Winnequah Park PCB Lagoon Dredging Feasibility Study, 2016

DNR Large Scale Lake Management Planning Grant
Final Report, LPL159916

The City's goal for this project is to find existing locations of PCB laden soils and to create a feasibility plan for dredging these soils from Winnequah Park Lagoon. The City hopes to prevent PCBs in the accumulated sediment and soils at the bottom of the lagoon from affecting water quality, animal habitat, and potentially human health. This project would be carried out in phases in an attempt to take a more comprehensive approach to reinvigorating the City's largest park and largest water habitat outside of Lake Monona and Yahara River. Monetary assistance was used along with City cost share to accomplish the objectives to acquire the information necessary to perform the task of safely dredging the lagoon of contaminated soil and accumulated sediment while also providing a framework for designing a stormwater treatment project and shoreland restoration project.

In May of 2016 the City of Monona continued work that had been previously accomplished in 2015 dedicated to improving water quality in its Winnequah Park Lagoon. During the previous project of 2015, soil samples were taken prior to performing spot dredging upstream and downstream of the large culvert at Nichols Rd. In these samples they found PCBs present in the sediment located at the bottom of the lagoon. Using guidance from the WDNR and assistance from the City's consultant, Strand, the City was directed to create a dredging feasibility study along with a stormwater treatment plan and shoreline erosion assessment and restoration plan. Prior to doing soil sampling the City created a site investigation work plan and discussed it with WDNR. Then using funding support from the WDNR's Large Scale Lake Management Planning Grant, 2016, the City took numerous more samples from 9 new locations upstream and 2 downstream in the lagoons near Nichols Rd.

The results from the soil samples are connected with this Final Report in the Final Technical Memo and attachments done by Strand Associates as Attachment A. Sediment sampling test results found many sample locations had concentrations of PCBs that did not exceed the Threshold Effect Concentration (TEC) where it is unlikely concentrations would be toxic to benthic-dwelling organisms. However, several locations North of Nichols Rd. tested higher than the TEC and 2 tested higher than the Probable Effect Concentration (PEC) where toxicity to benthic-dwelling organisms is probable. These results can be found in Figure 1 and 2 of the attachments.

A dredging feasibility investigation was then done which analyzed current extents of proposed dredging, including areas for where PCBs concentrations were greater than the PEC. The goal would be to remove sediment to allow for 3 feet of water at Lake Monona Summer Target Maximum levels. A survey was completed and shows that approximately 2,543 cubic yards would remove all accumulated sediment in the North lagoon, upstream of Nichols Rd. 883 cubic yards, including 207 yards of PCB laden soils would bring the level to 3 feet in this same location. If removing all sediments accumulated in the South lagoon, downstream of Nichols Rd. the City would need to have 10,699 cubic yards and 8,007 cubic yards to get to an average 3' depth. The opinion of probable cost is attached in the memo and report from Strand.

The stormwater treatment device assessment was completed using the WINSLAMM software for modeling water quality of stormwater runoff. Drainage basins for 11 outfalls were modeled using a Suntree Nutrient Baffle Box unit. Basins 5, 7, and 8 are recommended for pretreatment devices as these basins have the highest

peak flows and baseline suspended solids. Other options outside of treatment devices were also suggested, such as rain gardens, wet detention, and other forms of bioretention. In order to do bioretention elevations would have to be such that it was above average ground water levels. Because of this, many locations in Winnequah Park would be eliminated for these types of devices. The goal of this study was to find the best course of action and options for cleaning up the lagoon waterway and protecting any future dredging projects. More than likely pretreatment upstream in the lagoon is the City's best option.

Shoreland erosion has been a key issue in Winnequah Park Lagoon. Over the past several decades the lagoon waters have slowly undermined parts of the shoreline, which have continued to erode away and sluff into the lagoon. This soil slowly leaches phosphorus into the waterway while making it wider and shallower. In the hot months of summer this lack of depth causes reduced dissolved oxygen and warmer waters, creating a less than ideal wildlife habitat. Strand looked to propose 3 types of restoration practices; Traditional Riprap, Augmentative Riprap, and Coir Fiber Roll. Table 4 in the attachments highlights these three types and how much of each is proposed for the project.

PCB contamination was not found at high enough concentrations in the parent material of the lagoon and therefore no further investigation or remediation of parent materials or groundwater beyond lagoon sediments is necessary. Sampling results show that the extent of the PCBs in the lagoon sediments has been adequately analyzed and locations of the PCBs are well defined and no further investigation will be taken on that account. A schedule for the elimination and remediation of the PCB laden sediments is attached in Table 6. An implementation plan and schedule follows in the attached memo for the installation of stormwater treatment devices, shoreland restoration, and lagoon dredging and remediation. An assortment of maps and figures follow the memo from Strand. Please let Brad Bruun, Monona Public Works Project Coordinator, know if you have any questions.

Brad Bruun
City of Monona, Public Works Dept.
Project Coordinator & GIS Specialist
bbruun@ci.monona.wi.us
608.222.2525 EXT. 7402

Winnequah Park Lagoons: Sediment Samples
1093.047

				GRAB SEDIMENT SAMPLES - March 6, 2015											
				SB-1		SB-2		SB-3		SB-4		SB-5		SB-6	
				** TOC mg/kg 63300	TOC % 6.33	** TOC mg/kg 63300	TOC % 6.33	** TOC mg/kg 63300	TOC % 6.33	** TOC mg/kg 63300	TOC % 6.33	** TOC mg/kg 63300	TOC % 6.33	** TOC mg/kg 63300	TOC % 6.33
Contaminant	**CBSQG TEC**	**CBSQG MEC**	**CBSQG PEC**	Dry Weight Concentration	Concentration Normalized to 1% TOC	Dry Weight Concentration	Concentration Normalized to 1% TOC	Dry Weight Concentration	Concentration Normalized to 1% TOC	Dry Weight Concentration	Concentration Normalized to 1% TOC	Dry Weight Concentration	Concentration Normalized to 1% TOC	Dry Weight Concentration	Concentration Normalized to 1% TOC
PAHs (ug/kg)															
1-Methylnaphthalene			--	400	63.19	8.7	1.37	29.0	4.58	26	4.11	7.1	1.12	14	2.21
2-Methylnaphthalene	20.2	111	201	41	6.48	5.8	0.92	13.0	2.05	20	3.16	14.0	2.21	28	4.42
Acenaphthene	6.7	48	89	49	7.74	3.3	0.52	6.7	1.06	16	2.53	26.0	4.11	33	5.21
Acenaphthylene	5.9	67	128	29	4.58	8.2	1.30	16.0	2.53	15	2.37	14.0	2.21	21	3.32
Anthracene	57.2	451	845	110	17.38	24.0	3.79	41.0	6.48	55	8.69	43.0	6.79	56	8.85
Benzo(a)anthracene	108	579	1050	370	58.45	26.0	4.11	91.0	14.38	140	22.12	120.0	18.96	160	25.28
Benzo(a)pyrene	150	800	1450	380	60.03	21.0	3.32	78.0	12.32	130	20.54	110.0	17.38	160	25.28
Benzo(b)fluoranthene	240	6820	13400	730	115.32	45.0	7.11	130.0	20.54	270	42.65	210.0	33.18	280	44.23
Benzo(g,h,i)perylene	170	1685	3200	340	53.71	26.0	4.11	71.0	11.22	120	18.96	100.0	15.80	120	18.96
Benzo(k)fluoranthene	240	6820	13400	200	31.60	13.0	2.05	43.0	6.79	72	11.37	67.0	10.58	90	14.22
Chrysene	166	728	1290	550	86.89	38.0	6.00	110.0	17.38	210	33.18	180.0	28.44	210	33.18
Dibenzo(a,h)anthracene	33	84	135	76	12.01	8.7	1.37	17.0	2.69	30	4.74	23.0	3.63	31	4.90
Fluoranthene	423	1327	2230	1200	189.57	99.0	15.64	280.0	44.23	540	85.31	450.0	71.09	510	80.57
Fluorene	77.4	307	536	99	15.64	19.0	3.00	35.0	5.53	66	10.43	67.0	10.58	79	12.48
Indeno(1,2,3-cd)pyrene	200	1700	3200	320	50.55	21.0	3.32	62.0	9.79	120	18.96	93.0	14.69	120	18.96
Naphthalene	176	369	561	87	13.74	24.0	3.79	46.0	7.27	44	6.95	20.0	3.16	36	5.69
Phenanthrene	204	687	1170	650	102.69	85.0	13.43	200.0	31.60	340	53.71	260.0	41.07	330	52.13
Pyrene	195	858	1520	920	145.34	69.0	10.90	210.0	33.18	370	58.45	320.0	50.55	380	60.03
Total PAHs (ug/kg)	1610	12205	22800	6551	1034.91	544.7	86.05	1478.7	233.60	2584	408.21	2124.1	335.56	2658	419.91
Total PCBs (mg/kg)	0.06	0.368	0.676	0.27	0.04	0	0.00	0	0.00	7.6	**1.20**	4.48	**0.71**	1.16	*0.18*

** The TOC concentration of 63,300 mg/kg used to normalizing these results to 1% TOC is the median TOC concentration of the 11 Winnequah Park Lagoon sediment samples analyzed for TOC.

CBSQG - Consensus-Based Sediment Quality Guidelines, Interim Guidance, Publication WT-732 2003.
TEC - Threshold Effect Concentration
MEC - Midpoint Effect Concentration
PEC - Probable Effect Concentration
-- - No Standard for this compound
mg/kg - milligrams per kilogram
ug/kg - micrograms per kilogram

Italics - Exceeds TEC
Bold - Exceeds MEC
Highlighted - Exceeds PEC
PAH - polycyclic aromatic hydrocarbon
PCB - polychlorinated biphenyl
TOC - Total Organic Carbon

Winnequah Park Lagoons: Sediment Samples
1093.047

				COMPOSITE SAMPLES - May 12, 2016			
				S-1/S-2 Sediment		S-1/S-2 Parent Material	
				TOC mg/kg	TOC %	TOC mg/kg	TOC %
				44100	4.41	6020	0.602
Contaminant	CBSQG TEC	CBSQG MEC	CBSQG PEC	Dry Weight Concentration	Concentration Normalized to 1% TOC	Dry Weight Concentration	Concentration Normalized to 1% TOC
PAHs (ug/kg)							
1-Methylnaphthalene			--	5.22	1.18	2.17	3.60
2-Methylnaphthalene	20.2	111	201	45.7	10.36	28.8	*47.84*
Acenaphthene	6.7	48	89	4.11	0.93	0.558	0.93
Acenaphthylene	5.9	67	128	9.54	2.16	2.39	3.97
Anthracene	57.2	451	845	14.2	3.22	4.35	7.23
Benzo(a)anthracene	108	579	1050	33.8	7.66	3.31	5.50
Benzo(a)pyrene	150	800	1450	31.2	7.07	2.7	4.49
Benzo(b)fluoranthene	240	6820	13400	81.3	18.44	6.62	11.00
Benzo(g,h,i)perylene	170	1685	3200	28.6	6.49	<1.5	0.00
Benzo(k)fluoranthene	240	6820	13400	13.8	3.13	1.78	2.96
Chrysene	166	728	1290	43.7	9.91	3.03	5.03
Dibenzo(a,h)anthracene	33	84	135	7.34	1.66	1.91	3.17
Fluoranthene	423	1327	2230	115	26.08	8.13	13.50
Fluorene	77.4	307	536	19.2	4.35	1.7	2.82
Indeno(1,2,3-cd)pyrene	200	1700	3200	26.6	6.03	3.62	6.01
Naphthalene	176	369	561	5.56	1.26	1.69	2.81
Phenanthrene	204	687	1170	43.2	9.80	4.04	6.71
Pyrene	195	858	1520	88.9	20.16	7.29	12.11
Total PAHs (ug/kg)	1610	12205	22800	616.97	139.90	84.09	139.68
Total PCBs (mg/kg)	0.06	0.368	0.676	0.0214	0.00	0	0.00
Solids (%)			--	51.4	NA	73.7	NA
Moisture (%)			--	48.6	NA	26.3	NA
Particle Size (Hydrometer)			--	OL	NA	CL/CL-ML	NA
Inorganic Results (mg/kg)							
Ammonia Nitrogen			--	69.3	NA	33.5	NA
Cyanide			--	<0.22	NA	<0.17	NA
Phosphorus			--	703	NA	629	NA
Kjeldahl Nitrogen			--	3710	NA	890	NA
Nitrate Nitrogen			--	<0.77	NA	3.85	NA
Nitrite Nitrogen			--	<2.9	NA	<2.0	NA
Total Organic Carbon			--	44100	NA	6020	NA
Metals (mg/kg)							
Arsenic	9.8	21.4	33	8.7	NA	4.5	NA
Barium	--	--	--	53	NA	58.1	NA
Cadmium	0.99	3	5	<0.025	NA	<0.020	NA
Chromium	43	76.5	110	13.6	NA	12.7	NA
Copper	32	91	150	13.5	NA	15.1	NA
Iron	20000	30000	40000	9870	NA	12900	NA
Lead	36	83	130	12.7	NA	8.5	NA
Manganese	460	780	1100	196	NA	271	NA
Nickel	23	36	49	13.1	NA	17.8	NA
Selenium	--	--	--	2.3	NA	1.1	NA
Zinc	120	290	460	59.4	NA	56.6	NA
Mercury	0.18	0.64	1.1	0.04	NA	0.031	NA

CBSQG - Consensus-Based Sediment Quality Guidelines, Interim Guidance, Publication WT-732 2003.
PEC - Probable Effect Concentration
TEC - Threshold Effect Concentration
MEC - Midpoint Effect Concentration
-- - No Standard for this compound
mg/kg - milligrams per kilogram
ug/kg - micrograms per kilogram
NA - Not Applicable
Italics - Exceeds TEC
Bold - Exceeds MEC
Highlighted - Exceeds PEC
PAH - polycyclic aromatic hydrocarbon
PCB - polychlorinated biphenyl
TOC - Total Organic Carbon
CL - lean clay
ML - silt
OL - organic silt

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ANALYTICAL REPORT

STRAND ASSOCIATES
STEVE SMALL
910 W WINGRA DR
MADISON, WI 53715

Project Name: CITY OF MONONA
Project Phase: WINNEQUAH PARK
Contract #: 2418
Project #: 1093-047
Folder #: 119017
Purchase Order #:

Arrival Temperature: See COC
Report Date: 06/02/2016
Date Received: 05/16/2016
Reprint Date: 06/02/2016

CT LAB Sample#: 723601 Sample Description: N-7 SEDIMENT Sampled: 05/12/2016 1000

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**38.1**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Total Organic Carbon	**63300**	mg/kg	1700	5500	1			05/25/2016 11:23	JJF	L-Kahn/9060A
Organic Results										
Aroclor-1016	<0.021	mg/kg	0.021	0.068	1		05/17/2016 10:15	05/18/2016 13:50	JJY	EPA 8082A
Aroclor-1221	<0.052	mg/kg	0.052	0.17	1		05/17/2016 10:15	05/18/2016 13:50	JJY	EPA 8082A
Aroclor-1232	<0.037	mg/kg	0.037	0.12	1		05/17/2016 10:15	05/18/2016 13:50	JJY	EPA 8082A
Aroclor-1242	<0.026	mg/kg	0.026	0.084	1		05/17/2016 10:15	05/18/2016 13:50	JJY	EPA 8082A
Aroclor-1248	<0.034	mg/kg	0.034	0.11	1		05/17/2016 10:15	05/18/2016 13:50	JJY	EPA 8082A
Aroclor-1254	**0.176**	mg/kg	0.026	0.086	1		05/17/2016 10:15	05/18/2016 13:50	JJY	EPA 8082A
Aroclor-1260	**0.0236**	mg/kg	0.0079 *	0.052	1		05/17/2016 10:15	05/18/2016 13:50	JJY	EPA 8082A
1-Methylnaphthalene	**23.8**	ug/kg	3.7 *	26	5		05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
2-Methylnaphthalene	**28.3**	ug/kg	3.8	26	5		05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Acenaphthene	**66.7**	ug/kg	3.4	26	5		05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Acenaphthylene	**46.7**	ug/kg	3.9	26	5		05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723601 Sample Description: N-7 SEDIMENT Sampled: 05/12/2016 1000

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Anthracene	**306**	ug/kg	5.2	26	5	M,Y	05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Benzo(a)anthracene	**991**	ug/kg	10	34	5	M,Y	05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Benzo(a)pyrene	**989**	ug/kg	14	50	5	M,Y	05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Benzo(b)fluoranthene	**1860**	ug/kg	17	56	5	M,Y	05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Benzo(g,h,i)perylene	**819**	ug/kg	14	48	5	M,Y	05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Benzo(k)fluoranthene	**398**	ug/kg	10	35	5	M,Y	05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Chrysene	**1050**	ug/kg	10	35	5	M,Y	05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**176**	ug/kg	12	41	5		05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Fluoranthene	**2310**	ug/kg	6.5	26	5	M,Y	05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Fluorene	**146**	ug/kg	3.8	26	5		05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**741**	ug/kg	14	51	5	M,Y	05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Naphthalene	**29.7**	ug/kg	3.7	26	5		05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Phenanthrene	**1200**	ug/kg	6.5	26	5	M,Y	05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM
Pyrene	**1920**	ug/kg	6.5	26	5	M,Y	05/17/2016 10:00	05/19/2016 12:29	RPN	EPA 8270D-SIM

CT LAB Sample#: 723602 Sample Description: N-8 SEDIMENT Sampled: 05/12/2016 1040

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**32.8**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Total Organic Carbon	**55400**	mg/kg	1900	6400	1			05/25/2016 11:33	JJF	L-Kahn/9060A
Organic Results										
Aroclor-1016	<0.024	mg/kg	0.024	0.079	1		05/17/2016 10:15	05/18/2016 12:45	JJY	EPA 8082A
Aroclor-1221	<0.061	mg/kg	0.061	0.20	1		05/17/2016 10:15	05/18/2016 12:45	JJY	EPA 8082A

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723602 Sample Description: N-8 SEDIMENT Sampled: 05/12/2016 1040

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Aroclor-1232	<0.042	mg/kg	0.042	0.14	1		05/17/2016 10:15	05/18/2016 12:45	JJY	EPA 8082A
Aroclor-1242	<0.030	mg/kg	0.030	0.097	1		05/17/2016 10:15	05/18/2016 12:45	JJY	EPA 8082A
Aroclor-1248	<0.039	mg/kg	0.039	0.13	1		05/17/2016 10:15	05/18/2016 12:45	JJY	EPA 8082A
Aroclor-1254	**0.167**	mg/kg	0.030	0.10	1		05/17/2016 10:15	05/18/2016 12:45	JJY	EPA 8082A
Aroclor-1260	**0.0455**	mg/kg	0.0091 *	0.061	1		05/17/2016 10:15	05/18/2016 12:45	JJY	EPA 8082A
1-Methylnaphthalene	**39.7**	ug/kg	4.3	30	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
2-Methylnaphthalene	**41.7**	ug/kg	4.4	30	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
Acenaphthene	**181**	ug/kg	4.0	30	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
Acenaphthylene	**89.5**	ug/kg	4.6	30	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
Anthracene	**507**	ug/kg	6.1	30	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
Benzo(a)anthracene	**2690**	ug/kg	12	40	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
Benzo(a)pyrene	**3610**	ug/kg	84	290	25		05/17/2016 10:00	05/19/2016 17:47	RPN	EPA 8270D-SIM
Benzo(b)fluoranthene	**7430**	ug/kg	99	330	25		05/17/2016 10:00	05/19/2016 17:47	RPN	EPA 8270D-SIM
Benzo(g,h,i)perylene	**2890**	ug/kg	17	56	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
Benzo(k)fluoranthene	**1540**	ug/kg	12	41	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
Chrysene	**4010**	ug/kg	61	210	25		05/17/2016 10:00	05/19/2016 17:47	RPN	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**577**	ug/kg	14	47	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
Fluoranthene	**8010**	ug/kg	38	150	25		05/17/2016 10:00	05/19/2016 17:47	RPN	EPA 8270D-SIM
Fluorene	**370**	ug/kg	4.4	30	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**2760**	ug/kg	17	59	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
Naphthalene	**62.9**	ug/kg	4.3	30	5		05/17/2016 10:00	05/19/2016 12:49	RPN	EPA 8270D-SIM
Phenanthrene	**3770**	ug/kg	38	150	25		05/17/2016 10:00	05/19/2016 17:47	RPN	EPA 8270D-SIM
Pyrene	**6450**	ug/kg	38	150	25		05/17/2016 10:00	05/19/2016 17:47	RPN	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723603 Sample Description: N-9 SEDIMENT Sampled: 05/12/2016 1100

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**41.5**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Total Organic Carbon	**56400**	mg/kg	1500	5100	1			05/25/2016 11:40	JJF	L-Kahn/9060A
Organic Results										
Aroclor-1016	<0.019	mg/kg	0.019	0.062	1		05/17/2016 10:15	05/18/2016 13:07	JJY	EPA 8082A
Aroclor-1221	<0.048	mg/kg	0.048	0.16	1		05/17/2016 10:15	05/18/2016 13:07	JJY	EPA 8082A
Aroclor-1232	<0.033	mg/kg	0.033	0.11	1		05/17/2016 10:15	05/18/2016 13:07	JJY	EPA 8082A
Aroclor-1242	<0.024	mg/kg	0.024	0.076	1		05/17/2016 10:15	05/18/2016 13:07	JJY	EPA 8082A
Aroclor-1248	<0.031	mg/kg	0.031	0.10	1		05/17/2016 10:15	05/18/2016 13:07	JJY	EPA 8082A
Aroclor-1254	**0.222**	mg/kg	0.024	0.079	1		05/17/2016 10:15	05/18/2016 13:07	JJY	EPA 8082A
Aroclor-1260	**0.0525**	mg/kg	0.0072	0.048	1		05/17/2016 10:15	05/18/2016 13:07	JJY	EPA 8082A
1-Methylnaphthalene	**9.85**	ug/kg	3.4 *	24	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
2-Methylnaphthalene	**13.2**	ug/kg	3.5 *	24	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Acenaphthene	**84.8**	ug/kg	3.1	24	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Acenaphthylene	**32.9**	ug/kg	3.6	24	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Anthracene	**260**	ug/kg	4.8	24	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Benzo(a)anthracene	**1350**	ug/kg	9.6	31	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Benzo(a)pyrene	**1320**	ug/kg	13	46	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Benzo(b)fluoranthene	**2340**	ug/kg	16	52	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Benzo(g,h,i)perylene	**1120**	ug/kg	13	45	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Benzo(k)fluoranthene	**673**	ug/kg	9.6	33	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Chrysene	**1370**	ug/kg	9.6	33	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**248**	ug/kg	11	37	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Fluoranthene	**3270**	ug/kg	12	48	10		05/17/2016 10:00	05/19/2016 18:06	RPN	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723603 Sample Description: N-9 SEDIMENT Sampled: 05/12/2016 1100

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Fluorene	**164**	ug/kg	3.5	24	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**1060**	ug/kg	13	47	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Naphthalene	**17.6**	ug/kg	3.4 *	24	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Phenanthrene	**1450**	ug/kg	6.0	24	5		05/17/2016 10:00	05/19/2016 13:29	RPN	EPA 8270D-SIM
Pyrene	**2660**	ug/kg	12	48	10		05/17/2016 10:00	05/19/2016 18:06	RPN	EPA 8270D-SIM

CT LAB Sample#: 723604 Sample Description: N-10 SEDIMENT Sampled: 05/12/2016 1120

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**37.4**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Total Organic Carbon	**80100**	mg/kg	1700	5600	1			05/25/2016 11:46	JJF	L-Kahn/9060A
Organic Results										
Aroclor-1016	<0.021	mg/kg	0.021	0.069	1		05/17/2016 10:15	05/18/2016 13:28	JJY	EPA 8082A
Aroclor-1221	<0.053	mg/kg	0.053	0.18	1		05/17/2016 10:15	05/18/2016 13:28	JJY	EPA 8082A
Aroclor-1232	<0.037	mg/kg	0.037	0.12	1		05/17/2016 10:15	05/18/2016 13:28	JJY	EPA 8082A
Aroclor-1242	<0.027	mg/kg	0.027	0.085	1		05/17/2016 10:15	05/18/2016 13:28	JJY	EPA 8082A
Aroclor-1248	<0.034	mg/kg	0.034	0.11	1		05/17/2016 10:15	05/18/2016 13:28	JJY	EPA 8082A
Aroclor-1254	**0.337**	mg/kg	0.027	0.088	1		05/17/2016 10:15	05/18/2016 13:28	JJY	EPA 8082A
Aroclor-1260	**0.0822**	mg/kg	0.0080	0.053	1		05/17/2016 10:15	05/18/2016 13:28	JJY	EPA 8082A
1-Methylnaphthalene	**10.4**	ug/kg	3.7 *	27	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
2-Methylnaphthalene	**15.2**	ug/kg	3.8 *	27	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Acenaphthene	**34.4**	ug/kg	3.4	27	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Acenaphthylene	**23.4**	ug/kg	4.0 *	27	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723604 Sample Description: N-10 SEDIMENT Sampled: 05/12/2016 1120

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Anthracene	**85.2**	ug/kg	5.3	27	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Benzo(a)anthracene	**503**	ug/kg	11	34	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Benzo(a)pyrene	**556**	ug/kg	15	50	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Benzo(b)fluoranthene	**1090**	ug/kg	17	57	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Benzo(g,h,i)perylene	**539**	ug/kg	15	49	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Benzo(k)fluoranthene	**306**	ug/kg	11	36	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Chrysene	**596**	ug/kg	11	36	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**112**	ug/kg	12	41	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Fluoranthene	**1280**	ug/kg	6.6	27	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Fluorene	**73.8**	ug/kg	3.8	27	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**496**	ug/kg	15	52	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Naphthalene	**17.6**	ug/kg	3.7 *	27	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Phenanthrene	**541**	ug/kg	6.6	27	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM
Pyrene	**1100**	ug/kg	6.6	27	5		05/17/2016 10:00	05/19/2016 13:48	RPN	EPA 8270D-SIM

CT LAB Sample#: 723605 Sample Description: N-11 SEDIMENT Sampled: 05/12/2016 1300

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**40.7**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Total Organic Carbon	**64400**	mg/kg	1600	5200	1			05/25/2016 11:52	JJF	L-Kahn/9060A
Organic Results										
Aroclor-1016	<0.020	mg/kg	0.020	0.064	1		05/17/2016 10:15	05/18/2016 15:37	JJY	EPA 8082A
Aroclor-1221	<0.049	mg/kg	0.049	0.16	1		05/17/2016 10:15	05/18/2016 15:37	JJY	EPA 8082A

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723605 Sample Description: N-11 SEDIMENT Sampled: 05/12/2016 1300

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Aroclor-1232	<0.034	mg/kg	0.034	0.12	1		05/17/2016 10:15	05/18/2016 15:37	JJY	EPA 8082A
Aroclor-1242	<0.025	mg/kg	0.025	0.079	1		05/17/2016 10:15	05/18/2016 15:37	JJY	EPA 8082A
Aroclor-1248	<0.032	mg/kg	0.032	0.11	1		05/17/2016 10:15	05/18/2016 15:37	JJY	EPA 8082A
Aroclor-1254	**0.609**	mg/kg	0.025	0.081	1		05/17/2016 10:15	05/18/2016 15:37	JJY	EPA 8082A
Aroclor-1260	**0.177**	mg/kg	0.0074	0.049	1		05/17/2016 10:15	05/18/2016 15:37	JJY	EPA 8082A
1-Methylnaphthalene	**202**	ug/kg	3.4	25	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
2-Methylnaphthalene	**270**	ug/kg	3.6	25	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Acenaphthene	**93.1**	ug/kg	3.2	25	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Acenaphthylene	**52.3**	ug/kg	3.7	25	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Anthracene	**173**	ug/kg	4.9	25	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Benzo(a)anthracene	**984**	ug/kg	9.8	32	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Benzo(a)pyrene	**1240**	ug/kg	14	47	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Benzo(b)fluoranthene	**2640**	ug/kg	32	110	10		05/17/2016 10:00	05/19/2016 18:26	RPN	EPA 8270D-SIM
Benzo(g,h,i)perylene	**1270**	ug/kg	14	46	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Benzo(k)fluoranthene	**607**	ug/kg	9.8	33	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Chrysene	**1450**	ug/kg	9.8	33	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**254**	ug/kg	11	38	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Fluoranthene	**2840**	ug/kg	12	49	10		05/17/2016 10:00	05/19/2016 18:26	RPN	EPA 8270D-SIM
Fluorene	**181**	ug/kg	3.6	25	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**1180**	ug/kg	14	48	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Naphthalene	**64.7**	ug/kg	3.4	25	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Phenanthrene	**1430**	ug/kg	6.2	25	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM
Pyrene	**2330**	ug/kg	6.2	25	5		05/17/2016 10:00	05/19/2016 14:08	RPN	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723606 Sample Description: N-12 SEDIMENT Sampled: 05/12/2016 1140

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**38.9**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Total Organic Carbon	**70500**	mg/kg	1600	5400	1			05/25/2016 12:04	JJF	L-Kahn/9060A
Organic Results										
Aroclor-1016	<0.021	mg/kg	0.021	0.067	1		05/17/2016 10:15	05/18/2016 15:59	JJY	EPA 8082A
Aroclor-1221	<0.051	mg/kg	0.051	0.17	1		05/17/2016 10:15	05/18/2016 15:59	JJY	EPA 8082A
Aroclor-1232	<0.036	mg/kg	0.036	0.12	1		05/17/2016 10:15	05/18/2016 15:59	JJY	EPA 8082A
Aroclor-1242	<0.026	mg/kg	0.026	0.082	1		05/17/2016 10:15	05/18/2016 15:59	JJY	EPA 8082A
Aroclor-1248	<0.033	mg/kg	0.033	0.11	1		05/17/2016 10:15	05/18/2016 15:59	JJY	EPA 8082A
Aroclor-1254	**0.360**	mg/kg	0.026	0.085	1		05/17/2016 10:15	05/18/2016 15:59	JJY	EPA 8082A
Aroclor-1260	**0.0796**	mg/kg	0.0077	0.051	1		05/17/2016 10:15	05/18/2016 15:59	JJY	EPA 8082A
1-Methylnaphthalene	**17.4**	ug/kg	3.6 *	26	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
2-Methylnaphthalene	**29.8**	ug/kg	3.7	26	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Acenaphthene	**123**	ug/kg	3.3	26	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Acenaphthylene	**54.0**	ug/kg	3.8	26	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Anthracene	**325**	ug/kg	5.1	26	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Benzo(a)anthracene	**1200**	ug/kg	10	33	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Benzo(a)pyrene	**1210**	ug/kg	14	49	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Benzo(b)fluoranthene	**2290**	ug/kg	17	55	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Benzo(g,h,i)perylene	**989**	ug/kg	14	47	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Benzo(k)fluoranthene	**499**	ug/kg	10	34	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Chrysene	**1320**	ug/kg	10	34	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**215**	ug/kg	11	40	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Fluoranthene	**3240**	ug/kg	13	51	10		05/17/2016 10:00	05/19/2016 18:46	RPN	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723606 Sample Description: N-12 SEDIMENT Sampled: 05/12/2016 1140

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Fluorene	**229**	ug/kg	3.7	26	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**943**	ug/kg	14	50	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Naphthalene	**28.2**	ug/kg	3.6	26	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Phenanthrene	**1850**	ug/kg	6.4	26	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM
Pyrene	**2550**	ug/kg	6.4	26	5		05/17/2016 10:00	05/19/2016 14:28	RPN	EPA 8270D-SIM

CT LAB Sample#: 723607 Sample Description: N-13 SEDIMENT Sampled: 05/12/2016 1200

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**35.6**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Total Organic Carbon	**56100**	mg/kg	1800	5900	1			05/25/2016 12:11	JJF	L-Kahn/9060A
Organic Results										
Aroclor-1016	<0.022	mg/kg	0.022	0.072	1		05/17/2016 10:15	05/18/2016 16:20	JJY	EPA 8082A
Aroclor-1221	<0.056	mg/kg	0.056	0.18	1		05/17/2016 10:15	05/18/2016 16:20	JJY	EPA 8082A
Aroclor-1232	<0.039	mg/kg	0.039	0.13	1		05/17/2016 10:15	05/18/2016 16:20	JJY	EPA 8082A
Aroclor-1242	<0.028	mg/kg	0.028	0.089	1		05/17/2016 10:15	05/18/2016 16:20	JJY	EPA 8082A
Aroclor-1248	<0.036	mg/kg	0.036	0.12	1		05/17/2016 10:15	05/18/2016 16:20	JJY	EPA 8082A
Aroclor-1254	**0.200**	mg/kg	0.028	0.092	1		05/17/2016 10:15	05/18/2016 16:20	JJY	EPA 8082A
Aroclor-1260	**0.0390**	mg/kg	0.0084 *	0.056	1		05/17/2016 10:15	05/18/2016 16:20	JJY	EPA 8082A
1-Methylnaphthalene	**15.4**	ug/kg	3.9 *	28	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
2-Methylnaphthalene	**21.0**	ug/kg	4.1 *	28	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Acenaphthene	**40.8**	ug/kg	3.6	28	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Acenaphthylene	**41.7**	ug/kg	4.2	28	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723607 Sample Description: N-13 SEDIMENT Sampled: 05/12/2016 1200

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Anthracene	**106**	ug/kg	5.6	28	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Benzo(a)anthracene	**576**	ug/kg	11	36	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Benzo(a)pyrene	**702**	ug/kg	15	53	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Benzo(b)fluoranthene	**1570**	ug/kg	18	60	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Benzo(g,h,i)perylene	**706**	ug/kg	15	52	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Benzo(k)fluoranthene	**351**	ug/kg	11	38	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Chrysene	**846**	ug/kg	11	38	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**145**	ug/kg	13	43	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Fluoranthene	**1580**	ug/kg	7.0	28	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Fluorene	**84.4**	ug/kg	4.1	28	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**657**	ug/kg	15	55	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Naphthalene	**25.9**	ug/kg	3.9 *	28	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Phenanthrene	**546**	ug/kg	7.0	28	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM
Pyrene	**1330**	ug/kg	7.0	28	5		05/17/2016 10:00	05/19/2016 14:48	RPN	EPA 8270D-SIM

CT LAB Sample#: 723608 Sample Description: N-14 SEDIMENT Sampled: 05/12/2016 1220

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**41.5**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Total Organic Carbon	**41200**	mg/kg	1500	5100	1			05/25/2016 12:33	JJF	L-Kahn/9060A
Organic Results										
Aroclor-1016	<0.019	mg/kg	0.019	0.063	1		05/17/2016 10:15	05/18/2016 16:42	JJY	EPA 8082A
Aroclor-1221	<0.048	mg/kg	0.048	0.16	1		05/17/2016 10:15	05/18/2016 16:42	JJY	EPA 8082A

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723608 Sample Description: N-14 SEDIMENT Sampled: 05/12/2016 1220

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Aroclor-1232	<0.034	mg/kg	0.034	0.11	1		05/17/2016 10:15	05/18/2016 16:42	JJY	EPA 8082A
Aroclor-1242	<0.024	mg/kg	0.024	0.077	1		05/17/2016 10:15	05/18/2016 16:42	JJY	EPA 8082A
Aroclor-1248	<0.031	mg/kg	0.031	0.10	1		05/17/2016 10:15	05/18/2016 16:42	JJY	EPA 8082A
Aroclor-1254	**0.299**	mg/kg	0.024	0.080	1		05/17/2016 10:15	05/18/2016 16:42	JJY	EPA 8082A
Aroclor-1260	**0.150**	mg/kg	0.0072	0.048	1		05/17/2016 10:15	05/18/2016 16:42	JJY	EPA 8082A
1-Methylnaphthalene	**16.0**	ug/kg	0.67	4.8	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
2-Methylnaphthalene	**28.9**	ug/kg	0.69	4.8	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Acenaphthene	**13.2**	ug/kg	0.62	4.8	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Acenaphthylene	**17.7**	ug/kg	0.72	4.8	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Anthracene	**25.2**	ug/kg	0.95	4.8	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Benzo(a)anthracene	**46.2**	ug/kg	1.9	6.2	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Benzo(a)pyrene	**45.5**	ug/kg	2.6	9.1	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Benzo(b)fluoranthene	**104**	ug/kg	3.1	10	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Benzo(g,h,i)perylene	**43.5**	ug/kg	2.6	8.8	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Benzo(k)fluoranthene	**19.0**	ug/kg	1.9	6.4	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Chrysene	**66.4**	ug/kg	1.9	6.4	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**10.9**	ug/kg	2.1	7.4	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Fluoranthene	**139**	ug/kg	1.2	4.8	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Fluorene	**34.8**	ug/kg	0.69	4.8	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**38.9**	ug/kg	2.6	9.3	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Naphthalene	**14.6**	ug/kg	0.67	4.8	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Phenanthrene	**124**	ug/kg	1.2	4.8	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM
Pyrene	**135**	ug/kg	1.2	4.8	1		05/17/2016 10:00	05/19/2016 19:06	RPN	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723609 Sample Description: N-15 SEDIMENT Sampled: 05/12/2016 1250

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**39.5**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Total Organic Carbon	**72200**	mg/kg	1600	5300	1			05/25/2016 12:41	JJF	L-Kahn/9060A
Organic Results										
Aroclor-1016	<0.020	mg/kg	0.020	0.065	1		05/17/2016 10:15	05/18/2016 17:03	JJY	EPA 8082A
Aroclor-1221	<0.050	mg/kg	0.050	0.17	1		05/17/2016 10:15	05/18/2016 17:03	JJY	EPA 8082A
Aroclor-1232	<0.035	mg/kg	0.035	0.12	1		05/17/2016 10:15	05/18/2016 17:03	JJY	EPA 8082A
Aroclor-1242	<0.025	mg/kg	0.025	0.081	1		05/17/2016 10:15	05/18/2016 17:03	JJY	EPA 8082A
Aroclor-1248	<0.033	mg/kg	0.033	0.11	1		05/17/2016 10:15	05/18/2016 17:03	JJY	EPA 8082A
Aroclor-1254	**0.315**	mg/kg	0.025	0.083	1		05/17/2016 10:15	05/18/2016 17:03	JJY	EPA 8082A
Aroclor-1260	**0.126**	mg/kg	0.0075	0.050	1		05/17/2016 10:15	05/18/2016 17:03	JJY	EPA 8082A
1-Methylnaphthalene	**27.3**	ug/kg	3.5	25	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
2-Methylnaphthalene	**46.5**	ug/kg	3.6	25	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Acenaphthene	**81.9**	ug/kg	3.3	25	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Acenaphthylene	**87.3**	ug/kg	3.8	25	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Anthracene	**181**	ug/kg	5.0	25	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Benzo(a)anthracene	**663**	ug/kg	10	33	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Benzo(a)pyrene	**752**	ug/kg	14	48	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Benzo(b)fluoranthene	**1400**	ug/kg	16	54	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Benzo(g,h,i)perylene	**569**	ug/kg	14	47	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Benzo(k)fluoranthene	**359**	ug/kg	10	34	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Chrysene	**813**	ug/kg	10	34	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**141**	ug/kg	11	39	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Fluoranthene	**1700**	ug/kg	6.3	25	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723609 Sample Description: N-15 SEDIMENT Sampled: 05/12/2016 1250

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Fluorene	**179**	ug/kg	3.6	25	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**551**	ug/kg	14	49	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Naphthalene	**38.2**	ug/kg	3.5	25	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Phenanthrene	**1080**	ug/kg	6.3	25	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM
Pyrene	**1480**	ug/kg	6.3	25	5		05/17/2016 10:00	05/19/2016 15:28	RPN	EPA 8270D-SIM

CT LAB Sample#: 723611 Sample Description: N-7 PARENT MATERIAL Sampled: 05/12/2016 1005

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**63.3**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Organic Results										
Aroclor-1016	<0.013	mg/kg	0.013	0.041	1		05/17/2016 10:15	05/18/2016 17:25	JJY	EPA 8082A
Aroclor-1221	<0.031	mg/kg	0.031	0.10	1		05/17/2016 10:15	05/18/2016 17:25	JJY	EPA 8082A
Aroclor-1232	<0.022	mg/kg	0.022	0.074	1		05/17/2016 10:15	05/18/2016 17:25	JJY	EPA 8082A
Aroclor-1242	<0.016	mg/kg	0.016	0.050	1		05/17/2016 10:15	05/18/2016 17:25	JJY	EPA 8082A
Aroclor-1248	<0.020	mg/kg	0.020	0.067	1		05/17/2016 10:15	05/18/2016 17:25	JJY	EPA 8082A
Aroclor-1254	<0.016	mg/kg	0.016	0.052	1		05/17/2016 10:15	05/18/2016 17:25	JJY	EPA 8082A
Aroclor-1260	<0.0047	mg/kg	0.0047	0.031	1		05/17/2016 10:15	05/18/2016 17:25	JJY	EPA 8082A

CT LAB Sample#: 723612 Sample Description: N-8 PARENT MATERIAL Sampled: 05/12/2016 1045

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723612 Sample Description: N-8 PARENT MATERIAL Sampled: 05/12/2016 1045

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**66.9**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Organic Results										
Aroclor-1016	<0.012	mg/kg	0.012	0.039	1		05/17/2016 10:15	05/18/2016 17:46	JJY	EPA 8082A
Aroclor-1221	<0.030	mg/kg	0.030	0.099	1		05/17/2016 10:15	05/18/2016 17:46	JJY	EPA 8082A
Aroclor-1232	<0.021	mg/kg	0.021	0.070	1		05/17/2016 10:15	05/18/2016 17:46	JJY	EPA 8082A
Aroclor-1242	<0.015	mg/kg	0.015	0.048	1		05/17/2016 10:15	05/18/2016 17:46	JJY	EPA 8082A
Aroclor-1248	<0.019	mg/kg	0.019	0.064	1		05/17/2016 10:15	05/18/2016 17:46	JJY	EPA 8082A
Aroclor-1254	<0.015	mg/kg	0.015	0.049	1		05/17/2016 10:15	05/18/2016 17:46	JJY	EPA 8082A
Aroclor-1260	<0.0045	mg/kg	0.0045	0.030	1		05/17/2016 10:15	05/18/2016 17:46	JJY	EPA 8082A

CT LAB Sample#: 723613 Sample Description: N-9 PARENT MATERIAL Sampled: 05/12/2016 1105

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**66.8**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Organic Results										
Aroclor-1016	<0.012	mg/kg	0.012	0.039	1		05/17/2016 10:15	05/18/2016 18:08	JJY	EPA 8082A
Aroclor-1221	<0.030	mg/kg	0.030	0.099	1		05/17/2016 10:15	05/18/2016 18:08	JJY	EPA 8082A
Aroclor-1232	<0.021	mg/kg	0.021	0.071	1		05/17/2016 10:15	05/18/2016 18:08	JJY	EPA 8082A
Aroclor-1242	<0.015	mg/kg	0.015	0.048	1		05/17/2016 10:15	05/18/2016 18:08	JJY	EPA 8082A
Aroclor-1248	<0.020	mg/kg	0.020	0.065	1		05/17/2016 10:15	05/18/2016 18:08	JJY	EPA 8082A
Aroclor-1254	<0.015	mg/kg	0.015	0.050	1		05/17/2016 10:15	05/18/2016 18:08	JJY	EPA 8082A
Aroclor-1260	<0.0045	mg/kg	0.0045	0.030	1		05/17/2016 10:15	05/18/2016 18:08	JJY	EPA 8082A

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723613 Sample Description: N-9 PARENT MATERIAL Sampled: 05/12/2016 1105

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method

CT LAB Sample#: 723614 Sample Description: N-10 PARENT MATERIAL Sampled: 05/12/2016 1125

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**70.7**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Organic Results										
Aroclor-1016	<0.011	mg/kg	0.011	0.036	1		05/17/2016 10:15	05/18/2016 18:29	JJY	EPA 8082A
Aroclor-1221	<0.028	mg/kg	0.028	0.093	1		05/17/2016 10:15	05/18/2016 18:29	JJY	EPA 8082A
Aroclor-1232	<0.020	mg/kg	0.020	0.066	1		05/17/2016 10:15	05/18/2016 18:29	JJY	EPA 8082A
Aroclor-1242	<0.014	mg/kg	0.014	0.045	1		05/17/2016 10:15	05/18/2016 18:29	JJY	EPA 8082A
Aroclor-1248	<0.018	mg/kg	0.018	0.060	1		05/17/2016 10:15	05/18/2016 18:29	JJY	EPA 8082A
Aroclor-1254	<0.014	mg/kg	0.014	0.046	1		05/17/2016 10:15	05/18/2016 18:29	JJY	EPA 8082A
Aroclor-1260	<0.0042	mg/kg	0.0042	0.028	1		05/17/2016 10:15	05/18/2016 18:29	JJY	EPA 8082A

CT LAB Sample#: 723615 Sample Description: N-11 PARENT MATERIAL Sampled: 05/12/2016 1305

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**47.8**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Organic Results										
Aroclor-1016	<0.017	mg/kg	0.017	0.054	1		05/17/2016 10:15	05/18/2016 19:34	JJY	EPA 8082A
Aroclor-1221	<0.042	mg/kg	0.042	0.14	1		05/17/2016 10:15	05/18/2016 19:34	JJY	EPA 8082A

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723615 Sample Description: N-11 PARENT MATERIAL Sampled: 05/12/2016 1305

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Aroclor-1232	<0.029	mg/kg	0.029	0.098	1		05/17/2016 10:15	05/18/2016 19:34	JJY	EPA 8082A
Aroclor-1242	<0.021	mg/kg	0.021	0.067	1		05/17/2016 10:15	05/18/2016 19:34	JJY	EPA 8082A
Aroclor-1248	<0.027	mg/kg	0.027	0.090	1		05/17/2016 10:15	05/18/2016 19:34	JJY	EPA 8082A
Aroclor-1254	<0.021	mg/kg	0.021	0.069	1		05/17/2016 10:15	05/18/2016 19:34	JJY	EPA 8082A
Aroclor-1260	<0.0063	mg/kg	0.0063	0.042	1		05/17/2016 10:15	05/18/2016 19:34	JJY	EPA 8082A

CT LAB Sample#: 723616 Sample Description: N-12 PARENT MATERIAL Sampled: 05/12/2016 1145

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**51.7**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Organic Results										
Aroclor-1016	<0.015	mg/kg	0.015	0.050	1		05/17/2016 10:15	05/18/2016 19:55	JJY	EPA 8082A
Aroclor-1221	<0.039	mg/kg	0.039	0.13	1		05/17/2016 10:15	05/18/2016 19:55	JJY	EPA 8082A
Aroclor-1232	<0.027	mg/kg	0.027	0.091	1		05/17/2016 10:15	05/18/2016 19:55	JJY	EPA 8082A
Aroclor-1242	<0.019	mg/kg	0.019	0.062	1		05/17/2016 10:15	05/18/2016 19:55	JJY	EPA 8082A
Aroclor-1248	<0.025	mg/kg	0.025	0.083	1		05/17/2016 10:15	05/18/2016 19:55	JJY	EPA 8082A
Aroclor-1254	**0.0676**	mg/kg	0.019	0.064	1		05/17/2016 10:15	05/18/2016 19:55	JJY	EPA 8082A
Aroclor-1260	<0.0058	mg/kg	0.0058	0.039	1		05/17/2016 10:15	05/18/2016 19:55	JJY	EPA 8082A

CT LAB Sample#: 723617 Sample Description: N-13 PARENT MATERIAL Sampled: 05/12/2016 1205

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723617 Sample Description: N-13 PARENT MATERIAL Sampled: 05/12/2016 1205

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**65.5**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Organic Results										
Aroclor-1016	<0.012	mg/kg	0.012	0.040	1		05/17/2016 10:15	05/18/2016 20:17	JJY	EPA 8082A
Aroclor-1221	<0.031	mg/kg	0.031	0.10	1		05/17/2016 10:15	05/18/2016 20:17	JJY	EPA 8082A
Aroclor-1232	<0.021	mg/kg	0.021	0.072	1		05/17/2016 10:15	05/18/2016 20:17	JJY	EPA 8082A
Aroclor-1242	<0.015	mg/kg	0.015	0.049	1		05/17/2016 10:15	05/18/2016 20:17	JJY	EPA 8082A
Aroclor-1248	<0.020	mg/kg	0.020	0.066	1		05/17/2016 10:15	05/18/2016 20:17	JJY	EPA 8082A
Aroclor-1254	<0.015	mg/kg	0.015	0.050	1		05/17/2016 10:15	05/18/2016 20:17	JJY	EPA 8082A
Aroclor-1260	<0.0046	mg/kg	0.0046	0.031	1		05/17/2016 10:15	05/18/2016 20:17	JJY	EPA 8082A

CT LAB Sample#: 723618 Sample Description: N-14 PARENT MATERIAL Sampled: 05/12/2016 1225

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**65.0**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Organic Results										
Aroclor-1016	<0.012	mg/kg	0.012	0.040	1		05/17/2016 10:15	05/18/2016 20:38	JJY	EPA 8082A
Aroclor-1221	<0.031	mg/kg	0.031	0.10	1		05/17/2016 10:15	05/18/2016 20:38	JJY	EPA 8082A
Aroclor-1232	<0.022	mg/kg	0.022	0.072	1		05/17/2016 10:15	05/18/2016 20:38	JJY	EPA 8082A
Aroclor-1242	<0.015	mg/kg	0.015	0.049	1		05/17/2016 10:15	05/18/2016 20:38	JJY	EPA 8082A
Aroclor-1248	<0.020	mg/kg	0.020	0.066	1		05/17/2016 10:15	05/18/2016 20:38	JJY	EPA 8082A
Aroclor-1254	<0.015	mg/kg	0.015	0.051	1		05/17/2016 10:15	05/18/2016 20:38	JJY	EPA 8082A
Aroclor-1260	<0.0046	mg/kg	0.0046	0.031	1		05/17/2016 10:15	05/18/2016 20:38	JJY	EPA 8082A

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723618 Sample Description: N-14 PARENT MATERIAL Sampled: 05/12/2016 1225

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method

CT LAB Sample#: 723619 Sample Description: N-15 PARENT MATERIAL Sampled: 05/12/2016 1255

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**47.8**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Organic Results										
Aroclor-1016	<0.017	mg/kg	0.017	0.054	1		05/17/2016 10:15	05/18/2016 21:00	JJY	EPA 8082A
Aroclor-1221	<0.042	mg/kg	0.042	0.14	1		05/17/2016 10:15	05/18/2016 21:00	JJY	EPA 8082A
Aroclor-1232	<0.029	mg/kg	0.029	0.098	1		05/17/2016 10:15	05/18/2016 21:00	JJY	EPA 8082A
Aroclor-1242	<0.021	mg/kg	0.021	0.067	1		05/17/2016 10:15	05/18/2016 21:00	JJY	EPA 8082A
Aroclor-1248	<0.027	mg/kg	0.027	0.090	1		05/17/2016 10:15	05/18/2016 21:00	JJY	EPA 8082A
Aroclor-1254	<0.021	mg/kg	0.021	0.069	1		05/17/2016 10:15	05/18/2016 21:00	JJY	EPA 8082A
Aroclor-1260	<0.0062	mg/kg	0.0062	0.042	1		05/17/2016 10:15	05/18/2016 21:00	JJY	EPA 8082A

CT LAB Sample#: 723620 Sample Description: SOUTH SEDIMENT Sampled: 05/12/2016 1415

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**51.4**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Ammonia Nitrogen	**69.3**	mg/kg	7.4	25	2	M	05/27/2016 09:15	05/27/2016 13:47	MER	SM 4500-NH3H
Cyanide	<0.22	mg/kg	0.22	0.76	1		05/17/2016 09:30	05/18/2016 14:26	LJS	EPA 9012A
Phosphorus	**703**	mg/kg	22	73	1	M	05/25/2016 10:00	05/27/2016 12:30	LJS	EPA 365.4
Nitrogen Kjeldahl	**3710**	mg/kg	68	230	2	M	05/18/2016 11:00	05/20/2016 13:02	MER	ASTM D3590

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723620 Sample Description: SOUTH SEDIMENT Sampled: 05/12/2016 1415

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Nitrate Nitrogen	<0.77	mg/kg	0.77	2.7	1		05/20/2016 11:00	05/20/2016 20:59	JJF	EPA 9056A
Nitrite Nitrogen	<2.9	mg/kg	2.9	9.8	1		05/20/2016 11:00	05/20/2016 20:59	JJF	EPA 9056A
Percent Moisture	**48.6**	%	0.1	0.1	1			05/16/2016 17:00	AMA	SM 2540G
Total Organic Carbon	**44100**	mg/kg	1200	4100	1			05/25/2016 12:49	JJF	L-Kahn/9060A
Metals Results										
Arsenic	**8.7**	mg/kg	0.39	1.4	1		05/19/2016 07:00	05/19/2016 22:46	NAH	EPA 6010C
Barium	**53.0**	mg/kg	0.052	0.18	1		05/19/2016 07:00	05/19/2016 22:46	NAH	EPA 6010C
Cadmium	<0.025	mg/kg	0.025	0.083	1		05/19/2016 07:00	05/19/2016 22:46	NAH	EPA 6010C
Chromium	**13.6**	mg/kg	0.091	0.29	1		05/19/2016 07:00	05/19/2016 22:46	NAH	EPA 6010C
Copper	**13.5**	mg/kg	0.16	0.49	1		05/19/2016 07:00	05/19/2016 22:46	NAH	EPA 6010C
Iron	**9870**	mg/kg	1.2	3.8	1		05/19/2016 07:00	05/19/2016 22:46	NAH	EPA 6010C
Lead	**12.7**	mg/kg	0.34	1.1	1		05/19/2016 07:00	05/19/2016 22:46	NAH	EPA 6010C
Manganese	**196**	mg/kg	0.26	0.84	1		05/19/2016 07:00	05/19/2016 22:46	NAH	EPA 6010C
Nickel	**13.1**	mg/kg	0.18	0.62	1		05/19/2016 07:00	05/19/2016 22:46	NAH	EPA 6010C
Selenium	**2.3**	mg/kg	0.65	2.1	1		05/19/2016 07:00	05/19/2016 22:46	NAH	EPA 6010C
Zinc	**59.4**	mg/kg	0.13	0.43	1		05/19/2016 07:00	05/19/2016 22:46	NAH	EPA 6010C
Mercury	**0.040**	mg/kg	0.00044	0.0015	1		05/18/2016 09:30	05/19/2016 12:47	LJF	EPA 7471B
Organic Results										
Aroclor-1016	<0.016	mg/kg	0.016	0.050	1		05/17/2016 10:15	05/18/2016 21:21	JJY	EPA 8082A
Aroclor-1221	<0.039	mg/kg	0.039	0.13	1		05/17/2016 10:15	05/18/2016 21:21	JJY	EPA 8082A
Aroclor-1232	<0.027	mg/kg	0.027	0.091	1		05/17/2016 10:15	05/18/2016 21:21	JJY	EPA 8082A
Aroclor-1242	<0.019	mg/kg	0.019	0.062	1		05/17/2016 10:15	05/18/2016 21:21	JJY	EPA 8082A
Aroclor-1248	<0.025	mg/kg	0.025	0.083	1		05/17/2016 10:15	05/18/2016 21:21	JJY	EPA 8082A
Aroclor-1254	**0.0214**	mg/kg	0.019 *	0.064	1		05/17/2016 10:15	05/18/2016 21:21	JJY	EPA 8082A

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723620 Sample Description: SOUTH SEDIMENT Sampled: 05/12/2016 1415

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Aroclor-1260	<0.0058	mg/kg	0.0058	0.039	1		05/17/2016 10:15	05/18/2016 21:21	JJY	EPA 8082A
1-Methylnaphthalene	**5.22**	ug/kg	0.54	3.9	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
2-Methylnaphthalene	**45.7**	ug/kg	0.56	3.9	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Acenaphthene	**4.11**	ug/kg	0.50	3.9	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Acenaphthylene	**9.54**	ug/kg	0.58	3.9	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Anthracene	**14.2**	ug/kg	0.77	3.9	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Benzo(a)anthracene	**33.8**	ug/kg	1.5	5.0	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Benzo(a)pyrene	**31.2**	ug/kg	2.1	7.3	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Benzo(b)fluoranthene	**81.3**	ug/kg	2.5	8.3	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Benzo(g,h,i)perylene	**28.6**	ug/kg	2.1	7.1	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Benzo(k)fluoranthene	**13.8**	ug/kg	1.5	5.2	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Chrysene	**43.7**	ug/kg	1.5	5.2	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**7.34**	ug/kg	1.7	6.0	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Fluoranthene	**115**	ug/kg	0.97	3.9	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Fluorene	**19.2**	ug/kg	0.56	3.9	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**26.6**	ug/kg	2.1	7.5	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Naphthalene	**5.56**	ug/kg	0.54	3.9	1	B	05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Phenanthrene	**43.2**	ug/kg	0.97	3.9	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Pyrene	**88.9**	ug/kg	0.97	3.9	1		05/17/2016 10:00	05/19/2016 19:26	RPN	EPA 8270D-SIM
Sub Lab Results										
Hydrometer	**attached**		N/A	N/A	1			05/23/2016 00:00	SUB	

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723645 Sample Description: SOUTH PARENT MATERIAL Sampled: 05/12/2016 1420

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
Solids, Percent	**73.7**	%	0.1	0.1	1			05/16/2016 17:00	AMA	EPA 8000C
Ammonia Nitrogen	**33.5**	mg/kg	5.0	17	2		05/27/2016 09:15	05/27/2016 13:53	MER	SM 4500-NH3H
Cyanide	<0.17	mg/kg	0.17	0.59	1		05/17/2016 09:30	05/18/2016 14:27	LJS	EPA 9012A
Phosphorus	**629**	mg/kg	14	47	1		05/18/2016 11:00	05/20/2016 16:26	MER	EPA 365.4
Nitrogen Kjeldahl	**890**	mg/kg	24	81	1		05/18/2016 11:00	05/20/2016 13:11	MER	ASTM D3590
Nitrate Nitrogen	**3.85**	mg/kg	0.53	1.8	1		05/20/2016 11:00	05/20/2016 21:17	JJF	EPA 9056A
Nitrite Nitrogen	<2.0	mg/kg	2.0	6.7	1		05/20/2016 11:00	05/20/2016 21:17	JJF	EPA 9056A
Percent Moisture	**26.3**	%	0.1	0.1	1			05/16/2016 17:00	AMA	SM 2540G
Total Organic Carbon	**6020**	mg/kg	860	2900	1			05/25/2016 13:07	JJF	L-Kahn/9060A
Metals Results										
Arsenic	**4.5**	mg/kg	0.32	1.2	1		05/19/2016 07:00	05/19/2016 22:52	NAH	EPA 6010C
Barium	**58.1**	mg/kg	0.042	0.15	1		05/19/2016 07:00	05/19/2016 22:52	NAH	EPA 6010C
Cadmium	<0.020	mg/kg	0.020	0.068	1		05/19/2016 07:00	05/19/2016 22:52	NAH	EPA 6010C
Chromium	**12.7**	mg/kg	0.074	0.23	1		05/19/2016 07:00	05/19/2016 22:52	NAH	EPA 6010C
Copper	**15.1**	mg/kg	0.13	0.40	1		05/19/2016 07:00	05/19/2016 22:52	NAH	EPA 6010C
Iron	**12900**	mg/kg	0.95	3.1	1		05/19/2016 07:00	05/19/2016 22:52	NAH	EPA 6010C
Lead	**8.5**	mg/kg	0.28	0.92	1		05/19/2016 07:00	05/19/2016 22:52	NAH	EPA 6010C
Manganese	**271**	mg/kg	0.21	0.69	1		05/19/2016 07:00	05/19/2016 22:52	NAH	EPA 6010C
Nickel	**17.8**	mg/kg	0.15	0.51	1		05/19/2016 07:00	05/19/2016 22:52	NAH	EPA 6010C
Selenium	**1.1**	mg/kg	0.53 *	1.7	1		05/19/2016 07:00	05/19/2016 22:52	NAH	EPA 6010C
Zinc	**56.6**	mg/kg	0.11	0.35	1		05/19/2016 07:00	05/19/2016 22:52	NAH	EPA 6010C
Mercury	**0.031**	mg/kg	0.00029	0.00098	1		05/18/2016 09:30	05/19/2016 12:49	LJF	EPA 7471B
Organic Results										

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723645 Sample Description: SOUTH PARENT MATERIAL Sampled: 05/12/2016 1420

Analyte	Result	Units	LOD		LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Aroclor-1016	<0.011	mg/kg	0.011		0.035	1		05/17/2016 10:15	05/18/2016 21:43	JJY	EPA 8082A
Aroclor-1221	<0.027	mg/kg	0.027		0.089	1		05/17/2016 10:15	05/18/2016 21:43	JJY	EPA 8082A
Aroclor-1232	<0.019	mg/kg	0.019		0.063	1		05/17/2016 10:15	05/18/2016 21:43	JJY	EPA 8082A
Aroclor-1242	<0.013	mg/kg	0.013		0.043	1		05/17/2016 10:15	05/18/2016 21:43	JJY	EPA 8082A
Aroclor-1248	<0.017	mg/kg	0.017		0.058	1		05/17/2016 10:15	05/18/2016 21:43	JJY	EPA 8082A
Aroclor-1254	<0.013	mg/kg	0.013		0.044	1		05/17/2016 10:15	05/18/2016 21:43	JJY	EPA 8082A
Aroclor-1260	<0.0040	mg/kg	0.0040		0.027	1		05/17/2016 10:15	05/18/2016 21:43	JJY	EPA 8082A
1-Methylnaphthalene	**2.17**	ug/kg	0.38	*	2.7	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
2-Methylnaphthalene	**28.8**	ug/kg	0.39		2.7	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Acenaphthene	**0.558**	ug/kg	0.35	*	2.7	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Acenaphthylene	**2.39**	ug/kg	0.41	*	2.7	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Anthracene	**4.35**	ug/kg	0.54		2.7	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Benzo(a)anthracene	**3.31**	ug/kg	1.1	*	3.5	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Benzo(a)pyrene	**2.70**	ug/kg	1.5	*	5.1	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Benzo(b)fluoranthene	**6.62**	ug/kg	1.8		5.8	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Benzo(g,h,i)perylene	<1.5	ug/kg	1.5		5.0	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Benzo(k)fluoranthene	**1.78**	ug/kg	1.1	*	3.7	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Chrysene	**3.03**	ug/kg	1.1	*	3.7	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Dibenzo(a,h)anthracene	**1.91**	ug/kg	1.2	*	4.2	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Fluoranthene	**8.13**	ug/kg	0.68		2.7	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Fluorene	**1.70**	ug/kg	0.39	*	2.7	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Indeno(1,2,3-cd)pyrene	**3.62**	ug/kg	1.5	*	5.3	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Naphthalene	**1.69**	ug/kg	0.38	*	2.7	1	B	05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Phenanthrene	**4.04**	ug/kg	0.68		2.7	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM
Pyrene	**7.29**	ug/kg	0.68		2.7	1		05/17/2016 10:00	05/19/2016 13:09	RPN	EPA 8270D-SIM

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

CT LAB Sample#: 723645 Sample Description: SOUTH PARENT MATERIAL Sampled: 05/12/2016 1420

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Sub Lab Results										
Hydrometer	**attached**		N/A	N/A	1			05/23/2016 00:00	SUB	

Unless specifically stated to the contrary, soil/sediment/sludge sample results reported on a Dry Weight Basis

Notes: * Indicates a value in between the LOD (limit of detection) and the LOQ (limit of quantitation). All LOD/LOQs are adjusted to reflect dilution and also any differences in the sample weight / volume as compared to standard amounts.

All samples were received intact and properly preserved unless otherwise noted. The results reported relate only to the samples tested. This report shall not be reproduced, except in full, without written approval of this laboratory. The Chain of Custody is attached.

Submitted by: Eric T. Korthals
Project Manager
608-356-2760

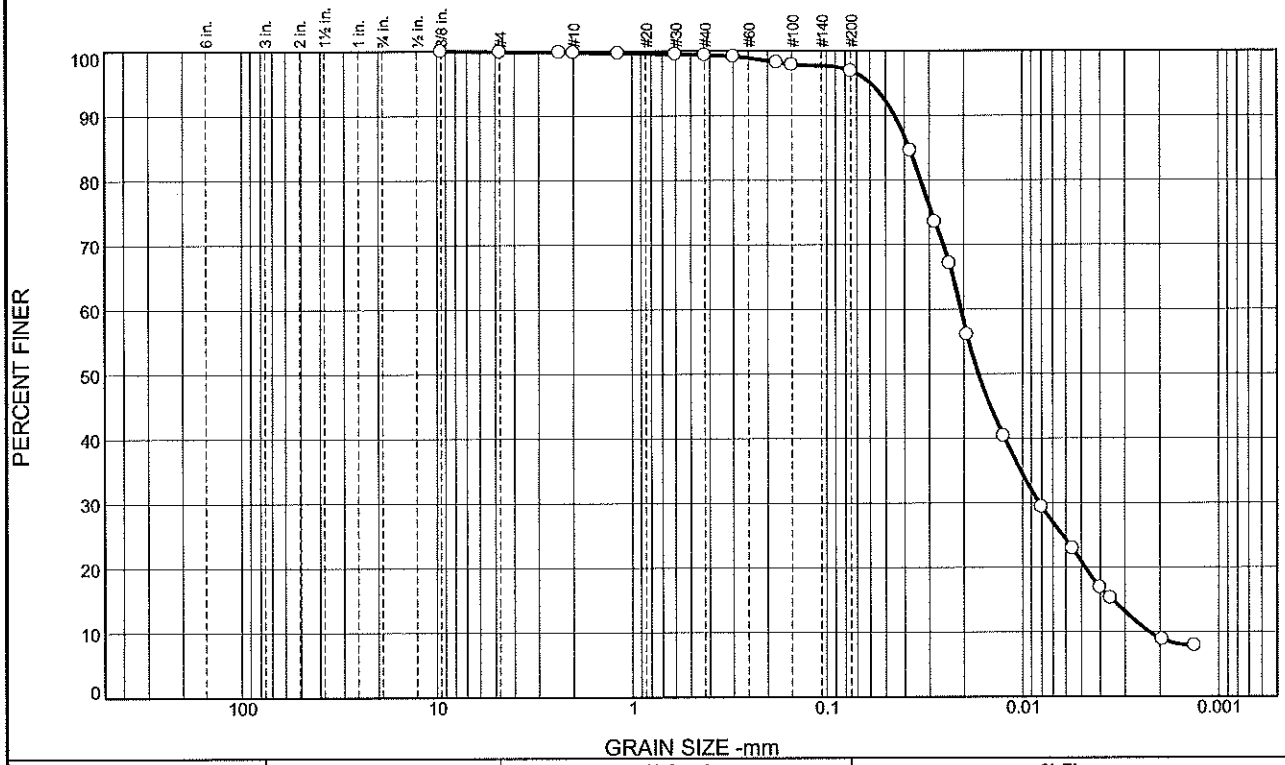
QC Qualifiers

Code	Description
B	Analyte detected in the associated Method Blank.
C	Toxicity present in BOD sample.
D	Diluted Out.
E	Safe, No Total Coliform detected.
F	Unsafe, Total Coliform detected, no E. Coli detected.
G	Unsafe, Total Coliform detected and E. Coli detected.
H	Holding time exceeded.
I	BOD incubator temperature was outside acceptance limits during test period.
J	Estimated value.
L	Significant peaks were detected outside the chromatographic window.
M	Matrix spike and/or Matrix Spike Duplicate recovery outside acceptance limits.
N	Insufficient BOD oxygen depletion.
O	Complete BOD oxygen depletion.
P	Concentration of analyte differs more than 40% between primary and confirmation analysis.
Q	Laboratory Control Sample outside acceptance limits.
R	See Narrative at end of report.
S	Surrogate standard recovery outside acceptance limits due to apparent matrix effects.
T	Sample received with improper preservation or temperature.
U	Analyte concentration was below detection limit.
V	Raised Quantitation or Reporting Limit due to limited sample amount or dilution for matrix background interference.
W	Sample amount received was below program minimum.
X	Analyte exceeded calibration range.
Y	Replicate/Duplicate precision outside acceptance limits.
Z	Specified calibration criteria was not met.

Current CT Laboratories Certifications

Kansas NELAP ID# E-10368
Kentucky ID# 0023
ISO/IEC 17025-2005 A2LA Cert # 3806.01
North Carolina ID# 674
Wisconsin (WDNR) Chemistry ID# 157066030
Wisconsin (DATCP) Bacteriology ID# 105-289
DoD-ELAP A2LA 3806.01
GA EPD Stipulation ID E871111, Expires Annually
Louisiana ID # 115843
Virginia ID# 7608
Illinois NELAP ID # 002413
Wisconsin (WOSB) ID# WI-5499-WBE
Maryland ID# 344

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	0.4	2.5	76.0	20.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	99.9		
#8	99.8		
#10	99.8		
#16	99.7		
#30	99.5		
#40	99.4		
#50	99.2		
#80	98.2		
#100	97.9		
#200	96.9		

* (no specification provided)

Material Description

Gray Lean Clay to Silty Clay, Trace Sand and Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0450 D_{85}= 0.0379 D_{60}= 0.0207
D_{50}= 0.0169 D_{30}= 0.0082 D_{15}= 0.0035
D_{10}= 0.0023 C_u= 9.15 C_c= 1.44

Classification

USCS= CL/CL-ML AASHTO=

Remarks

Natural Moisture = 36.4%
* - Visual Classification Only; No Atterberg Limits Performed

Sample Number: South Parent Mat'l

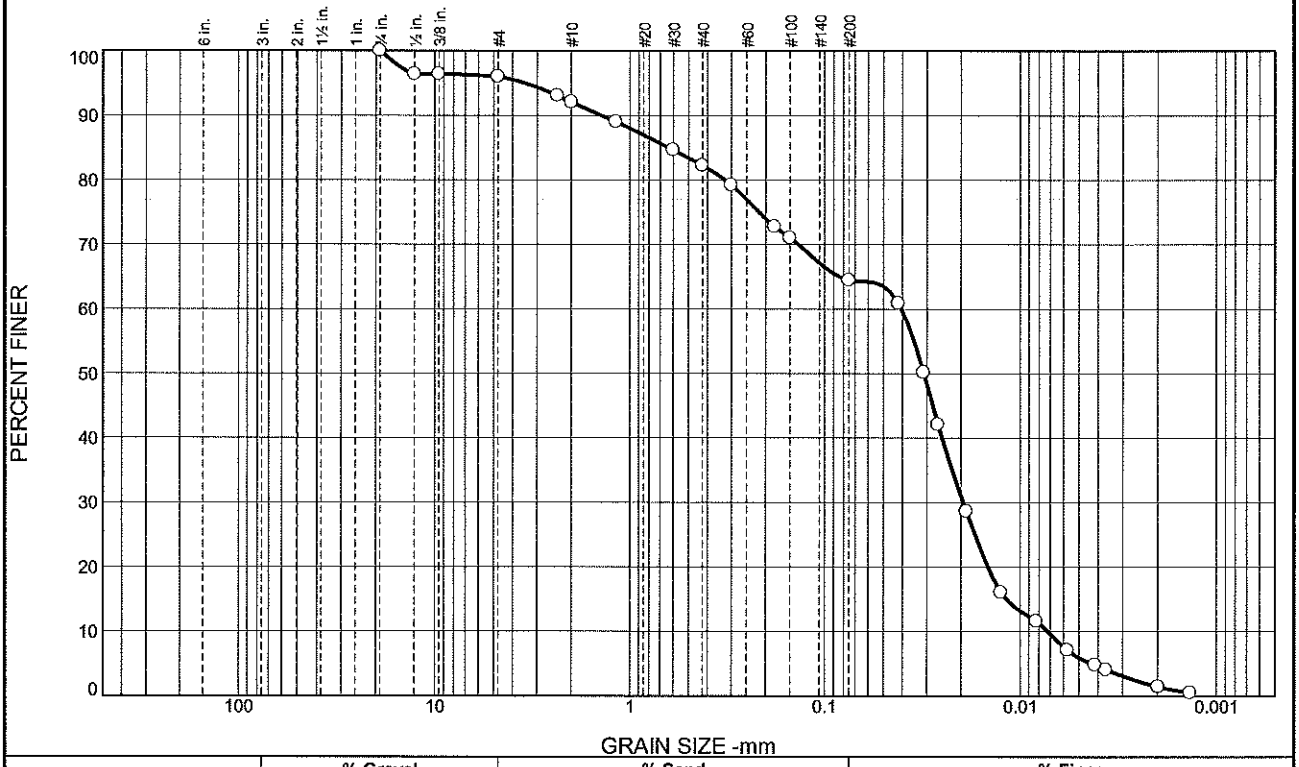
Date: 5/23/16

CGC, Inc.

Client: CT Laboratories
Project: City of Monona
(PO# 119017 CGC)
Project No: C15013-12 **Figure**

Tested By: DRW **Checked By:** DAS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.0	4.0	9.8	17.8	58.5	5.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	96.4		
3/8	96.4		
#4	96.0		
#8	93.0		
#10	92.0		
#16	89.0		
#30	84.6		
#40	82.2		
#50	79.2		
#80	72.8		
#100	71.0		
#200	64.4		

* (no specification provided)

Material Description

Dark Gray to Black Organic Silt, Some Sand, Trace Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.4112 D_{85}= 0.6357 D_{60}= 0.0405
D_{50}= 0.0310 D_{30}= 0.0195 D_{15}= 0.0118
D_{10}= 0.0072 C_u= 5.63 C_c= 1.30

Classification

USCS= OL AASHTO=

Remarks

Natural Moisture = 128.3%
* - Visual Classification Only, No Atterberg Limits or Loss-on-Ignition Performed

Sample Number: South Sediment

Date: 5/23/16

CGC, Inc.

Client: CT Laboratories
Project: City of Monona (PO# 119017 CGC)
Project No: C15013-12 **Figure**

Tested By: DRW **Checked By:** DAS

Rev. 3/2015

CHAIN OF CUSTODY

Page 1 of 2

Company: Strand Associates, Inc.
Project Contact: Lukas Hellermann
Telephone (608) 251-4843
Project Name: City of Monona
Project #: Winnequah Park 1095-047
Location: Monona, WI
Sampled By: Steve Small

CT LABORATORIES

1230 Lange Court, Baraboo, WI 53913
608-356-2760 Fax 608-356-2766
www.ctlaboratories.com

Folder #: 119017
Company: STRAND ASSOCIATES
Project: CITY OF MONONA
Logged By: JLS PM ET

Program:
DSM RCRA SDWA NPDES
Solid Waste Other _____
PO #

Report To: Steve Small
EMAIL: Steve.Small@Strand.com
Company: Strand Associates, Inc
Address: 910 W. Wingra Dr
Madison, WI 53715
Invoice To:*
EMAIL: SAME
Company:
Address:

*Party listed is responsible for payment of invoice as per CT Laboratories' terms and conditions

Client Special Instructions

Matrix:
GW – groundwater SW - surface water WW - wastewater DW - drinking water
S - soil/sediment SL - sludge A - air M - misc/waste

Turnaround Time: (Normal) RUSH* Date Needed: _____
Rush analysis requires prior CT Laboratories' approval
Surcharges:
24 hr 200%
2-3 days 100%
4-9 days 50%

Collection Date	Collection Time	Matrix	Grab/ Comp	Sample #	Sample ID Description	Filtered? Y/N	PCBs	PAHs	TOC	% Solids	Total # Containers	Designated MS/MSD	CT Lab ID # (Lab use only)
					ANALYSES REQUESTED		Fill in Spaces with Bottles per Test						
5/12/16	10:00	S	Grab		N-7 Sediment	No	X	X	X	X	1		723601
5/12/16	10:40	S	Grab		N-8 Sediment	No	X	X	X	X	1		723602
5/12/16	11:00	S	Grab		N-9 Sediment	No	X	X	X	X	1		723603
5/12/16	11:20	S	Grab		N-10 Sediment	No	X	X	X	X	1		723604
5/12/16	13:00	S	Grab		N-11 Sediment	No	X	X	X	X	1		723605
5/12/16	11:40	S	Grab		N-12 Sediment	No	X	X	X	X	1		723606
5/12/16	12:00	S	Grab		N-13 Sediment	No	X	X	X	X	1		723607
5/12/16	12:20	S	Grab		N-14 Sediment	No	X	X	X	X	1		723608
5/12/16	12:50	S	Grab		N-15 Sediment	No	X	X	X	X	1		723609
5/12/16	10:05	S	Grab		N-7 Parent Material	No	X				1		723611
5/12/16	10:45	S	Grab		N-8 Parent Material	No	X				1		723612
5/12/16	11:05	S	Grab		N-9 Parent Material	No	X				1		723613

Relinquished By:	Date/Time	Received By:	Date/Time 5/16/16 1158
Received by:	Date/Time	Received for Laboratory by:	Date/Time 5/15/16 9:35

Lab Use Only
Ice Present (Yes) No
Temp 0.9 IR Gun 14
Cooler # 5676

Rev. 3/2015

CHAIN OF CUSTODY

Page 2 of 2

Company: Strand Associates, Inc.
Project Contact: Luke Hellermann
Telephone: (608) 251-4843
Project Name: City of Monona Winnequah Park
Project #: 1093-047
Location: Monona, WI
Sampled By: Steve Small

CT LABORATORIES
1230 Lange Court, Baraboo, WI 53913
608-356-2760 Fax 608-356-2766
www.ctlaboratories.com

Lab Use Only
Place Header Sticker Here:
119017

Program:
QSM RCRA SDWA NPDES
Solid Waste Other _____

PO #

Report To: Steve Small
EMAIL: Steve.Small@Strand.com
Company: Strand Associates, Inc.
Address: 910 W. Wingra Dr. Madison, WI 53715

Invoice To:*
EMAIL:
Company: Same
Address:

*Party listed is responsible for payment of invoice as per CT Laboratories' terms and conditions

Client Special Instructions
(1) Metals analysis: As, Ba, Cd, Cu, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Se, & Zn
(2) Grain Size (Sieve + Hydrometer)

Matrix:
GW – groundwater SW - surface water WW - wastewater DW - drinking water
S - soil/sediment SL - sludge A - air M - misc/waste

Turnaround Time
(Normal) RUSH*
Date Needed: _____
Rush analysis requires prior CT Laboratories' approval
Surcharges:
24 hr 200%
2-3 days 100%
4-9 days 50%

Collection Date	Collection Time	Matrix	Grab/ Comp	Sample #	Sample ID Description	Filtered? Y/N	PCB's	Metals (1)	PAH	T.O.C.	Moisture Content	Ammonia, N	Nitrate, N	Nitrite, N	% Solids	Total Phosphorus	TKN	Grain Size (2)			Total # Containers	Designated MS/MSD	CT Lab ID # (Lab use only)
							Fill in Spaces with Bottles per Test																	
5/12/16	11:25	S	Grab		N-10 Parent Material	No	X														1		723614
5/13/16	13:05	S	Grab		N-11 Parent Material	No	X														1		723615
5/12/16	11:45	S	Grab		N-12 Parent Material	No	X														1		723616
5/12/16	12:05	S	Grab		N-13 Parent Material	No	X														1		723617
5/12/16	12:25	S	Grab		N-14 Parent Material	No	X														1		723618
5/12/16	12:55	S	Grab		N-15 Parent Material	No	X														1		723619
5/12/16	14:15	S	Comp		South Sediment	No	X	X	X	X	X	X	X	X	X	X	X	X			2		723620
5/12/16	14:20	S	Comp		South Parent Material	No	X	X	X	X	X	X	X	X	X	X	X	X			2		723645

Relinquished By:	Date/Time	Received By:	Date/Time
			5/16/16 1158
Received by:	Date/Time	Received for Laboratory by:	Date/Time
			5/15/16 9:35

Lab Use Only
Ice Present (Yes) No
Temp 0.9 IR Gun 14
Cooler # 5676

STRAND ASSOCIATES®

Strand Associates, Inc.®
910 West Wingra Drive
Madison, WI 53715
(P) 608-251-4843
(F) 608-251-8655

July 19, 2016

Mr. Dan Stephany, Director of Public Works
City of Monona
5211 Schluter Road
Monona, WI 53716

Re: Winnequah Park Lagoon Sampling, Management, and Planning
Sediment Investigation, BRRTS No. 02-13-576071

Dear Dan,

We have completed additional sediment sampling and the initial management and planning efforts for the Winnequah Park lagoons. The assessment included collection and analysis of sediment samples, an initial dredging feasibility study, a stormwater treatment device assessment, and a shoreland erosion assessment. This project is partially funded by a Wisconsin Department of Natural Resources (WDNR) Large Scale Lake Management Planning Grant.

Sediment Collection and Analysis

On May 12, 2016, additional sediment and parent material samples were collected from 9 locations north of Nichols Road (N-7 through N-15) and from 2 locations south of Nichols Road (S-1 and S-2). Figures 1 and 2 show the Winnequah Park lagoons and these sampling locations. Figure 1 also shows locations where sediment samples were previously collected in March 2015 (SB-1 through SB-6). The additional sampling north of Nichols Road was completed after elevated levels of polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) were detected in some of the initial sediment samples collected at SB-1 through SB-6.

Prior to initiating the May 2016 sediment sampling, a Site Investigation Work Plan was submitted to the WDNR on March 23, 2016. The Work Plan summarized the sampling locations, proposed sampling procedures, the number of samples to be analyzed, and the proposed analytical tests. The sampling and analysis details were also discussed with WDNR representatives during a subsequent phone conference and a follow-up meeting.

The following sampling and analysis was completed in May 2016:

1. North of Nichols Road (sample locations N-7 through N-15), a grab parent material sample and a grab sediment sample were collected at each location. The 9 sediment samples were analyzed for PCBs, PAHs, total organic carbon (TOC), and percent solids. The 9 parent material samples were analyzed for PCBs.
2. South of Nichols Road (sample locations S-1 and S-2), grab sediment and grab parent material samples were collected. The grab sediment samples were composited and analyzed for a partial list of the NR 347 Table 1 sediment characterization parameters, including: total metals (As, Ba, Cd, Cr, Cu, Cn, Fe, Pb, Mn, Hg, Ni, Se, and Zn), PCBs, PAHs, nitrate, nitrite, ammonia, total kjeldahl nitrogen (TKN), total phosphorus, grain size by hydrometer, percent solids, total organic carbon, and moisture content. The grab parent material samples were composited and analyzed for the same NR 347 Table 1 parameters.

The sample analytical results are summarized on the data tables and laboratory report in Attachment A. The tables include results from the March 2015 and the May 2016 sampling events and compare the analytical results to the Consensus-Based Sediment Quality Guidelines (CBSQG) from the WDNR Interim Guidance dated December 2003. Results are compared to the Threshold Effect Concentration (TEC), Midpoint Effect Concentration (MEC), and Probable Effect Concentration (PEC) as provided in the CBSQG. The lower TEC is the concentration at which toxicity to benthic-dwelling organisms is unlikely, and the PEC is the concentration at which toxicity to benthic-dwelling organisms is probable. The MEC is the concentration midway between the TEC and the PEC concentrations. Reported dry weight results are provided as well as the results normalized to 1 percent TOC for comparison to the TEC, MEC, and PEC provided in the CBSQG.

Concentrations of total PAHs in sediment exceeded the TEC at locations N-7, N-8, N-9, N-11, N-12, and N-13. No concentrations of total PAHs in sediment exceeded the MEC or the PEC. Concentrations of total PCBs in sediment exceeded the TEC at locations SB-6, N-11, N-12, N-14, and N-15. At SB-4 and SB-5, the concentrations of total PCBs in sediment exceeded the MEC and the PEC. Refer to data tables and laboratory report in Attachment A.

Of the parent material samples collected, only the S-1/S-2 composite parent material sample was analyzed for PAHs. Total PAHs in that parent material sample did not exceeded the TEC. The parent material samples collected from the S-1/S-2 composite and from locations N-7 through N-15 were analyzed for PCBs. Total PCBs in these parent material samples did not exceeded the TEC. Refer to data tables and laboratory report in Attachment A.

The total PCB and total PAH concentrations at each sampling location are also summarized on Figures 1 and 2 and compared to the PECs. No concentrations of total PAHs exceed the PEC. Total PCBs exceeded the PEC at 2 of the 17 sediment sampling locations (SB-4 and SB-5) near Nichols Road.

North of Nichols Road, the estimated extents of PCB contamination in the sediment exceeding the TEC and the PEC are shown on Figure 1. South of Nichols Road at locations S-1, S-2, SB-1, SB-2, and SB-3, total PCBs, total PAHs, and other contaminants were all below the respective TECs.

Dredging Feasibility Study

An analysis was conducted for the area upstream of Nichols Road and the area downstream of Nichols Road. The analysis included conceptual plan and profile sheets and cross sections showing removal of all sediment and removal of sediment to elevation 842.20. The plan and profile and cross section sheets are included as Attachment B. An opinion of probable construction cost (OPCC), a listing of required permits and grant opportunities, and an implementation plan were included with the analysis.

Three scenarios for dredging were analyzed: Scenario 1–Removing all sediment in the stream; Scenario 2–Removing sediment to elevation 842.20; and Scenario 3–Removing sediment north of Nichols Road where PCB concentrations exceed the PEC. Removing all sediment from the lagoons would improve stormwater retention by maximizing storage capacities and would remove nutrient-rich sediments that could potentially be washed into Lake Monona. Removing sediment to elevation 842.20 would allow three feet of water depth at the Lake Monona Summer Target Maximum (845.20) and allow two and a half feet of water depth at the Lake Monona Summer Target Minimum (844.70). Removing sediment where PCB concentrations exceed the PEC would protect benthic-dwelling organisms and may be the appropriate remediation measure to protect human health and the environment. A topographic

survey of the top of sediment and the top of parent material was completed. This survey data was used to compute approximate quantities of sediment removal for each scenario which is summarized in Table 1.

Area	Removal of all Sediment (CY)	Removal of Sediment to EL. 842.20 (CY)	Removal of Sediment with PCBs > PEC (CY)
Upstream of Nichols Road	2,543	883	207
Downstream of Nichols Road	10,699	8,007	0

Table 1 Sediment Removal Summary

An opinion of probable construction cost in second quarter 2016 dollars was computed for each scenario.

1. Upstream of Nichols Road, low levels of PCBs were widespread and one option for disposal of this sediment is landfill disposal at Waste Management's Madison Prairie Landfill in Sun Prairie. A recent price quote and preliminary approval of the PCB-contaminated sediment was obtained from Madison Prairie Landfill providing a more conservative estimate for sediment management in the OPCC. It also appears this sediment would meet the Dredged Material Exemptions in NR 500.08(3) and would be suitable for some type of beneficial reuse as "clean" sediment, but a location that accepts the material would need to be identified. Options might include land application on a farm field or disposal at an approved fill site such as the Mandt Brothers facility in Oregon. Beneficial reuse and landfill disposal options will be more fully evaluated when the Chapter 30 permit is submitted.
2. Downstream of Nichols Road, less contamination was detected and the dredged sediment would meet the Dredged Material Exemptions in NR 500.08(3) and would be suitable for some type of beneficial reuse as "clean" sediment. Beneficial reuse and landfill disposal options will be more fully evaluated when the Chapter 30 permit is submitted.

Table 2 summarizes the OPCCs assuming off-site beneficial reuse and landfill disposal. If an acceptable on-site reuse location is identified, sediment disposal costs would be significantly reduced. The detailed OPCCs are included as Attachment C.

Scenario	Upstream of Nichols Road		Downstream of Nichols Road	
	Beneficial Reuse	Landfill Disposal	Beneficial Reuse	Landfill Disposal
1–Remove all Sediment	$521,100	$750,000	$1,335,000	$2,297,900
2–Remove Sediment to El. 842.20	$263,400	$345,000	$1,156,500	$1,925,200
3–Remove Sediment with PCB Concentrations > PEC	$109,400	$126,800	N/A	N/A

Table 2 OPCC Summary
Note: The OPCCs do not include design and construction observation costs.

Stormwater Treatment Device Assessment

The stormwater treatment device assessment was completed using the modeling program, WinSLAMM v. 10.2. Drainage basins to 11 outfalls were delineated and modeled with a Suntree Nutrient Baffle Box unit. The unit size was chosen based off the peak flow rate (from WinSLAMM) that enters the device with the goal to remove 80 percent total suspended solids for the 110 micron particle size. Figure 3 shows the outfall drainage basins and proposed locations for stormwater treatment devices. Table 3 provides a summary of the pollutant loading each basin experiences in the baseline and proposed conditions, along with the recommended pretreatment device size. Basins 5, 7, and 8 are recommended as the priority basins to receive a pretreatment unit due to the larger amounts of pollutants being reduced.

Basin	Basin Area (ac)	Baseline TSS Load (lbs)	TSS Load with Proposed Unit (lbs)	Total TSS Load Reduct. (lbs)	TSS Load Reduct. (%)	Baseline TP Load (lbs)	TP Load with Proposed Unit (lbs)	Total TP Load Reduct. (lbs)	TP Load Reduct. (%)	Peak Flow Entering -Win SLAMM (cfs)	Prelim. Unit Size
1	5.7	1,361	1,229	132	16.3%	5.54	4.92	0.62	11.2%	2.7	NSBB-4-8
2	6.1	1,408	1,180	228	16.2%	5.82	5.18	0.64	11.0%	2.8	NSBB-4-8
3	4.8	1,384	1,154	230	16.6%	4.81	4.25	0.57	11.8%	2.9	NSBB-4-8
4	2.6	609	502	108	17.7%	2.49	2.19	0.30	12.2%	1.2	NSBB-3-6
5	5.3	2,924	2,478	446	15.3%	8.05	7.11	0.94	11.7%	6.2	NSBB-5-10
6	0.94	221	179	42	19.0%	0.90	0.78	0.12	13.1%	0.4	NSBB-2-4
7	8.6	3,293	2,819	474	14.4%	10.4	9.27	1.10	10.7%	7.5	NSBB-5-10
8	23.6	6,012	5,240	772	12.8%	23.5	21.4	2.08	8.9%	12.2	NSBB-6-12
9	7.2	1,701	1,445	256	15.1%	6.92	6.20	0.72	10.4%	3.4	NSBB-4-8
10	5.2	1,267	1,054	213	16.8%	5.05	4.47	0.59	11.6%	2.5	NSBB-4-8
11	4.3	1,023	839	184	18.0%	4.16	3.65	0.52	12.4%	2.0	NSBB-3-6

Table 3 Modeling Summary
*Modeling does not include street sweeping or catch basin sumps in the watershed.

As shown on Figure 3, as an alternative to construction of stormwater treatment devices, some of the outfalls would be conducive to treatment by rain gardens/bioretention basins and diversion to existing or new wet detention basins. Due to the low lying nature of Winnequah Park topography, rain gardens and bioretention basins that rely on a depth of engineered soil above ground water such that storm flows will infiltrate or be underdrained to daylight are likely only feasible at outfalls that are located 3 to 4 feet above the normal water surface elevation of the lagoon. A potential wet detention basin north of Winnequah School that would treat flows diverted from the existing 24 inch and 12 inch storm sewers may be feasible in lieu of treatment devices if land is able to be dedicated to its construction. It is our understanding that the City is investigating the feasibility (per 2015 Wisconsin ACT 387) of taking over the lagoon system as a stormwater BMP (as an artificial navigable waterway) that would get credit towards Rock River TMDL compliance. If the City is allowed to utilize the lagoon system as a stormwater BMP, stormwater treatment upstream of the lagoon system would serve as a convenient location of pretreatment to extend the life of the lagoon system.

Shoreland Erosion Assessment

A field investigation was completed on April 25, 2016 to assess the streambank erosion along the Winnequah Park Stream. Figure 4 shows the locations of erosion, categorized by three types of restoration: Traditional Riprap Restoration, Augmentitive Riprap Restoration, and Coir Fiber Roll Restoration. Table 4 provides a summary of the existing streambank erosion. It is our understanding that the City is interested in reclaiming some of the shoreline that has been lost to erosion in the northwest portion of the lagoon system as shown on Figure 4. Reclaiming this land by filling to the original edge of shoreline would restore the City's access for maintenance on the north side of the lagoon system but may require additional permitting.

	Length of Erosion		
Treatment	**Upstream of Nichols Road**	**Downstream of Nichols Road**	**Total**
Augmentitive Riprap Restoration	693.5	390.2	1,083.7
Coir Fiber Roll Restoration	351.2	0.00	351.2
Traditional Riprap Streambank Restoration	48.4	944.9	993.3
Grand Total	**1,093.1**	**1,335.1**	**2,428.2**

Table 4 Shoreland Erosion Summary

Recommendations, Funding Opportunities and Schedule

In response to the WDNR letter dated September 24, 2015, BRRTS No. 02-13-576071, investigation of the extent of PCB contamination in lagoon sediment and parent material was completed. Sampling results show that concentrations of PCBs in the parent material are not a concern and no further investigation or remediation of parent materials or soils or groundwater beyond the lagoon sediments is warranted. Sampling results show that the extent of PCBs in the lagoon sediments has been adequately defined and no further investigation of the sediment is planned. Dredging of all sediment and 6 inches of parent material is recommended to remove PCB-contaminated sediment where concentrations exceed the PEC. This area is shown on Figure 1. The estimated volume of material that will be removed from this area is 207 CYs. This dredging is intended to be completed in accordance with the tentative schedule shown in Table 6.

Other dredging efforts are also anticipated to remove excess sediment from the lagoons, both north and south of Nichols Road, for the installation of stormwater pretreatment devices, and for streambank restoration. All of these improvements will require an engineering and permitting effort. Construction drawings and specifications will be required to convey project design information to the WDNR for review approval and issuance of permits. The following is a list of anticipated required permits for dredging, streambank restoration, and the installation of stormwater pretreatment devices.

Anticipated Required Permits (depends on size, nature, and complexity of the project):

- Wisconsin Department of Natural Resources Chapter 30 Permit
- Wisconsin Department of Natural Resources Dredging/Dewatering-Related Permits
- Wisconsin Department of Natural Resources Notice of Intent (NOI) Permit
- U.S. Army Corps of Engineers General Permit
- Environmental Analysis and Decision on the Need for an Environmental Impact Statement
- City of Monona Permit to Construct, Maintain, or Repair within Street Right of Way

Potential funding opportunities for the above mentioned projects are shown in Table 5.

Grant Funding Opportunities	Dredge	Streambank Restoration	Stormwater Treatment Units/BMPs
Dane County Urban Water Quality Grant			X
DNR UNPS Construction Grant		X	X
Yahara WINS Phosphorus Reducing Grant		X	X
Lake Management Planning Grant	X		
USEPA Brownfields Cleanup Grant	X		

Table 5 Funding Opportunities

Table 6 summarizes an implementation plan and schedule for dredging the entire lagoon system upstream of Nichols Road. The overall schedule allows for dredging to be completed in mid- to late-summer 2019. This schedule could potentially be modified if only the sediment with PCB concentrations greater than PEC were removed.

Winnequah Park Dredging Implementation Plan-North of Nichols Road	
Activity	**Anticipated Date**
Submit 2017 Lake Management Planning Grant	December 10, 2016
Design Phase 1-Begin Preliminary Engineering Including Surveying, Preliminary Drawings, and Permit Meeting with Regulatory Agencies	February 15, 2017
Submit 2018 Lake Management Planning Grant	December 10, 2017
Design Phase 2-Begin Final Engineering Including Final Drawings, Specifications, Permitting, and Bidding	February 15, 2018
Submit Required Permits	October 2018
Public Information Meeting	November 2018
Advertisement for Bids #1	January 2019
Advertisement for Bids #2	January 2019
Bid Opening	February 2019
Begin Construction	July 2019
End Construction (Substantial Completion)	November 2019
Winnequah Park Dredging Implementation Plan-South of Nichols Road	
Design and Construction as funds become available	

Table 6 Dredging Implementation Plan

An implementation plan and schedule for the design and construction of five stormwater pretreatment devices and three streambank restoration projects is shown in Table 7. It is anticipated that a streambank restoration project could be designed and constructed every other year when the DNR UNPS Construction Grant is available. Also, the lagoon system outfall at Winnequah Road is a Top Ten Outfall which potentially allows the City to get up to 75 percent of the stormwater pretreatment device projects funded.

Winnequah Park Stormwater Treatment Device and Streambank Restoration Implementation Plan	
Activity	**Anticipated Date**
Project 1–Construction in 2018	
Submit 2017 MMSD Phosphorus Reduction Grant Application	April 28, 2017
Submit 2017 Dane County Urban Water Quality Grant	October 13, 2017 *(assumed deadline)*
Design Project 1–Stormwater Pretreatment Device	January 2018
Submit Required Permits	March 2018
Advertise for Bids	May 2018

Winnequah Park Stormwater Treatment Device and Streambank Restoration Implementation Plan	
Activity	**Anticipated Date**
Bid Opening	June 2018
Begin Construction	July 2018
End Construction (Substantial Completion)	November 2018
Project 2–Construction in 2019	
Submit 2018 WDNR Urban Nonpoint Source and Stormwater Construction Grant Application	April 16, 2018
Submit 2018 MMSD Phosphorus Reduction Grant Application	April 30, 2018
Submit 2018 Dane County Urban Water Quality Grant	October 12, 2018 *(assumed deadline)*
Design Project 2-Stormwater Pretreatment Device and Streambank Restoration	January 2019
Submit Required Permits	March 2019
Advertise for Bids	May 2019
Bid Opening	June 2019
Begin Construction	July 2019
End Construction (Substantial Completion)	November 2019
Project 3–Construction in 2020	
Submit 2019 MMSD Phosphorus Reduction Grant Application	April 30, 2019
Submit 2019 Dane County Urban Water Quality Grant	October 11, 2019 *(assumed deadline)*
Design Project 3-Stormwater Pretreatment Device	January 2020
Submit Required Permits	March 2020
Advertise for Bids	May 2020
Bid Opening	June 2020
Begin Construction	July 2020
End Construction (Substantial Completion)	November 2020
Project 4–Construction in 2021	
Submit 2020 WDNR Urban Nonpoint Source and Stormwater Construction Grant Application	April 16, 2020
Submit 2020 MMSD Phosphorus Reduction Grant Application	April 30, 2020
Submit 2020 Dane County Urban Water Quality Grant	October 9, 2020 *(assumed deadline)*
Design Project 4-Stormwater Pretreatment Device and Streambank Restoration	January 2021
Submit Required Permits	March 2021
Advertise for Bids	May 2021
Bid Opening	June 2021
Begin Construction	July 2021
End Construction (Substantial Completion)	November 2021
Project 5–Construction in 2022	
Submit 2021 MMSD Phosphorus Reduction Grant Application	April 30, 2021
Submit 2021 Dane County Urban Water Quality Grant	October 8, 2021 *(assumed deadline)*
Design Project 5-Stormwater Pretreatment Device	January 2022
Submit Required Permits	March 2022
Advertise for Bids	May 2022
Bid Opening	June 2022
Begin Construction	July 2022
End Construction (Substantial Completion)	November 2022

Table 7 Stormwater Treatment Device and Streambank Restoration Implementation Plan

If you have any comments or questions regarding the preliminary planning and investigation results, please contact us.

Sincerely,

STRAND ASSOCIATES, INC.®

Jon H. Lindert, P.E.

Luke T. Hellermann, P.G.

Enclosures

Copy: Woody Myers, Wisconsin Department of Natural Resources
Jim Amrhein, Wisconsin Department of Natural Resources
Brad Bruun, City of Monona
Josh Straka, Strand Associates, Inc.®

6/21/2016

Winnequah Park Lagoon Sampling, Management, and Planning

Upstream of Nichols Road-Remove Area of Sediment with PCB Concentrations > PEC, Plus 6 Inches of Parent Material

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$20,000.00	$20,000
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	2	EA	$2,500.00	$5,000
5	Turbidity Barrier	15	LF	$40.00	$600
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Disposal (Beneficial Reuse)	207	CY	$155.00	$32,085
8	Sediment Excavation and Disposal (Landfill Disposal)	207	CY	$225.00	$46,575
9	Medium Rip Rap (Assumes 1-25'x15' Access Area Restoration)	42	SY	$75.00	$3,150
10	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide around Perimeter)	372	SY	$5.25	$1,953
11	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	372	SY	$3.75	$1,395
12	Coffer Dam at Nichols	1	LS	$15,000.00	$15,000
				Beneficial Reuse Cost	
				Subtotal	$91,183
				20% Construction Contingency	$18,237
				SITE GRAND TOTAL	**$109,400**
				Landfill Disposal Cost	
				Subtotal	$105,673
				20% Construction Contingency	$21,135
				SITE GRAND TOTAL	**$126,800**

6/21/2016

Winnequah Park Lagoon Sampling, Management, and Planning

Upstream of Nichols Road-Remove Sediment to Elevation 842.20

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$20,000.00	$20,000
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	2	EA	$2,500.00	$5,000
5	Turbidity Barrier	15	LF	$40.00	$600
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Disposal (Beneficial Reuse)	883	CY	$145.00	$128,035
8	Sediment Excavation and Disposal (Landfill Disposal)	883	CY	$222.00	$196,026
9	Medium Rip Rap (Assumes 2-25'x15' Access Area Restoration)	84	SY	$75.00	$6,300
10	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide around Perimeter)	3619	SY	$5.25	$19,000
11	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	3619	SY	$3.75	$13,571
12	Coffer Dam at Nichols	1	LS	$15,000.00	$15,000
				Beneficial Reuse Cost	
				Subtotal	$219,506
				20% Construction Contingency	$43,901
				SITE GRAND TOTAL	**$263,400**
				Landfill Disposal Cost	
				Subtotal	$287,497
				20% Construction Contingency	$57,499
				SITE GRAND TOTAL	**$345,000**

6/21/2016

Winnequah Park Lagoon Sampling, Management, and Planning

Upstream of Nichols Road-Remove All Sediment

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$20,000.00	$20,000
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	2	EA	$2,500.00	$5,000
5	Turbidity Barrier	15	LF	$40.00	$600
6	Dust Control	1	LS	$2,000.00	$2,000
7	Sediment Excavation and Disposal (Beneficial Reuse)	2,543	CY	$135.00	$343,305
8	Sediment Excavation and Disposal (Landfill Disposal)	2,543	CY	$210.00	$534,030
9	Medium Rip Rap (Assumes 2-25'x15' Access Area Restoration)	84	SY	$75.00	$6,300
10	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide around Perimeter)	3619	SY	$5.25	$19,000
11	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	3619	SY	$3.75	$13,571
12	Coffer Dam at Nichols	1	LS	$15,000.00	$15,000
				Beneficial Reuse Cost	
				Subtotal	$434,276
				20% Construction Contingency	$86,855
				SITE GRAND TOTAL	**$521,100**
				Landfill Disposal Cost	
				Subtotal	$625,001
				20% Construction Contingency	$125,000
				SITE GRAND TOTAL	**$750,000**

6/21/2016

Winnequah Park Lagoon Sampling, Management, and Planning

Downstream of Nichols Road-Remove Sediment to Elevation 842.20

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$20,000.00	$20,000
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	2	EA	$2,500.00	$5,000
5	Turbidity Barrier	35	LF	$40.00	$1,400
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Disposal (Beneficial Reuse)	8,007	CY	$95.00	$760,662
8	Sediment Excavation and Disposal (Landfill Disposal)	8,007	CY	$175.00	$1,401,220
9	Medium Rip Rap (Assumes 6-25'x15' Access Area Restoration)	250	SY	$75.00	$18,750
10	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide around Perimeter)	12329	SY	$5.25	$64,727
11	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	12329	SY	$3.75	$46,234
12	Coffer Dam at Nichols	1	LS	$15,000.00	$15,000
13	Coffer Dam at Winnequah	1	LS	$20,000.00	$20,000
				Beneficial Reuse Cost	
				Subtotal	$963,773
				20% Construction Contingency	$192,755
				SITE GRAND TOTAL	**$1,156,500**
				Landfill Disposal Cost	
				Subtotal	$1,604,331
				20% Construction Contingency	$320,866
				SITE GRAND TOTAL	**$1,925,200**

6/21/2016

Winnequah Park Lagoon Sampling, Management, and Planning

Downstream of Nichols Road-Remove All Sediment

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

ITEM NO.	DESCRIPTION	Quantity	Units	Unit Price	Total
1	Mobilization	1	LS	$20,000.00	$20,000
2	Clearing and Grubbing	1	LS	$1,500.00	$1,500
3	Traffic Control	1	LS	$8,000.00	$8,000
4	Stone Tracking Pad	2	EA	$2,500.00	$5,000
5	Turbidity Barrier	35	LF	$40.00	$1,400
6	Dust Control	1	LS	$2,500.00	$2,500
7	Sediment Excavation and Disposal (Beneficial Reuse)	10,699	CY	$85.00	$909,415
8	Sediment Excavation and Disposal (Landfill Disposal)	10,699	CY	$160.00	$1,711,840
9	Medium Rip Rap (Assumes 6-25'x15' Access Area Restoration)	250	SY	$75.00	$18,750
10	Turf Restoration-Topsoil, Seed, and Fertilizer (Assumes 25' Wide around Perimeter)	12329	SY	$5.25	$64,727
11	Turf Restoration-Class I, Urban Type B Erosion Control Revegetative Mat	12329	SY	$3.75	$46,234
12	Coffer Dam at Nichols	1	LS	$15,000.00	$15,000
13	Coffer Dam at Winnequah	1	LS	$20,000.00	$20,000
				Beneficial Reuse Cost	
				Subtotal	$1,112,526
				20% Construction Contingency	$222,505
				SITE GRAND TOTAL	**$1,335,000**
				Landfill Disposal Cost	
				Subtotal	$1,914,951
				20% Construction Contingency	$382,990
				SITE GRAND TOTAL	**$2,297,900**

Attachment C - Opinion of Probable Construction Costs

State of Wisconsin
Department of Natural Resources
PO Box 7921, Madison WI 53707-7921
dnr.wi.gov

Surface Water Grant Project Lab Costs

Form 8700-360 (R 12/15)

Notice: Pursuant to s. 281.58, Wis. Stats., this form is required to be completed and submitted to the Department of Natural Resources (DNR) by all applicants seeking wastewater treatment financial assistance from the Clean Water Fund Program (CWFP). Failure to submit a complete application to the DNR may result in denial of the application by the CWFP. Personal information collected will

A. Applicant information

Applicant Name: City of Monona
Primary Contact: Brad Bruun
Primary Contact Phone Number: (608) 222-2525
Street Address: 5211 Schluter Road
City: Monona State: WI ZIP Code: 53716
Email: bbruun@ci.monona.wi.us

B. Supplies & Laboratory Slips

☒ Check if same as Primary Contact

Primary Contact for Supplies: Brad Bruun
Phone Number: (608) 222-2525
Street Address: 5211 Schluter Road
City: Monona State: WI ZIP Code: 53716
Email: bbruun@ci.monona.wi.us

C. Water Sample Laboratory Information

Lab Name: CT Laboratories
Lab Address: 1230 Lange Ct.
City: Baraboo State: WI ZIP Code: 53913
Lab ID Number: 157066030
Phone Number: (608) 356-2760

D. Billing

☒ Check if same as Primary Contact

Primary Contact for Billing: Brad Bruun
Phone Number: (608) 222-2525
Billing Address: 5211 Schluter Road
City: Monona State: WI ZIP Code: 53716
Email: bbruun@ci.monona.wi.us

E. Data Reporting for Deliverables, Send Report to:

Additional recipient of lab results: indicate delivery method

☒ DNR (electronic) ☐ USGS (electronic)

☒ Check if same as Primary Contact

Name: Brad Bruun
Email Address: bbruun@ci.monona.wi.us
OR
US Mail Address: 5211 Schluter Road
Monona WI 53716

DNR Use Only

Account Number:
DNR Lake Coordinator:
Grant Project Number:

State Lab of Hygiene Only

Client ID

F. Water Sample Test

Station ID	Test Year	Test Month	# of Samples	Parameters	Test ID	Price Per Sample	Total Parameter Cost
10044573	2016	February	2			$464.00	$928.00
10044572	2016	February	2	NR 347 List of Parameters Previously Approved by DNR for Winne		$464.00	$928.00
10044571	2016	February	1	NR 347 List of Parameters Previously Approved by DNR for Winne		$120.00	$120.00
10044571	2016	February	2	PAHs		$55.00	$110.00
10044570	2016	February	1	PCBs		$120.00	$120.00
10044570	2016	February	2	PAHs		$55.00	$110.00
10044569	2016	February	1	PCBs		$120.00	$120.00
10044569	2016	February	2	PAHs		$55.00	$110.00
				PCBs			

Surface Water Grant Project Lab Cost Worksheet

Form 8700-360 (R 12/15)

F. Water Sample Test

Station ID	Test Year	Test Month	# of Samples	Parameters	Test ID	Price Per Sample	Total Parameter Cost
10044568	2016	February	1			$120.00	$120.00
10044568	2016	February	2	PAHs		$55.00	$110.00
10044567	2016	February	1	PCBs		$120.00	$120.00
10044567	2016	February	2	PAHs		$55.00	$110.00
10044566	2016	February	1	PCBs		$120.00	$120.00
10044566	2016	February	2	PAHs		$55.00	$110.00
10044565	2016	February	1	PCBs		$120.00	$120.00
10044565	2016	February	2	PAHs		$55.00	$110.00
10044564	2016	February	1	PCBs		$120.00	$120.00
10044564	2016	February	2	PAHs		$55.00	$110.00
10044563	2016	February	1	PCBs		$120.00	$120.00
10044563	2016	February	2	PAHs		$55.00	$110.00
				PCBs			$0.00
							$0.00
						Grand Total	$3,926.00

Attachment A - Analytical Data Tables and Lab Report

City of Monona
Winnequah Park Lagoon Sampling
Project 1093.047

All samples were collected using a 4-foot Wildco hand core sediment sampler with clear plastic liner/sampling tubes. Sampling was completed May 12, 2016.

Sediment Samples Collected North of Nichols Road

Sample	Depth to Top of Sediment (ft)	Depth to Parent Material (ft)	Sediment Thickness (ft)	Approximate Sampler Thrust (ft)	Core Sample Recovery (ft)
N-7	4.0	8.0	4.0	4.0	1.5
N-8	3.5	5.5	2.0	2.0	1.7
N-9	7.0	9.5	2.5	2.5	2.4
N-10	5.0	8.5	3.5	3.0	2.7
N-11	7.0	12.0	5.0	4.2	3.3
N-12	7.0	10.0	3.0	2.5	2.2
N-13	6.0	8.5	2.5	2.3	2.3
N-14	3.5	8.0	4.5	2.5	2.3
N-15	0.5	4.0	3.5	2.8	2.3

Sediment Samples Collected South of Nichols Road

Sample	Depth to Top of Sediment (ft)	Depth to Parent Material (ft)	Sediment Thickness (ft)	Approximate Sampler Thrust (ft)	Core Sample Recovery (ft)
S-1	1.5	3.5	2.0	1.5	1.4
S-2	2.0	4.5	2.5	2.0	1.7

Sediment Description
The top layer of sediment was typically very loose, watery, black grey MUCK. The thickness of the loose muck layer ranged from 3 to 6 inches and was typically about 4 inches thick.

Beneath the loose muck was grey to black sandy SILT that extended to the depth of parent material. The thickness of the sandy silt ranged from approximately 1.7 to 4.7 feet and contained varying amounts of shells, sticks, hair, leaves, and wood chunks.

The parent material consisted of grey, medium stiff to stiff SILT. Recovery of parent material in the sampler ranged from 1 to 8 inches, but was typically about 4 inches.

Grain size analysis completed on the composite S-1/S-2 sediment sample classified the sediment as dark grey to black organic SILT, some sand, trace gravel. The analysis detected approximately 4% gravel, 32% sand, 59% silt, and 6% clay.

Grain size analysis completed on the composite S-1/S-2 parent material sample classified the sample as grey lean CLAY to silty clay, trace sand and gravel. The analysis detected approximately 0.2% gravel, 3% sand, 76% silt, and 21% clay.