DRAFT

Sediment Characterization Report

Cedar Creek
Cedarburg, Wisconsin

Amcast/Mercury Marine

December 1998

BBL
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1. Introduction

1.1 Overview

Cedar Creek and its watershed are located in the Milwaukee River basin in southeastern Wisconsin. Cedar Creek starts at the outlet of Big Cedar Lake in Washington county and flows south by southeast through Washington and Ozaukee counties for approximately 31.5 miles before its confluence with the Milwaukee River, downstream of the city of Cedarburg. In the Cedarburg area, five impoundments existed on Cedar Creek. They are (from upstream to downstream) Cedarburg, Ruck, Columbia, Wire and Nail, and Hamilton ponds. In April 1996, following heavy rains and associated high Creek flow, the Hamilton Pond dam failed. Remnants of the failed dam were subsequently removed.

PCBs were originally detected in the latter four ponds by Wawrzyn and Wakeman of the Wisconsin Department of Natural Resources (WDNR) in 1986. Since then, a removal action was undertaken by Mercury Marine (Mercury) in Ruck Pond to address PCB-containing sediment. Mercury and Amcast intended to conduct a Sediment Characterization Program (SCP) in the remaining impoundments, during the winter months of 1998, while ice was present over the impoundments. However, unusually warm weather resulted in partial and/or incompetent ice formation over the ponds. Field activities therefore had to be postponed until the ice had completely melted and flows were low enough to be safe, and allow for sampling activities to be conducted. As a result, work activities were eventually initiated in March and completed in June 1998. This document reports the findings of the SCP for the Site which includes the portion of Cedar Creek downstream of Ruck Pond to the confluence with the Milwaukee River.

1.2 Objectives

A limited amount of sediment probing and analytical characterization had historically been performed by WDNR and others, in the reach of Cedar Creek extending from Ruck Pond dam to the Milwaukee River. Investigative activities had focused primarily on sediments in the impoundments, where the majority of the Site sediments had reportedly accumulated over time. Sediment characterization activities conducted during this investigation were performed to verify and supplement the existing database of site sediment information. The overall objective of the SCP, therefore, was to collect sufficient data to characterize the current nature and extent of PCBs in Cedar Creek sediments. The SCP consisted of the following major tasks:

Site-wide reconnaissance activities to determine sediment distribution, types and volumes and select sample locations;

- Sediment sampling and analysis, to determine the site-wide extent of PCBs; and
- Data assessment/compilation.

2. Background

2.1 Physical Setting

The Cedar Creek watershed covers areas in both Washington and Ozaukee counties and includes two subwatersheds. The downstream portion of the Cedar Creek watershed is located entirely in Ozaukee county and is called the Cedarburg subwatershed. The Cedarburg subwatershed includes the five impoundments on Cedar Creek and the city of Cedarburg.

Ozaukee county is characterized by a variable northern climate. Summers are warm and humid, while the winter months can be harsh. Average temperatures range from 66°F in the summer to 26°F in the winter. Average annual precipitation is approximately 33 inches. Land use in this area includes residential development and some light to moderate/heavy industries. The principal land use beyond the city limits is agricultural, although residential developments are becoming prevalent.

The site is comprised of two impoundments and a former impounded area, referred to as Columbia pond, Wire and Nail pond and the former Hamilton pond (Figure 1). The physical setting of each is described briefly below.

<u>Columbia Pond and Ruck Pond Raceway</u>

Columbia pond is characterized as a wide, shallow impoundment covering approximately 14.8 acres, with a maximum width of 400 feet and a maximum observed water depth of 7.5 feet. The pond's dam is a fixed sill and masonry structure, which includes a flood gate that has a differential head of 9.5 feet. Just upstream of the pond, a diversion conduit/channel (i.e., Ruck pond raceway) joins Cedar Creek's main channel. The raceway can serve to divert flow from Ruck pond, and has a maximum observed water depth of 2 feet and an average width of 12 feet.

Previous reports indicated that extensive and deep deposits of fine-textured substrate are found throughout Columbia pond. A small area of shallow to moderately deep deposits of fine substrate is found along the southern shoreline where flow from the confluence of the Ruck pond raceway and Columbia pond has scoured a narrow channel or thalweg. Land use along Columbia pond and the upstream raceway include private residences and the city of Cedarburg Cedar Creek and Adlai Horn Parks. Commercial facilities also are located adjacent to the raceway (Wawrzyn and Wakeman, 1986).

Wire and Nail Pond

Wire and Nail pond is an elongated and narrow impoundment, comprised of two distinct basins. The uppermost basin is shallower and wider than the lower basin. The entire pond is approximately 3 acres in size, approximately 0.30 miles long, and has a maximum observed water depth of 14 feet. Pond widths range from 40 to 100 feet. Extensive and very deep deposits of fine sediment exist in the lower basin. Little sediment is present in the upper basin. The dam is a rock and earthen filled concrete structure having a differential head of 25 feet. There is a partial control structure associated with the dam raceway. Land use in the vicinity of the pond is entirely within private ownership (Wawrzyn and Wakeman, 1986).

There is a 1.6 mile long stretch of free-flowing stream between Wire and Nail dam and the former pool that was formed by the Hamilton dam (the former Hamilton pond). This reach of stream is more scoured and is dominated by coarser substrate (Wawrzyn and Wakeman, 1986) .

Hamilton Pond

Prior to the dam failure in 1996, Hamilton pond had a size of approximately 5 acres with a maximum observed depth and width of 5 feet and 160 feet, respectively (Wawrzyn and Wakeman, 1986). The upper third of the pond generally is shallow and well scoured of fine material. Sediment consists of well-sorted deposits of coarse to fine gravel and sand. The lower two-thirds of the basin is dominated by shallow to moderately deep deposits of fine silt and debris. The former dam was a rock and earthen filled concrete structure with a head differential of approximately 7 feet. A sluice gate and raceway structure also were present (Wawrzyn and Wakeman, 1986).

The former Hamilton pond generally is bordered by steep banks supporting mature vegetation. The properties bordering the former pond are owned by private residents, the city of Cedarburg, and a few businesses.

2.2 Site History

The Columbia pond dam was constructed in 1855, as was an adjacent grist mill that utilized power generated by the dam. A water wheel also was installed. Grain was ground into flour at the 5-story mill. The mill's dam later was converted to produce hydroelectric power.

The dam on Wire and Nail pond, originally associated with the adjacent mill, was built in the 1860s to grind grain into flour. The mill later (circa 1900) was converted to a nail manufacturing operation. In 1931, a hydroelectric plant was installed and the water wheel was removed.

The former Hamilton dam was a historic grist mill dam. The dam structure reportedly was greater than 140 years old and had an approximately 7-foot high stone and concrete spillway. The spillway was approximately 100 feet long with stone abutments and earthen embankments. On April 22, 1996, the Hamilton pond dam was undercut by the Creek and consequently failed (Milwaukee Journal Sentinel, Monday, May 27, 1996). The main portion of the dam then was removed from the Creek by the owner. The removal of the spillway structure was undertaken thereafter. In a letter dated October 15, 1996, the WDNR indicated to the dam owner that the WDNR considered the dam formally abandoned.

During the early 1980s, the WDNR detected PCBs in Hamilton pond sediment (exact location unknown). This prompted additional studies which led to the discovery of PCBs in sediments of three other impoundments on Cedar Creek, namely, Ruck pond, Columbia pond, and Wire and Nail pond. In 1994, Mercury Marine performed a sediment removal action in Ruck pond, the uppermost pond in Cedar Creek with PCB-containing sediment.

2.3 Previous Investigations

Four reports documenting previous PCB-related investigations of Cedar Creek have been identified. In 1986 WDNR produced "Distribution of Polychlorinated Biphenyls in Cedar Creek Sediments at Cedarburg, Ozaukee County, Wisconsin "(Wawrzyn and Wakeman, 1986)." In 1992, Strand Associates, Inc. developed a document entitled "Cedar Creek PCB Investigation (Final Report)" for WDNR. The reported purpose of the study was to identify potential sources of PCBs identified in the sediments of Cedar Creek, within the city of Cedarburg. In 1993 WDNR produced "Cedar Creek PCB Mass Balance Report - Final Draft," (Westenbroek, 1993) that investigated PCB transport in Cedar Creek. A similar report also was developed by WDNR in 1997, entitled "Milwaukee River PCB Mass Balance Project - Final Report" (Baird and Associates, 1997). Sediment data from these previous investigations that relate to this project, and other available data, are discussed below for each impoundment.

2.3.1 Columbia Pond/Ruck Pond Raceway

Columbia Pond

The sediment in Columbia pond was previously sampled at a total of 19 locations (Figure 2) on three occasions. During all three of these sampling events, 1986, 1991 and 1995, sediment cores were collected by the WDNR. Depending on sediment depth, some of the cores collected were segmented. This resulted in a total of 81 samples. each of which was analyzed for PCBs. The analytical PCB results for these samples are provided on Figure 2. PCB concentrations ranged from non-detect (detection limit of either 0.05 or 0.1 ppm) to 190 ppm, with a mean concentration of 24.5 ppm. Sediment depths up to 6 feet were reported, with the thickest sediment deposits found off the southern shore of the impoundment.

During their 1991 investigation, WDNR also examined sediment samples from four Columbia pond locations for porosity, bulk density and percent sand, silt, clay, and solids. Core samples analyzed by WDNR for PCBs in 1986 and 1991 also were analyzed for total organic carbon (TOC). The range and mean of the non-PCB results are provided below.

Data Set	Parameter	No. of Samples	Mean	Range
1991	Percent sand	13	51	14 - 90
	Percent silt	13	40	7 - 74
	Percent clay	13	8.5	3 - 14
	Percent solids	13	48	25 - 76
	Porosity	13	0.7	0.5 - 0.9
	Bulk density (lb/ft^3)	13	46	18 - 89
	Percent TOC	10	3.6	0.6 - 6.8
1986	Percent TOC	18	10.7	- 36

Ruck Pond Raceway

The sediment in the raceway was previously sampled at two locations (Figure 2) on one occasion in 1986, by the WDNR. The two cores were each segmented into two and five intervals to provide a total of seven samples. Each sample was analyzed for PCBs. The analytical PCB results for these samples are provided on Figure 2. PCB concentrations ranged from 7.5 to 126 ppm, with a mean concentration of 43.1 ppm. During the 1986 investigation the seven sediment samples were also analyzed for TOC. The mean and the range of the TOC results were 11.1 and 8.6 to 13 percent, respectively.

2.3.2 Wire and Nail Pond

The sediment in Wire and Nail pond was previously sampled at four locations (Figure 2) on one occasion. A total of 13 samples were collected by WDNR in 1986 and analyzed for PCBs. The analytical PCB results for these samples are provided on Figure 2. PCB concentrations ranged from 0.1 to 86 ppm, with a mean concentration of 18.5 ppm. Sediment depths up to 7 feet were reported just upstream of the dam. During the 1986 investigation, the 13 sediment samples were also analyzed for TOC. The mean and range of the TOC results were 10 and 8 to 13 percent, respectively.

2.3.3 Between Wire and Nail and the Former Hamilton Ponds

During 1995, two grab samples of sediment were collected for WDNR from Cedar Creek at two locations just upstream of County Highway "T" (sample locations CC-1 and CC-2 on Figure 2). These locations are in the stretch of Creek between Wire and Nail dam and the former Hamilton pond. Each sample was analyzed for PCBs, and the analytical results are provided on Figure 2. PCBs were detected at concentrations of 3.3 and 0.98 ppm (average concentration of 2.1 ppm).

Sediment in the stretch of Creek between Wire and Nail and the former Hamilton ponds was also sampled in November 1997, by Connestoga-Rovers Associates, on behalf of Mercury Marine. A total of 12 samples were collected, from each of 12 locations as depicted on Figure 2. PCB concentrations ranged from 0.04 to 0.39 ppm, with a mean concentration of 0.15 ppm. Sediment samples from the 12 locations also were analyzed for percent gravel, sand, silt, clay, solids, and TOC. The ranges and means of the non-PCB results are provided below.

Data Set	Parameter	No. of Samples	Mean	Range
1997	Percent gravel	12	43	4.2 - 77
	Percent sand	12	47	22 - 67
	Percent silt	12	6.9	0.3 - 25
	Percent clay	12	2.5	0.2 - 8.8
	Percent solids	12	73	38 - 90
	Percent TOC	12	0.5	0.2 - 2.6

2.3.4 Hamilton Pond/Hamilton Pond Raceway

Hamilton Pond

The sediment in the former Hamilton pond impoundment was previously sampled at a total of 16 locations (Figure 2) on three occasions prior to the 1996 dam failure. The former pond was sampled on one occasion at four locations, following the dam failure. On two of the pre-failure sampling events, samples were collected by the WDNR in 1986 and in 1991. The other pre-failure sampling was performed by Blasland & Bouck Engineers, P.C. (B&B) in 1989, on behalf of Amcast. Depending on sediment depth, some of the cores collected were segmented to provide a total of 46 samples. Each sample was analyzed for PCBs and the analytical results are provided on Figure 2. PCB concentrations ranged from non-detect (detection limit of either 0.025 or 0.05 ppm) to 82 ppm, with a mean concentration of 7.8 ppm. Sediment depths up to 7 feet were reported, with the majority of the sediment located just upstream of the dam.

On April 24, 1996, following the Hamilton pond dam failure, the WDNR collected and analyzed a total of six sediment samples, from four locations in the former Hamilton pond, for PCBs. The analytical PCB results for these samples also are provided on Figure 2. PCB concentrations ranged from non-detect (detection limit of 0.05 ppm) to 4.3 ppm, with a mean concentration of 1.2 ppm.

During the 1991 investigation, sediment samples from four Hamilton pond locations were tested for porosity, bulk density and percent sand, silt, clay, and solids. Samples from the cores analyzed by WDNR for PCBs in 1986, 1991 and 1996 also were analyzed for TOC. The ranges and means of the non-PCB results are provided below.

Data Set	Parameter	No. of Samples	Mean	Range
1986	Percent TOC	15	10	6.7 - 14
1991	Percent sand	13	46	16 - 90
	Percent silt	13	43	8 - 63
	Percent clay	13	12	2 - 21
	Percent solids	13	37	21 - 74
	Porosity	13	0.8	0.5 - 0.9
	Bulk density (lb/ft^3)	13	32	15 - 86
	Percent TOC	11	4.4	.8 - 6.3
1996	Percent TOC	6	3.4	0.9 - 5.5

During 1989, five sediment samples were collected by B&B from Cedar Creek at three locations (Figure 2) along the stretch of Creek between the former Hamilton pond dam and the Milwaukee River. Only a limited number of sediment deposit areas were observed along this stretch of Creek. Each sample collected was analyzed for PCBs and the analytical results are provided on Figure 2. PCB concentrations ranged from 0.23 to 1.9 ppm with a mean concentration of 0.74 ppm.

Hamilton Pond Raceway

On August 23, 1996, Fox Environmental Services, Inc. of Milwaukee, Wisconsin, took two sediment samples from the Hamilton pond raceway (Figure 2). The samples were collected to a depth of approximately 8 inches and analyzed for PCBs. The results for the two samples had PCB concentrations of 0.75 and 0.85 ppm (Frank, 1996).

3. Investigative Approach and Field Methodologies

3.1 Overview

The portion of Cedar Creek investigated during the Sediment Characterization Program (SCP) starts from just below the Ruck pond dam, downstream to the confluence of Cedar Creek with the Milwaukee River. This portion of Cedar Creek includes the Ruck Pond raceway, the three impounded areas: Columbia pond, Wire and Nail pond, the former Hamilton pond and the main Creek stretches between the impoundments, down to the Milwaukee River confluence. Work in the former Hamilton pond included areas between the former (prior to the dam failure) and the current waterline.

Sediment characterization activities were originally proposed to be conducted during the winter, while ice was present over the impoundments. However, an unusually warm winter precluded the formation of competent ice. The partial ice hampered activities so that field work was postponed until Spring 1998. The Cedar Creek SCP field work was conducted in a phased manner. The first phase involved field reconnaissance and sediment probing in the main channel of Cedar Creek. Based on the results of the first phase, a second phase was implemented. The second phase involved selection of sediment sampling locations and collection of sediment samples for chemical/physical analysis. Additional details on the field activities are provided below. A complete description of the field activities as proposed, is presented in the Cedar Creek SCP Work Plan and associated Project Operation Plans (BBL, February 1998 a,b,c,d).

3.2 Phase 1 - Reconnaissance and Probing

To characterize and quantify the distribution of sediments present in the impoundments, the areas between the impoundments and the raceways, a field reconnaissance was undertaken. This reconnaissance involved a "walk-through" of the Site followed by probing in the impoundments along field established transect lines and systematic probing in areas in between the impoundments and down to the confluence with the Milwaukee River. The transect lines were established relative to a baseline control set up for each of the three impoundments, using standard field surveying techniques.

The probing activities were performed primarily to provide information on sediment volume, distribution, and composition and bed/cross-section configuration. In the impoundments, the pre-established probing transects were perpendicular to water flow and spaced either 100 or 200 feet apart, depending on the area of the impoundment being

probed. Probing of some areas along transects spaced approximately 200 feet apart was due to the sparse presence of sediment as observed by Westenbroek (1993). Areas probed along 200-foot transects included the area between Columbia and Wire and Nail ponds and the upstream half of the former Hamilton pond. Additionally, areas in between the 200-foot transects also were systematically probed to identify any areas of significant sediment accumulation in between the transects. In impounded areas where more sediment was present, the probing transects were spaced closer, approximately 100 feet apart. The probing interval along all transects was approximately 20 feet.

Areas in between Wire and Nail and the former Hamilton ponds and downstream of the former Hamilton pond also were walked and systematically probed to identify areas of significant sediment accumulation. Probing for the Ruck and former Hamilton pond raceways was performed at approximately 50-foot intervals along transects located in the wider portions of the raceways.

During probing at the site, cores were collected from several field-selected locations. These cores were observed for sediment composition, noting the presence of any oily material, any distinct interface between sediment type in the core and any information on the appearance/composition of the underlying stream bed material. Probing locations, transects and cross sections were surveyed to local benchmarks. In-situ material volumes were estimated using areas (the product of distances along and between transects) multiplied by the average of the sediment depths noted at the respective probing locations.

3.3 Phase 2 - Sediment Characterization

Based on the existing data and the results of the sediment probing activities, sampling locations were selected and samples collected and analyzed to better define the horizontal and vertical distribution of PCBs in Cedar Creek. Other considerations made in the selection of sample locations included the appearance of oil sheens during probing, presence/absence of oily material, the relative proximity of locations to one another and the goal to characterize areas of greatest sediment accumulation (i.e., more samples per unit area were collected in areas of deeper material than in shallower areas). Prior to implementing the sampling and analysis efforts, discussions were held with the WDNR to obtain concurrence with the proposed strategy. BBL also walked certain portions of the site with WDNR personnel so that WDNR could verify the reconnaissance and probing data and approve the sampling strategy.

Areas were selected for sampling from among the 75 discrete sediment areas identified in the main creek stretches above and below the former Hamilton pond impoundment, based on the estimated volume of the area. Areas with volumes equal to, or greater than, 100 cy were sampled. One exception to this criterion was that areas between Wire

and Nail pond and the former Hamilton pond impoundment that were sampled in 1997 by Connestoga-Rovers & Associates (Figure 2), were not resampled.

With the exception of four locations in Wire and Nail pond, sediment cores were collected to refusal at all Cedar Creek locations sampled. Although depths up to 13 feet were probed in Wire and Nail pond, the deepest sediment core collected was eight feet. This was due primarily to limitations posed by the sampling method (hand driven Lexan tubing) being employed at the time. Also, it was expected, and later confirmed, that the analysis of deeper Wire and Nail pond samples was not necessary because historic data had suggested that PCBs were restricted generally to the upper few feet of sediment.

The sediment cores were collected and then segmented into 1-foot increments. Since the historic data indicated that PCBs were restricted generally to the upper two feet, the upper two feet were analyzed in 1-foot increments (i.e., 0- to 1-foot and 1- to 2-foot intervals). The rest of the 1-foot increments in each core (i.e., below 2 feet) were split for analysis and/or archiving. Splits from each of the samples were composited into a series of 2-foot segments and analyzed as single samples representing 2-foot intervals of the core (i.e., 2- to 4-foot, 4- to 6-foot, etc.). The rest of the split samples were archived in a locked freezer, in 1-foot intervals, for possible future analysis. Additionally, the upper six inches of select sediment cores were split and analyzed separately as a 0- to 6-inch segment to provide "surficial data."

All the samples collected from the various cores were analyzed except for the five deeper Wire and Nail cores. These five cores were initially analyzed to a depth of four feet due to the historic observation of PCBs in the upper two feet only. However, upon review of the analytical results for the upper four feet, the archived samples representing the next interval down (i.e., 4- to 5-foot) for each of the five locations, also were analyzed for PCBs. Based on a review of the PCB analytical results for the five 4- to 5-foot samples, no further analysis was conducted.

Overall, all samples were analyzed for PCBs and TOC. Select samples were analyzed for oil and grease and geotechnical parameters as summarized below:

Sediment Sampling and Analysis Summary

Site Segment	Number of Locations Sampled	Number of Samples Analyzed					
		PCBs and TOC	Oil & Grease	Specific Gravity	Organic Content	Atterberg Limits	Particle-Size Distribution
Ruck Pond Raceway	4	7			1		
Columbia Pond	25	88	6	9	6	6	9
Wire and Nail Pond	7	27	3	3	3	3	
Downstream Wire and Nail Pond	3	3	0	0	0	0	
Former Hamilton Pond	19	57	5	5	5		
Downstream Former Hamilton Pond	8	12					
Total	66	194	16	19	16	12	19

4. Sediment Characterization Data

4.1 General

This section presents the overall findings of the SCP. Information on the reconnaissance and probing activities are discussed, and the estimated sediment volumes that were generated for the various components of the site are presented. This is followed by presentation of the analytical data (chemical and geotechnical). Finally, a brief review of the data quality also is presented .

4.2 Reconnaissance and Probing

As noted previously, each of the three impoundments was probed along and in between (as appropriate) pre-established transects. Sediment contours were developed for the three impoundments using the probing data collected. Sediment contours for Columbia, Wire and Nail, and Hamilton ponds are presented in Figures 4, 5 and 7, respectively. In each of these three impoundments sediment depths were recorded through probing to maximum depths of approximately 7, 13, and 7 feet, respectively.

Using the Average End Area Method (Moffitt and Bouchard, 1982), sediment volumes were estimated for the three impoundments and are presented in Table 1. Sediment volumes for the Ruck pond and Hamilton pond raceways were estimated using raceway widths and average sediment depths at measured (i.e., 50 feet) intervals. As noted previously, 75 sediment areas were identified above and below the former Hamilton pond. These areas are depicted in Figures 5 through 9. Volumes for the sediment areas above and below the former Hamilton pond were estimated using average sediment depths and areas based on multiple probing at each area. A sediment volume summary for the various portions of the site is presented in Table 1.

4.3 Chemical Data

As noted previously, a total of 188 sediment samples were collected from Cedar Creek and analyzed for PCBs and total organic carbon (TOC). Additionally, 16 samples were analyzed for oil and grease. A description of each sediment sample and details regarding its collection are presented in Table 2. Table 3 presents the analytical results for PCBs, TOC and oil and grease. Overall, the highest PCB concentrations observed at the Site were in the impoundments. Minimal PCBs were detected between the Wire and Nail and the former Hamilton ponds and downstream of the former Hamilton pond.

4.4 Geotechnical Data

Select sediment samples also were tested for geotechnical parameters. This subset of samples was tested for particle size distribution, specific gravity and water content. Select samples that appeared to be organic in appearance were tested for organic content and select cohesive samples were tested for Atterberg limits. The results of these tests are provided in Table 4. Overall, the site contains predominantly silt-sized sediment with varying amounts of fine sand- and clay-sized material.

4.5 Data Quality Review

Data from 11 sample delivery groups (SDGs) for sediment samples collected between May 4 and June 30, 1998 were reviewed for quality assurance/quality control compliance with method guidelines and project specific requirements. Each data package from the laboratory (ITS Environmental Laboratories and EnChem, Inc.) was reviewed as outlined in the Quality Assurance Project Plan (BBL, 1998c). Specifically, evaluations were made of holding times, calibration requirements (initial and continuing), blank contamination, surrogate spike recovery (where applicable), matrix spike and duplicate performance, laboratory control sample recovery and analyte identification, as applicable. The following summarizes the findings of the data review.

Polychlorinated biphenyls (PCBs)

- Analyses were performed following the Environmental Protection Agency (EPA) SW-846 method 8082. Data were reported as PCB Aroclors.
- All samples were extracted and analyzed within the method-specified holding times.
- No Aroclors were present in the method or rinse blanks.
- Recovery for one surrogate was below control limits in approximately 10 percent of the samples. Surrogates were diluted beyond the range of quantitation in an additional 14 percent of the samples. No data qualification was warranted for either excursion. Recoveries for both surrogates were below control limits in two samples, CP28-7 (1-2) and CP30-10 (0-1), resulting in the qualification of all Aroclor data for these samples as estimated with a potential low bias.
- Recoveries for a third of the matrix spikes analyzed were within control limits. Recoveries for the other two thirds could not be accurately calculated due to interference from PCBs present in the unspiked samples. All laboratory control sample recoveries were, however, within control limits.
- All field duplicate results were acceptable.
- All initial and continuing calibration standards were within method specifications.

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Tables

Table 1

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Volume Summary

Impoundment/Area		Estimated Volume (cy)
Ruck Pond Raceway[1]		4,000
Columbia Pond[2]		100,000
Wire and Nail Pond[2]		14,000
Between Wire and Nail Pond and the former Hamilton Pond[3]		
Areas:	1, 2, 3, 4, 6, 7, 8, 9, 11, 13, 14, 16, 17, 18, 19, 20, 22, 23, 24, 25, 27, 29, 30, 32, 33, 34, 35 (<100 cy sediment per area)	600
Areas:	5, 10, 12, 15, 21, 26, 28, 31 (≥100 cy sediment per area)	2,500
Former Hamilton Pond[2] (including formerly impounded areas)		23,000
Hamilton Pond Raceway[1]		1,000
Downstream former Hamilton Pond[3]		
Areas:	36, 37, 38, 39, 41, 42, 43, 44, 45, 46, 47, 48, 52, 53, 54, 55, 56, 57, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75 (<100 cy sediment per area)	1,200
Areas:	40, 49, 50, 51, 58, 59, 60, (≥100 cy sediment per area)	2,000

Notes:

1 Sediment volumes for the Raceways were estimated using raceway widths and average sediment depths at measured (e.g., 50 feet) intervals.

2 Sediment volumes for the impoundments were estimated by the Average End Area Method using probing data obtained along established transects.

3 Volumes for the sediment areas noted were estimated using average sediment depths and areas based on multiple probing at each area.

Data collected during spring 1998.

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Ruck Pond Raceway						
RPR - 1	5/28/98	10:45 AM	1.5	1.2	1.2	0 - 1.2 - tan fine sand & silt with organic matter over dark brown to black silt with organic matter and shells over brown medium sand over black silt with organic matter over coarse sand and gravel
RPR - 2		11:15 AM	0.7	1.3	1.1	0 - 1.1 - tan medium and coarse sand with trace fine sand, over black trace fine sand with organic matter, moderate organic odor over brown fine sand over black fine sand trace silt, over gray fine sand, some silt
RPR - 3		11:45 AM	1.3	4.1	4.0	0 - 2 - dark brown silt with organic matter (soft) over brown soft silt with trace black silt with slight organic odor 2 - 4 - dark brown silt over black silt with organic matter and odor over medium gray silty clay with organic matter over brown to black stiffer silty clay, over brown silty clay with shells and organic matter, trace fine sand over fine sand and medium sand.
RPR - 4	5/28/98	12:15 PM	1.7	4.2	4.1	0 - 2 - dark brown soft silt with organic matter over brown soft silt with organic matter, slight odor 2 - 4.1 - dark brown to black silt with organic matter and odor with fine sands over brown stiff silt, some fine sands

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
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Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Columbia Pond						
CP2 - 4	5/7/98	2:50 PM	2.3	1.8	1.6	0 - 0.3 - gray brown silt 0.3 - 1 - dark brown to black silt, very strong organic odor 1 - 1.6 - dark brown to black silt, very strong organic odor, on top rock & gravel
CP4 - 6		3:10 PM	2.0	1.4	1.4	0 - 0.3 - dark brown silt and organic matter slight to moderate organic odor 0.3 - 1.4 - gray brown silt, slight organic odor
CP5 - 10		3:30 PM	1.2	2.2	2.0	0 - 0.5 - dark brown loose silt and organic matter 0.5 - 1 - brown silt with organic matter, slight organic odor 1 - 2 - gray brown silt, with some fine to coarse sand, some organic matter, slight organic odor
CP6 - 7		4:00 PM	2.1	2.1	1.9	0 - 0.3 - brown loose silt 0.3 - 1 - dark gray brown silt with moderate to strong organic odor 1 - 1.4 - gray brown silt with moderate organic odor 1.4 - 1.9 - gray brown fine sand
CP8 - 4		4:30 PM	2.5	2.0	1.8	0 - 0.4 - brown silt 0.4 - 1 - dark gray brown silt with moderate organic odor 1 - 1.7 - dark gray brown silt with moderate to strong organic odor 1.7 - 1.8 - brown fine to medium sand

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Columbia Pond (cont'd)						
CP10 - 6	5/13/98	8:30 AM	2.5	3.1	3.0	0 - 0.5 - brown to dark brown fine sand, organic matter, trace silt 0 - 1 - brown to dark brown fine sand, organic matter, trace silt over dark brown silt, fine sand, organic matter 1 - 2 - dark brown silt, trace fine sand, organic matter, organic odor 2 - 3 - dark brown silt, trace fine sand, trace organic matter
CP11 - 2		8:45 AM	2.0	3.0	3.0	0 - 1 - brown silt, trace very fine sand 1 - 2 - dark brown, trace black silt, organic matter 2 - 3 - stiff dark brown to black silt over dark brown silt with fine sand, trace small gravel at bottom
CP12 - 5		9:00 AM	1.9	4.2	4.0	0 - 0.5 - loose dark brown silt 0 - 1 - loose dark brown silt, organic odor 1 - 2 - dark brown to black silt, organic odor 2 - 4 - dark brown to dark gray silt, organic odor, over dark brown trace fine sand
CP12 - 17		9:15 AM	3.8	2.4	2.2	0 - 1 - dark brown fine sand, silt, organic matter over black silt, organic odor 1 - 2.2 - black, dark gray silt, organic matter over dark gray fine sand, trace silt

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Columbia Pond (cont'd)						
CP13 - 12	5/13/98	9:30 AM	3.5	3.0	3.0	0 - 1 - dark brown silt, fine sand, organic matter, small gravel, organic odor, trace coarse sand 1 - 2 - dark brown to black silt, organic matter over fine to medium coarse sand, organic odor 2 - 3 - dark brown silt, organic matter
CP14 - 2		9:45 AM	2.4	4.0	3.8	0 - 0.5 - loose brown silt 0 - 1 - loose brown silt 1 - 2 - dark brown soft silt, trace organic matter 2 - 3.8 - dark brown silt, trace fine sand, slight organic odor over dark brown fine sand - trace silt
CP15 - 14		10:15 AM	3.8	3.6	3.4	0 - 0.5 - dark brown silt, trace fine sand 0 - 1 - dark brown silt, trace fine sand 1 - 2 - dark brown silt, some fine sand 2 - 3.4 - dark brown silt, over gray fine sand, trace silt, shells
CP16 - 5		10:45 AM	2.9	3.6	3.5	0 - 1 - dark brown soft silt 1 - 2 - dark brown soft silt, some organic matter, some fine sand 2 - 3.5 - dark brown soft silt, some organic matter, some fine sand over gray silt, some fine sand over tan fine sand, some shells

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Columbia Pond (cont'd)						
CP16/17	5/13/98	11:30 AM	3.3	4.4	3.8	0 - 0.5 - dark brown soft silt, some organic material 0 - 1 - dark brown soft silt, some organic material 1 - 2 - dark brown to black silt, organic matter, shells, oil sheen, some fine sands 2 - 3.8 - black to dark brown silt over dark brown stiff silt, some fine sand over dark brown silt with organic matter, some fine sand over a dark brown fine to medium over coarse sand and gravel
CP17 - 5		11:00 AM	1.9	5.0	4.7	0 - 1 - brown to dark brown soft silt, some organic matter, shells 1 - 2 - dark brown to brown soft silt, some fine sand, organic matter, shells 2 - 3 - dark brown stiff silt, some organic matter, some fine sand (twigs) 3 - 4.7 - dark brown stiff silt, some fine sand, organic matter (wood cover)
CP18 - 4	5/14/98	2:00 PM	2.6	5.3	5.3	0 - 1 1 - 2

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Columbia Pond (cont'd)						
CP18 - 11	5/14/98	2:00 PM	3.0	4.3	4.3	0 - 1 - fine sand trace medium sand over dark brown silt with organic matter 1 - 2 - dark brown silt over fine sand 2 - 4.3 - dark brown silt trace organic matter over gray fine sand, trace medium coarse sand over stiff brown silt
CP20 - 5		3:00 PM	3.5	3.8	3.6	0 - 0.5 - dark brown to dark gray fine sand and silt organic matter/odor 0 - 1 - dark brown to dark gray fine sand and silt organic matter/odor 1 - 2 - dark gray to black soft silt, some organic matter 2 - 3.6 - dark brown to dark gray silt to organic matter over fine sand & silt, trace medium sand and gravel at bottom
CP20 - 14		3:15 PM	2.2	6.1	5.9	0 - 0.5 - dark brown loose silt 0 - 1 - dark brown loose silt over black silt, organic odor 1 - 2 - dark gray to black silt, some fine sand and organic matter 4 - 5.9 - dark brown silt, organic matter (stiff)

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Columbia Pond (cont'd)						
CP22 - 4	5/18/98	1:00 PM	4.2	4.7	4.6	0 - 1 - dark brown sand, trace organic matter over dark brown silt 1 - 2 - dark brown to dark gray fine sand, organic odor 2 - 3 - dark brown soft silt 3 - 4.6 - dark brown soft silt gravel at bottom
CP23 - 10		1:30 PM	2.7	6.7	6.6	0 - 0.5 - dark brown soft silt 0 - 1 - dark brown soft silt 1 - 2 - dark brown soft silt over black soft silt, trace organic matter 2 - 3 - dark brown silt, slight organic odor 3 - 5 - dark brown silt over dark brown stiffer silt 5 - 6.6 - dark brown stiff silt, some organic matter over gravel (some wood pieces)
CP24 - 6		2:10 PM	4.2	4.2	4.1	0 - 0.5 - dark brown soft silt, trace organic matter 1 - 2 - dark brown soft silt, trace black silt 2 - 4.1 - dark brown soft silt over brown stiff silt, some fine sand, over a dark brown stiff silt, some fine silt, organic matter over gray fine sand (some shells)
CP26 - 6		3:00 PM	6.5	4.2	4.1	0 - 1 - dark brown soft silt 1 - 2 - dark brown soft silt at 1.5 feet, dark brown lense over dark brown silt 2 - 4.1 - dark brown soft silt over stiffer brown silt over brown silty clay, some organic matter

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Columbia Pond (cont'd)						
CP28 - 7	5/18/98	3:30 PM	5.7	4.8	4.8	0 - 0.5 - dark brown soft silt 0 - 1 - dark brown soft silt 1 - 2 - dark brown soft silt 2 - 3 - dark brown soft silt over black silt (trace) over brown soft silt 3 - 4.8 - dark brown silt, some organic matter, trace black silt
CP30 - 10		4:00 PM	5.8	5.2	5.2	0 - 1 - dark brown soft silt, some organic matter 1 - 2 - dark brown silt, trace black silt (soft) 2 - 3 - dark brown silt, trace black silt, trace organic matter 3 - 5.2 - dark brown silt, trace black silt, trace organic matter over stiffer silt
Wire and Nail Pond						
WN4 - 9	5/20/98	9:30 AM	8.9	3.5	3.4	0 - 1 - dark brown silt, organic matter, trace fine sand 1 - 2 - dark brown silt over dark brown silt with fine sand, organic matter 2 - 3.4 - dark brown silt, organic matter, over fine sand, some silt, organic matter
WN5 - 3		9:45 AM	17.8	0.8	0.6	0 - 0.6 - dark brown silt, fine sand, organic matter, small gravel, oil sheen

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Wire and Nail Pond (cont'd)						
WN6 - 2	5/20/98	10:30 AM	11.5	6.0	5.8	0 - 1 - dark brown loose silt, trace organic matter 1 - 2 - dark brown soft silt, organic matter 2 - 4 - dark brown to black silt, trace fine sand, organic matter & odor 4 - 5 - dark brown silt, trace fine sand
WN6 - 8		3:15 PM	10.9	6.6	6.5	0 - 1 - dark brown loose silt, trace organic matter 1 - 2 - dark brown loose silt, trace organic matter 2 - 4 - dark brown to black loose silt, organic matter & odor 4 - 5 - dark gray to black silt, layer medium to coarse sand
WN7/8		2:00 PM	9.0	8.0	7.8	0 - 0.5 - dark brown loose silt 0 - 1 - dark brown loose silt, organic matter 1 - 2 - dark brown silt, slight organic odor 2 - 4 - dark brown silt, trace fine sand over dark brown silt, trace fine sand, slight organic odor 4 - 5 - dark brown silt, organic odor
WN9 - 4		11:00 AM	10.7	7.2	7.0	0 - 1 - dark brown loose silt 1 - 2 - dark brown silt, trace organic matter 2 - 4 - dark brown to dark gray silt (organic matter and odor) 4 - 5 - dark brown silt, trace fine sand
WN10 - 10	5/28/98	1:00 PM	7.8	8.2	7.9	0 - 1 - dark brown soft silt, trace organics 1 - 2 - dark brown silt, trace sand, trace organics, some shells 2 - 4 - dark brown silt, trace sand, trace organics, some shells 4 - 5 - dark brown (trace black) silt, organic matter

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Wire & Nail to Former Hamilton Pond						
WH-15	6/30/98	12:30 PM	0.1	3.4	3.1	0 - 3.1 - brown silt over brown/gray silt with organic matter, slight to moderate organic odor
WH-21		11:45 AM	1.0	1.0	0.8	0 - 0.8 - dark brown/dark gray silt, trace fine sand, trace organic matter, small gravel
WH-26		11:00 AM	2.5	2.8	2.6	2 - 2.6 - dark brown silt and fine sand, trace medium sand over gray medium to coarse sand, trace fine sand, small gravel, wood debris
Former Hamilton Pond (Within Current Channel)						
WH - 35A	5/28/98	2:00 PM	0.1	4.0	3.8	0 - 1 - dark brown soft silt with organic matter over black silt, some fine sand over brown silt, trace fine sand and organic matter and organic odor, over black softer silt with organic matter and shells 1 - 2 - dark brown silt, trace fine sand, over gray silty clay over dark brown silt with trace fine sand and organic matter, moderate odor 2 - 3 - dark brown stiffer silt with organic matter and organic odor over brown trace fine sand 3 - 3.8 - dark brown, stiff silt over tan fine sand to medium sand and gravel
HP1 - 3	5/4/98	3:50 PM	1.1	1.7	1.5	0 - 0.5 - dark gray fine sand with silt, some organic matter 0.5 - 1 - gray fine sand, medium-coarse sand & gravel 1 - 1.5 - gray fine sand, medium-coarse sand & gravel
HP6 - 15		4:45 PM	1.4	0.6	0.6	0 - 0.6 brown fine sand with medium to coarse sand

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Former Hamilton Pond (Within Current Channel) (cont'd)						
HP8 - 5	5/4/98	5:15 PM	1.4	2.3	2.0	0 - 1 - gray-brown fine sand, some silt and peat 1 - 2 - gray and brown fine sand and brown silt and peat - gravel at bottom 2 ft
HP10 - 3		6:40 PM	2.4	1.9	1.5	0 - 1 - dark brown to black silt with moderate to strong organic odor 1 - 1.5 - gray brown fine sand with gravel (some shells)
HP11 - 8		7:15 PM	2.5	1.5	1.5	0 - 0.5 - dark brown silt, moderate to strong organic odor 0.5 - 1 - gray fine sand with medium to coarse sand 1 - 1.5 - gray, fine to coarse sand
HP12 - 9		7:40 PM	1.3	2.0	2.0	0 - 0.5 - brown silt with organic matter 0.5 - 1 - dark brown to black silt with fine sand, some organic matter, strong organic odor 1 - 2 - gray brown fine to coarse gravel, some silt
HP16 - 8	5/5/98	10:25 AM	1.0	3.4	3.0	0 - 0.5 - brown to black silt, some organic matter, slight organic odor 0.5 - 0.7 - dark brown to black silt, moderate organic odor 0.7 - 1 - dark gray fine sand 1 - 2 - gray brown fine sand, some silt, some organic matter, some white shells 2 - 3 - gray brown fine sand, some silt, some organic matter, some white shells

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Former Hamilton Pond (Within Current Channel) (cont'd)						
HP17 - 6	5/5/98	11:20 AM	1.0	4.0	3.8	0 - 0.5 - brown to black silt, some organic matter, moderate organic odor 0.5 - 0.7 - dark brown to black silt, moderate to strong organic odor 0.7 - 1 - dark gray fine sand 1 - 2 - gray-brown fine sand with organic matter and silt 2 - 2.8 - gray-brown silt and fine sand with some white shells 2.8 - 3 - brown peat 3 - 3.8 - gray-brown silt and peat
Former Hamilton Pond (Above Water Line But Within Former Impoundment)						
HP2 - 7	5/6/98	12:10 PM	Samples collected outside main water channel, using a stainless steel scoop or auger, as appropriate.			0 - 0.5 - brown silt, groundwater at 6" 0 - 1 - brown to black silt 1 - 2.4 - brown silt and gray fine to coarse sand
HP12 - 13		11:30 AM				0 - 1 - brown silt, some fine sand 1 - 1.5 - brown fine sand 1.5 - 2.3 - gray sandy clay
HP13 - 9		10:40 AM				0 - 0.5 brown silt with organic matter and white shells 0.5 - 1 brown silt, little fine sand 1 - 1.5 brown fine sand and silt 1.5 - 2 dark brown to black, light organic odor 2 - 3 brown fine sand with dark brown silt 4 - 5.2 gray brown fine to coarse sand and silt

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Former Hamilton Pond (Above Water Line But Within Former Impoundment) (cont'd)						
HP13 - 14	5/6/98	10:30 AM	Samples collected outside main water channel, using a stainless steel scoop or auger, as appropriate.			0 - 0.7 - dark silt 0.7 - 1 - orange - brown fine sand 1 - 1.6 - brown silty clay, medium to coarse sand
HP14 - 14		9:35 AM				0 - 0.5 - brown silt 0.5 - 1 - brown silt with some fine sand 1 - 2 - brown fine sand with some silt 2 - 3 - brown fine sane with silt and organic matter 3 - 4 - brown fine sand and dark brown silt 2 - 4 - brown fine sand and dark brown silt 4 - 5.2 - dark gray silt and gray fine sandy clay
HP15 - 1	5/5/98	5:00 PM	Samples collected outside main water channel, using a stainless steel scoop or auger, as appropriate.			0 - 1 - brown silt with organic matter 1 - 1.7 - light gray brown fine sand
HP15 - 12		3:25 PM				0 - 0.5 - brown silt, some fine sand, some shells 0 - 1 - brown silt, some fine sand, some shells 1 - 2 - brown fine sand with silt; groundwater at 2' 2 - 3 - gray - brown fine sand, little silt, little organic matter 3 - 4 - gray - brown silt, some fine sand 2 - 4 - gray - brown silt, some fine sand 4 - 5.5 - gray - brown fine sand and silt

(See Notes on Page 15)

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Former Hamilton Pond (Above Water Line But Within Former Impoundment) (cont'd)						
HP15 - 19	5/5/98	2:30 PM	Samples collected outside main water channel, using a stainless steel scoop or auger, as appropriate.			0 - 1 - brown silt with little organic matter 1 - 2 - brown silt with fine sand 2 - 3 - dark brown silt, some fine sand, groundwater at 2.5' 3 - 3.5 - brown silt and gray, brown, silty clay 3.5 - rock
HP16 - 12		1:30 PM				0 - 0.5 - brown silt, some organic matter 0 - 1 - brown silt with some fine sand 1 - 2 - gray - brown fine sand with silt groundwater at 2.0' 2 - 3 - brown fine sand 3 - 4 - brown fine sand and gray very tight, very fine sand 2 - 4 - brown fine sand and gray very tight, very fine sand
HP17 - 11		12:00 PM				0 - 0.5 - brown silt with little organic matter 0 - 1 - brown silt with little organic matter 1 - 2 - brown silt, some fine sand 2 - 2.5 - gray, brown fine sand 2.5 - 3 - dark brown to black silt 3 - 3.5 - dark brown silt 3.5 - 3.8 - gray brown silty clay over rock
Downstream Former Hamilton Pond						
DHP-40	6/30/98	2:45 PM	0.1	1.1	1.0	0 - 1 - brown fine sand trace medium sand over dark gray fine sand with medium to coarse sand, trace small gravel

Table 2

Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Sample Descriptions
(cont'd)

Sample Location	Sample Date	Sample Time	Water Depth (ft)	Sediment Penetrated During Sampling (ft)	Sediment Recovered (ft)	Sample Description
Downstream Former Hamilton Pond (cont'd)						
DHP-49	6/30/98	3:20 PM	0.4	2.0	1.9	0 - 1.9 - dark brown/dark gray silt, some fine sand, organic matter over gray fine sand some silt trace medium to coarse sand, small gravel
DHP-50		4:00 PM	0.10	2.6	2.5	0 - 1 - brown to gray fine sand with trace silt 1 - 2.5 - gray fine sand with silt, trace medium sand
DHP-51		4:15 PM	0.10	2.7	2.5	0 - 1 - tan over brown fine sand with silt, some organic matter 1 - 2.5 - dark brown fine sand with silt over dark brown silt with organic matter, leaves, twigs trace fine sand
DHP-58		4:45 PM	0.8	0.7	0.7	0 - .7 - brown to dark fine to medium sand, some coarse sand with small gravel
DHP-59A		5:50 PM	1.4	1.3	1.2	0 - 1.2 - dark brown silt, with fine sand, trace coarse sand, some small gravel, organic matter
DHP-59	7/1/98	1:00 PM	0.1	1.9	1.7	0 - 1 - light brown fine sand, some silt, shells, organic matter, trace medium sand 1 - 1.7 - dark brown silt and fine sand, some organic matter
DHP-60	6/30/98	5:20 PM	0.10	1.0	1.0	0 - 1 - dark brown fine sand some silt, trace medium sand, shells, organic matter

Notes:
Sample times are Central Daylight Time (CDT).
In-water sediment sampling performed using lexan tubing; samples above water line taken using scoop and/or auger, as appropriate.

Table 3
Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Chemical Data

Sample Location	Depth Interval (ft)	Percent Moisture	Total Organic Carbon (TOC) (%)	Oil & Grease (mg/kg, dry weight)	Polychlorinated Biphenyls (PCBs), mg/kg (dry weight)				
					Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs
Ruck Pond Raceway									
RPR-1	0 - 1.2	48	6.96	---	ND (4.77)	54.5	ND (4.77)	52.8	107
	0 - 1.2 DUP	43	4.12	---	ND (4.41)	42.5	ND (4.41)	37.3	79.8
RPR-2	0 - 1.1	20	1.32	---	ND (0.62)	1.59	ND (0.62)	2.86	4.45
RPR-3	0 - 2	66	15.1	5950	ND (0.74)	1.89	ND (0.74)	8.27	10.2
	2 - 4	50	6.29	---	ND (1.98)	11.3	ND (1.98)	32.2	43.5
RPR-4	0 - 2	41	5.20	---	ND (0.43)	1.14	ND (0.43)	4.41	5.55
	2 - 4.1	48	6.37	---	ND (4.84)	14.4	ND (4.84)	34.1	48.5
Columbia Pond									
CP2-4	0 - 1	62	6.83	---	ND (39.6)	127	ND (39.6)	218	345
	1 - 1.6	54	8.82	---	ND (0.65)	3.65	ND (0.65)	2.72	6.37
CP4-6	0 - 1.4	66	13.3	---	ND (8.82)	34.1	ND (8.82)	48.7	82.8
CP5-10	0 - 0.5	76	3.57	---	ND (2.12)	ND (2.12)	ND (2.12)	4.53	4.53
	0 - 1	66	13.2	4630	ND (0.87)	1.50	ND (0.87)	3.90	5.40
	1 - 2	47	6.65	---	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND
CP6-7	0 - 1	61	12.2	---	ND (0.77)	ND (0.77)	ND (0.77)	1.72	1.72
	1 - 1.9	46	5.69	---	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND
CP8-4	0 - 1	68	15.3	---	ND (1.54)	7.10	ND (1.54)	16.3	23.4
	1 - 1.8	48	5.63	---	ND (0.57)	ND (0.57)	ND (0.57)	0.11 J	0.11 J
CP10-6	0 - 0.5	43	2.65 J	---	ND (5.30)	ND (5.30)	ND (5.30)	58.6	58.6
	0 - 1	40	3.42 J	---	14.5	ND (6.70)	ND (6.70)	66.2	80.7
	1 - 2	69	25.7 J	---	ND (0.48)	1.04	ND (0.48)	1.31	2.35
	2 - 3	52	7.96 J	---	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND

(See Notes on Page 12)

Table 3
Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Chemical Data
(cont'd)

Sample Location	Depth Interval (ft)	Percent Moisture	Total Organic Carbon (TOC) (%)	Oil & Grease (mg/kg, dry weight)	Polychlorinated Biphenyls (PCBs), mg/kg (dry weight)				
					Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs
Columbia Pond (cont'd)									
CP11-2	0 - 1	67	13.7 J	---	ND (0.45)	2.11	ND (0.45)	3.95	6.06
	1 - 2	63	10.0 J	---	ND (2.01)	10.2	ND (2.01)	13.8	24.0
	2 - 3	51	8.31 J	---	ND (1.03)	13.5	ND (1.03)	9.59	23.1
CP12-5	0 - 0.5	68	20.1 J	---	ND (0.48)	1.84	ND (0.48)	4.74	6.58
	0 - 1	68	12.5 J	2280	ND (0.93)	8.15	ND (0.93)	10.6	18.8
	1 - 2	64	11.6 J	---	ND (8.26)	70.4	ND (8.26)	53.4	124
	2 - 4	53	7.97 J	---	ND (0.21)	0.86	ND (0.21)	0.99	1.85
CP12-17	0 - 1	58	7.52	---	112	ND (7.18)	ND (7.18)	109	221
	1 - 2.2	49	3.91	---	ND (2.92)	38.6	ND (2.92)	24.4	63.0
CP13-12	0 - 1	55	3.81	---	21.9	ND (6.73)	ND (6.73)	56.9	78.8
	1 - 2	46	3.66	---	ND (5.60)	85.7	ND (5.60)	58.8	145
	2 - 3	57	11.8	---	ND (0.23)	ND (0.23)	ND (0.23)	0.10 J	0.10 J
CP14-2	0 - 0.5	75	18.9	---	ND (0.60)	ND (0.60)	ND (0.60)	2.48	2.48
	0 - 1	73	10.8 J	---	ND (0.56)	1.60	ND (0.56)	4.76	6.36
	1 - 2	67	13.8 J	---	ND (0.91)	13.9	ND (0.91)	11.8	25.7
	1 - 2 DUP	66	11.7 J	---	ND (0.88)	8.44	ND (0.88)	8.71	17.2
	2 - 3.8	50	5.04 J	---	ND (3.01)	11.4	ND (3.01)	13.2	24.6
CP15-14	0 - 0.5	49	5.01 J	---	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND
	0 - 1	45	5.17 J	---	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND
	1 - 2	51	7.57 J	---	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND
	2 - 3.4	47	6.74 J	---	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND

(See Notes on Page 12)

Table 3
Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Chemical Data
(cont'd)

Sample Location	Depth Interval (ft)	Percent Moisture	Total Organic Carbon (TOC) (%)	Oil & Grease (mg/kg, dry weight)	Polychlorinated Biphenyls (PCBs), mg/kg (dry weight)				
					Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs
Columbia Pond (cont'd)									
CP18-11	0 - 1	46	3.84	---	ND (0.28)	0.15 J	ND (0.28)	0.17 J	0.31 J
	1 - 2	42	4.08	---	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND
	1 - 2 DUP	---	2.08	---	---	---	---	---	---
	2 - 4.3	35	3.37	---	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND
CP18-11	2 - 4.3 DUP	37	4.08	---	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND
CP20-5	0 - 0.5	42	2.46	---	ND (0.26)	0.70	ND (0.26)	1.28	1.98
	0 - 1	48	4.32	---	ND (0.29)	1.57	ND (0.29)	3.58	5.15
	1 - 2	56	7.10	---	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.34)	ND
	2 - 3.6	35	2.35	---	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND
CP20-14	0 - 0.5	63	11.5	---	ND (0.82)	9.48	ND (0.82)	9.34	18.8
	0 - 1	52	7.56	3860	ND (1.58)	23.4	ND (1.58)	19.3	42.7
	1 - 2	50	6.06	---	ND (0.30)	0.86	ND (0.30)	0.45	1.31
	1 - 2 DUP	52	5.34	---	ND (0.31)	0.66	ND (0.31)	0.71	1.37
	2 - 4	53	9.51	---	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND
	4 - 5.9	54	11.5	---	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND
CP22-4	0 - 1	58	4.04	1230	ND (2.36)	20.6	ND (2.36)	20.6	41.2
	1 - 2	54	5.55	---	ND (2.20)	18.8	ND (2.20)	13.5	32.3
	2 - 3	55	6.98	---	ND (0.11)	1.25	ND (0.11)	0.70	1.95
	3 - 4.6	56	8.57	---	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND

(See Notes on Page 12)

Table 3
Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Chemical Data
(cont'd)

Sample Location	Depth Interval (ft)	Percent Moisture	Total Organic Carbon (TOC) (%)	Oil & Grease (mg/kg, dry weight)	Polychlorinated Biphenyls (PCBs), mg/kg (dry weight)				
					Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs
Columbia Pond (cont'd)									
CP23-10	0 - 0.5	72	14.5	---	ND (0.88)	3.15	ND (0.88)	7.79	10.9
	0 - 1	70	11.4	---	ND (3.29)	26.4	ND (3.29)	36.8	63.2
	1 - 2	69	9.22	---	ND (6.51)	41.7	ND (6.51)	44.3	86.0
	2 - 3	55	7.00	---	ND (0.22)	1.47	ND (0.22)	1.87	3.34
	3 - 5	53	7.84	---	ND (0.11)	0.29	ND (0.11)	0.30	0.59
	5 - 6.6	62	23.5	---	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND
CP24-6	0 - 1	64	12.5	---	ND (2.75)	4.65	ND (2.75)	7.75	12.4
	1 - 2	62	9.36	---	ND (1.31)	11.5	ND (1.31)	10.5	22.0
	2 - 4.1	29	2.07	---	ND (0.07)	0.15	ND (0.07)	0.08	0.23
CP26-6	0 - 1	68	12.40	---	ND (0.79)	1.47	ND (0.79)	5.02	6.49
	1 - 2	64	12.90	---	ND (1.40)	3.02	ND (1.40)	7.58	10.6
	2 - 4.1	60	9.33	---	ND (0.12)	0.56	ND (0.12)	1.42	1.98
CP28-7	0 - 0.5	75	21.20	---	ND (0.20)	1.13	ND (0.20)	2.80	3.93
	0 - 1	72	14.40	---	ND (0.90)	1.74	ND (0.90)	4.94	6.68
	1 - 2	67	14.30	---	ND (0.75)	1.94	ND (0.75)	4.51	6.45
	2 - 3	63	10.1	---	ND (2.72)	8.63	ND (2.72)	17.2	25.8
	3 - 4.8	57	8.77	---	ND (1.16)	6.59	ND (1.16)	9.27	15.9

(See Notes on Page 12)

Table 3
Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Chemical Data
(cont'd)

Sample Location	Depth Interval (ft)	Percent Moisture	Total Organic Carbon (TOC) (%)	Oil & Grease (mg/kg, dry weight)	Polychlorinated Biphenyls (PCBs), mg/kg (dry weight)				
					Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs
Columbia Pond (cont'd)									
CP30-10	0 - 1	73	21.5	2220	ND (1.87)	4.01	ND (1.87)	8.58	12.6
	0 - 1DUP	---	---	2440	---	---	---	---	---
	1 - 2	65	11.1	---	ND (2.86)	32.6	ND (2.86)	31.8	64.4
	1 - 2 DUP	64	9.92	---	ND (2.79)	29.1	ND (2.79)	31.4	60.5
	2 - 3	59	9.84	---	ND (0.12)	1.16	ND (0.12)	1.39	2.55
	3 - 5.2	53	8.11	---	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND
Wire and Nail Pond									
WN4-9	0 - 1	70	13.7	---	ND (0.83)	5.13	ND (0.83)	9.96	15.1
	1 - 2	56	5.23	---	ND (0.57)	2.51	ND (0.57)	5.91	8.42
	2 - 3.4	47	2.95	733	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND
WN5-3	0 - 0.6	50	4.33	---	ND (0.50)	2.67	ND (0.50)	6.14	8.81
WN6-2	0 - 0.5	72	14.9	---	ND (0.89)	2.85	ND (0.89)	5.47	8.32
	0 - 1	65	11.4	---	ND (0.72)	4.16	ND (0.72)	9.06	13.2
	1 - 2	63	10.3	---	ND (2.70)	12.3	ND (2.70)	22.8	35.1
	1 - 2 DUP	---	3.54	---	---	---	---	---	---
	2 - 4	51	5.97	---	ND (2.06)	21.0	ND (2.06)	22.9	43.9
	2 - 4 DUP	54	7.50	---	ND (2.16)	27.5	ND (2.16)	27.6	55.1
	4 - 5	56	2.30	---	ND (0.09)	ND (0.09)	ND (0.09)	0.12	0.12

(See Notes on Page 12)

Table 3
Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Chemical Data
(cont'd)

Sample Location	Depth Interval (ft)	Percent Moisture	Total Organic Carbon (TOC) (%)	Oil & Grease (mg/kg, dry weight)	Polychlorinated Biphenyls (PCBs), mg/kg (dry weight)				
					Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs
Wire and Nail Pond (cont'd)									
WN6-8	0 - 1	67	13.3	---	ND (0.76)	2.91	ND (0.76)	7.08	9.99
	1 - 2	66	9.71	---	ND (1.46)	10.9	ND (1.46)	20.2	31.1
	2 - 4	59	6.76	3320	ND (2.43)	22.3	ND (2.43)	23.0	45.3
	4 - 5	53	2.50	---	ND (0.09)	ND (0.09)	ND (0.09)	0.10	0.10
WN-7/8	0 - 0.5	70	15.4	---	ND (0.83)	3.75	ND (0.83)	9.35	13.1
	0 - 1	67	11.0	---	ND (1.53)	6.06	ND (1.53)	11.8	17.9
	1 - 2	63	10.7	---	ND (1.36)	7.99	ND (1.36)	17.6	25.6
	2 - 4	55	7.93	---	ND (2.23)	16.2	ND (2.23)	22.5	38.7
	4 - 5	44	2.30	---	ND (0.11)	ND (0.11)	ND (0.11)	1.20	1.20
WN9-4	0 - 1	74	18.2	---	ND (0.94)	2.56	ND (0.94)	5.86	8.42
	1 - 2	66	13.0	---	ND (1.46)	5.00	ND (1.46)	12.1	17.1
	1-2 DUP	66	15.1	---	ND (1.46)	6.13	ND (1.46)	13.2	19.3
	2 - 4	59	9.28	3030	ND (1.22)	11.4	ND (1.22)	11.0	22.4
	4 - 5	42	2.10	---	ND (0.12)	ND (0.12)	ND (0.12)	0.19	0.19
WN10-10	0 - 0.5	71	16.0	---	ND (0.86)	3.97	ND (0.86)	7.34	11.3
	0 - 1	68	14.0	---	ND (0.77)	4.43	ND (0.774)	8.48	12.9
	1 - 2	59	8.00	---	ND (2.44)	22.7	ND (2.44)	24.7	47.4
	2 - 4	54	7.67	---	ND (1.09)	10.2	ND (1.09)	10.4	20.6
	4 - 5	46	2.80	---	ND (0.11)	ND (0.11)	ND (0.11)	0.74	0.74

(See Notes on Page 12)

Table 3
Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Chemical Data
(cont'd)

Sample Location	Depth Interval (ft)	Percent Moisture	Total Organic Carbon (TOC) (%)	Oil & Grease (mg/kg, dry weight)	Polychlorinated Biphenyls (PCBs), mg/kg (dry weight)				
					Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs
Wire & Nail Pond to Former Hamilton Pond									
WH-15	0 - 3.1	48	6.89	---	ND (0.48)	1.61	ND (0.48)	4.32	5.93
WH-21	0 - 0.8	53	6.13	---	ND (0.11)	0.41	ND (0.11)	1.77	2.18
WH-26	0 - 2.6	41	1.94	---	ND (0.09)	0.30	ND (0.09)	0.88	1.18
Former Hamilton Pond									
WH-35A	0 - 1	50	7.19	---	25.5	ND (5.04)	ND (5.04)	6.74	32.2
	1 - 2	48	5.90	---	5.12	ND (0.95)	ND (0.95)	3.65	8.77
	2 - 3.8	42	3.74	---	0.23	ND (0.09)	ND (0.09)	1.14	1.37
HP1-3	0 - 1	22	2.27	---	ND (0.19)	ND (0.19)	ND (0.19)	0.82	0.82
	1 - 1.5	8	0.44	---	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.16)	ND
HP2-7*	0 - 0.5	63	12.2	---	ND (0.39)	1.05	ND (0.39)	3.53	4.58
	0 - 1	66	11.5	---	ND (0.43)	ND (0.43)	ND (0.43)	5.29	5.29
	1 - 2.4	53	8.39	---	ND (0.31)	0.45	ND (0.31)	1.26	1.71
HP6-15	0 - 0.6	9	0.35	---	ND (0.17)	ND (0.17)	0.06 J	ND (0.17)	0.06 J
HP8-5	0 - 1	36	2.82	---	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.16)	ND
	1 - 2	42	4.93	---	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND
HP10-3	0 - 1	46	5.62	2220	ND (0.56)	3.55	ND (0.56)	6.56	10.1
	1 - 1.5	37	2.72	---	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND
HP11-8	0 - 1	43	4.90	---	ND (0.26)	1.84	2.49	ND (0.26)	4.33
	1 - 1.5	14	0.36	455	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND

(See Notes on Page 12)

Table 3
Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Chemical Data
(cont'd)

Sample Location	Depth Interval (ft)	Percent Moisture	Total Organic Carbon (TOC) (%)	Oil & Grease (mg/kg, dry weight)	Polychlorinated Biphenyls (PCBs), mg/kg (dry weight)				
					Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs
Former Hamilton Pond (cont'd)									
HP15-12*	0 - 1	44.9	5.69 J	---	ND (0.91)	2.28	ND (0.91)	5.80	8.08
	1 - 2	41.8	5.00 J	---	ND (0.17)	1.90	ND (0.17)	2.73	4.63
	2 - 4	42.6	4.14 J	---	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND
	4 - 5.5	37.4	3.60 J	---	ND (0.16)	ND (0.16)	ND (0.16)	0.15 J	0.15 J
HP15-19*	0 - 1	53.3	11.3 J	---	ND (1.07)	1.98	ND (1.07)	7.71	9.69
	1 - 2	48.5	13.1 J	---	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND
	2 - 3.5	32.5	3.44 J	---	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND
HP16-8	0 - 0.5	66	8.42	97.3	ND (8.93)	33.3	ND (8.93)	94.6	128
	0 - 1	35	1.04	---	ND (2.31)	4.57	ND (2.31)	11.5	16.1
	1 - 2	27	1.20	---	ND (0.14)	ND (0.14)	ND (0.14)	0.06 J	0.06 J
	2 - 3	40	2.42	---	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND
HP16-12*	0 - 0.5	47.2	5.64 J	---	ND (0.38)	1.28	ND (0.38)	3.60	4.88
	0 - 1	43.3	4.75 J	---	ND (0.88)	3.86	ND (0.88)	12.2	16.1
	1 - 2	40.0	4.43 J	---	ND (0.17)	0.37	ND (0.17)	1.09	1.46
	2 - 4	22.4	1.22 J	---	ND (0.19)	0.19 J	ND (0.19)	0.67	0.86 J

(See Notes on Page 12)

Table 4
Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Geotechnical Data

Sample Location	Depth Interval (ft)	Date Sampled	Water Content (%)	Specific Gravity	Organic Content (%)	Atterberg Limits (%)			Particle-Size Distribution (%)				
									Sand			Silt	Clay
						Liquid Limit	Plastic Limit	Plasticity Index	Coarse	Medium	Fine		
Ruck Pond Raceway													
RPR-3	0 - 2	5/28/98	200	2.38	34	45	40	6	0	0	7	76	10
Columbia Pond													
CP5-10	0 - 1	5/07/98	153	2.40	18	102	53	50	0	1	6	58	17
CP12-5	0 - 1	5/13/98	212	2.48	16	133	57	76	0	1	6	75	10
CP 15-14	0-0.5	7/2/98	--	2.65	--	--	--	--	1	2	68	23	6
CP17-5	0 - 1	5/13/98	205	2.55	14	124	54	70	0	1	7	73	12
CP 18-4	0-0.5	7/2/98	--	2.65	--	--	--	--	0	6	18	67	9
CP20-14	0 - 1	5/14/98	219	2.52	15	141	51	90	0	1	10	69	11
CP22-4	0 - 1	5/18/98	120	2.62	10	92	37	54	0	1	26	55	10
CP 28-7	0-0.5	7/2/98	--	2.65	--	--	--	--	0	1	3	75	21
CP30-10	0 - 1	5/18/98	262	2.44	18	166	62	104	0	0	4	67	18
	0 - 1 DUP		262	2.46	18	170	69	101	0	0	4	66	18

(See Notes on Page 2)

Table 4
Cedar Creek - Cedarburg, Wisconsin
Sediment Characterization Report

Sediment Geotechnical Data

Sample Location	Depth Interval (ft)	Date Sampled	Water Content (%)	Specific Gravity	Organic Content (%)	Atterberg Limits (%)			Particle-Size Distribution (%)				
						Liquid Limit	Plastic Limit	Plasticity Index	Sand			Silt	Clay
									Coarse	Medium	Fine		
Wire & Nail Pond													
WN6-8	0 - 1	5/20/98	228	2.44	16	132	55	77	0	0	11	64	15
WN-7/8	0 - 0.5		233	2.43	17	128	59	69	0	0	8	70	13
WN10-10	0 - 1		233	2.42	16	152	57	95	0	0	3	74	13
	0 - 1 DUP		241	2.52	16	153	52	101	0	0	3	72	15
Former Hamilton Pond													
HP10-3	0 - 1	5/04/98	118	2.54	11	92	41	51	1	4	21	44	16
HP11-8	1 - 1.5	5/04/98	69	2.61	9	--	--	--	3	1	25	50	8
HP13-9*	0 - 0.5	5/06/98	63	2.54	8	--	--	--	0	1	34	44	11
HP16-8	0 - 0.5	5/05/98	26	2.72	7	--	--	--	1	5	72	17	3
HP17-6	0 - 0.5	5/05/98	93	2.67	14	--	--	--	0	6	65	18	7
Downstream Former Hamilton Pond													
DHP-49	0-1	6/30/98	114	2.50	18	NP	NP	NP	0	5	49	36	10

Notes:

-- Not submitted for testing.

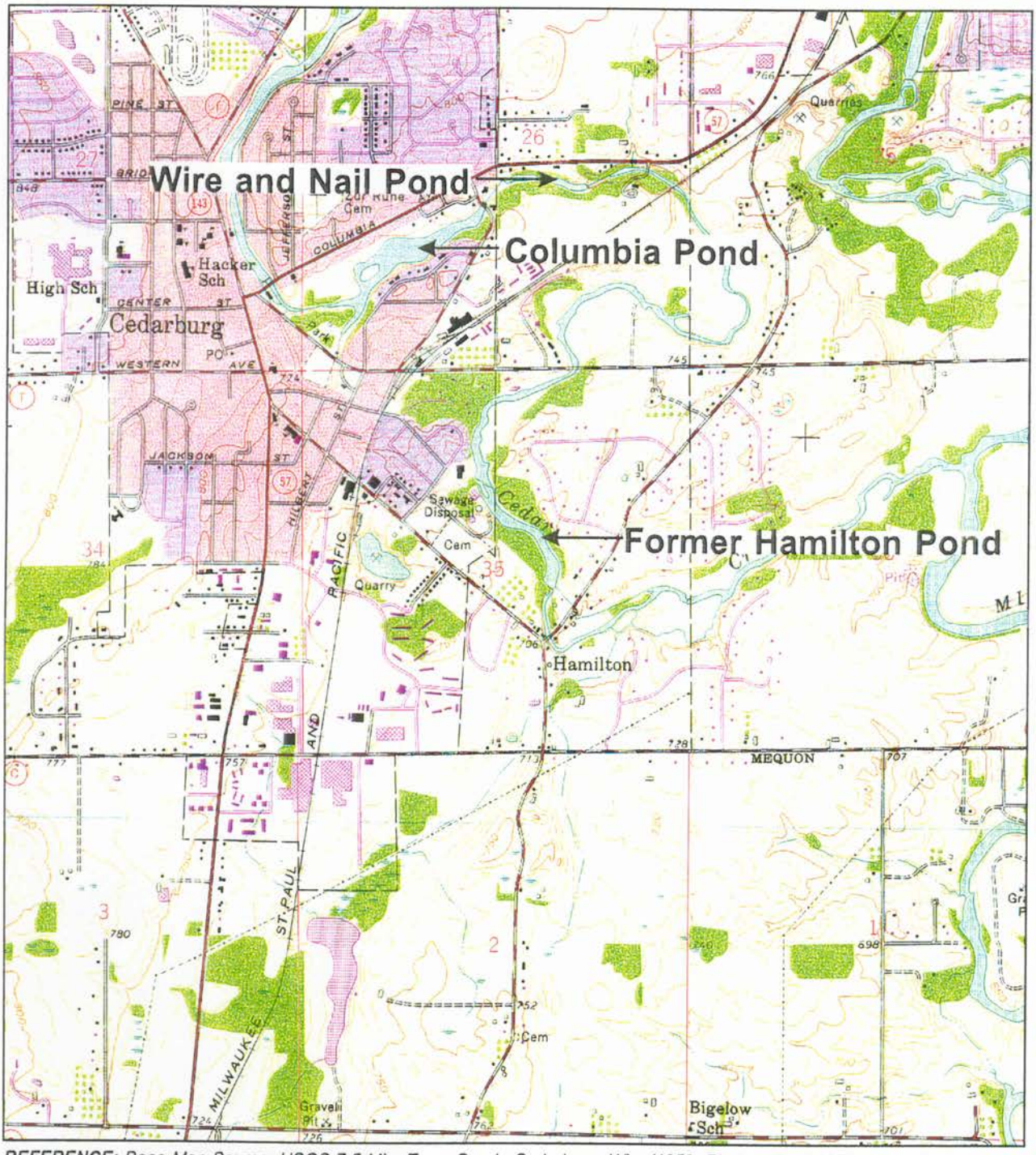
NP Test not performed because sample is non plastic.

DUP Indicates a duplicate result.

* Sample taken above the existing water line but within the former limits of Hamilton Pond.

Water content determined as mass of water per unit mass of solid.

Figures



REFERENCE: Base Map Source: USGS 7.5 Min. Topo. Quad., Cedarburg, Wis. (1959, Photorevised 1971 and 1976).

2,000' 0 2,000'

APPROX. SCALE 1" = 2,000'

Area Enlargement

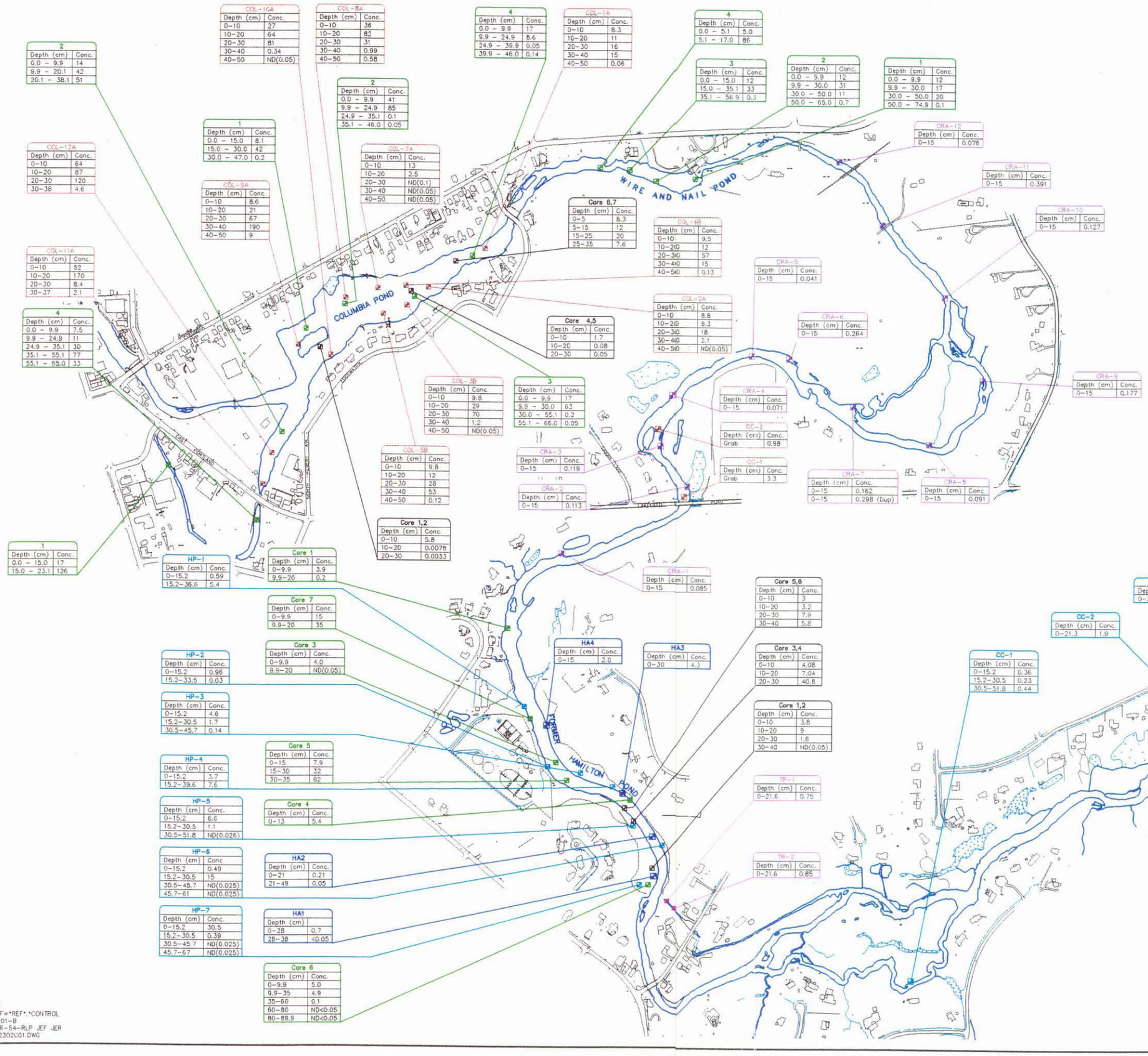
CEDAR CREEK
CEDARBURG, WISCONSIN
SEDIMENT CHARACTERIZATION REPORT

SITE LOCATION MAP

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 1

02/98 SYR-D54-DJH
62302002/62302n01.CDR



SAMPLING SYMBOL KEY		
SYMBOL	DATE	SAMPLED BY:
	1986	WDNR
	1989	BLASLAND & BOUCK ENGINEERS, P.C.
	1991	WDNR
	1995	WDNR
	1996	FOX ENVIRONMENTAL SERVICES, INC.
	1996	WDNR
	1997	CONNESTOGA-ROVERS & ASSOCIATES

SAMPLING RESULTS KEY

Core 4 — SAMPLE NAME
Depth (cm) | Conc.
0-13 | 5.4 — PCB CONCENTRATION, IN PARTS PER MILLION (
ND(0.05) = NOT DETECTED (DETECTION LIMIT)
SAMPLE DEPTH, IN CENTIMETERS (cm)

Dup — DUPLICATE ANALYSIS
WDNR — WISCONSIN DEPARTMENT OF NATURAL RESOURC

GENERAL NOTES:

1. MAPPING PREPARED BY LOCKWOOD MAPPING, INC., (ROCHESTER, NY) BASED ON AERIAL PHOTOGRAPHY FLOWN MARCH 1, 1997.
2. ALL SAMPLE AND OUTFALL LOCATIONS ARE APPROXIMATE.
3. SEE REFERENCES IN THE TEXT FOR DATA SOURCES.
4. SAMPLE COL-8A COLLECTED 1993
5. CURRENT WATER LINE IN HAMILTON POND REPRESENTS POST DAM FAILURE.
6. SAMPLES COLLECTED BY CONNESTOGA-ROVERS AND ASSOCIATES IN 1997 ARE REPRESENTATIVE OF THE TOTAL SEDIMENT DEPTH. THE 0-15 cm DEPTH REPORTED IS AN ESTIMATE.

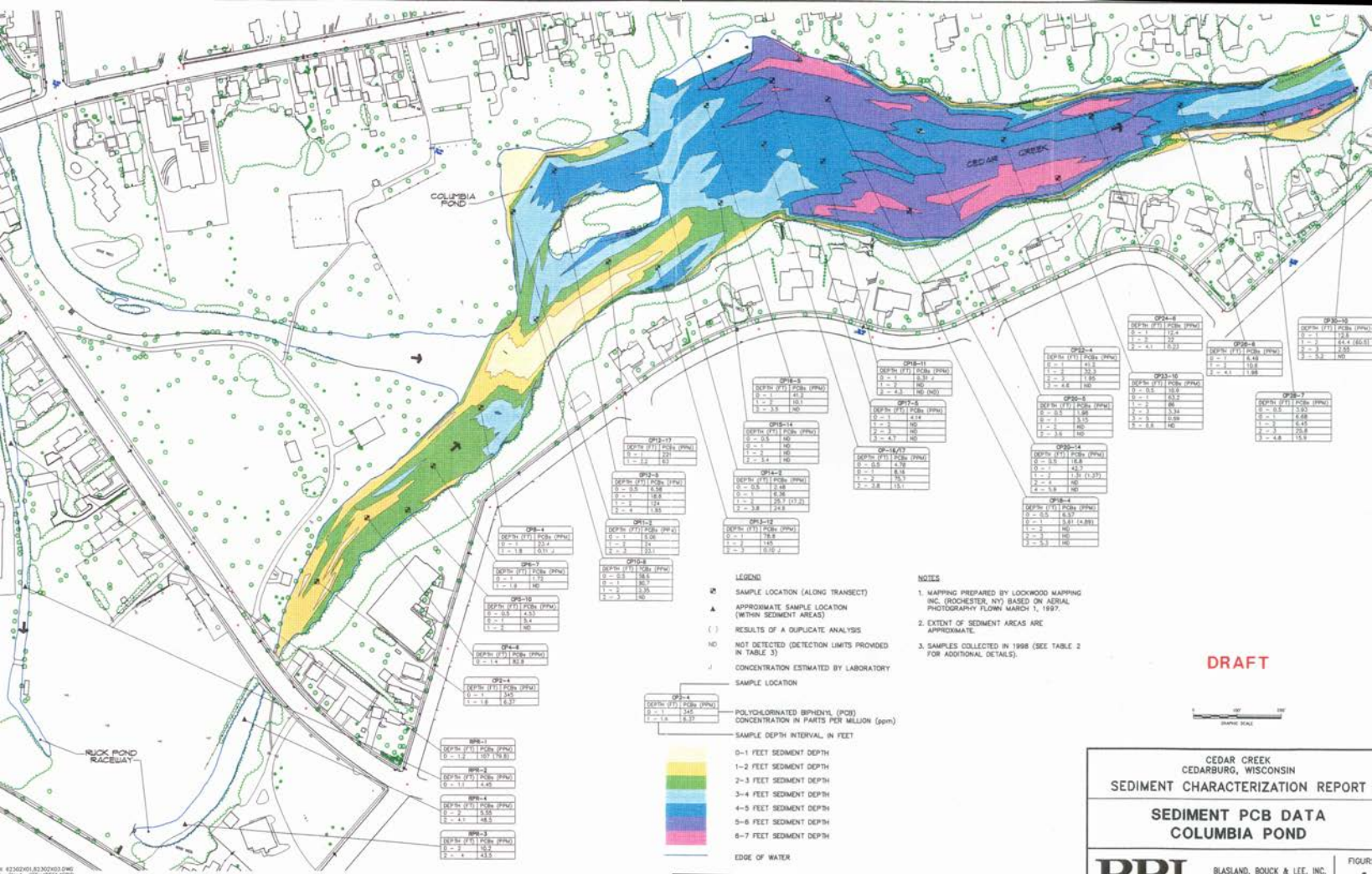
CEDAR CREEK
CEDARBURG, WISCONSIN

SEDIMENT CHARACTERIZATION REPO

PRE - 1998
SEDIMENT PCB DATA

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

X: 62302X01
L: OT*=*, OFF=*REF*,*CONTROL
P: C01-S, C01-B
7/24/98 SYR-54-RLP JEF JER
62302001/62302C01.DWG



CEDAR CREEK
CEDARBURG, WISCONSIN

SEDIMENT CHARACTERIZATION REPORT

SEDIMENT PCB DATA
COLUMBIA POND

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 4

LEGEND

- SAMPLE LOCATION (ALONG TRANSECT)
- ( ) RESULTS OF A DUPLICATE ANALYSIS
- ND NOT DETECTED (DETECTION LIMITS PROVIDED IN TABLE 3)
- SAMPLE LOCATION
- WN5-3 | DEPTH (FT) 0 - 0.6 | PCBs (PPM) 8.81 — POLYCHLORINATED BIPHENYL (PCB) CONCENTRATION IN PARTS PER MILLION (ppm)
- SAMPLE DEPTH INTERVAL, IN FEET
- SEDIMENT AREA IDENTIFIED DURING PROBING
- EDGE OF WATER

- 0-1 FEET SEDIMENT DEPTH
- 1-2 FEET SEDIMENT DEPTH
- 2-3 FEET SEDIMENT DEPTH
- 3-4 FEET SEDIMENT DEPTH
- 4-5 FEET SEDIMENT DEPTH
- 5-6 FEET SEDIMENT DEPTH
- 6-7 FEET SEDIMENT DEPTH
- 7-8 FEET SEDIMENT DEPTH
- 8-9 FEET SEDIMENT DEPTH
- 9-10 FEET SEDIMENT DEPTH
- 10-11 FEET SEDIMENT DEPTH
- 11-12 FEET SEDIMENT DEPTH
- 12-13 FEET SEDIMENT DEPTH

NOTES

1. MAPPING PREPARED BY LOCKWOOD MAPPING INC. (ROCHESTER, NY) BASED ON AERIAL PHOTOGRAPHY FLOWN MARCH 1, 1997.
2. EXTENT OF SEDIMENT AREAS ARE APPROXIMATE.
3. SAMPLES COLLECTED IN 1998 (SEE TABLE 2 FOR ADDITIONAL DETAILS).

DRAFT

X 62302X01,62302X03
L: ON=* OFF=*REF*,*GRID,*X03*
P: G01-G06.PCP
12/4/98 SYR-54 NES YCC
62302002/62302G05.DWG

CEDAR CREEK
CEDARBURG, WISCONSIN

SEDIMENT CHARACTERIZATION REPORT

SEDIMENT PCB DATA
WIRE & NAIL POND

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FIGURE 5