

PCB Mass Loading Phase II
Wilmington Rolling Mill Property
SIRS ID: DE-1198
Wilmington, Delaware



Appendix 29

WILMINGTON ROLLING MILL PROPERTY WILMINGTON, DELAWARE

SIRS ID: DE-1198

GENERAL SITE INFORMATION

Site Name: Wilmington Rolling Mill Property

SIRS ID Number: DE-1198

Site Location and Description:

The Wilmington Rolling Mill Property is located at 1020 Church Street in Wilmington, Delaware (Figure 1). The site is approximately 2.8 acres in size and is comprised of two parcels (#2603630706 and #2603630707). The site is bounded to the north by a City of Wilmington parcel to the east by the Brandywine Creek, to the south by O'Brien Industries, and to the west by Church Street.

Based on the 2004 Remedial Investigation, surface water from the Site is expected to flow east towards the Brandywine Creek.

The property is currently owned by 920, LLC. There are two buildings on the property from the 1800s as well as a small welding storage shed.

Previous Site Uses:

The Wilmington Rolling Mill Property was used for industrial purposes starting in the mid to late 1800s. The Seidel and Hastings Company (Wilmington Plate Iron Rolling Mills) was indicated as the occupant of the property on an 1884 map. Historic research indicates that Seidel and Hastings owned the property as early as 1864. Seidel and Hastings manufactured steel plates. Historic maps indicate that by 1893, a railway and a coal yard were present on the northern and eastern portions of the property. At some point between 1893 and 1901, John Hamilton took ownership of the coal yard on the northern portion of the property and several buildings were constructed. The southern portion of the site was still owned by Seidel and Hastings. By 1927, the property had become part of the estate of Samuel Hilles and the former occupants were no longer operating at the property. Between 1929 and 1971, a variety of companies occupied the site including Consolidated Machine Tool Company, Diamond Ice and Coal Company, and McCormick Supply & Equipment, Inc. The site was unoccupied for some time and it was a part of the estate of George Horn. It was later sold and used for different commercial purposes, one of them being steel storage by RC Fabricators, Inc.

Site Regulatory Status:

This section briefly summarizes previous investigations performed on the site through the SIRS program. A current SIRS regulatory status is also included.

Brownfield Preliminary Assessment II (DNREC, 2000)

In June 2000, DNREC SIRB performed site visits to the property to identify topographic features at the site and to determine sampling locations for an investigation of the property. During the initial site investigation, between 50 and 60 abandoned 55-gallon drums were discovered in a stone and cinderblock building located near a pumping station owned by the City Wilmington. Guardian Environmental Services (GES) was contracted by DNREC Emergency Response Branch (ERB) to characterize the contents of the drums. GES sampled the drums on July 12, 2000 and none of the drums were found to contain hazardous materials. Twenty-one drums were found to contain rainwater, 22 drums were empty, 10 drums were found to contain non-PCB oil mixed with rainwater, and three drums were found to contain grease and rainwater. On July 11 and 12, 2000, DNREC collected 24 soil samples from 12 test pits at the property, 8 surface soil samples, and three sediment samples from the Brandywine Creek located adjacent to the property. Soil samples were field screened for PCBs by DNREC using immunoassay test kits. Based on results of the field screening, one surface soil sample and one sediment sample were sent for laboratory PCB analysis. The surface soil sample (WRM-SS2) was found to contain Aroclor 1260 at a concentration of 1.1 mg/kg. The sediment sample (WRM-SED3) was also found to contain Aroclor 1260 at a concentration 2,500 mg/kg. Sediment sample WRM-SED3 was reportedly collected from below a stormwater outfall for the property which discharged to the Brandywine Creek. Based on the results of the BPA II, DNREC recommended that additional investigation of the property be performed prior to any redevelopment activities at the property.

Tank Closure Documentation (DNREC, 2001)

In August 2001 five USTs were removed from the site and soil samples were collected. Analyses showed detections above the DNREC Tier 0 Action Levels for TPH-GRO and xylene concentrations at Tank 1. The UST system was granted “No Further Action” status by DNREC but a contaminated soil management plan is required if any future excavation takes place.

Remedial Investigation Report (Environmental Alliance, 2004)

Environmental Alliance, Inc. (Environmental Alliance) conducted a Remedial Investigation (RI) at the property in 2004. The RI was conducted through the Voluntary Cleanup Program under DNREC-SIRB oversight. Soil and groundwater testing was performed in 33 locations to determine impacts, if any, from previous industrial uses.

A total of 50 soil and sediment samples were collected. All soil samples were screened then selected samples were submitted for confirmatory analyses. PCBs were not detected in any of the surface or subsurface soil samples during screening. Two samples were submitted for further analysis and PCBs were detected in surface soil sample S-17 (0-2 feet below ground surface) below URS unrestricted values for surface soils. Three sediment samples were submitted as well but none of the concentrations exceeded the URS for Protection of the Environment value. Five groundwater samples were collected from monitoring wells, two from existing wells and three from temporary monitoring wells installed by Environmental Alliance for the RI. Total and dissolved PCBs analysis was performed on samples from the wells. PCBs were not detected above the URS guidance values in any groundwater sample.

Overall, the RI determined that PCBs were not a contaminant of concern at the Wilmington Rolling Mill site and additional PCB evaluation was not recommended.

Current Regulatory Status:

Brownsapes, LLC had plans to purchase the site and commissioned Environmental Alliance to perform the RI in October 2003. Review of information obtained from the DNREC Environmental Navigator indicates that a Brownfields Remedial Action Plan was proposed for the site in 2011. There are no additional records of progress since then.

SUMMARY OF SITE PCB INFORMATION

Site Investigation PCB Findings:

PCBs were detected in two surface soil samples, S-17 (0 to 2 feet below ground surface (bgs)) and WRMSS-2 (0 to 2 feet bgs), at concentrations of 0.16 mg/kg and 1.1 mg/kg, respectively. Additional detections in screened surface soil samples include six samples with PCBs present at a concentration <0.5 mg/kg and one samples with unconfirmed PCBs. In the unsaturated subsurface soil, PCBs were present based on screening analysis at a concentration less than 0.5 mg/kg for one sample, WRMTP-3 (8 feet bgs). In the saturated subsurface soil, PCBs were present based on screening analysis at a concentration less than 0.5 mg/kg in two samples, WRMTP-10 (6 feet bgs) and WRMTP-12 (12 to 12.5 feet bgs).

Due to the fact that there were only two detections in the surface soil, the maximum detected value (1.1 mg/kg) was used in the overland flow calculations instead of calculating the 95% upper confidence limit (UCL) of the mean of the concentration of total PCBs observed in the surface soil. There were no PCBs detected in groundwater.

Concentrations of PCBs on Site			
Sample Matrix	Corresponding Figure	Analytical Methods	Range of Total PCBs
Surface Soil	Figure 2	Method 8082 and Screening Data	Not detected to 1.1 mg/kg
Subsurface Soil (unsaturated)	Figure 3	Screening Data	Not detected to <0.5 mg/kg
Subsurface Soil (saturated)	Figure 4	Screening Data	Not detected to <0.5 mg/kg
Groundwater	Figure 5	Method 8082	Not Detected

A summary of all samples collected for PCB analyses are presented in Tables 1 through 3.

Acreage where PCBs detected:

The estimated surface soil area impacted by PCBs is 0.52 acres (Figure 2). In the subsurface unsaturated soil, 0.28 acres are impacted by PCBs (Figure 3). The estimated subsurface saturated soil area impacted by PCBs is 0.90 acres (Figure 4). Based on the data available and reviewed by BrightFields, the groundwater is not impacted by PCBs.

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PCB Remediation Status:

A Brownfields Remedial Action Plan has been proposed for the site but there is no record of remediation to date.

PCB MASS LOADING SUMMARY

The PCB mass loading rate to surface water via overland flow and groundwater transport was estimated for the Wilmington Rolling Mill Property. A summary of the results is included below and the details of the calculations are included as attachments to this Appendix.

Overland Flow:

Overland flow has been determined on this site by using the Revised Universal Soil Loss Equation (RUSLE). The RUSLE predicts the long term average annual rate of erosion on an area based on rainfall patterns, soil type, topography, cover/canopy factors and support management practices. These specific factors are site specific and rely on local information of the site. A breakdown of the individual factors is presented below with a brief explanation of their choice.

Ground Cover and Canopy:

The surface cover and flow paths were assessed through aerial photography and available contour mapping (Delaware Data Mil, 2007). The cover/management factor (C) assigned to the erodible area and associated flow paths was 0.17, which corresponds to areas instituting a vegetative cover primarily consisting of tall weeds with approximately 25% coverage and ground cover of grass or grass-like vegetation over 20% of the area.

Site Sediment and Erosion Control Practices:

Based on the aerial photography evaluation and review of site documents it does not appear that any sediment and erosion control practices are being implemented on Site.

Input Factors and Results:

A breakdown of the individual factors is presented below with a brief explanation of their choice.

Wilmington Rolling Mill Property

RUSLE Factors	Values Provided	Explanation of choice
R = rainfall-runoff erosivity index (10 ² ft-tonf-in/ac-hr-yr)	175	An appropriate value for R for the Site was determined using the Isoerodent Map of the Eastern U.S. from the Stormwater Phase II Final Rule Construction Rainfall Erosivity Waiver (USEPA, 2012).
K = soil erodibility (0.01 ton-ac-hr/ac-ft-tonf-in)	0.35	The soil erodibility factors were selected from the National Resource Conservation Soil Survey Geographic Database (SSURGO) and a raster was created using the values 0.12, 0.42, and 0.25, with a weighted average of 0.35.
ls = topographic factor (dimensionless)	0.32	The topographic factor was derived based on the slope and flow accumulation grids created in ArcGIS. An output LS grid was created and the average value for the grid is provided.
C = cover/management factor (dimensionless)	0.17	The cover/management factor C assigned to the erodible area was 0.17, which corresponds to areas instituting a vegetative cover primarily consisting of tall weeds with approximately 25% coverage and ground cover of grass or grass-like vegetation over 20% of the area.
P = support practice factor (dimensionless)	1	No documentation was provided indicating that any sediment and erosion controls are in place.
A = average annual soil loss estimate (ton/ac-yr)	5.0	The average soil loss estimate was generated by ArcGIS using the input factors listed above.
Erodible Area (acres)	0.15	The erodible area was calculated based on the pervious surfaces within the area of concern polygon for surface soil (Figure 6).

For factors that were not consistent across the site, rasters were used to characterize the variations. Due to the methodology utilized to derive the soil loss estimate, the numbers listed above cannot simply be multiplied.

The total estimated PCB loading via overland flow for the Wilmington Rolling Mill Property is **0.74 grams per year**. Please see attached table for specific variables.



Uncertainty Analysis Associated with Overland Flow:

Specific Areas and Degree of Uncertainty for the Wilmington Rolling Mill Property

	Samples Per Acre (site)	Chemical Data Quality*	Soil Type	Site Coverage	Map Quality	Average Distance to Discharge Point
Site Specific Information	18.7	Screening Data	Soil Database	Based on a limited site assessment	Well Scaled Maps	Approximately 23 feet
Degree of Uncertainty	Low	High	Low	Low to Moderate	Low to Moderate	Low

* Primary analysis used in the historical samples

Sources of uncertainty for the Wilmington Rolling Mill Property include: The majority of the data utilized for the overland flow analysis was Immunoassay screening data, with a few samples that had Aroclor lab data. There was limited access to the site for a site assessment, however the site is small which allowed for an adequate assessment of site coverage. The sample locations were taken from well scaled maps. Based on this evaluation the level of uncertainty associated with overland flow PCB mass loading from the Wilmington Rolling Mill Property is **Moderate**.

Groundwater Discharge Analysis:

Groundwater discharge is based on the hydraulic conductivity of the soil, the groundwater gradient, and the cross-sectional area of the aquifer. A breakdown of the individual factors used in the Darcy equation is presented below. A groundwater discharge map is included as Figure 7.

Because PCBs were detected in saturated soil, but not in groundwater, the calculated concentration of PCBs in pore water, based on partitioning, was used to calculate the mass loading.

The calculations are presented in Table B in the groundwater transport calculations attachment.

Input Factors:

A breakdown of the individual factors is presented below with a brief explanation of their choice.

Groundwater Transport Factors	Value Used		Justification/Derivation of Value Used
	min	max	
K = Hydraulic Conductivity (ft/day)	0.28	5.7	Drilling logs from Geoprobe® borings were used to evaluate the lithology beneath the site. Groundwater being monitored is within the fill zone. The fill unit ranges in composition from clayey sand and clayey gravel to fine-to coarse-grained sand. The hydraulic conductivity for coarse sandy silt ranges from approximately 1×10^{-4} to 2×10^{-3} cm/sec (Cernica, 1995). This converts to 0.28 to 5.7 ft/day.
I = Horizontal Groundwater Gradient	0.031	0.031	Estimated from EA data, flowing east toward Brandywine Creek.
Saturated Thickness (ft)	7	8	Based on the borings logs from Environmental Alliance, groundwater appears to have been generally encountered at between 7 to 8 feet bgs. A clay unit was encountered at 14 feet bgs.
Lateral Discharge Distance (ft)	202	244	The lateral discharge distance was estimated to be equal to the length of the PCB-impacted soil measured perpendicular to groundwater flow.
A= Cross-Sectional Area (ft ²)	1,410	1,950	Calculated from the saturated thickness and lateral discharge distance.
Groundwater PCB Concentration (µg/L)	0.055	0.27	One half of the “present but < 0.5 mg/kg” designation concentration estimated in the saturated subsurface soil (0.250 mg/kg) was used to determine the estimated concentration in groundwater.
Distance to Discharge point (ft)	Directly adjacent		Approximate distance from property boundary to closest surface water location. Brandywine Creek is adjacent.

Mass Loading Via Groundwater Transport Result:

The groundwater discharge is 347 to 9,800 L/day (see attached Table A). The maximum detected PCB concentration (0.25 mg/kg) was used to calculate the groundwater concentrations for the loading estimate (Table B). The estimated minimum and maximum contaminant mass loading contributions shown in Table C assume that there are no contaminant losses due to degradation, dispersion, sorption, volatilization, etc.



The total PCB loading via groundwater discharge is estimated to be between **0.03** and **1 gram per year** (Table C).

Uncertainty Analysis Associated with Groundwater Transport:

Specific Areas and Degree of Uncertainty for the Wilmington Rolling Mill Property

	Groundwater PCB Concentration	Sampling Density	Hydraulic Conductivity	Horizontal Groundwater Gradient	Saturated Thickness	Lateral Discharge Distance	Distance to Discharge Point
Site Specific Information	Partitioning based on maximum concentration observed in saturated soil	1.8; Possible data gaps	Based on detailed site logs	Multiple points with numerous groundwater measurements	Good quality logs	Good groundwater gradient defined and a moderate number of samples collected onsite	Directly Adjacent
Degree of Uncertainty	High	Moderate	Moderate	Low to Moderate	Moderate	Moderate	Low

Based on this evaluation the level of uncertainty associated with groundwater transport PCB mass loading from the Wilmington Rolling Mill Property is **Moderate**.

Site References:

Delaware Department of Natural Resources and Environmental Control (DNREC), 2000, Brownfield Preliminary Assessment II, Wilmington Iron Plate Rolling Mill, September 2000.

DNREC, 2008, Revised Plan of Remedial Action, March 2008.

Delaware Geological Survey, 2013, Delaware Data Mil, <<http://datamil.delaware.gov/geonetwork/srv/en/main.home>>, May 2013.

Environmental Alliance, Inc., 2004, Remedial Investigation Report, 1000-1020 Church Street, February 2004.

PCB Mass Loading Phase II
Wilmington Rolling Mill Property
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Wilmington, Delaware



Figures



- Soil Sample
- Groundwater Sample
- ▲ Sediment Sample
- Wilmington Rolling Mill Site Boundary (2.83 ac)

Source: Delaware DataML - Aerial 2012, Tax Parcels.

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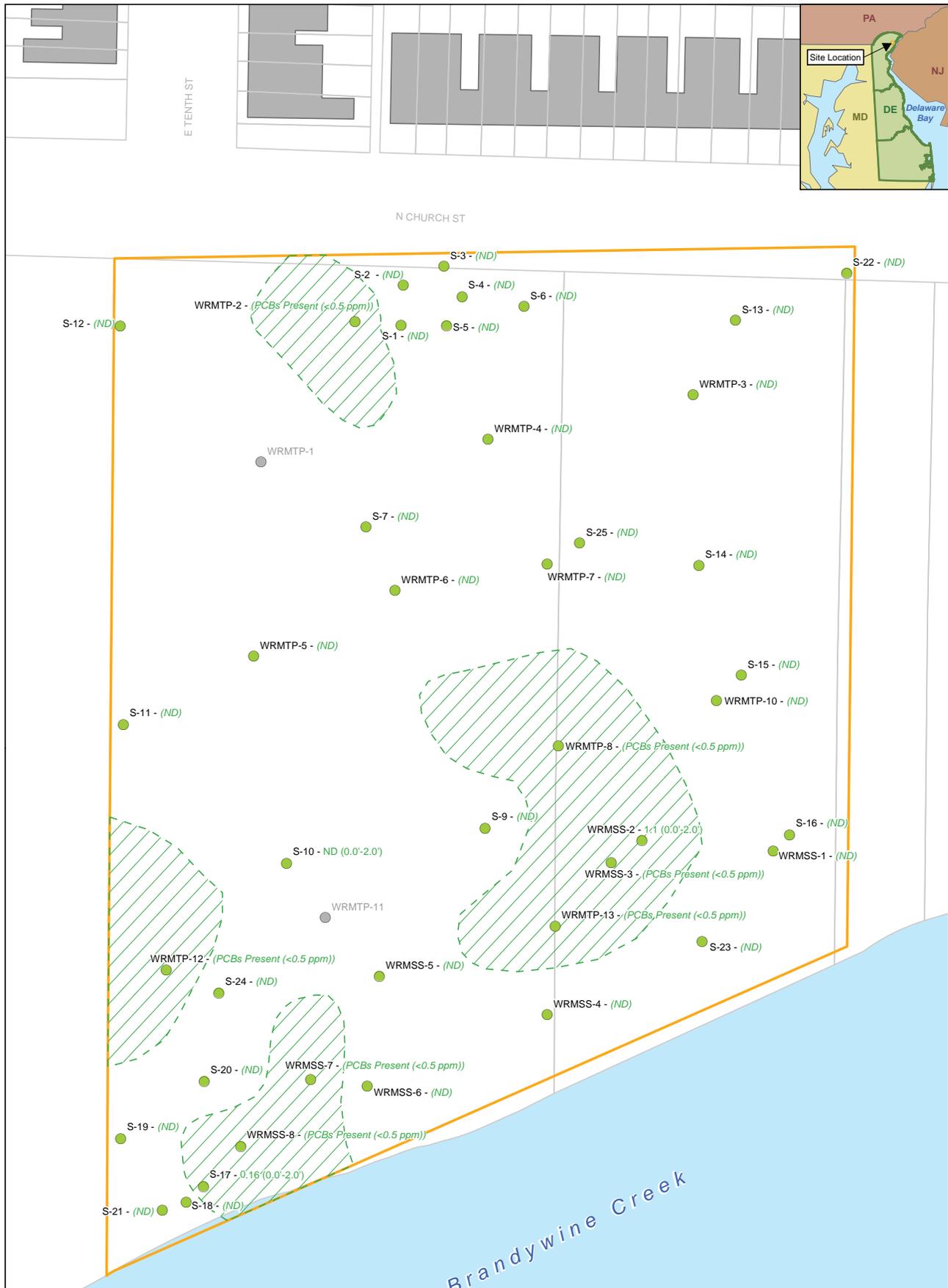
801 Industrial Street, Suite 1
 Wilmington, Delaware 19801

302-656-9600
 302-656-9700 fax

Historic Sample Locations
 and Aerial Photograph (2012)
 Wilmington Rolling Mill
 Wilmington, Delaware

Drawn	By	Date	Scale	File Name:
ADS	ADS	5/30/2014	1:480	Fig1SiteLoc.mxd
Checked	JPR	5/30/2014	Fig. No.	
			Figure 1	
Project #	0985.69.51			

0 20 40 Feet



- Soil Sample, No PCB data available
- Soil Sample
- ▨ Estimated PCB Distribution
- ▭ Wilmington Rolling Mill Site Boundary
- ▭ Tax Parcels
- ▭ Buildings
- ▭ Surface Water

Notes:
 0.55 (0) - Total PCB Concentration (mg/kg) and Sample Depth.
 ND - Not Detected
 Screening data is in parentheses and italicized.
 Source: Delaware DataMIL - Tax Parcels;
 New Castle County - Buildings.

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PCB Distribution in Surface Soil (0' - 2' bgs)
 Wilmington Rolling Mill
 Wilmington, Delaware

Drawn	By	Date	Scale	File Name:
ADS	ADS	7/8/2013	1:480	Fig2DistSurf.mxd
Checked	By	Date	Fig. No.	
JPR	JPR	7/8/2013	Figure 2	
Project #	0985.69.51			

0 20 40 Feet



E TENTH ST

N CHURCH ST



- Soil Sample, No PCB data available
- Soil Sample
- ▨ Estimated PCB Distribution
- ▭ Wilmington Rolling Mill Site Boundary
- ▭ Tax Parcels
- ▭ Buildings
- ▭ Surface Water

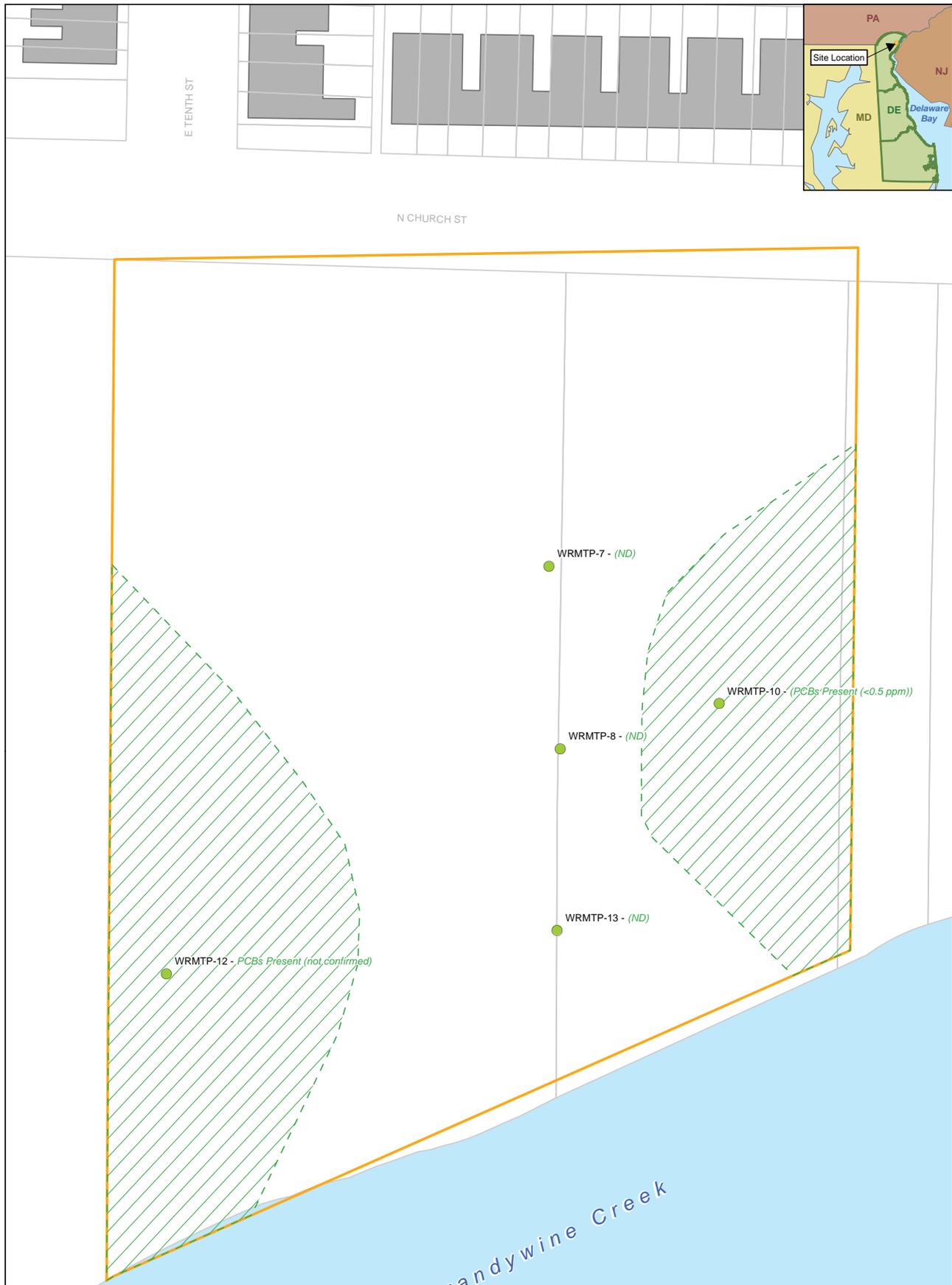
Notes:
 Screening data (mg/kg) is in parentheses and italicized.
 ND - Not Detected
 Source: Delaware DataMIL - Tax Parcels;
 New Castle County - Buildings.

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PCB Distribution in Subsurface Unsaturated Soil
 Wilmington Rolling Mill
 Wilmington, Delaware

Drawn	By	Date	Scale:	File Name:
ADS	ADS	12/17/2013	1:480	Fig3SS_UnSat.mxd
Checked	JPR		12/17/2013	Fig. No.
Project #	0985.69.51		Figure 3	

0 20 40 Feet



E TENTH ST

N CHURCH ST

WRMTP-7 - (ND)

WRMTP-8 - (ND)

WRMTP-13 - (ND)

WRMTP-12 - PCBs Present (not confirmed)

WRMTP-10 - (PCBs Present (<0.5 ppm))

Brandywine Creek

- Soil Sample
- ▨ Estimated PCB Distribution
- ▭ Wilmington Rolling Mill Site Boundary
- ▭ Tax Parcels
- ▭ Buildings
- ▭ Surface Water

Notes:
 Screening data (mg/kg) is in parentheses and italicized.
 ND - Not Detected
 Source: Delaware DataMIL - Tax Parcels;
 New Castle County - Buildings.

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PCB Distribution in Subsurface Saturated Soil
 Wilmington Rolling Mill
 Wilmington, Delaware

Drawn	By	Date	Scale	File Name
ADS	ADS	12/17/2013	1:480	Fig4SS_Sat.mxd
Checked	Project #	Fig. No.		
JPR	0985.69.51	Figure 4		

0 20 40 Feet



ETENTH ST

N CHURCH ST

MW-1 - ND
WRMMW-1 - ND

MW-3

MW-2 - ND
WRMMW-2 - ND

MW-4 - ND

MW-5

Brandywine Creek

- Groundwater Sample, No PCB data available
- Groundwater Sample
- Wilmington Rolling Mill Site Boundary
- Tax Parcels
- Buildings
- Surface Water

Notes:
 ND - Not Detected
 Source: Delaware DataMIL - Tax Parcels;
 New Castle County - Buildings.

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PCB Distribution in Groundwater
 Wilmington Rolling Mill
 Wilmington, Delaware

Drawn	By	Date	Scale:	File Name:
ADS	ADS	5/30/2014	1:480	Fig5GW.mxd
Checked	Project #		Fig. No.	
JEH	0985.69.51		Figure 5	

0 20 40 Feet



→ Overland Flow
 [Orange Outline] Wilmington Rolling Mill Site Boundary
 [White Outline] Tax Parcels
 Tons/Year/Acre of Soil Loss Estimated
 High : 60.65
 [Color Gradient] Low : 0

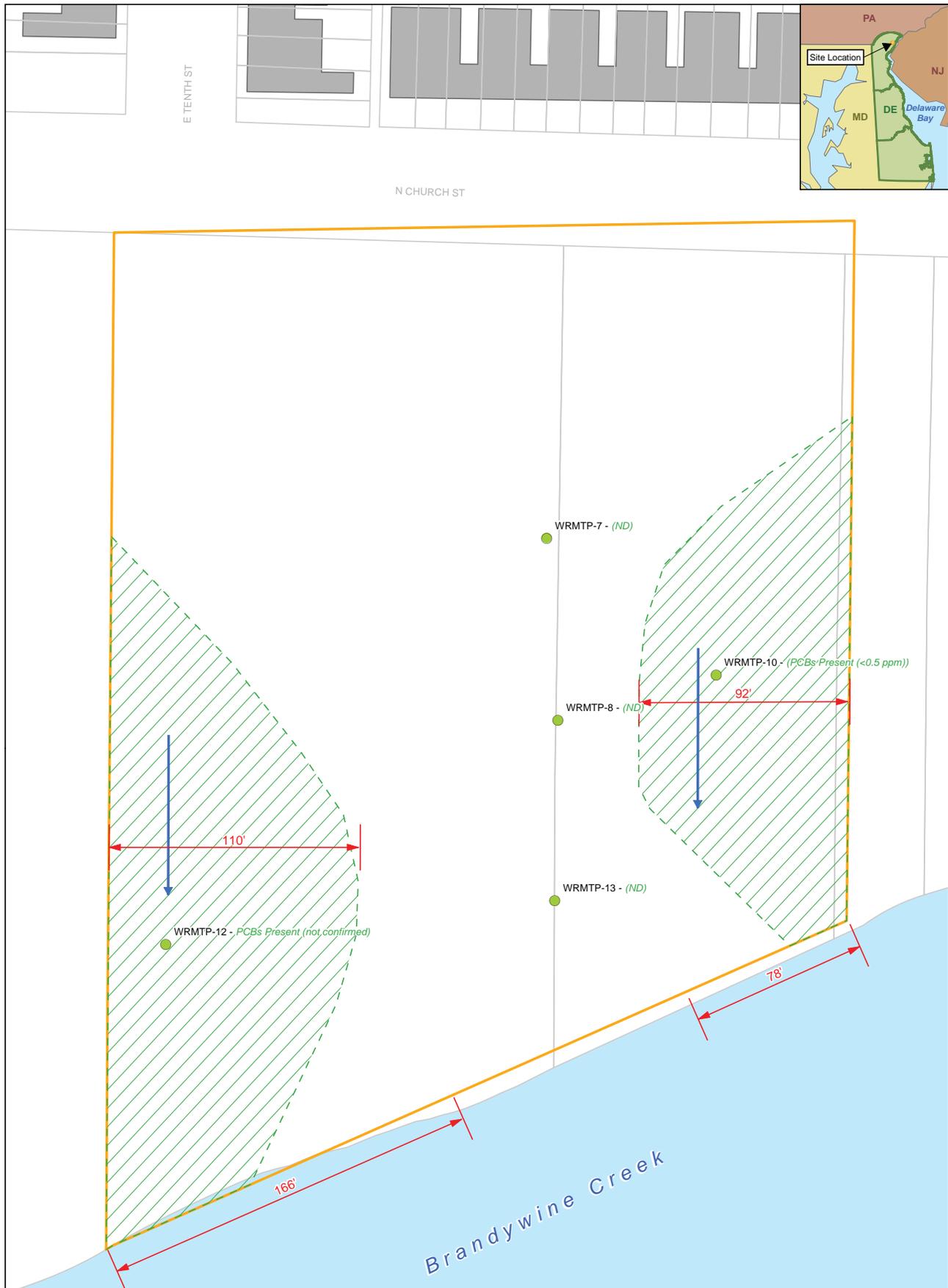
Source: Delaware DataMIL - Aerial 2012, Tax Parcels.


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Soil Loss Estimates
 Wilmington Rolling Mill
 Wilmington, Delaware

Drawn	By	Date	Scale:	File Name:
ADS	ADS	6/18/2014	1:480	Fig6SoilLoss.mxd
Checked	KEP	6/18/2014	Fig. No.	
Project #	0985.69.51		Figure 6	

0 20 40 Feet

- Soil Sample
- ↔ Groundwater Discharge Distance (feet)
- Groundwater Discharge Limit
- Groundwater Flow Direction
- ▨ Estimated PCB Distribution
- Wilmington Rolling Mill Site Boundary
- Tax Parcels
- Buildings
- Surface Water

Notes:
 Screening data (mg/kg) is in parentheses and italicized.
 ND - Not Detected

Source: Delaware DataMIL - Tax Parcels;
 New Castle County - Buildings.

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Groundwater Discharge Map
 Wilmington Rolling Mill
 Wilmington, Delaware

Drawn	By	Date	Scale	File Name:
ADS	ADS	12/17/2013	1:480	Fig7Discharge.mxd
Checked	Project #	Fig. No.	Figure 7	
JPR	0985.69.51	12/17/2013		

PCB Mass Loading Phase II
Wilmington Rolling Mill Property
SIRS ID: DE-1198
Wilmington, Delaware



Tables

Table 1
PCB Screening Results For Soil
Wilmington Rolling Mill Property (DE-1198)
Wilmington, DE

Sample Identification	Sample Depth (feet bgs)	Sampling Company	Report Name	Report Date	Total PCBs	
					DNREC-SIRS Screening Level (January 2014) (mg/kg)	NCA
S-1	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-2	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-3	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-4	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-5	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-6	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-7	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-9	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-10	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-11	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-12	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-13	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-14	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-15	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-16	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-17	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-18	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-19	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-20	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-21	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-22	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-23	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-24	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
S-25	0.0'-2.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	ND	ND
WRMSS-1	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMSS-2	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	PCBs Present (<0.5 ppm)	PCBs Present (<0.5 ppm)
WRMSS-3	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	PCBs Present (<0.5 ppm)	PCBs Present (<0.5 ppm)
WRMSS-4	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMSS-5	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMSS-6	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMSS-7	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	PCBs Present (<0.5 ppm)	PCBs Present (<0.5 ppm)
WRMSS-8	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	PCBs Present (<0.5 ppm)	PCBs Present (<0.5 ppm)
WRMTP-2	1.0'-1.5'	DNREC	Brownfield Preliminary Assessment II	Sep-00	PCBs Present (<0.5 ppm)	PCBs Present (<0.5 ppm)
WRMTP-2	12.5'-13.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-3	0.5'-1.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-3	8.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	PCBs Present (<0.5 ppm)	PCBs Present (<0.5 ppm)
WRMTP-4	1.5'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-4	9.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-5	0.5'-1.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-5	10.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-6	1.0'-1.5'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-6	12.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND

Table 1
PCB Screening Results For Soil
Wilmington Rolling Mill Property (DE-1198)
Wilmington, DE

Sample Identification	Sample Depth (feet bgs)	Sampling Company	Report Name	Report Date	Total PCBs	
					DNREC-SIRS Screening Level (January 2014) (mg/kg)	NCA
WRMTP-7	1.0'-1.5'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-7	8.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-8	1.0'-1.5'	DNREC	Brownfield Preliminary Assessment II	Sep-00	PCBs Present (<0.5 ppm)	ND
WRMTP-8	9.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-10	1.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-10	6.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	PCBs Present (<0.5 ppm)	ND
WRMTP-11	9.0'-10.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND
WRMTP-12	1.0'-1.5'	DNREC	Brownfield Preliminary Assessment II	Sep-00	PCBs Present (<0.5 ppm)	PCBs Present
WRMTP-12	12.0'-12.5'	DNREC	Brownfield Preliminary Assessment II	Sep-00	PCBs Present (<0.5 ppm)	ND
WRMTP-13	1.5'	DNREC	Brownfield Preliminary Assessment II	Sep-00	PCBs Present (<0.5 ppm)	ND
WRMTP-13	7.5'	DNREC	Brownfield Preliminary Assessment II	Sep-00	ND	ND

Note: All results reported in mg/kg.

Qualifiers:

bgs - Below ground surface

NCA - No criteria available

ND - Not detected

Table 2
 PCB Analytical Results For Soil
 Wilmington Rolling Mill Property (DE-1198)
 Wilmington, DE

Sample Identification	Sample Depth (feet bgs)	Sampling Company	Report Name	Report Date	Aroclor-1016 DNREC-SIRS Screening Level (January 2014) (mg/kg)	Aroclor-1221 DNREC-SIRS Screening Level (January 2014) (mg/kg)	Aroclor-1232 DNREC-SIRS Screening Level (January 2014) (mg/kg)	Aroclor-1242 DNREC-SIRS Screening Level (January 2014) (mg/kg)	Aroclor-1248 DNREC-SIRS Screening Level (January 2014) (mg/kg)	Aroclor-1254 DNREC-SIRS Screening Level (January 2014) (mg/kg)	Aroclor-1260 DNREC-SIRS Screening Level (January 2014) (mg/kg)	Total PCBs DNREC-SIRS Screening Level (January 2014) (mg/kg)
S-10	0.0-2.0	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	0.39	0.14	0.14	0.22	0.22	0.11	0.22	NCA
S-17	0.0-2.0	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	NA	NA	NA	NA	0.027	0.023	0.11	ND
WRMSS-2	0.0-2.0	DNREC	Brownfield Preliminary Assessment II	Sep-00	0.043	0.068	0.043	0.043	0.043	0.043	1.1	1.1

Note: All results reported in mg/kg.

Qualifiers:

- bgs - Below ground surface
- NCA - No criteria available
- NA - Not available from reports provided to Brightfields
- ND - Not detected
- U - Sample not detected above the laboratory method detection limit
- J - Estimated value
- Bold and shaded - Exceeds DNREC-SIRS January 2014 Screening Levels

Table 3
 PCB Analytical Results For Groundwater
 Wilmington Rolling Mill Property (DE-1198)
 Wilmington, DE

Sample Identification	Screen Depth (feet bgs)	Sampling Company	Report Name	Report Date	Aroclor-1016 DNREC-SIRS Screening Level (ug/L)	Aroclor-1221 DNREC-SIRS Screening Level (ug/L)	Aroclor-1232 DNREC-SIRS Screening Level (ug/L)	Aroclor-1242 DNREC-SIRS Screening Level (ug/L)	Aroclor-1248 DNREC-SIRS Screening Level (ug/L)	Aroclor-1254 DNREC-SIRS Screening Level (ug/L)	Aroclor-1260 DNREC-SIRS Screening Level (ug/L)	Total PCBs DNREC-SIRS Screening Level (ug/L) NCA
MW-1	14.0'-24.0'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	NA	ND						
MW-2	5.5'-15.5'	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	NA	ND						
MW-4	NA	Environmental Alliance, Inc.	Remedial Investigation Report	Feb-04	NA	ND						
WRMMW-1	14.0'-24.0'	DNREC	Brownfield Preliminary Assessment II	Sep-00	1	2	1	1	1	1	1	U
WRMMW-2	5.5'-15.5'	DNREC	Brownfield Preliminary Assessment II	Sep-00	1	2.1	1	1	1	1	1	U

Note: All results reported in ug/L.

Qualifiers:

- bgs - Below ground surface
- * - Screening level likely below the routine method detection limit
- NCA - No criteria available
- NA - Not available from reports provided to Brightfields
- ND - Not detected
- U - Sample not detected above the laboratory method detection limit

PCB Mass Loading Phase II
Wilmington Rolling Mill Property
SIRS ID: DE-1198
Wilmington, Delaware



Site Photographs



The western corner of the site along N Church Street with tall weeds and small saplings.



The entrance to the site on the southern boundary with gravel and limited vegetation.

PCB Mass Loading Phase II
Wilmington Rolling Mill Property
SIRS ID: DE-1198
Wilmington, Delaware



Looking north from the southern site boundary into debris piles and areas with patchy vegetation.

PCB Mass Loading Phase II
Wilmington Rolling Mill Property
SIRS ID: DE-1198
Wilmington, Delaware



Overland Flow Calculations

**PCB Loading Calculations from the Revised Universal Soil Loss Equation (RUSLE)
Wilmington Rolling Mill Property (DE-1198)
Wilmington, DE**

Surface PCB Concentration 1.1 mg/kg

Symbol	Factor	Value	Units
R	Rainfall/Runoff Erosivity Index	175	10 ² ft-tonf-in/ac-hr-yr
K	Soil Erodibility	0.35	0.01 ton-ac-hr/ ac-ft-tonf-in
	Erodible Area	0.15	Acres
LS	Topographic Factor	0.32	Dimensionless
C	Cover and Management Factor	0.17	Dimensionless
P	Support Practice Factor	1	Dimensionless
A	Average Annual Soil Loss	5.0	ton/ac-yr

**PCB Loading via Overland
Flow** 0.74 **grams/year - PCBs**

PCB Mass Loading Phase II
Wilmington Rolling Mill Property
SIRS ID: DE-1198
Wilmington, Delaware



Groundwater Transport Calculations

**PCB Loading Calculations - Groundwater Discharge to Surface Water
Wilmington Rolling Mill Property (DE-1198)
Wilmington, DE**

**TABLE A
Groundwater Discharge Calculations**

	Hydraulic Conductivity (K) (ft/day)	Horizontal Gradient (i) (ft/ft)	Cross-sectional Area (A) (ft ²)	Groundwater Discharge*	
				Liters/day	Gallons/day
Minimum	0.28	0.031	1,410	347	92
Maximum	5.7	0.031	1,950	9,800	2,600

* - Groundwater Discharge (Q) = KiA

**TABLE B
Potential Groundwater PCB Concentration Calculation**

Maximum Soil PCB (µg/kg)	f _{oc} (fraction of organic carbon)		Pore Water PCB (µg/L)	
			Maximum	Minimum
250	0.01	0.05	0.27	0.055

**TABLE C
Estimated Mass Loadings of PCBs in Groundwater to the
Brandywine Creek**

Maximum Estimated Groundwater Concentration (µg/L)	Estimated PCB Mass Loading (g/yr)	
	Minimum	Maximum
0.27	0.03	1.0