

PCB Mass Loading Phase II
Newport City Landfill Property
SIRS ID: DE-0044
Wilmington, Delaware



Appendix 22

NEWPORT CITY LANDFILL PROPERTY WILMINGTON, DELAWARE

SIRS ID: DE-0044

GENERAL SITE INFORMATION

Site Name: Newport City Landfill Property

SIRS ID Number: DE-0044

Site Location and Description:

The Newport City Landfill Property is located at Water Street and Copper Drive in Newport, Delaware. The site has been redeveloped and is now a portion of the Newport Industrial Park. The site is 15.86 acres in size and is comprised of ten tax parcels (#2000400031, #2000400032, #2000400034, #2000400035, #2000400036, #2000400037, #2000400038, #2000400039, #2000400040, and #2000400044).

A lagoon, which drains directly to the Christina River, is located south of the site. Groundwater is present at the site approximately 10 feet below ground surface and flows south towards the lagoon and the Christina River. Surface water from the Site is also expected to flow south towards the lagoon.

The site is bounded to the north by Water Street, an AMTRAK railroad right-of-way, and residential properties; to the east by industrial/commercial properties; to the south by a tidal lagoon and the Christina River; and to the west by industrial/commercial properties.

The site currently serves as an active industrial park. The site has been developed as an industrial park since the early 1980s, following the addition of several feet of fill above the land filled material. Buildings and hardscaping cover over 75% of the site surface. The facilities were built in the mid-1980s. Prior to the 1980s, the site was primarily used as a municipal landfill for the City of Newport.

Previous Site Uses:

The City of Newport operated a landfill at the site from the 1950s until 1974. The landfill was used to burn and dispose of municipal and commercial wastes. Several sources reported midnight dumping and burying of industrial wastes including sludge, drums, and oil at the property. The City of Newport purchased the property from Anna Justis in 1940. In 1974, DNREC ordered that the landfill be closed after several violations of solid waste regulations were noted at the site, including inadequate daily cover. After the landfill was closed, the site was capped with several

feet of fill material. Beginning in 1977, the City of Newport began selling the lots of the site for industrial use. During development of the site in the early 1980s, high levels of methane were detected in the subsurface at the site and mercury was detected in the sediments of a surface water drainage swale at the site prompting further investigation.

A review of historical aerial photographs of the former Newport City Landfill Property indicate the following: The 1937 aerial photograph shows the site as vacant, open land with wetlands along the southern extent. The 1954 aerial photograph shows the same, although some land immediately west of the site appears disturbed. A structure, presumably a warehouse, appears in the northeast corner of the site. The 1961 aerial photographs shows the land to the west of the site as heavily disturbed and being used for stockpiling /storage. A small area of disturbed land, accessible by a dirt road, is present on the site. Dredging operations appear to be occurring in the wetlands south of the site. The 1968 aerial photograph shows the site and immediate areas as heavily disturbed. The Christina River has been re-routed to accommodate Interstate 95 and a lagoon has been excavated along the southern boundary of the site. The 1992 aerial photograph depicts the site as being developed; several warehouse-sized buildings are now present onsite. There is little change between the 1992, 1997, 2002, and 2007 aerial photographs except the appearance of additional buildings.

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.

Preliminary Assessment (DNREC, 1983)

DNREC performed a Preliminary Assessment (PA) of the Newport City Landfill Property in 1983. The report identified a PA previously completed by Ecology & Environment, Inc. (E&E) in 1981. The E&E PA concluded that the site did not pose any serious threat to human health or the environment and recommended no further action at the site. The DNREC PA report indicated that based on the detection of mercury in the sediments of a drainage swale at the property, the detection of explosive levels of methane gas in the subsurface at the site, and the reports of midnight dumping of industrial wastes at the property, DNREC disagreed with the E&E recommendation for no further action at the site and DNREC recommended that a Site Inspection (SI) be performed.

Site Inspection (NUS Corporation, 1985)

The NUS Corporation (NUS) conducted a Site Inspection (SI) at the property in March 1984 and collected samples from surface waters, sediments, stained soils, and offsite municipal drinking water wells. The report indicated that the detection of PCBs and trichloroethene (TCE) in soils and sediments at the site suggest past disposal of hazardous wastes.

NUS Corporation collected three soil samples from areas with evidence of surficial staining. The PCB analysis indicated that surface soil sample C8119/MC 3126 contained PCBs (Aroclor 1254) at a concentration of 0.43 mg/kg. This concentration exceeds the 2013 DNREC screening level of 0.22 mg/kg for Aroclor 1254. All other soil samples collected by NUS Corporation did not contain PCBs above laboratory detection limits.

Three sediment and three surface water samples were collected from upstream, midstream, and downstream locations in a drainage swale located on the eastern side of the site. The PCB analysis indicated that sediment sample C8114/MC 3121 from the midstream drainage swale location contained PCBs (Aroclor 1254) at a concentration of 0.53 mg/kg, which exceeds the 2013 DNREC screening level of 0.22 mg/kg for Aroclor 1254. None of the other sediment and surface water samples collected by NUS Corporation contained PCBs above laboratory detection limits.

Facility Evaluation (DNREC, 1993)

DNREC conducted a Facility Evaluation (FE) of the Newport City Landfill Property in 1993 in order to further characterize the extent of contamination present at the site. DNREC advanced five soil borings and installed five monitor wells in the borings. DNREC collected ten soil samples from soil cuttings derived from the well drilling activities. Soil samples were submitted to a laboratory for analysis of VOCs, SVOCs, metals, pesticides, and PCBs. No screening analysis was performed. The PCB analysis indicated that soil sample NP-10 (8 to 10 feet below ground surface (bgs)) contained PCBs (Aroclor 1242, 1254, and 1260) at a total concentration of 0.37 mg/kg. None of the individual Aroclor concentrations detected exceed the 2013 DNREC screening level of 0.22 mg/kg for Aroclor 1242, 1254, and 1260. None of the other soil samples collected by DNREC contained PCBs above laboratory detection limits.

DNREC collected groundwater samples from each newly installed well. All groundwater samples were analyzed for select inorganic and organic analytes. PCBs were not detected above laboratory detection limits.

Based on the results of the sampling, DNREC concluded that there did not appear to be any significant threat to human health or the environment and therefore, no further action was required at the site.

Current Regulatory Status:

The site has been redeveloped and is now a portion of the Newport Industrial Park. Review of information from the DNREC Environmental Navigator indicates that deed restrictions have been placed on each of the parcels located within the former landfill area and that no further action is planned for the site. DNREC issued a No Further Action Letter in April 1994.



SUMMARY OF SITE PCB INFORMATION

Site Investigation PCB Findings:

PCBs were detected in surface soil at only one location, C8119/MC 3126 (0 to 0.5 feet bgs), at a concentration of 0.43 mg/kg. In the saturated subsurface soil PCBs were detected at one location, NP-10 (8 to 10 feet bgs), at a concentration of 0.37 mg/kg. There were no PCBs detected in unsaturated subsurface soil or groundwater samples.

Due to the fact that there was only one detection each in the surface and subsurface soil, the detected value (0.43 mg/kg) was used in the calculations instead of calculating the 95% upper confidence limit (UCL) of the mean across the site.

Concentrations of PCBs on Site			
Sample Matrix	Corresponding Figure	Analytical Methods	Range of Total PCBs
Surface Soil	Figure 2	Method 8082	Not detected to 0.43 mg/kg
Subsurface Soil (unsaturated)	Figure 3	Method 8082	Not Detected
Subsurface Soil (saturated)	Figure 4	Method 8082	Not detected to 0.37 mg/kg
Groundwater	Figure 5	Method 8082	Not Detected

A summary of all samples collected for PCB analyses are presented in Tables 1 and 2.

Acreage where PCBs detected:

The estimated surface soil area impacted by PCBs is 1.3 acres in the vicinity of C8114/MC 3126 (Figure 2). The estimated subsurface saturated soil area impacted by PCBs is 3.1 acres in the vicinity of NP-10 (Figure 4). Based on the data available and reviewed by BrightFields, the subsurface unsaturated soil and groundwater are not impacted by PCBs.

PCB Remediation Status:

PCB remediation is not presently required for the Newport City Landfill Property.

PCB MASS LOADING SUMMARY

The PCB mass loading rate to surface water via overland flow and groundwater transport was estimated for the Newport City Landfill 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 0.003, which corresponds to areas utilizing a vegetative cover primarily consisting of grass or grass like plants with greater than 95% coverage.

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.

Newport City Landfill 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)	0.2	The soil erodibility factor was selected from the National Resource Conservation Soil Survey Geographic Database (SSURGO).
ls = topographic factor (dimensionless)	0.23	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)	0.003	The cover/management factor C assigned to the erodible area was 0.003, which corresponds to areas instituting a vegetative cover primarily consisting of grass like plants with greater than 95% coverage.
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)	0.029	The average soil loss estimate was generated by ArcGIS using the input factors listed above.
Erodible Area (acres)	1.0	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 Newport City Landfill Property is **0.011 grams per year**. Please see attached table for specific variables.

Uncertainty Analysis Associated with Overland Flow

Specific Areas and Degree of Uncertainty for the Newport City Landfill Property

	Samples Per Acre (site)	Chemical Data Quality*	Soil Type	Site Coverage	Map Quality	Distance to Discharge Point
Site Specific Information	0.96	Aroclor Data	Soil Database	Based on a thorough site assessment	Scaled and Poorly Scaled Maps	Directly Adjacent
Degree of Uncertainty	High	Moderate	Low	Low	Moderate	Low

* Primary analysis used in the historical samples

Sources of uncertainty for the Newport City Landfill Property include: All of the data used in this evaluation was Aroclor lab data. The majority of the sample locations were from scaled maps, however they were not well scaled and some additional locations came from poorly scaled maps. Based on this evaluation the level of uncertainty associated with overland flow PCB mass loading from the Newport City Landfill Property is **Low to Moderate**.

Groundwater Discharge Analysis:

Groundwater flow data is not available for the Newport City Landfill Property. However, the DuPont Newport Landfill Superfund Site (Newport Pigments or Newport Plant) is located approximately 0.6 miles west of the Newport City Landfill Property in a similar geologic setting. Data from the DuPont Landfill were used to estimate the hydrologic parameters. A groundwater discharge map is included as Figure 7.

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.

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 for their choice.

Groundwater Transport Factors	Value Used		Justification/Derivation of Value Used
	min	max	
K = Hydraulic Conductivity (ft/day)	5.3	16	Estimates of the hydraulic conductivity were taken from the DuPont Landfill "Shallow Zone." Their estimates of the hydraulic conductivity was between 40 gallons/day/feet ² (gpd/ft ²) to 120 gpd/ft ² . This is equal to 5.3 to 16 ft/day.
Horizontal hydraulic gradient	0.0067	0.0073	Horizontal hydraulic gradients were estimated from groundwater elevation data from the DuPont Landfill.
Saturated Thickness (ft)	12	12	Based on the DuPont Landfill data.
Lateral Discharge Distance (ft)	495	900	The lateral discharge distance was estimated to be equal to the length of the PCB impacted area, or site boundaries, measured perpendicular to the Christina River.
A= Cross-Sectional Area (ft ²)	5,940	10,800	Calculated from the saturated thickness and lateral discharge distance.
Groundwater PCB Concentration (µg/L)	0.081	0.41	The maximum concentration observed in the saturated subsurface soil (0.37 mg/kg) was used to estimate the concentration in groundwater.
Distance to Discharge point (ft)	Directly adjacent		Approximate distance from property boundary to closest surface water location.

Mass Loading Via Groundwater Transport Result:

As previously stated, the majority of the hydrogeologic data were taken from the DuPont Landfill. The groundwater discharge is estimated to be 5,970 to 36,000 L/day (see attached Table A). The maximum detected PCB concentration in saturated subsurface soil (0.37 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 assumes 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 **0.88** and **5.3 grams per year** (Table C).

Uncertainty Analysis Associated with Groundwater Transport:

Specific Areas and Degree of Uncertainty for the Newport City Landfill 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	0.37; possible data gaps	Based on nearby site estimates	Based on nearby site estimates	Based on nearby site estimates	Based on a few samples collected on-site	Directly Adjacent
Degree of Uncertainty	High	High	High	High	High	Moderate	Low

Based on this evaluation the level of uncertainty associated with groundwater transport PCB mass loading from the Newport City Landfill Property groundwater discharge PCB mass loading is **Moderate to High.**

Site References:

Delaware Department of Natural Resources and Environmental Control (DNREC), 1983, Preliminary Assessment of City of Newport Landfill, December 1983.

DNREC, 1993, Newport City Landfill Facility Evaluation, August 1993.

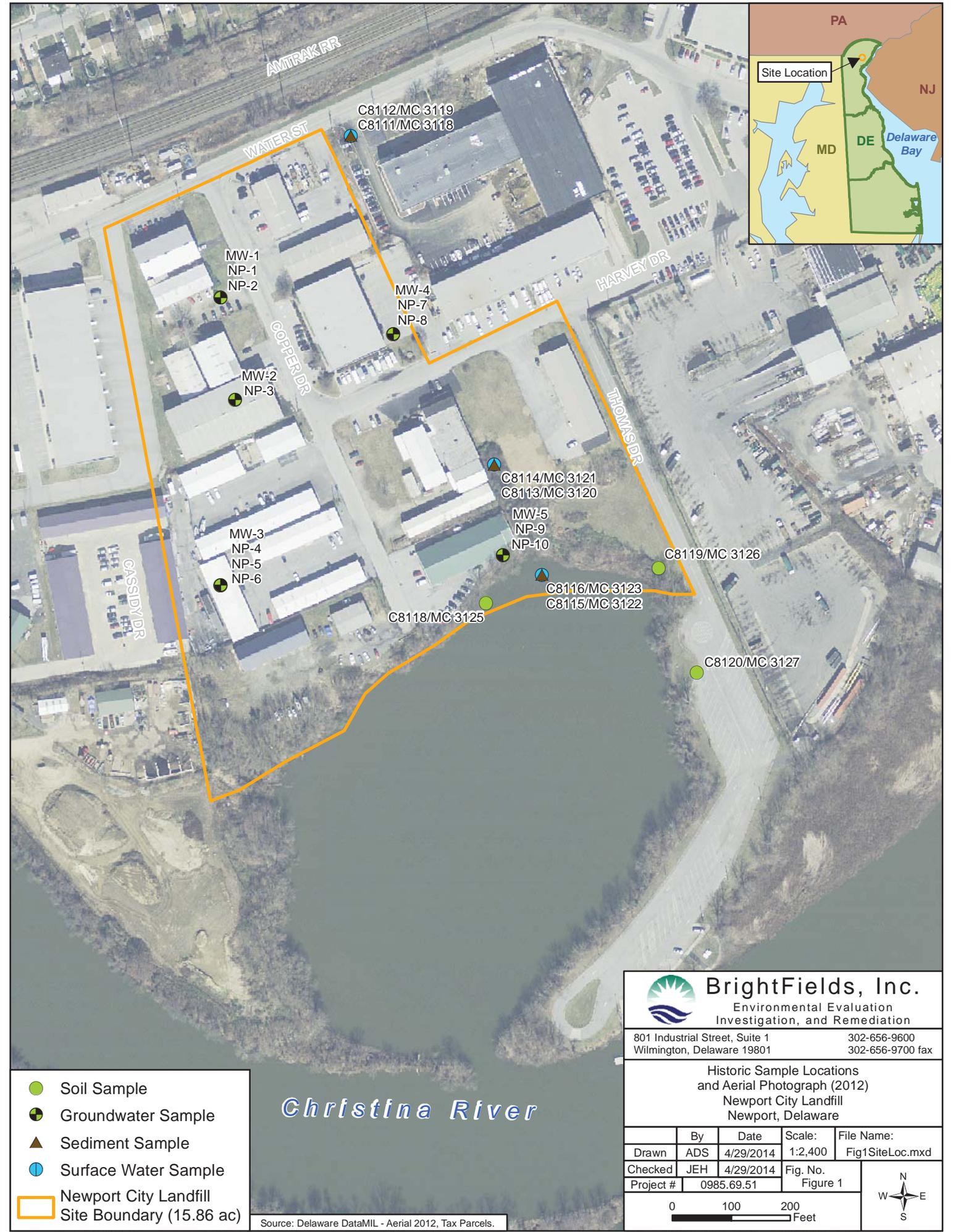
Delaware Geological Survey, 2013, Delaware Data Mil, <http://datamil.delaware.gov/geonetwork/srv/en/main.home>, May 2013.

NUS Corporation 1985, Site Inspection of City of Newport Landfill, July 1985.

PCB Mass Loading Phase II
Newport City Landfill Property
SIRS ID: DE-0044
Wilmington, Delaware



Figures



- Soil Sample
- ⊗ Groundwater Sample
- ▲ Sediment Sample
- Surface Water Sample
- Newport City Landfill Site Boundary (15.86 ac)

Source: Delaware DataMIL - Aerial 2012, Tax Parcels.

BrightFields, Inc.
Environmental Evaluation
Investigation, and Remediation

801 Industrial Street, Suite 1
Wilmington, Delaware 19801

302-656-9600
302-656-9700 fax

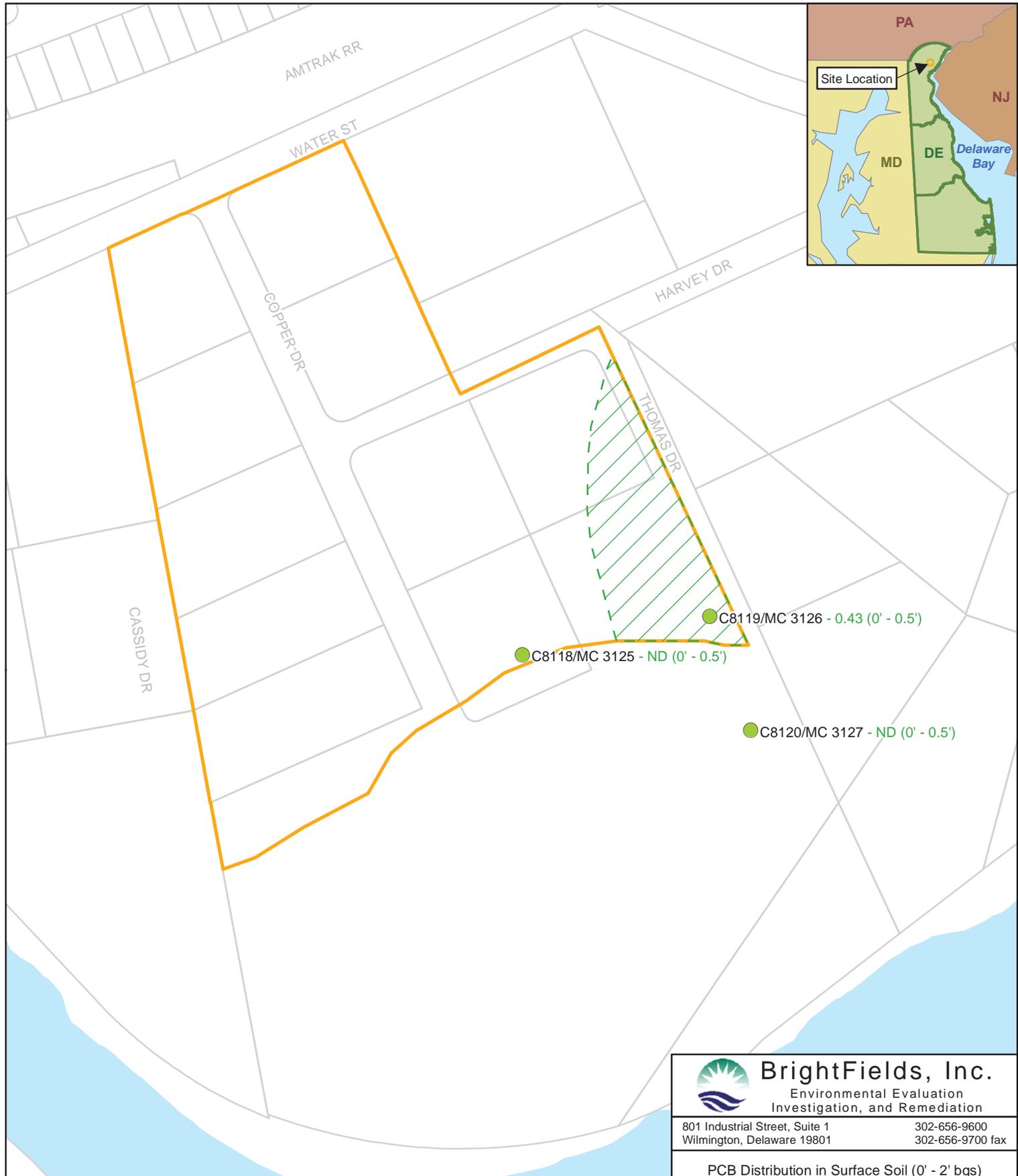
Historic Sample Locations
and Aerial Photograph (2012)
Newport City Landfill
Newport, Delaware

	By	Date	Scale:	File Name:
Drawn	ADS	4/29/2014	1:2,400	Fig1SiteLoc.mxd
Checked	JEH	4/29/2014	Fig. No.	
Project #	0985.69.51		Figure 1	

0 100 200
Feet

N
W — + — E
S

Christina River



- Soil Sample
- Estimated PCB Distribution
- Newport City Landfill Site Boundary
- Tax Parcels
- Surface Water

Notes:
 0.43 (0.0' - 0.5') - Total PCB Concentration (mg/kg) and Sample Depth.
 ND - Not Detected

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

BrightFields, Inc.
 Environmental Evaluation
 Investigation, and Remediation

801 Industrial Street, Suite 1
 Wilmington, Delaware 19801

302-656-9600
 302-656-9700 fax

PCB Distribution in Surface Soil (0' - 2' bgs)
 Newport City Landfill
 Newport, Delaware

	By	Date	Scale:	File Name:
Drawn	ADS	4/29/2014	1:2,400	Fig2DistSurf.mxd
Checked	JEH	4/29/2014	Fig. No.	
Project #	0985.69.51		Figure 2	

0 100 200 Feet



- Soil Sample
- Newport City Landfill Site Boundary
- Tax Parcels
- Buildings
- Surface Water

Notes:
 ND (4.0' - 7.0') - Not Detected and Sample Depth.
 Source: Delaware DataMIL - Tax Parcels;
 New Castle County - Buildings.



BrightFields, Inc.

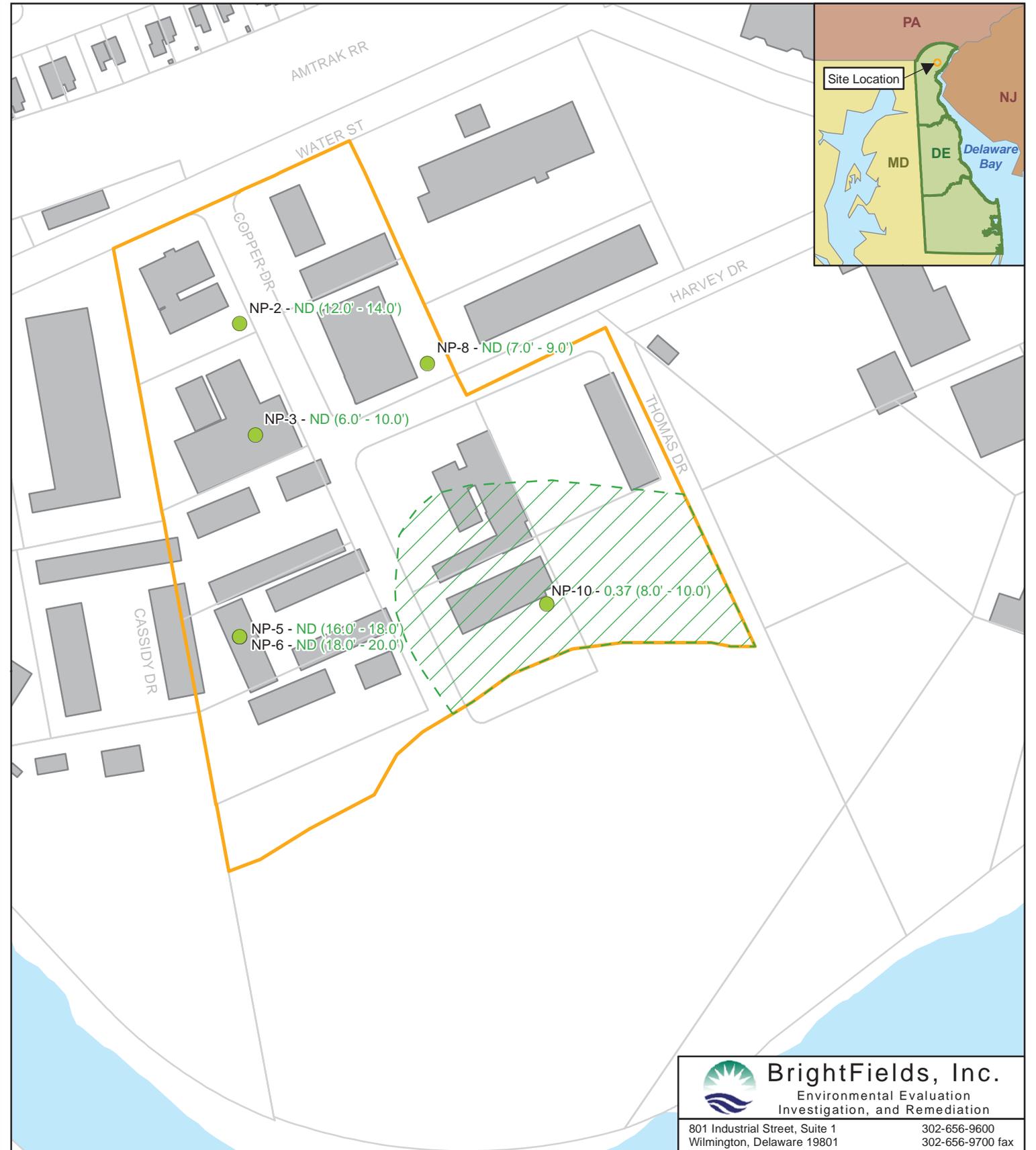
Environmental Evaluation
Investigation, and Remediation

801 Industrial Street, Suite 1 Wilmington, Delaware 19801		302-656-9600 302-656-9700 fax	
PCB Distribution in Subsurface Unsaturated Soil Newport City Landfill Newport, Delaware			

	By	Date	Scale:	File Name:
Drawn	ADS	4/29/2014	1:2,400	Fig3SS_UnSat.mxd
Checked	JEH	4/29/2014	Fig. No.	
Project #	0985.69.51		Figure 3	







- Soil Sample
- Estimated PCB Distribution
- Newport City Landfill Site Boundary
- Tax Parcels
- Buildings
- Surface Water

Notes:
 0.37 (8.0' - 10.0') - Total PCB Concentration (mg/kg) and Sample Depth.
 ND - Not Detected.

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

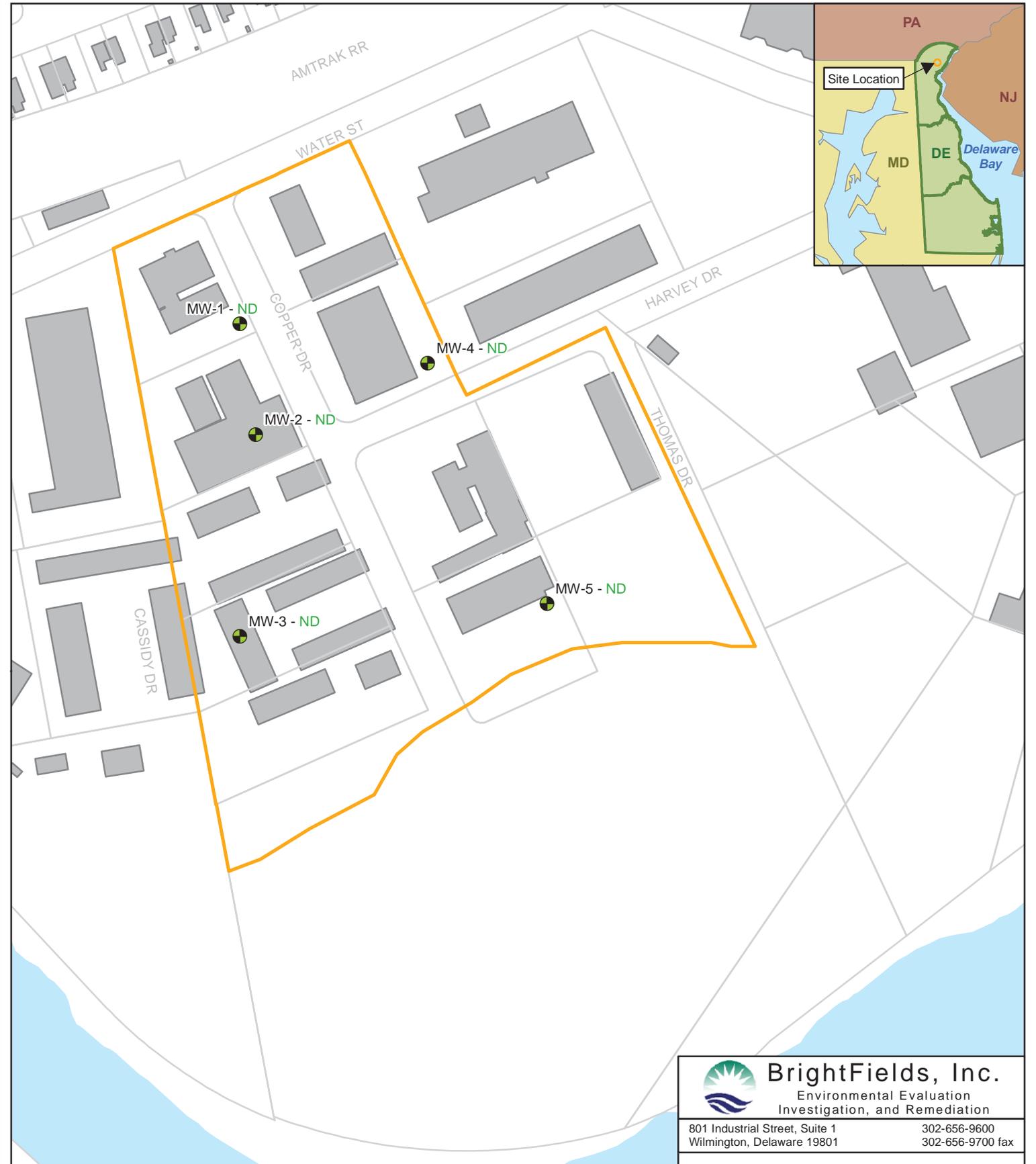
BrightFields, Inc.
 Environmental Evaluation
 Investigation, and Remediation

801 Industrial Street, Suite 1
 Wilmington, Delaware 19801

302-656-9600
 302-656-9700 fax

**PCB Distribution in Subsurface Saturated Soil
 Newport City Landfill
 Newport, Delaware**

	By	Date	Scale:	File Name:
Drawn	ADS	4/29/2014	1:2,400	Fig4SS_Sat.mxd
Checked	JEH	4/29/2014	Fig. No.	
Project #	0985.69.51		Figure 4	



- Groundwater Sample
- Newport City Landfill Site Boundary
- Tax Parcels
- Buildings
- Surface Water

Note:
 ND - Not Detected.
 Source: Delaware DataMIL - Tax Parcels.

BrightFields, Inc.
 Environmental Evaluation
 Investigation, and Remediation

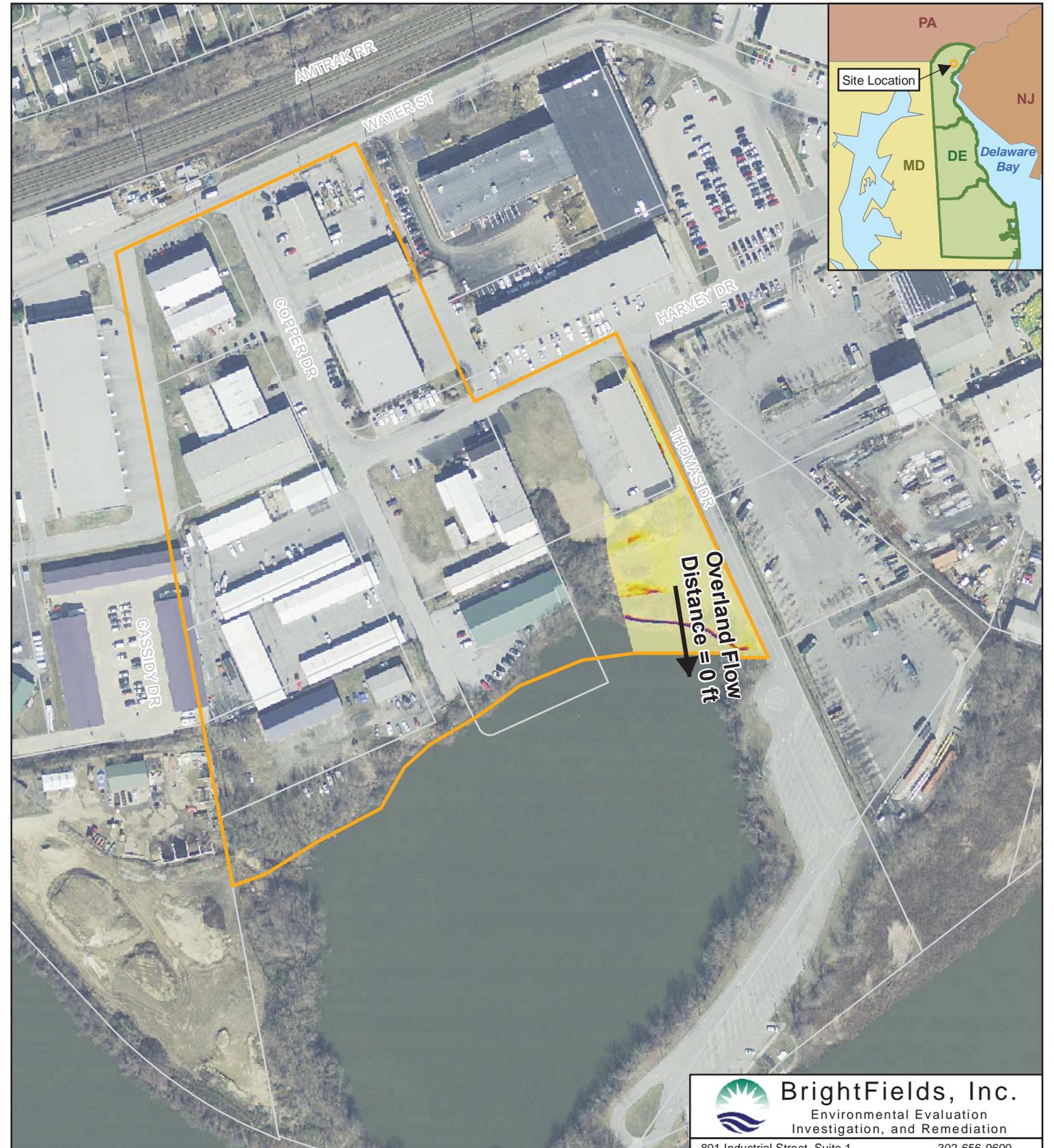
801 Industrial Street, Suite 1
 Wilmington, Delaware 19801

302-656-9600
 302-656-9700 fax

PCB Distribution in Groundwater
 Newport City Landfill
 Newport, Delaware

	By	Date	Scale:	File Name:
Drawn	ADS	4/29/2014	1:2,400	Fig5GW.mxd
Checked	JEH	4/29/2014	Fig. No.	
Project #	0985.69.51		Figure 5	

0 100 200 Feet



Overland Flow
 Newport City Landfill Site Boundary
 Tax Parcels
 Tons/Year/Acre of Soil Loss Estimated
 High : 4.86
 Low : 0

Christina River

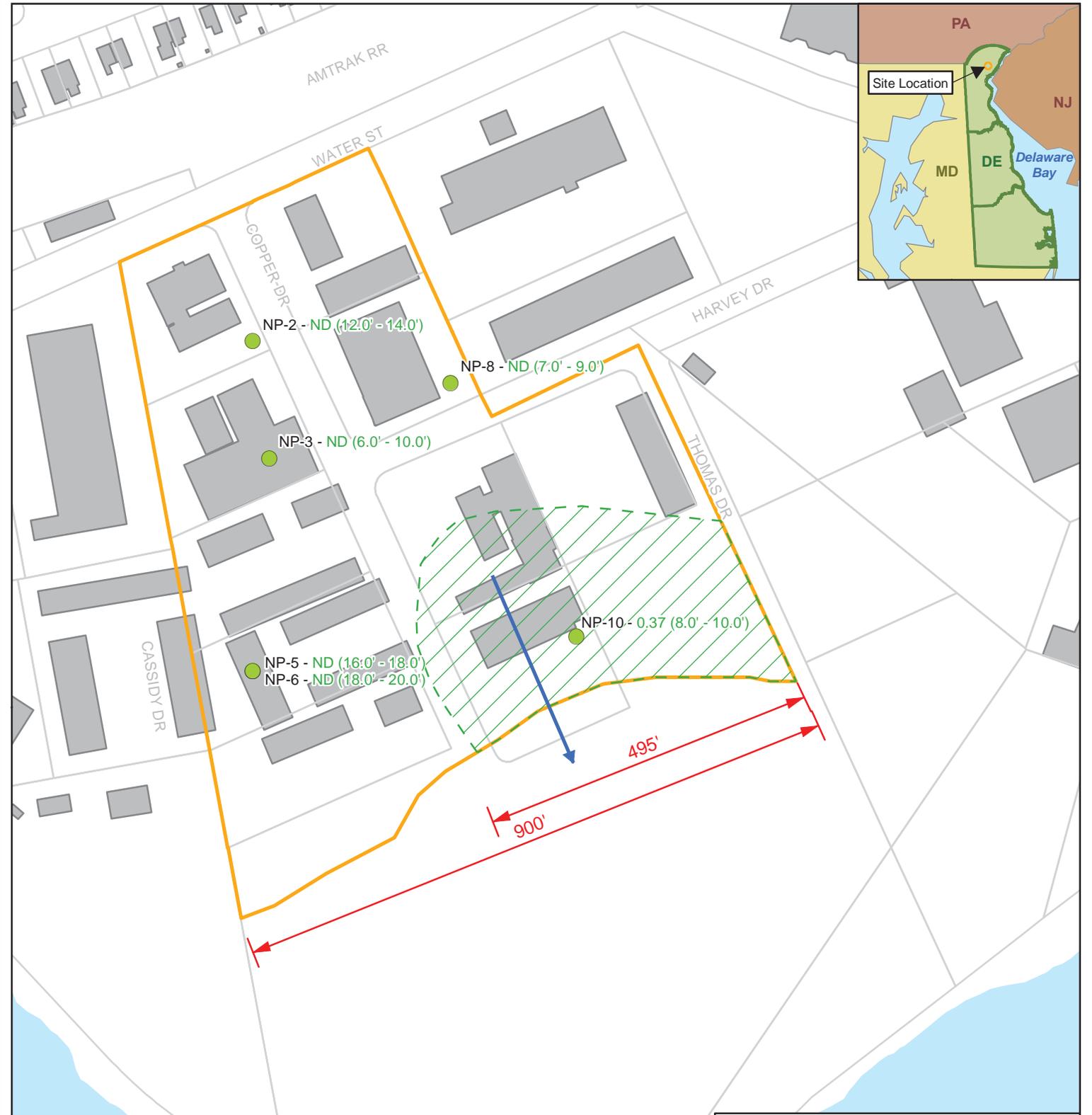
Source: Delaware DataMIL - Aerial 2012, Tax Parcels.

BrightFields, Inc.
 Environmental Evaluation
 Investigation, and Remediation
 801 Industrial Street, Suite 1 302-656-9600
 Wilmington, Delaware 19801 302-656-9700 fax

Soil Loss Estimates
 Newport City Landfill
 Newport, Delaware

	By	Date	Scale:	File Name:
Drawn	ADS	6/18/2014	1:2,400	Fig6SoilLoss.mxd
Checked	KEP	6/18/2014	Fig. No.	
Project #	0985.69.51		Figure 6	

0 100 200 Feet



- Soil Sample
- Groundwater Discharge Distance (feet)
- Groundwater Discharge Limit
- Groundwater Flow Direction
- Estimated PCB Distribution
- Newport City Landfill Site Boundary
- Tax Parcels
- Buildings
- Surface Water

Notes:
 0.37 (8.0' - 10.0') - Total PCB Concentration (mg/kg) and Sample Depth.
 ND - Not Detected.

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

BrightFields, Inc.
 Environmental Evaluation
 Investigation, and Remediation

801 Industrial Street, Suite 1
 Wilmington, Delaware 19801

302-656-9600
 302-656-9700 fax

Groundwater Discharge Map
 Newport City Landfill
 Newport, Delaware

Drawn	By	Date	Scale:	File Name:
Checked	JEH	4/29/2014	1:2,400	Fig7Discharge.mxd
Project #	0985.69.51		Fig. No.	Figure 7

0 100 200 Feet

PCB Mass Loading Phase II
Newport City Landfill Property
SIRS ID: DE-0044
Wilmington, Delaware



Tables

Table 1
 PCB Analytical Results For Soil
 Newport City Landfill Property (DE-0044)
 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)
C8118/MC 3125	0' - 0.5'	NUS Corporation	Site Inspection Report	Jul-85	0.02	U	0.02	U	0.02	U	0.02
C8119/MC 3126	0' - 0.5'	NUS Corporation	Site Inspection Report	Jul-85	0.02	U	0.02	U	0.02	U	0.02
C8120/MC 3127	0' - 0.5'	NUS Corporation	Site Inspection Report	Jul-85	0.02	U	0.02	U	0.02	U	0.02
NP-1	4.0' - 7.0'	DNREC	Facility Evaluation Report	Aug-93	ND						
NP-10	8.0' - 10.0'	DNREC	Facility Evaluation Report	Aug-93	ND	ND	ND	0.078	ND	0.21	0.082
NP-2	12.0' - 14.0'	DNREC	Facility Evaluation Report	Aug-93	ND						
NP-3	6.0' - 10.0'	DNREC	Facility Evaluation Report	Aug-93	ND						
NP-4	4.0' - 8.0'	DNREC	Facility Evaluation Report	Aug-93	ND						
NP-5	16.0' - 18.0'	DNREC	Facility Evaluation Report	Aug-93	ND						
NP-6	18.0' - 20.0'	DNREC	Facility Evaluation Report	Aug-93	ND						
NP-7	2.0' - 6.0'	DNREC	Facility Evaluation Report	Aug-93	ND						
NP-8	7.0' - 9.0'	DNREC	Facility Evaluation Report	Aug-93	ND						
NP-9	2.0' - 4.0'	DNREC	Facility Evaluation Report	Aug-93	ND						

Note: All data reported in mg/kg.

Qualifiers:

- bgs - Below ground surface
- U - Sample not detected above the laboratory method detection limit
- ND - Not detected
- Bold and shaded - Exceeds DNREC-SIRS January 2014 Screening Levels

Table 2
PCB Analytical Results For Groundwater
Newport City Landfill Property (DE-0044)
Wilmington, DE

Sample Identification	Screen Depth (feet bgs)	Sampling Company	Report Name	Report Date	Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260		Total PCBs						
					DNREC-SIRS Screening Level (January 2014) (ug/L)	0.11	DNREC-SIRS Screening Level (January 2014) (ug/L)	0.004*	ND	ND	DNREC-SIRS Screening Level (January 2014) (ug/L)	0.004*	ND	ND	DNREC-SIRS Screening Level (January 2014) (ug/L)	0.034*	ND	ND	DNREC-SIRS Screening Level (January 2014) (ug/L)	0.031*	ND	ND	DNREC-SIRS Screening Level (January 2014) (ug/L)	0.034*	ND
MW-1	3.0' - 13.0'	DNREC	Facility Evaluation Report	Aug-93	ND	0.11	ND	0.004*	ND	ND	0.034*	ND	ND	0.034*	ND	0.031*	ND	ND	0.034*	ND	ND	ND	ND	ND	NCA
MW-2	3.0' - 13.0'	DNREC	Facility Evaluation Report	Aug-93	ND	0.11	ND	0.004*	ND	ND	0.034*	ND	ND	0.034*	ND	0.031*	ND	ND	0.034*	ND	ND	ND	ND	ND	NCA
MW-3	3.0' - 18.0'	DNREC	Facility Evaluation Report	Aug-93	ND	0.11	ND	0.004*	ND	ND	0.034*	ND	ND	0.034*	ND	0.031*	ND	ND	0.034*	ND	ND	ND	ND	ND	NCA
MW-4	3.0' - 13.0'	DNREC	Facility Evaluation Report	Aug-93	ND	0.11	ND	0.004*	ND	ND	0.034*	ND	ND	0.034*	ND	0.031*	ND	ND	0.034*	ND	ND	ND	ND	ND	NCA
MW-5	3.0' - 18.0'	DNREC	Facility Evaluation Report	Aug-93	ND	0.11	ND	0.004*	ND	ND	0.034*	ND	ND	0.034*	ND	0.031*	ND	ND	0.034*	ND	ND	ND	ND	ND	NCA

Note: All data reported in ug/L.

Qualifiers:

bgs - Below ground surface

NCA - No criteria available

* - Screening level likely below the routine method detection limit

ND - Not detected

PCB Mass Loading Phase II
Newport City Landfill Property
SIRS ID: DE-0044
Wilmington, Delaware



BrightFields, Inc.

Site Photographs



Pavement and landscaping alongside Copper Drive facing northeast in the northern portion of the site.



The view across Copper Drive to the west with gently sloping pavement and some patchy areas with grass.



The intersection of Copper Drive and Harvey Drive with mostly buildings and pavement as well as some grassy areas.



Grassy area south of Harvey Drive in the eastern portion of the site.



Ponded water at the southern end of Copper Drive.



Heavily vegetated sloping land along the river at the southern end of Copper Drive.

PCB Mass Loading Phase II
Newport City Landfill Property
SIRS ID: DE-0044
Wilmington, Delaware



BrightFields, Inc.

Overland Flow Calculations

**PCB Loading Calculations from the Revised Universal Soil Loss Equation (RUSLE)
Newport City Landfill Property (DE-0044)
Wilmington, DE**

Surface PCB Concentration 0.43

Symbol	Factor	Value	Units
R	Rainfall/Runoff Erosivity Index	175	10 ² ft-tonf-in/ac-hr-yr
K	Soil Erodibility	0.2	0.01 ton-ac-hr/ ac-ft-tonf-in
	Erodible Area	1.0	Acres
LS	Topographic Factor	0.23	Dimensionless
C	Cover and Management Factor	0.003	Dimensionless
P	Support Practice Factor	1	Dimensionless
A	Average Annual Soil Loss	0.029	ton/ac-yr

PCB Loading via Overland Flow 0.011 **grams/year - PCBs**

PCB Mass Loading Phase II
Newport City Landfill Property
SIRS ID: DE-0044
Wilmington, Delaware



BrightFields, Inc.

Groundwater Transport Calculations

**PCB Loading Calculations - Groundwater Discharge to Surface Water
Newport City Landfill Property (DE-0044)
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	5.3	0.0067	5,940	5,970	1,580
Maximum	16	0.0073	10,800	36,000	9,400

* - 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
370	0.01	0.05	0.41	0.081

**TABLE C
Estimated Mass Loadings of PCBs in Groundwater to the Christina River**

Maximum Estimated Groundwater Concentration (µg/L)	Estimated PCB Mass Loading (g/yr)	
	Minimum	Maximum
0.41	0.88	5.3