HAZARD RANKING SYSTEM (HRS) PACKAGE
MAGNA METALS
CORTLANDT MANOR, WESTCHESTER COUNTY, NY

EPA ID No.: NYD001394881

EPA Contract No. EP-S13-08-01
TDD No. 0004/1801-03
Document Control No. W0564.1A.01650

September 2018

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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HRS DOCUMENTATION RECORD - COVER SHEET

Name of Site: Magna Metals

Date Prepared: September 2018

Contact Persons

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Pathways, Components, or Threats Not Scored

The surface water migration pathway—drinking water threat, the surface water migration pathway—ground water to surface water component, the ground water migration pathway, the soil exposure and subsurface intrusion pathway, and the air migration pathway were not scored because the listing decision is not affected significantly by those pathways, components, or threats. The site score is sufficient to list the site based on the surface water migration pathway—human food chain threat and the surface water migration pathway—environmental threat.

Data indicate that there is an area of soil-gas contamination beneath an active office/warehouse building adjacent to the former Magna Metals building and there is a release to indoor air. Overburden groundwater exists in the form of a very shallow water-bearing unit that is typically less than five feet in thickness; the observed flow direction is to the west [Ref. 15, pp. 7, 121]. The Remedial Investigation (RI) data showed the presence of a groundwater and soil-gas plume containing trichloroethylene (TCE) and other volatile organic compounds (VOC) at the site [Ref. 9, pp. 55–57; 12, pp. 6–13; 15, pp. 110, 113]. During the RI, groundwater samples showed TCE concentrations as high as 4,700 micrograms per liter (µg/L) [Ref. 9, pp. 55, 86–91, 97, 100–101]. The highest concentrations of VOCs in groundwater were detected in the vicinity of Source 1 and the former Magna Metals building [Ref. 15, p. 7]. The results of soil-vapor investigations show that the soil-gas plume contains TCE, cis-1,2-dichloroethylene (DCE) (a TCE breakdown product), and toluene, and it extends beneath the occupied office/warehouse building at the facility [Ref. 47, pp. 6–9, 13, 17; 48, pp. 2, 28–36, 45; 49, pp. 5–11, 16–18, 25; 50, pp. 6–8, 13, 19; 51, pp. 6–8, 12–13, 20]. Soil vapor intrusion into the building has occurred, as shown by elevated levels of TCE in indoor air samples collected from the building [Ref. 50, pp. 7–9, 15–16, 19; 51, pp. 7–9, 15,17, 20]. A sub-slab depressurization system (SSDS) was installed in 2011 so as to mitigate the imminent acute exposure risks to on-site workers [Ref. 52, pp. 6–12]. Post-installation indoor air sampling indicated non-detect levels, and the SSDS is regularly inspected and maintained [Ref. 52, pp. 11–12; 53, pp. 1–6; 54, pp. 1–9]. The continued presence of elevated levels of VOCs in the subsurface remain a concern as the threat posed by the VOCs has only been mitigated and might present future exposure via ingestion, contact, or inhalation [Ref. 15, p. 7].

Subsurface intrusion and ground water to surface water are exposure pathways of concern at the site [Ref. 6, pp. 10–12; 10, p. 84; 51, pp. 7–8], however, these components are not scored because the site already receives a listing-eligible site score based on the surface water migration pathway.

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HRS DOCUMENTATION RECORD

Name of Site:	Magna Metals	Date Prepared:	September 2018
EPA ID No.:	NYD001394881		
EPA Region:	2		
Street Address of Site*:	510 Furnace Dock Road, Cortlandt Manor, NY 10567		
County and State:	Westchester County, New York		
General Location in the State:	Lower Hudson River valley		
Topographic Map:	Mohegan Lake, NY		
Latitude*:	41° 16′ 28.20” North (41.2745°)		
Longitude*:	73° 52′ 13.44″ West (-73.8704°)		
Site Reference Point:	Approximate center of the former Magna Metals building at Source 2		

[**Figures 1 through 5**; Ref. 3, p. 1; 4, p. 1; 5, p. 1; 6, pp. 7, 44]

* The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area the site is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for NPL listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, disposed, or placed, or has otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under CERCLA. Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.

<u>Scores</u>

Ground Water[1] Pathway	Not Scored
Surface Water Pathway	100.00
Soil Exposure and Subsurface Intrusion Pathway	Not Scored
Air Pathway	Not Scored
HRS SITE SCORE	50.00

[1] “Ground water” and “groundwater” are synonymous; the spelling is different due to “ground water” being codified as part of the HRS, while “groundwater” is the modern spelling.

WORKSHEET FOR COMPUTING HRS SITE SCORE
MAGNA METALS

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	Not Scored	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100.00	10,000.00
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	Not Scored	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	100.00	10,000.00
3a.	Soil Exposure Component Score (S_{se}) (from Table 5-1, line 22)	Not Scored	
3b.	Subsurface Intrusion Component Score (S_{ssi}) (from Table 5-11, line 12)	Not Scored	
3c.	Soil Exposure and Subsurface Intrusion Pathway Score (S_{sessi}) (from Table 5-11, line 13)	Not Scored	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	Not Scored	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_{sessi}^2 + S_a^2$	10,000.00	
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	50.00	

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
MAGNA METALS

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	MAXIMUM VALUE	VALUE ASSIGNED
Likelihood of Release		
1. Observed Release	550	550
2. Potential to Release by Overland Flow		
2a. Containment	10	not scored
2b. Runoff	25	not scored
2c. Distance to Surface Water	25	not scored
2d. Potential to Release by Overland Flow (lines 2a [2b + 2c])	500	not scored
3. Potential to Release by Flood		
3a. Containment (Flood)	10	not scored
3b. Flood Frequency	50	not scored
3c. Potential to Release by Flood (lines 3a x 3b)	500	not scored
4. Potential to Release (lines 2d + 3c)	500	not scored
5. Likelihood of Release (higher of lines 1 and 4)	550	550
Waste Characteristics		
6. Toxicity/Persistence	*	not scored
7. Hazardous Waste Quantity	*	not scored
8. Waste Characteristics	100	not scored
Targets		
9. Nearest Intake	50	not scored
10. Population		
10a. Level I Concentrations	**	not scored
10b. Level II Concentrations	**	not scored
10c. Potential Contamination	**	not scored
10d. Population (lines 10a + 10b + 10c)	**	not scored
11. Resources	5	not scored
12. Targets (lines 9 + 10d + 11)	**	not scored
13. DRINKING WATER THREAT SCORE ([lines 5 x 8 x 12]/82,500)	100	not scored

* Maximum value applies to waste characteristics category.
** Maximum value not applicable

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
MAGNA METALS

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	MAXIMUM VALUE	VALUE ASSIGNED
Likelihood of Release		
14. Likelihood of Release (same as line 5)	550	550
Waste Characteristics		
15. Toxicity/Persistence/Bioaccumulation	*	5.00E+08
16. Hazardous Waste Quantity	*	100
17. Waste Characteristics	1,000	320
Targets		
18. Food Chain Individual	50	20
19. Population		
19a. Level I Concentrations	**	0
19b. Level II Concentrations	**	0
19c. Potential Human Food Chain Contamination	**	0.0000003
19d. Population (lines 19a + 19b + 19c)	**	0.0000003
20. Targets (lines 18 + 19d)	**	20.0000003
21. HUMAN FOOD CHAIN THREAT SCORE ([lines 14 x 17 x 20]/82,500)	100	42.66

* Maximum value applies to waste characteristics category.
** Maximum value not applicable

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
MAGNA METALS

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	MAXIMUM VALUE	VALUE ASSIGNED
Likelihood of Release		
22. Likelihood of Release (same as line 5)	550	550
Waste Characteristics		
23. Ecosystem Toxicity/Persistence/Bioaccumulation	*	5.00E+08
24. Hazardous Waste Quantity	*	100
25. Waste Characteristics	1,000	320
Targets		
26. Sensitive Environments		
26a. Level I Concentrations	**	0
26b. Level II Concentrations	**	50
26c. Potential Contamination	**	Not scored
26d. Sensitive Environments (lines 26a + 26b + 26c)	**	50
27. Targets (line 26d)	**	50
28. ENVIRONMENTAL THREAT SCORE ([lines 22 x 25 x 27]/82,500)	60	60.00
29. WATERSHED SCORE (lines 13 + 21 + 28)	100	100.00
30. SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE (S_{of})	100	100.00
SURFACE WATER MIGRATION PATHWAY SCORE (S_{sw})	100	100.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable

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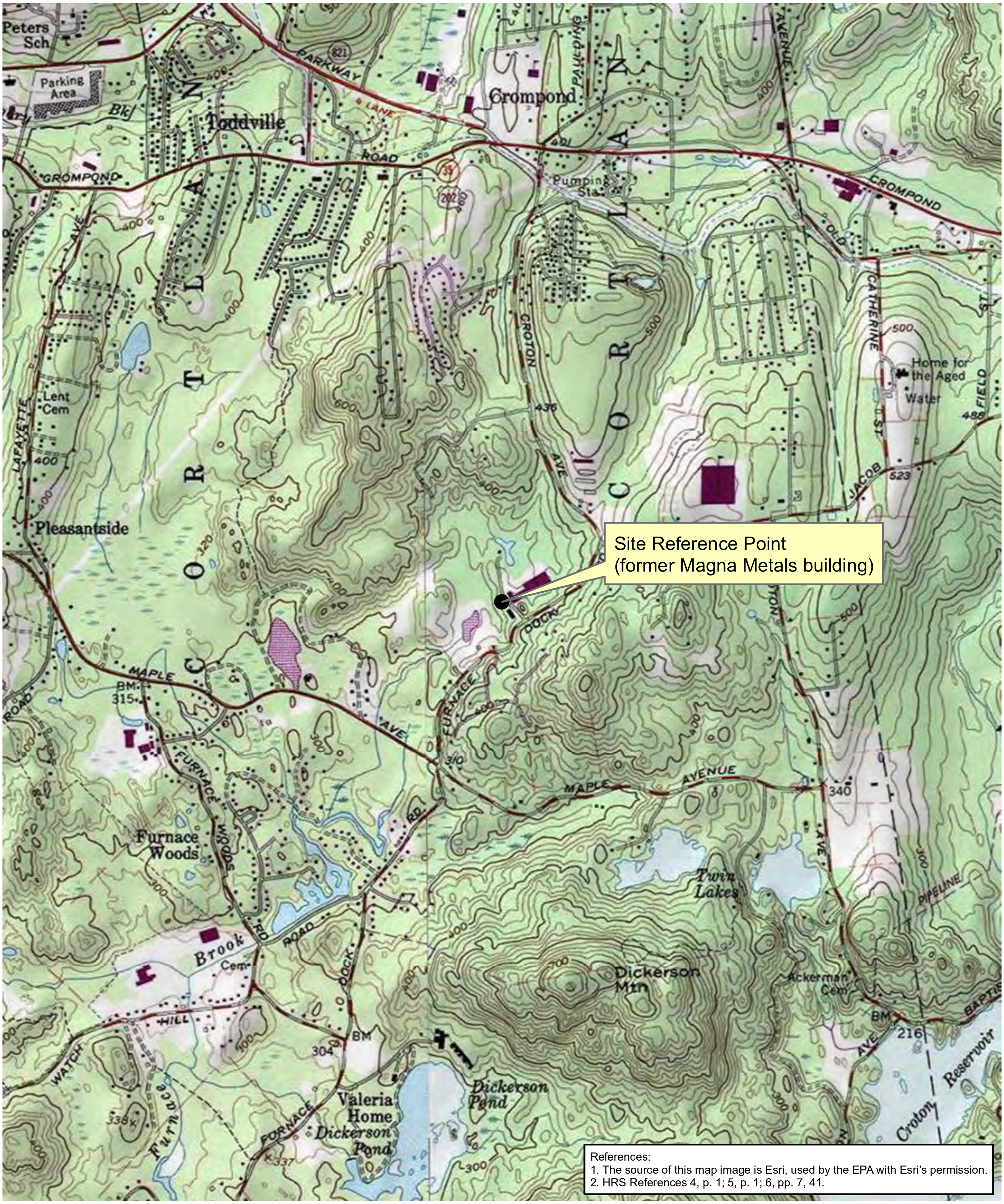
SITE DESCRIPTION

The Magna Metals site as scored for HRS purposes consists of two sources of hazardous substances at the former Magna Metals, Inc. (Magna) facility in Cortlandt Manor, Westchester County, New York, as well as sediment, contaminated with site-attributable hazardous substances as a result of releases from site sources [Ref. 6, pp. 9–12]. Magna was a metal plating facility that operated from 1955 to 1979 [Ref. 6, p. 8]. Historical documents prepared by the property owner and by New York State Department of Environmental Conservation (NYSDEC) document the presence of inorganic constituents, volatile organic compounds (VOC), and semivolatile organic compounds (SVOC) in waste materials deposited at the site and the presence of metals in sediment that meet the criteria for observed release [see **Sections 2.2, 4.1.2.1.1**]. For the Magna Metals site, EPA is evaluating the surface water migration pathway, overland/flood migration component—human food chain threat and the surface water migration pathway, overland/flood migration component—environmental threat. The site sources are evaluated as surface impoundments (Source 1) and contaminated soil (Source 2), as further discussed in **Section 2.2**. Sampling and analysis of sediment by NYSDEC documents the presence of several hazardous substances at levels that meet the criteria for observed release [see **Section 4.1.2.1.1**]. A downstream fishery is evaluated as being subject to potential contamination, and wetland frontage greater than 1 mile in length is evaluated as being subject to actual contamination [see **Sections 4.1.3.3 and 4.1.4.3**].

The former Magna facility is located at 510 Furnace Dock Road, Cortlandt Manor, Westchester County, New York; the geographic coordinates of the former building are 41.2745° north latitude, -73.8704° west longitude [Ref. 3, p. 1; 5, p. 1; 6, pp. 7, 41]. Magna conducted metal plating, polishing, and lacquering operations at the facility from 1955 to June 1979 [Ref. 7, p. 1; 8, p. 4; 9, p. 8]. During the course of its operations, Magna installed a series of interconnected settling tanks and leach pits west and northwest of the building for the disposal of industrial and sanitary wastewater into the ground [Ref. 6, pp. 7–8, 43; 7, p. 1; 8, p. 4; 9, pp. 24–26, 210–212]; this former wastewater disposal system is evaluated as Source 1. The former Magna building, which was demolished in 2013, was part of a larger commercial property; other buildings on the property continue to be used for offices, a laboratory, and warehousing [Ref. 5, p. 1; 6, pp. 7, 47–48; 18, pp. 2, 5]. A wetland area, an unnamed tributary to Furnace Brook, and an unnamed pond are located just west-southwest of the former Magna operation, and the surrounding area is primarily residential [Ref. 6, pp. 7, 41, 48]. **Figure 1** presents a Location Map and **Figure 2** presents a Sources Map for the Magna Metals site.

The former wastewater disposal system (i.e., Source 1) at the former Magna facility consists of two rectangular, concrete settling tanks connected to a series of eleven concrete leach pits [Ref. 9, pp. 24, 39]. The leach pits, each approximately 6 feet in diameter, are constructed of cinderblock or of perforated concrete cylinders, emplaced vertically with bottoms open to underlying soil or gravel and with concrete or metal covers [Ref. 9, pp. 24–25, 35, 39]. NYSDEC reports that the leach pits appear to have been constructed with gravel bottoms and gravel packing around the sides to facilitate the percolation of water away from the pits [Ref. 9, p. 25]. The settling tanks and leach pits, including those reportedly used as septic tanks for sanitary waste, are connected by perforated plastic pipes [Ref. 9, pp. 25, 39, 212, 216–217]. During Remedial Investigation (RI) sampling by former property owner ISC Properties, Inc. (ISCP) in 2003, it was discovered that some of the leach pits had been left open to the elements, while others had been covered over with soil; one leach pit was filled with debris and was inaccessible for sampling [Ref. 9, pp. 25–26, 35, 214–216].

During Magna's operation, the company discharged iron, lead, copper, nickel, and zinc chlorides; cyanides; sulfates; waste trichloroethylene (TCE); cooling water from the TCE bath; and floor drain capture to its wastewater disposal system [Ref. 6, pp. 8, 43; 7, p. 1; 9, pp. 8, 24–26, 39, 210–212]. During a water pollution investigation in October 1978, Westchester County Health Department (WCHD) collected four wastewater samples at Magna, including "influent wastewater to industrial disposal system", "overflow or effluent from industrial disposal system", "influent wastewater", and "overflow or effluent wastewater", as well as a sample of ponded liquid near one of the leach pits; the samples were analyzed for pH and metals [Ref. 9, pp. 8–9, 12; 10, pp. 10–12]. The wastewater samples showed pH values from 7.8 to 11.3 and they all contained levels of chromium, copper, cyanide, iron, nickel, and zinc [Ref. 9, p. 12; 10, pp. 10–12]. One of the samples also contained lead above the groundwater standard [Ref. 10, pp. 10–12].



SCALE:

2,000 1,000 0 2,000

Graphic Scale in Feet

TITLE:

Site Location Map
Magna Metals
Cortlandt Manor, New York

PROJECT: MAGNA METALS

CLIENT NAME: EPA

WESTON SOLUTIONS

DATE: August 2018

FIGURE #: 1

P:\SAT2\Magna_Metals\MXD\2018_06\22375_Site_Location_Map.mxd

References:
1. The source of this map image is Esri, used by the EPA with Esri's permission.
2. HRS References 9, pp. 35, 39, 97–98; 18, p. 5; 19, pp. 10, 11, 13.

Legend

Source 1
- Settling Tank
- Leach Pit
- Inferred Leach Pit
- Pipe Connections
- Inferred Piping
- Background Soil Sample Location

Source 2
- Contaminated Soil Sample Location
- Source 2 (contaminated soil) – Total Area = 60154 ft^2
- Delineated Wetlands

SCALE:

150 75 0 150

Graphic Scale in Feet

TITLE:

Sources Map
Magna Metals
Cortlandt Manor, New York

PROJECT: MAGNA METALS

CLIENT NAME: EPA

WESTON SOLUTIONS

DATE: August 2018

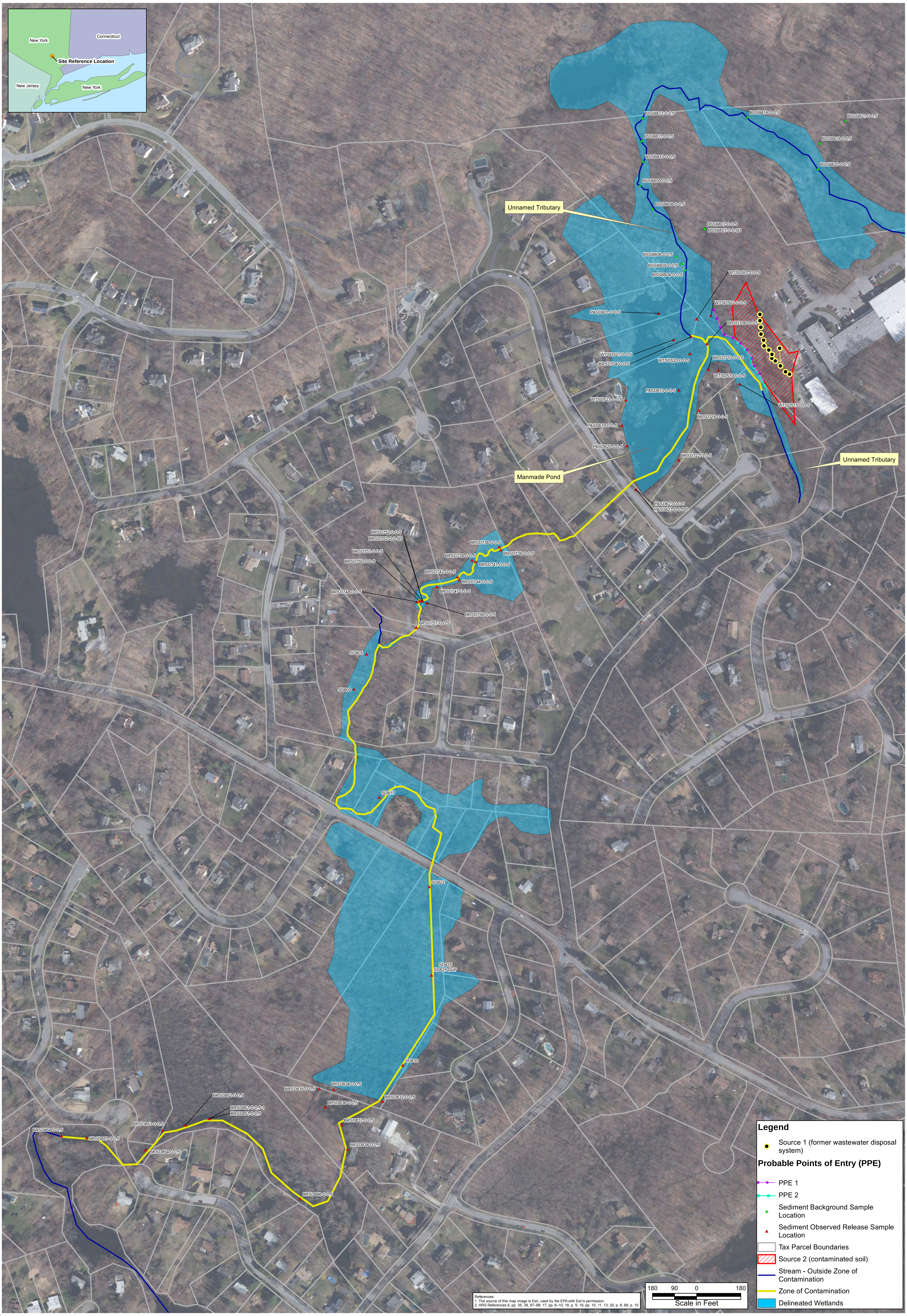
FIGURE #: 2

P:\SAT2\Magna_Metals\MXD\2018_0622378_Site_Source_Map.mxd

In December 1979, Magna consolidated 49,780 pounds of corrosive liquid waste, which was a combination of potash cleaners, copper cyanide, electroplating cyanide, and waste from some of the leach pits and removed it from the facility; in February 1980, Magna additionally removed drummed waste materials, including waste TCE, contaminated paint thinners, and acids [Ref. 7, pp. 1–7]. Sampling investigations conducted by Magna, NYSDEC, WCHD, and the property owner after the waste removals show the continuing presence of hazardous substances in Source 1 [Ref. 8, pp. 4–5; 9, pp. 8–10, 47–49]. Analytical results for aqueous, soil, and sludge samples collected from various points within the former wastewater disposal system in 1982, 1983, 1984, 1997, and 2003 have indicated the presence of arsenic, benz(a)anthracene, benzo(a)pyrene, cadmium, chromium, chrysene, copper, cyanide, 1,4-dichlorobenzene, cis- and trans-1,2-dichloroethylene (DCE), ethylbenzene, lead, manganese, mercury, 2-methylnaphthalene, nickel, selenium, silver, thallium, trichloroethylene (TCE), vinyl chloride, xylenes, and zinc [Ref. 9, pp. 9–10, 15, 18–23, 47–49, 58–63, 97–98; 10, pp. 26–29, 50–54, 185–192, 278]. During the 2003 leach pit survey and sampling event, sludge ranging up to 1.3 feet thick was found to remain in the leach pits and was underlain by soil at depths of approximately 7 to 8 feet below the pit openings [Ref. 9, p. 35; 11, pp. 4–5].

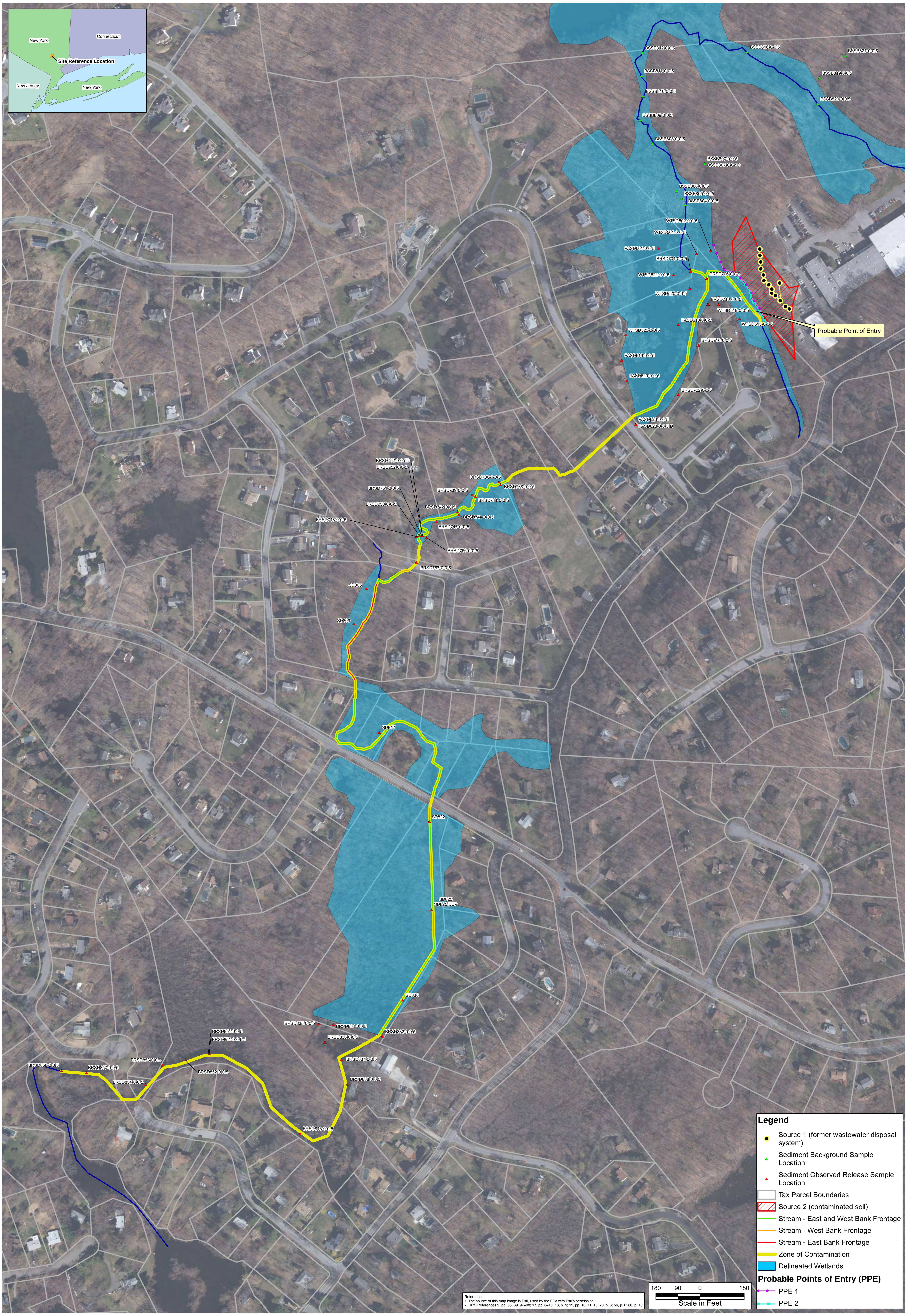
Sampling investigations also show the presence of contaminated soil at the Magna Metals site, which is evaluated as Source 2. In 1996, 1997, 2003, and 2008, under NYSDEC oversight, the former property owner collected surface and subsurface soil samples in support of the RI at the former Magna facility [Ref. 9, pp. 28–29, 97–98, 264–284; 13, pp. 5–6; 14, p. 1]. The analytical results indicated the presence of arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, selenium, and zinc at concentrations significantly above background levels and above NYSDEC-recommended soil cleanup criteria [Ref. 9, pp. 49, 52–55, 79–84, 97–98, 317, 368, 372, 387–389, 411–414, 440, 778–787, 803–805, 808–809]. Soil sampling performed in 2013 and 2015 by NYSDEC in support of a Pre-Design Investigation (PDI) confirms the presence of contaminated soil in Source 2; analytical results show the presence of arsenic, cadmium, chromium, copper, cyanide, lead, nickel, selenium, TCE, xylenes, and zinc at concentrations significantly above background levels [see **Source 2, Section 2.2.2; Ref. 25, 26, 36, 37, 38, 39, 40, and 44 for additional analytical data packages associated with the PDI sampling effort**].

The RI included surface water and sediment sampling; analytical results indicated contamination, and the PDI sediment sampling results from 2013 through 2015 confirm that there is an observed release to surface water from site sources [see **Section 4.1.2.1.1**]. The data document the presence of an extensive zone of contamination along the surface water migration pathway associated with the site, as shown in **Figures 3 and 4**.



DRAWING TITLE:	CLIENT NAME:		REPORT DATE:	PROJECT MANAGER:	
Site Map Showing Observed Release and Zone of Contamination Magna Metals Cortlandt Manor, New York	EPA	N W E S	August 2018	G. Gilliland	WESTON SOLUTIONS SM
			DRAWING: 22380_Magna_Metals_Sediment_Release.mxd PATH: P:\SAT2\Magna_Metals\MXD\2018_06\	CHECKED BY: G. Gilliland	
	PROJECT NAME: Magna Metals		REVISION No. 0	CONTRACT No. DELIVERY ORDER NO.	Weston Solutions, Inc. 205 Campus Drive Edison, New Jersey 08837-3939 TEL: (732) 417-5800 Fax: (732) 417-5801 http://www.westonsolutions.com
FIGURE: 3 / SCALE: 1" = 180' / DATE: August 2018			WORK ORDER No. 20408.012.004.0564.00	DRAWN/MODIFIED BY: J. Gardner DATE CREATED: 6/13/2018	

P:\SAT2\Magna_Metals\MXD\2018_06\22380_Magna_Metals_Sediment_Release.mxd



DRAWING TITLE: Wetland Frontage along Zone of Contamination Magna Metals 510 Furnace Dock Rd, Cortlandt Manor, NY	CLIENT NAME: EPA	REPORT DATE: August 2018
FIGURE: 4	PROJECT NAME: Magna Metals	PROJECT MANAGER: G. Gilliland
SCALE: See Above		DRAWING: 22383_Magna_Metals_Wetlands_Frontage.mxd PATH: P:\SAT2\Magna_Metals\MXD\2018_06\
DATE: August 2018		CHECKED BY: G. Gilliland
		REVISION No. 0
		CONTRACT No.
		DELIVERY ORDER NO.
		WORK ORDER No. 20408.012.004.0564.00
		DRAWN/MODIFIED BY: K. Heulitt
		DATE CREATED: 6/13/2018

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205 Campus Drive Edison, New Jersey 08837-3939
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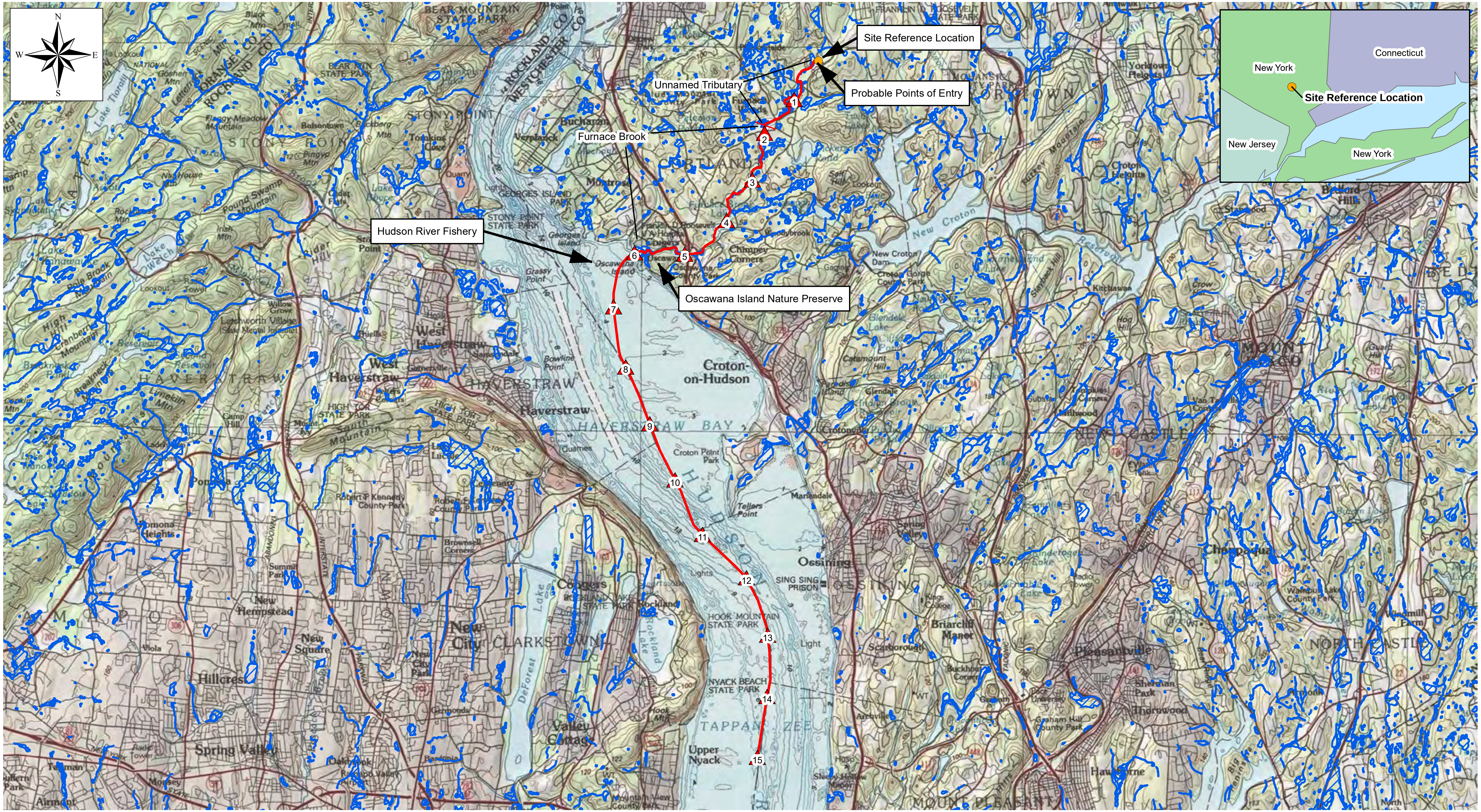
http://www.westonsolutions.com



Legend
- Site Reference Location
- Surface Water Pathway Marker
- Surface Water Pathway
- HRS-Eligible Wetland

References:
1. The source of this map image is Esri, used by the EPA with Esri's permission.
2. National Wetlands Inventory. U.S. Fish & Wildlife Service (US FWS). Acquisition Date: 4/13/2018. https://www.fws.gov/wetlands/Data/Data-Download.html
3. HRS References 5, p. 1; 63, pp. 30, 31, 37; 64, p. 1; 67, pp. 1–2.

SCALE: 8,000 4,000 0 8,000 Feet

PROJECT: Magna Metals

CLIENT NAME: EPA

TITLE: Surface Water Pathway Target Distance Limit Map
Magna Metals
Cortlandt Manor, NY

DATE: August 2018

FIGURE #: 5

P:\SAT2\Magna_Metals\MXD\2018_06\22379_Magna_Metals_SW_Pathway.mxd

SOURCE DESCRIPTION

2.2 SOURCE CHARACTERIZATION

2.2.1 Source Identification

Number of the source: Source No. 1

Name and description of the source: Former Wastewater Disposal System (settling tanks/leach pits/piping)

Source Type: Surface Impoundment

During the course of its metal plating operations, Magna installed a series of interconnected settling tanks and leach pits west and northwest of the former Magna Metals building for the disposal of industrial and sanitary wastewater into the ground [Ref. 6, pp. 7–8, 42–43; 7, p. 1; 8, p. 4; 9, pp. 24–26, 98, 210–212]. This former wastewater disposal system at the former Magna facility is evaluated as Source 1 (see **Figure 2**). The source consists of two rectangular, concrete settling tanks connected by perforated piping to a series of eleven concrete leach pits [Ref. 9, pp. 24–25, 39, 212]. The leach pits, each approximately 6 feet in diameter, are constructed of cinderblock or of perforated concrete cylinders, emplaced vertically with bottoms open to underlying soil and with concrete or metal covers [Ref. 9, pp. 24–25, 35, 39]. During the RI at the former Magna facility, the investigators observed that the leach pit construction included gravel bottoms and gravel packing around the sides to facilitate the percolation of water away from the pits [Ref. 9, p. 25]. The settling tanks and leach pits, including those reportedly used as septic tanks for sanitary waste, are connected by perforated plastic pipes [Ref. 9, pp. 25, 39, 212, 216–217]. While attempting to locate all components and connections of the system during the RI, investigators encountered an obstruction believed to be another leach pit and were unable to trace the full length of some of the piping [Ref. 9, pp. 24–25, 39]; these features of Source 1 are depicted in **Figure 2** as inferred leach pit or inferred piping, as applicable.

During RI sampling in 2003, it was discovered that some of the leach pits had been left open to the elements, while others had been covered over with soil; one leach pit was filled with debris and was inaccessible for sampling during the RI [Ref. 9, pp. 25–26, 35, 214–216]. NYSDEC performed remedial design sampling in 2013 and 2015 to characterize the full impact of Source 1 on surrounding soils, but continued to find hazardous substances in excess of soil cleanup objectives; Source 1 remains in place awaiting remediation, and continues to pose a threat to the surface water pathway [Ref. 18, pp. 1–3, 5; 19, pp. 2–4, 10].

Source 1 is scored as source type: surface impoundment as this is the primary HRS source type that corresponds to the former wastewater disposal system.

Location of the source, with reference to a map of the site:

Source 1 is located west and northwest of the former Magna Metals building, as shown in **Figures 2 and 3**.

Containment

Release to surface water via overland migration:

There is evidence of hazardous substance migration from Source 1. Historical documentation indicates that overflow from Source 1 and ponded liquid near Source 1 contained high levels of the same metals found within Source 1, and that vegetation in an area downgradient of Source 1 had been adversely affected by the overland waste flow [Ref. 7, p. 1; 9, p. 12]. The leach pits are located within a steep hillside; surface soil contamination in the area downslope of Source 1 provides further evidence of overland flow of contaminants (the soil contamination at the former Magna facility [i.e., Source 2] is primarily associated with Source 1, from both overland flow and subsurface migration of wastewater) [Ref. 6, p. 22; 9, pp. 9, 52–53, 80–81, 97–98; 18, p. 5; 19, p. 10]. Based on the documented evidence of hazardous substance migration via overland flow from the source, a surface water containment factor value for overland migration of 10 is assigned for Source 1 [Ref. 1, Table 4-2].

Release to surface water via flood:

The containment factor value for release to surface water via flood is not evaluated because it does not affect the listing decision.

2.2.2 Hazardous Substances

During Magna's operation, the company reportedly discharged iron, lead, copper, nickel, and zinc chlorides; cyanides; sulfates; waste TCE; cooling water from the TCE bath; and floor drain capture to its wastewater disposal system [Ref. 6, pp. 8, 43; 7, p. 1; 9, pp. 8, 24–26, 39, 210–212]. During a water pollution investigation in October 1978, WCHD collected four wastewater samples at Magna, including "influent wastewater to industrial disposal system", "overflow or effluent from industrial disposal system", "influent wastewater", and "overflow or effluent wastewater", as well as a sample of ponded liquid near one of the leach pits; the samples were analyzed for pH and metals [Ref. 9, pp. 8–9, 12; 10, pp. 10–12]. The wastewater samples showed pH values from 7.8 to 11.3 and they all contained levels of chromium, copper, cyanide, iron, nickel, and zinc that exceeded NYSDEC groundwater standards by one to four orders of magnitude [Ref. 9, p. 12; 10, pp. 10–12]. One of the samples also contained lead above the groundwater standard [Ref. 10, pp. 10–12].

In December 1979 and February 1980, Magna removed waste materials from the former Magna facility, including waste from some of the leach pits [Ref. 7, pp. 1–7]. Sampling investigations conducted by Magna, NYSDEC, WCHD, and the property owner after the waste removals show the continuing presence of hazardous substances in Source 1 [Ref. 8, pp. 4–5; 9, pp. 8–10, 47–49]. Analytical results for aqueous, soil, and sludge samples collected from various points within the former wastewater disposal system in 1982, 1983, 1984, 1997, and 2003 have indicated the presence of arsenic, benz(a)anthracene, benzo(a)pyrene, cadmium, chromium, chrysene, copper, cyanide, 1,4-dichlorobenzene, cis- and trans-1,2-DCE, ethylbenzene, lead, manganese, mercury, 2-methylnaphthalene, nickel, selenium, silver, thallium, TCE, vinyl chloride, xylenes, and zinc [Ref. 9, pp. 9–10, 15, 18–23, 47–49, 58–63, 97–98; 10, pp. 26–29, 50–54, 185–192, 278]. During the 2003 investigation, sludge ranging up to 1.3 feet thick was found to remain in the leach pits and was underlain by soil at depths of approximately 7 to 8 feet below the pit openings [Ref. 9, p. 35]. **Section 2.2.2** provides additional detail regarding the hazardous substances found in Source 1.

The wastewater samples collected by WCHD in October 1978 showed the deposition of wastewater containing high levels of chromium, copper, cyanide, lead, nickel, and zinc into the wastewater disposal system (i.e., into Source 1) [Ref. 9, pp. 8–9, 12]. Sampling investigations conducted by WCHD, NYSDEC, and the property owner after the waste removals show the continuing presence of hazardous substances in Source 1 [Ref. 8, pp. 4–5; 9, pp. 8–10, 47–49]. Analytical results for aqueous, soil, and sludge samples collected from various points within the former wastewater disposal system in 1978, 1982, 1983, 1984, 1997, and 2003 have indicated the presence of several metals, VOCs, and semi-volatile organic compounds (SVOCs) [Ref. 9, pp. 9–10, 15, 18–23, 47–49, 58–63, 97–98; 10, pp. 26–29, 50–54, 185–192, 278], as listed below.

It was discovered during the RI that some leach pits were constructed with gravel bottoms to allow percolation; the 2003 samples characterized as soil were collected from inside the pits directly beneath samples characterized as sludge, but not beneath gravel bottoms [Ref. 9, pp. 25, 27, 35, 202–203]. Therefore, the soil and sludge samples are all considered to represent Source 1 waste material.

TABLE 1. HAZARDOUS SUBSTANCES, SOURCE 1

Hazardous Substance	Evidence	Reference(s)
Arsenic	<u>NYSDEC, 11/16/82</u>: Extract sample R001201 (pit 1 extraction). <u>NYSDEC, 5/15/84</u>: Water sample 05 (distribution tank adjacent to building), and sludge samples 06 (leaching pit 4) and 07 (leaching pit 2). <u>ISCP, 5/14/97</u>: Sludge sample SP-SL (septic tank A) and water sample LP-AQ (leach pit G). <u>ISCP, July-October 2003</u>: Sludge and soil samples from leach/septic pits ST-01, ST-02, LP-02, LP-03, LP-05, LP-06, LP-06A, LP-07, LP-08, LP-09, and LP-0A.	9, pp. 9–10, 15, 19–21, 27, 37–39, 47–49, 58, 60–63, 98, 211, 420–428, 452, 804–810; 10, pp. 54, 192, 278
Benz(a)anthracene	<u>ISCP, July-October 2003</u>: Sludge and soil samples from leach/septic pits LP-05, LP-07, and LP-0A.	9, pp. 27, 35, 37–39, 48–49, 60–62, 98, 430, 804–807

TABLE 1. HAZARDOUS SUBSTANCES, SOURCE 1		
Hazardous Substance	**Evidence**	**Reference(s)**
Benzo(a)pyrene	ISCP, July-October 2003: Sludge and soil samples from leach/septic pits LP-05, LP-07, and LP-0A.	9, pp. 27, 35, 37–39, 48–49, 60–62, 98, 430, 804–807
Cadmium	NYSDEC, 8/19/82 and 11/16/82: Extract samples pit 1 (Water only) and R001203 (pit 5 extraction). NYSDEC, 5/15/84: Sludge samples 06 (leaching pit 4), and 07 (leaching pit 2). ISCP, 5/14/97: Sludge sample SP-SL (septic tank A). ISCP, July-October 2003: Sludge and soil samples from leach/septic pits ST-01, ST-02, LP-02, LP-03, LP-05, LP-06, LP-06A, LP-09, and LP-0A.	9, pp. 9–10, 15, 20, 27, 35, 37–39, 47–49, 58, 60–62, 97–98, 211, 420–421, 424–425, 452, 804–810; 10, pp. 54, 192, 278
Chromium	WCHD, 10/3/78: Wastewater samples 2 (influent wastewater to industrial disposal system) and 3 (overflow or effluent from industrial disposal system). NYSDEC, 8/19/82 and 11/16/82: Extract sample R001203 (pit 5 extraction). NYSDEC, 5/15/84: Water samples 05 (distribution tank adjacent to building) and 08 (leaching pit A), and sludge samples 06 (leaching pit 4) and 07 (leaching pit 2). ISCP, July-October 2003: Sludge and soil samples from leach/septic pits ST-01, ST-02, LP-02, LP-03, LP-05, LP-06A, LP-09, and LP-0A.	9, pp. 8–10, 12, 15, 19–20, 27, 35, 37–39, 48–49, 60–62, 98, 211, 420–425, 452, 804–810
Chrysene	ISCP, July-October 2003: Sludge and soil samples from leach/septic pits LP-05, LP-07, and LP-0A.	9, pp. 27, 35, 37–39, 48–49, 61–62, 98, 430, 804–807
Copper	WCHD, 10/3/78: Wastewater samples 2 (influent wastewater to industrial disposal system), 3 (overflow or effluent from industrial disposal system), 4 (influent wastewater), and 5 (overflow or effluent wastewater). NYSDEC, 8/19/82 and 11/16/82: Extract samples pit A (Manhole cover, sand), pit 1 (Water only), pit 2 (Soil, sludge), pit 4 (Soil mix), pit 5 (Sand), R001201 (pit 1 extraction), and R001203 (pit 5 extraction). NYSDEC, 5/15/84: Water samples 05 (septic distribution tank) and 08 (leaching pit A), and sludge samples 06 (leaching pit 4) and 07 (leaching pit 2). ISCP, 5/14/97: Sludge sample SP-SL (septic tank A), and water samples SP-AQ (septic tank A) and LP-AQ (leach pit G). ISCP, July-October 2003: Sludge and soil samples from leach/septic pits ST-01, ST-02, LP-02, LP-03, LP-05, LP-06, LP-06A, LP-07, LP-08, LP-09, and LP-0A.	9, pp. 8–10, 12, 15, 19–20, 27, 35, 37–39, 47–49, 59–63, 97–98, 211, 420–428, 452, 804–810; 10, pp. 54, 192, 278
Cyanide	WCHD, 10/3/78: Wastewater samples 2 (influent wastewater to industrial disposal system) 3 (overflow or effluent from industrial disposal system), 4 (influent wastewater), and 5 (overflow or effluent wastewater). NYSDEC, 8/19/82 and 11/16/82: Extract samples pit A (Manhole cover, sand), pit 1 (Water only), pit 2 (Soil, sludge), pit 4 (Soil mix), pit 5 (Sand), R001202 (pit 1 extraction), and R001203 (pit 5 extraction). ISCP, 5/14/97: Sludge sample SP-SL (septic tank A), and water samples SP-AQ (septic tank A) and LP-AQ (leach pit G).	9, pp. 8–9, 12, 15; 10, pp. 54, 192, 278

TABLE 1. HAZARDOUS SUBSTANCES, SOURCE 1		
Hazardous Substance	**Evidence**	**Reference(s)**
cis-1,2-DCE	ISCP, 5/14/97: Water sample LP-AQ (leach pit G). ISCP, July-October 2003: Sludge sample from septic tank ST-01.	9, pp. 27, 35, 37–39, 47–49, 58, 416, 805–806; 10, pp. 50, 186, 278
trans-1,2-DCE	NYSDEC, 5/15/84: Water sample 08 (leaching pit A).	9, pp. 10, 22, 24
Lead	WCHD, 10/3/78: Wastewater sample 5 (overflow or effluent wastewater). NYSDEC, 8/19/82 and 11/16/82: Extract samples R001201 (pit 1 extraction), R001203 (pit 5 extraction), and R001203EX (pit 5 extraction). ISCP, 5/14/97: Sludge sample SP-SL (septic tank A). ISCP, July-October 2003: Sludge and soil samples from leach/septic pits ST-01, ST-02, LP-02, LP-03, LP-05, LP-06, LP-06A, LP-07, LP-09, and LP-0A.	9, pp. 8–9, 12, 15, 27, 35, 37–39, 47–49, 59–63, 97–98, 211, 420–428, 452, 804–810; 10, pp. 54, 192, 278
Manganese	WCHD, 10/3/78: Wastewater samples 2 (influent wastewater to industrial disposal system) 3, (overflow or effluent from industrial disposal system), 4 (influent wastewater), and 5 (overflow or effluent wastewater). NYSDEC, 8/19/82 and 11/16/82: Extract samples pit A (Manhole cover, sand), pit 1 (Water only), pit 2 (Soil, sludge), pit 4 (Soil mix), pit 5 (Sand), R001201 (pit 1 extraction), and R001203 (pit 5 extraction). ISCP, 5/14/97: Sludge sample SP-SL (septic tank A), and water samples SP-AQ (septic tank A) and LP-AQ (leach pit G). ISCP, July-October 2003: Sludge and soil samples from leach/septic pits ST-01, ST-02, LP-02, LP-03, LP-05, LP-06, LP-06A, LP-07, and LP-09.	9, pp. 8–9, 12, 15, 27, 35, 37–39, 47–49, 59–63, 97–98, 211, 420–428, 452, 804–810; 10, pp. 54, 192, 278
Mercury	NYSDEC, 5/15/84: Water sample 08 (leaching pit A). ISCP, 5/14/97: Sludge sample SP-SL (septic tank A). ISCP, July-October 2003: Sludge and soil samples from leach/septic pits ST-01, ST-02, LP-02, LP-03, LP-05, LP-06, and LP-06A.	9, pp. 10, 19, 24, 27, 35, 37–39, 47–49, 59–62, 97–98, 420–426, 452, 804–810; 10, pp. 54, 192, 278
Nickel	WCHD, 10/3/78: Wastewater samples 2 (influent wastewater to industrial disposal system), 3 (overflow or effluent from industrial disposal system), 4 (influent wastewater), and 5 (overflow or effluent wastewater). NYSDEC, 8/19/82 and 11/16/82: Extract samples pit A (Manhole cover, sand), pit 1 (Water only), pit 2 (Soil, sludge), pit 4 (Soil mix), pit 5 (Sand), R001201 (pit 1 extraction), and R001203 (pit 5 extraction). NYSDEC, 5/15/84: Water samples 05 (septic distribution tank) and 08 (leaching pit A), and sludge samples 06 (leaching pit 4) and 07 (leaching pit 2). ISCP, 5/14/97: Sludge sample SP-SL (septic tank A), and water samples SP-AQ (septic tank A) and LP-AQ (leach pit G). ISCP, July-October 2003: Sludge and soil samples from leach/septic pits ST-01, ST-02, LP-02, LP-03, LP-05, LP-06, LP-06A, LP-07, LP-08, LP-09, and LP-0A.	9, pp. 8–10, 12, 15, 19–20, 27, 35, 37–39, 47–49, 59–63, 97–98, 211, 420–428, 452, 804–810; 10, pp. 54, 192, 278

TABLE 1. HAZARDOUS SUBSTANCES, SOURCE 1		
Hazardous Substance	**Evidence**	**Reference(s)**
Selenium	NYSDEC, 8/19/82 and 11/16/82: Extract sample R001203 (pit 5 extraction). NYSDEC, 5/15/84: Water samples 05 (septic distribution tank) and 08 (leaching pit A), and sludge samples 06 (leaching pit 4) and 07 (leaching pit 2). ISCP, 5/14/97: Sludge sample SP-SL (septic tank A) and water sample SP-AQ (septic tank A). ISCP, July-October 2003: Sludge and soil samples from leach/septic pits ST-01, ST-02, LP-02, LP-03, LP-05, LP-06, LP-06A, LP-07, LP-08, LP-09, and LP-0A.	9, pp. 9–10, 15, 19–21, 27, 35, 37–39, 47–49, 59–63, 97–98, 211, 420–428, 452, 804–810; 10, pp. 54, 192, 278
Silver	NYSDEC, 8/19/82 and 11/16/82: Extract samples R001201 (pit 1 extraction) and R001203 (pit 5 extraction). NYSDEC, 5/15/84: Sludge samples 06 (leaching pit 4), and 07 (leaching pit 2). ISCP, July-October 2003: Sludge sample from leach pit LP-06.	9, pp. 9–10, 15, 20, 27, 35, 38–39, 48–49, 98, 211, 425, 806–808
Thallium	ISCP, July-October 2003: Sludge and soil samples from leach/septic pits ST-02, LP-06, LP-06A, and LP-07.	9, pp. 27, 35, 38–39, 48–49, 61–62, 98, 421, 425–426, 452, 805–808
TCE	WCHD 3/15/83: Water sample ST (septic tank) and soil sample P2 (Soil-leachate pit 2). NYSDEC, 5/15/84: Water samples 05 (distribution septic tank adjacent to building) and 08 (leaching pit A), and sludge samples 06 (leaching pit 4) and 07 (leaching pit 2). ISCP, 5/14/97: Water sample LP-AQ (leach pit G). ISCP, July-October 2003: Sludge and soil samples from leach pits LP-03, LP-06A, and LP-08.	9, pp. 9–10, 18, 22–23, 27, 35, 37–39, 47–49, 58, 97–98, 432, 450, 806–807, 809; 10, pp. 50, 186, 278
Vinyl chloride	ISCP, 5/14/97: Water sample LP-AQ (leach pit G).	10, pp. 50, 186, 278
Xylenes	NYSDEC, 5/15/84: Sludge samples 06 (leaching pit 4) and 07 (leaching pit 2). ISCP, July-October 2003: Sludge samples from leach/septic pits ST-01 and LP-07.	9, pp. 10, 23, 27, 35, 38–39, 48–49, 62, 98, 211, 417, 432, 805–807
Zinc	WCHD, 10/3/78: Wastewater samples 2 (influent wastewater to industrial disposal system), 3 (overflow or effluent from industrial disposal system), 4 (influent wastewater), and 5 (overflow or effluent wastewater). NYSDEC, 8/19/82 and 11/16/82: Extract samples pit A (Manhole cover, sand), pit 1 (Water only), pit 2 (Soil, sludge), pit 4 (Soil mix), pit 5 (Sand), R001201 (pit 1 extraction), and R001203 (pit 5 extraction). NYSDEC, 5/15/84: Water samples 05 (septic distribution tank) and 08 (leaching pit A), and sludge samples 06 (leaching pit 4) and 07 (leaching pit 2). ISCP, 5/14/97: Sludge sample SP-SL (septic tank A), and water samples SP-AQ (septic tank A) and LP-AQ (leach pit G). ISCP, July-October 2003: Sludge and soil samples from leach/septic pits ST-01, ST-02, LP-02, LP-03, LP-05, LP-06, LP-06A, LP-07, LP-08, LP-09, and LP-0A.	9, pp. 8–10, 12, 15, 19–20, 27, 35, 37–39, 47–49, 59–63, 97–98, 211, 420–428, 452, 804–810; 10, pp. 54, 192, 278

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Tier A – Hazardous Constituent Quantity

The hazardous constituent quantity for Source 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, Section 2.4.2.1.1]. There are insufficient historical and current data [manifests, potentially responsible party (PRP) records, State records, permits, waste concentration data, etc.] available to adequately calculate the total or partial mass of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous constituent quantity for Source 1 with reasonable confidence. As a result, the evaluation of hazardous waste quantity proceeds to the evaluation of *Tier B*, Hazardous Wastestream Quantity [Ref 1, Section 2.4.2.1.1].

Hazardous Constituent Quantity (C) Value: NS

2.4.2.1.2 Tier B – Hazardous Wastestream Quantity

The hazardous wastestream quantity for Source 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all hazardous wastestreams plus the mass of any additional CERCLA pollutants and contaminants in the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, Section 2.4.2.1.2]. There are insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, etc.) available to adequately calculate the total mass or partial mass of the hazardous wastestreams plus the mass of all CERCLA pollutants and contaminants in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous wastestream quantity for Source 1 with reasonable confidence. Scoring proceeds to the evaluation of *Tier C*, Volume [Ref. 1, Section 2.4.2.1.2].

Hazardous Wastestream Quantity (W) Value: NS

2.4.2.1.3 Volume (Tier C)

The volume for Source 1 can be determined based on facility records. Source 1 consists of two rectangular settling tanks, 11 cylindrical leach pits, and perforated piping that connects the structures; the sizes of the settling tanks, piping, and one of the leach pits are unknown, while the ten other leach pits are 6 feet in diameter and at least 7 feet deep [Ref. 9, pp. 24–25, 35]. Using the formula for volume of a cylinder ($V = \pi r^2 h$) and converting to cubic yards ($1\ yd^3 = 27\ ft^3$), the minimum volume of Source 1 is $73.3\ yd^3$. The source type is "Surface Impoundment", so the volume (V) of the source ($73.3\ yd^3$) is divided by 2.5 to assign a hazardous waste quantity factor to the volume measure [Ref. 1, Section 2.4.2 and Table 2-5]. Based on these calculations, Tier C – Volume is assigned a value of 29.3 for Source 1 [Ref. 1, Section 2.4.2 and Table 2-5].

Volume (V) of source in yd^3 = 73.3
Volume Assigned Value = 73.3/2.5 = 29.3

2.4.2.1.4 Area (Tier D)

As the volume of Source 1 can be determined, an area measure value of 0 is assigned [Ref. 1, Section 2.4.2.1.3].

Area (A) Value: 0

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value for Source 1 is 29.3 for Tier C – Volume [Ref. 1, Section 2.4.2.1.5].

Source Hazardous Waste Quantity Value: 29.3

SOURCE DESCRIPTION

2.2 SOURCE CHARACTERIZATION

2.2.1 Source Identification

Number of the source: Source No. 2

Name and description of the source: Contaminated Soil

Source Type: Contaminated Soil

Source 2 consists of the contaminated soil found at the former Magna facility, primarily in the area downslope of Source 1, as indicated by the RI sampling activities in 1996, 1997, and 2003, and confirmed by the PDI sampling activities in 2013 and 2015 [**Figure 2**]. The former property owner collected surface and subsurface soil samples in support of the RI; the analytical results indicated the presence of arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, selenium, and zinc at concentrations significantly above background levels and above NYSDEC-recommended soil cleanup criteria [Ref. 9, pp. 28–29, 49, 52–55, 79–84, 97–98, 264-268, 273–284, 317, 368, 372, 387–389, 411–414, 440, 778–787, 803–805, 808–809]. The PDI sampling performed by NYSDEC confirms the ongoing presence of contaminated soil; analytical results show the presence of arsenic, cadmium, chromium (total and hexavalent), copper, cyanide, lead, nickel, selenium, TCE, xylenes, and zinc at concentrations significantly above background levels [see **Section 2.2.2** below].

The soil contamination at the former Magna facility (i.e., Source 2) is primarily associated with migration from Source 1, from both overland flow and subsurface migration of wastewater [Ref. 6, p. 22; 9, pp. 9, 52–53, 80–81, 97–98; 18, p. 5; 19, p. 10]. Historical documentation indicates that overflow from Source 1 and ponded liquid near Source 1 contained high levels of the same metals found in Source 2, and that vegetation in an area downslope of Source 1 had been adversely affected by the overland waste flow [Ref. 7, p. 1; 9, p. 12].

Location of the source, with reference to a map of the site:

Source 2 is located west of the former Magna building and within the footprint of the former building, as shown in **Figures 2 and 3**.

Containment

Release to surface water via overland migration:

Contaminated soil is present at the ground surface at some locations and within a foot of the surface at many others (see **Section 2.2.2** below), indicating that there is no engineered cover for Source 2. In addition, Source 2 is in direct contact with an HRS-eligible wetland, constituting an observed release by direct observation (see **Figure 2 and Section 4.1.2.1.1**). Based on the lack of containment features associated with Source 2 and the direct contact of Source 2 with surface water, a surface water containment factor value for overland migration of 10 is assigned for the source [Ref. 1, Table 4-2].

Release to surface water via flood:

The containment factor value for release to surface water via flood is not evaluated because it does not affect the listing decision.

2.2.2 Hazardous Substances

Laboratory analytical results for soil samples collected by NYSDEC in 2013 and 2015 confirm the presence of arsenic, cadmium, chromium, copper, cyanide, lead, nickel, selenium, TCE, xylenes, and zinc at concentrations significantly above background levels in soil at the former Magna facility. Site-specific background levels were established during the RI through the collection and analysis of surface and subsurface soil samples in areas of little or no impact at the facility. Although NYSDEC did not specifically designate background samples during the 2013 and 2015 PDI sampling activities, samples collected at the edges or outside of the main areas of concern show comparable levels to the earlier background samples and are considered to represent background conditions for the sake of comparison (see **Table 2** below).

Although not required for sources, background samples are presented to demonstrate the relative increase of source contaminant levels over background levels. The following tables present the results that document background samples and contaminated samples that exhibit concentrations that are significantly above the associated site-specific background level (i.e., three times greater, or above the quantitation limit if not detected in background samples) [Ref. 1, Section 2.3]. This evaluation differs from previous evaluations of soil contamination, which used NYSDEC-established soil cleanup levels to delineate areas of contamination. The background and contaminated samples were collected during the same timeframe (2013 and 2015), are the same location types (surface soil and soil borings), similar depth intervals, and same analyses; the samples were collected according to state technical guidance [Ref. 16, pp. 9–10, 21, 24–26; 18, pp. 1–5; 19, pp. 1–11]. The predominant soil type at the sample locations is sand [Ref. 9, pp. 42, 264, 284; 18, pp. 6–37; 19, pp. 40–42, 63–89]. The same EPA SW-846 analytical methods were used for analyses of all background and contaminated samples, and included Target Analyte List (TAL) Metals by Methods 6010B/C and 7471/7471A, Cyanide by Method 9014, and VOCs by Method 8260C [Ref. 9, p. 47; 10, p. 49; 29, pp. 1–2; 34, pp. 1–3; 45, pp. 1, 3].

For inorganics, the previous site-specific background results from 1997 and 2003 are included to demonstrate the maximum overall site-specific background level for each hazardous substance. Maximum background level for each hazardous substance is denoted by ***bold italics*** in the background table. All results are presented in milligrams per kilogram (mg/kg) for consistency.

Background Samples

TABLE 2. BACKGROUND SAMPLES, SOURCE 2						
Hazardous Substance	**Sample ID**	**Depth (in.)**	**Sample Date**	**Result (mg/kg)**	**RDL/RL (mg/kg)**	**References**
Arsenic (adjustment factor = 1.74)	MMS-SS04-01	0–12	4/11/97	3.1	NR	9, pp. 783–787; 10, pp. 32, 62, 182, 236, 278
	MMS-SS05-01	0–12	4/11/97	2.9	NR	9, pp. 783–787; 10, pp. 32, 62, 182, 236, 278
	MMS-MW01-01 (MMS-MW1-01)	72–96	11/19/97	U	0.66	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MMS-MW01-02	144–168	11/19/97	1.6 B	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MM-SS13-072903	0–2	7/29/03	2.6	1.5	9, pp. 53, 82, 98, 413, 803–804
	MM-SS14-072903	***0–2***	***7/29/03***	***4.3***	***1.4***	***9, pp. 53, 82, 98, 413, 803–804***
	MM-SS15-072903	0–2	7/29/03	3.7	1.3	9, pp. 53, 82, 98, 414, 803–804
	RASB304-0-0.5	0–6	11/5/13	1.5 J (2.6)	2.5	18, pp. 3, 5, 28; 30, pp. 44, 81; 34, pp. 1–5, 7

TABLE 2. BACKGROUND SAMPLES, SOURCE 2						
Hazardous Substance	**Sample ID**	**Depth (in.)**	**Sample Date**	**Result (mg/kg)**	**RDL/RL (mg/kg)**	**References**
	RASB305-0-0.5	0–6	11/5/13	1.2 J (2.1)	2.4	18, pp. 3, 5, 29; 30, pp. 42, 80; 34, pp. 1–5, 7
	BDSB406-1-1.5	12–18	11/5/13	1.4 J (2.4)	2.7	18, pp. 4–5, 11; 30, pp. 36, 40, 80; 34, pp. 1–5, 7
	LPSB114-3-4	36–48	3/24/15	2.0 J (3.5)	2.8	19, pp. 3–4, 10, 40; 42, pp. 34, 118; 45, pp. 1–5, 30
	LPSB114-4-5	48–60	3/24/15	U	2.7	19, pp. 3–4, 10, 40; 42, pp. 36, 118; 45, pp. 1–5, 30
Cadmium (adjustment factor = 1.41)	MMS-MW01-01 (MMS-MW1-01)	72–96	11/19/97	U	0.22	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MMS-MW01-02	144–168	11/19/97	U	0.22	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MM-SS13-072903	0–2	7/29/03	0.45 J (0.63)	0.76	9, pp. 53, 98, 413, 803–804
	MM-SS14-072903	0–2	7/29/03	0.29 J (0.41)	0.68	9, pp. 53, 98, 413, 803–804
	MM-SS15-072903	0–2	7/29/03	0.16 J (0.23)	0.67	9, pp. 53, 82, 98, 414, 803–804
	RASB301-0-0.5	0–6	11/5/13	0.6	0.26	18, pp. 3, 5, 25; 30, pp. 52, 81; 34, pp. 1–5, 8
	RASB302-0-0.5	0–6	11/5/13	0.45	0.28	18, pp. 3, 5, 26; 30, pp. 48, 81; 34, pp. 1–5, 8
	RASB303-1-1.5	***12–18***	***11/5/13***	***0.69***	***0.26***	***18, pp. 3, 5, 27; 30, pp. 50, 81; 34, pp. 1–5, 8***
	RASB304-0-0.5	0–6	11/5/13	0.45	0.25	18, pp. 3, 5, 28; 30, pp. 44, 81; 34, pp. 1–5, 7
	RASB304-4-4.5	48–54	11/5/13	0.21 J (0.30)	0.25	18, pp. 3, 5, 28; 30, pp. 46, 81; 34, pp. 1–5, 8
	RASB305-0-0.5	0–6	11/5/13	0.57	0.24	18, pp. 3, 5, 29; 30, pp. 42, 80; 34, pp. 1–5, 7
	BDSB406-1-1.5	12–18	11/5/13	0.36	0.27	18, pp. 4–5, 11; 30, pp. 36, 40, 80; 34, pp. 1–5, 7
	BDSB406D-1-1.5	12–18	11/5/13	0.34	0.27	
	LPSB114-3-4	36–48	3/24/15	0.17 J (0.24)	0.28	19, pp. 3–4, 10, 40; 42, pp. 34, 118; 45, pp. 1–5, 30
	LPSB114-4-5	48–60	3/24/15	U	0.27	19, pp. 3–4, 10, 40; 42, pp. 36, 118; 45, pp. 1–5, 30
Chromium	MMS-SS04-01	0–12	4/11/97	21.1	NR	9, pp. 783–787; 10, pp. 32, 62, 182, 236, 278
	MMS-SS05-01	0–12	4/11/97	14.1	NR	9, pp. 783–787; 10, pp. 32, 62, 182, 236, 278
	MMS-MW01-01 (MMS-MW1-01)	72–96	11/19/97	2.2 B	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MMS-MW01-02	144–168	11/19/97	6.8	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MM-SS13-072903	0–2	7/29/03	19.5	1.5	9, pp. 53, 82, 98, 413, 803–804
	MM-SS14-072903	0–2	7/29/03	15.4	1.4	9, pp. 53, 82, 98, 413, 803–804
	MM-SS15-072903	***0–2***	***7/29/03***	***70.5***	***1.3***	***9, pp. 53, 82, 98, 414, 803–804***

TABLE 2. BACKGROUND SAMPLES, SOURCE 2						
Hazardous Substance	**Sample ID**	**Depth (in.)**	**Sample Date**	**Result (mg/kg)**	**RDL/RL (mg/kg)**	**References**
	RASB301-0-0.5	0–6	11/5/13	68	0.53	18, pp. 3, 5, 25; 30, pp. 52, 81; 34, pp. 1–5, 8
	RASB302-0-0.5	0–6	11/5/13	25	0.55	18, pp. 3, 5, 26; 30, pp. 48, 81; 34, pp. 1–5, 8
	RASB303-1-1.5	12–18	11/5/13	37	0.53	18, pp. 3, 5, 27; 30, pp. 50, 81; 34, pp. 1–5, 8
	RASB304-0-0.5	0–6	11/5/13	14	0.49	18, pp. 3, 5, 28; 30, pp. 44, 81; 34, pp. 1–5, 7
	RASB304-4-4.5	48–54	11/5/13	45	0.50	18, pp. 3, 5, 28; 30, pp. 46, 81; 34, pp. 1–5, 8
	RASB305-0-0.5	0–6	11/5/13	11	0.48	18, pp. 3, 5, 29; 30, pp. 42, 80; 34, pp. 1–5, 7
	BDSB406-1-1.5	12–18	11/5/13	11	0.55	18, pp. 4–5, 11; 30, pp. 36, 40, 80; 34, pp. 1–5, 7
	BDSB406D-1-1.5	12–18	11/5/13	10	0.53	
	LPSB114-3-4	36–48	3/24/15	12	0.57	19, pp. 3–4, 10, 40; 42, pp. 34, 118; 45, pp. 1–5, 30
	LPSB114-4-5	48–60	3/24/15	15	0.55	19, pp. 3–4, 10, 40; 42, pp. 36, 118; 45, pp. 1–5, 30
Copper (adjustment factor = 1.22)	MMS-SS04-01	0–12	4/11/97	14.8	NR	9, pp. 783–787; 10, pp. 32, 62, 182, 236, 278
	MMS-SS05-01	0–12	4/11/97	12.8	NR	9, pp. 783–787; 10, pp. 32, 62, 236, 278
	MMS-MW01-01 (MMS-MW1-01)	72–96	11/19/97	13.7	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MMS-MW01-02	144–168	11/19/97	20.6	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MM-SS13-072903	0–2	7/29/03	22.8	3.8	9, pp. 53, 82, 98, 413, 803–804
	MM-SS14-072903	0–2	7/29/03	21.2	3.4	9, pp. 53, 82, 98, 413, 803–804
	MM-SS15-072903	0–2	7/29/03	22.4	3.4	9, pp. 53, 82, 98, 414, 803–804
	RASB301-0-0.5	0–6	11/5/13	74 J (90)	0.53	18, pp. 3, 5, 25; 30, pp. 52, 81; 34, pp. 1–5, 8
	RASB302-0-0.5	0–6	11/5/13	37 J (45)	0.55	18, pp. 3, 5, 26; 30, pp. 48, 81; 34, pp. 1–5, 8
	RASB303-1-1.5	12–18	11/5/13	56 J (68)	0.53	18, pp. 3, 5, 27; 30, pp. 50, 81; 34, pp. 1–5, 8
	RASB304-0-0.5	0–6	11/5/13	26 J (32)	0.49	18, pp. 3, 5, 28; 30, pp. 44, 81; 34, pp. 1–5, 7
	RASB304-4-4.5	***48–54***	***11/5/13***	***78 J (95)***	***0.50***	***18, pp. 3, 5, 28; 30, pp. 46, 81; 34, pp. 1–5, 8***
	RASB305-0-0.5	0–6	11/5/13	30 J (37)	0.48	18, pp. 3, 5, 29; 30, pp. 42, 80; 34, pp. 1–5, 7
	BDSB406-1-1.5	12–18	11/5/13	24 J (29)	0.55	18, pp. 4–5, 11; 30, pp. 36, 40, 80; 34, pp. 1–5, 7
	BDSB406D-1-1.5	12–18	11/5/13	22 J (27)	0.53	
	LPSB114-3-4	36–48	3/24/15	19	0.57	19, pp. 3–4, 10, 40; 42, pp. 34, 118; 45, pp. 1–5, 30
	LPSB114-4-5	48–60	3/24/15	12	0.55	19, pp. 3–4, 10, 40; 42, pp. 36, 118; 45, pp. 1–5, 30

TABLE 2. BACKGROUND SAMPLES, SOURCE 2						
Hazardous Substance	**Sample ID**	**Depth (in.)**	**Sample Date**	**Result (mg/kg)**	**RDL/RL (mg/kg)**	**References**
Cyanide	***LPSB114-3-4***	***36–48***	***3/24/15***	***0.44***	***0.35***	***19, pp. 3–4, 10, 40; 42, pp. 35, 118; 45, pp. 1–5, 30***
	LPSB114-4-5	48–60	3/24/15	U	0.51	19, pp. 3–4, 10, 40; 42, pp. 37, 118; 45, pp. 1–5, 30
Lead (adjustment factor = 1.44)	MMS-SS04-01	0–12	4/11/97	12.2	NR	9, pp. 783–787; 10, pp. 32, 62, 182, 236, 278
	MMS-SS05-01	0–12	4/11/97	18.1	NR	9, pp. 783–787; 10, pp. 32, 62, 236, 278
	MMS-MW01-01 (MMS-MW1-01)	72–96	11/19/97	2.2 J (3.2)	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MMS-MW01-02	144–168	11/19/97	3.7	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MM-SS13-072903	0–2	7/29/03	67.4	0.46	9, pp. 53, 82, 98, 413, 803–804
	MM-SS14-072903	***0–2***	***7/29/03***	***91.7***	***0.41***	***9, pp. 53, 82, 98, 413, 803–804***
	MM-SS15-072903	0–2	7/29/03	39.2	0.40	9, pp. 53, 82, 98, 414, 803–804
	RASB301-0-0.5	0–6	11/5/13	14	0.79	18, pp. 3, 5, 25; 30, pp. 52, 81; 34, pp. 1–5, 8
	RASB302-0-0.5	0–6	11/5/13	6.1	0.83	18, pp. 3, 5, 26; 30, pp. 48, 81; 34, pp. 1–5, 8
	RASB303-1-1.5	12–18	11/5/13	9.9	0.79	18, pp. 3, 5, 27; 30, pp. 50, 81; 34, pp. 1–5, 8
	RASB304-0-0.5	0–6	11/5/13	14	0.74	18, pp. 3, 5, 28; 30, pp. 44, 81; 34, pp. 1–5, 7
	RASB304-4-4.5	48–54	11/5/13	1.8	0.75	18, pp. 3, 5, 28; 30, pp. 46, 81; 34, pp. 1–5, 8
	RASB305-0-0.5	0–6	11/5/13	30	0.72	18, pp. 3, 5, 29; 30, pp. 42, 80; 34, pp. 1–5, 7
	BDSB406-1-1.5	12–18	11/5/13	5.0	0.82	18, pp. 4–5, 11; 30, pp. 36, 40, 80; 34, pp. 1–5, 7
	BDSB406D-1-1.5	12–18	11/5/13	5.3	0.80	
	LPSB114-3-4	36–48	3/24/15	11	0.85	19, pp. 3–4, 10, 40; 42, pp. 34, 118; 45, pp. 1–5, 30
	LPSB114-4-5	48–60	3/24/15	4.4	0.82	19, pp. 3–4, 10, 40; 42, pp. 36, 118; 45, pp. 1–5, 30
Nickel	MMS-SS04-01	0–12	4/11/97	18.8	NR	9, pp. 783–787; 10, pp. 32, 62, 182, 236, 278
	MMS-SS05-01	0–12	4/11/97	16.2	NR	9, pp. 783–787; 10, pp. 32, 62, 182, 236, 278
	MMS-MW01-01 (MMS-MW1-01)	72–96	11/19/97	6.7 B	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MMS-MW01-02	144–168	11/19/97	15.2	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MM-SS13-072903	0–2	7/29/03	17.8	6.1	9, pp. 53, 82, 98, 413, 803–804
	MM-SS14-072903	0–2	7/29/03	17.3	5.5	9, pp. 53, 82, 98, 413, 803–804
	MM-SS15-072903	***0–2***	***7/29/03***	***87.5***	***5.4***	***9, pp. 53, 82, 98, 414, 803–804***

TABLE 2. BACKGROUND SAMPLES, SOURCE 2						
Hazardous Substance	**Sample ID**	**Depth (in.)**	**Sample Date**	**Result (mg/kg)**	**RDL/RL (mg/kg)**	**References**
	RASB301-0-0.5	0–6	11/5/13	59	0.53	18, pp. 3, 5, 25; 30, pp. 52, 81; 34, pp. 1–5, 8
	RASB302-0-0.5	0–6	11/5/13	42	0.55	18, pp. 3, 5, 26; 30, pp. 48, 81; 34, pp. 1–5, 8
	RASB303-1-1.5	12–18	11/5/13	52	0.53	18, pp. 3, 5, 27; 30, pp. 50, 81; 34, pp. 1–5, 8
	RASB304-0-0.5	0–6	11/5/13	15	0.49	18, pp. 3, 5, 28; 30, pp. 44, 81; 34, pp. 1–5, 7
	RASB304-4-4.5	48–54	11/5/13	75	0.50	18, pp. 3, 5, 28; 30, pp. 46, 81; 34, pp. 1–5, 8
	RASB305-0-0.5	0–6	11/5/13	17	0.48	18, pp. 3, 5, 29; 30, pp. 42, 80; 34, pp. 1–5, 7
	BDSB406-1-1.5	12–18	11/5/13	11	0.55	18, pp. 4–5, 11; 30, pp. 36, 40, 80; 34, pp. 1–5, 7
	BDSB406D-1-1.5	12–18	11/5/13	11	0.53	
	LPSB114-3-4	36–48	3/24/15	17	0.57	19, pp. 3–4, 10, 40; 42, pp. 34, 118; 45, pp. 1–5, 30
	LPSB114-4-5	48–60	3/24/15	20	0.55	19, pp. 3–4, 10, 40; 42, pp. 36, 118; 45, pp. 1–5, 30
Selenium (adjustment factor = 2.38)	MMS-SS04-01	0–12	4/11/97	1.2 J (2.9)	NR	9, pp. 783–787; 10, pp. 32, 62, 182, 236, 278
	MMS-SS05-01	0–12	4/11/97	1.6 J (3.8)	NR	9, pp. 783–787; 10, pp. 32, 62, 236, 278
	MMS-MW01-01 (MMS-MW1-01)	72–96	11/19/97	U	0.89	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MMS-MW01-02	144–168	11/19/97	0.9 B	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MM-SS14-072903	0–2	7/29/03	1.1	0.68	9, pp. 53, 82, 98, 413, 803–804
	MM-SS15-072903	0–2	7/29/03	0.63 J (1.5)	0.63	9, pp. 53, 82, 98, 414, 803–804
	RASB301-0-0.5	0–6	11/5/13	U	5.3	18, pp. 3, 5, 25; 30, pp. 52, 81; 34, pp. 1–5, 8
	RASB302-0-0.5	0–6	11/5/13	U	2.8	18, pp. 3, 5, 26; 30, pp. 48, 81; 34, pp. 1–5, 8
	RASB303-1-1.5	***12–18***	***11/5/13***	***U***	***13***	***18, pp. 3, 5, 27; 30, pp. 50, 81; 34, pp. 1–5, 8***
	RASB304-0-0.5	0–6	11/5/13	U	2.5	18, pp. 3, 5, 28; 30, pp. 44, 81; 34, pp. 1–5, 7
	RASB304-4-4.5	48–54	11/5/13	U	2.5	18, pp. 3, 5, 28; 30, pp. 46, 81; 34, pp. 1–5, 8
	RASB305-0-0.5	0–6	11/5/13	U	2.4	18, pp. 3, 5, 29; 30, pp. 42, 80; 34, pp. 1–5, 7
	BDSB406-1-1.5	12–18	11/5/13	U	2.7	18, pp. 4–5, 11; 30, pp. 36, 40, 80; 34, pp. 1–5, 7
	BDSB406D-1-1.5	12–18	11/5/13	U	2.7	
	LPSB114-3-4	36–48	3/24/15	U	2.8	19, pp. 3–4, 10, 40; 42, pp. 34, 118; 45, pp. 1–5, 30
	LPSB114-4-5	48–60	3/24/15	U	2.7	19, pp. 3–4, 10, 40; 42, pp. 36, 118; 45, pp. 1–5, 30
TCE	BDSB406-1-1.5	12–18	11/5/13	U	0.0021	18, pp. 4–5, 11; 30, pp. 35, 80; 34, pp. 1–5, 7

TABLE 2. BACKGROUND SAMPLES, SOURCE 2

Hazardous Substance	Sample ID	Depth (in.)	Sample Date	Result (mg/kg)	RDL/RL (mg/kg)	References
	BDSB406D-1-1.5	12–18	11/5/13	U	0.0021	18, pp. 4–5, 11; 30, pp. 39, 39, 80; 34, pp. 1–5, 7
Xylenes, m,p-	BDSB406-1-1.5	12–18	11/5/13	U	0.0041	18, pp. 4–5, 11; 30, pp. 35, 80; 34, pp. 1–5, 7
	BDSB406D-1-1.5	12–18	11/5/13	U	0.0021	18, pp. 4–5, 11; 30, pp. 39, 39, 80; 34, pp. 1–5, 7
Xylene, o-	BDSB406-1-1.5	12–18	11/5/13	U	0.0021	18, pp. 4–5, 11; 30, pp. 35, 80; 34, pp. 1–5, 7
	BDSB406D-1-1.5	12–18	11/5/13	U	0.0021	18, pp. 4–5, 11; 30, pp. 39, 39, 80; 34, pp. 1–5, 7
Zinc (adjustment factor = 1.50)	MMS-SS04-01	0–12	4/11/97	41.1 J (61.6)	NR	9, pp. 783–787; 10, pp. 32, 62, 182, 236, 278
	MMS-SS05-01	0–12	4/11/97	34.2 J (51.3)	NR	9, pp. 783–787; 10, pp. 32, 62, 182, 236, 278
	MMS-MW01-01 (MMS-MW1-01)	72–96	11/19/97	11.2 J (16.8)	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MMS-MW01-02	144–168	11/19/97	23.3 J (34.9)	NR	9, pp. 798–802; 10, pp. 32, 65, 159, 256, 278
	MM-SS13-072903	0–2	7/29/03	19.8	3.0	9, pp. 53, 82, 98, 413, 803–804
	MM-SS14-072903	0–2	7/29/03	50.7 J (76.1)	2.7	9, pp. 53, 82, 98, 413, 803–804
	MM-SS15-072903	0–2	7/29/03	44.4 J (66.6)	2.7	9, pp. 53, 82, 98, 414, 803–804
	RASB301-0-0.5	0–6	11/5/13	66	1.1	18, pp. 3, 5, 25; 30, pp. 52, 81; 34, pp. 1–5, 8
	RASB302-0-0.5	0–6	11/5/13	65	1.1	18, pp. 3, 5, 26; 30, pp. 48, 81; 34, pp. 1–5, 8
	RASB303-1-1.5	12–18	11/5/13	72	1.1	18, pp. 3, 5, 27; 30, pp. 50, 81; 34, pp. 1–5, 8
	RASB304-0-0.5	***0–6***	***11/5/13***	***280***	***0.98***	***18, pp. 3, 5, 28; 30, pp. 44, 81; 34, pp. 1–5, 7***
	RASB304-4-4.5	48–54	11/5/13	12	0.99	18, pp. 3, 5, 28; 30, pp. 46, 81; 34, pp. 1–5, 8
	RASB305-0-0.5	0–6	11/5/13	130	0.96	18, pp. 3, 5, 29; 30, pp. 42, 80; 34, pp. 1–5, 7
	BDSB406-1-1.5	12–18	11/5/13	32	1.1	18, pp. 4–5, 11; 30, pp. 36, 40, 80; 34, pp. 1–5, 7
	BDSB406D-1-1.5	12–18	11/5/13	35	1.1	
	LPSB114-3-4	36–48	3/24/15	40	1.1	19, pp. 3–4, 10, 40; 42, pp. 34, 118; 45, pp. 1–5, 30
	LPSB114-4-5	48–60	3/24/15	26	1.1	19, pp. 3–4, 10, 40; 42, pp. 36, 118; 45, pp. 1–5, 30

RDL/RL = Reporting detection limit/Reporting limit; these limits are sample- and matrix-dependent quantitation limits and hence are equivalent to the sample quantitation limit defined in the HRS Rule [Ref. 1, Section 1.1; 9, p. 47; 10, p. 49; 30, p. 73; 34, p. 5; 42, p. 115; 45, p. 5].
NR = The value is not reported in the available documentation.
B = The analyte value is less than the required method detection limit but greater than the instrument detection limit [Ref. 10, p. 185].
J = The reported value is estimated [Ref. 10, p. 185]. These estimated results have been adjusted up to account for potential low or unknown bias in the background samples per EPA Quick Reference Fact Sheet *Using Qualified Data*

to Document an Observed Release and Observed Contamination; the adjustment factors are provided in the table and the adjusted results are shown in parentheses [Ref. 46, pp. 5–8, 18].
U = The analyte was analyzed for, but was not detected above the level of the associated reported quantitation limit [Ref. 34, p. 5; 45, p. 5].

Contaminated Samples

The results listed here are significantly above background levels (i.e., equal to three times or greater than the maximum background levels; or equal to or greater than the quantitation limit where the maximum background is non-detect) and are considered to represent the minimum extent of contaminated soil at the former Magna facility.

TABLE 3. CONTAMINATED SAMPLES, SOURCE 2						
Hazardous Substance	**Sample ID**	**Depth (in.)**	**Sample Date**	**Result (mg/kg)**	**RL (mg/kg)**	**References**
Arsenic (adjustment factor = 1.74)	BDSB404-1-1.5	12–18	11/5/13	110 J (63.2)	2.9	18, pp. 4–5, 9; 30, pp. 32, 80; 34, pp. 1–5, 7
	LPSB112-12.5-13	150–156	11/6/13	19	2.4	18, pp. 3, 5, 23; 32, pp. 24, 107; 34, pp. 1–5, 11
	LPSB113-9-9.5	108–114	11/6/13	25 J (14)	2.6	18, pp. 3, 5, 24; 31, pp. 13, 98; 34, pp. 1–5, 9
	UASB209-1-1.5	12–18	11/8/13	21	3.9	18, pp. 3, 5, 36; 33, pp. 38, 157; 34, pp. 1–5, 13
Cadmium	LPSB101-6.5-7	78–84	11/8/13	2.6	0.29	18, pp. 3, 5, 12; 33, pp. 19, 157; 34, pp. 1–5, 13
Chromium	LPSB105-7.5-8	90–96	11/7/13	300	0.56	18, pp. 3, 5, 16; 32, pp. 40, 107; 34, pp. 1–5, 11
	LPSB111-6.5-7	78–84	11/6/13	230	0.53	18, pp. 3, 5, 22; 31, pp. 24, 98; 34, pp. 1–5, 9
	UASB218-1-2	12–24	2/6/15	270	0.54	19, pp. 4, 10, 77; 35, pp. 26, 59; 45, pp. 1–5, 8
	UASB218-2-3	24–36	2/6/15	350	0.57	19, pp. 4, 10, 77; 35, pp. 28, 60; 45, pp. 1–5, 8
	UASB218-3-4	36–48	2/6/15	260	0.51	19, pp. 4, 10, 77; 35, pp. 30, 60; 45, pp. 1–5, 8
	UASB218-7-8	84–96	2/6/15	310	0.50	19, pp. 4, 10, 77; 35, pp. 32, 60; 45, pp. 1–5, 8
	UASB219-1-2	12–24	2/6/15	280	0.55	19, pp. 4, 11, 78; 35, pp. 36, 60; 45, pp. 1–5, 8
	UASB219-4-5	48–60	2/6/15	290	0.58	19, pp. 4, 11, 78; 35, pp. 38, 60; 45, pp. 1–5, 8
	UASB219-4-5-1	48–60	2/6/15	320	0.55	19, pp. 4, 11, 78; 35, pp. 40, 60; 45, pp. 1–5, 9
	UASB219-5-6	60–72	2/6/15	280	0.53	19, pp. 4, 11, 78; 35, pp. 42, 60; 45, pp. 1–5, 9
	UASB219-6-7	72–84	2/6/15	290	0.58	19, pp. 4, 11, 78; 35, pp. 44, 60; 45, pp. 1–5, 9
	UASB219-7-7.5	84–90	2/6/15	330	0.59	19, pp. 4, 11, 78; 35, pp. 46, 60; 45, pp. 1–5, 9
	UASB220-15-16	180–192	3/25/15	360	0.58	19, pp. 4, 11, 79; 42, pp. 96, 121; 45, pp. 1–5, 34
	UASB224-18-19	216–228	3/25/15	240	0.61	19, pp. 4, 10, 83; 42, pp. 70, 119; 45, pp. 1–5, 32
Copper (adjustment factor = 1.22)	BDSB404-1-1.5	12–18	11/5/13	2,900 J (2,377)	0.58	18, pp. 4–5, 9; 30, pp. 32, 80; 34, pp. 1–5, 7
	BDSB405-1-1.5	12–18	11/5/13	1,200 J (984)	0.53	18, pp. 4–5, 10; 30, pp. 20, 80; 34, pp. 1–5, 7

TABLE 3. CONTAMINATED SAMPLES, SOURCE 2						
Hazardous Substance	**Sample ID**	**Depth (in.)**	**Sample Date**	**Result (mg/kg)**	**RL (mg/kg)**	**References**
	BDSB405-6-6.5	72–78	11/5/13	520 J (426)	0.56	18, pp. 4–5, 10; 30, pp. 24, 80; 34, pp. 1–5, 7
	LPSB101-6.5-7	78–84	11/8/13	850	0.58	18, pp. 3, 5, 12; 33, pp. 19, 157; 34, pp. 1–5, 13
	LPSB102-9-9.5	108–114	11/7/13	5,300	0.7	18, pp. 3, 5, 13; 32, pp. 56, 108; 34, pp. 1–5, 12
	LPSB110-0-0.5	0–6	11/6/13	520 J (426)	0.54	18, pp. 3, 5, 21; 31, pp. 28, 98; 34, pp. 1–5, 9
	LPSB113-9-9.5	108–114	11/6/13	520 J (426)	0.52	18, pp. 3, 5, 24; 31, pp. 13, 98; 34, pp. 1–5, 9
	UASB203-0-0.5	0–6	11/8/13	570	0.62	18, pp. 3, 5, 30; 33, pp. 98, 159; 34, pp. 1–5, 15
	UASB203-1-1.5	12–18	11/8/13	480	0.62	18, pp. 3, 5, 30; 33, pp. 102, 159; 34, pp. 1–5, 15
	UASB209-0-0.5	0–6	11/8/13	680	0.76	18, pp. 3, 5, 36; 33, pp. 34, 157; 34, pp. 1–5, 13
	UASB209-1-1.5	12–18	11/8/13	1,400	0.77	18, pp. 3, 5, 36; 33, pp. 38, 157; 34, pp. 1–5, 13
	UASB210-0-0.5	0–6	11/8/13	510	0.71	18, pp. 3, 5, 37; 33, pp. 23, 157; 34, pp. 1–5, 13
	UASB210-1-1.5	12–18	11/8/13	690	0.59	18, pp. 3, 5, 37; 33, pp. 27, 157; 34, pp. 1–5, 13
	UASB211-4-5	48–60	2/24/15	370	0.53	19, pp. 4, 11, 71; 41, pp. 29, 60; 45, pp. 1–5, 23
	UASB228-2-2.5	24–30	2/4/15	770	0.66	19, pp. 3–4, 10, 40; 35, pp. 14, 59; 45, pp. 1–5, 7
Cyanide	UASB214-3-3.8	36–45.6	2/24/15	2.5	0.37	19, pp. 4, 11, 73; 41, pp. 20, 59; 45, pp. 1–5, 22
	UASB222-6-6.5	72–78	3/23/15	1.8	0.51	19, pp. 4, 10, 81; 42, pp. 15, 117; 45, pp. 1–5, 29
	UASB228-2-2.5	24–30	2/4/15	3.8	0.52	19, pp. 4, 11, 86; 35, pp. 15, 59; 45, pp. 1–5, 7
	UASB228-7.5-8	90–96	2/4/15	3.4	0.39	19, pp. 4, 11, 86; 35, pp. 17, 59; 45, pp. 1–5, 7
Lead	LPSB101-6.5-7	78–84	11/8/13	640	0.87	18, pp. 3, 5, 12; 33, pp. 19, 157; 34, pp. 1–5, 13
	LPSB102-9-9.5	108–114	11/7/13	430	1.0	18, pp. 3, 5, 13; 32, pp. 56, 108; 34, pp. 1–5, 12
Nickel	BDSB404-1-1.5	12–18	11/5/13	1,000	0.58	18, pp. 4–5, 9; 30, pp. 32, 80; 34, pp. 1–5, 7
	LPSB105-7.5-8	90–96	11/7/13	400	0.56	18, pp. 3, 5, 16; 32, pp. 40, 107; 34, pp. 1–5, 11
	UASB209-1-1.5	12–18	11/8/13	450	0.77	18, pp. 3, 5, 36; 33, pp. 38, 157; 34, pp. 1–5, 13
	UASB210-1-1.5	12–18	11/8/13	280	0.59	18, pp. 3, 5, 37; 33, pp. 27, 157; 34, pp. 1–5, 13
	UASB218-0-1	0–12	2/6/15	280	0.62	19, pp. 4, 10, 77; 35, pp. 24, 59; 45, pp. 1–5, 8
	UASB218-1-2	12–24	2/6/15	660	0.54	19, pp. 4, 10, 77; 35, pp. 26, 59; 45, pp. 1–5, 8

TABLE 3. CONTAMINATED SAMPLES, SOURCE 2						
Hazardous Substance	**Sample ID**	**Depth (in.)**	**Sample Date**	**Result (mg/kg)**	**RL (mg/kg)**	**References**
	UASB218-2-3	24–36	2/6/15	670	0.57	19, pp. 4, 10, 77; 35, pp. 28, 60; 45, pp. 1–5, 8
	UASB218-3-4	36–48	2/6/15	580	0.51	19, pp. 4, 10, 77; 35, pp. 30, 60; 45, pp. 1–5, 8
	UASB218-7-8	84–96	2/6/15	710	0.50	19, pp. 4, 10, 77; 35, pp. 32, 60; 45, pp. 1–5, 8
	UASB218-8-9	96–108	2/6/15	450	0.53	19, pp. 4, 10, 77; 35, pp. 34, 60; 45, pp. 1–5, 8
	UASB219-1-2	12–24	2/6/15	400	0.55	19, pp. 4, 11, 78; 35, pp. 36, 60; 45, pp. 1–5, 8
	UASB219-4-5	48–60	2/6/15	730	0.58	19, pp. 4, 11, 78; 35, pp. 38, 60; 45, pp. 1–5, 8
	UASB219-4-5-1	48–60	2/6/15	690	0.55	19, pp. 4, 11, 78; 35, pp. 40, 60; 45, pp. 1–5, 9
	UASB219-5-6	60–72	2/6/15	710	0.53	19, pp. 4, 11, 78; 35, pp. 42, 60; 45, pp. 1–5, 9
	UASB219-6-7	72–84	2/6/15	660	0.58	19, pp. 4, 11, 78; 35, pp. 44, 60; 45, pp. 1–5, 9
	UASB219-7-7.5	84–90	2/6/15	650	0.59	19, pp. 4, 11, 78; 35, pp. 46, 60; 45, pp. 1–5, 9
	UASB220-15-16	180–192	3/25/15	300	0.58	19, pp. 4, 11, 79; 42, pp. 96, 121; 45, pp. 1–5, 34
	UASB224-18-19	216–228	3/25/15	450	0.61	19, pp. 4, 11, 83; 42, pp. 70, 119; 45, pp. 1–5, 32
	UASB230-4-5	48–60	3/24/15	410	0.54	19, pp. 4, 11, 88; 42, pp. 48, 118; 45, pp. 1–5, 31
Selenium	BDSB405-1-1.5	12–18	11/5/13	220	2.7	18, pp. 4–5, 10; 30, pp. 20, 80; 34, pp. 1–5, 7
	UASB209-1-1.5	12–18	11/8/13	19	3.9	18, pp. 3, 5, 36; 33, pp. 38, 157; 34, pp. 1–5, 13
	UASB228-2-2.5	24–30	2/4/15	40	3.3	19, pp. 3–4, 10, 40; 35, pp. 14, 59; 45, pp. 1–5, 7
TCE	BDSB403-1-1.5	12–18	11/5/13	0.040	0.0022	18, pp. 4–5, 8; 30, pp. 27, 80; 34, pp. 1–5, 7
	BDSB404-1-1.5	12–18	11/5/13	0.0053	0.0022	18, pp. 4–5, 9; 30, pp. 31, 80; 34, pp. 1–5, 7
Xylenes, m,p-	LPSB102-9-9.5	108–114	11/7/13	3.6	0.44	18, pp. 3, 5, 13; 32, pp. 55, 108; 34, pp. 1–5, 12
	LPSB105-7.5-8	90–96	11/7/13	0.017	0.0043	18, pp. 3, 5, 16; 32, pp. 39, 107; 34, pp. 1–5, 11
Xylene, o-	LPSB102-9-9.5	108–114	11/7/13	1.5	0.22	18, pp. 3, 5, 13; 32, pp. 55, 108; 34, pp. 1–5, 12
	LPSB105-7.5-8	90–96	11/7/13	0.0097	0.0021	18, pp. 3, 5, 16; 32, pp. 39, 107; 34, pp. 1–5, 11
Zinc	BDSB404-1-1.5	12–18	11/5/13	890	1.2	18, pp. 4–5, 9; 30, pp. 32, 80; 34, pp. 1–5, 7
	LPSB101-6.5-7	78–84	11/8/13	920	1.2	18, pp. 3, 5, 12; 33, pp. 19, 157; 34, pp. 1–5, 13
	LPSB102-9-9.5	108–114	11/7/13	8,700	14	18, pp. 3, 5, 13; 32, pp. 56, 108; 34, pp. 1–5, 12

RL = Reporting limit; these limits are sample- and matrix-dependent quantitation limits and hence are equivalent to the sample quantitation limit defined in the HRS Rule [Ref. 1, Section 1.1; 30, p. 73; 31, p. 91; 32, p. 98; 33, p. 150; 34, p. 5; 35, p. 57; 41, p. 57; 42, p. 115; 45, p. 5].
J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample [Ref. 34, p. 5]. These estimated results have been adjusted down to account for possible high bias in the contaminated samples, per EPA Quick Reference Fact Sheet *Using Qualified Data to Document an Observed Release and Observed Contamination*; the adjustment factors are provided in the table and the adjusted results are shown in parentheses [Ref. 46, pp. 5–8, 18].

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Tier A – Hazardous Constituent Quantity

The hazardous constituent quantity for Source 2 could not be adequately determined according to the HRS requirements; that is, the total mass of all Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, Section 2.4.2.1.1]. There are insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, etc.) available to adequately calculate the total or partial mass of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous constituent quantity for Source 2 with reasonable confidence. As a result, the evaluation of hazardous waste quantity proceeds to the evaluation of *Tier B*, Hazardous Wastestream Quantity [Ref 1, Section 2.4.2.1.1].

Hazardous Constituent Quantity (C) Value: NS

2.4.2.1.2 Tier B – Hazardous Wastestream Quantity

The hazardous wastestream quantity for Source 2 could not be adequately determined according to the HRS requirements; that is, the total mass of all hazardous wastestreams plus the mass of any additional CERCLA pollutants and contaminants in the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, Section 2.4.2.1.2]. There are insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, etc.) available to adequately calculate the total mass or partial mass of the hazardous wastestreams plus the mass of all CERCLA pollutants and contaminants in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous wastestream quantity for Source 2 with reasonable confidence. Scoring proceeds to the evaluation of *Tier C*, Volume [Ref. 1, Section 2.4.2.1.2].

Hazardous Wastestream Quantity (W) Value: NS

2.4.2.1.3 Tier C – Volume

Sampling and analytical results show that soil at the former Magna facility is contaminated with metals and VOCs (see **Sections 2.2.1 and 2.2.2**). However, the volume of contaminated soil is unknown. Therefore, the volume of the source is assigned a value of 0 [Ref. 1, Section 2.4.2.1.3].

Volume (V) Assigned Value: 0

2.4.2.1.4 Tier D – Area

Sampling and analytical results show that soil at the former Magna facility is contaminated with metals and VOCs (see **Sections 2.2.1** and **2.2.2**). The soil contamination surrounds Source 1 and is associated with overland flow and subsurface migration of contaminated wastewater from that source [Ref. 6, p. 22; 9, pp. 9, 52–53, 80–81, 97–98; 18, p. 5; 19, p. 10]. The area of contaminated soil as documented according to HRS criteria is approximately 60,154 square feet (ft^2) [**Figure 2**]. The source type is “Contaminated Soil”, so the area value is divided by 34,000 to obtain the assigned value shown below [Ref. 1, Section 2.4.2.1.4].

Dimensions of source = 60,154 ft^2
Area (A) Assigned Value: 60,154/34,000 = 1.77

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value for Source 2 is 1.77 for Tier D – Area [Ref. 1, Section 2.4.2.1].

Source Hazardous Waste Quantity Value: 1.77

SITE SUMMARY OF SOURCE DESCRIPTIONS

TABLE 4. HAZARDOUS WASTE QUANTITY AND CONTAINMENT					
Source Number	Source Hazardous Waste Quantity Value	Containment			
		Ground Water	Surface Water	Air	
				Gas	Particulate
1	29.3	NS	10	NS	NS
2	1.77	NS	10	NS	NS

NS = Not Scored

Other Possible Sources

No other possible sources at the site have been identified.

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1 Definition of Hazardous Substance Migration Path for Overland/Flood Component

Topography across the former Magna facility is fairly steep from east to west [Ref. 9, p. 42]. The nearest surface water body is the large wetland complex to the west and northwest of site sources, which includes broad-leaf deciduous forest, emergent communities, perennial streams, ponds, and small ponded areas [Ref. 9, p. 104]. Sources 1 and 2 at the site are located just upslope (i.e., east) of this freshwater wetland complex, and stormwater drainage flows west with the topography, from the source areas into the wetlands and streams [Ref. 6, p. 12; 9, p. 42]. Historical documentation indicates that overflow from Source 1 and ponded liquid near Source 1 contained high levels of the same metals found in Source 1, and that vegetation in an area downgradient of Source 1 had been adversely affected by the overland waste flow [Ref. 7, p. 1; 9, p. 12]. Surface soil contamination in the area downslope of Source 1 provides further evidence of overland flow of contaminants (the soil contamination at the former Magna facility [i.e., Source 2] is primarily associated with Source 1, from both overland flow and subsurface migration of wastewater) [Ref. 6, p. 22; 9, pp. 9, 52–53, 80–81, 97–98; 18, p. 5; 19, p. 10]. The overland flow appears to have resulted in a probable point of entry (PPE) line (i.e., PPE1) into the wetlands from Source 1; the overland distance to the nearest point of PPE1 is approximately 60 feet. Source 2 intersects the wetland area, forming a PPE line (i.e., PPE2) that overlaps the Source 1 PPE and extends further south; the overland distance to PPE2 is 0 feet or negligible. See **Figures 2 and 3** for depictions of the PPEs with respect to the Source 1 and 2 locations.

The wetlands where the PPEs are located are palustrine, forested, broad-leaved deciduous, seasonally flooded wetlands (PFO1C) and palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated wetlands (PFO1E); they are contiguous to two small streams that converge within the wetland complex [Ref. 9, pp. 104, 134, 194; 56, pp. 2, 7, 11]. One stream (approximately 1.5 feet wide and 6 inches deep) flows northerly into the wetland complex and enters the southerly-flowing stream (approximately 3 feet wide and 6–8 inches deep); the merged stream flows southwesterly through wetlands and a manmade pond (i.e., impounded reach) [Ref. 9, pp. 104–105, 194; 56, pp. 2, 8, 11]. The small, unnamed tributary stream flows through a culvert at the southwest edge of the pond, beneath Cross Road and private property, and resurfaces to the southwest [Ref. 9, pp. 104, 118, 194; 56, p. 11]. It flows for a total of approximately 1.8 miles from the PPEs to the main branch of Furnace Brook, which in turn flows for approximately 5 miles to its terminus at the Hudson River; there are several ponds or ponded areas along the tributary and along Furnace Brook between the former Magna facility and the Hudson River [Ref. 55, pp. 1–3; 57, p. 4; 68, p. 6]. The unnamed tributaries and Furnace Brook are fresh water streams that have contiguous fresh water wetlands [Ref. 9, pp. 104, 122, 130, 170, 194; 55, pp. 7–8]. The target distance limit (TDL) for the site is completed in the Hudson River approximately 8 miles downstream of Furnace Brook [Ref. 55, p. 3; **Figure 5**]. The Hudson River is a large river with an average flow greater than 22,000 cubic feet per second (cfs), and the portion of the river within the TDL is tidal [Ref. 60, p. 1]. The salt water/fresh water interface moves through the area and salinity of the river fluctuates with the tides, however, it is generally brackish or saline in the lower Hudson River near Cortlandt Manor [Ref. 61, pp. 1–11; 62, pp. 9–12].

The RI included surface water and sediment sampling; analytical results indicated contamination, and the PDI sediment sampling results from 2013 through 2015 confirm that there is an observed release to surface water from site sources; the release affects the stream, wetlands, and pond that are located adjacent to the sources at the site [see **Section 4.1.2.1.1**]. Targets within the surface water TDL include approximately 1.5 miles of freshwater wetland frontage along the zone of contamination, a downstream fishery used for recreation and consumption in the Hudson River, eagle habitat along the Hudson River, and other sensitive environmental areas such as the Oscawana Island Nature Preserve located at the mouth of Furnace Brook [Ref. 56, pp. 3, 6; 58, p. 6; 63, p. 31; 64, p. 2; 67, pp. 1–2].

4.1.2.1 Likelihood of Release

4.1.2.1.1 Observed Release

An observed release to surface water is documented by direct observation and by chemical analysis.

Observed Release by Direct Observation

Source 2 is in direct contact with an HRS-eligible wetland (see **Figure 2**), constituting an observed release by direct observation. Soil samples UASB210-0-0.5 and UASB210-1-1.5, collected within Source 2 along the eastern edge of the wetland, contain copper at concentrations that significantly exceed background levels; sample UASB210-1-1.5 also contains nickel at a concentration that meets the criteria for significance above background (see **Source 2, Section 2.2.2**). Therefore, source material that contains one or more site-attributable hazardous substances is known to be in direct contact with surface water and there is an observed release by direct observation [Ref. 1, Section 4.1.2.1.1].

Observed Release by Chemical Analysis

The sediment sampling and analysis by NYSDEC documents an observed release by chemical analysis of arsenic, cadmium, chromium, copper, and nickel along the surface water migration pathway from the PPE to NYSDEC sediment sampling location BRSD858, approximately 1.5 miles (almost 8,000 feet) downstream [**Figure 3**; see **Tables 5 and 6** below]. This zone of contamination affects approximately 1.5 miles of wetland frontage [**Figure 3**].

The sediment samples that document background and observed release conditions were collected by the NYSDEC PDI investigation team between March 2013 and March 2015 [Ref. 17, pp. 1–10; 20, pp. 1–37; 69, pp. 2192–2194]. (Although subsurface sampling shows the presence of elevated levels of site-related hazardous substances throughout the adjacent stream, wetlands, and pond, these data are not considered in the evaluation of observed release due to the lack of subsurface background samples for comparison [Ref. 17, pp. 2–8].) The background and observed release samples all were collected from the 0- to 6-inch depth interval, and they were analyzed for metals according to SW-846 Method 6010C [Ref. 17, pp. 1–10; 20, pp. 1–37; 45, pp. 1-5; 69, pp. 4–5, 2192–2194]. All the samples were collected from downstream locations in the wetland complex to the west of site sources and downstream areas (see **Table 9** for the specific surface water body for each sample). The analytical results show the presence of arsenic, cadmium, chromium, copper, and nickel at concentrations significantly above background. **Tables 5** presents the results that demonstrate background conditions and **Table 6** presents the results that meet observed release criteria.

To show that the increase in contaminant concentrations are not due to any of the differences between background and release sediment sample characteristics, release concentrations are compared to the maximum reported background concentration in the observed release evaluation. Estimated concentrations (flagged “J”) used in the observed release evaluation were adjusted per EPA Quick Reference Fact Sheet *Using Qualified Data to Document an Observed Release and Observed Contamination* to account for possible bias in the analytical results; estimated background results were multiplied by adjustment factors to account for possible low bias, and estimated release concentrations were divided by adjustment factors to account for possible high bias [Ref. 46, pp. 5–8, 18]. The HRS significant increase criteria were verified in consideration of the projected adjustments, which are shown in parentheses after reported results in the background and observed release tables below.

TABLE 5. BACKGROUND SEDIMENT SAMPLE CONCENTRATIONS (mg/kg)													
Field Sample ID	**Lab Sample ID**	**Sample Date**	**Arsenic**		**Cadmium**		**Chromium**		**Copper**		**Nickel**		**References**
			Result	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	
BSSB804-0-0.5	13E0231-09	5/7/13	U	3.0	U	0.49	***41***	0.42	***35 J (43)***	1.3	70 J (95)	0.40	17, pp. 1–3, 10; 28, pp. 23, 46; 29, pp. 1–4, 24
BSSB805-0-0.5	13E0231-07	5/7/13	U	1.3	U	0.21	7.7	0.18	4.4 J (5.4)	0.54	15 J (20)	0.17	17, pp. 1–3, 10; 28, pp. 19, 46; 29, pp. 1–4, 24
BSSB806-0-0.5	13E0231-08	5/7/13	U	1.3	U	0.22	10	0.19	4.9 J (6.0)	0.57	15 J (20)	0.18	17, pp. 1–3, 10; 28, pp. 21, 46; 29, pp. 1–4, 24
BSSB807-0-0.5	13E0231-05	5/7/13	2.2	1.4	U	0.23	35	0.20	10 J (12)	0.60	26 J (35)	0.19	17, pp. 1–3, 10; 28, pp. 15, 46; 29, pp. 1–4, 24
BSSB807-0-0.5D	13E0231-06	5/7/13	***2.4***	1.5	U	0.25	34	0.21	10 J (12)	0.64	25 J (34)	0.20	17, pp. 1–3, 10; 28, pp. 17, 46; 29, pp. 1–4, 24
BSSB808-0-0.5	13E0231-10	5/7/13	U	1.1	U	0.18	28	0.15	7.8 J (9.5)	0.46	38 J (51)	0.15	17, pp. 1–3, 10; 28, pp. 25, 46; 29, pp. 1–4, 24
BSSB809-0-0.5	13E0231-11	5/7/13	U	1.1	U	0.18	30	0.16	7.3 J (8.9)	0.48	***110 J (149)***	0.15	17, pp. 1–3, 10; 28, pp. 27, 47; 29, pp. 1–4, 24
BSSB810-0-0.5	13E0231-12	5/7/13	U	1.1	U	0.19	16	0.16	8.4 J (10)	0.48	40 J (54)	0.15	17, pp. 1–3, 10; 28, pp. 29, 47; 29, pp. 1–4, 24
BSSB811-0-0.5	13E0231-13	5/7/13	U	1.1	U	0.19	8.5	0.16	4.1 J (5.0)	0.48	30 J (41)	0.15	17, pp. 1–3, 10; 28, pp. 31, 47; 29, pp. 1–4, 25
BSSB812-0-0.5	13E0231-14	5/7/13	U	1.0	U	0.17	7.2	0.14	6.6 J (8.1)	0.44	8.8 J (12)	0.14	17, pp. 1–3, 10; 28, pp. 33, 47; 29, pp. 1–4, 25
BSSB816-0-0.5	13E0231-01	5/7/13	U	1.1	***0.39***	0.18	8.6	0.15	5.4 J (6.6)	0.47	12 J (16)	0.15	17, pp. 1–3, 10; 28, pp. 5, 46; 29, pp. 1–4, 24
BSSB819-0-0.5	13E0231-03	5/7/13	U	1.9	U	0.31	23	0.26	27 J (33)	0.80	17 J (23)	0.25	17, pp. 1–3, 10; 28, pp. 9, 46; 29, pp. 1–4, 24
BSSB820-0-0.5	13E0231-02	5/7/13	U	1.2	U	0.19	16	0.16	18 J (22)	0.49	14 J (19)	0.16	17, pp. 1–3, 10; 28, pp. 7, 46; 29, pp. 1–4, 24
BSSB821-0-0.5	13E0231-04	5/7/13	U	1.3	U	0.21	4.5	0.18	4.1 J (5.0)	0.54	4.1 J (5.5)	0.17	17, pp. 1–3, 10; 28, pp. 11, 46; 29, pp. 1–4, 24

mg/kg = milligrams per kilogram.
RL = Reporting limit; these limits are sample- and matrix-dependent quantitation limits and hence are equivalent to the sample quantitation limit defined in the HRS Rule [Ref. 1, Section 1.1; 28, p. 43; 29, p. 4].
U = The analyte was analyzed for, but was not detected above the level of the associated reported quantitation limit [Ref. 29, p. 4].
J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample [Ref. 29, p. 4]. These estimated results have been adjusted up to account for possible low bias in the background samples, per EPA Quick Reference Fact Sheet *Using Qualified Data to Document an Observed Release and Observed Contamination*; the adjusted results are shown in parentheses [Ref. 29, pp. 1–4; 46, pp. 5–8, 18].

TABLE 6. OBSERVED RELEASE SEDIMENT CONCENTRATIONS (mg/kg) – Page 1 of 4													
Field Sample ID	**Lab Sample ID**	**Sample Date**	**Arsenic**		**Cadmium**		**Chromium**		**Copper**		**Nickel**		**References**
			Result	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	
Maximum Background Level			***2.4***	1.5	***0.39***	0.18	***41***	0.42	***35 J (43)***	1.3	***110 J (149)***	0.15	17, pp. 1–3, 10; 28, pp. 5–33, 46–47; 29, pp. 1–4, 24–25
WTSD501-0-0.5	13C0854-13	3/22/13	---		---		---		590	2.9	---		17, pp. 1–3, 6; 23, pp. 30, 96; 29, pp. 1–4, 12
WTSD502-0-0.5	13C0854-12	3/22/13	---		---		---		380	3.8	---		17, pp. 1–3, 6; 23, pp. 28, 96; 29, pp. 1–4, 12
WTSD515-0-0.5	13C0680-22	3/21/13	---		---		180 J (140)	1.9	---		---		17, pp. 1–3, 6; 22, pp. 49, 62; 29, pp. 1–4, 11
WTSD519-0-0.5	13C0680-17	3/21/13	19	3.9	1.6	0.39	270	0.78	---		---		17, pp. 1–3, 6; 22, pp. 39, 61; 29, pp. 1–4, 11
WTSD520-0-0.5	13C0613-14	3/19/13	---		1.8	1.3	---		220 J (180)	2.7	---		17, pp. 1–3, 7; 21, pp. 36, 102; 29, pp. 1–4, 7
WTSD521-0-0.5	13C0613-17	3/19/13	---		1.9 J (1.3)	1.4	---		500 J (410)	2.8	---		17, pp. 1–3, 7; 21, pp. 43, 102; 29, pp. 1–4, 7
WTSD523-0-0.5	13C0680-12	3/21/13	---		---		---		130	0.97	---		17, pp. 1–3, 7; 22, pp. 29, 61; 29, pp. 1–4, 11
PASD601-0-0.5	13C0613-05	3/19/13	---		1.9 J (1.3)	1.2	---		220 J (180)	2.4	---		17, pp. 1–3, 7; 21, pp. 16, 101; 29, pp. 1–4, 6
PASD610-0-0-5	13C0950-31	3/28/13	---		3.2 J (2.3)	1.6	---		330 J (270)	3.3	---		17, pp. 1–3, 7; 24, pp. 70, 171; 29, pp. 1–4, 17
PASD619-0-0.5	13C0680-18	3/21/13	100	6.4	3.2	0.64	140	1.3	260	1.3	---		17, pp. 1–3, 7; 22, pp. 41, 61; 29, pp. 1–4, 11
PASD620-0-0.5	13C0613-32	3/18/13	---		---		210	0.72	---		---		17, pp. 1–3, 7; 21, pp. 74, 104; 29, pp. 1–4, 8
PASD623-0-0.5	13C0680-10	3/21/13	---		---		190	0.62	690	0.62	640	0.62	17, pp. 1–3, 7; 22, pp. 25, 60; 29, pp. 1–4, 10
PASD623-0-0.5 D	13C0680-11	3/21/13	---		---		170	0.57	650	0.57	720	0.57	17, pp. 1–3, 7; 22, pp. 2, 27, 61; 29, pp. 1–4

mg/kg = milligrams per kilogram.
RL = Reporting limit; these limits are sample- and matrix-dependent quantitation limits and hence are equivalent to the sample quantitation limit defined in the HRS Rule [Ref. 1, Section 1.1; 21, p. 99; 22, p. 58; 23, p. 93; 24, p. 166; 28, p. 43; 29, p. 4].
--- = Result does not meet observed release criteria.
J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample [Ref. 29, p. 4]. These estimated results have been adjusted down to account for possible high bias in the release samples, per EPA Quick Reference Fact Sheet *Using Qualified Data to Document an Observed Release and Observed Contamination*; the adjusted results are shown in parentheses [Ref. 29, pp. 1–4; 46, pp. 5–8, 18].

TABLE 6. OBSERVED RELEASE SEDIMENT CONCENTRATIONS (mg/kg) – Page 2 of 4													
Field Sample ID	**Lab Sample ID**	**Sample Date**	**Arsenic**		**Cadmium**		**Chromium**		**Copper**		**Nickel**		**References**
			Result	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	
Maximum Background Level			***2.4***	1.5	***0.39***	0.18	***41***	0.42	***35 J (43)***	1.3	***110 J (149)***	0.15	17, pp. 1–3, 10; 28, pp. 5–33, 46–47; 29, pp. 1–4, 24–25
BRSD704-0-0.5	13C0950-58	3/28/13	---		---		---		300 J (246)	2.7	---		17, pp. 1–3, 8; 24, pp. 124, 173; 29, pp. 1–4, 19
BRSD706-0-0.5	13C0950-50	3/28/13	---		---		---		140	1.6	---		17, pp. 1–3, 8; 24, pp. 108, 172; 29, pp. 1–4, 18
BRSD710-0-0.5	13C0680-16	3/21/13	---		---		140	0.66	---		---		17, pp. 1–3, 8; 22, pp. 37, 61; 29, pp. 1–4, 11
BRSD716-0-0.5	13C0680-14	3/21/13	---		---		170	0.63	---		---		17, pp. 1–3, 8; 22, pp. 33, 61; 29, pp. 1–4, 11
BRSD722-0-0.5	13C0613-26	3/18/13	---		---		160	0.59	---		---		17, pp. 1–3, 8; 21, pp. 62, 103; 29, pp. 1–4, 8
BRSD736-0-0.5	13E0068-01	4/30/13	---		---		150	0.94	970 J (795)	0.94	---		17, pp. 1–3, 9; 27, pp. 7, 70; 29, pp. 1–4, 22
BRSD738-0-0.5	13E0068-03	4/30/13	---		---		---		270 J (221)	0.58	---		17, pp. 1–3, 9; 27, pp. 11, 70; 29, pp. 1–4, 22
BRSD739-0-0.5	13E0068-04	4/30/13	---		---		170	0.95	1300 J (1066)	0.95	---		17, pp. 1–3, 9; 27, pp. 13, 70; 29, pp. 1–4, 22
BRSD741-0-0.5	13E0068-06	4/30/13	---		---		---		180 J (148)	0.88	---		17, pp. 1–3, 9; 27, pp. 17, 70; 29, pp. 1–4, 22
BRSD742-0-0.5	13E0068-07	4/30/13	---		---		---		170 J (139)	0.79	---		17, pp. 1–3, 9; 27, pp. 19, 70; 29, pp. 1–4, 22
BRSD744-0-0.5	13E0068-09	4/30/13	---		1.2	0.49	140	0.98	240 J (197)	0.98	---		17, pp. 1–3, 9; 27, pp. 23, 70; 29, pp. 1–4, 22
BRSD747-0-0.5	13E0068-12	4/30/13	---		---		---		180 J (148)	1.0	---		17, pp. 1–3, 9; 27, pp. 29, 71; 29, pp. 1–4, 22
BRSD748-0-0.5	13E0068-13	4/30/13	---		---		---		190 J (156)	0.99	---		17, pp. 1–3, 9; 27, pp. 31, 71; 29, pp. 1–4, 22

mg/kg = milligrams per kilogram.
RL = Reporting limit; these limits are sample- and matrix-dependent quantitation limits and hence are equivalent to the sample quantitation limit defined in the HRS Rule [Ref. 1, Section 1.1; 21, p. 99; 22, p. 58; 24, p. 166; 27, p. 67; 28, p. 43; 29, p. 4].
--- = Result does not meet observed release criteria.
J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample [Ref. 29, p. 4]. These estimated results have been adjusted down to account for possible high or unknown bias in the release samples, per EPA Quick Reference Fact Sheet *Using Qualified Data to Document and Observed Release and Observed Contamination*; the adjusted results are shown in parentheses [Ref. 29, pp. 1–4; 46, pp. 5–8, 18].

TABLE 6. OBSERVED RELEASE SEDIMENT CONCENTRATIONS (mg/kg) – Page 3 of 4

Field Sample ID	Lab Sample ID	Sample Date	Arsenic		Cadmium		Chromium		Copper		Nickel		References
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	
Maximum Background Level			***2.4***	1.5	***0.39***	0.18	***41***	0.42	***35 J (43)***	1.3	***110 J (149)***	0.15	17, pp. 1–3, 10; 28, pp. 5–33, 46–47; 29, pp. 1–4, 24–25
BRSD750-0-0.5	13E0068-15	4/30/13	---		---		---		240 J (197)	0.83	---		17, pp. 1–3, 9; 27, pp. 37, 71; 29, pp. 1–4, 23
BRSD751-0-0.5	13E0068-16	4/30/13	---		---		---		170 J (139)	1.0	---		17, pp. 1–3, 9; 27, pp. 39, 71; 29, pp. 1–4, 23
BRSD752-0-0.5	13E0068-17	4/30/13	---		---		140	0.91	---		---		17, pp. 1–3, 9; 27, pp. 41, 71; 29, pp. 1–4, 23
BRSD752-0-0.5D	13E0068-18	4/30/13	---		1.3	0.44	130	0.88	---		---		17, pp. 1–3, 9; 27, pp. 43, 71; 29, pp. 1–4, 23
BRSD756-0-0.5	13E0068-22	4/30/13	---		1.3	0.53	170	1.1	190 J (156)	1.1	---		17, pp. 1–3, 9; 27, pp. 51, 72; 29, pp. 1–4, 23
BRSD757-0-0.5	13E0068-23	4/30/13	---		---		---		160 J (131)	1.1	---		17, pp. 1–3, 9; 27, pp. 53, 72; 29, pp. 1–4, 23
SD805	480-49854-5	11/8/13	---		---		---		414	1.3	---		68, p. 10; 69, pp. 5, 9, 38, 2192–2194
SD809	480-49854-9	11/8/13	---		---		---		617	1.3	---		68, p. 10; 69, pp. 5, 11, 42, 2192–2194
SD817	480-49854-17	11/7/13	---		---		---		132	1.3	---		68, p. 10; 69, pp. 5, 15, 50, 2192–2194
SD822	480-49854-22	11/7/13	---		---		---		144	1.2	---		68, p. 10; 69, pp. 5, 20, 55, 2192–2194
SD825	480-49854-25	11/7/13	---		---		---		267	1.3	---		68, p. 10; 69, pp. 5, 23, 58, 2192–2194
SD825 DUP	480-49854-34	11/7/13	---		---		---		314	1.4	---		68, p. 10; 69, pp. 5, 30, 2192–2194
SD830	480-49854-30	11/7/13	---		---		---		426	1.3	---		68, p. 10; 69, pp. 5, 28, 2192–2194

mg/kg = milligrams per kilogram.
RL = Reporting limit; these limits are sample- and matrix-dependent quantitation limits and hence are equivalent to the sample quantitation limit defined in the HRS Rule [Ref. 1, Section 1.1; 27, p. 67; 28, p. 43; 29, p. 4; 69, p. 4].
--- = Result does not meet observed release criteria.
J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample [Ref. 29, p. 4]. These estimated results have been adjusted down to account for possible high bias in the release samples, per EPA Quick Reference Fact Sheet *Using Qualified Data to Document an Observed Release and Observed Contamination*; the adjusted results are shown in parentheses [Ref. 29, pp. 1–4; 46, pp. 5–8, 18].

TABLE 6. OBSERVED RELEASE SEDIMENT CONCENTRATIONS (mg/kg) – Page 4 of 4													
Field Sample ID	**Lab Sample ID**	**Sample Date**	**Arsenic**		**Cadmium**		**Chromium**		**Copper**		**Nickel**		**References**
			Result	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	
Maximum Background Level			***2.4***	1.5	***0.39***	0.18	***41***	0.42	***35 J (43)***	1.3	***110 J (149)***	0.15	17, pp. 1–3, 10; 28, pp. 5–33, 46–47; 29, pp. 1–4, 24–25
BRSD832-0-0.5	15C0559-18	3/12/15	---		1.5	1.4	---		170	2.9	---		20, pp. 1–3, 6, 16; 43, pp. 45, 81; 45, pp. 1–5, 27
BRSD834-0-0.5	15C0559-20	3/12/15	---		1.6	1.2	---		160	2.5	---		20, pp. 1–3, 6, 18; 43, pp. 49, 81; 45, pp. 1–5, 27
BRSD835-0-0.5	15C0559-21	3/12/15	---		1.5	1.3	---		---		---		20, pp. 1–3, 6, 19; 43, pp. 51, 82; 45, pp. 1–5, 27
BRSD836-0-0.5	15C0559-22	3/12/15	---		1.5	1.2	---		310	2.5	---		20, pp. 1–3, 6, 20; 43, pp. 53, 82; 45, pp. 1–5, 27
BRSD837-0-0.5	15C0559-23	3/12/15	---		1.5	1.2	---		350	2.5	---		20, pp. 1–3, 6, 21; 43, pp. 55, 82; 45, pp. 1–5, 27
BRSD838-0-0.5	15C0559-24	3/12/15	---		1.8	1.5	---		360	2.9	---		20, pp. 1–3, 6, 22; 43, pp. 57, 82; 45, pp. 1–5, 27
BRSD846-0-0.5	15C0559-28	3/12/15	---		2.0	1.5	---		300	3.1	---		20, pp. 1–3, 6, 29; 43, pp. 65, 82; 45, pp. 1–5, 28
BRSD851-0-0.5	15C0559-15	3/11/15	---		2.5	2.1	170	4.2	2,800	4.2	450	4.2	20, pp. 1–3, 6, 30; 43, pp. 39, 81; 45, pp. 1–5, 26
BRSD851-0-0.5-1	15C0559-16	3/11/15	---		2.7	2.1	170	4.1	2,500	4.1	---		20, pp. 1–3, 6, 30; 43, pp. 41, 81; 45, pp. 1–5, 26
BRSD852-0-0.5	15C0559-14	3/11/15	---				---		150	1.7	---		20, pp. 1–3, 6, 31; 43, pp. 37, 81; 45, pp. 1–5, 26
BRSD853-0-0.5	15C0559-13	3/11/15	---				---		380	4.6	---		20, pp. 1–3, 6, 32; 43, pp. 35, 81; 45, pp. 1–5, 26
BRSD854-0-0.5	15C0559-12	3/11/15	---		1.8	1.5	---		230	3.1	---		20, pp. 1–3, 6, 33; 43, pp. 33, 81; 45, pp. 1–5, 26
BRSD857-0-0.5	15C0559-11	3/11/15	---				---		1,000	4.9	---		20, pp. 1–3, 6, 36; 43, pp. 31, 81; 45, pp. 1–5, 26
BRSD858-0-0.5	15C0559-10	3/11/15	---				---		350	4.6	---		20, pp. 1–3, 6, 37; 43, pp. 29, 80; 45, pp. 1–5, 26

mg/kg = milligrams per kilogram.
RL = Reporting limit; these limits are sample- and matrix-dependent quantitation limits and hence are equivalent to the sample quantitation limit defined in the HRS Rule [Ref. 1, Section 1.1; 28, p. 43; 29, p. 4; 43, p. 78; 45, p. 5].
--- = Result does not meet observed release criteria.
J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample [Ref. 29, p. 4; see **Table 5**].

Attribution

Magna Metals conducted metal plating, polishing, and lacquering at the facility from 1955 to June 1979. During operations, the facility used Source 1, Magna's wastewater disposal system consisting of a series of interconnected settling tanks and leach pits, for the disposal of industrial wastewater into the ground [Ref. 6, pp. 7–8, 43; 7, p. 1; 8, p. 4; 9, pp. 8, 24–26, 210–212]. Source 1 was constructed with cinderblock, perforated concrete, perforated piping, and gravel to facilitate percolation of wastewater into the ground [Ref. 9, pp. 24–25, 35, 39, 212, 216–217; 18, p. 5]. During Magna's operation, the company discharged iron, lead, copper, nickel, and zinc chlorides; cyanides; sulfates; and waste TCE to Source 1 [Ref. 6, pp. 8, 43; 7, p. 1; 9, pp. 8, 24–26, 39, 210–212]. Wastewater influent, effluent, and overflow samples collected at Magna in October 1978 contained levels of chromium, copper, and nickel above NYSDEC standards [Ref. 9, pp. 8–9, 12; 10, pp. 10–12]. Sludge remains in the leach pits and is underlain by soil or gravel [Ref. 9, pp. 35, 202–203]. Sampling investigations conducted by Magna, NYSDEC, WCHD, and the former property owner show the continuing presence of hazardous substances in the sludge and underlying soil, including arsenic, cadmium, chromium, copper, and nickel [Ref. 8, pp. 4–5; 9, pp. 9–10, 15, 18–23, 47–49, 58–63, 97–98; 10, pp. 26–29, 50–54, 185–192, 278]. Sampling investigations from 2006 to 2015 also show the presence of contaminated soil at the former Magna facility (Source 2); arsenic, cadmium, chromium, copper, nickel, and other organic and inorganic substances are present at concentrations significantly above background levels [Ref. 9, pp. 28–29, 49, 52–55, 79–84, 97–98, 264–284, 317, 368, 372, 387–389, 411–414, 440, 778–787, 803–805, 808–809; 13, pp. 5–6; also see **Source 2, Section 2.2.2**]. The continuing presence of hazardous substances in these uncontained sources, which are derived from the wastewater discharge that ceased in 1979, indicates that these sources have been draining into the adjacent surface water for almost 40 years. In addition, Source 2 is in direct contact with an HRS-eligible wetland at the PPE, constituting an observed release by direct observation: source material that contains one or more site-attributable hazardous substances is known to have entered surface water through direct deposition and there is an observed release by direct observation (see **Figure 2 and Section 4.1.2.1.1**).

Historically, the concentrations of copper and other metals in sediment at all locations downstream of site sources is higher than the background levels, and there are no other known sources or releases of metals between the upstream background sample locations and the locations that show observed release concentrations [Ref. 10, pp. 84, 92–96; 17, pp. 6–10; 18, p. 5; 19, pp. 10–15; 20, pp. 6–7; 68, pp. 6–12]. The former Magna facility and the associated site sources are located adjacent to the affected surface water on the outer perimeter of an industrial park, which represents the only significant development in the surrounding area [Ref. 10, p. 84; 68, p. 6]. The owner of the industrial park has leased property to various tenants whose waste disposal practices are unknown, including Con Edison and a furniture business [Ref. 10, p. 10; 51, p. 3; 68, p. 6]. The office/warehouse building east of the former Magna building has had some manufacturing activities [Ref. 51, pp. 3–4]. Current tenants include a marketer and distributer of medical testing instruments; a development and manufacturing company specializing in electrical power distribution and motor/hoist control systems for rigging, lighting, staging and sound; and a wholesale distributer of retail merchandise [Ref. 51, p. 4]. Business activities include corporate management, laboratory testing of equipment, and warehouse storage; there is a refrigerated storage unit containing reagents for control testing of laboratory machines, and a maintenance room where there is storage of containerized chemicals and cleaning products; there is no reported storage or indication of a release of the hazardous substances found in the observed release from these facilities [Ref. 51, pp. 3–6]. The areas surrounding the industrial park where the former Magna facility is located consist of forested wetlands, forested uplands, and residential areas; due to private ownership and steep slopes, access to much of the area is limited [Ref. 6, p. 8; 10, pp. 10, 74, 76, 83–84]. Other nearby land uses include an inactive emery mine to the north-northwest, and farming locations to the northeast and west [Ref. 10, pp. 76, 83; 51, p. 3]. The areas along the documented zone of contamination are similar to the areas in the vicinity of the site sources (i.e., forested wetlands within residential development) [Ref. 68, pp. 6–12].

During the RI, a dumping area was observed north of the former Magna building, where building materials and several excavated underground storage tanks were discovered; the area is not known to be associated with the former Magna operation [Ref. 9, p. 109]. A smaller dump area was found in the woodland northwest of the former Magna building, where two 55-gallon drums were observed [Ref. 9, p. 109]. Both areas were within the same industrial/commercial park as the former Magna Metals facility [Ref. 9, p. 109]. In addition, direct push soil samples were collected to determine if a former drum storage area reported in historic NYSDEC documentation may have contributed to contamination; the location was at the southwestern corner of the active commercial building, southeast of Sources 1 and 2 [Ref. 13, pp. 5, 8]. Soil borings to depths of 2 feet and 6 feet did not show any elevated photoionization detector (PID) readings, and the soil samples collected from the borings did not indicate any exceedances of NYSDEC's recommended soil criteria for commercial use [Ref. 13, pp. 5, 8, 12–14, 30–36]; therefore these areas are not expected to have contributed to the contamination detected in the observed release.

A refuse area north of the former Magna building was investigated during the PDI, with five soil borings ranging in depth from 1 to 5.5 feet below ground surface (bgs); chromium was detected above NYSDEC's soil cleanup objective (SCO) concentration of 19 mg/kg in four samples, and barium had a concentration above the commercial use SCO of 400 mg/kg in one sample [Ref. 18, pp. 2, 3, 5; 25–29]. It is therefore possible that this area contributed partly to the chromium concentrations in the observed release.

<u>Hazardous Substances Released:</u>

Arsenic	Copper
Cadmium	Nickel
Chromium	

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Observed Release Factor Value: 550

4.1.3.2 Human Food Chain Threat - Waste Characteristics

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

TABLE 7. HUMAN FOOD CHAIN TOXICITY/PERSISTENCE/BIOACCUMULATION						
Hazardous Substance	**Source Number**	**Toxicity Factor Value**	**River Persistence Factor Value ***	**Food Chain Bioaccumulation Factor Value ****	**Toxicity/Persistence/ Bioaccumulation Factor Value (HRS Table 4-16)**	**Ref. 2 Page**
Arsenic	1, 2, OR	10,000	1	500	5×10^6	1
Benz(a)anthracene	1	100	1	50,000	5×10^6	3
Benzo(a)pyrene	1	10,000	1	50,000	5×10^8	5
Cadmium	1, 2, OR	10,000	1	50,000	5×10^8	7
Chromium	1, 2, OR	10,000	1	500	5×10^6	9
Chrysene	1	1,000	1	5,000	5×10^6	11
Copper	1, 2, OR	100	1	50,000	5×10^6	13
Cyanide	1, 2	1,000	0.07	0.5	35	15
cis-1,2-DCE	1	1,000	0.07	50	3,500	17
trans-1,2-DCE	1	100	0.07	50	350	19
Lead	1, 2	10,000	1	5,000	5×10^7	21
Manganese	1	10,000	1	50,000	5×10^8	23
Mercury	1	10,000	1	50,000	5×10^8	25
Nickel	1, 2, OR	10,000	1	5	5×10^4	27
Selenium	1, 2	100	1	500	5×10^4	29
Silver	1	100	1	50,000	5×10^6	31
Thallium	1	10,000	1	500	5×10^6	33
TCE	1, 2	1,000	0.07	50	3,500	35
Vinyl chloride	1	10,000	0.0007	5	35	37
Xylenes	1, 2	100	0.07	50	350	39
Zinc	1, 2	10	1	50,000	5×10^5	41

OR = Observed release.
* The predominant water category between the PPE and the nearest fishery is River; therefore, the river persistence factor value is assigned to each hazardous substance [Ref. 1, Sections 4.1.2.2.1.2 and 4.1.3.2.1.2].
** The fishery being evaluated is located in a tidal portion of the Hudson River through which the salt water/fresh water interface moves at least periodically [Ref. 62, pp. 9–13]. Therefore, the higher of the fresh water or salt water human food chain bioaccumulation factor values is assigned to each hazardous substance [Ref. 1, Section 4.1.3.2.1.3].

4.1.3.2.2 Hazardous Waste Quantity

TABLE 8. HAZARDOUS WASTE QUANTITY		
Source Number	**Source Hazardous Waste Quantity (HWQ) Value (HRS Section 2.4.2.1.5)**	**Is source hazardous constituent quantity data complete? (yes/no)**
1	29.3	No
2	1.77	No
Sum of Values:	31 (rounded to nearest integer as specified in HRS Section 2.4.2.2)	

The sum of hazardous waste quantity values corresponds to a hazardous waste quantity factor value of 1 in HRS Table 2-6 [Ref. 1, Section 2.4.2.2]. However, the HRS states that if any target is subject to Level I or Level II concentrations, assign either the value for Table 2-6 or a value of 100, whichever is greater, as the hazardous waste quantity factor value for that pathway [Ref. 1, Section 2.4.2.2]. As described in **Section 4.1.4.3.1.2**, wetlands are subject to Level II concentrations in the surface water migration pathway. Therefore, a hazardous waste quantity factor value of 100 is assigned for the surface water migration pathway.

4.1.3.2.3 Waste Characteristics Factor Category Value

Benzo(a)pyrene, cadmium, manganese, and mercury, which are associated with site sources that have surface water pathway containment factor values greater than 0 for the watershed, correspond to a toxicity/persistence factor value of 10,000 and a bioaccumulation potential factor value of 50,000, as shown in the table above [Ref. 1, Section 4.1.3.2.1.4; 1a, Section 2.4.1; 2, pp. 5, 7, 23, 25].

(Toxicity/Persistence Factor Value) x (Hazardous Waste Quantity Factor Value) =
10,000 x 100 = 1×10^6
(Subject to a maximum of 1×10^8)
[Ref. 1, Section 4.1.3.2.3]

(Toxicity/Persistence Factor Value x Hazardous Waste Quantity Factor Value) x
(Bioaccumulation Potential Factor Value) = (1×10^6) x (50,000) = 5×10^{10}
(Subject to a maximum of 1×10^{12})
[Ref. 1, Section 4.1.3.2.3]

The resulting waste characteristics product of 5×10^{10} corresponds to a waste characteristics factor category value of 320 in Table 2-7 of the HRS [Ref. 1, Section 2.4.3.1].

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Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^8
Hazardous Waste Quantity Factor Value: 100
Waste Characteristics Factor Category Value: 320

4.1.3.3 Human Food Chain Threat - Targets

The Hudson River within the 15-mile TDL is used for consumption fishing [**Figure 5**; Ref. 63, pp. 7, 17, 30–40; 64, p. 2]. There are fishing access locations to the river from public boat launches and along the shoreline [Ref. 65, pp. 28–29; 66, p. 3]. Species reported to be fished include striped bass and blue crabs [Ref. 63, pp. 37–40]. The Hudson River at Furnace Brook is one example of a specific location within the TDL where consumption fishing (subsistence) is reported [**Figure 5**; Ref. 64, p. 2]. The available documentation does not demonstrate that the fishery is located within the zone of contamination; therefore, the target fishery is evaluated for potential contamination [**Figures 4 and 5**; Ref. 1, Section 4.1.3.3].

There is historical evidence of bass fishing in Furnace Brook [Ref. 59, p. 2]. In addition, there are no fishing restrictions at Furnace Dock Lake (a.k.a. Furnace Brook Pond, a.k.a. Railroad Pond) and there is anecdotal evidence of fishing at Oscawana Park, both of which are located along Furnace Brook within the TDL; however, there is no direct documentation of fishing for consumption at these locations and these areas are not herein evaluated as fisheries [Ref. 58, p. 7; 66, p. 3; 67, pp. 1–2].

Sediment Samples for Observed Release

Notes on the table below:

All results are presented in milligrams per kilogram (mg/kg).

J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample [Ref. 29, p. 4]. These estimated results have been adjusted per EPA Quick Reference Fact Sheet *Using Qualified Data to Document and Observed Release and Observed Contamination*; the adjusted results are shown in parentheses [Ref. 46, pp. 5–8, 18].

TABLE 9. SAMPLES FOR OBSERVED RELEASE					
Sample ID	**Surface Water Body**	**Distance from PPE [Figure 4]**	**Hazardous Substance**	**Concentration (mg/kg)**	**Reference(s)**
WTSD501-0-0.5	wetland	0.05 mile	Copper	590	17, p. 6; 23, pp. 30, 96; 29, pp. 1–4, 12; 46, pp. 5–8, 18
WTSD502-0-0.5	wetland	0.05 mile	Copper	380	17, p. 6; 23, pp. 28, 96; 29, pp. 1–4, 12; 46, pp. 5–8, 18
WTSD515-0-0.5	wetland	0.02 mile	Chromium	180 J (140)	17, p. 6; 22, pp. 49, 62; 29, pp. 1–4, 11; 46, pp. 5–8, 18
WTSD519-0-0.5	wetland	0.04 mile	Arsenic Cadmium Chromium	19 1.6 270	17, p. 6; 22, pp. 39, 61; 29, pp. 1–4, 11
WTSD520-0-0.5	wetland	0.04 mile	Cadmium Copper	1.8220 J (180)	17, p. 7; 21, pp. 36, 102; 29, pp. 1–4, 7; 46, pp. 5–8, 18
WTSD521-0-0.5	wetland	0.07 mile	Cadmium Copper	1.9 J (1.3) 500 J (410)	17, p. 7; 21, pp. 43, 102; 29, pp. 1–4, 746, pp. 5–8, 18
WTSD523-0-0.5	wetland	0.12 mile	Copper	130	17, p. 7; 22, pp. 29, 61; 29, pp. 1–4, 11
PASD601-0-0.5	pond	0.09 mile	Cadmium Copper	1.9 J (1.3) 220 J (180)	17, p. 7; 21, pp. 16, 101; 29, pp. 1–4, 6; 46, pp. 5–8, 18
PASD610-0-0.5	pond	0.08 mile	Cadmium Copper	3.2 J (2.3) 330 J (270)	17, p. 7; 24, pp. 70, 171; 29, pp. 1–4, 17; 46, pp. 5–8, 18

TABLE 9. SAMPLES FOR OBSERVED RELEASE					
Sample ID	**Surface Water Body**	**Distance from PPE [Figure 4]**	**Hazardous Substance**	**Concentration (mg/kg)**	**Reference(s)**
PASD619-0-0.5	pond	0.15 mile	Arsenic Cadmium Chromium Copper	100 3.2 140 260	17, p. 7; 22, pp. 41, 61; 29, pp. 1–4, 11
PASD620-0-0.5	pond	0.16 mile	Chromium	210	17, p. 7; 21, pp. 74, 104; 29, pp. 1–4, 8
PASD623-0-0.5	pond	0.17 mile	Chromium Copper Nickel	190 690 640	17, p. 7; 22, pp. 25, 60; 29, pp. 1–4, 10
PASD623-0-0.5 D	pond	0.17 mile	Chromium Copper Nickel	170 650 720	17, p. 7; 22, pp. 2, 27, 61; 29, pp. 1–4
BRSD704-0-0.5	unnamed tributary	0.06 mile	Copper	300 J (246)	17, p. 8; 24, pp. 124, 173; 29, pp. 1–4, 19; 46, pp. 5–8, 18
BRSD706-0-0.5	unnamed tributary	0.04 mile	Copper	140	17, p. 8; 24, pp. 108, 172; 29, pp. 1–4, 18
BRSD710-0-0.5	unnamed tributary	0.06 mile	Chromium	140	17, p. 8; 22, pp. 37, 61; 29, pp. 1–4, 11
BRSD716-0-0.5	unnamed tributary	0.08 mile	Chromium	170	17, p. 8; 22, pp. 33, 61; 29, pp. 1–4, 11
BRSD722-0-0.5	unnamed tributary	0.15 mile	Chromium	160	17, p. 8; 21, pp. 62, 103; 29, pp. 1–4, 8
BRSD736-0-0.5	unnamed tributary	0.29 mile	Chromium Copper	150 970 J (795)	17, p. 9; 27, pp. 7, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD738-0-0.5	unnamed tributary	0.29 mile	Copper	270 J (221)	17, p. 9; 27, pp. 11, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD739-0-0.5	unnamed tributary	0.31 mile	Chromium Copper	170 1300 J (1066)	17, p. 9; 27, pp. 13, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD741-0-0.5	unnamed tributary	0.31 mile	Copper	180 J (148)	17, p. 9; 27, pp. 17, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD742-0-0.5	unnamed tributary	0.33 mile	Copper	170 J (139)	17, p. 9; 27, pp. 19, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD744-0-0.5	unnamed tributary	0.33 mile	Cadmium Chromium Copper	1.2 140 240 J (197)	17, p. 9; 27, pp. 23, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD747-0-0.5	unnamed tributary	0.35 mile	Copper	180 J (148)	17, p. 9; 27, pp. 29, 71; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD748-0-0.5	unnamed tributary	0.37 mile	Copper	190 J (156)	17, p. 9; 27, pp. 31, 71; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD750-0-0.5	unnamed tributary	0.37 mile	Copper	240 J (197)	17, p. 9; 27, pp. 37, 71; 29, pp. 1–4, 23; 46, pp. 5–8, 18
BRSD751-0-0.5	unnamed tributary	0.37 mile	Copper	170 J (139)	17, p. 9; 27, pp. 39, 71; 29, pp. 1–4, 23; 46, pp. 5–8, 18
BRSD752-0-0.5	unnamed tributary	0.37 mile	Chromium	140	17, p. 9; 27, pp. 41, 71; 29, pp. 1–4, 23
BRSD752-0-0.5D	unnamed tributary	0.37 mile	Cadmium Chromium	1.3 130	17, p. 9; 27, pp. 43, 71; 29, pp. 1–4, 23
BRSD756-0-0.5	unnamed tributary	0.37 mile	Cadmium Chromium Copper	1.3 170 190 J (156)	17, p. 9; 27, pp. 51, 72; 29, pp. 1–4, 23; 46, pp. 5–8, 18
BRSD757-0-0.5	unnamed tributary	0.39 mile	Copper	160 J (131)	17, p. 9; 27, pp. 53, 72; 29, pp. 1–4, 23; 46, pp. 5–8, 18

TABLE 9. SAMPLES FOR OBSERVED RELEASE					
Sample ID	**Surface Water Body**	**Distance from PPE [Figure 4]**	**Hazardous Substance**	**Concentration (mg/kg)**	**Reference(s)**
SD805	unnamed tributary	0.43 mile	Copper	414	68, p. 10; 69, pp. 5, 9, 38
SD809	unnamed tributary	0.46 mile	Copper	617	68, p. 10; 69, pp. 5, 11, 42
SD817	unnamed tributary	0.65 mile	Copper	132	68, p. 10; 69, pp. 5, 15, 50
SD822	unnamed tributary	0.75 mile	Copper	144	68, p. 10; 69, pp. 5, 20, 55
SD825	unnamed tributary	0.82 mile	Copper	267	68, p. 10; 69, pp. 5, 23, 58
SD825 DUP	unnamed tributary	0.82 mile	Copper	314	68, p. 10; 69, pp. 5, 30, 63
SD830	unnamed tributary	0.90 mile	Copper	426	68, p. 10; 69, pp. 5, 28, 67
BRSD832-0-0.5	unnamed tributary	0.95 mile	Cadmium Copper	1.5 170	20, p. 6, 16; 43, pp. 45, 81; 45, pp. 1–5, 27
BRSD834-0-0.5	unnamed tributary	0.99 mile	Cadmium Copper	1.6 160	20, p. 6, 18; 43, pp. 49, 81; 45, pp. 1–5, 27
BRSD835-0-0.5	unnamed tributary	1.02 miles	Cadmium	1.5	20, p. 6, 19; 43, pp. 51, 82; 45, pp. 1–5, 27
BRSD836-0-0.5	unnamed tributary	1.05 miles	Cadmium Copper	1.5 310	20, p. 6, 20; 43, pp. 53, 82; 45, pp. 1–5, 27
BRSD837-0-0.5	unnamed tributary	1.08 miles	Cadmium Copper	1.5 350	20, p. 6, 21; 43, pp. 55, 82; 45, pp. 1–5, 27
BRSD838-0-0.5	unnamed tributary	1.1 miles	Cadmium Copper	1.8 360	20, p. 6, 22; 43, pp. 57, 82; 45, pp. 1–5, 27
BRSD846-0-0.5	unnamed tributary	1.25 miles	Cadmium Copper	2.0 300	20, p. 6, 29; 43, pp. 65, 82; 45, pp. 1–5, 28
BRSD851-0-0.5	unnamed tributary	1.35 miles	Cadmium Chromium Copper Nickel	2.5 170 2,800 450	20, p. 6, 30; 43, pp. 39, 81; 45, pp. 1–5, 26
BRSD851-0-0.5-1	unnamed tributary	1.35 miles	Cadmium Chromium Copper	2.7 170 2,500	20, p. 6, 30; 43, pp. 41, 81; 45, pp. 1–5, 26
BRSD852-0-0.5	unnamed tributary	1.38 miles	Copper	150	20, p. 6, 31; 43, pp. 37, 81; 45, pp. 1–5, 26
BRSD853-0-0.5	unnamed tributary	1.40 miles	Copper	380	20, p. 6, 32; 43, pp. 35, 81; 45, pp. 1–5, 26
BRSD854-0-0.5	unnamed tributary	1.44 miles	Cadmium Copper	1.8 230	20, p. 6, 33; 43, pp. 33, 81; 45, pp. 1–5, 26
BRSD857-0-0.5	unnamed tributary	1.48 miles	Copper	1,000	20, p. 6, 36; 43, pp. 31, 81; 45, pp. 1–5, 26
BRSD858-0-0.5	unnamed tributary	1.5 miles	Copper	350	20, p. 6, 37; 43, pp. 29, 80; 45, pp. 1–5, 26

4.1.3.3.1 Food Chain Individual

There is an observed release to surface water of hazardous substances, including cadmium, with a bioaccumulation potential factor value of 500 or greater in several samples identified below, and there is a fishery present within the 15-mile TDL [see **Sections 4.1.2.1.1**, **4.1.3.2.1.3**, and **4.1.3.3**]. Therefore, a food chain individual factor value of 20 is assigned [Ref. 1, Section 4.1.3.3.1].

Sample IDs: WTSD519-0-0.5, WTSD520-0-0.5, WTSD521-0-0.5, PASD601-0-0.5, PASD610-0-0.5, PASD619-0-0.5, BRSD744-0-0.5, BRSD752-0-0.5D, BRSD756-0-0.5, BRSD832-0-0.5, BRSD834-0-0.5, BRSD835-0-0.5, BRSD836-0-0.5, BRSD837-0-0.5, BRSD838-0-0.5, BRSD846-0-0.5, BRSD851-0-0.5, BRSD851-0-0.5-1, BRSD854-0-0.5
Hazardous Substance: Cadmium
Bioaccumulation Potential: 50,000
References: See **Section 4.1.2.1.1** and **Table 9**.

TABLE 10. FISHERIES

Identity of Fishery	**Type of Surface Water Body**	**Dilution Weight**	**Reference(s)**
Hudson River	Large river*	0.0001	Ref. 1, Table 4-13; 60, p. 1; 61, pp. 1–11; 62, pp. 9–12; 63, pp. 30–31

*The average tidal discharge at a gauging station located north of the subject fishery is greater than 22,000 cubic feet per second (cfs), and the entire segment of the river that lies within the TDL is tidal [**Figure 5**; Ref. 60, p. 1; 61, pp. 1–11; 62, pp. 9–12]. The tidal discharge rate at the subject fishery is considered to lie within the flow characteristics range of Greater than 10,000 to 100,000 cfs [Ref. 1, Table 4-13].

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Food Chain Individual Factor Value: 20

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

The Level I concentrations factor value is 0 because there are no documented fisheries subject to Level I concentrations [Ref. 1, Section 4.1.3.3.2.1].

===

Level I Concentrations Factor Value: 0

4.1.3.3.2.2 Level II Concentrations

The Level II concentrations factor value is 0 because there are no documented fisheries subject to Level II concentrations [Ref. 1, Section 4.1.3.3.2.2].

===

Level II Concentrations Factor Value: 0

4.1.3.3.2.3 Potential Human Food Chain Contamination

The Hudson River within the 15-mile TDL is used for consumption fishing [Ref. 63, pp. 7, 17, 30–40; 64, p. 2]. There are fishing access locations to the river from public boat launches and along the shoreline [Ref. 65, pp. 28–29; 66, p. 3]. Species reported to be fished include striped bass and blue crabs [Ref. 63, pp. 37–40]. The Hudson River at Furnace Brook is one example of a specific location within the TDL where consumption fishing is reported [Ref. 64, p. 2]. The available documentation does not demonstrate that the fishery is located within the zone of contamination; therefore, the target fishery is evaluated for potential contamination [**Figure 4**; Ref. 1, Section 4.1.3.3].

The Hudson River is a large river; the average tidal discharge at a gauging station located north of the subject fishery is greater than 22,000 cubic feet per second (cfs), and the entire segment of the river that lies within the TDL is tidal [**Figure 5**; Ref. 60, p. 1; 61, pp. 1–11; 62, pp. 9–12]. The tidal discharge rate at the subject fishery is considered to lie within the flow characteristics range of Greater than 10,000 to 100,000 cfs [Ref. 1, Table 4-13]. The salt water/fresh water interface moves through the area and salinity of the river fluctuates with the tides, however, it is generally brackish or saline in the lower Hudson River near Cortlandt [Ref. 61, pp. 1–11; 62, pp. 9–12]. The potential human food chain contamination value is calculated below [Ref. 1, Section 4.1.3.3.2.3].

TABLE 11. POTENTIAL HUMAN FOOD CHAIN CONTAMINATION

Identity of Fishery	Annual Production (Pounds)	Type of Surface Water Body (Table 4-13)	Average Annual Flow (cfs)	Population Value (P_i) (Table 4-18)	Dilution Weight (D_i) (Table 4-13)	P_i x D_i
Hudson River	Greater than 0	Large river	>10,000 to 100,000	0.03	0.0001	0.000003

Sum of Pi x Di: 0.000003
(Sum of Pi x Di)/10: 0.0000003

===

Potential Human Food Chain Contamination Factor Value: 0.0000003

4.1.4.2 Environmental Threat - Waste Characteristics

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

TABLE 12. ECOSYSTEM TOXICITY/PERSISTENCE/BIOACCUMULATION						
Hazardous Substance	**Source Number**	**Fresh Water Ecotoxicity Factor Value***	**River Persistence Factor Value****	**Fresh Water Ecosystem Bioaccumulation Factor Value***	**Ecotoxicity/Persistence/ Bioaccumulation Factor Value (HRS Table 4-21)**	**Ref. 2 Page**
Arsenic	1, 2, OR	10	1	50,000	5×10^5	1
Benz(a)anthracene	1	10,000	1	50,000	5×10^8	3
Benzo(a)pyrene	1	10,000	1	50,000	5×10^8	5
Cadmium	1, 2, OR	10,000	1	50,000	5×10^8	7
Chromium	1, 2, OR	10,000	1	500	5×10^6	9
Chrysene	1	1,000	1	5,000	5×10^6	11
Copper	1, 2, OR	1,000	1	50,000	5×10^7	13
Cyanide	1, 2	1,000	0.4	0.5	200	15
cis-1,2-DCE	1	0	0.07	50	0	17
trans-1,2-DCE	1	1	0.07	50	3.5	19
Lead	1, 2	1,000	1	50,000	5×10^7	21
Manganese	1	100	1	50,000	5×10^6	23
Mercury	1	10,000	1	50,000	5×10^8	25
Nickel	1, 2, OR	100	1	50,000	5×10^6	27
Selenium	1, 2	1,000	1	500	5×10^5	29
Silver	1	10,000	1	50	5×10^5	31
Thallium	1	100	1	500	5×10^4	33
TCE	1, 2	100	0.07	50	350	35
Vinyl chloride	1	0	0.0007	5	0	37
Xylenes	1, 2	100	0.07	50	350	39
Zinc	1, 2	10	1	50,000	5×10^5	41

OR = Observed release.
* The sensitive environments being evaluated are located in fresh water [Ref. 55, pp. 7–8; 56, pp. 1–6]. Therefore, the fresh water environmental toxicity and bioaccumulation factor values are assigned to each hazardous substance [Ref. 1, Section 4.1.4.2.1.3].
** The predominant water category between the PPEs and the nearest sensitive environment along the hazardous substance migration path for the watershed is River; therefore, the river persistence factor value is assigned to each hazardous substance [Ref. 1, Sections 4.1.2.2.1.2 and 4.1.4.2.1.2].

4.1.4.2.2 Hazardous Waste Quantity

TABLE 13. HAZARDOUS WASTE QUANTITY		
Source Number	**Source Hazardous Waste Quantity (HWQ) Value (Ref. 1, Section 2.4.2.1.5)**	**Is source hazardous constituent quantity data complete? (yes/no)**
1	29.3	No
2	1.77	No
Sum of Values:	31 (rounded to nearest integer as specified in Ref. 1, Section 2.4.2.2)	

The sum of hazardous waste quantity values corresponds to a hazardous waste quantity factor value of 1 in HRS Table 2-6 [Ref. 1, Section 2.4.2.2]. However, the HRS states that if any target is subject to Level I or Level II concentrations, assign either the value for Table 2-6 or a value of 100, whichever is greater, as the hazardous waste quantity factor value for that pathway [Ref. 1, Section 2.4.2.2]. As described in **Section 4.1.4.3.1.2**, wetlands are subject to Level II concentrations in the surface water migration pathway. Therefore, a hazardous waste quantity factor value of 100 is assigned for the surface water migration pathway.

4.1.4.2.3 Waste Characteristics Factor Category Value

Benz(a)anthracene, benzo(a)pyrene, cadmium, and mercury, which are associated with site sources that have surface water pathway containment factor values greater than 0 for the watershed, correspond to an ecotoxicity/persistence factor value of 10,000 and bioaccumulation potential factor value of 50,000, as shown in the table above [Ref. 1, Section 4.1.4.2.1.4; 2, pp. 3, 5, 7, 25].

(Ecotoxicity/persistence factor value) x (hazardous waste quantity factor value) =
10,000 x 100 = 1 x 10^6
(Subject to a maximum of 1 x 10^8)
[Ref. 1, Section 4.1.4.2.3]

(Ecotoxicity/persistence factor value x hazardous waste quantity factor value) x
(bioaccumulation potential factor value) = (1 x 10^6) x (50,000) = 5 x 10^{10}
(Subject to a maximum of 1 x 10^{12})
[Ref. 1, Section 4.1.4.2.3]

The resulting waste characteristics product of 5 x 10^{10} corresponds to a waste characteristics factor category value of 320 in Table 2-7 of the HRS [Ref. 1, Section 2.4.3.1].

Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value: 5 x 10^8
Hazardous Waste Quantity Factor Value: 100
Waste Characteristics Factor Category Value: 320

4.1.4.3 Environmental Threat - Targets

The zone of contamination (i.e., the stream segment where observed release by chemical analysis is documented) along the surface water migration pathway downstream of the site sources extends from the PPE to sediment sample location BRSD858-0-0.5, a length of approximately 1.5 miles (almost 8,000 feet) [**Figure 3**; Ref. 56, pp. 1–3, 6]. The zone of contamination includes approximately 1.5 miles of contaminated wetland frontage, as documented by EPA in April 2018 [Ref. 56, pp. 3, 6]. The wetland classifications include palustrine, forested, broad-leaved deciduous, seasonally flooded wetlands (PFO1C); palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated wetlands (PFO1E); and palustrine unconsolidated bottom, permanently flooded, excavated (PUBHx), which meet the 40 CFR 230.3 definition of a wetland and are HRS-eligible (i.e., positive indicators of hydric soils, wetland hydrology, and wetland vegetation were observed at all wetland locations) [Ref. 55, pp. 7–8; 56, pp. 1–11]. These, freshwater wetlands are located along the hazardous substance migration path in the area of Level II concentrations, and the total wetland frontage considered as subject to actual contamination is 1.51 miles [Ref. 1, Section 4.1.4.3.1; 56, pp. 3, 6]. There are no media-specific benchmarks for sediment, so the target wetlands are subject to Level II concentrations [Ref. 1, Sections 2.5 and 4.1.4.3; 2, pp. 2, 8, 10, 14, 28].

Samples for Observed Release/Level II Concentrations

The sediment concentrations meet the criteria for Level II concentrations because they meet criteria for observed release and their locations are associated with eligible HRS wetlands at the PPEs and contiguous with the unnamed tributary along the extent of the observed release [**Section 4.1.2.1.1 and Figures 3 and 4**; Ref. 1, Sections 2.5 and 4.1.4.3.1]:

Notes on the table below:

mg/kg = milligrams per kilogram.

J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample [Ref. 29, p. 4]. These estimated results have been adjusted per EPA Quick Reference Fact Sheet *Using Qualified Data to Document and Observed Release and Observed Contamination*; the adjusted results are shown in parentheses [Ref. 46, pp. 5–8, 18].

TABLE 14. SAMPLES FOR OBSERVED RELEASE/LEVEL II CONCENTRATIONS					
Sample ID	**Surface Water Body**	**Distance from PPE [Figure 4]**	**Hazardous Substance**	**Concentration (mg/kg)**	**Reference(s)**
WTSD501-0-0.5	wetland	0.05 mile	Copper	590	17, p. 6; 23, pp. 30, 96; 29, pp. 1–4, 12; 46, pp. 5–8, 18
WTSD502-0-0.5	wetland	0.05 mile	Copper	380	17, p. 6; 23, pp. 28, 96; 29, pp. 1–4, 12; 46, pp. 5–8, 18
WTSD515-0-0.5	wetland	0.02 mile	Chromium	180 J (140)	17, p. 6; 22, pp. 49, 62; 29, pp. 1–4, 11; 46, pp. 5–8, 18
WTSD519-0-0.5	wetland	0.04 mile	Arsenic Cadmium Chromium	19 1.6 270	17, p. 6; 22, pp. 39, 61; 29, pp. 1–4, 11
WTSD520-0-0.5	wetland	0.04 mile	Cadmium Copper	1.8 220 J (180)	17, p. 7; 21, pp. 36, 102; 29, pp. 1–4, 7; 46, pp. 5–8, 18
WTSD521-0-0.5	wetland	0.07 mile	Cadmium Copper	1.9 J (1.3) 500 J (410)	17, p. 7; 21, pp. 43, 102; 29, pp. 1–4, 7; 46, pp. 5–8, 18
WTSD523-0-0.5	wetland	0.12 mile	Copper	130	17, p. 7; 22, pp. 29, 61; 29, pp. 1–4, 11

TABLE 14. SAMPLES FOR OBSERVED RELEASE/LEVEL II CONCENTRATIONS					
Sample ID	**Surface Water Body**	**Distance from PPE [Figure 4]**	**Hazardous Substance**	**Concentration (mg/kg)**	**Reference(s)**
PASD601-0-0.5	pond	0.09 mile	Cadmium Copper	1.9 J (1.3) 220 J (180)	17, p. 7; 21, pp. 16, 101; 29, pp. 1–4, 6; 46, pp. 5–8, 18
PASD610-0-0.5	pond	0.08 mile	Cadmium Copper	3.2 J (2.3) 330 J (270)	17, p. 7; 24, pp. 70, 171; 29, pp. 1–4, 17; 46, pp. 5–8, 18
PASD619-0-0.5	pond	0.15 mile	Arsenic Cadmium Chromium Copper	100 3.2 140 260	17, p. 7; 22, pp. 41, 61; 29, pp. 1–4, 11
PASD620-0-0.5	pond	0.16 mile	Chromium	210	17, p. 7; 21, pp. 74, 104; 29, pp. 1–4, 8
PASD623-0-0.5	pond	0.17 mile	Chromium Copper Nickel	190 690 640	17, p. 7; 22, pp. 25, 60; 29, pp. 1–4, 10
PASD623-0-0.5 D	pond	0.17 mile	Chromium Copper Nickel	170 650 720	17, p. 7; 22, pp. 2, 27, 61; 29, pp. 1–4, 10
BRSD704-0-0.5	unnamed tributary	0.06 mile	Copper	300 J (246)	17, p. 8; 24, pp. 124, 173; 29, pp. 1–4, 19; 46, pp. 5–8, 18
BRSD706-0-0.5	unnamed tributary	0.04 mile	Copper	140	17, p. 8; 24, pp. 108, 172; 29, pp. 1–4, 18
BRSD710-0-0.5	unnamed tributary	0.06 mile	Chromium	140	17, p. 8; 22, pp. 37, 61; 29, pp. 1–4, 11
BRSD716-0-0.5	unnamed tributary	0.08 mile	Chromium	170	17, p. 8; 22, pp. 33, 61; 29, pp. 1–4, 11
BRSD722-0-0.5	unnamed tributary	0.15 mile	Chromium	160	17, p. 8; 21, pp. 62, 103; 29, pp. 1–4, 8
BRSD736-0-0.5	unnamed tributary	0.29 mile	Chromium Copper	150 970 J (795)	17, p. 9; 27, pp. 7, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD738-0-0.5	unnamed tributary	0.29 mile	Copper	270 J (221)	17, p. 9; 27, pp. 11, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD739-0-0.5	unnamed tributary	0.31 mile	Chromium Copper	170 1300 J (1066)	17, p. 9; 27, pp. 13, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD741-0-0.5	unnamed tributary	0.31 mile	Copper	180 J (148)	17, p. 9; 27, pp. 17, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD742-0-0.5	unnamed tributary	0.33 mile	Copper	170 J (139)	17, p. 9; 27, pp. 19, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD744-0-0.5	unnamed tributary	0.33 mile	Cadmium Chromium Copper	1.2 140 240 J (197)	17, p. 9; 27, pp. 23, 70; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD747-0-0.5	unnamed tributary	0.35 mile	Copper	180 J (148)	17, p. 9; 27, pp. 29, 71; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD748-0-0.5	unnamed tributary	0.37 mile	Copper	190 J (156)	17, p. 9; 27, pp. 31, 71; 29, pp. 1–4, 22; 46, pp. 5–8, 18
BRSD750-0-0.5	unnamed tributary	0.37 mile	Copper	240 J (197)	17, p. 9; 27, pp. 37, 71; 29, pp. 1–4, 23; 46, pp. 5–8, 18
BRSD751-0-0.5	unnamed tributary	0.37 mile	Copper	170 J (139)	17, p. 9; 27, pp. 39, 71; 29, pp. 1–4, 23; 46, pp. 5–8, 18
BRSD752-0-0.5	unnamed tributary	0.37 mile	Chromium	140	17, p. 9; 27, pp. 41, 71; 29, pp. 1–4, 23
BRSD752-0-0.5D	unnamed tributary	0.37 mile	Cadmium Chromium	1.3 130	17, p. 9; 27, pp. 43, 71; 29, pp. 1–4, 23

TABLE 14. SAMPLES FOR OBSERVED RELEASE/LEVEL II CONCENTRATIONS					
Sample ID	**Surface Water Body**	**Distance from PPE [Figure 4]**	**Hazardous Substance**	**Concentration (mg/kg)**	**Reference(s)**
BRSD756-0-0.5	unnamed tributary	0.37 mile	Cadmium Chromium Copper	1.3 170 190 J (156)	17, p. 9; 27, pp. 51, 72; 29, pp. 1–4, 23; 46, pp. 5–8, 18
BRSD757-0-0.5	unnamed tributary	0.39 mile	Copper	160 J (131)	17, p. 9; 27, pp. 53, 72; 29, pp. 1–4, 23; 46, pp. 5–8, 18
SD805	unnamed tributary	0.43 mile	Copper	414	68, p. 10; 69, pp. 5, 9, 32, 38
SD809	unnamed tributary	0.46 mile	Copper	617	68, p. 10; 69, pp. 5, 11, 32, 42
SD817	unnamed tributary	0.65 mile	Copper	132	68, p. 10; 69, pp. 5, 15, 32, 50
SD822	unnamed tributary	0.75 mile	Copper	144	68, p. 10; 69, pp. 5, 20, 32, 55
SD825	unnamed tributary	0.82 mile	Copper	267	68, p. 10; 69, pp. 5, 23, 32, 58
SD825 DUP	unnamed tributary	0.82 mile	Copper	314	68, p. 10; 69, pp. 5, 30, 32, 63
SD830	unnamed tributary	0.90 mile	Copper	426	68, p. 10; 69, pp. 5, 28, 32, 67
BRSD832-0-0.5	unnamed tributary	0.95 mile	Cadmium Copper	1.5 170	20, p. 6, 16; 43, pp. 45, 81; 45, pp. 1–5, 27
BRSD834-0-0.5	unnamed tributary	0.99 mile	Cadmium Copper	1.6 160	20, p. 6, 18; 43, pp. 49, 81; 45, pp. 1–5, 27
BRSD835-0-0.5	unnamed tributary	1.02 miles	Cadmium	1.5	20, p. 6, 19; 43, pp. 51, 82; 45, pp. 1–5, 27
BRSD836-0-0.5	unnamed tributary	1.05 miles	Cadmium Copper	1.5 310	20, p. 6, 20; 43, pp. 53, 82; 45, pp. 1–5, 27
BRSD837-0-0.5	unnamed tributary	1.08 miles	Cadmium Copper	1.5 350	20, p. 6, 21; 43, pp. 55, 82; 45, pp. 1–5, 27
BRSD838-0-0.5	unnamed tributary	1.1 miles	Cadmium Copper	1.8 360	20, p. 6, 22; 43, pp. 57, 82; 45, pp. 1–5, 27
BRSD846-0-0.5	unnamed tributary	1.25 miles	Cadmium Copper	2.0 300	20, p. 6, 29; 43, pp. 65, 82; 45, pp. 1–5, 28
BRSD851-0-0.5	unnamed tributary	1.35 miles	Cadmium Chromium Copper Nickel	2.5 170 2,800 450	20, p. 6, 30; 43, pp. 39, 81; 45, pp. 1–5, 26
BRSD851-0-0.5-1	unnamed tributary	1.35 miles	Cadmium Chromium Copper	2.7 170 2,500	20, p. 6, 30; 43, pp. 41, 81; 45, pp. 1–5, 26
BRSD852-0-0.5	unnamed tributary	1.38 miles	Copper	150	20, p. 6, 31; 43, pp. 37, 81; 45, pp. 1–5, 26
BRSD853-0-0.5	unnamed tributary	1.40 miles	Copper	380	20, p. 6, 32; 43, pp. 35, 81; 45, pp. 1–5, 26
BRSD854-0-0.5	unnamed tributary	1.44 miles	Cadmium Copper	1.8 230	20, p. 6, 33; 43, pp. 33, 81; 45, pp. 1–5, 26
BRSD857-0-0.5	unnamed tributary	1.48 miles	Copper	1,000	20, p. 6, 36; 43, pp. 31, 81; 45, pp. 1–5, 26
BRSD858-0-0.5	unnamed tributary	1.5 miles	Copper	350	20, p. 6, 37; 43, pp. 29, 80; 45, pp. 1–5, 26

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.1 Level I Concentrations

The Level I concentrations factor value is 0 because there are no sensitive environments subject to Level I concentrations [Ref. 1, Section 4.1.4.3.1.1].

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Level I Concentrations Factor Value: 0

4.1.4.3.1.2 Level II Concentrations

The target wetlands are subject to Level II concentrations because they are located in a Level II zone of contamination delineated by samples meeting observed release criteria [**Figure 4**; Ref. 1, Sections 2.5 and 4.1.4.3].

Sensitive Environments

There are currently no known sensitive environments other than wetlands that are considered as subject to Level II concentrations [Ref. 1, Section 4.1.4.3].

Wetlands

There are HRS-eligible wetlands along the zone of contamination, and the total wetland frontage subject to actual contamination is greater than 1.0 mile [**Figure 4**; 56, pp. 3, 6].

TABLE 15. LEVEL II CONCENTRATIONS – WETLANDS			
Wetland	**Wetland Frontage**	**Wetlands Rating Value (HRS Table 4-24)**	**Reference**
Furnace Brook unnamed tributary	1.5 miles*	50	**Figure 4**; Ref. 56, pp. 3, 6

*The most upstream and downstream points of frontage of wetlands on both the east and west banks of the watercourse were documented using a Trimble ProXR DGPS global positioning system (GPS) unit, after which the GPS points were plotted and the total length of wetland frontage along the zone of contamination determined using geographical information systems (GIS) technology [Ref. 56, pp. 2–3].

Wetland Value: 50
Sum of Sensitive Environments Value + Wetland Value: 50

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Level II Concentrations Factor Value: 50

4.1.4.3.1.3 Potential Contamination

The potential contamination factor value is not scored because the site already receives a listing-eligible site score based on other factors.

Sensitive Environments

The sensitive environment value (S_j) is not scored.

Wetlands

Although the most recent wetlands mapping information available from both U.S. Fish and Wildlife Service (USFWS) and New York State indicate that there is potentially contaminated wetland frontage within the TDL, the wetland frontage value (W_j) is not scored [Ref. 55, pp. 4–8].

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Potential Contamination Factor Value: NS