Appendix F

Notice in Lieu of a Deed Notice (Draft)

Return Address:
APTIM
200 Horizon Center
Trenton, New Jersey 08691

NOTICE IN LIEU OF DEED NOTICE

THIS DOCUMENT SHALL BE DISTRIBUTED TO THE ENTITIES IDENTIFIED IN ACCORDANCE WITH N.J.A.C. 7:26C-7.2(b)2

Prepared by: _____
[Signature]

Crystal L. Leavey, Aptim Environmental & Infrastructure, LLC
[Print name below signature]

This Notice in Lieu of a Deed Notice is made as of the _____ day of _____, 2019, by the City of Jersey City, 280 Grove Street, Jersey City, New Jersey 07302 ("Owner").

1. THE PROPERTY. The City of Jersey City, 280 Grove Street, Jersey City, New Jersey 07302, is the owner in fee simple of certain real property located within the right-of-way of portions of Burma Road and Morris Pesin Drive, adjacent to and abutting certain real property designated as Block 21503, Lot 11 on the tax map of the City of Jersey City, Hudson County, New Jersey; and the property is more particularly described in Exhibit A, which is attached hereto and made a part hereof (the "Property").

2. REMEDIATION.

i. The New Jersey Department of Environmental Protection (Department) has approved this Notice in Lieu of a Deed Notice as an institutional control for the Property, which is part of the remediation of the Property for chromium-related impacts. The Department Program Interest Number (Preferred ID) for the contaminated site which includes the Property is G00008693 and referred to as Hudson County Chromate Site 65 (Site). The Property is subject to a Consent Judgment between the Department and Honeywell et al. filed September 7, 2011, Superior Court of New Jersey, Chancery Division-Hudson County, Docket No. C-77-05 ("Consent Judgment") and a Partial Consent Judgment between PPG and Honeywell et al. filed June 26, 2009, Superior Court of New Jersey, Chancery Division-Hudson County, Docket No. C-77-05 ("Partial Consent Judgment"). PPG has responsibility for remediation of chromium-related contamination at Hudson County Chromate Site 65 in accordance with the Consent Judgment and Partial Consent Judgment. Remedial actions for chromium-related impacts were addressed in a January 9, 2018 Settlement Agreement ("Settlement Agreement") between the Department, PPG, the City of Jersey City, and the Jersey City Municipal Utilities Authority (JCMUA).

ii. N.J.A.C. 7:26C-7 requires the Owner, among other persons, to obtain a soil remedial action permit for the soil remedial action at the Property. That permit will contain the monitoring, maintenance and biennial certification requirements that apply to the Property.

3. SOIL CONTAMINATION. PPG is responsible for remediation of the Property to address chromium-related contamination. The remedial action will be consistent with the provisions of the Settlement Agreement, and soil contamination remains in certain areas of the Property in concentrations that do not allow for the unrestricted use of the Property; this soil contamination is described, including the type, concentration and specific location of such contamination, and the existing engineering controls on the site are described, in Exhibit B, which is attached hereto and made a part hereof. As a result, there is a statutory requirement for this Notice in Lieu of a Deed Notice and engineering controls in accordance with N.J.S.A. 58:10B-13.

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

5A. RESTRICTED AREAS. Due to the presence of contamination remaining at concentrations that do not allow for unrestricted use, the Owner has agreed, as part of the remedial action for the Property, to restrict the use of certain parts of the Property (the "Restricted Areas"); a narrative description of these restrictions is provided in Exhibit C, which is attached hereto and made a part hereof. The Owner has also agreed to maintain a list of these restrictions available for inspection by governmental officials.

5B. RESTRICTED LAND USES. The following statutory land use restrictions apply to the Restricted Areas:

i. The Brownfield and Contaminated Site Remediation Act, N.J.S.A. 58:10B-12.g(10), prohibits the conversion of a contaminated site, remediated to non-residential soil remediation standards that require the maintenance of engineering or institutional controls, to a child care facility, or public, private, or charter school without the Department's prior written approval, unless a presumptive remedy is implemented; and

ii. The Brownfield and Contaminated Site Remediation Act, N.J.S.A. 58:10B-12.g(12), prohibits the conversion of a landfill, with gas venting systems and or leachate collection systems, to a single family residence or a child care facility.

5C. ENGINEERING CONTROLS. Due to the presence and concentration of these contaminants, the Owner has also agreed, as part of the remedial action for the Property, to the placement of certain engineering controls on the Property; a narrative description of these engineering controls is provided in Exhibit C.

5D. WORKER TRAINING MANUAL/STANDARD OPERATING PROCEDURE.

A Worker Training Manual has been prepared for use by the owner, lessee, and/or operators for the protection of workers who may be potentially exposed to chromium-impacted soils or groundwater in conjunction with utility or other ground intrusive work on the Property; the Worker Training Manual identifies health and safety requirements for the protection of personnel and contractors who may perform ground intrusive activities (e.g., digging, drilling, excavation) that may disturb existing engineering controls and informs workers of potential hazards associated with chromium-impacted media. Owner shall make the Worker Training Manual available to operators, tenants, contractors, and/or utility workers intending to conduct invasive work within the Restricted Area to prevent unauthorized disturbance of engineering controls and potential exposure to contaminants. The JCMUA and/or PPG will make the Worker Training Manual available to owners/operators, tenants, contractors, and/or utility workers in the event that the JCMUA and/or PPG are notified of invasive work by owners/operators, tenants, contractors and/or utility workers. A Standard Operating Procedure (SOP) which has been prepared addresses the identification, notification, and coordination of work between PPG and the JCMUA related to the utilities located within the Site. The Worker Training Manual is an attachment to the SOP, which has been prepared in accordance with the requirements of the Sewer Protocol (Appendix B of the Consent Judgement), and addresses procedures for utility workers to safely repair or replace utilities at sites containing chromium-impacted fill and is provided in Exhibit D, which is attached hereto and made a part hereof.

6A. CHANGE IN OWNERSHIP AND REZONING.

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

ii. The Owner and the subsequent owners shall provide written notice to the Department on a form provided by the Department and available at https://www.state.nj.us/dep/srp/srra/forms/ within 30 calendar days after the effective date of any conveyance, grant, gift, or other transfer, in whole or in part, of the Owner's or subsequent owner's interest in the Restricted Area.

iii. The Owner and the subsequent owners shall provide written notice to the Department, on a form available from the Department at https://www.state.nj.us/dep/srp/srra/forms/, within thirty (30) calendar days after the owner's petition for or filing of any document initiating a rezoning of the Property to residential.

6B. SUCCESSORS AND ASSIGNS. This Notice in Lieu of a Deed Notice shall be binding upon Owner and upon Owner's successors and assigns, and subsequent owners, lessors, lessees and operators while each is an owner, lessor, lessee, or operator of the Property.

7A. ALTERATIONS, IMPROVEMENTS, AND DISTURBANCES.

i. The Owner and all subsequent owners, lessors, and lessees shall notify any person, including, without limitation, tenants, employees of tenants, and contractors, intending to conduct invasive work or excavate within the Restricted Areas, of the nature and location of contamination in the Restricted Areas, and, of the precautions necessary to minimize potential human exposure to contaminants.

ii. Except as provided in Paragraph 7B, below, no person shall make, or allow to be made, any alteration, improvement, or disturbance in, to, or about the Property which disturbs any engineering control at the Property without first retaining a licensed site remediation professional (LSRP) as specified in the Settlement Agreement. Nothing herein shall constitute a waiver of the obligation of any person to comply with all applicable laws and regulations including, without limitation, the applicable rules of the Occupational Safety and Health Administration.

iii. Notwithstanding subparagraph 7A.ii., above, a soil remedial action permit modification is not required for any alteration, improvement, or disturbance provided that the owner, lessor, lessee or operator:

(A) Notifies the Department of the activity by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337, within twenty-four (24) hours after the beginning of each alteration, improvement, or disturbance;

(B) Notifies PPG of the activity by calling the Chromium Cleanup Partnership at 201-777-2099;

(C) Restores any disturbance of an engineering control to pre-disturbance conditions within sixty (60) calendar days after the initiation of the alteration, improvement or disturbance;

(D) Follows all applicable worker health and safety laws and regulations during the alteration, improvement, or disturbance, and during the restoration;

(E) Takes appropriate measures so that human exposure to contamination in excess of the remediation standards does not occur; and

(F) Describes, in the next biennial certification the nature of the alteration, improvement, or disturbance, the dates and duration of the alteration, improvement, or disturbance, the name of key individuals and their affiliations conducting the alteration, improvement, or disturbance, a description of the notice the Owner gave to those persons prior to the disturbance.

7B. EMERGENCIES. In the event of an emergency which presents, or may present, an unacceptable risk to the public health and safety, or to the environment, or an immediate

environmental concern, see N.J.S.A. 58:10C-2, any person may temporarily breach an engineering control provided that that person complies with each of the following:

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

ii. Immediately notifies PPG of the emergency by calling the Chromium Cleanup Partnership at 201-777-2099;

iii. Hires a Licensed Site Remediation Professional (unless the Restricted Areas includes an unregulated heating oil tank) to respond to the emergency, consistent with the Settlement Agreement;

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

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

vi. Notifies the Department when the emergency or immediate environmental concern has ended by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337; and

vii. Restores the engineering control to the pre-emergency conditions as soon as possible; and

viii. Submits to the Department within sixty (60) calendar days after completion of the restoration of the engineering control, a report including: (a) the nature and likely cause of the emergency; (b) the measures that have been taken to mitigate the effects of the emergency on human health and the environment; (c) the measures completed or implemented to restore the engineering control; and (d) the changes to the engineering control or site operation and maintenance plan to prevent reoccurrence of such conditions in the future.

8. TERMINATION OF NOTICE IN LIEU OF A DEED NOTICE.

i. This Notice in Lieu of a Deed Notice may be terminated only upon recording a Department-approved Termination of a Notice in Lieu of Deed Notice, available at N.J.A.C. 7:26C Appendix C, with the Affected Parties as identified in N.J.A.C. 7:26C-7.2(b)2, expressly terminating this Notice in Lieu of a Deed Notice.

ii. Within 30 calendar days after recording a Department-approved Termination of Notice in Lieu of a Deed Notice, the owner of the property should apply to the Department for termination of the soil remedial action permit pursuant to N.J.A.C. 7:26C-7.

9. ACCESS. The Owner, and the subsequent owners, lessors, lessees, and operators agree to allow the Department, its agents and representatives access to the Property to inspect and

evaluate the continued protectiveness of the remedial action that includes this Notice in Lieu of Deed Notice and to conduct additional remediation to ensure the protection of the public health and safety and of the environment if the subsequent owners, lessors, lessees, and operators, during their ownership, tenancy, or operation, and the Owner fail to conduct such remediation pursuant to this Notice in Lieu of Deed Notice as required by law. The Owner, and the subsequent owners, lessors, and lessees, shall also cause all leases, subleases, grants, and other written transfers of an interest in the Restricted Areas to contain a provision expressly requiring that all holders thereof provide such access to the Department.

10. ENFORCEMENT OF VIOLATIONS.

i. This Notice in Lieu of Deed Notice itself is not intended to create any interest in real estate in favor of the Department of Environmental Protection, nor to create a lien against the Property, but merely is intended to provide notice of certain conditions and restrictions on the Property and to reflect the regulatory and statutory obligations imposed as a conditional remedial action for this site.

ii. The restrictions provided herein may be enforceable solely by the Department against any person who violates this Notice in Lieu of a Deed Notice. To enforce violations of this Notice in Lieu of a Deed Notice, the Department may initiate one or more enforcement actions pursuant to N.J.S.A. 58:10-23.11, and N.J.S.A. 58:10C, and require additional remediation and assess damages pursuant to N.J.S.A. 58:10-23.11, and N.J.S.A. 58:10C.

11. SEVERABILITY. If any court of competent jurisdiction determines that any provision of this Notice in Lieu of aDeed Notice requires modification, such provision shall be deemed to have been modified automatically to conform to such requirements. If a court of competent jurisdiction determines that any provision of this Notice in Lieu of a Deed Notice is invalid or unenforceable and the provision is of such a nature that it cannot be modified, the provision shall be deemed deleted from this instrument as though the provision had never been included herein. In either case, the remaining provisions of this Notice in Lieu of a Deed Notice shall remain in full force and effect.

12A. EXHIBIT A. Exhibit A includes the following maps of the Property and the vicinity:

i. Exhibit A-1: Vicinity Map - A map that identifies by name the roads, and other important geographical features in the vicinity of the Property (for example, USGS Quad map, Hagstrom County Maps);

ii. Exhibit A-2: Metes and Bounds Description - A tax map of lots and blocks as well as metes and bounds description of the restricted area within the Property, including references to tax lot and block numbers for the properties adjacent to the Property;

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

12B. EXHIBIT B. Exhibit B includes the following descriptions of the Restricted Areas:

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

(A) As-built diagrams of each engineering control, including caps, fences, slurry walls, (and, if any) ground water monitoring wells, extent of the ground water classification exception area, pumping and treatment systems that may be required as part of a ground water engineering control in addition to the Notice in Lieu of a Deed Notice

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

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

ii. Exhibit B-2: Restricted Area Data Table - A separate table for each restricted area that includes either (A) or (B) through (F):

(A) Only for historic fill extending over the entire site or a portion of the site and for which analytical data are limited or do not exist, a narrative that states that historic fill is present at the site, a description of the fill material (e.g., ash, cinders, brick, dredge material), and a statement that such material may include, but is not limited to, contaminants such as PAHs and metals;

(B) Sample location designation from Restricted Area map (Exhibit B-1);

(C) Sample elevation based upon mean sea level;

(D) Name and chemical abstract service registry number of each contaminant with a concentration that exceeds the unrestricted use standard;

(E) The restricted and unrestricted use standards for each contaminant in the table; and

(F) The remaining concentration of each contaminant at each sample location at each elevation.

12C. EXHIBIT C. Exhibit C includes narrative descriptions of the institutional controls and engineering controls as follows:

i. Exhibit C-1: Notice in Lieu of Deed Notice as Institutional Control: Exhibit C-1 includes a narrative description of the restriction and obligations of this Notice in Lieu of Deed Notice that are in addition to those described above, as follows:

(A) Description and estimated size in acres of the Restricted Areas as described above;

(B) Description of the restrictions on the Property by operation of this Notice in Lieu of a Deed Notice; and

(C) The objective of the restrictions.

ii. Exhibit C-2: Asphalt Capping: Exhibit C-2 includes a narrative description of the Asphalt Capping engineering control as follows:

(A) Description of the engineering control;

(B) The objective of the engineering control; and

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

12D. EXHIBIT D. January 9, 2018 Settlement Agreement between the Department, PPG, the City of Jersey City, and the JCMUA: Exhibit D includes the fully executed January 9, 2018 Settlement Agreement with all figures and exhibits and narrative descriptions the Property, the Worker Training Manual/Standard Operating Procedure to be followed by owners/operators, tenants, contractors, and/or utility workers in the event of intrusive work within the Restricted Areas on the Property.

13. SIGNATURES. IN WITNESS WHEREOF, Owner has executed this Notice in Lieu of a Deed Notice as of the date first written above.

ATTEST: The City of Jersey City

_____ By_____

_____ _____
[Print name and title] [Signature]

STATE OF NEW JERSEY SS:
COUNTY OF HUDSON

I certify that on _____, 2019, _____ personally came before me, and this person acknowledged under oath, to my satisfaction, that:

(a) this person is the [secretary/assistant secretary] of the City of Jersey City, the corporation named in this document;

(b) this person is the attesting witness to the signing of this document by the proper corporate officer who is the [enter title] of the corporation;

(c) this document was signed and delivered by the corporation as its voluntary act and was duly authorized;

(d) this person knows the proper seal of the corporation which was affixed to this document; and

(e) this person signed this proof to attest to the truth of these facts.

_____
[Signature]

_____
[Print name and title of attesting witness]

Signed and sworn before me on _____, 2019

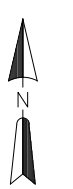
_____, Notary Public

_____
[Print name and title]

EXHIBIT A

A-1 Vicinity Map
A-2 Metes and Bounds Description and Tax Map
A-3 Property Map

DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY
146429-A1	C.L. 4/9/18	C.L. 4/9/18	A.Y. 4/9/18



SCALE

0 2000' 4000'

Site NJ State Plane Coordinates:
N 680465'
E 612391'

Sources:
JERSEY CITY, NJ USGS Topographic Quadrangle, 7.5-minute series, dated 1967

Aptim Environmental & Infrastructure, LLC
200 Horizon Center
Trenton, New Jersey 08691

EXHIBIT A-1
VICINITY MAP

SITE 065
1 BURMA ROAD
JERSEY CITY, NEW JERSEY

File: K:\Project\146429-PPG\146429-A1.dwg
Plot Date/Time: Apr 09, 2018 - 3:24pm
Plotted By: andrius.yanavicius

MASER CONSULTING P.A.

Engineers
Planners
Surveyors
Landscape Architects
Environmental Scientists

Corporate Headquarters
331 Newman Springs Road, Suite 203
Red Bank, NJ 07701
T: 732.383.1950
F: 732.383.1984
www.maserconsulting.com

DESCRIPTION OF PROPERTY
CITY OF JERSEY CITY
HUDSON COUNTY, NEW JERSEY

SITE 65 BOUNDARY
NOVEMBER 27, 2017
PROJECT NO. 14000664C

All that certain lot, tract or parcel of land situate, lying and being in the City of Jersey City, in the County of Hudson and the State of New Jersey, and being a portion of Burma Road and Morris Pesin Drive as shown on a map entitled "Boundary Survey of Lot 11, Block 21503, Tax Map of the City of Jersey City, Hudson County, State of New Jersey", prepared by Faraldi Group, Inc. dated May 3, 2013, and being more particularly bounded and described as follows, to wit:

Beginning at the intersection of the northeasterly right of way line of Morris Pesin Drive (variable width Right of Way) with the line dividing Lot 11, Block 21503, and the southeasterly right of way line of the New Jersey Turnpike, thence–

1) **S 43°34'13" E, 19.08 feet**, along the southerly line of said Lot 11, Block 21503; thence–

2) Along an arc along the same, having a radius of **173.64 feet** and curving to the left, an arc distance of **304.41 feet** (Central Angle of 100°26'42"), said arc being connected by a chord distance of **266.90 feet**, and a chord bearing of **N 86°12'26" E**, to a point of tangency; thence–

3) **N 35°59'26" E, 601.18 feet**, along the southeasterly line of said Lot 11, Block 21503; thence–

Running through Burma Road (40 foot wide Right of Way), the following six (6) courses;

4) **S 54°06'04" E, 4.52 feet**; thence–

5) **S 35°54'34" W, 626.52 feet**; thence–

6) Along an arc having a radius of **105.14 feet** and curving to the right, an arc distance of **49.91 feet** (Central Angle of 27°11'54"), said arc being connected by a chord distance of **49.44 feet**, and a chord bearing of **S 49°30'31" W**, to a point of compound curvature; thence–

7) Along an arc having a radius of **206.61 feet** and curving to the right, an arc distance of **214.00 feet** (Central Angle of 59°20'45"), said arc being connected by a chord distance of **204.56 feet**, and a chord bearing of **N 87°13'09"** W, to a point; thence–

8) **N 39°28'00" W, 48.88 feet**; thence–

9) **N 43°22'18" E, 5.89 feet** to the Point and Place of **BEGINNING**.

MASER
CONSULTING P.A.

DESCRIPTION OF PROPERTY
CITY OF JERSEY CITY
HUDSON COUNTY, NEW JERSEY

SITE 65 BOUNDARY
NOVEMBER 27, 2017
PROJECT NO. 14000664C

CONTAINING: 5,601 square feet or 0.129 acres of land, more or less.

Jeffrey D. Bunce 11/27/17

JEFFREY D. BUNCE, P.L.S. DATE SIGNED
NEW JERSEY PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER GS41045

R:\AllOffices\MtArlington\Projects\2014\14000664C\Survey\Description\revised 11-22-17\site 65 boundary.docx

File: K:\Project\146429-PPG\sites 63 and 65\SITE 65\151136-A3.dwg
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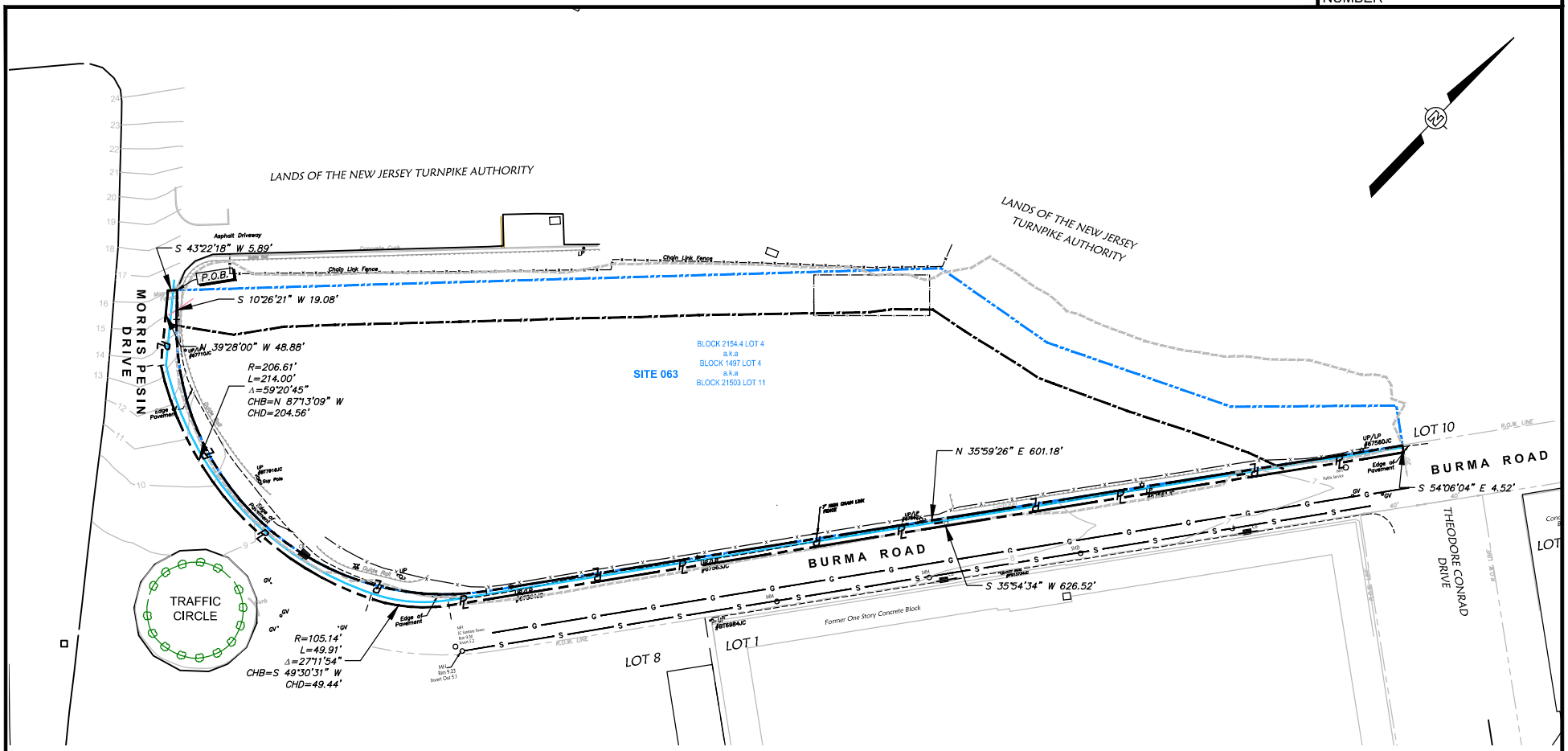
Plotted By: Andrius.Yanavicius

DRAWING NUMBER 151136-A2.dwg



SCALE
0 100 200 FEET

LEGEND

- PROPERTY LINE SITE 065
- SITE 063 BOUNDARY
- SURFACE DISTURBANCE BOUNDARY
- CHAIN-LINK FENCE
- 16" WATER LINE
- GAS LINE
- STORMWATER LINE
- SPECTRA NATURAL GAS PIPELINE CENTERLINE

REFERENCE:

1. "BURMA ROAD EXHIBIT" DRAWING NO. 14000664C BY MASER CONSULTING, PA. LAST REVISED ON DECEMBER 19, 2017.
2. HUDSON COUNTY CHROMATE REMEDIATION SITE NUMBER 065 IS THE NARROW STRIP OF LAND ON THE WEST SIDE OF BURMA ROAD, BETWEEN BURMA ROAD AND SITE 063 AND SHOULDER OF BURMA ROAD.
3. HORIZONTAL DATUM REFERENCE, NEW JERSEY STATE PLANE COORDINATE SYSTEM (NAD 83). VERTICAL DATUM REFERENCE, NORTH AMERICAN VERTICAL DATUM SYSTEM OF 1988 (NAVD 88).
4. THE GROUNDWATER ELEVATION USED FOR THE EVALUATION OF THE IMPACT TO GROUND WATER (IGW) EXPOSURE PATHWAY IS 5.2 FEET NAVD 88.

APTIM
Aptim Environmental & Infrastructure, LLC
200 Horizon Center
Trenton, New Jersey 08691

DESIGNED BY: C. Leavey	EXHIBIT A-3 PROPERTY MAP NOTICE IN LIEU OF DEED NOTICE JERSEY CITY RIGHT-OF-WAY BURMA ROAD AND MORRIS PESIN DRIVE
DRAWN BY: A. Y.	
CHECKED BY: C. Leavey	

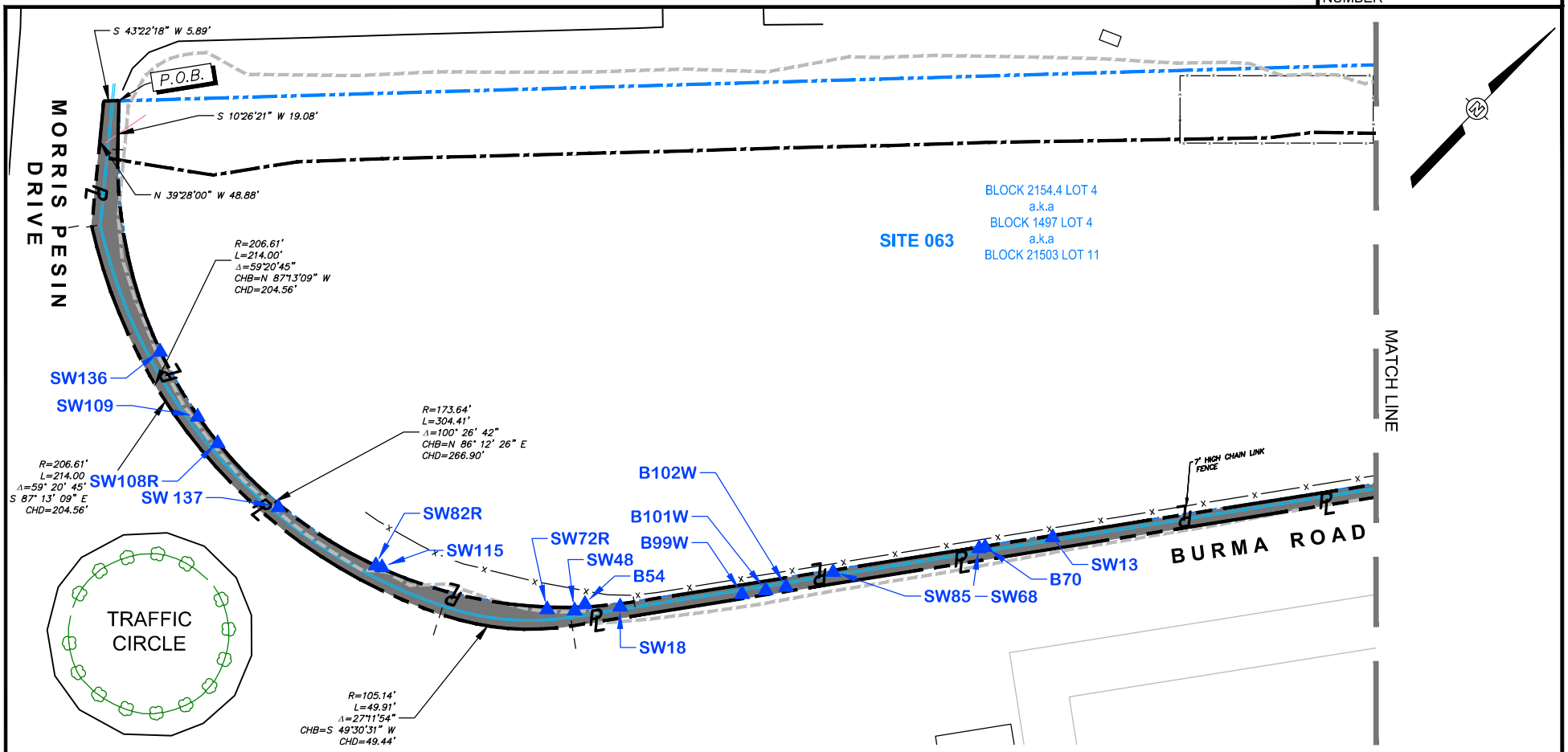
APPROVED BY:	DATE:	SCALE:	DRAWING NO.	SHEET, NO.
C. Leavey	1/29/19	AS SHOWN	151136-A2.dwg	1

EXHIBIT B

B-1 Restricted Area Map
B-2 Restricted Area Data Table

File: K:\Project\146429-PPG\sites 63 and 65\SITE 65\151136-A3-1.dwg
Plot Date/Time: Mar 01, 2019 - 11:49am
Plotted By: Andrius.Yanavicius

DRAWING NUMBER 151136-A3-1.dwg



SCALE
0 60 120 FEET

LEGEND

- PROPERTY LINE SITE 065/ RESTRICTED AREA BOUNDARY
- SITE 063 BOUNDARY
- SURFACE DISTURBANCE BOUNDARY
- POST-EXCAVATION BASE AND SIDEWALL SAMPLE
- CHAIN-LINK FENCE
- 16" WATER LINE
- SPECTRA NATURAL GAS PIPELINE CENTERLINE

SURFICIAL CAP TYPE:
- ASPHALT CAP

REFERENCE:

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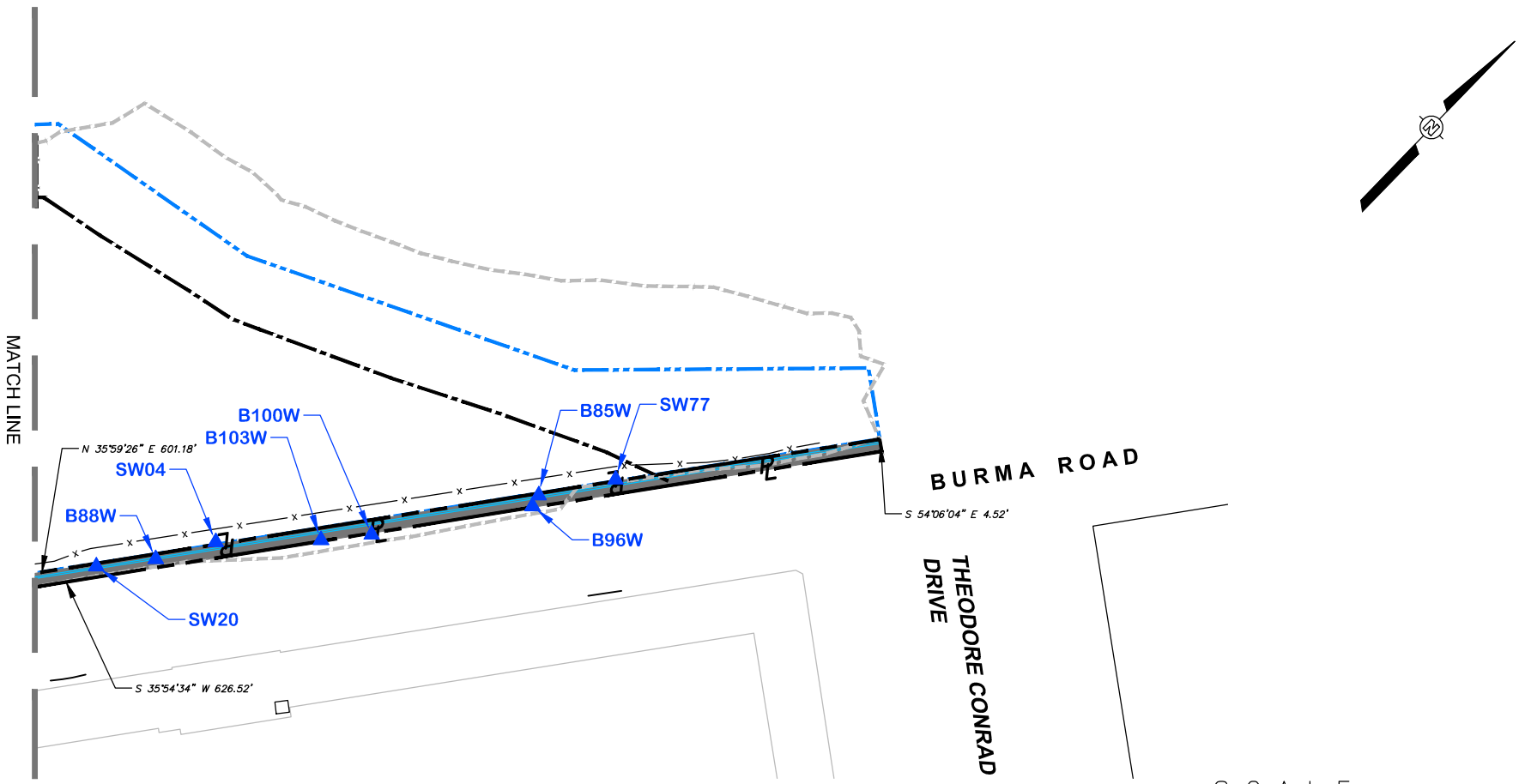
APTIM
Aptim Environmental & Infrastructure, LLC
200 Horizon Center
Trenton, New Jersey 08691

DESIGNED BY:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:	SCALE:	DRAWING NO.	SHEET NO.
C. Leavey	A. Y.	C. Leavey	C. Leavey	1/29/19	AS SHOWN	151136-A3.dwg	1 of 2

EXHIBIT B-1
RESTRICTED AREA MAP
NOTICE IN LIEU OF DEED NOTICE
JERSEY CITY RIGHT-OF-WAY
BURMA ROAD AND
MORRIS PESIN ROAD

File: K:\Project\146429-PPG\sites 63 and 65\SITE 65\151136-A3-1.dwg
Plot Date/Time: Mar 01, 2019 - 11:49am
Plotted By: Andrius.Yanavicius

DRAWING NUMBER 151136-A3.dwg



LEGEND

- PROPERTY LINE SITE 065/ RESTRICTED AREA BOUNDARY
- SITE 063 BOUNDARY
- SURFACE DISTURBANCE BOUNDARY
- POST-EXCAVATION BASE AND SIDEWALL SAMPLE
- CHAIN-LINK FENCE
- 16" WATER LINE
- SPECTRA NATURAL GAS PIPELINE CENTERLINE
- SURFICIAL CAP TYPE: ASPHALT CAP

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1. "BURMA ROAD EXHIBIT" DRAWING NO. 14000664C BY MASER CONSULTING, PA. LAST REVISED ON DECEMBER 19, 2017.
2. HUDSON COUNTY CHROMATE REMEDIATION SITE NUMBER 065 IS THE NARROW STRIP OF LAND ON THE WEST SIDE OF BURMA ROAD, BETWEEN BURMA ROAD AND SITE 063 AND SHOULDER OF BURMA ROAD.
3. HORIZONTAL DATUM REFERENCE, NEW JERSEY STATE PLANE COORDINATE SYSTEM (NAD 83). VERTICAL DATUM REFERENCE, NORTH AMERICAN VERTICAL DATUM SYSTEM OF 1988 (NAVD 88).
4. THE GROUNDWATER ELEVATION USED FOR THE EVALUATION OF THE IMPACT TO GROUND WATER (IGW) EXPOSURE PATHWAY IS 5.2 FEET NAVD 88.

Aptim Environmental & Infrastructure, LLC
200 Horizon Center
Trenton, New Jersey 08691

DESIGNED BY:	C. Leavey
DRAWN BY:	A. Y.
CHECKED BY:	C. Leavey
APPROVED BY:	C. Leavey
DATE:	1/29/19
SCALE:	AS SHOWN
DRAWING NO.	151136-A3.dwg
SHEET NO.	2 of 2

EXHIBIT B-1
RESTRICTED AREA MAP
NOTICE IN LIEU OF DEED NOTICE
JERSEY CITY RIGHT-OF-WAY
BURMA ROAD AND
MORRIS PESIN ROAD

Exhibit B-2
Sample Summary Table
Site 65, Burma Road Morris Pesin Drive, Jersey City, NJ
NJDEP SRP ID G000008693
Sampled by APTIM (f/k/a CB&I)

Sample ID	Easting	Northing	Approximate Sample Depth (ft bgs)	Sample Elevation Interval (ft msl)
B54	612238.2	680254.6	6.0-6.5	1.8-2.3
B70	612332.5	680380.3	5.5-6.0	1.5-2
B85W	612531.0	680653.0	4.1-4.6	2.3-2.8
B88W	612448.8	680538.0	4.0-4.5	3.2-3.7
B96W	612532.2	680648.6	6.9-7.4	-0.5-0
B99W	612278.6	680300.6	4.8-5.3	1.8-2.3
B100W	612498.1	680599.9	6.0-6.5	1-1.5
B101W	612284.1	680308.1	5.2-5.7	2.3-2.8
B102W	612288.7	680314.7	5.2-5.7	2.3-2.8
B103W	612486.5	680585.5	6.1-6.6	0.8-1.3
SW04	612458.8	680559.1	1.5-2	6-6.5
SW13	612348.4	680401.6	3.0-3.5	4.0-4.5
SW18	612248.6	680263.6	3.0-3.5	4.6-5.1
SW20	612435.4	680520.8	7.3-7.8	-0.2 - (0.3)
SW48	612237.1	680250.0	1.6-2.1	6-6.5
SW68	612331.2	680378.3	2.3-2.8	4.7-5.2
SW72R	612229.2	680242.8	0.7-1.2	6.5-7.0
SW77	612546.7	680676.9	1.9-2.4	4.3-4.8
SW82R	612165.3	680211.6	0-0.5	7.9-8.4
SW85	612297.6	680331.7	0-0.5	6.5-7
SW108R*	612093.0	680197.9	1.1-1.6	7.7-8.2
SW109	612080.2	680199.7	0.5-1	9-9.5
SW115	612171.7	680210.7	0.5-1	7-7.5
SW136*	612052.0	680207.2	1.3-1.8	8.8-9.3
SW 137*	612127.3	680197.0	0.7-1.2	7.5-8.0

Notes:
* = CCPW nodules observed in this location, samples placed on hold at lab.
ft msl = feet mean sea level
ft bgs = feet below ground surface
CCPW = Chromate Chemical Processing Waste

Exhibit B-2.1
Analytical Results - CCPW Metals
Site 65, Burma Road Morris Pesin Drive, Jersey City, NJ
NJDEP SRP ID G000008693
Sampled by APTIM (f/k/a CB&I)

Analyte	CAS #	NJ Non-Residential Direct Contact Soil (NJAC 7:26D 6/08)	NJ Residential Direct Contact Soil (NJAC 7:26D 6/08)	NJ Default Impact to Groundwater Soil Screening (11/13)	Units	Client Sample ID:	PPG 63/65_B54	PPG63/65_B70	PPG63/65_B85W	PPG63/65_B88W	PPG63/65_B96W	PPG63/65_B99W	PPG63/65_DUP- B99W	PPG63/65_B100W	PPG63/65_B101W	PPG63/65_B102W	PPG63/65_B103W
						Sample Elevations (ft msl):	1.8-2.3	1.5-2	2.3-2.8	3.2-3.7	-0.5-0	1.8-2.3	1.8-2.3	1-1.5	2.3-2.8	2.3-2.8	0.8-1.3
						Sample Depths (ft bgs):	6.0-6.5	5.5-6.0	4.1-4.6	4.0-4.5	6.9-7.4	4.8-5.3	4.8-5.3	6.0-6.5	5.2-5.7	5.2-5.7	6.1-6.6
						Excavated:											
						Lab Sample ID:	JB81181-2	JB84487-3	JB87201-2	JB87265-2	JB87890-3	JB88086-4	JB88086-6	JB88086-5	JB88134-3	JB88308-1	JB88725-1
						Date Sampled:	11/6/2014	12/17/2014	1/28/2015	1/29/2015	2/9/2015	2/11/2015	2/11/2015	2/11/2015	2/12/2015	2/13/2015	2/22/2015
						Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
							R Q	R Q	R Q	R Q	R Q	R Q	R Q	R Q	R Q	R Q	R Q
Chromium, Hexavalent	18540-29-9	20	-	-	mg/kg		0.98 NJ- / 0.61 NJ-	<0.53 *NJ	**11.6 *NJ- / 20.6 NJ-**	**163 NJ / 21.6**	<0.53 *NJ-/ <0.53 NJ-	**72 NJ- / 283 *NJ-**	**111 NJ- / 152 *NJ-**	2.3 NJ- / 1.4 *NJ-	**132 *NJ- / 106 NJ+**	**28.8 NJ+ / 11.1 *NJ+**	0.54 NJ- / 0.62 NJ-
Chromium	7440-47-3	120,000	-	-	mg/kg		49.1 EJ	277	483	5,290	48.1	4,310	3,850	899	7,450	3,610	59.3
Antimony	7440-36-0	450	31	6	mg/kg		3 NJ-	2.7 NJ-	<2.7 NJ-	**6.8 NJ-**	<2.6 NJ-	4.4 NJ-	<2.5 NJ-	3.6 NJ-	**14.8**	4.9 NJ-	<2.4NJ-
Nickel	7440-02-0	23,000	1,600	205^	mg/kg		19.9	13	22.3	19.3	14.3	19.2	19	41.7	20.8	19.2	22.2
Thallium	7440-28-0	79	5	3	mg/kg		<1.1	<1.4	<1.3	<1.3	<1.3	<1.2	<1.2	<1.3	<2.3	<1.3	<1.2
Vanadium	7440-62-2	1,100	390**	NA	mg/kg		16.6	30.1	31.4	46.4	17.2	40.3	38	70.1	24.4	21	18.1
Iron, Ferrous	15438-31-0	-	-	-	%		-	-	-	-	-	-	-	-	-	0.9	-
Redox Potential Vs H2	-	-	-	-	mv		254	8.9	317	321	224	74.1	85.3	136	83.5	143	339
Solids, Percent	-	-	-	-	%		90.2	75	77	82.2	74.9	80.4	80.9	73.2	86.3	79	84.3
Sulfide Screen	-	-	-	-			-	-	-	-	-	-	-	-	-	NEGATIVE	-
Total Organic Carbon	-	-	-	-	mg/kg		-	-	-	-	-	-	-	-	-	85,400	-
pH	-	-	-	-	su		8.15	10.12	7.46	8.19	7.82	11.29	11.17	7.95	11.21	10.98	8.04

Analytical Data Qualifiers:

< - The analyte was not detected at the stated reporting limit.

* - Duplicate analysis not within control limits; indeterminate bias direction.

J - The reported result is an estimated value.

*J - Duplicate analysis not within control limits; result is estimated with indeterminate bias direction.

EJ - The reported value is estimated because of the presence of interference; indeterminate bias direction.

N -The matrix spike sample recovery in the associated QC sample is not within QC limits.

- = no criteria or not analyzed

J+ - The result is estimated and may be biased high.

J- - The result is estimated and may be biased low.

R - The reported result is rejected .

Footnotes:

**The use of the USEPA Regional Soil Screening Level of 390 mg/kg for vanadium is proposed as an alternative remediation standard for the site. Based on: https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide-november-2015

ft msl = feet mean sea level

ft bgs = feet below ground surface

mg/kg = milligram per kilogram

su = standard unit

mv = millivolts

^Nickel site specific impact due to groundwater screen level method calculated using SPLP laboratory methods;
SPLP = Synthetic Precipitation Leaching Procedure.

The groundwater elevation used for the evaluation of the Impact to Ground Water (IGW) exposure pathway is 5.2 feet NAVD.

Result exceeded criteria

Exhibit B-2.1
Analytical Results - CCPW Metals
Site 65, Burma Road Morris Pesin Drive, Jersey City, NJ
NJDEP SRP ID G000008693
Sampled by APTIM (f/k/a CB&I)

Analyte	CAS #	NJ Non-Residential Direct Contact Soil (NJAC 7:26D 6/08)	NJ Residential Direct Contact Soil (NJAC 7:26D 6/08)	NJ Default Impact to Groundwater Soil Screening (11/13)	Units	Client Sample ID:	PPG 63/65_SW13	PPG63/65_SW18	PPG63/65_DUP	PPG63/65_SW20	PPG 63/65_SW48	PPG63/65_SW68	PPG63/65_SW72R	PPG63/65_SW77	PPG63/65_SW82R	PPG 63/65_SW85
						Sample Elevations (ft msl)	4.0-4.5	4.6-5.1	4.6-5.1	-0.2 - (0.3)	6-6.5	4.7-5.2	6.5-7.0	4.3-4.8	7.9-8.4	6.5-7
						Sample Depths (ft bgs)	3.0-3.5	3.0-3.5	3.0-3.5	7.3-7.8	1.6-2.1	2.3-2.8	0.7-1.2	1.9-2.4	0-0.5	0-0.5
						Excavated:										
						Lab Sample ID:	JB72034-5A	JB74463-1	JB74463-3	JB74943-1	JB81181-1	JB84487-4	JB86243-1	JB86141-2	JB88913-5	JB86495-2
						Date Sampled:	7/18/2014	8/19/2014	8/19/2014	8/22/2014	11/6/2014	12/17/2014	1/13/2015	1/12/2015	2/26/2015	1/16/2015
						Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Chromium, Hexavalent	18540-29-9	20	-	-	mg/kg	0.45	**21.1 NJ-**	<0.47 NJ-	<0.48 NJ-	**26.8 *NJ- / NJ-** **55.2**	<0.48 NJ- / NJ- <0.48	**116 *NJ+**	8.3 *NJ- / 7.4 *NJ-	**22.5 *NJ**	**3.1 NJ- / 23**	<0.51 *J
Chromium	7440-47-3	120,000	-	-	mg/kg	40.4	1010 NJ+	70.5	57.9	1,740	22.4 EJ	14,700	293	1,120	588	14,600
Antimony	7440-36-0	450	31	6	mg/kg	<2.1 NJ-	<2.1	5.1 NJ-	**8.6 NJ-**	**8.1 NJ-**	<2.2 NJ-	**18.2 NJ-**	<2.1 NJ-	<2.6 NJ-	<2.3 NJ-	**23.7 NJ-**
Nickel	7440-02-0	23,000	1,600	205^	mg/kg	12.5	14.5	22.3	**36.3**	21.8	17.7	23.7	26.6	**44.9**	**37.9**	27.5
Thallium	7440-28-0	79	5	3	mg/kg	<1.1	<1.0	<1.2	<1.2	<1.2	<1.1	<4.1	<1.1	<1.3	<1.1	<3.7
Vanadium	7440-62-2	1,100	390**	NA	mg/kg	21.1	32.4	17.5	22.4	34.5	35.2	31.6	51.3	101	78.1	90.2
Iron, Ferrous	15438-31-0	-	-	-	%		-	-	-	-	0.79	-	-	-	-	-
Redox Potential Vs H2	-	-	-	-	mv	376	243	272	239	435	-84.7	144	285	342	335	276
Solids, Percent	-	-	-	-	%	90	83	84.8	83.4	82.4	83.1	71.1	88.8	76.7	88.4	78.9
Sulfide Screen	-	-	-	-		-	-	-	-	-	NEGATIVE	-	-	-	-	-
Total Organic Carbon	-	-	-	-	mg/kg	-	-	-	-	-	5,640	-	-	-	-	-
pH	-	-	-	-	su	8.5	8.38	7.11	7.12	8.05	9.87	9.5	7.85	7.65	8.32	8.73

Analytical Data Qualifiers:

< - The analyte was not detected at the stated reporting limit.

* - Duplicate analysis not within control limits; indeterminate bias direction.

J - The reported result is an estimated value.

*J - Duplicate analysis not within control limits; result is estimated with indeterminate bias direction.

EJ - The reported value is estimated because of the presence of interference; indeterminate bias direction.

N -The matrix spike sample recovery in the associated QC sample is not within QC limits.

J+ - The result is estimated and may be biased high.

J- - The result is estimated and may be biased low.

R - The reported result is rejected .

Footnotes:

SW108R, SW136, SW137- No data due to CCPW nodules at this location.

Sample held at lab.

**The use of the USEPA Regional Soil Screening Level of 390 mg/kg for vanadium is proposed as an alternative remediation standard for the site. Based on: https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide-november-2015

^Nickel site specific impact due to groundwater screen level method calculated using SPLP laboratory methods; SPLP = Synthetic Precipitation Leaching Procedure.

The groundwater elevation used for the evaluation of the Impact to Ground Water (IGW) exposure pathway is 5.2 feet NAVD.

- = No criteria or not analyzed

[a] =Elevated detection limit due to dilution required for high interfering element

[b] = Elevated detection limit due to dilution required for matrix interference

ft msl = feet mean sea level

ft bgs = feet below ground surface

mg/kg = milligram per kilogram

su = standard unit

mv = millivolts

CCPW = Chromate Chemical Processing Waste

Result exceeded criteria

EXHIBIT C-1

NOTICE IN LIEU OF A DEED NOTICE
AS INSTITUTIONAL CONTROL

A. GENERAL DESCRIPTION OF THIS NOTICE IN LIEU OF A DEED NOTICE

In order to limit exposure to impacted soils, an Institutional Control in the form of a Notice in Lieu of a Deed Notice will be employed. The Notice in Lieu of a Deed Notice is required by the New Jersey Department of Environmental Protection (the Department) as part of the remediation for soils. The Notice in Lieu of a Deed Notice will be a notification to existing and future property owners and the entities identified in N.J.A.C. 7:26C-7.2(b)2 that site soils are contaminated and that the impacted soils will need to be taken into consideration during future intrusive work.

This Notice in Lieu of a Deed Notice is for property located in the City of Jersey City, Hudson County, New Jersey that is identified as the right-of-way of portions of Burma Road and Morris Pesin Drive, which is further defined in Exhibit D.

1. Description and estimated size of the Restricted Area:

   As shown on Exhibit B-1, the restricted area for this Notice in Lieu of a Deed Notice includes a portion of the right-of-way of Burma Road and Morris Pesin Drive in the City of Jersey City, Hudson County, New Jersey.

   The Notice in Lieu ofa Deed Notice totals approximately 5,601 square feet or 0.129 acres and is further identified in Exhibits A, B, and D.

2. Descriptions of the restrictions on the Property:

   The soils in the restricted area (see Exhibit B-1 and B-2) may not be disturbed without appropriate actions. Restrictions are primarily limited to intrusive activities below the acceptable engineering controls (i.e., cap) between the depth intervals noted in Exhibit B-1 and Exhibit B-2 below the ground surface within the restricted area on the sites. All soils deeper than the cap shall be restricted.

   Any intrusive activities within the restricted area will require the application of a site-specific health and Safety Plan and may include the use of Personal Protective Equipment (PPE). Soils removed from the depth intervals below the cap in the areas shown on Exhibit B-1 and Exhibit B-2 within the restricted area cannot be placed above the cap or transported offsite without property characterization and/or handling. Reasonable construction methods and techniques shall be employed to minimize risk of exposure. As per the Settlement Agreement, the MUA's LSRP will determine whether any excavated soil can be reused as backfill or disposed of off-site, following concurrence with an LSRP designated by PPG ("PPG LSRP") that no visible CCPW is identified during the course of intrusive activities.

3. The objectives of the restrictions:

The objective of the Restriction is to prevent impacts to human health and the environment associated with impacted soils on the site via engineering controls.

B. DESCRIPTION OF NECESSARY MONITORING

Monitoring of the institutional control shall be conducted by a representative of PPG and include at a minimum:

1. Annual inspections of the asphalt capping to verify its integrity and effectiveness.
2. Any changes to land use are subsequently reported to the Department.
3. Ensure that the current land use on the Property is consistent with the Notice in Lieu of a Deed Notice.
4. The Property complies with the requirements of applicable regulations and any new standards that may be developed.
5. Any additional sampling necessitated by the requirements of any new standards, regulations, or laws shall be conducted accordingly by PPG.
6. The obtaining of any Department, or other governmental, permits and approvals and the payment of any associated charges and fees.

C. DESCRIPTION OF ITEMS TO BE INCLUDED IN THE BIENNIAL CERTIFICATION

PPG shall be responsible for the biennial certification, which will be required every two years upon establishment of a *Remedial Action Permit for Soil*, and will be prepared according to the requirements set forth in N.J.A.C. 7:26C-7.7 and 7.8 which will include, but is not limited to, the following:

1. A monitoring report that describes the specific activities conducted pursuant to the inspections and conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Notice in Lieu of a Deed Notice;

2. A statement that the land use at the Property is consistent with the restrictions in this Notice in Lieu of a Deed Notice; and

3. Ensure that the remedial action that includes this Notice in Lieu of a Deed Notice continues to be protective of the public health and safety and of the environment.

EXHIBIT C-2

ASPHALT CAPPING

The remedial action installed on the right-of-way of portions of Burma Road and Morris Pesin Drive includes engineering controls consisting of an asphalt cap.

A. GENERAL DESCRIPTION OF THE ASPHALT CAPPING:

1. Description of the engineering control:

The asphalt capping covers the Property where concentrations of Chromate Chemical Production Waste (CCPW) and CCPW-related metals remain in excess of the Department soil remediation criteria and/or standards consistent with the Settlement Agreement. In addition, chromium blooms may also be present in areas beneath the asphalt cap. The area covered by the asphalt cap is shown on Exhibit B-1.1. The asphalt cap consists of 4-inches of asphalt pavement consisting of two 2-inch thick paving courses.

2. The objective of the engineering control:

The objective of the engineering control is to permit the use of the property containing CCPW-related contamination while preventing direct contact or exposure to contaminants by creating a physical barrier to exposure and limiting the potential impact to the environment.

3. How the engineering control is intended to function:

The asphalt capping prevents direct contact and the generation of fugitive dust, reduces infiltration through the areas of identified contamination.

B. DESCRIPTION OF THE OPERATION AND MAINTENANCE:

1. PPG will conduct periodic inspections of the asphalt capping to determine its integrity, operability, and effectiveness on an annual basis;

2. PPG shall verify that the asphalt cap is operating as designed and remains protective of public health and safety and the environment including identifying conditions that may be the result of a problem with the engineering control. The conditions may include the following: observance of any cracking of the asphalt surface; observance of an area where settlement has occurred; and observance of the formation of chromium related blooms.

3. PPG or the owner will ensure that each alteration, excavation or disturbance of any engineering control is timely and appropriately addressed to maintain the integrity of the engineering control;

4. Alterations, excavation, or disturbance of the asphalt cap will be logged and noted at the time of disturbance. Significant alterations of the asphalt cap will be described in the Biennial Certification. Any excavation activities below the asphalt will necessitate the oversight of PPG to ensure contaminated soils are not disturbed. Alterations, excavations,

or disturbances of the asphalt cap will be reported to the Department within 24 hours of discovery.

5. PPG will maintain a record of the self-inspection dates, name of the inspector, results of the inspection and condition(s) of this engineering control.

6. Any additional sampling necessitated by the requirements of any new standards or applicable regulations shall be conducted accordingly by PPG.

7. The City of Jersey City will be responsible for the asphalt-capping surface on Site 65, including any repair or maintenance required as a result of the inspections performed by PPG.

C. DESCRIPTION OF ITEMS TO BE INCLUDED IN THE BIENNIAL CERTIFICATION

PPG shall be responsible for the biennial certification, which will be required every two years upon establishment of a *Remedial Action Permit for Soil*, and will be prepared according to the requirements set forth in N.J.A.C. 7:26C-7.7 and 7.8 which will include, but is not limited to, the following:

1. A monitoring report that describes the specific activities conducted pursuant to the inspections and conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Notice in Lieu of a Deed Notice;

2. A statement that the land use at the Property is consistent with the restrictions in this Notice in Lieu of a Deed Notice; and

3. Ensure that the remedial action that includes this Notice in Lieu of a Deed Notice continues to be protective of the public health and safety and of the environment.

EXHIBIT D

JANUARY 9, 2018 SETTLEMENT AGREEMENT BETWEEN THE DEPARTMENT, PPG, THE CITY OF JERSEY CITY, AND THE JCMUA

SETTLEMENT AGREEMENT

(SITE 65 – BURMA ROAD AND MORRIS PESIN DRIVE)

This **SETTLEMENT AGREEMENT** (the "Agreement") is made this 9th day of January 2018 (the "Effective Date") by and among the **NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION ("NJDEP"), PPG INDUSTRIES, INC. ("PPG")**, the **CITY OF JERSEY CITY, NEW JERSEY ("City")** and the **JERSEY CITY MUNICIPAL UTILITIES AUTHORITY (the "MUA")**. Each of the foregoing may sometimes be referred to herein as a "Party" or collectively as the "Parties".

WHEREAS, NJDEP and PPG entered into that certain Administrative Consent Order entitled "In the Matter of Hudson County Chromate Chemical Production Waste Sites" dated July 19, 1990 (the "1990 ACO");

WHEREAS, NJDEP, PPG and the City are parties to that certain Partial Consent Judgment Concerning the PPG Sites filed June 26, 2009, Superior Court of New Jersey, Chancery Division, Hudson County, Docket No. HUD C-77-05, as amended (the "JCO");

WHEREAS, NJDEP, PPG and the City are parties to that certain Consent Judgment filed September 7, 2011, Superior Court of New Jersey, Chancery Division, Hudson County, Docket No. HUD-C-77-05, as amended (the "2011 JCO");

WHEREAS, pursuant to the JCO, PPG is obligated to remediate chromate chemical production waste, as defined in the JCO ("CCPW"), located at the Hudson County Chrome ("HCC") Sites identified in the JCO or in the 1990 ACO;

WHEREAS, Site 65 is one of the HCC Sites identified in the 1990 ACO and defined in Attachment One thereto as the west side of Burma Road near Caven Point Road, Jersey City, Block 1497 (the "Former Site 65 Boundaries");

WHEREAS, there exist disputes amongst the Parties concerning, among other things, the boundaries of Site 65 and whether or not chromium and other contaminants identified in portions of Burma Road and Morris Pesin Drive are the responsibility of PPG pursuant to the 1990 ACO or the JCO;

WHEREAS, further complicating the aforementioned disputes, is an existing MUA-owned sixteen inch water line located within the Burma Road and Morris Pesin Drive rights of way as further depicted on **Figure 1** and **Figure 2** attached hereto (the "Water Line");

WHEREAS, the NJDEP and Weston Solutions, Inc. ("Weston"), the Technical Consultant under the JCO, selected by the Site Administrator and tasked with providing technical support to the NJDEP, provided oversight of PPG's investigation of soils and groundwater within the Former Site 65 Boundaries and in nearby areas;

WHEREAS, the MUA was made a Party to this Agreement in light of, among other reasons, the interests it has in assuring the proper remediation of contaminated materials in proximity to the Water Line and because its cooperation is needed in connection with remediation

activities that may be necessary in proximity to the Water Line during future repairs and/or replacement of the Water Line by the MUA or otherwise;

WHEREAS, the Parties have decided to settle their disputes relating to the matters set forth above and herein and to memorialize that settlement in this Agreement.

NOW THEREFORE, in consideration of the mutual promises set forth herein and other good and valuable consideration, the receipt of which is hereby acknowledged, the Parties agree as follows:

1. **New Boundaries of Site 65**. The Parties agree that for the purposes of this Agreement the boundaries of Site 65 shall consist of the area depicted on **Figure 1** attached hereto and as described in the legal description attached hereto as **Exhibit A**. The Site 65 boundaries depicted on **Figure 1** and as described on **Exhibit A** shall replace and supplant any prior figures or other descriptions of the Site 65 area, whether as set forth in the 1990 ACO, the JCO, any amendments thereto or otherwise. All references below to "Site 65" shall mean the area depicted on **Figure 1** and as described on **Exhibit A**.

2. **Reporting/Permitting Requirements.**

(i) Within ninety (90) days of the Effective Date of this Agreement, PPG shall submit to NJDEP (with copies to the Parties to this Agreement and any other pertinent parties as required pursuant to the JCO) a Remedial Action Report ("RAR"). The RAR will memorialize the soils remedy for Site 65 and will include a Remedial Investigation summary as required per the NJDEP Technical Requirements for Site Remediation (N.J.A.C. 7:26E, *et seq.*), including all data collected by PPG in Burma Road and Morris Pesin Drive to date. The Parties agree that the soils remedy to be implemented by PPG for Site 65 will be a restricted use remedy consisting, essentially, of the following: (A) the asphalt road surface covering Site 65 shall function as an engineering control to prevent direct contact exposure, (B) a notice in lieu of deed notice will be filed because contaminants will be left in place in Site 65 soils that exceed NJDEP soil remediation criteria and/or standards, (C) at the time the MUA undertakes Water Line Work (as defined below) such work activities will be managed by the MUA as a linear construction project governed by the LC Guidance (as defined below) and pursuant to the terms and conditions of this Agreement, and (D) PPG shall be obligated for the cost to excavate visible CCPW and any other contaminants under the LC Guidance that is identified in the Trench Area (as defined below) pursuant to the terms and conditions of this Agreement.

(ii) Subject to PPG satisfying applicable NJDEP requirements, a Soils Remedial Action Permit ("SRAP") will be issued by NJDEP as part of the remedy referenced in Section 2(i) above. PPG shall be the permittee and responsible party and the City, as the owner of Site 65, shall be a co-permittee. The Parties agree that PPG shall be responsible, at its sole cost and expense, to comply with the terms of the SRAP, including, without limitation, inspections of the asphalt cap and preparation and filing of biennial certifications, provided, however, the City agrees that the City shall be responsible, at its sole cost and expense, to maintain the asphalt capping surface on Site 65, including any repair or maintenance required as a result of the cap inspections performed by PPG.

(iii) PPG shall be responsible to satisfy NJDEP financial assurance requirements for the engineering control that will be used at Site 65, although all Parties acknowledge and agree that the financial assurance established by PPG pursuant to Section 9 of the 2011 JCO shall apply to Site 65 and shall satisfy PPG's financial assurance obligation as of the issuance of the SRAP.

3. **Water Line Work.**

(i) The Parties agree that, in the event the MUA shall undertake to conduct in whole or in part, repairs, alterations and/or replacement to the Water Line within the Site 65 boundaries, excavation of a trench will be required. The scope of the aforementioned trench will be dependent upon the extent of MUA's work on the Water Line located within the Site 65 boundaries, but for purposes of this Agreement, PPG will be responsible for the PPG Trench Reimbursable Expenses (as defined below) within a trench extending three feet laterally from every point along the outside diameter of the Water Line, as measured on the center axis perpendicular to the direction of the Water Line and up to 6 feet deep, regardless of the actual depth required of the trench to conduct the Water Line Work (the "Trench Area").

(ii) The Parties agree that, with the exception of specific procedures for the identification of CCPW which shall be subject to Section 5 and **Exhibit E** of this Agreement, any and all utility work to be performed under this Agreement shall be performed in accordance with the following three documents:

(a) "Procedure for Coordinating Utility Work Within Chromium Soil Areas, Honeywell Sites, Jersey City, New Jersey," prepared by Amec Foster Wheeler Environment and Infrastructure, Inc., and dated December 2014, updated January 2017, attached to this Agreement as **Exhibit B**; and

(b) "Worker Training Manual for Managing Contaminated Soils and Groundwater," prepared by Amec Foster Wheeler Environment and Infrastructure, Inc., and dated December 2014, updated January 2017, attached to this Agreement as **Exhibit C**.

(c) NJDEP's **Linear Construction** Technical Guidance dated January 2012, as amended (the "LC Guidance").

(iii) Subject to reimbursement by PPG for the PPG Reimbursable Trench Expenses (as defined below), MUA shall be responsible to perform and pay for, at its sole cost and expense, all work related to the repair, alteration and/or replacement of the Water Line, including, without limitation: (A) installation of a bypass water line; (B) repairs/alterations to the Water Line; (C) excavation and dewatering of the Trench Area; (D) stockpiling of soils; (E) removal of the existing Water Line; (F) installation of a new Water Line; (G) backfilling of the Trench Area; (H) placing new asphalt on top of the Trench Area following backfilling; and (I) any other activities or work related to the aforementioned tasks (all such work activities being collectively referred to hereinafter as the "Water Line Work"). The new asphalt placed on top of the Trench Area shall be placed at the surface so as to serve as the engineering control referenced in Section 2 above.

(iv) The Parties agree that, for the purpose of this Agreement, the Water Line Work referenced in Section 3(iii) above shall be deemed to be a linear construction project and shall be

governed by the LC Guidance and the terms of this Agreement. In the event of any conflict between the LC Guidance and the terms of this Agreement, the terms of this Agreement shall prevail. The LC Guidance shall be used pursuant to the terms of this Agreement to address contamination that is identified during the Water Line Work and to ensure that contamination encountered during the Water Line Work is handled in a manner that is protective of human health, safety and the environment.

(v) The MUA shall retain a Licensed Site Remediation Professional (the "MUA LSRP") to oversee (A) all aspects of the Water Line Work pursuant to the LC Guidance; (B) removal and disposal of visible CCPW in the Trench Area; and (C) any other work activities described herein.

(vi) The following reasonable fees and expenses incurred by the MUA in connection with the Water Line Work shall be subject to reimbursement by PPG, including, without limitation, (A) the incremental cost related to retaining OSHA 40-hour trained personnel as compared to hiring non-trained personnel; (B) sampling and laboratory analytical costs and expenses; (C) fees and expenses of the MUA LSRP; (D) removal and transportation of contaminated soils that cannot be re-used for backfill; (E) clean backfill required to replace contaminated soils that cannot be re-used as backfill; (F) the incremental cost increase related to the treatment, transportation and/or disposal of contaminated fluids as compared to handling non-contaminated fluids from dewatering; (G) costs incurred related to the removal and disposal of visible CCPW in the Trench Area; (H) costs incurred related to addressing the contamination in the Trench Area; and (I) all other costs and expenses reasonably related to the implementation of the LC Guidance in the Trench Area ("PPG Trench Reimbursable Expenses"). Within fourteen (14) days prior to commencement of Water Line Work within the Site 65 boundaries, the MUA shall notify PPG of its intent to conduct Water Line Work, and shall reasonably cooperate with PPG with regard to any requests for information pertaining thereto.

(vii) The MUA LSRP shall develop a materials management plan listing the actions required to manage visible CCPW, contaminated dewatering fluids and contaminated soils resulting from the Water Line Work in the Trench Area. The costs and expenses related to dewatering fluids, soils, and replacement of backfill material shall be allocated between the MUA and PPG as follows:

(1) **Contaminated Dewatering Fluids.** The MUA will arrange to manage all dewatering fluids, provided that PPG shall be responsible to reimburse the MUA for the incremental cost increase related to the treatment, transportation and/or disposal of contaminated fluids as compared to handling non-contaminated fluids from dewatering. If such water is determined to be hazardous waste in accordance with applicable federal, state and local requirements, PPG shall execute a Uniform Hazardous Waste Manifest as required by the Federal Resource Conservation and Recovery Act (40 CFR Subpart B Parts 262.20 to 262.23) and N.J.A.C 7:26G, obtain an EPA Identification Number and otherwise comply, at its sole cost and expense, with all applicable requirements, including recordkeeping requirements, with respect to the transportation and disposal of hazardous waste materials.

(2) **Contaminated Soils.** The MUA LSRP shall determine whether pursuant to the LC Guidance soils removed from the Trench Area can be used as backfill in the Trench

Area or whether such soils must be disposed off-site. For avoidance of doubt, and whether or not permissible under the LC Guidance, the MUA LSRP must ensure, and the Parties acknowledge and agree, that visible CCPW cannot be replaced in the Trench Area and must be disposed off-site. In the event the MUA LSRP determines that soils must be disposed off-site based upon the presence of any contaminant, substance or characteristic and based upon such LSRP's application of the LC Guidance and/or presence of visible CCPW, PPG shall be responsible to pay, at its sole cost and expense, all transportation, disposal, replacement of backfill materials and other costs and expenses in connection with the off-site disposal of such soils. If any such soils are determined to be hazardous waste in accordance with applicable federal, state and local requirements, PPG shall execute a Uniform Hazardous Waste Manifest as required by the Federal Resource Conservation and Recovery Act (40 CFR Subpart B Parts 262.20 to 262.23) and N.J.A.C 7:26G, obtain an EPA Identification Number and otherwise comply, at its sole cost and expense, with all applicable requirements, including recordkeeping requirements, with respect to the transportation and disposal of hazardous waste materials.

(3) **Waiver/Indemnification.** PPG agrees to waive any claims against the City and MUA for contribution and/or incremental handling, transportation or disposal costs that may be incurred by PPG resulting from the presence of non-CCPW contaminants in the soils and/or water PPG is required to manage in accordance with this Section 3, including but not limited to, mercury, petroleum, lead and coal ash, that may be commingled with the CCPW. PPG further agrees to indemnify, defend and hold the City and the MUA harmless from and against any and all losses, damages, liabilities, deficiencies, actions, judgments, interest, penalties, fines and any other costs or expenses of any kind in connection with any third party claims for personal injury, death or property damage arising from the actions of PPG or its agents, servants, employees and/or contractors resulting from or relating to the transportation, disposal or other handling of the soils and/or water that PPG is required to manage pursuant to this Section 3.

(4) **Dispute Resolution.** To the extent that there is a dispute between the MUA LSRP and the PPG LSRP (as defined in Section 5) as to the determination made by the MUA LSRP that material must be disposed of off-site or as to the incremental costs under this Section 3, PPG and the MUA agree that such dispute will be resolved by a determination by a third LSRP (the "Third LSRP") and the decision of the Third LSRP shall be binding upon PPG and the MUA. Such LSRP shall be selected and approved by PPG and the MUA. PPG shall be solely responsible for the costs and expenses of the Third LSRP.

(viii) **Backfilling.** PPG shall be required to reimburse the MUA for the cost of clean backfill materials needed to replace the volume of soils from the Trench Area that were required to be disposed off-site pursuant to Section 3(vii)(2).

4. **Weston Technical Memorandum.** In a Technical Memorandum dated December 22, 2017 (attached hereto as **Exhibit D)**, Weston has provided a rationale for the maximum horizontal remediation distance of 10 ft. from the Water Line for both Burma Road and Morris Pesin Drive. Soil delineation investigations of Burma Road and Morris Pesin Drive were performed by PPG in June and October of 2015. During these investigations, a total of 59 soil borings were advanced to a depth of 10 ft. and 281 soil samples were collected and analyzed. Upon

a review of the soil investigations, Weston finds that it is reasonable to conclude that the extent of visible CCPW or visible CCPW impacts in Burma Road and Morris Pesin Drive is limited to a maximum of 10 ft. from the Water Line.

5. **Remediation of Visible CCPW**.

(i) During the excavation of the Trench Area, and prior to backfilling of the Trench Area, the MUA LSRP and an LSRP designated by PPG (the "PPG LSRP") shall conduct inspections of the Trench Area to determine the presence of visible CCPW within the Trench Area. A procedure for identifying visible CCPW is attached hereto as **Exhibit E**. If the MUA LSRP and the PPG LSRP agree that no visible CCPW is identified within the Trench Area, the Trench Area can be backfilled pursuant to the procedures set forth in Section 3 of this Agreement. In the event the MUA LSRP and the PPG LSRP agree that visible CCPW is identified in the Trench Area, then the MUA will perform the excavation, transportation, and disposal of all visible CCPW and PPG shall be responsible for the costs of excavation, transportation, and disposal of all such visible CCPW ("PPG CCPW Reimbursable Expenses") identified in both the 7 foot area beyond the Site 65 boundary (hereinafter referred to as the "Supplemental Remediation Area," which such area is depicted on **Figure 1** attached hereto and described in **Exhibit A** attached hereto) and in the area between the Water Line and the Site 63 boundary. PPG shall not be responsible for excavation of visible CCPW in any of the aforementioned areas deeper than 6 feet, which will be treated, as necessary, as groundwater by PPG pursuant to Section 6 of this Agreement. PPG will not be responsible to conduct post-excavation samples in connection with any of the aforementioned excavation activities. Rather, excavation shall be conducted solely for the purpose of removing visible CCPW.

(ii) In the event there is a dispute between the MUA LSRP and the PPG LSRP as to the presence or absence of visible CCPW, the extent of excavation required to remove same or other related matters, PPG and the MUA agree that such dispute will be resolved by a determination made by the Third LSRP and the decision of the Third LSRP shall be binding upon PPG and the MUA. Such LSRP will be selected and approved by PPG and the MUA. PPG shall be solely responsible for the costs and expenses of the Third LSRP.

6. **Groundwater**. Groundwater that exceeds the NJDEP Groundwater Quality Standards, N.J.A.C. 7:9C, for total chromium within Site 65, the Supplemental Remediation Area, the Released Area (as defined in Section 7 herein) or another location adjacent to Site 63, shall remain PPG's responsibility under the JCO as emanating from Site 63.

7. **Release by City**. The MUA, the City, and all instrumentalities of the City, hereby waive, release, and fully and forever discharge any and all complaints, claims, charges, liabilities, claims for relief, demands, suits, actions or causes of action, whether in law or in equity, whether known or unknown, which it actually asserts or could assert, at common law or under any statute, rule, regulation, order or law, whether federal, state or local, or on any grounds whatsoever against PPG with respect to any contaminants of any kind whatsoever, whether known or unknown, that exist in soils on or under the portions of Burma Road and Morris Pesin Drive that are adjacent to the boundaries of Site 65, as set forth in **Exhibit A** and **Figure 1**, attached hereto (the "Released Area"). This release shall not apply to the boundaries of Site 65 or the Supplemental Remediation Area that are the subject of this Agreement, to portions of Burma Road or Morris Pesin not within the Released Area, or to any other location within the City of Jersey City.

8. **Reservation of Rights**. Each of the Parties agrees that the recitals, statements, covenants and agreements set forth herein and the exhibits attached hereto were arrived at after extensive negotiation and compromise and shall be without prejudice to the Parties' taking different positions with respect to other HCC Sites identified in the JCO, the 1990 ACO, or otherwise. All of the Parties to this Agreement were represented by counsel in connection with the negotiation of the terms and conditions of this Agreement.

9. **Soils in Areas Outside of Site 65 and the Supplemental Remediation Area.** Notwithstanding anything contained herein to the contrary, NJDEP, the MUA and the City acknowledge that PPG has not accepted responsibility for any contaminants of any kind whatsoever, whether known or unknown, that exist in soils on or under any portions of Burma Road and Morris Pesin Drive that are within the Released Area. If CCPW is identified in the Released Area, this CCPW will be addressed as a "Newly Discovered Site" as defined in Article IV, Section 7.C. of the September 7, 2011 Consent Judgment.

10. **Miscellaneous.**

(i) Cooperation. Each of the Parties hereby agree to cooperate with each other in taking all steps necessary in complying with the reasonable requests of the other Party to fully effectuate the terms, covenants and conditions of this Agreement.

(ii) Governing Law/Venue. This Agreement shall be governed by the laws of the State of New Jersey. The parties acknowledge that this Agreement has been executed and delivered in the State of New Jersey and that the Parties hereto submit to the jurisdiction of the Superior Court, Chancery Division, Hudson County, New Jersey in the event of any dispute under this Agreement.

(iii) Binding Nature/Successors. This Agreement shall be binding on the Parties and their successors and assigns.

(iv) Authority of Signatories. Each person executing this Agreement on behalf of each Party hereto hereby acknowledges and represents that he or she has full authority to execute this Agreement and bind the Party on whose behalf the person executes this Agreement and that the execution of this Agreement has been approved by appropriate Resolution or other action of the Party on whose behalf the person is executing this Agreement.

(v) Entire Agreement/Amendments to be in Writing. This Agreement contains the entire agreement among the Parties hereto. This Agreement may only be amended or modified by a writing fully executed by all Parties hereto. This provision cannot be orally waived.

(vi) Severability. In case any provision in or obligation under this Agreement shall be held to be invalid, illegal or unenforceable in any jurisdiction, the validity, legality and enforceability of the remaining provisions or obligations under this Agreement shall not in any way be affected or impaired thereby.

(vii) Notices. All notices, requests or other communications which may be or are required to be given, served or sent by any Party hereto to the other shall be deemed to have been properly given, if in writing and addressed, in each case, as set forth in this section below, and shall be deemed to have been delivered, (a) three (3) business days after having been deposited in any

post office or mail depository regularly maintained by the United States Postal Office and sent by registered or certified mail, postage paid, return receipt requested, (b) one (1) business day after having been deposited for overnight delivery by a nationally recognized courier service which obtains delivery receipts (e.g., FedEx or UPS), or (c) as otherwise mutually agreed to by the Parties.

To PPG:

Jody Overmyer, PE, PMP
Remediation Project Engineer
Corporate EHS Environmental Affairs
PPG
440 College Park Drive
Monroeville, PA 15146
E-mail: overmyer@ppg.com

With copies to:

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Newark, New Jersey 07102
Email: joseph.lagrotteria@leclairryan.com

To the City of Jersey City:

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City of Jersey City
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Jersey City, NJ 07302
Email: jfarrell@jcnj.org

With copies to:

Michael D. Witt, Esq.
Chasan Lamparello Mallon & Cappuzzo, P.C.
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Secaucus, NJ 07094
Email: mwitt@chasanlaw.com

To the Jersey City Municipal Utilities Authority:

Executive Director
Jersey City Municipal Utilities Authority
555 Route 440
Jersey City, NJ 07305
Email: j.farrell@jcmua.org

With copies to:

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Glenpointe Centre West
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Teaneck, NJ 07666
Email: FBORIN@decotiislaw.com

To NJDEP:

Thomas J. Cozzi
Assistant Director
Office of the Assistant Commissioner
NJDEP
Mail Code 401-06
PO Box 420
Trenton, NJ 08625-0420
Email: Tom.Cozzi@dep.nj.gov

With copies to:

Richard Engel
Deputy Attorney General
Office of the Attorney General
Richard J. Hughes Justice Complex
25 Market Street
P.O. Box 093
Trenton, NJ 08625-0093
Email: Richard.Engel@law.njoag.gov

(iv) Counterpart Signatures. This Agreement may be executed in any number of counterparts, and by different Parties hereto in separate counterparts, each of which when so executed shall be deemed to be an original and all of which taken together shall constitute one and the same agreement. Delivery of an executed counterpart to this Agreement by facsimile or e-mail shall be as effective as delivery of a manually executed counterpart of this Agreement, and each Party hereto shall be entitled to rely on a facsimile or e-mail signature of each other Party hereto as if it were an original.

SIGNATURES ON FOLLOWING PAGE

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the date first written above.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:_____

PPG INDUSTRIES, INC.

BY:_____

CITY OF JERSEY CITY

BY:_____

JERSEY CITY MUNICIPAL UTILITIES AUTHORITY

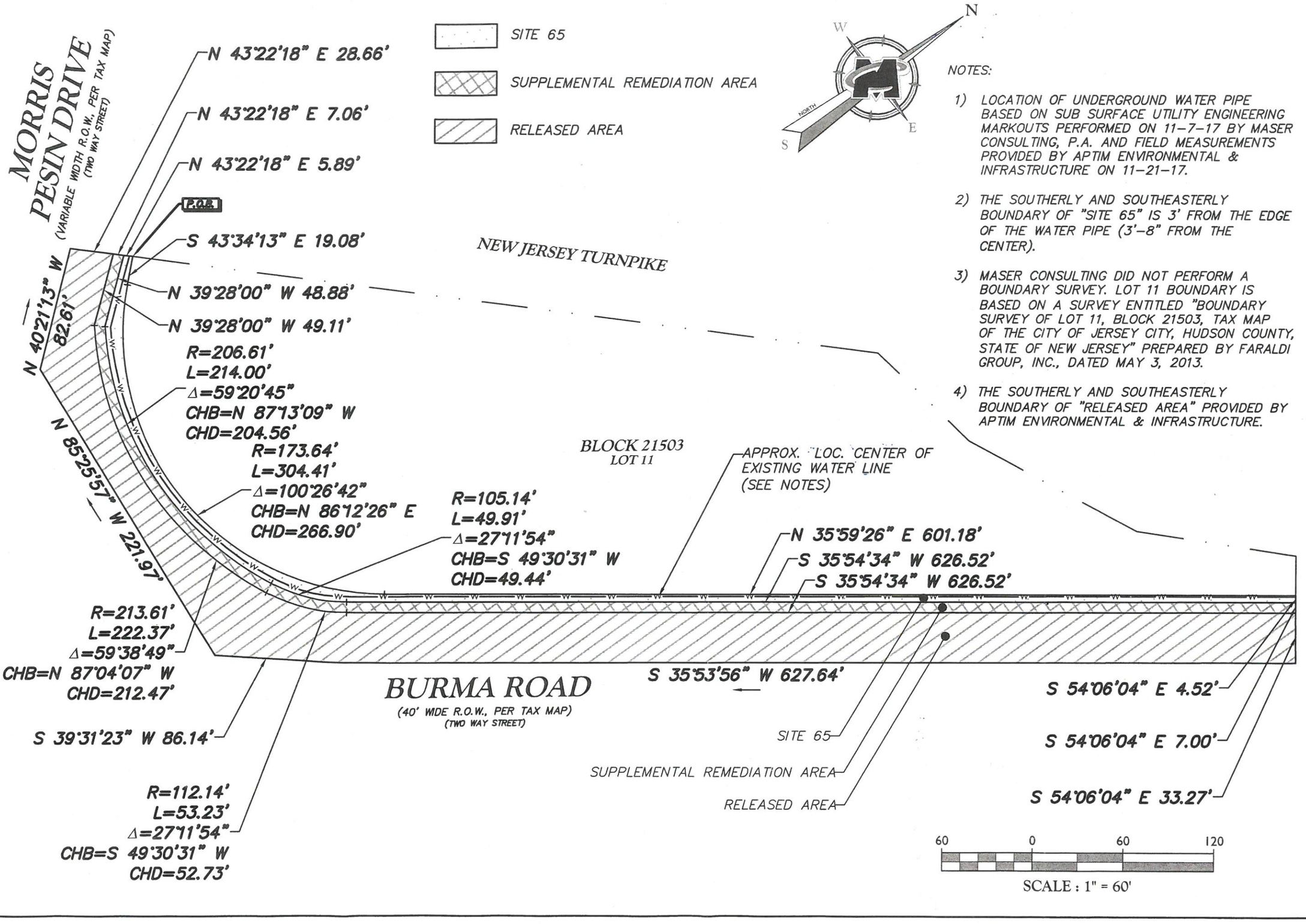
BY:_____

[FIGURES AND EXHIBITS ON FOLLOWING PAGES]

FIGURE 1

SITE 65 SURVEY

(ATTACHED)



NOTES:

1) LOCATION OF UNDERGROUND WATER PIPE BASED ON SUB SURFACE UTILITY ENGINEERING MARKOUTS PERFORMED ON 11-7-17 BY MASER CONSULTING, P.A. AND FIELD MEASUREMENTS PROVIDED BY APTIM ENVIRONMENTAL & INFRASTRUCTURE ON 11-21-17.

2) THE SOUTHERLY AND SOUTHEASTERLY BOUNDARY OF "SITE 65" IS 3' FROM THE EDGE OF THE WATER PIPE (3'-8" FROM THE CENTER).

3) MASER CONSULTING DID NOT PERFORM A BOUNDARY SURVEY. LOT 11 BOUNDARY IS BASED ON A SURVEY ENTITLED "BOUNDARY SURVEY OF LOT 11, BLOCK 21503, TAX MAP OF THE CITY OF JERSEY CITY, HUDSON COUNTY, STATE OF NEW JERSEY" PREPARED BY FARALDI GROUP, INC., DATED MAY 3, 2013.

4) THE SOUTHERLY AND SOUTHEASTERLY BOUNDARY OF "RELEASED AREA" PROVIDED BY APTIM ENVIRONMENTAL & INFRASTRUCTURE.

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State of NJ. Cert. of Authorization: 24GA27986500

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ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
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FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

JEFFREY D. BUNCE 12/19/17
NEW JERSEY PROFESSIONAL LAND SURVEYOR - LICENSE NUMBER: GS41045

PLAN
FOR
SITE 65
JERSEY CITY
RIGHT-OF-WAY
BURMA ROAD AND
MORRIS PESIN ROAD
CITY OF JERSEY CITY
HUDSON COUNTY
NEW JERSEY

MT. ARLINGTON OFFICE
400 Valley Road
Suite 304
Mt. Arlington, NJ 07856
Phone: 973.398.3110
Fax: 973.398.3199

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	12/19/2017	NPS	JDB
PROJECT NUMBER: 14000664C	DRAWING NAME: V-SURV		

SHEET TITLE: EXHIBIT

SHEET NUMBER: 1 of 1

FIGURE 2

WATER LINE CROSS-SECTIONS (3 PAGES)

(ATTACHED)

SITE 65

SUPPLEMENTAL REMEDIATION AREA

RELEASED AREA

MORRIS PESIN DRIVE
(VARIABLE WIDTH R.O.W., PER TAX MAP)
(TWO WAY STREET)

NEW JERSEY TURNPIKE

BLOCK 21503
LOT 11

APPROX. LOC. CENTER OF EXISTING WATER LINE (SEE NOTES)

BURMA ROAD
(40' WIDE R.O.W., PER TAX MAP)
(TWO WAY STREET)

SITE 65

SUPPLEMENTAL REMEDIATION AREA

RELEASED AREA

NOTES:

1) LOCATION OF UNDERGROUND WATER PIPE BASED ON SUB SURFACE UTILITY ENGINEERING MARKOUTS PERFORMED ON 11-7-17 BY MASER CONSULTING, P.A. AND FIELD MEASUREMENTS PROVIDED BY APTIM ENVIRONMENTAL & INFRASTRUCTURE ON 11-21-17.

2) THE SOUTHERLY AND SOUTHEASTERLY BOUNDARY OF "SITE 65" IS 3' FROM THE EDGE OF THE WATER PIPE (3'-8" FROM THE CENTER).

60 0 60 120

SCALE : 1" = 60'

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State of N.J. Cert. of Authorization: 24GA27986500

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Know what's below. Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

EXHIBIT
FOR
SITE 65
JERSEY CITY
RIGHT-OF-WAY
BURMA ROAD AND
MORRIS PESIN ROAD
CITY OF JERSEY CITY
HUDSON COUNTY
NEW JERSEY

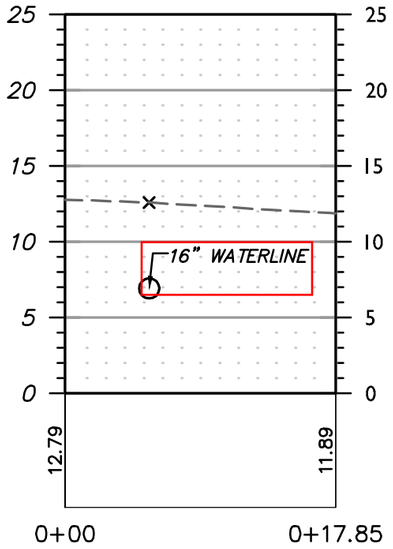
MT. ARLINGTON OFFICE
400 Valley Road
Suite 304
Mt. Arlington, NJ 07856
Phone: 973.398.3110
Fax: 973.398.3199

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	11/16/17	OJM	JFK

PROJECT NUMBER: 14000664C
DRAWING NAME: V-SURV

SHEET TITLE:
CROSS SECTION PLAN LOCATIONS

SHEET NUMBER:
1 of 3



PROFILE OF A-A'
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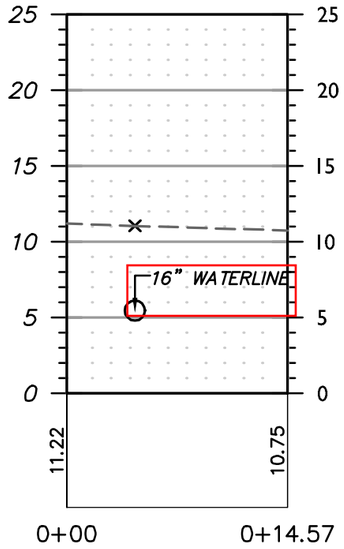
VERTICAL : 1" = 10'



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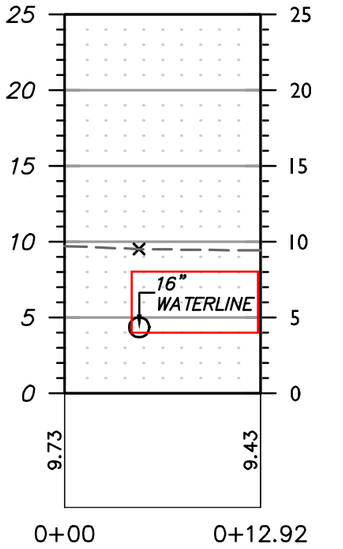

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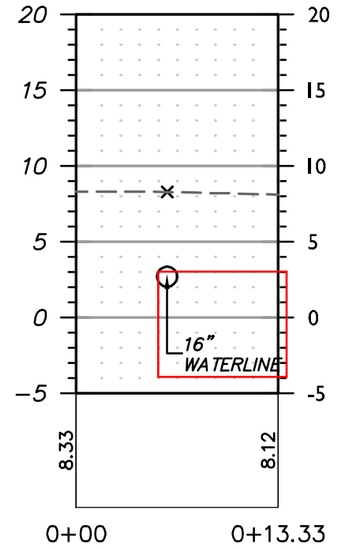

PROFILE OF D-D'
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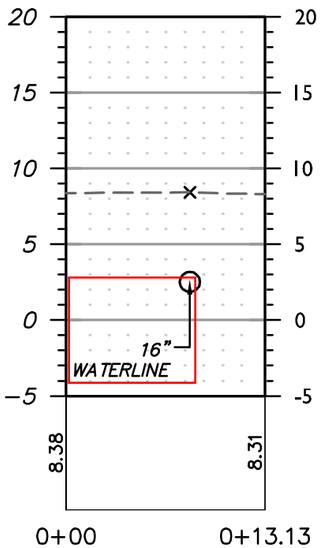
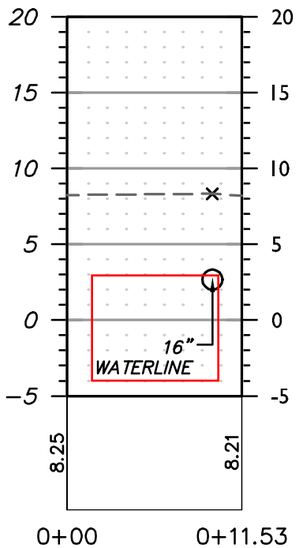
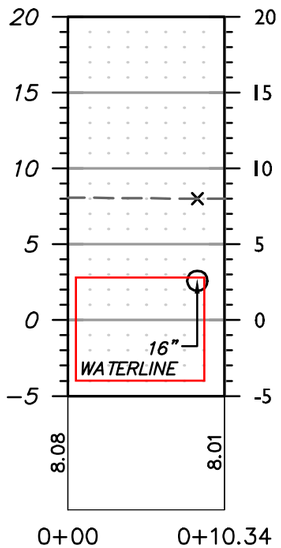
VERTICAL : 1" = 10'



PROFILE OF E-E'
HORIZONTAL : 1" = 10'
VERTICAL : 1" = 10'



PROFILE OF F-F'
HORIZONTAL : 1" = 10'
VERTICAL : 1" = 10'



PROFILE OF G-G'
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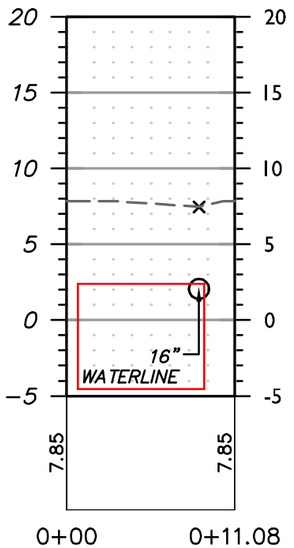
VERTICAL : 1" = 10'



PROFILE OF H-H'
HORIZONTAL : 1" = 10'
VERTICAL : 1" = 10'

NOTE:

ACTUAL WATER LINE DEPTHS MAY VARY FROM THOSE SHOWN IN PROFILES. TOP OF WATER LINE DEPTHS ESTIMATED AS SHOWN [AT APPROXIMATELY 5 FEET BELOW GROUND SURFACE (B.G.S.)] BASED ON SUBSURFACE UTILITY ENGINEERING DATA GATHERED ON 11-7-17 BY MASER CONSULTING, P.A. TOP OF WATER LINE DEPTHS AT FOUR LOCATIONS ALONG ITS LENGTH RANGED FROM 3.25-3.5 FEET B.G.S. BASED ON FIELD MEASUREMENTS BY APTIM ENVIRONMENTAL & INFRASTRUCTURE ON 11-21-17.

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REV	DATE	DRAWN BY	DESCRIPTION

EXHIBIT
FOR
SITE 65
JERSEY CITY
RIGHT-OF-WAY
BURMA ROAD AND
MORRIS PESIN ROAD
CITY OF JERSEY CITY
HUDSON COUNTY
NEW JERSEY

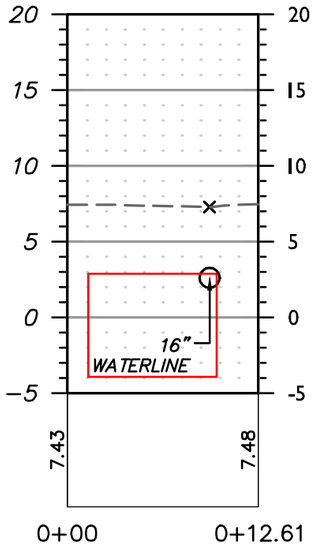
MT. ARLINGTON OFFICE
400 Valley Road
Suite 304
Mt. Arlington, NJ 07856
Phone: 973.398.3110
Fax: 973.398.3199

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	11/16/17	OJM	JFK

PROJECT NUMBER: 14000664C
DRAWING NAME: V-SURV

SHEET TITLE:
WATER LINE
CROSS SECTIONS

SHEET NUMBER:
2 of 3



PROFILE OF J-J'
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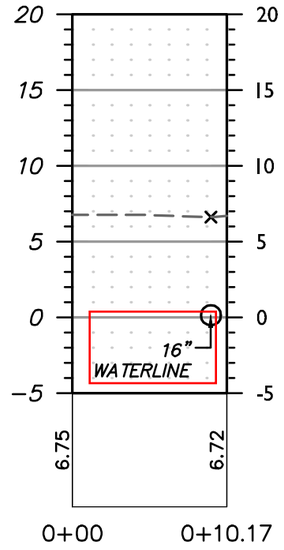
VERTICAL : 1" = 10'



PROFILE OF K-K'
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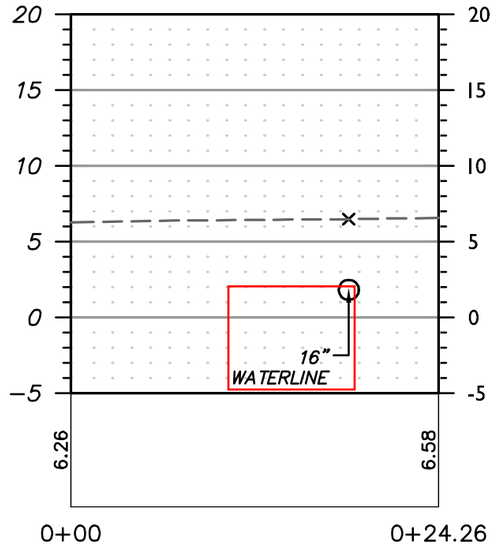
VERTICAL : 1" = 10'



PROFILE OF L-L'
HORIZONTAL : 1" = 10'
VERTICAL : 1" = 10'

NOTE:

ACTUAL WATER LINE DEPTHS MAY VARY FROM THOSE SHOWN IN PROFILES. TOP OF WATER LINE DEPTHS ESTIMATED AS SHOWN [AT APPROXIMATELY 5 FEET BELOW GROUND SURFACE (B.G.S.)] BASED ON SUBSURFACE UTILITY ENGINEERING DATA GATHERED ON 11-7-17 BY MASER CONSULTING, P.A. TOP OF WATER LINE DEPTHS AT FOUR LOCATIONS ALONG ITS LENGTH RANGED FROM 3.25-3.5 FEET B.G.S. BASED ON FIELD MEASUREMENTS BY APTIM ENVIRONMENTAL & INFRASTRUCTURE ON 11-21-17.

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REV	DATE	DRAWN BY	DESCRIPTION

EXHIBIT
FOR
SITE 65
JERSEY CITY
RIGHT-OF-WAY
BURMA ROAD AND
MORRIS PESIN ROAD
CITY OF JERSEY CITY
HUDSON COUNTY
NEW JERSEY

MT. ARLINGTON OFFICE
400 Valley Road
Suite 304
Mt. Arlington, NJ 07856
Phone: 973.398.3110
Fax: 973.398.3199

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	11/16/17	OJM	JFK

PROJECT NUMBER:	DRAWING NAME:
14000664C	V-SURV

SHEET TITLE:
WATER LINE
CROSS SECTIONS

SHEET NUMBER:
3 of 3

EXHIBIT A

LEGAL DESCRIPTIONS

(ATTACHED)

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Landscape Architects
Environmental Scientists

Corporate Headquarters
331 Newman Springs Road, Suite 203
Red Bank, NJ 07701
T: 732.383.1950
F: 732.383.1984
www.maserconsulting.com

DESCRIPTION OF PROPERTY
CITY OF JERSEY CITY
HUDSON COUNTY, NEW JERSEY

SITE 65 BOUNDARY
NOVEMBER 27, 2017
PROJECT NO. 14000664C

All that certain lot, tract or parcel of land situate, lying and being in the City of Jersey City, in the County of Hudson and the State of New Jersey, and being a portion of Burma Road and Morris Pesin Drive as shown on a map entitled "Boundary Survey of Lot 11, Block 21503, Tax Map of the City of Jersey City, Hudson County, State of New Jersey", prepared by Faraldi Group, Inc. dated May 3, 2013, and being more particularly bounded and described as follows, to wit:

Beginning at the intersection of the northeasterly right of way line of Morris Pesin Drive (variable width Right of Way) with the line dividing Lot 11, Block 21503, and the southeasterly right of way line of the New Jersey Turnpike, thence–

1) **S 43°34'13" E, 19.08 feet**, along the southerly line of said Lot 11, Block 21503; thence–

2) Along an arc along the same, having a radius of **173.64 feet** and curving to the left, an arc distance of **304.41 feet** (Central Angle of 100°26'42"), said arc being connected by a chord distance of **266.90 feet**, and a chord bearing of **N 86°12'26" E**, to a point of tangency; thence–

3) **N 35°59'26" E, 601.18 feet**, along the southeasterly line of said Lot 11, Block 21503; thence–

Running through Burma Road (40 foot wide Right of Way), the following six (6) courses;

4) **S 54°06'04" E, 4.52 feet**; thence–

5) **S 35°54'34" W, 626.52 feet**; thence–

6) Along an arc having a radius of **105.14 feet** and curving to the right, an arc distance of **49.91 feet** (Central Angle of 27°11'54"), said arc being connected by a chord distance of **49.44 feet**, and a chord bearing of **S 49°30'31" W**, to a point of compound curvature; thence–

7) Along an arc having a radius of **206.61 feet** and curving to the right, an arc distance of **214.00 feet** (Central Angle of 59°20'45"), said arc being connected by a chord distance of **204.56 feet**, and a chord bearing of **N 87°13'09"** W, to a point; thence–

8) **N 39°28'00" W, 48.88 feet**; thence–

9) **N 43°22'18" E, 5.89 feet** to the Point and Place of **BEGINNING**.

MASER
CONSULTING P.A.

DESCRIPTION OF PROPERTY
CITY OF JERSEY CITY
HUDSON COUNTY, NEW JERSEY

SITE 65 BOUNDARY
NOVEMBER 27, 2017
PROJECT NO. 14000664C

CONTAINING: 5,601 square feet or 0.129 acres of land, more or less.

Jeffrey D. Bunce 11/27/17

JEFFREY D. BUNCE, P.L.S. DATE SIGNED
NEW JERSEY PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER GS41045

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DESCRIPTION OF PROPERTY
CITY OF JERSEY CITY
HUDSON COUNTY, NEW JERSEY

SUPPLEMENTAL REMEDIATION AREA
NOVEMBER 27, 2017
PROJECT NO. 14000664C

All that certain lot, tract or parcel of land situate, lying and being in the City of Jersey City, in the County of Hudson and the State of New Jersey, and being a portion of Burma Road and Morris Pesin Drive, as shown on a map entitled "Boundary Survey of Lot 11, Block 21503, Tax Map of the City of Jersey City, Hudson County, State of New Jersey", prepared by Faraldi Group, Inc. dated May 3, 2013, and being more particularly bounded and described as follows, to wit:

Beginning at a point in Morris Pesin Drive (variable width Right of Way), said point being S 43°22'18" W, 5.89 feet from the intersection of the northeasterly line of Morris Pesin Drive with the line dividing Lot 11, Block 21503, and the southeasterly right of way line of the New Jersey Turnpike; thence–

Running through Burma Road (40 foot wide Right of Way), the following ten (10) courses;

1) **S 39°28'00" E, 48.88 feet**; thence–

2) Along a non-tangent arc having a radius of **206.61 feet** and curving to the left, an arc distance of **214.00 feet** (Central Angle of 59°20'45"), said arc being connected by a chord distance of **204.56 feet**, and a chord bearing of **S 87°13'09" E** to a point of compound curvature; thence–

3) Along an arc having a radius of **105.14 feet** and curving to the left, an arc distance of **49.91 feet** (Central Angle of 27°11'54"), said arc being connected by a chord distance of **49.44 feet**, and a chord bearing of **N 49°30'31" E**, to a point of tangency; thence–

4) **N 35°54'34" E, 626.52 feet**; thence–

5) **S 54°06'04" E, 7.00 feet**; thence–

6) **S 35°54'34" W, 626.52 feet**; thence–

7) Along an arc having a radius of **112.14 feet** and curving to the right, an arc distance of **53.23 feet** (Central Angle of 27°11'54"), said arc being connected by a chord distance of **52.73 feet**, and a chord bearing of **S 49°30'31" W,** to a point compound curvature; thence–

8) Along an arc having a radius of **213.61 feet** and curving to the right, an arc distance of **222.37 feet** (Central Angle of 59°38'49"), said arc being connected by a chord distance of **212.47 feet**, and a chord bearing of **N 87°04'07" W**, to a point; thence–

9) **N 39°28'00" W, 49.11 feet**; thence–

10) N 43°22'18" E, 7.06 feet to the Point and Place of **BEGINNING**.

CONTAINING 6,617 square feet or 0.152 acres of land, more or less.

11/27/17

JEFFREY D. BUNCE, P.L.S. DATE SIGNED
NEW JERSEY PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER GS41045

R:\AllOffices\MtArlington\Projects\2014\14000664C\Survey\Description\revised 11-22-17\supplemental remediation area.docx

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F: 732.383.1984
www.maserconsulting.com

DESCRIPTION OF PROPERTY
CITY OF JERSEY CITY
HUDSON COUNTY, NEW JERSEY

RELEASED AREA
NOVEMBER 27, 2017
PROJECT NO. 14000664C

All that certain lot, tract or parcel of land situate, lying and being in the City of Jersey City, in the County of Hudson and the State of New Jersey, and being a portion of Burma Road and Morris Pesin Drive, as shown on a map entitled "Boundary Survey of Lot 11, Block 21503, Tax Map of the City of Jersey City, Hudson County, State of New Jersey", prepared by Faraldi Group, Inc. dated May 3, 2013, and being more particularly bounded and described as follows, to wit:

Beginning at a point in Morris Pesin Drive (variable width Right of Way), said point being S 43°22'18" W, 12.95 feet from the intersection of the northeasterly line of Morris Pesin Drive with the line dividing Lot 11, Block 21503, and the southeasterly right of way line of the New Jersey Turnpike; thence–

Running through Burma Road (40 foot wide Right of Way), the following ten (10) courses;

1) **S 39°28'00" E, 49.11 feet**; thence–

2) Along a non-tangent arc having a radius of **213.61 feet** and curving to the left, an arc distance of **222.37 feet** (Central Angle of 59°38'49"), said arc being connected by a chord distance of **212.47 feet**, and a chord bearing of **S 87°04'07" E,** to a point of compound curvature; thence–

3) Along an arc having a radius of **112.14 feet** and curving to the left, an arc distance of **53.23 feet** (Central Angle of 27°11'54"), said arc being connected by a chord distance of **52.73 feet**, and a chord bearing of **N 49°30'31" E**, to a point of tangency; thence–

4) **N 35°54'34" E, 626.52 feet**; thence–

5) **S 54°06'04" E, 33.27 feet**; thence–

6) **S 35°53'56" W, 627.64 feet**; thence–

7) **S 39°31'23" W, 86.14 feet**; thence–

8) **N 85°25'57" W, 221.97 feet**; thence–

9) **N 40°21'13" W, 82.61 feet**; thence–

10) **N 43°22'18" E, 28.66 feet** to the Point and Place of **BEGINNING**.

CONTAINING: 31,839 square feet or 0.731 acres of land, more or less.

MASER
CONSULTING P.A.

DESCRIPTION OF PROPERT
CITY OF JERSEY CITY
HUDSON COUNTY, NEW JERSEY

RELEASED AREA
NOVEMBER 27, 2017
PROJECT NO. 14000664C

Jeffrey D. Bunce 11/22/17

JEFFREY D. BUNCE, P.L.S. DATE SIGNED
NEW JERSEY PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER GS41045

R:\AllOffices\MtArlington\Projects\2014\14000664C\Survey\Description\revised 11-22-17\released area.docx

EXHIBIT B

PROCEDURE FOR COORDINATING UTILITY WORK WITHIN CHROMIUM SOIL AREAS, HONEYWELL SITES, JERSEY CITY, NEW JERSEY

(ATTACHED)

PROCEDURE FOR COORDINATING UTILITY WORK WITHIN CHROMIUM SOIL AREAS

HONEYWELL SITES
JERSEY CITY, NEW JERSEY

Prepared by
Amec Foster Wheeler Environment & Infrastructure, Inc.
200 American Metro Boulevard, Suite 113
Hamilton, New Jersey 08619

DECEMBER 2014;
UPDATED JANUARY 2017

Approved by:

Jersey City Municipal Utilities Authority – Senior Engineer

Honeywell – Global Remediation Director

TABLE OF CONTENTS

ILLUSTRATIONS

APPENDICES

1.0 INTRODUCTION AND SCOPE

Honeywell has developed this Standard Operating Procedure (SOP) to assist the Jersey City Municipal Utilities Authority (JCMUA) in safely and protectively executing sewer repair or replacement work at sites containing chromium-impacted fill soils in Jersey City (referred to herein as "sites" or "sewer sites").

Utility workers will follow this SOP when they have to repair or otherwise maintain pipelines and any associated equipment that have been constructed in areas where chromium-contaminated soils or chromium fill (also referred as chromium ore processing residue [COPR]) is located. The SOP helps protect utility workers who may encounter chromium-contaminated soils or fill during the course of their work. Chromium-contaminated soils (also referred to as "chromium soils") refers to soils containing hexavalent chromium above the NJDEP soil criteria, currently 20 milligrams per kilogram (mg/kg or parts per million [ppm]).

This SOP addresses sewer repair or replacement performed either as part of planned maintenance work, or required as a result of an emergency situation at the sites. The procedure meets the requirements of the Consent Judgment between the New Jersey Department of Environmental Protection (NJDEP) et al. and Honeywell et al., dated September 7, 2011 ("Consent Judgment"). Pursuant to the Consent Judgment, Honeywell has responsibility for investigation and remediation of designated sewer sites in accordance with a NJDEP approved Sewer Protocol. The Sewer Protocol includes requirements for developing procedures to allow utility workers to safely repair or replace sewer lines at these sites. In the event of any planned maintenance or emergency repair of its sewer pipeline(s) at the sites that will involve disturbance of chromium soils or remedial measures, the JCMUA agrees to follow the steps identified in this procedure.

Currently, JCMUA employees may perform sewer maintenance and repair work to depths of approximately 20 feet below grade. For emergency sewer work and excavation to depths greater than 20 feet, work is typically performed by JCMUA contractors (the current contractor is J. Fletcher Creamer & Son, Inc. [Creamer]). Additionally, the JCMUA has entered into a long-term agreement with United Water for operation and maintenance of its water systems. Accordingly, any reference to the JCMUA in terms of operation and maintenance of its water system

shall be interpreted as including United Water, its contractors and employees. Similarly, Honeywell uses remediation contractors and consultants and where this SOP references Honeywell, it should be understood that this includes its consultants and contractors.

The SOP describes a series of steps to be taken before and during times when utility work is to be conducted by the JCMUA at the sites. These steps detail requirements of Honeywell after JCMUA notifies them that work is pending on the part of JCMUA. The procedures contained in this document address the excavation of chromium-impacted material and safe handling methods in the event that JCMUA workers and/or contractors are required to work in the area of chromium-contaminated fill. Worker safety and training requirements are discussed in Section 5 and addressed in an accompanying Worker Training Manual prepared by Honeywell for use by the JCMUA and included as **Appendix C**.

The first step in this procedure is the determination by the JCMUA supervisory personnel (or JCMUA representatives) that sewer utility work is going to be implemented at one of the designated site(s) listed in **Appendix B**. Following this internal identification and acknowledgement, JCMUA notifies Honeywell using the Telephone Response System established by Honeywell (Chromium Response Hotline), indicating that work will be taking place at the specific site (including NJDEP Site number and site address) and the timing for that work. These steps initiate the SOP process. A process flowchart for the SOP and information on key personnel are provided in **Appendix A**. Site information and maps for the Honeywell-assigned (PPG has shared responsibility for certain sites) sewer sites in Jersey City are included in **Appendix B**.

Once the JCMUA notifies Honeywell through the Chromium Response Hotline that work is required at the site(s), Honeywell will provide technical assistance and coordination of field work with JCMUA. For emergency utility work, JCMUA will use an OSHA 40-hour trained contractor (Occupational Safety and Health Administration [OSHA] 40-Hour Hazardous Waste Operations and Emergency Response [HAZWOPER] training). This requirement is necessary because the time typically available does not allow for a case-by-case evaluation of whether the work is in an area of chromium soils, and therefore using an OSHA 40-hour trained contractor is prudent. Honeywell will cooperate with the JCMUA to provide field support, as needed, relating to the presence of chromium.

In a non-emergency situation, following notification of pending work, Honeywell personnel will evaluate the specific area of planned work against existing site data, and determine whether the area where the work will be conducted contains chromium-contaminated fill, and therefore, requires OSHA 40-hour trained personnel. In some cases, it may be necessary for Honeywell to collect samples to determine whether or not chromium impacts are present. Honeywell will communicate its conclusions to JCMUA. If the work is in a chromium containing area, Honeywell will provide technical assistance, field oversight and support, as needed, during the implementation of the sewer utility work and, if applicable, the restoration of any engineering controls.

JCMUA contractors will perform the excavation of material generated during sewer work (with the exception of longer term, planned sewer upgrade work which will be evaluated on a case-by-case basis). JCMUA works with designated contractors who can provide properly trained personnel, as needed, to work in areas with chromium contamination. Honeywell will provide information on specific licensed facilities to be used for the disposal of chromium-contaminated materials and on the restoration of engineering controls, if applicable in connection with sewer work. Financial issues and cost reimbursement are discussed in Section 3.4.

In non-emergency cases, the work would follow a schedule established between Honeywell and the JCMUA following initial notification. For a non-emergency or planned sewer project, the JCMUA would typically retain a contractor for sewer work through a public bidding process. For emergency related sewer work, the JCMUA has a designated emergency services contractor and these services are subject to periodic bidding. Honeywell will provide specifications for excavation, management and disposal of chromium-contaminated materials to the JCMUA for inclusion as part of its contractor bidding process for sewer work. The JCMUA will retain properly trained contractor(s) to perform sewer work in areas of chromium-contaminated fill.

Honeywell will retain an emergency response contractor with capability to respond within an approximately three (3) hour timeframe (which JCMUA has indicated is an acceptable timeframe for response action) if needed in the event that JCMUA's contractor is unable to perform the excavation and disposal of chromium-contaminated soils.

In addition to being subject to the requirements identified in this SOP, some sites may be the subject of an existing institutional control (deed notice) which includes certain provisions pertaining to disturbance and restoration of engineering controls (capping), as well as notification and reporting requirements. Because areas subject to capping and deed notice must maintain their integrity to function as they were intended, work activity in such areas will require restoration of the engineering control to its pre-disturbance condition. If work is occurring in an area subject to a deed notice and will involve disturbance of engineering controls, NJDEP notification and reporting requirements will apply in addition to the process described in this SOP.

This SOP will be followed in all applicable cases; however, this SOP cannot account for all site specific conditions and field-driven modifications to this procedure can be made upon agreement of both Honeywell and JCMUA.

This SOP is organized in the following sections:

2.0 Regulatory and Legal Section: Provides background information on the regulatory and legal basis for the development of this SOP.

3.0 Notification and Response Procedure: Describes the function of the proposed system.

3.1 Telephone Answering Service (Chromium Response Hotline): Describes the function of the "Hotline".

3.2 Honeywell Response Team: Describes the function of Honeywell's staff.

3.3 Emergency Response Contractors: Describes the function of Emergency Response Contractors.

3.4 Responsibilities: Describes roles and responsibilities of the various parties.

4.0 Identification of Chromium Soil Areas: Describes the sites where this SOP applies.

5.0 Hazard Evaluation and Worker Training: Provides information regarding the health hazards that may be encountered and worker training.

2.0 REGULATORY AND LEGAL SECTION

Chromium-contaminated fill was historically used as construction fill at various sites in Hudson County, New Jersey, including portions of sewer pipelines in Jersey City. Regulatory requirements for sewer sites containing chromium fill include the Sewer Protocol, which specifies remedial action requirements that take into consideration of:

- protection of the utility;
- depth of contaminated soils; and
- land use such as the presence of public streets or highways.

For these types of utility sites (linear site containing a utility line), with subsurface contamination at depths greater than 3 feet, or sites situated beneath city streets or highways, capping and institutional controls in the form of a deed notice constitute the prescribed remedy. For sites (or part of sites) with shallow contamination (less than 3 feet), the prescribed remedy is either installation of an engineered capping system or removal of the top 3 feet of contaminated soils and replacement with 3 feet of clean soil underlain by a demarcation layer.

The Sewer Protocol provides protective remedial measures while minimizing invasive excavation work that could disturb or damage sewer pipelines or other utilities. The Sewer Protocol requires excavation and removal of chromium-contaminated soils if it is necessary to affect the repair or replacement of the sewer pipeline. Coordinating soil removal with sewer repair or replacement allows for removal under more controlled conditions to reduce the likelihood of incidental damage to the sewer line or disruption of sewer service.

NJDEP regulations include requirements for engineering controls (capping) and institutional controls (deed notice) as part of remedial actions. These controls are established to communicate the presence of contaminated soils and control disturbance of these soils and potential exposure to them.

Capping systems are implemented in conjunction with a deed notice to protect and prevent unauthorized disturbance of the cap. For remedial actions where residual groundwater contaminants may remain at concentrations above the NJDEP

groundwater quality standards, an institutional control for groundwater (referred to as a Classification Exception Area) is required in order to communicate the presence of, and restrict the use of contaminated groundwater.

Under the Consent Judgment, Honeywell has responsibility for investigation and remediation of designated sewer sites in accordance with the Sewer Protocol. Honeywell also must develop procedures to identify when sewer sites are scheduled for repair, address emergency utility work at sewer sites, and provide for training of utility workers on recognition of chromium materials and appropriate steps for worker protection.

The Worker Training Manual addresses worker protection requirements including training of workers for protection from exposure to chromium-contaminated media during utility or other work performed at the sites. Further information regarding the Worker Training Manual is included in Section 5. A copy of the Worker Training Manual is included as **Appendix C**.

This SOP provides details for coordination of work between Honeywell and the JCMUA. The notification and response procedure, coordination of work, key personnel and responsibilities for SOP implementation are described in the following section.

3.0 NOTIFICATION AND RESPONSE PROCEDURE

The following procedure guides work that will take place on JCMUA utilities at designated sites in Jersey City (refer to **Appendix B** for site information and maps). Fundamental to the process is the obligation that JCMUA notify Honeywell if pending work is to be conducted at one of the specified sewer sites so that Honeywell can take appropriate actions that will enable the JCMUA to conduct its work in a safe manner. The notification and response procedures described in this document involve collaborative work between Honeywell, JCMUA and their respective representatives, and requires specific actions to be taken by each party. The success of this procedure will depend on the collaboration and full understanding of the procedure. A detailed activity flow process is presented in **Appendix A**: **Notification and Response System Flow Chart**. A simplified process flow illustration follows:

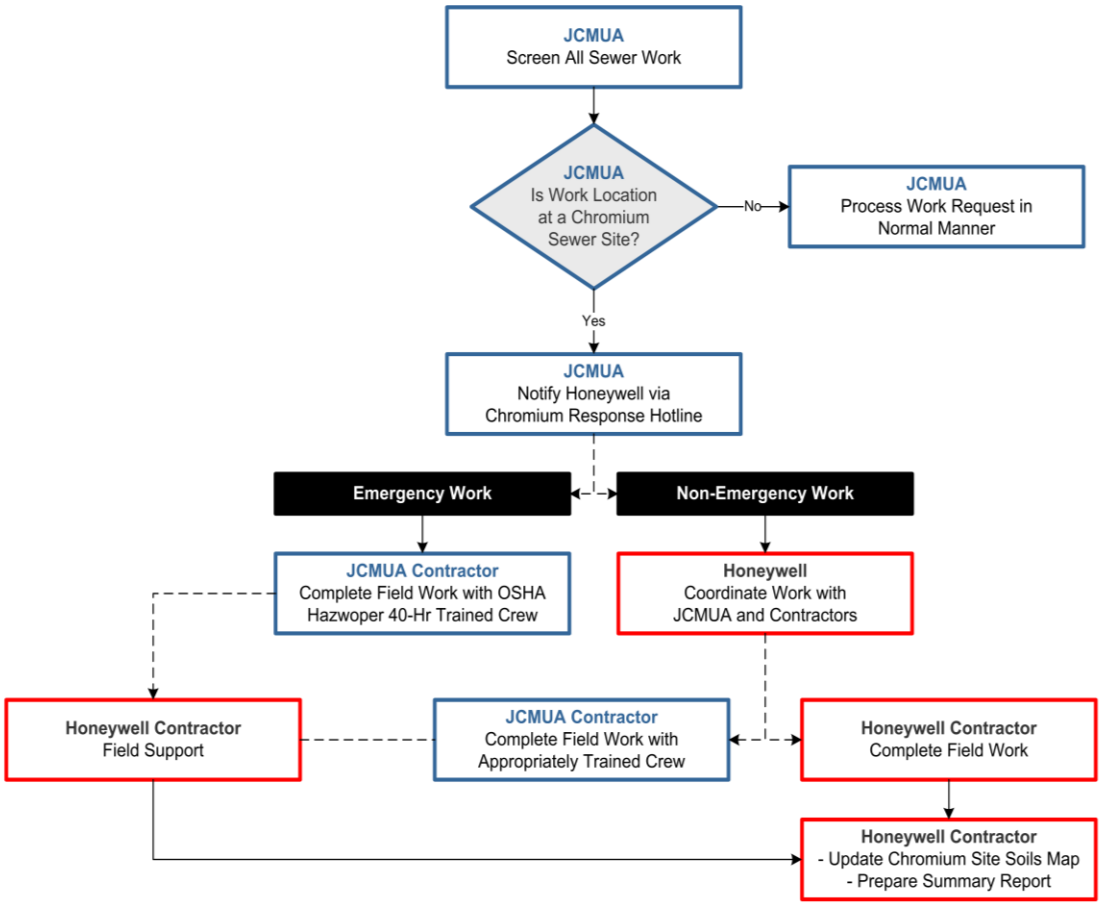

Illustration 1 SOP General Process Flow Summary

JCMUA has established a checkpoint in its work order process that enables it to identify when work will occur on the subject sites. The procedure described in this section is initiated by the JCMUA supervisor or JCMUA's designated representative. Initiation of the process starts with a call to Honeywell's telephone answering service ("Chromium Response Hotline" or "Hotline") for Honeywell to respond. The Hotline is the single point of notification through which pending work will be reported. A detailed activity flow process is presented in **Appendix A-1** (Notification and Response System Flow Chart) and contains details regarding work identification, notification, coordination, and reporting requirements. The location of the work area can be made by a JCMUA responsible individual by referring to the site information and figures in **Appendix B.**

The Chromium Response Hotline operates in a manner similar to the New Jersey One-Call utility mark-out notification. Following determination that work will be performed at the site(s), the JCMUA will contact the Chromium Response Hotline to report that work will be undertaken, specify the location, identify whether the work is emergency or routine maintenance, and provide information regarding the caller and pertinent contact information. For scheduled maintenance work, it will be necessary to indicate the projected timeframe for conducting the work. Based on the reported information, the Chromium Response Hotline will generate a report using appropriate templates for emergency or non-emergency situations, and will proceed to make notifications to designated Honeywell individuals (Honeywell Response Team list included in **Appendix A-2**). If JCMUA is contacted by other parties regarding work at the sites, JCMUA will notify Honeywell for coordination of work with other parties.

The process for emergency and non-emergency work is further described below.

Emergency Work

For emergency sewer work at the sites, the JCMUA will be required to use OSHA 40-hour personnel as the timing typically will not allow for a determination as to whether the work location is in a chromium-impacted area. Therefore, for this procedure, and subject to an agreement between Honeywell and the JCMUA, all emergency work will be conducted in this manner. Honeywell will provide technical assistance and field support as needed in cooperation with the JCMUA. Honeywell will target having its emergency response contractor respond onsite within an

approximate three (3) hour timeframe (to be coordinated in consultation with the JCMUA).

Non-Emergency Work

For non-emergency work, after determining that it will conduct work on the site(s), JCMUA must identify the type of work, specific location, and timing of the planned work. The determination on whether the area may have chromium contamination will be made by Honeywell after JCMUA notification to the Chromium Response Hotline. Any utility work at or adjacent to the site(s) should be identified even if the work is not within the defined site property boundary. In some situations it may be necessary for Honeywell to go to the work area and make a visual inspection or collect samples to determine whether or not chromium impacts are present. If Honeywell determines that the work will occur in a chromium impacted area, it will notify the JCMUA that the work will require properly trained contractor(s). The JCMUA will then proceed with the work using properly trained contractors.

Honeywell and JCMUA have agreed that the JCMUA's contractor will perform excavation and disposal of materials generated during sewer work, backfilling and site restoration (with the exception of possibly longer term, planned sewer upgrade work). If work is in a chromium-impacted area, Honeywell will provide technical assistance, field oversight and support, as needed, during the sewer utility work and, if applicable, soil disposal and restoration of engineering controls. Backfilling and site restoration will require the placement of clean fill in accordance with JCMUA specifications as well as NJDEP requirements (including the NJDEP Fill Guidance; last updated April 2015).

If the area is subject to a deed notice, restoration of the area will involve replacement in kind of the pre-existing engineering control(s) which may include clean fill, geotextile liner, landscaping and/or paving. Site backfill and restoration work may also include measures (e.g., placement of geotextile liner along the sides of excavation zone) to prevent recontamination of new fill from surrounding contaminated fill, to the extent practicable and allowable by the JCMUA.

In some cases, it is possible that Honeywell's contactor may take the lead on field work or a portion of the field work, to be determined on a case by case basis in cooperation with the JCMUA. For example, possible situations where Honeywell's contractor may take the lead on field work would be an emergency situation where

JCMUA's emergency services contractor could not provide properly trained workers in a timely manner for some unforeseen reason, or a non-emergency planned project where there is a mutual agreement between Honeywell and the JCMUA for Honeywell's contractor to take the lead on the field work or a specific portion of the field work (e.g., Honeywell's contractor completes excavation/disposal of chromium materials and/or replacement of engineering controls while JCMUA's contractor completes sewer-related repair or replacement work).

It is possible that removal of COPR and/or chromium-impacted soils beyond the initial identified sewer repair work area may be performed, to be determined on a case-by-case basis and coordinated between Honeywell and the JCMUA. Such additional remediation may be performed to complete the work under permits and/or other measures (i.e., traffic control) obtained as part of the sewer repair project.

As a last step in the process, Honeywell will update the chromium soil area site map by incorporating the changed conditions of the area subject to the work.

Key components of the notification and response system are described in the following sections. Additional activities and administrative controls include periodic site inspections by Honeywell and periodic communications via calls or meetings with the JCMUA regarding any upcoming work at the sites.

3.1 TELEPHONE ANSWERING SERVICE ("CHROMIUM RESPONSE HOTLINE")

Honeywell has established a contracted telephone answering service (Chromium Response Hotline: **855-727-2658**) to provide 24-hour coverage of notifications received from the JCMUA. The answering service will record and relay to Honeywell the name of the person initiating the call on behalf of the JCMUA, contact information, planned excavation location(s), expected start date, and the nature of the work (emergency or non-emergency). The Hotline has appropriate scripts and templates for the answering service personnel, so that incoming calls can be addressed appropriately. In addition, Honeywell has provided and will maintain a list of contacts, chain-of-command and telephone-chain so that incoming notifications can be routed to appropriate personnel for response in a timely manner.

After receiving a report through the Chromium Response Hotline, the answering service will contact the designated Honeywell representatives via email, text, and telephone.

3.2 HONEYWELL RESPONSE TEAM

Honeywell will provide qualified personnel to respond to the JCMUA notifications. As necessary, the person(s) responding to the notification of pending JCMUA work will assess existing information to determine whether the proposed work is in an area of known or suspected chromium-contamination. The person responding will coordinate as necessary with other Honeywell staff, the JCMUA and appropriate contractor staff to implement the work in accordance with procedures contained in this document. The Honeywell representative will visit the proposed work location and assess visually whether there is an indication of chromium impacted fill or collect samples, if necessary.

As part of the program, a Health and Safety Plan (HASP) will be implemented during field work activities. Existing HASP documents have been developed by Honeywell's contractors for site investigation and remedial action field work involving chromium-contaminated fill and include provisions for worker safety, community health and safety, and emergency response procedures.

3.3 EMERGENCY RESPONSE CONTRACTORS

The JCMUA will retain an emergency response contractor with properly trained workers and equipment necessary to perform sewer work in areas of chromium-contaminated fill. Honeywell will provide specifications for excavation, management and disposal of chromium-contaminated materials to the JCMUA for inclusion as part of its contractor bidding process for sewer work. Draft specifications and a list of specific licensed facilities for disposal of chromium-contaminated materials are provided for reference in **Appendix D**.

Honeywell will also retain one or more emergency response contractors that have the labor and equipment necessary to respond promptly in the case of an emergency if needed and in situations where the JCMUA contractor may not be able to respond. The contractor(s) will have 24-hour response capability. Based on input from the JCMUA and for the purposes of this SOP, an emergency is considered to be an

unforeseen sewer-related problem that requires action including onsite response within three (3) hours of notification to Honeywell by the JCMUA.

In the case of an emergency notification by JCMUA where it is requested that Honeywell's emergency response contractor is needed to perform field work or other technical support, Honeywell will contact its emergency services contractor and make provisions to have the contractor onsite within three (3) hours of the call. The Honeywell contractor will contact JCMUA and provide appropriate contact information and a time estimate for arrival of the emergency response contractor.

The contractor will be responsible for excavating in areas where JCMUA needs to implement its work and will make appropriate arrangements for the disposal of chromium-contaminated material. The contractor will also be responsible for providing clean fill and restoring engineering controls. For emergency response cases, JCMUA's contractor will take the lead in completing the field work activities including excavation and disposal of materials generated during sewer work, backfilling and site restoration. In some cases, Honeywell's contractor may take the lead in performing field work or a portion of the field work (e.g., transportation and disposal of chromium-contaminated materials, restoration of engineering controls), to be determined on a case by case basis in coordination with the JCMUA.

3.4 RESPONSIBILITIES

Telephone Answering Service (Chromium Response Hotline): Will receive all notifications from the JCMUA and/or its designated contractor informing Honeywell of expected work at the sites subject to this procedure. The answering service will obtain information from the calling party regarding work location, timing of work, whether the work is emergency or non-emergency, and the identity of the JCMUA representative and contact information. The service will contact a responsible individual within the Honeywell Response Team.

Honeywell Remediation Director (or assigned personnel): Responsible for supporting the overall function of the system; and will have final approval authority for the development and revision of the SOP and its application to the JCMUA utilities at the sites.

Honeywell Remediation Manager: Responsible for implementation of procedures in accordance with the SOP including retaining contracted services and communicating with project personnel for proper coordination and documentation of work.

Honeywell Project Personnel: Responsible for the implementation of all SOP requirements, including providing an assessment to the entities submitting notice of intent to perform work at the site(s), that chromium-contaminated fill is or is not present at the work site. Project personnel will provide field support and technical assistance as needed prior to and during the proposed work, and after completion of the work and document all information in a field log book. Project personnel will also be responsible for updating the chromium soils site maps and preparing summary reports following completion of field work.

Honeywell Emergency Response Contractor: Responsible for responding to emergency situations when requested by Honeywell in consultation with the JCMUA. As part of the response, the contractor will be prepared to address all chromium-contaminated media including offsite transportation and disposal, and coordinate work with JCMUA's project personnel and contractor as may be required for sewer work. In addition, the emergency response contractor will be responsible for developing a Health and Safety Plan (including emergency response procedures) for its workers. Non-emergency type work may also be conducted by the emergency contractor (or another contractor), to be determined by Honeywell based on the projected schedule and consultation with JCMUA project personnel.

JCMUA Supervisor/Superintendent: Responsible for retaining appropriate contracted services as indicated in the SOP, checking the proposed sewer work location on the chromium soils site maps, and providing notification to Honeywell in the event of any sewer utility work at the sites, including notification to the Chromium Response Hotline.

JCMUA Project Personnel/Contractors: Responsible for coordinating sewer work with Honeywell's project personnel and contractor, as applicable. JCMUA's employees (designated supervisory and field staff) will be required to have appropriate training as indicated in Section 5 and specified in the Worker Training Manual. In most cases, JCMUA personnel are not expected to conduct ground-intrusive work (e.g., digging, drilling, and excavation) in areas of chromium soils. It

is expected that, in the majority of cases, JCMUA's contractor(s) will perform field work involving removal and disposal of chromium-contaminated soils and site restoration in conjunction with sewer repair or replacement work. JCMUA's employees and/or its contractors performing field work will be required to have applicable health and safety training as indicated in the Worker Training Manual.

JCMUA Rules and Regulations: All sewer-related work must comply with JCMUA's Rules and Regulations, which include standard material specifications including backfill and restoration requirements. Backfill requirements include providing clean fill certification, laboratory analysis reports, and specific requirements for compaction. A copy of JCMUA's Rules and Regulations pertaining to site work, excavation and backfill are provided for reference in **Appendix E**.

The SOP notification and response system flow chart and Honeywell Response Team key personnel and contact information (phone numbers, email addresses) are included in **Appendix A**.

Cost Reimbursement: Financial issues and cost reimbursement details will be addressed in a cooperative manner between Honeywell and the JCMUA. Honeywell will reimburse the JCMUA for the need to employ OSHA 40-hour trained personnel as required by this SOP. Honeywell will also pay for costs associated with transportation and disposal of chromium soils. Currently, it is anticipated that cost reimbursement would be accomplished by JCMUA submittal of copies of invoices to Honeywell for additional costs associated with use of OSHA-trained workers and transportation and disposal of chromium soils, as applicable on a project specific basis. Cost reimbursement, including the responsibilities of Honeywell and JCMUA for costs arising from the presence of chromium soils co-located with soils containing other hazardous constituents, will be addressed in a separate agreement between Honeywell and the JCMUA, if needed.

4.0 IDENTIFICATION OF CHROMIUM SOIL AREAS

This document applies to Honeywell-assigned sewer sites as designated in the Consent Judgment between Honeywell and the NJDEP.

Site maps and a summary table with information on ownership, address, and tax parcel information are provided in **Appendix B**. Site maps were provided by Honeywell to the JCMUA in May 2013. The sites include 27 sewer sites in Jersey City as specified in the Consent Judgment including 10 sites with shared responsibility between Honeywell and PPG. For the shared sites, Honeywell is taking the lead on remediation, and, therefore, Honeywell should be contacted for any work expected to be performed by the JCMUA at those sites. Honeywell will also provide survey coordinates for the sites for use by the JCMUA and incorporation into existing Geographical Information System (GIS) sewer mapping system.

The presence of chromium impacted soil or fill may be indicated as gray-black granular material, yellow-green colored staining, reddish-brown nodules in soils, gray-green mud, or extremely hard layers of dark brown soil. Chromium-impacted groundwater may be indicated by yellow-green colored water. Fill soils may also contain other contaminants that are commonly associated with historic fill and unrelated to COPR fill, such as polycyclic aromatic hydrocarbons (PAHs) and metals. This SOP does not address potential risk of exposure to these other contaminants.

Site 153 (Former Morris Canal Site) is the location of a force main sewer pipeline operated by the Bayonne Municipal Utility Authority (BMUA) along the eastern side of Route 440 between Carbon Place and Danforth Avenue in Jersey City. The sewer pipeline conveys sewage from the City of Bayonne to the Passaic Valley Sewerage Commission. Remedial actions were completed at Site 153 in 2009 and 2011 including engineering controls (placement of 3 feet of clean fill, pavement and/or vegetative cover) and establishment of institutional controls (Deed Notice). A separate SOP has been prepared for coordination of work between Honeywell and the BMUA at Site 153 Former Morris Canal.

JCMUA also has sewer utilities at or adjacent to portions of the Morris Canal Site along the east side of Route 440. Coordination of work between Honeywell and JCMUA relative to its sewer utilities at or near the Morris Canal Site will be addressed in this SOP for coordinating utility work at sewer sites in Jersey City. Such work may also likely require notification and/or coordination with the BMUA, in the event that JCMUA's utility work is proximate to or has any impact on BMUA's force main sewer pipeline which is located within the Morris Canal.

5.0 HAZARD EVALUATION AND WORKER TRAINING

This SOP is intended to provide information and procedures for protection of utility workers and contractors who may be performing work at sites containing chromium-contaminated soils or groundwater.

Potential chemical exposure pathways are:

- Inhalation of airborne dusts and mists that may contain contaminated particulates
- Skin and eye contact and absorption due to direct contact with contaminated soil, sediment, and/or liquids
- Incidental ingestion of contaminated soils, liquids, and/or particulates

Contact with known or suspected chromium-contaminated media must be avoided. Potential exposure to chromium contamination could occur by utility workers performing ground intrusive activities (e.g. drilling, digging, and excavation). Only properly trained and equipped personnel should be allowed to perform tasks that may involve the handling of known or suspected chromium-contaminated media.

As stated in previous sections, it is anticipated that, in most cases, JCMUA personnel will not conduct activities such as excavation, material handling, and disposal of chromium-contaminated materials. Such activities will be implemented by JCMUA contractors or Honeywell designated contractors whether on an emergency or non-emergency basis. However, JCMUA personnel must be knowledgeable and trained on the potential hazards and safety procedures to be followed when work is conducted in areas of chromium fill, as well as on the safety procedures that should be followed if exposure to chromium fill occurs during normal operation and maintenance of the sewer pipeline. Accordingly, Honeywell has developed a Worker Training Manual as discussed below.

Worker Training Manual

Honeywell has prepared a Worker Training Manual which addresses training of workers who potentially may be exposed to COPR or chromium-impacted soils or groundwater in conjunction with utility or other subsurface work. The Worker Training Manual contains details regarding worker training requirements and

pertinent reference information including fact sheets with information on chromium and potential health hazards. Honeywell will provide training support to the JCMUA as deemed appropriate, and the JCMUA will develop and implement a permanent worker training plan based on the requirements outlined in the Worker Training Manual.

Honeywell in consultation with the JCMUA has identified the following training needs for JCMUA employees that would be provided by Honeywell (or its designated contractor):

- Chromium Awareness Training - initial and periodic training (approximately every 3 years): estimated 1 to 2 hours duration and includes JCMUA staff with responsibility for performing field work.

- HAZWOPER 40-hour training and annual 8-hour refresher training: estimated to include two JCMUA supervisory employees.

It is expected that Honeywell will pay for the cost of the training program and the JCMUA would cover the cost for the time for its employees to attend the training.

JCMUA's employees or contractors performing field work involving disturbance of engineering controls and potential for exposure to chromium soils will be required to have applicable health and safety training as indicated in the Worker Training Manual. Health and safety training requirements for JCMUA contractors will be specified as part of JCMUA's bidding process for sewer work and that contractors will be required to demonstrate appropriate training documentation to the JCMUA prior to performing field work at the sites.

APPENDIX A

SOP PROCESS FLOW CHART/
HONEYWELL RESPONSE TEAM KEY PERSONNEL

APPENDIX A-1

NOTIFICATION AND RESPONSE SYSTEM FLOW CHART

Figure 1 Notification and Response System Flow Chart
Response Actions and Responsibilities for JCMUA Projects in Areas of Chromium Sites

JCMUA Sewer Work Order

JCMUA Supervisor/Engineer
Determine if work location is at a chromium site

No → **JCMUA Supervisor/Engineer**
Proceed with Work in Normal Manner

Yes

Is it Emergency Work?

No →
JCMUA Supervisor/Engineer
- Notify Honeywell via Chromium Response Hotline or normal communication with Honeywell Remediation Manager
- Provide Scope/Schedule to Honeywell

→ **Honeywell Remediation Manager**
- Evaluate scope of work and existing data
- Evaluate if work area affected by Deed Notice and/or Engineering Controls[1]
- Sample (if necessary)
- Notify NJDEP Case Manager and/or NJDEP Hotline as applicable per Deed Notice or regulatory requirements
- Coordinate work with JCMUA
  - ▲ Work Plan for Chromium Soils Management

Yes

JCMUA Supervisor/Engineer
Notify Honeywell via Chromium Response Hotline (855-727-2658)

JCMUA Contractor
Completes field work using OSHA HAZWOPER 40-hour trained crew

Honeywell Contractor
Field support as needed (to be determined in cooperation with JCMUA[2])

Honeywell Remediation Manager
- Evaluate if work area affected by Deed Notice and/or Engineering Controls[1]
- Notify NJDEP Case Manager and/or NJDEP Hotline as applicable per Deed Notice or regulatory requirements

JCMUA Contractor
Completes field work with appropriately trained crew

Honeywell Contractor
Completes field work (to be determined in cooperation with JCMUA[2])

Honeywell Remediation Manager
- Update Master Chromium Site Map
- Compile manifests, volumes, map, daily construction report
  - ▲ Response Action Report for project file
  - ▲ Summary Report to NJDEP and other relevant parties per Deed Notice or other reporting requirements (as applicable)

Legend

- JCMUA or JCMUA Contractor
- Honeywell or Honeywell Contractor
- ▲ Document/Report to Project File/Agency

1 See Deed Notice For Notification/Reporting Requirements

2 Refer to SOP for details on coordination and requirements for excavation and disposal of chromium soils, backfill, and site restoration. Honeywell reimbursement of JCMUA for the portion of work associated with OSHA 40-hour trained crew and transportation/disposal of chromium soils

Points Of Contact:
Chromium Response Hotline: 855-727-2658 (24/7 answering service)
Honeywell Remediation Manager: Maria Kaouris 973-455-3302 (office); 862-579-8453 (cell)
JCMUA Main Office Number: 201-432-1150
JCMUA Senior Engineer: Rich Haytas 201-954-8463 (cell)

10/10/14

APPENDIX A-2

HONEYWELL RESPONSE TEAM KEY PERSONNEL

Table 1: Notification System Key Personnel
JCMUA / Honeywell SOP for Coordination of Work at Sewer Sites

ORGANIZATION	KEY PERSONNEL	PHONE NUMBERS	EMAIL	MAILING ADDRESS
Honeywell Emergency Response Contractor (ERTS)	Nathan Walden, VP Operations Zane Gloer, Director	**Honeywell Response #** **855-727-2658** **[rings to ERTS 24/7 #** **800-924-6804]**	nwalden@ertsonline.com zgloer@ertsonline.com	6001 Cochran Road Solon, OH 44139
Honeywell	John Morris, Remediation Director Bill Hague, Remediation Design & Construction Director Maria Kaouris, Remediation Manager John Mojka, Engineering & Construction Manager George Pfeiffer, Remediation Construction Manager	973-455-3003 (973-727-6573 cell) 973-455-2175 (973-896-9366 cell) 973-455-3302 (862-579-8453 cell) 973-455-4252 (973-615-3782 cell) 973-455-2019 (908-797-0897 cell)	john.morris@honeywell.com william.hague@honeywell.com maria.kaouris@honeywell.com john.mojka@honeywell.com george.pfeiffer@honeywell.com	Honeywell 115 Tabor Road Morris Plains, NJ 07950
Honeywell Project Personnel / Consultant - Amec	Joe Clifford, Principal Engineer Ed Gaven, Principal Scientist Peg Bonaker, Project Manager Telly Giouzelis, Field Services Andrew Shust, H&S Coordinator Other Project Personnel TBD	973-455-4163 (610-505-9315 cell) 609-631-2905 (609-865-6959 cell) 609-689-6777 (484-880-0772 cell) 609-631-2906 (609-865-3592 cell) 609-631-2921 (609-638-3598 cell)	joseph.clifford@amecfw.com ed.gaven@amecfw.com margaret.bonaker@amecfw.com aristotelis.giouzelis@amecfw.com andrew.shust@amecfw.com	Amec Foster Wheeler Environment & Infrastructure, Inc. 200 American Metro Blvd., Suite 113 Hamilton, NJ 08619 609-689-2829 (main office) Hamilton, NJ 08619
JCMUA	Daniel Becht, Executive Director Bill Golden, Chief of Operations Rich Haytas, Senior Engineer	201-432-1150 (main office) 201-954-8466 (cell) 201-954-8463 (cell)	d.becht@jcmua.com w.golden@jcmua.com r.haytas@jcmua.com	Jersey City MUA 555 Route 440 Jersey City, NJ 07305
JCMUA Field Personnel	[To be provided by JCMUA]	[To be provided by JCMUA]	[To be provided by JCMUA]	[To be provided by JCMUA]
JCMUA Contractors(s)	[To be provided by JCMUA]	[To be provided by JCMUA]	[To be provided by JCMUA]	[To be provided by JCMUA]
United Water Jersey City Operations	Michael Leahy, Manager, System Maintenance T&D Operations	201-239-1108 (201-538-0225 cell)	michael.leahy@unitedwater.com	United Water 233 Coles Street Jersey City, NJ 07310

APPENDIX B

SITE INFORMATION/MAPS

APPENDIX B-1

SITES OVERVIEW MAP

Site Number	Site Name
007	NJ Turnpike at Communipaw
019	Phillip Street
067	Chapel Avenue (part sewer)
068	Clendenny Outfall (part sewer)
069	Clendenny Avenue (part sewer)
091	NE Interceptor #1
092	NE Interceptor #2
093	NE Interceptor #3
094	18th Street
097	NW Interceptor #1
098	NW Interceptor #2
099	Recycling Specialists (part sewer)
100	Richard Street (part sewer)
101	Stockton Avenue (part sewer)
153	Former Morris Canal
172	Warren Street
180A	Eastern Oil Sewer*
183	Sludge Line #1
187	Route 440 Median Strip*
188	Sussex Street*
189	Henderson Street*
196	POTW Outfall Line*
197	Grand Street Sewer*
198	Hartz Mountain*
199	Sludge Line #2*
200	Sludge Line #3*
205	Urban Redevelopment Partners*

Except for Site 153 Former Morris Canal, sites listed on the table and shown on the figure include Honeywell-assigned sewer sites in the Consent Judgment with NJDEP dated 9/7/11. Site 153 was identified in the Administrative Consent Order with NJDEP dated June 17, 1993.

* Indicates shared Honeywell and PPG sites.

Legend

Sewer Site Boundary

Municipality Boundary

2,000 1,000 0 2,000

SCALE IN FEET

Source:
Bing Maps Aerial Imagery Web Mapping Service; ESRI Map Service; Microsoft; 2013.

REV.	DATE	STATUS	Prepared By	Checked By

Amec Project No.
3480120316

Prepared/Date
WSL 03/06/2013

Checked/Date

amec
ENVIRONMENT & INFRASTRUCTURE
200 AMERICAN METRO BLVD, SUITE 113
HAMILTON, NEW JERSEY 08619

DRAFT

Sewer Sites
Jersey City, New Jersey

APPENDIX B-2

SITES SUMMARY TABLE

SITES SUMMARY TABLE

Site ID[1]	NJDEP Program Interest Number	Site Location	Block/Lot[2]	Current Property Owner	Property Class[2]	Current Land Use[3]	Zoning District[4]
Site 007 New Jersey Turnpike at Communipaw (sewer)	PI#G000008635	Jersey City Boulevard (County Rte 612) and I-78/NJ Turnpike	NJ Turnpike and Jersey City Boulevard ROWs	NJ Turnpike Authority City of Jersey City	N/A	NJ Turnpike and municipal street ROWs	Morris Canal Redevelopment Area - Roadway Liberty Harbor Redevelopment Area - Roadway
Site 019 Phillip Street (sewer)	PI#G000008647	Caven Point Avenue; east of Site 100	Block 21503, Lot 2	Consolidated Rail	5A - Class I Railroad	Railroad lines	Canal Crossing Redevelopment Area - Rail transportation
			Block 21503, Lot 4		5A - Class I Railroad	Railroad lines	
			Block 21503, Lot 6		1 - Vacant	Railroad lines and vacant land	
			Block 21503, Lot 3	NJ Transit	15C - Exempt Public	Vacant land	
			Block 21503, Lot 13		15C - Exempt Public	Vacant land	
			Block 21503, Lot 14		15C - Exempt Public	Vacant land	
			Block 21503, Lot 5	City of Jersey City	15C - Exempt Public	Vacant land	
			NJ Turnpike and Caven Point Avenue ROWs	NJ Turnpike Authority City of Jersey City	N/A	NJ Turnpike and municipal street ROWs	
Site 067 Chapel Avenue (part sewer)	PI#G000008695	Access road between Chapel and Linden Avenue [Lot 41 is 143 Chapel Ave and Lot 43 is 20 Linden Ave East in database]	Block 27401, Lot 40	Simsmetal East LLC	4B - Industrial	Scrap metal yard - bus, railcar, trailers	Danforth Transit Village Redevelopment Area - Residential, offices, hotels, parks
			Block 27401, Lot 41	Hudson Maine Urban Renewal LLC	1 - Vacant	Vacant; temporary storage yard	Chapel Avenue Industrial Park - Industrial
			Block 27401, Lot 42	Greenberg Prop. LLC c/o Commercial RLT	4B - Industrial	Industrial facility	Chapel Avenue Industrial Park - Industrial
			Block 27401, Lot 43	American Self Storage Liberte, LLC	4B - Industrial	Commercial	Danforth Transit Village Redevelopment Area - Residential, offices, hotels, parks
Site 068 Clendenny Outfall (part sewer)	PI#G000008696	Clendenny Avenue	Block 16001, Lot 2	City of Jersey City	15C - Exempt Public	Vacant land	Western Gateway Redevelopment Area - Commercial (incl. day care) and public park/open space Marine Industrial Redevelopment Area - Industrial
		355 Clendenny Avenue	Block 18004, Lot 3	Hudson Milestones, Inc.	15D - Exempt Charitable	Commercial	Waterfront Planned Development - Mixed use
		777-785 Route 440	Block 18004, Lot 4	Joseph Scibetta	4A - Commercial	Commercial	Waterfront Planned Development - Mixed use
		Clendenny Avenue	Clendenny Avenue ROW	City of Jersey City	N/A	Utility ROW	Western Gateway Redevelopment Area - Commercial (incl. day care) and public park/open space Marine Industrial Redevelopment Area - Industrial Waterfront Planned Development - Mixed use

SITES SUMMARY TABLE

Site ID[1]	NJDEP Program Interest Number	Site Location	Block/Lot[2]	Current Property Owner	Property Class[2]	Current Land Use[3]	Zoning District[4]
Site 069 Clendenny Avenue (part sewer)	PI#G000008697	Hackensack River and Clendenny Avenue	Block 16001, Lot 2	City of Jersey City	15C - Exempt Public	Vacant land	Marine Industrial Redevelopment Area - Industrial
Site 070 Colony Diner	PI#G000008698	1033 Communipaw Ave	Block 18001, Lot 4	Hudson County	15C - Exempt Public	Vacant land	Western Gateway Redevelopment Area - Commercial (incl. day care) and public park/open space
		400 Clendenny Ave	Block 18001, Lot 5		15C - Exempt Public	Vacant land	
Site 091 Northeast Interceptor 1 (sewer)	PI#G000008714	41 Aetna St	Block 15801, Lot 77	City of Jersey City	15C - Exempt Public	Vacant land; CSO regulating chamber on Mill Creek	Grand Jersey Redevelopment Area - Mixed use (residential, offices, hotels, government, schools, retail, open space, medical buildings/offices)
		Aetna St	Block 15801, Lot 78		15C - Exempt Public		
		246 Johnston Ave	Block 15801, Lot 76	Johnston View Owner, LLC c/o Argent, LLC	4B - Industrial		
Site 092 Northeast Interceptor 2 (sewer)	PI#G000008715	52 Aetna Street	Block 15801, Lot 3	Jersey City Redevelopment Agency	15C - Exempt Public	Vacant land	Grand Jersey Redevelopment Area - Mixed use (residential, offices, hotels, government, schools, retail, open space, medical buildings/offices)
		Part of sewer easement	Block 15801, Lot 4		15C - Exempt Public	Vacant land	
		Part of sewer easement	Block 15801, Lot 70	City of Jersey City	15C - Exempt Public	Light rail	Grand Jersey Redevelopment Area - Light rail (majority)
		Part of sewer easement	Block 15801, Lot 66	Aetna Lot 66, LLC. c/o Frenkel, H. & S.	4B - Industrial	Industrial facility	Grand Jersey Redevelopment Area - Mixed use (residential, offices, hotels, government, schools, retail, open space, medical buildings/offices)
		Between NJ Turnpike and Lot 3	Mill Creek ROW	City of Jersey City (unverified)	N/A	Creek filled in for I-78 extension	
Site 093 Northeast Interceptor 3 (sewer)	PI#250059	215 Communipaw Ave	Block 21504, Lot 4	Jersey City Sewerage Authority	15C - Exempt Public	Sewage treatment pumping station	Liberty Harbor Redevelopment Area - Multi-purpose district (residential, retail, public and semi-public uses, hotels, recreation, television transmission tower with public observation deck, utilities [not natural gas])
		101 Phillip Street	Block 21504, Lot 5		15C - Exempt Public	Vacant; police car pound (not Site 093)	
		Jersey City Boulevard (Communipaw Ave on older maps)	Block 21504, Lot 7		15C - Exempt Public	Vacant land	
Site 094 Eighteeth Street Sewer (sewer)	PI#244883	Eighteenth Street (between Coles Street and Jersey Avenue)	Eighteenth Street ROW	City of Jersey City	N/A	Municipal Street ROW	Jersey Ave Park Redevelopment Area - Roadway

SITES SUMMARY TABLE

Site ID[1]	NJDEP Program Interest Number	Site Location	Block/Lot[2]	Current Property Owner	Property Class[2]	Current Land Use[3]	Zoning District[4]
Site 097 Northwest Interceptor 1 (sewer)	PI#G000008720	Rail corridor between Secaucus Road and County Road; south of USPS Bulk Mailing Facility	Block 101, Lot 6	United States of America	15C - Exempt Public	Vacant	Highway Commercial - Government, retail, offices, auto sales, restaurants, theatres, service stations, day care New Jersey Meadowlands Commission - Roads, railroads
			Block 101, Lot 8		15C - Exempt Public	Vacant	
			Block 101, Lot 9		15C - Exempt Public	Vacant	
			Block 1001, Lot 11		15C - Exempt Public	Vacant	
			Block 1001, Lot 12		15C - Exempt Public	Vacant	
			Block 1001, Lot 13		15C - Exempt Public	Vacant	
			Block 1001, Lot 17		15C - Exempt Public	U.S. Post Office Bulk Sorting Center	
			Block 101, Lot 7	City of Jersey City	15C - Exempt Public	Vacant land	
			Block 1001, Lot 14	Consolidated Rail	5A - Class I Railroad	Railroad lines	
			Block 1001, Lot 16		5A - Class I Railroad	Vacant land	
Site 098 Northwest Interceptor 2 (sewer)	PI#G000008721	75 County Road (tax records show as New County Road; address listings show County Road)	Block 1002, Lot 6	Norfolk Southern Railway Company	4B - Industrial	Freight terminal	Majority zoned as Highway Commercial; western edge in New Jersey Meadowlands Commission - Intermodal, railroads
			Block 1002, Lot 7		5B - Class II Railroad	Railroad	
			Block 3101, Lot 9	Consolidated Rail	1 - Vacant	Vacant land	
			Block 3101, Lot 10		1 - Vacant	Vacant land	
			Block 3101, Lot 11		5A - Class I Railroad	Vacant land	
			Block 3101, Lot 13		5A - Class I Railroad	Vacant land	
			Block 3101, Lot 14		5A - Class I Railroad	Vacant land	
Site 099 Recycling Specialists (part sewer)	PI#G000008722	375 Route 1&9	Block 11702, Lot 2	375 1 & 9 Associates, L.P.	4B - Industrial	Recycling center	Majority zoned as Industrial; western corner overlaps with Hackensack River Edge Redevelopment Area
			NJDOT ROW	NJDOT	N/A	NJDOT ROW	
Site 100 Richard Street (sewer)	PI#G000008723	Between Chapel Avenue and Caven Point Road; east of Site 067 and west of Site 100	Block 24303, Lot 1	Consolidated Rail	1 - Vacant	Railroad	Claremont Industrial Redevelopment Area - Industrial
			Block 27402, Lot 2		5A - Class I Railroad	Railroad	Claremont Industrial Redevelopment Area - Residential Claremont Industrial Redevelopment Area - Industrial
			Block 27402, Lot 3		5A - Class I Railroad	Railroad	Claremont Industrial Redevelopment Area - Residential
			Block 27402, Lot 7		5A - Class I Railroad	Railroad	Claremont Industrial Redevelopment Area - Industrial
			Block 24302, Lot 1	Jersey City Redevelopment Agency	15C - Exempt Public	Vacant land	Claremont Industrial Redevelopment Area - Residential
			Block 27402, Lot 4		15C - Exempt Public	Vacant land	Claremont Industrial Redevelopment Area - Residential
			Block 27402, Lot 6		15C - Exempt Public	Vacant land	Claremont Industrial Redevelopment Area - Industrial
			Block 27402, Lot 2.02	Black Bear Hollow, LLC. c/o Tempesta	1 - Vacant	Vacant land	Claremont Industrial Redevelopment Area - Residential
			Block 27402, Lot 5		1 - Vacant	Vacant land (crossed by railroad)	Claremont Industrial Redevelopment Area - Residential

SITES SUMMARY TABLE

Site ID[1]	NJDEP Program Interest Number	Site Location	Block/Lot[2]	Current Property Owner	Property Class[2]	Current Land Use[3]	Zoning District[4]
Site 101 Stockton Avenue (part sewer)	PI#G000008724	255 Route 1&9	Block 11706, Lot 3 - combined in tax database with 11707, Lot 3 for billing	AMB Pulaski Distribution Center LLC	4B - Industrial	Warehouse facility with park areas	Hackensack River Edge Redevelopment Area - Open Space and High-Cube Overlay (Warehouse)
		235 Stockton Avenue	Block 11706, Lot 4	G. & A. Equipment Corp.	4A - Commercial	Truck sales and repair	Hackensack River Edge Redevelopment Area - Open Space and Industrial Overlay (Truck sales)
Site 119 Droyers Point Groundwater (GW requirements only)	PI#G000008896	Society Hill at Droyers Point	Block 26102, Lots 14, 15, 18 and 20 subdivided into units for Society Hill development.	Residential: See PA/SI Non-residential: Society Hill at Droyers Point Condo	2 - Residential; 15F - Exempt Miscellaneous; 1 -Vacant	Condominiums	Droyers Point Redevelopment Area - Residential, professional home offices, real estate offices
			Block 26102, Lot 13	Society Hill at Jersey City II	1 - Vacant	Vacant land	
			Block 26102, Lot 16 - Not listed in tax database	N/A	N/A	Walkway	
			Block 26102, Lot 17	Society Hill at Droyers P.C.ASC, Inc	1 - Vacant	Walkway	
			Block 26102, Lot 19		1 - Vacant	Walkway	
			Block 26102, Lot 21	Jersey City Redevelopment Agency	15C - Exempt Public	Walkway	
Site 130 Communipaw 5	PI#G000008747	1115 Communipaw Ave	Block 18001, Lot 3	City of Jersey City	15C - Exempt Public	Vacant land	Jersey City Recreation & Open Space Master Plan - Park Western Gateway Redevelopment Area - Commercial (incl. day care) and public park/open space
Site 153 Former Morris Canal	PI#G000008767	Along Route 440 between Danforth Ave. & Carbon Place, Jersey City	Block 21902, Lot 1	Honeywell subsidiary (425/445 Route 440 Property LLC)	1 - Vacant	Sewer Easement along Route 440	NJCU West Campus Redevelopment Area and Highway Commercial - Roadway
	PI#G000008767	457 Danforth Avenue	Block 26704, Lot 5	Listed as Bayonne MUA in tax database but should be Honeywell subsidiary	15C - Exempt Public	Sewer Easement	Highway Commercial - Roadway
Site 165 Tempesta & Sons Inc. (DEP Lead)	PI#G000008779	7-33 Aetna Street	Block 15801, Lot 80	One Harbor Owner, LLC	4B - Industrial	Inactive solid waste sorting facility	Grand Jersey Redevelopment Area - Mixed use (residential, offices, hotels, government, schools, retail, open space, medical buildings/offices)
			Block 15801, Lot 73	City of Jersey City	15C - Exempt Public	Vacant land	Grand Jersey Redevelopment Area - Mixed use (see above) and public park
Site 172 Warren Street (sewer)	PI#G000008786	Warren Street between First Street and Steuben Street	Warren Street ROW	City of Jersey City	N/A	Municipal streets	Powerhouse Arts District Redevelopment Area - Roadway
Site 178 Cabana Club	PI#G000011469	185 Theodore Conrad Drive	Block 24304, Lot 1	State of NJ Dept of Env Protection	15C - Exempt Public	Park maintenance facility	Liberty Harbor Redevelopment Area - Industrial

SITES SUMMARY TABLE

Site ID[1]	NJDEP Program Interest Number	Site Location	Block/Lot[2]	Current Property Owner	Property Class[2]	Current Land Use[3]	Zoning District[4]
Site 180A Eastern Oil Sewer	PI#G000011471	Duffield Avenue	Block 7402, Lot 4	City of Jersey City	15C - Exempt Public	Vacant Land	New Jersey Meadowlands Commission
			Block 7402, Lot 5	State of NJ Dept of Transportation	15C - Exempt Public	Vacant Land	
			Block 7402, Lot 7		15C - Exempt Public	Vacant Land	
			Block 7402, Lot 8		15C - Exempt Public	Vacant Land	
			Block 7402, Lot 9		15C - Exempt Public	Vacant Land	
			Block 7402, Lot 6 - Not listed in tax database	N/A	N/A	Vacant Land	
Site 183 Sludge Line 1 (sewer)	PI#G000011475	207 Randolph Ave (Light rail corridor between Randolph Ave and Arlington Ave)	Block 21404, Lot 1	Jersey City Sewerage Authority	15C - Exempt Public	Sewer corridor	R-1 One and Two Family Housing - Rail corridor
			NJ Transit ROW	NJ Transit	N/A	Light rail	
Site 185 Allied Stockpile	PI#G000011476	Aetna Street and Jersey Avenue	Block 15801, Lot 5	Jersey City Medical Center	15C - Exempt Public	Medical facility - parking area	Grand Jersey Redevelopment Area - Mixed use (residential, offices, hotels, government, schools, retail, open space, medical buildings/offices)
			Block 15801, Lot 6	Jersey City Medical Center	4A - Commercial	Medical facility	
			Block 15801, Lot 66	Aetna Lot 66, LLC. c/o Frenkel, H. & S.	4B - Industrial	Industrial facility	
			Block 15801, Lot 67	Summit Metals Co Inc.	4B - Industrial	Industrial facility	
			Block 15801, Lot 68	Aetna Street, LLC	1 - Vacant	Vacant land	
			Block 15801, Lot 69	Aetna Street, LLC	1 - Vacant	Vacant land	
			Block 15801, Lot 4	City of Jersey City	15C - Exempt Public	Vacant land	
			Block 15801, Lot 70		15C - Exempt Public	Light rail	Grand Jersey Redevelopment Area - Light rail (majority)
			Block 15801, Lot 71		15C - Exempt Public	Light rail	Grand Jersey Redevelopment Area - Light rail/park
Site 187 Route 440 Median Strip (sewer)	PI#G000011679	Route 440 median strip between Danforth Avenue and Carbon Place	NJDOT ROW	State of NJ Dept of Transportation	N/A	Median within state highway	Waterfront Planned Development, Highway Commercial, Droyers Point, Bayfront, and New Jersey City University West Campus Redevelopment Areas- Rt. 440 Roadway Median
Site 188 Sussex Street (sewer)	PI#G000011680	Sussex Street between Van Vorst Street and Warren Street	Sussex Street ROW	City of Jersey City	N/A	Municipal street	Historic District and Tidewater Redevelopment Area (western corner) - Roadway
Site 189 Henderson Street (sewer)	PI#G000026751	Second Street and Marin Boulevard	Henderson Street ROW	City of Jersey City	N/A	Municipal street	At junction of Henderson Street South, Harsimus Cove Station, Luis Munoz Marin, and Powerhouse Arts District Redevelopment Areas - Roadway

SITES SUMMARY TABLE

Site ID[1]	NJDEP Program Interest Number	Site Location	Block/Lot[2]	Current Property Owner	Property Class[2]	Current Land Use[3]	Zoning District[4]
Site 196 POTW Outfall Line (sewer)	PI#G000044578	Liberty State Park at Phillip Street	Block 21505 Lot 1	State of NJ Dept of Env Protection	15C - Exempt Public	Sewer corridor within public park	Liberty Harbor Redevelopment Area - Park
			Block 21601, Lot 5		15C - Exempt Public		
			Block 21601, Lot 6		15C - Exempt Public		
			Block 15802, Lot 13		15C - Exempt Public		
			Block 15802, Lot 15		15C - Exempt Public		
Site 197 Grand Street (sewer)	PI#G000044586	Grand Street between Washington Street and Warren Street	Grand Street ROW	City of Jersey City	N/A	Municipal street	Historic District
Site 198 Hartz Mountain (sewer)	PI#G000044580	95 Caven Point Road	Block 27402, Lot 8	Caven Point Urban Ren. Ass. LLC	4B - Industrial	Commercial warehouse and access road	Claremont Industrial Redevelopment Area - Industrial
Site 199 Sludge Line 2 (sewer)	PI#G000044581	Light rail corridor between Garfield Avenue and Halladay Street	Block 21501, Lot 1.01 (combined former Lots 1, 2 and 3 [not listed])	Jersey City Sewerage Authority	15C - Exempt Public	NJ Transit light rail and sewer corridor	Morris Canal Redevelopment Area - Rail transportation Canal Crossing Redevelopment Area - Rail transportation
			NJ Transit ROW	NJ Transit	N/A		
Site 200 Sludge Line 3 (sewer)	PI#G000044582	Light rail corridor between Arlington Avenue and West Side Avenue	Block 21305, Lot 25	Jersey City Sewerage Authority	15C - Exempt Public	Sewer corridor	Intersection of Martin Luther King Jr. Drive and Green Villa Redevelopment Areas - NJ Transit Hudson Bergen Light Rail
			NJ Transit ROW	NJ Transit	N/A	NJ Transit ROW	
Site 205 Urban Redevelopment Partners (sewer)	PI#G000044587	108 First Street	Block 11603, Lot 41	"A" Condominium Association, Inc.	15C - Exempt Public	Public Park	Power House Arts District Redevelopment Areas - Park
Site 206 Polarome International	PI#G000008288	200 Theodore Conrad Drive	Block 21508, Lot 5	ADAR 12, LLC	4B - Industrial	Commercial facility	Liberty Harbor Redevelopment Area - Industrial
			Block 21508, Lot 5.T01		4A - Commercial	T01 qualifier for cellular ant.; not observed	

Notes:

1) Honeywell assigned sites as indicated in Appendix A of Consent Judgment dated 9/7/11.

2) Sources include Jersey City tax maps, revised 2010-2017, and State of New Jersey Division of Taxation MOD-IV database

3) Information provided in Preliminary Assessment/Site Investigation (PA/SI) Reports prepared by AMEC and by subsequent site visits

4) As designated by City of Jersey City Zoning Map (amended June 16, 2016) and redevelopment plans made available on Jersey City Planning Board website

Site 165 Tempesta: Site 165 Tempesta: DEP Lead (Honeywell financial obligation only).

Indicates Shared Site Shared Site - Honeywell and PPG Industries

APPENDIX B-3

INDIVIDUAL SITE MAPS
(on compact disk)

APPENDIX C

WORKER TRAINING PLAN MANUAL
(Separate Document)

APPENDIX D

DRAFT SPECIFICATIONS FOR CHROMIUM MATERIALS EXCAVATION AND MANAGEMENT

DRAFT SPECIFICATIONS

FOR

CHROMIUM MATERIALS EXCAVATION AND MANAGEMENT

Prepared by:

AMEC Environment & Infrastructure, Inc.
200 American Metro Boulevard, Suite 113
Hamilton, New Jersey 08619

DECEMBER 2014

Table of Contents

ATTACHMENTS

SECTION 01000 CHROMIUM-IMPACTED MATERIALS

PART 1 – GENERAL

1.01 DESCRIPTION

A. These specifications were prepared by Honeywell for use by the Jersey City Municipal Utilities Authority (JCMUA) and its Contractors to address excavation, handling and transportation/disposal of chromium-impacted materials that may be encountered during sewer maintenance; repair and/or replacement work at designated sites in Jersey City. Chromium-impacted material refers to soil, fill or other materials such as concrete debris containing hexavalent chromium above the NJDEP soil criteria, currently 20 milligrams per kilogram (mg/kg or parts per million [ppm]). Chromium-impacted groundwater refers to groundwater containing chromium above the NJDEP groundwater quality standards, currently 70 micrograms per liter (µg/L or parts per billion [ppb] based on total chromium).

B. This specification consists of the following sections.

Section 01001 Excavation of Chromium-Impacted Materials
Section 01002 Handling and Management of Chromium-Impacted Materials
Section 01003 Waste Transportation and Disposal of Chromium-Impacted Materials

C. These specifications apply to excavation, management and disposal of chromium-impacted materials that may be generated during sewer work. For JCMUA specifications applicable to sewer construction work, refer to the JCMUA Rules and Regulations Governing the Operation of the Jersey City Sewer System.

D. During work execution, the JCMUA will be the contracting authority and will direct all work being conducted. However, coordination and consultation between the JCMUA and Honeywell may be needed on how best to manage chromium-impacted materials on a case by case basis. Honeywell may observe or provide oversight of work involving excavation and handling of chromium-impacted materials. In such cases, Honeywell will provide a designated representative ("Honeywell Representative") to provide guidance on the handling of these materials.

E. These specifications are included as an attachment to the Standard Operating Procedure (SOP) for Coordinating Work within Chromium Soil Areas. The SOP addresses coordination of work between Honeywell and the JCMUA during sewer repair or replacement performed either as part of planned maintenance work, or required as a result of an emergency situation in areas of chromium-impacted soils. The SOP specifies that JCMUA's contractor will take the lead in performing work associated with excavation, material handling, and transportation/disposal of materials generated during sewer work. Honeywell and/or its designated representative will assist the JCMUA in determining whether or not the work location is in an area of chromium soils and provide technical assistance, field oversight and support as needed during soil excavation and site restoration. In some cases, Honeywell's contractor may take the lead on excavation and/or transportation/disposal of chromium contaminated materials, to be determined on a case by case basis in consultation with the JCMUA.

1.02 REFERENCES

A. The Contractor shall perform all work in accordance with all applicable, Federal, State and local regulations and guidance documents.

B. Worker Training Manual: Prepared by Honeywell for use by the JCMUA and addresses health and safety requirements for JCMUA personnel and contractors who may be implementing sewer pipeline maintenance, repair and/or replacement work or other ground intrusive activities (e.g., digging, drilling, excavation) in areas of chromium-impacted fill.

C. JCMUA Rules and Regulations Governing the Operation of the Jersey City Sewer System.

D. NJDEP Guidance for the Characterization of Concrete and Clean Material Certification for Recycling.

1.03 SUBMITTALS

A. The Contractor shall submit to the JCMUA's designated representative for approval (unless otherwise specified) the following:

1. Materials Management Plan: The plan shall include the identified chromium-impacted materials requiring management, the type of containers to be utilized, procedures for management of chromium-impacted materials, equipment to be utilized, and the proposed means/methods of coordinating the work including transportation/disposal of chromium-impacted materials at a Honeywell approved waste facility.
2. Health and Safety Plan (HASP): The HASP shall comply with all provisions of OSHA which are relevant to the excavation, handling and management of chromium-impacted materials. At a minimum, the plan shall cover OSHA personnel training requirements for work being performed, provisions for prevention of contaminant migration during work, emergency and contingency planning, and work zone monitoring, and perimeter air-monitoring (if required). It shall be prepared in conformance with all applicable Health and Safety laws and regulations including but not limited to OSHA 1910.120.
3. Hazardous Waste Contingency Plan: The plan shall address preparedness and prevention, emergency procedures and evacuation plan, if required in accordance with 40 CFR 262.34 and 264.52. This plan may overlap with and be included as part of the HASP.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

- END OF SECTION -

SECTION 01001: EXCAVATION OF CHROMIUM-IMPACTED MATERIALS

PART 1 GENERAL

1.1 SCOPE OF WORK

A. The work under this section shall consist of furnishing all labor, equipment and materials for performing all operations for excavation of chromium-impacted materials.

1.2 QUALITY ASSURANCE

A. The Contractor shall be responsible for contacting Honeywell approved waste facility to determine waste classification sampling and analytical requirements and obtain acceptance of the material for treatment/disposal.

B. Confirmatory/post-excavation sampling or testing may be required for excavation bottom and sidewall(s), to be determined on a case by case basis in consultation with JCMUA and Honeywell. Contractor shall cooperate with JCMUA and/or Honeywell's designated representative and provide access for sampling if needed.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 EXCAVATION

The Contractor shall prepare and submit as part of the Materials Management Plan, a section describing excavation activities for chromium-impacted areas to the JCMUA for review and approval. The excavation section of the Plan shall include a description of the work required in this specification section, work sequencing and scheduling including: excavation methods; plans for decontamination; dust control measures; any proposed temporary staging areas; handling and management of excavated materials; and any permit requirements. The excavation section of the Plan shall also include copies of required notifications and permits obtained by the Contractor and a list of all subcontractors proposed with copies of their current, valid permits or licenses to perform the work. All work shall be conducted in accordance with all OSHA requirements. Work shall not begin until approval is received from JCMUA's designated representative.

3.2 REMOVAL OF CONTAMINATED SOIL

A. The Contractor shall excavate contaminated soil/material as needed to complete sewer work as required by the JCMUA.

B. The Contractor shall provide means to suppress dust as needed during excavation and while the excavation is open and/or stockpiles are in place.

C. The Contractor shall manage and dispose of contaminated soil/material in accordance with Specification – Material Handling and Management.

D. The Contractor shall coordinate access to the excavation(s) with JCMUA's and/or Honeywell's designated representative as deemed necessary for inspection and collection of soil samples.

E. The Contractor shall maintain a Record Drawing documenting the daily cumulative horizontal and vertical extent of the excavation in each area of concern including

estimated quantities. The Record Drawing shall be updated daily, provided to the JCMUA's designated representative and shall be posted in the Contractor's trailer.

F. Any subsurface structures, or portions thereof, or debris located within the limits of the chromium-impacted area being excavated shall be removed and decontaminated where practicable, and segregated for characterization prior to off-site disposal. Material shall be characterized in accordance with current NJDEP guidance and disposal facility requirements. Debris may be reduced in size to meet specific disposal facility requirements. Size reduction will be accomplished in coordination with and the concurrence of the JCMUA's designated representative and be performed in compliance with all applicable state and local regulation.

G. Any utilities and associated structures encountered within the excavation shall be addressed on a case by case basis by the Contractor in consultation with JCMUA's designated representative and other utility owners (if encountered).

H. Excavation in close proximity to active utilities or aboveground structures shall be done in a manner protective of the utility or structure. The Contractor shall protect all existing structures to remain and active utilities.

I. All earthwork equipment and tools used for excavation of contaminated soil/material shall be decontaminated in accordance with the HASP, and these specifications, prior to being used elsewhere on site or before leaving the site.

3.3 EXCAVATION AREA

A. The chromium-impacted areas to be excavated will be defined in the field by JCMUA's and/or Honeywell's representative.

B. Excavation activities include the excavation and removal of soil/material from designated chromium-impacted area(s).

C. The activities shall be performed in accordance with OSHA requirements for excavation. Work shall be completed by OSHA trained individuals. Refer to the Worker Training Plan for guidance on applicable training requirements.

D. The Contractor shall not backfill the excavation until the final limits of excavation are reviewed and approved by the JCMUA's designated representative. Backfill can begin immediately upon approval of the JCMUA's designated representative.

E. The excavation shall be kept dry by the implementation of construction dewatering operations, if groundwater or storm water is encountered during construction. Evacuated water shall be characterized and disposed in accordance with all applicable Federal, State and local requirements.

F. Once loaded, the Contractor shall cover the truck prior to leaving the work area. Filled trucks shall then exit the work area and proceed to the decontamination pad. Refer to Section 01002 (Handling and Management of Chromium-Impacted Materials) and Section 01003 (Waste Transportation/Disposal of Chromium-Impacted Materials) for requirements regarding truck liners, loading and transportation.

G. The Contractor shall provide all labor, equipment and materials for road closures, as needed, based on the operation.

- END OF SECTION -

SECTION 01002: HANDLING AND MANAGEMENT OF CHROMIUM-IMPACTED MATERIAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall furnish all labor, equipment, and materials necessary to provide for the proper on-site handling and management of chromium-impacted materials including but not limited to: excavated indigenous soils, borrow soils, fill materials (including materials identified as chromium-impacted solid waste); excavated chromium-impacted concrete/masonry, metal, and all other debris; excavated non-chromium impacted soils/materials; asphalt pavement; miscellaneous construction debris (vegetation, trees, wood, etc.); liquid waste (decontamination water, construction dewatering, etc.); and remediation waste (disposable PPE, plastic sheeting, sampling equipment, etc.).

B. The Contractor is responsible to perform all work in compliance with applicable Federal, State, and local regulations and requirements.

C. The Contractor is required to provide a Site Specific Health and Safety Plan, Materials Management Plan, and Hazardous Waste Contingency Plan.

D. The Contractor shall be responsible for coordinating the work/schedule with Honeywell approved waste facilities (see list of approved facilities in Attachment A).

E. Non-chromium impacted soils removed from excavation areas shall be stockpiled temporarily in a designated stockpile area, as approved by JCMUA's designated representative.

F. For chromium-impacted soils, the preferred soil management method is direct loading and offsite transportation of soils removed from excavation area. If direct loading is not possible, then soils may be stockpiled temporarily in a designated Waste Staging and Storage Area as approved by JCMUA's and/or Honeywell's designated representative.

G. Asphalt and/or concrete materials removed from excavation areas shall be inspected for potential chromium impacts, characterized in accordance with current NJDEP guidance and properly disposed off-site. NJDEP Guidance for Characterization of Concrete and Clean Material Certification for Recycling may be applicable.

H. Oversize material removed from excavation areas, shall be properly disposed off-site in accordance with local, State and Federal disposal requirements.

I. The Contractor shall provide a system to weigh loaded trucks before they leave the site to confirm the maximum weight restriction is not exceeded. The system can include trucks equipped with load cells, or portable truck scale or similar device approved by JCMUA and Honeywell's Representative.

1.02 WASTE CONTAINERS

A. The Contractor shall provide as applicable:
   1. Plastic bags for disposable personnel protection equipment. Plastic bags shall have a minimum thickness of six (6) mils.
   2. Containers (e.g., roll-off containers) for non-hazardous municipal trash and debris.
   3. DOT-approved, steel drums (55-gallon capacity) and/or roll-off containers for storage of residual impacted material and/or water, if needed.
   4. Portable temporary storage tanks (FRAC tanks, etc.) for the storage, treatment and/or disposal of any collected liquids, such as pumped groundwater from excavation dewatering, decontamination fluids. The Contractor is responsible for transportation/disposal of collected liquids at an approved facility including any chromium-impacted groundwater. If water is discharged to local sanitary sewer system, Contractor is responsible for obtaining any approvals/permits, meeting local sewer utility discharge criteria and satisfying all other conditions and requirements of the local sewer utility, including sampling/analysis/reporting and compliance with NJDEP Treatment Works Approval for the construction and operation of on-site treatment system.

1.03 ON-SITE MANAGEMENT AND STORAGE OF MATERIALS

A. The Contractor shall be responsible for proper on-site management of wastes generated in compliance with all Federal, State, and Local regulations and requirements.

B. The Contractor shall load non-hazardous municipal trash and debris into appropriate containers for subsequent removal from the site in a timely manner.

C. The Contractor shall load cleared vegetation and other non-impacted debris into appropriate containers for subsequent removal from the site in a timely manner.

   1. Temporary on-site stockpiles of cleared material may be allowed, as approved by JCMUA's designated representative, to facilitate the progress of the work.

D. The Contractor shall be responsible for loading all waste containers, trucks, etc. with non-hazardous and hazardous solid waste materials removed from the work areas.

E. The Contractor shall be responsible for movement/direction of the containers, trucks, etc. into positions required for proper loading and management of material.

F. The Contractor shall be responsible for the on-site management of roll-off containers, storage of trash and debris from site preparation, and final site cleanup activities.

G. The Contractor shall be responsible for coordinating the schedule for delivery and pick-up of supplied waste containers. The Contractor shall also be responsible for movement and storage of containers within the site to allow the progress of the work.

H. The Contractor shall provide a base for any temporary stockpiles using at a minimum 6 mil polyethylene sheeting to prevent direct contact and cross-contamination of the underlying soil/asphalt. The plastic sheeting shall be properly overlapped to protect against direct soil/asphalt contact.

I. The Contractor shall cover any temporary stockpiles with at a minimum 6 mil polyethylene sheeting to prevent erosion of the stockpiles or uncontrolled runoff while promoting runoff of precipitation. The plastic sheeting shall be weighted down appropriately for expected weather conditions.

1. Temporary stockpiles shall be located in designated Stockpile Area, as approved by the JCMUA's designated representative. The base of all stockpiles shall be contained by a siltation fence reinforced with staked straw bales. In addition to the above, asphalt berms and/or sand bags may be used to divert surface water runoff from the stockpile areas. In all cases contractor shall maintain conformance with standard methods for NJ Soil and Erosion Control and/or a Soil and Erosion Control Plan Certification.

1.04 ANALYTICAL TESTING AND CLASSIFICATION OF WASTE MATERIALS

A. No testing requirements are expected for the following non-impacted wastes:

1. Cleared vegetation; and

2. General trash and rubbish from outside the exclusion zone.

B. Contractor shall be responsible for waste classification testing of excavated soils and other debris destined for offsite disposal as required in accordance with applicable regulations and guidance; obtaining acceptance of waste material as needed from disposal facilities; and making arrangements for waste transportation and disposal including the use of Honeywell approved waste facilities for chromium-impacted materials.

C. For non-chromium impacted soils, Contractor shall provide for waste classification sampling and transportation/disposal/reuse as appropriate in consultation with JCMUA's designated representative. Excavated materials identified/characterized as non-chromium impacted soil shall be stockpiled temporarily in the designated Stockpile Area, as approved by JCMUA's designated representative.

D. For chromium-impacted soils, Contractor shall provide for waste classification testing of chromium-impacted materials as needed and direct-loading (where possible) into trucks/containers for transportation to a Honeywell approved waste facility. If direct loading is not possible, then soils shall be stockpiled temporarily in a designated stockpile area (separate from non-chromium impacted soils). Direct loading and transportation/disposal of chromium-impacted soils is preferred whenever possible. When used, stockpiles of chromium-impacted soil shall be constructed and protected in a manner that will ensure the integrity of the stockpile is maintained and the potential for migration of chromium-impacted soil or water in contact with chromium-impacted soil is mitigated.

1.05 LOADING OF WASTES

A. The Contractor shall furnish all labor, equipment, and materials necessary to provide for the proper loading of all materials generated during the execution of the work. Refer to Section 01003 for requirements for lining of trucks.

B. The Contractor shall be responsible for coordinating the work/schedule with Honeywell approved Waste Facilities.

C. The Contractor shall be responsible for any demurrage charges associated with delays in the timely loading the waste materials.

D. Materials that contain excess water shall be mixed with a sufficient quantity of absorbent to prevent free water from developing in containers during transport to the disposal facility.

E. Absorbents shall be approved by the disposal facility and JCMUA's designated representative as needed to allow effective transport of materials to designated disposal facility.

1.06 TRANSPORTATION OF WASTES

A. The Contractor shall arrange for the proper transportation and disposal of non-impacted waste (e.g., cleared vegetation, general trash and rubbish) in accordance with applicable local, state and federal regulations.

B. The Contractor shall arrange for the proper transportation of non-hazardous waste materials and chromium-impacted hazardous waste materials (if applicable) to appropriate licensed/permitted disposal facilities, in accordance with applicable local, state and federal regulations.

C. The Contractor shall be responsible for coordinating with Honeywell (or its designated contractor) and scheduling transporters for offsite transportation and disposal of chromium-impacted materials generated during execution of the work at Honeywell approved waste facilities. Honeywell (or its designated contractor) may take the lead in coordinating offsite transportation and disposal of chromium-contaminated materials, to be determined on a case-by-case basis.

D. The Contractor shall require that the transporters arriving at the site for loading do not cause undue congestion to local streets, and shall stage trucks either within the perimeter of the site or at an off-site staging area.

1.07 DISPOSAL OF WASTES

A. The Contractor shall be responsible for coordinating with Honeywell approved waste facilities, scheduling transporters and arranging for off-site transportation and disposal of chromium-impacted materials. Honeywell's contractor may take the lead in coordinating offsite transportation and disposal of chromium-contaminated materials at an approved waste facility, to be determined on a case-by-case basis.

B. The Contractor shall provide for offsite transportation and disposal of non-chromium impacted waste materials in accordance with in accordance with applicable local, state and federal regulations.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

--END OF SECTION--

SECTION 01003: WASTE TRANSPORTATION AND DISPOSAL OF CHROMIUM-IMPACTED MATERIALS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the Contractor's minimum responsibilities for and requirements for Waste Transportation/Disposal of chromium-impacted materials, including coordination with Honeywell approved waste facilities.

B. Contractor's work includes determining the recipient of the waste, loading wastes into trucks and containers for shipment off site, providing temporary haul roads for trucks and traffic control as needed, and coordination and scheduling with Transportation Contractor and Disposal Facility to ensure timely arrival and departure of trucks.

C. All work related to the management of chromium-impacted materials shall be done in conformance with a Health and Safety Plan (HASP), and in accordance with OSHA 1910.120. All personnel that may become exposed to impacted materials at levels above NJDEP criteria must be OSHA trained in accordance with OSHA requirements. The HASP will be reviewed by JCMUA. Refer to the Worker Training Manual for applicable training requirements.

1.02 SUBMITTALS

A. Prepare and submit a comprehensive detailed Materials Management Plan. This comprehensive plan shall address all waste categories: Rubbish and Construction Debris, Non-Hazardous Waste and Hazardous Waste.

B. If required by JCMUA, prepare and submit a Traffic Control and Transportation Plan at least 30 days prior to the excavation. The Traffic Control and Transportation Plan shall include, as a minimum: a proposed truck route from the on-site loading staging area to the disposal facility, traffic control, and alternate traffic patterns. The route(s) to and from the disposal facility shall be in accordance with the disposal facility requirements and Federal, State and local regulations, laws, and ordinances. The Contractor shall specify the weight limitations on all sections of the route(s) and indicate the maximum truck load/weight that will be maintained in accordance with route weight limits and any other applicable Federal, State and local regulations. In addition, the plan should outline the procedures that will be followed to comply with all applicable traffic and transportation regulations.

C. Submit resume for Contractor's proposed Transportation and Disposal Coordinator.

D. Submit technical data for the specified truck liner material and installation procedures.

1.03 QUALITY ASSURANCE

A. JCMUA in coordination with Honeywell will monitor the Contractor's activities associated with the work of this Section. This monitoring may include but not be limited to:
   1. Verifying Contractor conformance with requirements for on-site management of excavated chromium-impacted materials;
   2. Reviewing requests from Contractor for off-site reuse, recycling, treatment, and disposal facilities, associated chemical testing and documentation of chromium-impacted waste materials acceptance by receiving facilities; and
   3. Verifying the appropriate Contractor-prepared paperwork accompanies each load of excavated soil and material that is transported from the site and verifying receipt of Contractor's submittal of paperwork for off-site facility receipt and processing of site materials.

PART 2 - PRODUCTS

2.01 GENERAL

Not applicable.

PART 3 - EXECUTION

3.01 GENERAL

A. Transportation and Disposal Coordinator (TDC). The Contractor shall designate, by position and title, one person to act as the Transportation and Disposal Coordinator. The TDC shall be on-site full time. The TDC shall serve as the single point of contact for all environmental regulatory matters, and shall have overall responsibility for environmental compliance at the site including, but not limited to, accurate identification and classification of hazardous waste and hazardous materials, determination of proper shipping names, identification of marking, labeling, packaging and placarding requirements, completion of waste profiles, hazardous waste manifests, bills of lading, exception and discrepancy reports, and ail other environmental documentation. In addition, the TDC responsibilities shall include maintaining any hazardous waste being stored in compliance with all applicable regulations (i.e. proper stockpiling) prior to shipment off-site. The TDC shall have, at a minimum, five-years of specialized experience in the management and transportation of hazardous waste. The TDC shall have appropriate DOT, OSHA and EPA training.

3.02 HAUL ROADS

A. The Contractor shall construct and maintain temporary haul roads onsite from the site entrance to the locations of active excavation, stockpiles, weigh scales and truck washing facility, as needed to complete the work. Haul roads shall be maintained to permit efficient travel of fully loaded trucks. Contractor shall provide traffic control, such as signs and flaggers.

B. Contractor shall prepare contingency plans for handling disabled vehicles, providing designated areas for queuing trucks, snow removal, lighting and any other facilities necessary to provide for efficient travel of trucks on-site.

3.03 COORDINATING WASTE SHIPMENTS

A. Contractor will obtain letters of acceptance/commitment from waste haulers and from the TSDFs agreeing to handle and dispose wastes. Letters shall specifically state what types and quantities of waste the facility will accept. A copy of each letter shall be maintained in the Contractor's file.

B. Contractor shall coordinate shipment of waste to a Honeywell approved waste facility, for each class of waste. Contractor shall be responsible for determining the disposal facility's testing requirements and other acceptance requirements, and complying with those requirements for each shipment of waste.

C. Contractor shall prepare daily and weekly schedules for shipment of waste to each disposal facility, identifying the quantities and dates of shipments.

D. Contractor shall coordinate the supply of trucks necessary for shipment of waste from the site to the TSDF. Contractor shall coordinate the number of trucks in service to meet Contractor's schedule. The Contractor shall coordinate the schedule for vehicle arrival and material deliveries at the construction site to meet the approved project schedule. The schedule shall be compatible with the availability of equipment and personnel for material handling operations and ensure that the excavation schedule is maintained.

3.04 SHIPPING DOCUMENTS AND PACKAGING CERTIFICATION

A. The Contractor shall be responsible for obtaining all permits and shipping documents (from the TSDF or regulatory authorities) to ship hazardous wastes off site, either within the USA or outside of the USA.

B. The Contractor shall use manifests for transporting hazardous wastes as required by 40 CFR 263. Transportation shall comply with all requirements in the Department of Transportation referenced regulations in the 49 CFR series. The Contractor shall prepare manifests in accordance with the hierarchy established in 40 CFR 262, Section 21.

C. The Contractor shall prepare hazardous waste manifests for each shipment of hazardous waste shipped off site. Manifests shall be completed using instructions in 40 CFR 262, Subpart B and any applicable state or local law or regulation. Manifests and waste profiles shall be submitted to JCMUA and Honeywell for review and approval. The Contractor shall prepare land disposal restriction notifications as required by 40 CFR 268 or any applicable state or local law or regulation for each shipment of hazardous waste. Notifications shall be submitted with the manifest to JCMUA and Honeywell for review and approval.

D. The Contractor shall verify that each truck and-or container complies with applicable permitting.

3.05 LOADING TRUCKS

A. Chromium impacted waste shall be loaded into trucks or containers within the exclusion area. Trucks will include liners. When loading is complete, the liner flaps shall be placed over the top of the chromium impacted waste prior to covering the waste in a manner to prevent contact adjacent to the loading area with the road tarp.

B. Contractor shall provide liners for trucks used to transport hazardous chromium-impacted waste materials. Contractor shall assume and use trucks and truck liners with a truck capacity of 18-cubic yards (loose). **Liners shall consist of a 7.4-oz Woven Polypropylene outer layer to provide strength, and a 3 mil Polyethylene inner layer as manufactured by PACTEC. Contractor shall be advised that these liners are heavy duty liners, and will require specialized scaffolding or other techniques to install. Normally 2 to 4 workers are required to line each truck prior to filling, and to zip closed once filling is complete. At no time will a worker enter the truck bed.**

C. When truck loading is complete, the truck shall be decontaminated.

D. Each loaded truck shall be weighed on-site.

E. Each truck shall have a proper manifest and placard prior to leaving the site.

F. Each truck entering and exiting the site shall be recorded and entered into the Disposal Manifest and Management system.

3.06 WEIGH SCALE

A. The Contractor shall provide a system to weigh loaded trucks before they leave the site to confirm the maximum weight restriction for anticipated travel route is not exceeded. The system can include trucks equipped with load cells or a portable truck scale or similar device approved by JCMUA and Honeywell's Representative.

3.07 HAULING BY TRUCK

A. The Contractor shall insure that the vehicle is properly decontaminated, weighed and has the proper manifests and placards before the truck leaves the site.

B. The Contractor shall respond and remedy situations involving material spilled in transit or mud and dust tracked off-site, within a distance of one mile from the site.

C. The Contractor shall protect trucks against contamination by properly covering and lining them with compatible material or by decontaminating them prior to any use other than hauling contaminated materials. The Contractor is responsible for inspection of transportation vehicles prior to leaving the site, to verify no material adheres to the wheels, undercarriage, tailgates, covers or other areas of transport vehicles.

D. The Contractor shall utilize truck tarps on all trucks entering and exiting the site.

--END OF SECTION--

ATTACHMENT A

LIST OF HONEYWELL APPROVED WASTE FACILITIES

(To be provided by Honeywell)

Draft Document - Honeywell Confidential
This document is for Honeywell use only and
is not to be distributed to unauthorized personnel.

HONEYWELL APPROVED FACILITIES - FOR RESPONSE ACTIONS AT HUDSON COUNTY CHROMATE SITES

Country	State / Province	City	Waste Management Facility Name	Address	Postal Code	Tel No. or Web Site	Regulatory ID
USA	New York	Model City	Chemical Waste Management (CWM Chemical Services)	1550 Balmer Rd	14107	786-286-1550	NYD049836679
USA	New Jersey	South Kearny	Clean Earth Of North Jersey, Inc.	105 Jacobus Avenue	7032	973-344-4004	NJD991291105
USA	Pennsylvania	York	Envirite	730 Vogelsong Road	17404	717-846-1900	PAD010154045

APPENDIX E

REFERENCE JCMUA RULES AND REGULATIONS FOR SITE WORK, EXCAVATION AND BACKFILL

THE JERSEY CITY MUNICIPAL UTILITIES AUTHORITY
JCMUA

RULES AND REGULATIONS
GOVERNING THE OPERATION OF THE JERSEY CITY SEWER SYSTEM

The Jersey City Municipal Utilities Authority (hereinafter the "*JCMUA*"), created pursuant to the Municipal Utilities Law, N.J.S.A. 40:14B-1, et seq., being charged with the duty and obligation of improving conditions affecting public health by maintaining in operation a sewerage system for the proper collection and conveyance of sanitary sewage originated in Jersey City and in cities with which the *JCMUA* has conveyance agreements with, **HEREBY ADOPTS** the following rules and regulations to govern the operation of the system, facilities and processes of The *JCMUA*.

ADOPTED BY RESOLUTION No. _____
Dated:

TABLE OF CONTENTS

ARTICLE I. INTRODUCTION

SECTION 1.01 HISTORY OF THE *JCMUA*

The *JCMUA* is the successor of the Jersey City Sewerage Authority (*JCSA*) which was created in 1949. The *JCSA* built two sewage treatment plants for treating wastewater prior to discharging into the rivers. These treatment plants served the residents of Jersey City until 1990, when more stringent rules required the treatment system to be upgraded. With a $2I million grant from the United States Environmental Protection Agency, the *JCSA* converted its two treatment plants to pumping stations, constructed a transmission line and began pumping wastewater under the Newark Bay to the Passaic Valley Sewerage Commissioners (PVSC) wastewater treatment plant in Newark.

The *JCSA* was reorganized into the *JCMUA* in 1998. The *JCMUA* took over the responsibility of the Jersey City Water System under a franchise agreement with the City. Previously, a department within the City had operated or been responsible for operation of the Water System. The 2005 Amended and Restated Franchise Agreement provides for *JCMUA* operation of the Water System through December 31, 2027 and mandates that *JCMUA* adopt its own regulations for operation of the Water System during the term of the franchise. The *JCMUA* has contracted the operation of the Water System to a private entity. The City continues to own the Water System.

SECTION 1.02 MISSION STATEMENT OF THE *JCMUA*

The *JCMUA* pledges to operate and maintain its sewerage system and the City's water facilities in a fashion that will protect the public health and environment of all its constituents. The *JCMUA* will always strive to accomplish this goal in the most competent, economical and compassionate manner possible.

SECTION 1.03 OFFICE HOURS AND LOCATION

The office of the Jersey City Municipal Utilities Authority is located at 555 Route 440 in Jersey City, New Jersey 07305, and is open for business Monday through Friday from 8:30 a.m. to 4:30 p.m. Regular meetings of the *JCMUA* are ordinarily held the last Thursday of each month at 5:00 p.m. at the *JCMUA* offices. Special meetings can be called by the Chairperson. All meetings are conducted in accordance with the provisions of the Open Public Meetings Act, N.J.S.A. 10:4-6 et seq.

SECTION 1.04 APPLICABILITY OF RULES AND REGULATIONS

The following sets forth the rates, procedural rules, standard terms and conditions of service, standards technical specifications and other regulations under which sewage service will be supplied by the *JCMUA* to its customers. It establishes regulations for the use of public and private sewers and drains, for the installation, rehabilitation and

connection of building sewers and for the discharge of waters and wastes into the public sewer system in compliance with the regulations of the New Jersey Department of Environmental Protection (NJDEP) and the United States Environmental Protection Agency (EPA). It also provides for a system of charges to customers to compensate the *JCMUA* for the use of its sewer system.

The *JCMUA* reserves the right to change or amend, from time to time, these Rules & Regulations, and the rates for sewer use by resolution of the Board of Commissioners as necessary.

ARTICLE II. DEFINITIONS

As used in these Rules & Regulations, unless a different meaning clearly appears from the context, the following words shall have the following meanings:

AASHTO: American Association of State and Highway Transportation Officials.

ACI: American Concrete Institute

ACOE: Army Corp of Engineers

AISC: American Institute of Steel Construction

ANSI: American National Standards Institute

ASCE: American Society of Civil Engineers

ASTM: American Standard of Tests and Measures

AWS: American Welding Society

AWWA: American Water Works Association

Applicant: A developer, property owner or property owners who have filed an application with the *JCMUA* pursuant to these Rules & Regulations for permission to connect to the sewer system.

Application for Service: An application prepared and completed by an Applicant, Customer, or Owner in accordance with the requirements of the *JCMUA*.

Authority: The Jersey City Municipal Utilities Authority (*JCMUA*).

Block: An area delineated as such on the Tax Map of the City of Jersey City.

BMP: Best Management Practices, as defined by the NJDEP for storm water management under Clean Water Rules.

City: The City of Jersey City.

Chief Engineer: The *JCMUA's* Professional Engineering representative acting either directly or through assistants under him.

Cleanout: Shall mean an access point constructed on a lateral installed at 1-ft. behind the curb or property line.

Combined Sewer System (CSS): A sewer system which conveys both sanitary and storm flow through the same sewer mains.

CMP: Corrugated Metal Pipe shall not be used for sanitary sewer, storm sewer or combined sewer without the expressed written permission of the Chief Engineer.

Connection: Any operational or physical change to the sewer collection system or to the plumbing or piping of any building, facility or structure either proposed or existing, which connects directly or indirectly to any portion of the *JCMUA* facilities.

Deflection: The allowable amount of pipe shape change of 5% as allowed for Plastic Pipe in N.J.A.C. 7:14A-23 et al.

Developer: The legal or beneficial owner or owners of a lot or of any land proposed to be included in a development including the holder of an option to purchase or other person having an enforceable propriety interest in such land.

Development: The division of a parcel of land into two or more parcels; the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or other structure; or any change in use of any building or structure.

DIP: Ductile Iron Pipe, unless otherwise directed, shall be cement lined with an asphalt coating complying with AWWA standards for water mains and minimum class 52.

EPA: United States Environmental Protection Agency.

Easement: The right to use the land of another for a specific purpose not inconsistent with the general property rights of the owner.

Equivalent Dwelling Unit (EDU): Equal to a residential user using 225 gallons of service per day.

F.E.M.A.: Federal Emergency Management Agency, responsible for preparation of flood mapping, disaster mitigation, preparedness, response, and recovery planning.

Handhole: Shall mean an 24" diameter access point on a sewer lateral or main. It shall be constructed of material as directed by the Chief Engineer with a frame and cover clear mark "JCMUA".
HDPE: High Density Polyethylene Pipe, for gravity applications shall be corrugated double wall smooth interior pipe with couplings or bell and spigot connections, for force mains it shall be SDR 21 minimum heat fused joint.

House Service Connection: The pipe and appurtenances between *JCMUA's* sewer main and the individual building cleanout.

JCMUA: Jersey City Municipal Utilities Authority.

Lateral: Shall mean a pipe of a size smaller than the sewer to convey flow from the building to the sewer main by City of Jersey City Ordinance and *JCMUA* Rules is owned by the property owner from the main to the building.

Large Development: Site and/or building footprint improvements in excess of 10,000 sq. ft.

Lot: A tract or parcel of land intended for separate use, development or transfer of ownership.

Main: ALL *JCMUA*-owned or controlled piping and appurtenances used for the collection of storm water and/or sewerage.

Manhole: Shall mean a concrete structure to access a sewer main of adequate size to allow a person to enter safely with a *JCMUA* approved frame and cover.

Mandrel: A device to be pulled through pipe to measure the deflection.

NJMC: New Jersey Meadowlands Commission.

NJDEP: New Jersey Department of Environmental Protection.

NJDOT: New Jersey Department of Transportation.

OSHA: United States Occupational Safety and Health Administration.

Professional Engineer: A person licensed to practice professional engineering in the State of New Jersey.

Professional Land Surveyor: A person licensed to practice land surveying in the state of New Jersey.

PVC Pipe: Polyvinylchloride pipe for use in conveyance of sanitary waste, stormwater, and/or combined sewage.

PVSC: Passaic Valley Sewerage Commission.

Plat: A map of a development.

RCP: Reinforced concrete pipe.

Right-of-Way (ROW): Land subject to use as a street, alley, or for drainage or other public purposes.

Sanitary Sewer: All facilities collect and convey appurtenances to domestic, commercial, and industrial waste, but not stormwater or groundwater.

Sewer Main: The part of the sewage collection system which is located within the public Right-Of-Way or within a sanitary sewer easement and which is designed to convey the sewage from one or more customers.

Sewer System: All facilities and appurtenances connected with the collection system, trunk system and laterals.

Sketch plan: The sketch map of a development of sufficient crosswalk accuracy to be used for the purpose of discussion and classification and meeting the requirements of these Rules and Regulations.

Small Development: Site and/or building footprint improvements less than 10,000 sq. ft.

Stormwater: Runoff generated by a precipitation event or the melting of frozen precipitation.

Street: Any street, avenue, boulevard, road, land viaduct, bridge, alley or other way which is an existing state, county or municipal roadway, including the land between the street lines whether improved or unimproved, and may compromise pavement, shoulders, gutters, sidewalks, parking areas and other areas within the street lines.

TSS: Total suspended solids, as defined by the NJDEP Best Practices Manual for Stormwater Management.

TWA: NJDEP Treatment Works Approval Permit for the construction of combined or sanitary sewer systems and related structures.

Uni Bell: Plastic Pipe Manufacturers Association

ARTICLE III. CONDITIONS REQUIRING JCMUA APPROVAL

The *JCMUA* shall review and approve all site plans or building plans for developments or building change of use that introduce sanitary and/or storm flow and/or groundwater to the Jersey City Sewer System. These developments include, but are not limited to the following:

a) New Construction
b) Sewer Main Installation
c) Parking Lot Construction
d) Temporary Parking Lot Construction
e) Park Construction
f) Athletic Field Construction
g) Storm Water Construction
h) Roadway Construction
i) Construction site dewatering
j) Site Remediation dewatering

JCMUA shall review and approval is also required when any change in flow (increase or decrease) that may be introduced into the system. Such situations include, but are not limited to the following:

a) Additions
b) Change of Use
c) Renovations
d) Rehabilitations

ARTICLE IV. SEWER CONNECTION APPLICATIONS

All applications for sewer connections must be submitted to the *JCMUA* for review and approval. The following sections detail the application requirements for various types of developments. The applications for sewer connection can be found in Appendix I of these Rules and Regulations. They must be submitted with a bank or certified check as payment. Connection and Application fee amounts are outlined in Schedule I of these Rules and Regulations. Connection Fee Rules can be found in Schedule III of these Rules and Regulations.

SECTION 4.00 DRAWING REQUIREMENTS

1) Two (2) sets of drawings shall be submitted. These drawings shall be signed and bear the raised seal of a NJ Licensed Professional Engineer or Registered Architect.
2) Drawings shall be 24-inches by 36-inches or larger. All drawings shall be to scale of adequate size for easy reading and include a north arrow. Details shall be clear and of appropriate scale.
   a. All drawings shall show lot and block lines and numbers

b. North arrow.
c. Existing utilities including:
    i. Size
    ii. Type of utility (gas, electric, telecom, etc.).
    iii. Direction of flow.
    iv. Inverts.
    v. Valves, hydrants, vents, etc.
    vi. Inlet, manholes, vaults, etc.
d. Street names with traffic striping
e. Existing topography at one (1) foot intervals.
f. Proposed topography at one (1) foot intervals.
g. Proposed and existing structures.
h. Scale: 1 inch = 30 feet minimum.
i. Proposed stormwater detention facilities.
j. Proposed sanitary sewers.
k. Proposed water mains.
l. Proposed roads.
m. All other existing or proposed site conditions.
n. Show all *JCMUA* applicable standard details.
o. Show all *JCMUA* notes.

3) ALL connection details must be included on the drawings and shall be in conformance with *JCMUA's* standard specifications which can be found in Appendix II.
4) The size and type of pipe of all proposed service laterals as well as the sewer main to which connection is proposed must be indicated.
5) a. All connections of surface parking lot drainage system shall comply with the Jersey City, *JCMUA*, and NJDEP requirements.
    b. ALL connections of parking garage drainage systems must comply with the National Standard Plumbing Code and the requirements of the Jersey City Building Department.
    c. For parking garages oil and water separator shall be included and sized to handle surface loading of garage and easy access for cleaning and maintenance.

6) A separate and distinct connection shall be provided for every building and premise, unless otherwise approved by the *JCMUA*.
7) No new sanitary fixtures shall be installed in a building at an elevation lower than the front curb elevation or street centerline elevation or below 100 year flood elevation (whichever is higher) unless special precautions are incorporated into the building connection to prevent the backup of sewerage because of high flows or a blockage. See Appendix II. In any event, the *JCMUA* will NOT be responsible for any backups or surcharges into fixtures or structures, below the above-mentioned elevations.
8) ALL elevations on site plans must use vertical datum NAVD 1988 and horizontal datum NAD 1983. All plans shall indicate the 100 year flood elevation as per the latest FEMA mapping.

9) The drawings must comply with *JCMUA's* "Standard Requirements for New Sanitary and Storm Sewers and Service Laterals," current revision, which can be found in Appendix III.
10) The drawings must comply with *JCMUA's* "Requirements for Site Plan Applications," current revision, which can be found in Appendix IV. A signed copy of these requirements must be submitted with the application.
11) The developer shall provide proposed surface conditions utilizing NRCS – TR55, CN values with areas for each condition, such that data can be inserted in XPSWMM model for the city to determine development impact on combined sewer system. This shall apply to developments over 10,000 sq. ft. or 8,000 gpd.

SECTION 4.01 GENERAL

1) The *JCMUA* will not review or consider any application for service until the Applicant has paid ALL charges required for review of plans and/or permit applications.
2) The accepted application shall oblige the Applicant to pay all other fees (CCTV inspection or others) to the *JCMUA*, as revised from time to time, and to comply with its Rules and Regulations.
3) ALL completed applications for sewer permits/approvals shall be approved on a first-come first-served basis. The obligation of the *JCMUA* to approve completed applications is contingent upon the availability of capacity of the physical facilities as well as in contractual capacities that the *JCMUA* has with the Passaic Valley Sewerage Commissioners.
4) The applicant shall not construct sewer facilities until such time as the *JCMUA* is in receipt of all necessary approvals from the NJDEP or any other municipal, state or federal agency that may be required.
5) The *JCMUA* shall not approve an application that is incomplete or an application for service or services that cannot be rendered as a result of the lack of conveyance or contractual capacity.
6) When an NJDEP TWA Permit has been issued, the NJDEP IVQM-005 Form with approved as-builts should be submitted to the *JCMUA* prior to the release of fees, bonds, or others.

SECTION 4.02 NEW CONSTRUCTION

A) Applies to small and large development that meet the following criteria:
   i) Do not require a NJDEP-TWA Permit
   ii) Sanitary sewage flow does not exceed 8,000 gpd.
   iii) No extension on sewer main is required.
   iv) PVSC Sewer Connection Permit is required.
   v) Plans shall be submitted in conformance with Article IV, Section 4.00.

B) Applies to large developments only that meet the criteria of Section 4.02 A:
   i) NJDEP-TWA is required.
   ii) Stormwater management system is required.
      a) Stormwater system design shall consist of the following items:

1) Detention system is capable of containing a 100 year storm runoff.
   A) On site outlet control structure designed in compliance with NJDEP Stormwater Regulations.
   B) Stormwater pipes shall be designed with a minimum velocity of 3.5 fps for a 2 year storm, and capable of passing 100 year Storm flow to the detention basin.
   C) Stormwater discharge from the site, post construction conditions for the 2 year, 10 year, and 100 year events.
   D) The post-construction peak runoff rate for 2 year, 10 year, and 100 year shall be 50%, 75%, 80% respectively of the pre-construction peak rates.

SECTION 4.03 NEW CONSTRUCTION – SEWER EXTENSION (TWA APPLICATION REQUIRED)

A. Small Development (Less than 10,890 SF area developed)
   a. The plans must be submitted as stated in ARTICLE IV, Section 4.00
   b. Application and Fees must be submitted as per the Connection Fee Rules
      1. Performance Bond
         i. Required if a new storm or sanitary sewer main will be installed or if there will be a sewer main extension
         ii. Performance Bond shall be 120% of the total construction cost guaranteeing complete construction within the time period to be specified by the *JCMUA* and further guaranteeing that said construction will be in accordance with these Rules and Regulations of the *JCMUA* and the plans and specifications, Engineer's Report and cost estimates approved by the *JCMUA*
         iii. Engineer's Construction Cost Estimate must be submitted
         iv. Inspection Fees, TWA Review Fee and As-Built Deposits must also be submitted as per SCHEDULE IV.
      2. Indemnification Agreement
         i. Required if a new storm or sanitary sewer main will be installed or if there will be a sewer main extension
         ii. *JCMUA's* General Counsel, Elnardo Webster, Esq. of the Law Firm of Trenk, DiPasquale, et al., 347 Mt. Pleasant Avenue, West Orange, NJ 07052, 973-243-8600, must be contacted, for the execution of an Indemnity and Hold Harmless Agreement with the *JCMUA*

B. Large Development (Greater than 10,890 SF area developed)
   a. The plans shall be submitted as stated in ARTICLE IV.
   b. Development shall include a detention system satisfying the following criteria:

The on-site flow control structure shall detain a volume of storm water runoff equal to:

i. The volume of storm water discharged from the site so that the rate of runoff from 2, 10 and 100 year events for the post-construction site conditions does not exceed the pre-construction volume and rate of run-off; and

ii. The post-construction peak runoff rate for the 2 year storm event is 50 percent of the pre-construction peak runoff rate and the post-development peak runoff rate for the 10 and 100 year storm shall be 75% and 80% respectively of the pre-construction peak runoff rates.

A storm drainage report and calculations must be submitted to this office for review.

c. Application and Fees must be submitted as per the Connection Fee Rules
    1. Performance Bond
        i. Required if a new storm or sanitary sewer main will be installed or if there will be a sewer main extension
        ii. Performance Bond must be 120% of the total construction cost guaranteeing complete construction within the time period to be specified by the *JCMUA* and further guaranteeing that said construction will be in accordance with these Rules and Regulations of the *JCMUA* and the plans and specifications, Engineer's Report and cost estimates approved by the *JCMUA*
        iii. Engineer's Construction Cost Estimate must be submitted.
        iv. Inspection Fees, TWA Review Fee and As-Built Deposits must also be submitted as per SCHEDULE IV.
    2. Indemnification Agreement
        i. Required if a new storm or sanitary sewer main will be installed or if there will be a sewer main extension
        ii. *JCMUA's* General Counsel, Elnardo Webster, Esq. of the Law Firm of Trenk, DiPasquale, et al., 347 Mt. Pleasant Avenue, West Orange, NJ 07052, 973-243-8600, must be contacted, for the execution of an Indemnity and Hold Harmless Agreement with the *JCMUA*.

SECTION 4.04 MULTIPLE PARCEL DEVELOPMENTS

A. Proposed developments that are composed of multiple parcels or lots and being constructed in phases shall submit an overall site plan for storm water and sanitary sewers.

a. The stormwater management shall be considered to be one (1) system for the entire development, not one (1) parcel at a time.
b. Stormwater detention systems shall be sized and constructed for the entire site.
c. The detention system and stormwater management system shall be constructed in the first phase.
d. In the event that the detention system cannot be constructed in the first phase due to demolition of existing structures, temporary detention shall be constructed, and operated until development or final detention system is completed.
e. All other requirements of Section 4.03-B et al shall be applicable.

SECTION 4.05 ADDITION/RENOVATION/REHABILITATION

A. No changes made to the existing service laterals/connections
   a. The plans must be submitted as stated in ARTICLE IV.
   b. A letter must be submitted explaining the scope and use of additions/renovations/rehabilitation work that is being completed and why no changes are being made to the existing service, and no increase in impervious or disturbed are or increase in sanitary or stormwater flows.
   c. Application and Fees must be submitted as per the Connection Fee Rules

B. Changes made to the existing service laterals/connections
   a. The plans must be submitted as stated in ARTICLE IV.
   b. The same rules apply as for "new construction" in SECTION 4.01 or 4.02.
   c. Application and Fees must be submitted as per the Connection Fee Rules

SECTION 4.06 CONNECTION FEES

The Applicant shall pay a one-time sewer connection fee and sewer connection fee for each EDU in an amount as established by the *JCMUA's* rate schedule in effect at the time the fee is paid. The Connection Fee shall be applicable to all connections for each single-family unit or EDU.

The Connection Fee rate schedule can be found in Schedule I.
The Connection Fee Rules can be found in Appendix VI.

ARTICLE V. DESIGN AND CONSTRUCTION

This section provides information on the minimum standards of the *JCMUA*. The Applicant and his/her design engineer shall ensure that the construction of all facilities

are conducted in accordance with these standards. ALL application and connection fees must be paid by form of a bank or certified check.

The authority reserves the right to periodically modify these Rules and Regulations and its Standard Specifications and construction details to address changes in Federal, State, County, Municipal, and Building Code regulations or engineering standards. Accordingly, the Design Engineer must verify prior to design that the standards contained herein have not been modified in any manner, and shall implement and use the Authority's standard construction specifications and details in effect at the time.

All work to be done shall comply with all applicable requirements of Federal, State, County, and local statutes, regulations and codes, and especially the safety provisions contained therein.

SECTION 5.01 GENERAL

All sanitary sewers shall be designed to carry a peak flow of 2.0 times the average flow for a half full pipe estimated based on a twenty-five years flow projection. Average flow shall be assumed to be 100 gallons per person, per day, and 3 persons shall be assumed per EDU, including infiltration.

Wherever possible for new construction, all sewers must be designed on a "separate system" basis in which all water from roofs, basement sump pumps, groundwater, streets and any other areas are connected to a separate Storm Sewer System to minimize the impact of new development on the *JCMUA's* combined sewers. Where storm water runoff from roofs, streets or any other areas is to be connected to the combined sewer system, the applicant shall undertake appropriate planning, design and construction of offline storage facilities (detention systems) to reduce peak discharges into the combined sewer system so as to maintain, at a minimum, existing storm water flow conditions within the combined sewer system.

If the proposed project includes the construction, connection or extension of a Storm Sewer System, the Applicant shall comply with all applicable requirements of the Residential Site Improvements Standards, N.J.A.C.5-21, et seq., and the NJDEP Tier A Municipal Stormwater General Permit. Any sites engaging in "industrial activity" as defined in N.J.A.C. 7:14A-1.2, the facility must comply with all applicable NJDEP Regulations, and Passaic Valley Sewage Commission (PVSC) Regulations.

Sanitary Sewers and Force Mains shall be designed to flow with a minimum velocity of not less than 2.2 fps (feet per second) at full flow based on Manning formula with n=0.013.

Acceptable materials used in the construction of sewers, service laterals and force mains are listed below:

1. Gravity Sewers

a. Reinforced Concrete
b. Ductile Iron
c. Cast Iron
d. Polyvinyl Chloride (PVC)
e. Vitrified Clay Tile

2. Inverted Siphons and Force Mains
    a. Cement Lined Ductile Iron (CLDP)
    b. Cast Iron (CIP)
    c. High Density Polyethylene

3. Outfalls
    a. Reinforce Concrete Pipe.
    b. Ductile Iron
    c. Reinforced Concrete Box Culvert

The materials must meet the requirements listed below. All references to standard specifications NJDEP, NJDOT, ASTM, ANSI, AWWA, EPA, AWS, AASHTO, ACI, AISC, UniBell and the like, shall be to the latest version thereof.

The *JCMUA* or its Engineers shall not be responsible for the design of the project or any errors or omissions therein; such responsibility shall be solely and completely assumed by the Applicant's engineer, surveyor, architect or other design professional.

Any changes in pipe materials during prior to start of construction, the Developer, Developer's Engineer or Developer's Contractor/Construction Manager shall contact JCMUA for review, comment and approval of change in materials prior to proceeding with construction.

SECTION 5.02 EXCAVATION AND BACKFILL

A. Character of Material

Any and all fill imported to the site shall be certified as clean fill. An original copy of such certification and laboratory analysis reports shall be provided to the Authority prior to the material being brought to the site.

B. Excavations, Clearances and Trimming

Excavations shall be of sufficient width to permit work to be done competently, in the manner and of the size specified and shown, and limits shall be such as to permit the use of excavation support, unless permission for an alternate procedure is specifically granted. In no case shall excavations be carried more than bedding depth below grade by machine and backfill used to bring the grade to the proper elevation for bottom slabs, footings or pipelines.

In all excavations for sewer system components, boulders, rock, masonry, or other similar materials shall be excavated to a level at least six inches below the outside wall of the pipe at the invert, and carefully backfilled with NJDOT No.57 or No.67 stone or other approved material to 18-inches over the top of the pipe. Rock or boulders shall be removed from sides of trenches to a plane 12 inches beyond the outside wall of the pipe, manholes, etc., unless permission to do otherwise is expressly given.

Where the removal of a boulder creates a void below the pipe bedding, the void shall be backfilled with bedding stone. In cases where the boulder creates a void in the side of a trench, all material above the void shall be removed and backfilled as part of the normal trench backfill operation.

The trench width just above the top of the pipe shall be maintained as narrow as possible and in general shall not exceed the outside diameter of pipe plus two (2) feet.

C. Unauthorized Excavation

If any excavation is caused by the Contractor's error, or wherever the excavation is carried beyond or below the lines and grade given by the Engineer, the Contractor shall, at his own expense, refill all such excavated space with such material and in such manner as may be directed, in order to insure the stability of the various structures. Beneath all structures, the space excavated without Engineer shall be backfilled with 4,000 psi concrete.

D. Sheeting and Bracing

Where necessary, particularly to prevent disturbance, damage, or settlement of adjacent structures, pipelines, utilities, improvements or paving, excavation shall be adequately sheeted and braced. In areas where excavations exceed four (4) feet in depth, the Contractor shall assume full responsibility for the design and installation of sheeting and bracing of excavations such that the sheeting and bracing design meets all the latest requirements of the New Jersey Construction Safety Code and Federal Occupational Safety and Health Act.

Sheeting and bracing shall be furnished and installed, and if ordered by the Engineer, left permanently in place. If sheeting is not ordered to be left in place it shall be removed.

All permanent steel sheet piling and accessories shall be new and conform to the requirements of ASTM A6-99, "Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling." All steel sheet piling shall be interlocking steel sheeting as shown on Contract Drawings and conform to the ASTM Designation A572-99a, "Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel" (GR50).

E. Compacting Foundation

Wherever the development of suitable foundation conditions requires it, the Contractor shall take the proper means of compacting such foundation material. After excavation to grade, the surface shall be compacted, or otherwise consolidated to adequately prepare the bottom for the loads to come upon it, the method depending upon the quality and condition of the material. Where so required to stabilize the surface, screened gravel shall be placed on the surface and shall be compacted into the sub-grade in such thickness as may be required by the Engineer.

F. Additional Excavation

Wherever, in the opinion of the Engineer, the material found at the grades for the slabs, wall footings, or pipe inverts, is not satisfactory, the Contractor shall make any additional excavations as directed by the Engineer, and shall refill the same to two inches above the required grade with selected material.

G. Backfilling

As soon as practicable, after the pipe, masonry, or cast in place concrete has been placed and has acquired a suitable degree of hardness, or cast in place concrete has reached seven (7) day strength, the backfilling shall begin and shall thereafter be prosecuted expeditiously.

All lumber, rubbish, and braces shall be carefully removed from behind walls or other structures, unless ordered left in place by the Engineer. Backfill under the pipe haunches, around the pipe, and up to a cover of at least 18 inches over the top of the pipe shall be placed by hand in 6 inch layers, each layer to be thoroughly compacted by mechanical tampers of an approved type.

All other backfill shall be compacted and tamped in maximum 6 inch to 12 inch lifts to obtain 90 to 95% of relative density. If 90 to 95% relative density is not obtained, the lifts shall be reduced in thickness and the moisture level shall be adjusted. No stones or boulders over three (3) inches shall be allowed to drop in the trench.

All excavated soil within roadways and other paved areas shall be replaced with NJDOT virgin dense aggregate or quarry process stone conforming to I-5 (recycled concrete will not be accepted). Backfill between a horizontal plane 18 inches above the top of the pipe and the finished surface grade shall be placed in successive layers of not over 6 inches compacted thickness. Each layer shall be thoroughly compacted using approved tamping machines.

In rights-of-way, easements, and paper streets, backfill between a plane 18 inches above the top of the pipe and the finished surface grade, the Contractor shall keep settlement to a minimum and shall promptly restore to proper grade any settlement that might occur. Backfill in this zone shall be placed in successive layers of not over one (1) foot

compacted thickness, or as directed by the Engineer. Each layer shall be thoroughly compacted using tamping machines.

All excavated material outside the roadways i.e., easements, shall be stockpiled at the site, outside the roadway. The stockpiled materials shall not interfere with vehicular bicycle or pedestrian traffic, interfere with drainage or cause sight distance problems for vehicular bicycle or pedestrian traffic.

The trench outside the roadway shall be backfilled with only acceptable excavated material. Where in the opinion of the Engineer the excavated material is unsuitable for backfilling, the excavated material shall be disposed of at approved off site locations and the trench backfilled with NJDOT virgin grade aggregate or quarry process (I-5) stone as directed by the Engineer.

All backfill in embankments shall be thoroughly compacted by rollers of approved size and weight or by other approved methods.

H. Disposal of Material

All areas where soil is to be used as backfill shall be tested for potential contaminants based on EPA's total listed priority contaminates plus forty (TLPC +40).

Only excavated material acceptable to the Engineer shall be placed as backfill, outside roadways, i.e. easements and to the lines and grades established by the Design Engineer. All other excess material and all material within roadways shall be disposed of by the Contractor in approved locations outside of the working areas.

Temporary storage of excavated material shall not be on environmentally sensitive areas. Also excess fill shall not be used for the top 6 inches of topsoil. All stockpiles shall be in compliance with the NJDEP requirements and soil erosion and sediment control standards.

The Contractor shall restore all grades to those elevations existing, prior to construction. The Contractor shall be responsible for removal and disposal of all excess excavated material. Approval by the City Engineer must be obtained prior to disposal of excess excavated material to sites within the City.

Prior to disposal of excess material, the Contractor shall notify and obtain approval from the City of Jersey City regarding the location of the disposal site. All permits, surveys, tests, manifests, etc., as required for disposal of material, by the NJDEP or any other agency shall be obtained by the Contractor. Under no circumstances shall material be disposed of in flood plain, wetlands, or any other environmentally sensitive area.

I. Protection and Restoration of Existing Structures & Pipe Lines

The Contractor shall carefully protect all existing structures, both above and underground, including but not limited to poles, curbs, driveways, parking areas, privately owned pavements, signs, sumps, pits, catch basins, manholes, underground tanks, ads building foundations; pipe lines, including gas mains, water mains, hydrants, drain lines, storm sewers, sanitary sewers, service connections, conduits, and miscellaneous underground pipe lines; and shall restore same to a condition equivalent to conditions existing prior to his operation.

The Contractor is specifically directed to the requirements of protecting all trees along the route of the work in an approved manner.

The work of protecting and restoring existing utilities and facilities and including trees where no definite physical interference exists, or where the interference is avoidable, shall be the responsibility of the Contractor.

Ample precautions shall be taken to prevent settlement of existing improvements.

The work will be located so as to avoid interference to the greatest degree practicable, based upon data available as to depth and location of existing utilities and other existing facilities.

The Contractor shall make all efforts required by law and all other reasonable efforts to determine in advance of excavation of operations, the location of all utilities and other subsurface structures and facilities, and shall accurately mark same so that they may be avoided by Contractor's operations.

Where existing utilities or other sub-surface facilities adjacent to the trench or crossing through the trench require temporary support or protection, the work shall be the responsibility of the Contractor.

Where definite physical interference would be unavoidable in the final work and necessitates the removal, alteration, replacement or extension of existing utilities, the Contractor shall make all excavations for such work and shall cooperate with other forces involved in the work.

The labor, pipe and other material necessary for removing, altering, replacing, or extending such utilities, other than for excavation, will, unless otherwise ordered, be coordinated by the Contractor with the respective utility companies or other owners involved. In specific cases, the Contractor may be ordered to perform such work unless otherwise completed by the utility.

The Contractor shall be responsible for protecting all existing Jersey City Municipal Utilities Authority's (*JCMUA's*) Engineer appurtenances including but not limited to catch basin inlets, sanitary/combined/storm manhole covers, and water valve boxes or manhole covers hereafter referred to as utility castings. The Contractor shall accurately mark out the location of all utility castings in advance of milling of the roadway. Care

shall be exercised during the milling/paving operations to avoid damage to the utility castings by the milling/paving machines. Following the milling operation and prior to pavement, the Contractor shall inspect all utility castings within the roadway to assure that they were not hit and displaced during the milling activity and that no millings have entered the utility castings. The Contractor shall be responsible for removing any and all millings from the valve box or other utility castings and shall assure that complete and clear access is available to all valves and other utility appurtenances. In addition, the Contractor shall remove and reinstall/replace to the satisfaction of the *JCMUA*, all utility castings which have been dislodged by the milling or paving operations.

The Contractor shall also be responsible for raising all utility castings located in the roadway to the proposed finished grade in areas where the roadway is scheduled for additional pavement above the existing rim elevations. The work and materials associated with altering, replacing or extending such utility castings shall be the sole responsibility of the Contractor and shall be coordinated by the Contractor with the *JCMUA* Engineer prior to work being undertaken.

The *JCMUA* shall be contacted within 48 hours of final paving to schedule an inspection of all the utility castings within the project area to assure compliance with this specification. All utility castings determined to have been buried, damaged, moved or in any other way affected by the project, shall be reinstalled, replaced or uncovered to the satisfaction of the *JCMUA* within two weeks of notification by the *JCMUA*.

J. Work in Private Easements

Where the work is in easements located within privately owned areas, rear yards, etc., the Contractor shall make every effort to minimize disturbance to the area. All trees shall be boxed or fenced to dripline. Excavated material shall be stored on tarpaulins or other means used to prevent it from being spread on the ground. Backfill shall be completed on the same day. Topsoil shall be removed and stored separately, and upon completion of backfill shall be evenly spread over the disturbed area. If settlement occurs, the Contractor shall bring in additional topsoil of an approved variety to bring the trench up to grade.

All disturbed lawns, trees, shrubs, bushes, planting, fences, walls, driveways, walkways, etc. shall be restored to the satisfaction of the owner. It is required that the Contractor take “before and after” photographs of all such areas. Any disturbance or damage to existing structures and/or any site enhancement, shall be immediately repaired in kind by the Contractor without compensation.

K. Connection to Existing Manholes

Where new connections to existing manholes are required, the Contractor shall core drill a hole in the existing manhole to accept the pipe and a flexible gasket around the pipe with stainless steel appurtenances to hold the gasket in place. The Contractor shall

properly reconstruct the existing manhole channel and benching to accommodate the new sanitary sewer upon testing and acceptance of the sewer.

Where it is determined by the Authority to be unfeasible to core drill an existing manhole, the Contractor shall use a hammer drill to create an adequately sized opening to accept the incoming sewer at the invert specified on the plans. A waterstop as manufactured by Fernco or approved equal shall be provided on the clean end of the new pipe. The waterstop shall be positioned so that it is centered on the manhole wall. Non-shrink grout shall be placed around the waterstop to fill the voids between the manhole walls and the waterstop. The non-shrink grout shall be Five Star Structural Concrete, or approved equal. Prior to placement of the grout, the manhole surface shall be roughened to facilitate adherence of the grout.

L. Abandonment of Existing Sewers

Where deemed necessary and approved by the Authority in approved plans and specifications, the Contractor shall undertake the abandonment of existing sewers. The abandonment of existing sewers must be coordinated with the Authority and must be approved by the system operator. The cast iron frames, covers and castings on all manholes and drain inlets or appurtenances to be abandoned shall be removed and transported to the Jersey City Municipal Utilities Authority East Side Pumping Station, or as designated by the Authority for future use.

The downstream end of the existing sewer to be abandoned shall be plugged with concrete or capped with a mechanical plug. All structures within a minimum distance of 12-inches from existing grade shall be demolished and removed. All sewers, manholes and drain inlets to be abandoned shall then be filled with pea gravel or sand and capped with a minimum of 4-inches of concrete. The upstream end of the pipes shall then be capped or plugged and the ground surfaces adjacent to all inlets or manholes shall be restored to their original condition.

SECTION 5.03 REINFORCED CONCRETE PIPE (CLASS III to CLASS V)

A. General

Unless otherwise specified, all pipe shall be best quality reinforced concrete pipe Class III, in 8" – 0" lengths, joints providing requisite flexibility and water-tightness under service conditions. All reinforced concrete pipe shall conform to the Standard Specifications for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe, ASTM C-76, latest issue. Where required by the Engineer best quality reinforced concrete pipe Class V shall be used.

All circumferential reinforcing steel in circular reinforced concrete pipe shall be of the circular type and use of elliptical steel will not be allowed.

All pipe shall be sound, true and free from cracks or other defects. Interior surfaces shall be smooth and free from ridges. Pipe ends shall be accurately formed, and no pipe shall be used in the work which has cracked, chipped or otherwise defective jointing surfaces. Patching or plastering of defective surfaces will not be permitted.

B. Jointing

Pipe joints between sections of the RCP shall be sealed with a gasket conforming with ASTM C443 or approved equal. The upper half of all pipe joints shall be totally sealed with 1:2 mortar mixture.

The mortar shall consist of one part of Portland cement and two parts of sand by volume, mixed together with sufficient water to produce a stiff, workable mortar. The amount of water shall in no case exceed five and one-half (5-1/2) gallons of water per bag of cement.

Before making a joint, the pipe ends shall be thoroughly cleaned and wet with clean water.

C. Pipe Laying

All pipe shall be carefully examined for dents, cracks, through wall lifting holes, chips on spigot or bell, and other defects, and no pipe known to be defective shall be laid. If any pipe is found to be broken or defective after being laid, it shall be removed and replaced by sound pipe without any further payment.

Joint surfaces shall be protected from damage and shall be carefully examined before jointing. No damaged joints shall be used in the work.

Pipe shall be thoroughly cleaned and ample precautions shall be taken to prevent entrance of dirt and debris into the pipe after laying. Exposed ends of the sewer shall be provided with temporary plugs or covers.

All pipe shall be carefully laid to true alignment and grade with bell ends upstream. All pipe shall be bedded as required by the Engineer or Authority. Care shall be taken not to excavate below grade. Material excavated below adopted grade shall be replaced with broken stone as provided in Section 503.

Immediately after the pipe is brought to final position, it shall be thoroughly secured and properly bedded, and ample support shall be provided to prevent settlement or disturbance. Pipe shall be protected during construction against possible flotation due to pouring of concrete cradle or in case the trench bottom becomes flooded prior to placing the backfill.

D. Pipe Testing

All concrete pipe shall be tested using the methods discussed in Section 7.03.

SECTION 5.04 DUCTILE IRON PIPE

A. General

Ductile iron pipe shall be centrifugally cast cement-lined and shall conform with the latest revision of ANSI A21.51 (AWWA C-151) Ductile Iron-Pipe Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids. Cement lining shall conform with A21.4 Cement Mortar Lining for Cast Iron Pipe and Fittings and shall receive a standard foundry bituminous seal coat. Pipe exterior shall receive a standard foundry coal tar dip coating. Pipe may be furnished in 18 or 20 foot nominal laying lengths.

Main line joints shall be of the push-on type with a rubber gasket conforming with the latest revision of ANSI A21.11 (AWWA C-111). Pipe plain ends shall be suitable beveled to permit easy entry into the bell. Each joint shall be provided with two bronze wedges. Pipe joints shall be "TR Flex" as manufactured by United States Pipe and Foundry Company, or approved equal, or as required by the Engineer.

Flanged ductile iron pipe shall have ductile iron flanges conforming to ANSI B16.1 Class 125 specifications designed for use with ANSI/AWWA C151/A21.10-82 flanges fittings, with pipe barrel conform to ANSI/AWWA C151/A21.51-81, or latest revisions with the previously mentioned exception. Ductile iron pipe shall be threaded and flanged in the foundry. The flanges shall be of the long hub type; screwed on the pipe barrel; power tightened by machine, and faced and drilled after tightening. No ductile iron pipe of class thickness less than Class 53 shall be threaded and flanged.

Joint restraint on straight pipe lengths, where required by the Engineer, shall be by the use of mechanical joint retainer glands or by specially modified push-on joints with joint restraint provided by ductile iron retainer rings jointed together by corrosion resistant, low alloy, high strength steel tee head bolts and nuts.

B. Pipe Thickness

Pipe thickness design shall be in accordance with the latest revision of ANSI Standard A21.50 Thickness Design of Ductile Iron Pipe, latest edition, with design based upon maximum anticipated working pressure combined with a 50% increase for water hammer and utilizing the maximum anticipated earth loading conditions combined with an H-20m live loading. Minimum bedding condition shall be Condition 2 as outlined in the above Standard. Minimum acceptable pipe thickness is Class 52, or as required by the Engineer.

C. Jointing

Pipe shall be handled with care to avoid damage to the lining and coating. Cutting of pipe where required shall be done only by experienced men using power-driven pipe cutters in such a manner to leave a smooth end, normal to the pipe axis, with cement lining undamaged. Cut ends shall be beveled to prevent damage to gaskets.

Jointing shall be done in strict accordance with manufacturer's recommendations. Pipe ends shall be thoroughly cleaned prior to jointing and only approved lubricants shall be used. Gland bolts for fittings shall be uniformly tightened using torque limiting ratchet wrenches properly set to the foot pound of torque as recommended by the manufacturer.

Pipe shall be properly aligned to line and grade. Where necessary to change direction, pipe may be deflected in the joint in accordance with the manufacturer's recommendations.

Yellow warning tape shall be buried approximately two (2) feet above all force mains.

D. Pipe Laying

All pipe shall be laid to accurate line and grade on a continuously ascending grade from the downstream station, except where shown otherwise on the plans. The minimum cover over the pipe shall be 4 feet.

All pipe shall be carefully examined for defects, and no pipe known to be defective shall be laid. If any pipe is found to be broken or defective after being laid, it shall be removed and replaced by sound pipe without any further payment.

Joint surfaces shall be protected from damage, and shall be carefully examined before jointing. No damaged joints shall be used in the work.

Pipe shall be thoroughly cleaned and ample precautions shall be taken to prevent entrance of dirt and debris into pipe after laying. Exposed ends of all uncompleted lines shall be provided with plugs or covers at all times when pipe laying is not actually in progress.

All pipe shall be carefully laid to true alignment and grade with the open end of bell facing upgrade. The trench bottom shall be carefully graded to the proper elevation, and the maximum practical solid bearing area shall be provided throughout its entire length, prior to swinging the pipe into place. The pipe shall be laid on a minimum of 6-inches of ¾ inch clean broken stone in accordance with the requirements of the Authority.

Care shall be taken not to excavate below grade. Material excavated below grade shall be replaced by material, which will meet with the approval of the Engineer, without any further payment.

Immediately after the pipe is brought to final position, it shall be thoroughly secured and properly bedded, in accordance with ANSI A21.50 (latest revision), and ample support shall be provided to prevent settlement of disturbances.

Pipe shall be protected during construction against possible flotation due to poring of concrete or in case the trench becomes flooded prior to placing the backfill, either with water, or a wet mud mixture.

E. Pipe Testing

Ductile iron pipe shall be tested using the method described in section 7.03.

SECTION 5.05 CAST IRON PIPE

Cast iron (pit cast) house connection pipe and fittings shall be extra heavy thickness conforming with the requirements of A.N.S.I. Specifications A74.
Neoprene gasket joints shall conform to A.S.T.M. C-564. Lead and oakum joints shall be made in accordance with A.W.W.A. Standard C-600.

SECTION 5.06 POLYVINYL CHLORIDE (PVC) PIPE

A. General

All pipe shall be best quality unplasticized polyvinyl chloride sewer pipe, adequate for external loading conditions with joints providing flexibility and water tightness under service conditions. Smooth internal surfaces, producing high carrying capacity obtainable with best standard practice and best workmanship, will be required. Gravity sewer pipe shall be in accordance with ASTM D3034 for sizes 4" through 15", and ASTM F679 for sizes greater than 15" (latest revisions). Pressure sewer pipe shall be in accordance with ASTM D2241. Sewer pipe shall meet the requirements for extra strength sections of the above noted ASTM Specifications (minimum of SDR-35 for gravity pipe and SDR-26 for pressure pipe).

All pipe shall be of uniform dimensions, straight, and true to form, without bulges, dents, cracks, tears, or other defects or exposure to sunlight longer than two (2) months, which will result in a noticeable variation in diameter from that obtained on adjacent unaffected portions of the surface. Each pipe shall not vary in length more than 1.0 inch in a length of 12-1/2 feet (20 feet for pressure pipe) measured as mid-ordinate. Materials properties shall meet the test requirements of ASTM D1784 (latest revisions).

B. Joints

Joints shall be of the bell and 76 spigot type with rubber ring. Joints shall be manufactured in accordance with ASTM 3212 (ASTM D3139 Pressure Pipe), latest revision. The ring groove shall be so designed as to prevent ring displacement. Sizes shall be as required by field conditions. Joints shall be in accordance with recommendations of the manufacturer.

C. Jointing

Pipe shall be carefully jointed in conformity with the best practice and the detailed instructions of the manufacturers. All pipe ends shall be thoroughly cleaned prior to and during the jointing operation. The pipe end shall be thoroughly lubricated in accordance with the recommendation of the manufacturer.

Actual details of required jointing practice will depend upon the particular type adopted, but shall in all cases, involve approved practice and shall be such as to produce the required results, particularly with regard to watertightness.

D. Pipe Laying

The Contractor shall submit calculations and plans including sketches and details of the method of installation of manholes and gravity sewers in areas requiring excavation greater than 8 feet deep. If trench boxes are to be used, the design strength of the boxes shall be checked against the soil loading. The calculations and sketches shall be accompanied by a signed and sealed certificate from a currently licensed N.J. Professional Engineer stating that the method of installation proposed meets all the latest requirements of the New Jersey Construction Safety Code and the Federal Occupational Safety and Health Act.

All pipe shall be carefully examined for dents, excessive deflection, or bowing, and other defects. The minimum pipe cover for PVC pipe shall be 4 feet unless otherwise approved by the Engineer.

No pipe known to be defective shall be laid. If any pipe is found to be broken or defective after being laid, it shall be removed and replaced by sound pipe without any further payment.

Joint surfaces shall be protected from damage and shall be carefully examined before jointing. No damage joints shall be used in the work.

Pipe shall be thoroughly cleaned and ample precautions shall be taken to prevent entrance of dirt and debris into the pipe after laying. Exposed ends of the sewer shall be provided with temporary plugs or covers.

All pipe shall be carefully laid to true alignment and grade and installed in accordance with ASTM D2321 (latest revisions).

The trench bottom shall be carefully graded to the proper elevation, and the maximum practical solid bearing area shall be provided throughout its entire length, prior to swinging the pipe into place. Requirements for proper bedding shall also include adherence to typical bedding details.

Care shall be taken not to excavate below grade. Material excavated below adopted grade shall be replaced by material, which meets with the approval of the Engineer.

All pipe shall be accurately centered prior to jointing and then thoroughly driven home.

All trenches shall be dewatered prior to laying pipe.

Immediately after the pipe is brought to final position, it shall be thoroughly secured and properly bedded, and ample support shall be provided to prevent settlement or disturbances as detailed in these Specifications.

Pipe shall be protected during construction against possible floatation due to pouring of concrete cradle or in case the trench becomes flooded prior to placing the backfill.

Six inch wide metallic warning tape shall be buried approximately two (2) feet above all PVC pressure pipe. The tape shall be capable of being detected with a non-ferric metal detector.

E. Branch Connections

Branch connections shall be of the type that are manufactured integrally with the main sewer pipe and shall be PVC 45 degrees or 60 degrees wye connections or 90 degree tee connections of a 4 inch or 6 inch diameter. Branch connections shall be best quality unplasticized polyvinyl chloride (PVC) sewer pipe and shall be provided and installed in accordance with applicable specifications sections and details.

F. Bedding and Corporation Notes

1. Bedding and haunch material to springline shall be in ¾ inch clean crushed stone and gravel in accordance with the requirements of the Engineer.

2. After placement of pipe, Contractor shall install haunch material and compact to 90% relative density utilizing equipment as necessary. Note: Hydro-hammers are <u>not</u> to be used 3 feet or less from the top of pipe.

3. After installation of haunch material, the Contractor shall install initial backfill and compact to 90% relative density.

4. If Contractor excavates to greater depth or a wider trench then specified, it shall be his responsibility to install material and compaction as deemed necessary by the Engineer to achieve the required bedding strength.

5. Precautions shall be taken to ensure sufficient material is placed under the pipe haunch (area between bottom and springline of pipe) to provide adequate side support. Take precaution to prevent movement of the pipe during the placement

of the material in this area. All sheeting below the top of the pipe shall be left in place.

Movable trench supports shall be used only in earlier wide trench constructions (wide trenches are classified as trenches whose width at the top of the pipe is greater than 2-1/2 pipe diameters on each side of the pipe) where supports extend below the top of the pipe or on a stable shelf above the pipe with the pipe installed in a narrow, vertical wall sub-ditch. (Uni-bell B-5)

G. Connection to Existing Brick Manholes

Connection of new or replacement gravity sewers at existing brick manholes shall be performed using an elastrometric plastic waterstop. The Contractor shall carefully remove the damaged section of pipe at the manhole wall or create an opening in the manhole wall using saws or other appropriate methods to accept the new gravity sewer. All efforts shall be made to limit the opening in the existing manhole to a diameter that is less than 6" greater than the pipe to be installed. The opening in the wall shall be cleaned and the edges roughened to facilitate the adherence of grout.

The waterstop shall be Model LDCMA as manufactured by Fernco, Inc., approved equal. The waterstop shall be installed on the new pipe section in accordance with the manufacturer's recommendations. The pipe and waterstop shall be positioned in the opening at the required elevation so that the waterstop is centered along the wall's thickness. Non-shrink, non-metallic grout shall be carefully applied between the edges of the wall opening and the pipe so that all gaps are filled and the pipe is securely fastened in place. Grout shall be Five-Star Structural Concrete as manufactured by U.S. Grout Corporation, or approved equal.

H. Connection to Existing Pre-cast Concrete Manholes

Connections of new or replacement gravity sewers at existing pre-cast concrete manholes shall be made by using the cast in place flexible gasket if available, or by core drilling the manhole wall and by the use of a Kor-n-seal gasket or approved equal. The channel and benching in the manhole shall be reconstructed as necessary with non-shrink grout to provide a smooth transition between the new and existing main connection.

I. Pipe Testing

All PVC pipe shall be tested using methods described in section 7.03.

SECTION 5.07 PIPE BEDDING AND TRENCHING

Trench dimensions, maximum depths and bedding requirements (including cradles and encasement) for sewers, laterals, etc. shall be in accordance with the manufacturer's

recommendations and as a minimum shall conform to the details shown on the Division of Engineering Street Opening Requirements and Trench Detail.

The applicant's application for preliminary review by the Authority shall include trenching dimensions and bedding details including cut reinforcing bar schedules for concrete cradles where applicable.

If proposed facilities or mains are to be constructed on piles for any reason, the Applicant must submit a report that is signed and sealed by a NJ Licensed Professional Engineer analyzing the surrounding surface and subsurface. The report must evaluate the possibility settling in the areas surrounding the proposed structures. The report must determine whether future settling in the surrounding areas will adversely impact the proposed structures and/or roadways, pavement, etc.

SECTION 5.08 PRE-CAST CONCRETE MANHOLES

A. General

Manholes shall be provided at ends of sewer lines, at interceptions and at changes of grade or alignment. Distances between manholes shall not exceed 200 feet for sewers 15 inches or less in diameter, 300 feet for sewers greater than 15 inches in diameter. Where collector sewers or lateral connections enter manholes at elevations two feet or more above the invert, drop manholes shall be provided and drop pipes shall be built.

B. Description

Pre-cast concrete manholes shall consist of pre-cast reinforced concrete sections, a conical or flat slab top section, and a base section conforming to the requirements of the *JCMUA*, as illustrated on the enclosed standard details, and as specified herein.

C. Materials

Concrete: Precast manhole shall be constructed of 4000psi or stronger concrete with type III or IIIA cements in accordance with ASTM CISO. Aggregate shall be a maximum of 3/8" crushed stone.

Reinforcing Steel: Reinforcing steel shall be F_Y = 60,000psi deformed bar.

Structural Design: Manholes shall be designed to support the sill loading and H-20 loading.

Frames and Covers: The Contractor shall furnish and set level and to the proper grade, Class 30B cast iron manhole frames and covers of the form and dimensions specified by the *JCMUA* conforming to standards.

All castings for manhole frames and covers shall be of tough gray iron, free from cracks, holes and cold shuts. The quality should be such that a blow from a hammer will produce an indentation on a rectangular edge of the casting without flaking the metal.

All castings shall be made accurately to dimensions and shall be machined to provide even bearing surfaces. Covers must fit frames in any position, and if found to rattle under traffic, shall be replaced. Filling to obtain tight covers will not be permitted. No plugging, burning in or filling will be allowed. The frame shall be thoroughly bedded in mortar.

All castings shall be carefully coated inside and out with coal-tar pitch varnish of approved quality.

Exterior of Manhole: Shall be coated with black epoxy bitumastic paint for waterproofing. Lift holes shall be non-through pick-up holes. Interior shall be coated with white epoxy bitumastic paint.

Steps: During the construction of each manhole, Polypropylene steps with a 5/8-inch Grade 60 steel reinforcement shall be set in place on the inside of the manhole beginning two feet above the bottom, and spaced not more than twelve inches center to center.

Steps shall be constructed to the dimensions required by the Jersey City MUA and shall be properly embedded in the wall.

Piezometer: Manholes shall be constructed with piezometer pipe through the wall located immediately above the bench. The piezometer shall be constructed as shown within *JCMUA* Sanitary Sewer Details.

Lifting Holes: Lifting holes shall be non-penetrating with a keyed lock as manufactured by Atlantic Concrete or equal.

Force Main Discharge Manholes: The discharge pipe shall be aimed in to the channel of the manhole to limit splashing to as little as possible. Inside walls shall have HDPE liner plates cast into the wall. Liner plates shall be equal to a "T-lock" as manufactured by American International.

D. Installation

Pre-cast base sections shall be installed on a 12-inch crushed stone foundation mat as indicated on the standard detail drawings. Concrete foundation mats (4000 psi) shall be furnished if required by the Engineer due to adverse field conditions. The bell of the manhole base shall be wiped clean, be free of all dirt and grit, and liberally soaped in preparation for receiving the riser, cone or slab top sections. Prior to snapping the gasket onto the spigot groove of the riser or cone sections, the gasket should be wiped clean and well soaped. Soaping the gasket groove will also make jointing of the pipe sections easier. A screwdriver or hammer handle inserted beneath the gasket and run around the

pipe will ensure even seating. The riser or cone sections with gasket in place should then be lowered into the bell of the manhole base, taking care that no dirt gets into the joint on the gasket. Additional riser or cone section shall be jointed in a similar manner.

Manhole joints shall be mortared inside and outside. The entire exterior of manholes including bottom shall receive two waterproof coatings with an epoxy sealing compound.

E. Watertight Work Required

THE ENTIRE WORK OF CONSTRUCTION MANHOLES MUST BE CARRIED ON IN A MANNER TO INSURE WATERTIGHT WORK, AND ANY LEAKS IN MANHOLES SHALL BE GROUTED, REPAIRED, OR THE ENTIRE WORK SHALL BE REMOVED AND REBUILT.

ATTENTION IS PARTICULARLY CALLED TO THE NECESITY OF KEEPING THE WATER LEVEL BELOW ALL PARTS OF THE BRICK OR CONCRETE FOUNDATION AND WALLS UNTIL THE CEMENT HAS OBTAINED ADEQUATE SET.

F. Watertight Covers

In areas susceptible to flooding or where directed by the Engineer, watertight manhole frames and covers shall be installed, Campbell No. 6548 or approved equal. The Contractor shall cement the rubber gasket in place, lubricate all bolts, and permanently mark the frame and cover for alignment. Where watertight manholes are used, vents stack and branch pipe shall be installed. See vent stack detail.

G. Locking Type Covers

Where directed by the Design Engineer or *JCMUA* Engineer, locking type frames and covers shall be installed, Campbell No. 1486 or approved equal.

H. Manhole Testing

Manholes shall be tested as described in Section 7.03.

SECTION 5.09 PRE-CAST CONCRETE CATCH BASINS

A. Description

Pre-cast concrete catch basin inlets shall consist of pre-cast reinforced concrete sections, a flat slab top section, and a base section in conformance with the requirements of the *JCMUA* and as detailed in the attached “Standard Construction Details” and specified herein.

B. Other Materials

Frames and Grates – The Contractor shall furnish and set level and to the proper grade, cast iron catch basin inlet frames and grates of the form and dimensions shown on the standard detail drawings. All grates shall be bicycle type grates.

All castings for catch basin inlet frames and grates shall be of tough gray iron conforming to ASTM Specification A48-83, Class 30B (A.A.S.H.T.O. M105-82), free from cracks, holes and cold shuts. The quality shall be such that a blow from a hammer will produce an indentation on a rectangular edge of the casting without flaking the metal. All castings shall be heavy duty and shall be capable of safely withstanding A.A.S.H.T.O. HS20-44 Highway Loading.

All castings shall be made accurately to dimensions and shall be machined to provide even bearing surfaces. Grates must fit frames in any position, and if found to rattle under traffic, shall be replaced. Filling to obtain tight grates will not be permitted. No plugging, burning in or filling will be allowed. The frame shall be thoroughly bedded in mortar.

All castings shall be carefully coated inside and out with coal-tar pitch varnish of approved quality.

Steps – During the construction of each catch basin inlet, polypropylene steps with a 1/2-inch Grade 60 steel reinforcement shall be set in place on the inside of the catch basin inlet beginning 2 feet above the bottom and spaced 12-inches center to center, as shown on the standard detail drawings. Steps shall be constructed to the dimensions required by the Owner and shall be properly embedded in the inlet wall.

C. Installation

Pre-cast base sections shall be installed on a 12-inch NJDOT No. 57 foundation mat. Concrete foundation mats (4,000 psi) shall be furnished, if required by the Engineer due to adverse field conditions. The bell of the catch basin inlet shall be wiped clean, be free of all dirt and grit, and be liberally soaped in preparation for receiving the riser or top slab section. The riser or top slab sections should then be lowered into the bell of the catch basin inlet base, taking care that no dirt gets into the joint. Additional riser sections or top slab sections shall be jointed in a similar manner. All catch basin inlet joints shall be mortared inside and outside. All catch basin inlets that have flows tributary to the Authority's combined sewer system shall be constructed with a 2-foot deep sediment sump and a Standard Type Catch Basin Trap as manufactured by Campbell Foundry of Harrison, New Jersey.

D. General Requirements

All pre-cast catch basin inlets shall be designed and manufactured to meet the requirements of "Pre-Cast Concrete Water and Wastewater Structures," ASTM Spec, C-

913 and shall conform with the requirements of the NJDOT Standard Specifications. The minimum compressive strength for all concrete sections shall be 4000 psi.

Joints of the catch basin inlet sections shall be formed entirely of concrete and when assembled, shall be self-centering and make a uniform tight joint. All inside surfaces of the bell or outside surfaces of the spigot, or both, shall be parallel within 1 degree and have an angle of not more than 2 degrees with the longitudinal axis of the pipe. Joints shall be mortared on exterior and interior surfaces.

The Contractor must submit shop prints prior to placing orders.

E. "Solids Restricting" Type Inlet Frame and Grate

Storm drain inlets shall meet or exceed NJDEP Design Standards under NJPDE's Permit No. NJ0141852 (latest revision), which requires that the curb opening be divided by bars or other means into individual clear spaces. Each such clear opening shall have an area of no more than seven (7.0) square inches and the smallest dimension of the opening shall not be greater than two (2.0) inches. The Authority may provide relief and approval an alternate inlet opening at low points if required for adequate hydraulic performance.

Catch basin frames and grates shall be supplied with a "Solids Restricting" type catch basin curb piece as manufactured by Campbell Foundry Company of Harrison, New Jersey. Curb pieces shall be either Campbell Foundry Eco Curb Piece, Type "E". Model 25481362 for use with a 6 inch high curb or Model 25481382 for use with an 8 inch high curb, as modified, if necessary, to meet the above referenced clear opening requirements. The "Solids Restricting" type catch basin curb piece shall be used in conjunction with a Heavy Duty Club Type Inlet Frame and Bicycle Type Grate, Campbell Foundry Company Model #2617, or approved equal, unless specified otherwise.

SECTION 5.10 SEWER CLEANOUTS

All clean outs shall be left a minimum of 24" above finished grade during initial construction. Prior to final testing of all clean outs, installation of the clean out protection box, as shown on the construction details In Appendix II, will be required and installed to final grade. Clean outs are required for all newly constructed individual sewer connections (Both storm and Sanitary). The *JCMUA* reserves the right to have bull tee cleanouts constructed when, in the opinion of the Chief Engineer, it is warranted.

SECTION 5.11 INVERTED SIPHONS

Inverted siphons, if permitted, shall not have less than two barrels at a minimum of 8" diameter. Provision shall be made for rodding and for flushing. Velocity shall not be less than 3 feet per second and flow control gates in chambers shall be provided. These are special conditions and further standards will be provided by the Authority. When a siphon is approved, it should be constructed of ductile iron pipe.

SECTION 5.12 SEWER PIPE SERVICE CONNECTIONS AND SADDLES

A. General

Break in connections and protruding plumbers taps shall not be allowed for sewer main extensions or where existing combined/sanitary sewers are to be replaced. Connections made to existing combined/sanitary sewers for individual residential and/or existing buildings can be constructed as a "break-in" connection in accordance with the Authority's standard details. The maximum protrusion of the service lateral into the existing sewer main is 1 inch. The Contractor shall be fully responsible for excavation and reinstallation of the connection should internal inspection by the Authority or others note that the connection protrudes more than the maximum amount allowed.
The cost correction of the installation shall be borne completely by the Contractor and shall not be the responsibility of the Authority or the Customer.

In areas wherein the Contractor damages the existing combined/sanitary sewer main, the Contractor shall immediately notify the Authority and undertake under their direction the repair of the sewer main. The length of the new sewer pipe required shall be suitable to accomplish the repair as hereinafter described. The existing combined/sanitary sewer, and branch connection if applicable, shall be removed as necessary to completely repair the effected area. Where the proposed branch connection is within (3) feet of a pipe joint on the sewer main, and the main is of a suitable size, the portion of the new main installed shall be connected to the existing sewer main by use of a fully flexible coupling. After securely fastening the coupling to the pipes, it shall be fully encased in concrete. Special care shall exercise by the Contractor to fully support the pipe to assure a consistent invert at the transition. Where the sewer main is of a size wherein flexible connectors are not available, the transition between the new and existing pipes shall be constructed as a cast-in-place transition collar in accordance with the Authority's standard details.

B. Lateral Connections

Sewer service laterals that are ¼ or smaller in diameter than the sewer on the combined sewer main being connected to shall be constructed in conformance with Section 5.12-A, C, D, and E.

Where the sewer service lateral is greater than ¼ in diameter of the receiving sewer main, the connection shall be made to the nearest existing manhole or when the nearest manhole is more than 50 feet upstream or downstream of property lines, the tap shall be connected to the main with a manhole constructed 5 feet upstream of the point of connection on the lateral.

C. Taping and Saddles

For existing combined/sanitary sewers less than 24 inches in diameter the service connection for individual residential and/or existing buildings can be completed by the use of a properly installed sewer pipe saddle or other approved method, such as a "Kor-n-Tee". The sewer pipe saddles or service adaptor shall be designed to provide an infiltration-free connection between service laterals and existing gravity sewers. Sewer pipe saddles shall Sealite Model UH, EH, CH or CH8 as manufactured by the General Engineering Company of Frederick, MD 21705-0609, or equal for connecting SDR 35-PVC laterals to existing sewers. Sealite Model US, ES or CS, or equal shall be used for connecting laterals that are made of a material other than SDR 35-PVC. Kor-n-Tee shall be manufactured by NPC Inc. or approved equal.

The sewer pipe saddles shall consist of a cast iron saddle body with a captive rubber o-ring flange gasket and a stainless steel strap for attaching the assembly to the existing sewer pipe. The inner diameter of the cast iron saddle body shall be correctly contoured for the size and kind of pipe on which it is to be installed.

The saddle body shall be ASTM A-48 Class 30 cast iron and shall be furnished with a tubular rubber flange gasket cemented into a groove within the saddle body. The gasket shall be resilient enough to seal against minor pipe irregularities yet sturdy enough to resist expansion due to temperature and earth movement. The tubular rubber flange gasket shall conform to ASTM C-361-77.

The sewer pipe saddle is to be installed by positioning it over a core-drilled hole, sized in accordance with the recommendations of the saddle manufacturer. The cast iron saddle body shall be secured to the sewer pipe with the use of a Type 304 stainless steel strap, Type 304 stainless steel t-bolt and Type 18-8 stainless steel nut. The steel strap shall be a minimum of 24 gage and shall be provided with a Type 303 stainless steel swivel pin so designed to permit the band to seat properly on the outside of the sewer pipe. The manufacturer of the sewer saddle shall supply all bands, nuts and bolts used to attach the saddle.

D. Pipe

Saddles used for connecting SDR-35-PVC laterals to the existing sewers shall be furnished with an ASTM D3034, SDR-35 PVC gasketed adapter. The adapter shall be installed by the saddle manufacturer and attached to the saddle with a suitable epoxy.

Where laterals of a material other than SDR-35-PVC are to be used, an appropriately sized Fernco electrometric coupling, or equal, with a stainless steel shear ring and clamping bands, shall be furnished for attaching the lateral to the saddle spigot. The 5psi of internal pressure when installed.

E. Finishes

All cast iron surfaces shall be coated with asphaltum paint.

SECTION 5.13 EROSION CONTROL

The developer/applicant shall be responsible for obtaining all soil erosion and sediment control permits from the Hudson Essex Passaic District office. Erosion control procedures, inclusive of mulching, shall be utilized in all project areas. Erosion control measures shall be taken, as required, staring immediately after site and access clearing, continuing during sewer construction, site demolition, and until the site has been satisfactorily restored.

The Contractor shall continuously control erosion during construction. Critical Areas shall be protected at all times by temporary seeding, mulching, or sodding, or the slope lengths shall be reduced by the installation of diversions or other means. Where topography permits, debris basins shall be constructed at points of water concentration from Critical Areas. Earth berms or diversions shall be constructed to intercept and divert runoff water away from Critical Areas. Diversion outlets shall be stabilized by paving or other means acceptable to the Engineer, if required.

Structures proposed for erosion control shall be designed by the Contractor and approved by the Engineer and constructed in accordance with the Engineering Practice Standards for diversions, waterways, and debris basins as defined by "Standards for Soil Erosion and Sediment Control in New Jersey," prepared by the New Jersey State Soil Conservation Committee.

In critical areas, particularly along steep slopes and wetlands, site clearing shall be delayed until absolutely necessary for the continuance of construction.

SECTION 5.14 SEDIMENT CONTROL

Sediment shall be settled or filtered out of all surface or subsurface water encountered during construction before such water enters any surface waters. Dewatering operations shall direct pumpage as far from stream banks as possible. Care should be taken not to damage or kill vegetation by excessive watering or silt accumulation in the discharge area. Settling basins or sediment traps shall be constructed and used where necessary to protect vegetation and to achieve environmental objectives.

Construction staging areas, and areas for stockpiling material, shall be selected so as to be consistent with environmental objectives and constraints. All such areas shall be located so as to avoid erosion and siltation. Locations of staging areas used for stockpiling shall be approved by the Owner and modified as required by other authorities.

SECTION 5.15 DATUM

All elevations and coordinates on site plans must use vertical datum NAVD 1988 and horizontal datum NAD 1983.

SECTION 5.16 GREASE TRAPS/INTERCEPTORS

Grease traps/interceptors shall be constructed of Concrete, stainless steel, or PVC. Grease traps shall have two chambers influent and effluent flow. The influent chamber shall be maintained such that grease is allowed to rises to the top and wastewater passes through an orifice into the effluent chamber. Shall be two access covers one into each section of the chamber. When the grease trap is constructed of stainless steel or PVC an anti-floatation slab shall be placed around the chamber with tie down straps.

Grease traps/interceptors shall be constructed such that it can support the appropriate loading for roadway or sidewalk or interior building uses.

Grease traps/interceptors shall be operated and maintained in conformance with PVSC Rules and regulation sections 405 and 406.

Grease traps/interceptors shall be sized based on fixture count for apartment buildings, traps maybe size based on 2006 National Plumbing Code Chapter 6 et al and Plumbing and Drainage Institute Standard G101 as stated in national plumbing code or by the following method:

Grease Interceptor Sizing Formula

GI = SC * FF * RT * SF

GI = grease interceptor volume, gallons
SC = seating capacity (# of seats)
RT = retention time, hours = 2.5
SF = storage factor, dimensionless = 1.5
FF = flow factor criteria in gallons/meal-hour determined using following criteria:

Restaurant Operation Condition	Flow factor
Deep frying and dishwasher	3.0
No deep frying, dishwasher	2.5
Deep frying, disposable serving ware	2.5
No deep frying, reusable serving ware, no dishwasher	2.0
No deep frying, disposable serving ware	1.5
No cooking of any type, disposable serving ware	0.5

Grease Trap Sizing Formula

GT = CS * 0.4
GT = minimum grease trap rating in gallons per minute
CS = capacity in gallons of fixtures or sink to be discharged to the grease trap

Oil/Water Separator Sizing Criteria

Separator capacity = Six cubic feet for the first 100 square feet of floor space draining to separator plus 1 cubic foot for each 100 square feet thereafter.

SECTION 5.17 PUMP STATIONS

A. Wetwell

Wetwell shall conform in volume requirement of NJDEP Standards. The structure shall be either cast in place concrete or precast concrete. The top slab shall be designed to support AASHTO H20 loading.

Access shall be through a single leaf or double leaf stainless steel hatch. The hatch shall be equipped with lift cylinders, safety locks to prevent closure. The hatch shall be equipped with locking mechanism with recessed key. The hatch shall be approved by the JCMUA.

B. Piping

Piping in Pump Station wet well, dry well and for a distance of eight (8) ft below the exterior face of the structure shall be bitomastic cement-lined ductile iron class SG pipe. Pipe inside the wet well and dry well shall be flanged pipe. At 24-inch outside the structure shall be a mechanical joint with retainer gland. When the piping is less than 3" in diameter, the pipe shall be 307 stainless steel – SCH 40 pipe, meeting the same flanging requirements.

C. Pumps

Pumps shall be ABS Piranha submersible or approved equal. The pumps shall be capable of passing a 2" solid and have cutting heads to masicate all sewage solids. Pump shall be equipped with Motor High Temp, Motor Overload, seal failure and capable of working under water. All pumps to be turned over to JCMUA shall be approved by the Senior Engineer. Pumps shall be sized based on NJDEP Requirements.

D. Trash Basket

As manufactured by Holiday or approved equal.

E. Ventilation

F. Controls

- Transducer – Submersible; approved by JCMUA
- Flow Metering – Provide a Venturi flow meter, chart recorder
- SCADA - shall work with JCMUA's system without modification to existing system.

G. Electrical

- Generator – shall be diesel and approved by JCMUA. The generator shall be sized to power entire station
- Fuel Systems – self contained and under generator tank with secondary containment

H. Water Supply

Shall comply with Jersey City Water Standards

I. Miscellaneous

ARTICLE VI. CONSTRUCTION REQUIREMENTS

SECTION 6.01 WORKING HOURS

The Contractor should generally limit construction operations and activities between the hours of 7:00 a.m. to 4 p.m. unless law establishes stricter limitations. No pile driving, pulling or other noisy operations or operations entailing the use of vibratory hammers or compactors will be permitted, other than between the hours of 8:00 a.m. to 4:00 p.m.

The Contractor must also have all work completed (including backfilling, plating and cleanup) on all County and NJDOT roadways by 3:00 p.m. each afternoon.

SECTION 6.02 ROAD OPENING

Road opening permits must be obtained from the Jersey City City Engineer's office prior to undertaking any construction in or along the Jersey City public Right-of-Way. Backfill and resurfacing of County and NJDOT roadways shall be as per the requirements of the County and the NJDOT. The Contractor is specifically alerted to include the requirement for traffic control, working hour restrictions, and provisions of uniformed Municipal Policemen when working within the municipality, County and NJDOT Right-of-Ways.

SECTION 6.03 ENVIRONMENTAL PROTECTION

The Contractor is to minimize environmental impact due to his/her operations during all phases of his work. This shall include, but is not limited to, prohibition of the following construction procedures.

1. Dumping of spoil material into any stream corridor, any wetlands, any surface waters, or any unspecified locations.

2. Indiscriminate, arbitrary or capricious operation of equipment in any stream corridors, wetlands or surface waters.

3. Pumping of silt-laden water from trenches or other excavations into catch basins, surface waters, stream corridors or wetlands.

4. Damaging vegetation adjacent to or outside of the access road or the right of way.

5. Disposal of trees, brush and other debris in any stream corridors, wetlands, surface waters or at unspecified locations.

6. Permanent or unspecified alteration of any flow line of any stream.

7. Open burning of project debris.

8. Use of chemicals for dust control.

9. Use of asphaltic mulch binder.

10. Discharge of test waters with high chemical disinfectant or other pollutant concentrations.

The Contractor shall protect, to the dripline, all trees not designated by the Engineer, the City of Jersey City or the Authority to be removed.

The Contractor is directed to the appropriate sections of the Specifications for additional information regarding environmental work and protection.

SECTION 6.04 LABOR, SAFETY, HEALTH AND SECURITY REGULATION

The Contractor is to refer to the appropriate portions of Information for Bidders regarding Regulations.

The Contractor is to provide adequate signs, barricades, red lights and uniformed guards and take all necessary precautions for the protection of the workers, the work and the safety of the public. All traffic control shall be in accordance with the requirements of the latest edition of the USDOT "Manual of Uniform Traffic Control Devices". All barricades and obstructions are to be protected at night by suitable signal lights which are to be lit from sunset to sunrise. Barricades are to be of substantial construction and painted such as to increase their visibility at night. Suitable warning signs are to be so placed and illuminated at night as to show in advance where construction, barricades or detours exist.

The Contractor is to keep on proper lights each night between the hours of sunset and sunrise at and upon all portions of his work; upon all ranges or other stakes in connection

with the work, when deemed necessary by the Owner, the Authority, or by the proper authorities, or when required by the liability insurance coverers, and is to be responsible for all injuries and damages resulting from neglect or failure in this respect. Night lighting must be so sized, concentrated and located so as to cast sufficient illumination around new construction and excavations. All excavations and obstructions must be properly marked, lighted and provided with railing and other guards.

The Contractor is to maintain sufficient guards by day and night to prevent accidents of any kind or character whatsoever, and will be liable for any damage, which may arise from any negligence on his part or that of his agents and employees.

If, at any time, in the opinion of the Owner, the Engineer, the City, the Authority, the work is not properly lighted, barricaded, and in all respects safe in respect to public travel, persons on or about the work, or public or private property, the Owner will have the right, but not the obligation, to order such safeguards to be erected and such precautions to be taken as he deems advisable, and the Contractor is to promptly comply with such orders. If, under the circumstances, the Contractor does not, or cannot, immediately put the same into proper and approved condition, or if the Contractor or his representative is not upon the grounds so that he can be immediately notified of this insufficiency of safety precautions in accordance with the procedures for notification of the Contractor specified under "Emergency Telephone", then the Owner may put the work into such a condition that it shall be, in his opinion, in all respects safe and the Contractor is to pay all expenses of such labor and materials as may have been used for this purpose by him or by the Owner. Such action of the Owner, or his failure to take such action, will in no way relieve the Contractor of the entire responsibility for any cost, loss or damage by any party sustained on account of the insufficiency of the safety precautions taken by him, by the Owner acting under authority of this Section.

SECTION 6.05 SANITATION

Sanitary conveniences, properly screened from public observation, for the use of all persons employed on the work and beginning with the first persons engaged in preliminary operations, are to be provided and maintained by the Contractor in sufficient numbers, in such a manner and at such locations as will be approved. Sanitary facilities are to be completely self-contained, chemically treated and regularly serviced.

SECTION 6.06 FIRE SAFETY

The Contractor is held responsible and is to maintain conditions, which promote fire safety in his operations at all times. Materials that could constitute a fire hazard such as gasoline, paints, wood and paper products are to be safely stored.

SECTION 6.07 MATERIALS

Unless otherwise specified, only new materials are to be incorporated into the work. All materials furnished by the Contractor to be incorporated into the work may be subjected to the inspection and approval of the Engineer. No material is to be processed, fabricated or delivered to the work without the prior approval of the Engineer, except at the risk of the Contractor.

The Contractor is to submit, to the Design Engineer and Engineer, data relating to materials he proposes to furnish for the work. Such data are to be in sufficient detail to enable the Engineers to identify the particular product in question and to form an opinion as to its conformity to the Authority Rules and Regulations. This data must be submitted for review and approval as soon as possible and prior to the ordering of any materials for construction.

Facilities and labor for the handling and inspection of all materials are to be furnished by the Contractor. Defective materials must immediately be removed from the site of the work.

If the Engineer so requires, either prior to beginning, or during the progress of the work, the Contractor is to submit samples of materials for such specific tests as may be necessary to demonstrate that the materials conform to the Specifications. Such samples are to be furnished, taken, stored, packed and shipped as directed, at the expense of the Contractor, Except as otherwise noted, the Owner will make arrangements for and pay for tests.

All samples are to be packed so as to reach their destination in good condition and are to be so labeled as to indicate the materials represented, the name of the building or work and location for which the material is intended, and the name of the Contractor submitting the sample. To ensure consideration of samples, the Contractor is to notify the Engineer by letter that the samples have been shipped and is to properly describe the samples in the letter. In no case is the letter of notification to be enclosed with the samples.

The Contractor is to submit data and samples, or to place his orders, sufficiently early to permit consideration, inspection, testing, and approval before the materials are necessary for incorporation in the work. Any delay resulting from his failure to do so is not to be used as the basis of a claim against the Owner, the Design Engineer, the Authority, or the Authority's Consulting Engineer.

When required, the Contractor is to furnish to the Engineer, in quadruplicate, sworn copies of manufacturer's shop or mill tests, or reports from independent testing laboratories relative to material data.

In accordance with the "Buy American" provision in Public Law 95-217 (Section 215 of the Public Law 92-500 as amended) N.J. Public Contracts Law 40A:11-18, and implementing EPA regulations and guidelines, the Contractor agrees that preference will

be given to domestic construction material by the Contractor, subcontractor, material suppliers, and equipment suppliers in the performance of this contract.

The Contractor is to certify that the purchased products and materials are in accordance with the above referenced "Buy American" clause and, in addition, is to provide all information required to justify the use of any foreign made product.

SECTION 6.08 CUTTING AND PATCHING

The Contractor is to do all necessary cutting and patching of the work that may be required to properly receive the work of the various trades or as may be required by the Specifications to complete the structures. He is to restore all such cut or patched work to a condition, which receives the approval of the Engineer. Cutting of structures that may endanger the work, adjacent property, workers or the public is not to be done.

SECTION 6.09 DELIVERY AND STORAGE

The Contractor is to deliver equipment and materials to the site and store them in original containers suitably sheltered from the elements, but readily accessible for inspection until installed. He is to store all items subject to moisture damage (such as controls and electrical equipment) in dry, heated spaces. All excavated materials, construction equipment and materials to be incorporated in the new work are to be so placed as not to damage the work and so placed that free access may be had at any time to all parts of the work and to all public utility installations in the vicinity of the work. If insufficient area is available, the Contractor is to provide off-site areas at his own expense. Materials are to be kept neatly piled and compacted and conveniently stored so as to inconvenience, as little as possible, public travel and adjoining tenants.

SECTION 6.10 ASBESTOS-CONTAINING MATERIAL AND HAZARDOUS MATERIAL

The Contractor shall not supply, provide or bring onto the construction site any asbestos containing material or hazardous material (either in kind, as a component of equipment to be used or furnished under the Contract, or as a component of another material to be used or furnished under the Contract) without the express advance, written consent of the Owner. The term, 'hazardous material" shall have the meaning ascribed in Federal Standard No. 313B in effect on the date of the Contract.

The Contractor shall submit to the Authority and the Owner (with a copy to the Engineers) a Material Safety Data Sheet (Department of Labor Form OSHA-20) together with a complete written description of the intended usage for any such material for which the Owner's consent is required, at least thirty (30) days before the delivery of such material.

Such consent shall not be given if materials or equipment not containing asbestos or hazardous material are available, and the Contractor shall not be entitled to any

adjustment in time or compensation for providing non-asbestos containing and non-hazardous materials.

ARTICLE VII. INSPECTION OF SEWER SYSTEM

SECTION 7.01 GENERAL

All construction of sewerage systems shall be under the Jurisdiction of the Engineer for the Authority, either directly or through consultants or inspectors. The Engineer shall have the authority to stop work in the event of discovery of non-compliance.
Construction or testing of sewerage systems shall be performed during the regular JCMUA working hours.
The applicant shall give 48 hours notice to the Authority prior to construction or testing of sewers at all times during the construction period for the project. Should any sewer construction be performed wherein a qualified inspector is absent due to the applicant's failure to provide the proper notification, the Authority may require said work to be uncovered at the applicant's expense. Failure to do so may result in non-acceptance of the work.
The applicant shall also furnish the name of occupant, the street address and lot and block number of every connection made to an approved section of sewer main during the month.
No house service connections shall be made to a street main, whether tested or not, unless under the supervision and inspection of the engineer or agent for the Authority.
When a section of sewer main has been satisfactorily tested, then all individual house connections must also be satisfactorily tested.
A temporary, leak-proof, masonry bulkhead type plug shall be installed in the downstream (outlet) side of the manhole furthest downstream in any sewer main or branch under construction and shall remain in tact and unloosened until written permission is received from the Authority Engineer to remove same.
This permission will not be granted until each section of the sewer has been cleaned and flushed in a manner acceptable to the Authority's Engineer.
The applicant's engineer must certify to the Authority and to the State that the project has been constructed according to the approved plans and specifications. NJDEP requires that such certification be given prior to its issuance of a permit to operate new sewerage facilities.

SECTION 7.02 INSPECTION DURING CONSTRUCTION

All sewer projects are subject to inspection by JCMUA personnel at any time during construction.

SECTION 7.03 TESTING OF COMPLETED SEWER SYSTEM

All sewers constructed within Jersey City by Contractors not contracted to the Jersey City Municipal Utilities Authority (*JCMUA*) shall comply with the following testing/inspection procedures:

1. CCTV inspection of all pipes, including, but not limited to vitrified clay pipe (VCP), reinforced concrete pipe (RCP), polyvinyl chloride pipe (PVC), ductile iron pipe (DIP), high density polyethylene pipe (HDPE) with a copy of the video showing distances, date, operators, names, and a letter signed and sealed by the NJPE certifying tape (where applicable when *JCMUA* has not received an inspection fee to conduct a CCTV inspection).

2. The testing shall be witnessed by a representative of the *JCMUA*. In the event that the developer/Contractor is testing without the *JCMUA* representative present and has written permission from the *JCMUA* Chief Engineer. All test data and results shall be signed and sealed by a New Jersey Licensed Professional Engineer from a certified independent testing company.

3. Air pressure testing for the following pipe types: PVC, DIP, VCP, HDPE, and RCP adhering to the procedure as follows (ASTM F1417-92) or (ASTM 924 for RCP):
    a. All laterals shall be installed.
    b. Trench is backfilled.
    c. Pipe is cleaned and has been flushed.
    d. Stabilized base asphalt pavement is in place.
    e. Pipes entering manholes are plugged at the inside face of manhole laterals, are plugged at ends and clean outs (where applicable) are plugged at top.
    f. Pipe is pressurized to 3.5 psig with an allowable maximum pressure drop of 0.5 psig over the time period as shown in the table below.

Pipe Size	**Time**
8”	3 min. 47 sec.
12”	5 min. 40 sec.
15”	7 min. 5 sec.
18”	8 min. 30 sec.
24”	10 min. 0 sec.

For pipes with 24-inch diameter, or where laterals are included in main being tested, see the test time calculation procedure in section six (6).

In cases where a connection to a manhole is a drop configuration, plugs shall be placed in both upper and lower pipes of the drop, and the assembly shall be tested as a part of the pipeline.

4. Testing of Reinforced Concrete Pipe and Vitrified Clay Pipe:
    a. Pipe shall be backfilled; stabilized base asphalt pavement shall be in place.

b. All laterals and clean outs installed and plugged at ends.
c. Both ends of pipe shall be plugged.
d. The pipe shall be filled with water to a level of 24-inches above crown of pipe or 12-inches above groundwater whichever provides greater head pressure. Filling with water and bleeding of air shall be at the upstream end of the pipe.
e. The test shall be held for 24 hours with an allowable leakage rate of one hundred (100) gallons per inch diameter per mile, as per NJDEP regulations.

5. Manholes shall be vacuum tested for infiltration in accordance with ASTM C1244. All pipes in this structure shall be plugged at the inside face of the manhole.
   a. A vacuum shall be pulled on the manhole equal to 10-inches Hg. Vacuum shall be turned off and all valves closed.
   b. The vacuum shall be held as shown in the following table:

Manhole Diameter	**Time**
48”	60 sec.
60”	75 sec.
72”	90 sec.
>72”	+15 sec./12 diameter

6. Determining test time for large diameter pipe (>24”) or when laterals are included in the main being tested:

   $\mathbf{T} = 0.085 * \mathbf{DK}/\mathbf{Q}$

   (for mains only)

   $\mathbf{T} = 0.085[(\mathbf{D}^2 * \mathbf{L}) + (\mathbf{d}_L * \mathbf{L}_T) / (\mathbf{D} * \mathbf{L}) + (\mathbf{d}_L * \mathbf{L}_T)] * (1.0 / 0.0015)$

   (for sewer mains & laterals)

   Where:

   T = shortest time to drop 1.0 psig

   K = 0.000419 **DL**

   (must not be less than 1.0)

   $\mathbf{K} = 0.000419[(\mathbf{D} * \mathbf{L}) + (\mathbf{d}_L * \mathbf{L})]$

   (in cases where the laterals are included in the testing)

   Q = 0.0015 cubic feet/minute/square feet of internal surface area

   D = *pipe* nominal diameter *(inches)*

   $\mathbf{d}_L$ = lateral diameter *(inches)*

   L = length of pipe reach tested

   *(the time to drop 0.5 psig shall be equal to half of **T** as calculated)*

   $\mathbf{L}_T$ = total length of laterals included in test

7. Deflection testing for PVC, HDPE, and other:
   A. A 7½ % deflection mandrel shall be pulled through the entire pipe length by hand, without mechanical assistance.

8. All sanitary, storm, or combined sewer shall also be visually inspected by Lamping Method.

9. Attached is a test form to be submitted to the *JCMUA*.

ARTICLE VIII. ACCEPTANCE OF NEW SEWER SYSTEM

Prior to acceptance by the JCMUA, the Applicant's Engineer will certify to the JCMUA, and the State, where necessary, that all plans and specifications were prepared in accordance with the JCMUA's Rules and Regulations and with the requirements of the NJDEP, that actual construction costs were not significantly different from the originally submitted cost estimates and that the construction has been in conformance with the approved plans and specifications.

It should be noted that the sewer lateral from the first clean-out at the street onto a private property belongs to the property owner. The property owner has the sole responsibility of maintenance and repair of that section of sewer lateral.

SECTION 8.01 RECORD DRAWINGS AND MANUALS

Upon completion of construction and prior to JCMUA acceptance of the new sewer system, complete As-Built Drawings and/or Manuals must be submitted to the JCMUA. They must be signed and sealed by a New Jersey Licensed Professional Engineer or Land Surveyor. They must meet all the requirements of the JCMUA's "Submission of Record Drawings for Extension of Water/Sewer Mains and other Water/Wastewater Facilities," current revision, which can be found in Appendix V.

The applicant shall also provide for each connection to this system data including depth at clean out, length of lateral from cleanout to main, stationing, upstream and downstream manhole data and location by triangulation of all cleanout and tee-wye.

This submission MUST include a digital rendering using a current version of the AutoCAD format.

Prior to receiving water meter approval, the Developer/Owner/Contractor/Engineer shall have submitted and received approval of as-builts both electronic (AUTO CAD) and paper for sanitary sewer, storm sewers and water main from JCMUA. Additionally, when applicable, the WQM-005 for sewers and construction certification shall be submitted to JCMUA prior to issuance and release of water meters.

SECTION 8.02 EASEMENTS

After construction and before final acceptance by the Authority, the applicant shall furnish one (1) reproducible and two (2) prints (blue and white) of maps together with metes and bounds descriptions for each easement to be deeded to the Authority. Maps shall be sealed by a licensed land surveyor. The applicant shall also provide the Authority with a properly executed Deed of Conveyance for the easements to be conveyed to the Authority in form recordable in the office of the Hudson County Clerk.

SECTION 8.03 CERTIFICATIONS AND PERMITS

The applicant must provide the JCMUA with all applicable certifications/permits from any municipal, state or federal agency that may be required.

SECTION 8.04 MAINTENANCE BOND

Upon completion of the new sewer system, the applicant must post a Maintenance Bond for an amount equal to 15% of the Total Construction Cost. The Maintenance Bond must guarantee satisfactory performance of the system for a period of 730 Calendar Days.

SECTION 8.05 SEWER SYSTEM ACCEPTANCE

Upon receipt and approval of the above listed items in Section 7.01 through Section 7.04, the Authority will:

A. Release the applicant from the Performance Bond.
    a. Replaced with the Maintenance Bond listed above.

B. Accept the title to **all** lands, easements, structures, appurtenances and improvements.

C. Assume the operation and maintenance of the system thereafter.

ARTICLE IX. WASTE DISCHARGE REQUIREMENTS

SECTION 9.01 INDUSTRIAL WASTES

All industrial users must apply to the Passaic Valley Sewerage Commission in Newark, NJ to obtain an industrial permit, if required, prior to final approval by the JCMUA. If the user is exempt from said permit, a copy of the correspondence stating such exemption must be submitted.

SECTION 9.02 RESIDENTIAL AND COMMERCIAL WASTES

All residential and commercial discharges must comply with Passaic Valley Sewerage Commission's Pretreatment Regulations. The JCMUA also reserves the right to enforce these standards by separately adopted JCMUA resolution.

SECTION 9.03 PROHIBITED WASTES

No person shall discharge or cause to be discharged any storm water, surface water, ground water, roof runoff, subsurface drainage or discharge from a sump pump into any sanitary interceptor sewer. No person shall discharge or cause to be discharged any prohibited waste as outlined by PVSC regulations.

SECTION 9.04 GREASE

No person shall discharge Grease, Fats, and oils directly to any storm water, sanitary sewer, combined sewer without a Grease trap.

Grease traps shall be required on all establishments handling, managing, preparing, disposing of: food products, food, animal food, grease or renderings, animal waste or plant material.

Food handling shall be considered as: preparation of foods, packing of foods, distribution of packaged foods, on-site cooking/baking/frying/or other method, washing of utensils used in context of food. These types of establishments shall include: coffee shops, fast food, ethnic food restaurants, diners, bakeries, factories, bodegas, delicatessens, supermarkets, rendering plants, oil processing and all other similar businesses.

The trap shall be constructed such that greases and oils are collected and removed from the sanitary flow before entering combined sewer system or sanitary sewer.

Food establishments shall submit to JCMUA, monthly invoices for grease trap cleaning and grease/oil as removed by grease/oil handling firm.

Traps shall be constructed of durable materials capable of sanitary service without leakage. Trap arrangement shall be installed in conformance with National Plumbing Code, Jersey City Plumbing requirements, Passaic Valley Sewerage Commission requirements and NJDEP.

Where the JCMUA is required to clean sewers to remove grease blockage due to grease and/or oils being discharged by a business into the system without a grease trap in place, the business owner shall be billed the costs related to the cleaning. Those costs shall include: all labor (3 workers), 1 Superintendent, 1 jet vacuum truck, 1 superintendent truck. The Laborers' arrival at Westside Plant shall be billed at a minimum of two (2) hours, up to the total time taken, to the nearest hour after work is completed, including emptying of truck at the East Side Plant and returning to the West Side Plant. Minimum rate per Laborer is $35.00/hour; per Superintendent is $60.00/hour. Vacuum Truck is billed at $150.00/hour and Superintendent truck at $15.00/hour. The Superintendent shall

be billed from the time call is received to the time the Superintendent returns to the West Side Plant.

ARTICLE X. USE OF SEWER SYSTEM

SECTION 10.01 USE BY JCMUA

During any construction and before final acceptance, the JCMUA shall have the right to use any portion of the system completed without waiving their right to order correction of any defects upon final completion.

SECTION 10.02 UNAUTHORIZED USE

Discharge of any non-approved commercial, residential or industrial waste into the system is strictly prohibited

ARTICLE XI. COMPLIANCE WITH RULES AND REGULATIONS

SECTION 11.01 GENERAL

The applicant MUST comply with ALL of the Rules and Regulations as set forth herein. Failure to do so will result in a stop work order directive by the JCMUA.

The applicant shall exercise ALL construction constraints to be required to conform to the New Jersey Department of Environmental Protection (NJDEP).

SECTION 11.02 NONCOMPLIANCE

The JCMUA reserves the right to refuse to any applicant the privilege of connecting o the Authority's system, or to compel discontinuance of use of a sewer, or to compel the pretreatment of wastes as per PVSC regulations at any time, in order to prevent discharge of wastes into the sewerage system which are deemed to be harmful to the system, treatment process or operating personnel.

EXHIBIT C

WORKER TRAINING MANUAL FOR MANAGING CONTAMINATED SOILS AND GROUNDWATER

(ATTACHED)

WORKER TRAINING MANUAL
FOR MANAGING CONTAMINATED SOILS AND GROUNDWATER

HONEYWELL SITES
JERSEY CITY, NEW JERSEY

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DECEMBER 2014;
UPDATED JANUARY 2017

TABLE OF CONTENTS

This Worker Training Manual is hereby approved by the following parties.

Honeywell - Global Remediation Director	4/5/17 Date
Jersey City Municipal Utilities Authority - Senior Engineer	3/28/17 Date

1.0 INTRODUCTION

This document presents a Worker Training Manual (Manual) for sewer sites located in Jersey City, New Jersey, for which Honeywell has responsibility for remediation of chromium-impacted fill (referred to herein as "sewer sites" or "sites"). Portions of the sites may contain chromium ore processing residue (COPR) historically used as fill material.

This Manual was prepared by Honeywell to assist the Jersey City Municipal Utilities Authority (JCMUA) with protection and training of workers who potentially may be exposed to COPR, chromium-impacted soils or groundwater in conjunction with utility or other subsurface work performed at the sites, and provides steps for the identification and coordination of work with Honeywell.

This Manual:

- Identifies health and safety requirements for workers who maintain, repair or replace utilities or conduct other ground intrusive activities (e.g., digging, drilling, excavation) in areas of COPR and/or chromium contaminated fill.
- Provides a basis for worker awareness and training to inform workers of potential hazards associated with chromium-impacted media.
- Addresses identification and coordination of work with Honeywell.

This Manual supplements a Standard Operating Procedure (SOP) for coordinating work within chromium soils, which has been developed by Honeywell in cooperation with the JCMUA. The SOP addresses coordination of work between the JCMUA and Honeywell at the sites. The coordination covers notification, response, and handling and disposal of chromium soils in conjunction with sewer work at the sites. Site information and maps are provided with the SOP.

This Manual is organized into the following sections:

Section 1 – Introduction: identifies the purpose and scope of the Manual.

Section 2 – Site Background: includes site information including regulatory background, remediation phase, engineering and institutional controls

Section 3 – Hazard Evaluation: provides general information on potential health hazards associated with chromium.

Section 4 – Health and Safety Requirements: identifies applicable health and safety requirements for workers.

Section 5 – Coordination of Work: addresses coordination of work between the JCMUA and Honeywell including management and disposal of chromium-impacted materials in connection with utility work.

JCMUA employees may perform sewer maintenance and repair work for projects up to depths of approximately 20 feet below grade. For emergency sewer work and excavation to depths greater than 20 feet below grade, work is typically performed by JCMUA contractors. Additionally, the JCMUA has entered into a long-term agreement with United Water for operation and maintenance of its water systems. Accordingly, any reference to the JCMUA in terms of operation and maintenance of its water system shall be interpreted as including United Water, its contractors and employees. Similarly, any mention of Honeywell in this document includes its contractors and consultants.

This Worker Training Manual focuses on work performed by JCMUA and their contractors; however, it may also be used by other parties as a guide for other workers who may be doing utility or other subsurface work on the sites. Other potential users of the manual may include the following utilities and their contractors: Public Service Electric and Gas Company (PSE&G), Comcast, Verizon, and SUEZ North America (formerly United Water).

It is essential that all existing and future remedial measures and engineering controls (e.g. capping systems) are not compromised by utility or other subsurface work. Deed notice documents contain specific requirements pertaining to notification, disturbance and repair of engineering controls.

2.0 SITE BACKGROUND

Pursuant to a Consent Judgment between the NJDEP et al. and Honeywell et al., dated September 7, 2011 (Consent Judgment), Honeywell has responsibility for the investigation and remediation of designated sewer sites in accordance with a NJDEP approved Sewer Protocol, which includes requirements for developing procedures to identify when sewer sites are scheduled for repair, emergency utility repair procedures, training for utility workers on recognition of chromium materials and appropriate steps for worker protection.

The SOP for Coordinating Utility Work within Chromium Soils identifies Honeywell-assigned sewer sites and contains site maps and a summary table with information on ownership, address, and tax parcel information. The majority of sites are currently in the remedial investigation phase. Additional remedial investigation work to assess chromium impacts in soils and groundwater will be conducted and documented in Remedial Investigation Reports pursuant to Honeywell's Master Schedule for chromium sites approved by the NJDEP. Refer to the SOP for site maps and further information about the sites.

Chromium-contaminated fill (also referred to as chromite ore processing residue or COPR) was historically used as construction fill at various sites in Hudson County, New Jersey, including portions of sewer pipelines in Jersey City. The presence of chromium impacts or fill may be indicated as gray-black granular material, yellow-green colored staining, reddish-brown nodules in soils, green-gray mud, or extremely hard layers of dark brown soil. Chromium-impacted groundwater may be indicated by yellow-green colored water. Fill soils may also contain other contaminants that are commonly associated with historic fill and unrelated to chromium fill, such as polycyclic aromatic hydrocarbons (PAHs) and metals.

3.0 HAZARD EVALUATION

This section provides information on chromium, including health and safety information and general assessment of potential hazards and health and safety concerns for work on sites where COPR fill or chromium-impacted media such as soils or groundwater are present.

Chromite ore processing residue (COPR) is a by-product of the extraction process of chromium from its ore. COPR is typically a grayish-black colored granular material and may also be indicated by the presence of yellow to green colored staining, reddish-brown nodules, or hard layers of reddish-brown material. COPR contains both hexavalent and trivalent chromium in a complex mineral matrix and may be caustic, i.e., highly alkaline with pH values typically greater than 11.

Potential chemical hazards associated with sewer repair and/or replacement work or disturbance of remedial measures and engineering controls at the sites may include the presence of chromium and hexavalent chromium in fill soils and groundwater. Chromium-impacted soil (also referred to as "chromium soils") refers to soils containing hexavalent chromium above the NJDEP soil criteria, currently 20 milligrams per kilogram (mg/kg or parts per million [ppm]). Chromium-impacted groundwater refers to groundwater containing chromium above the NJDEP groundwater quality standards, currently 70 micrograms per liter (µg/L or parts per billion [ppb] based on total chromium).

Potential chemical exposure pathways include:

- Inhalation of airborne dusts and mists that may contain contaminated particulates
- Skin and eye contact and absorption due to direct contact with contaminated soil sediment, and/or liquids
- Incidental ingestion of contaminated soils, liquids, and/or particulates

Potential exposure to chromium contamination could occur by construction or utility workers performing ground intrusive activities (e.g., drilling, digging, excavation). Only properly trained and equipped personnel should be allowed to perform tasks

that may involve the handling of known or suspected contaminated media. Worker training requirements are included in Section 4.

In the event of any inadvertent disturbance to any existing engineering controls or underlying chromium soils by workers who are not properly trained, workers are advised to stop work, cover and secure the area using appropriate measures (e.g., plastic sheeting, traffic cones or barrier) and notify appropriate site management personnel (JCMUA or other applicable party). On-going work would then be coordinated with Honeywell with respect to the management of chromium-contaminated materials and restoration of any engineering controls (see Section 5 for coordination of work).

The following fact sheets with information on chromium, potential health hazards, and precautions to prevent exposure are provided in **Appendix A**:

- Agency for Toxic Substance and Disease Registry (ATSDR) Fact Sheet on Chromium
- Occupational Safety and Health Administration (OSHA) Fact Sheet on Health Effects of Hexavalent Chromium
- New Jersey Department of Health and Senior Services (DHSS) Right to Know Hazardous Substance Fact Sheet

Representative photographs of COPR fill are provided for reference in **Appendix B**.

4.0 HEALTH AND SAFETY REQUIREMENTS

This section presents health and safety requirements and programs for workers who may be potentially exposed to hazardous substances including hexavalent chromium. These programs include worker training, medical monitoring, respiratory protection, and hazard communication. Applicable regulations include OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) requirements at 29 Code of Federal Regulations (CFR) Section 1926.65 and the Hexavalent Chromium Standard (29 CFR 1926.1126; Construction Industry Standard). A summary of worker training requirements for hazardous waste sites and hexavalent chromium is presented on **Table 1**.

The training requirements in this section are applicable to workers who could be exposed to chromium-contaminated materials and are to be addressed by the employer of the person performing the work. These requirements do not apply to work that does not involve potential exposure to contaminants, such as non-intrusive work or work limited to clean cover soils above any existing engineering controls (cap).

Prior to work at the sites in areas of known or suspected chromium soils, Honeywell must be notified as indicated in Section 5 to confirm requirements and coordinate removal and/or disposal of chromium soils and restoration of engineering controls, if required in connection with the work. Contractors for JCMUA should incorporate the worker protection requirements of this section into their Health and Safety Plan, which would be prepared and implemented by the site contractors performing the work under OSHA HAZWOPER requirements.

In most cases, JCMUA personnel are not expected to conduct ground intrusive activities (e.g., excavation, digging, drilling) that would involve potential for exposure to chromium soils. It is expected that such activities (if required) would be implemented by contractors for JCMUA who need to be knowledgeable about potential hazards and procedures to be followed when work is conducted in areas of engineering controls. Therefore, the JCMUA and/or other applicable party responsible for conducting work at the sites are obligated to confirm that their personnel and contractors have appropriate training.

Honeywell Training

Honeywell will provide the following training (refer to Section 5 for details):

- Initial and periodic training for JCMUA on this Worker Training Manual including chromium awareness, remedial measures and engineering controls, and procedures for coordination of work with Honeywell

JCMUA and Contractors

The following sections include, but are not necessarily limited to, current OSHA requirements expected to be applicable to work involving potential for exposure to chromium-contaminated soils or groundwater. All parties conducting work at the sites are responsible for complying with current OSHA requirements.

Personnel Training

- OSHA HAZWOPER training is required for field personnel whose job responsibilities cause them to be exposed or have the potential to be exposed to hazardous substances/wastes, in this case, hexavalent chromium. This applies to work involving disturbance of any existing engineering controls and potential exposure to hexavalent chromium at the sites or work within the exclusion zone or regulated area for field work as defined in the site-specific HASP.
- Management and Supervisory Training is required for individuals who manage or supervise personnel engaged in hazardous waste operations.
- Training documentation is required to be maintained by the party conducting the field work. Field work supervisory personnel (i.e., health and safety officer) are responsible for checking training documentation to verify that workers have complete and current documentation.

Preparation of Site Health and Safety Plan

- Potential exposure to contaminants in the soil or groundwater would be addressed as part of a site-specific HASP, which would be prepared and implemented by contractors performing field work under OSHA HAZWOPER requirements.

Medical Monitoring

- Under the OSHA HAZWOPER standard, medical monitoring is required for workers performing field work onsite for more than 30 days per year and exposed to hazardous substances including hexavalent chromium above applicable exposure limits. Medical monitoring requirements would apply to most work situations involving disturbance of engineering controls and potential for exposure to chromium-contaminated soils, to be determined on a case by case basis by the entity performing field work. If required, medical monitoring is provided by the employer of the person performing field work.

Hazard Communication

- OSHA hazard communication requirements govern "hazardous substances" and exclude "hazardous waste." For hazardous waste site work, the OSHA Hazard Communication standard only applies to hazardous chemicals brought to the site (e.g., decontamination fluids), not to the contaminants in the soil or groundwater.
- The hazard communication program is required to be part of the Health and Safety Policy and Procedures Manual and be made available to employees for review. A model hazard communication program can be found at the following OSHA website: *http//www.osha.gov/dsg/hazcom/oshacomplianceassistance.html.*
- Containers of hazardous substances are required to be labeled as to the contents, appropriate hazard warning, and the name and address of the manufacturer. The name on the label must match the name on Material Safety Data Sheets/Globally Harmonized System. Material Safety Data Sheets are obtained from the manufacturer when hazardous substances are purchased to conduct field work, and maintained at the work site for all hazardous substances to be used.

In addition to the above requirements to address work at the sites involving potential exposure to hexavalent chromium, there may be other applicable OSHA training requirements for contractors performing field work. Compliance with such requirements, as for example those pertaining to excavation activities under OSHA 29 CFR 1926.650, is the result of the type of activity undertaken rather than the presence of chromium, thus the JCMUA and their respective contractors must independently evaluate the need to comply with such requirements. All parties

conducting work at the subject sites must check applicability and comply with current OSHA requirements.

5.0 COORDINATION OF WORK

Details regarding coordination of utility work at the sites are contained in the SOP for Coordinating Utility Work within Chromium Soils, which has been developed by Honeywell in cooperation with the JCMUA. Prior to performing any utility maintenance or repair work at the chromium sewer sites, the JCMUA and/or their contractors or other parties conducting work must notify Honeywell and provide information regarding the work location and nature of disturbance (i.e., area and depth of disturbance, timing of work). This information will enable coordination of work, establishing requirements for worker protection, handling and disposal of chromium-impacted media, and repair and restoration of the engineering controls. A summary of worker training requirements for hazardous waste sites and hexavalent chromium is provided for reference on **Table 1.**

As indicated in the SOP, JCMUA is required to notify Honeywell prior to any planned maintenance or emergency repair of sewer pipelines on any of the chromium sewer sites. Deed Notice requirements also specify notification to Honeywell and the NJDEP prior to any activities that will involve the disturbance of engineering controls or remedial measures.

Honeywell has established a telephone notification and response system for use by the JCMUA and/or other parties to notify Honeywell of any activities planned or required on an emergency basis at the sites. The notification and response system facilitates coordination of activities between Honeywell, JCMUA and/or other parties with respect to handling and disposal of contaminated media that may be generated during sewer work at the sites. The notification and response system is an element of the JCMUA work process for sewer work.

The notification system includes a telephone answering service (referred to as the Chromium Response Hotline: **855-727-2658**); this number will also be included in Deed Notice documents for providing notification to Honeywell prior to disturbance of engineering controls. All parties who plan to perform any work that may have the potential to disturb any existing engineering controls and/or cause exposure to chromium-impacted media must notify Honeywell and determine what level of

worker protection is appropriate and if the proposed work activities comply with or are applicable to any existing deed notice requirements.

Standard Operating Procedure for Coordination of Work

Honeywell in cooperation with the JCMUA has developed a Standard Operating Procedure (SOP) for identifying and coordinating work at the chromium sewer sites. The SOP addresses repair or replacement performed as part of planned maintenance work or required as a result of an emergency situation. Prior to performing sewer work, JCMUA will contact the Chromium Response Hotline, which will prompt Honeywell to coordinate field work activities including proper handling and disposal of chromium-contaminated materials with the JCMUA. Refer to the SOP document for further details regarding coordination of work between Honeywell and the JCMUA.

Coordination of Work Between Honeywell, JCMUA and Other Parties

The following steps summarize procedures for coordination of work between Honeywell, JCMUA or other parties performing subsurface work at the sites:

1. JCMUA or other party identifies work project (e.g., sewer/utility repair or replacement) at the chromium sewer sites.

2. JCMUA or other party notifies Honeywell of the planned work location and the estimated schedule/timing for completion of work.

3. For emergency situations where work needs to be done before a determination can be made on whether the work location is in an area of chromium soils, JCMUA's contractor will proceed with work using properly trained workers (i.e., OSHA 40-hour HAZWOPER training) and Honeywell will provide technical assistant and field support (to be determined in cooperation with JCMUA). For non-emergency situations, Honeywell determines whether or not the proposed work location is within an area of chromium soils and provides confirmation to the JCMUA and/or other applicable party. If the work location is confirmed to be in an area of chromium soils, then Honeywell coordinates with the JCMUA or other party regarding response and field work activities. If Honeywell determines that the proposed work is not in an area of chromium soils, then JCMUA or other party would proceed with its work without further coordination with Honeywell.

4. Honeywell or other applicable party provides notification to the NJDEP, as may be required in accordance with Deed Notice requirements for disturbance of engineering controls or other regulatory requirements.

5. Honeywell coordinates with JCMUA or other party as needed for performance of field work including the use of qualified contractors for excavation and disposal of chromium-contaminated materials at a facility licensed to accept such materials, backfilling, and site restoration including replacement of any engineering controls. JCMUA's contractor will take the lead in performing field work (with the exception of possibly longer term, planned sewer work). Honeywell will provide technical assistance and field support as needed for documentation and reporting requirements. In some cases, Honeywell's contractor may take the lead in performing field work or a portion of field work (e.g., removal and disposal of chromium contaminated materials, restoration of engineering controls), to be determined on a case by case basis in consultation and cooperation with the JCMUA or other party performing site work.

6. Honeywell prepares an updated chromium soils map and provides a copy to the JCMUA following completion of the work, as applicable.

7. Honeywell or other applicable party prepares and submits a summary report of field work to the NJDEP (with copies provided to the JCMUA) in accordance with Deed Notice or other regulatory requirements.

Training - JCMUA

With respect to training of JCMUA employees, Honeywell will provide training support to the JCMUA as deemed appropriate, and JCMUA will develop and implement a worker training plan based on the requirements outlined in this Worker Training Manual. Honeywell in consultation with the JCMUA has identified the following training needs for JCMUA employees that would be provided by Honeywell (or its designated contractor):

- Chromium Awareness Training - initial and periodic training (every 3 years estimated): estimated 1 to 2 hours and include JCMUA staff with responsibility for performing field work.

- HAZWOPER 40-hour training and annual 8-hour refresher training: estimated to include two JCMUA supervisory employees.

Honeywell will pay for the cost of the training program and the JCMUA would cover the cost for the time for its employees to attend the training.

JCMUA's contractors performing field work on the sites will be required to have applicable health and safety training as indicated in the Worker Training Manual. It is expected that health and safety training requirements for JCMUA contractors will be specified as part of JCMUA's bidding process for sewer work and that contractors will be required to demonstrate appropriate training documentation to the JCMUA prior to performing field work at the sites.

The timing for training will be coordinated in consultation with JCMUA.

TABLE 1

SUMMARY OF WORKER TRAINING REQUIREMENTS

TABLE 1: Summary of Worker Training Requirements
Hazardous Waste Sites and Hexavalent Chromium Standard

Type of Workers	Hexavalent Chromium Standard Awareness Training	40-Hour OSHA Hazwoper Training	24-Hour OSHA Hazwoper Training [1]	On The Job Training	8-hour refresher	8-hour Supervisory	Respiratory Protection	Medical Monitoring [2]	Hazard Communication [3]
Hands On Site Workers (JCMUA, Contractors or Other Parties)	Required for those working in exclusion zone/regulated area who maybe exposed to COPR	Required on hazardous waste sites for site workers. Site workers may potentially be required to wear respirators. This training is recommended for workers who may be directly exposed (direct contact) to COPR or hexavalent chromium. While the use of respiratory protection isn't expected to be required, this would allow the use of respiratory protection should site conditions warrant	Not applicable - superseded by 40-hour training	3 Days	Required annually	Required if directly supervises other workers	Respiratory protection program is required for workers who work on hazardous waste sites	Medical monitoring is required for workers who work on hazardous waste sites. Typically, HAZWOPER physicals also cover medical monitoring requirements under the Hexavalent Chromium Standard (verify with examining physician)	Hazard Communication Program is applicable for chemical usage including any chemicals brought onsite for use during site work.
Supervisory Type Personnel (JCMUA, Contractors or Other Parties)	Required for those working in exclusion zone/regulated area who maybe exposed to COPR or hexavalent chromium	Not required	Minimum Training allowable for working on hazardous waste sites and typically does not include in-depth coverage of respiratory protection and level C and B personal protection equipment. Cannot be used if respiratory protection will be required.	1 Day	Required annually	Required if directly supervises other workers	These types of workers are unlikely to be exposed to levels above the PEL/TLV therefore, the need for respiratory protection is not likely to be required	Workers are not expected to be exposed to elevated levels above the PEL/TLV, medical monitoring is not likely required under the OSHA Standard	Hazard Communication Program is applicable for chemical usage including any chemicals brought onsite for use during site work.

This table is provided for reference purposes; all parties conducting work at the subject sites are responsible to verify applicability and comply with current OSHA requirements, as applicable.

[1] Workers who have only received 24-hour of initial training who then need to wear a respirator will first be required to complete an additional 16 hour of classroom training and two additional days of on the job training and be enrolled in a medical monitoring program. If use of respirator is likely, then worker should receive 40-hours of initial training.

[2] Medical monitoring is required under the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard (29 CFR 1926.65) and the Hexavalent Chromium Standard (29 CFR 1926.1126) if on site more than 30 days per year and exposed to hazardous waste or hexavalent chromium above applicable exposure limits (PEL/TLVs). In addition, medical clearance is required prior to wearing a respirator (29 CFR 1910.134). *If required, medical exams include baseline physicals, periodic exams (typically annually), and exit physicals. The content and frequency of medical exams must be determined in consultation with the JCMUA's medical consultant/physician; typical medical exam requirements include: occupational/medical history, physical exam, blood/urine test, ability to wear PPE (e.g., pulmonary function testing, EKG), and baseline monitoring based on potential onsite exposure to particular contaminants (e.g., hexavalent chromium). For further information, refer to OSHA Guidance Manual for Hazardous Waste Site Activities at http://www.cdc.gov/niosh/85-115.html*

[3] Hazard Communication is applicable to hazardous substances such as any chemical brought onsite for use during site work. For work on hazardous waste sites, a Site Health and Safety Plan would be required to be prepared and implemented by the site remediation contractor to address potential exposure to contaminated soils and/or groundwater. *For more information, refer to the OSHA Hazard Communication Standard at http://www.osha.gov/dsg/hazcom/oshacomplianceassistance.html*

APPENDIX A

FACT SHEETS: CHROMIUM INFORMATION AND POTENTIAL HEALTH HAZARDS

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

CHROMIUM

CAS # 7440-47-3

Division of Toxicology and Environmental Medicine ToxFAQs™ September 2008

This fact sheet answers the most frequently asked health questions (FAQs) about chromium. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to chromium occurs from ingesting contaminated food or drinking water or breathing contaminated workplace air. Chromium(VI) at high levels can damage the nose and cause cancer. Ingesting high levels of chromium(VI) may result in anemia or damage to the stomach or intestines. Chromium(III) is an essential nutrient. Chromium has been found in at least 1,127 of the 1,669 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is chromium?

Chromium is a naturally occurring element found in rocks, animals, plants, and soil. It can exist in several different forms. Depending on the form it takes, it can be a liquid, solid, or gas. The most common forms are chromium(0), chromium(III), and chromium(VI). No taste or odor is associated with chromium compounds.

The metal chromium, which is the chromium(0) form, is used for making steel. Chromium(VI) and chromium(III) are used for chrome plating, dyes and pigments, leather tanning, and wood preserving.

What happens to chromium when it enters the environment?

❑ Chromium can be found in air, soil, and water after release from the manufacture, use, and disposal of chromium-based products, and during the manufacturing process.
❑ Chromium does not usually remain in the atmosphere, but is deposited into the soil and water .
❑ Chromium can easily change from one form to another in water and soil, depending on the conditions present.
❑ Fish do not accumulate much chromium in their bodies from water.

How might I be exposed to chromium?

❑ Eating food containing chromium(III).
❑ Breathing contaminated workplace air or skin contact during use in the workplace.
❑ Drinking contaminated well water.
❑ Living near uncontrolled hazardous waste sites containing chromium or industries that use chromium.

How can chromium affect my health?

Chromium(III) is an essential nutrient that helps the body use sugar, protein, and fat.

Breathing high levels of chromium(VI) can cause irritation to the lining of the nose, nose ulcers, runny nose, and breathing problems, such as asthma, cough, shortness of breath, or wheezing. The concentrations of chromium in air that can cause these effects may be different for different types of chromium compounds, with effects occurring at much lower concentrations for chromium(VI) compared to chromium(III).

The main health problems seen in animals following ingestion of chromium(VI) compounds are irritation and ulcers in the stomach and small intestine and anemia. Chromium(III) compounds are much less toxic and do not appear to cause these problems.

Sperm damage and damage to the male reproductive system have also been seen in laboratory animals exposed to chromium(VI).

Skin contact with certain chromium(VI) compounds can cause skin ulcers. Some people are extremely sensitive to chromium(VI) or chromium(III). Allergic reactions consisting of severe redness and swelling of the skin have been noted.

How likely is chromium to cause cancer?

The Department of Health and Human Services (DHHS), the International Agency for Reseach on Cancer (IARC), and the EPA have determined that chromium(VI) compounds are known human carcinogens. In workers, inhalation of chromium(VI) has been shown to cause lung cancer. Chromium(VI) also causes lung cancer in animals. An increase in stomach tumors was observed in humans and animals exposed to chromium(VI) in drinking water.

How can chromium affect children?

It is likely that health effects seen in children exposed to high amounts of chromium will be similar to the effects seen in adults.

We do not know if exposure to chromium will result in birth defects or other developmental effects in people. Some developmental effects have been observed in animals exposed to chromium(VI).

How can families reduce the risks of exposure to chromium?

❑ Children should avoid playing in soils near uncontrolled hazardous waste sites where chromium may have been discarded.

❑ Chromium is a component of tobacco smoke. Avoid smoking in enclosed spaces like inside the home or car in order to limit exposure to children and other family members.

❑ Although chromium(III) is an essential nutrient, you should avoid excessive use of dietary supplements containing chromium.

Is there a medical test to determine whether I've been exposed to chromium?

Since chromium(III) is an essential element and naturally occurs in food, there will always be some level of chromium in your body. Chromium can be measured in hair, urine, and blood.

Higher than normal levels of chromium in blood or urine may indicate that a person has been exposed to chromium. However , increases in blood and urine chromium levels cannot be used to predict the kind of health effects that might develop from that exposure.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to chromium in drinking water at concentrations of 1 mg/L for up to 10 days is not expected to cause any adverse effects in a child.

The FDA has determined that the chromium concentration in bottled drinking water should not exceed 1 mg/L.

The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to an average of 0.005 mg/m^3 chromium(VI), 0.5 mg/m^3 chromium(III), and 1.0 mg/m^3 chromium(0) for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for Chromium (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmenta l quality department if you have any more questions or concerns.

OSHA FactSheet

Health Effects of Hexavalent Chromium

Hexavalent chromium is a toxic form of the element chromium. Hexavalent chromium compounds are man-made and widely used in many different industries.

Some major industrial sources of hexavalent chromium are:

- chromate pigments in dyes, paints, inks, and plastics
- chromates added as anti-corrosive agents to paints, primers and other surface coatings
- chrome plating by depositing chromium metal onto an item's surface using a solution of chromic acid
- particles released during smelting of ferro-chromium ore
- fume from welding stainless steel or nonferrous chromium alloys
- impurity present in portland cement.

How hexavalent chromium can harm employees

Workplace exposure to hexavalent chromium may cause the following health effects:

- lung cancer in workers who breathe airborne hexavalent chromium
- irritation or damage to the nose, throat, and lung (respiratory tract) if hexavalent chromium is breathed at high levels
- irritation or damage to the eyes and skin if hexavalent chromium contacts these organs in high concentrations.

How hexavalent chromium affects the nose, throat and lungs

Breathing in high levels of hexavalent chromium can cause irritation to the nose and throat. Symptoms may include runny nose, sneezing, coughing, itching and a burning sensation.

Repeated or prolonged exposure can cause sores to develop in the nose and result in nosebleeds. If the damage is severe, the nasal septum (wall separating the nasal passages) develops a hole in it (perforation).

Breathing small amounts of hexavalent chromium even for long periods does not cause respiratory tract irritation in most people.

Some employees become allergic to hexavalent chromium so that inhaling chromate compounds can cause asthma symptoms such as wheezing and shortness of breath.

How hexavalent chromium affects the skin

Some employees can also develop an allergic skin reaction, called allergic contact dermatitis. This occurs from handling liquids or solids containing hexavalent chromium. Once an employee becomes allergic, brief skin contact causes swelling and a red, itchy rash that becomes crusty and thickened with prolonged exposure. Allergic contact dermatitis is long-lasting and more severe with repeated skin contact.

Direct skin contact with hexavalent chromium can cause a non-allergic skin irritation. Contact with non-intact skin can also lead to chrome ulcers. These are small crusted skin sores with a rounded border. They heal slowly and leave scars.

How employees can be exposed to hexavalent chromium

Employees can inhale airborne hexavalent chromium as a dust, fume or mist while:

- producing chromate pigments and powders; chromic acid; chromium catalysts, dyes, and coatings
- working near chrome electoplating
- welding and hotworking stainless steel, high chrome alloys and chrome-coated metal
- applying and removing chromate-containing paints and other surface coatings.

Skin exposure can occur during direct handling of hexavalent chromium-containing solutions, coatings, and cements.

Steps OSHA has taken to protect employees from health hazards caused by hexavalent chromium

The new OSHA workplace standard requires employers to:

- limit eight-hour time-weighted average hexavalent chromium exposure in the workplace to 5 micrograms or less per cubic meter of air.
- perform periodic monitoring at least every 6 months if initial monitoring shows employee exposure at or above the action level (2.5 micrograms per cubic meter of air calculated as an 8-hour time-weighted average).
- provide appropriate personal protective clothing and equipment when there is likely to be a hazard present from skin or eye contact.
- implement good personal hygiene and housekeeping practices to prevent hexavalent chromium exposure.
- prohibit employee rotation as a method to achieve compliance with the exposure limit (PEL).
- provide respiratory protection as specified in the standard.
- make available medical examinations to employees within 30 days of initial assignment, annually, to those exposed in an emergency situation, to those who experience signs or symptoms of adverse health effects associated with hexavalent chromium exposure, to those who are or may be exposed at or above the action level for 30 or more days a year, and at termination of employment.

For more complete information:

OSHA Occupational Safety and Health Administration

U.S. Department of Labor

www.osha.gov

(800) 321-OSHA

DSG 7/2006

Right to Know
Hazardous Substance Fact Sheet

Common Name: **CHROMIUM**

Synonyms: Chrome; Metallic Chromium

Chemical Name: Chromium

Date: January 2000 Revision: March 2009

CAS Number: 7440-47-3

RTK Substance Number: 0432

DOT Number: UN 3089

EMERGENCY RESPONDERS >>>> SEE LAST PAGE

Description and Use

Chromium is a hard, gray, odorless solid with a metallic luster. It is used in stainless and alloy steels, in making alloys, and as an isotope in medicine and research.

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	2	-
FLAMMABILITY	3	-
REACTIVITY	0	-
FLAMMABLE POWDER POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

Reasons for Citation

- **Chromium** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, DEP, IARC and EPA.
- This chemical is on the Special Health Hazard Substance List.

- **Chromium** can affect you when inhaled.
- Contact can irritate and burn the skin and eyes with possible eye damage.
- Inhaling **Chromium** can irritate the nose and throat.
- Exposure to **Chromium** *fumes* can cause a flu-like illness called *metal fume fever.*
- **Chromium** may cause a skin allergy and an asthma-like allergy
- Inhaling **Chromium** can cause a sore and/or a hole in the "bone" (septum) dividing the inner nose.
- **Chromium** may affect the liver and kidneys.
- **Chromium** in *powder* form is FLAMMABLE and a DANGEROUS FIRE HAZARD. It may also spontaneously explode in air.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact
- Immediately flush with large amounts of water for at least 30 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention.

Skin Contact
- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Inhalation
- Remove the person from exposure
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **1 mg/m^3** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **0.5 mg/m^3** averaged over a 8-hour workshift.

ACGIH: The threshold limit value (TLV) is **0.5 mg/m^3** averaged over an 8-hour workshift.

Determining Your Exposure

- Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to **Chromium**:

- Contact can irritate and burn the skin and eyes with possible eye damage.
- Inhaling **Chromium** can irritate the nose and throat causing coughing and wheezing.
- Exposure to **Chromium** *fumes* can cause *"metal fume fever."* This is a flu-like illness with symptoms of metallic taste in the mouth, headache, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to **Chromium** and can last for months or years:

Cancer Hazard
- While **Chromium** has been tested, it is not classifiable as to its potential to cause cancer.

Reproductive Hazard
- There is no evidence that **Chromium** affects reproduction. This is based on test results presently available to the NJDHSS from published studies.

Other Effects
- Inhaling **Chromium** can cause a sore and/or a hole in the "bone" (septum) dividing the inner nose, sometimes with bleeding, discharge, and/or formation of a crust.
- **Chromium** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
- **Chromium** may cause an asthma-like allergy. Future exposure can cause asthma attacks with shortness of breath, wheezing, coughing, and/or chest tightness.
- Prolonged skin contact can cause burns, blisters and deep ulcers
- **Chromium** may affect the liver and kidneys.

Medical

Medical Testing
For frequent or potentially high exposure (half the TLV or greater), the following are recommended before beginning work and at regular times after that:

- Lung function tests. The results may be normal if the person is not having an attack at the time of the test.

If symptoms develop or overexposure is suspected, the following are recommended:

- Examine your skin periodically for little bumps or blisters, the first sign of "chrome ulcers." If not treated early, these can last for years after exposure.
- Evaluation by a qualified allergist can help diagnose skin allergy.
- Liver and kidney function tests

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures
- Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.
- More than light alcohol consumption can cause liver damage. Drinking alcohol can increase the liver damage caused by **Chromium**.

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- Label process containers.
- Provide employees with hazard information and training.
- Monitor airborne chemical concentrations.
- Use engineering controls if concentrations exceed recommended exposure levels.
- Provide eye wash fountains and emergency showers.
- Wash or shower if skin comes in contact with a hazardous material.
- Always wash at the end of the workshift.
- Change into clean clothing if clothing becomes contaminated.
- Do not take contaminated clothing home.
- Get special training to wash contaminated clothing.
- Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- Before entering a confined space where **Chromium** *powder* may be present, check to make sure that an explosive concentration does not exist.
- Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- Avoid skin contact with **Chromium**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- Safety equipment manufacturers recommend Nitrile and Natural Rubber for gloves, and Tyvek®, or the equivalent, as a protective material for clothing.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Wear eye protection with side shields or goggles.
- If additional protection is needed for the entire face, use in combination with a face shield. A face shield should not be used without another type of eye protection.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- Where the potential exists for exposure over **0.5 mg/m^3**, use a NIOSH approved negative pressure, air-purifying, particulate filter respirator with an N, R or P95 filter. More protection is provided by a full facepiece respirator than by a half-mask respirator, and even greater protection is provided by a powered-air purifying respirator.
- Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Chromium**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- Where the potential exists for exposure over **5 mg/m^3**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- Exposure to **250 mg/m^3** is immediately dangerous to life and health. If the possibility of exposure above **250 mg/m^3** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- Extinguish fire using an agent suitable for type of surrounding fire. **Chromium** itself does not burn.
- **Chromium** in *powder* form is FLAMMABLE and a DANGEROUS FIRE HAZARD. It may also spontaneously explode in air.
- Use dry sand or dry chemical extinguishing agents to fight **Chromium** *powder* fires.
- POISONOUS GASES ARE PRODUCED IN FIRE.
- CONTAINERS MAY EXPLODE IN FIRE.
- DO NOT get water inside container.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Chromium** *powder* is spilled, take the following steps:

- Evacuate personnel and secure and control entrance to the area.
- Eliminate all ignition sources.
- Moisten spilled material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal.
- Keep **Chromium** *powder* out of confined spaces, such as sewers, because of the possibility of an explosion.
- Ventilate and wash area after clean-up is complete.
- DO NOT wash into sewer.
- It may be necessary to contain and dispose of **Chromium** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **Chromium** you should be trained on its proper handling and storage.

- **Chromium** may react violently or explosively with AMMONIUM NITRATE; CARBON DIOXIDE ATMOSPHERES; BROMINE PENTAFLUORIDE; LITHIUM; NITROGEN OXIDES; and SULFUR DIOXIDE.
- **Chromium** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); STRONG ACIDS (such as HYDROCHLORIC and SULFURIC); and ALKALI METALS (such as SODIUM and POTASSIUM).
- Store in tightly closed containers in a cool, well-ventilated area.
- Sources of ignition, such as smoking and open flames, are prohibited where **Chromium** *powder* is used, handled, or stored.

Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health & Senior Services
Right to Know Program
PO Box 368
Trenton, NJ 08625-0368
Phone: 609-984-2202
Fax: 609-984-7407
E-mail: rtk@doh.state.nj.us
Web address: http://www.nj.gov/health/eoh/rtkweb

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Acute Exposure Guideline Levels (AEGLs) are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

Emergency Response Planning Guideline (ERPG) values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

LEL or **Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

Protective Action Criteria (PAC) are values established by the Department of Energy and are based on AEGLs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.

Right to Know Hazardous Substance Fact Sheet

Emergency Responders Quick Reference

Common Name: **CHROMIUM**

Synonyms: Chrome; Metallic Chromium
CAS No: 7440-47-3
Molecular Formula: Cr
RTK Substance No: 0432
Description: Hard, gray, odorless solid with a metallic luster

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
2 - Health **3 - Fire** **0 - Reactivity** **DOT#:** UN 3089 **ERG Guide #:** 170 **Hazard Class:** 4.1 (Flammable Solid)	Extinguish fire using an agent suitable for type of surrounding fire. **Chromium** itself does not burn. **Chromium** in *powder* form is FLAMMABLE and a DANGEROUS FIRE HAZARD. It may also spontaneously explode in air. Use dry sand or dry chemical extinguishing agents to fight **Chromium** *powder* fires. POISONOUS GASES ARE PRODUCED IN FIRE. CONTAINERS MAY EXPLODE IN FIRE. DO NOT get water inside container.	**Chromium** may react violently or explosively with AMMONIUM NITRATE; CARBON DIOXIDE ATMOSPHERES; BROMINE PENTAFLUORIDE; LITHIUM; NITROGEN OXIDES; and SULFUR DIOXIDE. **Chromium** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); STRONG ACIDS (such as HYDROCHLORIC and SULFURIC); and ALKALI METALS (such as SODIUM and POTASSIUM).

SPILL/LEAKS

Isolation Distance:

Spill: 25 meters (75 feet)

Fire: 800 meters (1/2 mile)

Moisten spilled material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal.

Keep **Chromium** *powder* out of confined spaces, such as sewers, because of the possibility of an explosion.

DO NOT wash into sewer.

PHYSICAL PROPERTIES

Odor Threshold:	Odorless
Flash Point:	Noncombustible solid, Flammable *powder*
Vapor Pressure:	<0 mm Hg at 68°F (20°C) (approximate)
Specific Gravity:	7.2 (water = 1)
Water Solubility:	Insoluble
Boiling Point:	4,788°F (2,642°C)
Melting Point:	3,452°F (1,900°C)
Molecular Weight:	52

EXPOSURE LIMITS

OSHA:	1 mg/m^3, 8-hr TWA
NIOSH:	0.5 mg/m^3, 8-hr TWA
ACGIH:	0.5 mg/m^3, 8-hr TWA
IDLH:	250 mg/m^3

The Protective Action Criteria values are:

PAC-1 = 1.5 mg/m^3 PAC-3 = 250 mg/m^3

PAC-2 = 2.5 mg/m^3

PROTECTIVE EQUIPMENT

Gloves:	Nitrile or Natural Rubber
Coveralls:	Tyvek®
Respirator:	>0.5 mg/m^3 - full facepiece APR with High efficiency filters >1.5 mg/m^3 - SCBA

HEALTH EFFECTS

Eyes:	Irritation, burns and possible eye damage
Skin:	Irritation, burns, itching, rash and skin ulcers
Inhalation:	Nose and throat irritation with coughing and wheezing Headache, fever and chills

FIRST AID AND DECONTAMINATION

Remove the person from exposure.

Flush eyes with large amounts of water for at least 30 minutes. Remove contact lenses if worn. Seek medical attention.

Quickly remove contaminated clothing and wash contaminated skin with large amounts of soap and water.

Begin artificial respiration if breathing has stopped and CPR if necessary.

Transfer promptly to a medical facility.

APPENDIX B

REPRESENTATIVE PHOTOGRAPHS
CHROMIUM ORE PROCESSING RESIDUE

CHROMITE ORE PROCESSING RESIDUE (COPR)
EXAMPLE PHOTOS

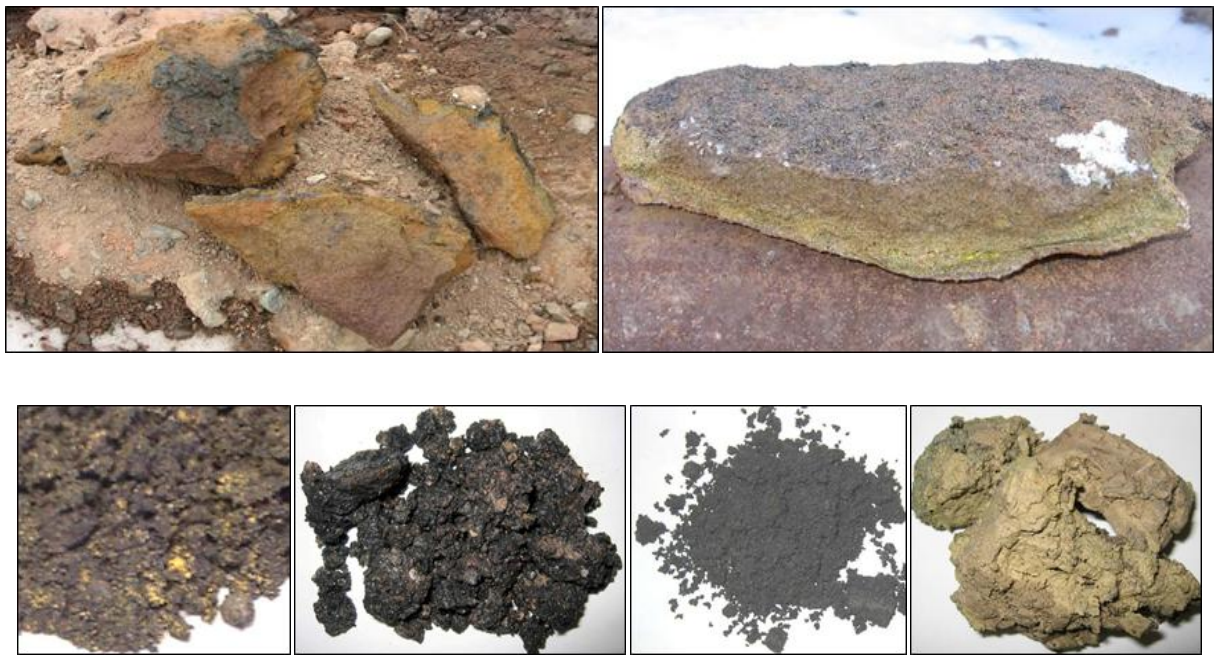


EXHIBIT D

WESTON MEMORANDUM

(ATTACHED)

WESTON SOLUTIONS, INC.
205 CAMPUS DRIVE
EDISON, NEW JERSEY 08837
732-417-5800 • FAX: 732-417-5801

TO: **Ronald J. Riccio (Site Administrator)** **DATE: December 22, 2017**
FROM: **Prabal N. Amin, P.E., LSRP (Weston)**
SUBJECT: **Hudson County Chromate Site 65 Technical Memorandum**

As part of the negotiated settlement, the Parties to the Judicial Consent Order (JCO) defined the boundary and soil remediation limits of Hudson County Chromate (HCC) Site 65 (Burma Road and Morris Pesin Drive) which remains PPG's responsibility, as discussed below. HCC Site 65 constitutes the area from the property line of Site 63 into Burma Road and Morris Pesin Drive and extending to a point 3 feet (ft.) beyond the existing 16-inch water line within Burma Road and Morris Pesin Drive as shown on the survey drawing developed by Maser Consulting, P.A., dated 12/19/17 (See Figure 1 attached). The distance of 3 ft. beyond the existing water line represents the typical width on either side of the water line of an excavated trench, presumed to be a total of 6 ft. wide by 6 ft. deep, required to access, repair or remove/replace the water line.

During any future utility work within HCC Site 65, PPG would be responsible for remediating visible CCPW (e.g., COPR nodules) and visible CCPW impacts (e.g., crystalline chromium "blooms") to a maximum horizontal remediation distance of 10 ft. from the existing water line. Because the aforementioned excavation trench is expected to extend to a depth below the groundwater table, any CCPW impacts encountered at the bottom of the excavation (i.e., depth of 6 ft. below ground surface) would be the responsibility of PPG as part of the HCC Site 63 ongoing groundwater remediation.

The rationale for the maximum horizontal remediation distance of 10 ft. from the existing water line is provided below for both Burma Road and Morris Pesin Drive. It should be noted that soil delineation investigations of Burma Road and Morris Pesin Drive were performed by PPG in June and October of 2015. During these investigations, a total of 59 soil borings were advanced to a depth of 10 ft. and 281 soil samples were collected and analyzed. Of these soil borings, thirty-three were located within approximately 10 ft. of the existing water line.

<u>Burma Road</u>

Historically, visible CCPW was observed under the western shoulder of Burma Road at multiple locations which was subsequently removed during the remedial excavation of HCC Site 63 conducted by PPG. The HCC Site 63 soil remedial excavation progressed into Burma Road in February 2015. Visible CCPW impacts in the form of chromium "blooms" were observed in soils beneath Burma Road during this excavation work. While CCPW impacts have been observed and documented in the western portion of Burma Road during these activities, it is reasonable to conclude that the extent of visible CCPW or visible CCPW impacts in Burma Road is limited to a maximum of 10 ft. from the existing water line based on the following:

1. Visible CCPW was not observed at the terminus of the excavation sidewall cut which, in some areas, extended beyond the water line in Burma Road as part of the HCC Site 63 remedial excavation work. The maximum extent of the excavation beyond the water line

was approximately 10 ft. near the northern end of HCC Site 63. Furthermore, post-excavation samples collected from the excavation sidewalls in this area at this distance indicated that hexavalent chromium concentrations were below the Department's soil criterion of 20 parts per million (ppm).

2. Visible CCPW or visible CCPW impacts were not identified in the series of Burma Road soil borings located approximately 10 ft. east of the existing water line.

3. The magnitude and trends of hexavalent chromium concentrations detected in Burma Road soils are indicative of the soil impacts east of the existing water line being attributed to the emanation of CCPW from HCC Site 63 into Burma Road via groundwater rather than the presence of visible CCPW waste material.

Morris Pesin Drive

During the remedial excavation work conducted by PPG at HCC Site 63, visible CCPW (e.g., COPR nodules) was observed in the excavation sidewall at the boundary of HCC Site 63 along Morris Pesin Drive. The visible CCPW was observed in isolated areas and within approximately 2 ft. below the ground surface. The observed CCPW along Morris Pesin Drive was not removed by PPG during the remedial excavation work due to the proximity of the existing water line. In addition, during the aforementioned delineation investigations performed by PPG in Burma Road and Morris Pesin Drive, chromium "blooms" were observed in soil samples taken from borings drilled in Morris Pesin Drive. While CCPW impacts have been documented in Morris Pesin Drive, it is reasonable to conclude that the extent of visible CCPW in Morris Pesin Drive is limited to a maximum of 10 ft. from the existing water line based on the following:

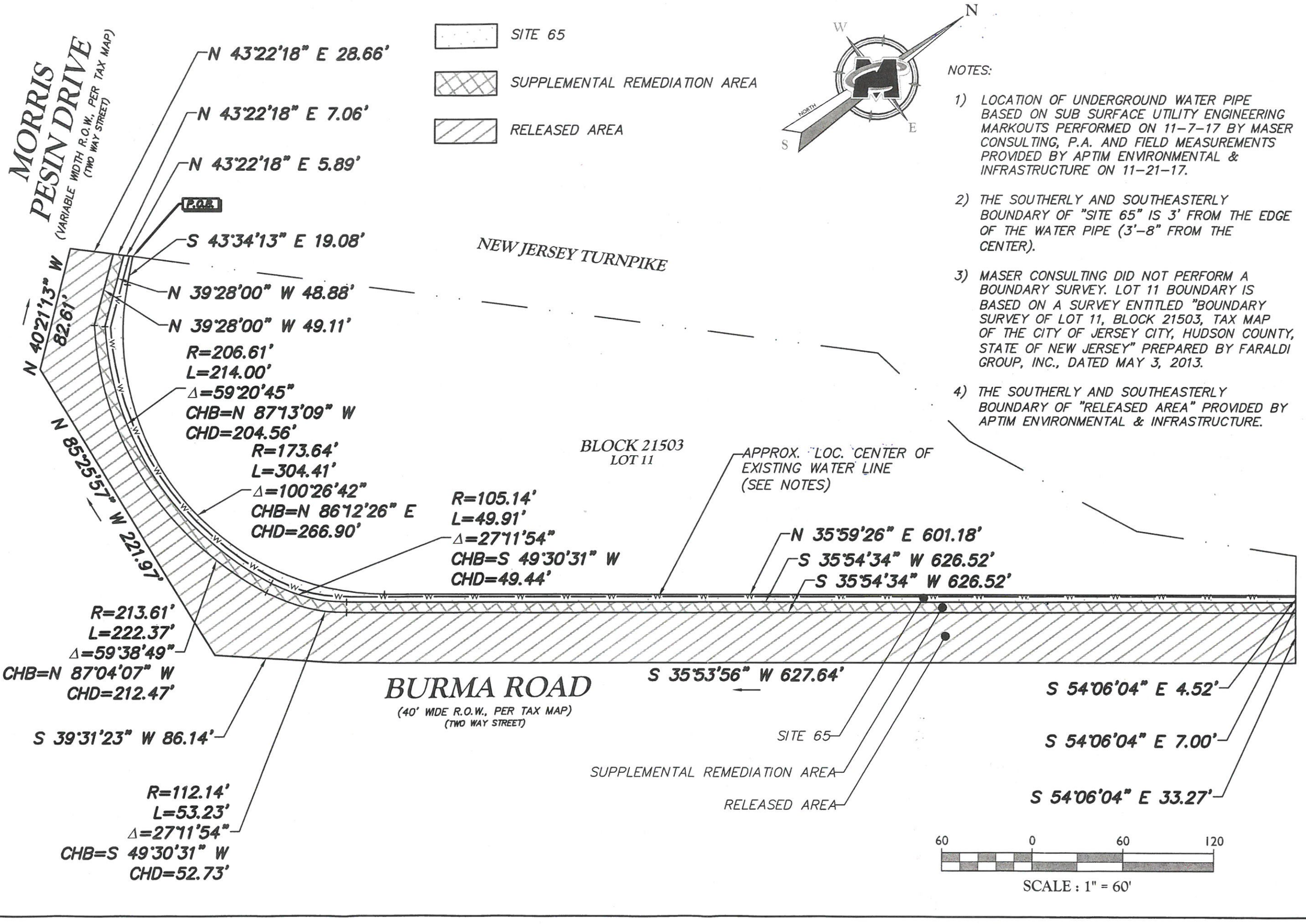
1. Visible CCPW is present in three discontinuous isolated shallow areas within the excavation sidewall.

2. The absence of visible CCPW is supported by data collected from soil borings located approximately 10 ft. from the existing water line.

3. Soil borings located in Morris Pesin Drive indicated that hexavalent chromium concentrations in Morris Pesin Drive were below the Department's soil criterion of 20 ppm.

FIGURE 1

Site 65 Survey Drawing (Maser Consulting, P.A., 12/19/17)



NOTES:

1) LOCATION OF UNDERGROUND WATER PIPE BASED ON SUB SURFACE UTILITY ENGINEERING MARKOUTS PERFORMED ON 11-7-17 BY MASER CONSULTING, P.A. AND FIELD MEASUREMENTS PROVIDED BY APTIM ENVIRONMENTAL & INFRASTRUCTURE ON 11-21-17.

2) THE SOUTHERLY AND SOUTHEASTERLY BOUNDARY OF "SITE 65" IS 3' FROM THE EDGE OF THE WATER PIPE (3'-8" FROM THE CENTER).

3) MASER CONSULTING DID NOT PERFORM A BOUNDARY SURVEY. LOT 11 BOUNDARY IS BASED ON A SURVEY ENTITLED "BOUNDARY SURVEY OF LOT 11, BLOCK 21503, TAX MAP OF THE CITY OF JERSEY CITY, HUDSON COUNTY, STATE OF NEW JERSEY" PREPARED BY FARALDI GROUP, INC., DATED MAY 3, 2013.

4) THE SOUTHERLY AND SOUTHEASTERLY BOUNDARY OF "RELEASED AREA" PROVIDED BY APTIM ENVIRONMENTAL & INFRASTRUCTURE.

MASER CONSULTING P.A.
Customer Loyalty through Client Satisfaction
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State of NJ. Cert. of Authorization: 24GA27986500

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REV	DATE	DRAWN BY	DESCRIPTION

JEFFREY D. BUNCE 12/19/17
NEW JERSEY PROFESSIONAL LAND SURVEYOR - LICENSE NUMBER: GS41045

PLAN
FOR
SITE 65
JERSEY CITY
RIGHT-OF-WAY
BURMA ROAD AND
MORRIS PESIN ROAD
CITY OF JERSEY CITY
HUDSON COUNTY
NEW JERSEY

MT. ARLINGTON OFFICE
400 Valley Road
Suite 304
Mt. Arlington, NJ 07856
Phone: 973.398.3110
Fax: 973.398.3199

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	12/19/2017	NPS	JDB
PROJECT NUMBER: 14000664C	DRAWING NAME: V-SURV		

SHEET TITLE: EXHIBIT

SHEET NUMBER: 1 of 1

EXHIBIT E

CCPW IDENTIFICATION PROCEDURE

(ATTACHED)

CCPW Field Identification Procedure for Site 65 Only

Background

Hexavalent chromium (Cr+6) contamination from Chromate Chemical Production Waste (CCPW) can manifest itself in several forms, including green-gray mud (GGM), Chromite Ore Processing Residue (COPR), Cr+6 contaminated water, and a crystallized form referred to as chromium blooms. At Site 65, COPR is the most likely form of CCPW that may be encountered.

Appearance

COPR is generally a reddish-brown coarse to fine gravel, with varying amounts of sand and silt particles. The gravel portion of the matrix is typically defined as nodules 1/8 to 3/4 to inch (in) in diameter, but have been detected at diameters greater than 1 in. COPR may be found either as individual nodules or as clusters of agglomerated nodules. A cluster may consist of various sized nodules cemented or fused together by a finer grained matrix. Some clusters of nodules can be disintegrated easily with minimal force (e.g. manually with a hammer). When cleaved, the interior cross-section of the nodule is reddish brown and typically displays concentric layers. Below are several photos of COPR identified at PPG sites.

Photo #1 – COPR identified from PPG's Garfield Avenue (GA) site.

Photo #2 – COPR from PPG Site 63, adjacent to Site 65

Photo #3 – COPR from PPG Site 63, adjacent to Site 65

Photo #4 – COPR from PPG Site 63, adjacent to Site 65

Field Procedure

The MUA LSRP will meet with the PPG LSRP on site. The following lines of evidence will be evaluated by the two LSRPs to determine if the suspected CCPW is actual CCPW:

1. Physical appearance – The material will be evaluated and compared to the appearance description above and photos provided. If the LSRPs concur that the exterior, physical appearance matches the description and photos provided above, then the presence of CCPW is confirmed.

2. If the LSRPs do not concur on the exterior physical appearance, then the nodule(s) shall be lightly cleaved open to evaluate the interior of the nodule. If the interior, physical appearance matches the description and photos provided, then the presence of CCPW is confirmed.

3. If the LSRPs do not concur on the exterior and interior physical appearance of the nodules, then one or both of the following tests may be performed:

   a) Acid test – high levels of calcium carbonate would be expected in GGM and possibly COPR. A drop, or drops, of diluted (10%) hydrochloric acid will be applied to the cleaved portions of the suspected material to assess the presence of carbonate. If the material is observed to effervesce after application of the acid, the material is likely to be CCPW. Additionally, this acid test procedure may produce a yellowish colored liquid when it effervesces and can be readily detected if tested on white paper. If there is a positive result using the acid test, then the presence of CCPW is confirmed.

   b) Magnet response test – CCPW nodules are slightly magnetic to strongly magnetic. The cleaved portions of the nodule(s) will be tested for a response to a magnet. If there is a positive result using the magnet response test, then the presence of CCPW is confirmed.