



Corporate Environmental Programs  
General Electric Company  
100 Woodlawn Avenue, Pittsfield, MA 01201

January 20, 2005

Mr. James M. DiLorenzo  
U.S. Environmental Protection Agency  
EPA New England  
1 Congress Street, Suite 1100  
Boston, MA 02114-2023

**Re: GE-Pittsfield/Housatonic River Site  
Silver Lake Area (GECD600)  
Bench-Scale Study Work Plan**

Dear Mr. DiLorenzo:

Enclosed please find the General Electric Company's (GE's) *Bench-Scale Study Work Plan for Silver Lake Sediments* which outlines bench-scale tests proposed to be performed on Silver Lake Sediments.

Please call me if you have any questions.

Sincerely,

Andrew T. Silfer, P.E.  
GE Project Coordinator

ATS/tld  
Enclosure

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Robert Bell, MDEP (without attachments)  
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Dale Young MA EOE  
Nancy Harper, MA AG (without attachments)  
Linda Palmieri, Roy F. Weston  
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Stuart Messur, BBL  
Mark Gravelding, BBL  
James Bieke, Goodwin Procter  
Public Information Repositories  
GE Internal Repositories

**R E P O R T**

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***Bench-Scale Study Work Plan for  
Silver Lake Sediments***

**General Electric Company  
Pittsfield, Massachusetts**

**January 2005**

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**BBL**<sup>®</sup>  
BLASLAND, BOUCK & LEE, INC.  
engineers, scientists, economists

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# 1. Introduction

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## 1.1 General

In 2003, the General Electric Company (GE) performed several pre-design investigation activities related to capping Silver Lake sediments. The pre-design activities have been performed to verify a number of key design parameters and assumptions documented in Attachment K of the *Statement of Work for Removal Activities Outside the River* (SOW; BBL, 1999). The results of these activities were presented in the *Pre-Design Investigations Report for Silver Lake Sediments* (Sediments PDI Report; BBL, 2004a). That report proposed the performance of several supplemental pre-design investigations, including the performance of a bench-scale study to evaluate: 1) physical and geotechnical responses to cap placement; 2) the presence and potential influence of total petroleum hydrocarbons (TPH) and/or non-aqueous phase liquid (NAPL) on polychlorinated biphenyl (PCB) mobility; and 3) the potential for and significance of gas-induced PCB transport. Objectives of the proposed bench-scale study were developed and presented to the United States Environmental Protection Agency (EPA) in a letter dated September 15, 2004. EPA conditionally approved the bench-scale study objectives in a letter dated November 30, 2004.

This *Bench-Scale Study Work Plan for Silver Lake Sediments* (Work Plan) has been prepared to describe the bench-scale study activities proposed by GE for Silver Lake sediments. The results of these activities will be used to identify any refinements to the conceptual design that should be incorporated during detailed design activities.

Following implementation of the bench-scale study, it is anticipated that a pilot study will be performed in Silver Lake to evaluate different sediment cap placement techniques and other implementation-related information.

## 1.2 Objectives of Bench-Scale Study

As noted above, the objectives of the bench-scale study were presented to EPA in a letter dated September 15, 2004 and conditionally approved by EPA in a letter dated November 30, 2004. These agreed upon objectives are to:

- Use column studies to preliminarily evaluate the geotechnical and physical responses of the sediments (i.e., mixing and consolidation) due to placement of cap materials at varying rates of sand placement both with and without a geotextile;
- Further assess the interrelationships between TPH and NAPL that may be present in the sediment and PCB mobility during and following cap placement, through observation and direct measurement of mixing and migration of PCBs, TPH, and/or NAPL in column consolidation studies; and
- Determine the presence and significance of gas-induced transport of PCBs through existing sediments and proposed cap materials in column studies.

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### 1.3 Format of this Work Plan

After this introductory section, the remainder of this Work Plan is presented in the following five sections:

- Section 2 provides a general description of Silver Lake, summarizes the findings of the Sediments PDI Report relevant to the bench-scale study, and provides other pertinent background information concerning prior sediment investigations and available lake-related data.
- Section 3 discusses the bench-scale study approach and provides details on implementation, such as methods, sample locations, materials, and construction techniques.
- Section 4 presents a proposed schedule for implementation of the bench-scale study.
- Section 5 provides a list of references used to prepare this Work Plan.

## **2. Background Information**

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### **2.1 General**

This section of the Work Plan summarizes background information concerning Silver Lake as it pertains to the performance of the bench-scale study, including:

- General description of Silver Lake; and
- Summary of certain pre-design investigation activities, data, and results.

### **2.2 Site Location and Description**

Silver Lake is located immediately west of, and across Silver Lake Boulevard from, the 30s Complex portion of the GE Plant Area in Pittsfield, Massachusetts. The lake is bordered to the north by Silver Lake Boulevard and to the west and south by several commercial and residential properties (see Figure 1). Silver Lake has a surface area of approximately 26 acres and a maximum water depth of about 30 feet. The lake receives stormwater discharges from several municipal stormwater outfalls, a portion of the GE Plant Area and several adjacent residential and commercial/industrial properties. Silver Lake discharges to the East Branch of the Housatonic River through a 48-inch-diameter concrete pipe located in the southwest portion of the lake. This pipe conveys surface water from Silver Lake and stormwater runoff from Fenn and East Streets to the Housatonic River.

### **2.3 Summary of Pre-Design Investigation Activities**

In accordance with the SOW, Silver Lake Performance Standards include requirements for the installation of a cap over the entire bottom of the lake.

Pre-design investigation activities were performed in part to verify assumptions made regarding the conceptual cap design as described in the SOW. Results of these activities were summarized in the Sediments PDI Report. PCB and TPH concentrations and sediment characteristics are briefly summarized in this section.

#### **2.3.1 PCB Concentrations in Sediment**

Sediment sampling for PCBs has been performed on several occasions in Silver Lake, resulting in the collection of more than 200 samples. The results of these analyses indicate PCBs are present in lake sediments at concentrations ranging from non-detect to 36,000 milligrams per kilogram (mg/kg). In general, the results indicate that PCB concentrations are greater in sub-surface samples and generally greater in the eastern portion of the lake. The highest concentrations are located in the northeast corner of the lake in the area that will be subject to future sediment removal activities. Sample locations and PCB results are included on Figure 2. A complete discussion of the results of these PCB results can be found in the Sediments PDI Report.

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### 2.3.2 TPH Concentrations in Sediment

EPA collected sediment samples from the 0- to 0.5-foot (ft) (0- to 15-cm) interval at seven locations during August 2003 and analyzed them for various constituents including TPH. Sediment TPH concentrations ranged from 1,220 to 77,400 mg/kg with an average of 16,300 mg/kg. The highest TPH concentration was reported in a sample collected from the eastern end of the lake. The seven sediment locations and associated TPH results are depicted on Figure 3.

### 2.3.3 Sediment Characteristics

Silver Lake sediments are generally characterized by the following three distinct layers:

- The surface layer (Layer 1) is characterized as soft black silt identified as having a sludge-like consistency.
- The intermediate layer (Layer 2) is characterized as soft silt and marl of an olive or brown color.
- The bottom layer (Layer 3) is characterized as sand and silt.

Generally, the three layers have relatively low strength characteristics for their respective classifications.

The bench-scale study will be performed using sediment from the surface layer (Layer 1) as this layer was typically found in thicknesses up to 6 feet and will be in direct contact with the cap. Field and laboratory results indicate that the majority of this layer consists of organic silts with fine sand having a high plasticity. This layer is generally consistent throughout the lake; however, somewhat coarser material has been observed along the northern shore.

## ***3. Bench-Scale Study Approach***

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### **3.1 General Approach to the Bench-Scale Study**

The field work and analyses described in the Sediments PDI Report verified that key design parameters and assumptions used in the conceptual design for a Silver Lake cap were appropriate and, in many cases, conservative in nature. Given the physical conditions at the lake and potential options related to cap configuration and placement techniques, it was determined that it would be appropriate to conduct a bench-scale study

The bench-scale study will use a series of column studies conducted on undisturbed sediment cores. The study will be performed in three sequential stages, with each stage building on the knowledge acquired from the previous stage. Should any of the stages of the bench-scale study provide new insights into Silver Lake conditions and sediment characteristics that suggest substantive changes to the bench-scale study assumptions or procedures noted herein, such developments and proposed modifications will be discussed with EPA prior to implementation.

The first two stages of the bench-scale study will involve placement of cap material on undisturbed Silver Lake sediments within a fixed column. A multi-pathway transport column test will comprise the third stage. Specifically, the three stages will be as follows:

- In Stage 1, sediment cores will be collected from five lake locations to represent varying sediment types and characteristics. Bench-scale column consolidation studies will be performed on these cores using the same capping materials, cap configurations, and placement rates (i.e., these test parameters will not be varied among the columns).
- In Stage 2, representative sediment cores will be collected from one location (based on Stage 1 test results). Bench-scale column consolidation studies will then be performed on these cores, varying the capping materials, cap configurations, and cap placement rates.
- In Stage 3, sediment cores will be collected from the same location as the Stage 2 tests. A multi-pathway transport column test will be performed on these cores simulating representative transport conditions with a variety of cap materials and cap configurations.

These three stages are described in further detail below and are graphically illustrated on Figure 4.

### **3.2 Stage 1 – Variable Sediment Source Areas**

#### **3.2.1 Sample Collection**

A total of five locations within Silver Lake have been selected for sediment sample collection for Stage 1 testing. These locations are shown on Figure 5. Specifically, these locations were selected to represent a range of sediment conditions:



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- Location A is in the vicinity of relatively high PCB and TPH concentrations;
  - Location B is representative of relatively steep bed slope conditions and is in the area that is a potential candidate for the pilot study;
  - Location C is in a deep, flat-bottomed portion of Silver Lake where relatively softer sediments exist;
  - Location D is in an area where the sediment has relatively higher sand content than other portions of the lake; and
  - Location E is representative of relatively shallow bed slope conditions found in the western end of the lake.

Individual sediment cores approximately three feet in length will be obtained using four-inch diameter Lexan tubing at each of the five selected locations. Core collection will be performed in a manner consistent with the requirements of the *Field Sampling Plan/Quality Assurance Project Plan* (FSP/QAPP; BBL, 2004b). A second sediment core will be collected from each sampling location for characterization of pre-consolidation sediment conditions. In addition, three extra cores will be collected for use as trial columns to verify the selected cap material placement rate prior to initiating Stage 1 tests.

The core locations will be surveyed during sample collection. Other field measurements such as water depth, sediment penetration, sediment recovery, and visual observations will also be recorded at the time of sediment collection. Upon retrieval, the core will be cut off as close to the mudline as possible, and the majority of overlying water will be decanted off before sealing the core. Although the majority of water will be removed, the sediment within the core will not be allowed to dry or become oxidized by exposure to air. The cores will be properly labeled to identify the collection location, the top and bottom of the core, and the location of the sediment/water interface at the time of collection. The cores will then be transported upright to the location of the column consolidation tests. It is anticipated that the Stage 1 column consolidation study will be performed at the GE facility in Pittsfield.

While Stage 1 tests are being performed, two additional cores will be collected for the purpose of performing a “dry-run” of the proposed Stage 3 tests. Cores collected for the “dry-run” trial will be collected and handled according to the procedures outlined herein and shipped to the selected test site. If in the course of the “dry-run” trial it becomes apparent that proposed Stage 3 procedures (Section 3.4.2) require substantive changes, such modifications will be discussed with EPA prior to the initiation of the actual Stage 3 tests.

### **3.2.2 Column Test Procedures**

For the consolidation tests, sediment will be maintained at room temperature in the original cores in which the sediment samples were obtained. Upon arrival at the study location, a fitting will be attached to the cores and an additional four- to five-foot length of column material (Lexan) added to the top of the column. Cores will be placed upright and secured in place, the initial sediment/water interface checked and re-marked (if necessary), sediment depth will be measured, and a visual description noted. A minimum of two feet of water will then be slowly added and maintained above the sediment (the water depth will be approximately equal for all test columns). A photograph of a typical column test is displayed on Figure 6.

Prior to placement, a representative sample of the bench-scale study cap material will be obtained and analyzed for grain size (ASTM method D-422) and total organic carbon (TOC) content (Lloyd Kahn method in

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accordance with the FSP/QAPP). Additionally, sediments obtained from each location for pre-consolidation testing will be analyzed for bulk density, porosity, particle size (American Society for Testing and Materials (ASTM) Method D-422), and moisture content (ASTM Method D-2216).

To begin the test, a nominal one-foot layer of potential capping material will be slowly added to the top of each column over time and allowed to settle through the overlying water column. The placement rate, selected to reflect possible placement techniques being considered for full-scale implementation, will be equal for all columns. The proposed placement rate is the application of three inches of cap material per day on four successive days. This placement rate reflects the placement of the cap in lifts as well as placement over time. As noted previously, the three trial columns will be used initially to verify the acceptability of the proposed placement rate for Stage 1 testing.

Sediment consolidation within each column will be monitored over time for a three to four week period (or until 100% primary consolidation is approached). During this period visual observation of the sediment and cap layers (including any identifiable NAPL or other interfaces such as a separate flocculent layer at the top of cap) will be recorded.

At the end of the consolidation test period, the sediment will be sampled for PCB and TPH laboratory analysis (SW-846 method 8082 and MADEP-VPH-98-1/MADEP-EPH-98-1, respectively, in accordance with the FSP/QAPP) and the cap material will be sampled for PCB, TPH, and TOC laboratory analysis. Samples will be obtained from the upper sediment layer (0- to 6-inches below the sediment/cap interface), and the following cap layers (measurements relative to the sediment/cap interface): 0- to 2-inch, 2- to 4-inch, 4- to 6-inch, and 6- to 12-inch from each core (See Figure 7).

At the end of the test, remaining sediment will be appropriately disposed at the Building 71 On-Plant Consolidation Area (OPCA).

### **3.3 Stage 2 – Variable Cap Placement Rate and Materials**

#### **3.3.1 Sample Collection**

Based on the results of the Stage 1 consolidation tests, one sampling location will be selected for collection of additional cores for performance of Stage 2 tests. The selected location will be the Stage 1 location from which sediments exhibited relatively higher mobility of PCB and TPH (in comparison to the other locations) and/or the highest degree of settlement/mixing. At the selected location, eight additional cores will be obtained. The procedures for the sediment core collection and handling will be the same as those previously discussed for the Stage 1 consolidation tests. Five of these cores will be used for the Stage 2 column consolidation tests. One of the cores will be used for pre-consolidation characterization of sediment bed properties including bulk density, particle size, porosity and moisture content. The remaining two cores will be retained as “back-up” cores in the event that it becomes necessary to replace any of the primary sediment cores. It is anticipated that the Stage 2 column consolidation studies will also be performed at the GE facility in Pittsfield.

#### **3.3.2 Column Test Procedures**

Sediment will be maintained in the original cores in which the sediment samples were obtained. Upon arrival at the study location, fittings will again be attached to the cores and an additional four to five foot length of column material (Lexan) added to the top of the column. Cores will be placed upright and secured in-place and the

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initial sediment/water interface checked and re-marked (if necessary), the sediment depth will be measured, and a visual description noted. A minimum of two feet of water will then be slowly added, and maintained, above the sediment (the water depth will be the same as used in Stage 1 tests).

Five column tests will be constructed with the following basic setups:

- Two columns with one foot of capping materials added at two different rates, both rates being different from that used in Stage 1. Selected cap material placement rates for these two cores will be based on observations obtained during Stage 1 tests related to potential mixing of sediments and cap material. These columns will not have a geotextile or an armor layer added.
- One column with one foot of capping material added at the same rate as that used in Stage 1 tests. This column will include a geotextile layer placed between the sediment and capping material.
- One column with one foot of capping material added at the same rate as that used in Stage 1 tests. This column will include a geocomposite layer placed between the sediment and the capping material.
- One column with one foot of capping material added at the same rate as that used in Stage 1 tests. This column will have no geotextile layer, but additional material (e.g., gravel or lead plates) will be added on top of the cap material to represent the added weight of a potential armoring layer.

Sediment consolidation within each column will be monitored over time for a three to four week period (or until 100% primary consolidation is approached). During this period visual observation of the sediment and cap layers (including any identifiable NAPL or other interfaces such as a separate flocculent layer at the top of cap) will be recorded.

At the end of the consolidation test period, the sediment will be sampled for PCB and TPH laboratory analysis and the cap material will be sampled for PCB, TPH, and TOC laboratory analysis. Samples will be obtained from the upper sediment layer (0- to 6-inches below the sediment/cap interface), and the following cap layers (measurements relative to the sediment/cap interface): 0- to-2 inch, 2- to 4-inch, 4- to 6-inch, and 6- to 12-inch from each core (See Figure 7).

At the end of the test remaining sediment will be appropriately disposed at the Building 71 OPCA.

### **3.4 Stage 3 – Multi-Pathway Transport Column Test**

The Stage 3 column consolidation studies will consist of a series of longer duration column consolidation tests that will be conducted to evaluate PCB and NAPL mobility associated with upward groundwater flux and possible in-situ gas generation and bubble formation.

#### **3.4.1 Sample Collection**

Six three-foot length sediment cores will be obtained (from the same approximate location as the Stage 2 cores) for the Stage 3 core consolidation tests. The procedures for the sediment core collection and handling will be the same as those previously discussed for the Stage 1 consolidation tests including modifications (if any) resulting from the “dry run” tests performed during Stage 1 as discussed in Section 3.2.1. Four of the six cores

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collected will be used for the Stage 3 tests and the two remaining cores will be retained as “back-up” cores in the event that it becomes necessary to replace any of the Stage 3 consolidation test cores.

### 3.4.2 Column Test Procedures

As with the previous tests, sediment will be maintained in the original cores in which the sediment samples were obtained. Upon arrival at the laboratory, fittings will be attached to both the bottom and top ends of the cores. The lower section of the column will be designed to deliver “groundwater” at an approximate seepage rate of 2.74 liters per square meter per day (L/m<sup>2</sup>/day) (i.e., the assumed value used in the conceptual capping design). An additional five-foot length of column will be added to the upper end of the cores and will serve to hold the cap material, overlying water and gas and water collection systems. As before, cores will be placed upright and secured in-place, the initial sediment/water interface re-marked (if necessary), the sediment depth measured, and a visual description noted. A minimum of two feet of water will again be slowly added to the column.

Details regarding the shipping procedures and the construction of the testing apparatus for the long term, multi-pathway column tests will be developed in cooperation with the laboratory performing the work. A schematic of the proposed column set up is included in Figure 8. General operating features will be similar to those found in a corresponding bench-scale test performed as part of the St. Louis River/Interlake/Duluth Tar Site in Duluth, MN.

To simulate potential groundwater flux through the bottom of the lake, an upward water gradient will be applied at the base of the column, with the simulated groundwater supplied by a reservoir with slight hydraulic head. Water used in the simulation will be de-gassed after being drawn from Silver Lake. At the bottom of the column, at the point of the groundwater intrusion, granular material and a filter plate will be included to provide for sufficient diffusion of the flow to prevent short circuiting or concentration of the flow into and through the sediments. In addition, the top of the column will be fitted with a funnel to concentrate and collect the upward migration of gas bubbles and associated materials. The funnel will be connected to a flexible collection bag to collect any gas. A layer of glass wool will be used within the funnel to collect particulate and NAPL materials associated with gas (bubble) related transport, if any.

Four column tests will be used, having the following basic setups:

- One column with sediment but without the addition of cap material (baseline condition for gas generation).
- One column with one foot of capping material and no geotextile.
- One column with one foot of capping material and an underlying geotextile.
- One column with one foot of capping material and an underlying geocomposite layer.

The column tests will be run for up to six months at room temperature. During this period visual observations of the sediment and cap layers will be made. Other visual observations will be recorded as appropriate. During the test period, the generation of gas as noted by the accumulation within the gas collection bags in each column will be monitored and recorded. The rate of “groundwater” flux into the columns will also be noted including any change in the ground water flux during consolidation of the sediment. The rate of groundwater movement through the column will be measured either as rate of change in the supply reservoir or by the combined change in water level or volume removed from the column.

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At approximately monthly intervals during the test period, the overlying water will be sampled and analyzed for PCBs. At the end of the test period, samples for PCB and TPH analysis will be obtained from the upper sediment layer (0- to 6-inches below the sediment/cap interface). Samples also will be collected for PCB, TPH, and TOC analysis of the following cap layers: 0- to 2-inch, 2- to 4-inch, 4- to 6-inch, and 6- to 12-inch from each core (See Figure 7). The glass wool in each column will be analyzed for PCBs and TPH.

Due to the complexity of the Stage 3 tests it is not anticipated that they will be performed at the GE facility. Currently, it is anticipated that the cores will be transported to the Woods Hole Group in Raynham, Massachusetts for performance of the tests.

At the end of the test, the water used in the test will be returned to the GE facility for treatment at the 64G groundwater treatment facility. Remaining sediment will be returned to the GE facility for appropriate disposal at the Building 71 OPCA.

## **4. Proposed Bench-Scale Study Activities Schedule**

GE will initiate performance of the bench-scale study activities within 30 days (weather permitting) of EPA approval of the activities described herein and will submit a report summarizing the results of these investigations to EPA within ten months following EPA approval of this Work Plan. Note that this schedule may be subject to change based on preliminary results of the upcoming supplemental pre-design investigation activities. The proposed schedule may also require modification in response to changes in the proposed bench-scale activities as a result of information gathered during performance of the various stages of the bench-scale study. In the event a schedule change is necessary, GE will discuss such potential changes with EPA.

## 5. References

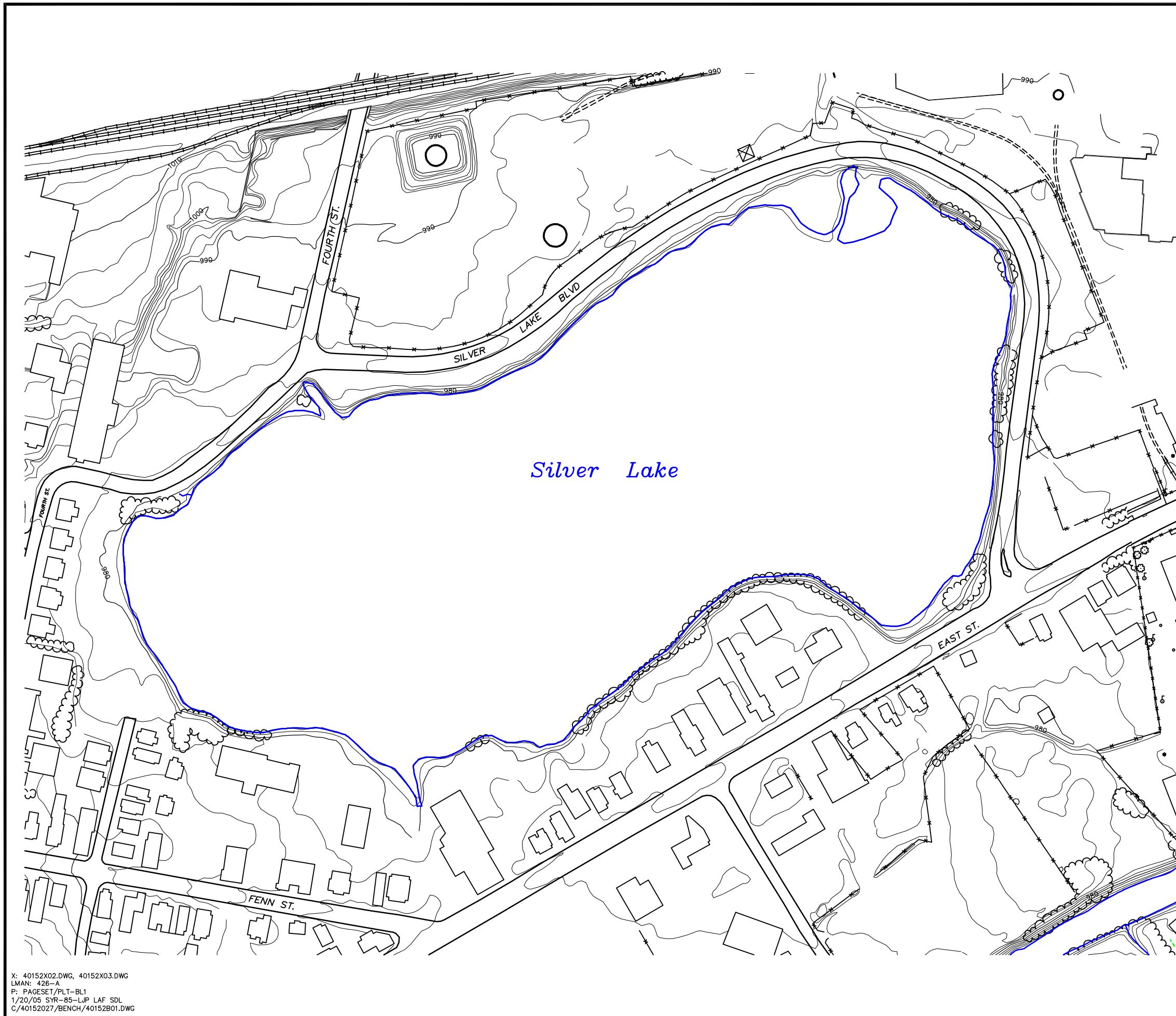
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- BBL. 1999. *Technical Attachment K to the Silver Lake Sediment Response Action Conceptual Design.*
- BBL. 2004a. *Pre-Design Investigations Report for Silver Lake Sediments.*
- BBL. 2004b. *Field Sampling Plan/Quality Assurance Project Plan.*


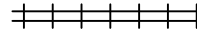

# *Figures*

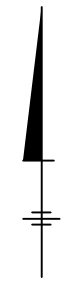
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**LEGEND**


-  EDGE OF WATER
-  RAILROAD
-  VEGETATION



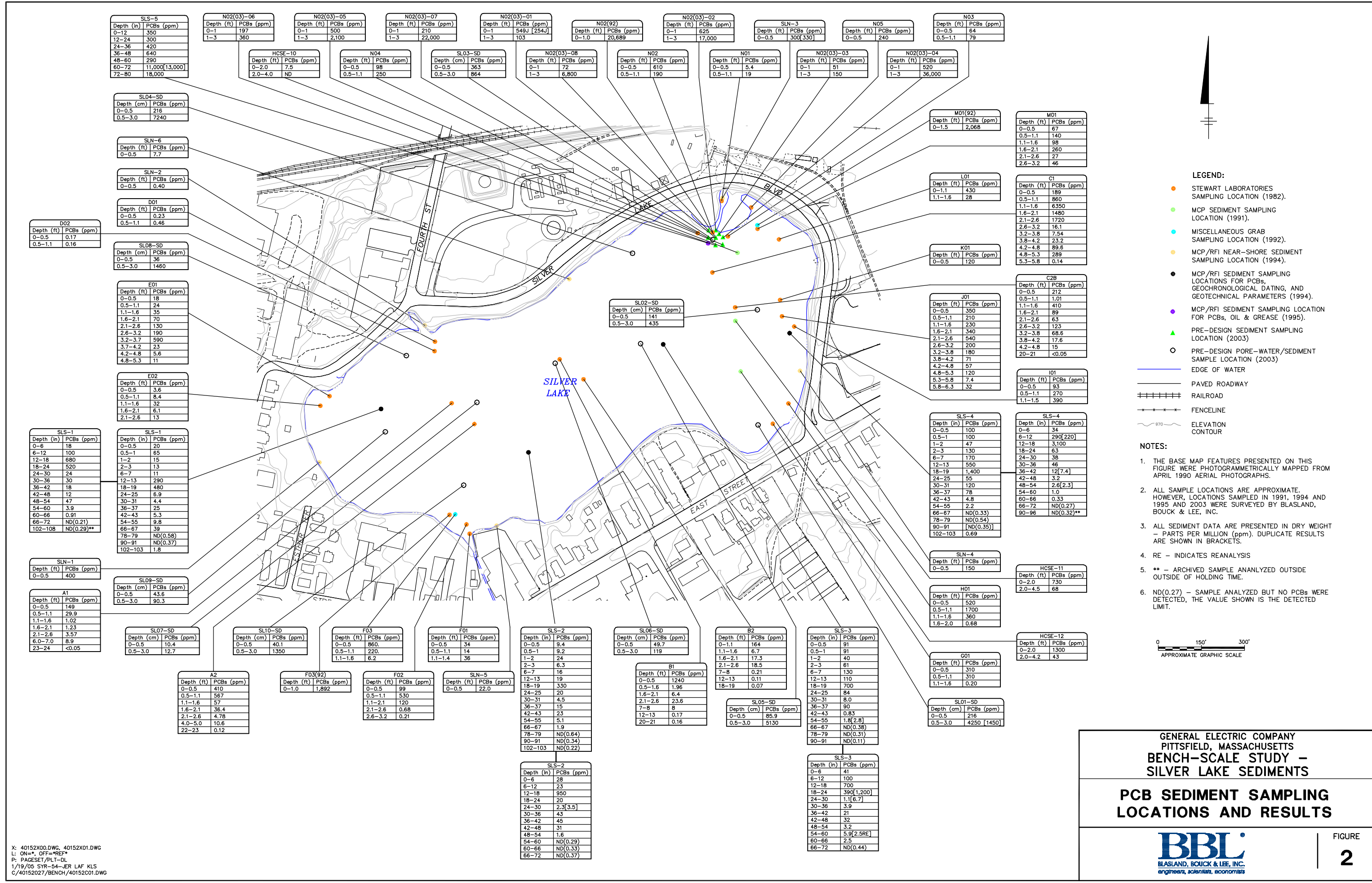
**NOTES:**

1. THE BASE MAP FEATURES PRESENTED ON THIS FIGURE WERE PHOTOGRAMMETRICALLY MAPPED FROM APRIL 1990 AERIAL PHOTOGRAPHS.
2. TAX BOUNDARY INFORMATION OBTAINED FROM CITY OF PITTSFIELD'S TAX ASSESSOR'S OFFICE AND IS CURRENT THROUGH SEPTEMBER 5, 1997.



GENERAL ELECTRIC COMPANY PITTSFIELD, MASSACHUSETTS <b>BENCH-SCALE STUDY -          SILVER LAKE SEDIMENTS</b>	
<b>SILVER LAKE SITE MAP</b>	
 <small>BBL BLASLAND, BOUCK &amp; LEE, INC. engineers, scientists, economists</small>	FIGURE <b>1</b>

X: 40152X02.DWG, 40152X03.DWG  
 LMAN: 426-A  
 P: PAGESET/PLT-BL1  
 1/20/05 SYR-85-LJP LAF SDL  
 C:/40152027/BENCH/40152B01.DWG



SLS-5	
Depth (in)	PCBs (ppm)
0-12	350
12-24	300
24-36	420
36-48	640
48-60	290
60-72	11,000 [13,000]
72-80	18,000

N02(03)-06	
Depth (ft)	PCBs (ppm)
0-1	197
1-3	360

N02(03)-05	
Depth (ft)	PCBs (ppm)
0-1	500
1-3	2,100

N02(03)-07	
Depth (ft)	PCBs (ppm)
0-1	210
1-3	22,000

N02(03)-01	
Depth (ft)	PCBs (ppm)
0-1	549J [254J]
1-3	103

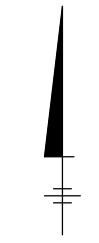
N02(92)	
Depth (ft)	PCBs (ppm)
0-1.0	20,889

N02(03)-02	
Depth (ft)	PCBs (ppm)
0-1	625
1-3	17,000

SLN-3	
Depth (ft)	PCBs (ppm)
0-0.5	300 [330]

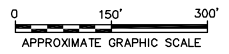
N05	
Depth (ft)	PCBs (ppm)
0-0.5	240

N03	
Depth (ft)	PCBs (ppm)
0-0.5	64
0.5-1.1	79



- LEGEND:**
- STEWART LABORATORIES SAMPLING LOCATION (1982).
  - MCP SEDIMENT SAMPLING LOCATION (1991).
  - MISCELLANEOUS GRAB SAMPLING LOCATION (1992).
  - MCP/RFI NEAR-SHORE SEDIMENT SAMPLING LOCATION (1994).
  - MCP/RFI SEDIMENT SAMPLING LOCATIONS FOR PCBs, GEOCHEMICAL DATING, AND GEOTECHNICAL PARAMETERS (1994).
  - MCP/RFI SEDIMENT SAMPLING LOCATION FOR PCBs, OIL & GREASE (1995).
  - ▲ PRE-DESIGN SEDIMENT SAMPLING LOCATION (2003)
  - PRE-DESIGN PORE-WATER/SEDIMENT SAMPLE LOCATION (2003)
  - EDGE OF WATER
  - PAVED ROADWAY
  - RAILROAD
  - FENCELINE
  - ELEVATION CONTOUR

- NOTES:**
- THE BASE MAP FEATURES PRESENTED ON THIS FIGURE WERE PHOTOGRAMMETRICALLY MAPPED FROM APRIL 1990 AERIAL PHOTOGRAPHS.
  - ALL SAMPLE LOCATIONS ARE APPROXIMATE. HOWEVER, LOCATIONS SAMPLED IN 1991, 1994 AND 1995 AND 2003 WERE SURVEYED BY BLASLAND, BOUCK & LEE, INC.
  - ALL SEDIMENT DATA ARE PRESENTED IN DRY WEIGHT - PARTS PER MILLION (ppm). DUPLICATE RESULTS ARE SHOWN IN BRACKETS.
  - RE - INDICATES REANALYSIS
  - \*\* - ARCHIVED SAMPLE ANALYZED OUTSIDE OUTSIDE OF HOLDING TIME.
  - ND(0.27) - SAMPLE ANALYZED BUT NO PCBs WERE DETECTED, THE VALUE SHOWN IS THE DETECTED LIMIT.



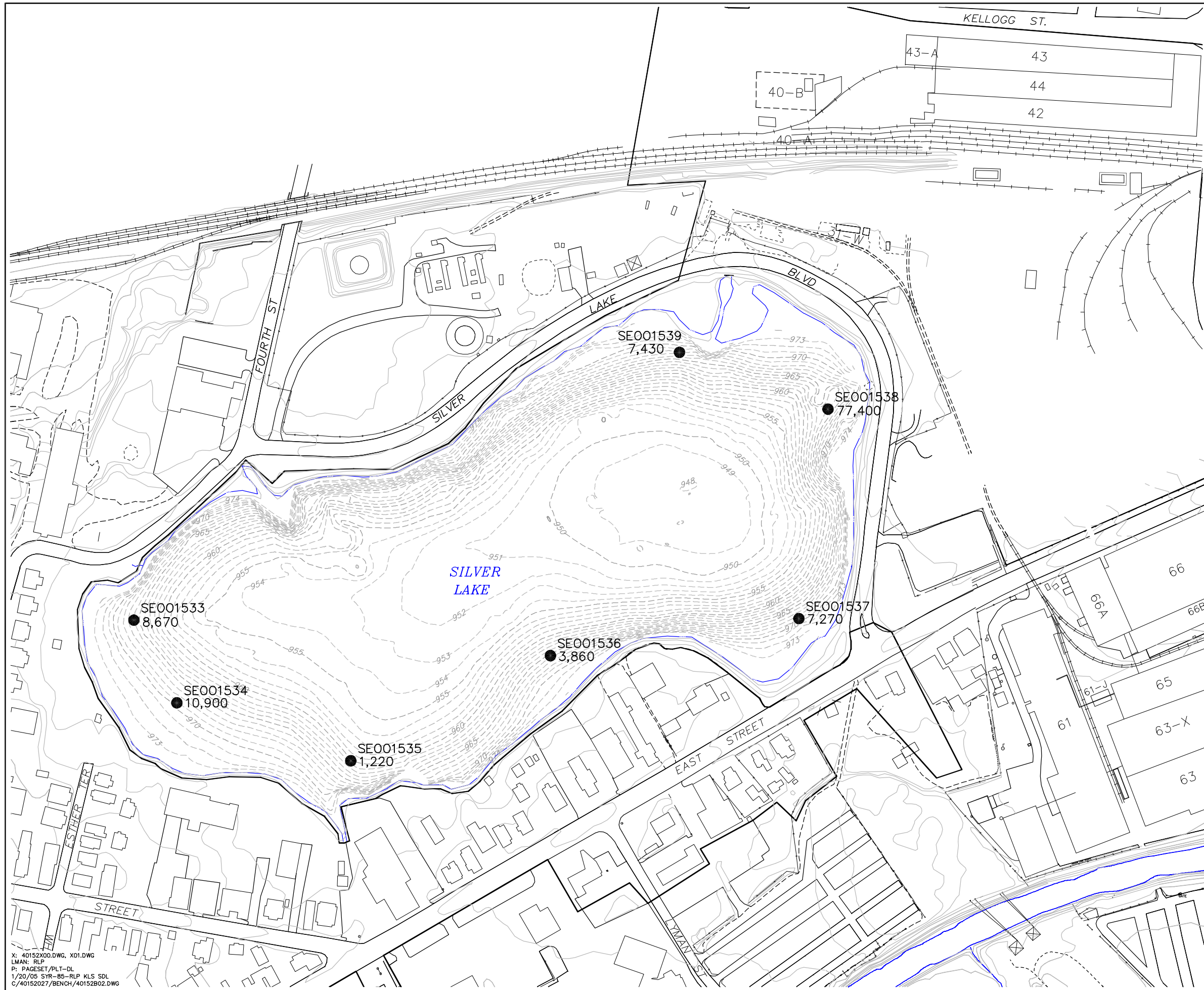
X: 40152X00.DWG, 40152X01.DWG  
 L: ON=\*, OFF=\*REF\*  
 P: PAGESET/PLT-DL  
 1/19/05 SYR-54-JER LAF KLS  
 C:/40152027/BENCH/40152C01.DWG

**GENERAL ELECTRIC COMPANY  
 PITTSFIELD, MASSACHUSETTS  
 BENCH-SCALE STUDY -  
 SILVER LAKE SEDIMENTS**

**PCB SEDIMENT SAMPLING  
 LOCATIONS AND RESULTS**

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

FIGURE  
**2**

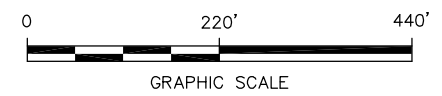


**LEGEND**

----- ELEVATION CONTOUR

● EPA SAMPLE ID  
 SE001537  
 7,270  
 TOTAL PETROLEUM HYDROCARBONS  
 CONCENTRATIONS, mg/kg

- NOTES:**
1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOCGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. - FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY, AND BLASLAND AND BOUCK ENGINEERS, P.C. CONSTRUCTION PLANS.
  2. NOT ALL PHYSICAL FEATURES SHOWN.
  3. SITE BOUNDARY IS APPROXIMATE.
  4. ALL LOCATIONS ARE APPROXIMATE.
  5. THE CONTOUR INFORMATION PRESENTED ON THIS DRAWING REPRESENTS THE RESULTS OF A SURVEY PERFORMED BY OCEAN SURVEYS, INC. ON 10-13 JUNE 2003 AND CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS EXISTING AT THAT TIME. REUSE OF THIS INFORMATION BY CLIENT OR OTHERS BEYOND THE SPECIFIC SCOPE OF WORK FOR WHICH IT WAS ACQUIRED SHALL BE AT THE SOLE RISK OF THE USER AND WITHOUT LIABILITY TO OSI.



GENERAL ELECTRIC COMPANY  
 PITTSFIELD, MASSACHUSETTS  
**BENCH-SCALE STUDY -  
 SILVER LAKE SEDIMENTS**

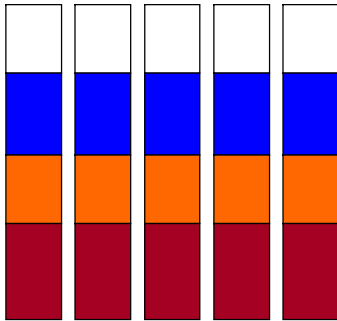
**TPH SAMPLE LOCATIONS  
 AND RESULTS**

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

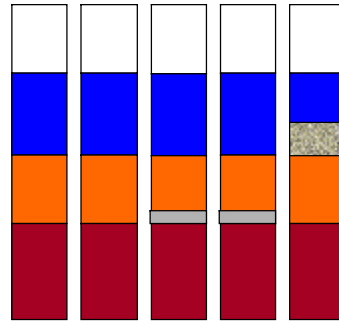
FIGURE  
**3**

X: 4015200.DWG, X01.DWG  
 LMAN: RLP  
 P: PAGESET/PLT-DL  
 1/20/05 SYR-85-RLP KLS SDL  
 C:/40152027/BENCH/40152B02.DWG

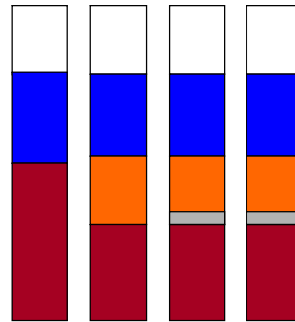
**Stage 1**  
**Various Sediments**



**Stage 2**  
**Various Placements**



**Stage 3**  
**Groundwater Flux & Gas Generation**



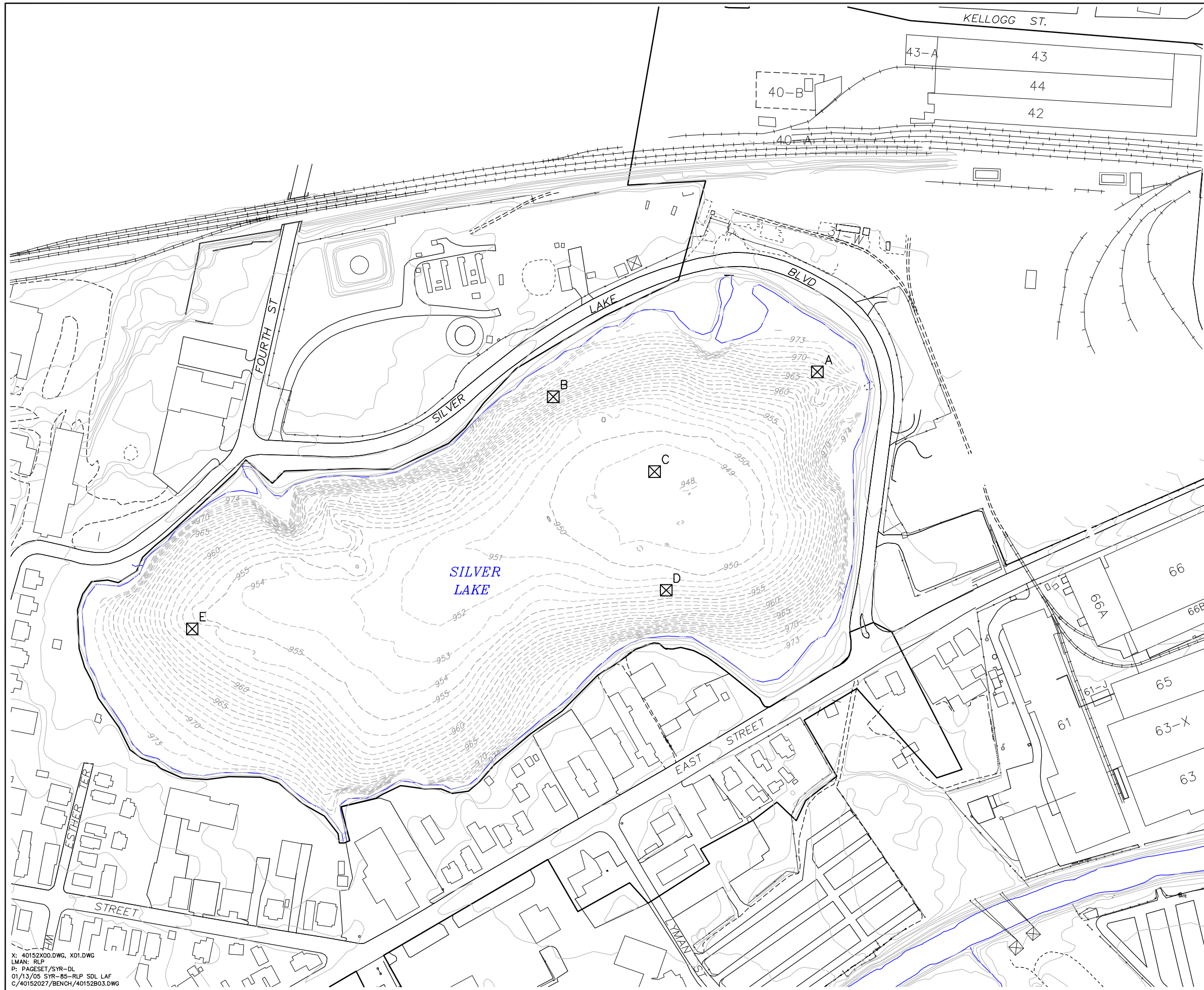
- Silver Lake Sediments
- Cap Material
- Silver Lake Water
- Geotextile/Geocomposite
- Cap Armoring Layer

GENERAL ELECTRIC COMPANY  
PITTSFIELD, MASSACHUSETTS  
**BENCH-SCALE STUDY -  
SILVER LAKE SEDIMENTS**

**BENCH-SCALE STUDY  
STAGED APPROACH**

**BBL**<sup>®</sup>  
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*engineers, scientists, economists*

FIGURE  
**4**

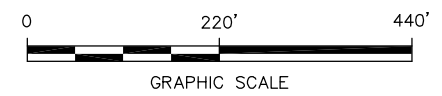


**LEGEND**

- ELEVATION CONTOUR
- ⊠ A PROPOSED SAMPLING LOCATION AND LOCATION NAME
- EDGE OF WATER
- PAVED ROADWAY
- ⊥ RAILROAD
- ⋆ FENCELINE

**NOTES:**

1. MAPPING IS BASED ON AERIAL PHOTOGRAPHS AND PHOTOCGRAMMETRIC MAPPING BY LOCKWOOD MAPPING, INC. - FLOWN IN APRIL 1990; DATA PROVIDED BY GENERAL ELECTRIC COMPANY, AND BLASLAND AND BOUCK ENGINEERS, P.C. CONSTRUCTION PLANS.
2. NOT ALL PHYSICAL FEATURES SHOWN.
3. SITE BOUNDARY IS APPROXIMATE.
4. ALL LOCATIONS ARE APPROXIMATE.
5. THE CONTOUR INFORMATION PRESENTED ON THIS DRAWING REPRESENTS THE RESULTS OF A SURVEY PERFORMED BY OCEAN SURVEYS, INC. ON 10-13 JUNE 2003 AND CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS EXISTING AT THAT TIME. REUSE OF THIS INFORMATION BY CLIENT OR OTHERS BEYOND THE SPECIFIC SCOPE OF WORK FOR WHICH IT WAS ACQUIRED SHALL BE AT THE SOLE RISK OF THE USER AND WITHOUT LIABILITY TO OSI.



<p>GENERAL ELECTRIC COMPANY PITTSFIELD, MASSACHUSETTS <b>BENCH-SCALE STUDY - SILVER LAKE SEDIMENTS</b></p>	
<p><b>PROPOSED BENCH-SCALE STUDY SAMPLE LOCATIONS</b></p>	
	<p>FIGURE <b>5</b></p>

X: 4015200.DWG, X01.DWG  
LMAN: RLP  
P: PAGESET/SYR-DL  
01/13/05 SYR-85-RLP SDL LAF  
C/40152027/BENCH/40152B03.DWG



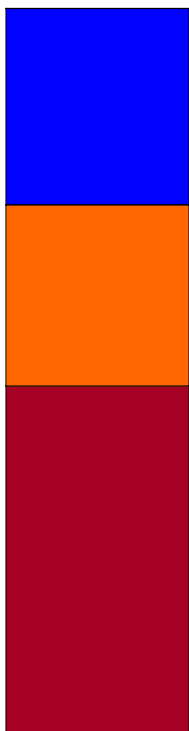
GENERAL ELECTRIC COMPANY  
PITTSFIELD, MASSACHUSETTS  
**BENCH SCALE STUDY -  
SILVER LAKE SEDIMENTS**

**PROPOSED STAGE 1/STAGE 2  
COLUMN TEST SCHEMATIC**

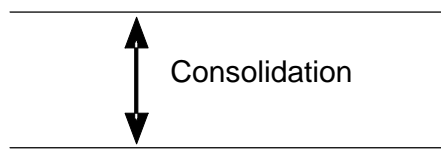
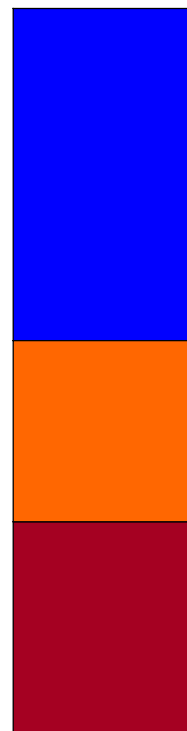
**BBL**<sup>®</sup>  
BLASLAND, BOUCK & LEE, INC.  
*engineers, scientists, economists*

FIGURE  
**6**

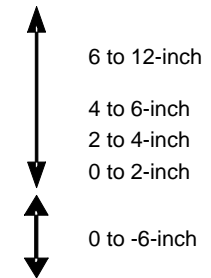
**Pre-Consolidation Column**






**Post-Consolidation Column**



Post-Consolidation Sample Intervals



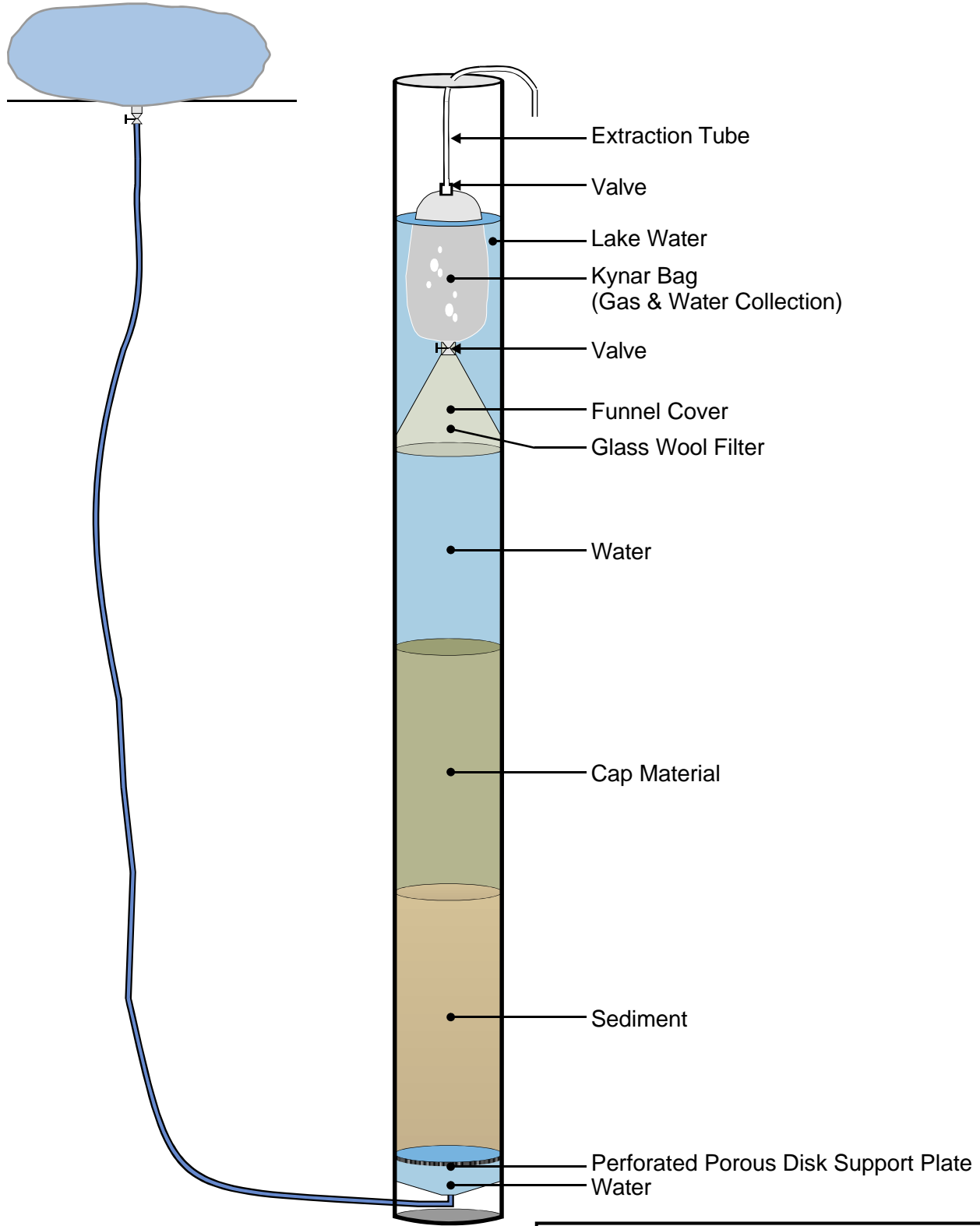
-  Silver Lake Sediments
-  Cap Material
-  Silver Lake Water

GENERAL ELECTRIC COMPANY  
PITTSFIELD, MASSACHUSETTS  
**BENCH-SCALE STUDY -  
SILVER LAKE SEDIMENTS**

**CONSOLIDATION COLUMN SCHEMATIC  
AND POST-CONSOLIDATION  
SAMPLE INCREMENTS**



FIGURE  
**7**



**NOT-TO-SCALE**

GENERAL ELECTRIC COMPANY  
 PITTSFIELD, MASSACHUSETTS  
**BENCH-SCALE STUDY -  
 SILVER LAKE SEDIMENTS**

**PROPOSED STAGE 3  
 COLUMN TEST SET UP**

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FIGURE  
**8**