BrightFields, Inc.

Appendix 18

HARVEY AND HARVEY LANDFILL PROPERTY

WILMINGTON, DELAWARE

SIRS ID: DE-0047

BrightFields, Inc.

GENERAL SITE INFORMATION

Site Name: Harvey and Harvey Landfill Property

SIRS ID Number: DE-0047

Site Location and Description:

The Harvey and Harvey Landfill Property is located at 420 Marsh Lane in Newport, Delaware (Figure 1). The site is approximately 21.3 acres in size and consists of two parcels (#2000500002 and #2000700001). The property currently is owned by Edgar Thomas Harvey Jr., President of Harvey Development Company.

The property is bounded to the north by an Amtrak Railroad and a county park, to the east and south by wetlands and the Christina River, and to the west by Marsh Lane and the Newport Industrial Park.

According to the 1993 Expanded Site Inspection, surface water from the Site is expected to flow into the Christina River. Ultimately it would discharge to the Delaware River, approximately 6.2 miles from the Site.

Previous Site Uses:

The property was used as a landfill from the 1930s until May 1977, when the property was closed to all dumping. Prior to 1960, the site was used as an open burning dump and municipal landfill by the City of Newark. After 1960, the landfill was used to dispose of municipal and industrial wastes. Between 1960 and 1977, approximately 20 cubic yards of paint sludge, generated at the General Motors assembly plant in Wilmington, was deposited at the property on a daily basis to depths of approximately three feet below ground surface (bgs) over an approximately 9 acre area. The layers of dried paint sludge were covered with fill dirt on a bi-monthly basis. After the landfill was closed in 1977, the landfill continued to accept wastes despite not having a permit. Edgar Harvey, the owner of the property, was fined numerous times in 1982 and 1983 for charges including dumping of solid waste without a permit, hauling liquid waste without a permit, filling wetlands on the property without a permit, and discharging pollutants from the property without a permit.

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, 1982)

At the time of the Preliminary Assessment (PA), the landfill was inactive and DNREC did not observe any leachate streams or other adverse environmental/health impacts. A Site Inspection was recommended with sampling at the Harvey and Knotts well, samples from the adjacent marsh, up and down gradient samples from the Christina River, subsurface hand auger sediment samples in the marsh area, samples of any observable leachate seeps, and samples of runoff drainage.

Preliminary Assessment (DNREC, 1984)

After reexamining the site, DNREC suggested a more thorough site inspection with soil cores and groundwater samples from the landfill, sediment and surface water samples from the Christina River, and the use of metal detectors to check the area for buried drums.

Site Inspection (NUS Corporation, 1986)

Sediment and surface water samples (five solid and five aqueous including blanks) were collected. The results indicated that phthalates were detected in sediment samples and metals were detected in surface water samples. Additionally, sediment samples collected from two springs and a drainage ditch indicated leachate seeps from the closed landfill. During the SI, NUS Corporation attempted to take cores at ten locations but could not achieve greater than 6 inches depth during the attempts. A magnetometer survey of the landfill was also performed in a suspected drum burial area with no unusual readings.

Expanded Site Inspection for Harvey and Knotts Landfill #2 (DNREC, 1993)

DNREC performed an expanded site inspection of the Harvey and Harvey Landfill Property in 1992 in order to further characterize and evaluate the potential risks associated with suspected hazardous waste at the site. Analytical results for soil samples collected from the property during the investigation indicated that Aroclor 1254 was detected in one shallow soil sample (HK-14) at a concentration of 0.033 mg/kg and in one deep soil sample (HK-16) at a concentration of 0.180. Aroclor 1254 was also detected in three sediment samples (HK-20, HK-21, and HK-23) collected

from the property at concentrations of 0.035 mg/kg, 0.044 mg/kg, and 0.014 mg/kg, respectively. The report concluded that additional sampling and evaluation of the property would be necessary to assess the potential threat to human health and/or the environment posed by the property.

Report of Remedial Investigation (Clean Tech, 1996)

A Remedial Investigation (RI) of the property was conducted by Clean Tech in 1996 in order to further assess the potential threat that the property may pose to human health and/or the environment. None of the soil samples collected during the RI were analyzed for PCBs. Findings of the RI indicated that contaminates had not leached from the landfill and therefore, Clean Tech recommended site closure.

Current Regulatory Status:

Review of information obtained from the DNREC Environmental Navigator indicates that a deed restriction was placed on the Harvey and Harvey Landfill Property in 1997 and that currently the property is not under investigation by DNREC. DNREC has performed Operation and Maintenance (O&M) Inspections on roughly an annual basis beginning in 2004.

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SUMMARY OF SITE PCB INFORMATION

Site Investigation PCB Findings:

PCBs were detected in the surface soil at one location in sample HK-SS-14 (0.0 to 0.7 feet below ground surface (bgs)) at a concentration of 0.033 mg/kg. In the unsaturated subsurface PCBs were detected in one sample, HK-DS-16 (3.5 to 4.0 feet bgs), at a concentration of 0.18 mg/kg. Saturated subsurface soil samples were not analyzed for PCBs.

Due to the fact that there was only one detection in the surface soil, the detected value (0.033 mg/kg) was used in the calculations instead of calculating the 95% upper confidence limit (UCL) of the mean of the concentration of total PCBs observed in the surface soil (for overland flow calculations). 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	Not detected to 0.033 mg/kg
Subsurface Soil (unsaturated)	Figure 3	Method 8082	Not detected to 0.18 mg/kg
Subsurface Soil (saturated)	Figure 4	Not Analyzed	Not Analyzed
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 3.5 acres (Figure 2). The estimated subsurface unsaturated soil area impacted by PCBs is 5.6 acres (Figure 3). Based on the data available and reviewed by BrightFields, no saturated subsurface soil samples were analyzed for PCBs and PCBs were not detected in groundwater.

PCB Remediation Status:

PCB remediation is not presently required for the Harvey and Harvey Landfill Property.

PCB MASS LOADING SUMMARY

The PCB mass loading rate to surface water via overland flow was estimated for the Harvey and Harvey Landfill Property. There were no reported concentrations of PCBs in the groundwater and no subsurface saturated soil samples were analyzed for PCBs; therefore, groundwater transport cannot be evaluated as a mechanism of transport for PCBs at the 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 0.038, which corresponds to vegetation with small bushes and trees with 75% cover and over 80% coverage of broadleaf herbaceous plants.

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.

Harvey and Harvey Landfill

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)	0.27	The soil erodibility factors were selected from the National Resource Conservation Soil Survey Geographic Database (SSURGO) and a raster was generated using the values 0.20 and 0.28, with a weighted average of 0.27.
ls = topographic factor (dimensionless)	0.19	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)	0.038	The cover/management factor C assigned to the erodible area was 0.038, which corresponds to vegetation with small bushes and trees with 75% cover and over 80% coverage of broadleaf herbaceous plants.
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)	0.34	The average soil loss estimate was generated by ArcGIS using the input factors listed above.
Erodible Area (acres)	3.1	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 Harvey and Harvey Landfill Property is **0.032 grams per year**. Please see attached table for specific variables.

Uncertainty Analysis Associated with Overland Flow:

Specific Areas and Degree of Uncertainty for the Harvey and Harvey Landfill Property

	Samples Per Acre (site)	Chemical Data Quality*	Soil Type	Site Coverage	Map Quality	Distance to Discharge Points
Site Specific Information	0.28	Aroclor Data	Soil Database	Based on a limited site assessment	Okay Scaled Maps	Directly Adjacent
Degree of Uncertainty	High	Moderate	Low	Moderate	Moderate	Low

* Primary analysis used in the historical samples

Sources of uncertainty for the Harvey and Harvey Landfill Property include: All of the data utilized in the analysis was Aroclor lab data. The only detection in the surface soil was an estimated value (denoted by the J qualifier) and the percent difference between the primary and secondary columns was outside the validation quality (denoted by the P qualifier). There was limited access to the eastern and southern portions of the property, which adds to the site coverage factor uncertainty. Sample locations were from maps that were scaled and once georeferenced, details on the maps appeared to match up consistently with layers in ArcGIS. Based on this evaluation the level of uncertainty associated with overland flow PCB mass loading from the Harvey and Harvey Landfill Property is **Moderate.**

Groundwater Discharge Analysis:

No groundwater discharge analysis was performed for this site.

Site References:

Clean Tech, Inc., 1996, Report of Remedial Investigation Under the Delaware Voluntary Cleanup Program, Harvey & Harvey Landfill DE-047, June 1996.

Delaware Department of Natural Resources and Environmental Control (DNREC), 1984, A Preliminary Assessment of Harvey and Knotts Landfill #2, January 1984.

DNREC, 1993, Expanded Site Inspection for Harvey and Knotts Landfill #2, September 1993.

DNREC to Harvey and Harvey Inc., Harvey and Harvey Landfill (DE 047) Certificate of Completion, March 1997.

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

Ecology and Environment, Inc., 1982, Preliminary Assessment of Harvey and Knotts Landfill II, July 1982.

NUS Corporation, 1986, Site Inspection of Harvey and Knotts Landfill No. 2, March 1986.

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Figures

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

	By	Date	Scale:	File Name:
Drawn	ADS	11/22/2013	1:1,800	Fig1SiteLoc.mxd
Checked	JPR	11/22/2013	Fig. No. Figure 1	
Project #	0985.69.51			

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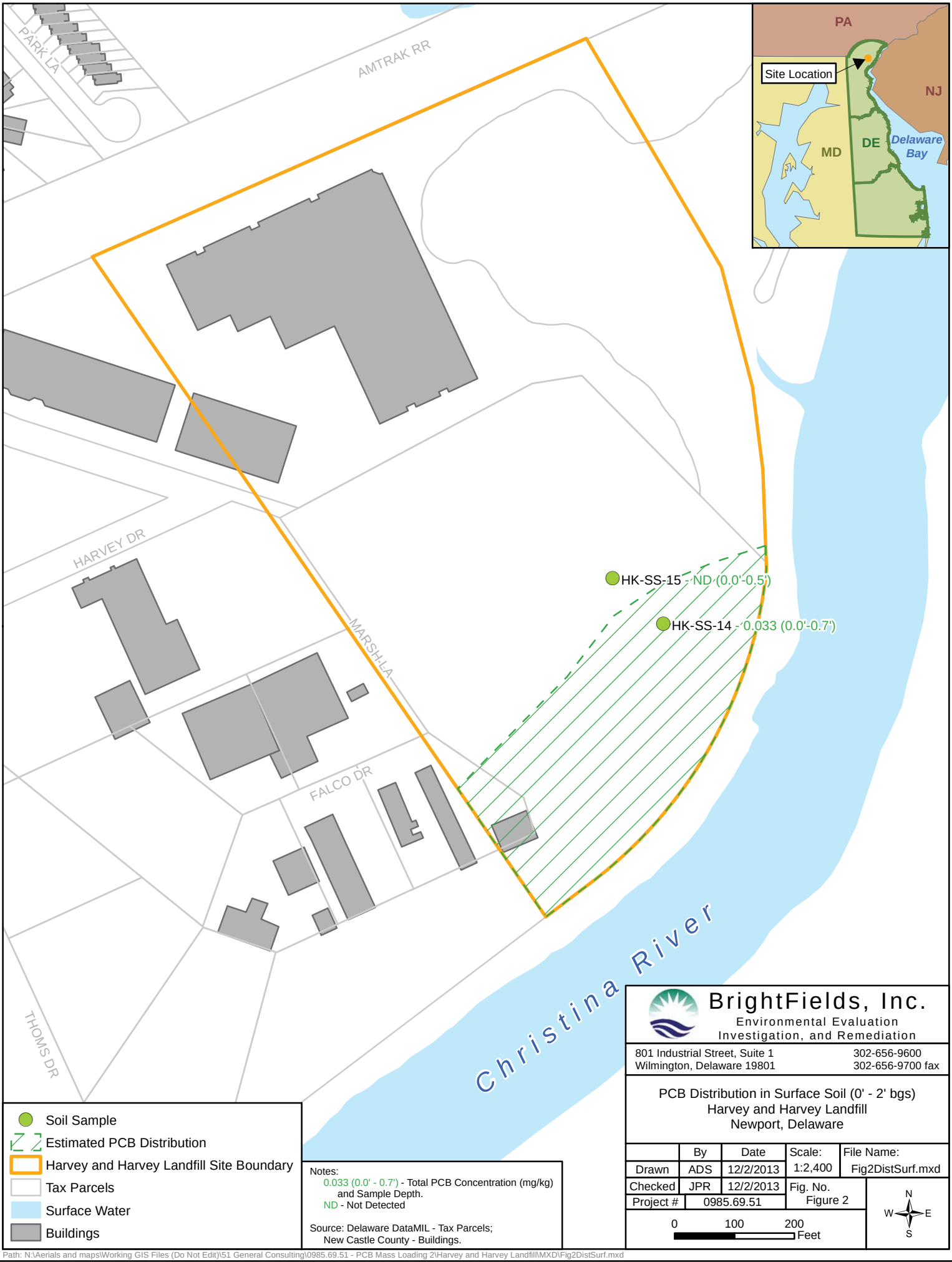

Notes:
0.033 (0.0' - 0.7') - Total PCB Concentration (mg/kg) and Sample Depth.
ND - Not Detected

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

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

	By	Date	Scale:	File Name:
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Checked	JPR	12/2/2013	Fig. No. Figure 2	
Project #	0985.69.51			

0 100 200 Feet

N W E S

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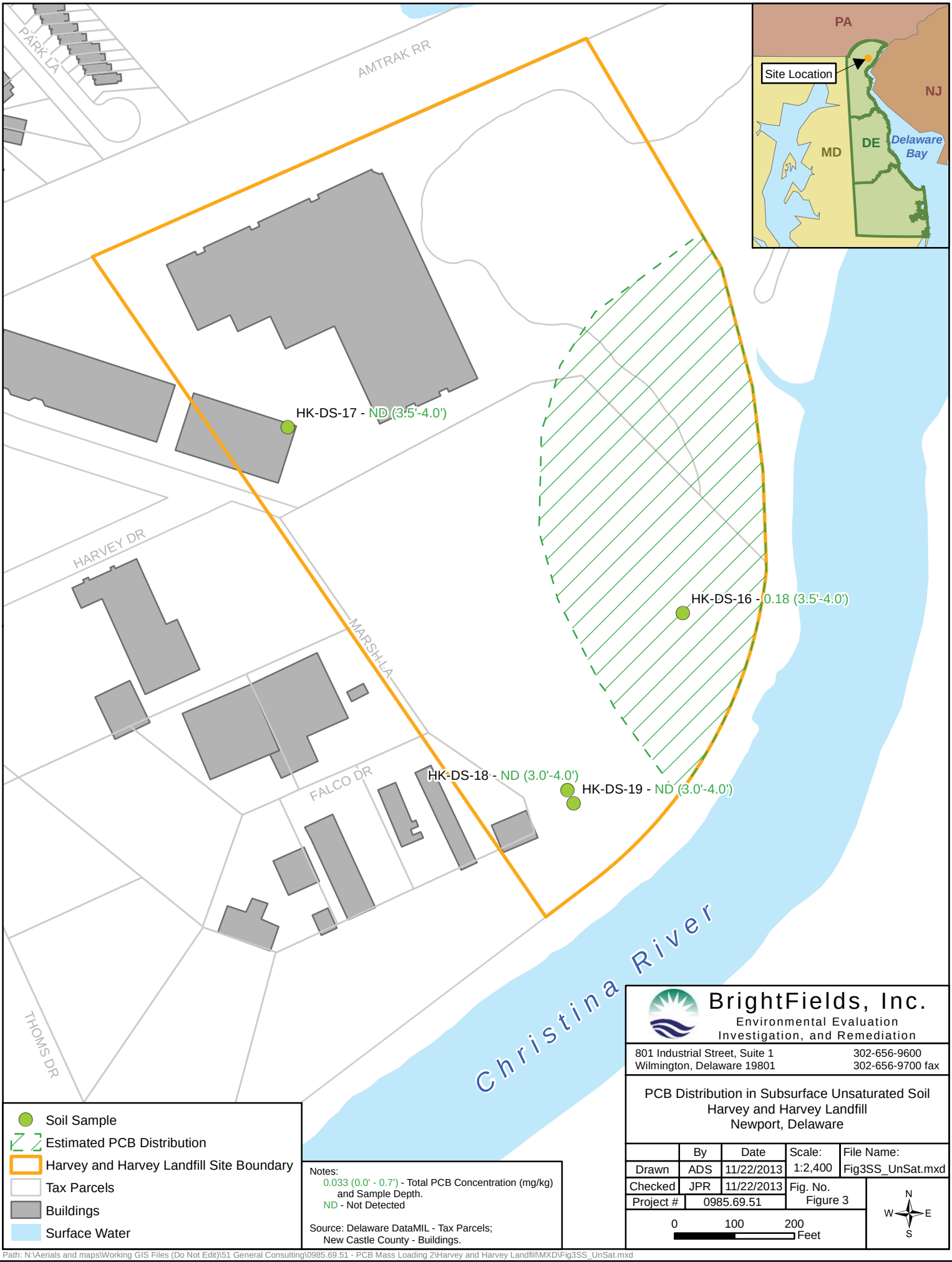
PARK LA
AMTRAK RR
HARVEY DR
MARSH LA
FALCO DR
THOMS DR
HK-DS-17 - ND (3.5'-4.0')
HK-DS-16 - 0.18 (3.5'-4.0')
HK-DS-18 - ND (3.0'-4.0')
HK-DS-19 - ND (3.0'-4.0')
Christina River
PA
NJ
MD
DE
Delaware Bay
Site Location
Soil Sample
Estimated PCB Distribution
Harvey and Harvey Landfill Site Boundary
Tax Parcels
Buildings
Surface Water
Notes:
0.033 (0.0' - 0.7') - Total PCB Concentration (mg/kg) and Sample Depth.
ND - Not Detected
Source: Delaware DataMIL - Tax Parcels; New Castle County - Buildings.
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PCB Distribution in Subsurface Unsaturated Soil
Harvey and Harvey Landfill
Newport, Delaware
By | Date | Scale: | File Name:
Drawn | ADS | 11/22/2013 | 1:2,400 | Fig3SS_UnSat.mxd
Checked | JPR | 11/22/2013
Project # | 0985.69.51
Fig. No. Figure 3
0 100 200 Feet
N W E S
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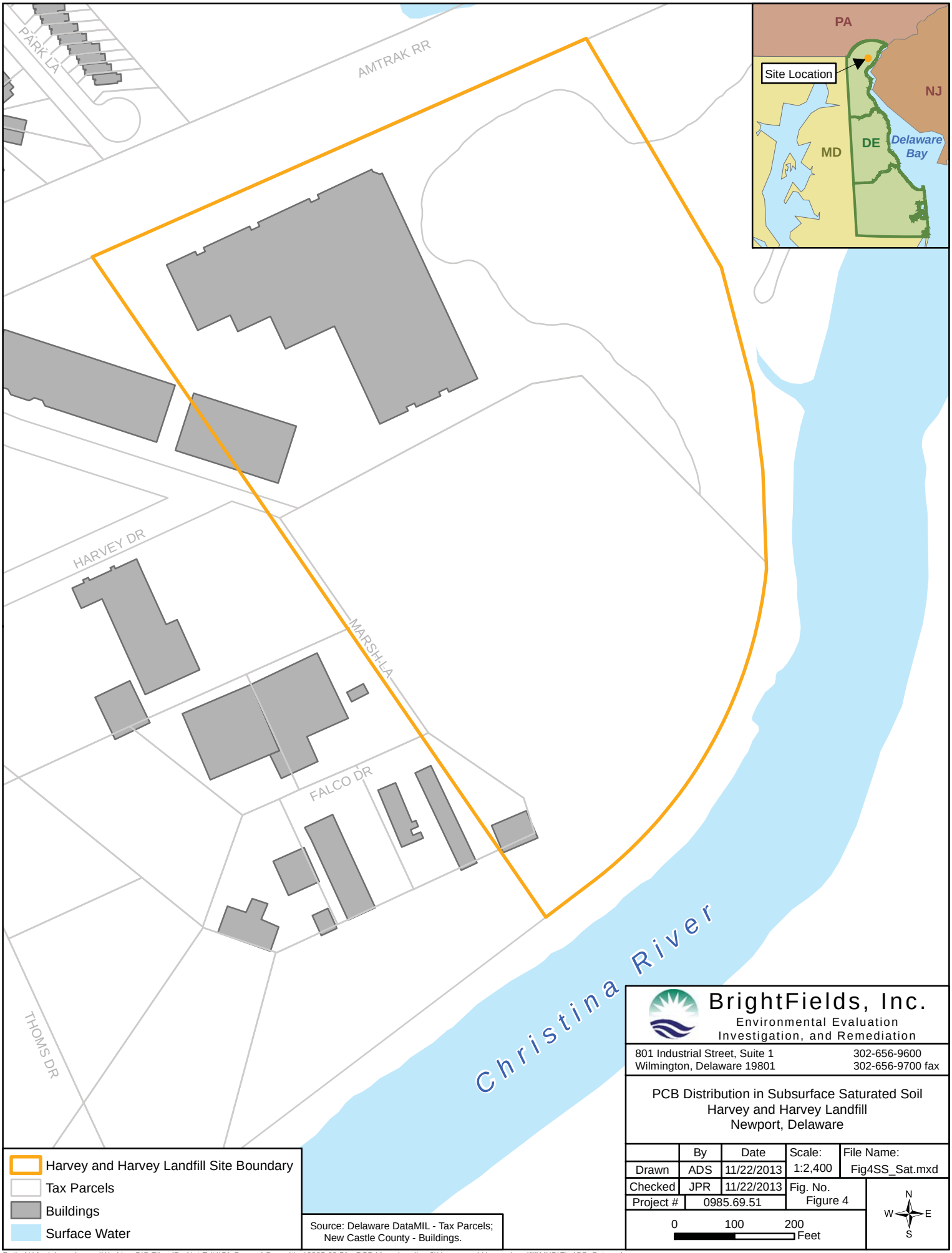

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PCB Distribution in Subsurface Saturated Soil
Harvey and Harvey Landfill
Newport, Delaware

	By	Date	Scale:	File Name:
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Checked	JPR	11/22/2013	Fig. No. Figure 4	
Project #	0985.69.51			

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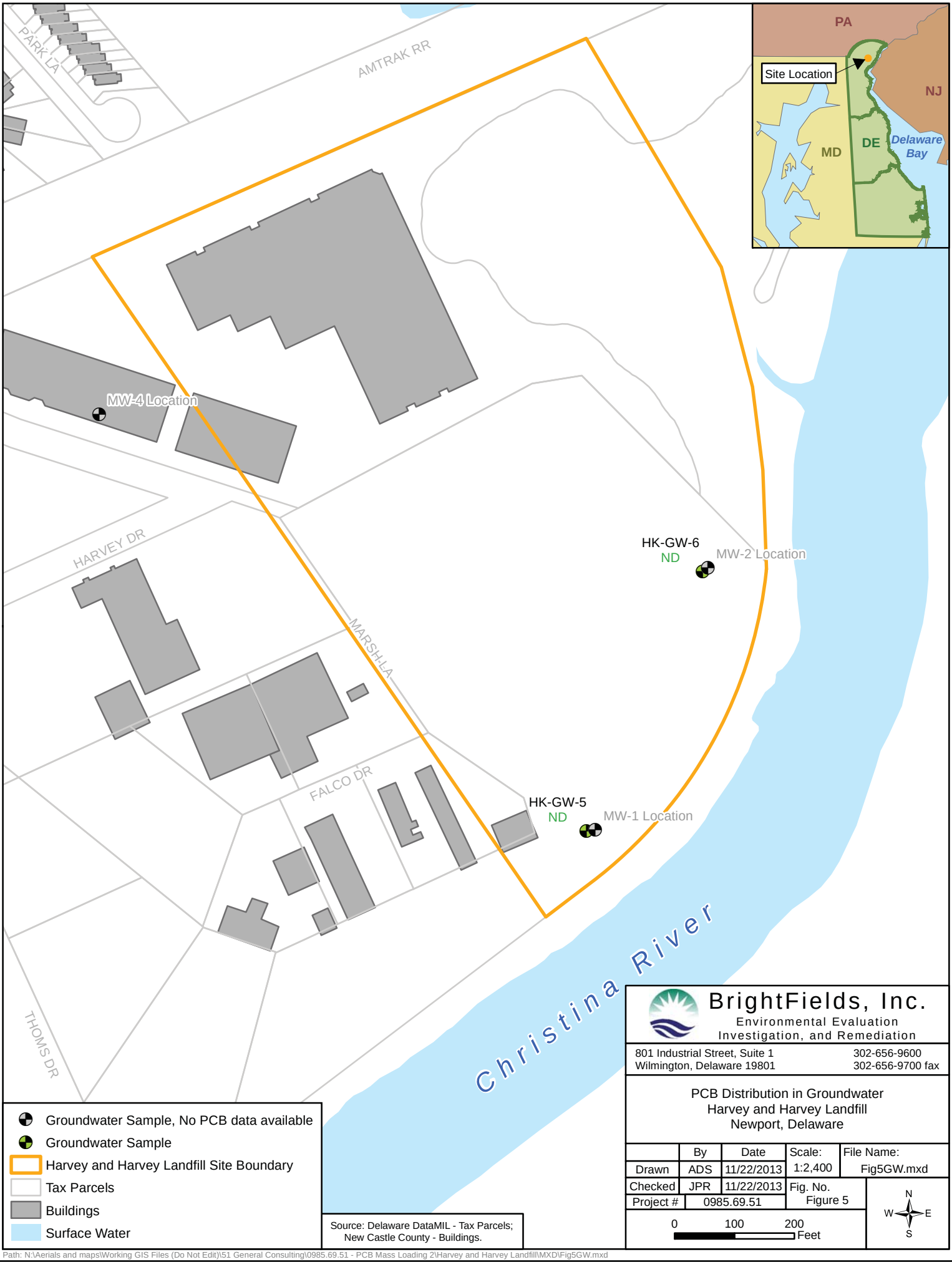

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PCB Distribution in Groundwater
Harvey and Harvey Landfill
Newport, Delaware

	By	Date	Scale:	File Name:
Drawn	ADS	11/22/2013	1:2,400	Fig5GW.mxd
Checked	JPR	11/22/2013	Fig. No. Figure 5	
Project #	0985.69.51			

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Soil Loss Estimates
Harvey and Harvey Landfill
Newport, Delaware

	By	Date	Scale:	File Name:
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Checked	KEP	6/18/2014	Fig. No. Figure 6	
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Tables

Table 1
PCB Analytical Results For Soil
Harvey and Harvey Landfill Property (DE-0047)
Wilmington, DE

Sample Identification	Sample Depth (feet bgs)	Sampling Company	Report Name	Report Date	Aroclor-1016 DNREC-SIRS Screening Level (January 2014) (mg/kg) 0.39		Aroclor-1221 DNREC-SIRS Screening Level (January 2014) (mg/kg) 0.14		Aroclor-1232 DNREC-SIRS Screening Level (January 2014) (mg/kg) 0.14		Aroclor-1242 DNREC-SIRS Screening Level (January 2014) (mg/kg) 0.22		Aroclor-1248 DNREC-SIRS Screening Level (January 2014) (mg/kg) 0.22		Aroclor-1254 DNREC-SIRS Screening Level (January 2014) (mg/kg) 0.11		Aroclor-1260 DNREC-SIRS Screening Level (January 2014) (mg/kg) 0.22	
HK-DS-16	3.5'-4.0'	DNREC	Expanded Site Inspection	Sep-93	0.036	U	0.074	U	0.036	U	0.036	U	0.036	U	**0.18**	**P**	0.036	U
HK-DS-17	3.5'-4.0'	DNREC	Expanded Site Inspection	Sep-93	0.039	U	0.079	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
HK-DS-18	3.0'-4.0'	DNREC	Expanded Site Inspection	Sep-93	0.042	U	0.085	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U
HK-DS-19	3.0'-4.0'	DNREC	Expanded Site Inspection	Sep-93	0.043	U	0.088	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
HK-SS-14	0.0'-0.7'	DNREC	Expanded Site Inspection	Sep-93	0.037	U	0.074	U	0.037	U	0.037	U	0.037	U	0.033	JP	0.037	U
HK-SS-15	0.0'-0.5'	DNREC	Expanded Site Inspection	Sep-93	0.036	U	0.074	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U

Note: All results reported in mg/kg.

Qualifiers:
bgs - Below ground surface
U - Sample not detected above the laboratory method detection limit
J - Estimated value
P - Percent difference between the primary and secondary columns were outside validation quality
Bold and shaded - Exceeds DNREC-SIRS January 2014 Screening

Table 2
PCB Analytical Results For Groundwater
Harvey and Harvey Landfill Property (DE-0047)
Wilmington, DE

Sample Identification	Screen Depth (feet bgs)	Sampling Company	Report Name	Report Date	Aroclor-1016 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.11		Aroclor-1221 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.004*		Aroclor-1232 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.004*		Aroclor-1242 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.034*		Aroclor-1248 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.034*		Aroclor-1254 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.031*		Aroclor-1260 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.034*	
HK-GW-5	>2.0'	DNREC	Expanded Site Inspection	Sep-93	1	U	2	U	1	U	1	U	1	U	1	U	1	U
HK-GW-6	>2.0'	DNREC	Expanded Site Inspection	Sep-93	1	U	2	U	1	U	1	U	1	U	1	U	1	U

Note: All results reported in ug/L.

Qualifiers:
bgs - Below ground surface
* - Screening level likely below the routine method detection limit
U - Sample not detected above the laboratory method detection limit

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Site Photographs

South of the building where the land slopes upwards gently and is densely vegetated at the top.

The western portion of the site at the edge of the parking lot and the beginning of a heavily wooded area.

South of the railroad tracks in the northern portion of the site.

Slope downwards towards the railroad tracks in the northern portion of the site.

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Overland Flow Calculations

PCB Loading Calculations from the Revised Universal Soil Loss Equation (RUSLE)
Harvey and Harvey Landfill Property (DE-0047)
Newport, DE

Surface PCB Concentration | 0.033 | mg/kg

Symbol	Factor	Value	Units
R	Rainfall/Runoff Erosivity Index	175	10^2 ft-tonf-in/ac-hr-yr
K	Soil Erodibility	0.27	0.01 ton-ac-hr/ ac-ft-tonf-in
	Erodible Area	3.1	Acres
LS	Topographic Factor	0.190	Dimensionless
C	Cover and Management Factor	0.038	Dimensionless
P	Support Practice Factor	1	Dimensionless
A	Average Annual Soil Loss	0.34	ton/ac-yr

PCB Loading via Overland Flow | 0.032 | **grams/year - PCBs**

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Groundwater Transport Calculations

(Not Applicable)