BrightFields, Inc.

Appendix 24

O'BRIEN PROPERTY

WILMINGTON, DELAWARE

SIRS ID: DE-1106

GENERAL SITE INFORMATION

Site Name: O'Brien Property

SIRS ID Number: DE-1106

Site Location and Description:

The O'Brien Property is located at 100 South West Street in Wilmington, Delaware. The site is approximately 2.8 acres in size (Figure 1). The property is bounded to the north by an office building, to the east by Tatnall Street, to the south by the Christina River, and to the west by South West Street. The property consists of one tax parcel (#2604300002) and the property currently is owned by Juniper Building, LLC.

Based on the 1998 Brownfield Preliminary Assessment II (BPA II), surface water from the Site flows to the Christina River, and ultimately discharges to the Delaware River.

There is currently an office building occupied by Barclay's and a restaurant on the Site. The majority of the remaining land is covered in pavement or landscaped.

Previous Site Uses:

The O'Brien Property has been used for industrial purposes since at least 1876. In 1876, the property was occupied by the H.W. Gause lumber yard and the adjacent property to the west was occupied by the Harlan & Hollingsworth Company which manufactured iron ships and railcars. By 1881, the Harlan & Hollingsworth Company occupied the property in addition to the lumber yard. By 1936, the property was part of the Bethlehem Steel Company Harlan Plant. Between 1881 and 1936, the surrounding properties were also used for industrial purposes including machine works, coal and manufactured gas works, lumber yards, ship building, and industrial warehousing. The O'Brien Property and the adjacent property to the northwest were later used by Seiler Industries, Inc., Knapp Mills, Inc., NL (National Lead) Industries, and Gates Engineering/GEC Industries, Inc from the 1940s through the 1980s. Gates Engineering/GEC Industries, Inc operations consisted of mixing elastomers, filler, clay, carbon black pigments, and solvents together to manufacture varieties of rubber-based coatings, adhesives, and roofing membranes.

The 1998 BPA II mentioned that the building, which historical maps show was constructed before 1881, was over 40,000 square feet in area. There were also two carbon black storage silos, two aboveground storage tanks (AST) for process oil each with about an 8,000 gallon capacity, and a parking lot on site at the time of the report.

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 of the Gates Engineering Company, Inc. (DNREC, 1986)

DNREC performed a Preliminary Assessment (PA) of the Gates Engineering Company, Inc. (Gates Engineering) facility located at the O'Brien Property in June 1986. The PA report indicates that a DNREC inspection of the facility conducted on September 30, 1983 found multiple violations the Delaware Regulations Governing Hazardous Waste including improperly labeled storage containers, no established contingency plan, no documentation of hazardous waste training for facility employees, not maintaining adequate aisle spacing, containers storing hazardous waste in poor condition and showing signs of leakage and/or corrosion, no weekly inspection report records, and not maintaining an inspection log. Gates Engineering was subsequently issued a Notice of Violation (NOV) by DNREC.

On May 14, 1984, DNREC received a complaint of oil being present in the sewer at the O'Brien Property. A representative of Gates Engineering indicated that oil permeated through the soil and surfaced at several locations on the property during heavy rain events. An inspection by DNREC did not find any oil tanks or valves at the facility to be leaking, however, tire tracks were observed near a storm sewer drain at the property, possibly indicating illegal oil dumping.

On March 27, 1986, DNREC noted that Gates Engineering failed to file a 1985 Annual Report for hazardous wastes generated at the facility and therefore an NOV was issued to the company on June 3, 1986. On June 9, 1986 DNREC performed an unannounced inspection of the site. During the inspection the weekly inventory logs for the facility were reviewed. DNREC noted that Gates had reported that no drums of hazardous waste were generated for the past several months, however, the inventory log showed that 65 drums were generated in a one week period during this time and that 82 drums were sent out from the plant the following week.

DNREC did not recommend any action at the time since no signs of leakage or stains were noted during the inspection, previous leakages noted in the past were cleaned up, and at the time, Gates Engineering appeared to be practicing better housekeeping than in the past. The PA report recommended that DNREC continue surveillance of the property.

Environmental Survey (RT Environmental Services, 1993)

RT Environmental was retained by O'Brien Environmental and Energy Corporation to complete an environmental survey of the property in 1993. The report indicates that at the time of inspection nearly all of the equipment and materials associated with the Gates Engineering manufacturing operations had been removed from the property and that the site was being used by O'Brien Environmental and Energy Corporation for the storage of electrical generating equipment. The report noted that industrial residues were present on the floor of the facility, but that plans were being made for further cleaning at the facility. RT Environmental concluded that based on results of the survey, there did not appear to be any significant environmental liabilities associated with the site.

Phase I and II Environmental Site Assessment Update Draft (RT Environmental Services, 1997)

The assessment was performed to evaluate environmental liabilities for the O'Brien property. However, no additional concerns were identified beyond those presented in the Phase I Assessment from March 1993. The industrial history of the site and surrounding area caused concern regarding groundwater pollution, but this did not seem to be an issue after testing wells close to the main areas of concern. There were also industrial residues on the floor and although cleaning had been planned, the residues and need for additional cleaning were still evident during later inspections. Large equipment inside the building was on concrete flooring and outside equipment did not have noticeable soil staining, so these were not a main concern. Inside the building there was a drum containing an unknown material and two ASTs, one with an unknown material. There were also two ASTs outside of the building that did not appear to be leaking. The area surrounding the two silos outside was stained black from loading and unloading carbon black, but the staining was not noted to be a concern. Disposal of these drums and ASTs was recommended. There were also transformers on site owned by the power company which were going to eventually be removed by the power company but it was unknown whether or not they contained PCBs. As long as all of these concerns are properly addressed, they determined that there are no significant environmental liabilities.

Grid Sampling Report (WIK Associates, 1998)

Prior to implementing improvements and adding a connector road between West Street and South Madison Street, the Delaware Department of Transportation (DelDOT) contracted WIK Associates to perform soil sampling. Of the 100 cubic meter area sampled, only a small portion overlapped with the O'Brien property and a total of four geoprobes were advanced on the site. One soil sample was collected from the site and screening data revealed a PCB concentration less than 0.5 mg/kg.

Brownfield Preliminary Assessment II (DNREC, 1998)

The BPA II report indicates that the O'Brien Property and surrounding area were targeted for economic, social, cultural and environmental redevelopment by the Governor's Task Force and that as part of the redevelopment effort, public-private partnerships were focusing on the O'Brien property for future development projects. The purpose of the BPA II was to investigate the possible existence of released hazardous substances at the O'Brien property in order to evaluate the potential for human and environmental exposure. During the investigation, eight test pits were dug at the property and surface soil samples were collected from nine locations. A total of 27 soil samples were collected from test pits and soil surface, including QA/QC samples. Shallow and deep test pit soil samples were collected using a backhoe from test pits excavated to a maximum depth of 13 feet below ground surface (bgs) or until the soil-groundwater interface was encountered. Screening results showed two samples (one shallow and one deep) exhibited estimated concentrations of PCBs. The report notes that the DNREC laboratory was unable to screen all of the samples collected due to extremely high petroleum levels. Based on the screening results, 11 samples were sent for confirmatory laboratory analysis. Four test pit samples (one shallow and four deep) and two surface soil samples were sent for PCB analysis. Analytical results for the samples indicated that PCBs were detected in shallow test pit sample TP-2s and in both surface soil samples (SS-6 and SS-7). Aroclor 1254 and Aroclor 1260 were detected in TP-2s at concentrations of 0.74 mg/kg and 0.38 mg/kg, respectively with a total PCB concentration of 1.1 mg/kg. Aroclor 1254 and Aroclor 1260 were detected in SS-6 at concentrations of 0.34 mg/kg and 0.25 mg/kg, respectively, and a total PCB concentration of 0.59 mg/kg. Aroclor 1260 was detected in SS-7 at a concentration 0.32 mg/kg with a total PCB concentration of 0.32 mg/kg. The report concluded that in general, the O'Brien Property is significantly contaminated by hazardous substances in the surface and subsurface soils as well as the groundwater and sediment media. Additionally, the report concluded that the contaminants

present at the site were not entirely consistent with the historical uses of the property. DNREC recommended that the site be further investigated to determine remedial alternatives for the property.

DNREC Memorandum, Site Inactivated Due to Development (DNREC, 2010)

A DNREC Memorandum dated June 14, 2010 indicates that the O'Brien property was inadvertently redeveloped during extensive redevelopment activities in the area in the late 1990s. Redevelopment of the O'Brien Property included capping the site with asphalt parking areas and landscaped areas as well as renovation of the existing building (now Barclay's). As a result, hazardous substances on the property were not expected to pose any risks as long as development and site use remained the same. At the time of the memorandum, ownership of the property had been transferred to Juniper Bank. The memorandum also indicated that soil from a nearby site was deposited onto the O'Brien site prior to redevelopment and that the Riverfront Development Corporation (RDC), the owner of the property at that time, was notified. However, an additional letter reviewed by BrightFields from 2001 indicated that EA Engineering, on behalf of DelDOT and RDC, requested to deposit the soil to the west of the O'Brien site, and not within the site boundaries. The letter also mentioned that the soil was originated from Riverwalk Phases III/IV and V/VI, which analyses showed were contaminated with arsenic and lead.

Current Regulatory Status:

As discussed above, the property has been redeveloped with a renovated office building, parking lots, and landscaped areas. Review of the DNREC Memorandum dated June 14, 2010 indicates that DNREC concluded that the property does not pose a risk to human health so long as the property is not disturbed. The DNREC Memorandum also indicates that DNREC-SIRS reserves the right to further investigate and/or remediate the site in the event that site use changes or the property is redeveloped.

SUMMARY OF SITE PCB INFORMATION

Site Investigation PCB Findings:

For purposes of the PCB loading estimates, surface soil is defined as 0 to 2 feet below ground surface (bgs). Samples collected from soil depths spanning 2 feet bgs were included in both the surface and subsurface data sets.

PCBs were detected in three surface samples ranging from 0.32 mg/kg to 1.1 mg/kg as well as two additional screening samples at a concentration less than 0.5 mg/kg. PCBs were detected in the unsaturated subsurface soil in two screened samples, GP-654 (1.0 to 2.5 feet below ground surface (bgs)) and OBTP-4 (>2 feet bgs), at concentrations of less than 0.5 mg/kg and greater than 10 mg/kg, respectively. No soil samples were collected and analyzed for PCBs in the saturated subsurface zone.

Due to the fact that there was limited data available in the surface soil, the maximum detected value (1.1 mg/kg) was used in the calculations instead of calculating the 95% upper confidence limit (UCL) of the mean across the site. There were no PCBs detected in groundwater samples.

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	Method 8082 and Screening Data	Not detected to >10 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 through 3.

Acreage where PCBs detected:

The surface soil area impacted by PCBs is 1.0 acres (Figure 2). The estimated subsurface unsaturated soil area impacted by PCBs is 0.23 acres (Figure 3). There are no subsurface saturated soil or groundwater areas that are impacted by PCBs.

PCB Remediation Status:

No specific PCB remediation was required to be performed, however, contact with the majority of surface soil PCB concentrations is now being prevented through capping performed during redevelopment of the property. Areas of the site may have been capped but no documentation has been provided.

PCB MASS LOADING SUMMARY

The PCB mass loading rate to surface water via overland flow was estimated for the O'Brien Property. There were no reported concentrations of PCBs in the groundwater and no subsurface saturated samples were analyzed for PCBs; therefore, groundwater transport cannot be evaluated as a mechanism of transport for PCBs at the O'Brien 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 0.013, which corresponds to areas instituting a vegetative cover primarily consisting of grass or grass like plants with greater than 80% 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.

O'Brien 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)	0.27	The soil erodibility factor was assigned using surface soil descriptions from soil logs to assess the soil composition and equate them to a corresponding generic soil type and organic material content within the RUSLE program.
ls = topographic factor (dimensionless)	0.020	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)	0.013	The cover/management factor C assigned to the erodible area was 0.013, which corresponds to a vegetative cover of grass or grass like vegetation with greater than 80% coverage.
P = support practice factor (dimensionless)	1	There is no indication that any sediment and erosion controls are in place.
A = average annual soil loss estimate (ton/ac-yr)	0.048	The average soil loss estimate was generated by ArcGIS using the input factors listed above.
Erodible Area (acres)	0.05	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 O'Brien Property is **0.002 grams per year**. Please see attached table for specific variables.

Uncertainty Analysis Associated with Overland Flow:

Specific Areas and Degree of Uncertainty for the O'Brien Property

	Samples Per Acre (site)	Chemical Data Quality*	Soil Type	Site Coverage	Map Quality	Average Distance to Discharge Point
Site Specific Information	8.8	Screening Data	Detailed site logs	Based on a thorough site assessment	Scaled Map	Approximately 163 feet
Degree of Uncertainty	Moderate	High	Moderate	Low	Moderate	Low to Moderate

* Primary analysis used in the historical samples

Sources of uncertainty for the O'Brien Property include: The soil erodibility factor was not available in the National Resource Conservation Soil Survey Geographic Database (SSURGO), so boring logs from the 1998 BPA II were utilized to determine soil type. The majority of the data was Immunoassay screening data, with only a few samples that were Aroclor lab data. Based on this evaluation the level of uncertainty associated with overland flow PCB mass loading from the O'Brien Property is **Moderate.**

Groundwater Discharge Analysis:

No groundwater discharge analysis was performed for this site.

Site References:

Delaware Department of Natural Resources and Environmental Control (DNREC), 1998, O'Brien Property Brownfield Preliminary Assessment II, September 1998.

DNREC to The O'Brien Properties Site (DE-1106) File, Site Inactivated Due to Development, June 2010.

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

EA Engineering to DNREC, Riverwalk Soil Disposition, Wilmington, DE, January 2001.

RT Environmental Services, Inc., 1997, Phase I and II Environmental Site Assessment Update, March 1997.

WIK Associates, Inc., 1998, Grid Sampling Report To Fill Soil Analytical Data Gaps in Support of Soil-Management Activities, July 1998.

Figures

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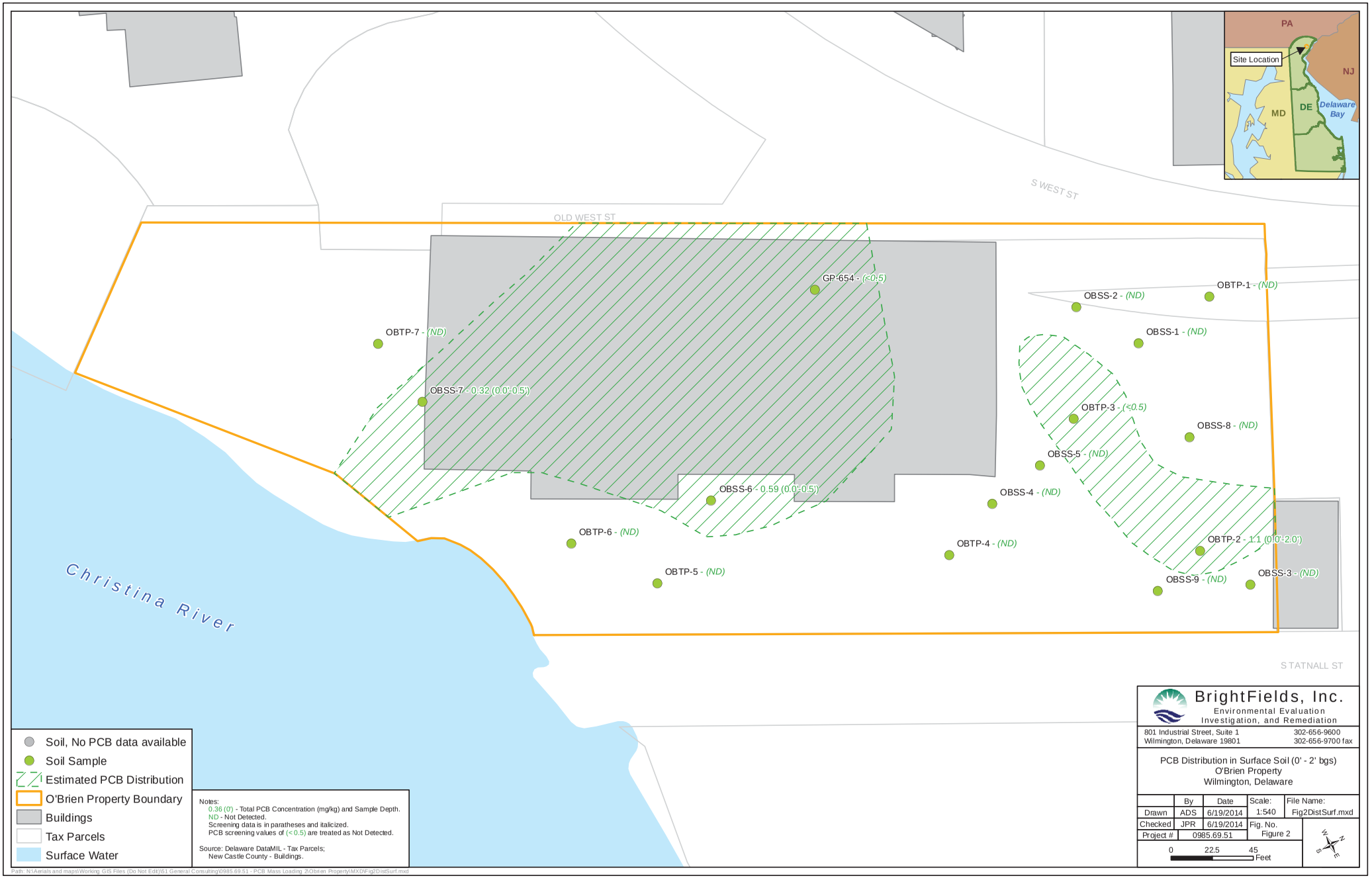

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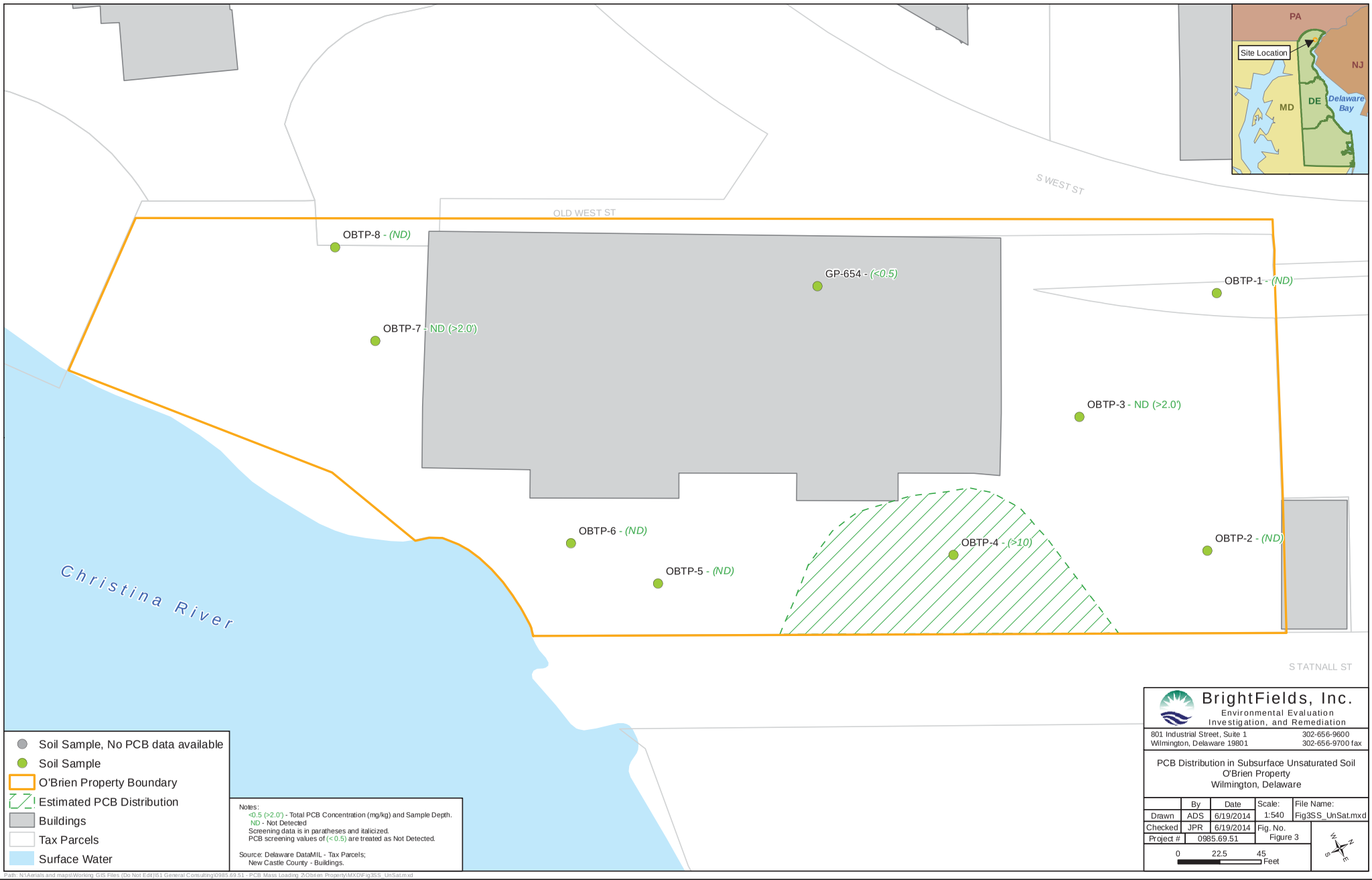

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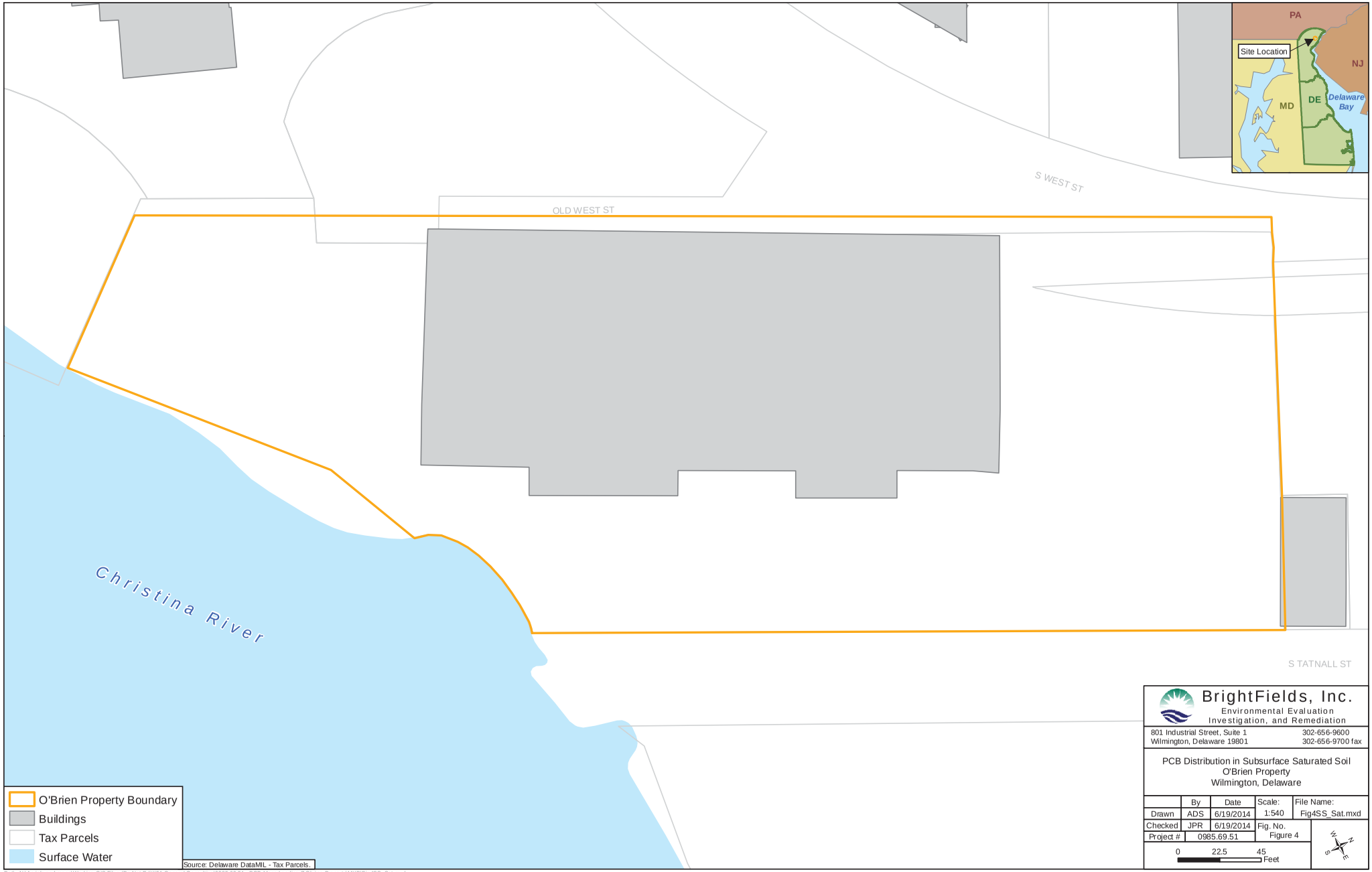

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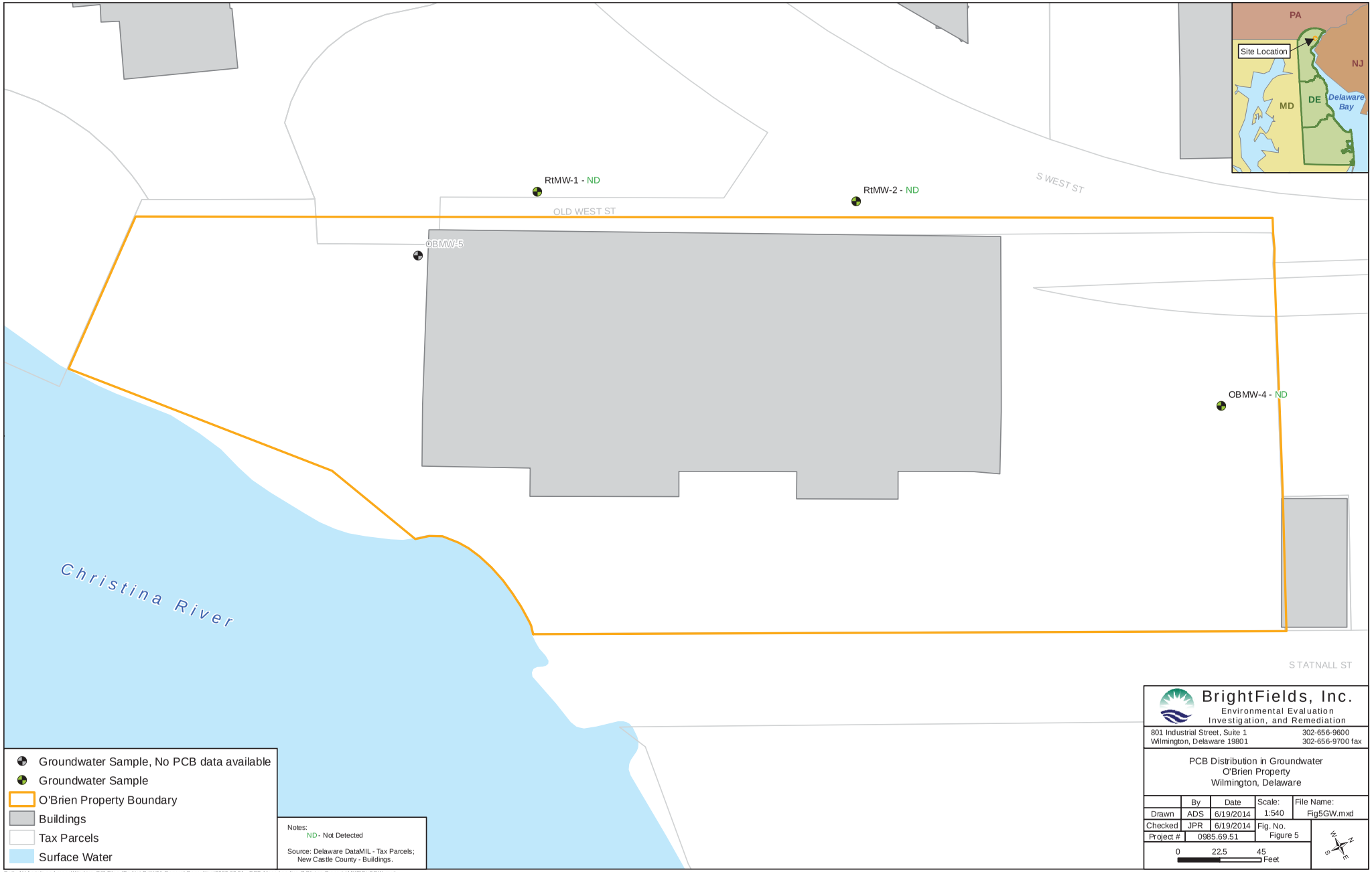

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Tables

Table 1
PCB Screening Results For Soil
O'Brien Property (DE-1106)
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
GP-654	1.0'-2.5'	WIK Associates, Inc.	Grid Sampling Report	Jul-98	<0.5
OBSS-1	0.0'-0.5'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBSS-2	0.0'-0.5'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBSS-3	0.0'-0.5'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBSS-4	0.0'-0.5'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBSS-5	0.0'-0.5'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBSS-6	0.0'-0.5'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBSS-7	0.0'-0.5'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBSS-8	0.0'-0.5'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBSS-9	0.0'-0.5'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-1	>2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-1	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-2	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-2	>2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-3	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	<0.5
OBTP-3	>2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-4	>2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	>10
OBTP-4	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-5	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-5	>2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-6	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-6	>2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-7	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-7	>2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	ND
OBTP-8	>2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	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
O'Brien Property (DE-1106)
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	
OBTP-2	0.0'-2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	0.035	U	0.069	U	0.035	U	0.035	U	0.035	U	**0.74**		**0.38**	
OBTP-3	>2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	0.044	U	0.089	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U
OBTP-7	>2.0'	DNREC	Brownfield Preliminary Assessment II	Sep-98	0.045	U	0.090	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
OBSS-6	0.0'-0.5'	DNREC	Brownfield Preliminary Assessment II	Sep-98	0.038	U	0.076	U	0.038	U	0.038	U	0.038	U	**0.34**	**P**	**0.25**	
OBSS-7	0.0'-0.5'	DNREC	Brownfield Preliminary Assessment II	Sep-98	0.038	U	0.076	U	0.038	U	0.038	U	0.038	U	0.038	U	**0.32**	

Note: All results reported in mg/kg.

Qualifiers:
bgs - Below ground surface
U - Sample not detected above the laboratory method detection limit
P - % difference between primary and secondary columns outside quality control limits
Bold and shaded - Exceeds DNREC-SIRS January 2014 Screening Levels

Table 3
PCB Analytical Results For Groundwater
O'Brien Property (DE-1106)
Wilmington, DE

Sample Identification	Sample Depth (feet bgs)	Sampling Company	Report Name	Report Date	Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
					DNREC-SIRS Screening Level (January 2014) (ug/L) 0.11		DNREC-SIRS Screening Level (January 2014) (ug/L) 0.004*		DNREC-SIRS Screening Level (January 2014) (ug/L) 0.004*		DNREC-SIRS Screening Level (January 2014) (ug/L) 0.034*		DNREC-SIRS Screening Level (January 2014) (ug/L) 0.034*		DNREC-SIRS Screening Level (January 2014) (ug/L) 0.031*		DNREC-SIRS Screening Level (January 2014) (ug/L) 0.034*	
OBMW-4	NA	DNREC	Brownfield Preliminary Assessment II	Sep-98	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
RtMW-2	NA	DNREC	Brownfield Preliminary Assessment II	Sep-98	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
RtMW-1	NA	DNREC	Brownfield Preliminary Assessment II	Sep-98	1.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

Note: All results reported in mg/kg.

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

Site Photographs

Paths and landscaped areas south of the building.

Sloped land on southeastern side of the building towards the river.

Riverbank east of the building.

Landscaped area near the eastern entrance to the building

BrightFields, Inc.

Overland Flow Calculations

PCB Loading Calculations from the Revised Universal Soil Loss Equation (RUSLE)
O'Brien Property (DE-1106)
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	0.27	0.01 ton-ac-hr/ ac-ft-tonf-in
	Erodible Area	0.05	Acres
LS	Topographic Factor	0.020	Dimensionless
C	Cover and Management Factor	0.013	Dimensionless
P	Support Practice Factor	1	Dimensionless
A	Average Annual Soil Loss	0.048	ton/ac-yr

PCB Loading via Overland Flow | 0.002 | **grams/year - PCBs**

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Groundwater Transport Calculations

(Not Applicable)