THE GREAT BAEHRE CONSERVATION AREA
HYRDOGEOLOGIC INVESTIGATION

Prepared for:
Town of Amherst
Amherst, New York

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Project 363-15-1

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1.0 INTRODUCTION

1.1 General

The Great Baehre Conservation Area (GBCA) includes a former municipal landfill on Hopkins Road in Amherst, New York (Figure 1). This inactive landfill covers approximately 50 acres and is referred to as the Hopkins Road site in this report. The Town of Amherst (Amherst) plans to develop the site into an open space - recreational area. In the context of current and intended uses, Amherst and the New York State Department of Environmental Conservation (DEC) deemed further studies of the site would be prudent. These studies were felt to be necessary to determine if the site poses significant hazards to public health or the environment. Consequently, Malcolm Pirnie was retained by Amherst to conduct a hydrogeologic investigation of the Hopkins Road site.

1.2 Background

At least as early as the 1950's, the Hopkins Road site was utilized as a disposal area by Amherst and the Village of Williamsville. However, the exact dates of active site use are uncertain. An unknown volume of material, including leaves, construction debris, and other types of hard fill were deposited at the site (NYSDEC, 1984; Town of Amherst, 1984). Animals killed on town roads are also placed in pits on the site for burial.

The Hopkins Road site was identified as an inactive landfill by the New York Interagency Task Force on Hazardous Wastes (1979). Due to the uncertainty about the volumes and characteristics of material disposed at the facility, the Hopkins Road site has been assigned a priority classification code of "2a" (NYSDEC, 1984). The code "2a" is a temporary classification applied to sites for which sufficient information on environ-

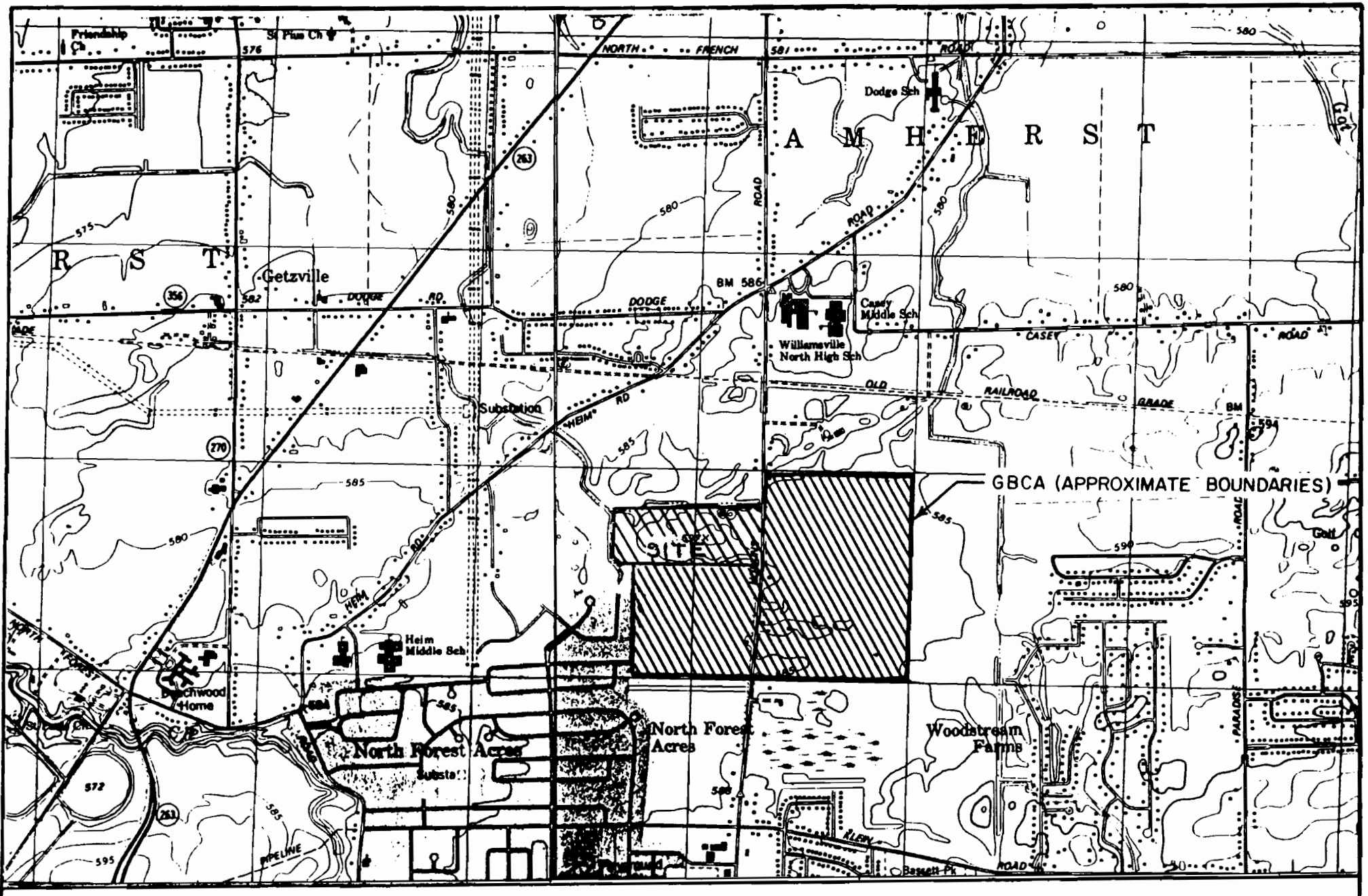


FIGURE 1

HOPKINS ROAD SITE, REGIONAL MAP
AMHERST, NEW YORK (USGS 1980a; 1980b)

mental conditions and disposal activities is lacking. Once adequate data are generated, the site will be given a priority classification consistent with the degree of (potential) hazards posed by on-site materials.

The area has recreational and environmental potential. In a 1972 report, the Erie County Environmental Management Council and the University of Buffalo identified the 450 acre wetlands bordering the Hopkins Road site as the best example of a wooded wetland forest in the county (Town of Amherst, 1984). In 1975, this area adjacent to the Hopkins Road site was designated a protected freshwater wetlands by the NYSDEC. Also in 1975, the Town Conservation Advisory Council developed an Open Space Index. That 1975 document cited the value of the Hopkins Road Swamp Area for stormwater storage, environmental education, and recreation. The GBCA and the Hopkins Road site are included in the Hopkins Road Swamp Area (Town of Amherst, 1984).

The Hopkins Road site has been proposed for use as a special recreation area in Amherst (Town of Amherst, 1984). Such development would allow Amherst to exploit the recreational and educational values of the GBCA. The site would be easily accessible to Amherst residents because of the location of the facility. Once fully developed, the facility is intended to provide integrated recreational opportunities for both handicapped and able-bodied residents. The variety of benefits offered by the proposed use is detailed in the Amherst (1984) proposal.

In 1983, Amherst initiated a preliminary investigation of the Hopkins Road site. Four shallow "wells" were installed and water samples collected from these "wells" were analyzed (Amherst, 1984). Additional work consisted of the performance of a number

of soil borings in 1985. Soil samples collected from the borings were analyzed for a variety of metals, as well as scanned for halogenated organics (Amherst, 1985).

1.3 Purpose and Scope

This report summarizes the results of the hydrogeologic investigation conducted at the Hopkins Road site by Malcolm Pirnie. The primary objective of this investigation was to evaluate site conditions in the context of the existing adjacent land use and the proposed use of the area as a park. Specific goals were to define site geological and hydrogeological characteristics and the impacts of the fill material on soil, groundwater, and surface waters. The work was performed between May and August 1985. The potential for significant environmental or public health hazards could then be evaluated based upon the results of this study.

2.0 SITE DESCRIPTION

2.1 Environmental Setting

The Hopkins Road site is located in a mixed environmental setting. As indicated in Figure 2, residential areas border the site to the north and to the west. Residential areas exist about one-half mile to the east and to the south of the site. As depicted in Figure 2, a 450 acre freshwater wetlands lies between the Hopkins Road site and these southerly and easterly residential areas.

Figure 2 also presents census data for the tracts in the vicinity of the Hopkins Road site. According to the 1980 U.S. census (Taylor, 1982), a total of 4,665 people resided in the areas immediately to the north and to the west of the site (see Figure 2). A total of 2,691 people lived in the residential areas to the east of the Hopkins Road site. However, most of the residences in the easterly areas are located over one-half mile from the site (Figure 2). These numbers are probably conservative because rapid residual development is continuing in the areas around the site.

The wetlands adjacent to the Hopkins Road site appears to have a number of associated environmental functions. The hydrologic characteristics and storm water retention abilities have been investigation by Pratt and Huth Associates (1984). The wetlands provides habitat for a variety of animal species. These animals occasionally are present on the Hopkins Road site, at least as transients. Wildlife and fowls observed on the site and adjacent wetlands during the course of this investigation included white-tail deer, red-tailed hawks, grass frogs, bull frogs, snakes, wood chucks, doves, golden finches, a variety of blackbirds and mallard ducks. A complete inventory of species was not attempted. These organisms apparently use the area for purposes of feeding, breeding and nesting, and cover.

FIGURE-2

POP.-432

POP.-4,233

SITE

POP.-2,691

WOODED WETLANDS

TRANSMISSION

R. O. W.

VICINITY MAP AND AREA POPULATION
OF HOPKINS ROAD SITE (U.S. CENSUS-1980)

TOWN OF AMHERST — JULY 1985

2.2 Site Conditions

2.2.1 Topography and Drainage

The former landfilling operations have significantly altered site topography and drainage. As illustrated in Figure 3, the original topography at the Hopkins Road site was uniformly flat. A wetlands area covered the eastern portion of the facility. Surface drainage channels ran to the west along the northern and southern boundaries of the site, as well as in an east-west transect through the center of the site.

Present site conditions are depicted on Figure 1 and Plate 1. The placement of fill and subsequent cover have raised the elevations of certain portions of the site by more than twenty feet. Berms have been constructed on the northern and eastern portions of the site. The drainage channels in the center and along the southern boundary of the site no longer exist. A new drainage channel, fed by surface run-off and groundwater seeps, runs from the southwest corner of the site northward along the western site boundary (Figure 1). This ditch discharges into the channel flowing westward along the northern site boundary (known as the Amherst Ditch #4). Ditch #4 discharges into Ellicott Creek about one and a half miles southwest of the Hopkins Road site.

2.2.2 Environmental Conditions

The landfilling operations have also significantly modified the environmental conditions at the Hopkins Road site. A variety of deciduous trees and shrubs grow on the site. However, these plants are primarily restricted to portions of the site along the edge, and outside, of the landfill area. A limited amount of vegetation, mainly

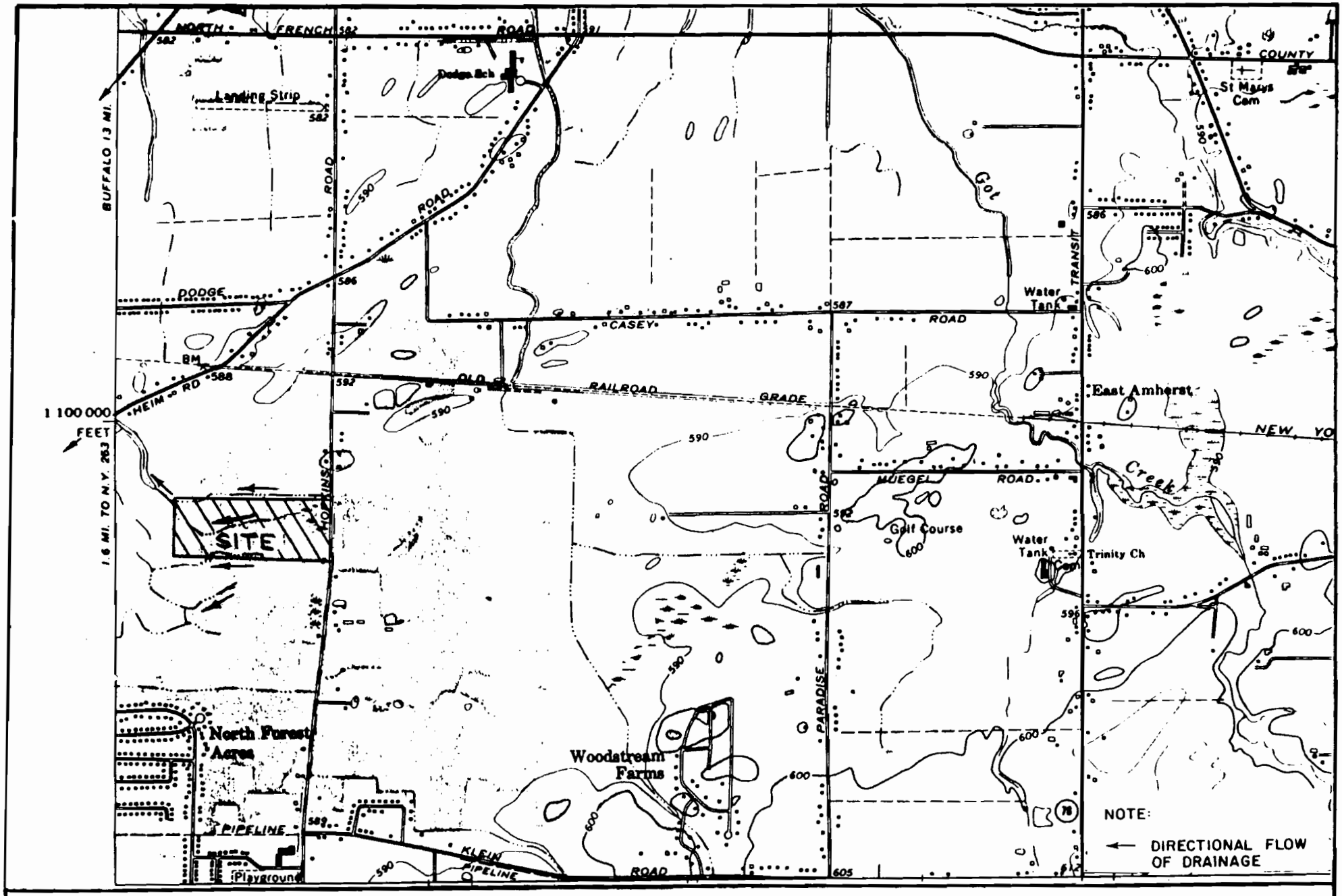


FIGURE 3

HOPKINS ROAD SITE–PREVIOUSLY EXISTING SITE TOPOGRAPHY (USGS, 1965)

grass and low weeds, has colonized the major areas used for landfilling. Plants observed growing on the site include poplar, willow, sumac and maple trees; cat tails; tall reeds; purple loose strife; chickory; golden rods; Queen Anne's Lace; and poison ivy. Large animals from the wetlands occasionally venture onto the site. However, the most common animal observed utilizing the Hopkins Road site is the woodchuck.

There are no dwellings or buildings currently on the Hopkins Road site. There are no utilities servicing the site except for a water line feeding a fire hydrant. Public access to the site is limited but not excluded. A locked fence runs north to south between the eastern berm and Hopkins Road. However, the fence is in disrepair and people have been observed walking around and over the fence. The ditches limit access to the site from the north and west. However, several rudimentary bridges have been placed across the ditches from the residential areas. Four wheeled vehicles also appear to enter the site from the south. People have been observed collecting rhubarb, which grows wild on the site, for the purpose of eating.

This procedure was followed due to the potential existence of channels in the clay and lenses of coarse grained material in the till.

Three wells were installed to investigate the extent of sand lenses in the deeper portions of the glacial till. One well was completed at the top of bedrock while the others were screened in the till. Split spoon samples were collected continuously in the first deep till well and at five foot intervals in the other. All wells consisted of threaded 2" ID PVC pipe and were equipped with a locking protective steel casing. The boring logs and well construction details are presented in Appendix II to this report. Schematics of the typical construction of the monitoring wells are shown in Figures 4 through 6.

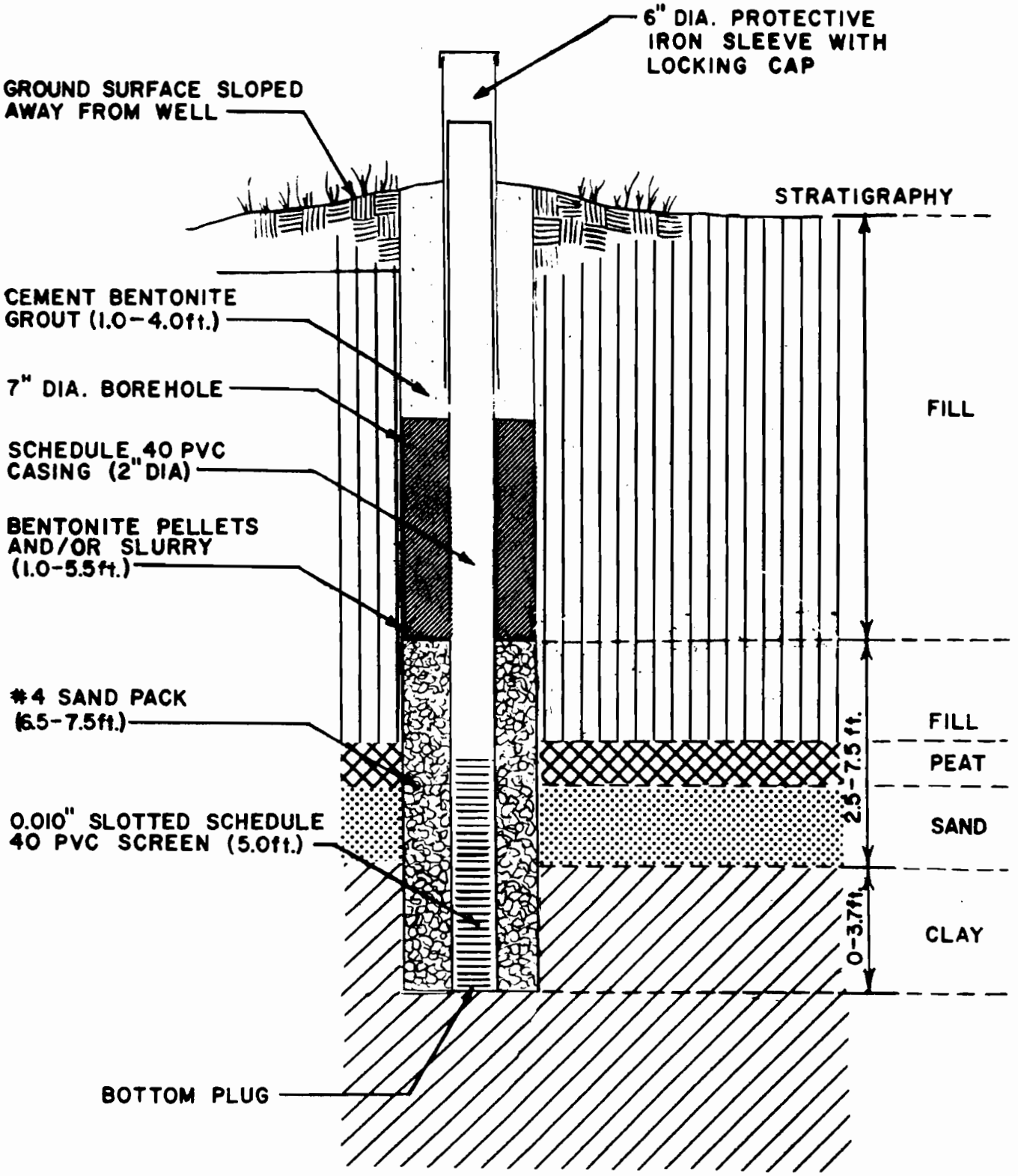
Split spoon samples were photographed, placed in glass jars, and stored for subsequent analysis. Between samples, the split spoons were washed in soapy water, rinsed with clean water, and rinsed with hexane. Augers were decontaminated between wells using high pressure water.

After installation, the 2" I.D. PVC monitoring wells were developed by flushing and surging with clean water. All wells and boreholes were surveyed to determine the exact locations and elevations relative to an established datum. The locations of the monitoring wells and exploratory borings are given in Plate 1.

3.2 Soil Characteristics

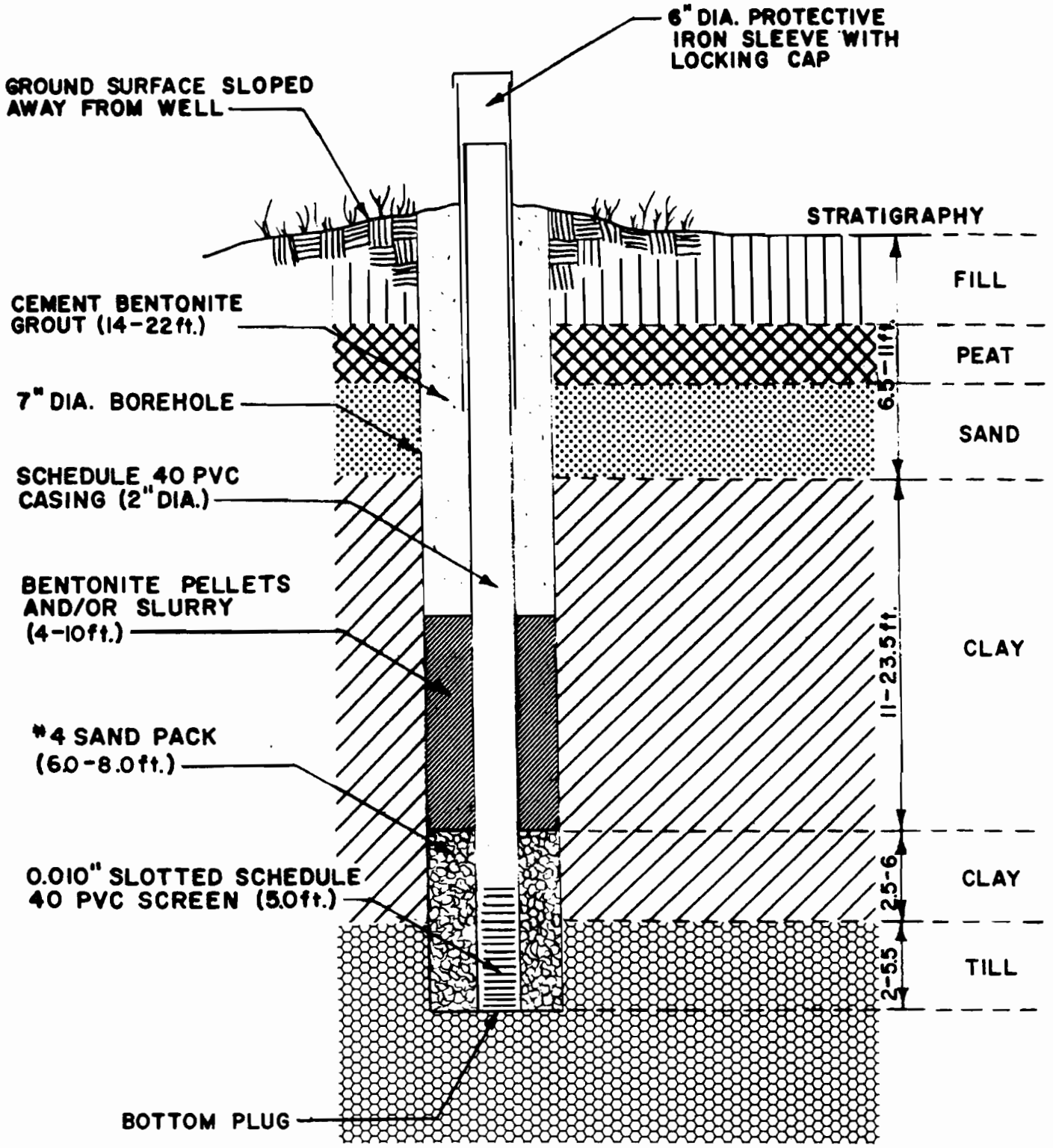
A limited number of tests were conducted to help characterize the fill, cover, and underlying clays at the Hopkins Road site. The void ratio, cation exchange capacity (CEC), and pH were measured in two clay samples. One sample was of the stiff,

FIGURE - 4



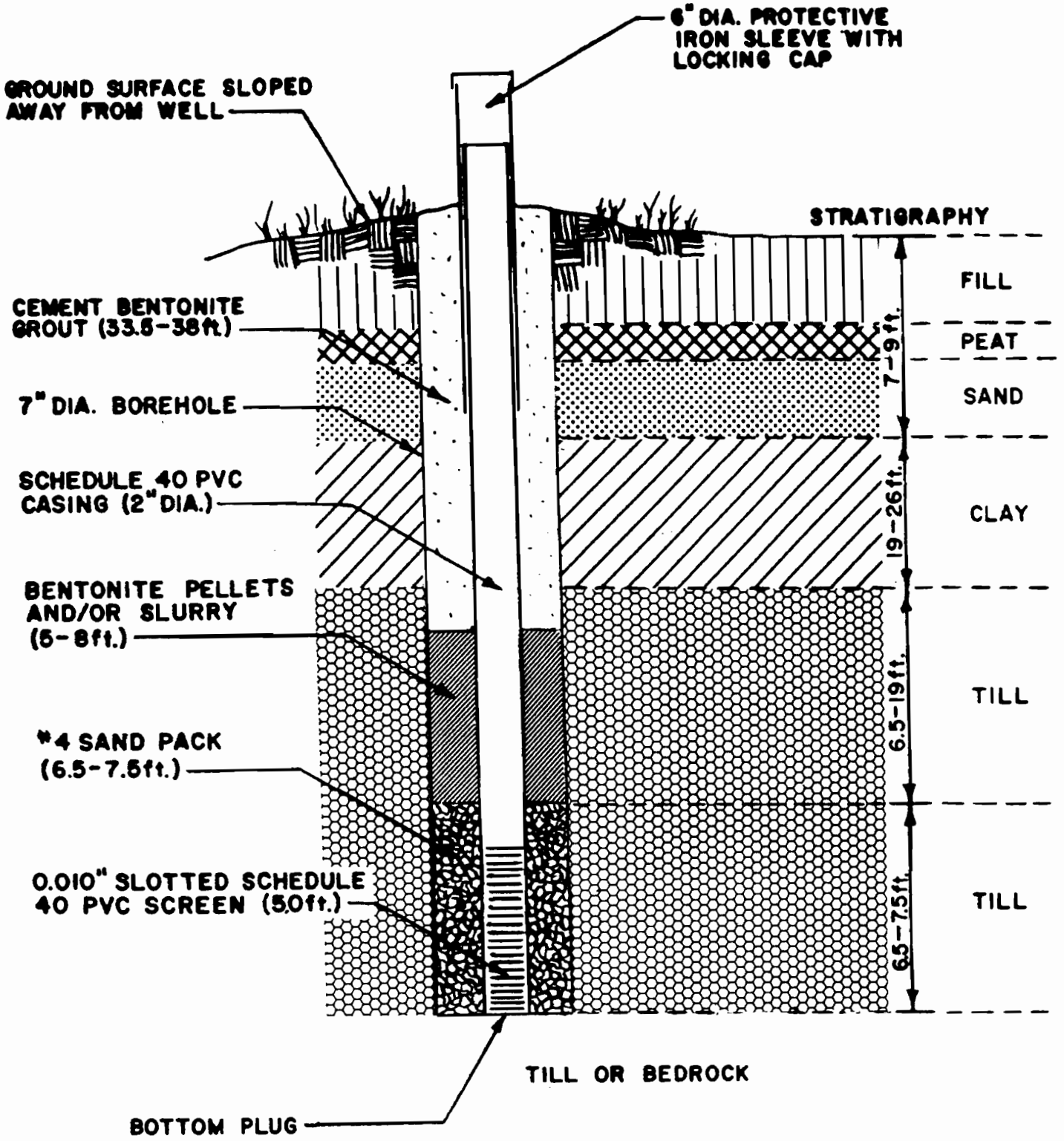
GREAT BAEHRE CONSERVATION AREA
HYDROGEOLOGIC INVESTIGATION
TYPICAL SHALLOW MONITORING WELL DETAIL

FIGURE - 5



GREAT BAEHRE CONSERVATION AREA
HYDROGEOLOGIC INVESTIGATION
TYPICAL DEEP
MONITORING WELL DETAIL

FIGURE - 6



GREAT BAEHRE CONSERVATION AREA
HYDROGEOLOGIC INVESTIGATION
TYPICAL DEEP TILL MONITORING WELL DETAIL

grey varved clays while the other was of the softer, underlying red clays encountered on the site. The results of these tests and an earlier study are given in Table 1.

Eight samples were made by compositing the split spoon samples of the upper two feet of material in a number of borings. The composites were made based upon locations and, to the extent possible, samples from the same areas of the site were grouped together. Table 2 lists the sample locations included in each composite. The composites were subjected to grain size analysis and the results are reported in Table 3. Surficial materials range from predominantly sands and gravels to clays and silts.

3.3 Permeability Tests

3.3.1 Bailer Permeability Tests

Bailer permeability tests were performed on a number of shallow and deep wells. The results of these tests are summarized in Table 4, while the data and calculations are attached as Appendix III. As can be seen from a review of that data, the permeability in the shallow zone is 1×10^{-4} cm/sec or greater. These values would have to be considered conservative because part of the well screen was located in clay. Permeabilities of the fill are probably higher than the rates obtained from shallow wells. There was no recognizable fill layer at well MW-8S so this well probably represents permeabilities in the swamp derived "peat" (organic silt) and clay materials.

Permeability values obtained from the deep wells were approximately 4×10^{-5} cm/sec or less. The permeability of the clay layers are probably less than 10^{-5} cm/sec. However, since these wells are partially screened in glacial till, the presence of sand and fine grained materials would tend to increase permeability values. These values

TABLE 1

CHARACTERISTICS OF GLACIO-LACUSTRINE CLAYS

Table 1a - Characteristics of Glacio-lacustrine Clays Present on the Hopkins Road site, Amherst, New York

Sample Identification	Sample Description	pH	Void Ration	Cation Exchange Capacity (CEC) meq/100g
MW-1D, Sample S-6 (10-12' depth)	Stiff, grey silty clay, moist, varved (CL)	8.1	0.56	23.2
MW-1D, Sample S-13 (24-26' depth)	Very soft, red silty clay, varved, (CL)	8.7	1.24	23.5

Table 1b - Characteristics of Glacio-lacustrine Clays at the FSA site, Tonawanda Creek, Amherst, New York (Malcolm Pirnie, 1981)

Sample Depth	Sample Description	Mechanical Analysis (%)* Silt	Clay	pH	CEC (meq/100g)	Atterberg Limits Plastic Limit%	Liquid Limit%	Plasticity Index (%)
10-11.5'	Stiff, grey silty-clay, varved (CL)	34	66	8.0	13.5	24	44	20
14-15.5'	soft, red, silty-clay, varved (CL)	32	68	8.3	13.1	22	38	16

* Percent composition by weight
silt (75 um - 5 um)
clay (<5um)

TABLE 2

BORING SOIL SAMPLES INCLUDED IN SOIL COMPOSITES,
HOPKINS ROAD SITE, AMHERST, NEW YORK

Comp#	Borings and Monitoring Wells Included*
1	MW-1D, MW-3S, MW-4S
2	B-7, B-9
3	MW-5S, B-11, B-15
4	MW-7S, B-12, B-13
5	MW-9S, MW-10S, B-8
6	MW-9D, MW-11S
7	MW-12M, MW-6S, B-14
8	MW-13S, B-16

* The 0-2 foot split spoon sample from each bore hole was used in the composite. Due to the variable recovery, the exact fraction of soil included in the composite may have been anywhere within this depth range.

TABLE 3

GRAIN SIZE ANALYSIS OF SURFICIAL MATERIALS
HOPKINS ROAD SITE, AMHERST NEW YORK

	Grain Size Distribution*					
Sample ID	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt and Clay
Comp 1	6.3	16.9	10.1	13.9	22.9	29.9
Comp 2	3.3	17.8	10.7	15.5	18.7	34.0
Comp 3	6.0	28.6	19.4	14.6	31.4	0
Comp 4	1.1	11.2	9.7	11.2	13.7	53.1
Comp 5	1.6	14.7	6.6	9.4	17.4	50.3
Comp 6	14.9	24.4	18.5	25.9	8.4	7.9
Comp 7	0	8.5	19.6	13.0	17.5	41.4
Comp 8	0	17.1	10.5	13.7	15.0	43.7

* Percent Composition by Weight
Coarse Gravel (191 mm)
Fine Gravel (191-4.76 mm)
Coarse Sand (4.76-2.00 mm)
Medium Sand (2.00-0.42 mm)
Fine Sand (0.42-0.074 mm)
Silt and Clay (0.074 mm)

TABLE 4

BAILER PERMEABILITY TESTS
HOPKINS ROAD SITE
AMHERST, NEW YORK

SHALLOW WELLS

Well#	Date Tested	Mean Permeability Coeff. (cm/sec)*
MW-1S	6/17/85	2.8×10^{-4}
MW-3S	6/17/85	$\geq 10^{-3}$
MW-4S (Test 1)	6/17/85	1.7×10^{-4}
MW-4S (Test 2)	6/17/85	1.9×10^{-4}
MW-5S	6/28/85	9.6×10^{-5}
MW-7S	6/28/85	5.9×10^{-4}
MW-8S	6/26/85	4.7×10^{-5}
MW-14S	6/27/85	2.9×10^{-4}

DEEPER WELLS

Well#	Date Tested	Mean Permeability Coeff. (cm/sec)*
MW-1M	6/17/85	1.3×10^{-5}
MW-2M	6/26/85	1.4×10^{-5}
MW-12M	6/28/85	1.6×10^{-5}
MW-14M	6/27/85	2.3×10^{-6}
MW-15M	6/27/85	3.6×10^{-5}

* Assumes Isotropic Flow Conditions ($K_h/K_v = 1$)

represent the rate of movement along the junction of both deposits rather than in either of the units individually.

3.3.2 Soil Percolation Tests

Nine in-situ permeability tests were conducted on the cover material at the Hopkins Road site. The purpose of these tests was to determine the adequacy of the existing cap for final cover.

For the purpose of these tests, a three foot length of 4" ID PVC pipe was used. The pipe was driven into the ground to depths varying from two to six inches to achieve a tight seal between the pipe and surrounding soils. Loose soil from the interior of the pipe was removed and the pipe was then filled with water. The percolation of water into the soil was measured over time. From these values, the permeability of the cap was calculated. The locations of the nine tests are shown on Plate 1. The calculated cap permeabilities are given in Table 5. The field data and calculations are attached as Appendix IV.

As suggested by the data in Table 5, the permeability of the cover material varies markedly from place to place on the site. Permeability coefficients range from 2.6×10^{-1} to 7×10^{-6} cm/sec. In five of the nine tests, values were less than 5.4×10^{-5} cm/sec. In the other four tests, the permeability values exceeded 1×10^{-4} cm/sec.

The variability in permeability reflects the heterogeniety of the surficial materials. Asphalt and construction rubble, leave debris, sand, and gravel help make the cover quite permeable in certain areas. In other portions of the site, clayey fill at the surface forms a relatively imper-

TABLE 5

IN-SITU PERMEABILITY TEST RESULTS
HOPKINS ROAD SITE
AMHERST, NEW YORK
(August 14 and 16, 1985)

TEST #	LOCATION*	MEAN PERMEABILITY COEFF. (cm/sec)
P-1	7.3' SW of B-12	5.4×10^{-5}
P-2	30' N of B-13	7.4×10^{-3}
P-3	9' E of B-15	1.1×10^{-5}
P-4	14' WSW of MW-4S	3.1×10^{-5}
P-5	120' W of MW-3S	6.0×10^{-4}
P-6	25' SSW of B-1	7.0×10^{-6}
P-7	5'W of B-14	1.3×10^{-5}
P-8	75' SE of MW-9S	2.6×10^{-1}
P-9	7' N of MW-7S	1.2×10^{-4}

* Locations shown on Plate 1.

meable cap. Areas of ponded water and wetland vegetation attest to the low permeability of some of the surficial soils.

3.4 Chemical Analysis

Chemical analyses were performed on soil composites and groundwater and surface water samples. The eight soil composites prepared from the split spoon samples (as previously described) were analyzed for the parameters listed in Table 6. Surface water samples were collected as grab samples on June 10 and June 12, 1985. The four locations sampled are shown in Plate 1. Heavy rainstorms occurred between the two sampling events. Therefore, the results provide an indication of the variability in water quality caused by storm events. The surface water samples were tested for the parameters listed in Table 6.

Groundwater samples were collected from the shallow and deep wells on two occasions. The first set of samples was collected June 26-28, 1985. The second set was collected July 18-19, 1985. During the first sampling event, the wells were evacuated with a submersible pump and sampled with a PVC bailer. During the second sampling period, PVC bailers were used to evacuate the wells and a teflon bailer was used to obtain the samples. Field reports for the groundwater sampling are included in Appendix VI. The groundwater samples were analyzed for the parameters listed in Table 6. The results of the chemical analysis of soil and water samples are presented in Appendices VII and VIII. The data are summarized and evaluated later in this report.

3.5 Potentiometric Mapping

Groundwater elevations were measured in the monitoring wells on 14 occasions between May 3 and July 18, 1985 (Appendix

TABLE 6

PARAMETERS FOR CHEMICAL ANALYSIS
HOPKINS ROAD SITE, AMHERST, NEW YORK

SOIL COMPOSITES

Arsenic
Lead
Zinc
Copper
Total Halogenated Organic Scan

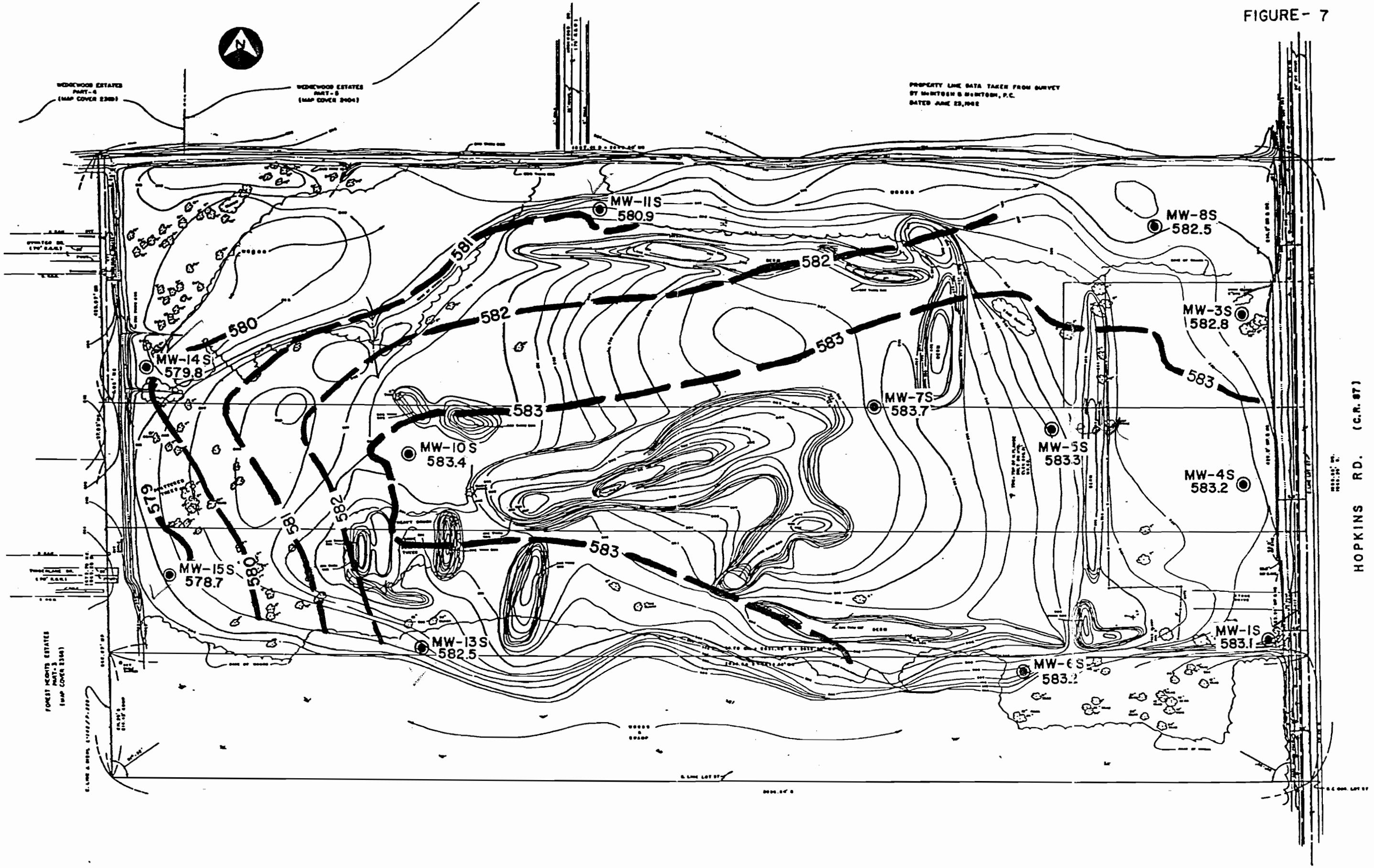
GROUNDWATER AND SURFACE WATERS

pH
Chloride
Total Dissolved Solids (TDS)
Sulfate
Total Organic Carbon (TOC)
Total Organic Halides (TOX)
Priority Pollutant Heavy Metals
Priority Pollutant Pesticides
Priority Pollutant Volatiles *
Priority Pollutant Base/Neutrals*
Priority Pollutant Acid Extractibles*

* Performed only on samples from wells MW-1M, MW-1S, MW-9M, MW-11S, MW-14M, MW-14S collected during the second (July 18-19, 1985) sampling.

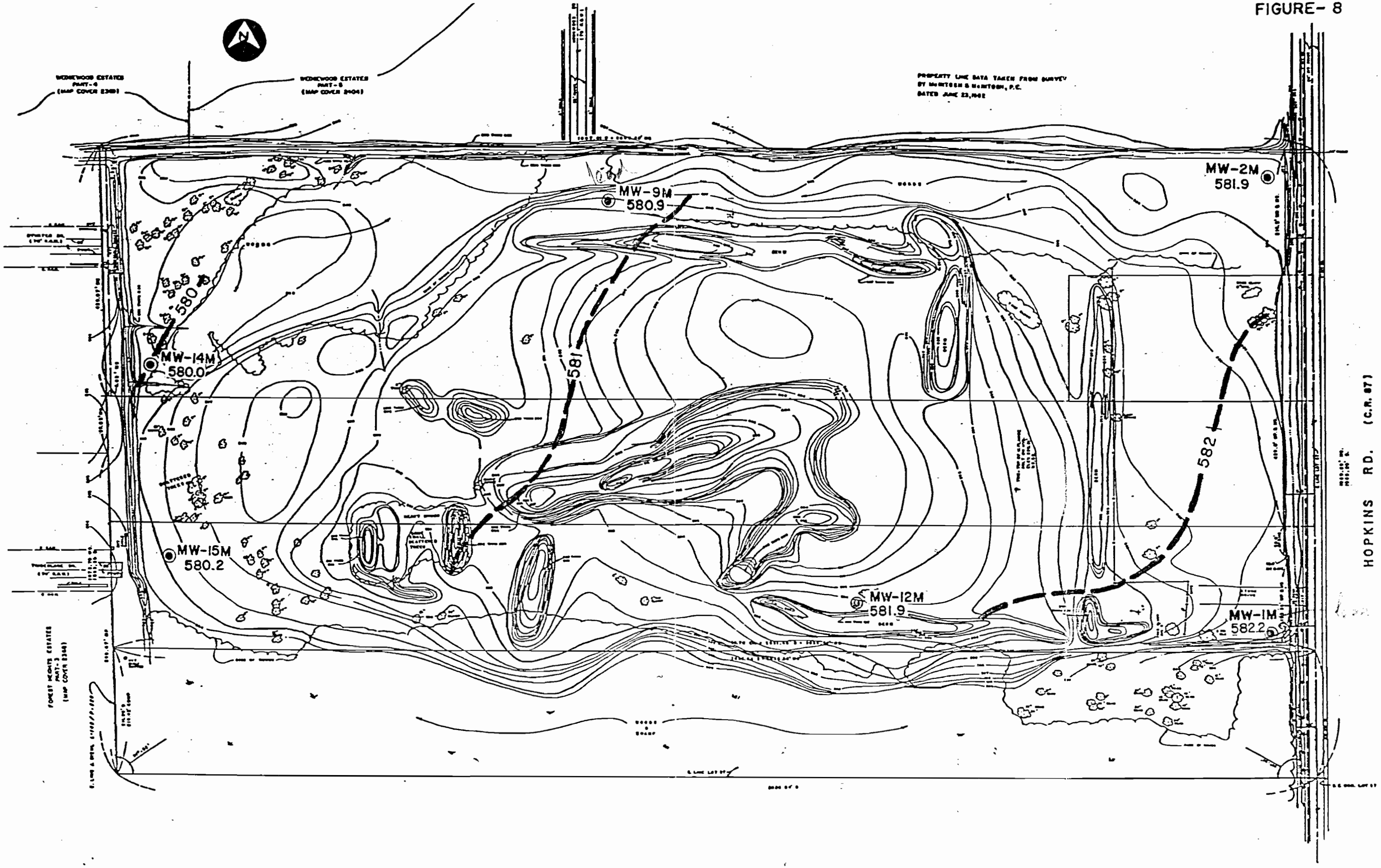
V). Elevations measured on June 10, 1985 were arbitrarily chosen for use in constructing groundwater potentiometric maps. The potentiometric map based on levels in the shallow wells is given in Figure 7. Figure 8 represents the potentiometric map using data from the deep wells. Due to the different intervals screened by the three till wells, no information can be inferred on groundwater flows at the bedrock-glacial till interface.

FIGURE- 7



GROUNDWATER POTENTIOMETRIC MAP FOR SHALLOW (FILL-TOP OF CLAY) WELLS ON 6/10/85

FIGURE- 8



GROUNDWATER POTENTIOMETRIC MAP FOR DEEP (CLAY-TOP OF TILL) WELLS ON 6/10/85

4.0 GEOLOGY

The geology of the Hopkins Road site appears to be typical of the western New York region. Basically, the geology consists of Paleozoic bedrock unconformably overlain by unconsolidated Quaternary deposits. The intervening deposits have apparently been removed as a consequence of the glacial episodes experienced by this area.

This investigation was primarily concerned with the unconsolidated deposits on the site. Therefore, no cores of the bedrock were obtained at the Hopkins Road site. However, according to Rickard and Fisher (1970), bedrock in the area is the Silurian aged Camillus Shale. Corings at the FSA site in Amherst (Malcolm Pirnie, 1981) identified the Camillus Shale as the bedrock formation. Those cores were described as consisting of a thin bedded, light grey, mudstone with numerous gypsum laminae and solution channels.

The sequence of unconsolidated deposits overlying the bedrock is similar to that found at other sites in the region. This stratigraphy is shown best in Figure 6, a schematic of a monitoring well installation. These deposits include glacial tills immediately overlying bedrock and which are, in turn, overlain by glacio-lacustrine clays. The glacio-lacustrine clays underlie a sand layer which was apparently deposited in a near-shore environment. Fill, topsoil, and swamp derived deposits compose the uppermost layers of materials. The site geologic conditions are depicted in the fence diagram in Plate 2. The unconsolidated deposits are discussed in greater detail below.

The glacial till overlies the bedrock at the Hopkins Road site. In the one bore hole advanced through till to bedrock (MW-9D), the till layer was approximately 27 feet thick. This

thickness agreed with the findings of an earlier investigation conducted at the FSA site in Amherst (Malcolm Pirnie, 1981).

Glacial till is a dense, heterogeneous, non-stratified mixture of silt, sand, boulders, gravel and clay deposited as glaciers advanced over the bedrock surface. Locally, pockets of homogeneous materials may be created. For example, a lens of sand over five feet in thickness was encountered in boring MW-1D. Although such lenses are of limited areal extent, the presence of coarse grained material may increase the permeability of the glacial till in certain portions of the site.

Overlying the glacial till is approximately 19 to 26 feet of glacio-lacustrine clay. The clay deposits consist of two types. The basal portion is composed of soft red clay. The upper approximately one-fourth of the deposit contains a stiff grey clay. The gradation of the deposit from stiff grey clay to soft, more wet, red clay appears typical for glacio-lacustrine clay deposits in Western New York.

The clays are characteristically varved and contain laminae of sand and silt. These sediments were apparently deposited in post-glacial Lake Tonawanda. Deposition in this former lake would explain the regional extent of these sediments. The glacial tills and glacio-lacustrine clays appear to underlie all sections of the Hopkins Road site.

Overlying the clays in most areas of the site is a deposit of fine sand and silty sand. The sand layer varies between zero and ten feet in thickness. The sand is generally light brown or grey and usually mottled. Rust-colored staining indicates that leachate from the landfill has entered this layer in some areas. The sands were probably deposited in a near-shore environment as post-glacial Lake Tonawanda receded (Malcolm Pirnie, 1981).

The sand (and in some places, clay) deposits are overlain by a mixture of soil types. Towards the western side of the Hopkins Road site, silty-loam topsoil is encountered. On the more easterly side of the site, black organic silts and sand (i.e. "peat") appear common. These latter organic materials appear to be derived from a swampy environment. The distribution of the organic sediments probably reflect the extent of on-site wetlands prior to the filling operations. The topsoil and peat deposits, when present, are rarely more than a couple of feet thick.

Fill material covers most of the Hopkins Road site. As indicated by changes in elevation and early maps of the area (U.S.G.S., 1965), the fill is, in places, over twenty feet thick. The fill layer thins towards the northern and western borders of the site. However, debris, litter, and trash appear to be present in almost every area of the site. The fill consists mainly of a hetergeneous mixture of soil, construction and highway debris, and clean fill. Glass, chunks of concrete and bricks, wood, plastic sheets and containers, and cinders and ash are common.

5.0 HYDROGEOLOGY

Groundwater can be found in the unconsolidated soils and the bedrock. The glacially-derived unconsolidated deposits yield extremely low quantities of groundwater and are, therefore, not considered aquifers in the Amherst area. The Camillus Shale bedrock formation is believed to be the principal aquifer in the area (Malcolm Pirnie, 1981). Shale characteristically has a low primary porosity and the rock matrix acts as an aquitard. However, secondary porosity accounts for the water bearing capacities of the formation. This secondary porosity is due to cavities formed by the dissolution of gypsum by groundwater and by possibly fractures along the bedding planes. There are no known groundwater drinking wells in Amherst.

Although no aquifers are present in the unconsolidated material, two water bearing zones were the focus of this investigation at the Hopkins Road site. The first zone was encountered in the fill and natural soils above the glacial lacustrine clays. As illustrated in Figure 7, groundwater mounding exists in the landfill. This mounding results in groundwater discharging radially from the site. The mounding also modifies the more regional flow patterns, which appear to be in a westerly direction.

Due to the moderate permeability of the fill, sand, and possibly peat layers, migration of contaminants from the fill material is predominantly in this shallow water bearing zone. However, the limited extent of these materials and the presence of the ditch on the north and west, would help restrict off-site movement of contaminants via the shallower zone. Surface discharges, including seeps, appear to have a limited impact on surface water quality, as discussed later. The adjacent wetlands and ditches are the immediate receptors of these discharges.

The second water bearing zone occurs at the base of the glacio-lacustrine clays and the top of the glacial till layers.

Groundwater flow in this deeper zone appears to be in a westerly direction (see Figure 8). The DEC prohibited installation of monitoring wells in the main landfill areas of the site. Therefore, the possible effect of groundwater mounding on flow in the deeper water bearing zone can not be evaluated.

Previous laboratory tests involving Shelby tube samples conducted at the FSA site indicated the soft red clays have a hydraulic conductivity on the order of 3×10^{-8} cm/sec. Bailer permeability tests performed at the FSA site yielded values on the order of 2×10^{-6} cm/sec for glacial till (Malcolm Pirnie, 1981).

The clay and till deposits, because of low permeabilities, probably act as aquicludes and inhibit water movement. However, due to the presence of high permeable coarse-grained material in the till and the differential permeability of the two layers, a moderate water bearing zone exists at the junction of the clays and tills. Flow in this zone can be expected to be quite limited

As depicted in Figure 8, groundwater flows under a gentle gradient to the west in this deep water bearing zone. On the western portion of the site, the vertical gradient, as represented by groundwater elevations (see Appendix V), appears to be directed upward. However, the mounding effect of the landfill has reversed the vertical gradient on the eastern portion of the site by elevating levels in the shallow water bearing zone. On some occasions, the vertical gradient on the western side is reversed and in a downward direction as well. Therefore, the vertical gradient under the landfill would act to allow groundwater to move vertically downward from the shallow water bearing zone to the deeper zone. Vertical gradients on the western side of the site would typically resist or prevent such movement. The reversal of this gradient would result in a flux of movement towards the deeper water bearing zone.

6.0 WATER QUALITY

6.1 Water Quality Guidelines

State and Federal regulatory agencies have developed guidelines for assessing and maintaining the quality of water resources. On the Federal level, interim standards have been established for primary drinking water sources. On the State level, the DEC has promulgated guidelines for groundwater and surface waters within New York. However, no surface water standards apply to the ditch (Ditch #4) adjacent to the Hopkins Road site. Therefore, for the purpose of comparisons in this report, the EPA interim primary drinking water standards have been utilized in assessing surface water quality.

Under Part 703 of the New York Codes, Rules and Regulations (NYCRR), the groundwaters of the State are classified according to best use. All fresh groundwaters (i.e. non-saline) are best used as sources of potable water, which are classified as "GA". Although groundwater in the Amherst area is not used for drinking, the class GA guidelines are still applicable at the Hopkins Road site. These standards stipulate that "no raw or treated sewage, industrial wastes or ineffectively treated effluents, taste or odor-producing substances or other deleterious matter may be present which may impair the quality of groundwater to render it unsuitable as a potable water supply". Additionally, the DEC has established maximum allowable concentrations of various parameters in Class "GA" groundwater. The quality of groundwater at the Hopkins Road site has been evaluated in relation to these guidelines.

6.2 Surface Water Quality

Four surface water locations were sampled on two separate occasions during June 1985. Station SW-2 was located in Ditch #4 upstream of the Hopkins Road site (see Plate 1). Station

SW-4 was in Ditch #4 downstream of the site. This location was also downstream of the confluence of Ditch #4 and the ditch flowing along the western boundary of the site. This investigation has documented the occurrence of groundwater mounding in the shallow water bearing zone and of groundwater discharging as surface seeps. These two phenomena suggest groundwater from the landfill area has the potential for impacting on the quality of surface water in the ditches and wetlands adjacent to the facility. Therefore, due to the locations of stations SW-1 and SW-3, these two stations may also represent "downstream" water quality.

Surface water samples were tested for the parameters listed in Table 6. The results of the laboratory analyses are presented in Appendix VI to this report. A summary is presented in Table 7. A thunderstorm occurred after the first surface water collection and before the second sampling episode. Therefore, the second set of surface water data (collected June 12, 1985) may reflect impacts associated with storm events.

Based upon a review of the analytical data, the Hopkins Road site does not appear to have a significant impact on surface water quality. As illustrated in Table 7, the levels of most of the parameters detected in the surface waters were not elevated in samples collected downstream of the landfill (SW-4) when compared to concentrations in upstream samples (SW-2). Exceptions to this pattern are beryllium, antimony,total dissolved solids (TDS), and possibly zinc. For those parameters with established drinking water standards, only the standards for lead and selenium were exceeded in upgradient and downgradient samples.

The Hopkins Road site does appear to contribute to the levels of a few parameters in adjacent surface waters. For

TABLE 7

RESULTS OF SURFACE WATER CHEMICAL ANALYSIS
HOPKINS ROAD SITE, AMHERST, NEW YORK

PARAMETER	EPA INTERIM PRIMARY DRINKING WATER STANDARDS (mg/l)	CONCENTRATION (mg/l or ppm) U SW-2[2] 6/10/85	U SW-2 6/12/85	SW-1 6/10/85	SW-1 6/12/85	SW-3 6/10/85	SW-3 6/12/85	D SW-4 6/10/85	D SW-4 6/12/85
Chlorides	-	61	103	21	298	1.3	20	106	105
Sulfates	-	25	61	77	270	19	33	92	63
Selenium	0.01	0.008	0.027	0.008	0.011	0.012	0.013	0.026	*
Arsenic	0.05	0.011	0.036	0.035	0.035	0.045	0.017	0.032	0.034
Lead	0.05	*[3]	0.11	0.11	*	*	*	*	*
Beryllium	-	*	*	*	*	*	0.13	0.09	0.14
Antimony	-	*	*	*	1.50	*	*	1.10	*
Zinc	-	*	0.16	0.07	0.26	*	0.21	*	0.22
Total Dissolved Solids (TDS)	-	365	483	1,630	1,217	790	954	9,047	1,453
Total Organic Carbon (TOC)	-	19	29	39	24	59	50	16	15
Total Halogenated Organics (TOX)[1]	-	66	276	210	174	297	194	141	98
pH	-	6.7	7.2	7.1	7.2	7.3	7.7	-[4]	7.7

NOTES:

(1) TOX values in ug/l or ppb
(2) SW-2 is located on Ditch #4 upstream of site.
SW-4 is located on Ditch #4 downstream of site
SW-1 is located in the confluence of a ditch and wetlands outflow adjacent to the southeast corner of the landfill
SW-3 is located in a ditch adjacent to the southwest corner of the landfill
(3) * - Below Detection Limits
(4) pH reading not taken

example, values for beryllium, antimony, zinc, and total dissolved solids (TDS) are higher in samples from SW-1, SW-3, and SW-4 than in upstream samples (SW-2). However, no drinking water standards exist for these parameters. The pH values at SW-3 and SW-4 are slightly higher than the upstream readings, but the downstream measurements are still within the neutral range.

Storm events do not appear to have significant adverse effects on surface water quality at the Hopkins Road site. Rain appears to increase the levels of chlorides, sulfates, and antimony at SW-1 and of beryllium at SW-3. However, no comparable increases were observed at SW-4 (see Table 7). Zinc concentrations were higher at all sample locations following the June 1985 storm event investigated.

6.3 Groundwater Quality

The groundwater wells at the Hopkins Road site were sampled and analyzed on two occasions. The first sampling episode was during the period of June 26 through June 28, 1985. The second set of samples were collected on July 18 and 19, 1985.

The groundwater samples were analyzed for the parameters listed in Table 6. Complete priority pollutant scans were performed on samples from three pairs of wells (deep and shallow) collected in July 18-19, 1985. The pairs were located (see Plate 1) in the southeast corner (MW-1M and MW-1S), the northwest portion (MW-14M and MW-14S), and northern side (MW-9M and MW-11S) of the site. Flow in the lower water bearing zone, monitored by the deep wells, is generally in a northwesterly direction. Therefore, well MW-1M can be considered upgradient while MW-9M and MW-14M are downgradient wells. The shallow water bearing zone appears to discharge radially from the site due to the groundwater mounding in the landfill. Therefore, all three shallow wells provide an indication of the quality of

groundwater potentially moving off the site. The results of the chemical analyses of these samples are presented in Appendices VII and VIII of this report and summarized in Tables 8 and 9.

A number of parameters were not detected in any groundwater samples. All samples were analyzed for organic priority pollutants; namely base/neutral extractables, polychlorinated biphenyls (PCB), organic pesticides, acid extractables (phenols) and volatile organics. With the exception of Bis(2-ethylhexyl)-phthalate, no specific organic compounds were detected. The phthalate may be a reflection of material leaching either from the PVC casing of the wells or plastics in the fill. In addition, no cyanides were detected in any of the well samples.

A number of metals were found to be present in the groundwater at the Hopkins Road site. However, no chromium, copper, nickel, or thallium were detected in any of the wells. The concentrations of the parameters which were found in groundwater samples are discussed below relative to groundwater and drinking water standards. The impacts of the landfill on the different water bearing zones, i.e. the shallow zone at the base of the fill and the deeper zone at the clay-till interface, are evaluated separately.

6.3.1 Shallow Zone Groundwater Quality

As illustrated in Table 8, groundwater standards were exceeded for eight parameters in the shallow water bearing zone at the Hopkins Road site. Excursions from groundwater standards were detected for:

- sulfates in all wells except downgradient well MW-15S, on at least one sampling episode,
- chlorides in wells MW-4S and MW-8S on the eastern portion of the site on one occasion

TABLE 8

RESULTS OF GROUNDWATER CHEMICAL ANALYSIS
HOPKINS ROAD SITE, AMHERST, NEW YORK
SHALLOW WELLS

PARAMETER	CLASS GA STDS. (mg/l)	CONCENTRATIONS (mg/l) MW-1S 6/26/85	MW-1S 7/19/85	MW-3S 6/26/85	MW-3S 7/19/85	MW-4S 6/26/85	MW-4S 7/19/85	MW-5S 6/28/85	MW-5S 7/19/85	MW-6S 6/28/85	MW-6S 7/19/85	MW-7S 6/28/85	MW-7S 7/19/85
Sulfates	250	172	371	339	813	966	1,331	366	530	13	329	833	1,097
Chlorides	250	11	1.6	138	13	419	24	6.8	2.6	72	6.0	5.0	*
Arsenic	0.025	0.029	*(2)	0.024	0.078	0.062	0.019	0.023	0.049	0.009	0.035	0.010	0.024
Silver	0.05	0.07	*	0.06	*	0.06	*	0.07	*	0.06	*	0.06	*
Mercury	0.002	0.001	*	0.005	*	*	*	*	*	*	*	*	*
Lead	0.025	*	*	*	*	*	*	2.04	*	*	*	*	*
Cadmium	0.01	*	*	*	*	*	*	*	*	*	*	*	*
Zinc	5	*	*	0.35	1.64	0.07	0.04	1.23	0.26	0.05	0.08	*	*
Selenium	0.02	*	*	0.008	*	*	*	*	*	*	*	*	*
Antimony	-	1.00	*	*	*	*	*	*	*	*	*	*	*
TOC	-	44	23	6.3	0.7	38	12	35	18	31	21	72	32
TOX(1)	-	150	*	6	108	6	70	*	185	138	274	234	326
TDS	-	2,452	2,634	1,503	2,059	3,090	3,054	2,264	1,982	2,512	2,694	3,412	3,162
pH	6.5-8.5	6.9	-(3)	6.9	-	6.5	-	7.0	-	6.8	-	7.0	-

NOTES:

(1) TOX values in ug/l or ppb
(2) * - Below Detection Levels
(3) pH readings not taken during July 1985 sampling

TABLE 8 (cont.)

RESULTS OF GROUNDWATER CHEMICAL ANALYSIS
HOPKINS ROAD SITE, AMHERST, NEW YORK
SHALLOW WELLS

PARAMETER	CLASS GA STDS. (mg/l)	CONCENTRATIONS (mg/l) MW-8S 6/26/85	MW-8S 7/19/85	MW-10S 6/27/85	MW-10S 7/19/85	MW-11S 6/27/85	MW-11S 7/19/85	MW-13S 6/27/85	MW-13S 7/19/85	MW-14S 6/27/85	MW-14S 7/19/85	MW-15S 6/27/85	MW-15S 7/19/85
Sulfates	250	822	1,447	265	697	417	747	133	513	322	446	8	17
Chlorides	250	47	396	3.8	*	56	2.6	3.6	2.1	121	20	182	1.0
Arsenic	0.025	0.054	0.022	0.020	0.027	0.041	0.023	0.039	0.009	0.022	0.036	0.042	0.008
Silver	0.05	0.07	*(2)	0.06	*	0.07	*	0.08	*	0.08	*	0.07	*
Mercury	0.002	*	*	0.002	*	*	*	*	*	0.001	*	*	*
Lead	0.025	*	*	*	*	*	*	*	*	*	*	*	*
Cadmium	0.01	*	*	0.11	*	0.05	*	0.07	*	0.05	*	0.05	*
Zinc	5	0.04	0.05	0.05	*	0.36	*	0.23	*	0.36	*	0.12	*
Selenium	0.02	*	*	*	*	*	*	*	0.009	*	*	*	0.006
Antimony	-	*	*	*	*	*	*	1.10	*	*	*	*	*
TOC	-	23	13	126	62	58	33	83	47	46	29	72	30
TOX(1)	-	130	144	112	374	170	*	290	246	17	108	100	62
TDS	-	2,816	3,616	3,000	3,169	2,330	2,258	257	1,724	166	1,291	1,379	1,580
pH	6.5-8.5	6.7	-(3)	6.4	-	6.7	-	6.6	-	6.6	-	6.6	-

NOTES:

(1) TOX values in ug/l or ppb

(2) * - Below Detection Levels

(3) pH readings not taken during July 1985 sampling

TABLE 9

RESULTS OF GROUNDWATER CHEMICAL ANALYSIS
HOPKINS ROAD SITE, AMHERST, NEW YORK
DEEP WELLS

PARAMETER	CLASS GA STDS. (mg/l)	CONCENTRATIONS (mg/l) MW-1M 6/26/85	MW-1M 7/19/85	MW-2M 6/26/85	MW-2M 7/19/85	MW-9M 6/27/85	MW-9M 7/19/85	MW-12M 6/28/85	MW-12M 7/19/85	MW-14M 6/28/85	MW-14M 7/19/85	MW-15M 6/27/85	MW-15M 7/19/85
Sulfates	250	1,458	1,718	1,033	1,307	< 1,307	< 1,548	1,705	1,815	< 909	< 1,414	1,080	1,581
Chlorides	250	43	36	13	-(4)	< 10	< 13	55	56	< 19	< 19	13	14
Arsenic	0.025	0.064	*	0.065	0.029	< 0.017	*	0.007	0.014	< 0.005	< 0.036	0.014	0.009
Silver	0.05	0.07	*	0.06	*	> 0.08	*	0.06	*	< 0.04	*	0.07	*
Mercury	0.002	*	*	*	*	*	*	*	*	0.006	*	*	0.001
Lead	0.025	1.76	*	*	*	< 1.64	*	*	*	*	*	*	*
Cadmium	0.01	*	*	*	*	0.08	*	*	*	*	*	0.08	*
Zinc	5	*	*	*	*	*	0.05	*	*	0.24	*	*	*
Selenium	0.02	*	*	*	*	*	*	*	*	*	0.005	*	0.010
Antimony	-	*	*	*	*	*	*	*	*	*	*	*	*
Beryllium	-	*	*	*	*	0.05	*	*	*	0.07	*	*	*
TOC	-	4.1	1.6	3.8	1.4	3.4	1.6	3.6	1.6	11	3.2	4.6	2.0
TOX(1)	-	226	20	*	37	30	50	97	*	47	31	96	78
TDS	-	2,127	2,658	2,215	-(4)	2,283	2,305	2,672	2,841	1,153	2,046	1,949	2,411
pH	6.5-8.5	8.7	-(3)	7.8	-	9.4	-	8.1	-	7.5	-	7.4	-

NOTES:

(1) TOX values in ug/l or ppb
(2) * - Below Detection Levels
(3) pH readings not taken during July 1985 sampling

- arsenic in all wells on at least one sampling event, except well MW-7S in the center of the landfill area

- silver in all wells during the June sampling

- mercury in wells MW-3S and MW-10S along the eastern and western edges of the fill area on one occasion

- lead in well MW-5S in the middle of the fill area on one collection episode; which also exceeded drinking water standards

- cadmium in wells MW-10S, MW-11S, MW-13S, MW-14S, and MW-15S during the June sampling

- pH in well MW-4S and MW-10S along the edges of the fill area (see Plate 1 for well locations).

No groundwater or drinking water standards have been established for some of the parameters found at the Hopkins Road site. These parameters include antimony, total dissolved solids (TDS), and beryllium. Antimony was detected in samples from well MW-1S, adjacent surface water sampling point SW-1, well MW-13S, and downstream sampling location SW-4. Comparable levels of TDS were measured in the shallow wells and surface water sampling stations SW-1, SW-3, and SW-4. However, although beryllium was found in surface water samples from SW-3 and SW-4, no beryllium was detected in any of the shallow wells.

For those parameters analyzed with established drinking water limits, there was only one single sample from well MW-5S which exceeded the lead standards.

The radial discharge from the shallow water bearing zone appears to be contributing significant amounts of inorganic dissolved solids to adjacent surface waters. These dissolved solids appear to be predominately sulfates and chlorides. To a lesser degree, the shallow water bearing zone also seems to be contributing antimony and possibly zinc to the surrounding surface waters. However, the concentrations of antimony and zinc are not considered significant.

6.3.2 Deep Zone Groundwater Quality

As indicated in Table 9, groundwater standards were surpassed for seven parameters in the deep water bearing zone at the Hopkins Road site. Excursions from groundwater standards were detected for:

- sulfates in all deep wells
- arsenic in upgradient wells MW-1M, MW-2M, and downgradient well MW-14M (levels in MW-1M and MW-2M exceeded drinking water standards)
- silver in most upgradient and downgradient wells sampled in June 1985; however, the levels were at, or near, the standard
- mercury in well MW-14M
- lead in upgradient well MW-1M and downgradient well MW-9M (exceeded drinking water standards, also)
- cadmium in downgradient wells MW-9M and MW-15M (exceeded drinking water standards, also)
- pH in wells MW-1M and MW-9M.

Except for well MW-14M, the silver levels also exceeded drinking water standards.

In contrast to the more acidic shallow wells, the pH in the deep wells were basic. Both the pH and sulfate levels in the deep wells may represent the natural quality of groundwater. Dissolution of gypsum in the Camillus Shale would tend to elevate levels of pH and sulfates in groundwater.

With regards to these parameters, no antimony was detected in the deep wells. TDS levels in the deep water bearing zone appear similar to values measured in surface waters and the shallow water bearing zone. Like sulfate concentrations, TDS readings may reflect natural groundwater quality. Beryllium was detected at surface water sampling points SW-3 and SW-4. Although no beryllium was found in the shallow wells, this parameter was measured in deep wells MW-9M and MW-14M.

The potentiometric map illustrated in Figure 8 suggests the direction of groundwater flow in the deep water bearing zone is to the west. Therefore, wells MW-1M and MW-2M are hydraulically upgradient of the landfill. Based upon the analytical data summarized in Table 9, the landfill does not appear to be significantly impacting on the quality of the deep water bearing zone.

7.0 SOIL CHEMICAL ANALYSIS

In January 1985, soil and fill samples were collected from borings installed at the Hopkins Road site. The samples were analyzed for a number of metals as a preliminary evaluation of contamination at the site. The analytical data, along with the locations of the borings and the intervals sampled, are presented in Appendix I.

Concentrations of metals in naturally occurring soils are variable. Table 10 presents ranges of mean concentrations of metals established in a number of areas. By way of comparison, the ranges of the metals detected in the soil borings at the Hopkins Road site are also given. Although the fill may contain these metals, most values fall within the ranges reported for some naturally occurring soils. Exceptions are cadmium, mercury, and zinc. For these parameters, some of the concentrations detected at the Hopkins Road site exceed the maximum levels reported in some naturally occurring soils.

Table 11 presents the sediment concentrations of metals which were noted in the discussions on surface and groundwater quality. Levels of beryllium, selenium, and silver are uniformly low across the fill area. The other parameters display more patchy distribution with localized areas having relatively high concentrations.

As part of the present investigation, composites of the upper two feet of soil were analyzed for arsenic, copper, lead, and zinc. The locations of the soil composites are identified in Table 2. The results of the analysis are given in Table 12.

The surface concentrations of these metals are within the same ranges reported from the boring analyses (see Table 11). Arsenic values ranged from about 3 to 12 mg/kg with the highest levels being detected to the east of the berm towards Hopkins

TABLE 10

CONCENTRATION OF METALS IN NATURAL SOILS AND HOPKINS ROAD SITE SOILS

PARAMETER	MEAN CONCENTRATION RANGES (ppm) BY REFERENCE			CONCENTRATION RANGES IN HOPKINS ROAD SITE
	BRADFORD[2] etal. (1971)	PRESANT (1972)[3]	ALLAWAY (1968)[4]	BORINGS (ppm)[1]
Antimony	< 0.01 - 10.4	< 1 - 152	---	< 1
Arsenic	---	5 - 3,500	0.1 - 40	< 2.0 - 26.2
Beryllium	< 0.1 - 26.0	---	2 - 100	< 0.2 - 1.8
Cadmium	---	---	0.01 - 7	< 0.18 - 10.1
Chromium	< 0.01 - 0.017	---	5 - 3,000	5.1 - 50.7
Copper	< 0.01 - 0.20	< 5 - 560	2 - 100	< 10 - 292
Lead	< 0.01 - 0.30	0.03 - 3,000	2 - 200	3.3 - 1,310
Mercury	0.0002 - 0.011	---	---	< 0.08 - 0.382
Nickel	< 0.01 - 0.09	---	10 - 1,000	8.5 - 48
Selenium	---	---	0.1 - 2.0	< 0.09 - 0.33
Silver	---	---	---	0.65 - 5.06
Zinc	0.01 - 0.40	10 - 2,000	10 - 300	36 - 2,470

(1) Analyzed by Ecology and Environment, 1985, results reported in Appendix I.
(2) Analysis of 68 California Soil Samples
(3) Analysis of Soils in Humid Temperate Climate
(4) Soil Type or Source Not Identified

TABLE 11

CONCENTRATIONS OF METALS IN FILL AND SEDIMENTS
HOPKINS ROAD SITE, AMHERST, NEW YORK[1]

Concentration Ranges (mg/kg) ppm

Parameter	Boring 1	Boring 2	Boring 3	Boring 4	Boring 5	Boring 6	Boring 7
Arsenic	7.1 - 26	BDL[2] - 6.9	BDL - 14.2	BDL - 2.0	BDL	BDL	BDL - 2.4
Silver	0.65 - 5.1	1.2 - 4.1	1.8 - 3.8	0.4 - 2.6	1.4 - 3.5	1.8 - 2.5	1.2 - 2.1
Mercury	BDL - 0.1	BDL	BDL	BDL - 0.1	BDL - 0.38	BDL	BDL
Lead	6.4 - 901	3.3 - 495	6.7 - 1,310	6.7 - 68	9.2 - 127	7.5 - 134	2.6 - 46
Cadmium	0.06 - 1.5	BDL - 0.5	0.07 - 10	0.08 - 0.5	0.08 - 0.8	BDL - 0.7	0.1 - 0.6
Zinc	51 - 554	31 - 678	56 - 503	60 - 246	61 - 2,470	49 - 171	36 - 83
Selenium	BDL - 0.3	BDL - 0.5	BDL - 0.3	BDL - 0.18	BDL - 0.3	BDL - 0.2	BDL - 0.1
Beryllium	0.4 - 1.5	0.3 - 1.8	0.4 - 1.4	0.7 - 1.1	BDL - 1.4	0.5 - 1.1	0.3 - 1.1

(1) Borings installed January 1985, fill and soil samples analyzed by Ecology and Environment, Inc.
(2) BDL - Below Detection Limits

TABLE 12

CONCENTRATIONS OF METALS IN SURFACE SOIL COMPOSITES
HOPKINS ROAD SITE, AMHERST, NEW YORK

CONCENTRATION (mg/kg)

Parameter	COMP 1 6/7/85	COMP 2 6/7/85	COMP 3 6/7/85	COMP 4 6/7/85
Arsenic	9.3	11.8	3.6	3.5
Copper	588.0	546.0	57.0	116.0
Lead	178.0	860.0	249.0	BDL*
Zinc	430.0	780.0	160.0	150.0

CONCENTRATION (mg/kg)

Parameter	COMP 5 6/7/85	COMP 6 6/7/85	COMP 7 6/7/85	COMP 8 6/7/85
Arsenic	5.4	3.0	2.9	4.2
Copper	49.0	118.0	131.0	99.0
Lead	100.0	494.0	100.0	179.0
Zinc	130.0	370.0	24.0	420.0

Road. Lead concentrations, with the exception of Comp. #4, ranged from 100 to 860 mg/kg. The highest levels of lead were also found to be east of the berm; while the parameter was undetected in the middle of the fill area. Excluding the concentration of 24 mg/kg in Comp #7, levels of zinc varied between 130 and 780 mg/kg. Again, the highest concentrations were measured on the eastern portion of the site. No copper was detected in the water samples but was measured in levels up to about 290 mg/kg in boring soil samples (see Table 10). As illustrated in Table 12, copper concentrations as high as 558 mg/kg were measured in surficial soils on the eastern portion of the site.

8.0 CONCLUSIONS/RECOMMENDED MONITORING

8.1 Conclusions

The following conclusions have been developed based upon the results of this investigation of the Hopkins Road site:

- The bedrock is overlain by, successively, more than 20 feet of glacial till; 20 or more feet of glacio-lacustrine clays; and varying thicknesses of fine sand, swamp derived organic silts, topsoil, and fill deposits.

- The fill, although absent near the site boundaries, is over 20 feet thick in places.

- Two water bearing zones exist on the site; a shallow perched zone in the fill and sediments overlying the clay deposits and a deeper zone within the clay and till deposits.

- The clay and till deposits, due to low permeabilities, act as an aquitard and limit the downward flow of shallow groundwater or "leachate" into the deeper water bearing zone.

- The landfill has caused mounding of groundwater in the shallow water bearing zone creating a radial discharge of groundwater from the fill area into adjacent surface waters.

- Groundwater flow in the deep water bearing zone is generally in a westerly direction.

- The Hopkins Road Site appears to be contributing significant amounts of inorganic dissolved solids, predominantly sulfates and chloride, to adjacent surface waters.

- For most parameters examined, surface water samples collected upstream and downstream of the site had comparable concentrations and drinking water standards were not exceeded in downstream surface water samples.

- No organic contaminants were detected in groundwater at the Hopkins Road Site.

- Groundwater and drinking water standards for some parameters were exceeded in groundwaters at the Hopkins Road site.

- The background water quality and yield in the deep water bearing zone is not considered sufficient for drinking water and no drinking water wells are known to be active in the area.

- Concentrations of most metals in the sediments are within ranges reported for naturally occurring soils. Some values for cadmium, mercury, and zinc at the Hopkins Road site exceed these ranges.

- Concentrations of metals appear highest in fill and sediments near to, and east of, the berm on the eastern portion of the site.

- The existing cap exhibits a wide range of permeabilities. In addition, ponding of surface water occurs in several locations on the fill area.

8.2 Recommended Monitoring Program

Based upon the results of this investigation, a proposed monitoring program has been developed for the Hopkins Road site. The program is designed with two goals in mind. The first is to resolve the differences in results obtained during the June and July sampling periods. The second is to monitor changes in the quality of surface and groundwater moving from the site.

A limited number of points will be included in this program. For the surface waters, only the upstream SW-2 and downstream SW-4 will be sampled. For the groundwaters, shallow wells along the periphery of the site will be sampled. The wells to be monitored are MW-1S, MW-3S, MW-11S, MW-14S, and MW-15S. If concentrations in these wells should exhibit significant increases, additional monitoring of the deep wells will be considered.

Samples from each point will be analyzed for the parameters which were found to exceed groundwater standards in this investigation. These parameters include sulfate, chlorides, arsenic, silver, mercury, lead, cadmium, and pH. Annual sampling should be adequate to identify trends in contaminant levels. Groundwater elevations will be measured prior to sampling to monitor the direction of groundwater flow.

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ecology and environment, inc.
ANALYTICAL SERVICES CENTER, P.O. BOX D, BUFFALO, NEW YORK 14225, TEL. 716-631-0360
International Specialists in the Environmental Sciences

February 28, 1985

Ms. Nellie Brown-Fonte
Town of Amherst Water
Pollution Control Facility
455 Tonawanda Creek Road
North Tonawanda, New York 14120

Dear Ms. Brown-Fonte:

Attached is the laboratory report of the analysis conducted on thirty-two samples received at the Analytical Services Center on January 18, 1985. The analysis was performed according to the procedures set forth in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, "SW-846, Second Edition, U.S. EPA, 1982.

Very truly yours,

Gary Hahn ITB

Gary Hahn, Manager
Analytical Services Center

GH/cp
enclosure

RESULTS OF ANALYSIS OF SOIL SAMPLES
TOWN OF AMHERST WATER POLLUTION CONTROL FACILITY

(mg/kg as received)

E & E Lab No. 85- Sample Identity	0236 85-118	0237 85-120	0238 85-142	0239 85-144	0240 85-145	0241 85-147	0242 85-148	0243 85-149	0244 85-150	0245 85-151	0246 85-152	0247 85-153	0248 85-154	0249 85-155	0250 85-156	0251 85-158
Antimony	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic	18.0	26.2	12.5	7.11	6.91	<2.0	<2.0	<2.0	<2.0	3.57	14.2	<2.0	<2.0	<2.0	<2.0	1.97
Beryllium	1.47	1.51	1.04	0.40	0.80	1.76	0.37	0.29	1.17	1.15	1.38	0.37	0.48	1.14	0.70	0.70
Cadmium	0.113	0.072	1.54	0.055	0.466	<0.18	0.429	0.039	0.084	0.236	10.1	0.381	0.141	0.067	0.408	0.282
Chromium	40.5	43.7	33.3	14.8	21.7	5.12	8.78	9.35	31.9	31.2	50.7	9.09	14.8	32.0	26.4	22.3
Copper	22.6	23.8	141	<10	17.6	76.4	18.2	<10	19.1	17.1	292	16.4	11.9	15.8	16.4	11.1
Lead	10.9	6.41	901	31.0	48.3	495	8.34	3.34	9.23	12.2	1310	30.6	13.0	6.67	39.1	31.4
Mercury	<0.08	<0.08	0.122	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Nickel	33.0	35.1	24.3	10.4	19.4	32.0	11.7	9.86	29.5	21.2	48.0	13.0	15.7	27.8	21.3	15.6
Selenium	<0.09	<0.09	0.33	<0.09	<0.09	<0.09	0.51	<0.09	<0.09	<0.10	<0.11	0.27	<0.09	<0.09	<0.09	0.12
Silver	5.06	3.90	4.42	0.65	3.89	4.12	1.23	1.47	3.03	1.81	3.83	1.77	2.42	2.61	2.36	0.42
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	69.6	67.1	554	51.3	79.0	678	39.6	30.5	60.4	58.9	503	55.5	58.2	56.9	246	71.5
Total Halogenated Organics as Lindane	0.41	0.26	0.51	0.11	0.32	0.71	1.8	0.30	0.68	0.10	0.22	1.4	0.013	<0.001	0.016	0.66

U-1141

RESULTS OF ANALYSIS OF SOIL SAMPLES
TOWN OF AMHERST WATER POLLUTION CONTROL FACILITY

(mg/kg as received)

E & E Lab No. 85- Sample Identity	0252 85-159	0253 85-161	0254 85-162	0255 85-163	0256 85-165	0257 85-166	0258 85-167	0259 85-168	0260 85-169	0261 85-172	0262 85-175	0263 85-176	0264 85-204	0265 85-206	0266 85-209	0267 85-210
Antimony	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.44
Beryllium	1.11	0.87	1.06	0.84	0.55	0.87	<0.20	1.44	0.73	0.51	0.67	1.06	0.72	1.14	0.32	0.39
Cadmium	0.519	0.409	0.077	0.147	0.246	0.762	0.509	0.081	0.278	0.605	0.692	<0.20	0.285	0.552	0.106	0.162
Chromium	21.7	26.2	37.3	25.4	15.8	29.6	10.9	41.5	22.1	21.7	23.3	33.3	21.9	36.8	13.1	15.7
Copper	12.9	21	20.6	14.7	10.0	17.2	16.7	23.2	15.0	20.2	17.6	19.1	15.0	18.3	11.8	<10
Lead	51.5	67.9	6.68	15.7	30.9	127	73.9	9.16	55.2	134	9.85	7.48	45.5	25.2	3.87	2.59
Mercury	<0.08	0.123	<0.08	<0.08	<0.08	0.325	0.382	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Nickel	17.6	19.9	32.6	23.0	13.5	20.3	8.46	37.0	19.2	14.0	23.1	28.1	19.2	26.4	9.52	12.3
Selenium	0.13	0.18	<0.09	<0.09	0.28	<0.09	<0.09	<0.09	0.15	0.14	0.16	<0.09	0.14	<0.09	<0.09	0.06
Silver	2.64	1.77	2.61	3.07	1.78	3.47	1.41	2.54	2.45	1.87	1.76	2.30	1.36	2.08	1.22	1.61
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	84.3	110	59.5	62.5	61.1	2470	108	74.2	171	126	48.7	54.1	76.4	82.7	35.6	41.5
Total Halogenated Organics as Lindane	1.5	1.2	0.95	0.22	0.30	1.1	4.0	0.020	0.23	5.8	0.36	0.24	0.25	0.51	0.44	1.1

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF REPLICATE
ANALYSES OF SOIL SAMPLES

Compound/ Element	E & E Laboratory No. 85-	Original Analysis	Replicate Analysis	Relative Percent Difference RPD
THO as Lindane	0264	0.25	0.37	39
Antimony	0243	<1.0	<1.0	--
	0254	<1.0	<1.0	--
Arsenic	0243	<2.0	<2.0	--
	0254	<2.0	<2.0	--
Beryllium	0243	0.287	0.395	32
	0254	1.06	1.03	2.9
Cadmium	0243	0.039	0.041	5.0
	254	0.077	0.086	11
Chromium	0243	9.35	12.3	27
	0254	37.3	33.1	12
Copper	0243	<10	<10	--
	0254	20.6	20.8	1.0
Lead	0243	3.34	3.64	8.6
	0254	6.68	5.52	19
Mercury	0245	<0.073	0.082	--
	0257	0.338	0.311	8.3
Nickel	0243	9.86	11.4	14
	0254	32.6	34.2	4.8
Selenium	0243	<0.09	<0.09	--
	0254	<0.09	<0.09	--
Silver	0243	1.47	1.69	13.9
	0254	2.61	2.47	5.5
Thallium	0243	<1.0	<1.0	--
	0254	<1.0	<1.0	--
Zinc	0243	30.5	38.4	23
	0254	59.5	64.0	7.3

QUALITY CONTROL FOR ACCURACY:
PERCENT DIFFERENCE--EPA QUALITY ASSURANCE MATERIALS

Element	Concentrations in ug/L		Percent Difference
	Known	Determined	
Antimony	8.2	8.06	1.7
Arsenic	27	29.2	8
	27	22	18
Beryllium	235	245	4.3
Cadmium	9.1	8.97	1.4
	3.3	3.21	2.7
Chromium	261	268	2.7
Copper	339	344	1.5
Lead	435	507	16.6
Mercury	8.7	8.58	1.4
Nickel	207	226	9.2
Selenium	11	10.3	6.4
Thallium	25.2	26	3.2
Zinc	418	424	1.4

Note: These results are within the 95% confidence interval for these parameters.

DATE STARTED 1-14-85
FINISHED 1-14-85
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-1
SURF. ELEV. N.A.
G. W. DEPTH See Note

E&E LAB. Sample I.D. # 85-

PROJECT Hopkins Road Dump
LOCATION

DEPTH FT.	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	3	6				Brick, Wood, Ash (FILL)	142
			6	7		12			
		2	6	5					
			3	3		8			144
5		3	32	11					
			6	5		17			
		4	11	7				Wet, brown Silt and Sand, Organic	1st Free standing water encountered at 5'
			4	3		11			
		5	7	5					118
10			9	11		14		Moist, Silty Clay with Silt seams	
		6	11	10					
			12	14		22			
		7	11	14					120
			18	21		32			
15		8	6	7				Soft red Clay	
			7	7		14			
		9	7	6					
			7	5		13			
		10	1	1					
20			2	3		3			
		11	1	3					
			3	3		6			
		12	WOH	1					
			1	1		2			
25		13	1	1				Silty, Sandy, Clay	
			2	3		3			
		14	1	5					
			21	100		26		Glacial Till at approximately 27'	
30		15	100/.2					Boring Complete with Refusal at 30.2 feet	
35									

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.
: = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Drill Foreman

METHOD OF INVESTIGATION ASTM D-1586, Using drilled in casing

DATE STARTED 1-14-85
FINISHED 1-14-85
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG

HOLE NO. B-2
SURF. ELEV. N.A.
G. W. DEPTH See Note

E&E LAB SAMPLE I.D.# 85-

PROJECT Hopkins Road Dump
LOCATION

DEPTH FT.	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES	
0		1	21	100		12'		Frozen Fill		145
		2	5	2				Wet,black Fill, garbage,sand,gravel	1st free standing water recorded at 4.0'	
5			2	2		4				
		3	2	2						
			2	3		4		Fill ends at 8.0'		147
		4	2	2						148
			4	7		6		Organic Peat from 8'-10'		
10		5	5	11				Wet,brown,moist,brown Silt and fine		149
			11	12		22		sand		
		6	5	7				Moist,brown Silty Clay		150
			7	7		14				
15								Boring complete at 14.0 feet		
20										
25										

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow.
: = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ " per blow.

CLASSIFICATION Visual by Drill Foreman
ASTM D-1586, Using drilled in casing

DATE STARTED 1-14-85
FINISHED 1-14-85
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG

HOLE NO. B-3
SURF. ELEV. N.A.
G. W. DEPTH See note

E&E LAB SAMPLE I.D. # 85-

PROJECT Hopkins Road Dump

LOCATION

DEPTH/FT.	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/16	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES	
0										
		1	21	14				Silt, Sand, Gravel (FILL)		151
			7	10		21				
5		2	5	3				Moist, red Brick, Ash		152
			4	3		7			1st free standing water recorded at 7.0'	
		3	5	4						
			2	2		6				
		4	1	1						153
10			1	1		2		Organic peat at approximately 9'		
		5	1	5						154
			9	11		14		Wet, brown Silt and Sand at 10.5'		
		6	12	15						155
			15	17		30		Moist, brown Clay at 13'		
15								Boring complete at 14.0 feet		

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Drill Foreman

METHOD OF INVESTIGATION ASTM D-1586, Using drilled in casing

DATE STARTED 1-14-85
FINISHED 1-14-85
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC **SUBSURFACE LOG**

HOLE NO. B-4
SURF. ELEV. N.A.
G. W. DEPTH See Note

E & E LAB SAMPLE I.D. # 85-

PROJECT Hopkins Road Dump
LOCATION

DEPTH FT.	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES	
		1	10	12				Sand, Gravel, Clay (FILL)		156
			14	14		26				
		2	20	25						
			15	8		40				
5		3	9	9				Clay fill		158
			12	14		21				
		4	14	20				Organic Material, Wood, Peat		159
			31	40		51				
		5	8	7						
10			5	4		12		Wet, black organic Wood		
		6	15	17						161
			14	9		31		Peat at 11.5'		
		7	18	21						
			21	30		42				
15		8	25	19				No recovery	Push something ahead of spoon	
			10	9		29				
		9	10	10						
			9	12		19		Clay		
20		10	push							162
								Boring complete at 21.0 feet	No free standing water encountered	
25										

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.
C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Drill Foreman

METHOD OF INVESTIGATION ASTM D-1586, Using drilled in casing

DATE STARTED 1-16-85
FINISHED 1-16-85
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-5
SURF. ELEV. N.A.
G. W. DEPTH See Note

PROJECT Hopkins Road Dump
LOCATION

DEPTH FT.	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	10	100/.2				Dry, brown Silty Clay with Gravel (FILL)	
		2	70	63				Dry, brown-gray Slag, Silty Clay (FILL)	
			18	34		81			
5		3	14	24				Dry, brown Silty Clay, Gravel, Brush (FILL)	
			25	24		49			
		4	26	24				Dry, black Wood, Ashes, Glass (FILL)	
			18	100/.2		42			
		5	100/.1					Moist, black Wood	
10		6	6	5				No Recovery	
			8	100/.1		13			
		7	2	3				Moist, black Wood	
			3	6		6			
15		8	9	8				No recovery	
			10	14		18			
		9	20	30					
			31	38		61			
20		10	18	24				Wet, moist, brown Silty very fine Sand to clay	
			31	32		55			
								Boring complete at 22.0 feet	No free standing water encountered at boring completion
25									

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.
C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Drill Foreman

DATE STARTED 1-16-85 FINISHED 1-16-85 SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-6 SURF. ELEV. N.A. C. W. DEPTH See Note

E&E LAB SAMPLE ID # 85-

PROJECT Hopkins Road Dump LOCATION

DEPTH FT.	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	2	2				Moist, brown Silty Clay with Gravel (FILL)	169
			4	16		6			
		2	29	24				Dry, gray Crushed Stone (FILL)	
			16	14		40			
5		3	12	18				Moist, brown Gravel, wood (FILL)	
			16	10		34			
		4	6	28				Wet, brown Wood	172
			24	4		52			
		5	2	2				Wet, brown Wood, some Gravel	
10			8	100/.0		10			
		6	100/.2					Wet, brown Wood	
		7	13	8				No recovery	
			12	8		20			
15		8	4	5					
			7	8		12			
		9	5	12				Wet, brown Peat to very fine Sand	175
			13	15		25			
		10	7	10				Moist, brown Clay	176
20			12	16		22			
								Boring complete at 20.0 feet	No free standing water encountered at boring completion
25									

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Drill Foreman

METHOD OF INVESTIGATION: ASTM D-1586, Using drilled in casing

DATE
STARTED 1-15-85
FINISHED 1-15-85
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-7
SURF. ELEV. N.A.
G. W. DEPTH See Note

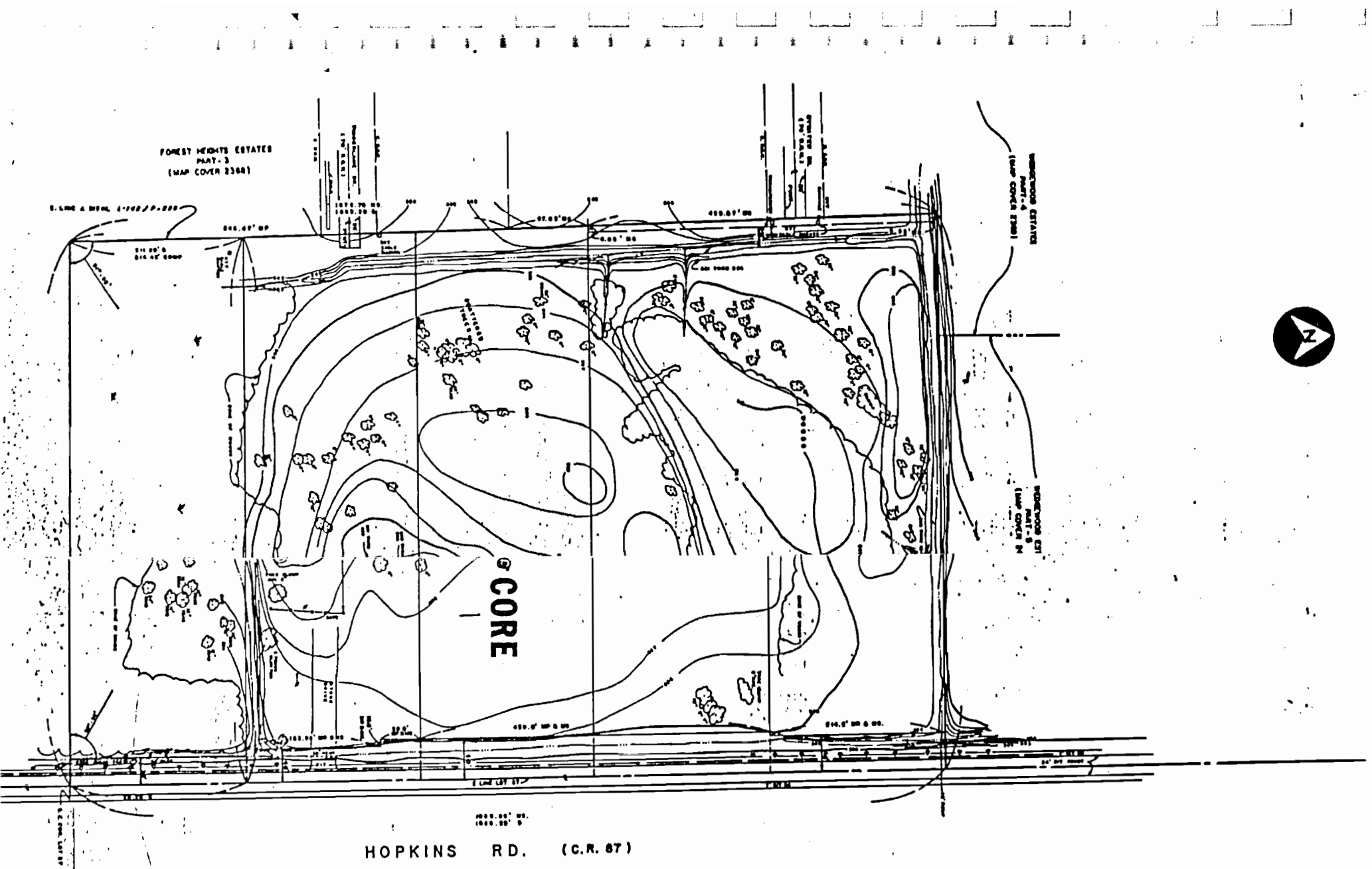
E&E LAB SAMPLE ID # 85-

PROJECT Hopkins Road Dump
LOCATION

DEPTH FT.	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	3	5				Moist, brown Silty Clay (Fill)	204
			18	12		23			
		2	8	12	100/.4			Wet, brown Crushed Stone Wood (Fill)	
5		3	100/.2					Moist, brown Wood	206
		4	100/.5					No Recovery	
		5	23	100/.2				Wet, brown Wood	
10		6	94	19					
			17	11		36		Wet, brown fine Sand	
		7	16	24					209
			27	32		51			
15		8	13	13				Wet, brown fine Sand to Clay	210
			13	9		26			
								Boring complete at 16.0 feet	No free standing water encountered at boring completion
20									

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.
C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Drill Foreman


FOREST HEIGHTS ESTATES
PART-3
(MAP COVER 2368)
CORE
N
HOPKINS RD. (C.R. 87)

Amherst GDCA ...

5/1/85 - 5/2/85	**LOCATION:** Hopkins Rd. Amherst, NY.
...LING CONTRACTOR: Empire Soils	**INSPECTOR:** TF, KCO
...LING METHOD: Hollow stem auger 4 1/4" ID. X 7" O.D.	**SAMPLING METHOD:** 2" diam split spoon continuous to 30' then every 5' standard penetration test
...ATION: GL585.56, TOC588.76	**DATUM:** USGS — **WELL #** MW -1D

SAMPLE no.	depth	blows per 6"		DEPTH	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	REMARKS
s-1	0-2'	2	2		Loose, brown SILT & CLAY	
		3	4		dry, FILL	
s-2	2'-4'	4	6		NO RECOVERY	
		6	7			
s-3	4'-6'	4	5	5	SM, Medium dense, brown,	
		6	11		FINE SAND and SILT, wet	
s-4	6'-8'	5	8			
		8	7			
s-5	8'-10'	2	3		Changing at 8.5ft to	
		6	8	10	CL Stiff, grey CLAY, little	
s-6	10'-12'	6	7		silt, moist, varved, GLACIAL	
		8	3		LACUSTRINE	
s-7	12'-14'	8	11			
		13	17		becoming very stiff	
s-8	14'-16'	2	3	15		
		4	4		CL firm, reddish brown and	
s-9	16'-18'	4	4		grey, CLAY, trace brown silt moist	
		4	4			
s-10	18'-20'	WOH	/18"			
			2	20	becoming very soft, wet	
s-11	20'-22'	WOH	/18"			
			2			
s-12	22'-24'	1	2			
		2	2			
s-13	24'-26'	WOH	/12"	25		
		1	2			
s-14	26'-28'	1	2			
		3	2		becoming firm	
s-15	28'-29.5	WOH	5		changing at 28.5ft to	
		31	50/0	30	ML Hard, reddish brown, SILT	
	30-30.7'	31	100	.2	and CLAY, some gravel, little sand, moist, GLACIAL TILL	
s-17	35-35.8'	73	100	35 .3		

NOTES: Description and Classification based upon visual inspection by MPI inspector. Monitoring Well Installation-5ft of 2" Diam PVC well screen (0.01" slot), 45.5ft of 2" Diam PVC riser to surface. 5ft of 6" diam protective steel sleeve with locking cap over stick up. Backfilled up to 43 feet with well sorted menium sand. to 38ft with bentonite slurry; and to surface with cement.

MALCOLM

BORING MW-1D

PROJECT: Amherst GBCA HYD Inves	PROJECT NO: 363- 151-105
DATE: 5/1/85 - 5/2/85	LOCATION: Hopkins Rd. Amherst, NY.
ELEVATION: GL585.56, TOC 588.76	DATUM: USGS

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-18	40-42'	8	12			GLACIAL TILL		
		27	48					
				45				
s-19	45-47'	3	4			Changing at 46ft to		
		5	5			SM Loose, brown, FINE SAND some silt, wet, TILL becoming medium dense		
s-20	47-49'	5	5					
		12	12					
				50				
				55				
				60				
				65				
				70				
				75		Bottom of Boring 50.5 ft.		

NOTES:

MALCOLM PIRNIE

PROJECT: AMHERST GBCA HYD INVES | PROJECT NO: 363--151-105

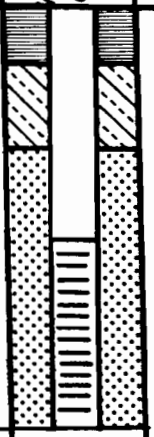
ATE: 5/3/85 | LOCATION: HOPKINS RD, AMHERST, NEW YORK

DRILLING CONTRACTOR: EMPIRE SOILS | INSPECTOR: KCO, TF

RILLING METHOD: HOLLOW STEM AUGER | SAMPLING METHOD: NONE, SEE LOG FOR MW- 1D

4 1/4 ID. X 7" O.D

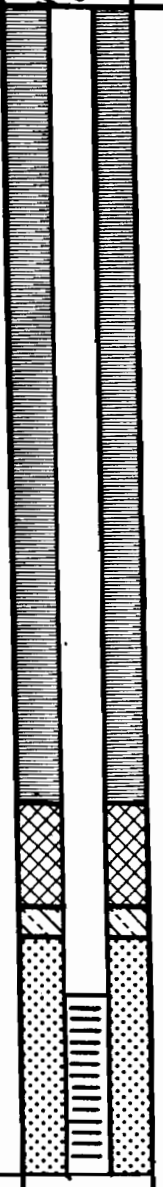
LEVATION: GL586.06 TOC 589.20 | DATUM: USGS | WELL # MW-1S

SAMPLE no.	SAMPLE depth	blows per 6"	DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
					for soil description see log for adjacent well MW- 1D		
			5				
			10		Bottom of Boring 11.5ft.		
			15				
			20				
			25				
			30				
			35				

NOTES: Monitoring well installation-5ft of 2"diam PVC well screen (0.01"slot), 6.5ft of 2"di PVC riser to surface backfilled up to 4ft with well-sorted medium sand. Well has a bentonite pellet seal up to I.5 feet and cement to ground surface. Well has a 5ft, 6" diam profective steel sleeve with a locking cap over the stick up.

MALCOLM

PROJECT: AMHERST GBCA HYD INVES	**PROJECT NO:** 363-151-105
DATE: 5/2/85	**LOCATION:** HOPKINS RD, AMHERST, NEW YORK
DRILLING CONTRACTOR: EMPIRE SOILS	**INSPECTOR:** TF, KCO
DRILLING METHOD: HOLLOW STEM AUGER	**SAMPLING METHOD:** NONE, SEE LOG FOR
4 1/4" ID X 7" OD.	MW-1D
ELEVATION: GL 585.96, TOC 587.74	**DATUM:** USGS — WELL # MW-1M

SAMPLE no.	SAMPLE depth	SAMPLE blows per 6"	DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST.	REMARKS
			5		for soil description see log for adjacent well MW-1D		
			10				
			15				
			20				
			25				
			30				
			35		Bottom of Boring 32.5'		

NOTES: Monitoring Well Installation-5ft of 2" diam PVC well screen (0.01"slot), 27.5ft. of 2" dia.PVC riser to surface. Backfilled up to 26ft with well sorted, medium sand; 25ft with bentonite pellets; 22ft with bentonite slurry; and to ground surface with cement. Well has a 5ft, 6" diam protective steel sleeve with locking cap over stick up.

MALCOLM

PROJECT: Amherst GBCA HYD INVES | **PROJECT NO:** 363-151-105

DATE: 5/3/85 | **LOCATION:** Hopkins RD. Amherst, NY.

DRILLING CONTRACTOR: Empire Soils | **INSPECTOR:** JHW

DRILLING METHOD: Hollow stem auger | **SAMPLING METHOD:** 2" diam split spoon

3 3/4" I.D. X 7" O.D. | Continuous to 10 ft, then (STP)

ELEVATION: GL585.30 TOC587.88 | **DATUM:** USGS | WELL # MW-2M

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	3	5			Brown SILT & CLAY. some glass FILL changing at 0.6ft to SM Medium Dense yellowish brown, FINE SAND, some silt, trace clay, wet, rust-colored staining changing at 4ft to SM Medium dense, brown, FINE SAND, some silt, trace clay, wet changing at 7ft to ML Hard, Brown SILT and CLAY moist streaks of sand grading to at 8ft. CL Hard, grey, CLAY, trace silt, moist, varved, GLACIAL LACUSTRINE CL soft, reddish brown, CLAY, trace silt, wet changing at 22ft to GLACIAL TILL ML Hard, grey, Clay, some silt, little gravel, dry, GLACIAL TILL Bottom of Boring 25.0ft		
		8	14					
-2	2-4'	15	12					
		14	22					
-3	4-6'	5	9	5				
		14	8					
s-4	6-8'	5	10					
		22	31					
-5	8-10'	11	15					
		21	23	10				
s-6	15-17'	1	1	15				
		2	2					
-7	20-22'	1	2	20				
		2	4					
s-8	25-27'	16	30	25				
		32	89					
				30				
				35				

NOTES: Description and Classification based upon visual inspection by MPI inspector. Monitoring well installation-5ft of 2"diam PVC well screen (0.01" slot), 20ft of 2" diam PVC riser to surface, 5ft of 6 " diam protective steel sleeve with locking cap over stickup. Backfilled up to 19 ft with well sorted medium sand; to 18ft with bentonite pellets; to 14 ft with bentonite slurry; and to surface with cement.

MALCOLM

SHEET 1 OF 1

PROJECT: Amherst GBLA RIV INVES

DATE: 5/3/85 - 5/4/85	LOCATION: Hopkins Rd, Amherst, NY
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: JHW
DRILLING METHOD: Hollow stem auger	SAMPLING METHOD: 2" diam split spoon
3 3/4" ID X 7" OD	continuous sampling
ELEVATION: GL586.95, TOC589.41	DATUM: USGS WELL # MW-3S

SAMPLE No.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
S-1	0-2'	9	8			Medium dense, black, red, and brown, SILT and CINDERS and ASH, wet, FILL		
		7	7					
S-2	2-4'	2	6					
		8	2			Medium dense, brown, SILT and ASH, some cinders, little glass, moist, FILL		
S-3	4-6'	7	7					
		8	8	5		S-3 NO RECOVERY		
S-4	6-8'	28	15					
		7	6			SM Dense, brown, FINE SAND, SOME SILT, WET, . rust-colored stains changing at 7.4ft to		
S-5	8-10'	8	17					
		21	24	10		ML Stiff, grey, SILT and CLAY, wet		
S-6	10-12	11	11			S-5 NO RECOVERY		
		13	22			CL very stiff, grey CLAY, trace silt, moist, varved, GLACIAL LACUSTRINE		
				15				
				20				
				25				
				30				
				35		Bottom of Boring-10.0ft		

NOTES: Description and Classification based upon visual inspection by MPI inspector. Monitoring Well Installation-5ft of 2 " diam PVC well screen(0.01" slot), 5ft of 2" diam PVC riser to surface, 5ft to 6" diam protective steel sleeve with locking cap ofer stickup. Backfilled up to 4ft with well sorted, medium sand; to 2ft with bentonite pellets; and to surface with cement.

MALCOLM

PROJECT: Amherst GBCA HYD INVES | PROJECT NO: 363-151-105

DATE: 5/3/85 | LOCATION: Hopkins RD, Amherst, N.Y.

DRILLING CONTRACTOR: Empire Soils | INSPECTOR: KCO, TF

DRILLING METHOD: Hollow Stem Auger | SAMPLING METHOD: 2"diam split spoon

4 1/4 ID X 7" OD | standard penetration test sampling every 5ft (STP)

ELEVATION: GL587.86, TOC590.55 | DATUM: USGS | WELL # MW-4S

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	5	9			Medium dense, brown, FINE SAND some silt, some cobbles, moist, Fill		
		9	9					
	5-7'	2	2	5		PT very loose, black PEAT, some woodand glass fill, wet		
		1	2					
	10-12	5	5	10		CL stiff, grey, CLAY, little silt, moist varved, GLACIAL LACUSTRINE		
		6	7					
				15				
				20				
				25				
				30				
				35		Bottom of Boring I2.0'		

NOTES: Description and Classification based upon visual inspection by MPI inspector. Monitoring well Installation-5ft of 2" diam PVC well screen (0.01"slot), 7ft of 2" diam PVC riser to surface, 5ft of 6" diam protective steel sleeve with locking cap over stickup. Backfilled up to 4.5ft with well sorted, medium sand, to 1ft with bentonite pellets; and capped to surface with cement.

MALCOLM

SHEET 1 OF 1

DATE: 5/1/85 - 5/2/85	LOCATION: Hopkins RD. Amherst, NY
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: JHW
DRILLING METHOD: Hollow stem auger	SAMPLING METHOD: 2"diam split spoon
4 1/4" ID X 7" OD	continuous sampling
ELEVATION GL591.31 TOC594.44	DATUM: USGS — WELL # MW-5S

SAMPLE No.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST.	REMARKS
s-1	0-2	6	10			Medium dense, brown, SAND & SILT & GRAVEL, dry, FILL		
		10	10					
-2	2'-4'	8	7			Stiff, brown, CLAY, some sand, some gravel, moist, FILL		
		8	25					
s-3	4-6'	12	22	5		Dense, black SILT AND BRICK moist, FILL		
		26	20					
-4	6-8'	4	3			Changing at 7.5ft to		
		1	1			PT very loose, black PEAT some wood, wet		
-5	8-10'	1	2			grading to at 10.0ft		
		3	3	10				
s-6	10-12	1	2			ML loose, grey SILT, trace CLAY		
		7	9			changing at 11ft to		
-7	12-14	5	7			SM Medium dense, brown FINE SAND, some silt, wet		
		8	8			changing at 14 ft to		
-8	14-16'	6	7	15		CL Very stiff, grey CLAY, trace silt, moist, varved, GLACIAL LACUSTRINE		
		9	10					
				20				
				25				
				30				
				35		Bottom of Boring at 16.0ft Debris cave in to 13.5 ft. Well Screen Bottom at 13.5ft.		

NOTES: Description and Classification based upon visual inspection by MPI inspector. Monitoring Well Installation 5ft of 2" diam PVC well screen (0.01" slot), 8.5 ft. of 2" diam PVC riser to surface, 5ft of 6" diam protective steel sleeve with locking cap over stickup. Backfilled up to 6ft with well sorted, medium sand; fill cave in to 3ft; backfilled to 1ft. with bentonite pellets; and to surface with cement.

MALCOLM

PROJECT: Amherst GBCA HYD INVES	PROJECT NO: 363-151-105
DATE: 5/13/85	LOCATION: Hopkins Fd, Amherst, NY
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: KCO
DRILLING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2" diam split spoon
4 1/4"ID X 7" OD	continuous sampling
ELEVATION: GL588.70 TOC590.48	DATUM: USGS — WELL# MW-6S

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	2	3			Loose, brown, FINE TO COARSE SAND, some silt, dry, FILL		
		7	3					
s-2	2-4'	1	3			Loose, brown, FINE TO COARSE SAND, some silt, some gravel dry, FILL		
		2	2					
s-3	4-6'	2	1	5		Very loose, black, FINE TO COARSE SAND, some silt, some gravel, moist FILL changing at 7.0ft to		
		2	3					
s-4	6-8'	2	3					
		4	3					
s-5	8-10'	1	1			OL Loose, black SILT, some clay, little sand, some wood, moist, organic changing at 10.0ft to		
		2	1	10				
s-6	10-12'	1	1					
		1	2			OH Soft, black CLAY, some silt, little sand, moist, grading to at 13ft		
s-7	12-14'	1	2					
		2	4					
s-8	14-16'	4	5	15		CL Stiff, grey CLAY, trace silt, moist, varved, GLACIAL LACUSTRINE		
		5	7					
				20				
				25				
				30				
				35		Bottom of Boring - 14.5ft		

NOTES: Description and Classification based upon visual inspection by MPI inspector. Monitor Well Installation-5ft of 2" diam PVC well screen (0.01"slot), 9.5ft of 2" diam PVC riser to surface, 5ft of 6" diam protective steel sleeve with locking cap over stickup. Backfilled up to 7ft with well sorted, medium sand; to 4ft with bentonite pellets; to 1.5ft with bentonite powder; and to surface with cement.

MALCOLM

SHEET 1 OF

JECT: AMHERST GRCA HYD INVTS	PROJECT NO: 363-151-105
5/13/85	LOCATION: Hopkins RD, Amherst, NY
ILLING CONTRACTOR: Empire Soils	INSPECTOR: KCO
LING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2" diam split spoon
4 1/4" ID X 7" OD	Continuous sampling
ATION: GL596.71, TOC599.69	DATUM: USGS / WELL # MW -7S

SAMPLE	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	4	6			Medium dense, black, SILT and SAND, some brown clay, some rock fragments, wet FILL		
		6	9					
-2	2-4'	6	8			Medium dense, black, CINDERS and WOOD, some sand, wet, FILL		
		7	11					
-3	4-6'	7	6	5		WOOD, some sand, wet FILL		
		4	5			Wood, wet FILL		
s-4	6-8'	7	6			Wood, some concrete debris, wet, FILL		
		4	5					
-5	8-10'	6	4			Medium dense, grey, STONE and BRICK FRAGMENTS and SAND, wet purple staning, FILL grading grading at about 14ft.		
		4	8	10				
-6	10-12	7	6					
		4	6			PT loose, black PEAT, some wood, wet changing at 15ft to		
s-7	12-14'	4	6					
		4	3					
-8	14-16'	2	3			ML loose, grey SILT, trace clay changing at 15.5ft to		
		6	8	15				
-9	16'	50/0				SM loose, brown SAND, wet, rust-colored staining S-9 No Recovery		
s-10	18-20'	5	6			ML Loose, grey, SILT and SAND wet, rust-colored streaks changing at 19ft to		
		9	9	20				
						CL Stiff, grey, CLAY, trace silt, moist, varved, GLACIAL LACUSTRINE		
				25				
				30				
				35		Bottom of Boring-19.5ft		

NOTES: Description and Classification based upon Visual inspection by MPI inspector. Monitoring Well Installation-4ft. of 2" diam PVC well screen(0.01 slot), 16ft of 2" diam PVC riser to surface, 5ft of 6" diam protective steel sleeve with locking cap over stickup. Backfilled up to 13ft. with well sorted, medium sand; to 9ft with bentonite pettlets; and cement to surface.

DATE: 5/13/85	LOCATION: Hopkins RD, Amherst, NY
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: KCO
DRILLING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2" diam split spoon
4 1/4" ID X 7" OD	continuous sampling
ELEVATION: GL 584.58 TOC587.18	DATUM: USGS — WELL # MW-8S

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST.	REMARKS
s-1	0-2'	3	3			loose, brown, SILT and SAND. some glass, some concrete, some plastic, dry, FILL changing at 2.0ft to		
		2	2					
s-2	2-4'	1	1			PT Loose, black, Peat, wet changing at 2.5ft to		
		4	5					
s-3	4-6'	2	2	5		SM loose, brown, FINE SAND & SILT, wet changing at 4.5ft to		
		4	6					
s-4	6-8'	5	10			CL Very Stiff, grey, CLAY, little sitl, moist, varved GLACIAL LACUSTRINE		
		12	14					
				10				
				15				
				20				
				25		Bottom of Boring-8.2ft		
				30				
				35				

NOTES: Description and Classification based upon visual inspection by MPI inspector. Monitoring Well Installation-5ft of 2"diam PVC well screen(0.01"slot 3.2ft of 2"diam PVC riser to surface, 5ft of 6"diam protective steel sleeve wi locking cap over stickup. Backfilled up to 2ft with well sorted, medium sand and to surface with bentonite pellets, capped at surface with cement.

MALCOLM PIRNIE

PROJECT: Amherst GBCA HYD INVES	**PROJECT NO:** 363-151-105
DATE: 5/8/85	**LOCATION:** Hopkins Rd. Amherst, NY
DRILLING CONTRACTOR: Empire Soils	**INSPECTOR:** JHW
DRILLING METHOD: Hollow Stem Auger 4 1/4" ID X 7" OD	**SAMPLING METHOD:** 2"split spoon standard penetration test sampling every 5ft
ELEVATION: GL584.87, TOC 587.89	**DATUM:** USGS — WELL #MW-9D

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	2	2			soft, brown, SILT, some sand, some wood, dry, FILL		
		1	2					
S-2	5-7'	8	12	5		SM Medium Dense, brown, FINE SAND, little silt, wet		
		11	16			changing at 6.8ft to		
s-3	10-12'	8	8	10		CL Very Stiff, Grey, CLAY little silt, moist, varved GLACIAL LACUSTRINE		
		10	14					
s-4	15-17'	1	1	15		CL Soft, reddish brown, CLAY, trace brown silt, wet		
		1	1					
s-5	20-22	1/12"		20				
		1	1					
s-6	25-27'	2	2	25		CL soft, reddish brown, CLAY and SILT grading to at 26ft		
		7	5			ML Stiff brown, SILT & CLAY, little sand, little gravel wet, GLACIAL TILL		
s-7	30-32'	6	10	30		ML very stiff brown, SILT & CLAY, some sand, little gravel, wet, GLACIAL TILL		
		16	16					
s-8	35-35.9'	100/.45		35		ML Hard, brown, SILT, some sand, some gravel, wet, GLACIAL TILL		

NOTES: Description and Classification based upon visual inspection by MPI inspector Monitoring well installation 5ft of 2"diam PVC well screen (0.01"slot 47.5ft of 2" diam PVC riser to surface, 5ft of 6" diam protective steel sleeve with locking cap over stickup. Backfilled up to 45ft with well sorted, medium sand; to 38ft with bentonite slurry; and to surface with cement.

MALCOLM

BORING MW-9D

PROJECT: Amherst GBCA HYD INVES	PROJECT NO: 363-151-105
DATE: 5/8/85	LOCATION: Hopkins Rd. Amherst, NY
ELEVATION: GL584.87, TOC587.89	DATUM: USGS

SAMPLE no.	SAMPLE depth	SAMPLE blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-9	40-40.4'	100/0.4				GLACIAL TILL		
s-10	45-46.5'	15	30	45		GLACIAL TILL		
		50						
s-11	50-52	11	24	50		grading to at 51ft GM Hard, grey, SILT, some rock fragments, dry, GLACIAL TILL		
		40	57			Auger Refusal at 52.5ft Rock		
				55				
				60		Auger Refusal at 52.5'		
				65				
				70				
				75				

NOTES:

MALCOLM PIRNIE ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

PROJECT: AMHERST GBCA HYD INVES	**PROJECT NO:** 363-151-105
DATE: 5/9/85	**LOCATION:** Hopkins Rd, Amherst, NY
DRILLING CONTRACTOR: Empire Soils	**INSPECTOR:** JHW
DRILLING METHOD: Hollow Stem Auger	**SAMPLING METHOD:** 2" diam split spoon
4 1/4' ID X 7" OD	(STP)
ELEVATION: GL 585.17 TOC587.93	**DATUM:** USGS — WELL # MW-9M

SAMPLE no.	SAMPLE depth	SAMPLE blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
				5		For soil description of surface to 29ft see logs for well MW-9D and MW-11S		
				10				
				15				
				20				
				25				
s-1	29'-31'	WOR	11	30		Bottom of Boring 29.0ft ML medium dense, reddish brown some sand and rock fragments, wet GLACIAL TILL		
		18	17					
				35				

NOTES: Monitoring Well Installations-5ft of 2" diam PVC well screen (0.01"slot) 24ft of 2" diam PVC riser to surface. 5ft of 6" diam protective steel sleeve with locking cap over stickup. Backfilled up to 22ft with well sorted, medium sand; to 15ft with bentonite slurry and to surface with cement. Description and Classification based upon visual inspection by MPI Inspector

MALCOLM

PROJECT: Amherst GBCA HYD INV	**PROJECT NO:** 363-151-105
DATE: 5/7/85	**LOCATION:** Hopkins Rd. Amherst, NY
DRILLING CONTRACTOR: Empire Soils	**INSPECTOR:** KCO
DRILLING METHOD: Hollow Stem Auger	**SAMPLING METHOD:** 2"ID Split spoon
3 3/4" ID X 7"OD	Continuous Sampling
ELEVATION: GL 588.59 TOC 590.85	**DATUM:** USGS — WELL # MW 10S

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST.	REMARKS
s-1	0-2	8	12			Very stiff, reddish brown CLAY little cobbles, sand, silt, dry, orange staining, FILL		
		13	18					
s-2	2-3.3	11	15			Very stiff, black, SILT and CLAY some wood, little rock fragments, FILL		
		100/4"						
				5				
s-3	5-7'	WOR	/18"			S-3 NO RECOVERY, wet		
			1			Pt loose, black PEAT, plastic sheets, some wood, wet, FILL		
s-4	7-9'	4	4			changing at 8.5 ft to SM medium dense, brown, FINE		
		5	5			SAND some silt, wet, rust-colored staining		
s-5	9-11'	9	16	10		changing at 12ft to		
		15	12			CL very stiff, grey, CLAY, little		
s-6	11-13'	8	10			silt, moist, varved, GLACIAL LACUSTRINE		
		14	19					
				15		Bottom of Boring at 14.0ft.		
				20				
				25				
				30				
				35				

NOTES: Description and Classification based upon visual inspection by MPI inspector. Monitoring well Installation -5ft of 2" dia. PVC well screen (0.01" slot), 9ft of 2"dia PVC riser to surface, 5ft of 6" dia, protective steel sleeve with locking cap over stickup. Backfilled to 8ft with well sorted, medium sand; to 4ft with bentonite pellets; and to surface with cement grout.

MALCOLM

SHEET 1 OF 1

PROJECT: Amherst GBCA HYD INVES	**PROJECT NO:** 363-151-105
ATE: 5/9/85	**LOCATION:** Hopkins Rd, Amherst, NY
DRILLING CONTRACTOR: Empire Soils	**INSPECTOR:** JHW
RILLING METHOD Hollow Stem Auger	**SAMPLING METHOD:** 2" diam split spoon
4 1/4" ID X 7" OD	continuous sampling
LEVATION: GL 585.47 TOC 587.93	**DATUM:** USGA — WELL # MW-11S

SAMPLE no.	SAMPLE depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST.	REMARKS
s-1	0-2'	6	9			medium dense, brown, SILT and SAND and ROCK FRAGMENTS, some foam rubber, some metal, dry, FILL		
		6	21					
s-2	2-4'	9	5					
		6	7			PT loose, black PEAT, moist, brown staining changing at 3.5ft to SM Soft, grey SILT and SAND, moist		
s-3	4-6'	25	29	5				
		25	17			S-3 NO RECOVERY		
s-4	6-8'	15	17			S-4 NO RECOVERY		
		12	12					
						CL Very Stiff, grey CLAY, little silt, moist, varved, GLACIAL LACUSTRINE		
s-5	9-10.5'	7	11	10				
		15						
				15				
				20		Bottom of Boring - 8.5ft		
				25				
				30				
				35				

NOTES: Description and Classification based upon visual inspection by MPI personnel. Monitori
Well Installation-5ft of 2" diam PVC well screen (0.01"slot), 3.5ft of 2" diam PVC riser to surface, 5ft of 6" diam protective steel sleeve with locking cap over stickup. Backfilled up to 2ft with well sorted, medium sand; to 0.5ft with bentonite pellets; and capped to surface with cement.

MALCOLM

PROJECT: Amherst GBCA HYD INVES | PROJECT NO: 363-151-105

DATE: 5/8/85 | LOCATION: Hopkins Rd, Amherst, NY

DRILLING CONTRACTOR: Empire Soils | INSPECTOR: KCO

DRILLING METHOD: Hollow Stem Auger | SAMPLING METHOD: 2" diam split spoon

3 3/4" ID X 7" OD | (STP)

ELEVATION: GL592.53, TOC594.85 | DATUM: USGS | WELL # MW-12M

SAMPLE no.	SAMPLE depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	12	12			Very stiff, brown CLAY, some crushed stone, some asphalt, some concrete, dry, FILL CONSTRUCTION DEBRIS		
		8	6					
				5				
s-2	5-7'	2	12			Very stiff, grey, SILT and CLAY some wood, dry, FILL		
		10	3					
						PT loose, black PEAT, moist changing at 10.5' to		
				10		ML Stiff, grey, SILT some clay dry changing at 11ft to		
s-3	10-12'	2	3					
		8	11			SM Medium dense, brown, FINE SAND, some silt, wet, rust-colored staining changing at 13.5ft		
				15				
s-4	15-17'	2	3			CL Stiff, grey CLAY, little silt moist, varved, GLACIAL LACUSTRINE		
		8	11					
				20		CL firm, reddish brown CLAY, trace SILT moist		
s-5	20-22'	2	2					
		4	4					
				25		CL Soft, reddish brown CLAY, trace silt wet		
s-6	25-27'	WOR	1					
		1	2					
				30		grading at 32ft into		
s-7	30-32'	WOR	WOR					
		4	5					
5-8	32-34'	16	11			ML very stiff, brown, SILT and CLAY, some gravel, wet, GLACIAL TILL		
		11	21					
				35				
						Bottom of Boring at 34.0ft		

NOTES: Description and Classification based upon visual inspection by MPI inspector . Monitoring Well Insatallation-5ft of 2" diam PVC well screen (0.01" slot), 29ft of 2" diam PVC riser to surface; 5ft of 6" diam protective steel sleeve with locking cap over stickup. Backfilled to 26ft with well sorted, medium sand: to 17ft with bentonite slurry; and to surface with cement.

MALCOLM

PROJECT: Amherst GBCA HYD INVES	PROJECT NO: 363-151-105
E: 5/7/85	LOCATION: Hopkins Rd. Amherst, NY
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: KCO
ILLING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2" diam split spoon
3 3/4'ID X 7" OD	continuous sampling
EVATION: GL586.61, TOC589.22	DATUM: USGS WELL # MW-13S

SAMPLE				DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
o.	depth	blows per 6"						
s-1	0-2'	3	4			Medium dense, brown SILT and SAND dry FILL, changing at 1ft to		
		8	11					
-2	2-4'	3	4			firm, reddish brown, CLAY, dry FILL		
		4	3					
-3	4-6'	3	5			S-3 NO RECOVERY		
		7	7	5				
s-4	6-8'	8	11			PT Medium dense, black, PEAT, some wood, moist changing at 7ft to		
		13	15					
-5	8-10'	8	12			SM Medium dense, brown, FINE SAND and SILT, wet changing at 8.5ft to		
		15	19	10		CL Very Stiff, grey CLAY, little silt, moist, varved, GLACIAL LACUSTRINE		
				15				
				20				
				25		Bottom of Boring at 10.0ft		
				30				
				35				

NOTES: Description and Classification based upon visual inspection by MPI personnel
Monitoring Well Installation-5ft of 2" diam PVC well screen (0.01"slot), 5ft of 2" diam PVC riser to surface, 5ft of 6" diam protective steel sleeve with locking cap over stickup. Backfilled to 4.5ft with well sorted, medium sand; to 2ft with bentonite pellets; and to surface with cement.

MALCOLM

SHEET 1 OF 1

PROJECT: Amherst GBCA HYD INVES	**PROJECT NO:** 363-151-105
DATE: 5/6/85	**LOCATION:** Hopkins Rd. Amherst, NY.
DRILLING CONTRACTOR: Empire Soils	**INSPECTOR:** KCO
DRILLING METHOD: Hollow Stem Auger	**SAMPLING METHOD:** 2'diam split spoon
3 3/4 ID X 7" OD	continuous sampling
ELEVATION: GL583.19, TOC 587.04	**DATUM:** USGS — WELL #MW-14S

SAMPLE no.	SAMPLE depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION: density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	4	6			Medium dense, brown, SAND and SILT some gravel, dry, roots, TOP SOIL		
		9	11					
s-2	2-4'	10	10			S-2 NO RECOVERY		
		15	11					
s-3	4-6'	WOH/	12"			SP Very loose, brown, SAND and GRAVEL, wet, changing at 5ft to		
		1	3	5				
s-4	6-8'	8	11			CL Firm Brown, CLAY, some silt, little sand, moist		
		15	15					
s-5	8-10'	8	11			CL Very Stiff, grey, CLAY, little silt, moist, varved, GLACIAL LACUSTRINE		
		14	16	10				
				15				
				20				
				25				
				30		Bottom of Boring at 8.0ft		
				35				

NOTES: Description and Classification based upon visual inspection by MPI inspector, Monitoring Well Installation-5ft of 2" diam PVC well screen (0.01"slot), 3ft of 2" diam PVC riser to surface, 5ft of 6" diam protectiove steel sleeve with locking cap over stickup. Backfilled to 2.5ft of well sorted, medium sand; to 1.5ft with bentonite pellets; and to surface with cement.

MALCOLM

PROJECT: Amherst GBCA HYD INVES	PROJECT NO: 363-151-105
TE: 5/6/85	LOCATION: Hopkins Rd. Amherst, NY.
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: KCO
ILLING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2"diam split spoon
3 3/4" ID X 7" OD	(STP)
EVATION: GL583.19 TOC585.81	DATUM: USGS WELL #MW-14M

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	2	3			loose, black, SAND and SILT, moist TOP SOIL, changing at 1.5ft to CL stiff, grey CLAY, some silt, moist		
		5	7					
				5		SP loose, brown SAND and GRAVEL, WET CHANGING AT 6.5ft to		
s-2	5-7'	2	5			CL Stiff, brown, CLAY and SILT, some sand, moist		
		8	10					
				10		CL Stiff, moist, grey CLAY, some silt, little sand, varved, GLACIAL LACUSTRINE		
s-3	10-12'	5	4					
		5	5					
				15		CL Soft, reddish brown CLAY, little silt, wet		
s-4	15-17'	1	1					
		1	2					
				20		becoming very soft		
s-5	20-25'	WOR	12"					
		WOH	1					
				25		becoming soft		
s-6	25-27'	1	2					
		2	2					
				30		changing at 30.5ft to		
s-7	30-31.5	5	27			ML Hard, reddish brown CLAY and SILT, some rock fragments, moist GLACIAL TILL		
		100/.5						
				35		Bottom of Boring 32.5 ft.		

NOTES: Description and classification based upon visual inspection by MPI inspector. Monitoring WellInstallation-5ft. of 2" diam PVC well screen(0.01"slot), 27.5ft of 2" PVC riser to surface, 5ft of 6" diam PVC protective steel sleeve with locking cap over stickup. Backfilled up to 25ft with well sorted, medium sand; 23ft with bentonite pellets; to 20ft with bentonite slurry; and to surface with cement

MALCOLM

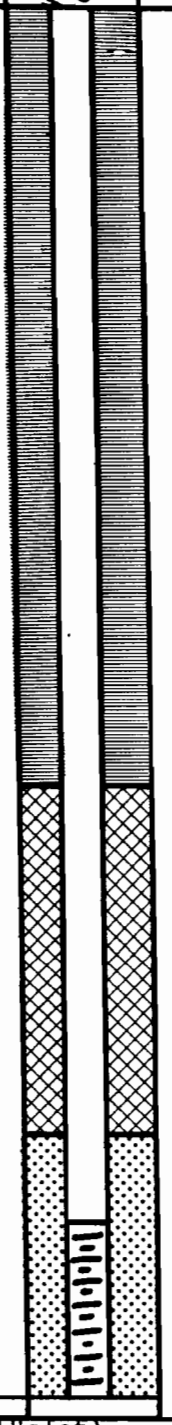
PROJECT: Amherst GBCA HYD INVES	PROJECT NO: 363-151-105
DATE: 5/7/85	LOCATION: Hopkins RD, Amherst, NY
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: JHW
DRILLING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2" diam split spoon
4 1/4" ID X7" OD	continuous sampling
ELEVATION: GL 585.51, TOC588.14	DATUM: USGS / WELL # MW-15S

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	3	7			Very Stiff, brown, SILT and CLAY, some sand, some gravel, dry, FILL		
		12	12					
s-2	2-4'	6	5			PT Medium dense, black PEAT, moist changing at 4ft to		
		7	8					
s-3	4 - 6'	6	7	5		SM Medium dense, brown, FINE SAND and SILT, wet		
		8	10					
s-4	6-8'	12	15			SM Dense, grey and brown, FINE SAND and Silt, wet changing at 8ft to		
		17	19					
s-5	8-10'	WOH	3			SP Very loose, grey, COARSE SAND, little gravel, wet changing at 8.5ft to		
		5	10	10		Cl Firm, grey, CLAY, little silt, moist, varved, GLACIAL LACUSTRINE		
				15				
				20				
				25				
				30				
				35		Bottom of Boring 8.5ft		

NOTES: Description and classification based upon visual inspection by MPI personnel.
Monitoring Well Installation-5ft of 2" diam PVC well screen (0.01"slot), 3.5ft of 2" diam PVC riser to surface, 5ft of 6 " protective steel sleeve with locking cap over stickup. Backfilled up to 2.5ft with well sorted, medium sand; to 0.5ft with bentonite pellets; and capped with cement to surface.

MALCOLM

PROJECT: Amherst GBCA HYD INVES	**PROJECT NO:** 363-151-105
DATE: 5/7/85	**LOCATION:** Hopkins Rd. Amherts, NY.
DRILLING CONTRACTOR: Empire Soils	**INSPECTOR:** JHW
DRILLING METHOD: Hollow Stem Auger 4 1/4" ID X 7"OD	**SAMPLING METHOD:** none, see logs for MW-15S and MW-15D
ELEVATION: GL585.21 TOC587.95	**DATUM:** USGS WELL# MW- 15M

SAMPLE no.	SAMPLE depth	blows per 6"	DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
			5		for soil description see logs for wells MW-15S and MW-15D		
			10				
			15				
			20				
			25				
			30				
			35		Bottom of Boring 39.5ft		

NOTES: Monitoring Well Installation-5ft of 2" diam PVC well screen(0.01"slot), 32ft of 2" diam PVC riser to surface. Backfilled up to 32ft with well sorted medium sand 22ft with bentonite slurry; and to surface wtih cement grout. Well has a 5ft 6" diam protective steel sleeve with locking cap over stick up.

MALCOLM

DATE: 5/6/85 - 5/7/85	LOCATION: Hopkins Rd, Amherst, NY
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: JHW
DRILLING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2" diam split spoon
4 1/4" ID X7" OD	(STP)
ELEVATION: GL 585.31 TOC 588.16	DATUM: USGS — WELL # MW-15D

SAMPLE no.	depth	blows per 6"	DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST.	REMARKS
s-1	0-2'	2 3 / 27 51			medium dense, brown, SILT and SAND, some concrete, moist, FILL		
s-2	5-7'	5 6 / 10 13	5		SM Medium dense, brown, FINE SAND and SILT, wet		
s-3	10-12'	5 11 / 15 16	10		CL Very Stiff, grey, CLAY, little silt, moist, varved, GLACIAL LACUSTRINE		
			15		CL becoming firm		
s-4	15-17'	2 2 / 4 4					
s-5	20-22'	WOH /12" / 1 1	20		CL very soft, reddish brown CLAY trace brown silt, wet		
s-6	25-27'	WOH /12" / 1 1	25				
s-7	30-32'	WOH /12" / 1 2	30				
s-8	35-37'	4 8 / 3 7	35		ML loose, brown SAND and SILT and GRAVEL, wet, GLACIAL TILL		

NOTES: Description and Classification based upon visual inspection by MPI personnel.
Monitaring Well Installation -5ft of 2"diam PVC well screen (0.01"slot), 43.5ft of 2"diam PVC riser to surface, 5ft. of 6" diam protective steel sleeve with locking cap over stickup. Backfilled up to 41.5ft. with well sorted, medium sand; to 33.5 ft with bentonite slurry; and to surface with cement.

MALCOLM

BORING MW-150

PROJECT: Amherst GRCA Hyd Inves	PROJECT NO: 363-151-105
DATE: 5/7/85	LOCATION: Hopkins Rd, Anherst, NY
ELEVATION: GL585.31, TOC588.16	DATUM: USGS WELL # MW - 15D

SAMPLE no.	SAMPLE depth	SAMPLE blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-9	40-41'	41	100			ML Hard, reddish brown, SILT and CLAY, some sand, some gravel, moist, GLACIAL TILL		
s-10	45-46.5	63	71	45		ML Hard, reddish brown, SILT some clay, some rock fragments, moist, GLACIAL TILL		
		55						
				50				
				55				
				60				
				65				
				70				
				75				
						Bottom of Boring at 48.5ft		

NOTES:

MALCOLM PIRNIE

DATE: 5/14/85	LOCATION: Hopkins RD, Amherst, NY
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: KCO
DRILLING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2" diam split spoon
4 1/4" ID X 7" OD	continuous sampling
ELEVATION: GL 589.96	DATUM: USGS — Boring B-7

SAMPLE No.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST.	REMARKS
S-1	0-2'	10	11			Medium dense, brown, SILT and DEBRIS dry, concrete, wood, and brick fragments, FILL		
		10	4					
S-2	2-4'	5	4			S-2 No Recovery		
		5	5					
S-3	4-6'	5	2			Medium dense, black, SILT, and wood fragments, wet, FILL,		
		13	8	5				
S-4	6-8'	3	3			medium dense, black, SILT, some clay, wet, some ash and glass, FILL changing at 6.5ft to		
		3	3					
S-5	8-10'	5	4					
		3	6	10		CL Firm, grey CLAY and SILT, wet changing at 8ft to		
						SM medium dense, brown, FINE SAND, some silt, wet changing at 9ft to		
						Cl Firm, grey CLAY, little silt, moist, GLACIAL LACUSTRINE		
				15				
				20		Bottom of Boring at 10ft		
				25				
				30				
				35				

NOTES: Description and classification based upon visual inspection by MPI inspector

MALCOLM

SHEET 1 OF

DATE: 5-15-85	LOCATION: Hopkins Rd. Amherst, NY
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: KCO
DRILLING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2"diam split spoon
2 1/2" ID X 6" OD	continuous sampling
ELEVATION: GL 594.71	DATUM: USGS — Boring B-8

SAMPLE No.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST.	REMARKS
S-1	0-2'	6	13			Medium dense, brown, SAND and SILT and GRAVEL, dry, FILL		
		10	6					
S-2	2-4'	10	10			S-2 No RECOVERY		
		8	12			Medium dense, brown, SILT and SAND some gravel, dry, FILL changing to black at 5ft		
S-3	4-6'	6	10	5				
		11	24					
S-4	6	50/0				S-4 NO RECOVERY		
						Medium dense, brown SILT and SAND, some plant debris, dry, FILL		
S-5	8-10'	27	16					
		12	12	10		OL Firm, grey, SILT, some plant debris, moist, organic		
S-6	10-11 1/2	4	4					
		4	50/0			OL Firm, black, SILT, some brown fine sand, moist, wood chips changing at 15.5ft to		
						Sm Medium dense, brown, FINE SAND, some silt, wet changing at 16.5ft to		
S-7	13-15'	1	2					
		5	8	15				
S-8	15-17'	21	12			CL Stiff, grey, CLAY, little silt, moist GLACIAL LACUSTRINE		
		6	9					
				20				
				25		Boring Completed at 17ft		
				30				
				35				

NOTES: Description and Cakssification based upon visual inspection by MPI inspector

MALCOLM

DATE: 5/14/85

LOCATION: Hopkins Rd. Amherst, NY

DRILLING CONTRACTOR: Empire Soils

INSPECTOR: KCO

DRILLING METHOD: Hollow Stem Auger
4 1/4" ID X 7" OD

SAMPLING METHOD: 2" diam split spoon
continuous sampling

ELEVATION: GL 587.35

DATUM: USGS

Boring B-9

SAMPLE no.	SAMPLE depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	5	4			Loose, brown, SAND and SILT and DEBRIS, dry, glass, cinders, brick fragments, etc., FILL		
		4	3			Becoming wet at 4ft		
s-2	2-4'	1	1			changing at 4.5ft to		
		2	3					
s-3	4-6'	1	1/12"	5		Pt soft, black, PEAT, wet		
			1			changing at 5ft to		
s-4	6-8'	2	6			ML, very soft, grey SILT and CLAY wet, changing at 6ft to		
		8	9					
s-5	8-10'	4	6			SM, medium dense, brown, FINE SAND, some silt, wet, rust-colored streaks changing at 9ft to		
		4	3	10		CL Firm, grey CLAY, little SILT, moist, GLACIAL LACUSTRINE		
				15		Boring Completed at 10.0ft		
				20				
				25				
				30				
				35				

NOTES: Description and Classification Based upon visual inspection by MPI personnel.

MALCOLM

DATE: 5/7/85	LOCATION: Hopkins Rd. Amherst, NY
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: JHW
DRILLING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2" diam split spoon
4 1/4" ID X 7" OD	continuous sampling
ELEVATION: GL 587.91	DATUM: USGS — Boring B-10

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION: density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	3	13			Medium dense, brown SILT, some sand, some gravel, dry, TOPSOIL		
		13	10					
s-2	2-4'	3	3			OL Loose, black, organic SILT, some SAND, some silt, wet		
		3	3					
s-3	4-6'	2	3			changing at 6.5ft to		
		5	5	5				
s-4	6-8'	4	5			SM Medium dense, brown, FINE SAND, some silt, wet		
		9	11					
s-5	8-10'	2	4					
		7	10			grading to at 10.5ft		
s-6	10-12'	2	4	10				
		7	6			Cl Stiff, brown CLAY and SILT some sand moist, grading to at 12ft		
s-7	12-14'	6	7					
		10	10			CL very stiff, grey CLAY, little silt, moist, varved, GLACIAL LACUSTRINE		
				15				
						Boring Completed at 14.0ft		
				20				
				25				
				30				
				35				

NOTES: Descripting and Classification based upon visual inspection by MPI personel

MALCOLM

SHEET 1 OF

DATE: 5/14/85 | LOCATION: Hopkins Rd. Amherst, NY

DRILLING CONTRACTOR: Empire Soils | INSPECTOR: KCO

DRILLING METHOD: Hollow Stem Auger | SAMPLING METHOD: 2" diam split spoon

4 1/4" ID X 7"OD | continuous sampling

ELEVATION: GL 588.21 | DATUM: USGS | Boring B-11

SAMPLE no.	SAMPLE depth	blows per 6"	DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST.	REMARKS
s-1	0-2'	6 5			Medium dense, brown, SAND and SILT, dry, FILL		
		11 27			Loose, black, COARSE SAND and gravel, dry, FILL		
s-2	2-4'	30 3			CHANGING AT 4ft to		
		2 1					
s-3	4-6'	1 1	5		Pt soft, black, PEAT, WET changing at 5.5ft to		
		1/12"			ML soft, brown, SILT and CLAY, wet changing at 7ft to		
s-4	6-8'	1 1					
		2 3			SM loose, brown, FINE SAND, some silt, wet changing at 9.5ft to		
s-5	8-10'	3 4					
		6 10	10		CL Stiff, greyCLAY, little silt, moist, GLACIAL LACUSTRINE		
			15		Boring Completed at 10.0ft		
			20				
			25				
			30				
			35				

NOTES: Description and Classification Based upon visual inspection by MPI inspector.

MALCOLM

SHEET 1 OF

DATE: 5/14/85 | LOCATION: Hopkins Rd, Amherst, NY

DRILLING CONTRACTOR: Empire Soils | INSPECTOR: KCO

DRILLING METHOD: Hollow Stem Auger | SAMPLING METHOD: 2" diam split spoon

2 1/2" ID X 6" OD | continuous sampling

ELEVATION: GL 596.11 | DATUM: USGS | Boring B-12

SAMPLE No.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
S-1	0-2'	6	2			Loose, brown, SILT, some gravel, dry, FILL.		
		6	7			Medium dense, black, ORGANIC SILT and DEBRIS, dry, Wood, Fill		
S-2	2-4'	7	7			Medium dense, black, SILT and		
		6	8			wood, wet, FILL		
S-3	4-6'	6	6			Medium dense, black, SILT and wood,		
		10	6	5		wood, wet, FILL		
S-4	6-8'	43	12			FILL, WOOD		
		6	7			Firm, brown, CLAY and SILT, some gravel, FILL, changing at 9ft to		
S-5	8-10'	1	7			Medium dense, black, SAND and SILT,		
		6	6	10		FILL changing at 10ft to		
S-6	10-12'	6	6			Medium dense, grey, SAND and SILT,		
		7	8			moist, some wood, some plastic, FILL		
S-7	12-14'	6	5			S-7 NO RECOVERY		
		4	3					
S-8	14-16'	2	4		+ + +	SM Firm, brown, SILT, some sand,		
		4	5	15	+ + +	little gravel, wet		
S-9	16-18'	4	8			changing at 16ft to		
		10	11			Pt loose, black Peat, wet		
S-10	18-20'	4	6			changing at 17ft to		
		7	9			ML, Stiff, brown, SILT and		
				20		CLAY, moist		
						Changing at 18ft to		
						CL Stiff, grey CLAY, little silt,		
						moist, GLACIAL LACUSTRINE		
						Boring Completed at 20.0ft		
				25				
				30				
				35				

NOTES: Description and Classification based upon visual inspection by MPI Inspector.

MALCOLM

SHEET 1 OF 1

PROJECT: AMHERST GBCA HYD INVES	**PROJECT NO:** 363-105-105
DATE: 5/15/85	**LOCATION:** Hopkins Rd. Amherst, NY.
DRILLING CONTRACTOR: Empire Soils	**INSPECTOR:** KCO
DRILLING METHOD: Hollow Stem Auger	**SAMPLING METHOD:** 2" diam split spoon
2 1/2" ID X6"OD	continuous sampling
ELEVATION: GL 597.21	**DATUM:** USGS — Boring B-13

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	4	3			Loose, brown, SILT, some sand, some gravel, dry, FILL		
		5	7					
s-2	2-4'	7	8			some wood, moist		
		7	8					
s-3	4-6'	12	11					
		10	14	5		some brick fragments		
s-4	6-8'	12	13			some brick and wood		
		14	8					
s-5	8-10'	1	1			very loose, grey SILT, some wood, some brick, moist, FILL		
		1	1					
s-6	10-12	4	5	10		BECOMING MEDIUM DENSE		
		5	8					
s-7	12-12.5	21	25/0			FILL, wood and cinders		
s-8	14-16'	16	73			S-8 NO RECOVERY		
		25	17	15				
s-9	18-20'	11	14		+ + +	SM medium dense, brown, FINE SAND , some silt, wet, black stains		
		9	8	20		changing at 19.5 ft to CL Stiff, reddish brown, CLAY, little silt, moist		
				25		Boring Completed at 20.0ft		
				30				
				35				

NOTES: Description and Classification based upon visual inspection by MPI Inspector.

MALCOLM

SHEET 1 OF 1

DATE: 5/14/85

LOCATION: Hopkins Rd. Amherst NY

DRILLING CONTRACTOR: Empire Soils

INSPECTOR: KCO

DRILLING METHOD: Hollow Stem Auger
4 1/4" ID X 7" OD

SAMPLING METHOD: 2" diam split spoon
continuous sampling

ELEVATION: GL 594.63

DATUM: USGS

Boring B-14

SAMPLE no.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	7	11			Medium dense, brown, SILT and SAND, some gravel, dry, FILL		
		27	10					
s-2	2-3'	8	72			Very dense, grey, STONE FRAGMENTS some sand, dry, FILL		
		25/0						
s-3	4-6'	16	17					
		11	10	5		Medium dense, grey, STONE, some silt some sand, dry, ILL		
s-4	6-8'	13	6			S-4 NO RECOVERY		
		11	9			Medium dense, grey, SAND, some silt some wood, some brick, moist, FILL grading into at 9ft		
s-5	8-10'	11	6					
		9	6					
s-6	10-12'	12	3	10		OL Firm, black, ORGANIC SILT, some grey clay, some wood, wet, plant fragments		
		24	11					
s-7	12-14'	8	5					
		7	8			increasing plant and wood debris changing at 16ft to		
s-8	14-16'	4	3	15				
		6	8			SM, medium dense, brown, SAND, some silt wet changing at 17.5ft to		
s-9	16-18'	10	7					
		7	8			CL, Stiff, grey, CLAY, little silt moist GLACIAL LACUSTRINE		
				20				
				25				
				30		Boring completed at 18.0ft		
				35				

NOTES: Description and Classification based upon visual inspection by MPI Inspector.

MALCOLM PIRNIE

DRILLING CONTRACTOR: Empire Soils	INSPECTOR: KCO
DRILLING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2" diam split spoon
4 1/4" ID X 7" OD	continuous sampling
ELEVATION: GL591.06	DATUM: USGS Boring B-15

SAMPLE no.	SAMPLE depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION: density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
S-1	0-2'	16	33			Dense, grey, SAND, some silt, some gravel, dry, rock fragments, FILL		
		30	18					
S-2	2-4'	17	16			FILL, wood and brick fragments		
		11	11					
S-3	4-6'	6	5			Loose, black, SAND, some silt, some gravel, some cinders, moist, FILL		
		2	1	5				
4	6-8'	1	2			very loose, black, SAND, some silt, some wood, wet, wall board debris, FILL		
		1	1					
S-5	8-10'	1	1			very loose, black, SAND, some silt, little gravel, wet, changing at 9ft to		
		2	2	10				
S-6	10-12'	6	7			SM loose, grey, FINE SAND and SILT, wet brown streaks changing at 10.7ft to		
		10	11					
						SM, medium dense, grey, FINE SAND, little silt, wet, brown streaks changing at 11.7ft to		
				15				
						CL, stiff, grey, CLAY, little silt, moist, GLACIAL LACUSTRINE		
				20				
				25				
				30				
				35		Boring Completed at 12ft.		

NOTES: Description and classification based upon visual inspection by MPI Inspector.

MALCOLM PIRNIE

DATE: 5/15/85	LOCATION: Hopkins Rd, Amherst, NY
DRILLING CONTRACTOR: Empire Soils	INSPECTOR: KCO
DRILLING METHOD: Hollow Stem Auger 2 1/2" ID X 6" OD	SAMPLING METHOD: 2"diam split spoon Continuous sampling
ELEVATION: GL 590.62	DATUM: USGS Boring B-16

SAMPLE no.	SAMPLE depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	2	3			Medium dense, brown, SAND, some silt, some cinders, some gravel dry FILL		
		12	7					
s-2	2-4'	4	4			Very stiff, grey SILT, some gravel, some wood. moist. FILL changing at 4 ft. to		
		14	13					
s-3	4-6'	1	1	5		OL, soft, black, ORGANIC SILT, some sand, moist changing at 5.5ft to		
		2	2					
s-4	6-8'	4	3			SM, loose, brown, FINE SAND, some silt wet grading into at 8.5ft to		
		2	4					
s-5	8-10'	4	12			GM medium dense, brown, FINE SAND, some gravel, wet grading into 9ft		
		8	10	10				
s-6	10-12'	3	3			SM, medium dense, brown, FINE SAND some silt, wet grading into at 11ft		
		4	8					
s-7	12-14'	5	5			SM, medium dense, grey, MEDIUM to COARSE SAND, little silt, wet changing at 13ft to		
		5	9	15				
						CL, Stiff, brown, CLAY, little silt, moist, varved, GLACIAL LACUSTRINE		
				20				
				25		Boring Completed at 14.0ft		
				30				
				35				

NOTES: Description and Classification based upon visual inspection by MPI Inspector.

MALCOLM

SHEET 1 OF

DATE: 5/3/85	LOCATION: Hopkins Rd. Amherst, NY
DRILLING CONTRACTOR Empire Soils	INSPECTOR: KCO
DRILLING METHOD: Hollow Stem Auger	SAMPLING METHOD: 2" diam split spoon
4 1/4"ID X 7"OD	continuous Sampling Boring MW-9S
ELEVATION: GL 588.57	DATUM: USGS BORING # MW-9S

SAMPLE No.	depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
s-1	0-2'	4	8			Stiff, brown SILT, some gravel, some wood, dry, FILL		
		12	6			Loose, brown, SILT, some sand, some glass, dry FILL		
s-2	2-4'	4	3			TIRE at 4ft FILL		
		3	2			changing at 6ft to		
				5		PTVery loose, black, PEAT, wet		
s-3	5-7'	1	1			changing at 7ft to		
		1	1					
s-4	7-9'	5	5			SM medium dense, grey, FINE SAND, some silt, wet		
		5	8			changing at 12.5ft to		
s-5	9-11'	3	4	10				
		8	6					
s-6	11-13'	6	7			CL very stiff, grey, CLAY, little silt, moist, varved, GLACIAL LACUSTRINE		
		7	10					
s-7	13-15'	4	8					
		9	13	15				
						Boring Completed at 15.0ft		
				20				
				25				
				30				
				35				

NOTES: Description and classification based upon visual inspection by MPI inspector, Standing Water at 4ft. Backfilled boring with cement grout to 4ft, fill material to surface. No well installed.

MALCOLM

PROJECT: AMHERST GBCA DATE: 7/22/85
JOB # 363-15-1 OPERATOR: KCO

WELL BAILER TESTS

WELL# MW - 1S MEAN PERM. COEFF: 0.00027662 CM/SEC
TEST DATE: 6/17/85
TIME (START): 2:00 PM

D (INTAKE): 17.78 CM m(TR.RATIO) 1
d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	6.01	10.6	4.59	1	0	0		
15	0:15	6.01	10.3	4.29	0.93464052	-0.0675932	15	0.00033714	1.06993006
30	0:30	6.01	9.8	3.79	0.82570806	-0.1915140	15	0.00061810	1.13192612
45	0:45	6.01	9.5	3.49	0.76034858	-0.2739782	15	0.00041132	1.08595988
60	1:00	6.01	9.1	3.09	0.67320261	-0.3957089	15	0.00060717	1.12944983
75	1:15	6.01	9	2.99	0.65141612	-0.4286866	15	0.00016409	1.03344481
90	1:30	6.01	8.9	2.89	0.62962962	-0.4626235	15	0.00016967	1.03460207
105	1:45	6.01	8.6	2.59	0.56427015	-0.5722221	30	0.00035816	1.15444015
120	2:00	6.01	8.4	2.39	0.52069716	-0.6525866	15	0.00040084	1.08368200
150	2:30	6.01	8.1	2.09	0.45533769	-0.7867159	30	0.00033451	1.14354066
180	3:00	6.01	7.9	1.89	0.41176470	-0.8873031	30	0.00025085	1.10582010
210	3:30	6.01	7.5	1.49	0.32461873	-1.1251039	30	0.00059306	1.26845637
240	4:00	6.01	7.4	1.39	0.30283224	-1.1945762	30	0.00017326	1.07194244
270	4:30	6.01	7.2	1.19	0.25925925	-1.3499267	30	0.00038743	1.16806722
300	5:00	6.01	7.1	1.09	0.23747276	-1.4377023	30	0.00021890	1.09174311
330	5:30	6.01	7	0.99	0.21568627	-1.5339303	30	0.00023998	1.10101010
360	6:00	6.01	6.9	0.89	0.19389978	-1.6404138	30	0.00026556	1.11235955
390	6:30	6.01	6.8	0.79	0.17211328	-1.7596023	30	0.00029724	1.12658227
420	7:00	6.01	6.75	0.74	0.16122004	-1.8249851	30	0.00016306	1.06756756
450	7:30	6.01	6.7	0.69	0.15032679	-1.8949437	30	0.00017447	1.07246376
480	8:00	6.01	6.67	0.66	0.14379084	-1.9393954	30	0.00011086	1.04545454
510	8:30	6.01	6.6	0.59	0.12854030	-2.0515127	30	0.00027961	1.11864406
540	9:00	6.01	6.6	0.59	0.12854030	-2.0515127	30	0	1
570	9:30	6.01	6.55	0.54	0.11764705	-2.1400661	30	0.00022084	1.09259259
600	10:00	6.01	6.5	0.49	0.10675381	-2.2372299	30	0.00024232	1.10204081
750	12:30	6.01	6.4	0.39	0.08496732	-2.4654885	150	0.00011385	1.25641025
900	15:00	6.01	6.3	0.29	0.06318082	-2.7617543	150	0.00014777	1.34482758
1800	30:00	6.01	6.04	0.03	0.00653594	-5.0304379	900	0.00018859	9.66666666

PROJECT: AMHERST GBCA DATE: 7/23/85
JOB # 363-15-1 OPERATOR: KCO

WELL BAILER TESTS

WELL# MW - 4S MEAN PERM. COEFF: 0.00017260 CM/SEC
TEST DATE: 6/17/85
TIME (START): 2:43 PM

D (INTAKE): 17.78 CM m(TR.RATIO) 1
d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	7.45	12.75	5.3	1	0	0		
15	0:15	7.45	12.55	5.1	0.96226415	-0.0384662	15	0.00019186	1.03921568
30	0:30	7.45	12.29	4.84	0.91320754	-0.0907920	15	0.00026099	1.05371900
45	0:45	7.45	12.1	4.65	0.87735849	-0.1308396	15	0.00019975	1.04086021
60	1:00	7.45	11.81	4.36	0.82264150	-0.1952347	15	0.00032119	1.06651376
75	1:15	7.45	11.57	4.12	0.77735849	-0.2518536	15	0.00028240	1.05825242
90	1:30	7.45	11.48	4.03	0.76037735	-0.2739404	15	0.00011016	1.02233250
105	1:45	7.45	11.36	3.91	0.73773584	-0.3041694	30	0.00013047	1.05370843
120	2:00	7.45	11.29	3.84	0.72452830	-0.3222344	15	0.00009010	1.01822916
150	2:30	7.45	11.1	3.65	0.68867924	-0.3729796	30	0.00012655	1.05205479
180	3:00	7.45	10.97	3.52	0.66415094	-0.4092458	30	0.00009044	1.03693181
210	3:30	7.45	10.85	3.4	0.64150943	-0.4439313	30	0.00008650	1.03529411
240	4:00	7.45	10.75	3.3	0.62264150	-0.4737843	30	0.00007445	1.03030303
270	4:30	7.45	10.63	3.18	0.6	-0.5108256	30	0.00009237	1.03773584
300	5:00	7.45	10.53	3.08	0.58113207	-0.5427772	30	0.00007968	1.03246753
330	5:30	7.45	10.43	2.98	0.56226415	-0.5757835	30	0.00008231	1.03355704
360	6:00	7.45	10.32	2.87	0.54150943	-0.6133947	30	0.00009380	1.03832752
390	6:30	7.45	10.09	2.64	0.49811320	-0.6969279	30	0.00020832	1.08712121
420	7:00	7.45	9.81	2.36	0.44528301	-0.8090452	30	0.00027961	1.11864406
450	7:30	7.45	9.58	2.13	0.40188679	-0.9115848	30	0.00025572	1.10798122
480	8:00	7.45	9.35	1.9	0.35849056	-1.0258529	30	0.00028497	1.12105263
510	8:30	7.45	9.15	1.7	0.32075471	-1.1370785	30	0.00027739	1.11764705
540	9:00	7.45	9.04	1.59	0.3	-1.2039728	30	0.00016683	1.06918238
570	9:30	7.45	8.83	1.38	0.26037735	-1.3456233	30	0.00035326	1.15217391
600	10:00	7.45	8.7	1.25	0.23584905	-1.4445632	30	0.00024675	1.104
900	15:00	7.45	8.25	0.8	0.15094339	-1.8908503	300	0.00011130	1.5625
1200	20:00	7.45	8.1	0.65	0.12264150	-2.0984897	300	0.00005178	1.23076923
2700	45:00	7.45	7.52	0.07	0.01320754	-4.3269668	1500	0.00011115	9.28571428

PROJECT: AMHERST GBCA DATE: 7/23/85
JOB # 363-15-1 OPERATOR: KCO

WELL BAILER TESTS

WELL# MW - 4S MEAN PERM. COEFF: 0.00018769 CM/SEC
TEST DATE: 6/17/85
TIME (START): 3:35 PM

D (INTAKE): 17.78 CM ∎(TR.RATIO) 1
d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	7.5	13.85	6.35	1	0	0		
15	0:15	7.5	13.39	5.89	0.92755905	-0.0751988	15	0.00037508	1.07809847
30	0:30	7.5	12.95	5.45	0.85826771	-0.1528392	15	0.00038726	1.08073394
45	0:45	7.5	12.8	5.3	0.83464566	-0.1807479	15	0.00013920	1.02830188
60	1:00	7.5	12.62	5.12	0.80629921	-0.2153003	15	0.00017234	1.03515625
75	1:15	7.5	12.44	4.94	0.77795275	-0.2510894	15	0.00017851	1.03643724
90	1:30	7.5	12.3	4.8	0.75590551	-0.2798388	15	0.00014339	1.02916666
105	1:45	7.5	12.15	4.65	0.73228346	-0.3115875	30	0.00015087	1.06236559
120	2:00	7.5	11.93	4.43	0.69763779	-0.3600552	15	0.00024175	1.04966139
150	2:30	7.5	11.54	4.04	0.63622047	-0.4522101	30	0.00022982	1.09653465
180	3:00	7.5	11.35	3.85	0.60629921	-0.5003816	30	0.00012013	1.04935064
210	3:30	7.5	11.18	3.68	0.57952755	-0.5455420	30	0.00011262	1.04619565
240	4:00	7.5	11.05	3.55	0.55905511	-0.5815072	30	0.00008969	1.03661971
270	4:30	7.5	10.93	3.43	0.54015748	-0.6158945	30	0.00008576	1.03498542
300	5:00	7.5	10.83	3.33	0.52440944	-0.6454825	30	0.00007379	1.03003003
330	5:30	7.5	10.73	3.23	0.50866141	-0.6759726	30	0.00007604	1.03095975
360	6:00	7.5	10.62	3.12	0.49133858	-0.7106218	30	0.00008641	1.03525641
390	6:30	7.5	10.53	3.03	0.47716535	-0.7398921	30	0.00007299	1.02970297
420	7:00	7.5	10.41	2.91	0.45826771	-0.7803017	30	0.00010077	1.04123711
450	7:30	7.5	10.31	2.81	0.44251968	-0.8152703	30	0.00008720	1.03558718
480	8:00	7.5	10.18	2.68	0.42204724	-0.8626380	30	0.00011813	1.04850746
510	8:30	7.5	9.9	2.4	0.37795275	-0.9729860	30	0.00027520	1.11666666
540	9:00	7.5	9.65	2.15	0.33858267	-1.0829869	30	0.00027433	1.11627906
570	9:30	7.5	9.4	1.9	0.29921259	-1.2066009	30	0.00030828	1.13:57894
600	10:00	7.5	9.2	1.7	0.26771653	-1.3178265	30	0.00027739	1.11764705
630	10:30	7.5	9.03	1.53	0.24094488	-1.4231870	30	0.00026276	1.11111111
660	11:00	7.5	8.9	1.4	0.22047244	-1.5119825	30	0.00022145	1.09285714
690	11:30	7.5	8.79	1.29	0.20314960	-1.5938125	30	0.00020407	1.08527131
720	12:00	7.5	8.61	1.11	0.17480314	-1.7440947	30	0.00037479	1.16216216
750	12:30	7.5	8.5	1	0.15748031	-1.8484548	30	0.00026026	1.11
900	15:00	7.5	8.27	0.77	0.12125984	-2.1098195	150	0.00013036	1.29870129

PROJECT: AMHERST GBCA DATE: 7/22/85
JOB # 363-15-1 OPERATOR: KCO

WELL BAILER TESTS

WELL# MW - 5S MEAN PERM. COEFF: 0.00009560 CM/SEC
TEST DATE: 6/28/85
TIME (START): 11:50 PM

D (INTAKE): 17.78 CM ■(TR.RATIO) 1
d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	11.06	15.45	4.39	1	0	0		
15	0:15	11.06	15.29	4.23	0.96355353	-0.0371272	15	0.00018518	1.03782505
30	0:30	11.06	15.08	4.02	0.91571753	-0.0880473	15	0.00025398	1.05223880
60	1:00	11.06	14.87	3.81	0.86788154	-0.1417000	30	0.00013380	1.05511811
75	1:15	11.06	14.78	3.72	0.84738041	-0.1656055	15	0.00011923	1.02419354
90	1:30	11.06	14.71	3.65	0.83143507	-0.1846020	15	0.00009475	1.01917808
105	1:45	11.06	14.64	3.58	0.81548974	-0.2039664	30	0.00009567	1.03910614
120	2:00	11.06	14.58	3.52	0.80182232	-0.2208682	15	0.00008430	1.01704545
150	2:30	11.06	14.45	3.39	0.77220956	-0.2584993	30	0.00009384	1.03834808
180	3:00	11.06	14.34	3.28	0.74715261	-0.2914858	30	0.00008226	1.03353658
210	3:30	11.06	14.26	3.2	0.72892938	-0.3161784	30	0.00006158	1.025
240	4:00	11.06	14.16	3.1	0.70615034	-0.3479271	30	0.00007917	1.03225806
270	4:30	11.06	14.09	3.03	0.69020501	-0.3707666	30	0.00005696	1.02310231
300	5:00	11.06	14	2.94	0.66970387	-0.4009196	30	0.00007520	1.03061224
330	5:30	11.06	13.93	2.87	0.65375854	-0.4250171	30	0.00006009	1.02439024
360	6:00	11.06	13.85	2.79	0.63553530	-0.4532876	30	0.00007050	1.02867383
390	6:30	11.06	13.75	2.69	0.61275626	-0.4897880	30	0.00009103	1.03717472
420	7:00	11.06	13.68	2.62	0.59681093	-0.5161549	30	0.00006575	1.02671755
450	7:30	11.06	13.56	2.5	0.56947608	-0.5630384	30	0.00011692	1.048
480	8:00	11.06	13.48	2.42	0.55125284	-0.5955616	30	0.00008111	1.03305785
510	8:30	11.06	13.39	2.33	0.53075170	-0.6334689	30	0.00009451	1.03862660
540	9:00	11.06	13.34	2.28	0.51936218	-0.6551537	30	0.00005410	1.02192982
570	9:30	11.06	13.28	2.22	0.50569476	-0.6818220	30	0.00006650	1.02702702
600	10:00	11.06	13.22	2.16	0.49202733	-0.7092210	30	0.00006833	1.02777777
750	12:30	11.06	12.93	1.87	0.42596810	-0.8533907	150	0.00007191	1.15508021
900	15:00	11.06	12.69	1.63	0.37129840	-0.9907492	150	0.00006851	1.14723926
1500	25:00	11.06	11.51	0.45	0.10250569	-2.2778369	600	0.00016049	3.62222222

PROJECT: AMHERST GBCA DATE: 7/25/85
JOB # 363-15-1 OPERATOR: AKG

WELL BAILER TESTS

WELL# MW - 7S MEAN PERM. COEFF: 0.00058852 CM/SEC
TEST DATE: 6/28/85
TIME (START): 11:57 AM

D (INTAKE): 17.78 CM m(TR.RATIO) 1
d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	16.09	18.61	2.52	1	0	0		
15	0:15	16.09	18.25	2.16	0.85714285	-0.1541506	15	0.00076888	1.16666666
30	0:30	16.09	17.89	1.8	0.71428571	-0.3364722	15	0.00090940	1.2
45	0:45	16.09	17.75	1.66	0.65873015	-0.4174412	15	0.00040386	1.08433734
60	1:00	16.09	17.56	1.47	0.58333333	-0.5389965	15	0.00060630	1.12925170
75	1:15	16.09	17.34	1.25	0.49603174	-0.7011153	15	0.00080863	1.176
90	1:30	16.09	17.16	1.07	0.42460317	-0.8566002	15	0.00077554	1.16822429
105	1:45	16.09	17.06	0.97	0.38492063	-0.9547181	30	0.00063247	1.28865979
120	2:00	16.09	16.91	0.82	0.32539682	-1.1227098	15	0.00083792	1.18292682
150	2:30	16.09	16.71	0.62	0.24603174	-1.4022947	30	0.00069727	1.32258064
180	3:00	16.09	16.57	0.48	0.19047619	-1.6582280	30	0.00063828	1.29166666
210	3:30	16.09	16.47	0.38	0.15079365	-1.8918429	30	0.00058262	1.26315789
240	4:00	16.09	16.38	0.29	0.11507936	-2.1621332	30	0.00067408	1.31034482
270	4:30	16.09	16.32	0.23	0.09126984	-2.3939348	30	0.00057810	1.26086956
300	5:00	16.09	16.29	0.2	0.07936507	-2.5336968	30	0.00034855	1.15
330	5:30	16.09	16.27	0.18	0.07142857	-2.6390573	30	0.00026276	1.11111111
360	6:00	16.09	16.24	0.15	0.05952380	-2.8213788	30	0.00045470	1.2
390	6:30	16.09	16.21	0.12	0.04761904	-3.0445224	30	0.00055650	1.25
420	7:00	16.09	16.19	0.1	0.03968253	-3.2268439	30	0.00045470	1.2
450	7:30	16.09	16.18	0.09	0.03571428	-3.3322045	30	0.00026276	1.11111111
480	8:00	16.09	16.16	0.07	0.02777777	-3.5835189	30	0.00062676	1.28571428
520	8:40	16.09	16.15	0.06	0.02380952	-3.7376696	40	0.00028833	1.16666666
540	9:00	16.09	16.14	0.05	0.01984126	-3.9199911	20	0.00068205	1.2
570	9:30	16.09	16.13	0.04	0.01587301	-4.1431347	30	0.00055650	1.25
600	10:00	16.09	16.12	0.03	0.01190476	-4.4308167	30	0.00071746	1.33333333

PROJECT: AMHERST GBCA DATE: 7/25/85
JOB # 363-15-1 OPERATOR: AKG

WELL BAILER TESTS

WELL# MW - 8S MEAN PERM. COEFF: 0.00004660 CM/SEC
TEST DATE: 6/26/85
TIME (START): 1:55 PM

D (INTAKE): 17.78 CM m(TR.RATIO) 1
d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	4.6	9.39	4.79	1	0	0		
15	0:15	4.6	9.2	4.6	0.96033402	-0.0404741	15	0.00020188	1.04130434
30	0:30	4.6	9.15	4.55	0.94989561	-0.051403	15	0.00005451	1.01098901
45	0:45	4.6	9.1	4.5	0.93945720	-0.0624530	15	0.00005511	1.01111111
60	1:00	4.6	9.07	4.47	0.93319415	-0.0691420	15	0.00003336	1.00671140
75	1:15	4.6	9.01	4.41	0.92066805	-0.0826557	15	0.00006740	1.01360544
90	1:30	4.6	8.97	4.37	0.91231732	-0.0917674	15	0.00004544	1.00915331
105	1:45	4.6	8.93	4.33	0.90396659	-0.1009628	30	0.00004565	1.01847575
120	2:00	4.6	8.9	4.3	0.89770354	-0.1079153	15	0.00003467	1.00697674
150	2:30	4.6	8.84	4.24	0.88517745	-0.1219671	30	0.00003504	1.01415094
180	3:00	4.6	8.77	4.17	0.87056367	-0.1386143	30	0.00004151	1.01678657
210	3:30	4.6	8.69	4.09	0.85386221	-0.1579854	30	0.00004831	1.01955990
240	4:00	4.6	8.62	4.02	0.83924843	-0.1752485	30	0.00004305	1.01741293
270	4:30	4.6	8.57	3.97	0.82881002	-0.1877643	30	0.00003121	1.01259445
300	5:00	4.6	8.54	3.94	0.82254697	-0.1953496	30	0.00001891	1.00761421
330	5:30	4.6	8.47	3.87	0.80793319	-0.2132759	30	0.00004470	1.01808785
360	6:00	4.6	8.41	3.81	0.79540709	-0.2289012	30	0.00003896	1.01574803
390	6:30	4.6	8.35	3.75	0.78288100	-0.2447745	30	0.00003958	1.016
420	7:00	4.6	8.29	3.69	0.77035490	-0.2609039	30	0.00004022	1.01626016
450	7:30	4.6	8.18	3.58	0.74739039	-0.2911676	30	0.00007547	1.03072625
480	8:00	4.6	8.13	3.53	0.73695198	-0.3052325	30	0.00003507	1.01416430
510	8:30	4.6	8.06	3.46	0.72233820	-0.3252618	30	0.00004995	1.02023121
540	9:00	4.6	8.01	3.41	0.71189979	-0.3398181	30	0.00003630	1.01466275
570	9:30	4.6	7.98	3.38	0.70563674	-0.3486547	30	0.00002203	1.00887573
600	10:00	4.6	7.92	3.32	0.69311064	-0.3665656	30	0.00004466	1.01807228
750	12:30	4.6	7.67	3.07	0.64091858	-0.4448528	150	0.00003904	1.08143322
900	15:00	4.6	7.49	2.89	0.60334029	-0.5052739	150	0.00003013	1.06228373
1500	30:00	4.6	7.02	2.42	0.50521920	-0.6827628	600	0.00002213	1.19421487
8670	144:30	4.6	4.73	0.13	0.02713987	-3.6067512	7170	0.00003051	18.6153846

PROJECT: AMHERST GBCA DATE: 7/25/85
JOB # 363-15-1 OPERATOR: AKG

WELL BAILER TESTS

WELL# MW - 14S MEAN PERM. COEFF: 0.00028982 CM/SEC
TEST DATE: 6/27/85
TIME (START): 12:46

D (INTAKE): 17.78 CM m(TR.RATIO) 1
d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	7.38	9.13	1.75	1	0	0		
30	0:30	7.38	8.8	1.42	0.81142857	-0.2089589	30	0.00052113	1.23239436
60	1:00	7.38	8.65	1.27	0.72571428	-0.3205988	30	0.00027842	1.11811023
75	1:15	7.38	8.45	1.07	0.61142857	-0.4919571	15	0.00085471	1.18691588
90	1:30	7.38	8.4	1.02	0.58285714	-0.5398131	15	0.00023870	1.04901960
105	1:45	7.38	8.32	0.94	0.53714285	-0.6214911	30	0.00032305	1.13829787
120	2:00	7.38	8.26	0.88	0.50285714	-0.6874491	15	0.00032699	1.0681818
150	2:30	7.38	8.13	0.75	0.42857142	-0.8472978	30	0.00039865	1.17333333
180	3:00	7.38	8.02	0.64	0.36571428	-1.0059028	30	0.00039555	1.171875
210	3:30	7.38	7.93	0.55	0.31428571	-1.1574527	30	0.00037795	1.16363636
240	4:00	7.38	7.88	0.5	0.28571428	-1.2527629	30	0.00023769	1.1
270	4:30	7.38	7.81	0.43	0.24571428	-1.4035858	30	0.00037614	1.16279069
300	5:00	7.38	7.77	0.39	0.22285714	-1.5012243	30	0.00024350	1.10256410
330	5:30	7.38	7.72	0.34	0.19428571	-1.6384254	30	0.00034217	1.14705882
360	6:00	7.38	7.71	0.33	0.18857142	-1.6682784	30	0.00007445	1.03030303
390	6:30	7.38	7.7	0.32	0.18285714	-1.6990500	30	0.00007674	1.03125
420	7:00	7.38	7.66	0.28	0.16	-1.8325814	30	0.00033302	1.14285714
450	7:30	7.38	7.63	0.25	0.14285714	-1.9459101	30	0.00028263	1.12
480	8:00	7.38	7.61	0.23	0.13142857	-2.0292917	30	0.00020794	1.08695652
510	8:30	7.38	7.59	0.21	0.12	-2.1202635	30	0.00022687	1.09523809
540	9:00	7.38	7.58	0.2	0.11428571	-2.1690537	30	0.00012168	1.05
570	9:30	7.38	7.56	0.18	0.10285714	-2.2744142	30	0.00026276	1.11111111
600	10:00	7.38	7.54	0.16	0.09142857	-2.3921972	30	0.00029374	1.125
810	13:30	7.38	7.49	0.11	0.06285714	-2.7668907	210	0.00013349	1.45454545
1740	17:30	7.38	7.46	0.08	0.04571428	-3.0853444	930	0.00002561	1.375

PROJECT: AMHERST SBCA DATE: 7/22/85
JOB # 363-15-1 OPERATOR: KCO

WELL BAILER TESTS

WELL# MW - 1M MEAN PERM. COEFF: 0.00001276 CM/SEC
TEST DATE: 6/17/85
TIME (START): 2:18 PM

D (INTAKE): 17.78 CM m(TR.RATIO) 1

d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	5.52	17.75	12.23	1	0	0		
15	0:15	5.52	17.67	12.15	0.99345870	-0.0065627	15	0.00003273	1.00658436
30	0:30	5.52	17.65	12.13	0.99182338	-0.0082102	15	0.00000821	1.00164880
45	0:45	5.52	17.62	12.1	0.98937040	-0.0106864	15	0.00001235	1.00247933
60	1:00	5.52	17.57	12.05	0.98528209	-0.0148272	15	0.00002065	1.00414937
75	1:15	5.52	17.53	12.01	0.98201144	-0.0181523	15	0.00001658	1.00333055
105	1:45	5.52	17.5	11.98	0.97955846	-0.0206533	30	0.00000623	1.00250417
120	2:00	5.52	17.46	11.94	0.97628781	-0.0239978	15	0.00001668	1.00335008
150	2:30	5.52	17.44	11.92	0.97465249	-0.0256742	30	0.00000418	1.00167785
180	3:00	5.52	17.4	11.88	0.97138184	-0.0290356	30	0.00000838	1.00336700
210	3:30	5.52	17.3	11.78	0.96320523	-0.0374887	30	0.00002108	1.00848896
240	4:00	5.52	17.25	11.73	0.95911692	-0.0417422	30	0.00001060	1.00426257
270	4:30	5.52	17.2	11.68	0.95502861	-0.0460139	30	0.00001065	1.00428062
300	5:00	5.52	17.14	11.62	0.95012264	-0.0511641	30	0.00001284	1.00516351
330	5:30	5.52	17.08	11.56	0.94521668	-0.0563410	30	0.00001291	1.00519031
360	6:00	5.52	17.02	11.5	0.94031071	-0.0615449	30	0.00001297	1.00521739
390	6:30	5.52	16.96	11.44	0.93540474	-0.0667759	30	0.00001304	1.00524475
420	7:00	5.52	16.94	11.42	0.93376941	-0.0685257	30	0.00000436	1.00175131
450	7:30	5.52	16.85	11.33	0.92641046	-0.0764378	30	0.00001973	1.00794351
480	8:00	5.52	16.8	11.28	0.92232215	-0.0808607	30	0.00001103	1.00443262
510	8:30	5.52	16.75	11.23	0.91823385	-0.0853031	30	0.00001107	1.00445235
540	9:00	5.52	16.69	11.17	0.91332788	-0.0906603	30	0.00001336	1.00537153
570	9:30	5.52	16.64	11.12	0.90923957	-0.0951466	30	0.00001118	1.00449640
600	10:00	5.52	16.6	11.08	0.90596892	-0.0987502	30	0.00000898	1.00361010
750	12:30	5.52	16.38	10.86	0.88798037	-0.1188056	150	0.00001000	1.02025782
900	15:00	5.52	16.19	10.67	0.87244480	-0.1364558	150	0.00000880	1.01780693
2400	40:00	5.52	13.88	8.36	0.68356500	-0.3804335	1500	0.00001216	1.27631578
6600	110:00	5.52	9.38	3.86	0.31561733	-1.1532247	4200	0.00001376	2.16580310

PROJECT: AMHERST GBCA DATE: 7/22/85
JOB # 363-15-1 OPERATOR: KCO

WELL BAILER TESTS

WELL# MW - 2M MEAN PERM. COEFF: 0.00001380 CM/SEC
TEST DATE: 6/26/85
TIME (START): 11:55 AM

D (INTAKE): 17.78 CM m(TR.RATIO) 1
d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	5.92	25.76	19.84	1	0	0		
15	0:15	5.92	25.54	19.62	0.98891129	-0.0111506	15	0.00005561	1.01121304
30	0:30	5.92	25.38	19.46	0.98084677	-0.0193390	15	0.00004084	1.00822199
45	0:45	5.92	25.19	19.27	0.97127016	-0.0291506	15	0.00004893	1.00985988
60	1:00	5.92	25.11	19.19	0.96723790	-0.0333107	15	0.00002075	1.00416883
75	1:15	5.92	25.05	19.13	0.96421370	-0.0364423	15	0.00001561	1.00313643
90	1:30	5.92	25.03	19.11	0.96320564	-0.0374883	15	0.00000521	1.00104657
105	1:45	5.92	24.97	19.05	0.96018145	-0.0406330	30	0.00001045	1.00419947
120	2:00	5.92	24.92	19	0.95766129	-0.0432611	15	0.00001310	1.00263157
150	2:30	5.92	24.83	18.91	0.953125	-0.0480092	30	0.00001184	1.00475938
180	3:00	5.92	24.77	18.85	0.95010080	-0.0511871	30	0.00000792	1.00318302
210	3:30	5.92	24.71	18.79	0.94707661	-0.0543752	30	0.00000795	1.00319318
240	4:00	5.92	24.63	18.71	0.94304435	-0.0586419	30	0.00001064	1.00427578
270	4:30	5.92	24.59	18.67	0.94102822	-0.0607821	30	0.00000533	1.00214247
300	5:00	5.92	24.52	18.6	0.9375	-0.0645385	30	0.00000936	1.00376344
330	5:30	5.92	24.47	18.55	0.93497983	-0.0672303	30	0.00000671	1.00269541
360	6:00	5.92	24.4	18.48	0.93145161	-0.0710110	30	0.00000942	1.00378787
390	6:30	5.92	24.35	18.43	0.92893145	-0.0737203	30	0.00000675	1.00271296
420	7:00	5.92	24.31	18.39	0.92691532	-0.0758930	30	0.00000541	1.00217509
450	7:30	5.92	24.27	18.35	0.92489919	-0.0780705	30	0.00000543	1.00217983
480	8:00	5.92	24.22	18.3	0.92237903	-0.0807990	30	0.00000680	1.00273224
510	8:30	5.92	24.17	18.25	0.91985887	-0.0835350	30	0.00000682	1.00273972
540	9:00	5.92	24.12	18.2	0.91733870	-0.0862785	30	0.00000684	1.00274725
570	9:30	5.92	24.02	18.1	0.91229838	-0.0917881	30	0.00001374	1.00552486
600	10:00	5.92	23.94	18.02	0.90826612	-0.0962178	30	0.00001104	1.00443951
750	12:30	5.92	23.72	17.8	0.89717741	-0.1085016	150	0.00000612	1.01235955
900	15:00	5.92	23.5	17.58	0.88608870	-0.1209382	150	0.00000620	1.01251422
1200	20:00	5.92	23.17	17.25	0.86945564	-0.1398879	300	0.00000472	1.01913043
1800	30:00	5.92	21.84	15.92	0.80241935	-0.2201239	600	0.00001000	1.08354271
7380	123:40	5.92	7.53	1.61	0.08114919	-2.5114659	5580	0.00003072	9.88819875

PROJECT: AMHERST G8CA DATE: 7/25/85
JOB # 363-15-1 OPERATOR: AKG

WELL BAILER TESTS

WELL# MW -12M MEAN PERM. COEFF: 0.00001583 CM/SEC
TEST DATE: 6/28/85
TIME (START): 10:08 AM

D (INTAKE): 17.78 CM m(TR.RATIO) 1
d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	13.05	35.26	22.21	1	0	0		
15	0:15	13.05	35.12	22.07	0.99369653	-0.0063234	15	0.00003154	1.00634345
30	0:30	13.05	35.12	22.07	0.99369653	-0.0063234	15	0	1
45	0:45	13.05	35.01	21.96	0.98874380	-0.0113200	15	0.00002492	1.00500910
60	1:00	13.05	34.94	21.89	0.98559207	-0.0145127	15	0.00001592	1.00319780
75	1:15	13.05	34.88	21.83	0.98289058	-0.0172574	15	0.00001369	1.00274851
90	1:30	13.05	34.83	21.78	0.98063935	-0.0195505	15	0.00001143	1.00229568
105	1:45	13.05	34.79	21.74	0.97883836	-0.0213887	30	0.00001030	1.00413983
120	2:00	13.05	34.74	21.69	0.97658712	-0.0236913	15	0.00001148	1.00230520
150	2:30	13.05	34.63	21.58	0.97163439	-0.0287756	30	0.00001268	1.00509731
180	3:00	13.05	34.52	21.47	0.96668167	-0.0338860	30	0.00001274	1.00512342
210	3:30	13.05	34.38	21.33	0.96037820	-0.0404281	30	0.00001631	1.00656352
240	4:00	13.05	34.26	21.21	0.95497523	-0.0460698	30	0.00001407	1.00565770
270	4:30	13.05	34.16	21.11	0.95047276	-0.0507957	30	0.00001178	1.00473709
300	5:00	13.05	34.05	21	0.94552003	-0.0560202	30	0.00001302	1.00523809
330	5:30	13.05	33.96	20.91	0.94146780	-0.0603151	30	0.00001071	1.00430416
360	6:00	13.05	33.83	20.78	0.93561458	-0.0665516	30	0.00001555	1.00625601
390	6:30	13.05	33.73	20.68	0.93111211	-0.0713755	30	0.00001203	1.00483558
420	7:00	13.05	33.65	20.6	0.92751013	-0.0752515	30	0.00000966	1.00388349
450	7:30	13.05	33.52	20.47	0.92165691	-0.0815822	30	0.00001578	1.00635075
480	8:00	13.05	33.41	20.36	0.91670418	-0.0869704	30	0.00001343	1.00540275
510	8:30	13.05	33.23	20.18	0.90859972	-0.0958506	30	0.00002214	1.00891972
540	9:00	13.05	33.11	20.06	0.90319675	-0.1018148	30	0.00001487	1.00598205
570	9:30	13.05	33.02	19.97	0.89914452	-0.1063114	30	0.00001121	1.00450676
600	10:00	13.05	32.92	19.87	0.89464205	-0.1113315	30	0.00001251	1.00503271
750	12:30	13.05	31.94	18.89	0.85051778	-0.1619099	150	0.00002522	1.05187930
900	15:00	13.05	30.68	17.63	0.79378658	-0.2309406	150	0.00003443	1.07146908
1200	20:00	13.05	28.68	15.63	0.70373705	-0.3513504	300	0.00003002	1.12795905

PROJECT: AMHERST GBCA DATE: 7/25/85
JOB # 363-15-1 OPERATOR: AKG

WELL BAILER TESTS

WELL# MW -14M MEAN PERM. COEFF: 0.00000233 CM/SEC
TEST DATE: 6/27/85
TIME (START): 12:23 PM

D (INTAKE): 17.78 CM m(TR.RATIO) 1
d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	5.87	33.78	27.91	1	0	0		
15	0:15	5.87	33.72	27.85	0.99785023	-0.0021520	15	0.00001073	1.00215439
30	0:30	5.87	33.71	27.84	0.99749193	-0.0025112	15	0.00000179	1.00035919
45	0:45	5.87	33.69	27.82	0.99677534	-0.0032298	15	0.00000358	1.00071890
60	1:00	5.87	33.67	27.8	0.99605876	-0.0039490	15	0.00000358	1.00071942
75	1:15	5.87	33.65	27.78	0.99534217	-0.0046687	15	0.00000358	1.00071994
90	1:30	5.87	33.63	27.76	0.99462558	-0.0053889	15	0.00000359	1.00072046
105	1:45	5.87	33.62	27.75	0.99426728	-0.0057492	30	0.00000269	1.00108108
120	2:00	5.87	33.6	27.73	0.99355069	-0.0064701	15	0.00000359	1.00072124
150	2:30	5.87	33.58	27.71	0.99283410	-0.0071916	30	0.00000179	1.00072176
180	3:00	5.87	33.57	27.7	0.99247581	-0.0075526	30	0.00000090	1.00036101
210	3:30	5.87	33.55	27.68	0.99175922	-0.0082749	30	0.00000180	1.00072254
240	4:00	5.87	33.53	27.66	0.99104263	-0.0089977	30	0.00000180	1.00072306
270	4:30	5.87	33.47	27.6	0.98889286	-0.0111692	30	0.00000541	1.00217391
300	5:00	5.87	33.45	27.58	0.98817628	-0.0118941	30	0.00000180	1.00072516
330	5:30	5.87	33.43	27.56	0.98745969	-0.0126196	30	0.00000180	1.00072568
360	6:00	5.87	33.41	27.54	0.98674310	-0.0133455	30	0.00000181	1.00072621
390	6:30	5.87	33.39	27.52	0.98602651	-0.0140720	30	0.00000181	1.00072674
420	7:00	5.87	33.36	27.49	0.98495163	-0.0151627	30	0.00000272	1.00109130
450	7:30	5.87	33.35	27.48	0.98459333	-0.0155265	30	0.00000090	1.00036390
480	8:00	5.87	33.34	27.47	0.98423504	-0.0158905	30	0.00000090	1.00036403
510	8:30	5.87	33.33	27.46	0.98387674	-0.0162546	30	0.00000090	1.00036416
540	9:00	5.87	33.31	27.44	0.98316015	-0.0169832	30	0.00000181	1.00072886
570	9:30	5.87	33.29	27.42	0.98244356	-0.0177123	30	0.00000181	1.00072939
600	10:00	5.87	33.28	27.41	0.98208527	-0.0180771	30	0.00000090	1.00036483
750	12:30	5.87	33.22	27.35	0.97993550	-0.0202685	150	0.00000109	1.00219378
900	15:00	5.87	33.15	27.28	0.97742744	-0.0228312	150	0.00000127	1.00256598
1320	22.00	5.87	33.11	27.24	0.97599426	-0.0242985	420	0.00000026	1.00146842
2340	39:00	5.87	32.85	26.98	0.96667860	-0.0338891	1020	0.00000070	1.00963676

PROJECT: AMHERST SBCA DATE: 7/25/85
JOB # 363-15-1 OPERATOR: AKG

WELL BAILER TESTS

WELL# MW -15M MEAN PERM. COEFF: 0.00003582 CM/SEC
TEST DATE: 6/27/85
TIME (START): 10:38 AM

D (INTAKE): 17.78 CM m(TR.RATIO) 1
d(STDPIPE): 5.08 CM
L (INTAKE): 152.4 CM

TIME SINCE PUMPING STOPPED (T') (SEC.)	TIME SINCE PUMPING STOPPED (T') (MIN:SEC)	INITIAL WATER DEPTH (H0) (FT)	WATER DEPTH AT T' (H1) (FT)	RESIDUAL DRAWDOWN (S1=H1-H0) (FT)	DRAWDOWN RATIO (R) (S1/S1 AT T'=0:00)	LN R	TIME AFTER LAST READING (SEC)	PERM. COEFF. (K) (CM/SEC)	R1/R2
0	0:00	7.66	36.95	29.29	1	0	0		
15	0:15	7.66	36.65	28.99	0.98975759	-0.0102952	15	0.00005135	1.01034839
30	0:30	7.66	36.1	28.44	0.97097965	-0.0294495	15	0.00009553	1.01933895
45	0:45	7.66	35.92	28.26	0.96483441	-0.0357987	15	0.00003166	1.00636942
60	1:00	7.66	35.73	28.07	0.95834755	-0.0425447	15	0.00003364	1.00676879
80	1:20	7.66	35.52	27.86	0.95117787	-0.0500541	20	0.00002809	1.00753768
90	1:30	7.66	35.4	27.74	0.94708091	-0.0543707	10	0.00003229	1.00432588
105	1:45	7.66	35.13	27.47	0.93786275	-0.0641516	25	0.00004219	1.01419730
120	2:00	7.66	35	27.34	0.93342437	-0.0688953	15	0.00002366	1.00475493
150	2:30	7.66	34.63	26.97	0.92079207	-0.0825210	30	0.00003398	1.01371894
180	3:00	7.66	34	26.34	0.89928303	-0.1061574	30	0.00005694	1.02391799
210	3:30	7.66	33.82	26.16	0.89313758	-0.1130146	30	0.00001710	1.00688073
240	4:00	7.66	33.48	25.82	0.88152953	-0.1260967	30	0.00003262	1.01316808
270	4:30	7.66	33.23	25.57	0.87299419	-0.1358263	30	0.00002426	1.00977708
300	5:00	7.66	32.84	25.18	0.85967907	-0.1511961	30	0.00003833	1.01548848
330	5:30	7.66	32.38	24.72	0.84397405	-0.1696335	30	0.00004598	1.01860841
360	6:00	7.66	32.21	24.55	0.83817002	-0.1765343	30	0.00001721	1.00692464
390	6:30	7.66	31.73	24.07	0.82178217	-0.1962799	30	0.00004924	1.01994183
420	7:00	7.66	31.38	23.72	0.80983270	-0.2109275	30	0.00003653	1.01475548
450	7:30	7.66	31.07	23.41	0.79924889	-0.2240828	30	0.00003280	1.01324220
480	8:00	7.66	30.63	22.97	0.78422669	-0.2430571	30	0.00004732	1.01915542
510	8:30	7.66	30.16	22.5	0.76818026	-0.2637308	30	0.00005155	1.02088888
540	9:00	7.66	29.91	22.25	0.75964453	-0.2749041	30	0.00002786	1.01123595
570	9:30	7.66	29.71	22.05	0.75281666	-0.2839335	30	0.00002251	1.00907029
600	10:00	7.66	29.39	21.73	0.74189143	-0.2985523	30	0.00003645	1.01472618
750	12:30	7.66	27.94	20.28	0.69238648	-0.3676109	150	0.00003444	1.07149901
900	15:00	7.66	26.97	19.31	0.65926937	-0.4166230	150	0.00002444	1.05023303
1470	24:30	7.66	22.61	14.95	0.51041311	-0.6725348	570	0.00003359	1.29163879
1920	32:30	7.66	20.38	12.72	0.43427791	-0.8340706	450	0.00002685	1.17531446
3210	53:30	7.66	15.78	8.12	0.27722772	-1.2829160	1290	0.00002603	1.56650246
9120	152:00	7.66	9.6	1.94	0.06623420	-2.7145581	5910	0.00001812	4.18556701

PROJECT: AMHERST GBCA HYD INVEST. OPERATOR: KCO
JOB #: 363-151-110 DATE: 8/19/85

SOIL PERCOLATION TESTS

TEST #: P-1
TEST DATE: 8/14/85 MEAN PERM. COEFF. 0.000054 CM/SE
TIME: 11:33 AM
LOCATION: 7.3' SW OF B-12

TIME START (T1)	TIME STOP (T2)	LAG TIME (T2-T1) (SEC)	DEPTH AT T1 (H1) (CM)	DEPTH AT T2 (H2) (CM)	RATIO H1/H2	PERM. COEFF. (CM/SEC)
0	18	1080	78.4225	76.99375	1.018556	0.000049
18	47	1740	76.99375	75.2475	1.023206	0.000038
47	61	840	75.2475	73.9775	1.017167	0.000058
61	81	1200	73.9775	72.86625	1.015250	0.000036
81	207	7560	72.86625	62.5475	1.164974	0.000058
207	240	1980	62.5475	59.3725	1.053475	0.000076
240	285	2700	59.3725	56.35625	1.053521	0.000056

PROJECT: AMHERST GBCA HYD INVEST. OPERATOR: KCO
JOB #: 363-151-110 DATE: 8/20/85

SOIL PERCOLATION TESTS

TEST #: P-2
TEST DATE 8/14/85 MEAN PERM. COEFF. 0.007415 CM/SEC
TIME: 12:03 HEIGHT (H0) (CM): 73.66
LOCATION: 30' N OF B-13

TIME START (T1)	TIME STOP (T2)	LAG TIME (T2-T1) (SEC)	DEPTH AT T1 (H1) (CM)	DEPTH AT T2 (H2) (CM)	RATIO H1/H2	PERM. COEFF. (CM/SEC)
0	1	60	73.66	66.04	1.115384	0.005278
1	2	60	66.04	59.69	1.106382	0.004886
2	3	60	59.69	51.435	1.160493	0.007194
3	4	60	51.435	43.815	1.173913	0.007750
4	5	60	43.815	36.83	1.189655	0.008394
5	6	60	36.83	31.115	1.183673	0.008150
6	7	60	31.115	26.035	1.195121	0.008615
7	8	60	26.035	21.59	1.205882	0.009049

PROJECT: AMHERST GBCA HYD INVEST. OPERATOR: KCC
JOB #: 363-151-110 DATE: 8/20/85

SOIL PERCOLATION TESTS

TEST #: P-3
TEST DATE 8/16/85 MEAN PERM. COEFF. 0.000011 CM/SE
TIME: 10:38 HEIGHT (H0) (CM): 77.47
LOCATION:9' E OF B-15

TIME START (T1)	TIME STOP (T2)	LAG TIME (T2-T1) (SEC)	DEPTH AT T1 (H1) (CM)	DEPTH AT T2 (H2) (CM)	RATIO H1/H2	PERM. COEFF. (CM/SEC)
0	7	420	75.565	75.40625	1.002105	0.000014
7	41	2040	75.40625	75.08875	1.004228	0.000005
41	71	1800	75.08875	74.77125	1.004246	0.000006
71	113	2520	74.77125	73.9775	1.010729	0.000012
113	253	8400	73.9775	72.0725	1.026431	0.000009
253	324	4260	72.0725	70.1675	1.027149	0.000018

PROJECT: AMHERST GBCA HYD INVEST. OPERATOR: ACO
JOB #: 363-151-110 DATE: 8/20/85

SOIL PERCOLATION TESTS

TEST #: P-4
TEST DATE 8/16/85 MEAN PERM. COEFF. 0.000031 CM/SE
TIME: 8:56 HEIGHT (H0) (CM): 83.66125
LOCATION: 14' WSW OF MW-4S

TIME START (T1)	TIME STOP (T2)	LAG TIME (T2-T1) (SEC)	DEPTH AT T1 (H1) (CM)	DEPTH AT T2 (H2) (CM)	RATIO H1/H2	PERM. COEFF. (CM/SEC)
0	20	1200	76.835	75.08875	1.023255	0.000055
20	34	840	75.08875	74.13625	1.012847	0.000044
34	50	960	74.13625	73.50125	1.008639	0.000025
50	67	1020	73.50125	72.86625	1.008714	0.000024
67	78	660	72.86625	72.0725	1.011013	0.000048
78	90	720	72.0725	71.4375	1.008888	0.000035
90	111	1260	71.4375	70.96125	1.006711	0.000015
111	152	2460	70.96125	69.69125	1.018223	0.000021
152	183	1860	69.69125	68.2625	1.020930	0.000032
183	228	2700	68.2625	66.675	1.023809	0.000025
228	352	7440	66.675	63.02375	1.057934	0.000021
352	448	5760	63.02375	60.16625	1.047493	0.000023

PROJECT: AMHERST GBCA HYD INVEST. OPERATOR: ACO
JOB #: 363-151-110 DATE: 8/20/85

SOIL PERCOLATION TESTS

TEST #: P-5
TEST DATE 8/16/85 MEAN PERM. COEFF. 0.000598 CM/SE
TIME: 9:19 HEIGHT (H0) (CM): 71.12
LOCATION: 120'W OF MW-3S

TIME START (T1)	TIME STOP (T2)	LAG TIME (T2-T1) (SEC)	DEPTH AT T1 (H1) (CM)	DEPTH AT T2 (H2) (CM)	RATIO H1/H2	PERM. COEFF. (CM/SEC)
0	2	120	69.69125	66.9925	1.040284	0.000954
2	4	120	66.9925	65.56375	1.021791	0.000521
4	6	120	65.56375	64.135	1.022277	0.000532
6	9	180	64.135	62.38875	1.027989	0.000444
9	13	240	62.38875	59.21375	1.053619	0.000631
13	18	300	59.21375	55.88	1.059659	0.000560
18	25	420	55.88	51.1175	1.093167	0.000615
25	33	480	51.1175	46.355	1.102739	0.000590
33	42	540	46.355	40.9575	1.131782	0.000664
42	47	300	40.9575	38.4175	1.066115	0.000618
47	57	600	38.4175	33.9725	1.130841	0.000594
57	60	180	33.9725	33.02	1.028846	0.000458

PROJECT: AMHERST GBCA HYD INVEST. OPERATOR: KCO
JOB #: 363-151-110 DATE: 8/21/85

SOIL PERCOLATION TESTS

TEST #: P-6
TEST DATE 8/16/85 MEAN PERM. COEFF. 0.000007 CM/SEC
TIME: 10:18 HEIGHT (H0) (CM): 91.44
LOCATION: 25' SSW OF B-1

TIME START (T1)	TIME STOP (T2)	LAG TIME (T2-T1) (SEC)	DEPTH AT T1 (H1) (CM)	DEPTH AT T2 (H2) (CM)	RATIO H1/H2	PERM. COEFF. (CM/SEC)
0	20	1200	83.34375	82.8675	1.005747	0.000013
20	40	1200	82.8675	82.55	1.003846	0.000009
40	81	2460	82.55	82.2325	1.003861	0.000004
81	99	1080	82.2325	82.07375	1.001934	0.000005
99	134	2100	82.07375	81.915	1.001937	0.000002
134	279	8700	81.915	81.5975	1.003891	0.000001
279	371	5520	81.5975	79.53375	1.025948	0.000013

PROJECT: AMHERST G&CA HYD INVEST. OPERATOR: KCO
JOB #: 363-151-110 DATE: 8/21/85

SOIL PERCOLATION TESTS

TEST #: P-7
TEST DATE 8/16/85 MEAN PERM. COEFF. 0.000013 CM/SE
TIME: 11:44 HEIGHT (H0) (CM): 83.09
LOCATION:5'W OF B-14

TIME START (T1)	TIME STOP (T2)	LAG TIME (T2-T1) (SEC)	DEPTH AT T1 (H1) (CM)	DEPTH AT T2 (H2) (CM)	RATIO H1/H2	PERM. COEFF. (CM/SEC)
0	19	1140	85.09	84.61375	1.005628	0.000014
19	54	2100	84.61375	83.82	1.009469	0.000013
54	194	8400	83.82	80.645	1.039370	0.000013
194	278	5040	80.645	79.0575	1.020080	0.000011

PROJECT: AMHERST GBCA HYD INVEST. OPERATOR: KCO
JOB #: 363-151-110 DATE: 8/21/85

SOIL PERCOLATION TESTS

TEST #: P-8
TEST DATE: 8/16/85 MEAN PERM. COEFF. 0.256630 CM/SE
TIME: 3:20 HEIGHT (H0) (CM): 73.025
LOCATION: 75' SE OF MW-9S

TIME START (T1)	TIME STOP (T2)	LAG TIME (T2-T1) (SEC)	DEPTH AT T1 (H1) (CM)	DEPTH AT T2 (H2) (CM)	RATIO H1/H2	PERM. COEFF. (CM/SEC)
0	1.5	90	73.025	0.0254	2875	0.256630

PROJECT: AMHERST GBCA HYD INVEST. OPERATOR: KCO
JOB #: 363-151-110 DATE: 8/21/85

SOIL PERCOLATION TESTS

TEST #: P-9
TEST DATE:8/16/85 MEAN PERM. COEFF. 0.000120 CM/SE
TIME: 3:33 HEIGHT (H0) (CM): 77.7875
LOCATION:7'N OF MW-7S

TIME START (T1)	TIME STOP (T2)	LAG TIME (T2-T1) (SEC)	DEPTH AT T1 (H1) (CM)	DEPTH AT T2 (H2) (CM)	RATIO H1/H2	PERM. COEFF. (CM/SEC)
0	3	180	68.2625	67.945	1.004672	0.000075
3	9	360	67.945	66.9925	1.014218	0.000113
9	17	480	66.9925	65.405	1.024271	0.000144
17	33	960	65.405	62.38875	1.048346	0.000142
33	53	1200	62.38875	59.21375	1.053619	0.000126

APPENDIX V

GROUNDWATER ELEVATIONS IN SHALLOW WELLS
HOPKINS ROAD SITE, AMHERST, NEW YORK
Groundwater Elevations (in feet above MSL)

	MW-1S	MW-3S	MW-4S	MW-5S	MW-6S	MW-7S	MW-8S	MW-10S	MW-11S	MW-13S	MW-14S	MW-15S
Ground Elev.	586.06	586.95	587.86	591.31	588.70	596.71	584.58	588.59	585.47	586.61	583.19	588.14
Elev. Top of Casing	589.20	589.41	590.55	594.44	590.48	599.69	587.18	590.85	587.93	589.22	587.04	585.51
5/3/85	583.5	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
5/7/85	583.6	583.1	583.2	NI	NI	NI	NI	584.3	NI	NI	580.5	579.1
5/8/85	583.4	583.1	583.3	583.5	NI	NI	NI	583.6	NI	583.0	581.0	579.4
5/9/85	583.4	583.1	583.3	583.5	NI	NI	NI	583.6	NI	583.0	581.0	579.5
5/13/85	583.3	583.0	583.3	583.5	ND	583.8	ND	583.6	581.5	582.9	580.7	579.4
5/14/85	583.3	583.0	583.3	583.5	ND	583.8	ND	583.6	581.5	582.8	580.6	579.3
5/21/85	583.4	582.9	583.4	583.4	NS	583.7	582.8	583.5	581.3	582.8	580.6	579.2
5/30/85	583.2	582.8	583.2	583.3	583.3	583.7	582.6	583.5	581.1	582.7	580.2	579.0
6/10/85	583.1	582.8	583.2	583.3	583.2	583.7	582.5	583.4	580.9	582.5	579.8	578.7
6/12/85	583.4	582.8	583.2	583.3	583.3	583.7	583.0	583.4	581.7	582.8	580.5	578.8
6/17/85	583.2	582.9	583.1	583.4	583.3	583.7	582.7	583.3	581.0	582.7	580.1	578.6
6/18/85	583.3	582.9	583.2	583.4	583.4	583.6	582.9	583.3	581.1	582.8	580.2	578.6
6/26-28/85	583.2	582.9	583.2	583.3	583.2	583.6	582.6	583.2	580.7	582.5	579.6	578.2
7/18/85	583.0	582.8	583.2	583.3	583.1	583.6	582.5	583.1	580.9	582.3	579.4	578.7

NOTE: NI = Not Intalled ND = Not Developed NS = Not Sampled

APPENDIX V (cont.)
GROUNDWATER ELEVATIONS IN DEEPER WELLS
HOPKINS ROAD SITE, AMHERST, NEW YORK
Groundwater Elevations (in feet above MSL)

	MW-1M	MW-2M	MW-9M	MW-12M	MW-14M	MW-15M	MW-1D	MW-9D	MW-15D
Ground Elev.	585.96	585.30	585.17	592.53	583.19	585.21	585.56	584.87	585.31
Elev. Top of Casing	587.74	587.88	587.93	594.85	585.81	587.95	588.76	587.89	588.16
5/3/85	582.4	NI	NI	NI	NI	NI	580.9	NI	NI
5/7/85	582.2	582.0	NI	NI	ND	580.3	580.7	NI	580.3
5/8/85	582.3	582.0	NI	581.9	577.4	581.0	580.6	NI	580.7
5/9/85	582.3	582.0	NI	582.0	579.1	580.8	580.5	NI	580.6
5/13/85	582.3	582.0	581.0	582.1	580.0	580.6	580.2	579.9	580.1
5/14/85	582.3	582.0	581.0	582.1	580.0	580.6	580.2	580.1	580.3
5/21/85	582.3	582.1	581.0	582.0	580.0	580.5	580.4	580.3	580.4
5/30/85	582.2	581.9	581.0	582.0	580.0	580.4	580.0	580.0	580.2
6/10/85	582.2	581.9	580.9	581.9	580.0	580.2	579.6	579.5	579.6
6/12/85	582.2	582.0	581.0	581.9	580.0	580.3	579.9	580.0	580.2
6/17/85	582.2	582.0	580.9	581.9	580.0	580.4	580.2	580.2	580.4
6/18/85	582.1	582.0	581.0	582.0	580.0	580.5	580.3	580.2	580.3
6/26-27/85	582.1	582.0	580.9	581.8	579.9	580.3	580.0	580.0	580.2
7/18/85	582.1	581.9	580.7	581.7	579.5	580.1	579.9	579.7	580.1

NOTE: NI = Not Intalled ND = Not Developed

AMHERST GBCA HYDROGEOLOGIC INVESTIGATION
GROUNDWATER SAMPLING FIELD REPORT #1

DATE: June 26 - 28, 1985
SAMPLING CREW: Kevin Owen and Steve Sammarco
WEATHER: Sunny, windy, warm

Twelve shallow monitoring wells (MW - 1S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 11S, 13S, 14S, and 15S) and 6 deep monitoring wells MW - 1M, 2M, 9M, 12M, 14M, and 15M) were sampled. The shallow wells are screened at the fill-glacialacustrine clay interface. The deeper wells are screened at the boundary of the clay and glacial till layers. Well construction details are provided in the boring logs.

The same general procedure was followed at each well. First, the groundwater elevation (actually the depth to groundwater) was determined using a Keck WLI - 82 water level indicator. From the height of the water, one well volume was calculated. The well was then pumped using a Keck SP -83 submersible pump. The pumping rate was approximately 1 gpm. Pumping was continued either until three to five well volumes were evacuated or until the well was evacuated to dryness. The well was then allowed to recover prior to sampling. Between wells, the water level indicator was washed with soapy water, rinsed with tap water, and thoroughly rinsed with distilled water. The pump was backflushed to remove residual well water from the tubing. The tubing was then rinsed by pumping through first tap water and then distilled water. The exterior of the pump and tubing was thoroughly rinsed with tap water and then with distilled water.

A teflon bailer was unavailable at the time of sampling. Therefore a PVC bailer was used. Before each well was sampled, the bailer was first washed with soapy water (inside and out) and thoroughly rinsed with tap water. The bailer was then subjected to three distilled water rinses.

Samples were placed in previously cleaned and labelled containers. Metal samples were placed in plastic containers. The other samples were poured into glass jars. The TOC samples and priority pollutant metals were preserved by lowering the pH below a value of 2. Nitric acid was added to the metals sample while sulfuric acid was added to the TOC samples. All samples were placed in coolers of ice and transferred under chain-of-custody to Advanced Environmental Systems for analysis. A malfunction of the pH meter prevented the samplers from determining pH values of the groundwater in the wells on June 26 and 27th. The pH of groundwater in all wells was determined on the afternoon of June 28. All field data were recorded on sample collection log sheets. A data summary sheet is attached.

A few notes should be made. First, many of the shallow wells (i.e. MW - 5S, 6S, 7S, 8S, 11S, 13S, 14S, and 15S) should be redeveloped. Samples from these wells were quite turbid due to the presence of large amounts of fine material. Due to the high permeability of the fill layers, the method used to originally develop the wells (i.e. flushing with water and surging) appears to have been ineffective. These wells need to be developed by pumping and surging. Wells developed by K. Owen using a pump the previous week (i.e. MW - 1S, 3S and 4S) provided relatively clear samples.

Another point of concern is the apparent hydraulic connection between certain wells. When well MW-14M was pumped, water levels in well MW-14S decreased. When well MW-15M was pumped, drawdown of groundwater in well MW-15D was observed.

AMHERST GBCA HYDROGEOLOGIC INVESTIGATION
GROUNDWATER FIELD SAMPLING DATA - TRIP #1

Evacuation Device: Keck SP-83 Submersible Pump
Sample Collection Device: PVC (2 feet long, 3/4 inch I.D.) with Nylon Rope

Well #	Date Sampled	Water Depth (ft. from TOC)	One Well Volume (gal)	Volume Evacuated (gal)	pH
MW-1S	6/26/85	6.03	7.0	3 (Evacuated to Dryness)	6.9
MW-1M	6/26/85	5.57	23.3	7 (Evacuated to Dryness)	8.7
MW-2M	6/26/85	5.92	17.6	5 (Evacuated to Dryness)	7.8
MW-3S	6/26/85	6.50	4.9	16	6.9
MW-4S	6/26/85	7.36	6.0	4 (Evacuated to Dryness)	6.5
MW-5S	6/28/85	11.06	4.5	4 (Evacuated to Dryness)	7.0
MW-6S	6/28/85	7.30	7.3	5 (Evacuated to Dryness)	6.8
MW-7S	6/28/85	16.09	5.6	3.5 (Evacuated to Dryness)	7.0
MW-8S	6/26/85	4.60	5.1	4 (Evacuated to Dryness)	6.7
MW-9M	6/27/85	6.99	20.2	12 (Evacuated to Dryness)	9.4
MW-10S	6/27/85	7.65	7.0	15 (Evacuated to Dryness)	6.4
MW-11S	6/27/85	7.17	3.1	4.5 (Evacuated to Dryness)	6.7
MW-12M	6/28/85	13.05	18.9	10 (Evacuated to Dryness)	8.1
MW-13S	6/27/85	6.72	4.8	20	6.6
MW-14S	6/27/85	7.38	3.7	3.5 (Evacuated to Dryness)	6.6
MW-14M	6/27/85	5.87	23.8	9 (Evacuated to Dryness)	7.5
MW-15S	6/27/85	7.28	3.1	15	6.6
MW-15M	6/27/85	7.66	28.1	14 (Evacuated to Dryness)	7.4
MW-1D	6/26/85	8.83	DID	NOT SAMPLE	
MW-15D	6/27/85	8.00	DID	NOT SAMPLE	
MW-9D	6/27/85	7.88	DID	NOT SAMPLE	

AMHERST GBCA HYDROGEOLOGIC INVESTIGATION
GROUNDWATER SAMPLING FIELD REPORT #2
Project #363-15-1-115

DATE: July 18 -19, 1985
SAMPLING CREW: Kevin Owen and John Whitney
WEATHER: Sunny, windy, warm

Sampling was initially attempted on July 16, 1985. However, in the initial set-up of the submersible pump, one of the connecting electrodes was broken. The pump was returned to the manufacturer for repairs. Sampling was delayed until July 18, 1985 when alternate well evacuation devices were obtained.

The same eighteen wells sampled during trip #1 (June 26 - 28, 1985) were again tested during this trip. This total consisted of twelve shallow wells (MW-1S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 11S, 13S, 14S, and 15S) and six deep monitoring wells (MW-1M, 2M, 9M, 12M, 14M, and 15M). The Scope of Work called for four downgradient wells to be analyzed for a complete priority pollutant scan during this second collection episode. Subsequent discussions with the NYSDEC resulted in two upgradient wells also being included. However, groundwater elevations show that mounding effects caused by the landfill effects groundwater flow patterns in the shallow water bearing zone. No truly upgradient shallow wells exist on the site. Therefore, patterns in the deeper wells were used to identify upgradient and down-gradient directions. The paired shallow wells were then included in the sampling scheme. Therefore, samples for the complete priority pollutant analyses were collected from wells MW-1M and 1S, MW-9M and 11S and MW-14M and 14S. Approval for the inclusion of these wells was obtained from Mary McIntosh of the NYSDEC Region 9 office on July 15, 1985.

Sampling during the first trip indicated several wells recovered very slowly after evacuation. Therefore, to allow

sufficient recovery time, all wells were bailed on July 18, 1985. The wells were then sampled on July 19, 1985. A malfunction in the pH meter prevented pH measurements from being taken in the field. This parameter was measured in the laboratory.

The same general procedures were followed at each well. First, the depth to groundwater was determined using a Keck WLI-82 water level indicator. From that measurement, one well volume was calculated. The well was then bailed with a 9.5 foot long 1¼" ID PVC bailer equipped with a bottom foot check valve. Bailing was continued until either three to five well volumes had been evacuated or until the well was evacuated to dryness. The well was then allowed to recover until the following day before sampling. The wells were sampled using a Galtek Model 219-2 teflon bailer (12" long by 1¼" ID).

Between wells, each piece of equipment was decontaminated. The teflon bailer and water level indicator were rinsed with clean water, washed with soapy water, rinsed again with clean water, and thoroughly rinsed with distilled water. The evacuation bailers were rinsed thoroughly with clean water and then distilled water. The foot valves were removed and disassembled and individually rinsed in clean water and tap water. One bailer was used to evacuate all of the deeper wells. Once these wells had been bailed, that bailer was also used on wells MW-10S and 7S. All of the other shallow wells were bailed using a second bailer.

Samples were placed in previously cleaned labelled containers. Heavy metal samples were placed in plastic containers and priority pollutant volatiles into septa vials. The other samples were placed in glass jars. The preservation techniques are listed in Table 1. All field data were recorded on sample log collection sheets. A summary of this data is presented in Table 2. Samples were transferred under chain-of-custody control to Advanced Environmental Systems for analysis.

TABLE 1

AMHERST GBCA GROUNDWATER SAMPLES PRESERVATIONS

PARAMETER	PRESERVATION
Chlorides	cooled 4°C
Sulfates	cooled 4°C
TOX	cooled 4°C
TDS	cooled 4°C
Priority Pollutant Pesticides	cooled 4°C
Priority Pollutant Heavy Metals	HNO_3 to pH < 2
TOC	H_2SO_4 to pH < 2
Priority Pollutant Volatiles	cooled 4°C
PCB and pesticides	cooled 4°C
Phenols	H_2SO_4 to pH < 2 and
Cyanide	cooled 4°C
	NaOH to pH > 12 and
	cooled 4°C
Priority Pollutant Acids	None
Priority Pollutant Base/Neutrals	None

TABLE 2

AMHERST GBCA HYDROGEOLOGIC INVESTIGATION
GROUNDWATER FIELD SAMPLING DATA - TRIP #2

Evacuation Device: 9.5' PVC Bailer 1½" ID
Sample Collection Device: Galtek Teflon Bailer 2' X 1¼" ID
Date Sampled: 7/18 - 7/19/85

Well	Well Depth (ft. from TOC)	Water Depth (ft. from TOC)	One Well Volume (gal)	Volume Evacuated (gal)	Sample Appearance
MW-1S	14.6	6.17	6.9	5.5 (evacuated to dryness)	Yellow-brown, Slightly Turbid
MW-1M	34.3	5.68	23.3	6.5 (evacuated to dryness)	Clear
MW-2M	27.6	6.00	17.6	5.0 (evacuated to dryness)	Clear
MW-3S	12.5	6.62	4.8	20	Dark Brown, Very Turbid
MW-4S	14.7	7.42	5.9	5.5 (evacuated to dryness)	Relatively Clear
MW-5S	16.6	11.10	4.5	4.0 (evacuated to dryness)	Brown, Very Turbid
MW-6S	16.3	7.40	7.3	4.0 (evacuated to dryness)	Yellow-Brown, Relatively Turbid
MW-7S	23.0	16.13	5.6	5.0 (evacuated to dryness)	Yellow-Brown, Relatively Turbid
MW-8S	10.8	4.67	5.0	4.5 (evacuated to dryness)	Yellow-Brown Slightly Turbid
MW-9M	31.8	7.15	19.8	15 (evacuated to dryness)	Clear
MW-10S	16.3	7.78	6.9	20	Yellow-Brown Relatively Turbid
MW-11S	11.0	7.04	3.2	5.0 (evacuated to dryness)	Yellow-Brown Relatively Turbid
MW-12M	36.3	13.21	18.8	12.5 (evacuated to dryness)	Relatively Clear
MW-13S	12.6	6.96	4.6	15	Dark Brown, Very Turbid
MW-14S	11.9	7.60	3.5	5.0 (evacuated to dryness)	Brown, Very Turbid
MW-14M	35.1	6.28	23.5	6.5 (evacuated to dryness)	Brown, Turbid
MW-15S	11.1	6.82	3.5	9.0 (evacuated to dryness)	Yellow-Brown, Relatively Turbid
MW-15M	42.2	7.91	28.0	12.5 (evacuated to dryness)	Relatively Clear
MW-1D	53.7	8.94	DID	NOT	SAMPLE
MW-15D	51.4	8.11	DID	NOT	SAMPLE
MW-9D	55.5	8.15	DID	NOT	SAMPLE

ANALYSIS OF EIGHT (8) SOIL SAMPLES AND TWENTY-SIX (26) WATER SAMPLES

Report Prepared For

MALCOLM-PIRNIE, INC.

By

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

Leonard Borzynski
Technical Evaluation

July 30, 1985
AES Report AUP

SCOPE OF WORK

Under the direction of Mr. Kent McManus and Mr. Kevin Owen, this subject work was performed to fulfill an analytical requirement for Malcolm-Pirnie, Inc's. client, The Town of Amherst, New York.

RECEIPT OF SAMPLES

Samples were collected throughout the month of June, 1985. After sampling completion for each sampling day, Malcolm-Pirnie, Inc. personnel transported the samples collected directly to the Advanced Environmental Systems, Inc. laboratory. At that time, Chain of Custody (Appendix A) was relinquished to Advanced Environmental Systems, Inc. personnel.

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LABORATORY REPORT

TYPE OF ANALYSIS: TOTAL HALOGENATED HYDROCARBON
UNITS OF MEASURE: MILLIGRAMS/KILOGRAM, PPM (DRY WT. BASIS)
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1505 COMP. #1 6-7-85	1506 COMP. #2 6-7-85	1507 COMP. #3 6-7-85	1508 COMP. #4 6-7-85
D SCAN	310-17	7	1.0	BDL*	BDL	BDL	BDL

elow determinable limits.

Susan M. Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: TOTAL HALOGENATED HYDROCARBON
UNITS OF MEASURE: MILLIGRAMS/KILOGRAM, PPM (DRY WT. BASIS)
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 02AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION			
				1509 COMP. #5 6-7-85	1510 COMP. #6 6-7-85	1511 COMP. #7 6-7-85	1512 COMP. #8 6-7-85
O SCAN	310-17	7	1.0	BDL*	BDL	BDL	BDL

elow determinable limits.

Susan M. Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/ KILOGRAM, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1505 COMP 1 6-7-85 SOIL	1506 COMP 2 6-7-85 SOIL	1507 COMP 3 6-7-85 SOIL	1508 COMP 4 6-7-85 SOIL
SENIC	206.2	3	0.50	9.3	11.8	3.6	3.5
PPER	220.1	3	20.0	588.0	546.0	57.0	116.0
AD	239.1	3	100.0	178.0	860.0	249.0	BDL*
NC	289.1	3	5.0	430.0	780.0	160.0	150.0

elow determinable limits.

Janette L. Bingert
JANETTE L. BINGERT
METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/ KILOGRAM, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1509 COMP 5 6-7-85 SOIL	1510 COMP 6 6-7-85 SOIL	1511 COMP 7 6-7-85 SOIL	1512 COMP 8 6-7-85 SOIL
SENIC	206.2	3	0.5	5.4	3.0	2.9	4.2
PPER	220.1	3	20.0	49.0	118.0	131.0	99.0
AD	239.1	3	100.0	100.0	494.0	100.0	179.0
NC	289.1	3	5.0	130.0	370.0	24.0	420.0

Janette L. Bingert

JANETTE L. BINGERT
METALS DIVISION SUPERVISOR

LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 03AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1513 SW-1 6-10-85	1514 SW-2 6-10-85	1515 SW-3 6-10-85	1516 SW-4 6-10-85
DRIN	608	1	1.0	BDL*	BDL	BDL	BDL
PHA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
TA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
MME-BHC	"	"	1.0	BDL	BDL	BDL	BDL
LTA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
LORDANE	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDT	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDE	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDD	"	"	1.0	BDL	BDL	BDL	BDL
ELDRIN	"	"	1.0	BDL	BDL	BDL	BDL
PHA-ENDOSULFAN	"	"	1.0	BDL	BDL	BDL	BDL
TA-ENDOSUFAN	"	"	1.0	BDL	BDL	BDL	BDL
DOSULFAN SULFATE	"	"	1.0	BDL	BDL	BDL	BDL
DRIN	"	"	1.0	BDL	BDL	BDL	BDL
DRINALDEHYDE	"	"	1.0	BDL	BDL	BDL	BDL
PTACHLOR	"	"	1.0	BDL	BDL	BDL	BDL
PTACHOROEPOXIDE	"	"	1.0	BDL	BDL	BDL	BDL
B-1242	"	"	1.0	BDL	BDL	BDL	BDL
B-1254	"	"	1.0	BDL	BDL	BDL	BDL
B-1221	"	"	1.0	BDL	BDL	BDL	BDL
B-1232	"	"	1.0	BDL	BDL	BDL	BDL
B-1248	"	"	1.0	BDL	BDL	BDL	BDL
B-1260	"	"	1.0	BDL	BDL	BDL	BDL
B-1016	"	"	1.0	BDL	BDL	BDL	BDL
XAPHENE	"	"	1.0	BDL	BDL	BDL	BDL

Susan M Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

elow determinable limits.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 04AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1533 SW-1 6-12-85	1534 SW-2 6-12-85	1535 SW-3 6-12-85	1536 SW-4 6-12-85
DRIN	608	1	1.0	BDL *	BDL	BDL	BDL
PHA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
TA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
MME-BHC	"	"	1.0	BDL	BDL	BDL	BDL
LTA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
LORDANE	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDT	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDE	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDD	"	"	1.0	BDL	BDL	BDL	BDL
ELDRIN	"	"	1.0	BDL	BDL	BDL	BDL
PHA-ENDOSULFAN	"	"	1.0	BDL	BDL	BDL	BDL
TA-ENDOSUFAN	"	"	1.0	BDL	BDL	BDL	BDL
DOSULFAN SULFATE	"	"	1.0	BDL	BDL	BDL	BDL
DRIN	"	"	1.0	BDL	BDL	BDL	BDL
DRINALDEHYDE	"	"	1.0	BDL	BDL	BDL	BDL
PTACHLOR	"	"	1.0	BDL	BDL	BDL	BDL
PTACHOROEPOXIDE	"	"	1.0	BDL	BDL	BDL	BDL
B-1242	"	"	1.0	BDL	BDL	BDL	BDL
B-1254	"	"	1.0	BDL	BDL	BDL	BDL
B-1221	"	"	1.0	BDL	BDL	BDL	BDL
B-1232	"	"	1.0	BDL	BDL	BDL	BDL
B-1248	"	"	1.0	BDL	BDL	BDL	BDL
B-1260	"	"	1.0	BDL	BDL	BDL	BDL
B-1016	"	"	1.0	BDL	BDL	BDL	BDL
XAPHENE	"	"	1.0	BDL	BDL	BDL	BDL

Susan M Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

*Below determinable limits.

[illegible] ENVIRONMENTAL SYSTEMS, INC.

LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 05AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1643 MW-1S 6-26-85	1644 MW-3S 6-26-85	1645 MW-4S 6-26-85	1646 MW-8S 6-26-85
LDRIN	608	1	1.0	BDL*	BDL	BDL	BDL
LPHA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
TA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
MME-BHC	"	"	1.0	BDL	BDL	BDL	BDL
LTA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
LORDANE	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDT	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDE	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDD	"	"	1.0	BDL	BDL	BDL	BDL
ELDRIN	"	"	1.0	BDL	BDL	BDL	BDL
LPHA-ENDOSULFAN	"	"	1.0	BDL	BDL	BDL	BDL
TA-ENDOSUFAN	"	"	1.0	BDL	BDL	BDL	BDL
DOSULFAN SULFATE	"	"	1.0	BDL	BDL	BDL	BDL
DRIN	"	"	1.0	BDL	BDL	BDL	BDL
DRINALDEHYDE	"	"	1.0	BDL	BDL	BDL	BDL
PTACHLOR	"	"	1.0	BDL	BDL	BDL	BDL
PTACHOROEPOXIDE	"	"	1.0	BDL	BDL	BDL	BDL
B-1242	"	"	1.0	BDL	BDL	BDL	BDL
B-1254	"	"	1.0	BDL	BDL	BDL	BDL
B-1221	"	"	1.0	BDL	BDL	BDL	BDL
B-1232	"	"	1.0	BDL	BDL	BDL	BDL
B-1248	"	"	1.0	BDL	BDL	BDL	BDL
B-1260	"	"	1.0	BDL	BDL	BDL	BDL
B-1016	"	"	1.0	BDL	BDL	BDL	BDL
XAPHENE	"	"	1.0	BDL	BDL	BDL	BDL

elow determinable limits.

Susan M Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 06AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1647 MW-1M 6-26-85	1648 MW-2M 6-26-85	1665 MW-9M 6-27-85	1666 10-S 6-27-85
LDRIN	608	1	1.0	BDL*	BDL	BDL	BDL
LPHA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
ETA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
AMME-BHC	"	"	1.0	BDL	BDL	BDL	BDL
ELTA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
HLORDANE	"	"	1.0	BDL	BDL	BDL	BDL
,4´-DDT	"	"	1.0	BDL	BDL	BDL	BDL
,4´-DDE	"	"	1.0	BDL	BDL	BDL	BDL
,4´-DDD	"	"	1.0	BDL	BDL	BDL	BDL
IELDRIN	"	"	1.0	BDL	BDL	BDL	BDL
LPHA-ENDOSULFAN	"	"	1.0	BDL	BDL	BDL	BDL
ETA-ENDOSUFAN	"	"	1.0	BDL	BDL	BDL	BDL
NDOSULFAN SULFATE	"	"	1.0	BDL	BDL	BDL	BDL
NDRIN	"	"	1.0	BDL	BDL	BDL	BDL
NDRINALDEHYDE	"	"	1.0	BDL	BDL	BDL	BDL
EPTACHLOR	"	"	1.0	BDL	BDL	BDL	BDL
EPTACHOROEPOXIDE	"	"	1.0	BDL	BDL	BDL	BDL
CB-1242	"	"	1.0	BDL	BDL	BDL	BDL
CB-1254	"	"	1.0	BDL	BDL	BDL	BDL
CB-1221	"	"	1.0	BDL	BDL	BDL	BDL
CB-1232	"	"	1.0	BDL	BDL	BDL	BDL
CB-1248	"	"	1.0	BDL	BDL	BDL	BDL
CB-1260	"	"	1.0	BDL	BDL	BDL	BDL
CB-1016	"	"	1.0	BDL	BDL	BDL	BDL
OXAPHENE	"	"	1.0	BDL	BDL	BDL	BDL

Susan M. Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

*Below determinable limits.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 07AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1667 11-S 6-27-85	1668 13-S 6-27-85	1669 14-S 6-27-85	1670 MW-15M 6-27-85
DRIN	608	1	1.0	BDL*	BDL	BDL	BDL
PHA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
TA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
MME-BHC	"	"	1.0	BDL	BDL	BDL	BDL
LTA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
LORDANE	"	"	1.0	BDL	BDL	BDL	BDL
4'-DDT	"	"	1.0	BDL	BDL	BDL	BDL
4'-DDE	"	"	1.0	BDL	BDL	BDL	BDL
4'-DDD	"	"	1.0	BDL	BDL	BDL	BDL
ELDRIN	"	"	1.0	BDL	BDL	BDL	BDL
PHA-ENDOSULFAN	"	"	1.0	BDL	BDL	BDL	BDL
TA-ENDOSUFAN	"	"	1.0	BDL	BDL	BDL	BDL
DOSULFAN SULFATE	"	"	1.0	BDL	BDL	BDL	BDL
DRIN	"	"	1.0	BDL	BDL	BDL	BDL
DRINALDEHYDE	"	"	1.0	BDL	BDL	BDL	BDL
PTACHLOR	"	"	1.0	BDL	BDL	BDL	BDL
PTACHOROEPOXIDE	"	"	1.0	BDL	BDL	BDL	BDL
B-1242	"	"	1.0	BDL	BDL	BDL	BDL
B-1254	"	"	1.0	BDL	BDL	BDL	BDL
B-1221	"	"	1.0	BDL	BDL	BDL	BDL
B-1232	"	"	1.0	BDL	BDL	BDL	BDL
B-1248	"	"	1.0	BDL	BDL	BDL	BDL
B-1260	"	"	1.0	BDL	BDL	BDL	BDL
B-1016	"	"	1.0	BDL	BDL	BDL	BDL
XAPHENE	"	"	1.0	BDL	BDL	BDL	BDL

elow determinable limits.

Susan M. Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 08AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION			
				1671 MW-15S 6-27-85	1716 5S 6-28-85	1717 14M 6-28-85	1718 6S 6-28-85
LDRIN	608	1	1.0	BDL*	BDL	BDL	BDL
LPHA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
ETA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
AMME-BHC	"	"	1.0	BDL	BDL	BDL	BDL
ELTA-BHC	"	"	1.0	BDL	BDL	BDL	BDL
HLORDANE	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDT	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDE	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDD	"	"	1.0	BDL	BDL	BDL	BDL
IELDRIN	"	"	1.0	BDL	BDL	BDL	BDL
LPHA-ENDOSULFAN	"	"	1.0	BDL	BDL	BDL	BDL
ETA-ENDOSUFAN	"	"	1.0	BDL	BDL	BDL	BDL
NDOSULFAN SULFATE	"	"	1.0	BDL	BDL	BDL	BDL
NDRIN	"	"	1.0	BDL	BDL	BDL	BDL
NDRINALDEHYDE	"	"	1.0	BDL	BDL	BDL	BDL
EPTACHLOR	"	"	1.0	BDL	BDL	BDL	BDL
EPTACHOROEPOXIDE	"	"	1.0	BDL	BDL	BDL	BDL
CB-1242	"	"	1.0	BDL	BDL	BDL	BDL
CB-1254	"	"	1.0	BDL	BDL	BDL	BDL
CB-1221	"	"	1.0	BDL	BDL	BDL	BDL
CB-1232	"	"	1.0	BDL	BDL	BDL	BDL
CB-1248	"	"	1.0	BDL	BDL	BDL	BDL
CB-1260	"	"	1.0	BDL	BDL	BDL	BDL
CB-1016	"	"	1.0	BDL	BDL	BDL	BDL
OXAPHENE	"	"	1.0	BDL	BDL	BDL	BDL

elow determinable limits.

Susan M. Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

...VAN... E... IRON...NTAL ...YS..., ...

LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM-PIRNIE   A.E.S. JOB CODE 09AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION	
				1719 7S 6-28-85	1720 12M 6-28-85
LDRIN	608	1	1.0	BDL *	BDL
LPHA-BHC	"	"	1.0	BDL	BDL
ETA-BHC	"	"	1.0	BDL	BDL
AMME-BHC	"	"	1.0	BDL	BDL
ELTA-BHC	"	"	1.0	BDL	BDL
HLORDANE	"	"	1.0	BDL	BDL
,4´-DDT	"	"	1.0	BDL	BDL
,4´-DDE	"	"	1.0	BDL	BDL
,4´-DDD	"	"	1.0	BDL	BDL
IELDRIN	"	"	1.0	BDL	BDL
LPHA-ENDOSULFAN	"	"	1.0	BDL	BDL
ETA-ENDOSUFAN	"	"	1.0	BDL	BDL
NDOSULFAN SULFATE	"	"	1.0	BDL	BDL
NDRIN	"	"	1.0	BDL	BDL
NDRINALDEHYDE	"	"	1.0	BDL	BDL
EPTACHLOR	"	"	1.0	BDL	BDL
EPTACHOROEPOXIDE	"	"	1.0	BDL	BDL
CB-1242	"	"	1.0	BDL	BDL
CB-1254	"	"	1.0	BDL	BDL
CB-1221	"	"	1.0	BDL	BDL
CB-1232	"	"	1.0	BDL	BDL
CB-1248	"	"	1.0	BDL	BDL
CB-1260	"	"	1.0	BDL	BDL
CB-1016	"	"	1.0	BDL	BDL
OXAPHENE	"	"	1.0	BDL	BDL

elow determinable limits.

Susan M. Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1513 SW-1 6/10/85	1514 SW-2 6/10/85	1515 SW-3 6/10/85	1516 SW-4 6/10/85
RIDES	407B	6	1	21.2	61.3	1.3	105.8
	160.1	3	1	1,630	365	790	9,047
ATES	426C	6	1	76.7	25.3	18.6	92.1
	415.1	3	0.1	39.4	18.6	58.7	16.3
	9020	5	5 PPB	210	66	297	141

-MEASURED IN MICROGRAMS PER LITER
PPB

Marlene Cheryl Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 02AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION			
				1533	1534	1535	1536
				SW-1	SW-2	SW-3	SW-4
				6/12/85	6/12/85	6/12/85	6/12/85
IDES	407B	6	1	297.8	103.4	20.0	104.7
	160.1	3	1	1,217	483	954	1,453
TES	426C	6	1	270	61.4	32.6	63.3
	415.1	3	0.1	24.4	29.3	49.5	15.3
	9020	5	5 PPB	174	276	194	98

MEASURED IN MICROGRAMS PER LITER
PB

Marlene Cheryl Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 03AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION			
				1643 MW-1S 6/26/85	1644 MW-3S 6/26/85	1645 MW-4S 6/26/85	1646 MW-8S 6/26/85
LORIDES	407B	6	1	11.0	137.6	418.9	47.1
S	160.1	3	1	2,452	1,503	3,090	2,816
LFATES	426C	6	1	172	339	966	822
C	415.1	3	0.1	44.0	6.3	38.4	23.2
X*	9020	5	5 PPB	150	6	6	130

OX-MEASURED IN MICROGRAMS PER LITER
R PPB

Marlene Cheryl Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 04AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1647 MW-1M 6/26/85	1648 MW-2M 6/26/85	1665 M2-9M 6/27/85	1666 10-S 6/27/85
LORIDES	407B	6	1	43.1	13.4	10.3	3.8
S	160.1	3	1	2,127	2,215	2,283	3,000
LFATES	426C	6	1	1,458	1,033	1,307	265
C	415.1	3	0.1	4.1	3.8	3.4	126
K*	9020	5	5 PPB	226	BDL**	30	112

*X-MEASURED IN MICROGRAMS PER LITER
*DL-BELOW DETECTION LIMITS

Marlene Cheryl Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 05AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION			
				1667	1668	1669	1670
				11-S	13-S	14-S	MW-15M
				6/27/85	6/27/85	6/27/85	6/27/85
LORIDES	407B	6	1	56.0	3.6	121.3	13.2
S	160.1	3	1	2,330	257	166	1,949
LFATES	426C	6	1	417	133	322	1,080
C	415.1	3	0.1	57.8	83.2	46.0	4.6
X*	9020	5	5 PPB	170	290	17	96

OX-MEASURED IN MICROGRAMS PER LITER
R PPB

Marlene Cheryl Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 06AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION			
				1671 MW-15S 6/27/85	1716 5S 6/28/85	1717 14M 6/28/85	1718 6S 6/28/85
LORIDES	407B	6	1	182.4	6.8	18.9	72.4
S	160.1	3	1	1,379	2,264	1,153	2,512
LFATES	426C	6	1	8	366	909	13
C	415.1	3	0.1	72.3	35.4	11.4	30.8
X*	9020	5	5 PPB	100	BDL**	47	138

*X-MEASURED IN MICROGRAMS PER LITER
BDL-BELOW DETECTION LIMITS

Marlene Cheryl Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 07AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1719 7S 6/28/85	1720 12M 6/28/85
HLORIDES	407B	6	1	5.0	55.4
OS	160.1	3	1	3,412	2,672
ULFATES	426C	6	1	833	1,705
OC	415.1	3	0.1	71.9	3.6
OX*	9020	5	5 PPB	234	97

OX-MEASURED IN MICROGRAMS PER LITER
R PPB

Marlene Cheryl Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 03AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1513 SW 1 6-10-85	1514 SW 2 6-10-85	1515 SW 3 6-10-85	1516 SW 4 6-10-85
ILVER	272.1	3	0.10	BDL *	BDL	BDL	BDL
HROMIUM	218.1	3	0.50	BDL	BDL	BDL	BDL
ADMIUM	213.1	3	0.05	BDL	BDL	BDL	BDL
ERCURY	245.1	3	0.001	BDL	BDL	BDL	BDL
OPPER	220.1	3	0.20	BDL	BDL	BDL	BDL
INC	289.1	3	0.05	0.07	BDL	BDL	BDL
ERYLLIUM	210.1	3	0.05	BDL	BDL	BDL	0.09
ICKEL	249.1	3	0.30	BDL	BDL	BDL	BDL
ELENIUM	270.2	3	0.005	0.008	0.008	0.012	0.026
EAD	239.1	3	0.10	0.11	BDL	BDL	BDL
HALLIUM	279.1	3	1.00	BDL	BDL	BDL	BDL
RSENIC	206.2	3	0.005	0.035	0.011	0.045	0.032
NTIMONY	204.1	3	1.00	BDL	BDL	BDL	1.10

elow determinable limits.

Janette L. Bingert

JANETTE L. BINGERT
METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 03AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1533 SW 1 6-12-85	1534 SW 2 6-12-85	1535 SW 3 6-12-85	1536 SW 4 6-12-85
SILVER	272.1	3	0.10	BDL*	BDL	BDL	BDL
CHROMIUM	218.1	3	0.50	BDL	BDL	BDL	BDL
CADMIUM	213.1	3	0.05	BDL	BDL	BDL	BDL
MERCURY	245.1	3	0.001	BDL	BDL	BDL	BDL
COPPER	220.1	3	0.20	BDL	BDL	BDL	BDL
ZINC	289.1	3	0.05	0.26	0.16	0.21	0.22
BERYLLIUM	210.1	3	0.05	BDL	BDL	0.13	0.14
NICKEL	249.1	3	0.30	BDL	BDL	BDL	BDL
SELENIUM	270.2	3	0.005	0.011	0.027	0.013	BDL
LEAD	239.1	3	0.10	BDL	0.11	BDL	BDL
THALLIUM	279.1	3	1.0	BDL	BDL	BDL	BDL
ARSENIC	206.2	3	0.005	0.035	0.036	0.017	0.034
ANTIMONY	204.1	3	1.00	1.50	BDL	BDL	BDL

*Below determinable limits.

Janette L. Bingert

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METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 04AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1643 MW 1S 6-26-85	1644 MW 3S 6-26-85	1645 MW 4S 6-26-85	1646 MW 8S 6-26-85
ELENIUM	270.2	3	0.005	BDL *	0.008	BDL	BDL
RSENIC	206.2	3	0.005	0.029	0.024	0.062	0.054
ILVER	272.1	3	0.01	0.07	0.06	0.06	0.07
OPPER	220.1	3	0.20	BDL	BDL	BDL	BDL
HROMIUM	218.1	3	0.50	BDL	BDL	BDL	BDL
ADMIUM	213.1	3	0.05	BDL	BDL	BDL	BDL
EAD	239.1	3	1.00	BDL	BDL	BDL	BDL
ICKEL	249.1	3	0.30	BDL	BDL	BDL	BDL
INC	289.1	3	0.05	BDL	0.35	0.07	0.04
ERCURY	245.1	3	0.001	0.001	0.005	BDL	BDL
NTIMONY	204.1	3	1.00	1.00	BDL	BDL	BDL
HALLIUM	279.1	3	1.00	BDL	BDL	BDL	BDL
ERYLLIUM	210.1	3	0.05	BDL	BDL	BDL	BDL

*Below determinable limits.

Janette L. Bingert

JANETTE L. BINGERT
METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 05AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1647 MW 1M 6-26-85	1648 MW 2M 6-26-85	1665 MW 9M 6-27-85	1666 10 S 6-27-85
ELENIUM	270.2	3	0.005	BDL *	BDL	BDL	BDL
RSENIC	206.2	3	0.005	0.064	0.065	0.017	0.020
ILVER	272.1	3	0.01	0.07	0.06	0.08	0.06
OPPER	220.1	3	0.20	BDL	BDL	BDL	BDL
HROMIUM	218.1	3	0.50	BDL	BDL	BDL	BDL
EAD	239.1	3	1.00	1.76	BDL	1.64	BDL
ICKEL	249.1	3	0.30	BDL	BDL	BDL	BDL
INC	289.1	3	0.05	BDL	BDL	BDL	0.05
ERCURY	245.1	3	0.001	BDL	BDL	BDL	0.002
NTIMONY	204.1	3	1.00	BDL	BDL	BDL	BDL
HALLIUM	279.1	3	1.00	BDL	BDL	BDL	BDL
ERYLLIUM	210.1	3	0.05	BDL	BDL	0.05	BDL
ADMIUM	213.1	3	0.05	BDL	BDL	0.08	0.11

Below determinable limits.

Janette L. Bingert

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METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 06AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1667 11 S 6-27-85	1668 13 S 6-27-85	1669 14 S 6-27-85	1670 MW 15M 6-27-85
ELENIUM	270.2	3	0.005	BDL*	BDL	BDL	BDL
RSENIC	206.2	3	0.005	0.041	0.039	0.022	0.014
ILVER	272.1	3	0.01	0.07	0.08	0.08	0.07
OPPER	220.1	3	0.20	BDL	BDL	BDL	BDL
HROMIUM	218.1	3	0.50	BDL	BDL	BDL	BDL
ADMIUM	213.1	3	0.05	0.05	0.07	0.05	0.08
EAD	239.1	3	1.00	BDL	BDL	BDL	BDL
ICKEL	249.1	3	0.30	BDL	BDL	BDL	BDL
INC	289.1	3	0.05	0.36	0.23	0.36	BDL
ERCURY	245.1	3	0.001	BDL	BDL	0.001	BDL
NTIMONY	204.1	3	1.00	BDL	1.10	BDL	BDL
HALLIUM	279.1	3	1.00	BDL	BDL	BDL	BDL
ERYLLIUM	210.1	3	0.05	BDL	BDL	BDL	BDL

Below determinable limits.

Janette L. Bingert
JANETTE L. BINGERT
METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 07AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION			
				1671 MW 15S 6-27-85	1716 5 S 6-28-85	1717 14 M 6-28-85	1718 6 S 6-28-85
SELENIUM	270.2	3	0.005	BDL*	BDL	BDL	BDL
ARSENIC	206.2	3	0.005	0.042	0.023	0.005	0.009
SILVER	272.1	3	0.01	0.07	0.07	0.04	0.06
COPPER	220.1	3	0.20	BDL	BDL	BDL	BDL
CHROMIUM	218.1	3	0.50	BDL	BDL	BDL	BDL
CADMIUM	213.1	3	0.05	0.05	BDL	BDL	BDL
LEAD	239.1	3	1.00	BDL	2.04	BDL	BDL
NICKEL	249.1	3	0.30	BDL	BDL	BDL	BDL
ZINC	289.1	3	0.05	0.12	1.23	0.24	0.05
MERCURY	245.1	3	0.001	BDL	BDL	0.006	BDL
ANTIMONY	204.1	3	1.00	BDL	BDL	BDL	BDL
THALLIUM	279.1	3	1.00	BDL	BDL	BDL	BDL
BERYLLIUM	210.1	3	0.05	BDL	BDL	0.07	BDL

*Below determinable limits.

Janette L. Bingert

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METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 08AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1719 7S 6-28-85	1720 12 M 6-28-85
SELENIUM	270.2	3	0.005	BDL*	BDL
ARSENIC	206.2	3	0.005	0.010	0.007
SILVER	272.1	3	0.01	0.06	0.06
COPPER	220.1	3	0.20	BDL	BDL
CHROMIUM	218.1	3	0.50	BDL	BDL
CADMIUM	213.1	3	0.05	BDL	BDL
LEAD	239.1	3	1.00	BDL	BDL
NICKEL	249.1	3	0.30	BDL	BDL
ZINC	289.1	3	0.05	BDL	BDL
MERCURY	245.1	3	0.001	BDL	BDL
ANTIMONY	204.1	3	1.00	BDL	BDL
THALLIUM	279.1	3	1.00	BDL	BDL
BERYLLIUM	210.1	3	0.05	BDL	BDL

*Below determinable limits.

Janette L. Bingert

JANETTE L. BINGERT
METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: TEST CONTROL WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALLOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	TYPE	ORIGINAL CONC.	ADDED CONC.	EXPECTED CONC.	REPORTED CONC.	PERCENT RECOVERY	95% CONFIDENCE INTERVAL
LORIDES	EPA	85.3	-	85.3	83.6	98.0	N/A*
LPHATES	EPA	93.8	-	93.8	98.8	105.3	81.9-102.2
LPHATES	SPIKE	3.8	5.0	8.8	7.3	82.6	N/A
LPHATES	SPIKE	9.7	5.0	14.7	11.7	80.1	N/A
LPHATES	SPIKE	20.8	5.0	25.8	25.3	98.2	N/A
C	SPIKE	19.7	5.0	24.7	24.3	98.6	N/A
C	SPIKE	22.0	5.0	27.0	27.2	100.7	N/A
C	SPIKE	17.7	5.0	22.7	23.5	103.9	N/A
C	STD	10.0	-	10.0	10.1	101	N/A
X **	STD	5.0	-	5.0	5.67	112.2	N/A

/A-not available
TOX reported in micrograms/liter, or ppb.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: WET CHEMISTRY DUPLICATE
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
LORIDES	1513	20.4	22	21.1	1.5	7.3
LORIDES	1643	11.0	11.0	11.0	0.0	0.0
LORIDES	1668	3.5	3.6	3.6	0.1	3.1
S	1443	2,460	2,443	2,452	17	1
S	1647	1,874	2,379	2,127	504	24
S	1720	2,611	2,734	2,673	123	5
LFATES	1513	71.6	81.8	76.7	10.2	13.3
LFATES	1645	985	947	966	38	3.9
LFATES	1648	1,042	1,023	1,033	19	1.8
C	1643	44.6	43.4	44.0	1.2	2.6
C	1513	39.5	39.2	39.4	0.3	0.8
C	1647	4.2	4.1	4.1	0.1	2.5
C	1716	33.8	36.9	35.4	3.0	8.6
X 1	1535	215	174	194	41	21.2
X 1	1647	222	230	226	8	3.5
X 1	1648	BDL*	BDL	BDL	N/A**	N/A

DL-below detection limits
N/A-not applicable
lative Percent Difference =
nge/Average X 100
TOX reported in micrograms/liter, or ppb.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: TEST CONTROL METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 03AUP

ANALYSIS	TYPE	ORIGINAL CONC.	ADDED CONC.	EXPECTED CONC.	REPORTED CONC.	PERCENT RECOVERY	95% CONFIDENCE INTERVAL
SENIC	1533	0.035	0.050	0.085	0.066	78.0	NA*
SENIC	1506	0.093	0.050	0.143	0.121	85.0	NA
A (AS)	1178-1	0.027	NR**	0.027	0.027	100.0	0.0198-0.0342
PPER	1506	5.46	2.5	7.96	6.60	82.9	NA
AD	1506	8.60	20.0	28.6	29.1	101.7	NA
A (PB)	283-1	2.0	NR	2.0	1.7	85.0	NA
NC	1506	7.8	10.0	17.8	18.6	104.5	NA
TIMONY	1533	1.5	40.0	41.5	36.6	88.2	NA

*Not applicable/not available.
**Not required.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: TEST CONTROL METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 02AUP

ANALYSIS	TYPE	ORIGINAL CONC.	ADDED CONC.	EXPECTED CONC.	REPORTED CONC.	PERCENT RECOVERY	95% CONFIDENCE INTERVAL
NC	1644	0.35	1.0	1.35	1.14	84.4	NA*
NC	1670	BDL**	1.0	1.00	0.90	90.0	NA
RCURY	1667	BDL	0.005	0.005	0.005	100.0	NA
RCURY	1668	BDL	0.005	0.005	0.006	120.0	NA
TIMONY	1665	BDL	40.0	40.0	42.8	107.0	NA
TIMONY	1720	BDL	40.0	40.0	39.2	98.0	NA
A (SB)	81-3-2	0.972	NR***	0.972	1.0	97.2	0.375-1.37
ALLIUM	1665	BDL	20.0	20.0	20.0	100.0	NA
ALLIUM	1720	BDL	20.0	20.0	19.0	95.0	NA
RYLLIUM	1665	0.05	1.00	1.05	1.04	99.0	NA
RYLLIUM	1720	BDL	1.00	1.00	1.12	112.0	NA
A (BE)	481-2	0.235	NR	0.235	0.21	89.4	0.207-0.257
ROMIUM	1515	BDL	10.0	10.0	9.8	98.0	NA
ROMIUM	1516	BDL	10.0	10.0	9.1	91.0	NA
A (CR)	283-1	1.25	NR	1.25	1.43	114.4	NA
RCURY	1535	BDL	0.005	0.005	0.006	120.0	NA
PPER	1533	BDL	5.0	5.0	4.0	80.0	NA
A (CU)	481-2	0.339	NR	0.339	0.30	88.5	0.302-0.368
CKEL	1533	BDL	5.0	5.0	5.5	110.0	NA
LENIUM	1533	0.011	0.050	0.061	0.049	80.3	NA
A (SE)	481-2	0.050	NR	0.050	0.052	104.0	0.0313-0.0621
AD	1533	BDL	20.0	20.0	19.9	99.6	NA
ALLIUM	1533	BDL	10.0	10.0	9.7	97.0	NA

ot applicable/not available.
Below determinable limits.
*Not required.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: TEST CONTROL METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	TYPE	ORIGINAL CONC.	ADDED CONC.	EXPECTED CONC.	REPORTED CONC.	PERCENT RECOVERY	95% CONFIDENCE INTERVAL
SELENIUM	1667	BDL *	0.050	0.050	0.047	94.0	**N
SELENIUM	1648	BDL	0.050	0.050	0.058	116.0	N
EPA (SE)	1178-1	0.011	NR	0.011	0.009	81.8	0.0065-0.014
ARSENIC	1670	0.014	0.050	0.064	0.049	77.0	N
EPA (AS)	1178-1	0.027	NR ***	0.027	0.0264	97.8	0.0198-0.034
SILVER	1644	0.06	0.01	0.16	0.18	112.5	N
SILVER	1671	0.07	0.1	0.17	0.22	129.4	N
EPA (AG)	283-1	1.00	NR	1.00	0.65	65.0	N
COPPER	1644	BDL	2.5	2.5	2.58	103.2	N
COPPER	1671	BDL	2.5	2.5	2.24	89.6	N
EPA (CU)	481-2	0.339	NR	0.339	0.39	115.1	0.302-0.36
CHROMIUM	1644	BDL	10.0	10.0	9.18	91.8	N
CHROMIUM	1720	BDL	10.0	10.0	9.2	92.0	N
EPA (CR)	283-1	1.25	NR	1.25	1.25	100.0	N
CADMIUM	1644	BDL	1.0	1.0	1.1	110.0	N
CADMIUM	1720	BDL	1.0	1.0	1.16	116.0	N
EPA (CD)	283-1	0.7	NR	0.7	0.79	112.9	N
LEAD	1644	BDL	20.	20.0	18.36	91.8	N
LEAD	1670	BDL	20.0	20.0	22.82	114.1	N
EPA (PB)	283-1	2.00	NR	2.00	1.73	86.4	N
NICKEL	1644	BDL	5.0	5.0	4.48	89.6	N
NICKEL	1670	BDL	5.0	5.0	5.08	101.6	N
EPA (NI)	475-6	0.30	NR	0.30	0.31	103.3	0.248-0.35

*Below determinable limits.
**Not applicable/not available.
***Not required.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: METALS DUPLICATE
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
CHROMIUM	1515	BDL*	BDL	NA**	NA	NA
CHROMIUM	1516	BDL	BDL	NA	NA	NA
CADMIUM	1536	BDL	BDL	NA	NA	NA
MERCURY	1533	BDL	BDL	NA	NA	NA
COPPER	1533	BDL	BDL	NA	NA	NA
ZINC	1533	0.26	0.23	0.245	0.03	12.2
BERYLLIUM	1533	0.03	0.06	0.045	0.03	66.7
NICKEL	1533	BDL	BDL	NA	NA	NA
SELENIUM	1533	0.011	0.0168	0.0139	0.0058	41.7
LEAD	1533	BDL	BDL	NA	NA	NA
THALLIUM	1533	BDL	BDL	NA	NA	NA
ARSENIC	1533	0.0344	0.0357	0.0350	0.0013	3.71
ARSENIC	1505	0.093	0.108	0.1005	0.015	14.9
COPPER	1505	5.88	5.92	5.900	0.04	0.68
LEAD	1505	1.78	1.59	1.685	0.19	11.28
ZINC	1505	4.3	3.2	3.75	0.9	24.0
ANTIMONY	1533	1.5	1.40	1.45	0.1	6.9

Relative Percent Difference =
Range/Average X 100

Below determinable limits.
*Not applicable/not available.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: METALS DUPLICATE
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
SELENIUM	1667	BDL *	BDL	NA **	NA	NA
SELENIUM	1648	BDL	BDL	NA	NA	NA
ARSENIC	1670	0.014	0.021	0.0175	0.007	40.0
SILVER	1644	0.06	0.08	0.07	0.02	28.6
SILVER	1671	0.07	0.06	0.065	0.01	15.4
COPPER	1644	BDL	BDL	NA	NA	NA
COPPER	1671	BDL	BDL	NA	NA	NA
CHROMIUM	1644	BDL	BDL	NA	NA	NA
CHROMIUM	1720	BDL	BDL	NA	NA	NA
CADMIUM	1644	BDL	BDL	NA	NA	NA
CADMIUM	1720	BDL	BDL	NA	NA	NA
LEAD	1644	BDL	BDL	NA	NA	NA
LEAD	1670	BDL	BDL	NA	NA	NA
NICKEL	1644	BDL	BDL	NA	NA	NA
NICKEL	1670	BDL	BDL	NA	NA	NA
ZINC	1644	0.35	0.29	0.32	0.06	18.75
ZINC	1670	BDL	BDL	NA	NA	NA
MERCURY	1665	BDL	0.001	0.0005	0.001	NA
MERCURY	1666	0.002	BDL	0.001	0.001	NA
ANTIMONY	1665	BDL	BDL	NA	NA	NA
ANTIMONY	1720	BDL	BDL	NA	NA	NA
THALLIUM	1665	BDL	BDL	NA	NA	NA
THALLIUM	1720	BDL	BDL	NA	NA	NA
BERYLLIUM	1665	BDL	BDL	NA	NA	NA
BERYLLIUM	1720	BDL	BDL	NA	NA	NA

Relative Percent Difference = Range/Average X 100

BDL Below determinable limits.
*Not applicable/not available.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - QUALITY CONTROL DUPLICATE
UNITS OF MEASURE: MILLIGRAM/KILOGRAM, OR PPM
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 03AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
IO SCAN	1505	<1.0	<1.0	NA *	NA	NA

lative Percent Difference =
nge/Average X 100
ot applicable/not available.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - TEST CONTROLS
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	TYPE	ORIGINAL CONC.	ADDED CONC.	EXPECTED CONC.	REPORTED CONC.	PERCENT RECOVERY	95% CONFIDENCE INTERVAL
INDANE - 1506 (mg/kg,ppm)	SPIKE	<0.6	20.99	20.99	12.06	57.5	9.6 - 32.6
INDANE - 1646	"	<1.0	85.83	85.83	88.63	103.3	39.4 - 133.2
NDRIN	EPA	2.00	---	2.00	2.38	118.9	1.28 - 2.44

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

LABORATORY REPORT

TYPE OF ANALYSIS: GC - QUALITY CONTROL DUPLICATE
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
LDRIN	1644	<1.0	<1.0	NA*	NA	NA
LPHA BHC	"	<1.0	<1.0	NA	NA	NA
ETA BHC	"	<1.0	<1.0	NA	NA	NA
AMMA BHC	"	<1.0	<1.0	NA	NA	NA
ELTA BHC	"	<1.0	<1.0	NA	NA	NA
HLORDANE	"	<1.0	<1.0	NA	NA	NA
,4´-DDT	"	<1.0	<1.0	NA	NA	NA
,4´-DDE	"	<1.0	<1.0	NA	NA	NA
,4´-DDD	"	<1.0	<1.0	NA	NA	NA
IELDRIN	"	<1.0	<1.0	NA	NA	NA
LPHA-ENDOSULFAN	"	<1.0	<1.0	NA	NA	NA
ETA-ENDOSULFAN	"	<1.0	<1.0	NA	NA	NA
NDOSULFAN SULFATE	"	<1.0	<1.0	NA	NA	NA
NDRIN	"	<1.0	<1.0	NA	NA	NA
NDRIN ALDEHYDE	"	<1.0	<1.0	NA	NA	NA
EPTACHLOR	"	<1.0	<1.0	NA	NA	NA
EPTACHLOR EPOXIDE	"	<1.0	<1.0	NA	NA	NA
CB-1242	"	<1.0	<1.0	NA	NA	NA
CB-1254	"	<1.0	<1.0	NA	NA	NA
CB-1221	"	<1.0	<1.0	NA	NA	NA
CB-1232	"	<1.0	<1.0	NA	NA	NA
CB-1248	"	<1.0	<1.0	NA	NA	NA
CB-1260	"	<1.0	<1.0	NA	NA	NA
CB-1016	"	<1.0	<1.0	NA	NA	NA
OXAPHENE	"	<1.0	<1.0	NA	NA	NA

elative Percent Difference =
ange/Average X 100
Not applicable/not available.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

LABORATORY REPORT

TYPE OF ANALYSIS: GC - QUALITY CONTROL DUPLICATE
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 02AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
LDRIN	1716	<1.0	<1.0	NA*	NA	NA
LPHA BHC	"	<1.0	<1.0	NA	NA	NA
ETA BHC	"	<1.0	<1.0	NA	NA	NA
AMMA BHC	"	<1.0	<1.0	NA	NA	NA
ELTA BHC	"	<1.0	<1.0	NA	NA	NA
HLORDANE	"	<1.0	<1.0	NA	NA	NA
,4´-DDT	"	<1.0	<1.0	NA	NA	NA
,4´-DDE	"	<1.0	<1.0	NA	NA	NA
,4´-DDD	"	<1.0	<1.0	NA	NA	NA
IELDRIN	"	<1.0	<1.0	NA	NA	NA
LPHA-ENDOSULFAN	"	<1.0	<1.0	NA	NA	NA
ETA-ENDOSULFAN	"	<1.0	<1.0	NA	NA	NA
NDOSULFAN SULFATE	"	<1.0	<1.0	NA	NA	NA
NDRIN	"	<1.0	<1.0	NA	NA	NA
NDRIN ALDEHYDE	"	<1.0	<1.0	NA	NA	NA
EPTACHLOR	"	<1.0	<1.0	NA	NA	NA
EPTACHLOR EPOXIDE	"	<1.0	<1.0	NA	NA	NA
CB-1242	"	<1.0	<1.0	NA	NA	NA
CB-1254	"	<1.0	<1.0	NA	NA	NA
CB-1221	"	<1.0	<1.0	NA	NA	NA
CB-1232	"	<1.0	<1.0	NA	NA	NA
CB-1248	"	<1.0	<1.0	NA	NA	NA
CB-1260	"	<1.0	<1.0	NA	NA	NA
CB-1016	"	<1.0	<1.0	NA	NA	NA
OXAPHENE	"	<1.0	<1.0	NA	NA	NA

elative Percent Difference =
ange/Average X 100
ot applicable/not available.

ANALYTICAL METHODOLOGIES REFERENCE LIST

Routine Analyses are Performed in Accordance with Protocols Found in the Following Numbered Sources. These Numbers Correspond to those Listed in the Laboratory Report Under the Reference ("REF") Column.

1 - EPA 600/D-80-021, "Guidelines Establishing Test Procedures for the Analysis of Pollutants; Proposed Regulations", Federal Register 44(233), December 3, 1979.

2 - EPA 600/D-80-022, "Guidelines Establishing Test Procedures for the Analysis of Pollutants; Proposed Regulations, Correction", Federal Register 44(244), December 18, 1979.

3 - EPA 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", (1983)

4 - EPA 600/4-79-057, "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", (1982)

5 - EPA-SW-846, "Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods", second edition (1982)

6 - "Standard Methods for the Examination of Water and Wastewater", 15th Edition, (1980)

7 - New York State Institute of Toxicology Analytical Handbook, October 1982

8 - NIOSH Manual of Analytical Methods, second edition 1977

9 - "The Analysis of Polychlorinated Biphenyls in Transformer Fluid and Waste Oil", EPA Environmental Monitoring and Support Laboratory, draft, June 24, 1980

APPENDIX A

CHAIN OF CUSTODY

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD:

ANALYSIS FOR CHARACTERISTICS OF HAZARDOUS WASTE

CLIENT NAME: Amherst 763-151-115

LOCATION: GBCA, Hopkins Rd, Amherst

REPRESENTATIVE SAMPLE DESCRIPTION	COLLECTED BY/DATE	SAMPLING METHOD	CHARACTERISTIC(S) TO BE TESTED*	HANDLING PRECAUTIONS	RECEIVED BY/DATE	PRESERVATION METHOD	TESTED BY/DATE
8 soil composites	KCO 5/1/85	~~split spoon~~	TOH (Halogenated organic scan)		M. Brau 6/10/85 3:05		
8 soil composites	KCO 5/1/85	~~split spoon~~	Arsenic Lead Zinc Copper				

COMMENTS: _____

* I = IGNITABILITY
C = CORROSIVITY
R = REACTIVITY
EM = EP TOXICITY (Metals)
EO = EP TOXICITY (Organics)

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD:

ANALYSIS FOR CHARACTERISTICS OF HAZAROOUS WASTE

CLIENT NAME: Amherst 363-151-115

LOCATION: Hopkins Rd, GBC & Cons. Hwy, Amherst

RESENTATIVE SAMPLE ESCRIPTION	COLLECTED BY/DATE	SAMPLING METHOD	CHARACTERISTIC(S) TO BE TESTED:*	HANDLING PRECAUTIONS	RECEIVED BY/DATE	PRESERVATION METHOD	TESTED BY/DATE
surface ater	KEO 6/10/85	grab	TOX, TOS, Cl, Sulfates		M. Brun 6/10/85 3:05	cooled	
surface ater	KEO 6/10/85	grab	Priority pollutant pesticides			cooled	
surface water	KEO 6/10/85	grab	Priority pollutant metals			HNO_3 (cooled)	
surface water	KEO 6/10/85	grab	TOC			H_2SO_4 chilled	

COMMENTS: _____

_____

_____

* I = IGNITABILITY
C = CORROSIVITY
R = REACTIVITY
EM = EP TOXICITY (Metals)
EO = EP TOXICITY (Organics)

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD:

ANALYSIS FOR CHARACTERISTICS OF HAZARDOUS WASTE

CLIENT NAME: Amherst 363-151-115

LOCATION: Hopkins Rd, Amherst, N.Y.

REPRESENTATIVE SAMPLE DESCRIPTION	COLLECTED BY/DATE	SAMPLING METHOD	CHARACTERISTIC(S) TO BE TESTED:*	HANDLING PRECAUTIONS	RECEIVED BY/DATE	PRESERVATION METHOD	TESTED BY/DATE
surface water samples	KEO 6/12/84	grab samples	TOC		Karen Kukla 6/13/85	H_2SO_4 pH<2 (cooled)	
surface water samples	KEO 6/12/84	grab samples	priority pollutant metals			HNO_3 (cooled) pH<2	
surface water samples	KEO 6/12/84	grab samples	priority pollutant pesticides			cooled 4°C	
surface water samples	KEO 6/12/84	grab samples	TOX, TOS Chloride Sulfate			cooled 4°C	

COMMENTS: ~~samples labelled~~ SW-1, SW-2, SW-3, SW-4

* I = IGNITABILITY
C = CORROSIVITY
R = REACTIVITY
EM = EP TOXICITY (Metals)
EO = EP TOXICITY (Organics) ~~Pesticides~~

- [redacted]

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD:

ANALYSIS FOR CHARACTERISTICS
OF HAZARDOUS WASTE

CLIENT NAME: Amherst 363-151-115

LOCATION: Hopkins Rd, Amherst

PRESENTATIVE SAMPLE DESCRIPTION	COLLECTED BY/DATE	SAMPLING METHOD	CHARACTERISTIC(S) TO BE TESTED:*	HANDLING PRECAUTIONS	RECEIVED BY/DATE	PRESERVATION METHOD	TESTED BY/DATE
ground water samples	6/26 PM KEO	bailer	Chlorides Sulfates TOX TOS		Kezquett 6/27/85	cooled 4°C	
ground water amples	same	bailer	priority pollutant. pestiddes			cooled 4°C	
ground ater amples	same	bailer	priority pollutant heavy metals			HNO_3 (cooled)	
ground ater amples	same	bailer	TOC			H_2SO_4 (cooled)	

COMMENTS: I.D. # MW-1S, MW-1M, MW-2M, MW-3S MW-4S, MW-8S

* I = IGNITABILITY
C = CORROSIVITY
R = REACTIVITY
EM = EP TOXICITY (Metals)
ED = EP TOXICITY (Organics)

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD:

ANALYSIS FOR CHARACTERISTICS
OF HAZARDOUS WASTE

CLIENT NAME: Amherst 363-151-115

LOCATION: Hopkins Rd, Amherst

REPRESENTATIVE SAMPLE DESCRIPTION	COLLECTED BY/DATE	SAMPLING METHOD	CHARACTERISTIC(S) TO BE TESTED:*	HANDLING PRECAUTIONS	RECEIVED BY/DATE	PRESERVATION METHOD	TESTED BY/DATE
ground water samples	6/27 PM 900	bailer	Chlorides Sulfates TOX TOS		AES	cooled 4°C	
ground water samples	"	bailer	priority pollutant. pestidides		"	cooled 4°C	
ground water samples	"	bailer	priority pollutant heavy metals		"	HNO_3 (cooled)	
ground water samples	"	bailer	TOC		"	H_2SO_4 (cooled)	

COMMENTS: ID # MW-9M, MW-11S, MW-10S, MW-13S, MW-14S MW-15S, MW-15M

* I = IGNITABILITY
C = CORROSIVITY
R = REACTIVITY
EM = EP TOXICITY (Metals)
EO = EP TOXICITY (Organics)

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD:

ANALYSIS FOR CHARACTERISTICS
OF HAZARDOUS WASTE

CLIENT NAME: Amherst 363-151-115

LOCATION: Hopkins Rd, Amherst

REPRESENTATIVE SAMPLE DESCRIPTION	COLLECTED BY/DATE	SAMPLING METHOD	CHARACTERISTIC(S) TO BE TESTED:*	HANDLING PRECAUTIONS	RECEIVED BY/DATE	PRESERVATION METHOD	TESTED BY/DATE
5 ground water samples	RCO + S 6/28/95	bailer	Chlorides Sulfates TOX TOS		M/Brau 6/28/95	cooled 4°C	
5 ground water samples	same	bailer	priority pollutant. pesticides			cooled 4°C	
ground water samples	same	bailer	priority pollutant heavy metals			HNO_3 (cooled)	
ground water samples	same	bailer	TOC			H_2SO_4 (cooled)	

total 20 samples

COMMENTS: IDW MW-5S, MW-6S MW-7S, MW-12M MW-14M

* I = IGNITABILITY
C = CORROSIVITY
R = REACTIVITY
EM = EP TOXICITY (Metals)
EO = EP TOXICITY (Organics)

ANALYSIS OF EIGHTEEN (18) GROUNDWATER SAMPLES

COLLECTED JULY 19, 1985

Report Prepared For

MALCOLM-PIRNIE, INC.

By

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

W. Joseph McDougall

W. Joseph McDougall, Ph.D.
Technical Evaluation

August 26, 1985
AES Report AUP

SCOPE OF WORK

Under the direction of Mr. Kent McManus and Mr. Kevin Owen, this subject work was performed to fulfill an analytical requirement for Malcolm-Pirnie, Inc.'s. client, The Town of Amherst, New York.

RECEIPT OF SAMPLES

Samples were collected throughout the month of July 1985. After sampling completion for each sampling day, Malcolm-Pirnie, Inc. personnel transported the samples collected directly to the Advanced Environmental Systems, Inc. laboratory. At that time, Chain of Custody (Appendix A) was relinquished to Advanced Environmental Systems, Inc. personnel.

ANALYTICAL METHODOLOGIES

The method numbers for each procedure are listed in the second column of the tabulated results. The source for each method is listed as a reference number in the third column. The complete Analytical Methodologies Reference List is provided in Appendix A.

COMMENT

Concentrations of chlorides, calcium and aluminum form compounds with arsenic which cannot easily be disassociated in a furnace analysis. Matrix modification was used in this analysis to control interferences. The analysis of an EPA Standard fit into the 95% confidence interval.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 08AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1868 MW-2M 7/19/85	1869 MW-3S 7/19/85	1870 MW-4S 7/19/85	1871 MW-5S 7/19/85
SULFATES	426C	6	1	1,347	813.3	1,331	529.6
TOTAL DISSOLVED SOLIDS	160.1	3	1	N/S *	2,059	3,054	1,982
CHLORIDES	407B	6	1	N/S	13.0	23.8	2.6
TOTAL ORGANIC CARBON	415.1	3	0.1	1.4	0.7	11.7	18.0
TOX**	9020	5	5 PPB	37.3	108.3	70.0	184.8

*No sample due to laboratory accident.
**Expressed in micrograms per liter or ppb.

Marlene Cheryl Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 09AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1872 MW-6S 7/19/85	1873 MW-7S 7/19/85	1874 MW-8S 7/19/85
SULFATES	426C	6	1	329.3	1,097	1,447
TOTAL DISSOLVED SOLIDS	160.1	3	1	2,694	3,162	3,616
CHLORIDES	407B	6	1	6.0	BDL*	396
TOTAL ORGANIC CARBON	415.1	3	0.1	21.2	32.4	13.2
TOX **	9020	5	5 PPB	274.3	325.8	143.7

BDL Below determinable limits.
*Expressed in micrograms per liter or ppb

Marlene Cheryl Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 10AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION			
				1875 MW-10S 7/19/85	1876 MW-12M 7/19/85	1877 MW-13S 7/19/85	1878 MW-15M 7/19/85
SULFATES	426C	6	1	696.5	1,815	512.9	1,581
TOTAL DISSOLVED SOLIDS	160.1	3	1	3,169	2,841	1,724	2,411
CHLORIDES	407B	6	1	BDL *	55.7	2.1	13.5
TOTAL ORGANIC CARBON	415.1	3	0.1	61.7	1.6	46.6	2.0
TOX **	9020	5	5 PPB	374	BDL	246	78

*Below determinable limits.
**Expressed in micrograms per liter or ppb.

Marlene Cheryl Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 11AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1879 MW-15S 7/19/85	1880 MW-1S 7/19/85	1881 MW-1M 7/19/85
SULFATES	426C	6	1	17.2	371.1	1,718
TOTAL DISSOLVED SOLIDS	160.1	3	1	1,580	2,634	2,658
CHLORIDES	407B	6	1	1.0	1.6	35.9
TOTAL ORGANIC CARBON	415.1	3	0.1	30.0	22.6	1.6
TOX *	9020	5	5 PPB	62	BDL **	20
CYANIDES	412E	6	0.1	N/R ***	BDL	BDL
PHENOLS	420.1	3	0.1	N/R	BDL	BDL

*Expressed in micrograms per liter or ppb.
**Below determinable limits.
***Not required.

Marlene C. Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 12AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1882 MW-9M 7/19/85	1883 MW-11S 7/19/85	1884 MW-14M 7/19/85	1885 MW-14S 7/19/85
SULFATES	426C	6	1	1,548	746.5	1,414	446.1
TOTAL DISSOLVED SOLIDS	160.1	3	1	2,305	2,258	2,046	1,291
CHLORIDES	407B	6	1	13.0	2.6	19.3	20.3
TOTAL ORGANIC CARBON	415.1	3	0.1	1.6	33.0	3.2	29.0
TOX *	9020	5	5 PPB	49.7	BDL **	30.7	107.9
CYANIDES	412E	6	0.1	BDL	BDL	BDL	BDL
PHENOLS	420.1	3	0.1	BDL	BDL	BDL	BDL

*Expressed in micrograms per liter or ppb.
**Below determinable limits.

Marlene C. Moyer

MARLENE C. MOYER
WET CHEMISTRY DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: WET CHEMISTRY DUPLICATE
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 13AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
SULPHATES	1868	1,347	1,347	1,347	-	-
SULPHATES	1880	379.4	362.7	371.1	16.7	4.5
TOTAL DISSOLVED SOLIDS	1869	2,320.6	1,797.1	2,058.85	523.5	25.4
TOX *	1872	288.0	260.6	274.3	27.4	10
TOX	1874	150.0	137.34	143.67	12.66	8.8
CYANIDES	1884	BDL**	BDL	BDL	N/AP***	N/AP
PHENOLS	1884	0.34	0.19	0.27	0.15	55
TOTAL ORGANIC CARBON	1874	13.3	13	13.2	0.2	1.6
CHLORIDES	1873	BDL	BDL	BDL	N/AP	N/AP
TOTAL DISSOLVED SOLIDS	1870	3,118.2	2,989.1	3,053.65	129.1	4.2
TOTAL DISSOLVED SOLIDS	1877	1,717.0	1,731.4	1,724.2	14.4	0.8
TOX	1884	30.6	30.8	30.7	0.2	0.7

Relative Percent Difference =
Range/Average X 100
*Expressed in micrograms per liter or ppb.
**Below determinable limits.
***Not applicable.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: TEST CONTROL WET CHEMISTRY
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 14AUP

ANALYSIS	TYPE	ORIGINAL CONC.	ADDED CONC.	EXPECTED CONC.	REPORTED CONC.	PERCENT RECOVERY	95% CONFIDENCE INTERVAL
SULPHATES	EPA	93.8	-	93.8	97.1	103.5	81.9-102.
SULPHATES	SPK	26.95	5.0	31.95	31.28	97.9	N/AV *
SULPHATES	SPK	7.42	5.0	12.42	12.93	104.1	"
PHENOLS	SPK	0.13	6.0	6.13	6.55	106.9	"
CHLORIDES	EPA	85.3	-	85.3	88.5	103.8	"
TOTAL ORGANIC CARBON	SPK	6.6	5.0	11.6	11.3	99.3	"
TOTAL ORGANIC HALIDES	STD	5.0	-	5.0	4.08	81.6	"
CYANIDES	SPK	BDL**	3.8	3.8	0.38	10***	"

*Not available.
**Below determinable limits.
***Reason for low recovery unknown.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

LABORATORY REPORT

TYPE OF ANALYSIS: BASE/NEUTRAL EXTRACTABLES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION #1880 MW-1S 7/19/85	#1881 MW-1M 7/19/85	#1882 MW-9M 7/19/85	#1883 MW-11S 7/19/85
N-NITROSODIMETHYLAMINE	625	1	10	BDL*	BDL	BDL	BDL
BIS(2-CHLOROETHYL)ETHER	"	"	10	BDL	BDL	BDL	BDL
1,3-DICHLOROBENZENE	"	"	10	BDL	BDL	BDL	BDL
1,4-DICHLOROBENZENE	"	"	10	BDL	BDL	BDL	BDL
1,2-DICHLOROBENZENE	"	"	10	BDL	BDL	BDL	BDL
BIS(2-CHLOROISOPROPYL) ETHER	"	"	10	BDL	BDL	BDL	BDL
HEXACHLOROETHANE	"	"	10	BDL	BDL	BDL	BDL
N-NITROSODI-N-PROPYLAMINE	"	"	10	BDL	BDL	BDL	BDL
NITROBENZENE	"	"	10	BDL	BDL	BDL	BDL
ISOPHORONE	"	"	10	BDL	BDL	BDL	BDL
BIS(2-CHLOROETHOXY)METHANE	"	"	10	BDL	BDL	BDL	BDL
1,2,4-TRICHLOROBENZENE	"	"	10	BDL	BDL	BDL	BDL
NAPHTHALENE	"	"	10	BDL	BDL	BDL	BDL
HEXACHLOROBUTADIENE	"	"	10	BDL	BDL	BDL	BDL
HEXACHLOROCYLOPENTADIENE	"	"	10	BDL	BDL	BDL	BDL
2-CHLORONAPHTHALENE	"	"	10	BDL	BDL	BDL	BDL
DIMETHYLPHTHALATE	"	"	10	BDL	BDL	BDL	BDL
ACENAPHTHYLENE	"	"	10	BDL	BDL	BDL	BDL
2,6-DINITROTOLUENE	"	"	10	BDL	BDL	BDL	BDL
ACENAPHTHENE	"	"	10	BDL	BDL	BDL	BDL
2,4-DINITROTOLUENE	"	"	10	BDL	BDL	BDL	BDL
DIETHYLPHTHALATE	"	"	10	BDL	BDL	BDL	BDL

*Below determinable limits.

Susan C. Scrocchi

SUSAN C. SCROCCHI
G. C. SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: BASE/NEUTRAL EXTRACTABLES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 03AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION		
				#1884 MW-14M 7/19/85	#1885 MW-14S 7/19/85	BLANK
-NITROSODIMETHYLAMINE	625	1	10	BDL*	BDL	BDL
IS(2-CHLOROETHYL)ETHER	"	"	10	BDL	BDL	BDL
,3-DICHLOROBENZENE	"	"	10	BDL	BDL	BDL
,4-DICHLOROBENZENE	"	"	10	BDL	BDL	BDL
,2-DICHLOROBENZENE	"	"	10	BDL	BDL	BDL
IS(2-CHLOROISOPROPYL) THER	"	"	10	BDL	BDL	BDL
EXACHLOROETHANE	"	"	10	BDL	BDL	BDL
-NITROSODI-N-PROPYLAMINE	"	"	10	BDL	BDL	BDL
ITROBENZENE	"	"	10	BDL	BDL	BDL
SOPHORONE	"	"	10	BDL	BDL	BDL
IS(2-CHLOROETHOXY)METHANE	"	"	10	BDL	BDL	BDL
,2,4-TRICHLOROBENZENE	"	"	10	BDL	BDL	BDL
APHTHALENE	"	"	10	BDL	BDL	BDL
EXACHLOROBUTADIENE	"	"	10	BDL	BDL	BDL
EXACHLOROCYLOPENTADIENE	"	"	10	BDL	BDL	BDL
-CHLORONAPHTHALENE	"	"	10	BDL	BDL	BDL
IMETHYLPHTHALATE	"	"	10	BDL	BDL	BDL
CENAPHTHYLENE	"	"	10	BDL	BDL	BDL
,6-DINITROTOLUENE	"	"	10	BDL	BDL	BDL
CENAPHTHENE	"	"	10	BDL	BDL	BDL
,4-DINITROTOLUENE	"	"	10	BDL	BDL	BDL
IETHYLPHTHALATE	"	"	10	BDL	BDL	BDL

*Below determinable limits.

Susan C. Scrocchi
SUSAN C. SCROCCHI
G. C. SUPERVISOR

ADV ED VIR EN SY MS, NC.

LABORATORY REPORT

TYPE OF ANALYSIS: BASE/NEUTRAL EXTRACTABLES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 02AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION #1880 MW-1S 7/19/85	#1881 MW-1M 7/19/85	#1882 MW-9M 7/19/85	#1883 MW-11S 7/19/85
FLUORENE	625	1	10	BDL*	BDL	BDL	BDL
4-CHLOROPHENYLPHENYLETHER	"	"	10	BDL	BDL	BDL	BDL
DIPHENYLAMINE(N-NITROSO)	"	"	10	BDL	BDL	BDL	BDL
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	"	"	10	BDL	BDL	BDL	BDL
4-BROMOPHENYLPHENYLETHER	"	"	10	BDL	BDL	BDL	BDL
HEXACHLOROBENZENE	"	"	10	BDL	BDL	BDL	BDL
PHENANTHRENE	"	"	10	BDL	BDL	BDL	BDL
ANTHRACENE	"	"	10	BDL	BDL	BDL	BDL
DI-N-BUTYLPHATHALTE	"	"	10	BDL	BDL	BDL	BDL
FLUORANTHENE	"	"	10	BDL	BDL	BDL	BDL
BENZIDINE	"	"	10	BDL	BDL	BDL	BDL
PYRENE	"	"	10	BDL	BDL	BDL	BDL
BUTYLBENZYLPHTHALATE	"	"	10	BDL	BDL	BDL	BDL
BENZO(a)ANTRACENE	"	"	10	BDL	BDL	BDL	BDL
3,3´-DICHLOROBENZIDINE	"	"	10	BDL	BDL	BDL	BDL
CHRYSENE	"	"	10	BDL	BDL	BDL	BDL
BIS(2-ETHYLHEXYL)PHTHALATE	"	"	10	82	54	62	51
DI-N-OCTYLPHTHALATE	"	"	10	BDL	BDL	BDL	BDL
BENZO(b)FLUORANTHENE	"	"	10	BDL	BDL	BDL	BDL
BENZO(k)FLUORANTHENE	"	"	10	BDL	BDL	BDL	BDL
BENZO(a)PYRENE	"	"	10	BDL	BDL	BDL	BDL
INDENO(1,2,3-C,D)PYRENE	"	"	10	BDL	BDL	BDL	BDL
DIBENZO(a,h)ANTHRACENE	"	"	10	BDL	BDL	BDL	BDL
BENZO(g,h,i)PERYLENE	"	"	10	BDL	BDL	BDL	BDL

*Below determinable limits.

Susan C. Scrocchi

SUSAN C. SCROCCHI
G. C. SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: BASE/NEUTRAL EXTRACTABLES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 04AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION #1884 MW-14M 7/19/85	#1885 MW-14S 7/19/85	BLANK
FLUORENE	625	1	10	BDL*	BDL	BDL
4-CHLOROPHENYLPHENYLETHER	"	"	10	BDL	BDL	BDL
DIPHENYLAMINE(N-NITROSO)	"	"	10	BDL	BDL	BDL
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	"	"	10	BDL	BDL	BDL
4-BROMOPHENYLPHENYLETHER	"	"	10	BDL	BDL	BDL
HEXACHLOROBENZENE	"	"	10	BDL	BDL	BDL
PHENANTHRENE	"	"	10	BDL	BDL	BDL
ANTHRACENE	"	"	10	BDL	BDL	BDL
DI-N-BUTYLPHATHALTE	"	"	10	BDL	BDL	BDL
FLUORANTHENE	"	"	10	BDL	BDL	BDL
BENZIDINE	"	"	10	BDL	BDL	BDL
PYRENE	"	"	10	BDL	BDL	BDL
BUTYLBENZYLPHTHALATE	"	"	10	BDL	BDL	BDL
BENZO(a)ANTRACENE	"	"	10	BDL	BDL	BDL
3,3´-DICHLOROBENZIDINE	"	"	10	BDL	BDL	BDL
CHRYSENE	"	"	10	BDL	BDL	BDL
BIS(2-ETHYLHEXYL)PHTHALATE	"	"	10	33	44	12
DI-N-OCTYLPHTHALATE	"	"	10	BDL	BDL	BDL
BENZO(b)FLUORANTHENE	"	"	10	BDL	BDL	BDL
BENZO(k)FLUORANTHENE	"	"	10	BDL	BDL	BDL
BENZO(a)PYRENE	"	"	10	BDL	BDL	BDL
INDENO(1,2,3-C,D)PYRENE	"	"	10	BDL	BDL	BDL
DIBENZO(a,h)ANTHRACENE	"	"	10	BDL	BDL	BDL
BENZO(g,h,i)PERYLENE	"	"	10	BDL	BDL	BDL

*Below determinable limits.

Susan C. Scrocchi

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G. C. SUPERVISOR

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LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1868 MW-2M 7-19-85	1869 MW-3S 7-19-85	1870 MW-4S 7-19-85	1871 MW-5S 7-19-85
DRIN	608	1	1.0	BDL *	BDL	BDL	BDL
pha-BHC	"	"	1.0	BDL	BDL	BDL	BDL
ta-BHC	"	"	1.0	BDL	BDL	BDL	BDL
mma-BHC	"	"	1.0	BDL	BDL	BDL	BDL
lta-BHC	"	"	1.0	BDL	BDL	BDL	BDL
LORDANE	"	"	10.0	BDL	BDL	BDL	BDL
4´-DDT	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDE	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDD	"	"	1.0	BDL	BDL	BDL	BDL
ELDRIN	"	"	1.0	BDL	BDL	BDL	BDL
pha-ENDOSULFAN	"	"	1.0	BDL	BDL	BDL	BDL
ta-ENDOSUFAN	"	"	1.0	BDL	BDL	BDL	BDL
DOSULFAN SULFATE	"	"	1.0	BDL	BDL	BDL	BDL
DRIN	"	"	1.0	BDL	BDL	BDL	BDL
DRIN ALDEHYDE	"	"	1.0	BDL	BDL	BDL	BDL
PTACHLOR	"	"	1.0	BDL	BDL	BDL	BDL
PTACHLOR EPOXIDE	"	"	1.0	BDL	BDL	BDL	BDL
B-1242	"	"	1.0	BDL	BDL	BDL	BDL
B-1254	"	"	1.0	BDL	BDL	BDL	BDL
B-1221	"	"	1.0	BDL	BDL	BDL	BDL
B-1232	"	"	1.0	BDL	BDL	BDL	BDL
B-1248	"	"	1.0	BDL	BDL	BDL	BDL
B-1260	"	"	1.0	BDL	BDL	BDL	BDL
B-1016	"	"	1.0	BDL	BDL	BDL	BDL
XAPHENE	"	"	10.0	BDL	BDL	BDL	BDL

elow determinable limits.

Susan M Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

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LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 02AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1872 MW-6S 7-19-85	1873 MW-7S 7-19-85	1874 MW-8S 7-19-85	1875 MW-10S 7-19-85
LDRIN	608	1	1.0	BDL*	BDL	BDL	BDL
lpha-BHC	"	"	1.0	BDL	BDL	BDL	BDL
eta-BHC	"	"	1.0	BDL	BDL	BDL	BDL
amma-BHC	"	"	1.0	BDL	BDL	BDL	BDL
elta-BHC	"	"	1.0	BDL	BDL	BDL	BDL
HLORDANE	"	"	10.0	BDL	BDL	BDL	BDL
,4´-DDT	"	"	1.0	BDL	BDL	BDL	BDL
,4´-DDE	"	"	1.0	BDL	BDL	BDL	BDL
,4´-DDD	"	"	1.0	BDL	BDL	BDL	BDL
IELDRIN	"	"	1.0	BDL	BDL	BDL	BDL
lpha-ENDOSULFAN	"	"	1.0	BDL	BDL	BDL	BDL
eta-ENDOSUFAN	"	"	1.0	BDL	BDL	BDL	BDL
NDOSULFAN SULFATE	"	"	1.0	BDL	BDL	BDL	BDL
NDRIN	"	"	1.0	BDL	BDL	BDL	BDL
NDRIN ALDEHYDE	"	"	1.0	BDL	BDL	BDL	BDL
EPTACHLOR	"	"	1.0	BDL	BDL	BDL	BDL
EPTACHLOR EPOXIDE	"	"	1.0	BDL	BDL	BDL	BDL
CB-1242	"	"	1.0	BDL	BDL	BDL	BDL
CB-1254	"	"	1.0	BDL	BDL	BDL	BDL
CB-1221	"	"	1.0	BDL	BDL	BDL	BDL
CB-1232	"	"	1.0	BDL	BDL	BDL	BDL
CB-1248	"	"	1.0	BDL	BDL	BDL	BDL
CB-1260	"	"	1.0	BDL	BDL	BDL	BDL
CB-1016	"	"	1.0	BDL	BDL	BDL	BDL
OXAPHENE	"	"	10.0	BDL	BDL	BDL	BDL

Susan M Cerquetti

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G. C. DIVISION

Below determinable limits.

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LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE   A.E.S. JOB CODE 03AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION			
				1876 MW-12M 7-19-85	1877 MW-13S 7-19-85	1878 MW-15M 7-19-85	1879 MW-15S 7-19-85
...RIN	608	1	1.0	BDL*	BDL	BDL	BDL
...pha-BHC	"	"	1.0	BDL	BDL	BDL	BDL
...ta-BHC	"	"	1.0	BDL	BDL	BDL	BDL
...ma-BHC	"	"	1.0	BDL	BDL	BDL	BDL
...ta-BHC	"	"	1.0	BDL	BDL	BDL	BDL
...LORDANE	"	"	10.0	BDL	BDL	BDL	BDL
...´-DDT	"	"	1.0	BDL	BDL	BDL	BDL
...´-DDE	"	"	1.0	BDL	BDL	BDL	BDL
...´-DDD	"	"	1.0	BDL	BDL	BDL	BDL
...LDRIN	"	"	1.0	BDL	BDL	BDL	BDL
...pha-ENDOSULFAN	"	"	1.0	BDL	BDL	BDL	BDL
...a-ENDOSUFAN	"	"	1.0	BDL	BDL	BDL	BDL
...OSULFAN SULFATE	"	"	1.0	BDL	BDL	BDL	BDL
...RIN	"	"	1.0	BDL	BDL	BDL	BDL
...RIN ALDEHYDE	"	"	1.0	BDL	BDL	BDL	BDL
...TACHLOR	"	"	1.0	BDL	BDL	BDL	BDL
...TACHLOR EPOXIDE	"	"	1.0	BDL	BDL	BDL	BDL
...-1242	"	"	1.0	BDL	BDL	BDL	BDL
...-1254	"	"	1.0	BDL	BDL	BDL	BDL
...-1221	"	"	1.0	BDL	BDL	BDL	BDL
...-1232	"	"	1.0	BDL	BDL	BDL	BDL
...-1248	"	"	1.0	BDL	BDL	BDL	BDL
...-1260	"	"	1.0	BDL	BDL	BDL	BDL
...-1016	"	"	1.0	BDL	BDL	BDL	BDL
...APHENE	"	"	10.0	BDL	BDL	BDL	BDL

...low determinable limits.

Susan M Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 04AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION			
				1880 MW-1S 7-19-85	1881 MW-1M 7-19-85	1882 MW-9M 7-19-85	1883 MW-11S 7-19-85
DRIN	608	1	1.0	BDL*	BDL	BDL	BDL
pha-BHC	"	"	1.0	BDL	BDL	BDL	BDL
ta-BHC	"	"	1.0	BDL	BDL	BDL	BDL
mma-BHC	"	"	1.0	BDL	BDL	BDL	BDL
lta-BHC	"	"	1.0	BDL	BDL	BDL	BDL
LORDANE	"	"	10.0	BDL	BDL	BDL	BDL
4´-DDT	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDE	"	"	1.0	BDL	BDL	BDL	BDL
4´-DDD	"	"	1.0	BDL	BDL	BDL	BDL
ELDRIN	"	"	1.0	BDL	BDL	BDL	BDL
pha-ENDOSULFAN	"	"	1.0	BDL	BDL	BDL	BDL
ta-ENDOSUFAN	"	"	1.0	BDL	BDL	BDL	BDL
DOSULFAN SULFATE	"	"	1.0	BDL	BDL	BDL	BDL
DRIN	"	"	1.0	BDL	BDL	BDL	BDL
DRIN ALDEHYDE	"	"	1.0	BDL	BDL	BDL	BDL
PTACHLOR	"	"	1.0	BDL	BDL	BDL	BDL
PTACHLOR EPOXIDE	"	"	1.0	BDL	BDL	BDL	BDL
B-1242	"	"	1.0	BDL	BDL	BDL	BDL
B-1254	"	"	1.0	BDL	BDL	BDL	BDL
B-1221	"	"	1.0	BDL	BDL	BDL	BDL
B-1232	"	"	1.0	BDL	BDL	BDL	BDL
B-1248	"	"	1.0	BDL	BDL	BDL	BDL
B-1260	"	"	1.0	BDL	BDL	BDL	BDL
B-1016	"	"	1.0	BDL	BDL	BDL	BDL
XAPHENE	"	"	10.0	BDL	BDL	BDL	BDL

elow determinable limits.

Susan M Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

...VAN... ENVIRONMENTAL TESTING, INC.

LABORATORY REPORT

TYPE OF ANALYSIS: PCBs AND PESTICIDES
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 05AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1884 MW-14M 7-19-85	1885 MW-14S 7-19-85
DRIN	608	1	1.0	BDL*	BDL
pha-BHC	"	"	1.0	BDL	BDL
ta-BHC	"	"	1.0	BDL	BDL
mma-BHC	"	"	1.0	BDL	BDL
lta-BHC	"	"	1.0	BDL	BDL
LORDANE	"	"	10.0	BDL	BDL
4´-DDT	"	"	1.0	BDL	BDL
4´-DDE	"	"	1.0	BDL	BDL
4´-DDD	"	"	1.0	BDL	BDL
ELDRIN	"	"	1.0	BDL	BDL
pha-ENDOSULFAN	"	"	1.0	BDL	BDL
ta-ENDOSUFAN	"	"	1.0	BDL	BDL
DOSULFAN SULFATE	"	"	1.0	BDL	BDL
DRIN	"	"	1.0	BDL	BDL
DRIN ALDEHYDE	"	"	1.0	BDL	BDL
PTACHLOR	"	"	1.0	BDL	BDL
PTACHLOR EPOXIDE	"	"	1.0	BDL	BDL
B-1242	"	"	1.0	BDL	BDL
B-1254	"	"	1.0	BDL	BDL
B-1221	"	"	1.0	BDL	BDL
B-1232	"	"	1.0	BDL	BDL
B-1248	"	"	1.0	BDL	BDL
B-1260	"	"	1.0	BDL	BDL
B-1016	"	"	1.0	BDL	BDL
XAPHENE	"	"	10.0	BDL	BDL

Susan M. Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

*Below determinable limits.

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LABORATORY REPORT

TYPE OF ANALYSIS: PHENOLS
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 04AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1880 MW-1S 7-19-85	1881 MW-1M 7-19-85	1882 MW-9M 7-19-85	1883 MW-11S 7-19-85
CHLORO-3-METHYLPHENOL	604	1	5.0	BDL*	BDL	BDL	BDL
CHLOROPHENOL	"	"	5.0	BDL	BDL	BDL	BDL
4-DICHLOROPHENOL	"	"	5.0	BDL	BDL	BDL	BDL
4-DIMETHYLPHENOL	"	"	5.0	BDL	BDL	BDL	BDL
4-DINITROPHENOL	"	"	100	BDL	BDL	BDL	BDL
METHYL-4,6-DINITROPHENOL	"	"	100	BDL	BDL	BDL	BDL
NITROPHENOL	"	"	5.0	BDL	BDL	BDL	BDL
NITROPHENOL	"	"	10.0	BDL	BDL	BDL	BDL
NTACHLOROPHENOL	"	"	1.0	BDL	BDL	BDL	BDL
ENOL	"	"	5.0	BDL	BDL	BDL	BDL
4,6-TRICHLOROPHENOL	"	"	10.0	BDL	BDL	BDL	BDL

elow determinable limits.

Susan M Cerquetti

SUSAN M. CERQUETTI
G. C. DIVISION

/AN EI ION TAI ST ,

LABORATORY REPORT

TYPE OF ANALYSIS: PHENOLS
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE   A.E.S. JOB CODE 05AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION	
				1884 MW-14M 7-19-85	1885 MW-14S 7-19-85
CHLORO-3-METHYLPHENOL	604	1	5.0	BDL *	BDL
CHLOROPHENOL	"	"	5.0	BDL	BDL
4-DICHLOROPHENOL	"	"	5.0	BDL	BDL
4-DIMETHYLPHENOL	"	"	5.0	BDL	BDL
4-DINITROPHENOL	"	"	100	BDL	BDL
METHYL-4,6-DINITROPHENOL	"	"	100	BDL	BDL
NITROPHENOL	"	"	5.0	BDL	BDL
NITROPHENOL	"	"	10.0	BDL	BDL
NTACHLOROPHENOL	"	"	1.0	BDL	BDL
ENOL	"	"	5.0	BDL	BDL
4,6-TRICHLOROPHENOL	"	"	10.0	BDL	BDL

low determinable limits.

Susan M Cerquetti
SUSAN M. CERQUETTI
G. C. DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - QUALITY CONTROL DUPLICATE
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
DRIN	1869	<1.0	<1.0	NA *	NA	NA
pha BHC	"	<1.0	<1.0	NA	NA	NA
ta BHC	"	<1.0	<1.0	NA	NA	NA
mma BHC	"	<1.0	<1.0	NA	NA	NA
lta BHC	"	<1.0	<1.0	NA	NA	NA
LORDANE	"	<10.0	<10.0	NA	NA	NA
4´-DDT	"	<1.0	<1.0	NA	NA	NA
4´-DDE	"	<1.0	<1.0	NA	NA	NA
4´-DDD	"	<1.0	<1.0	NA	NA	NA
ELDRIN	"	<1.0	<1.0	NA	NA	NA
pha ENDOSULFAN	"	<1.0	<1.0	NA	NA	NA
ta ENDOSULFAN	"	<1.0	<1.0	NA	NA	NA
DOSULFAN SULFATE	"	<1.0	<1.0	NA	NA	NA
DRIN	"	<1.0	<1.0	NA	NA	NA
DRIN ALDEHYDE	"	<1.0	<1.0	NA	NA	NA
PTACHLOR	"	<1.0	<1.0	NA	NA	NA
PTACHLOR EPOXIDE	"	<1.0	<1.0	NA	NA	NA
B 1242	"	<1.0	<1.0	NA	NA	NA
B 1254	"	<1.0	<1.0	NA	NA	NA
B 1221	"	<1.0	<1.0	NA	NA	NA
B 1232	"	<1.0	<1.0	NA	NA	NA
B 1248	"	<1.0	<1.0	NA	NA	NA
B 1260	"	<1.0	<1.0	NA	NA	NA
B 1016	"	<1.0	<1.0	NA	NA	NA
XAPHENE	"	<10.0	<10.0	NA	NA	NA

lative Percent Difference =
nge/Average X 100
ot applicable.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - QUALITY CONTROL DUPLICATE
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 02AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
DRIN	1878	<1.0	<1.0	NA*	NA	NA
pha BHC	"	<1.0	<1.0	NA	NA	NA
ta BHC	"	<1.0	<1.0	NA	NA	NA
mma BHC	"	<1.0	<1.0	NA	NA	NA
lta BHC	"	<1.0	<1.0	NA	NA	NA
LORDANE	"	<10.0	<10.0	NA	NA	NA
4´-DDT	"	<1.0	<1.0	NA	NA	NA
4´-DDE	"	<1.0	<1.0	NA	NA	NA
4´-DDD	"	<1.0	<1.0	NA	NA	NA
ELDRIN	"	<1.0	<1.0	NA	NA	NA
pha ENDOSULFAN	"	<1.0	<1.0	NA	NA	NA
ta ENDOSULFAN	"	<1.0	<1.0	NA	NA	NA
DOSULFAN SULFATE	"	<1.0	<1.0	NA	NA	NA
DRIN	"	<1.0	<1.0	NA	NA	NA
DRIN ALDEHYDE	"	<1.0	<1.0	NA	NA	NA
PTACHLOR	"	<1.0	<1.0	NA	NA	NA
PTACHLOR EPOXIDE	"	<1.0	<1.0	NA	NA	NA
B 1242	"	<1.0	<1.0	NA	NA	NA
B 1254	"	<1.0	<1.0	NA	NA	NA
B 1221	"	<1.0	<1.0	NA	NA	NA
B 1232	"	<1.0	<1.0	NA	NA	NA
B 1248	"	<1.0	<1.0	NA	NA	NA
B 1260	"	<1.0	<1.0	NA	NA	NA
B 1016	"	<1.0	<1.0	NA	NA	NA
XAPHENE	"	<10.0	<10.0	NA	NA	NA

lative Percent Difference =
nge/Average X 100
ot applicable.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - QUALITY CONTROL DUPLICATE
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE 03AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
CHLORO-3-METHYLPHENOL	1881	<5.0	<5.0	NA*	NA	NA
CHLOROPHENOL	"	<5.0	<5.0	NA	NA	NA
4-DICHLOROPHENOL	"	<5.0	<5.0	NA	NA	NA
4-DIMETHYLPHENOL	"	<5.0	<5.0	NA	NA	NA
4-DINITROPHENOL	"	<100	<100	NA	NA	NA
METHYL-4,6-DINITROPHENOL	"	<100	<100	NA	NA	NA
NITROPHENOL	"	<5.0	<5.0	NA	NA	NA
NITROPHENOL	"	<10.0	<10.0	NA	NA	NA
NTACHLOROPHENOL	"	<10.0	<10.0	NA	NA	NA
ENOL	"	<5.0	<5.0	NA	NA	NA
4,6-TRICHLOROPHENOL	"	<10.0	<10.0	NA	NA	NA

ative Percent Difference =
nge/Average X 100
t applicable.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - TEST CONTROLS
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT:MALCOLM PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	TYPE	ORIGINAL CONC.	ADDED CONC.	EXPECTED CONC.	REPORTED CONC.	PERCENT RECOVERY	95% CONFIDENCE INTERVAL
4-DIMETHYLPHENOL - 1084	SPIKE	<5.0	100	100	56.8	56.8	29.2 - 91.5
4-DICHLOROPHENOL - 1084	SPIKE	<5.0	100	100	69.6	69.6	50.9 - 112
4,6-TRICHLOROPHENOL-1084	SPIKE	<10.0	150	150	100	66.7	90.4 - 167
mma BHC - 1876	SPIKE	<1.0	51.5	51.5	26.7	51.9	NA*
mma BHC - 1872	SPIKE	<1.0	52.0	52.0	30.6	58.8	NA
B 1260 - 1876	SPIKE	<1.0	6.12	6.12	5.37	86.8	4.0 - 8.4
B 1260 - 1872	SPIKE	<1.0	6.25	6.25	6.13	98.0	4.1 - 8.6

t available.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: VOLATILE ORGANICS
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1880 MW-1S 7-19-85	1881 MW-1M 7-19-85	1882 MW-9M 7-19-85	1883 MW-11S 7-19-85
CHLOROMETHANE	624	1	10	BDL*	BDL	BDL	BDL
VINYL CHLORIDE	"	"	10	BDL	BDL	BDL	BDL
CHLOROETHANE	"	"	10	BDL	BDL	BDL	BDL
BROMOMETHANE	"	"	10	BDL	BDL	BDL	BDL
2-CHLOROETHYL VINYL ETHER	"	"	10	BDL	BDL	BDL	BDL
ETHYLBENZENE	"	"	10	BDL	BDL	BDL	BDL
METHYLENE CHLORIDE	"	"	30	BDL	BDL	BDL	BDL
CHLOROBENZENE	"	"	10	BDL	BDL	BDL	BDL
1,1-DICHLOROETHYLENE	"	"	10	BDL	BDL	BDL	BDL
1,1-DICHLOROETHANE	"	"	10	BDL	BDL	BDL	BDL
trans-1,2-DICHLOROETHYLENE	"	"	10	BDL	BDL	BDL	BDL
CHLOROFORM	"	"	10	BDL	BDL	BDL	BDL
1,2-DICHLOROETHANE	"	"	10	BDL	BDL	BDL	BDL
1,1,1-TRICHLOROETHANE	"	"	10	BDL	BDL	BDL	BDL
CARBON TETRACHLORIDE	"	"	10	BDL	BDL	BDL	BDL
BROMODICHLOROMETHANE	"	"	10	BDL	BDL	BDL	BDL
1,2-DICHLOROPROPANE	"	"	10	BDL	BDL	BDL	BDL
trans-1,3-DICHLOROPROPENE	"	"	10	BDL	BDL	BDL	BDL
TRICHLOROETHYLENE	"	"	10	BDL	BDL	BDL	BDL
BENZENE	"	"	10	BDL	BDL	BDL	BDL
cis-1,3-DICHLOROPROPENE	"	"	10	BDL	BDL	BDL	BDL
1,1,2-TRICHLOROETHANE	"	"	10	BDL	BDL	BDL	BDL
DIBROMOCHLOROMETHANE	"	"	10	BDL	BDL	BDL	BDL
BROMOFORM	"	"					

*Below determinable limits.

MICHAEL YEDINAK
G. C. DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: VOLATILE ORGANICS
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOLM PIRNIE A.E.S. JOB CODE AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1880 MW-1S 7-19-85	1881 MW-1M 7-19-85	1882 MW-9M 7-19-85	1883 MW-11S 7-19-85
1,1,2,2-TETRACHLORETHYLENE	624	1	10	BDL*	BDL	BDL	BDL
1,1,2,2-TETRACHLOROETHANE	"	"	10	BDL	BDL	BDL	BDL
TOLUENE	"	"	10	BDL	BDL	BDL	BDL

*Below determinable limits.

Michael Yedinak

MICHAEL YEDINAK
G. C. DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: VOLATILE ORGANICS
UNITS OF MEASURE: MICROGRAMS/LITER, OR PPB
CLIENT: MALCOM PIRNIE A.E.S. JOB CODE AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1884 MW-14M 7-19-85	1885 MW-14S 7-19-85
CHLOROMETHANE	624	1	10	BDL *	BDL
VINYL CHLORIDE	"	"	10	BDL	BDL
CHLOROETHANE	"	"	10	BDL	BDL
BROMOMETHANE	"	"	10	BDL	BDL
2-CHLOROETHYL VINYL ETHER	"	"	10	BDL	BDL
ETHYLBENZENE	"	"	10	BDL	BDL
METHYLENE CHLORIDE	"	"	30	BDL	BDL
CHLOROBENZENE	"	"	10	BDL	BDL
1,1-DICHLOROETHYLENE	"	"	10	BDL	BDL
1,1-DICHLOROETHANE	"	"	10	BDL	BDL
trans-1,2-DICHLOROETHYLENE	"	"	10	BDL	BDL
CHLOROFORM	"	"	10	BDL	BDL
1,2-DICHLOROETHANE	"	"	10	BDL	BDL
1,1,1-TRICHLOROETHANE	"	"	10	BDL	BDL
CARBON TETRACHLORIDE	"	"	10	BDL	BDL
BROMODICHLOROMETHANE	"	"	10	BDL	BDL
1,2-DICHLOROPROPANE	"	"	10	BDL	BDL
trans-1,3-DICHLOROPROPENE	"	"	10	BDL	BDL
TRICHLOROETHYLENE	"	"	10	BDL	BDL
BENZENE	"	"	10	BDL	BDL
cis-1,3-DICHLOROPROPENE	"	"	10	BDL	BDL
1,1,2-TRICHLOROETHANE	"	"	10	BDL	BDL
DIBROMOCHLOROMETHANE	"	"	10	BDL	BDL
BROMOFORM	"	"			

*Below determinable limits.

MICHAEL YEDINAK
G. C. DIVISION

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: TEST CONTROL METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 02AUP

ANALYSIS	TYPE	ORIGINAL CONC.	ADDED CONC.	EXPECTED CONC.	REPORTED CONC.	PERCENT RECOVERY	95% CONFIDENCE INTERVAL
NICKEL	1875	BDL*	5.0	5.0	4.8	96.4	** NA
NICKEL	1876	BDL	5.0	5.0	5.0	100.0	NA
NICKEL	EPA	0.20	-	0.20	0.18	86.9	0.177-0.23
MERCURY	1870	BDL	0.005	0.005	0.005	100.0	NA
MERCURY	1871	BDL	0.005	0.005	0.005	100.0	NA
ANTIMONY	1868	BDL	40.0	40.0	36.36	90.9	NA
ANTIMONY	1869	BDL	40.0	40.0	37.82	94.6	NA
THALLIUM	1868	BDL	20.0	20.0	21.6	108.0	NA
THALLIUM	1869	BDL	20.0	20.0	21.4	107.0	NA
BERYLLIUM	1868	BDL	2.0	2.0	1.86	93.0	NA
BERYLLIUM	1869	BDL	2.0	2.0	1.88	94.0	NA
EPA (Be)	481-2	0.235	-	0.235	0.24	102.1	0.207-0.25
ARSENIC	1877	0.0095	0.100	0.1095	0.1396	127.0	NA
ARSENIC	1878	0.0095	0.100	0.1095	0.141	129.0	NA
EPA (As)	1178-1	0.027	-	0.027	0.0204	75.6	0.0198-0.034

*Below determinable limits.
**Not available.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1868 MW 2M 7-19-85	1869 MW 3S 7-19-85	1870 MW 4S 7-19-85	1871 MW 5S 7-19-85
CADMIUM	213.1	3	0.05	BDL *	BDL	BDL	BDL
CHROMIUM	218.1	3	0.5	BDL	BDL	BDL	BDL
SILVER	272.1	3	0.1	BDL	BDL	BDL	BDL
LEAD	239.1	3	1.0	BDL	BDL	BDL	BDL
COPPER	220.1	3	0.2	BDL	BDL	BDL	BDL
ZINC	289.1	3	0.05	BDL	1.64	0.04	0.26
SELENIUM	270.2	3	0.005	BDL	BDL	BDL	BDL
NICKEL	249.1	3	0.3	BDL	BDL	BDL	BDL
MERCURY	245.1	3	0.001	BDL	0.004	BDL	BDL
ANTIMONY	204.1	3	1.0	BDL	BDL	BDL	BDL
THALLIUM	279.1	3	1.0	BDL	BDL	BDL	BDL
BERYLLIUM	210.1	3	0.05	BDL	BDL	BDL	BDL
ARSENIC	206.2	3	0.005	0.029	0.078	0.019	0.049

elow determinable limits.

Janette L. Bingert

JANETTE L. BINGERT
METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 04AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1880 MW 1S 7-19-85	1881 MW 1M 7-19-85	1882 MW 9M 7-19-85	1883 MW 11S 7-19-85
DMIUM	213.1	3	0.05	BDL *	BDL	BDL	BDL
ROMIUM	218.1	3	0.5	BDL	BDL	BDL	BDL
LVER	272.1	3	0.1	BDL	BDL	BDL	BDL
AD	239.1	3	1.0	BDL	BDL	BDL	BDL
PPER	220.1	3	0.2	BDL	BDL	BDL	BDL
NC	289.1	3	0.05	BDL	BDL	0.05	BDL
LENIUM	270.2	3	0.005	BDL	BDL	BDL	BDL
CKEL	249.1	3	0.3	BDL	BDL	BDL	BDL
RCURY	245.1	3	0.001	BDL	BDL	BDL	BDL
TIMONY	204.1	3	1.0	BDL	BDL	BDL	BDL
ALLIUM	279.1	3	1.0	BDL	BDL	BDL	BDL
RYLLIUM	210.1	3	0.05	BDL	BDL	BDL	BDL
SENIC	206.2	3	0.005	BDL	BDL	BDL	0.023

ow determinable limits.

Janette L. Bingert

JANETTE L. BINGERT
METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 02AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1872 MW 6S 7-19-85	1873 MW 7S 7-19-85	1874 MW 8S 7-19-85	1875 MW 10S 7-19-85
CADMIUM	213.1	3	0.05	BDL*	BDL	BDL	BDL
CHROMIUM	218.1	3	0.5	BDL	BDL	BDL	BDL
SILVER	272.1	3	0.1	BDL	BDL	BDL	BDL
LEAD	239.1	3	1.0	BDL	BDL	BDL	BDL
COPPER	220.1	3	BDL	BDL	BDL	BDL	BDL
ZINC	289.1	3	0.05	0.08	BDL	0.05	BDL
SELENIUM	270.2	3	0.005	BDL	BDL	BDL	BDL
NICKEL	249.1	3	0.3	BDL	BDL	BDL	BDL
MERCURY	245.1	3	0.001	BDL	BDL	BDL	BDL
ANTIMONY	204.1	3	1.0	BDL	BDL	BDL	BDL
THALLIUM	279.1	3	1.0	BDL	BDL	BDL	BDL
BERYLLIUM	210.1	3	0.05	BDL	BDL	BDL	BDL
ARSENIC	206.2	3	0.005	0.035	0.024	0.022	0.027

*Below determinable limits.

Janette L. Bingert

JANETTE L. BINGERT
METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 03AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1876 MW 12M 7-19-85	1877 MW 13S 7-19-85	1878 MW 15M 7-19-85	1879 MW 15S 7-19-85
CADMIUM	213.1	3	0.05	BDL *	BDL	BDL	BDL
CHROMIUM	218.1	3	0.5	BDL	BDL	BDL	BDL
SILVER	272.1	3	0.1	BDL	BDL	BDL	BDL
LEAD	239.1	3	1.0	BDL	BDL	BDL	BDL
COPPER	220.1	3	0.2	BDL	BDL	BDL	BDL
ZINC	289.1	3	0.05	BDL	BDL	BDL	BDL
SELENIUM	270.2	3	0.005	BDL	0.009	0.010	0.006
NICKEL	249.1	3	0.3	BDL	BDL	BDL	BDL
MERCURY	245.1	3	0.001	BDL	BDL	0.001	BDL
ANTIMONY	204.1	3	1.0	BDL	BDL	BDL	BDL
THALLIUM	279.1	3	1.0	BDL	BDL	BDL	BDL
BERYLLIUM	210.1	3	0.05	BDL	BDL	BDL	BDL
ARSENIC	206.2	3	0.005	0.014	0.009	0.009	0.008

*Below determinable limits.

Janette L. Bingert

JANETTE L. BINGERT
METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: RESULTS - METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 05AUP

ANALYSIS	METHOD	REF	DETERMINABLE LIMITS	SAMPLE IDENTIFICATION 1884 MW 14M 7-19-85	1885 MW 14S 7-19-85
ADMIUM	213.1	3	0.05	BDL *	BDL
HROMIUM	218.1	3	0.5	BDL	BDL
ILVER	272.1	3	0.1	BDL	BDL
EAD	239.1	3	1.0	BDL	BDL
OPPER	220.1	3	0.2	BDL	BDL
INC	289.1	3	0.05	BDL	BDL
ELENIUM	270.2	3	0.005	0.005	BDL
ICKEL	249.1	3	0.3	BDL	BDL
ERCURY	245.1	3	0.001	BDL	BDL
NTIMONY	204.1	3	1.0	BDL	BDL
HALLIUM	279.1	3	1.0	BDL	BDL
ERYLLIUM	210.1	3	0.05	BDL	BDL
RSENIC	206.2	3	0.005	0.036	0.036

*Below determinable limits.

Janette L. Bingert

JANETTE L. BINGERT
METALS DIVISION SUPERVISOR

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: METALS DUPLICATE
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 05AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
ADMIUM	1875	BDL*	BDL	NA**	NA	NR***
ADMIUM	1885	BDL	BDL	NA	NA	NR
HROMIUM	1875	BDL	BDL	NA	NA	NR
HROMIUM	1885	BDL	BDL	NA	NA	NR
ILVER	1875	BDL	BDL	NA	NA	NR
ILVER	1885	BDL	BDL	NA	NA	NR
EAD	1875	BDL	BDL	NA	NA	NR
EAD	1885	BDL	BDL	NA	NA	NR
OPPER	1875	BDL	BDL	NA	NA	NR
OPPER	1876	BDL	BDL	NA	NA	NR
INC	1875	BDL	BDL	NA	NA	NR
INC	1876	BDL	BDL	NA	NA	NR
ELENIUM	1868	BDL	BDL	NA	NA	NR
ELENIUM	1869	BDL	BDL	NA	NA	NR
ICKEL	1875	BDL	BDL	NA	NA	NR
ICKEL	1876	BDL	BDL	NA	NA	NR
ERCURY	1868	BDL	BDL	NA	NA	NR
ERCURY	1869	BDL	BDL	NA	NA	NR
NTIMONY	1868	BDL	BDL	NA	NA	NR
NTIMONY	1869	BDL	BDL	NA	NA	NR
HALLIUM	1868	BDL	BDL	NA	NA	NR
HALLIUM	1869	BDL	BDL	NA	NA	NR

elative Percent Difference =
ange/Average X 100
Below determinable limits.
*Not available.
**Not requested.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: METALS DUPLICATE
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: MALCOLM-PIRNIE A.E.S. JOB CODE 04AUP

ANALYSIS	SAMPLE	ORIGINAL CONC.	DUPL. CONC.	AVERAGE CONC.	RANGE	REL. % DIFF.
ERYLLIUM	1868	BDL*	BDL	NA**	NA	NR***
ERYLLIUM	1869	BDL	BDL	NA	NA	NR
RSENIC	1877	0.010	0.009	0.009	0.001	10.5
RSENIC	1878	0.009	0.010	0.009	0.001	10.5

elative Percent Difference =
ange/Average X 100
Below determinable limits.
*Not available.
**Not requested.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: TEST CONTROL METALS
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: TALCOLM-PIRNIE A.E.S. JOB CODE 01AUP

ANALYSIS	TYPE	ORIGINAL CONC.	ADDED CONC.	EXPECTED CONC.	REPORTED CONC.	PERCENT RECOVERY	95% CONFIDENCE INTERVAL
CADMIUM	1875	BDL *	2.0	2.0	1.8	90.0	** NA
CADMIUM	1885	BDL	2.0	2.0	1.7	87.0	NA
CADMIUM	EPA	0.7	-	0.7	0.67	95.7	NA
CHROMIUM	1875	BDL	10.0	10.0	10.24	102.4	NA
CHROMIUM	1885	BDL	10.0	10.0	8.80	88.0	NA
CHROMIUM	EPA	1.25	-	1.25	1.12	89.6	NA
SILVER	1875	BDL	4.0	4.0	4.0	100.0	NA
SILVER	1885	BDL	4.0	4.0	3.8	95.0	NA
LEAD	1875	BDL	20.0	20.0	20.8	104.0	NA
LEAD	1885	BDL	20.0	20.0	19.0	95.0	NA
LEAD	EPA	2.0	-	2.0	2.0	100.0	NA
COPPER	1875	BDL	5.0	5.0	5.1	102.4	NA
COPPER	1876	BDL	5.0	5.0	5.1	102.4	NA
COPPER	EPA	0.33	-	0.33	0.36	106.2	0.302-0.368
ZINC	1875	BDL	1.0	1.0	0.96	96.0	NA
ZINC	1876	BDL	1.0	1.0	1.0	100.0	NA
ZINC	EPA	0.418	-	0.418	0.390	93.3	0.381-0.449
SELENIUM	1868	BDL	0.10	0.10	0.99	99.0	NA
SELENIUM	1869	BDL	0.10	0.10	0.11	111.0	NA
SELENIUM	EPA	0.011	-	0.011	0.012	109.0	0.0065-0.014

Below determinable limits.
*Not available.

APPENDIX A

CHAIN OF CUSTODY

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD:

ANALYSIS FOR CHARACTERISTICS OF HAZARDOUS WASTE

CLIENT NAME: Amherst 363-151-115

LOCATION: Hopkins Rd, Amherst

REPRESENTATIVE SAMPLE DESCRIPTION	COLLECTED BY/DATE	SAMPLING METHOD	CHARACTERISTIC(S) TO BE TESTED:*	HANDLING PRECAUTIONS	RECEIVED BY/DATE	PRESERVATION METHOD	TESTED BY/DATE
ground water samples	K. Owen J. Whitney 7-19-85	bailer	Chlorides Sulfates TOX TDS		Judith E. McDougall 7/19/85	cooled 4°C	
ground water samples	K. Owen J. Whitney 7-19-85	bailer	priority pollutant. pestidides			cooled 4°C	
ground water samples	K. Owen J. Whitney 7-19-85	bailer	priority pollutent heavy metals			HNO_3 (cooled)	
ground water samples	K. Owen J. Whitney 7-19-85	bailer	TOC			H_2SO_4 (cooled)	
GROUND WATER 2 SAMPLES	K. Owen J. Whitney 7-19-85	bailer	VOLATILES -12 PCB & PEST. - 2 B/N - 2 PHENOLS - 2 ACIDS - 2 CYANIDE - 2			COOLED 4°C COOLED 4°C H_2SO_4 COOLED 4°C NACH	

COMMENTS:

* I = IGNITABILITY
C = CORROSIVITY
R = REACTIVITY
EM = EP TOXICITY (Metals)
EO = EP TOXICITY (Organics)

APPENDIX B

ANALYTICAL METHODOLOGIES REFERENCE LIST

ANALYTICAL METHODOLOGIES REFERENCE LIST

Routine Analyses are Performed in Accordance with Protocols Found in the Following Numbered Sources. These Numbers Correspond to those Listed in the Laboratory Report Under the Reference ("REF") Column.

1 - EPA 600/D-80-021, "Guidelines Establishing Test Procedures for the Analysis of Pollutants; Proposed Regulations", Federal Register 44(233), December 3, 1979.

2 - EPA 600/D-80-022, "Guidelines Establishing Test Procedures for the Analysis of Pollutants; Proposed Regulations, Correction", Federal Register 44(244), December 18, 1979.

3 - EPA 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", (1983)

4 - EPA 600/4-79-057, "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", (1982)

5 - EPA-SW-846, "Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods", second edition (1982)

6 - "Standard Methods for the Examination of Water and Wastewater", 15th Edition, (1980)

7 - New York State Institute of Toxicology Analytical Handbook, October 1982

8 - NIOSH Manual of Analytical Methods, second edition 1977

9 - "The Analysis of Polychlorinated Biphenyls in Transformer Fluid and Waste Oil", EPA Environmental Monitoring and Support Laboratory, draft, June 24, 1980

10 - "Approved Analytical Procedures for Determining the Content of Constituents Banned from Landburial" (New York State D. E. C., Division of Solid and Hazardous Waste), Jan. 1985.

11 - EPA 600/4-81-055, "Interim Methods for the Sampling and Analysis of Priority Pollutants in Sediments and Fish Tissue", Revised Jan. 7, 1983

PROPERTY LINE DATA TAKEN FROM SURVEY
BY McINTOSH & McINTOSH, P.C.
DATED JUNE 23,1982

WENKEWOOD ESTATES
PART-6
(MAP COVER 2388)

WENKEWOOD ESTATES
PART-5
(MAP COVER 2404)

CORE 6

CORE 3

CORE 5

CORE 4

CORE 2

CORE 1

FOREST HEIGHTS ESTATES
PART-3
(MAP COVER 2368)

HOPKINS RD. (C.R. 67)