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

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Re: Source Control Investigations and Preliminary Containment Barrier Design for East Street Area 2, General Electric Company, Pittsfield, Massachusetts DEP Site No. 1-0146, USEPA Area 4

Dear Mr. Olson, Mr. Tagliaferro, Mr. Weinberg:

I. INTRODUCTION

The General Electric Company (GE) has recently completed field work related to non-aqueous phase liquids (NAPLs) previously detected and addressed at USEPA Area 4/MCP East Street Area 2 in Pittsfield, Massachusetts (the Site). More specifically, the field work provided further information concerning subsurface conditions in the vicinity of existing 64V oil recovery system and near the adjacent riverbank area (the area). This letter summarizes the results of the field investigations conducted thus far in this area, and presents preliminary design information concerning the activities identified by GE to supplement the NAPL containment/recovery measures that are currently in place in this area.

The work described in this letter satisfies certain requirements of the United States Environmental Protection Agency (USEPA), as presented in its letter dated August 14, 1998 and as subsequently addressed by GE in a document entitled *Source Control Work Plan - Upper Reach of Housatonic River (First ½ Mile)*, dated September 1998 (Work Plan). As previously indicated in the Work Plan, GE believes that its current containment/recovery measures control any significant migration of NAPLs in the riverbank area. Although the results of the recent field work (summarized herein) do not alter GE's position regarding this matter, pursuant to its commitment presented in the Work Plan, GE will proceed with the design and installation of an additional NAPL containment barrier in this area.

In addition to summarizing the results of the field work conducted thus far, this letter provides preliminary information concerning the design of a proposed containment barrier. This containment barrier will be installed to supplement existing containment/recovery measures that are currently in place to address light NAPLs (i.e., LNAPLs). Additionally, this letter includes a proposal to further evaluate the detection of coal-tar derived dense NAPLs (DNAPLs) in this area, and propose certain recovery measures if warranted.

With concurrence from the USEPA and the Massachusetts Department of Environmental Protection (the Agencies) regarding the contents of this letter (specifically the preliminary containment barrier design information), GE will coordinate purchase and delivery of the necessary materials (i.e., steel sheetpiling) to allow the start of sheetpile installation this year. Prior to the implementation of the LNAPL containment barrier, GE will prepare a detailed Investigation Summary and Design Report for this area that will provide more detailed information concerning the results of the pre-design investigations, the final design for the LNAPL containment barrier, and additional evaluations regarding potential recovery of DNAPLs.

II. INVESTIGATION SUMMARY

A. Field Investigations

The scope of field investigations just conducted in the subject area were identified in response to the USEPA's August 14, 1998 letter (requiring such activities). The Work Plan was conditionally approved in a letter from the USEPA dated October 6, 1998. Subsequently, between October 7 and November 10, 1998, HSI/GeoTrans, Inc. advanced a total of 19 soil borings at 17 locations (E2SC-1 through E2SC-17). The majority of these soil borings were installed in the area of the existing 64V oil recovery system, the existing slurry wall, and the adjacent riverbank area (see Figure 1). Borings E2SC-12 and E2SC-15 are located to the southwest in the Building 60 and 61 areas, respectively. During the performance of these field investigations, oversight of GE's activities was performed by the USEPA, through use of an oversight contractor.

For each soil boring, representative soil samples were collected and analyzed for polychlorinated biphenyls and other hazardous constituents listed in Appendix IX of 40 CFR 264 [excluding herbicides/pesticides and including benzidene, 2-chloroethylvinyl ether, and 1,2-diphenylhydrazine (Appendix IX+3)]. Attachment A to this letter provides the soil boring logs that were prepared for each location, indicating the visual classification of the materials encountered; the presence of saturated soil conditions (indicating the general presence of groundwater); visual evidence of discoloration, staining, sheens, or non-aqueous liquids; and results of standard penetration testing. Table 1 lists the soil samples that were collected from each boring and the associated laboratory analyses. Table 2 presents the preliminary results of PCB analyses, while Attachment B provides the results of Appendix IX+3 analyses available to date.

Following drilling, a number of the soil borings were converted into monitoring wells to monitor the subsurface soils for the presence of NAPLs. A total of 13 wells were installed based on the locations and selection criteria proposed in the Work Plan and comments included in the USEPA's approval letter. Table 3 summarizes the boring and well construction details. Once installed, the wells were gauged periodically for water level elevation and the presence of NAPLs. Table 4 presents the results of the periodic well gauging effort.

Of the 13 recently installed monitoring wells, a measurable thickness of LNAPL was detected in only one well, ES2SC-6. However, the NAPL in this well is very viscous and appears (based on field observations) to be a mixture of LNAPL and DNAPL. A sheen was also noted on the oil/water interface probe on one occasion in shallow well E2SC-16S. Measurable accumulations of DNAPL have been detected in two wells (E2SC-3I and E2SC-17). In well E2SC-16I, a trace of DNAPL was noted on the oil/water interface probe. Sheens have also been detected sporadically on the probe when measuring deep wells E2SC-1, E2SC-2, E2SC-4, and E2SC-9. In addition to periodic well gauging, a sample of the accumulated DNAPL from well E2SC-3I was submitted for analysis of PCBs and Appendix IX+3 constituents. The preliminary analytical results are summarized on Table 5.

B. Preliminary Findings

The data collected from the recent soil borings and monitoring wells -- combined with data available from prior investigations in this portion of East Street Area 2 -- have been used to further delineate the type(s) of subsurface deposits present in this area and to assess the depth to the basal till layer. Using the data, a preliminary till elevation contour map has been developed for the subsurface area in the vicinity of the riverbank (Figure 2). In addition, a preliminary geologic cross section

generally parallel to the river has been prepared and is included as Figure 3 (the location of the cross section is shown on Figure 2). This information illustrates that the depth to till is approximately 30 to 45 feet below ground surface in the riverbank area, which is generally consistent with previous estimates. Overlying the till layer are stratified sand, gravel, and silt deposits, which are described in the attached boring logs and shown on the cross section (information concerning the grain size distribution of the overlying materials is presented in Attachment C).

With respect to the presence of NAPLs, information from the soil boring logs (Attachment A) and well gauging activities (Table 4) indicate that certain areas of soil staining, sheens, and separate-phase light and dense NAPLs are present within the subsurface soils. The information related to soil staining/discoloration and presence of sheens in the area associated with LNAPL is generally consistent with prior investigation results. With respect to DNAPLs, they occur within the general area of boring locations E2SC-3I and E2SC-17. This corresponds to a depression in the basal till layer located approximately 40 to 45 feet below ground surface -- or approximately 25 to 30 feet below the river bed. Visual and chemical information (Table 5) associated with this DNAPL indicates that the material is similar to typical coal tar residuals. Numerous semi-volatile organic compounds were detected with individual constituent concentrations up to 110,000 parts per million (naphthalene). PCBs were not detected in the DNAPL sample. The identification of coal tars is consistent with the results of previous investigations within East Street Area 2, where coal tar DNAPLs have been detected in wells located north and west of the newly installed wells (this general area is downgradient of a former manufactured gas facility). Prior monitoring has detected DNAPL in wells 28, 64V, and ES2-6 although no DNAPL has been detected in ES2-6 during monthly monitoring which was initiated in May 1996. Periodic gauging of the newly installed wells indicates a measured DNAPL thickness of approximately 5 feet in well E2SC-3I (Table 4).

III. PRELIMINARY CONTAINMENT BARRIER DESIGN

Based on the field work described in this letter, GE has identified future LNAPL and DNAPL containment/recovery measures to meet the requirements of the Work Plan as approved by the USEPA. As described below, GE proposes to continue the ongoing LNAPL recovery operations, and to expand those operations to include the installation of a sheetpile-based containment barrier along the riverbank. With respect to DNAPLs, GE will evaluate the need for, scope of, and potential effectiveness of an active recovery system. Additional information concerning these activities is provided below.

The proposed location of the LNAPL containment barrier is shown on Figure 4. Information concerning visual evidence of soil staining, sheens, depth to groundwater, and laboratory analytical results have been considered in selecting this location. In addition, the objectives of the source control activities as they relate to the future Housatonic River bank soil and sediment removal project in this stretch of the river were also considered (i.e., the possible removal of bank soils and sediments from this area and the structural support needed to brace the remaining riverbank during such activities). The horizontal extent of the proposed containment barrier has been selected to include those recent and prior soil borings and monitoring wells where separate-phase LNAPL has been detected in the vicinity of the riverbank. At many of these locations, the LNAPL appears to be present at residual saturation levels.

The western end of the proposed containment barrier will include existing well PZ-1S, where separate-phase LNAPL has been detected. In that area, the containment barrier will conservatively extend to include soil boring SB-1 and recent soil boring E2SC-10 (even though no evidence of LNAPLs or soil staining has been observed). The eastern end of the proposed containment barrier will include well PZ-4S, where separate-phase LNAPLs have been detected. The proposed containment barrier will also extend to include existing wells 54 and E2SC-16, where some evidence of soil staining has been identified.

However, it should be noted that separate-phase LNAPL has not been measured in either of these wells (well 54 has been monitored on a semi-annual basis since 1988). As presented above, the length of the containment barrier along the riverbank is approximately 350 feet. With the addition of wing walls (to aid in directing the flow of groundwater and the capture of any LNAPLs), the overall length of the proposed containment barrier is approximately 450 feet.

With respect to the vertical extent of the proposed containment barrier, a minimum elevation of approximately 960 feet has been selected for the bottom elevation of the sheetpile wall. This elevation is based on a number of considerations, including the results of the subsurface soil investigations, i.e., visual evidence concerning the vertical extent of LNAPL soil staining, sheens, etc., and information concerning the typical (i.e., seasonal) and historic fluctuations in groundwater elevations along the riverbank. Based on these considerations, the proposed containment barrier will be adequate to effectively capture any LNAPLs that may potentially migrate toward the river. The proposed containment barrier supplements (as a conservative measure) the existing LNAPL controls already in place, i.e., an approximate 400-foot soil-bentonite slurry wall, four active LNAPL pumping wells, and the riverbank boom/containment system.

Regarding the installation of the containment barrier relative to the riverbank, GE has selected a location within the lower portion of the bank adjacent to the typical edge of water. This location has been selected based on several considerations, including the performance of future sediment and bank soil removal actions within this river reach and the ability to contain any LNAPLs that may be present within the riverbank. A conceptual cross section of the proposed containment barrier is provided on Figure 5. Based on a minimum bottom elevation of 960 feet, and a ground surface elevation corresponding to the proposed installation location (ranging from approximately 975 to 978 feet), the necessary vertical length of sheetpiling for the containment barrier is approximately 15 to 18 feet. However, considering preliminary information and calculations regarding the possible removal of bank soils and river sediments, a 20-foot installation depth is anticipated to provide the necessary structural support (including an appropriate factor-of-safety) during excavation activities. Therefore, it is likely that in certain areas, the depth of the sheetpiling will extend to an elevation below 960 feet.

The type of sheetpile to be used for the proposed containment barrier will be consistent with that currently being installed near GE's Building 68 area (i.e., Waterloo-type sheetpile). Waterloo sheetpiling is used to create a low-permeability sheetpile wall that utilizes specially designed sheetpile joints and clay/cement grout, to minimize any potential for water leakage through the sheetpile sections. Attachment D provides additional vendor information concerning the Waterloo sheetpile.

Based on the preliminary results of the groundwater modeling conducted for this area, as well as the inclusion of wing walls at each end of the sheetpile wall, it appears that no significant additional hydraulic controls will be necessary. However, further assessment of the hydraulics is ongoing. Additional details regarding the design of the proposed sheetpile installation, including the results of hydraulic modeling and structural design calculations, will be provided in a forthcoming submittal to the Agencies, as discussed in Part IV of this letter.

With respect to DNAPL recovery, GE will further evaluate the need for and technical feasibility of an active recovery system involving the use of DNAPL recovery pumps. An active pumping system to recover subsurface DNAPLs will initially be evaluated in lieu of other potential options, including the installation of a sheetpile containment barrier extending into the underlying till layer, for the following reasons:

- The location and nature of the detected DNAPLs (at a depth of 40 to 45 feet below ground surface -- approximately 25 to 30 feet below the river bottom) indicate that these materials are not migrating into or toward the river.

- If sheetpiling were installed to the underlying till layer, several additional design concerns would result. Among these are the potential changes in groundwater flow directions, which could adversely affect existing LNAPL containment/recovery measures, the need for additional hydraulic controls, and possible difficulties in recovering any DNAPL that may potentially be located south of the proposed installed sheetpile location.

- Sheetpile installation to a depth of approximately 45 to 50 feet below ground surface would require an increased sheetpile wall thickness. Such material, although available, would require special ordering and would result in an increased delivery time and likely not be available until 1999.

For the reasons summarized above, a supplemental containment barrier to address LNAPLs, along with the existing measures, should provide sufficient LNAPL control in this area of the GE facility. As a follow-up to the current source control investigations, GE will collect additional information to assess the need for a DNAPL recovery system, including additional testing and possibly a pilot test to evaluate the feasibility of removal. GE will also evaluate the results of the geophysical testing conducted in this vicinity and assess the need for further boring/well installation.

IV. NEAR-TERM ACTIVITIES

Following Agency review and comment concerning the contents of this letter, GE will coordinate the purchase and delivery of the necessary sheetpiling to facilitate the start of the containment barrier installation this year. Also, over the next few weeks, GE will continue to perform detailed design-related activities toward the submittal of a final Investigation Report and Design Summary. Included in that report will be updated information (i.e., final boring logs, cross sections, laboratory results, etc.), as well as detailed design calculations, including final sheetpile layout and structural calculations, the results of the hydraulic modeling, and other implementation related issues. That report will also further address the need for and scope of DNAPL containment/recovery measures.

V. SUMMARY AND SCHEDULE

This letter presents the results of recent field work and preliminary design activities performed pursuant to the *Source Control Work Plan - Upper Reach of Housatonic River (First ½ Mile)*, pertinent to a portion of the East Street Area 2 site. The recent field work supplements the information available from prior investigations conducted in this area, and furthers GE's understanding of the subsurface conditions in this area. Based on these results and in accordance with the Work Plan, GE has identified additional NAPL containment/recovery measures. For LNAPLs, approximately 450 linear feet of steel sheetpiling will be installed along the base of the riverbank. This barrier wall will extend approximately 20 feet below the base of the riverbank and will supplement the existing LNAPL control measures already in place. With respect to the detection of DNAPLs at certain locations in this area, the proposed follow-up activities will include further evaluation of the potential extent of DNAPL and the feasibility of its recovery.

As previously indicated, the primary intent of this letter is to identify, for Agency review and comment, the preliminary location, depth, type, and quantity of the proposed sheetpile wall. With Agency concurrence, GE will proceed with the purchase and delivery of the sheetpile materials. Subsequent to this letter, GE will also provide a more complete and detailed Investigation Summary and Design Report that will include additional information related to various aspects of the source control investigations and

design. That report should be available for USEPA in the first week of December 1998. Additional information concerning the anticipated implementation schedule is presented in Figure 6.

We look forward to receiving your comments regarding this letter, and specifically any comments related to the proposed LNAPL containment barrier.

Yours truly,

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Tables

Table 1. General Electric Co., Pittsfield, Massachusetts, East Street Area 2 source control investigations samples collected

BORING	SAMPLE ID	DATE	TIME	DEPTH	ANALYSES
E2SC-01	CS01	10/9/98	14:56	0-1	PCBs
E2SC-01	CS0106	10/9/98	14:56	1-6	PCBs
E2SC-01	CS0615	10/9/98	14:56	6-15	PCBs & App 9 + 3
E2SC-01	CS3840	10/12/98	13:50	38-40	PCBs & App 9 + 3
E2SC-01	SS09	10/9/98	14:44	14-15	App 9 Volitile Organics
E2SC-01	SS22	10/12/98	13:50	38-40	App 9 Volitile Organics
E2SC-01	SS25	10/12/98	14:45	44-46	PCBs
E2SC-02	CS01	10/21/98	8:34	0-1	PCBs
E2SC-02	CS0106	10/21/98	10:25	1-6	PCBs
E2SC-02	CS0615	10/21/98	10:25	6-15	PCBs & App 9 + 3
E2SC-02	CS0615D	10/23/98	16:40	6-15	Duplicate PCBs & App 9 + 3 Base Neutral Acid Extractable, Metals, & Cyanide
E2SC-02	CS4042	10/23/98	10:03	40-42	PCBs & App 9 + 3
E2SC-02	CS4042D	10/23/98	10:03	40-42	Duplicate App 9 + 3 Sulfide & Dioxide
E2SC-02	SS09	10/21/98	9:32	14-15	App 9 Volatile Organics
E2SC-02	SS22	10/23/98	10:03	38-40	App 9 Volatile Organics
E2SC-03	CS01	10/15/98	9:39	0-1	PCBs
E2SC-03	CS0106	10/15/98	9:39	1-6	PCBs
E2SC-03	CS0615	10/15/98	9:39	6-15	PCBs & App 9 + 3
E2SC-03	CS4448	10/15/98	14:00	44-48	PCBs & App 9 + 3
E2SC-03	SS08	10/15/98	9:18	12-14	App 9 Volatile Organics
E2SC-03	SS25	10/15/98	13:45	44-46	App 9 Volatile Organics
E2SC-04	CS01	10/13/98	12:03	0-1	PCBs
E2SC-04	CS0106	10/13/98	13:00	1-6	PCBs
E2SC-04	CS0615	10/13/98	14:00	6-15	PCBs & App 9 + 3
E2SC-04	SS09	10/13/98	13:15	14-15	App 9 Volatile Organics
E2SC-04	GS01	10/14/98	9:40	0-5	PCB, Grain Size
E2SC-04	GS02	10/15/98	9:40	5-15.4	PCB, Grain Size
E2SC-04	GS03	10/16/98	9:40	15.4-24	PCB, Grain Size
E2SC-04	GS04	10/17/98	9:40	24-39	PCB, Grain Size
E2SC-04	GS05	10/18/98	9:40	39-43	PCB, Grain Size, Atterburg limit
E2SC-04	GS06	10/19/98	9:40	43-	PCB, Grain Size, Atterburg limit
E2SC-05	CS01	10/25/98	10:35	0-1	PCBs
E2SC-05	CS0106	10/25/98	10:35	1-6	PCBs
E2SC-05	CS0615	10/25/98	10:35	6-15	PCBs & Appendix IX + 3
E2SC-05	CS3840	10/26/98	10:35	38-40	PCBs & Appendix IX + 3
E2SC-05	CS4042	10/26/98	10:23	40-42	PCBs
E2SC-05	SS07	10/25/98	10:18	10-12	Appendix IX Volatile Organics
E2SC-05	SS22	10/26/98	10:05	38-40	Appendix IX Volatile Organics

Table 1. (Continued)

BORING	SAMPLE ID	DATE	TIME	DEPTH	ANALYSES
E2SC-06	CS0106	10/23/98	16:35	1-6	PCBs
E2SC-06	CS0615	10/23/98	16:40	6-15	PCBs & Appendix IX + 3
E2SC-06	SS08	10/23/98	16:08	12-14	Appendix IX Volatile Organics
E2SC-07	CS01	10/27/98	8:58	0-1	PCBs
E2SC-07	CS0106	10/27/98	8:58	1-6	PCBs
E2SC-07	CS0615	10/27/98	8:58	6-15	PCBs & Appendix IX + 3
E2SC-07	CS3840	10/27/98	13:40	38-40	PCBs
E2SC-07	SS09	10/27/98	8:48	14-15	Appendix IX Volatile Organics
E2SC-08	CS0106	10/14/98	17:15	1-6	PCBs
E2SC-08	CS0615	10/14/98	17:15	6-15	PCBs
E2SC-08	CS4244	10/19/98	13:30	42-44	PCBs
E2SC-09	CS01	10/21/98	8:25	0-1	PCBs
E2SC-09	CS0106	10/21/98	9:30	1-6	PCBs
E2SC-09	CS0615	10/21/98	9:30	6-15	PCBs & Appendix IX + 3
E2SC-09	CS4042	10/21/98	12:55	40-42	PCBs
E2SC-09	SS06	10/21/98	9:00	8-10	Appendix IX Volatile Organics
E2SC-10	CS01	10/20/98	9:00	0-1	PCBs
E2SC-10	CS0106	10/20/98	10:30	1-6	PCBs & Appendix IX + 3
E2SC-10	CS0615	10/20/98	10:30	6-15	PCBs
E2SC-10	CS2830	10/20/98	11:51	28-30	PCBs
E2SC-10	SS03	10/20/98	9:48	3-5	Appendix IX Volatile Organics
E2SC-11	CS01	10/9/98	11:02	0-1	PCBs
E2SC-11	CS0106	10/9/98	11:02	1-6	PCBs
E2SC-11	CS0615	10/9/98	11:02	6-15	PCBs & Appendix IX + 3
E2SC-11	SS05	10/9/98	9:45	6-8	Appendix IX Volatile Organics
E2SC-12	CS0106	10/19/98	11:06	1-6	PCBs
E2SC-12	CS0615	10/19/98	11:06	6-15	PCBs & Appendix IX + 3
E2SC-12	CS3032	10/19/98	13:55	30-32	PCBs
E2SC-12	SS05	10/19/98	10:35	6-8	Appendix IX Volatile Organics
E2SC-13	CS01	10/9/98	14:30	0-1	PCBs
E2SC-13	CS0106	10/9/98	14:30	1-6	PCBs
E2SC-13	CS0516	10/7/98	14:38	8-15	PCBs & Appendix IX + 3
E2SC-13	SS08	10/7/98	14:30	14-15	Appendix IX Volatile Organics
E2SC-14	CS01	10/8/98	10:30	0-1	PCBs
E2SC-14	CS0106	10/8/98	10:30	1-6	PCBs
E2SC-14	CS0615	10/8/98	10:30	6-15	PCBs & Appendix IX + 3

Table 1. (Continued)

BORING	SAMPLE ID	DATE	TIME	DEPTH	ANALYSES
E2SC-14	SS06	10/8/98	9:32	8-10	Appendix IX Volatile Organics
E2SC-15	CS0615	10/20/98	9:59	6-15	PCBs & Appendix IX + 3
E2SC-15	CS3436	10/20/98	13:42	34-36	PCBs
E2SC-15	SS08	10/20/98	9:39	12-14	Appendix IX Volatile Organics
E2SC-16	CS01	10/8/98	15:18	0-1	PCBs
E2SC-16	CS0106	10/8/98	15:18	1-6	PCBs
E2SC-16	CS0615	10/8/98	15:18	6-15	PCBs & Appendix IX + 3
E2SC-16	SS10	10/8/98	15:18	15-17	Appendix IX Volatile Organics
E2SC-16I	CS4042	11/10/98	11:14	40-42	PCBs & Appendix IX + 3
E2SC-16I	CS4850	11/10/98	1:10	48-50	PCBs
E2SC-16I	SS23	11/10/98	11:14	40-42	Appendix IX Volatile Organics
E2SC-17	CS01	10/27/98	15:40	0-1	PCBs
E2SC-17	CS0106	10/26/98	9:34	1-6	PCBs
E2SC-17	CS0615	10/26/98	9:34	6-15	PCBs & Appendix IX + 3
E2SC-17	CS4244	10/26/98	16:00	42-44	PCBs & Appendix IX + 3
E2SC-17	CS4749	10/27/98	9:40	47-49	PCBs
E2SC-17	SS05	10/26/98	8:50	6-8	Appendix IX Volatile Organics
E2SC-17	SS24	10/26/98	15:18	42-44	Appendix IX Volatile Organics

Table 2. General Electric Co., Pittsfield, Massachusetts, East Street Area 2 source control investigations, preliminary PCB soil concentration data

Boring	Sample Number	Depth (Ft.)	Aroclor Concentration (mg/kg)							
			1016	1221	1232	1242	1248	1254	1260	Total
E2SC-01	E2SC-01-CS01	0-1	ND	ND	ND	ND	ND	ND	0.66	0.66
E2SC-01	E2SC-01-CS0106	1-6	ND	ND	ND	ND	ND	ND	0.71	0.71
E2SC-01	E2SC-01-CS0615	6-15	ND	ND	ND	ND	ND	ND	0.06	0.06
E2SC-01	E2SC-01-CS3840	38-40	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-01	E2SC-01-SS25	44-46	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-02	E2SC-02-CS01	0-1	ND	ND	ND	ND	ND	ND	49.00	49.00
E2SC-02	E2SC-02-CS0106	1-6	ND	ND	ND	ND	ND	ND	43.00	43.00
E2SC-02	E2SC-02-CS0615	6-15	ND	ND	ND	ND	ND	ND	17.00	17.00
E2SC-02	E2SC-02-CS4042	40-42	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-03	E2SC-03-CS01	0-1	ND	ND	ND	ND	ND	ND	25.00	25.00
E2SC-03	E2SC-03-CS0106	1-6	ND	ND	ND	ND	ND	ND	52.00	52.00
E2SC-03	E2SC-03-CS0615	6-15	ND	ND	ND	ND	ND	ND	22.00	22.00
E2SC-03	E2SC-03-CS4448	44-48	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-04	E2SC-04-CS01	0-1	ND	ND	ND	ND	ND	ND	0.99	0.99
E2SC-04	E2SC-04-CS0106	1-6	ND	ND	ND	ND	ND	0.17	0.19	0.28
E2SC-04	E2SC-04-CS0615	6-15	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-04	E2SC-04-CS4244	42-44	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-05	E2SC-05-CS01	0-1	ND	ND	ND	ND	ND	ND	1.60	1.60
E2SC-05	E2SC-05-CS0106	1-6	ND	ND	ND	ND	ND	ND	0.29	0.29
E2SC-05	E2SC-05-CS0615	6-15	ND	ND	ND	ND	ND	ND	0.13	0.13
E2SC-05	E2SC-05-CS3840	38-40	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-05	E2SC-05-CS4042	40-42	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-06	E2SC-06-CS01	0-1	ND	ND	ND	ND	ND	ND	0.59	0.59
E2SC-06	E2SC-06-CS0106	1-6	ND	ND	ND	ND	ND	ND	0.07	0.07

Table 2. (Continued)

BORING	SAMPLE NUMBER	DEPTH (FT.)	AROCLOR CONCENTRATION (MG/KG)							
			1016	1221	1232	1242	1248	1254	1260	TOTAL
E2SC-07	E2SC-07-CS0615	6-15	ND	ND	ND	ND	ND	ND	1.40	1.40
E2SC-07	E2SC-07-CS3840	38-40	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-08	EW2SC-08-CS0106	1 - 6	ND	ND	ND	ND	ND	ND	170.00	170.00
E2SC-08	EW2SC-08-CS0615	6 - 15	ND	ND	ND	ND	ND	ND	210.00	210.00
E2SC-08	E2SC-08 CS4244	42-44	ND	ND	ND	ND	ND	ND	0.13	0.13
E2SC-09	E2SC-09-CS01	0-1	ND	ND	ND	ND	ND	ND	20.00	20.00
E2SC-09	E2SC-09-CS0106	1-6	ND	ND	ND	ND	ND	ND	3.90	3.90
E2SC-09	E2SC-09-CS0615	6-15	ND	ND	ND	ND	ND	ND	140.00	140.00
E2SC-09	E2SC-09-CS4042	40-42	ND	ND	ND	ND	ND	ND	0.11	0.11
E2SC10	E2SC-10-CS01	0-1	ND	ND	ND	ND	ND	ND	0.19	0.19
E2SC10	E2SC-10-CS0106	1-6	ND	ND	ND	ND	ND	ND	0.15	0.15
E2SC10	E2SC-10-CS0615	6-15	ND	ND	ND	ND	ND	ND	ND	ND
E2SC10	E2SC-10-CS2830	28-30	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-11	E2SC-11-CS01	0-1	ND	ND	ND	ND	ND	ND	0.10	0.10
E2SC-11	E2SC-11-CS0106	1-6	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-11	E2SC-11-CS0615	6-15	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-12	E2SC-12-CS01	0-1	ND	ND	ND	ND	ND	ND	0.19	0.19
E2SC-12	E2SC-12-CS0106	1-6	ND	ND	ND	ND	ND	83.00	91.00	91.00
E2SC-12	E2SC-12-CS0615	6-15	ND	ND	ND	ND	ND	ND	65.00	65.00
E2SC-12	E2SC-12-CS3032	30-32	ND	ND	ND	ND	ND	0.11	0.15	0.26
E2SC-13	ES2C-13-CS0106	0-1	ND	ND	ND	ND	ND	ND	0.21	0.21
E2SC-13	ES2C-13-CS0106	1-6	ND	ND	ND	ND	ND	ND	ND	ND

Table 2. (Continued)

Boring	Sample Number	Depth (Ft.)	Aroclor Concentration (mg/kg)							
			1016	1221	1232	1242	1248	1254	1260	Total
E2SC-14	E2SC-14-CS0615	6-15	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-15	E2SC-15-CS0106	1-6	ND	ND	ND	ND	ND	31.00	49.00	80.00
E2SC-15	E2SC-15-CS0615	6-15	ND	ND	ND	ND	ND	0.26	0.39	0.65
E2SC-15	E2SC-15-CS3436	34-36	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-16	E2SC-16-CS01	0-1	ND	ND	ND	ND	ND	ND	120.00	120.00
E2SC-16	E2SC-16-CS0106	1-6	ND	ND	ND	ND	ND	ND	1.50	1.50
E2SC-16	E2SC-16-CS0615	6-15	ND	ND	ND	ND	ND	ND	0.68	0.68
E2SC-17	E2SC-17-CS01	0-1	ND	ND	ND	ND	ND	ND	2.40	2.40
E2SC-17	E2SC-17-CS0106	1-6	ND	ND	ND	ND	ND	ND	24.00	24.00
E2SC-17	E2SC-17-CS0615	6-15	ND	ND	ND	ND	ND	ND	0.37	0.37
E2SC-17	E2SC-17-CS4244	42-44	ND	ND	ND	ND	ND	ND	ND	ND
E2SC-17	E2SC-17-CS4749	47-49	ND	ND	ND	ND	ND	ND	ND	ND

Table 3. General Electric Co., Pittsfield, Massachusetts, East Street Area 2 source control investigations boring and well constructions details

Well or Borind Number	Date Drilled	Boring Depth Ft (Bgs)	Ground Surface Elevation	Measuring Point Elev.	Measuring Point	Screen Interval Depth (Ft.)	Casing Type	Screen Type	Comments
E2SC-01	10/14/98	46	986.42	988.36	TOC PVC	31.0 ' - 41.0'	2" PVC	.010 Slot 2" PVC	
E2SC-02	10/23/98	42	985.93	987.57	TOC PVC	31.0' - 41.0'	2" PVC	.010 Slot 2" PVC	
E2SC-03I	10/15/98	47	980.43	982.12	TOC PVC	34.5'- 44.5'	2" PVC	.010 Slot 2" PVC	
E2SC-03S	10/16/98	20	980.57	982.15	TOC PVC	10.0' - 20.0'	2" PVC	.010 Slot 2" PVC	
E2SC-04	10/13/98	46	987.29	989.11	TOC PVC	34.0' -44.0'	2" PVC	.010 Slot 2" PVC	
E2SC-05	10/26/98	42	991.42	993.24	TOC PVC	30.0' -40.0'	2" PVC	.010 Slot 2" PVC	
E2SC-06	10/24/98	19.5	990.46	992.49	TOC PVC	8.7' - 18.7'	2" PVC	.010 Slot 2" PVC	
E2SC-07	10/27/98	40	989.13						Well Not Installed
E2SC-08	10/19/98	44	986.07						Well Not Installed
E2SC-09	10/21/98	42	983.48	984.78	TOC PVC	30' - 40'	2" PVC	.010 Slot 2" PVC	
E2SC-10	10/20/98	30	989.19						Well Not Installed
E2SC-11	10/9/98	17	990.06						Well Not Installed
E2SC-12	10/19/98	32	978.87						Well Not Installed
E2SC-13	10/7/98	18	988.09	989.89	TOC PVC	8.0' - 18.0'	2" PVC	.010 Slot 2" PVC	
E2SC-14	10/8/98	20	990.19	992.25	TOC PVC	10.0' -20.0'	2" PVC	.010 Slot 2" PVC	
E2SC-15	10/20/98	36	984.34						Well Not Installed
E2SC-16I	11/10/98	50	N/A	N/A	TOC PVC	38.5' - 48.5'	2" PVC	.010 Slot 2" PVC	
E2SC-16S	10/8/98	17	985.78	987.69	TOC PVC	7.0' -17.0'	2" PVC	.010 Slot 2" PVC	
E2SC-17	10/27/98	49	983.76	985.38	TOC PVC	36.7' - 46.7'	2" PVC	.010 Slot 2" PVC	

Table 4. General Electric Co., Pittsfield, Massachusetts, East Street Area 2 source control investigations water level and NAPL measurements

Well	Date	Measuring Point Elevation	Depth to LNAPL	Depth to Water	Water Level Elevation	LNAPL Thickness	Depth to DNAPL	DNAPL Elevation	Comments
E2SC-01	10/20/98	988.36	-	17.30	971.06				
E2SC-01	10/22/98	988.36	-	17.30	971.06		-		
E2SC-01	10/26/98	988.36	-	17.69	970.67		-		
E2SC-01	10/28/98	988.36	-	16.50	971.86		-		
E2SC-01	11/4/98	988.36	-	16.63	971.73		-		Sheen on Probe
E2SC-01	11/6/98	988.36	-	16.65	971.71		-		
E2SC-01	11/9/98	988.36	-	16.67	971.69		-		Sheen on Probe
E2SC-01	11/13/98	988.36	-	16.46	971.90		-		
E2SC-02	10/26/98	987.57	-	22.74	964.83		-		
E2SC-02	10/28/98	987.57	-	16.26	971.31		-		
E2SC-02	11/2/98	987.57	-	16.10	971.47		-		
E2SC-02	11/4/98	987.57	-	16.11	971.46		-		Sheen on Probe
E2SC-02	11/6/98	987.57	-	16.11	971.46		-		Sheen on Probe
E2SC-02	11/9/98	987.57	-	16.14	971.43		-		Sheen on Probe
E2SC-02	11/13/98	987.57	-	15.93	971.64		-		Sheen on Probe
E2SC-03I	10/22/98	982.12	-	10.29	971.83		40.68	941.44	
E2SC-03I	10/26/98	982.12	-	10.45	971.67		40.35	941.77	
E2SC-03I	10/28/98	982.12	-	10.49	971.63		38.96	943.16	
E2SC-03I	11/6/98	982.12	-	10.59	971.53		38.54	943.58	
E2SC-03I	11/10/98	982.12	-	10.55	971.57		38.72	943.40	
E2SC-03I	11/13/98	982.12	-	10.41	971.71		38.83	943.29	
E2SC-03S	10/26/98	982.15	-	10.95	971.20		-		
E2SC-03S	10/28/98	982.15	-	11.03	971.12		-		
E2SC-03S	11/6/98	982.15	-	11.05	971.10		-		
E2SC-03S	11/10/98	982.15	-	10.98	971.17		-		
E2SC-03S	11/13/98	982.15	-	10.87	971.28		-		

Table 4. (Continued)

Well	Date	Measuring Point Elevation	Depth to LNAPL	Depth to Water	Water Level Elevation	LNAPL Thickness	Depth to DNAPL	DNAPL Elevation	Comments
E2SC-04	10/20/98	989.11	-	16.54	972.57		-		
E2SC-04	10/22/98	989.11	-	17.40	971.71		-		
E2SC-04	10/26/98	989.11	-	16.91	972.20		-		
E2SC-04	10/28/98	989.11	-	16.71	972.40		-		
E2SC-04	11/4/98	989.11	-	17.28	971.83		-		Sheen on Probe
E2SC-04	11/6/98	989.11	-	17.27	971.84		-		
E2SC-04	11/9/98	989.11	-	17.28	971.83		-		
E2SC-04	11/13/98	989.11	-	17.08	972.03		-		
E2SC-05	10/28/98	993.24	-	21.23	972.01		-		
E2SC-05	11/2/98	993.24	-	21.65	971.59		-		
E2SC-05	11/4/98	993.24	-	21.41	971.83		-		
E2SC-05	11/6/98	993.24	-	21.44	971.80		-		
E2SC-05	11/9/98	993.24	-	21.49	971.75		-		
E2SC-05	11/13/98	993.24	-	21.36	971.88		-		
E2SC-06	10/26/98	992.49		20.25	972.24[2]		-		Sheen on Probe
E2SC-06	10/28/98	992.49	15.4[1]	20.51	971.98[2]	5.11	-		
E2SC-06	11/2/98	992.49	21.5[1]	21.90	970.59[2]	0.40	-		
E2SC-06	11/4/98	992.49	16.9[1]	18.01	974.48[2]	1.11	-		
E2SC-06	11/6/98	992.49		20.42	972.07[2]		-		NAPL on Probe
E2SC-06	11/9/98	992.49	17.72[1]	NM			-		
E2SC-06	11/13/98	992.49	17.73[1]	NM			-		
E2SC-09	10/22/98	984.78	-	18.05	966.73		-		
E2SC-09	10/26/98	984.78	-	13.65	971.13		-		
E2SC-09	10/28/98	984.78	-	13.54	971.24		-		Sheen on Probe
E2SC-09	11/6/98	984.78	-	13.6	971.18		-		
E2SC-09	11/13/98	984.78	-	13.32	971.46		-		Sheen on Probe

Table 4. (Continued)

WELL	DATE	MEASURING POINT ELEVATION	DEPTH TO LNAPL	DEPTH TO WATER	WATER LEVEL ELEVATION	LNAPL THICKNESS	DEPTH TO DNAPL	DNAPL ELEVATION	COMMENTS
E2SC-13	10/20/98	989.89	-	19.82	970.07		-		
E2SC-13	10/22/98	989.89	-	17.76	972.13		-		
E2SC-13	10/26/98	989.89	-	19.82	970.07		-		
E2SC-13	10/28/98	989.89	-	19.81	970.08		-		
E2SC-13	11/2/98	989.89	-	18.00	971.89		-		
E2SC-13	11/4/98	989.89	-	18.01	971.88		-		
E2SC-13	11/6/98	989.89	-	18.01	971.88		-		
E2SC-13	11/9/98	989.89	-	18.06	971.83		-		
E2SC-13	11/13/98	989.89	-	17.84	972.05		-		
E2SC-14	10/20/98	992.25	-	19.90	972.35		-		
E2SC-14	10/22/98	992.25	-	19.95	972.30		-		
E2SC-14	10/26/98	992.25	-	20.04	972.21		-		
E2SC-14	10/28/98	992.25	-	19.99	972.26		-		
E2SC-14	11/2/98	992.25	-	20.15	972.10		-		
E2SC-14	11/4/98	992.25	-	20.15	972.10		-		
E2SC-14	11/6/98	992.25	-	20.18	972.07		-		
E2SC-14	11/9/98	992.25	-	20.23	972.02		-		
E2SC-14	11/13/98	992.25	-	20.01	972.24		-		
E2SC-16S	10/20/98	987.69	-	15.81	971.88		-		
E2SC-16S	10/22/98	987.69	-	15.92	971.77		-		
E2SC-16S	10/26/98	987.69	-	16.37	971.32		-		
E2SC-16S	10/28/98	987.69	-	16.04	971.65		-		
E2SC-16S	11/4/98	987.69	-	16.19	971.50		-		Sheen on Probe
E2SC-16S	11/6/98	987.69	-	16.13	971.56		-		
E2SC-16S	11/9/98	987.69	-	16.15	971.54		-		
E2SC-16S	11/13/98	987.69	-	15.90	971.79		-		

Table 4. (Continued)

WELL	DATE	MEASURING POINT ELEVATION	DEPTH TO LNAPL	DEPTH TO WATER	WATER LEVEL ELEVATION	LNAPL THICKNESS	DEPTH TO DNAPL	DNAPL ELEVATION	COMMENTS
E2SC-16I	11/13/98		-	13.99			-		Sheen on Probe
E2SC-17	10/28/98	985.38	-	13.59	971.79		-		
E2SC-17	11/4/98	985.38	-	13.66	971.72		47.90	937.48	
E2SC-17	11/6/98	985.38	-	13.65	971.73		47.75	937.63	
E2SC-17	11/9/98	985.38	-	13.66	971.72		47.70	937.68	
E2SC-17	11/13/98	985.38	-	13.46	971.92		47.57	937.81	

Notes:

[1] The NAPL in well E2SC-06 reported here as LNAPL appears to be a mixture of LNAPL and DNAPL with a density near that of water.

[2] Not corrected for NAPL Density.

- Measurable NAPL not detected.

Table 5. General Electric Co., Pittsfield, Massachusetts, East Street Area 2 source central investigations summary of preliminary Appendix IX results for DNAPL from monitoring well E2SC-03I (detected compounds only)

COMPOUND	RESULT	QUALIFIER	UNITS	REPORTING LIMIT	MODIFIER
Metals					
Antimony	0.13	B	mg/kg	1	P
Arsenic	3		mg/kg	1	P
Barium	0.22	B	mg/kg	20	P
Chromium	0.079	B	mg/kg	1	P
Copper	8.7		mg/kg	2.5	P
Lead	1.3		mg/kg	0.3	P
Mercury	0.051		mg/kg	0.1	DUP
Mercury	0.061	B	mg/kg	0.1	P
Nickel	0.66	B	mg/kg	4	P
Selenium	0.92		mg/kg	0.5	P
Tin	2.2	B	mg/kg	10	P
Zinc	2.2		mg/kg	2	P
SVOC					
2-Methylnaphthalene	34000		mg/kg	2000	P
Acenaphthene	3800		mg/kg	2000	P
Acenaphthylene	19000		mg/kg	2000	P
Acetophenone	160	J	mg/kg	2000	P
Anthracene	8500		mg/kg	2000	P
Benzo(a)anthracene	5500		mg/kg	2000	P
Benzo(a)pyrene	4500		mg/kg	2000	P
Benzo(b)fluoranthene	2800		mg/kg	2000	P
Benzo(ghi)perylene	1100	J	mg/kg	2000	P
Benzo(k)fluoranthene	1300	J	mg/kg	2000	P
Chrysene	4800		mg/kg	2000	P

COMPOUND	RESULT	QUALIFIER	UNITS	REPORTING LIMIT	MODIFIER
Dibenz(a,h)authracene	320	J	mg/kg	2000	P
Dibenzofuran	770	J	mg/kg	2000	P
Fluoranthene	11000		mg/kg	2000	P
Fluorene	11000		mg/kg	2000	P
Indeno(1,2,3-cd)pyrene	980	J	mg/kg	2000	P
N-Nitrosodiphenylamine	110	J	mg/kg	2000	P
Naphthalene	110000		mg/kg	2000	P
Phenanthrene	32000		mg/kg	2000	P
Pyrene	15000		mg/kg	2000	P
VOC					
Benzene	13	J	mg/kg	2.5	P
Ethylbenzene	53		mg/kg	2.5	P
Toluene	19		mg/kg	2.5	P
Xylenes (total)	43		mg/kg	2.5	P
PCBs					
No PCBs were detected at a reporting limit of 10 mg/kg					

Notes:

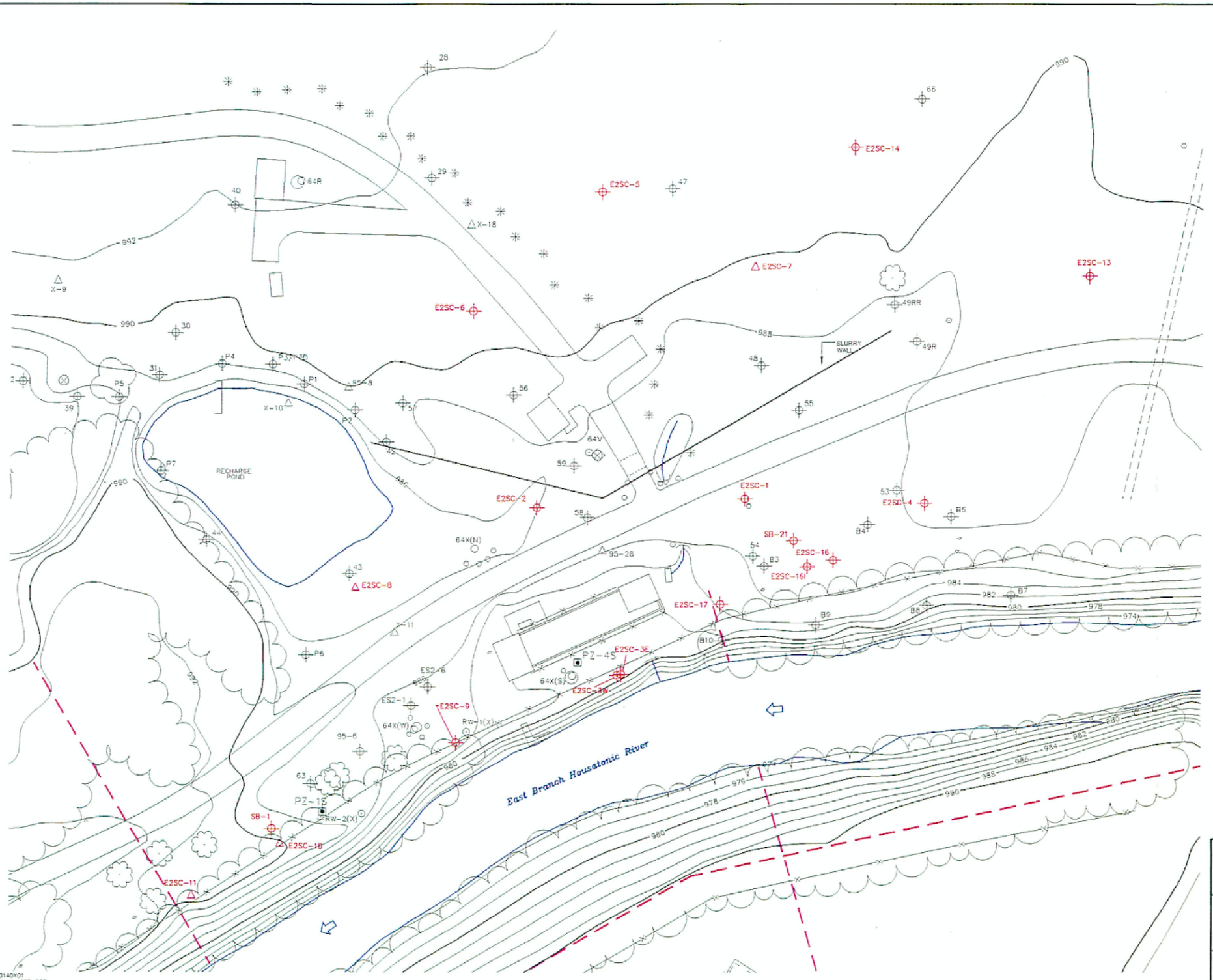
B For organics, compound found in method blank. For metals, result is between MDL and RL

J For organics, result is between MDL and RL.

DUP Duplicate sample.

P Preliminary result.

Figures



X 20140X01
L: Chk=*, OFF=REF
P: STD/DL.DZBL
11/18/98 SYR-54-DMW NES YCC
20140005\20140P02.DWG

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
EAST STREET AREA 2
SOURCE CONTROL INVESTIGATIONS

SITE PLAN

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

FIGURE 1

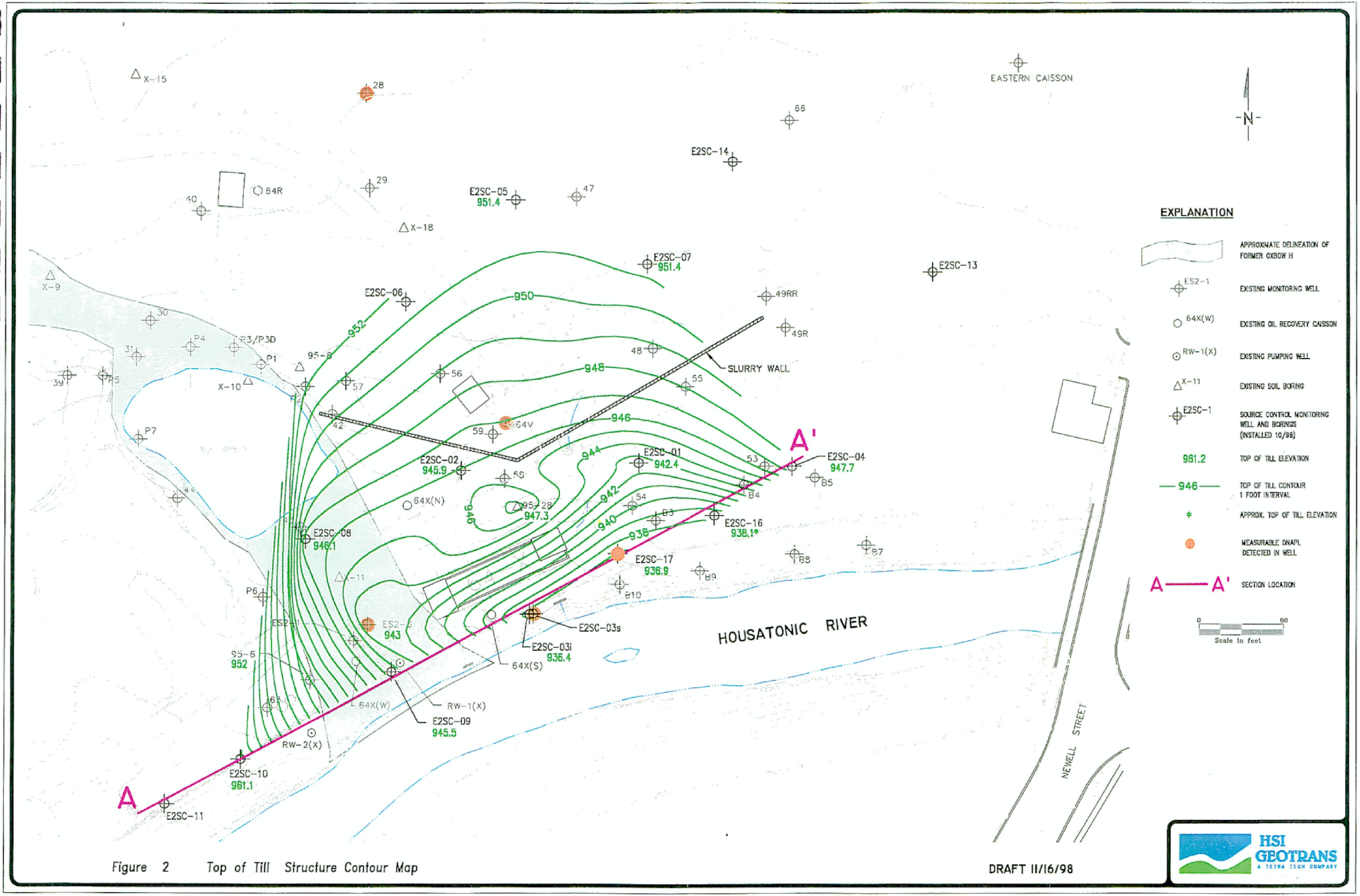


Figure 2 Top of Till Structure Contour Map

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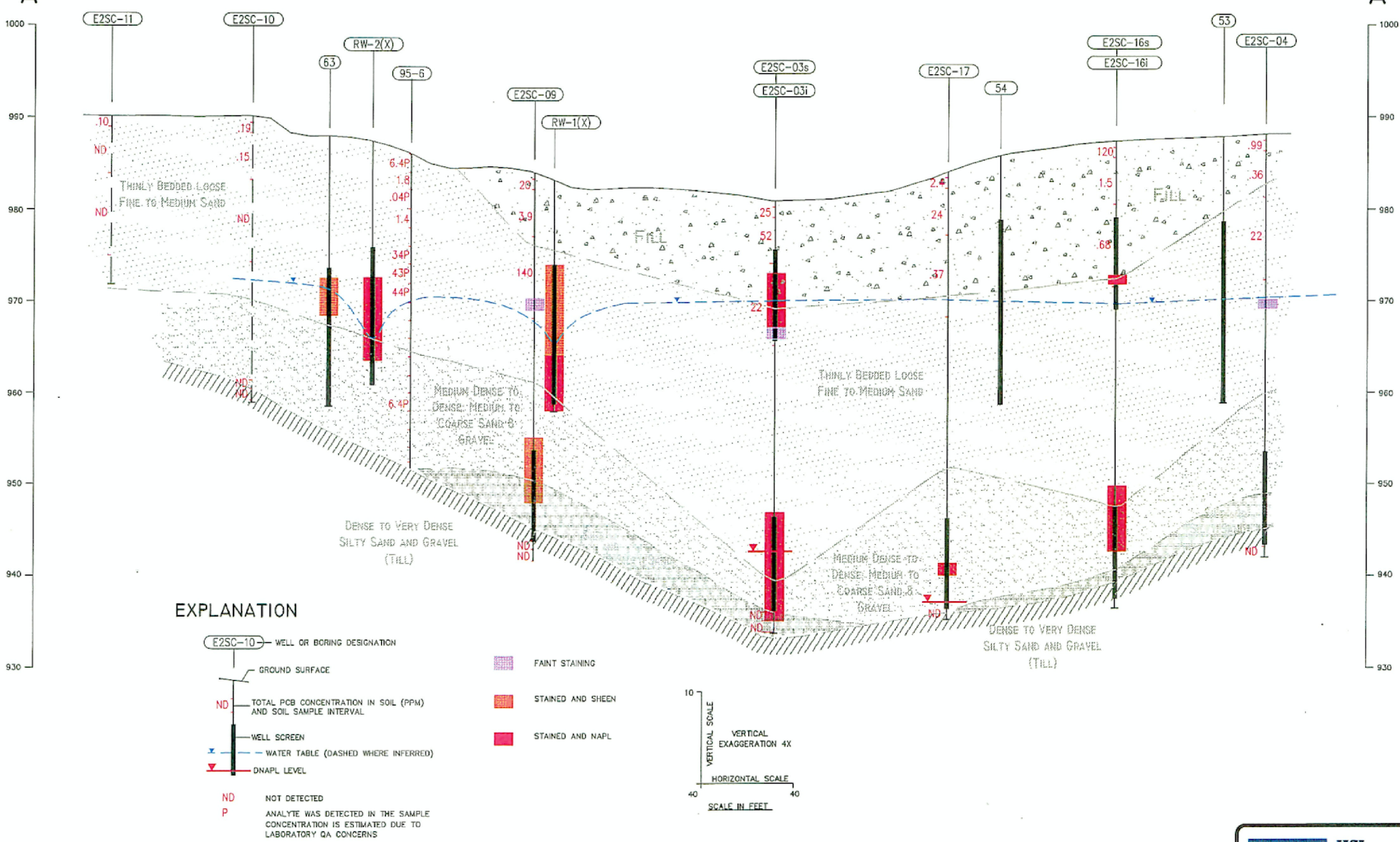


EXPLANATION

E2SC-10 — WELL OR BORING DESIGNATION

GROUND SURFACE

ND — TOTAL PCB CONCENTRATION IN SOIL (PPM) AND SOIL SAMPLE INTERVAL

WELL SCREEN

WATER TABLE (DASHED WHERE INFERRED)

DNAPL LEVEL

ND — NOT DETECTED

P — ANALYTE WAS DETECTED IN THE SAMPLE CONCENTRATION IS ESTIMATED DUE TO LABORATORY QA CONCERNS

FAINT STAINING

STAINED AND SHEEN

STAINED AND NAPL

VERTICAL SCALE 10

VERTICAL EXAGGERATION 4X

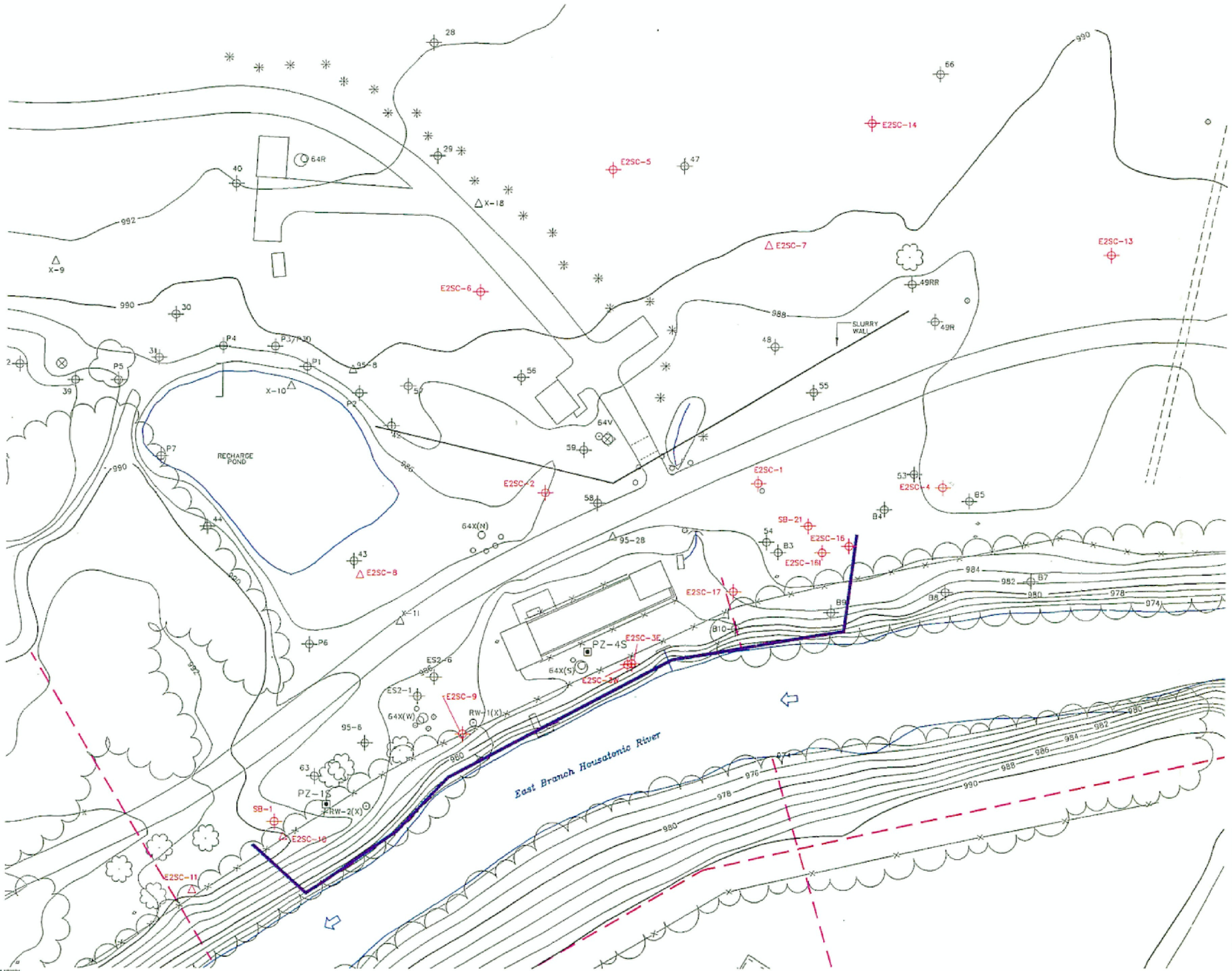
HORIZONTAL SCALE 40 40

SCALE IN FEET

Figure 3 Distribution of Stained Soils and NAPL Observed During Well Installation

DRAFT 11\17\98

HSI GEOTRANS
A TETRA TECH COMPANY
9811S-A.DWG



LEGEND:

- EXISTING INDEX ELEVATION CONTOUR
- 980 EXISTING INTERMEDIATE ELEVATION CONTOUR
- DECIDUOUS TREE
- CONIFEROUS TREE
- MANHOLE
- CHAIN LINK FENCE
- POLE (NON-UTILITY)
- POLE (OVERHEAD UTILITY)
- ES2-1 EXISTING MONITORING WELL
- 64X(W) EXISTING OIL RECOVERY CAISSON
- RW-1(X) EXISTING PUMPING WELL
- X-11 EXISTING SOIL BORING
- PROPOSED SEISMIC TRANSECT LOCATION
- APPROXIMATE LOCATION OF PROPOSED CONTAINMENT BARRIER

DRAFT

0 30' 60'
GRAPHIC SCALE

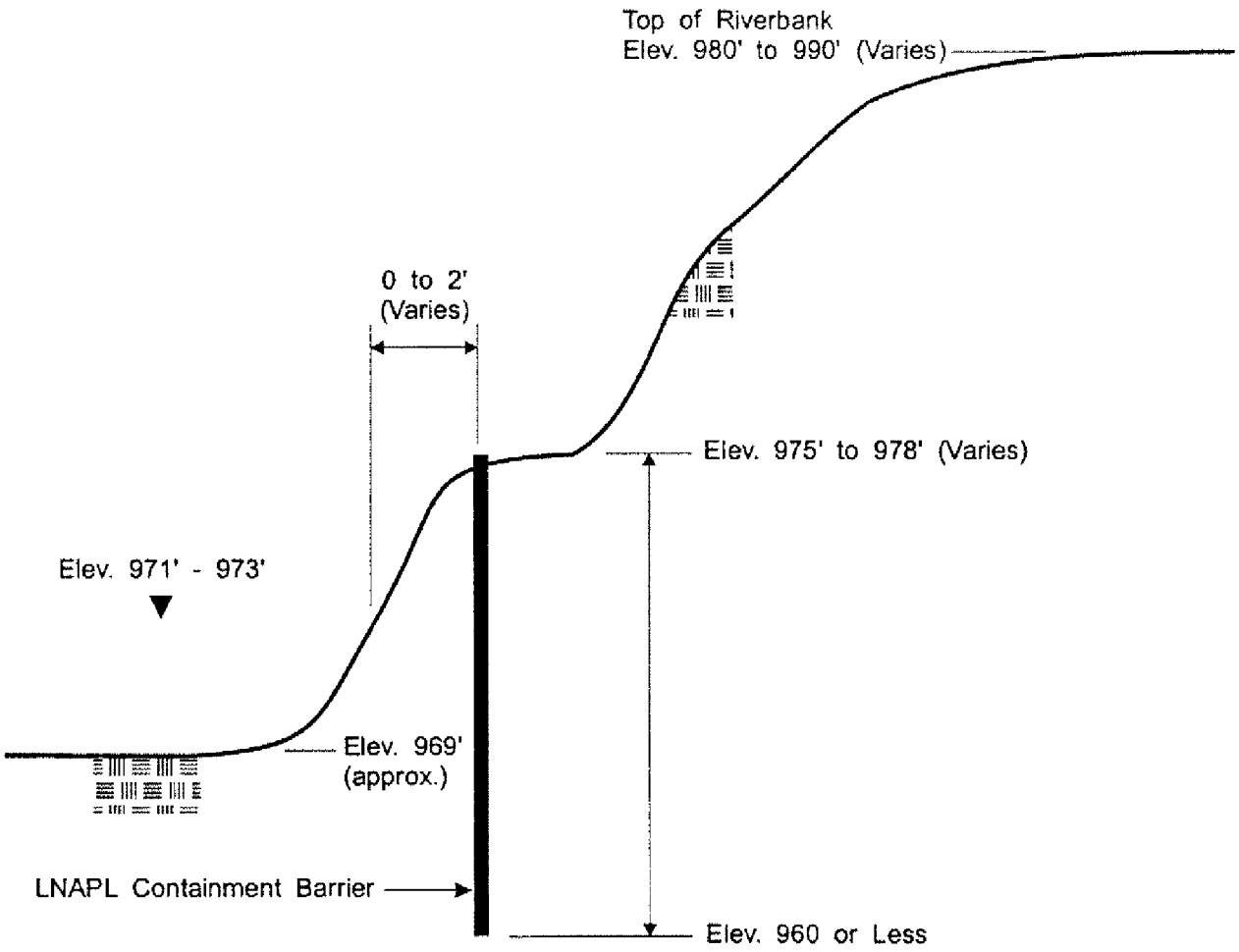
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
EAST STREET AREA 2
SOURCE CONTROL INVESTIGATIONS

PRELIMINARY LOCATION- PROPOSED LNAPL CONTAINMENT BARRIER

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

FIGURE 4

X 20140X01
L: ON=*; OFF=REF
P: STD/DLD28L
11/17/98 SYR-54-DMW HES YCC
20140065\20140P01.DWG



NOT-TO-SCALE

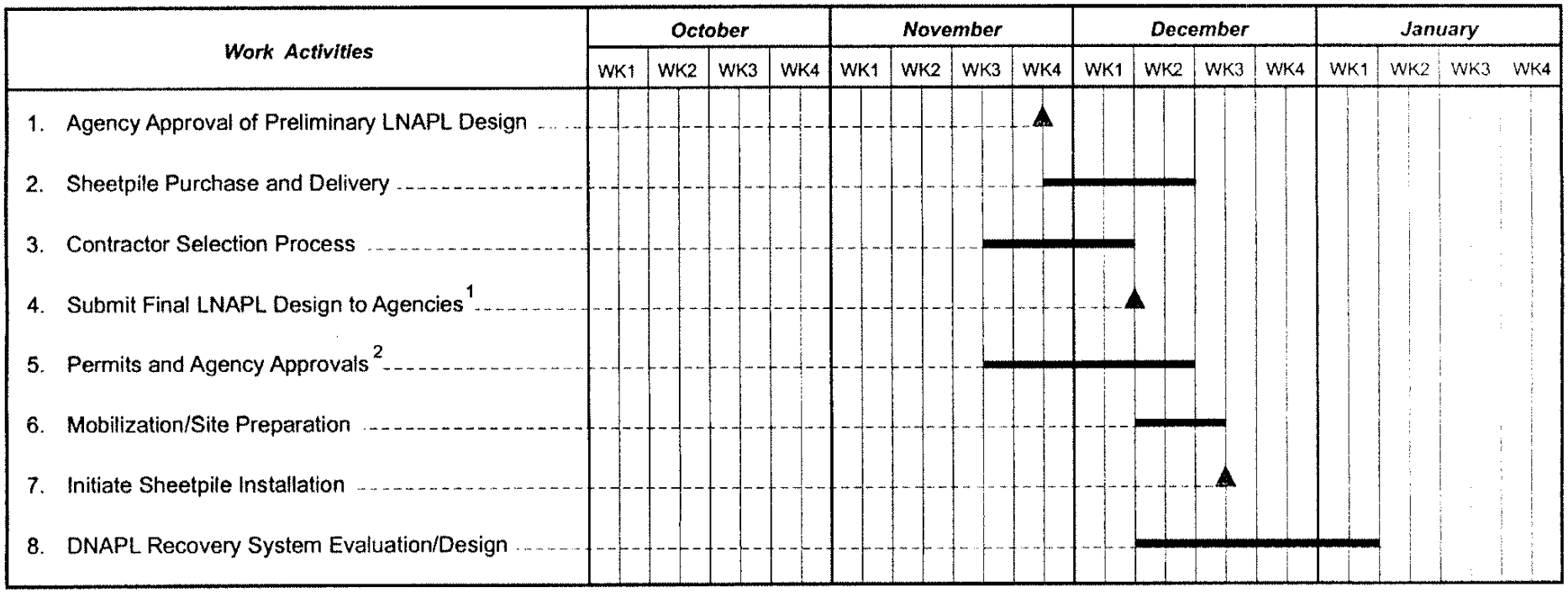
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
EAST STREET AREA 2
SOURCE CONTROL INVESTIGATIONS

LNAPL CONTAINMENT BARRIER - CONCEPTUAL CROSS-SECTION

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

FIGURE 5

11/98 SYR-D54-DJH LBR
20140005/20140g01.cdr



Notes:

1. This submittal will also address the need for DNAPL recovery measures.

2. The above schedule assumes an Emergency Certification will be obtained from the Pittsfield Conservation Commission or MDEP.

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
EAST STREET AREA 2
SOURCE CONTROL INVESTIGATIONS

IMPLEMENTATION SCHEDULE - EAST STREET AREA 2 NAPL CONTAINMENT/RECOVERY ACTIVITIES

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

FIGURE 6

11/98 SYR-D54-DJH LBR
20140005/20140J06.cdr

Attachment A

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Boring/Well Construction Log

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	P009-001	BORING/WELL NUMBER	E2SC-01
PROJECT NAME	Source Control Upper Reach Housatonic River	DATE DRILLED	10/14/98
LOCATION	Pittsfield Massachusetts	CASING TYPE/DIAMETER	2" PVC
DRILLING METHOD	HSA	SCREEN TYPE/SLOT	010 Slot 2" PVC
SAMPLING METHOD	SS	GRAVEL PACK TYPE	#0 Silica Sand
GROUND ELEVATION	986.42	GROUT TYPE/QUANTITY	Portland/Voiclay
TOP OF CASING	988.36	DEPTH TO WATER	
LOGGED BY	MJJ	GROUND WATER ELEVATION	
REMARKS			

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
1.2	6 12	SS01					Medium dense, Moderate Brown, SAND w/ little organics, trace gravel, moist, well graded (SW-Pt) (soil horizon).	1.0	
0.1	6 6 8 7	SS02					Medium dense, Moderate Brown, fine SAND w/ little gravel, moist, well graded, (SW) (poor recovery).	3.0	
1.2	6 5 7 8	SS03					Medium dense, Moderate olive Brown, SAND w/ little gravel, few fines, moist, well graded, (SW).	5.0	
1	4 7	SS04		5			Same as above.	6.0	
1	2 1 3 3	SS05					Loose, Light to Moderate yellowish Brown, fine SAND w/ little silt, moist, poorly graded, orange mottling, (SP).	8.0	
0	4 3 6 6	SS06					Same as above	10.0	
0	7 5 7 5	SS07		10			Top 1.2, Same as above. Bottom 0.5', Medium dense, Light olive Brown, fine to medium SAND w/ little silt, moist , poorly graded, laminated (SP).	12.0	
0.6	5 8 7 8	SS08					Medium dense, Light Grey to Medium Brown, Interbeded fine SAND and organic peat w/ little silt, moist (SP-Pt).	14.0	Portland / Voiclay Grout
12	25 7	SS09					Same as above	15.0	
11	3 3 3 5	SS10		15			Loose, Light to Moderate Grey, interbeded fine SAND w/organics, wet, well graded, (SP-Pt) (soil horizon).	17.0	
25	3 4 5 8	SS11					Same as above	19.0	
3	2 3	SS12					Same as above	20.0	
2	4 6 6 9	SS13		20			Same as above	22.0	
1	6 9 11 12	SS14					Same as above	24.0	
2.5	19 11 12 10	SS15		25			Medium dence, Brownish Black, medium SAND, wet, well graded, SW, stained.	26.0	
2	4 6 11 9	SS16					Similar too above except, little fines, few gravel	28.0	Bentonite Seal
3.1	12 12 11 10	SS17					Similar too above except, trace gravel	30.0	
0.6	19 12 11 11	SS18		30			Top 1.0, Same as above. Bottom .4, Medium dense, Light to Moderate olive Brown, GRAVEL w/ little sand, few silt, wet, well graded, sub-angular (GW).	32.0	
2	14 14 9	SS19					Medium dense, Light olive, sandy GRAVEL w/ few fines, wet, well graded, sub-round, (GW).	34.0	

Continued Next Page

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 **BORING/WELL NUMBER** E2SC-01

PROJECT NAME Source Control Upper Reach Housatonic River **DATE DRILLED** 10/14/98

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
N/A	10 9 10 15	SS20		35			Medium dense, Grayish Olive, gravelly SAND w/trace silt, wet, well graded, sub round, Quartz cobbles, (SW-GW).	36.0	#0 Filter Sand 010 Slot 2" PVC Schd 40 Screen
	16 10 17 17	SS21					No recovery/ no sample (sluff in spoon has sheen headspace 5.6).	38.0	
63.2	22 24 11 11	SS22					Medium dense, Black, gravelly SAND, wet, well graded, heavily stained, sheen, laminated fine sand at tip has faint staining, (SW-GW).	40.0	
0	17 4 11 11	SS23		40			Medium dense, Moderate yellowish Brown, fine SAND w/little silt, wet, poorly graded, (SP-SM).	42.0	1' Sump
1	9 4 4 6	SS24					Similar to above except, trace clay, laminated 1-3mm, tip has angular gravel.	44.0	
6	6 8 13 12 11	SS25		45			Medium dense, Light olive Brown, SAND w/ some silt, little gravel, trace clay, wet, well graded, (SW-SM), (Till).	46.0	Bentonite Seal

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield, Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 985.93
TOP OF CASING 987.57
LOGGED BY MJJ
REMARKS

BORING/WELL NUMBER E2SC-02
DATE DRILLED 10/23/98
CASING TYPE/DIAMETER 2" PVC
SCREEN TYPE/SLOT .010 Slot 2" PVC
GRAVEL PACK TYPE #0 Silica Sand
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0	4 6 8 14	SS02					Medium dense, Moderate olive Brown, fine SAND w/ some subangular gravel, few fines, dry, well graded, (SW).	3.0	
0.2	6 14 24 8	SS03					Dense, Light - Moderate olive Brown, SAND w/ little subangular gravel, few fines, dry, well graded, (SW).	5.0	
2.2	9 4	SS04		5			Same as above	6.0	
0.2	2 6 7 14	SS05					Top 1.0 Medium dense, Light olive Brown, clayey SILT w/ wood fragments, dry, poorly graded, (CL- ML). Bottom .3 Medium dense, Moderate olive Brown, medium SAND, moist, poorly graded, SP.	8.0	
0	4 4 4 11	SS06					Loose, Olive Grey, medium - fine SAND w/ few fines, trace organics, dry, graded, laminated, (SP), (native).	10.0	
0.4	2 2 2 5	SS07		10			Loose, Olive Grey, organic fine SAND w/ trace fines, moist, graded, wood fragments, faint organic odor (SW-SM).	12.0	
32	2 4 4 9	SS08					Top 1.4 Similar to above except, Interbedded. Bottom .3 Similar too above except, Loose, wet, petroleum odor, free product, (light yellow).	14.0	Portland / Volclay Grout
56	4 6	SS09					Loose, Olive Grey, fine SAND w/ little gravel, few organic (wood fragments), wet, faint odor, black staining in finer zones, (SW).	15.0	
80	4 5	SS10		15				16.0	
62	3 4 5 5	SS11					Loose, Moderate olive Brown, SAND w/ little gravel, few fines, wet, well graded, product observed, strong petroleum odor, (SW).	18.0	
50	3 5 11 12	SS12					Loose, Moderate olive Brown, gravelly SAND w/ trace fines, wet, well graded, subrounded, oil sheen on spoon, (SW-GW).	20.0	
26	14 7 7 7	SS13		20			Medium Dense, Moderate olive Brown, sandy subrounded GRAVEL w/ few fines, wet, well graded, sheen and odor present, (GW).	22.0	
46	4 1 4 6	SS14					Medium Dense, Olive Grey, medium - coarse SAND and subrounded GRAVEL w/ few fines, wet, well graded, (SW-GW). No Recovery.	24.0	
32	10 10 11 10	SS15		25			Loose, Olive Grey, medium - coarse SAND, w/ some subround gravel little fines, wet, well graded, (SW).	26.0	
58	13 12 15 9	SS16					Medium Dense, Olive Grey, gravelly SAND, wet, well graded, subround, (SW-GW).	28.0	Bentonite Seal
62		SS17					Similar to above except, visible NAPL.	30.0	
210	18 22 25 19	SS18		30			Medium Dense, Moderate olive Brown - Grey, fine - medium SAND interbedded w/ gravel, wet , poorly sorted. NAPL present in coarser zones (SW-GW).	32.0	
180	11 24 24	SS19					Dense, Moderate olive Brown - Olive Grey, sandy GRAVEL w/ few fines, wet, well graded, subangular, (GW).	34.0	

Continued Next Page

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 BORING/WELL NUMBER E2SC-02

PROJECT NAME Source Control Upper Reach Housatonic River DATE DRILLED 10/23/98

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U S C S	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
160	32 29 29 29	SS20		35			Same as above		#0 Filter Sand
200	32 25 15 11	SS21					Same as above	36.0	010 Slot 2" PVC Schd 40 Screen
16	11 9 15 30	SS22					Top .2 Same as above. Bottom .2 Medium dense, Olive Grey, fine SAND, wet, graded, product sheen on interior of SS, sample, (SW).	38.0	
	69			40			Top .9 Medium dense, Light - Moderate olive Brown, SILT w/ fine sand, trace clay, wet, poorly graded, (ML). Bottom .4 Dense, light - Light - Moderate olive Brown, silty fine SAND w/ some gravel few clay, wet, well graded, (CLG), (Till).	40.0 42.0	1' Sump

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield, Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 980.43
TOP OF CASING 982.12
LOGGED BY MJJ
REMARKS

BORING/WELL NUMBER E2SC-03I
DATE DRILLED 10/15/98
CASING TYPE/DIAMETER 2" PVC
SCREEN TYPE/SLOT .010 Slot 2" PVC
GRAVEL PACK TYPE #0 Silica Sand
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0.2	3 3	SS01					Very loose, Moderate dark Brown, organic SAND, (SW) (topsoil).	1.0	
0.2	2 2 2 2 3	SS02					Very loose, Moderate Brown, SAND w/ little gravel, few organics, moist, well graded, faint order, (SW).	3.0	
32	5 5 5 5 4	SS03					Loose, Light-Moderate olive Brown, SAND w/ few gravel, trace fines, moist, well graded, (SW), (Fill) (poor recovery).	5.0	
N/A	3 3	SS04		5			No Recovery.	6.0	
6.8	5 3 25 35	SS05					Top .3 Loose, Moderate olive Brown, SAND w/ few gravel, trace fines, dry, well graded, (SW). Bottom .4 Medium dense, Black, Coal Ash and slag, dry, well graded, fractured from drive, (Fill).	8.0	
28	11 16 9 13	SS06					Medium dense, Black, SAND w/ little gravel, trace fines, few wood fragments, moist to wet, well graded, heavily stained sheen present on soil (w/ NAPL), (SW).	10.0	
32	2 2 3 5	SS07		10			Loose, Black, SAND w/ NAPL, sheen on spoon (poor recovery), (FILL).	12.0	
38	6 5 4 5	SS08					Black, medium - fine SAND, wet, poorly graded, heavily stained sheen on spoon and sample, (SP).	14.0	
10	1 2	SS09					Top .4 Same as above. Bottom .3 Very loose, Olive gray, medium SAND, moist, faint staining, (SW).	15.0	Portland / Volclay Grout
N/A	2 1 3 4	SS10		15			No Recovery.	17.0	
13.2	3 3 3 4	SS11					Loose, Light olive Brown, fine SAND, wet, poorly graded, finely laminated, (SP).	19.0	
N/A	3 3	SS12					Same as above.	20.0	
N/A	4 4 4 4 3	SS13		20			Loose, Light olive Brown, fine SAND w/ few silt, wet, poorly graded, finely laminated 1-4 mm, (SM).	22.0	
N/A	5 4 4 4	SS14					Same as above.	24.0	
N/A	4 3 4 8	SS15		25			Same as above (loose).	26.0	
N/A	2 1 1 4	SS16					Same as above (poor recovery due to loose material).	28.0	
N/A	2 3 4 4	SS17					Same as above, Trace organics in units.	30.0	
N/A	2 3 4 5	SS18		30			Loose, Light olive Brown to Light olive Grey, fine SAND w/ trace fines, poorly graded, laminated 1-3mm, (SM).	32.0	Bentonite Seal
N/A	3 4 4	SS19					Same as above.	34.0	

Continued Next Page

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 BORING/WELL NUMBER E2SC-03I

PROJECT NAME Source Control Upper Reach Housatonic River DATE DRILLED 10/15/98

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
N/A	6 3 4 6	SS20		35			Loose, Light olive Brown, fine SAND w/ few silt, wet, poorly graded, loose laminated 1-3 mm, (SP).	36.0	
N/A	7 10 4 5	SS21					Same as above.	38.0	
N/A	6 5 2 2	SS22					Loose, Moderate olive Brown, medium - coarse SAND w/ few fines, wet, well graded, subrounded, heavily stained (DNAPL sheen), (SW).	40.0	#0 Filter Sand .010 Slot 2" PVC Schd 40 Screen
N/A	7 14 9 9	SS23		40			Medium dense, Moderate olive Brown, SAND w/ few gravel, trace fines, wet, well graded, heavily stained, NAPL observed in soil, (SW).	42.0	
N/A	16 20 21 28	SS24					Dense, Moderate - Dark Brown, sandy GRAVEL w/ little fines, wet, well graded, subrounded gravel, heavily stained, (GW-SW).	44.0	
6	54 32 98 73	SS25		45			Very dense, Moderate Brown to Moderate olive Brown, gravelly SAND w/ few silt trace clay, moist, well graded, heavily stained (prdt in preferential pathways), (SW-GW).	46.0	1' Sump
0	103 18 17 15 10	SS26					Dense, Light Olive, fine SAND w/ little silt, rafted clasts, well graded, (SM).	47.0	

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 980.57
TOP OF CASING 982.15
LOGGED BY MJJ
REMARKS

BORING/WELL NUMBER E2SC-03S
DATE DRILLED 10/16/98
CASING TYPE/DIAMETER 2" PVC
SCREEN TYPE/SLOT .010 Slot 2" PVC
GRAVEL PACK TYPE #0 Silica Sand
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
				5			See Boring Log " E2SC-03I"	20.0	Portland / Volclay Grout; Bentonite Seal; #0 Filter Sand; .010 Slot 2" PVC Schd 40 Screen; Cave in
				10					
				15					

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 987.29
TOP OF CASING 989.11
LOGGED BY MJJ
REMARKS

BORING/WELL NUMBER E2SC-04
DATE DRILLED 10/13/98
CASING TYPE/DIAMETER 2" PVC
SCREEN TYPE/SLOT 010 Slot 2" PVC
GRAVEL PACK TYPE #0 Silica Sand
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
N/A	4 11	SS01					Loose, Moderate - Dark Brown, organic SAND w/ little fines, moist, well graded, brick fragments. (SW) (FILL).	1.0
0	4 54	SS02					Dense, Light - Moderate olive Brown, SAND w/ little fines, little gravel, moist, well graded. SW, angular, brick and coal fragmients. (FILL).	3.0
0	5 5 5 4	SS03					Loose, Moderate olive Brown, SAND w/ little silt, few gravel, trace coal fragments, moist, well graded,subrounded, (SW) (FILL).	5.0
0	2 3	SS04		5			Very loose, Light - Moderate Brown, fine SAND w/ trace fines, moist, poorly graded, subangular, (SM).	6.0
2	4 4 4 5	SS05					Loose, Light Brown, fine SAND, moist, poorly graded, subangular, (SM).	8.0
2.9	4 4 6 6	SS06					Loose, Light yellowish Brown, fine SAND, dry, poorly graded, trace bedding, (SM).	10.0
3.2	4 6 5 6	SS07		10			Top .8 Same as above. Bottom .7 Loose, Light olive Grey, fine SAND w/ trace silt, dry, poorly graded, subangular, laminated 3-6 mm, (SM).	12.0
3.1	3 5 4 5	SS08					Loose, Light olive Grey to Moderate yellowish Brown, interbedded fine SAND w/ trace fines, moist, poorly graded, some fine bedded lamination. (SM).	14.0
3.6	5 3	SS09					Loose, Moderate yellowish Brown, moderate - fine SAND w/ trace fines, moist, poorly graded, (SM).	15.0
2.8	3 4 4 5	SS10		15			Top .2 loose, Moderate yellowish Brown, medium SAND, Bottom .7 Loose, Moderate Grey, medium - coarse SAND, wet, graded, visible staining at WT, (SW).	17.0
1	4 3 5 6	SS11					Loose, Olive Grey, medium SAND w/ coarse interval at top, wet, graded, faint odor present, staining, (SW).	19.0
N/A	2 3						No Recovery.	20.0
0.9	3 4 7 6	SS12		20			Loose, Light - Moderate olive Grey, fine - medium SAND w/course gravel, wet, graded, (SW).	22.0
0	2 2 7 6	SS13					Same as above	24.0
0	7 9 10 13	SS14		25			Medium dense, Moderate olive Brown, gravelly SAND w/ little silt, wet, well graded, angular, (SW).	26.0
0	7 8 11 11	SS15					Similar to above except, few - trace fines.	28.0
0	10 9 11 13	SS16					Medium dense, Light olive Grey, sandy GRAVEL w/ trace silt, wet, well graded, sub rounded. (GW-SW).	30.0
0	9 10 11 12	SS17		30			Same as above.	32.0
0	5 8 10	SS18					Similar to above except, trace silt few cobbles, color being lost w/ fines.	34.0

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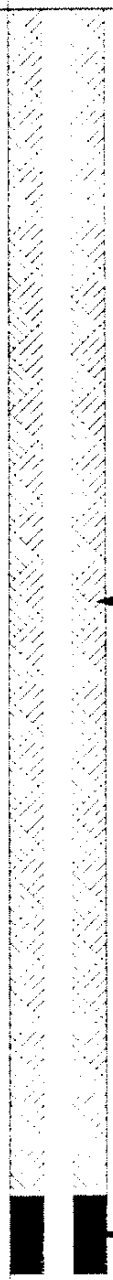
WELL DIAGRAM



HSI GEOTRANS
A ULTRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 BORING/WELL NUMBER E2SC-04

PROJECT NAME Source Control Upper Reach Housatonic River DATE DRILLED 10/13/98

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U.S.C.S	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
N/A	9 20 11 10	SS19		35			Same as above		
	9 6 5 5	SS20					Same as above	36.0	
0	7 13 7 6	SS21					Top .5 Same as above. Bottom .4 medium dense, Light olive Brown, SILT w/ little fine sand, wet, poorly graded, (ML).	38.0	#0 Filter Sand .010 Slot 2" PVC Schd 40 Screen
N/A	6 16 16 14			40			No Recovery.	40.0	
1	13 2 2 4	SS22					Loose, Light olive Brown, SILT w/ some gravel, few clay, wet, well graded, (ML) (TILL).	42.0	
0	3 23 30 53 42	SS23		45			Similar too above except, very dense (TILL).	44.0 46.0	1' Sump

BORING_WELL_P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

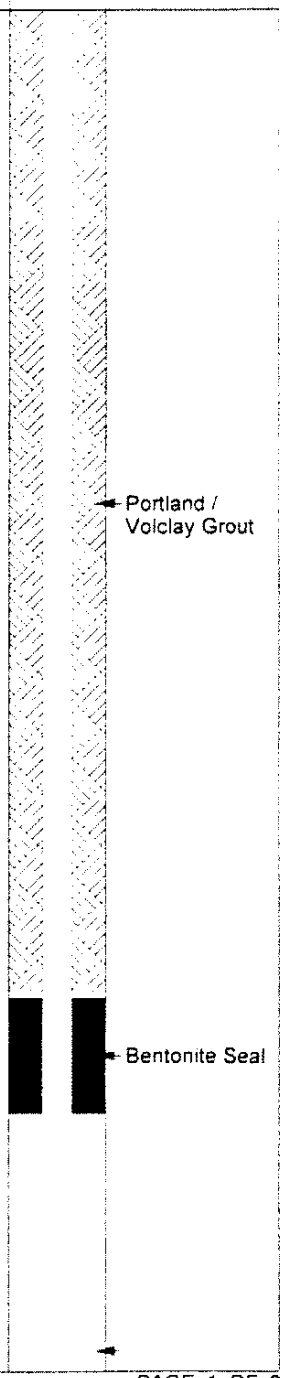
BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	P009-001	BORING/WELL NUMBER	E2SC-05
PROJECT NAME	Source Control Upper Reach Housatonic River	DATE DRILLED	10/26/98
LOCATION	Pittsfield, Massachusetts	CASING TYPE/DIAMETER	2" PVC
DRILLING METHOD	HSA	SCREEN TYPE/SLOT	.010 Slot 2" PVC
SAMPLING METHOD	SS	GRAVEL PACK TYPE	#0 Silica Sand
GROUND ELEVATION	991.42	GROUT TYPE/QUANTITY	Portland/Volclay
TOP OF CASING	993.24	DEPTH TO WATER	
LOGGED BY	MJJ	GROUND WATER ELEVATION	
REMARKS			

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.8	2 6	SS01					Loose, Light olive - Moderate Brown, silty SAND w/ some organics, dry, well graded, subround, (SM).	1.0
12	20 18 50/.4'	SS02					Medium dense, Light - Moderate olive Brown, SAND w/ some gravel, few fines, dry, well graded, subangular, (SW).	3.0
0.6	8 15 8 5	SS03					Medium dense, Moderate olive Brown, fine SAND w/ little gravel trace fines, dry, well graded, subangular, (SW), (FILL).	5.0
10.2	5 6	SS04		5			Same as above.	6.0
4.5	6 8 4 8	SS05					Similar to above w/ limestone cobbles.	8.0
0	10 7 6 6	SS06					Medium dense, Light olive Brown, fine SAND w/ some gravel, some fines, dry, well graded, (SW), (FILL).	10.0
7	4 5 5 4	SS07		10			Top .1 Same as above, Bottom 1.3 Medium dense, Olive Grey, silty SAND w/ few organics (roots) trace gravel, moist, graded, (SM), (native).	12.0
8	4 12 10 12	SS08					Medium dense, Olive Grey, sandy SILT w/ few clay, trace gravel, moist, well graded, (SM).	14.0
1.5	4 9	SS09					Medium Dense, Olive Grey, sandy GRAVEL w/ few fines, moist, well graded, faint odor (GM).	15.0
17	10 9 9 11	SS10		15			Medium dense, Olive Grey, sandy GRAVEL w/ trace fines, moist, well graded, subangular, faint odor (GW-SW).	17.0
13	10 9 9 11	SS11					Top .3 Same as above, Bottom 1.0 Olive Grey, gravelly coarse SAND w/ trace fines, moist, well graded, faint odor (SW-GW).	19.0
18	11 15	SS12					Medium dense, Olive Grey, gravelly coarse SAND, wet, well graded, (SW-GW).	20.0
15	8 9 9 7	SS13		20			Medium dense, Olive Grey, gravelly coarse SAND, wet, well graded, visable NAPL (SW-GW).	22.0
5.3	9 10 10 10	SS14					Similar too above except, no NAPL	24.0
5.2	11 16 17 20	SS15		25			Dense, Light olive Grey, sandy GRAVEL, wet, well graded, (GW-SW).	26.0
4.8	13 15 16 19	SS16					Dense, Olive Grey, medium - fine SAND w/ trace fines, wet, well graded, (SW).	28.0
3.2	8 15 20 30	SS17					Dense, Olive Grey, gravelly medium SAND, wet, well graded, (SW-GW).	30.0
4.6	7 10 14 24	SS18		30			Medium dense, Olive Grey, medium - fine SAND some gravel, wet, well graded, subangular (SW-GW).	32.0
2.8	26 20 19	SS19					Dense, Moderate dark Grey, medium - fine SAND some gravel, trace fines, wet, well graded, subangular (SW-GW).	34.0

Continued Next Page

WELL DIAGRAM



BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 **BORING/WELL NUMBER** E2SC-05

PROJECT NAME Source Control Upper Reach Housatonic River **DATE DRILLED** 10/26/98

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U S C S	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
3	13 11 12 15	SS20		35			Medium dense. Dark Brown - Dark Grey, medium SAND w/ few gravel, wet, well graded, slight odor (SW).		#0 Filter Sand .010 Slot 2" PVC Schd 40 Screen
N/A	10	SS21					Medium dense. Olive Grey, SAND w/ some gravel few fines, wet, well graded, visible NAPL (SW-GW).	36.0	
1	17 11 20 18	SS22					Top 0.2 Same as above. Bottom 0.3 Dense, Light olive Brown, sandy SILT, wet, poorly graded, (ML).	38.0	
1.2	25 21 33 51	SS23		40			Very dense. Light olive Brown, fine sandy SILT w/ little gravel, wet, well graded, angular, (ML) (Till).	40.0 42.0	1' Sump

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

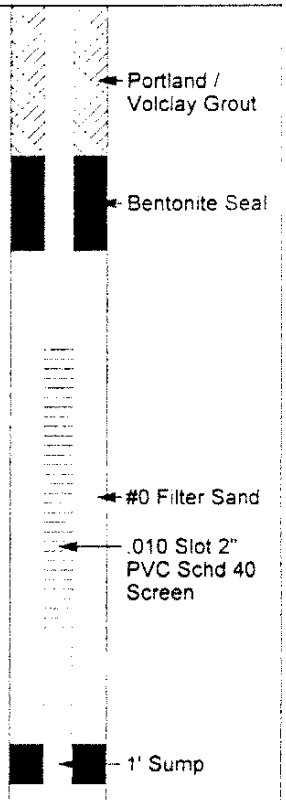
HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	P009-001	BORING/WELL NUMBER	E2SC-06
PROJECT NAME	Source Control Upper Reach Housatonic River	DATE DRILLED	10/24/98
LOCATION	Pittsfield Massachusetts	CASING TYPE/DIAMETER	2" PVC
DRILLING METHOD	HSA	SCREEN TYPE/SLOT	.010 Slot 2" PVC
SAMPLING METHOD	SS	GRAVEL PACK TYPE	#0 Silica Sand
GROUND ELEVATION	990.46	GROUT TYPE/QUANTITY	Portland/Volclay
TOP OF CASING	992.49	DEPTH TO WATER	
LOGGED BY	MJJ	GROUND WATER ELEVATION	
REMARKS			

FID (ppm)	BLOW COUNTS	SAMPLE ID	DEPTH (ft. BGL)	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.2	6 8	SS01		Loose, Moderate olive Brown, SAND w/ some organics, dry, well graded, (SW).	1.0
0.4	8 15 10 5	SS02		Medium dense, Moderate olive Brown, SAND w/ little organics, few slag, few fines, dry, well graded, (SW), (Fill).	3.0
17	12 6 4 3	SS03		Medium dense, Moderate olive Brown, SAND w/ few gravel, trace organics, dry, well graded, (SW), (Fill).	5.0
15	5 10	SS04	5	Medium dense, Light - Moderate olive Brown, SAND w/ little gravel, few fines, moist, well graded, organic odor (SW).	6.0
0	8 18 6 5	SS05		Medium dense, Moderate olive Brown, SAND w/ some gravel, trace fines, dry, well graded, (SW), (Fill).	8.0
18	3 3 7 5	SS06		Medium dense, Light olive Brown, silty SAND w/ little gravel, wet, well graded, perched water (SW).	10.0
20	5 9 4 1	SS07	10	Medium dense, Light Brown, silty SAND w/ some gravel, wet, graded, sheen (SW).	12.0
750	3 4 2 2	SS08		Top 0.2 Same as above. Middle 0.4 loose, Black, sandy GRAVEL, wet, saturated w/ NAPL (GW-SW). Bottom 0.5 Black, organic peat, saturated w/NAPL, odor.	14.0
580	4 3	SS09		Same as above (Bottom).	15.0
410	14 15 10 4	SS10	15	Top 0.6 Medium dense, Black - Dark Brown, peat organics (roots), wet, saturated w/ NAPL (PT). Bottom 0.4 sandy GRAVEL, moist, well graded, (GW-SW).	17.0
180	8 8 8 9	SS11		Top 0.3 Black, peat, saturated with NAPL. Middle 0.3 Loose, Olive Grey, clay, moist, poor grading, laminated (CL). Next 0.3 loose, Black - Dark Brown, gravelly SAND, wet, well graded, (SW-GW). Bottom 0.3 loose, Light olive Grey, medium SAND, moist, poorly graded, (SP).	19.0

WELL DIAGRAM



BORING_WELL_P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield, Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 989 13
TOP OF CASING None
LOGGED BY MJJ
REMARKS

BORING/WELL NUMBER E2SC-07
DATE DRILLED 10/27/98
CASING TYPE/DIAMETER 2" PVC
SCREEN TYPE/SLOT 010 Slot 2" PVC
GRAVEL PACK TYPE #0 Silica Sand
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0.6	3 9	SS01					Loose, Moderate Brown, silty fine SAND w/ some organics trace gravel, dry, well graded, (SW-SM), (soil horizon).	1.0	
0.2	11 13 13 11	SS02					Medium dense, Light to Moderate olive Brown, fine SAND w/ some silt, little gravel, trace coal fragments, dry, well graded, (SW-SM), (Fill).	3.0	
1.6	5 7 5 2	SS03					Same as above.	5.0	
0	3 3	SS04		5			Loose, Light Brown, fine SAND, dry, poorly graded, (SP).	6.0	
0	4 4 5 6	SS05					Loose, Moderate yellowish Brown, fine SAND w/ trace silt, dry, poorly graded, sub-angular (SP).	8.0	
3.8	3 6 5 6	SS06					Medium dense, Dusky Yellow - Moderate Brown, interbedded fine SAND w/ trace gravel, dry, well graded, (SW).	10.0	
2	5 3 3 3	SS07		10			Loose, Moderate yellowish Brown, gravelly SAND w/ trace fines, dry, well graded, sub-angular (SW).	12.0	
3	5 4 4 4	SS08					Similar to above except poor recovery.	14.0	
6		SS09					Loose, Light olive Grey, medium - coarse SAND, moist, graded, faint odor (SP).	15.0	
	3 3 4 4	SS10		15			Loose, Greyish Olive, medium SAND, moist, poorly graded, sub-angular (SP).	17.0	
30	5 5 6 6	SS11					Medium dense, Greyish Olive, medium SAND, wet, poorly graded, sub-angular, strong odor, visible NAPL (SP).	19.0	
28	3 5	SS12					Top 0.3 loose, Medium - Dark Grey, medium - coarse SAND, wet, poorly graded, sub-angular, visible NAPL (SP). Bottom 0.3 loose, Moderate olive Brown, medium - coarse SAND, wet, poorly graded,, sub-angular, no NAPL (SP).	20.0	Portland / Volclay Grout
15	3 5 6 6	SS13		20				22.0	
4	4 5 8 8	SS14					Top 0.2 Same as above (Bottom). Bottom 0.5 medium dense, Light olive Brown, fine SAND w/ some silt, wet, poorly graded, (SP-SM).	24.0	
0.7	14 7 10 15	SS15		25			Same as above (Bottom). Medium dense, Light olive Brown, interbedded SILT - SAND - GRAVEL, wet, wellgraded, sub-angular (GM).	26.0	
6.2	5 5 13 16	SS16					Medium dense, Light - Moderate olive Brown, interbedded SILTS - GRAVELS, wet, well graded, sub-angular (GW-GM).	28.0	
3.6	12 19 20 16	SS17					Same as above.	30.0	
0	22 22 19 21	SS18		30			No Recovery.	32.0	
2.8	10 12 11	SS19					Medium dense, Moderate olive Brown, medium - fine SAND w/ few silts, wet, poorly graded, sub-angular (SP-ML).	34.0	

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HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 BORING/WELL NUMBER E2SC-07

PROJECT NAME Source Control Upper Reach Housatonic River DATE DRILLED 10/27/98

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U S C S	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0.2	23 7 18 13	SS20		35			Dense, Moderate olive Brown, SAND w/ some gravel, trace fines, wet, well graded, angular, faint staining (SW-GW).	36.0	
1.2	14 19 13 14	SS21					Top 0.5 Same as above. Bottom 0.3 medium dense, Light olive Brown, silty fine SAND, wet, poorly graded, (SP-SM).	38.0	
0.2	21 12 16 30 35	SS22		40			Dense, Light olive Brown, silty SAND w/ little gravel, few clay, wet, well graded, angular, (SP_SM) (Till).	40.0	

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield, Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 986.07
TOP OF CASING None
LOGGED BY MJJ & BB
REMARKS

BORING/WELL NUMBER E2SC-08
DATE DRILLED 10/19/98
CASING TYPE/DIAMETER None
SCREEN TYPE/SLOT None
GRAVEL PACK TYPE None
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0	8 9	CS01					Loose, Moderate olive Brown, sandy GRAVEL trace fines, moist, well graded, (GW-SW).	1.0	
190	14 20 17 9	SS02					Similar to above except wood fragments.	3.0	
70	5 50 1 1	SS03					Loose, Moderate olive Brown, SAND w/ some wood fragments, little fines, well graded, (SW).	5.0	
190	6 3	SS04		5			Similar to above (sample recovery poor).	6.0	
62	4 3 4 5	SS05					Loose, Moderate to Dark olive Brown, SAND w/ some gravel, organic fragments (wood), poor recovery, (SW-GW).	8.0	
3.7	4 3 3 3	SS06					Loose, Dark Brown, SAND w/ some organics, moist, well graded, (SW).	10.0	
22	2 1 3 1	SS07		10			Top 0.01 very loose, Moderate - Dark Brown, organics and SAND (SW). Middle 0.01 - 0.9 very loose, Moderate - Dark Brown, fine SAND w/ little silt, moist, heavily stained, petroleum odor (SW). Bottom 0.1 very loose, Moderate - Dark Brown, SILT w/ little sand, moist, heavily stained, petroleum odor (ML).	12.0	
30	7 9 34 12	SS08					Dense, Black, SAND w/ little fines, wet (NAPL), well graded, heavily stained, strong odor (SW).	14.0	
30	5 4	SS09					Loose, Light olive Brown, medium - fine SAND, wet, poorly graded, strong odor, sluf is full of NAPL (SP).	15.0	
4.5	3 6 8 6	SS10		15			Medium dense, Moderate olive Brown, fine SAND few fines, wet, laminations 1-3mm (SP).	17.0	
N/A	7 7 7 8	SS11					Same as above.	19.0	
N/A	4 3						No Recovery.	20.0	
3	4 3 6 9	SS13		20			Loose, Olive gray, fine SAND fines, wet, laminated (SP).	22.0	
2.6	10 6 5 4	SS14					Medium dense, Olive Grey, fine SAND trace gravel and fines, sub-angular (SW).	24.0	Portland / Volclay Grout
N/A	4 4 6 7	SS15		25			Medium dense, dark olive Gray, subrounded to subangular GRAVEL trace fines,wet, (GM).	26.0	
2.5	6 8 8 6	SS16					Medium dense, Olive Grey, GRAVEL few fines, wet, sub-angular to sub-rounded (GM).	28.0	
N/A	6 8 9 9						No Recovery.	30.0	
N/A	2 1 4 8			30			No Recovery.	32.0	
1	9 6 8	SS19					Mediun dense, Greyish Olive w/ Greyish Yellow mottling, fine - medium SAND w/ gravel, sub-rounded to sub-angular (SW-GW).	34.0	

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BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 BORING/WELL NUMBER E2SC-08

PROJECT NAME Source Control Upper Reach Housatonic River DATE DRILLED 10/19/98

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U S C S	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
N/A	6 4 5 4	SS20		35			Loose, Greyish Olive, fine - medium SAND and GRAVEL, wet, (SW-GW).		
0	4 5 5 4	SS21					Top 0.5 loose, Dark yellowish Orange, SAND and GRAVEL trace clays, sub-angular (SW-GW). Bottom 0.25 loose, Brownish Black, GRAVEL trace sand, sub-angular to sub-rounded (GP).	36.0	
0.4	8 8 10 15	SS22					Medium dense, Light olive Grey, fine SAND some gravel, some fines, sub-angular (SW-GW).	38.0	
0.4	16 12 14 23	SS23		40			Dense, Light olive Grey, silty SAND w/ little clay and gravel, sub-angular to angular (SW-ML).	40.0	
N/A	24 28 37 37 39						Same as above.	42.0 44.0	

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 983.48
TOP OF CASING 984.78
LOGGED BY BB
REMARKS

BORING/WELL NUMBER E2SC-09
DATE DRILLED 10/21/98
CASING TYPE/DIAMETER 2" PVC
SCREEN TYPE/SLOT .010 Slot 2" PVC
GRAVEL PACK TYPE #0 Silica Sand
GROUT TYPE/QUANTITY Portland/Voiclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
N/A	3 3	CS01					Very loose, Dark yellowish Brown, clayey SILT, dry, OL.	1.0
10	5 5 3 3	SS02					Loose, Greyish Brown, clayey SILT trace pebbels, dry, (OL).	3.0
0	3 3 4 6	SS03					Loose, Greyish Brown, clayey SILT some gravel, trace sand , dry, (ML-GM).	5.0
0.2	4 6	SS04		5			Loose, Brownish Black, sandy clayey SILT trace gravel, coal ash and brick fragments, (ML-SM).	6.0
6	7 3 4 5	SS05					Loose, Pale Olive, SILT and very fine SAND trace clay, trace gravel root fragments, (ML-SM).	8.0
36	3 4 4 4	SS06					Loose, Light olive Grey, fine SAND some silt, trace clay root fragments, slight odor (SM).	10.0
28	2 1 5 6	SS07		10			Top 1.0 Same as above. Middle 0.5 loose, Olive Grey, SILT some sand, (SM) Bottom 0.5 loose, Black, SAND, wet, LNAPL (SW).	12.0
26	10 14 9 3	SS08					Medium dense. Black, SAND and GRAVEL, wet, odor (SW-GW).	14.0
6.5	3 5	SS09					Loose, Black, medium - coarse SAND and GRAVEL, wet, sheen, odor (SW-GW).	15.0
6	10 24 11 10	SS10		15			Dense, Light olive Grey, SAND and GRAVEL, wet, sub-angular to sub-rounded (SW-GW).	17.0
16.5	3 10 9 8	SS11					Medium dense, Pale Olive, SAND some gravel, wet to moist, (SW-GW).	19.0
6	9 5	SS12					No Recovery.	20.0
8	10 5 6 6	SS13		20			Medium Dense, Olive Grey, medium - coarse SAND some gravel, wet, (SW-GW).	22.0
11	11 13 13 11	SS14					Top 0.5 medium dense, Olive Grey, silty SAND trace gravel, (SM). Bottom 0.5 medium dense, GRAVEL and SAND some silt and clay, (SW-GW).	24.0
6	8 8 10 4	SS15		25			Medium dense, Light Olive, SAND and GRAVEL some clay, (SW-GW).	26.0
2	28 13 12 11	SS16					Top 0.5 Same as above. Bottom 1.5 Medium dense. Dark yellowish Orange, GRAVEL and SAND trace silt and clay, (SW-GW).	28.0
25	21 18 22 9	SS17					Dense, Pale Olive w/ Dark Grey staining, GRAVEL w/ silt, (GM)	30.0
12	8 22 24 16	SS18		30			Dense, Olive Grey w/ layered dark staining, fine SAND and SILT some gravel, (SM).	32.0
6	27 21 18	SS19					Dense, Greyish Yellow w/ black staining, SILT and GRAVEL, slight sheen (GM).	34.0

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WELL DIAGRAM: Portland / Voiclay Grout; Bentonite Seal

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 **BORING/WELL NUMBER** E2SC-09

PROJECT NAME Source Control Upper Reach Housatonic River **DATE DRILLED** 10/21/98

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U S C S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
7	22 8 16 25	SS20		35			Dense. Grayish Yellow w/ Black staining. SILT and fine SAND gravel. (SM).		#0 Filter Sand .010 Slot 2" PVC Schd 40 Screen
4	28 26 36 18	SS21					Same as above.	36.0	
8	9 19 13 9	SS22					Medium dense. Pale Olive, clayey SILT some gravel, Till (ML).	38.0	
1	6 29 49 52 50	SS23		40			Very dense. Olive Gray, SILT some clay and gravel, Till (ML).	40.0 42.0	1' Sump Cave in

BORING_WELL P009.GPJ HSI_MA GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 989 19
TOP OF CASING None
LOGGED BY BB
REMARKS

BORING/WELL NUMBER E2SC-10
DATE DRILLED 10/20/98
CASING TYPE/DIAMETER None
SCREEN TYPE/SLOT None
GRAVEL PACK TYPE None
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
1	3 5	CS01					Loose, Moderate olive Grey, silty CLAY some clay root fragments, (CH), (top soil)	1.0	
1	5 5 5 4	SS02					Loose, Olive Grey, silty SAND trace clay, (SM).	3.0	
36	4 6 5 5	SS03					Top 0.25 loose, Dark Grey to Black, organic granular material, no odor. Bottom 2.5 loose, Olive Grey, fine SAND trace clays, laminated (SM).	5.0	
0.3	3 5	SS04		5			Same as above (Bottom).	6.0	
1	4 4 7 7	SS05					Top 0.5 Same as above. Bottom 1.5 loose, Light olive Grey (salt and pepper), medium SAND trace fines, dry, (SW).	8.0	
3.8	6 6 7 6	SS06					Medium dense, Light olive Grey, fine - medium SAND and GRAVEL, dry, sub-rounded (SW-GW).	10.0	
1	5 7 6 5	SS07		10			Same as above.	12.0	
0	5 5 6 7	SS08					Medium dense, Light olive Grey (salt and pepper), medium SAND trace gravel, dry, sub-rounded, some Fe stained laminations, (SW).	14.0	
N/A	7 8	SS09					Same as above.	15.0	← Portland / Volclay Grout
1	8 8 8 8	SS10		15			Medium dense, Light olive Grey (salt and pepper), medium - coarse SAND trace gravel and qtz cobbles, (SP).	17.0	
0	6 6 6 3	SS11					Loose, Light olive Grey, fine - medium SAND some silt, trace clay, wet, laminations (SM).	19.0	
0.5	3 5	SS12					Top 0.5 Same as above. Bottom 0.5 loose, Light olive Grey (salt and pepper), medium SAND, wet, (SW)	20.0	
0.2	3 6 3 2 7	SS13		20			Top 0.5 Same as above (Bottom). Bottom 1.5 loose, Dark yellowish Orange, medium - coarse SAND some gravel, sub-rounded to sub-angular (SW-GW).	22.0	
0.2	8 11 15 18	SS14					Top 0.25 Same as above (Bottom). Bottom 1.5 loose, Pale Olive, GRAVEL trace cobbles, sub-rounded to sub-angular (GW).	24.0	
0.5	10 5 18 14	SS15		25			Same as above (Bottom).	26.0	
0	12 26 28 46	SS16					Top 1 Dense, Olive Grey, GRAVEL some sand and fines, well graded, (GW-SW). Bottom 1 Same but clay inc. trace sand	28.0	
0	50 29 26 28 34	SS17		30			Dense, Greyish Olive, SILT and CLAY w/ some gravel and cobbles, well graded, (ML), (Till).	30.0	

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield, Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 990.06
TOP OF CASING None
LOGGED BY MJJ
REMARKS

BORING/WELL NUMBER E2SC-11
DATE DRILLED 10/9/98
CASING TYPE/DIAMETER None
SCREEN TYPE/SLOT None
GRAVEL PACK TYPE None
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0.2	2 3	SS01					Very loose. Moderate to Dark Brown, medium to fine SAND, w/ some organics, moist, poorly graded, (SP).	1.0	
0	6 6 6 6 3	SS02					Medium loose, Moderate yellowish Brown, fine SAND, w/ few interbeded medium sand lenses, (SP).	3.0	
0	6 6 6 6 5	SS03					Similar too above except no medium sand lenses, finely laminated, dry.	5.0	
0	4 3	SS04		5			Same as above.	6.0	
0.4	4 4 4 4 3	SS05					Same as above.	8.0	
0.2	4 3 4 4 4	SS06					Same as above.	10.0	Portland / Volclay Grout
0	2 4 6 6 6	SS07		10			Similar too above except, few silt lenses.	12.0	
0	4 4 5 7	SS08					Similar too above except, moist.	14.0	
0.2	18 6	SS09					Similar too above except, wet.	15.0	
0.2	7 7 9 11	SS10		15			Same as above.	17.0	

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield, Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 978.87
TOP OF CASING None
LOGGED BY MJJ
REMARKS

BORING/WELL NUMBER E2SC-12
DATE DRILLED 10/19/98
CASING TYPE/DIAMETER None
SCREEN TYPE/SLOT None
GRAVEL PACK TYPE None
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
N/A	6 6	CS01					No Recovery (Pavement).	1.0	
N/A	5 4 4 5	SS02					No Recovery.	3.0	
0.2	3 4 5 4	SS03					Loose, Moderate olive Brown, SAND w/ little gravel trace fines, dry, well graded, sub-rounded (SW).	5.0	
N/A	1 3	SS04		5			No Recovery.	6.0	
42	1 3 6 13	SS05					Loose, Moderate - Dark Brown, SAND w/ few organic peat and fines, tip of spoon wet, visably discolored (SW).	8.0	
28	1 2 7 8	SS06					Top 0.6 Same as above. Bottom similar except coarse SAND w/ few gravel trace fines, wet, (SW).	10.0	
14	2 2 4 6	SS07		10			Top 0.4 loose, coarse SAND w/ gravel, (SW). Bottom loose, Moderate to Dark olive Brown, fine SAND w/ trace fines, wet, poorly graded, (SM).	12.0	
10	4 8 4 8	SS08					Medium dense, Moderate olive Brown, clayey SILT, wet, poorly graded, laminate 1-4mm (ML).	14.0	
	6 11	SS09					Medium dense, Moderate olive grey Brown, silty SAND w/ trace gravel, wet, well graded, interbedded (SM).	15.0	
4.2	7 7 8 9	SS10		15			Medium dense, Moderate olive Brown, SAND w/ some gravel trace fines, wet, well graded, sub-rounded (SW-GW).	18.0	← Portland / Volclay Grout
1.8	6 6 8 12	SS11					Top 0.3 Medium dense, Moderate olive Brown, SAND w/ little gravel trace fines, wet, well graded, (SW). Bottom 0.5 Medium dense, Moderate olive Brown, SAND, wet, poorly graded, SW.	20.0	
0.2	6 7 8 9	SS12		20			Medium dense, Light olive Brown, coarse - medium SAND w/ some gravel trace fines, wet, well graded, (SW-GW).	22.0	
N/A	2 4 12 10	SS13					No Recovery.	24.0	
0.4	4 7 7 12	SS14		25			Medium dense, Greyish Olive, medium - coarse SAND w/ few gravel trace fines, wet, graded, (SW).	26.0	
0.4	4 4 7 3	SS15					Medium dense, Moderate olive Brown, silty SAND w/ trace gravel, wet, poorly graded, laminated 1-3mm (SP).	28.0	
0	8 58 13 17	SS16					Very dense, Moderate olive Brown, SAND w/ some silt few gravel, wet, well graded, (SM).	30.0	
0.6	16 24 76 70	SS17		30			Very Dense, Light olive Brown, SAND w/ little gravel few fines, moist, well graded, (SW), (Till).	32.0	

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 988.09
TOP OF CASING 989.89
LOGGED BY MJJ
REMARKS

BORING/WELL NUMBER E2SC-13
DATE DRILLED 10/7/98
CASING TYPE/DIAMETER 2" PVC
SCREEN TYPE/SLOT .010 Slot 2" PVC
GRAVEL PACK TYPE #0 Silica Sand
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0	6 10	CS01					Loose, Moderate yellowish Brown, SAND w/ little fines and gravel, sub-rounded (SW).	1.0
0	11 13 14 20	SS02					Medium dense, Moderate Brown, SAND w/ some gravel trace fines, dry, (SW-GW).	3.0
0	7 7 4 3	SS03					Same as above.	5.0
0	6 4	SS04		5			Loose, Moderate Brown, SAND w/ some gravel little fines, dry, sub-rounded (SW-GW).	6.0
N/A	7 5 4 3							
N/A	3 2 2 3	SS05					Loose, Moderate Brown, fine - medium SAND w/ trace fines, moist, poorly graded, (SP).	10.0
0	10 12 14 4	SS06		10			No Recovery (Drove cobble).	12.0
0	4 6 6 5	SS07					Medium dense, Light olive Grey and Light olive Brown, SAND w/ some gravel, moist, laminated fine sand zone, (SW-GW).	14.0
N/A	3 2 2 1	SS08		15			Loose, Light olive Grey, medium SAND, wet, poorly graded, laminated (salt and pepper) (SW).	16.0
N/A	3 2 2 2	SS09						18.0

WELL DIAGRAM

- Portland / Volclay Grout
- Bentonite Seal
- #0 Filter Sand
- .010 Slot 2" PVC Schd 40 Screen

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	P009-001	BORING/WELL NUMBER	E2SC-14
PROJECT NAME	Source Control Upper Reach Housatonic River	DATE DRILLED	10/8/98
LOCATION	Pittsfield, Massachusetts	CASING TYPE/DIAMETER	2" PVC
DRILLING METHOD	HSA	SCREEN TYPE/SLOT	010 Slot 2" PVC
SAMPLING METHOD	SS	GRAVEL PACK TYPE	#0 Silica Sand
GROUND ELEVATION	990.19	GROUT TYPE/QUANTITY	Portland/Volclay
TOP OF CASING	992.25	DEPTH TO WATER	
LOGGED BY	MJJ	GROUND WATER ELEVATION	
REMARKS			

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
							Loose, Medium to Dark Brown, organic SAND w/ few gravel, moist, (SW). (Top soil/ Fill).	1.0
							Medium dense, Moderate Brown, SAND w/ little gravel, few fines, moist, (SW).	3.0
							Loose, Light to Pale olive Brown, SAND w/ trace fines, moist, poorly graded, (SP).	5.0
				5			Loose, Light olive Brown, fine SAND, moist, poorly graded (SP).	6.0
							Similar too above except, silty SAND	8.0
							Similar to above except fine to medium SAND.	10.0
				10			Similar too above except, medium SAND.	12.0
							Loose, Light olive Grey, medium to fine SAND w/ trace fines, moist, poorly graded, brown staining from bottom 0.6 (SP).	14.0
							Similar too above except, medium SAND, interbeded silt lens .4 to .6	16.0
				15			Similar too above except, no silt lens, wet.	18.0
							Medium dense, Light olive Grey, clayey SILT, wet, poorly graded, (MH).	20.0
				20				

WELL DIAGRAM

- Portland / Volclay Grout
- Bentonite Seal
- #0 Filter Sand
- .010 Slot 2" PVC Schd 40 Screen
- Cave in

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION N/A
TOP OF CASING N/A
LOGGED BY MJJ
REMARKS

BORING/WELL NUMBER E2SC-15
DATE DRILLED 10/20/98
CASING TYPE/DIAMETER None
SCREEN TYPE/SLOT None
GRAVEL PACK TYPE None
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0	3 4 6 2	SS02					Loose, Moderate olive Brown, SAND w/ little gravel, few fines(organics), dry, well graded, (SW).	3.0	
	5 4 3 4	SS03					Loose, Moderate olive Brown to Dusk yellow Brown, SAND w/ little gravel, few fines, dry, coal slag fragments (SW), (Fill).	5.0	
1.8	4 4	SS04		5			Same as above.	6.0	
0	3 6 6 18	SS05					Medium dense, Dark yellowish Brown, fine SAND w/ trace fines and gravel, dry, graded, (SW), (Fill).	8.0	
1.4	4 5 7 6	SS06					Similar to above except wood fragments.	10.0	
0	3 4 8 9	SS07		10			Medium dense, Light olive Grey to Moderate olive Brown, fine SAND w/ few fines, trace organics, poorly graded, Iron staining (SP).	12.0	
5	3 2 5 1	SS08					Loose, Light olive Grey, SAND w/ trace fines interbedded w/ fine - medium sand and trace organics, wet, graded, (SW).	14.0	
0.2	4 6	SS09					Loose, Light olive Grey to Moderate olive Brown, sandy GRAVEL w/ trace organics, wet, well graded, sub-angular (GW-SW).	15.0	
0.4	4 10	SS10		15			Same as above	16.0	
0.2	4 8 10 13	SS11					Medium dense, Moderate olive Brown, sandy GRAVEL few fines, wet, well graded, sub-angular (GW-SW).	18.0	Portland / Volclay Grout
8.2	10 5 3 7	SS12					Top 0.6 Same as above. Bottom 0.5 loose, Light olive Grey, silty SAND, wet, poorly graded, (SP-SM).	20.0	
0	4 4 4 6	SS13		20			Loose, Greyish Olive, silty fine SAND w/ trace clay, wet, poorly graded, laminated 1-3mm (SP-SM).	22.0	
0	3 5 9 10	SS14					Top 0.6 Same as above. Bottom 0.7 Medium dense, Greyish Brown to Moderate olive Brown, medium SAND, wet, poorly graded, top of sand has grayish interval (SW)	24.0	
0.4	4 6 9 11	SS15		25			Same as above (Bottom).	26.0	
0	5 13 28 60	SS16					Top 0.9 Same as above. Bottom 0.2 Dense, Olive Grey, SAND and GRAVEL w/ trace fines, wet, well graded, sub-rounded (SW-GW).	28.0	
0	6 12 26 45	SS17					Dense, Olive Grey to Moderate olive Brown, sandy GRAVEL w/ few fines, wet, well graded, sub-rounded (GW-SW).	30.0	
N/A	10 28 33 34	SS18		30			No Recovery.	32.0	
0	8 16 24	SS19					Dense, Light olive Brown, SAND w/ some silt, few gravel, wet, well graded, sub-angular, glacial outwash (SM).	34.0	

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HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 **BORING/WELL NUMBER** E2SC-15

PROJECT NAME Source Control Upper Reach Housatonic River **DATE DRILLED** 10/20/98

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0	17 17 33 66 71	SS20		35			Very dense. Light olive Brown. silty SAND w/ some gravel few clay. moist. well graded. sub-angular (SM). (Till).	36.0	

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield, Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION N/A
TOP OF CASING N/A
LOGGED BY NSB
REMARKS

BORING/WELL NUMBER E2SC-16I
DATE DRILLED 11/10/98
CASING TYPE/DIAMETER 2" PVC
SCREEN TYPE/SLOT .010 Slot 2" PVC
GRAVEL PACK TYPE #0 Silica Sand
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
							See Soil Boring "E2SC-16S"		
0.4	3 6 8 9	SS12		20			Medium dense, Dark Grey, coarse SAND trace fines, wet, well graded, (SW).	18.0	
2	3 5 7 7	SS13					Similar to above except middle 0.8 light olive gray.	20.0	
15	6 6 10 11	SS14					Top 0.8 Medium dense, Dark Grey to Moderate olive Grey, SAND, wet, poor grading, coarsening downward (SP). Bottom 0.4 Medium dense, Moderate olive Grey, fine SAND, trace silt, wet, well graded, (SW).	22.0	
24	5 8 10 15	SS15		25			Top 0.2 Medium dense, Dark Grey, fine SAND, wet, well graded, (SW). Bottom 1.0 Light to Moderate olive Grey, fine SAND little silt, wet, well graded, (Sw).	24.0	
16	9 8 10 10	SS16					Medium dense, Moderate olive Grey, fine to medium SAND trace silt, wet, well graded, chunk of metal slag on side of sample (SW).	26.0	
15	3 4 7 12	SS17					Medium dense, Moderate olive Grey, SAND trace silt and gravel, wet, well graded, (SW).	28.0	
20	5 6 9 11	SS18		30			Top 0.3 medium dense, Light Grey, fine SAND trace fines, wet, well graded, laminations (SW). Bottom 0.3 Moderate Grey, medium SAND, wet, well graded, (SW).	30.0	
42	8 10 12	SS19					Top 0.3 Same as above (Top). Bottom 0.7 Moderate olive Grey, coarse to medium SAND, wet, well graded, (SW).	32.0	
								34.0	

Portland / Volclay Grout

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BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 BORING/WELL NUMBER E2SC-16I

PROJECT NAME Source Control Upper Reach Housatonic River DATE DRILLED 11/10/98

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	USCS	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
40	11 4 7 11	SS20		35			Same as above (Bottom).		Bentonite Seal
								36.0	
N/A	11 9 10 13	SS21					No Recovery.		
								38.0	
130	10 4 5 16	SS22					Medium dense, Moderate olive Grey. SAND w/ few gravel, wet, well graded, sub-angular, visable NAPL (SW).		
								40.0	
80	21 18 35 37	SS23		40			Same as above except very dense.		
								42.0	#0 Filter Sand
N/A	36 14 17 16	SS24					No Recovery.		.010 Slot 2" PVC Schd 40 Screen
								44.0	
5	33 9 15 25	SS25		45			Top 0.8 Medium dense, Moderate olive Brown, SAND w/ little gravel, wet, well graded, sub-rounded, visable NAPL (SW). Bottom 0.2 Dense, Moderate olive Grey to Moderate olive Brown, SILT little gravel, wet, well graded (ML).		
								46.0	
15	37	SS26					Top 0.3 Moderate olive Brown, SAND, wet, well graded, (SW). Bottom 0.3 Moderate olive Grey, gravelly SILT, well graded, (ML), (Till).		
								48.0	
12		SS27					Light olive Grey to Yellowish Grey, fine SAND some weathered cobbles little silt, wet, well graded, (SM), (Till).		1' Sump
								50.0	Cave in

BORING WELL P009.GPJ HSI MA.GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

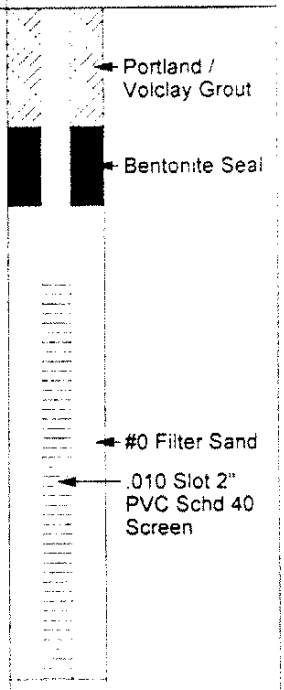
BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield, Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 985.78
TOP OF CASING 987.69
LOGGED BY MJJ
REMARKS

BORING/WELL NUMBER E2SC-16S
DATE DRILLED 10/8/98
CASING TYPE/DIAMETER 2" PVC
SCREEN TYPE/SLOT .010 Slot 2" PVC
GRAVEL PACK TYPE #0 Silica Sand
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0	7 13	CS01					Medium dense, Medium Brown, organic SAND w/ few gravel, moist. (CL), (Top soil/ Fill).	1.0
0	7 6 7 7	SS02					Medium dense, Dark Brown to Black, medium SAND w/ few gravel, trace fines, moist, well graded, (SW), (Fill).	3.0
	6 6 7 8	SS03					Dark Brown to Black, medium SAND w/ some cinders and coal ash, moist. (SW), (Fill).	5.0
	6 3	SS04		5			Same as above.	6.0
0.8	2 1 2 1	SS05					Top Same as above. Bottom 0.4, loose, Olive Brown, medium to course SAND, moist, well graded, (SW).	8.0
5.5	3 3 4 3	SS06					Loose, Interbeded cinders and sand units, (Fill).	10.0
6	6 6 7 9	SS07		10			Medium dense, Black, coal ash and slag, (Fill).	12.0
5.4	11 5 6 8 8	SS08					Same as above.	14.0
71.4	12 25	SS09					Loose, Black, gravelly SAND, moist, well graded, SW. heavily stained, (Fill).	15.0
0.4	7 4 4 2 2	SS10		15			Loose, Light olive Grey, medium to course SAND, wet, stained, (SW), (native).	17.0

WELL DIAGRAM



BORING WELL P009 GPJ HSI_MA GDT 11/15/98

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield, Massachusetts
DRILLING METHOD HSA
SAMPLING METHOD SS
GROUND ELEVATION 983.76
TOP OF CASING 985.38
LOGGED BY NSB
REMARKS

BORING/WELL NUMBER E2SC-17
DATE DRILLED 10/27/98
CASING TYPE/DIAMETER 2" PVC
SCREEN TYPE/SLOT 010 Slot 2" PVC
GRAVEL PACK TYPE #0 Silica Sand
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER
GROUND WATER ELEVATION

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0	4 5	CS01					Loose, Black - olive Brown, silty SAND few gravel, dry, well graded, sub-angular, (SW), (soil horizon).	1.0	
1	3 5 4 2	SS02					Loose, Moderate yellowish Brown, fine - medium SAND few fines, trace gravel, dry, well graded, (SW).	3.0	
50	1 6 3 4	SS03					Loose, Olive Black, fine SAND few fines coal fragments, dry, well graded, (SW), (Fill).	5.0	
12	2 2	SS04		5			Similar to above w/ few coal slag cobbles.	6.0	
30	6 12 12 6	SS05					Medium dense, Olive Black, medium to fine SAND trace fines, some coal fragments, dry, well graded, Fe staining, (SM), (Fill).	8.0	
17	5 3 15 16	SS06					Medium dense, Olive Black - Black, coarse SAND some coal fragments, dry, well graded, Fe staining, (SW), (Fill).	10.0	
5	10 12 9 5	SS07		10			Top and bottom 0.3 Similar to above w/ same coal fragments, moist, Middle 0.1 Loose, Pale greenish Yellow, coarse SAND, dry, well graded, (SW)	12.0	
7	2 3 5 4	SS08					Loose, Black, gravelly coarse SAND, wet well graded, sub-angular (SW-GW).	14.0	
6	1 1 1 2	SS09		15			Top 0.8 Very Loose, Olive Brown, coarse SAND, wet, well graded, (SW). Bottom 0.2 Similar to above except fine SAND trace fines	16.0	
25	7 9 12 22	SS11					Very loose, Black, silty SAND, wet, well graded, (SW). Medium dense, Light olive Grey, medium SAND trace fines, wet, well graded, laminations 1 - 3mm, (SW).	16.0 18.0	Portland / Volclay Grout
6	5 11 14 17	SS12					Same as above.	20.0	
8	4 7 9 10	SS13		20			Medium dense, Light olive Grey, fine SAND few fines, wet, well graded, laminated (SW).	22.0	
13	6 8 15 13	SS14					Same as above.	24.0	
18	6 9 6 11	SS15		25			Medium dense, Light olive Grey, fine SAND some fines, wet, well graded, laminated (SW).	26.0	
15	5 10 13 20	SS16					Medium dense, Light olive Grey - Greyish Olive, fine SAND some fines, wet, well graded, laminated (SW).	28.0	
N/A	6 10 24 19						No Recovery.	30.0	
N/A	2 4 5 5			30			No Recovery.	32.0	
30	11 10 26	SS19					Top 0.4 dense, Greyish Olive, sandy GRAVEL, wet, well graded, sub-rounded, (GW-SW). Bottom 0.4 dense, Greyish Olive, gravely SAND, wet, well graded.	34.0	Bentonite Seal

Continued Next Page

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 BORING/WELL NUMBER E2SC-17

PROJECT NAME Source Control Upper Reach Housatonic River DATE DRILLED 10/27/98

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
16	24 7 5 10	SS20		35			sub-rounded (SW-GW). Medium dense, greyish Olive, sandy GRAVEL, wet, well rounded, sub-rounded (GW-SW).	36.0	
N/A	11 6 4 9						No Recovery.	38.0	
N/A	33 17 11 13						No Recovery.	40.0	
N/A	20 8 18 14			40			No Recovery.	42.0	#0 Filter Sand .010 Slot 2" PVC Schd 40 Screen
72	18 28 56 78	SS24					Very dense, Light olive Grey - Olive Grey, GRAVEL w/ some sand, few fines, wet, well graded, sub-rounded, visable NAPL, outwash (GW-SW).	44.0	
N/A	63 6 100+			45			No Recovery.	44.8	
N/A	30 140						No Recovery.	46.9	1' Sump
20	16 41 47 43	SS27					Very Dense, Light olive Gray, fine SAND w/ some gravel few fines,weathered cobble, well graded, till, (SM)	49.0	Cave in

BORING_WELL P009.GPJ HSI_MA.GDT 11/15/98

Attachment B

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary of Preliminary Appendix IX Results (detected compounds only)

Attachment B: Summary of preliminary Appendix IX results (detected compounds only)

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
E2SC-01	CS01	0-1							
			Misc.						
				Percent Solids	88.6		%		P
E2SC-01	CS0106	1-6							
			Misc.						
				Percent Solids	89.7		%		P
E2SC-01	CS0615	6-15							
			Metals						
				Antimony	0.24	B	mg/kg	1.1	P
				Arsenic	2.7		mg/kg	1.1	P
				Barium	28.6		mg/kg	22.9	P
				Beryllium	0.29	B	mg/kg	0.57	P
				Cadmium	0.083	B	mg/kg	0.57	P
				Chromium	10		mg/kg	1.1	P
				Cobalt	8.8		mg/kg	5.7	P
				Copper	11.1		mg/kg	2.9	P
				Lead	6.9		mg/kg	0.34	P
				Mercury	0.026	B	mg/kg	0.11	P
				Nickel	12.9		mg/kg	4.6	P
				Thallium	1.9		mg/kg	1.1	P
				Vanadium	11		mg/kg	5.7	P
				Zinc	55		mg/kg	2.3	P
			Misc.						
				Acid-insoluble Sulfide	20.2	B	mg/kg	57.4	P
				Percent Solids	87.2		%		P
			SVOC						
				bis(2-Ethylhexyl) phthalate	0.062	J	mg/kg	0.38	P
				Fluoranthene	0.049	J	mg/kg	0.38	P
				Phenanthrene	0.042	J	mg/kg	0.38	P
				Pyrene	0.043	J	mg/kg	0.38	P
E2SC-01	CS3840	38-40							
			Metals						
				Antimony	0.26	B	mg/kg	1.1	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Arsenic	5.7		mg/kg	1.1	P
				Barium	13.8	B	mg/kg	22.9	P
				Beryllium	0.14	B	mg/kg	0.57	P
				Cadmium	0.27	B	mg/kg	0.57	P
				Chromium	10		mg/kg	1.1	P
				Cobalt	12.1		mg/kg	5.7	P
				Copper	22.8		mg/kg	2.9	P
				Lead	6.8		mg/kg	0.34	P
				Nickel	18.1		mg/kg	4.6	P
				Selenium	0.26	B	mg/kg	0.57	P
				Thallium	1.6		mg/kg	1.1	P
				Vanadium	7.6		mg/kg	5.7	P
				Zinc	61.8		mg/kg	2.3	P
			Misc.						
				Acid-insoluble Sulfide	77.1		mg/kg	57.2	P
				Percent Solids	87.5		%		P
			SVOC						
				2-Methylnaphthalene	61		mg/kg	30	P
				Acenaphthene	42		mg/kg	30	P
				Acenaphthylene	26	J	mg/kg	30	P
				Anthracene	46		mg/kg	30	P
				Benzo(a)anthracene	23	J	mg/kg	30	P
				Benzo(a)pyrene	21	J	mg/kg	30	P
				Benzo(b)fluoranthene	14	J	mg/kg	30	P
				Benzo(ghi)perylene	7.4	J	mg/kg	30	P
				Benzo(k)fluoranthene	6.2	J	mg/kg	30	P
				Chrysene	21	J	mg/kg	30	P
				Dibenzofuran	3.3	J	mg/kg	30	P
				Fluoranthene	51		mg/kg	30	P
				Fluorene	44		mg/kg	12	P
				Indeno(1,2,3-cd)pyrene	6.3	J	mg/kg	30	P
				Naphthalene	95		mg/kg	30	P
				Phenanthrene	140		mg/kg	30	P
				Pyrene	67		mg/kg	30	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
E2SC-01	SS09	14-15							
			Misc.						
				Percent Solids	76.6		%		P
E2SC-01	SS22	38-40							
			Misc.						
				Percent Solids	89.5		%		P
			VOC						
				Acetone	0.45	J	mg/kg	1.1	P
				Ethylbenzene	0.21	J	mg/kg	0.28	P
				Xylenes (total)	0.3		mg/kg	0.28	P
E2SC-01	SS25	44-46							
			Misc.						
				Percent Solids	89.3		%		P
E2SC-02	CS0615	6-15							
			Metals						
				Antimony	0.61	B	mg/kg	1.3	DUP
				Arsenic	7.3		mg/kg	1.3	DUP
				Barium	30		mg/kg	25.7	DUP
				Beryllium	0.25	B	mg/kg	0.64	DUP
				Cadmium	0.48	B	mg/kg	0.64	DUP
				Chromium	8.1		mg/kg	1.3	DUP
				Cobalt	6.4		mg/kg	6.4	DUP
				Copper	25.4		mg/kg	3.2	DUP
				Lead	92.5		mg/kg	0.38	DUP
				Mercury	0.13		mg/kg	0.13	DUP
				Nickel	10.1		mg/kg	5.1	DUP
				Selenium	2.6		mg/kg	0.64	DUP
				Thallium	2.6		mg/kg	1.3	DUP
				Vanadium	7.5		mg/kg	6.4	DUP
				Zinc	78.5		mg/kg	2.6	DUP
			Misc.						
				Percent Solids	78		%		DUP
				Percent Solids	75.9		%		DUP
				Total Cyanide	24.5		mg/kg	3.2	DUP

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
			SVOC						
				2-Methylnaphthalene	1300		mg/kg	420	DUP
				Acenaphthene	140		mg/kg	42	DUP
				Acenaphthylene	1500		mg/kg	420	DUP
				Anthracene	1700		mg/kg	420	DUP
				Benzo(a)anthracene	390	J	mg/kg	420	DUP
				Benzo(a)pyrene	240		mg/kg	42	DUP
				Benzo(b)fluoranthene	300		mg/kg	42	DUP
				Benzo(ghi)perylene	84		mg/kg	42	DUP
				Benzo(k)fluoranthene	130		mg/kg	42	DUP
				Chrysene	390	J	mg/kg	420	DUP
				Dibenz(a,h)anthracene	26	J	mg/kg	42	DUP
				Dibenzofuran	70		mg/kg	42	DUP
				Fluoranthene	970		mg/kg	420	DUP
				Fluorene	850		mg/kg	170	DUP
				Indeno(1,2,3-cd)pyrene	82		mg/kg	42	DUP
				Naphthalene	3700		mg/kg	420	DUP
				Phenanthrene	2800		mg/kg	420	DUP
				Phenol	3.2	J	mg/kg	42	DUP
				Pyrene	1600		mg/kg	420	DUP
E2SC-02	CS4042	40-42							
			Metals						
				Arsenic	4.3		mg/kg	1.3	P
				Barium	15.3	B	mg/kg	25.9	P
				Beryllium	0.16	B	mg/kg	0.65	P
				Cadmium	0.4	B	mg/kg	0.65	P
				Chromium	6.2		mg/kg	1.3	P
				Cobalt	7.4		mg/kg	6.5	P
				Copper	11.5		mg/kg	3.2	P
				Lead	5.5		mg/kg	0.39	P
				Mercury	0.015	B	mg/kg	0.13	P
				Nickel	12.3		mg/kg	5.2	P
				Thallium	1.6		mg/kg	1.3	P
				Vanadium	6.7		mg/kg	6.5	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Zinc	59.8		mg/kg	2.6	P
			Misc.						
				Percent Solids	78.1		%		P
				Percent Solids	77.3		%		P
			SVOC						
				Acenaphthene	0.24	J	mg/kg	0.43	P
				Acenaphthylene	0.11	J	mg/kg	0.43	P
				Anthracene	0.34	J	mg/kg	0.43	P
				Benzo(a)anthracene	0.31	J	mg/kg	0.43	P
				Benzo(a)pyrene	0.28	J	mg/kg	0.43	P
				Benzo(b)fluoranthene	0.17	J	mg/kg	0.43	P
				Benzo(ghi)perylene	0.097	J	mg/kg	0.43	P
				Benzo(k)fluoranthene	0.081	J	mg/kg	0.43	P
				bis(2-Ethylhexyl) phthalate	0.081	J	mg/kg	0.43	P
				Chrysene	0.26	J	mg/kg	0.43	P
				Fluoranthene	0.55		mg/kg	0.43	P
				Fluorene	0.26		mg/kg	0.17	P
				Indeno(1,2,3-cd)pyrene	0.08	J	mg/kg	0.43	P
				Phenanthrene	1.5		mg/kg	0.43	P
				Pyrene	0.99		mg/kg	0.43	P
E2SC-02	CS4042	40-42							
			Misc.						
				Percent Solids	83.9		%		DUP
E2SC-03	CS01	0-1							
			Misc.						
				Percent Solids	88.3		%		P
E2SC-03	CS0106	1-6							
			Misc.						
				Percent Solids	88.8		%		P
E2SC-03	CS0615	6-15							
			Metals						
				Antimony	5.4		mg/kg	2.4	P
				Arsenic	12.3		mg/kg	1.2	P
				Barium	34.1		mg/kg	24.5	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Beryllium	0.29	B	mg/kg	0.61	P
				Chromium	32.6		mg/kg	1.2	P
				Cobalt	16.8		mg/kg	6.1	P
				Copper	201		mg/kg	6.1	P
				Lead	477		mg/kg	0.73	P
				Mercury	0.033	B	mg/kg	0.12	P
				Nickel	42		mg/kg	4.9	P
				Selenium	2		mg/kg	1.2	P
				Thallium	4.7		mg/kg	2.4	P
				Vanadium	26		mg/kg	6.1	P
				Zinc	106		mg/kg	4.9	P
			Misc.						
				Acid-insoluble Sulfide	1120		mg/kg	61.2	P
				Percent Solids	79.7		%		P
				Percent Solids	81.7		%		P
			SVOC						
				2,4-Dimethylphenol	0.058	J	mg/kg	0.4	P
				2-Methylnaphthalene	0.33	J	mg/kg	0.4	P
				Acenaphthene	2.2		mg/kg	0.4	P
				Acenaphthylene	0.21	J	mg/kg	0.4	P
				Anthracene	0.3	J	mg/kg	0.4	P
				Benzo(a)anthracene	0.31	J	mg/kg	0.4	P
				Benzo(b)fluoranthene	0.29	J	mg/kg	0.4	P
				Benzo(k)fluoranthene	0.11	J	mg/kg	0.4	P
				bis(2-Ethylhexyl) phthalate	0.24	J	mg/kg	0.4	P
				Chrysene	0.34	J	mg/kg	0.4	P
				Dibenzofuran	0.11	J	mg/kg	0.4	P
				Fluoranthene	0.8		mg/kg	0.4	P
				Fluorene	1		mg/kg	0.16	P
				Naphthalene	5		mg/kg	0.81	P
				Phenanthrene	2.2		mg/kg	0.4	P
				Pyrene	0.76		mg/kg	0.4	P
E2SC-03	**CS4448**	**44-48**							
			Metals						

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Arsenic	9.8		mg/kg	1.1	P
				Barium	21.2	B	mg/kg	22.1	P
				Beryllium	0.091	B	mg/kg	0.55	P
				Chromium	17.7		mg/kg	1.1	P
				Cobalt	11.5		mg/kg	5.5	P
				Copper	19.1		mg/kg	2.8	P
				Lead	8		mg/kg	0.33	P
				Nickel	21.7		mg/kg	4.4	P
				Selenium	0.24	B	mg/kg	0.55	P
				Thallium	2.4		mg/kg	1.1	P
				Vanadium	7.2		mg/kg	5.5	P
				Zinc	50.4		mg/kg	2.2	P
			Misc.						
				Acid-insoluble Sulfide	529		mg/kg	55.2	P
				Percent Solids	90.6		%		P
				Percent Solids	93.6		%		P
			SVOC						
				2-Methylnaphthalene	1800		mg/kg	730	P
				Acenaphthene	130		mg/kg	73	P
				Acenaphthylene	1300		mg/kg	730	P
				Anthracene	530		mg/kg	73	P
				Benzo(a)anthracene	370		mg/kg	73	P
				Benzo(a)pyrene	320		mg/kg	73	P
				Benzo(b)fluoranthene	210		mg/kg	73	P
				Benzo(ghi)perylene	160		mg/kg	73	P
				Benzo(k)fluoranthene	100		mg/kg	73	P
				Chrysene	320		mg/kg	73	P
				Dibenz(a,h)anthracene	41	J	mg/kg	73	P
				Dibenzofuran	67	J	mg/kg	73	P
				Fluoranthene	830		mg/kg	730	P
				Fluorene	780		mg/kg	290	P
				Indeno(1,2,3-cd)pyrene	130		mg/kg	73	P
				Naphthalene	4600		mg/kg	730	P
				Phenanthrene	2400		mg/kg	730	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Pyrene	1200		mg/kg	730	P
E2SC-03	SS08	12-14							
			Misc.						
				Percent Solids	83		%		P
			VOC						
				Acetone	0.045		mg/kg	0.024	P
E2SC-03	SS25	44-46							
			Misc.						
				Percent Solids	78		%		P
			VOC						
				Benzene	15		mg/kg	6.4	P
				Ethylbenzene	67		mg/kg	6.4	P
				Methylene chloride	3.8	J	mg/kg	6.4	P
				Styrene	140		mg/kg	6.4	P
				Toluene	150		mg/kg	6.4	P
				Xylenes (total)	240		mg/kg	6.4	P
E2SC-04	CS4244	42-44							
			Misc.						
				Percent Solids	88.9		%		P
E2SC-04	CS4244	42-44							
			Misc.						
				Percent Solids	89.2		%		DUP
E2SC-04	GS01	0-5							
			Misc.						
				Percent Solids	84.4		%		P
E2SC-04	GS02	5-15.4							
			Misc.						
				Percent Solids	92.4		%		P
E2SC-04	GS03	15.4-24							
			Misc.						
				Percent Solids	79.8		%		P
E2SC-04	GS04	24-39							
			Misc.						
				Percent Solids	92.4		%		P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
E2SC-04	GS05	39-43							
			Misc.						
				Percent Solids	77.3		%		P
E2SC-04	GS06	43-							
			Misc.						
				Percent Solids	88.9		%		P
E2SC-06	CS01	0-1							
			Misc.						
				Percent Solids	89.2		%		P
E2SC-06	CS0106	1-6							
			Misc.						
				Percent Solids	90.3		%		P
E2SC-06	CS0615	6-15							
			Metals						
				Antimony	0.53	B	mg/kg	1.3	P
				Arsenic	6.3		mg/kg	1.3	P
				Barium	42.1		mg/kg	26.9	P
				Beryllium	0.33	B	mg/kg	0.67	P
				Cadmium	0.45	B	mg/kg	0.67	P
				Chromium	12.4		mg/kg	1.3	P
				Cobalt	8.8		mg/kg	6.7	P
				Copper	23.6		mg/kg	3.4	P
				Lead	47.1		mg/kg	0.4	P
				Mercury	0.064	B	mg/kg	0.13	P
				Nickel	16.2		mg/kg	5.4	P
				Selenium	1.3		mg/kg	0.67	P
				Thallium	2.1		mg/kg	1.3	P
				Vanadium	10		mg/kg	6.7	P
				Zinc	122		mg/kg	2.7	P
			Misc.						
				Acid-insoluble Sulfide	444		mg/kg	269	P
				Percent Solids	74.5		%		P
				Percent Solids	78		%		P
				Total Cyanide	53		mg/kg	3.4	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
			SVOC						
				2,4-Dimethylphenol	11	J	mg/kg	110	P
				2-Methylnaphthalene	4400		mg/kg	2200	P
				-Methylphenol & 4-Methylphen	19	J	mg/kg	110	P
				-Methylphenol & 4-Methylphen	19	J	mg/kg	110	P
				Acenaphthene	340		mg/kg	110	P
				Acenaphthylene	4400		mg/kg	2200	P
				Anthracene	8100		mg/kg	2200	P
				Benzo(a)anthracene	1100	J	mg/kg	2200	P
				Benzo(a)pyrene	590		mg/kg	110	P
				Benzo(b)fluoranthene	730		mg/kg	110	P
				Benzo(ghi)perylene	240		mg/kg	110	P
				Benzo(k)fluoranthene	300		mg/kg	110	P
				Chrysene	1200	J	mg/kg	2200	P
				Dibenz(a,h)anthracene	66	J	mg/kg	110	P
				Dibenzofuran	200		mg/kg	110	P
				Fluoranthene	2500		mg/kg	2200	P
				Fluorene	2700		mg/kg	870	P
				Indeno(1,2,3-cd)pyrene	230		mg/kg	110	P
				Naphthalene	12000		mg/kg	2200	P
				Phenanthrene	8200		mg/kg	2200	P
				Phenol	7.9	J	mg/kg	110	P
				Pyrene	4300		mg/kg	2200	P
E2SC-06	SS08	12-14							
			VOC						
				Benzene	2.1		mg/kg	0.53	P
				Styrene	2.1		mg/kg	0.53	P
				Toluene	2.3		mg/kg	0.53	P
				Xylenes (total)	1.6		mg/kg	0.53	P
E2SC-07	CS01	0-1							
			Misc.						
				Percent Solids	88		%		P
E2SC-07	CS01	0-1							
			Misc.						

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Percent Solids	88.8		%		DUP
E2SC-07	CS0106	1-6							
			Misc.						
				Percent Solids	90.5		%		P
E2SC-07	CS0615	6-15							
			Metals						
				Antimony	0.16	B	mg/kg	1	P
				Arsenic	4.2		mg/kg	1	P
				Barium	11.7	B	mg/kg	20.9	P
				Beryllium	0.27	B	mg/kg	0.52	P
				Chromium	6.4		mg/kg	1	P
				Cobalt	9.1		mg/kg	5.2	P
				Copper	14.5		mg/kg	2.6	P
				Lead	6.8		mg/kg	0.31	P
				Mercury	0.13		mg/kg	0.1	P
				Nickel	12.8		mg/kg	4.2	P
				Thallium	0.84	B	mg/kg	1	P
				Vanadium	6.6		mg/kg	5.2	P
				Zinc	37.2		mg/kg	2.1	P
			Misc.						
				Percent Solids	95.4		%		P
				Percent Solids	95.8		%		P
			SVOC						
				2-Methylnaphthalene	0.12	J	mg/kg	0.34	P
				Acenaphthene	0.5		mg/kg	0.34	P
				Acenaphthylene	0.4		mg/kg	0.34	P
				Anthracene	0.52		mg/kg	0.34	P
				Benzo(a)anthracene	0.25	J	mg/kg	0.34	P
				Benzo(a)pyrene	0.22	J	mg/kg	0.34	P
				Benzo(b)fluoranthene	0.16	J	mg/kg	0.34	P
				Benzo(ghi)perylene	0.059	J	mg/kg	0.34	P
				Benzo(k)fluoranthene	0.067	J	mg/kg	0.34	P
				bis(2-Ethylhexyl) phthalate	0.23	J	mg/kg	0.34	P
				Chrysene	0.24	J	mg/kg	0.34	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Dibenzofuran	0.053	J	mg/kg	0.34	P
				Fluoranthene	0.56		mg/kg	0.34	P
				Fluorene	0.45		mg/kg	0.14	P
				Indeno(1,2,3-cd)pyrene	0.053	J	mg/kg	0.34	P
				Naphthalene	0.67		mg/kg	0.34	P
				Phenanthrene	1.2		mg/kg	0.34	P
				Pyrene	0.49		mg/kg	0.34	P
E2SC-07	**CS3840**	**38-40**							
			Misc.						
				Percent Solids	83.1		%		P
E2SC-07	**SS09**	**14-15**							
			VOC						
				Acetone	0.018		mg/kg	0.018	P
				Benzene	0.002	J	mg/kg	0.0045	P
				Chlorobenzene	0.035		mg/kg	0.0045	P
				Ethylbenzene	0.023		mg/kg	0.0045	P
				Tetrachloroethene	0.0015	J	mg/kg	0.0045	P
				Xylenes (total)	0.071		mg/kg	0.0045	P
E2SC-08	**CS4244**	**42-44**							
			Misc.						
				Percent Solids	89		%		P
E2SC-08	**GS06**								
			Misc.						
				Percent Solids	73		%		P
			VOC						
				Acetone	0.037		mg/kg	0.027	P
				Methylene chloride	0.0018	J	mg/kg	0.0068	P
E2SC-11	**CS01**	**0-1**							
			Misc.						
				Percent Solids	89.9		%		P
E2SC-11	**CS0106**	**1-6**							
			Misc.						
				Percent Solids	96.7		%		P
E2SC-11	**CS0615**	**6-15**							

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
			Metals						
				Arsenic	5.1		mg/kg	1.1	P
				Barium	13.1	B	mg/kg	21.6	P
				Beryllium	0.15	B	mg/kg	0.54	P
				Cadmium	0.25	B	mg/kg	0.54	P
				Chromium	7.5		mg/kg	1.1	P
				Cobalt	9.5		mg/kg	5.4	P
				Copper	15.2		mg/kg	2.7	P
				Lead	5.3		mg/kg	0.32	P
				Nickel	13.8		mg/kg	4.3	P
				Thallium	1.6		mg/kg	1.1	P
				Vanadium	7.1		mg/kg	5.4	P
				Zinc	51.4		mg/kg	2.2	P
			Misc.						
				Percent Solids	92.7		%		P
			SVOC						
				bis(2-Ethylhexyl) phthalate	0.13	J	mg/kg	0.36	P
E2SC-11	**SS05**	**6-8**							
			Misc.						
				Percent Solids	96.9		%		P
E2SC-12	**CS0106**	**1-6**							
			Misc.						
				Percent Solids	87.2		%		P
E2SC-12	**CS05**	**0-5**							
			Misc.						
				Percent Solids	73.6		%		P
			VOC						
				Acetone	0.024	J	mg/kg	0.027	P
E2SC-12	**CS0615**	**6-15**							
			Metals						
				Antimony	2.4		mg/kg	1.4	P
				Arsenic	3.6		mg/kg	1.4	P
				Barium	34.3		mg/kg	28.1	P
				Beryllium	0.27	B	mg/kg	0.7	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Cadmium	0.71		mg/kg	0.7	P
				Chromium	24.3		mg/kg	1.4	P
				Cobalt	9.7		mg/kg	7	P
				Copper	33.2		mg/kg	3.5	P
				Lead	71		mg/kg	0.42	P
				Mercury	0.25		mg/kg	0.14	P
				Nickel	15.9		mg/kg	5.6	P
				Selenium	0.54	B	mg/kg	0.7	P
				Thallium	2		mg/kg	1.4	P
				Vanadium	10.5		mg/kg	7	P
				Zinc	105		mg/kg	2.8	P
			Misc.						
				Acid-insoluble Sulfide	106		mg/kg	70.2	P
				Percent Solids	75.5		%		P
				Percent Solids	71.2		%		P
			SVOC						
				1,3-Dichlorobenzene	0.13	J	mg/kg	0.46	P
				1,4-Dichlorobenzene	0.66		mg/kg	0.46	P
				2-Methylnaphthalene	0.28	J	mg/kg	0.46	P
				Acenaphthene	0.38	J	mg/kg	0.46	P
				Acenaphthylene	0.15	J	mg/kg	0.46	P
				Anthracene	0.42	J	mg/kg	0.46	P
				Benzo(a)anthracene	0.54		mg/kg	0.46	P
				Benzo(a)pyrene	0.46		mg/kg	0.46	P
				Benzo(b)fluoranthene	0.55		mg/kg	0.46	P
				Benzo(ghi)perylene	0.084	J	mg/kg	0.46	P
				Benzo(k)fluoranthene	0.24	J	mg/kg	0.46	P
				bis(2-Ethylhexyl) phthalate	0.066	J	mg/kg	0.46	P
				Chrysene	0.66		mg/kg	0.46	P
				Di-n-butyl phthalate	0.089	J	mg/kg	0.46	P
				Fluoranthene	1.2		mg/kg	0.46	P
				Fluorene	0.31		mg/kg	0.18	P
				Indeno(1,2,3-cd)pyrene	0.089	J	mg/kg	0.46	P
				Naphthalene	0.18	J	mg/kg	0.46	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Phenanthrene	1.5		mg/kg	0.46	P
				Pyrene	1.1		mg/kg	0.46	P
E2SC-12	CS3032	30-32							
			Misc.						
				Percent Solids	88.9		%		P
E2SC-13	CS01	0-1							
			Misc.						
				Percent Solids	94.5		%		P
E2SC-13	CS0106	1-6							
			Misc.						
				Percent Solids	92.7		%		P
E2SC-13	CS0516	5-16							
			Metals						
				Antimony	0.3	B	mg/kg	1.1	P
				Arsenic	1.7		mg/kg	1.1	P
				Barium	23.3		mg/kg	22.1	P
				Beryllium	0.24	B	mg/kg	0.55	P
				Cadmium	0.13	B	mg/kg	0.55	P
				Chromium	8.9		mg/kg	1.1	P
				Cobalt	7.7		mg/kg	5.5	P
				Copper	7.8		mg/kg	2.8	P
				Lead	5		mg/kg	0.33	P
				Mercury	0.023	B	mg/kg	0.11	P
				Nickel	13.5		mg/kg	4.4	P
				Thallium	2.1		mg/kg	1.1	P
				Vanadium	8.4		mg/kg	5.5	P
				Zinc	53.1		mg/kg	2.2	P
			Misc.						
				Percent Solids	90.5		%		P
			SVOC						
				Anthracene	0.035	J	mg/kg	0.36	P
				Benzo(a)anthracene	0.089	J	mg/kg	0.36	P
				Benzo(a)pyrene	0.078	J	mg/kg	0.36	P
				Benzo(k)fluoranthene	0.19	J	mg/kg	0.36	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				bis(2-Ethylhexyl) phthalate	0.62		mg/kg	0.36	P
				Chrysene	0.091	J	mg/kg	0.36	P
				Fluoranthene	0.22	J	mg/kg	0.36	P
				Phenanthrene	0.13	J	mg/kg	0.36	P
				Pyrene	0.15	J	mg/kg	0.36	P
			VOC						
				Acetone	0.052		mg/kg	0.022	P
E2SC-13	SS08	14-15							
			Misc.						
				Percent Solids	89.6		%		P
E2SC-13	SS08	14-15							
			Misc.						
				Percent Solids	89.1		%		DUP
E2SC-14	CS01	0-1							
			Misc.						
				Percent Solids	86		%		P
E2SC-14	CS01	0-1							
			Misc.						
				Percent Solids	87.2		%		DUP
E2SC-14	CS0106	1-6							
			Misc.						
				Percent Solids	89.5		%		P
E2SC-14	CS0615	6-15							
			Metals						
				Antimony	0.13	B	mg/kg	1.1	P
				Arsenic	7.4		mg/kg	1.1	P
				Barium	24.6		mg/kg	22.4	P
				Beryllium	0.28	B	mg/kg	0.56	P
				Cadmium	0.099	B	mg/kg	0.56	P
				Chromium	11.8		mg/kg	1.1	P
				Cobalt	13.4		mg/kg	5.6	P
				Copper	19.2		mg/kg	2.8	P
				Lead	6.4		mg/kg	0.34	P
				Mercury	0.012	B	mg/kg	0.11	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Nickel	21		mg/kg	4.5	P
				Thallium	2.7		mg/kg	1.1	P
				Vanadium	10.9		mg/kg	5.6	P
				Zinc	64.9		mg/kg	2.2	P
			Misc.						
				Percent Solids	91.1		%		P
				Percent Solids	89.3		%		P
			SVOC						
				bis(2-Ethylhexyl) phthalate	0.28	J	mg/kg	0.37	P
				Di-n-butyl phthalate	0.16	J	mg/kg	0.37	P
E2SC-16	CS01	0-1							
			Misc.						
				Percent Solids	86.6		%		P
E2SC-16	CS0106	1-6							
			Misc.						
				Percent Solids	87.8		%		P
E2SC-16	CS0615	6-15							
			Metals						
				Antimony	3.4		mg/kg	2.3	P
				Arsenic	13.3		mg/kg	1.2	P
				Barium	168		mg/kg	23.3	P
				Beryllium	0.35	B	mg/kg	0.58	P
				Cadmium	0.26	B	mg/kg	1.2	P
				Chromium	46.2		mg/kg	1.2	P
				Cobalt	15.8		mg/kg	5.8	P
				Copper	175		mg/kg	5.8	P
				Lead	181		mg/kg	0.7	P
				Mercury	0.12		mg/kg	0.12	P
				Nickel	55.6		mg/kg	4.7	P
				Thallium	7.1		mg/kg	2.3	P
				Vanadium	41.8		mg/kg	5.8	P
				Zinc	256		mg/kg	4.7	P
			Misc.						
				Acid-insoluble Sulfide	180		mg/kg	58.1	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Percent Solids	86		%		P
				Percent Solids	85.1		%		P
				Total Cyanide	5.1		mg/kg	2.9	P
			SVOC						
				2,4-Dimethylphenol	0.22	J	mg/kg	0.38	P
				2-Methylnaphthalene	0.84		mg/kg	0.38	P
				2-Methylphenol	0.067	J	mg/kg	0.38	P
				-Methylphenol & 4-Methylphen	0.26	J	mg/kg	0.38	P
				-Methylphenol & 4-Methylphen	0.26	J	mg/kg	0.38	P
				Acenaphthene	0.38		mg/kg	0.38	P
				Acenaphthylene	2.4		mg/kg	0.38	P
				Anthracene	4.5		mg/kg	3.8	P
				Benzo(a)anthracene	5.8		mg/kg	3.8	P
				Benzo(a)pyrene	2.2		mg/kg	0.38	P
				Benzo(ghi)perylene	0.26	J	mg/kg	0.38	P
				Benzo(k)fluoranthene	3.1	J	mg/kg	3.8	P
				bis(2-Ethylhexyl) phthalate	0.22	J	mg/kg	0.38	P
				Chrysene	5.1		mg/kg	3.8	P
				Di-n-butyl phthalate	0.098	J	mg/kg	0.38	P
				Dibenzofuran	2.5		mg/kg	0.38	P
				Fluoranthene	14		mg/kg	3.8	P
				Fluorene	2		mg/kg	0.15	P
				Indeno(1,2,3-cd)pyrene	0.44		mg/kg	0.38	P
				Naphthalene	0.96		mg/kg	0.38	P
				Phenanthrene	17		mg/kg	3.8	P
				Pyrene	11		mg/kg	3.8	P
E2SC-16	SS10	15-17							
			Misc.						
				Percent Solids	85.1		%		P
E2SC-17	CS01	0-1							
			Misc.						
				Percent Solids	89.7		%		P
E2SC-17	CS4749	47-49							
			Misc.						

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Percent Solids	88.4		%		P
E2SC-02	CS01	0-1							
			Misc.						
				Percent Solids	77.5		%		P
E2SC-02	CS0106	1-6							
			Misc.						
				Percent Solids	79.1		%		P
E2SC-02	CS0615	6-15							
			Metals						
				Antimony	0.29	B	mg/kg	1.3	P
				Arsenic	3.6		mg/kg	1.3	P
				Barium	31		mg/kg	26.4	P
				Beryllium	0.33	B	mg/kg	0.66	P
				Chromium	12.8		mg/kg	1.3	P
				Cobalt	11.1		mg/kg	6.6	P
				Copper	13.4		mg/kg	3.3	P
				Lead	6		mg/kg	0.4	P
				Mercury	0.042	B	mg/kg	0.13	P
				Nickel	16.7		mg/kg	5.3	P
				Selenium	0.89		mg/kg	0.66	P
				Thallium	2		mg/kg	1.3	P
				Vanadium	11.1		mg/kg	6.6	P
				Zinc	58.5		mg/kg	2.6	P
			Misc.						
				Percent Solids	75.8		%		P
				Percent Solids	77.4		%		P
			SVOC						
				2-Methylnaphthalene	5.5		mg/kg	2.2	P
				Acenaphthene	6.1		mg/kg	2.2	P
				Acenaphthylene	0.49	J	mg/kg	2.2	P
				Anthracene	3.3		mg/kg	2.2	P
				Benzo(a)anthracene	1.7	J	mg/kg	2.2	P
				Benzo(a)pyrene	1.4	J	mg/kg	2.2	P
				Benzo(b)fluoranthene	0.94	J	mg/kg	2.2	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Benzo(ghi)perylene	0.73	J	mg/kg	2.2	P
				Benzo(k)fluoranthene	0.5	J	mg/kg	2.2	P
				Chrysene	1.4	J	mg/kg	2.2	P
				Dibenzofuran	0.31	J	mg/kg	2.2	P
				Fluoranthene	4.4		mg/kg	2.2	P
				Fluorene	3.7		mg/kg	0.86	P
				Indeno(1,2,3-cd)pyrene	0.54	J	mg/kg	2.2	P
				Naphthalene	14		mg/kg	2.2	P
				Phenanthrene	11		mg/kg	2.2	P
				Pyrene	5.2		mg/kg	2.2	P
E2SC-02	**SS09**	**14-15**							
			Misc.						
				Percent Solids	84.5		%		P
			VOC						
				Acetone	0.42	J	mg/kg	1.2	P
				Chlorobenzene	0.21	J	mg/kg	0.3	P
				Ethylbenzene	1.3		mg/kg	0.3	P
				Xylenes (total)	1.6		mg/kg	0.3	P
E2SC-04	**CS01**	**0-1**							
			Misc.						
				Percent Solids	88.3		%		P
E2SC-04	**CS0106**	**1-6**							
			Misc.						
				Percent Solids	85.9		%		P
E2SC-04	**CS0615**	**6-15**							
			Metals						
				Antimony	0.29	B	mg/kg	1.1	P
				Arsenic	1.7		mg/kg	1.1	P
				Barium	20.7	B	mg/kg	22.2	P
				Beryllium	0.3	B	mg/kg	0.55	P
				Cadmium	0.079	B	mg/kg	0.55	P
				Chromium	8.5		mg/kg	1.1	P
				Cobalt	8.4		mg/kg	5.5	P
				Copper	7.1		mg/kg	2.8	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Lead	2.9		mg/kg	0.33	P
				Mercury	0.013	B	mg/kg	0.11	P
				Nickel	11.5		mg/kg	4.4	P
				Selenium	0.49	B	mg/kg	0.55	P
				Thallium	1.1		mg/kg	1.1	P
				Vanadium	8.6		mg/kg	5.5	P
				Zinc	44.7		mg/kg	2.2	P
			Misc.						
				Percent Solids	88.1		%		P
				Percent Solids	90.3		%		P
			SVOC						
				bis(2-Ethylhexyl) phthalate	0.14	J	mg/kg	0.37	P
E2SC-04	SS09	14-15							
			Misc.						
				Percent Solids	84.2		%		P
			VOC						
				Acetone	0.026		mg/kg	0.024	P
				Methylene chloride	0.0035	J	mg/kg	0.0059	P
E2SC-05	CS01	0-1							
			Misc.						
				Percent Solids	89.3		%		P
E2SC-05	CS0106	1-6							
			Misc.						
				Percent Solids	90.3		%		P
E2SC-05	CS0615	6-15							
			Metals						
				Antimony	0.29	B	mg/kg	1.2	P
				Arsenic	7.5		mg/kg	1.2	P
				Barium	35.3		mg/kg	23.7	P
				Beryllium	0.37	B	mg/kg	0.59	P
				Cadmium	0.29	B	mg/kg	0.59	P
				Chromium	10.9		mg/kg	1.2	P
				Cobalt	12.8		mg/kg	5.9	P
				Copper	17.3		mg/kg	3	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Lead	10.7		mg/kg	0.36	P
				Mercury	0.037	B	mg/kg	0.12	P
				Nickel	19.2		mg/kg	4.7	P
				Vanadium	12.1		mg/kg	5.9	P
				Zinc	68.5		mg/kg	2.4	P
			Misc.						
				Percent Solids	84.3		%		P
				Percent Solids	86.2		%		P
			SVOC						
				2-Methylnaphthalene	0.64		mg/kg	0.39	P
				Acenaphthene	0.1	J	mg/kg	0.39	P
				Acenaphthylene	0.84		mg/kg	0.39	P
				Acetophenone	0.021	J	mg/kg	0.39	P
				Anthracene	2		mg/kg	0.39	P
				Benzo(a)anthracene	0.49		mg/kg	0.39	P
				Benzo(a)pyrene	0.45		mg/kg	0.39	P
				Benzo(b)fluoranthene	0.33	J	mg/kg	0.39	P
				Benzo(ghi)perylene	0.12	J	mg/kg	0.39	P
				Benzo(k)fluoranthene	0.16	J	mg/kg	0.39	P
				bis(2-Ethylhexyl) phthalate	0.17	J	mg/kg	0.39	P
				Chrysene	0.53		mg/kg	0.39	P
				Dibenzofuran	0.055	J	mg/kg	0.39	P
				Fluoranthene	1		mg/kg	0.39	P
				Fluorene	0.73		mg/kg	0.15	P
				Indeno(1,2,3-cd)pyrene	0.1	J	mg/kg	0.39	P
				Naphthalene	0.97		mg/kg	0.39	P
				Phenanthrene	2.8		mg/kg	0.39	P
				Pyrene	1.5		mg/kg	0.39	P
E2SC-05	**CS3840**	**38-40**							
			Metals						
				Arsenic	3		mg/kg	1.1	P
				Barium	8.3	B	mg/kg	21.9	P
				Beryllium	0.065	B	mg/kg	0.55	P
				Cadmium	0.18	B	mg/kg	0.55	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Chromium	3.8		mg/kg	1.1	P
				Cobalt	4.2	B	mg/kg	5.5	P
				Copper	8.6		mg/kg	2.7	P
				Lead	4.2		mg/kg	0.33	P
				Mercury	0.012	B	mg/kg	0.11	P
				Nickel	4.4		mg/kg	4.4	P
				Vanadium	3	B	mg/kg	5.5	P
				Zinc	19.6		mg/kg	2.2	P
			Misc.						
				Percent Solids	89.7		%		P
				Percent Solids	91.3		%		P
			SVOC						
				2-Methylnaphthalene	3.1		mg/kg	1.8	P
				Acenaphthene	3.5		mg/kg	1.8	P
				Acenaphthylene	1.6		mg/kg	0.36	P
				Anthracene	2.4		mg/kg	0.36	P
				Benzo(a)anthracene	1.4		mg/kg	0.36	P
				Benzo(a)pyrene	1.2		mg/kg	0.36	P
				Benzo(b)fluoranthene	0.87		mg/kg	0.36	P
				Benzo(ghi)perylene	0.22	J	mg/kg	0.36	P
				Benzo(k)fluoranthene	0.38		mg/kg	0.36	P
				bis(2-Ethylhexyl) phthalate	0.14	J	mg/kg	0.36	P
				Chrysene	1.2		mg/kg	0.36	P
				Dibenz(a,h)anthracene	0.06	J	mg/kg	0.36	P
				Dibenzofuran	0.28	J	mg/kg	0.36	P
				Fluoranthene	2.6		mg/kg	1.8	P
				Fluorene	2.8		mg/kg	0.71	P
				Indeno(1,2,3-cd)pyrene	0.21	J	mg/kg	0.36	P
				Naphthalene	4.3		mg/kg	1.8	P
				Phenanthrene	9.1		mg/kg	1.8	P
				Pyrene	4.5		mg/kg	1.8	P
E2SC-05	**CS4042**	**40.42**							
			Misc.						
				Percent Solids	86.6		%		P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
E2SC-05	SS07	10-12							
			VOC						
				Acetone	0.021		mg/kg	0.021	P
E2SC-05	SS22	38-40							
			VOC						
				Acetone	0.0049	J	mg/kg	0.018	P
				Ethylbenzene	0.024		mg/kg	0.0044	P
				Tetrachloroethene	0.0012	J	mg/kg	0.0044	P
				Toluene	0.004	J	mg/kg	0.0044	P
				Xylenes (total)	0.033		mg/kg	0.0044	P
E2SC-09	CS01	0-1							
			Misc.						
				Percent Solids	80.8		%		P
E2SC-09	CS01	0-1							
			Misc.						
				Percent Solids	80.2		%		DUP
E2SC-09	CS0106	1-6							
			Misc.						
				Percent Solids	92.1		%		P
E2SC-09	CS0615	6-15							
			Metals						
				Antimony	0.63	B	mg/kg	1.2	P
				Arsenic	8		mg/kg	1.2	P
				Barium	40.5		mg/kg	23.4	P
				Beryllium	0.27	B	mg/kg	0.58	P
				Cadmium	0.65		mg/kg	0.58	P
				Chromium	22.4		mg/kg	1.2	P
				Cobalt	9.5		mg/kg	5.8	P
				Copper	34.7		mg/kg	2.9	P
				Lead	54.4		mg/kg	0.35	P
				Mercury	0.081	B	mg/kg	0.12	P
				Nickel	16.1		mg/kg	4.7	P
				Selenium	0.85		mg/kg	0.58	P
				Thallium	2.1		mg/kg	1.2	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Tin	20.6		mg/kg	11.7	P
				Vanadium	11		mg/kg	5.8	P
				Zinc	88.2		mg/kg	2.3	P
			Misc.						
				Percent Solids	85.6		%		P
				Percent Solids	85.6		%		P
			SVOC						
				1,4-Dichlorobenzene	1	J	mg/kg	1.9	P
				2,4-Dimethylphenol	0.26	J	mg/kg	1.9	P
				2-Methylnaphthalene	0.37	J	mg/kg	1.9	P
				Acenaphthene	2.3		mg/kg	1.9	P
				Benzo(a)anthracene	0.86	J	mg/kg	1.9	P
				Benzo(a)pyrene	0.76	J	mg/kg	1.9	P
				Benzo(b)fluoranthene	0.84	J	mg/kg	1.9	P
				Benzo(k)fluoranthene	0.4	J	mg/kg	1.9	P
				bis(2-Ethylhexyl) phthalate	0.2	J	mg/kg	1.9	P
				Chrysene	1	J	mg/kg	1.9	P
				Fluoranthene	1.9		mg/kg	1.9	P
				Indeno(1,2,3-cd)pyrene	0.18	J	mg/kg	1.9	P
				Naphthalene	2.4		mg/kg	1.9	P
				Pyrene	1.5	J	mg/kg	1.9	P
E2SC-09	**CS4042**	**40-42**							
			Misc.						
				Percent Solids	83.5		%		P
E2SC-10	**CS01**	**0-1**							
			Misc.						
				Percent Solids	89.5		%		P
E2SC-10	**CS0106**	**1-6**							
			Metals						
				Antimony	0.15	B	mg/kg	1.1	P
				Arsenic	5.8		mg/kg	1.1	P
				Barium	15.2	B	mg/kg	22.1	P
				Beryllium	0.14	B	mg/kg	0.55	P
				Chromium	8.3		mg/kg	1.1	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Cobalt	10.4		mg/kg	5.5	P
				Copper	20.3		mg/kg	2.8	P
				Lead	9.5		mg/kg	0.33	P
				Mercury	0.013	B	mg/kg	0.11	P
				Nickel	16.2		mg/kg	4.4	P
				Thallium	1.3		mg/kg	1.1	P
				Vanadium	7		mg/kg	5.5	P
				Zinc	52.7		mg/kg	2.2	P
			Misc.						
				Percent Solids	90.7		%		P
				Percent Solids	72.6		%		P
			SVOC						
				2-Methylnaphthalene	0.19	J	mg/kg	0.36	P
				Acenaphthene	0.11	J	mg/kg	0.36	P
				Acenaphthylene	0.25	J	mg/kg	0.36	P
				Anthracene	0.17	J	mg/kg	0.36	P
				Benzo(a)anthracene	0.15	J	mg/kg	0.36	P
				Benzo(a)pyrene	0.12	J	mg/kg	0.36	P
				Benzo(b)fluoranthene	0.14	J	mg/kg	0.36	P
				Benzo(k)fluoranthene	0.059	J	mg/kg	0.36	P
				bis(2-Ethylhexyl) phthalate	0.21	J	mg/kg	0.36	P
				Chrysene	0.14	J	mg/kg	0.36	P
				Fluoranthene	0.43		mg/kg	0.36	P
				Fluorene	0.22		mg/kg	0.14	P
				Naphthalene	0.31	J	mg/kg	0.36	P
				Phenanthrene	0.79		mg/kg	0.36	P
				Pyrene	0.32	J	mg/kg	0.36	P
E2SC-10	**CS0615**	**6-15**							
			Misc.						
				Percent Solids	93.9		%		P
E2SC-10	**CS2830**	**28-30**							
			Misc.						
				Percent Solids	90.3		%		P
E2SC-10	**SS03**	**3-5**							

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
			Misc.						
				Percent Solids	92.9		%		P
E2SC-15	CS0106	1-6							
			Misc.						
				Percent Solids	86.4		%		P
E2SC-15	CS0615	6-15							
			Metals						
				Antimony	0.29	B	mg/kg	1.3	P
				Arsenic	2.1		mg/kg	1.3	P
				Barium	28.3		mg/kg	25.5	P
				Beryllium	0.28	B	mg/kg	0.64	P
				Chromium	9.1		mg/kg	1.3	P
				Cobalt	7.3		mg/kg	6.4	P
				Copper	19.7		mg/kg	3.2	P
				Lead	7.5		mg/kg	0.38	P
				Mercury	0.032	B	mg/kg	0.13	P
				Nickel	12		mg/kg	5.1	P
				Selenium	0.56	B	mg/kg	0.64	P
				Thallium	1.7		mg/kg	1.3	P
				Vanadium	10.2		mg/kg	6.4	P
				Zinc	57.4		mg/kg	2.6	P
			Misc.						
				Percent Solids	78.3		%		P
				Percent Solids	77.6		%		P
			SVOC						
				Acenaphthylene	0.031	J	mg/kg	0.42	P
				Benzo(a)anthracene	0.043	J	mg/kg	0.42	P
				Benzo(a)pyrene	0.068	J	mg/kg	0.42	P
				Benzo(b)fluoranthene	0.091	J	mg/kg	0.42	P
				bis(2-Ethylhexyl) phthalate	0.032	J	mg/kg	0.42	P
				Chrysene	0.058	J	mg/kg	0.42	P
				Fluoranthene	0.08	J	mg/kg	0.42	P
				Phenanthrene	0.042	J	mg/kg	0.42	P
				Pyrene	0.055	J	mg/kg	0.42	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
E2SC-15	CS3436	34-36							
			Misc.						
				Percent Solids	87.2		%		P
E2SC-15	SS08	12-14							
			Misc.						
				Percent Solids	68.3		%		P
			VOC						
				Acetone	0.024	J	mg/kg	0.029	P
E2SC-17	CS0106	1-6							
			Misc.						
				Percent Solids	91.9		%		P
E2SC-17	CS0106	1-6							
			Misc.						
				Percent Solids	89.7		%		DUP
E2SC-17	CS0615	6-15							
			Metals						
				Antimony	3.3		mg/kg	1.2	P
				Arsenic	6.5		mg/kg	1.2	P
				Barium	91.5		mg/kg	23.5	P
				Beryllium	0.51	B	mg/kg	0.59	P
				Cadmium	0.15	B	mg/kg	0.59	P
				Chromium	25.2		mg/kg	1.2	P
				Cobalt	10.1		mg/kg	5.9	P
				Copper	74.5		mg/kg	5.9	P
				Lead	83.5		mg/kg	0.35	P
				Mercury	0.053	B	mg/kg	0.12	P
				Nickel	21.4		mg/kg	4.7	P
				Selenium	0.33	B	mg/kg	1.2	P
				Vanadium	33.5		mg/kg	5.9	P
				Zinc	108		mg/kg	4.7	P
			Misc.						
				Percent Solids	85.2		%		P
				Percent Solids	83.9		%		P
			SVOC						

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				2-Methylnaphthalene	0.2	J	mg/kg	0.39	P
				Acenaphthene	0.47		mg/kg	0.39	P
				Acenaphthylene	0.14	J	mg/kg	0.39	P
				Acetophenone	0.048	J	mg/kg	0.39	P
				Anthracene	0.65		mg/kg	0.39	P
				Benzo(a)anthracene	1.1		mg/kg	0.39	P
				Benzo(a)pyrene	1.1		mg/kg	0.39	P
				Benzo(b)fluoranthene	1.5		mg/kg	0.39	P
				Benzo(ghi)perylene	0.32	J	mg/kg	0.39	P
				Benzo(k)fluoranthene	0.56		mg/kg	0.39	P
				bis(2-Ethylhexyl) phthalate	0.036	J	mg/kg	0.39	P
				Chrysene	1.2		mg/kg	0.39	P
				Dibenz(a,h)anthracene	0.12	J	mg/kg	0.39	P
				Dibenzofuran	0.19	J	mg/kg	0.39	P
				Fluoranthene	1.9		mg/kg	0.39	P
				Fluorene	0.67		mg/kg	0.15	P
				Indeno(1,2,3-cd)pyrene	0.35	J	mg/kg	0.39	P
				Naphthalene	1.9		mg/kg	0.39	P
				Phenanthrene	2.1		mg/kg	0.39	P
				Pyrene	1.6		mg/kg	0.39	P
E2SC-17	**CS0615**	**6-15**							
			Metals						
				Antimony	3.9		mg/kg	1.2	DUP
				Arsenic	6.7		mg/kg	1.2	DUP
				Barium	74.4		mg/kg	23.5	DUP
				Beryllium	0.51		mg/kg	0.59	DUP
				Cadmium	0.19		mg/kg	0.59	DUP
				Chromium	23.3		mg/kg	1.2	DUP
				Cobalt	10.9		mg/kg	5.9	DUP
				Copper	59.9		mg/kg	5.9	DUP
				Lead	49.8		mg/kg	0.35	DUP
				Nickel	22.3		mg/kg	4.7	DUP
				Thallium	0.74		mg/kg	2.3	DUP
				Vanadium	31.1		mg/kg	5.9	DUP

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Zinc	157		mg/kg	4.7	DUP
E2SC-17	CS4244	42-44							
			Metals						
				Arsenic	7		mg/kg	1.1	P
				Barium	20.6	B	mg/kg	22.1	P
				Beryllium	0.15	B	mg/kg	0.55	P
				Cadmium	0.29	B	mg/kg	0.55	P
				Chromium	7.2		mg/kg	1.1	P
				Cobalt	14.8		mg/kg	5.5	P
				Copper	20.3		mg/kg	2.8	P
				Lead	7.3		mg/kg	0.33	P
				Mercury	0.02	B	mg/kg	0.11	P
				Nickel	15.5		mg/kg	4.4	P
				Vanadium	6		mg/kg	5.5	P
				Zinc	52.5		mg/kg	2.2	P
			Misc.						
				Acid-insoluble Sulfide	636		mg/kg	221	P
				Percent Solids	90.5		%		P
				Percent Solids	91.5		%		P
			SVOC						
				2-Methylnaphthalene	990		mg/kg	180	P
				Acenaphthene	62	J	mg/kg	180	P
				Acenaphthylene	730		mg/kg	180	P
				Anthracene	300		mg/kg	180	P
				Benzo(a)anthracene	200		mg/kg	180	P
				Benzo(a)pyrene	170	J	mg/kg	180	P
				Benzo(b)fluoranthene	120	J	mg/kg	180	P
				Benzo(ghi)perylene	36	J	mg/kg	180	P
				Benzo(k)fluoranthene	52	J	mg/kg	180	P
				Chrysene	170	J	mg/kg	180	P
				Dibenzofuran	33	J	mg/kg	180	P
				Fluoranthene	440		mg/kg	180	P
				Fluorene	420		mg/kg	72	P
				Indeno(1,2,3-cd)pyrene	34	J	mg/kg	180	P

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Naphthalene	1700		mg/kg	360	P
				Phenanthrene	1200		mg/kg	180	P
				Pyrene	540		mg/kg	180	P
E2SC-17	SS05	6-8							
			VOC						
				Acetone	0.0053	J	mg/kg	0.019	P
E2SC-17	SS24	42-44							
			VOC						
				Ethylbenzene	1		mg/kg	0.19	P
				Styrene	1.1		mg/kg	0.19	P
				Toluene	0.7		mg/kg	0.19	P
				Xylenes (total)	3.6		mg/kg	0.19	P
E2SC-08	CS0106	1-6							
			Misc.						
				Percent Solids	68		%		P
E2SC-08	CS0615	6-15							
			Metals						
				Antimony	1.5		mg/kg	1.4	P
				Arsenic	11.3		mg/kg	1.4	P
				Barium	73.2		mg/kg	28.6	P
				Beryllium	0.37	B	mg/kg	0.72	P
				Cadmium	0.86		mg/kg	0.72	P
				Chromium	48.6		mg/kg	1.4	P
				Cobalt	11.2		mg/kg	7.2	P
				Copper	180		mg/kg	3.6	P
				Lead	180		mg/kg	0.43	P
				Mercury	0.69		mg/kg	0.14	P
				Nickel	28		mg/kg	5.7	P
				Selenium	1.4		mg/kg	0.72	P
				Thallium	2.9		mg/kg	1.4	P
				Tin	29.2		mg/kg	14.3	P
				Vanadium	13.5		mg/kg	7.2	P
				Zinc	212		mg/kg	2.9	P
			Misc.						

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Acid-insoluble Sulfide	85.3		mg/kg	71.5	P
				Percent Solids	79.6		%		P
				Percent Solids	69.9		%		P
			SVOC						
				1,4-Dichlorobenzene	2.4		mg/kg	12	P
				2-Methylnaphthalene	4.6	J	mg/kg	12	P
				Acenaphthene	17		mg/kg	12	P
				Acenaphthylene	3	J	mg/kg	12	P
				Anthracene	19		mg/kg	12	P
				Benzo(a)anthracene	19		mg/kg	12	P
				Benzo(a)pyrene	15		mg/kg	12	P
				Benzo(b)fluoranthene	17		mg/kg	12	P
				Benzo(ghi)perylene	6.2	J	mg/kg	12	P
				Benzo(k)fluoranthene	7.5	J	mg/kg	12	P
				bis(2-Ethylhexyl) phthalate	1.4	J	mg/kg	12	P
				Chrysene	20		mg/kg	12	P
				Di-n-butyl phthalate	0.96	J	mg/kg	12	P
				Dibenz(a,h)anthracene	2.1	J	mg/kg	12	P
				Dibenzofuran	7.7	J	mg/kg	12	P
				Fluoranthene	56		mg/kg	12	P
				Fluorene	19		mg/kg	4.6	P
				Indeno(1,2,3-cd)pyrene	6.5	J	mg/kg	12	P
				Naphthalene	5.3	J	mg/kg	12	P
				Phenanthrene	79		mg/kg	12	P
				Pyrene	38		mg/kg	12	P
E2SC-08	CS0615	6-15							
			Metals						
				Antimony	2		mg/kg	1.4	DUP
				Arsenic	9.6		mg/kg	1.4	DUP
				Barium	78.6		mg/kg	28.6	DUP
				Beryllium	0.35		mg/kg	0.72	DUP
				Cadmium	1		mg/kg	0.72	DUP
				Chromium	47.6		mg/kg	1.4	DUP
				Cobalt	12		mg/kg	7.2	DUP

Boring	Sample Name	Sample Depth (ft)	Analysis	Compound	Result	Qualifier	Units	Reporting Limit	Modifier
				Copper	175		mg/kg	3.6	DUP
				Lead	197		mg/kg	0.43	DUP
				Mercury	0.43		mg/kg	0.14	DUP
				Nickel	29.4		mg/kg	5.7	DUP
				Selenium	1.3		mg/kg	0.72	DUP
				Thallium	2.9		mg/kg	1.4	DUP
				Tin	6.7		mg/kg	14.3	DUP
				Vanadium	15.2		mg/kg	7.2	DUP
				Zinc	200		mg/kg	2.9	DUP

B For organics, compound found in method blank. For metals, result is between MDL and RL.
J For organics, result is between MDL and RL.
DUP Duplicate sample.
WW Results reported on wet weight.
P Preliminary result.

Attachment C

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

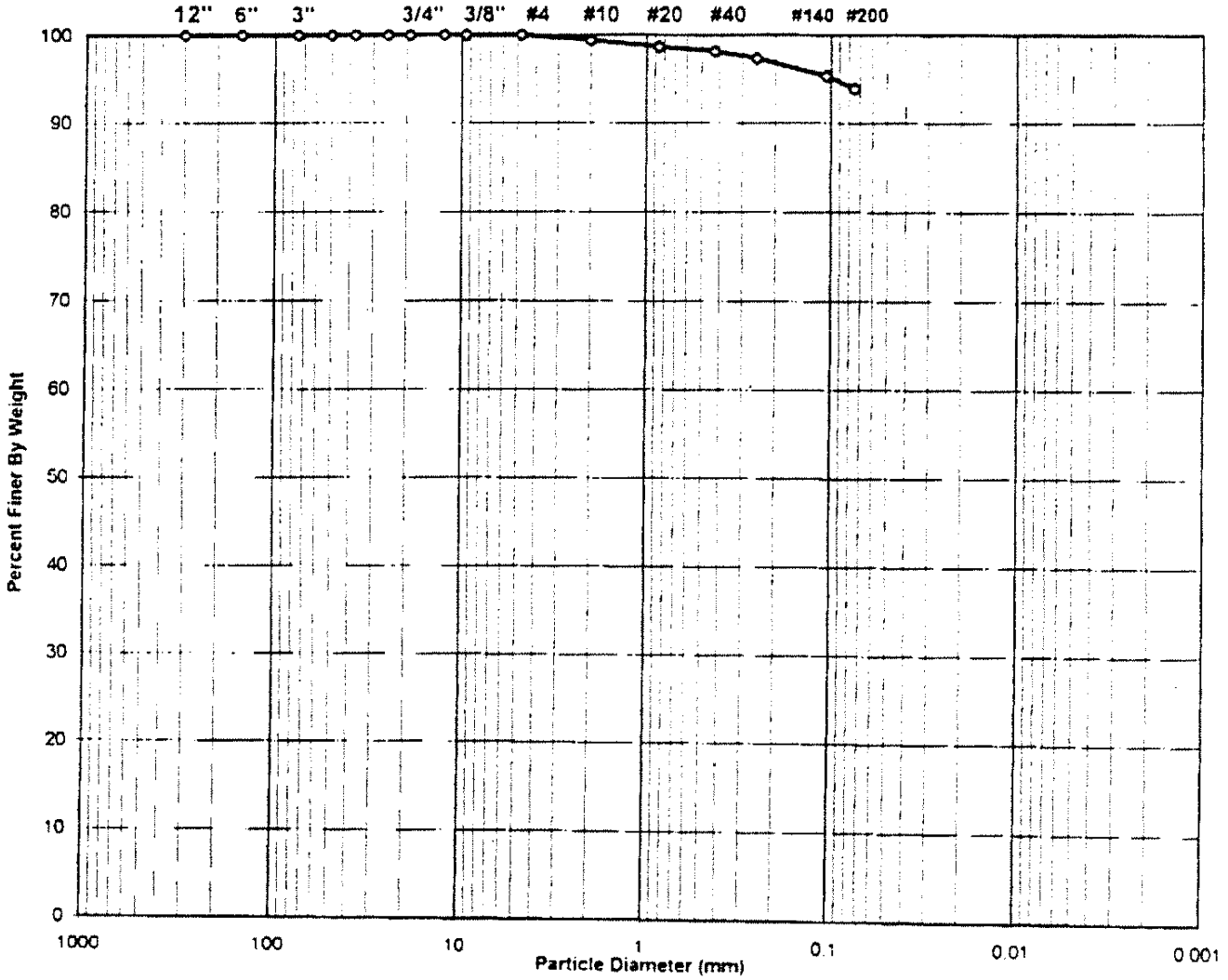
Grain-Size Analyses

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No.	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No.	98275-01	Sample No.	E2SC-04-GS05
Lab ID	98275-01 005	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol *ML, TESTED*

USCS Classification *SILT (NON-PLASTIC FINES)*

Tested By TO Date 10/27/98 Checked By Jcm Date 10-28-98

DCN: CT-S3A DATE 6-25 98 REVISION: 2

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Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No.	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No.	98275-01	Sample No.	E2SC-04-GS05
Lab ID	98275-01.005	Soil Color	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1681	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	232.08	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	214.99	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	103.91	Weight of Tare (gm)	NA
Weight of Water (gm)	17.09	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	111.08	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**15.4**	**Moisture Content (%)**	NA

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	111.08
Dry Weight - 3/4" Sample (gm)	6.8	Weight of minus #200 material (gm)	104.28
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	6.80
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12 50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	0.69	0.62	0.62	99.38	**99.38**
#20	0.850	0.79	0.71	1.33	98.67	**98.67**
#40	0.425	0.57	0.51	1.85	98.15	**98.15**
#60	0.250	0.88	0.79	2.64	97.36	**97.36**
#140	0.106	2.26	2.03	4.67	95.33	**95.33**
#200	0.075	1.61	1.45	6.12	93.88	**93.88**
Pan	-	104.28	93.88	100.00	-	-

Tested By TO Date 10/27/98 Checked By [signature] Date 10.28.98

DCN: CT-S3A DATE 6-25-98 REVISION: 2

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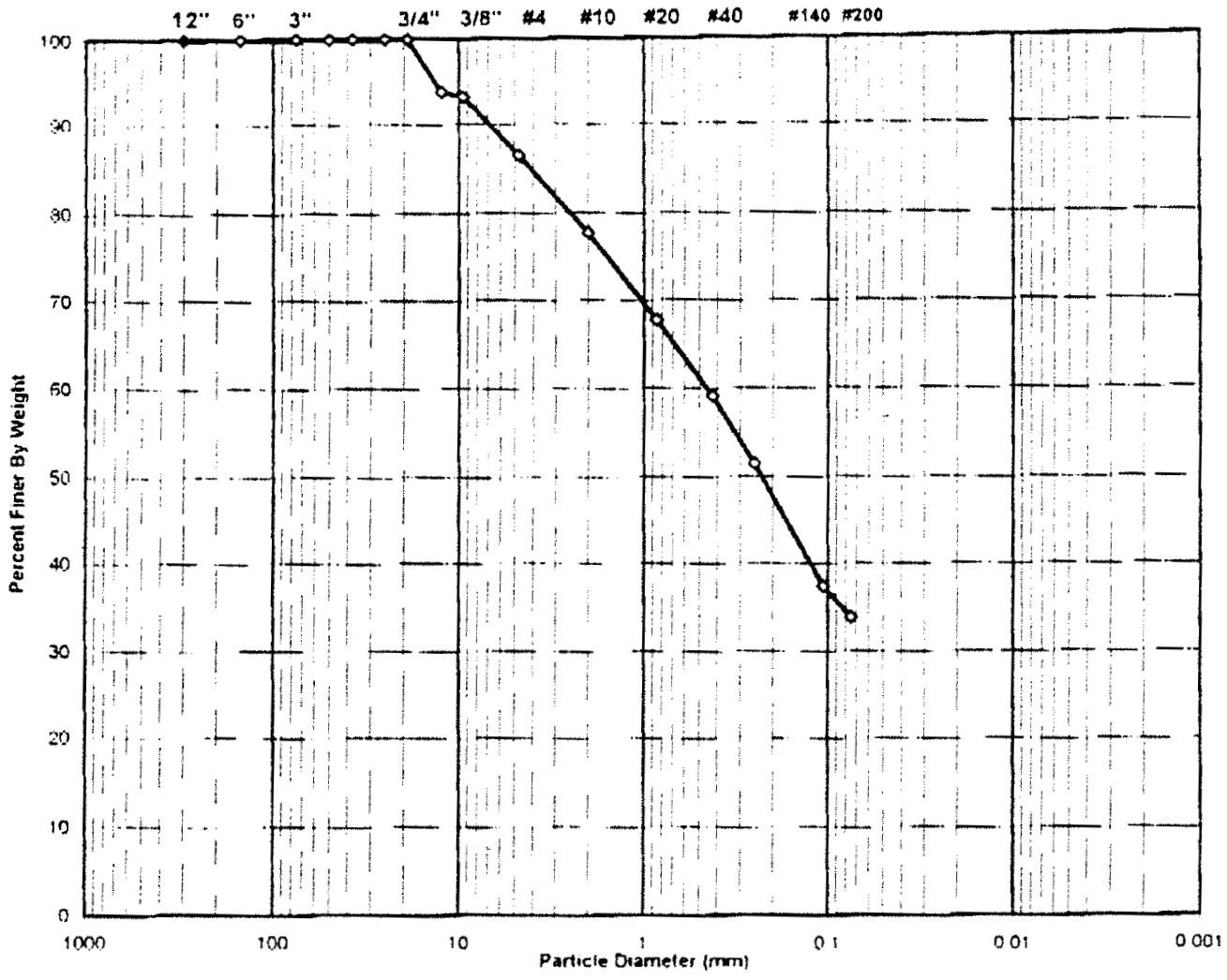
Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No.	98275-01	Sample No	E2SC-04-GS01
Lab ID	98275-01 001	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol *sc, ASSUMED*

USCS Classification *CLAYEY SAND*

Tested By JLD Date 10/19/98 Checked By Jm Date 10.27.98

DCN: CT-53A DATE 6-25-98 REVISION 2

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Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No.	98275-01	Sample No	E2SC-04-GS01
Lab ID	98275-01 001	Soil Color	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1718	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	368.11	Wgt Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	332.74	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	82.43	Weight of Tare (gm)	NA
Weight of Water (gm)	35.37	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	250.31	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**14.1**	**Moisture Content (%)**	NA

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	250.31
Dry Weight - 3/4" Sample (gm)	165.7	Weight of minus #200 material (gm)	84.62
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	165.69
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	15.79	6.31	6.31	93.69	**93.69**
3/8"	9.50	1.55	0.62	6.93	93.07	**93.07**
#4	4.75	16.80	6.71	13.64	86.36	**86.36**
#10	2.00	21.80	8.71	22.35	77.65	**77.65**
#20	0.850	25.01	9.99	32.34	67.66	**67.66**
#40	0.425	21.68	8.66	41.00	59.00	**59.00**
#60	0.250	18.82	7.52	48.52	51.48	**51.48**
#140	0.106	35.44	14.16	62.68	37.32	**37.32**
#200	0.075	8.80	3.52	66.19	33.81	**33.81**
Pan	-	84.62	33.81	100.00	-	-

Tested By JLD Date 10/19/98 Checked By Jcm Date 10-27-98

DCN GT-53A DATE 6-25-98 REVISION: 2

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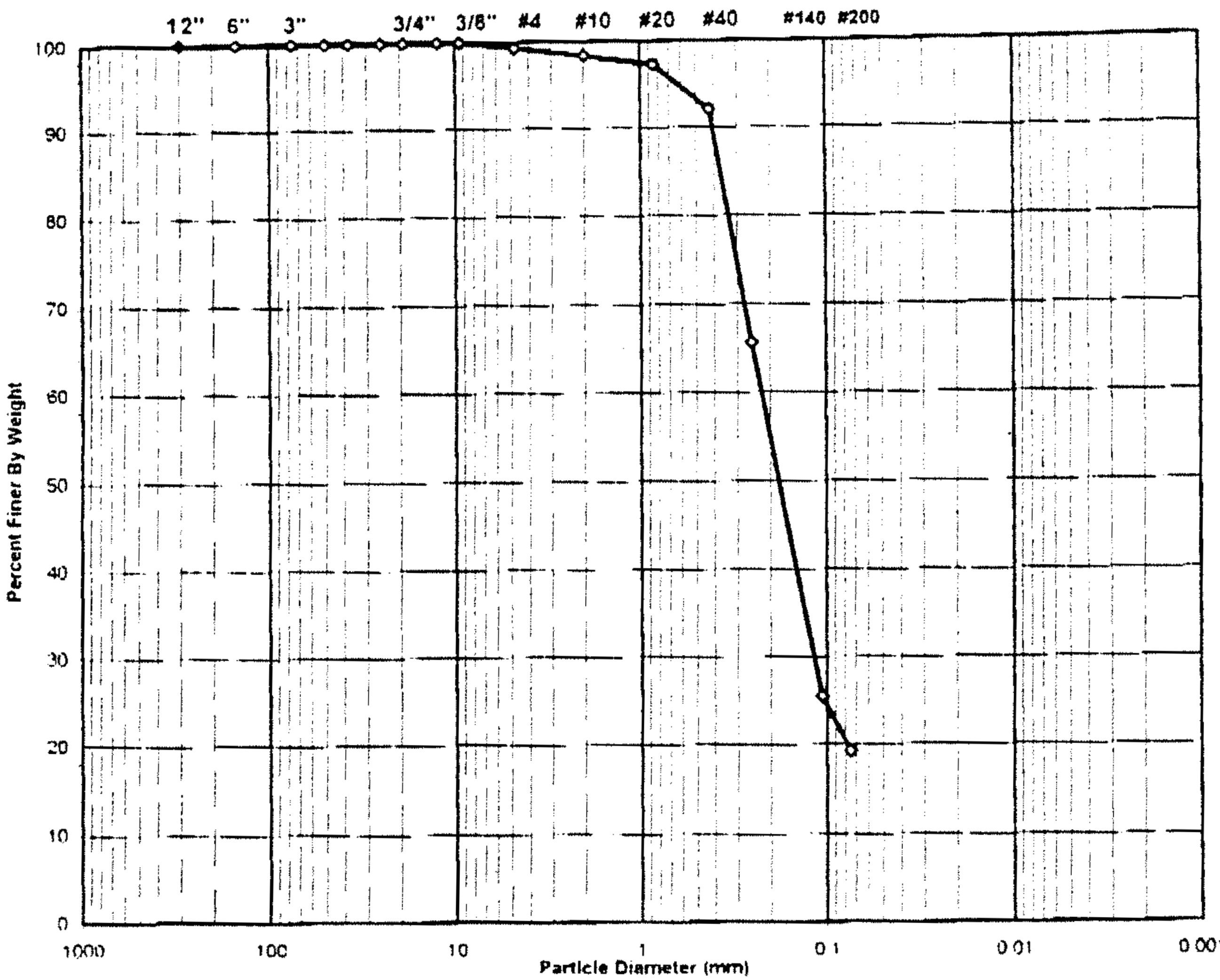
SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No.	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No	98275-01	Sample No.	E2SC-04-GS02
Lab ID	98275-01.002	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol *sc, ASSUMED*

USCS Classification *CLAYEY SAND*

Tested By JLD Date 10/19/98 Checked By [signature] Date 10-27-98

 DCN: CT-S3A DATE 6-25-98 REVISION: 2 C:\Printa\M59...\Sheet1

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WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No.	98275-01	Sample No.	E2SC-04-GS02
Lab ID	98275-01.002	Soil Color	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1719A	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	381.69	Wgt Tare + Wet Specimen (gm)	NA
Wgt Tare + Dry Specimen (gm)	351.85	Wgt Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	84.83	Weight of Tare (gm)	NA
Weight of Water (gm)	29.84	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	267.02	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**11.2**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	267.02
Dry Weight - 3/4" Sample (gm)	215.7	Weight of minus #200 material (gm)	51.34
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	215.68
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	2.01	0.75	0.75	99.25	**99.25**
#10	2.00	2.47	0.93	1.68	98.32	**98.32**
#20	0.850	2.88	1.08	2.76	97.24	**97.24**
#40	0.425	13.87	5.19	7.95	92.05	**92.05**
#60	0.250	70.57	26.43	34.38	65.62	**65.62**
#140	0.106	107.40	40.22	74.60	25.40	**25.40**
#200	0.075	16.48	6.17	80.77	19.23	**19.23**
Pan	-	51.34	19.23	100.00	-	-

Tested By JLD Date 10/19/98 Checked By Jcm Date 10.27.98

OCN: CT-53A DATE 6-26-98 REVISION: 2

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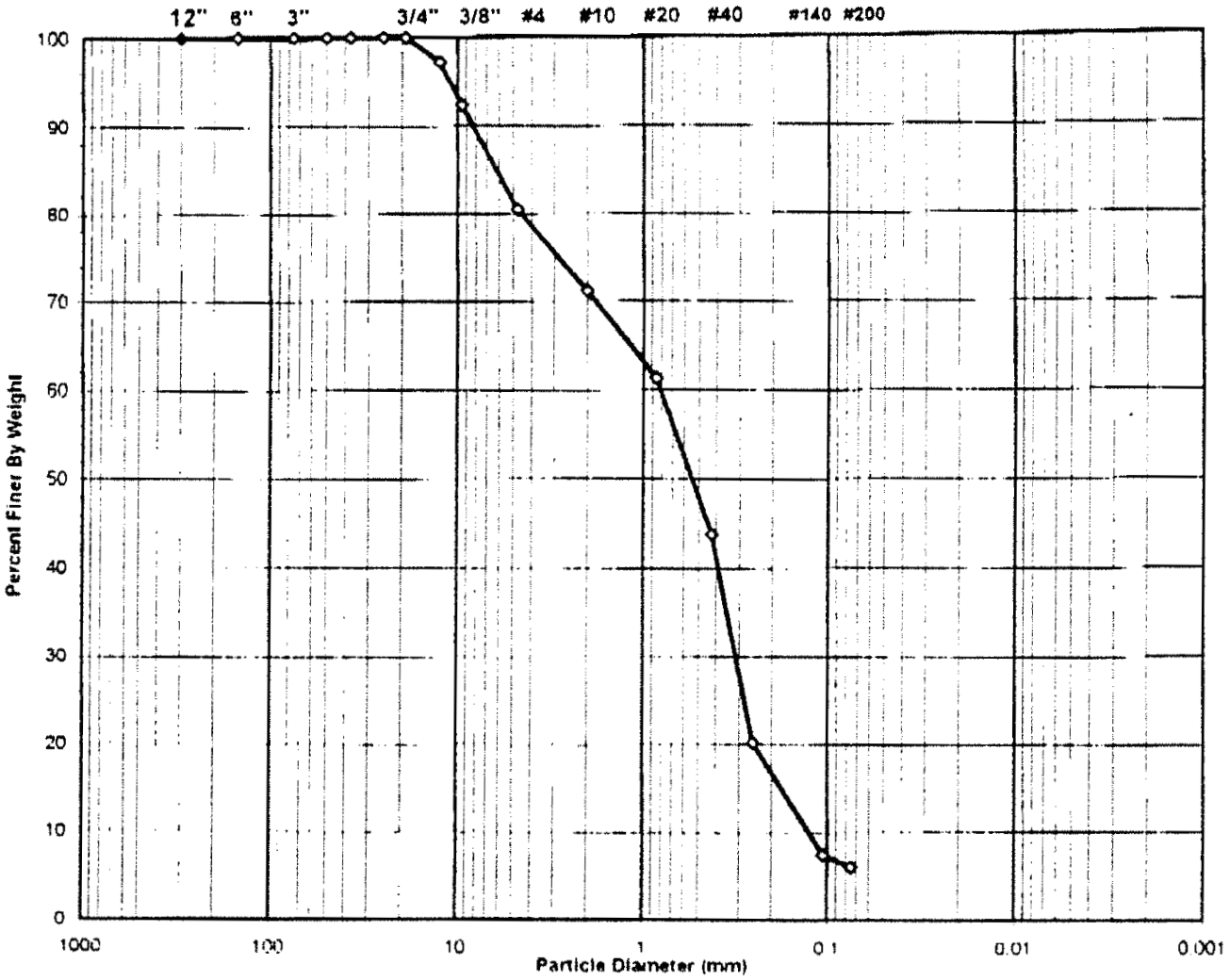
SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No.	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No.	98275-01	Sample No.	E2SC-04-GS03
Lab ID	98275-01.003	Soil Color	GRAY & BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol	*sp-sm, ASSUMED*	D60 =	0.8	CC =	1.0
USCS Classification	*POORLY GRADED SAND WITH SILT AND GRAVEL*	D30 =	0.3	CU =	6.4
		D10 =	0.1		

Tested By JLD Date 10/19/98 Checked By Jcm Date 10-27-98

DCN: GT-S3A DATE 6-25-98 REVISION: 2

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WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No.	98275-01	Sample No	E2SC-04-GS03
Lab ID	98275-01.003	Soil Color	GRAY & BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	598	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	475.20	Wgt Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	423.60	Wgt Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	84.79	Weight of Tare (gm)	NA
Weight of Water (gm)	51.60	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	338.81	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**15.2**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	338.81
Dry Weight - 3/4" Sample (gm)	318.6	Weight of minus #200 material (gm)	20.19
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	318 62
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37 5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0 00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0 00	0.00	100.00	**100.00**
1/2"	12.50	9.62	2 84	2.84	97.16	**97.16**
3/8"	9 50	16.46	4 86	7.70	92.30	**92.30**
#4	4 75	40 41	11 93	19.62	80.38	**80.38**
#10	2.00	31.20	9 21	28.83	71.17	**71.17**
#20	0.850	33.63	9.93	38.76	61.24	**61.24**
#40	0.425	59.59	17.59	56.35	43.65	**43.65**
#60	0.250	79.72	23.53	79.88	20.12	**20.12**
#140	0 106	43.18	12 74	92.62	7.38	**7.38**
#200	0 075	4.81	1 42	94.04	5.96	**5.96**
Pan	-	20.19	5 96	100 00	-	-

Tested By JLD Date 10/19/98 Checked By Jcm Date 10-27-98

 DCN CT-S3A DATE 6-23-98 REVISION 2 C:\My Documents\Met...\Sheet1

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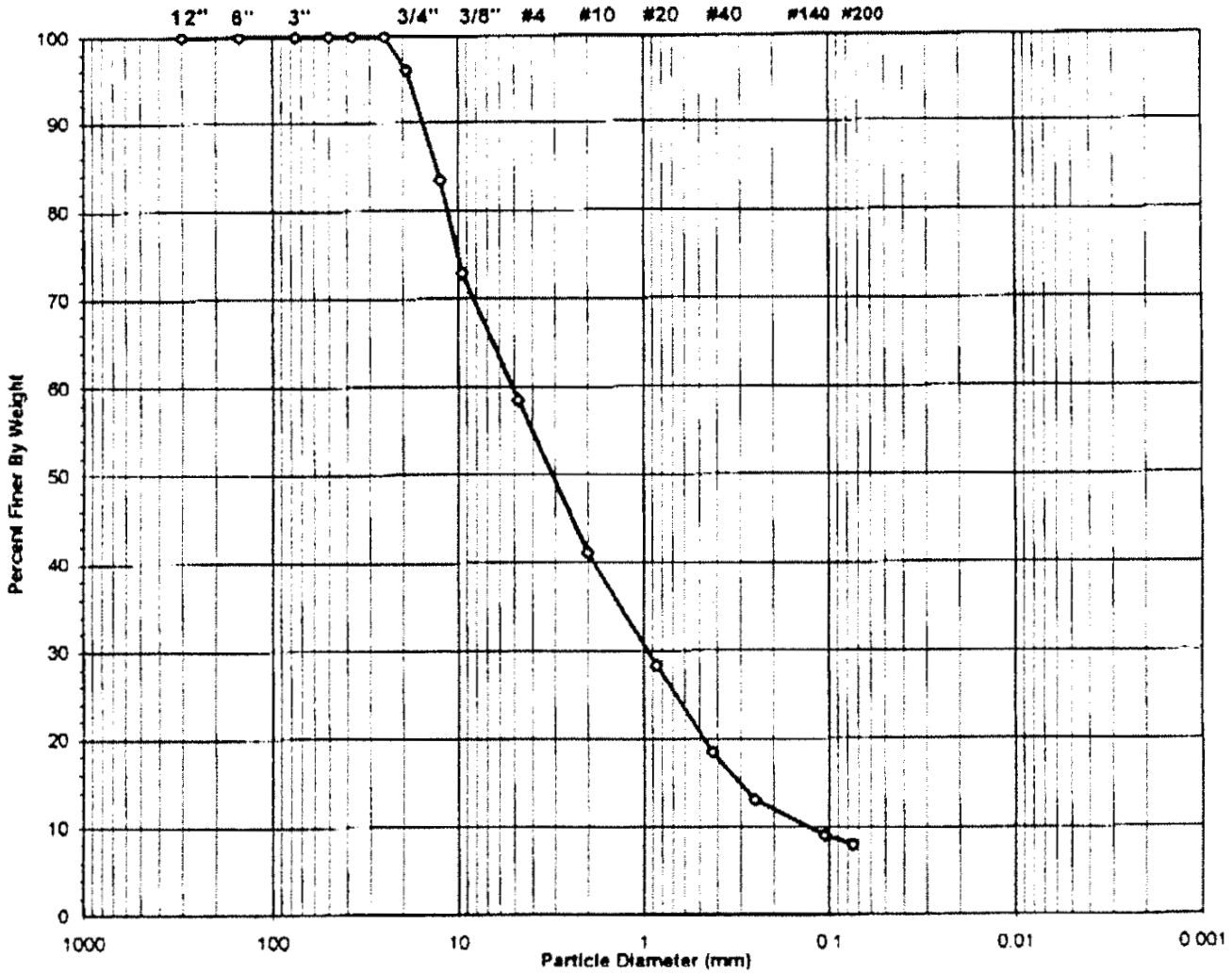
SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No.	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No.	98275-01	Sample No.	E2SC-04-GS04
Lab ID	98275-01.004	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol	*sw-sm, ASSUMED*	D60 =	5.1	CC =	1.3
USCS Classification	*WELL-GRADED SAND WITH SILT AND GRAVEL*	D30 =	1.0	CU =	38.7
		D10 =	0.1		

Tested By JLD Date 10/19/98 Checked By Date 10.22.98

DCN: CT-S3A DATE 8-25-98 REVISION: 2

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Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No.	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No.	98275-01	Sample No.	E2SC-04-GS04
Lab ID	98275-01.004	Soil Color	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	585	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	496.38	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	469.06	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	85.64	Weight of Tare (gm)	NA
Weight of Water (gm)	27.30	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	383.42	Weight of Dry Soil (gm)	NA
Moisture Content (%)	7.1	**Moisture Content (%)**	NA

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	383.42
Dry Weight - 3/4" Sample (gm)	337.9	Weight of minus #200 material (gm)	30.24
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	353.18
Dry Weight + 3/4" Sample (gm)	15.26		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100.00
6"	150	0.00	0.00	0.00	100.00	100.00
3"	75	0.00	0.00	0.00	100.00	100.00
2"	50	0.00	0.00	0.00	100.00	100.00
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.00
1"	25.0	0.00	0.00	0.00	100.00	100.00
3/4"	19.0	15.26	3.98	3.98	96.02	96.02
1/2"	12.50	48.56	12.66	16.64	83.36	83.36
3/8"	9.50	40.20	10.48	27.13	72.87	72.87
#4	4.75	55.24	14.41	41.54	58.46	58.46
#10	2.00	66.65	17.38	58.92	41.08	41.08
#20	0.850	49.07	12.80	71.72	28.28	28.28
#40	0.425	37.92	9.89	81.61	18.39	18.39
#60	0.250	20.87	5.44	87.05	12.95	12.96
#140	0.106	15.23	3.97	91.02	8.98	8.98
#200	0.075	4.18	1.09	92.11	7.89	7.89
Pan	-	30.24	7.89	100.00	-	-

Tested By JLD Date 10/19/98 Checked By Jcm Date 10-27-98

DCN: GT-53A DATE 6-25-98 REVISION: 2

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Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	QUANTERRA	Boring No.	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No	98275-01	Sample No.	E2SC-04-GS05
Lab ID	98275-01 005	Visual Description	**BROWN SILT** (Minus No 40 sieve material Airdried)

NON - PLASTIC MATERIAL

Tested By TO *Date* 10/26/98 *Checked By* Jm *Date* 10-27-98

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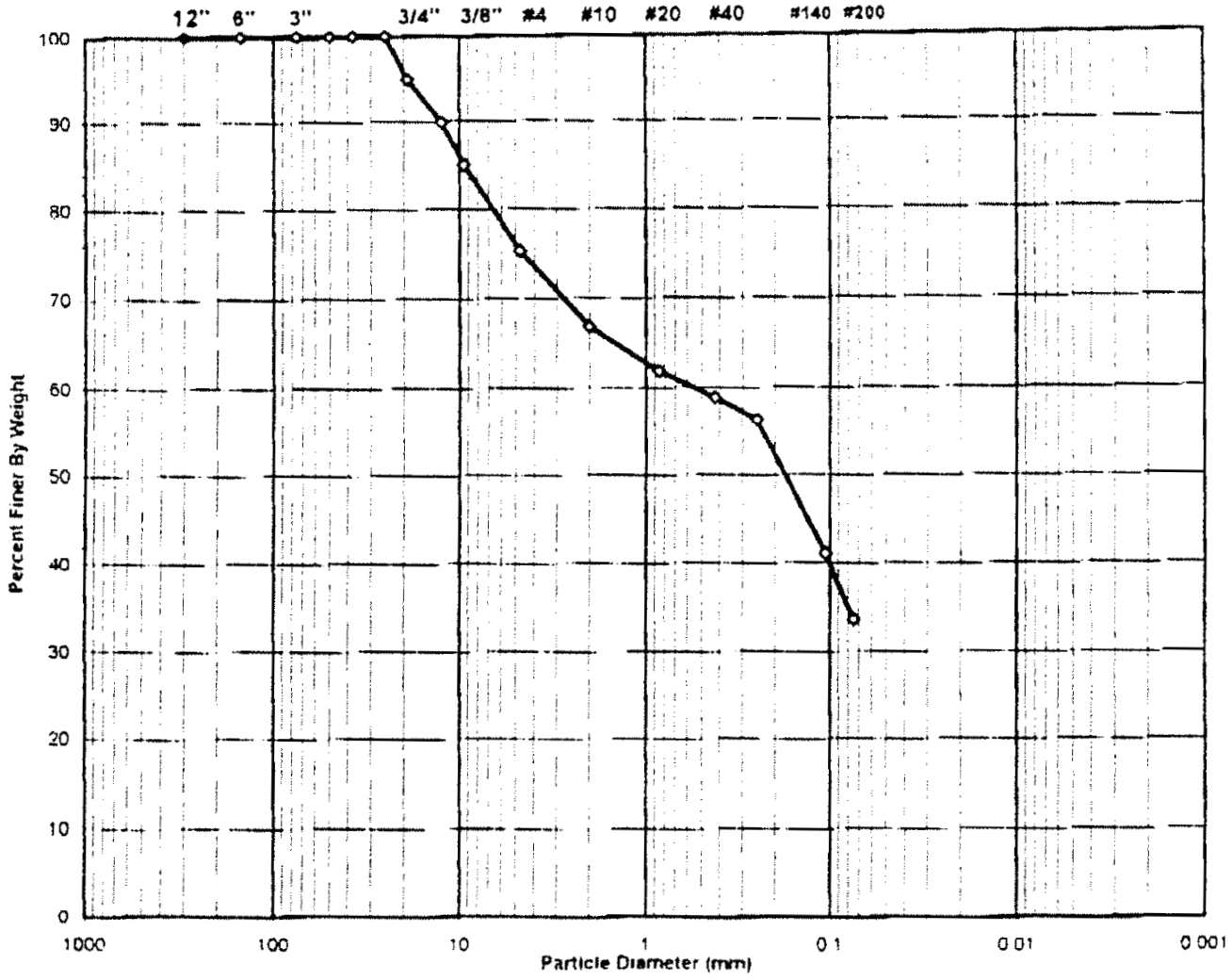
Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No.	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No.	98275-01	Sample No.	E2SC-04-GS06
Lab ID	98275-01 006	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol *SM, TESTED*

USCS Classification *SILTY SAND WITH GRAVEL (NON-PLASTIC FINDS)*

Tested By TO Date 10/21/98 Checked By Jan Date 10-27-98

DCN: GT-S3A DATE 6-25-98 REVISION 2

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WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	QUANTERRA	Boring No	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No	98275-01	Sample No.	E2SC-04-GS06
Lab ID	98275-01.006	Soil Color	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	586	Tare No	NA
Wgt.Tare + Wet Specimen (gm)	477.80	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	439.70	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	82.70	Weight of Tare (gm)	NA
Weight of Water (gm)	38.10	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	357.00	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**10.7**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	357.00
Dry Weight - 3/4" Sample (gm)	218.9	Weight of minus #200 material (gm)	119.97
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	237.03
Dry Weight + 3/4" Sample (gm)	18 18		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0 00	100 00	**100.00**
3"	75	0 00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100 00	**100.00**
1 1/2"	37 5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	18.18	5 09	5.09	94.91	**94.91**
1/2"	12.50	18.08	5.06	10.16	89.84	**89.84**
3/8"	9 50	17.32	4.85	15.01	84.99	**84.99**
#4	4.75	34 73	9 73	24.74	75 26	**75.26**
#10	2 00	30.24	8.47	33 21	66.79	**66.79**
#20	0.850	17 99	5.04	38.25	61.75	**61.75**
#40	0.425	10.62	2 97	41 22	58.78	**58.78**
#60	0 250	9.07	2.54	43.76	56.24	**56.24**
#140	0.106	54.30	15 21	58.97	41.03	**41.03**
#200	0.075	26.50	7 42	66.39	33.61	**33.61**
Pan	-	119.97	33.61	100.00	-	-

Tested By JLD Date 10/19/98 Checked By [signature] Date 10-27-98

DCN CT-S3A DATE 6-25-98 REVISION 2

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Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	QUANTERRA	Boring No	NA
Client Reference	QUANTERRA C8J150154	Depth (ft)	NA
Project No.	98275-01	Sample No.	E2SC-04-GS06
Lab ID	98275-01 006	Visual Description	**BROWN SILT** (Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DBB *Date* 10/24/98 *Checked By* Jcm *Date* 10-27-98

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Attachment D

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Waterloo Barrier Vendor Information

AN ENVIRONMENTAL PRODUCT FOR
GROUNDWATER CONTAINMENT AND CONTROL

WATERLOO BARRIER™

SEALABLE JOINT

SHEET PILING

MANUFACTURED BY CANADIAN METAL ROLLING MILLS

WHAT IS WATERLOO BARRIER™?

Waterloo Barrier is a low permeability cutoff wall for groundwater containment and control. It is a new design of steel sheet piling featuring joints that can be sealed after the sheets have been driven into the ground. The product was developed by researchers at the University of Waterloo (UW) and has patent/patent pending status in several countries. Canadian Metal Rolling Mills assisted in the development of the product and are currently the sole manufacturer. Field tests confirm that Waterloo Barrier is an effective method for providing low bulk hydraulic conductivity containment of groundwater in subsurface soil environments.

DEVELOPMENT OF WATERLOO BARRIER™

Low permeability containment walls are increasingly being applied in the control and remediation of groundwater pollution. Conventional technologies such as slurry walls and geomembranes do not necessarily provide cost-effective and efficient subsurface containment in all settings. Groundwater researchers at UW considered this in their construction of containment cells for field experiments involving contaminated groundwater. The concept of driving steel sheet piling and sealing the joints between adjacent piles was thus introduced. After a series of successful experimental cells the potential utility of Waterloo Barrier in real site conditions was confirmed with approximately one year of prototype field testing. UW and Canadian Metal Rolling Mills then collaborated to develop sheet piling in which a sealable cavity was incorporated into the pile interlock in the manufacturing process. A roll-formed shape was produced, and made available for field trials in 1991. Extensive field scale tests were conducted by UW, and bulk hydraulic conductivity values of less than 10^{-8} cm/sec were achieved. Installations of a commercial nature are currently in service.

COMMERCIAL APPLICATIONS

Potential uses of the Waterloo Barrier include:

- deep, enclosing barriers around hazardous waste sites or municipal landfills.
- shallow, enclosing barriers to contain petroleum products or other light contaminants which float on the water table.
- shallow or deep enclosures to control future groundwater contamination at new industrial or waste disposal sites.
- temporary, enclosing barriers to facilitate various removal or in situ remediation procedures.
- barriers along shorelines to prevent seepage of contaminated groundwater into waterways.
- isolation of accidental spills.
- cofferdams in waterways to facilitate efficient dewatering procedures.
- funnelling or directing contaminant plumes to enhance the efficiency of pump-and-treat techniques.
- groundwater control in construction projects involving excavating and tunnelling.

FEATURES & BENEFITS

- rapid installation and sealing.
- minimal disturbance of site during construction
- easily adapted to irregular layouts
- limited site access less of a problem compared to alternative cutoff wall techniques
- easily installed in areas with high water tables and surface water.
- easy to inspect and monitor for superior quality assurance and control during construction.
- predictable hydraulic performance.
- positive public perception.
- long service life for permanent installations.
- can be easily removed where applications are temporary.

INSTALLATION AND SEALING

Waterloo Barrier sheet piles are installed using the same equipment and techniques as conventional product. Vibro equipment is suitable for most soil conditions although better results may be achieved with impact equipment in certain cohesive soils. Vibratory drivers with an eccentric moment in the area of 3000 in-lbs are recommended for both WZ75 and WEZ95. Pile lengths of up to 70 feet are available and for greater depths the piles can be spliced. Corners and special fabrications are available for any geometrical layout. A foot plate at the toe of each larger interlock prevents most of the soil from entering the sealable cavity during driving. After driving the cavities are water jetted to remove small amounts of loose soil and are ready for the injection of sealant. A number of clay-based, cementitious, polymer and mechanical sealants are available to meet a variety of site conditions.

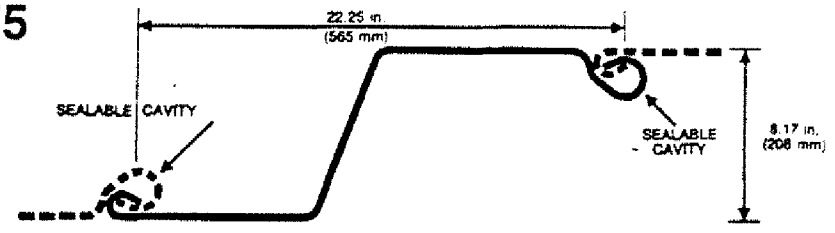
QUALITY ASSURANCE & CONTROL

Potential leak paths through the Barrier are limited to the sealed joints and therefore the joints are the focus of the quality control procedures. Joints are inspected before the sealing operation to confirm that the complete length of the cavity is open and can be sealed. Video inspection equipment can be lowered into each clean cavity to provide a permanent visual record. Each joint is sealed from bottom to top facilitating the emplacement of sealant into the entire length of the joint. Repair procedures can be initiated if joint separation or blockage is suspected. Quality assurance and control is further confirmed by the requirement that the pile driving and sealing be carried out by or under the supervision of trained and licenced personnel.

WATERLOO BARRIER™

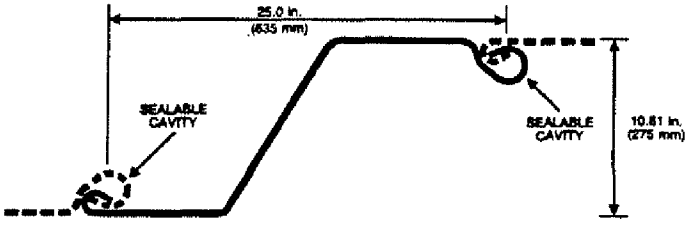
IS AVAILABLE IN TWO DESIGNS. THE MEDIUM WALL WZ75 AND THE HEAVY WALL WEZ95

WZ75



SECTION	THICKNESS in (mm)	HEIGHT in (mm)	NOMINAL WIDTH in (mm)	SECTION AREA in² (cm²)	WEIGHT lbs/lin. ft. (kg/lin.m)	WEIGHT lbs/ft² (kg/m²)	MOMENT OF INERTIA in⁴/wall ft. (cm⁴/wall m)	RADIUS OF GYRATION in (mm)	SECTION MODULUS in³/wall ft. (cm³/wall m)
WZ75	.295 (7.50)	8.17 (208)	22.25 (565)	10.5 (67.5)	35.6 (53.0)	19.2 (93.7)	84.8 (8870)	3.39 (86.1)	15.9 (850)

WEZ95



SECTION	THICKNESS in (mm)	HEIGHT in (mm)	NOMINAL WIDTH in (mm)	SECTION AREA in² (cm²)	WEIGHT lbs/lin. ft. (kg/lin. m)	WEIGHT lbs/ft² (kg/m²)	MOMENT OF INERTIA in⁴/wall ft. (cm⁴/wall m)	RADIUS OF GYRATION in (mm)	SECTION MODULUS in³/wall ft. (cm³/wall m)
WEZ95	.375 (9.50)	10.81 (275)	25.0 (635)	14.9 (96.2)	50.5 (75.2)	24.3 (119)	134 (18300)	4.33 (110)	24.9 (1340)

SPECIFICATIONS:

RAW MATERIAL: ASTM A572 GR50
CSA G40.21 GR 350W

MANUFACTURING: ASTM A6
CSA G40.20

COATINGS: 1) GALVANIZED ASTM A123, CSA G164
2) COAL TAR EPOXY SSPC-16
3) FUSION BONDED EPOXY RESIN, MFG'S SPEC.

ACCESSORIES: BENDS CAN BE SUPPLIED TO ANY ANGLE.
'T' SECTIONS AND OTHER WELDED FABRICATIONS ARE AVAILABLE.