJDEP. 2018b. N.J.A.C. 7:26E, Technical Requirements for Site Remediation. Statutory authority N.J.S.A. 13:1D et seq., 13:1E et seq., 13:1K-6 et seq., 58:10-23.11a et seq., 58:10A-1 et seq., 58:10A-21 et seq., and 58:10B-1 et seq. August 6.

Riccio, R.J. 2021. Letter from Ronald J. Riccio to The Honorable Jeffrey R. Jablonski, P.J. Ch., Subject: PROGRESS REPORT (January 30, 2021 through the date of this Report): New Jersey Department of Environmental Protection, et al. v. Honeywell International, Inc., et al. v. City of Jersey City, et al., Superior Court of New Jersey, Chancery Division, Hudson County, Civil Action No. HUD-C-77-05; Partial Consent Judgment Concerning the PPG Sites filed June 26, 2009. July.

Superior Court of New Jersey Law Division – Hudson County. 2009. Partial Consent Judgment Concerning the PPG Sites. New Jersey Department of Environmental Protection and the Administrator of the New Jersey Spill Compensation Fund, Plaintiffs, v. Honeywell International, Inc., Occidental Chemical Corporation and PPG Industries, Inc., Defendants, v. City of Jersey City, Jersey City Municipal Utilities Authority, Jersey City Incinerator Authority, and New Jersey Turnpike Authority, Third Party Defendants. Filed June 26, 2009.

USGS. 1996. Bedrock Geology Map of Northern New Jersey, Miscellaneous Series Map I-2540-A. Drake et al.