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YQ-1080 D3167

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

PHASE II INVESTIGATIONS

Town of Lewiston Landfill
Site No. 932076
Town of Lewiston, Niagara County

December 1990

Prepared for:

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233
Thomas C. Jorling, Commissioner

Division of Hazardous Waste Remediation
Michael J. O'Toole, Jr., P.E., Director

Prepared by:

Ecology and Environment Engineering, P.C.

Draft

YQ-1060 D3167

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1. EXECUTIVE SUMMARY

1.1 SITE DESCRIPTION AND BACKGROUND

The Town of Lewiston Landfill (Lewiston Site) [Site Number 932076] is located to the east of the intersection of Harold and Pletcher Roads in the Town of Lewiston, Niagara County, New York (see Figures 1-1 and 1-2). This 16-acre landfill is currently inactive, except for storage of mulch from the town. The operational history of the landfill is uncertain; however, it was used by the Town of Lewiston to dispose of household refuse between approximately ~~between~~ 1964 and 1972. The refuse was hauled by Niagara Sanitation. In addition to household wastes, crushed battery casings were also disposed of on site. A 10-foot by 10-foot mound approximately 4 to 5 feet above grade is currently visible on site near the north-central border. According to information filed with the New York State Department of Environmental Conservation (NYSDEC), the status of the landfill was changed from active to inactive on October 1, 1972, and was officially closed on August 25, 1979. Prior to the town's use of the site as a landfill, it was owned by the U.S. Government and may have been part of a TNT manufacturing facility.

The site is divided by a 20-inch Tennessee Gas Natural Gas Transmission Pipeline traversing east-west. The pipeline was installed in 1954 and a 50-foot-wide right-of-way is currently owned by Tennessee Gas. Disposal of refuse is believed to have occurred on both sides of the right-of-way.

In 1982, the Town of Lewiston collected two downgradient surface water/sediment samples from on-site drainage swales to the west of the landfill, and one from an area near the broken battery casings. The samples were analyzed for metals and total organic carbon (TOC). The surface water in the area near the battery casings contained high

On page 4-1
it is stated
that the
DEC conducted
this sampling

concentrations of arsenic, iron, and TOC. A high concentration of lead was found in the associated soil sample. Only antimony exhibited a high concentration in the sediment collected from the drainage swale to the west of the landfill.

On September 29, 1983, NUS Corporation conducted a site inspection for the United States Environmental Protection Agency (EPA). The results of this investigation indicated that the Lewiston site does not appear to pose a serious threat to the environment as a result of the
* disposal of municipal waste. The potential of other wastes disposed of by the U.S. Government should be further investigated.

A NYSDEC Phase I investigation was completed in January 1987 by Wehran Engineering, P.C. This investigation included the results of the surface water/sediment samples taken by the Town of Lewiston in 1982. This investigation concluded that there was a need for an additional Phase II investigation due to the presence of low-level concentrations of heavy metals in the surface water.

In May 1987, Ecology and Environment Engineering, P.C. (E & E), under contract to Tennessee Gas, conducted an investigation of the 1,600-foot segment of pipeline easement crossing the Lewiston Landfill. Results from 28 soil borings and six groundwater monitoring wells indicated undetectable contaminants in the soils, and very low levels of toluene along with lead concentrations exceeding New York State drinking water standards from some of the wells.

1.2 PHASE II INVESTIGATION

As part of the Phase II investigation, E & E performed an initial site reconnaissance on May 18, 1990, and began the geophysical surveys. The surveys were completed on May 22, 1990. Along with a visual inspection, the site reconnaissance also included a continuous air monitoring survey using an Organic Vapor Analyzer to determine the presence of organic vapors. The geophysical investigation consisted of a ground conductivity survey and a total earth magnetic field survey to locate any buried metallic materials and determine the presence of contaminant plumes.

Nine groundwater monitoring wells (3 pairs of wells and one set of
* three wells) were installed at the Lewiston site between July 16 and

July 31, 1990. The wells were drilled by American Auger and Drilling Company, and logged by E & E. Several subsurface soil samples were collected during drilling for geotechnical analyses. On August 8, 1990, surface water/sediment samples were collected, and the groundwater monitoring wells were purged. Due to dry conditions, only one surface water sample was collected; however, all of the sediment samples were collected. The wells were allowed to settle and then were sampled on August 9, 1990, because of high turbidity in the purge water on the previous day. Upon request by NYSDEC one additional surface soil sample and two waste samples were also collected on that day. All analyses were performed by the E & E Analytical Services Center (ASC). The fieldwork was completed on November 8, 1990 when Om P. Popli, P.E. Engineers (Om Popli) surveyed the site.

1.3 SITE ASSESSMENT

The continuous air monitoring survey during the site reconnaissance using the Century OVA 128 portable organic vapor analyzer (OVA) indicated no organic vapors above background levels for most of the site. Elevated levels of methane were detected at the mulch piles. The site was also surveyed with a Monitor 3 radiation detector, and no levels were noted above background for any area on site.

The geophysical surveys provided information to characterize the subsurface and locate potential areas of buried metallic materials in drilling areas. Three of the four survey grids contained prominent magnetic and electromagnetic anomalies, thus indicating the presence of fill material. The monitoring well locations were chosen in anomalous-free areas within the grid.

The subsurface stratigraphy underlying the site, as confirmed by the installation of the groundwater monitoring wells, consisted of mainly silt and clay, with a few sandy layers. No fill (i.e., refuse) was encountered in any of the borings. Bedrock varied in depth between 19 feet below ground surface in the western portion of the site to 27.5 feet below ground surface in the eastern portion of the site.

Water levels varied between 5.5 feet to 9.18 feet below ground surface. In the boreholes, water levels increased in elevation after the wells were constructed, thus indicating confined or semi-confined conditions. The Groundwater piezometric gradient across the site is nearly horizontal. In both the overburden and bedrock, it dips gently to the west/northwest.

No subsurface soil samples were collected from the boreholes for chemical analyses due to lack of instrument readings above background when the samples were screened with the OVA.

Nine groundwater samples and one drill water sample were collected and analyzed for Target Compound List (TCL) organics and inorganics. Several organic compounds (2-butanone GW-1B, 2-hexanone GW-1B, and methylene GW-3B chloride) were detected in the deeper groundwater from monitoring well GW-1B, and one polychlorinated biphenyl (PCB) mixture (Aroclor-1254) was detected in the shallow groundwater from monitoring well GW-3C in a concentration below sample quantitation limits. The drill water also contained several organic compounds, (chloroform, bromodichloromethane, and dibromochloromethane); however, these compounds are normally associated with chlorination processes of potable water supplies, and the drill water was City of Lewiston municipal water. Only two detected metals (iron and manganese) exceeded New York State drinking water standards. Iron exceeded standards in all of the wells, and manganese exceeded standards in GW-1A, GW-1B, GW-2A, GW-3C, and GW-4B. No semivolatile organic compounds, pesticides, or cyanide were detected in any of the groundwater samples tested.

Methylene chloride was detected in all the blanks. Clarified on page 4-9.

Of the four surface water/sediment samples proposed in the scope of work, only one surface water sample (SW-4) could be collected due to dry conditions. It was analyzed for TCL organics and inorganics. This sample contained two metals (aluminum and iron) that exceeded Class C surface water standards. No volatile or semivolatile organic compounds, PCBs/pesticides, or cyanide were detected in this sample. However, several organic compounds (2-butanone, dibenzofuran, and polynuclear aromatic hydrocarbons (PAHs)) were detected in the four sediment samples; mostly at concentrations below sample quantitation limits. Two pesticides (4,4′-DDE and 4,4′-DDD) were also detected below contract required detection limits. In samples SED-3 and SED-4 lead was detected in excess of common ranges of metals for soils in the eastern United States. No PCBs or cyanide were detected in any of the sediment samples.

Six surface soil samples were collected and analyzed for TCL organics and inorganics. Samples S-3 through S-6 were also analyzed for EP toxicity metals. Several samples contained very low levels of PAHs, and samples S-3 and S-5 contained the pesticides 4,4-DDE and 4,4-DDT at levels below sample quantitation limits. No PCBs or cyanide were detected in any of the surface soils, and metal concentrations were within common ranges of metals for soils of the eastern United States. No EP toxicity metals were detected in any of the samples tested.

Two waste samples were collected and analyzed for TCL organics and inorganics. Sample W-2 contained 2-methylphenol at a level below sample quantitation limits, and both contained low levels of PAHs. PCB mixtures (Aroclor-1248 and Aroclor-1254) were detected in waste samples W-2 and W-1, respectively, in relatively high concentrations. Iron and lead were detected in concentrations exceeding the common range of metals in soils of the eastern United States in samples W-2 and W-1, respectively. No pesticides or cyanide were detected in either waste sample.

1.4 HAZARD RANKING SYSTEM SCORE

The Hazard Ranking System (HRS) score was compiled to evaluate risks associated with the site. The HRS is applied to inactive hazardous waste sites in New York State to prioritize those needing additional investigation and remediation. The system evaluates site characteristics, containment measures, waste types, and potential contaminant receptors.

Under the HRS, three numerical scores are computed to express the site's relative risk to or damage done to the surrounding population and the environment. The three scores are described below:

- S_M reflects the potential for harm to humans or the environment from migration of a hazardous substance away from the facility via groundwater, surface water, or air. It is a composite of separate scores for each of the three routes (S_{gw} = groundwater route score, S_{sw} = surface water route score, and S_a = air route score).
- S_{FE} reflects the potential for harm from substances that can explode or cause fires.

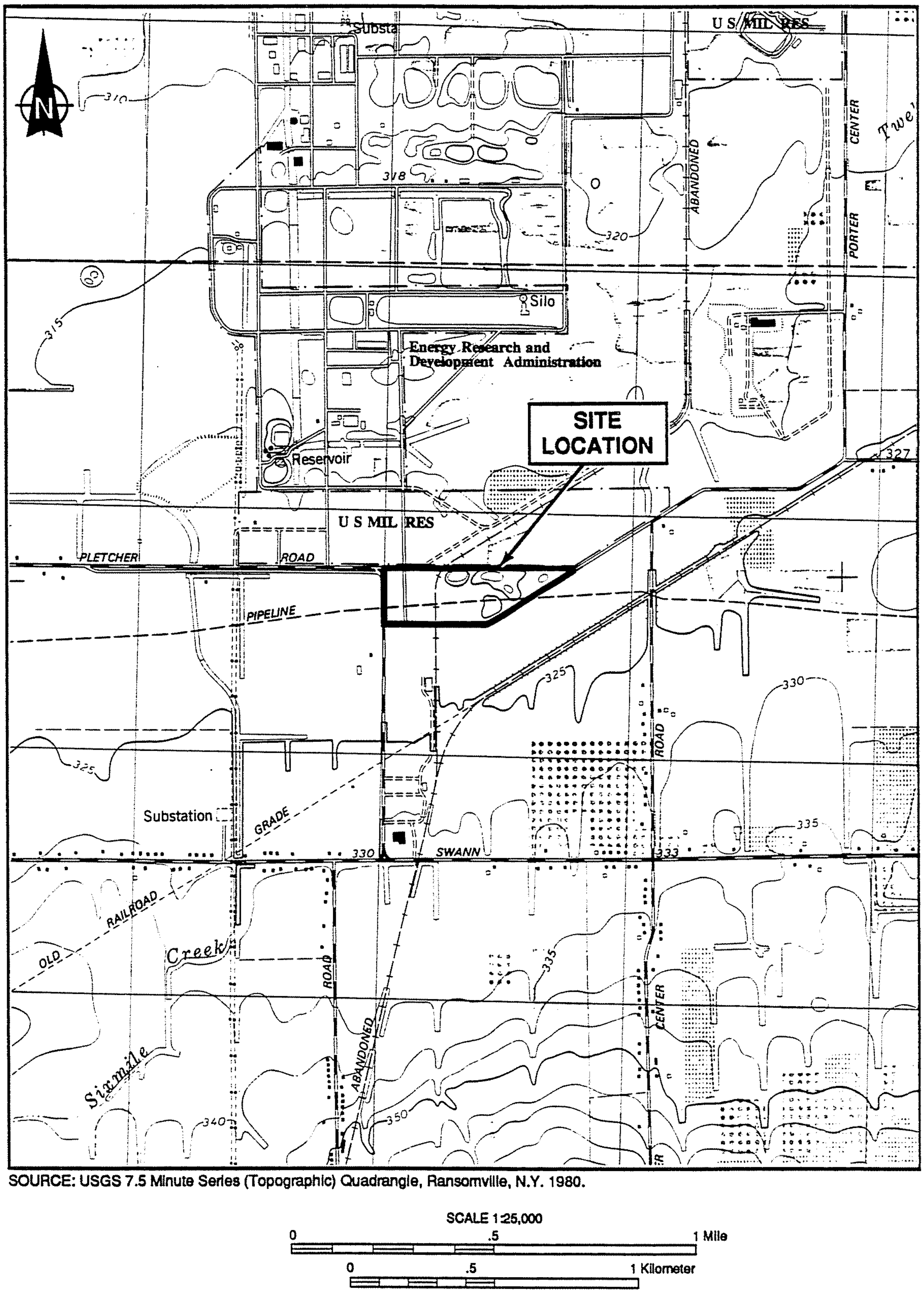
- S_{DC} reflects the potential for harm from direct contact with hazardous substances at the facility (i.e., no migration need be involved).

Based on the results of this and previous studies, the HRS scores for the Town of Lewiston Landfill have been calculated as follows:

S_M = 12.07 (S_{gw} = 20.88; S_{sw} = 0.62; S_a = 0)

S_{FE} = Not scored

S_{DC} = 25



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangle, Ransomville, N.Y. 1980.

Figure 1-1
SITE LOCATION MAP, TOWN OF LEWISTON LANDFILL

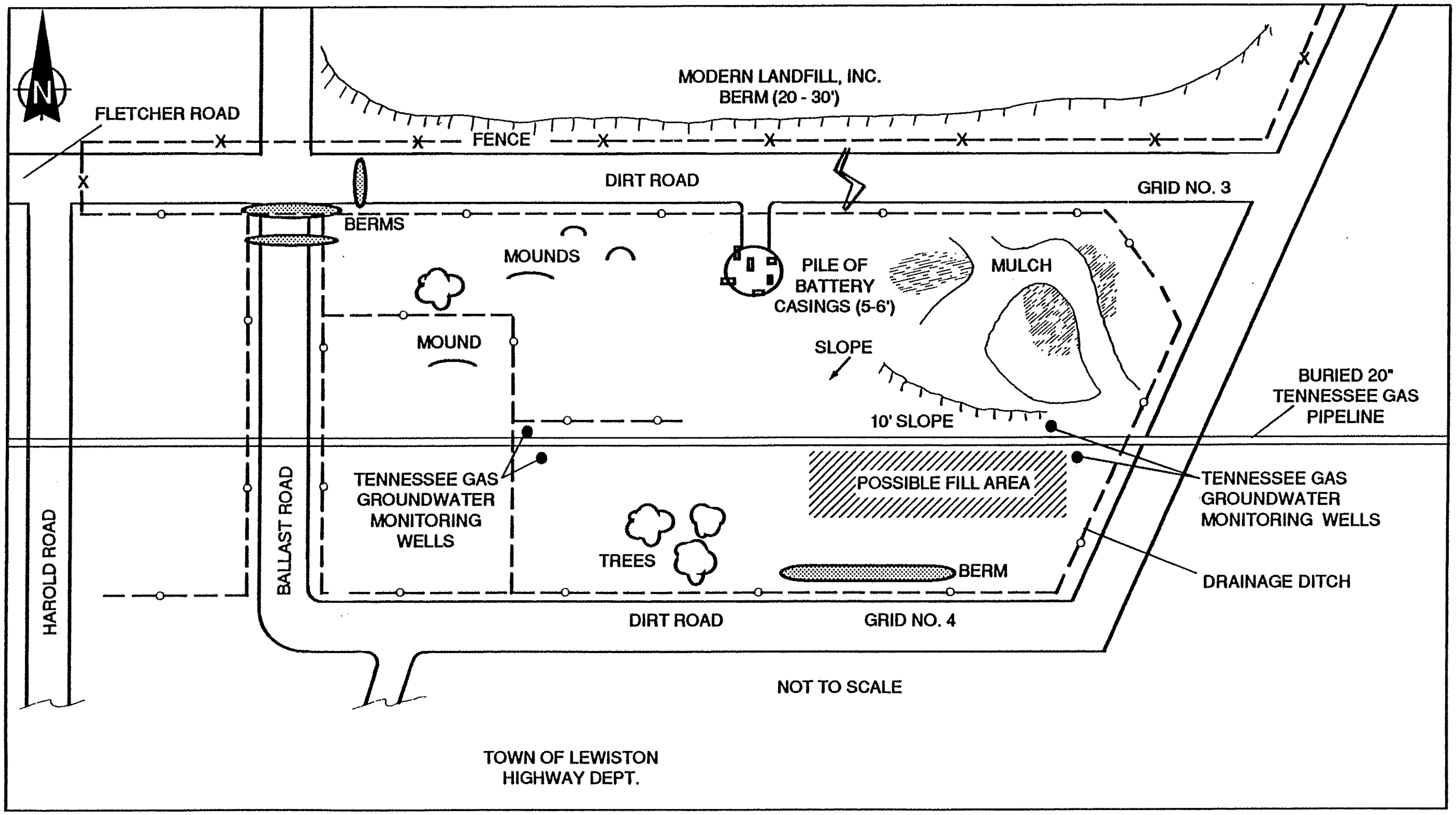


Figure 1-2
SITE SKETCH OF TOWN OF LEWISTON LANDFILL

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Copy-DOH
Copy-PREPARER

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION

ADDITIONS/CHANGES TO REGISTRY OF INACTIVE HAZARDOUS WASTE DISPOSAL SITES

1. Site Name Town of Lewiston Landfill	2. Site Number 932076	3. Town Lewiston	4. County Niagara

5. Region
6. Classification Current ______/Proposed ______
7. Activity ☐ Add ☐ Reclassify ☐ Delist ☐ Modify ______

8a. Describe location of site (attach USGS topographic map showing site location).
The site is located to the east of the intersection of Harold and Pletcher Roads in the Town of Lewiston, NY (see Figure 1-1 of the Engineering Investigation Report).

b. Quadrangle Ransomville c. Site latitude 43°12'30" Longitude 78°58'30" d. Tax Map Number ______

9a. Briefly describe the site (attach site plan showing disposal/sampling locations)
The site is bisected by a Tennessee Gas pipeline traversing east-west. It is relatively flat in most areas except for small mounds (8-10 feet above grade) in the northern and northeast portions of the site. The northeast portion also contains mulch piles. The site is almost entirely surrounded by drainage ditches. Figure 1-2 of the Engineering Investigation Report is a site sketch.

b. Area 16 acres c. EPA ID number ______ d. PA/SI ☐ Yes ☐ No

e. Completed: ☒ Phase I ☐ Phase II ☐ PSA ☒ Sampling

10. Briefly list the type and quantity of the hazardous waste and the dates that it was disposed of at this site.
No known hazardous waste has been disposed of on site. The site was previously owned by the U.S. Government and has part of a TNT manufacturing facility. It was later transferred to the Town of Lewiston and used as a Municipal landfill.

11a. Summarized sampling data attached

☐ Air ☒ Groundwater ☒ Surface Water ☒ Soil ☒ Waste ☒ EP Tox ☐ TCLP

b. List contravened parameters and values

See Appendix F in the Engineering Investigation Report for Analytical Results

12. Site impact data

a. Nearest surface water: Distance 3,200 ft. Direction west Classification D

b. Nearest groundwater: Depth 5.5 ft. Flow direction N/NW ☐ Sole source ☐ Primary ☐ Principal

c. Nearest water supply: Distance 19,000 ft. Direction west Active ☒ Yes ☐ No

d. Nearest building: Distance 600 ft. Direction southwest Use residence

e. Crops/livestock on site? ☐ Yes ☒ No

f. Exposed hazardous waste? ☐ Yes ☒ No

g. Controlled site access? ☒ Yes ☐ No

h. Documented fish or wildlife mortality? ☐ Yes ☒ No

i. Impact on special status fish or wildlife resource? ☐ Yes ☒ No

j. Within a State Economic Development Zone? ☐ Yes ☒ No

k. For Class 2A: Code ______ Health model score ______

l. For Class 2: Prority category ______

m. HRS Score 12.07

n. Significant threat ☐ Yes ______ ☒ No ☐ Unknown

13. Site owner's name Town of Lewiston	14. Address	15. Telephone Number ( ) -

16. Preparer
Gene Florentino, Geologist, Ecology and Environment, Engineering, P.C.
Name, title, and organization

12/05/90
Date

Gene Florentino
Signature

17. Approved
______
Name, title, and organization

______
Date

______
Signature

2

2. OBJECTIVE

This Phase II investigation was conducted under contract to the NYSDEC Division of Hazardous Waste Remediation, Bureau of Hazardous Site Control. The purpose of the investigation was to determine if hazardous wastes have been disposed of at the site; if contaminants exist in the various media; if contaminants are leaving the Lewiston site; and whether or not threats to human health and/or the environment exist.

The Phase II investigation was designed to supplement existing data for the Town of Lewiston Landfill and update the HRS score. Previous investigations conducted by the Town of Lewiston in 1982 indicated elevated concentrations of arsenic, iron, and TOC in on-site surface water, and lead and antimony in the soil. In 1983 NUS Corporation determined municipal refuse posed no serious threats to the environment. However, there may be a potential threat posed by previous United States Government activities when the site was part of the TNT manufacturing facility. Wehran Engineering, P.C. performed a Phase I investigation that was completed in January 1987. No other surface or subsurface analytical data of on-site soil and water were available at this time other than the 1982 data. A Phase II investigation was recommended based upon the results of that study. In May 1987 E & E sampled subsurface soil and groundwater for Tennessee Gas. The results indicated the presence of low levels of toluene and elevated levels of lead in the groundwater.

3

3. SCOPE OF WORK

3.1 INTRODUCTION

Field work for the Phase II investigation at the Lewiston Site, based on a work plan prepared by NYSDEC, began in May 1990 and was completed in November 1990. A site-specific health and safety plan (HSP) was submitted to NYSDEC for review, and a quality assurance project plan (QAPP) was submitted to NYSDEC for approval prior to the start of field work. The work plan called for the installation of eight groundwater monitoring wells (four pairs--shallow and deep) and the collection of groundwater samples from each monitoring well. An additional shallow well was drilled at the request of NYSDEC creating one set of three. The scope also included the collection of four surface water/sediment samples, and five surface soil samples. One additional surface soil and two waste samples were also added to the work scope by NYSDEC.

3.2 PHASE II SITE INVESTIGATION

3.2.1 Records Search/Data Compilation

Available information from state, county, municipal, and private files were collected and reviewed prior to the initiation of field work. Records from local and state agency files were reviewed to supplement the Phase I report prepared by Wehran Engineering, P.C. in January 1987. The data review facilitated completion of the field investigation and site assessment and calculation of the final HRS score. Specific contacts are listed in Table 3-1.

3.2.2 Site Reconnaissance and Site Safety

At the beginning of each day of field activities, a site safety meeting was conducted by the site safety officer or the team leader. Discussions included the contaminants found on site, routes of exposure, the route to the hospital, location of the nearest phone, and the use of the air monitoring instruments. Also, a general plan of the site activities for the day was discussed. Each person on site was requested to sign the attendance sheet from these meetings. A site specific HSP was available to all personnel at all times (see Appendix A).

On May 18 1990, E & E personnel conducted a site reconnaissance. The purposes of the site visit were to:

- Identify access problems;
- Identify tentative locations for borings and wells, surficial soil, surface water/sediment, waste, and leachate samples;
- Determine if underground or aboveground utilities may impact drilling by visually inspecting well locations and contacting utility companies;
- Identify a water supply source for drilling purposes;
- Conduct a limited air monitoring study using an organic vapor analyzer (OVA); and
- Photodocument present site conditions.

The air monitoring survey indicated no organic vapor readings above background except near the mulch piles due to methane production from decay processes.

3.2.3 Geophysical Survey

* Geophysical surveys utilizing an EM31 ground conductivity meter and a proton precession magnetometer were performed at the Town of Lewiston Landfill on May 18 to May 22, 1990. These surveys were conducted at the four proposed monitoring well locations within and around the perimeter of the site (see Figure 3-1). The results were used to evaluate site geological conditions, locate buried materials, verify proposed monitoring well locations, and identify any significant conductive

subsurface plumes. The geophysical survey methods and results are presented in Appendix C.

3.2.4 Monitoring Well Installation

Five shallow overburden wells and four bedrock wells were installed at the Lewiston site between July 16 and July 31, 1990 by American Auger and Ditching Company under the supervision of E & E. The wells ~~both~~ monitor both shallow and deep groundwater, both up- and downgradient of the site (see Figure 3-2 and Table 3-2).

The wells were drilled and constructed in accordance with NYSDEC guidelines. Two-foot soil samples were collected in 5-foot intervals above the water table and continuously below the water table. Additional samples were taken where major changes in lithology occurred. Ten soil samples were collected for geotechnical analyses. The boreholes were advanced using 4.25-inch inside diameter (ID) hollow-stem augers until refusal. The shallow wells (GW-1A, GW-2A, GW-3A, GW-3C, and GW-4A) were set in the overburden, above bedrock, and the bedrock wells (GW-1B, GW-2B, GW-3B, and GW-4B) were cored using an HQ bit (3.97-inch outside diameter) and set into the uppermost fractured bedrock zone. Well screen consisting of 2-inch ID 0.010 machine-slot polyvinyl chloride (PVC) was set at the bottom of each borehole. The screen length was 5 feet for each of the nine wells. The screens were followed by threaded, flush-joint PVC riser of the same diameter as the well screen to approximately 2 feet above ground surface. The wells were completed with a sand pack varying from 0.5 to 1.78 feet above the top of the well screen, followed by 1.5 to 3.5 feet of bentonite pellets, followed by cement/bentonite grout. A locking protective steel casing was placed over the PVC and a concrete pad was constructed on the ground surface around the protective casing.

My field note books indicates that samples were collected continuously from the surface to the final depth of the boring.

Not needed since sampling was continuous.

After completion of the well, but not sooner than 24 hours after grouting was completed, the well was developed by bailing. Well development was performed until pH, conductivity, and temperature remained constant and water turbidity stabilized at less than 50 nephelometric turbidity units (NTUs).

A decontamination pad was constructed on site to steam clean the drill rig, augers, bits, rods, split spoons, casings, etc. before and

A decon pad was not constructed. Deconing was conducted on an old railroad bed.

after the installation of each well. Split spoons were decontaminated at each drill site between each sample to prevent cross-contamination of samples. The decontamination procedure was as follows:

- o Initially cleaned of all foreign matter;
- o Washed with a trisodium phosphate and water solution;
- o Rinsed with potable water;
- o Rinsed with pesticide grade methanol;
- o Rinsed with deionized water; and
- o Allowed to air dry.

The split spoons were decontaminated by the steam-cleaner. No manual deconning was conducted.

Boring logs are found in Appendix D and geotechnical analyses are included in Appendix E.

3.2.5 Subsurface Soil Sampling and Analysis

Ten subsurface soil samples were collected for geotechnical analyses. All ten were analyzed for grain size and one for Atterberg limits. Each of these samples was chosen because it lay within the screened depth of the well or represented a prominent lithologic change. No samples were collected for chemical analyses due to the absence of visible and instrumental (i.e., OVA readings) evidence of contamination.

Field procedures for subsurface soil sampling are discussed in Section 3.2.4. Geotechnical analyses are included in Appendix E. Analytical results are discussed in Section 4.5 and data summary sheets are included in Appendix F.

3.2.6 Groundwater Sampling and Analysis

As part of the Phase II investigation of the Lewiston Site, groundwater samples were collected from the nine newly-installed monitoring wells on August 9, 1990 (see Figure 3-2 and Table 3-2). Not all the wells could be developed to a turbidity of less than 50 NTUs; therefore, they were purged on August 8, and allowed to settle overnight prior to sampling. These samples were analyzed for TCL organics and inorganics by E & E's ASC. In addition, QA/QC samples consisting of a drill rig water sample were analyzed for the above-mentioned compounds, along with MS/MSD samples (GW-2MS/GW-2MSD and Drill Rig MS/Drill Rig MSD).

Analytical results are discussed in Section 4.5 and data summary sheets are included in Appendix F. Field procedures for groundwater sampling are presented in Appendix G.

3.2.7 Surface Water/Sediment Sampling and Analysis

Of the four surface water/sediment samples scheduled from drainage ditches surrounding the site (see Figure 3-2 and Table 3-3), only one surface water sample (SW-4) was collected because other locations were dry. The one water sample and four soil samples were analyzed for TCL organics and inorganics by E & E's ASC. In addition, QA/QC samples consisting of sediment MS/MSD samples were analyzed for volatile organics (SED-4MS/SED-4 MSD), and BNAs and PCBs/pesticides (SED-2MS/SED-2MSD).

Analytical results are discussed in Section 4.5, data summary sheets are presented in Appendix F, and field procedures used are described in Appendix G.

3.2.8 Surface Soil Sampling and Analysis

Six surface soil samples were collected from various areas throughout the site on August 9, 1990 (see Figure 3-2 and Table 3-4). These samples were analyzed for TCL organics and inorganics by E & E's ASC. Samples S-3 through S-6 were also analyzed for EP toxicity metals. In addition, a QA/QC sample consisting of one MS/MSD sample (S-3MS/S-3MSD) was analyzed for all of the above-mentioned parameters except metals.

Analytical results are discussed in Section 4.51, data summary sheets are presented in Appendix F, and field procedures are described in Appendix G.

3.2.9 Waste Sampling and Analysis

Two waste samples were collected on August 9, 1990 (see Figure 3-2 and Table 3-5). These samples were analyzed for TCL organics and inorganics by E & E's ASC. Analytical results are discussed in Section 4.5, data summary sheets are presented in Appendix F, and field procedures are described in Appendix G.

Table 3-1

SOURCES CONTACTED FOR THE NYSDEC PHASE II INVESTIGATION AT THE TOWN OF LEWISTON LANDFILL

New York State Department of Environmental Conservation
584 Delaware Avenue
Buffalo, New York 14202
Contact: Jaspal Singh Walia
Telephone Number: 716/847-4585
Date: March 29 and April 4, 1990
Information Gathered: File search for NYSDEC Phase II report preparation.

Niagara County Environmental Management Council
County Courthouse
Lockport, New York 14094
Contact: Celeste Richardson
Telephone Number: 716/439-6170
Date: March 30, 1990
Information Gathered: Land use information.

Niagara County Health Department
10th and Falls Street
Niagara Falls, New York
Contact: Paul Dickey
Telephone Number: 716/284-3128
Date: April 2, 1990
Information Gathered: Water supply information.

Niagara County Health Department
5467 Upper Mountain Road
Lockport, New York
Contact: Ronald Gwozdek
Telephone Number: 716/439-6109
Date: April 2, 1990
Information Gathered: Water supply information.

Niagara County Highway Department
225 South Niagara Street
Lockport, New York 14094
Contact: Carl Allen
Telephone Number: 716/439-6066
Date: April 3, 1990
Information Gathered: Aerial photographs.

Soil Conservation Service
4487 Lake Avenue
Lockport, New York 14094
Contact: Edward Oliver
Telephone Number: 716/434-4949
Date: April 3, 1990
Information Gathered: Niagara County soil survey.

New York State Department of Environmental Conservation
Division of Regulatory Affairs
600 Delaware Avenue
Buffalo, New York 14202
Contact: Joseph Sciascia
Telephone Number: 716/847-4585
Date: April 3, 1990
Information Gathered: File search.

New York Natural Heritage Program
700 Troy-Schenectedy Road
Albany, New York 12110
Contact: Burrell Buffington
Telephone Number: 716/783-3932
Date: April 10, 1990
Information Gathered: Significant habitats.

Table 3-1 (Cont.)

New York State Department of Health
Bureau of Environmental Exposure
11 University Place
Room 205
Albany, New York 12203
Contact: Dawn Hettrick
Telephone Number: 518/458-6310
Date: April 10, 1990
Information Gathered: File search for NYSDEC Phase II report preparation.

Town of Lewiston Water District
1445 Swann Road
Lewiston, New York 14092
Contact: Steve Reiter
Telephone Number: 716/754-8218
Date: April 20, 1990
Information Gathered: Water supply information.

Table 3–2

MONITORING WELL LOCATIONS

Well	Location
GW–1A	Downgradient overburden well near the northwest corner of the site.
GW–1B	Downgradient bedrock well adjacent to GW–1A.
GW–2A	Downgradient overburden well, north of the Tennessee gas pipeline in the west-central portion of the site.
GW–2B	Downgradient bedrock well adjacent to GW–2A.
GW–3A	Upgradient overburden well in the northeast corner of the site.
GW–3B	Upgradient bedrock well adjacent to GW–3A.
GW–3C	Upgradient shallow overburden well adjacent to wells GW–3A and GW–3B.
GW–4A	Upgradient overburden well in the southeast corner of the site.
GW–4B	Upgradient bedrock ~~overburden~~ well adjacent to GW–4A.

02[UZ]YQ1080:D3167/3893/32

Table 3-3

SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS

Sample	
SED-1	Drainage swale bisecting the landfill which flows into ditch surrounding the site.
SED-2	Drainage ditch along southern border of site in southeast corner.
SED-3	Drainage ditch along northern border of site in northeast corner.
SW-4/ SED-4	Drainage ditch along northern border of site in northwest corner.

02[UZ]YQ1080:D3167/3884/33

Note: SW = surface water sample

SED = sediment sample

Table 3-4

SURFACE SOIL SAMPLING LOCATIONS

Sample	Location
S-1	Background soil taken to the southeast of the site
S-2	Background soil taken to the south of the site near the southwest corner
S-3	Near the northeast corner of the landfill
S-4	On the west-central portion of the landfill
S-5	Near the southeast corner of the landfill in the area of possible fill
S-6	Adjacent to the battery casing pile along the north-central border of the landfill

02[UZ]YQ1080:D3167/3894/32

Table 3-5

WASTE SAMPLING LOCATIONS

Sample	Location
W-1	On large mound near mulch piles in north-central portion of the landfill
W-2	On small mound near west-central portion of the landfill

02[UZ]YQ1080:D3167/3892/24

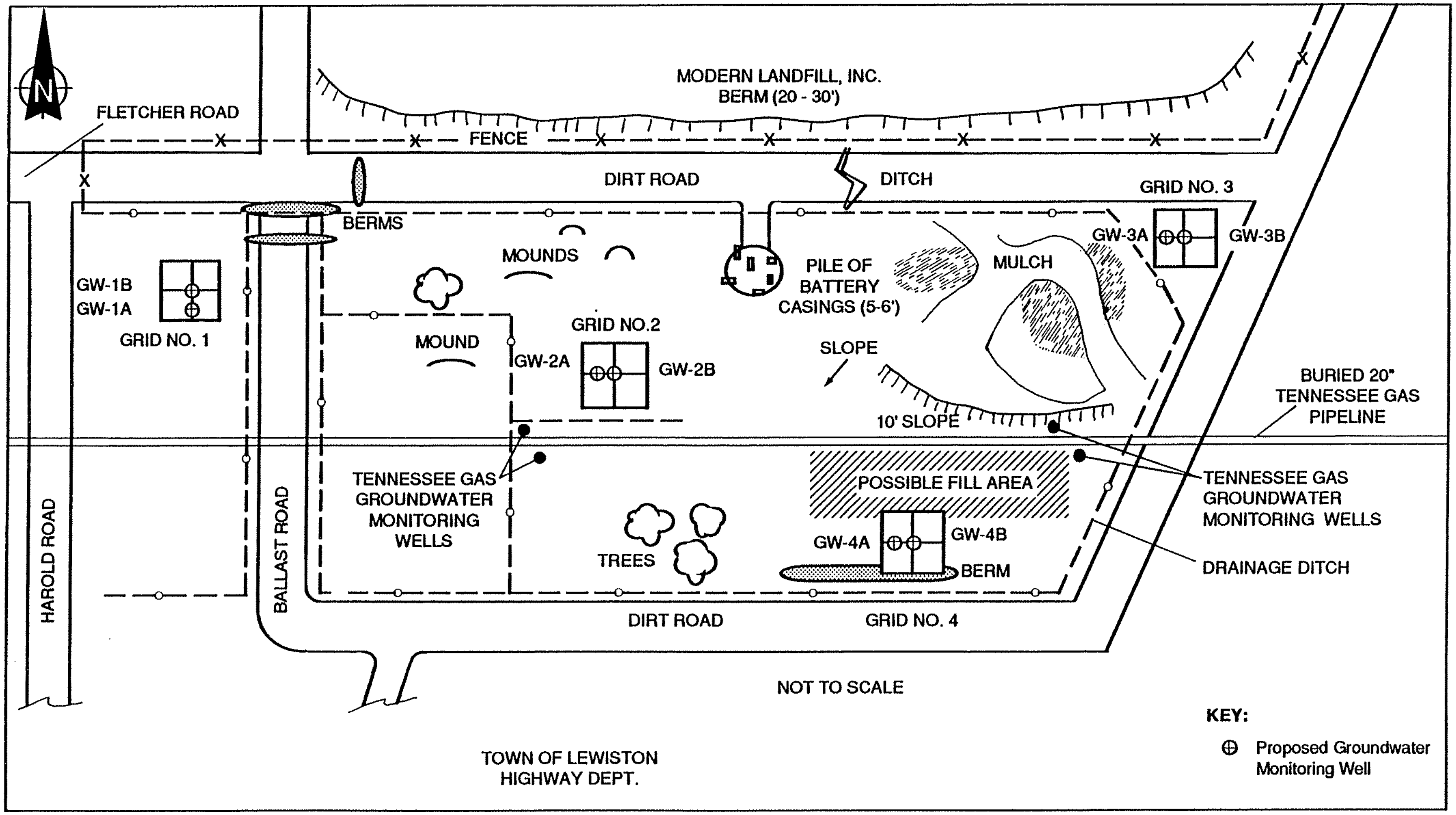

Figure 3 - 1
GEOPHYSICAL SURVEY AND PROPOSED GROUNDWATER MONITORING WELL LOCATIONS
LEWISTON LANDFILL, LEWISTON, NEW YORK

YQ2927

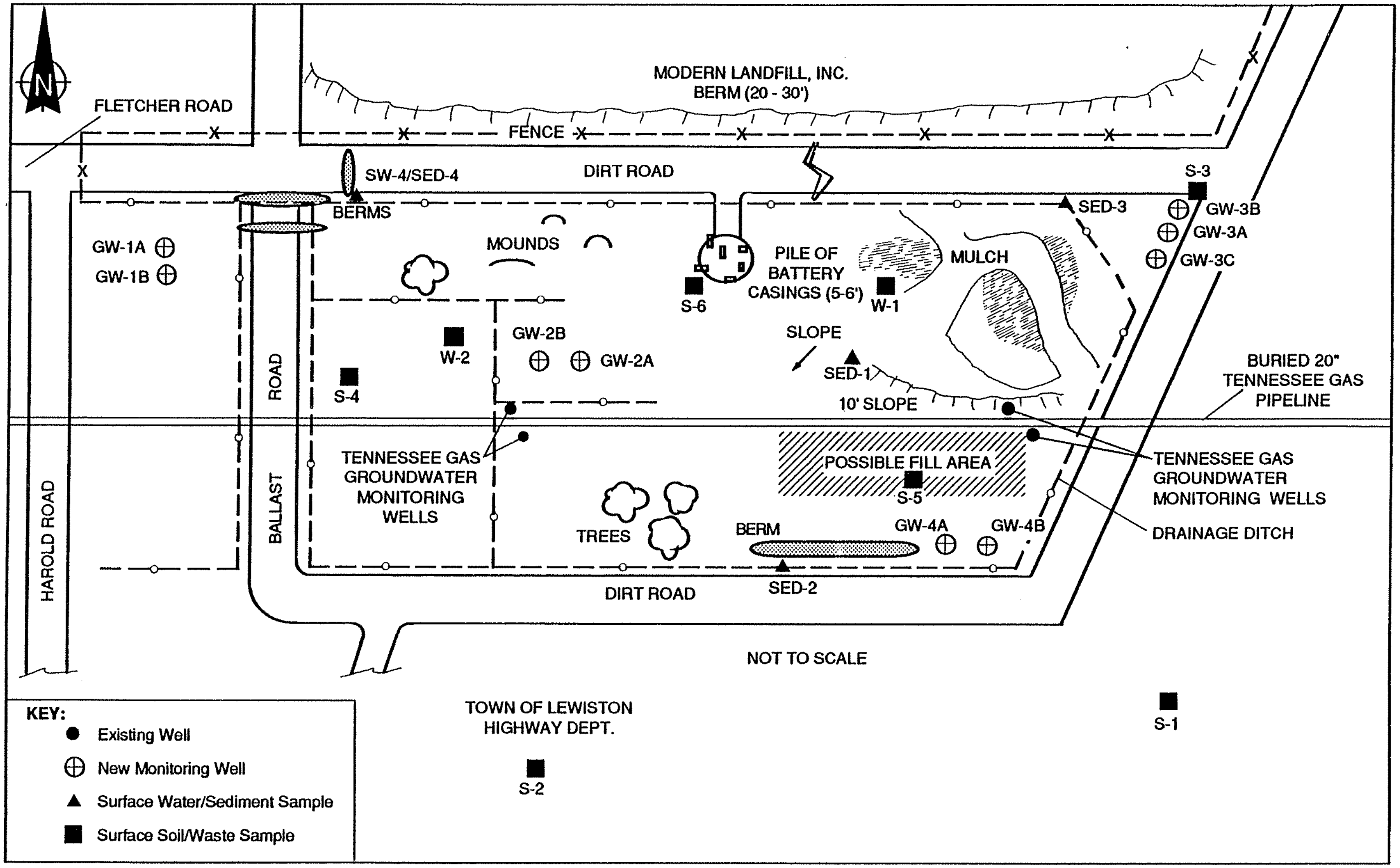

Figure 3-2
MONITORING WELL, GROUNDWATER, SURFACE WATER/SEDIMENT, SURFACE SOIL, AND WASTE SAMPLING LOCATIONS LEWISTON LANDFILL, LEWISTON, NEW YORK

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4. SITE ASSESSMENT

4.1 SITE HISTORY

The 16-acre Town of Lewiston Landfill was owned by the Town of Lewiston and is currently owned by Niagara County. The landfill changed from active to inactive on October 1, 1972 and officially closed on August 25, 1979. Before the Town of Lewiston owned the landfill, the site was owned by the U.S. Government and may have been part of a TNT manufacturing facility.

The landfill, located adjacent to the intersection of Harold and Pletcher Roads in the Town of Lewiston, Niagara County, New York, was primarily used by the Town and Village of Lewiston to dispose of household refuse. Some industrial wastes, mainly crushed battery cases, were also disposed of at the site. During its operational period, the landfill was cited numerous times for open burning, offensive odors, and leachate breakouts. Since closure, these have not been a problem.

The New York State Department of Environmental Conservation completed a limited sampling program in April 1982. Three soil and three water samples were analyzed. The results indicated high levels of arsenic, iron, and TOC in the water samples, and lead and antimony in the soil.

On page 1-1, it states that the Town of Lewiston conducted this sampling.

NUS completed an investigation of the site in October 1983 for EPA. A Phase I investigation conducted by Wehran Engineering, P.C. in January 1987 included a site inspection and the assignment of an HRS score. Based on observations made during the Phase I site inspection and review of agency files and other references, a score was calculated. The score indicated that the potential for direct contact with contaminated soil and possible contamination of groundwater were the primary concerns at the site. Therefore, a Phase II investigation was recommended.

The site is crossed by a natural gas pipeline owned and operated by Tennessee Gas. In May 1987, E & E analyzed soil and groundwater samples along the Tennessee Gas right-of-way to determine if contaminants were present that may be hazardous to workers performing routine maintenance along the pipeline. Low levels of toluene and levels of lead exceeding the New York State Class GA Groundwater Quality Standards were found in the groundwater tested.

4.2 REGIONAL SETTING

4.2.1 Regional Geology and Hydrology of Niagara County

Niagara County lies within the Central Lowland Physiographic Province; specifically, it occupies part of the Huron and Ontario Plains (Higgins, et al. 1972).

This area, known as the Niagara Frontier, is relatively flat and broken by two east-west trending escarpments: the Niagara Escarpment and the Onondaga Escarpment. The site lies below the Niagara Escarpment (Tesmer,1981).

Sediments in this area consist mainly of lacustrine deposits and glacial tills. The lacustrine deposits (i.e., silts and clays that settled to the bottom of the postglacial lake) are generally olive and brownish sediments overlying a red clay. The red clay was deposited by glacial Lake Lundy which covered almost the entire county. Glacial till also occupies a large part of the surface area in the county and underlies most areas of lake sediments. The glacial till deposits consist of ground moraines, drumlins, elongated till ridges, and terminal moraines. Ground moraines occupy the low undulating till plain and are approximately 10 to 15 feet thick. Drumlins are smoothly rounded hills that were molded beneath the ice. Drumlins in Niagara County are very subdued due to modification by the glacial lakes. Elongated till ridges are thin ridges of pebbly till trending northeast-southwest. These ridges may have been formed by giant flutings (furrows or grooves cut by glaciers) in the underlying Queenston shale. The terminal moraines have a general east-west trend and were formed when the ice stagnated for a long period of time. Other deposits, consisting of glacial outwash and beach deposits, exist in large belts (up to 8 miles in length) and are generally 1 to 10 feet thick.

Most of Niagara County was covered by lake Iroquois.

Surface drainage of the Ontario Plain is northward into Lake Ontario, and soil drainage is relatively poor. Surface drainage of the Huron Plain is southward into Tonawanda Creek and is also not well developed (Higgins, et al. 1972).

The lacustrine sediments and glacial till of the Niagara Frontier are underlain by sedimentary rocks varying in thickness between 1,980 to 4,200 feet (see Figure 4-1) and are Ordovician, Silurian, and Devonian in age. The lower part of the Ordovician System is composed primarily of limestones and dolostones. The upper part is composed of massive shales, interbedded with thin sandstone layers. These are in turn overlain by the red shales of the Queenston Formations.

The Silurian system is composed of the Medina, Clinton, Lockport, and Salina groups. The Medina Group consists of sandstones, shales, and siltstones. These are overlain by the limestones, shales, and dolostones of the Clinton, which in turn are overlain by the dolostones of the Lockport Group. Above the Lockport are shales, siltstones, and dolostones, and gypsum, anhydrite, and salt beds of the Salina Group. The poorly drained Tonawanda Plain is formed on the weathered surface of the Lockport and Salina groups (Tesmer 1981).

The Devonian system overlies Silurian rocks to the south of Niagara County. The formation at the Devonian-Silurian contact is the Onondaga limestone which is a massive cherty limestone that outcrops across most of northern Erie County.

Niagara County has abundant surface waters bordering it: Tonawanda Creek to the south, the Niagara River to the west, and Lake Ontario to the north. The county's municipal water district draws most of its water from the Niagara River. However, rural residents depend on both bedrock and overburden wells. The bedrock wells north of the Niagara Escarpment are dug or drilled into the Queenston shale. The yields of water are often inadequate during extended dry periods and may contain high levels of salt or sulfate. Bedrock wells to the south of the escarpment are drilled into the Lockport dolomite. Yields are generally higher, but the water is hard from high calcium and other base concentrations. Shallow-dug wells and springs are commonly in the three most permeable of the 11 soil associations in Niagara County: the Otisville-Altmar-Fredon-Stafford association, the Howard-Arkport-Phelps association, and the Hilton-Ovid-Ontario association. The shallow wells are less desirable than bedrock wells due to increasing pollution of shallow groundwater, primarily by septage from septic tanks (Higgins, et al. 1972).

4.3 SITE GEOGRAPHY

4.3.1 Topography

The Town of Lewiston landfill is located in the Central Lowlands (Eastern Lake Section) Physiographic Province of the United States. This section consists of the plains region, which is covered by a young blanket of glacial till (Pirkle and Yoho 1977). In Niagara County, the Niagara Escarpment divides the area into two plains: the Ontario plain to the north and the Huron plain to the south. The site lies on the Ontario plain. Drainage on this plain is northward toward Lake Ontario. The streams have crooked channels and meander through narrow floodplains that are not deeply cut. Elevations in the vicinity of the site range from 320 to 330 feet above mean sea level. The Niagara Escarpment consists of a steep northward slope of resistant limestone beds reaching an elevation of approximately 625 feet (USGS 1980) above mean sea level. Drainage to the south of the escarpment is toward Tonawanda Creek, which in turn flows westward into the Niagara River (Higgins, et al. 1972).

The ground surface over the site is uneven in the fill areas (scattered mounds up to 10 feet above grade) and relatively flat lying in the surrounding areas. A 50-foot-wide Tennessee Gas Pipeline right-of-way traversing east-west divides the site in half.

The site is located in Zone C of the Flood Insurance Rate Map (FIRM). The actual panel prepared by the Federal Emergency Management Agency (FEMA) for this area is not in print because Zone C represents areas of minimal flooding.

4.3.2 Soils

Two soil types have been identified surrounding the landfill area within the boundaries of the area of investigation. These soils are represented by the Madalin silt loam over the western two-thirds of the site, and Ovid Silt Loam (0 to 2% slopes) in the southwestern corner of the site. Fill material is present in the eastern third of the site (as seen in aerial photographs, see Appendix H).

The Madalin silt loam generally occurs on broad flats or in narrow drainageways in the basins of old glacial lakes. Commonly, glacial till inclusions are mixed into or are present in thin layers in the lacustrine silt and clay. Several areas may be underlain by firm glacial till at a depth of 40 inches or more.

Runoff is slow, and drainage is commonly difficult because a suitable outlet is lacking. Depth to bedrock is usually greater than 6 feet, and depth of the seasonal high water table is 0 to 0.5 foot. Permeability ranges from 0.63 to 2.0 inches per hour and available moisture capacity is 0.15 to 0.20 inch per inch of depth.

The Ovid silt loam (0 to 2% slopes) occurs in level areas that normally are near the beds of old post-glacial lakes. These areas, however, are slightly higher in elevation than the lakebed. Gravelly areas are generally found to the north of the Niagara Escarpment. Depth to bedrock is usually greater than 6 feet and depth to the seasonal high water table is 0.5 to 1 foot. Permeability ranges from 0.63 to 2.0 inches per hour and available moisture capacity is 0.14 to 0.20 inch per inch of depth (Higgins et al. 1972).

The soils encountered during the drilling of the boreholes for the monitoring wells consisted mainly of various layers of silt and clay mixtures with minor percentages of sand and gravel (see Appendix D). Ten soil samples were collected for grain size distribution including one sample for Atterberg Limit analyses at various depths. The results of these tests are presented in Table 4-1 and Appendix E.

4.4 SITE HYDROGEOLOGY

The information used to develop the discussion in this subsection includes the Phase II geophysical survey, nine monitoring well borings and installations, USGS topographic maps, geological survey maps, and regional groundwater reports.

The boring logs are included in Appendix D, and geotechnical analysis results are presented in Appendix E.

4.4.1 Geology

The bedrock underlying the soils at the Lewiston Site vary in depth from 25.2 to 29.0 feet below ground surface. Drill log information is summarized in Table 4-2. The elevations of the top of bedrock ~~was~~ were highest in the northeast corner of the site and lowest in the ~~southwest~~ Northwest and Southeast portion of the site, thus indicating an apparent dip to the south-southwest.

The bedrock beneath the site is Queenston Shale. This formation consists of mainly brick-red, sandy shale, massive to blocky, with thin beds of greenish-gray shale and greenish-gray sandstone. The thickness of the Queenston is 1,200 feet (Johnston 1964). The shale is silty and is cemented by dolomite and calcite. Scattered gypsum nodules occur throughout, and quartz is a common constituent. The shale is highly compacted and moderately hard.

The top of the formation is very fissile, weathered, and fractured. Fractures are mainly horizontal with some nearly vertical. There are occasional clay seams within some of the horizontal fractures. Clay minerals include illite, chlorite, kaolinite, montmorillonite and mixed layered clay (Buehler and Calkin 1982).

4.4.2 Hydrology

Groundwater

Nine groundwater monitoring wells were installed at the Lewiston Site. These wells were installed to establish whether or not contamination is present and migrating off site. The work plan consisted of the drilling and installation of four pairs of wells (i.e., one overburden and one bedrock at each location). In addition to these wells, one shallow overburden well (10 feet in depth) was added by the on-site NYSDEC representative based upon artesian conditions encountered during drilling. The purpose of this well was to intercept water infiltration from the surface at the northeast corner of the site.

The well locations are shown in Figure 3-2, well construction data are presented in Table 4-3, and water level data are shown in Table 4-4. Appendix D contains the boring logs.

One well pair was placed near each of the four corners of the site. The wells designated with the letter "A" monitor the groundwater in the overburden, wells designated with the letter "B" monitor the groundwater in the bedrock and a third well with the letter "C" monitors the shallow overburden. Several water-bearing zones were encountered during drilling in the overburden. These zones are usually undeveloped due to very low yields. The water quality is very hard with high chloride content. There appears to be a confining layer above the top of the bedrock. Both overburden and bedrock wells exhibited rises in groundwater upon well completion. As part of the scope of work, water levels from the newly installed wells were to be used to establish a water table gradient. Due to confined or semiconfined conditions existing at the site, the groundwater piezometric surface was measured and contoured (see Figure 4-2). The results indicated a nearly flat gradient with a gentle dip to the west/northwest for both the overburden and bedrock aquifers. Because the gradient is so flat, it is difficult to pinpoint actual flow direction of groundwater and contaminant migration.

In the Queenston shale, groundwater occurs principally within the fractured and weathered zone of the uppermost shale. This zone is generally less than 1 foot thick. The water is also very hard and highly mineralized (Johnston 1964).

Surface Water

There are several small seasonal surface water bodies located on the Lewiston Site. These bodies of water are contained in several drainage ditches that completely surround the site. High water levels and discharge were encountered during the site reconnaissance in May 1990. Almost all of these drainage ditches were dry during the sampling period in August 1990.

The Niagara River is approximately 3.6 miles to the west of the site, the New York State Power Authority Reservoir is approximately 3.3 miles south, Six-Mile Creek is 0.6 mile to the west, and Twelve-Mile Creek is 0.7 mile to the northeast of the site. The Niagara River is Class A- between the confluence of Lake Erie and Lake Ontario, from the international boundary to the American shore (State of New York 1983). Class A- is the same as Class A waters (i.e., a source of water supply for drinking, culinary, or food-processing purposes, and other uses); however, the Class A- designation is used when international waters are involved (NYSDEC 1986).

Six-Mile Creek is a Class D stream, and Twelve-Mile Creek is a Class B stream (State of New York 1983). Class D surface waters are suitable for fishing and primary and secondary contact. Due to natural conditions such as intermittency of flow, water conditions not conducive to propagation of game fishery, or stream bed conditions, Class D waters will not support fish propagation. Class B waters are suitable for primary contact recreation and any other uses except as a source of water supply for drinking, culinary, or food-processing purposes (NYSDEC 1986).

4.5 SITE CONTAMINATION ASSESSMENT

Analytical data for the site contamination assessment are presented in Appendix F. For TCL organic and inorganic compounds, all positive reported values and qualifiers for samples and field QC samples are presented on data summary forms. Laboratory QC sample results are included for TCL organic compounds.

All CLP data packages were reviewed to determine whether qualified data were acceptable for the intended use. In general, common laboratory contaminants, including methylene chloride, acetone, 2-butanone, and phthalate compounds are considered to be due to laboratory contamination and not evaluated if levels are less than 10 times the detection limit, when the values are qualified with a "B". In addition, hexane, typically considered a laboratory contaminant, is often found in samples from the unknown compound search.

4.5.1 Groundwater

Groundwater samples were collected from each of the nine new monitoring wells and analyzed for TCL organics and inorganics. Monitoring wells GW-1B, GW-2B, and GW-4B were only tested for volatile organics and metals at the request of NYSDEC due to the presence of pairs of wells at each location. Table 4-5 contains field measurements of groundwater chemical parameters taken during well sampling.

Page G-2 indicates that all samples were analyzed for TCL organics. Which is correct.

The following organic compounds were detected in the groundwater samples: 16 µg/l of 2-butanone and 13 µg/l of 2-hexanone in the bedrock well sample GW-1B, and 620 µg/l of methylene chloride in the bedrock well sample GW-3B. Although methylene chloride is commonly a laboratory contaminant, the concentration in this sample was more than 60 times the concentration of the associated blank sample. Only one PCB mixture (0.7 µg/l of Aroclor-1254) was also detected at low level in the groundwater sample GW-3C. The concentration of PCB in the shallow overburden well GW-3C, exceeded the NYSDEC water quality regulation of 0.1 µg/l. Turbidity readings and inorganic results indicate the sample contained high levels of particulates. The PCB present in the sample is most likely associated with this particulate phase. Table 4-6 summarizes the groundwater organic analyses for samples containing significant quantities of contaminants.

The drill water contained 25 µg/l chloroform, 11 µg/l bromodichloromethane, and 5 µg/l of dibromochloromethane. These compounds are common constituents in chlorinated potable water. No semivolatiles were detected in any of the groundwater or drill water samples.

Only two metals (iron and manganese) exceeded New York State Class GA drinking water standards. Class GA waters are best suited as a potable water supply. Iron exceeded standards in all of the wells tested, and manganese exceeded standards in GW-1A, GW-1B, GW-2A, GW-3C, and GW-4B. Since turbidity was greater than 200 nephelometric turbidity units (NTUs) and iron and manganese are common metals in soils in this region, the high concentrations are probably a reflection of the silt particles in the water. No cyanide was detected in any of the groundwater samples. Table 4-7 summarizes the groundwater inorganic analyses.

4.5.2 Surface Water/Sediment

Collection of four surface water/sediment samples was proposed in the scope of work. However, due to dry conditions during the sampling period, only one of the surface water samples was collected along with the four sediment samples. No organic compounds were detected in the surface water sample; however, aluminum and iron were detected in levels that exceeded Class C standards for aquatic life. Class C water is suitable for fishing and fish propagation, and primary or secondary contact recreation. No cyanide was detected in the surface water sample. Table 4-7 summarizes inorganic analyses for surface water.

One organic compound (2-butanone) and several polynuclear aromatic hydrocarbons (PAHs) were detected in SED-4 in concentrations below sample quantitation limits, and several PAHs also of very low concentrations were detected in SED-1 and SED-2. A high concentration of total PAHs was detected in SED-3 along with low concentrations of 9H-fluoren-9-one and 4H-cyclopenta(def)phenanthrene, which are tentatively identified compounds associated with PAHs; dibenzofuran, 4,4′-DDE, and 4,4′-DDD. Table 4-8 summarizes sediment organic analyses for samples containing significant quantities of contaminants. Lead concentrations exceeded the common ranges for metals in soils of the eastern United States in SED-3 and SED-4. No cyanide was detected in any of the sediment samples. Table 4-9 summarizes inorganic analyses.

4.5.3 Surface Soil

Six surface soil samples were collected at the Lewiston Site and analyzed for TCL organics and inorganics. Samples S-3, S-4, S-5, and S-6 were analyzed for EP Toxicity metals as per request of NYSDEC. The scope of work originally requested five samples; however, upon completion of the site reconnaissance, NYSDEC added another sample (S-6) near the battery casings pile. Two pesticides, 4,4′-DDE and 4,4′-DDT, were detected in S-3 and S-5, and 4,4′-DDD was detected in S-5, and very low concentrations of a few PAHs (below sample quantitation of PAH limits) were detected in samples S-1, S-3MS, S-3MSD, S-4, S-5, and S-6. Although PAHs were detected in samples S-3MS and S-3MSD, they were not detected in S-3 probably because they were in very low concentrations. The levels in the on-site samples were less than the levels in the background sample S-1. Table 4-8 summarizes surface soil organic analyses of samples containing only significant contaminants. No metals were detected above common ranges for metals in soils of the eastern United States, and no cyanide was detected in any soil sample. All samples analyzed for EP Toxicity metals indicated no metals were present above detection limits (see Appendix F).

4.5.4 Waste

Two waste samples were collected at the Lewiston Site and analyzed for TCL organics and inorganics. These samples consisted of refuse particles from mounded areas. The waste samples contained low concentrations of toluene (W-1 and W-2), ethylbenzene (W-1), 2-methylphenol

(W-2), and PAHs (W-1 and W-2) below sample quantitation limits. Waste samples W-1 and W-2 also contained high concentrations of the PCB compounds Aroclor-1248 (5,400 µg/kg) and Aroclor-1254 (10,000 µg/kg), respectively. No pesticides were detected in any of the waste samples. Table 4-8 summarizes organic analyses of samples that contained significant quantities of contaminants. Iron in W-2 and lead in W-1 exceeded the common range for metals in soils of the eastern United States. Table 4-9 summarizes inorganic analyses of the waste samples. No cyanide was detected in any of the waste samples.

4.5.5 Contamination Assessment Summary

Groundwater from downgradient bedrock well GW-1B and upgradient bedrock well GW-3B contained volatile organics 2-butanone, 2-hexanone, and methylene chloride (see Section 4.5.1). These compounds are commonly considered laboratory artifacts because they are usually found in blank samples. However, the concentrations of these contaminants in the sample blanks were either undetected or well below the levels detected in the groundwater samples. Therefore, due to the presence of these higher concentrations, they may be present in the groundwater beneath the site. In addition, a concentration of 0.7 µg/l of Aroclor-1254 was detected in the shallow overburden well GW-3C in exceedance of drinking water standards. The presence of Aroclor-1254 may be the result of leaching from waste piles. High concentrations of iron and manganese also exceeded Class GA drinking water standards in GW-3C along with almost all of the other wells. The elevated Aroclor-1254, and iron and manganese concentrations are probably the result of high turbidity in the samples. No semivolatile organic compounds or pesticides were detected in any of the groundwater samples. * Since the groundwater gradient in both the overburden and bedrock~~s~~ beneath the site is relatively flat, upgradient and downgradient locations cannot be accurately determined with the limited data obtained from this investigation.

The downgradient surface water sample contained only aluminum and iron in excess of Class C surface water standards for aquatic life. No volatile, semivolatile, or pesticide/PCB organic compounds were detected.

All of the sediment samples contained concentrations of PAHs below sample quantitation limits except downgradient sample SED-3 which contained a high concentration of total PAHs. Downgradient samples SED-3 and SED-4 also contained lead concentrations exceeding the common range for metals in soils of the eastern United States. This is probably due to their proximity to waste piles located along the northern border and northeast corner of the site. Results of waste samples also contained high lead concentrations. Very low concentrations (below sample quantitation limits) of dibenzofuran and pesticides, and 2-butanone were also detected in SED-3 and SED-4, respectively. No PCBs were detected in any of the sediment samples.

Several soil samples (both upgradient and downgradient) contained concentrations of select PAHs below sample quantitation limits. The concentrations were within the levels of background sample S-1. No PAHs were detected in background sample S-2. In addition, samples S-3 and S-5 contained pesticides. No volatile organic compounds or PCBs were detected, and all metal concentrations were within the common ranges for soils of the eastern United States.

The two waste samples contained very low concentrations (below sample quantitation limits) of toluene and PAHs and W-1 also contained ethylbenzene and 2-methylphenol. Iron concentrations in W-1 and lead concentrations in W-2 exceeded the common range for metals in soils of the eastern United States. No pesticides were detected in the waste samples.

In general, the groundwater exhibited minor contamination by
* ketones and methylene chloride, and a PCB concentration in exceedance of Class GA drinking water standards. Surface water contained high concentrations of aluminum and iron exceeding aquatic standards for Class C surface water; and the surface soils, sediment, and waste samples exhibited high concentrations of lead along the northern border and in the west central portion of the site, pesticides along the eastern portion, and very low concentrations of volatile organic compounds in the central portion of the site.

4.6 RECOMMENDATIONS

Based upon the analytical results of groundwater, surface water/sediment, surface soil, and waste samples collected at the

Lewiston Site, contamination of all the above-mentioned media was confirmed. Most of the organic contaminant levels were low; however, metal and pesticide concentrations in some of the soil/sediment/waste samples were high, and PCBs were detected in the shallow groundwater. It is apparent that the contamination is originating on site. The question that remains is whether there are contaminants on site which pose a significant threat to human health and the environment. Since the surrounding area is rural to semi-rural, Modern Landfill, Inc. is located downgradient of the site, and groundwater downgradient to the site is not used for a drinking water supply, the potential of the contaminants detected on site affecting human health and the environment is very low. However, since portions of the site are currently used by the town highway department and Tennessee Gas Pipeline maintenance personnel, proper cover material should be placed over the entire landfill to prevent direct contact with surface soils and inhibit further infiltration of surface runoff to the underlying groundwater system.

Table 4-1

SUMMARY OF GEOTECHNICAL ANALYSES

		Partical Size Distribution (percent)						Atterburg Limits (percent)		
Sample Number	Sample Depth (feet)	Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index
GW-1A	4 - 6	1	3	2	6	28	60	36	19	17
GW-1B	16 - 20	11	4	3	4	33	45			
GW-2A	14 - 16	2	1	1	4	40	52			
GW-2A	16 - 18	10	7	12	19	44	8			
GW-2B	6 - 8	0	2	2	5	23	68			
GW-2B	14 - 16	5	2	3	23	52	15			
GW-3A	22 - 24	10	7	13	13	40	17			
GW-3B	21.5 - 22	7	4	5	22	56	6			
GW-4B	4 - 6	1	7	2	9	36	45			
GW-4B	16 - 18	1	2	2	5	23	67			

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Table 4-2

DRILLING LOG INFORMATION OF NEW WELLS

Well Type	Approximate Thickness of Overburden (feet)	Approximate Elevation* of Top of Bedrock or Refusal (feet above MSL)	Total Depth of Borehole Measured from Ground Surface (feet)	Comments
GW-1A, Overburden			18.8	Drilled 7/19/90
GW-1B, Bedrock	26.0	292.5	29.1	Drilled 7/16/90
GW-2A, Overburden		293.7	18.5	Drilled 7/23/90
GW-2B, Bedrock	25.2	193.7	29.6	Drilled 7/20/90
GW-3A, Overburden			24.0	Drilled 7/25/90
GW-3B, Bedrock	27.5	293.9	32.5	Drilled 7/24/90
GW-3C, Overburden			10.0	Drilled 7/30/90
GW-4A, Overburden			24.5	Drilled 7/27/90
GW-4B, Bedrock	29.0	292.9	32.0	Drilled 7/26/90

02[UZ]YQ1080:D3167/3897/19

*Elevations are not true elevations, but relative to an assumed elevation of 320 feet AMSL at the centerline intersection of Pletcher and Harold Roads at the baseline point from U.S.G.S Ransomville, NY Quadrangle map.

Table 4-3

MONITORING WELL CONSTRUCTION DATA

Well	Opening	Feet of Screen or Open Hole	Feet of Riser	Thickness of Bentonite (feet)	Total Depth of Well (feet) Below Ground Surface	Stick-up Height (feet)
GW-1A	Screen	5	15.3	3.5	18.3	2
GW-1B	Screen	5	25.88	2.25	28.88	2
GW-2A	Screen	5	15.2	2.5	18.2	2
GW-2B	Screen	5	25.54	2.65	28.54	2
GW-3A	Screen	5	20.84	2.25	23.84	2
GW-3B	Screen	5	28.79	2.75	31.79	2
GW-3C	Screen	5	7.0	1.5	10.0	2
GW-4A	Screen	5	21.2	2.65	24.2	2
GW-4B	Screen	5	27.1	2.65	30.1	2

02[UZ]YQ1080:D3167/3891/15

Table 4-4

WATER LEVEL DATA

			Elevations in Feet AMSL*		
Well	Date Measured	Water Level Below Ground Surface (feet)	Elevation at TOC**	Grade Elevation	Water Level Elevation
GW-1A	8/9/90	9.20	320.08	318.8	309.6
GW-1B	8/9/90	5.58	319.99	318.5	312.92
GW-2A	8/9/90	5.70	320.81	318.9	313.2
GW-2B	8/9/90	5.60	319.71	318.9	313.3
GW-3A	8/9/90	7.95	323.01	321.7	313.75
GW-3B	8/9/90	7.28	323.26	321.4	314.12
GW-3C	8/9/90	7.20	323.73	321.7	314.5
GW-4A	8/9/90	7.85	323.55	321.6	313.75
GW-4B	8/9/90	8.10	323.92	321.9	313.8

02[UZ]YQ1080:D3167/3890/18

*Elevations are not true elevations, but relative to an assumed elevation of 320 feet AMSL at the centerline point from U.S.G.S. Ransomville, NY Quadrangle map.

**TOC = Top of steel casing.

Table 4-5

FIELD MEASUREMENTS OF GROUNDWATER CHEMICAL PARAMETERS TAKEN DURING WELL SAMPLING

Well	Date	Time	pH	Temperature °C	Conductivity (micromhos/cm)	Nephelometric Turbidity Units (NTU)*
GW-1A	8/9/90	1215	6.85	12.2	3,300	>50
GW-1B	8/9/90	1222	6.90	12.0	5,000	>200
GW-2A	8/9/90	1243	6.95	13.0	5,000	>50
GW-2B	8/9/90	1252	6.95	13.0	4,500	>50
GW-3A	8/9/90	1333	7.45	11.2	2,600	>200
GW-3B	8/9/90	1320	10.05	11.2	4,000	>200
GW-3C	8/9/90	1337	6.90	15.2	1,450	>200
GW-4A	8/9/90	1352	8.55	12.2	5,100	>200
GW-4B	8/9/90	1410	7.45	12.2	6,100	>200

[UZ]YQ1080:D3167/3889/17

*The well water met recommended limit of 50 NTU during development, but evidently silted up before sampling.

Well GW-3B is the well with high methylene chloride concentrations.

Since this table contains organic analyses, the PCB data should be included.

Table 4-6

GROUNDWATER, DRILL WATER, AND SURFACE WATER ORGANIC ANALYSES SUMMARY

Compound Detected	Concentration (μg/L)	Sample	Regulatory Limits (μg/L)
Volatile Organics			
2-Butanone	16	GW-1B	No standard or guidance
2-Hexanone	13	GW-1B	50 Guidance value GA waters
Methylene chloride	620 BE	GW-3B	5 standard GA waters

02[UZ]YQ1080:D3167/3903/20

B = Compounds found in associated blank sample as well as the sample tested.

E = Compounds whose concentration exceeded the calibration range for the GC/MS.

Drill water contained 25 ug/l chloroform, 11 ug/l bromodichloromethane and 5 ug/l dibromochloromethane.

Table 4-7

GROUNDWATER, DRILL WATER, AND SURFACE WATER INORGANIC ANALYSES SUMMARY

Inorganics Detected	Range (μg/L)	NYSDEC Class GA Groundwater Standards (μg/L)	NYSDEC Class C Surface Water Standards* (μg/l)	Sample Exceeding Standards (μg/L)	
				Location	Total Metals
Aluminum	94 - 5,590	No regulatory limit	100 (A) No regulatory limit for humans	SW-4	2,000 (A)
Arsenic	ND - 10.1	25	No regulatory limit for humans; 190 (A) (dissolved form)		
Barium	ND - 283	1,000	No regulatory limit for humans		
Calcium	37,700 - 456,000	No regulatory limit	No regulatory limits		
Iron	60 - 12,600	300	300(A) No regulatory limit for humans	GW-1A	2,670
				GW-1B	12,600
				GW-2A	2,220
				GW-2B	5,010
				GW-3A	1,130
				GW-3B	214
				GW-3C	9,140
				GW-4A	1,070
				GW-4B	2,860
				SW-4	4,270 (A)

02[UZ]YQ1080:D3167/3868/15

Key at end of table.

Table 4-7 (Cont.)

Inorganics Detected	Range (µg/L)	NYSDEC Class GA Groundwater Standards^1 (µg/L)	NYSDEC Class C Surface Water Standards* (µg/l)	Sample Exceeding Standards (µg/L)	
				Location	Total Metals
Lead	ND - 5.8	25	EXP (1.26 [1n (ppm hardness)] - 4.661) (A) No regulatory limit for humans		
Magnesium	4,430 - 416,000	No regulatory limit	No regulatory limit		
Manganese	2.2 - 896	300	No regulatory limit	GW-1A GW-1B GW-2A GW-3C GW-4B	526 356 409 896 655
Nickel	ND - 19.2	No regulatory limit	EXP (0.76 [1n (ppm hardness)] + 16) (A) No regulatory limit for humans		
Potassium	1,220 - 273,000	No regulatory limit	No regulatory limit		
Sodium	9,210 - 684,000	No regulatory limit	No regulatory limit		
Vanadium	ND - 10.6	No regulatory limit	14 (A) No regulatory limit for humans		

Key at end of table.

Table 4-7 (Cont.)

Inorganics Detected	Range (µg/L)	NYSDEC Class GA Groundwater Standards (µg/L)	NYSDEC Class C Surface Water Standards* (µg/l)	Sample Exceeding Standards (µg/L)	
				Location	Total Metals
Zinc	ND - 115	200	30 (A) No regulatory limit for humans		

02[UZ]YQ1080:D3167/3868/15

*Source: NYSDEC 1986 Water Quality Regulations
**Source: U.S. Environmental Protection Agency, 1975 and World Health Organization, European Standards 1970

Class:

A = Aquatic
C = Surface water suitable for fishing and fish propagation, and primary and secondary contact recreation
GA = Groundwater best suited as a potable water supply
ND = Not detected

Table 4-8

SURFACE SOILS, SEDIMENT, AND WASTE ORGANIC ANALYSES SUMMARY

Compound Detected	Concentration (μg/kg)	Sample
Semivolatile Organics		
Total PAHs*	49,000*	SED-3
Pesticides		
4,4'-DDE	36 53	S-3 S-5
4,4'-DDD	48	S-5
4,4'-DDT	43 20	S-3 S-5
PCBs		
Aroclor-1248	5,400	W-2
Aroclor-1254	10,000	W-1

02[UZ]YQ1080:D3167/3907/25

*PAH = Polynuclear Aromatic Hydrocarbons
**Compounds identified at a secondary dilution factor.

Samples S-1 and S-2 should be used as background concentrations instead of surface materials from the Eastern United States

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Table 4-9

SURFACE SOILS, SEDIMENT, AND WASTE INORGANIC ANALYSES SUMMARY

		Guidelines for Soils/ Surface Materials of Eastern United States*		Samples Exceeding Concentration Range	
Inorganics Detected	Range in Samples (mg/kg)	Range (mg/kg)	Estimated Arithmetic Mean (mg/kg)	Location	Level (mg/kg)
Aluminum	8,340 - 19,600	7,000 - >100,000	57,000		
Arsenic	2.3 - 13.7	<1.1 - 73	7.4		
Barium	74.2 - 425	10 - 1,500	420		
Beryllium	ND - 0.35 (B)	<1 - 7	0.85		
Cadmium	ND - 11.5	No guideline			
Calcium	3,290 - 64,800	10 - 280,000	630		
Chromium	12.8 - 39.5	1 - 1,000	52		
Cobalt	3.1 - 49	<0.1 - 70	9.2		
Copper	18.3 - 193	<1 - 700	22		
Iron	12,000 - 161,000	10 - >100,000	2,500	W-2	161,000
Lead	10.7 - 885	<10 - 300	17	W-1 SED-3 SED-4	885 543 556
Magnesium	ND - 11,900	50 - 50,000	460		
Manganese	143 - 938	<2 - 7,000	640		
Mercury	ND - 0.77	0.01 - 3.4	0.12		
Nickel	12.3 - 76.8	<5 - 700	18		
Potassium	513 - 3,100	50 - 3,700	--		
Sodium	ND - 410	<500 - 50,000	780		
Vanadium	14.3 - 39.9	<7 - 300	66		
Zinc	45.2 - 767	<5 - 2,900	52		

02[UZ]YQ1080:D3167/3908/15

B = The reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.

ND = Not detected

*Shacklette and Boerngen 1984.

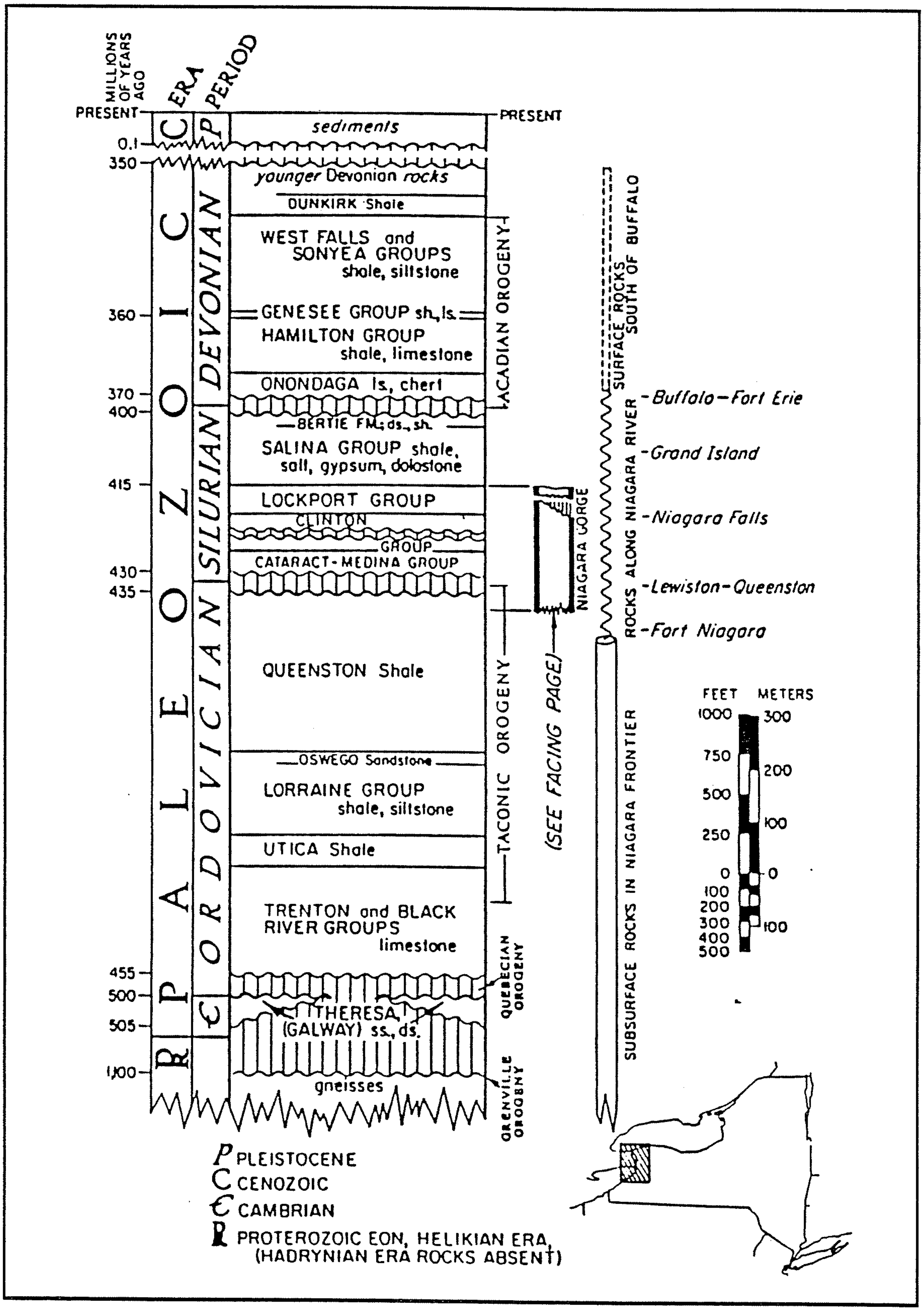

Figure 4-1
STRATIGRAPHIC COLUMN, NIAGARA FRONTIER

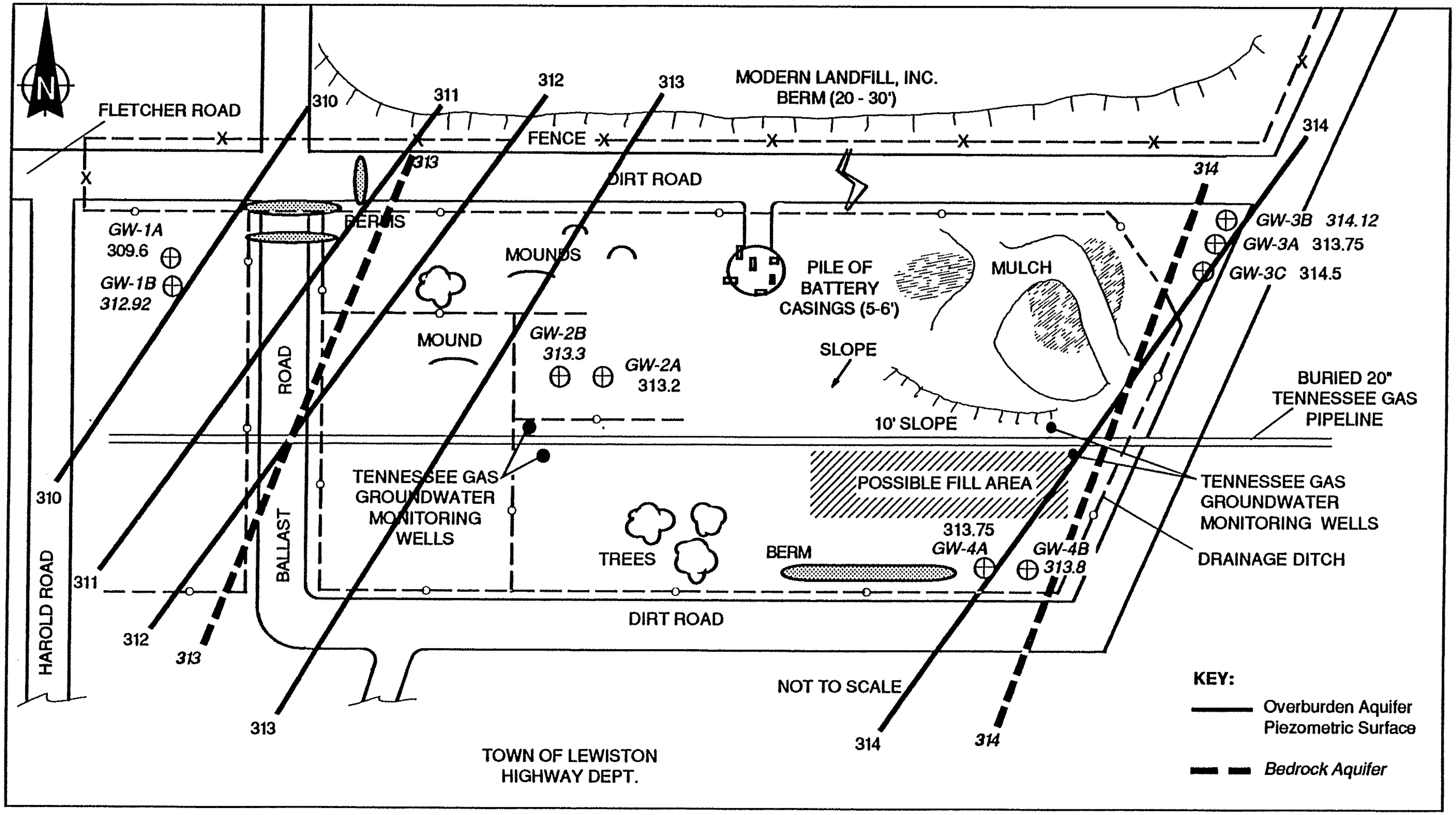

Figure 4-2
PIEZOMETRIC SURFACE CONTOUR MAP

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5

5. FINAL APPLICATION OF HAZARD RANKING SYSTEM

5.1 NARRATIVE SUMMARY

The Town of Lewiston Landfill is situated within a~~n~~ 16-acre parcel located near the intersection of Harold and Pletcher Roads in the Town of Lewiston, Niagara County, New York (see Figure 5-1). The site is currently owned by the Town of Lewiston. It was previously owned by the United States Government.

ON page 4-1 it is stated that Niag. County owns the site. On the page 5-84 the Town is listed as the owner. Town listed as owner on page 5-92

The operational history of the site is uncertain, but it was used by the Town of Lewiston to dispose of household refuse between 1964 and 1972. Crushed battery casings were also disposed of on site. The site became officially inactive on October 1, 1972, and was closed on August 25, 1979. Prior to its use as a Town landfill, the site was owned by the United States Government and may have been used as a TNT manufacturing facility.

According to tests conducted by E & E, groundwater, surface water/sediment, and surface soils are contaminated with low levels of organic compounds and PCBs and higher levels of metals and pesticides. Cyanide was not detected in any of the samples tested.

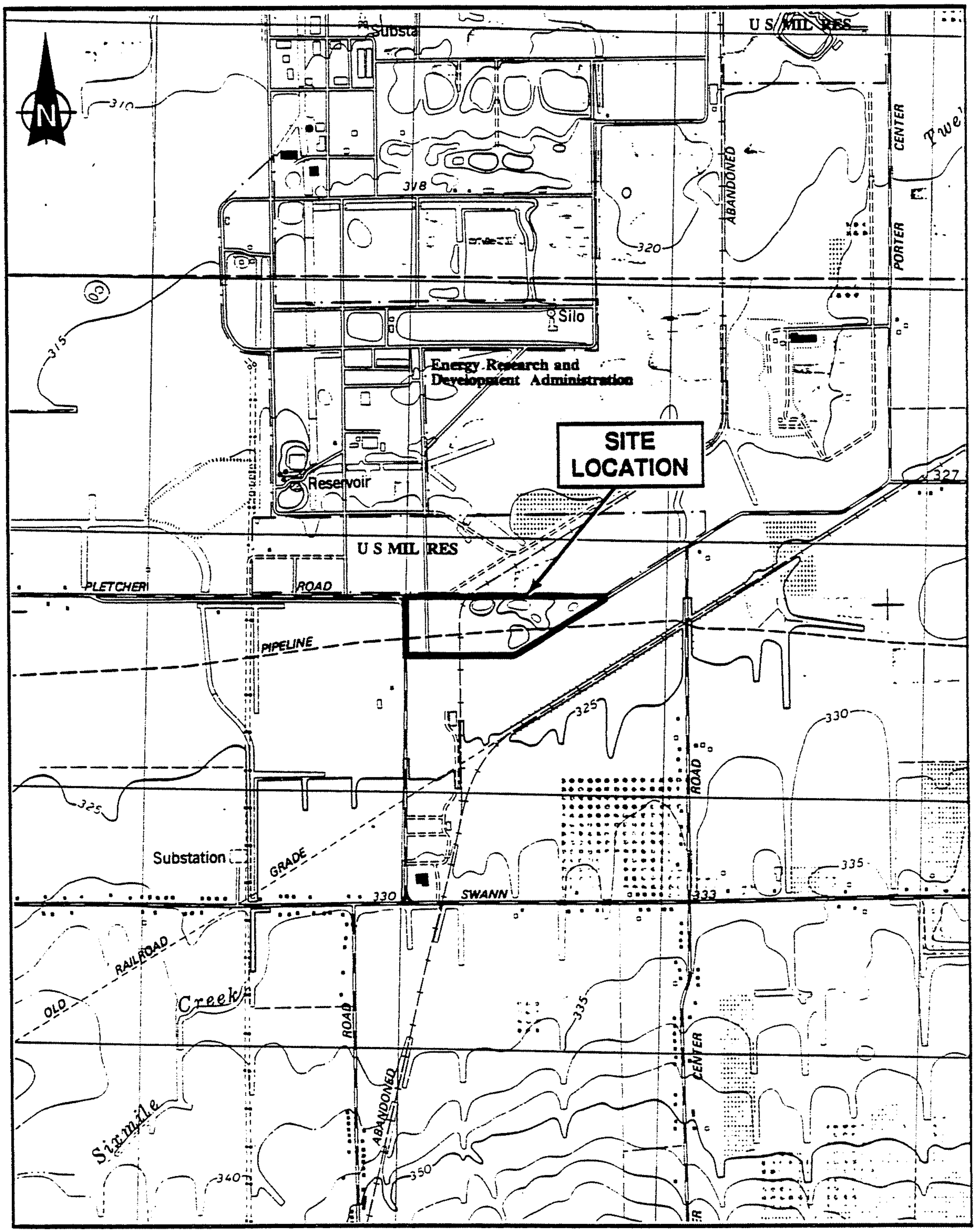
The site is located adjacent to Modern Landfill, Inc. and is split in half by a Tennessee Gas pipeline right-of-way. Approximately 250 people within a 1-mile radius are potentially affected by direct contact and surface water and soil contamination. There is only one groundwater well used as a drinking water source within a 3-mile radius, and it is upgradient to the site.

Narrative

5.1

Location

5.2



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangle, Ransomville, N.Y. 1980.

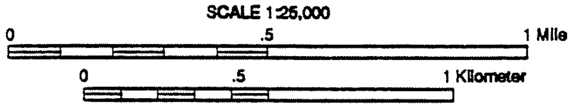


Figure 5-1
SITE LOCATION MAP, TOWN OF LEWISTON LANDFILL

5.3 HRS Worksheets

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FIGURE 1

HRS COVER SHEET

Facility Name: Lewiston Landfill

Location: Intersection of Harold and Pletcher Roads, Town of Lewiston, Niagara County

EPA Region: 2

Person(s) in Charge of Facility: Town of Lewiston Highway Department

Name of Reviewer: G. Florentino

Date: 11/6/90

General Description of the Facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action; etc.)

This approximately 16-acre landfill was used by the Town and Village of Lewiston primarily to dispose of household refuse. The site also received some industrial wastes in the form of crushed battery cases. Before the Town of Lewiston owned the landfill, the site was owned by the U.S. Government and may have been part of a TNT manufacturing plant.

The site is located at the intersection of Harold and Pletcher Roads, south of Modern Landfill, Inc. in the Town of Lewiston, Niagara County, New York. The contamination route of major concern is groundwater.

Scores: S_M = 12.09 (S_{gw} = 20.92 S_{sw} = 1.24 S_a = 0)

S_{FE} = not scored

S_{DC} = 25

Ground Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
$\boxed{1}$ Observed Release	0 [✓ 45]	1	45	45	3.1
If observed release is given a score of 45, proceed to line $\boxed{4}$. If observed release is given a score of 0, proceed to line $\boxed{2}$.					
$\boxed{2}$ Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 [✓ 3]	2	6	6	
Net Precipitation	0 1 [✓ 2] 3	1	2	3	
Permeability of the Unsaturated Zone	0 1 [✓ 2] 3	1	2	3	
Physical State	0 [✓ 1] 2 3	1	1	3	
Total Route Characteristics Score			11	15	
$\boxed{3}$ Containment	0 1 2 [✓ 3]	1	3	3	3.3
$\boxed{4}$ Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 [✓ 18]	1	18	18	
Hazardous Waste Quantity	0 [✓ 1] 2 3 4 5 6 7 8	1	1	8	
Total Waste Characteristics Score			19	26	
$\boxed{5}$ Targets					3.5
Ground Water Use	0 1 [✓ 2] 3	3	6	9	
Distance to Nearest Well/Population Served	0 4 6 [✓ 8] 10 12 16 18 20 24 30 32 35 40	1	8	40	
Total Targets Score			14	49	
$\boxed{6}$ If line $\boxed{1}$ is 45, multiply $\boxed{1}$ x $\boxed{4}$ x $\boxed{5}$ If line $\boxed{1}$ is 0, multiply $\boxed{2}$ x $\boxed{3}$ x $\boxed{4}$ x $\boxed{5}$			11970	57,330	
$\boxed{7}$ Divide line $\boxed{6}$ by 57,330 and multiply by 100		S_{gw} =	20.88		

FIGURE 2
GROUND WATER ROUTE WORK SHEET

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Surface Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
$\boxed{1}$ Observed Release	[✓ 0] 45	1	0	45	4.1
If observed release is given a value of 45, proceed to line $\boxed{4}$. If observed release is given a value of 0, proceed to line $\boxed{2}$.					
$\boxed{2}$ Route Characteristics					4.2
Facility Slope and Intervening Terrain	[✓ 0] 1 2 3	1	0	3	
1-yr. 24-hr. Rainfall	0 1 [✓ 2] 3	1	2	3	
Distance to Nearest Surface Water	0 1 [✓ 2] 3	2	4	6	
Physical State	0 [✓ 1] 2 3	1	1	3	
Total Route Characteristics Score			7	15	
$\boxed{3}$ Containment	0 1 2 [✓ 3]	1	3	3	4.3
$\boxed{4}$ Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 [✓ 18]	1	18	18	
Hazardous Waste Quantity	0 [✓ 1] 2 3 4 5 6 7 8	1	1	8	
Total Waste Characteristics Score			19	26	
$\boxed{5}$ Targets					4.5
Surface Water Use	[✓ 0] 1 2 3	3	0	9	
Distance to a Sensitive Environment	0 [✓ 1] 2 3	2	2	6	
Population Served/Distance to Water Intake Downstream	[✓ 0] 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
Total Targets Score			2	55	
$\boxed{6}$ If line $\boxed{1}$ is 45, multiply $\boxed{1}$ x $\boxed{4}$ x $\boxed{5}$ If line $\boxed{1}$ is 0, multiply $\boxed{2}$ x $\boxed{3}$ x $\boxed{4}$ x $\boxed{5}$			798	64,350	
$\boxed{7}$ Divide line $\boxed{6}$ by 64,350 and multiply by 100		S_{sw} =	1.24		

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

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Air Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	[✓ 0] 45	1	0	45	5.1
Date and Location:					
Sampling Protocol:					
If line 1 is 0, the S_a = 0. Enter on line 5. If line 1 is 45, then proceed to line 2.					
2 Waste Characteristics					5.2
Reactivity and Incompatibility	[✓ 0] 1 2 3	1	0	3	
Toxicity	[✓ 0] 1 2 3	3	0	9	
Hazardous Waste Quantity	0 [✓ 1] 2 3 4 5 6 7 8	1	1	8	
Total Waste Characteristics Score			1	20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 [✓ 15] 18 21 24 27 30	1	15	30	
Distance to Sensitive Environment	0 [✓ 1] 2 3	2	2	6	
Land Use	0 1 [✓ 2] 3	1	2	3	
Total Targets Score			19	39	
4 Multiply 1 x 2 x 3			0	35,100	
5 Divide line 4 by 35,100 and multiply by 100		S_a =	0		

FIGURE 9
AIR ROUTE WORK SHEET

	S	S^2
Groundwater Route Score (S_{gw})	20.88	435.97
Surface Water Route Score (S_{sw})	1.24	1.54
Air Route Score (S_a)	0	0
$S^2_{gw} + S^2_{sw} + S^2_a$	▨	437.51
$\sqrt{S^2_{gw} + S^2_{sw} + S^2_a}$	▨	20.92
$\sqrt{S^2_{gw} + S^2_{sw} + S^2_a} / 1.73 = S_M =$	▨	12.09

FIGURE 10
WORKSHEET FOR COMPUTING S_M

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Fire and Explosion Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
$\boxed{1}$ Containment	1 3	1		3	7.1
$\boxed{2}$ Waste Characteristics					7.2
Direct Evidence	0 3	1		3	
Ignitability	0 1 2 3	1		3	
Reactivity	0 1 2 3	1		3	
Incompatibility	0 1 2 3	1		3	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			20	
$\boxed{3}$ Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1		5	
Distance to Nearest Building	0 1 2 3	1		3	
Distance to Sensitive Environment	0 1 2 3	1		3	
Land Use	0 1 2 3	1		3	
Population Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1		5	
	Total Targets Score			24	
$\boxed{4}$ Multiply $\boxed{1}$ x $\boxed{2}$ x $\boxed{3}$				1,440	
$\boxed{5}$ Divide line $\boxed{4}$ by 1,440 and multiply by 100		S_{FE} =			

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

Note: Not scored as per Reference 17

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Direct Contact Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Incident	[✓ 0] 45	1	0	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2 Accessibility	0 1 2 [✓ 3]	1	3	3	8.2
3 Containment	0 [✓ 15]	1	15	15	8.3
4 Waste Characteristics Toxicity	0 1 2 [✓ 3]	5	15	15	8.4
5 Targets					8.5
Population Within a 1-Mile Radius	0 1 [✓ 2] 3 4 5	4	8	20	
Distance to a Critical Habitat	[✓ 0] 1 2 3.	4	0	12	
Total Targets Score			8	32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			5400	21,600	
7 Divide line 6 by 21,600 and multiply by 100	S_{DC} = 25.00				

FIGURE 12
DIRECT CONTACT WORK SHEET

5.4 HRS Documentation Records

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

<u>Instructions</u>: As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,320 drums plus 80 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference. Include the location of the document.

Facility Name: Lewiston Landfill

Location: Intersection of Harold and Pletcher Roads, Town of Lewiston, Niagara County

Date Scored: 10190

Person Scoring: Judith Vangalio/Gene Florentino

Primary Source(s) of Information (e.g., EPA region, state, FIT, etc.):

NYSDEC records, Ecology and Environment, Inc. site-specific investigations, previous site studies, published reports.

Factors Not Scored Due to Insufficient Information:

None

Comments or Qualifications:

None

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GROUNDWATER ROUTE

1. OBSERVED RELEASE

Contaminants detected (3 maximum):

2-butanone, 2-hexanone
PCBs

Rationale for attributing the contaminants to the facility:

t
Defected in downgradient bedrock monitoring wells
Ref. 1
Assigned Value = 45

* * *

2. ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifer(s) of concern: Queenston Shale consists of mostly brick-red, sandy shale and thin beds of greenish-gray shale and greenish-gray sandstone. Groundwater occurs principally within a fractured and weathered zone at the top of the shale.

Ref. 2, 3
Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern: Aquifer depth is 25 feet

25 feet 5.6 feet (see Table 4-4). May change HRS score
Ref. 1

Depth from the ground surface to the lowest point of waste disposal/storage:

15 feet
Ref. 4
Assigned Value = 3

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

32 inches
Ref. 5

Mean annual or seasonal evaporation (list months for seasonal):

27 inches
Ref. 5

Net precipitation (subtract the above figures):

5 inches
Assigned Value = 2

Permeability of Unsaturated Zone

Soil type in unsaturated zone: Madalin series consists of deep, poorly drained to very poorly drained soils that air underlain by glacial till. Ovid series consists of deep, somewhat poorly drained soils. They are formed in glacial till.
Ref. 6
are

Permeability associated with soil type:

$10^{-3} - 10^{-5}$ cm/sec
Ref. 6
Assigned Value = 2

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Solid municipal refuse, unconsolidated, unstablized
Ref. 4, 7
Assigned Value = 1

* * *

3. CONTAINMENT

Containment
Method(s) of waste or leachate containment evaluated:

Landfill - inadequate cover
Ref. 4, 7

Method with highest score:

Landfill - inadequate cover
Assigned value = 3

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

2-butanone, 2-hexanone, PCBs
Ref. 1

Compound with highest score:

PCBs
Assigned Value = 18

Ref. 8, 9

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0. (Give a reasonable estimate even if quantity is above maximum.):

No statistically significant/accurate way to estimate quantity. Hazardous substances found in samples. Industrial waste disposed of but nature and quantity unknown.

Ref. 1, 7

Basis of estimating and/or computing waste quantity:

Factor scored greater than 0 due to presence of hazardous substances in soil and water samples.
Assigned Value = 1
Ref. 8, 9

* *

5. TARGETS

Groundwater Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Drinking water
Ref. 1, 4, 7

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

Jowdy residence
4245 Porter-Center Road
Ref. 1, 4, 7

Distance to above well or building:
2500
0.35 feet east of site
Assigned Value = 3
Ref. 10

May change HRS score.
assigned values for this score do not include 3 as a choice.

Population Served by Groundwater Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

Only one well. Everyone else uses municipal water drawn from the Niagara River. Serves approximately three people.
Ref. 1, 11, 12

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

None
Ref. 12

Total population served by groundwater within a 3-mile radius:

Three people
Assigned Value = 1

SURFACE WATER ROUTE

1. OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

Only one surface water sample collected, therefore no basis for release.
Ref. 1
Assigned Value = 0

Rationale for attributing the contaminants to the facility:

* * *

2. ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

0-2%, site is relatively flat
Ref. 6, 10

Name/description of nearest downslope surface water:

0.6 mile to west at Six-Mile Creek
Ref. 10

Average slope of terrain between facility and above-cited surface water body in percent:

0-2%
Ref. 10

Is the facility located either totally or partially in surface water?

No
Ref. 6, 10

Is the facility completely surrounded by areas of higher elevation?

No
Ref. 6, 10
Assigned Value = 0

1-Year 24-Hour Rainfall in Inches

2.3 inches
Ref. 13
Assigned Value = 2

Distance to Nearest Downslope Surface Water

0.6 mile west at Six-Mile Creek
Ref. 10
Assigned Value = 2

Physical State of Waste

Solid municipal refuse, unconsolidated, unstablized
Ref. 4, 7
Assigned Value = 1

* * *

3. CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Landfill, inadequate cover
Ref. 4, 7

Method with highest score:

Landfill, inadequate cover
Assigned Value = 3

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

4,4 DDT
4,4 DDD
PAHs

Due to dry conditions, only one surface water sample was collected. This sample did not contain any significant concentrations of contaminants; however, these compounds were detected in associated sediment samples in other downgradient locations on site.

Compound with highest score:

4,4 DDT
Ref. 8, 9
Assigned Value = 18

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0. (Give a reasonable estimate even if quantity is above maximum.):

No statistically significant/accurate way to estimate quantity. Hazardous substances found in samples. Industrial waste disposed of, but nature and quantity unknown.
Ref. 4

Basis of estimating and/or computing waste quantity:

Factor scored greater than 0 due to presence of hazardous substances in soil and water samples.
score = 1
Ref. 8

* * *

5. TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

None. Municipal water is provided by the Niagara River which is 4 miles west of the site.
Ref. 7
Assigned Value = 0

Is there tidal influence?

No
Ref. 10

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

None
Ref. 14

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

0.55 mile northeast is RV-1
Ref. 14
Assigned Value = 1

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

None
Ref. 15

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

None. Niagara River has intakes and is more than 3 miles away.
Ref. 4, 7
Assigned value = 0

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

Not applicable

Total population served:

Not applicable

Name/description of nearest of above water bodies:

Not applicable

Distance to above-cited intakes, measured in stream miles:

Not applicable

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AIR ROUTE

1. OBSERVED RELEASE

Contaminants detected:

None. OVA and HNu only detected methane gas from a compost pile. All other readings were background. The minirad and explosimeter were background.
Ref. 1

Date and location of detection of contaminants:

No air samples collected for chemical analysis.

Methods used to detect the contaminants:

OVA, HNu, explosimeter, minirad
Ref. 17

Rationale for attributing the contaminants to the site:

None detected

* * *

2. WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:
None detected

Most incompatible pair of compounds:

None detected

Toxicity

Most toxic compound:

None detected

Hazardous Waste Quantity

Total quantity of hazardous waste:

No statistically significant/accurate way to estimate quantity. Hazardous substances found in samples. Industrial waste disposed of, but nature and quantity unknown.
Ref. 1, 7

Basis of estimating and/or computing waste quantity:

Factor scored greater than 0 due to presence of hazardous substances in soil and water samples.
Assigned Value = 1
Ref. 8

* * *

3. TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi   [✓ 0 to 1 mi]   0 to 1/2 mi   0 to 1/4 mi

250

Ref. 4, 10
Assigned Value = 15

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

None
Ref. 15

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

0.55 mile northeast is RV-1
Ref. 14
Assigned Value = 1

Distance to critical habitat of an endangered species, if 1 mile or less:

None
Ref. 15

Land Use

Distance to commercial/industrial area, if 1 mile or less:

0.5 mile north~~east~~ Modern Landfill
Ref. 14

Distance to national or state park, forest, wildlife reserve, if 2 miles or less:

No parks, but the Tuscarora Indian Reservation is 2 miles south of the site.
Ref. 10, 14

Distance to residential area, if 2 miles or less:
0.48 mile if residence is 2500 ft from site as indicated in work plan.
Jowdy residence is ~~0.35~~ mile northeast of site
Ref. 1, 4, 7

Distance to agricultural land in production within past 5 years, if 1 mile or less:

0.25 mile west of site
0.25 mile southwest of site
Ref. 14

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

0.3 mile southeast is at district No. 7 boundary and an orchard
Ref. 10, 14
Assigned Value = 2

Is a historic or landmark site (National Register of Historic Places and National Natural Landmarks) within the view of the site?

None
Ref. 16
Assigned Value = 0

FIRE AND EXPLOSION

1. CONTAINMENT

Hazardous substances present:

This site has not been certified by a state or local fire marshall to present a significant fire or explosion threat.
Ref. 17

Type of containment, if applicable:

N/A

* * *

2. WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

N/A

Ignitability

Compound used:

N/A

Reactivity

Most reactive compound:

N/A

Incompatibility

Most incompatible pair of compounds:

N/A

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

N/A

Basis of estimating and/or computing waste quantity:

N/A

* * *

3. TARGETS

Distance to Nearest Population

N/A

Distance to Nearest Building

N/A

Distance to a Sensitive Environment

Distance to wetlands:

N/A

Distance to critical habitat:

N/A

Land Use

Distance to commercial/industrial area, if 1 mile or less:

N/A

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

N/A

Distance to residential area, if 2 miles or less:

N/A

Distance to agricultural land in production within past 5 years, if 1 mile or less:

N/A

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

N/A

Is a historic or landmark site (National Register of Historic Places and National Natural Landmarks) within the view of the site?

N/A

Population Within 2-Mile Radius

N/A

Buildings Within 2-Mile Radius

N/A

DIRECT CONTACT

1. OBSERVED INCIDENT

Date, location, and pertinent details of incident:

None
Ref. 1, 4, 7

* * *

2. ACCESSIBILITY

Describe type of barrier(s):

The entrance along the road is blocked but the site is not fenced.
Ref. 1, 4
Assigned Value = 3

* * *

3. CONTAINMENT

Type of containment, if applicable:

None. It is a landfill with no cover or liner.
Ref. 1, 4, 18
Assigned Value = 15

* * *

4. WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

PCBs
Lead
4,4'-DDE
4,4'-DDT
4,4'-DDD
Ref. 1

Compound with highest score:

Lead
Ref. 8, 9
Assigned Value = 3

* * *

5. TARGETS

Population Within One-Mile Radius

250 people
Ref. 4, 10
Assigned Value = 2

Distance to Critical Habitat (of endangered species)

None
Ref. 15
Assigned Value = 0

REFERENCES

If the entire reference is not available for public review in the EPA regional files on this site, indicate where the reference may be found.

Reference Number	Description of the Reference
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11	Gowzdek, R., April 2, 1990, personal communication, Niagara County Health Department, Niagara Falls, New York. Document Location: Ecology and Environment Engineering, P.C., Buffalo, New York.
12	Reiter, S., April 20, 1990, personal communication, Town of Lewiston Water District, Lewiston, New York. Document Location: Ecology and Environment Engineering, P.C., Buffalo, New York.

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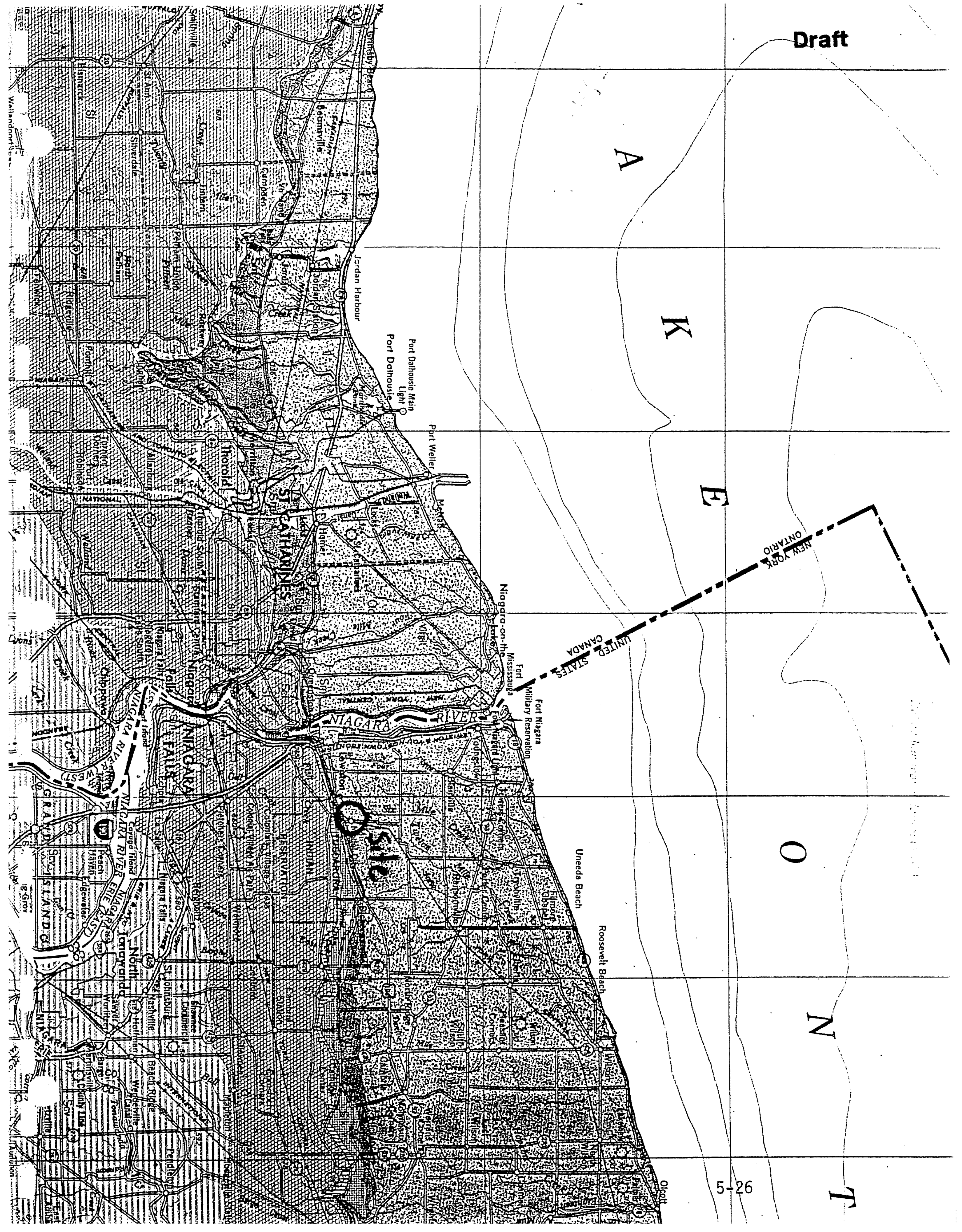
REFERENCE 1

REFERENCE 2

Draft



L
A
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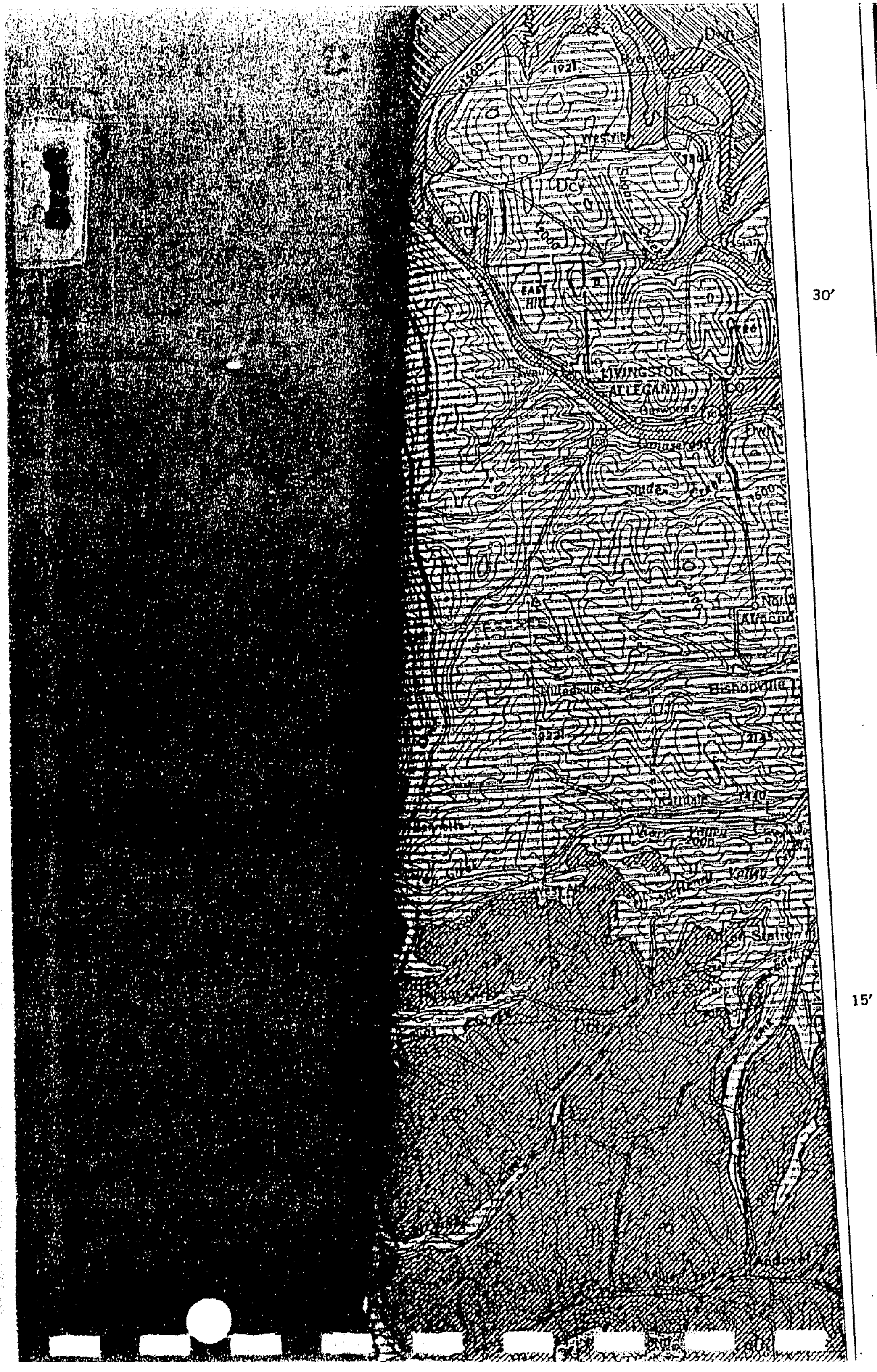
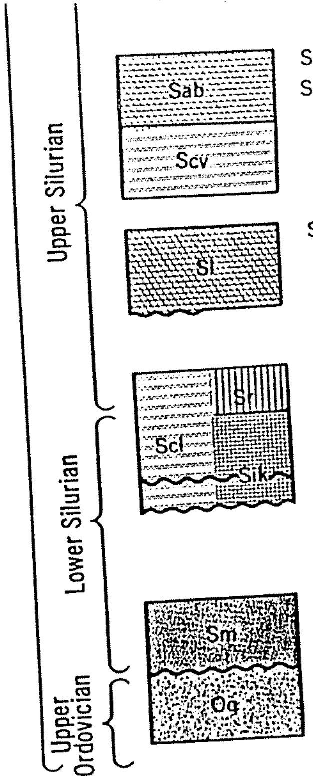
T
Site
NIAGARA RIVER
NIAGARA FALLS
ST. CATHARINES
Thorold
Jordan Harbour
Port Dalhousie Main Light
Port Dalhousie
Port Weller
Niagara-on-the-Lake
Fort Mississauga
Fort Niagara Military Reservation
ONTARIO
NEW YORK
UNITED STATES
CANADA
Youngstown
Lewiston
Uneeda Beach
Roosevelt Beach
Olcott
Wilson
GRAND ISLAND
NIAGARA RIVER (WEST)
NIAGARA RIVER (EAST)
North Tonawanda
Tonawanda
Chippawa
Beamsville
Vineland
Jordan
Queenston
Welland
Ransomville
Cambria





400-700 ft. (120-210 m.)

Sab	Akron Dolostone; Bertie Formation—dolostone, shale.
Scv	Camillus, Syracuse, and Vernon Formations—shale, dolostone, salt, and gypsum.

LOCKPORT GROUP
150-200 ft. (45-60 m.)

Sl	Guelph, Oak Orchard, Eramosa, and Goat Island Dolostones; Gasport Limestone—local bioherms.

CLINTON GROUP
100-150 ft. (30-45 m.)

Scl	Decew Dolostone; Rochester Shale; Irondequoit and Merriton Limestones.
Sr	Decew Dolostone; Rochester Shale.
Sik	Irondequoit Limestone; Rockway Dolostone; Hickory Corners Limestone; Neahga Shale; Kodak Sandstone.

MEDINA GROUP AND QUEENSTON FORMATION
800 ft. (250 m.)

Sm	Thorold Sandstone; Grimsby Formation—sandstone, shale; Power Glen and Cabot Head Shales; Whirlpool Sandstone.
Oq	Queenston Shale.

MAP SYMBOLS

Observed or approximately located contact

Conjectural contact; includes projections beneath extensive Quaternary cover and many contacts based on reconnaissance mapping.

Hypothetical contact: projection across unmapped area.

REFERENCE 3

Draft

GROUND WATER IN THE NIAGARA FALLS AREA, NEW YORK

With Emphasis on the Water-Bearing Characteristics of the Bedrock

BY
RICHARD H. JOHNSTON
GEOLOGIST
U.S. GEOLOGICAL SURVEY

STATE OF NEW YORK
CONSERVATION DEPARTMENT
WATER RESOURCES COMMISSION

BULLETIN GW-53
1964

million. However, the ability of the reservoir water to dissolve dolomite, and thus to increase its bicarbonate content, is roughly equal to the dissolving ability of rain water. This results from the fact that the ability of water to dissolve dolomite and limestone is largely dependent upon its carbon-dioxide content which is roughly equal in both rain water and the reservoir water. Because of this, water infiltrating into the Lockport from the reservoir has a "headstart" of 125 ppm bicarbonate. Therefore, an increase in bicarbonate content, such as that observed in the four wells listed in the preceding table, may represent the arrival at the wells of water from the reservoir.

CLINTON AND ALBION GROUPS

The Clinton and Albion Groups are a series of shales, sandstones, and limestones which crop out along a narrow belt parallel to the Niagara escarpment. The Clinton rocks are composed principally of the dark-gray Rochester Shale, but also contain two thin limestones and a thin shale unit. The Albion Group consists of two thin sandstones which are separated by a sequence of alternating shale and sandstone. The names and distinguishing lithologic features of the formations making up the Clinton and Albion Groups are given in figure 5.

The Clinton and Albion Groups are little utilized as sources of ground water, mainly because they are overlain everywhere, except along the Niagara escarpment, by the more productive Lockport Dolomite. Accordingly, not much is known about their water-bearing properties. In general, the limestones and sandstones are the most permeable units in the Clinton and Albion Groups. The abundance of both vertical and bedding joints in outcrops and quarries in the limestones and sandstones suggests that they are as permeable as the Lockport. However, the position of the relatively impermeable Rochester Shale at the top of the Clinton Group drastically limits recharge to the more permeable sandstones and limestones below. As a result the uppermost part of the more permeable limestone units in the Clinton Group is dry in many places. Because of the lack of recharge, the average yield of wells in the Clinton and Albion Groups is only 2 to 3 gpm which is adequate only for small domestic and farm supplies.

The water in the Clinton and Albion rocks is highly mineralized and very hard. As shown in table 2, the average hardness and chloride content of water from the Clinton and Albion Groups is the highest in the Niagara Falls area.

QUEENSTON SHALE

The Queenston Shale consists mostly of brick-red, sandy shale and thin beds of greenish-gray shale and greenish-gray sandstone. The thickness of the Queenston is 1,200 feet. However, only 200 feet are exposed in the area; the remainder of the formation crops out under Lake Ontario.

Water-bearing characteristics

Ground water occurs principally within a fractured and weathered zone at the top of the shale. This zone, according to drillers, is generally less than one foot thick. The unweathered Queenston Shale is less permeable than the overlying rocks in the Clinton and Albion Groups and much less permeable than the Lockport Dolomite.

Information obtained from wells drilled into the Queenston Shale, particularly data on yields, usually gives a misleading impression of the water-bearing properties of the formation. In general, the reported yields are too high because most wells penetrating the Queenston draw water from both the Queenston and the overlying unconsolidated deposits. This results from the fact that well drillers in the area commonly end the casing of wells a short distance above the top of the Queenston. Thus, a well in the Queenston with a reported yield of 10 gpm may derive 5 gpm from the unconsolidated deposits, 4 3/4 gpm from the weathered and fractured part of the Queenston, and 1/4 gpm from the unweathered part. The average of the reported yield of the wells drawing from the Queenston Shale listed in table 7 is 7 gpm. This average does not include some domestic and farm wells also listed in the table which have been abandoned for lack of adequate yields. The average yield of wells penetrating the Queenston, which are known also to penetrate a gravelly zone immediately above the Queenston, is 19 gpm.

Considerable difficulty is experienced in developing adequate water supplies in areas where the fractured zone at the top of the Queenston is dry. Such is the case near the village of Newfane, where the Queenston is overlain by less than 10 feet of surficial deposits and the water table lies below the top of rock. Well 316-843-2, a 6-inch-diameter drilled well located in this area, is inadequate to supply one family. Depth to rock at the well is 8 feet and the static water level is 16 feet below land surface (8 feet below the top of the rock). Well 316-843-1, a 48-inch-diameter dug well located about 100 feet to the east of well -2, also has a static water level 16 feet below land surface and is barely adequate to supply one family. In this area, where the fractured zone at the top of the Queenston is dry, the relatively small amount of water needed by one family can be obtained only through the use of a large-diameter well.

Chemical character of the water

Ground water in the Queenston Shale is very hard and locally is highly mineralized. The water is generally not satisfactory for most uses without treatment. The average dissolved-solids content of water in the Queenston is 2,600 ppm and ranges from 533 to 8,920 ppm. As shown in table 2, the hardness of water samples from the Queenston ranges from 219 to 1,910 ppm and averages 883 ppm. Softening of such water is desirable for many uses.

The chloride concentration of water from the Queenston Shale ranges from 90 to 3,150 ppm, the average being 646 ppm (table 2). Water containing more than 500 ppm chloride is salty to the taste. Wells yielding salty water from the Queenston are usually found in two areas--(1) in a band about two miles wide immediately north of the Niagara escarpment, and (2) in areas immediately adjacent to streams. Both these areas are believed to be places of ground-water discharge--that is, areas where ground water is moving upward from the Queenston to discharge naturally.

The origin of the salty water in the Queenston is unknown. In commenting on a similar occurrence of salty water in the bedrock in northern St. Lawrence County, N. Y., Trainer and Salvas (1962, p. 103) suggest three causes for the salty water in that area: (1) connate water, (2) the Champlain Sea, and (3) evaporite deposits. They conclude that the Champlain Sea, which covered the area about 10 or 20 thousand years ago, is the most likely source. This source is not applicable to the Niagara area, however, because the Champlain Sea did not extend into the area. Furthermore, it is unlikely that the salty water in the Niagara area is derived from evaporite beds because no such deposits are known to exist in the Queenston. Nor do any salt beds occur in the bedrock formations overlying the Queenston Shale (fig. 5) in the Niagara Falls area. The nearest salt beds occur about 40 miles to the southeast in the Salina Group which overlies the Lockport Dolomite. However, it is very improbable that salty water from the Salina beds has entered the Queenston Shale because (1) the salt beds themselves act as impermeable barriers to water moving downward from the Salina to the Queenston, and (2) it is more likely that salty water from the Salina would be discharged at points between the outcrop areas of the two formations.

Although direct evidence is lacking, the writer believes that the salty water in the Queenston Shale is most likely derived from connate water. The discharge of connate water begins as soon as a deeply buried bed is brought up into the zone of circulating ground water. The Queenston rocks were deposited as a sea-bottom clay about 350 million years ago, and have been deeply buried throughout most of the intervening time. During some thousands of years of Recent geologic time, connate water has been flushed from the upper several hundred feet of the Queenston. However, it is probable that flushing of the deeper part of the formation is continuing at present.

OCCURRENCE OF WATER IN UNCONSOLIDATED DEPOSITS

The unconsolidated deposits in the Niagara Falls area are not important sources of water. These deposits may be classified into two types based on their water-bearing properties: (1) coarse-grained materials of high permeability (sand and gravel), and (2) fine-grained materials of very low permeability (glacial till and lake deposits). The unconsolidated deposits in the Niagara Falls area are predominantly of the fine-grained type. However, the lack of sand and gravel deposits in the Niagara Falls area, other than a few deposits of very limited thickness and extent, has severely limited the development of large ground-water supplies in the area. Most large ground-water supplies in New York State are derived from sand and gravel deposits.

Table 2 shows selected chemical constituents from wells tapping unconsolidated deposits. Water from the different types of unconsolidated deposits is not easy to differentiate on the basis of quality because many

REFERENCE 4

-932076

Draft

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

PHASE I INVESTIGATIONS

TOWN OF LEWISTON LANDFILL
LEWISTON, NIAGARA COUNTY, NEW YORK
Site Code:932076

JANUARY 1987

Prepared for:

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 WOLF ROAD, ALBANY, NEW YORK 12233
HENRY G. WILLIAMS, COMMISSIONER

Division of Solid and Hazardous Waste
NORMAN H. NOSENCHUCK, P.E. DIRECTOR

WEHRAN ENGINEERING, P.C.
Middletown & Grand Island, New York

Draft

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

PHASE I INVESTIGATIONS

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LEWISTON, NIAGARA COUNTY, NEW YORK
SITE CODE: 932076

Prepared for

DIVISION OF SOLID AND HAZARDOUS WASTE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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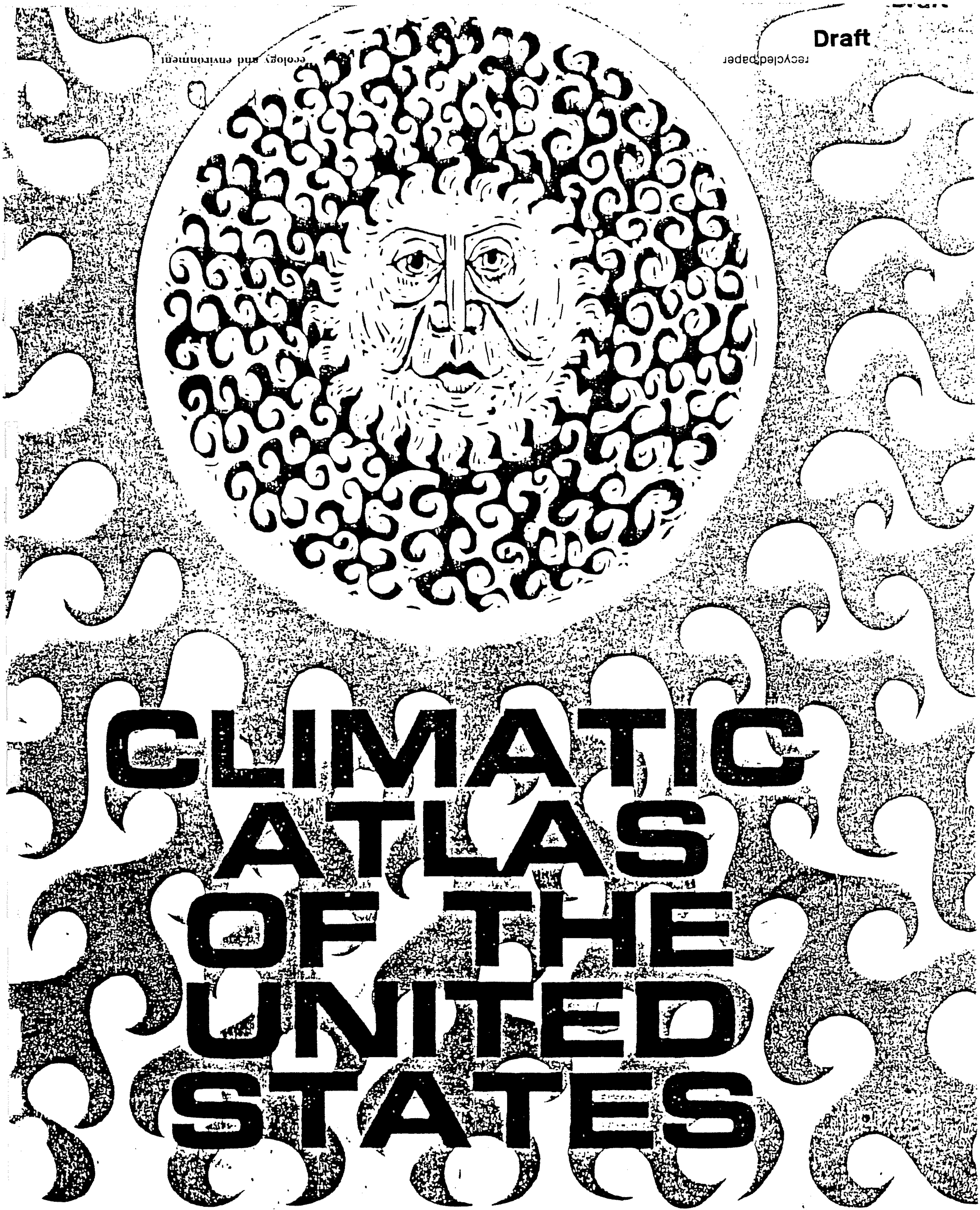
WE Project No. 01424339

January 1987

REFERENCE 5

Draft



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ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
Robert M. White, Administrator

ENVIRONMENTAL DATA SERVICE
Woodrow C. Jacobs, Director

JUNE 1968

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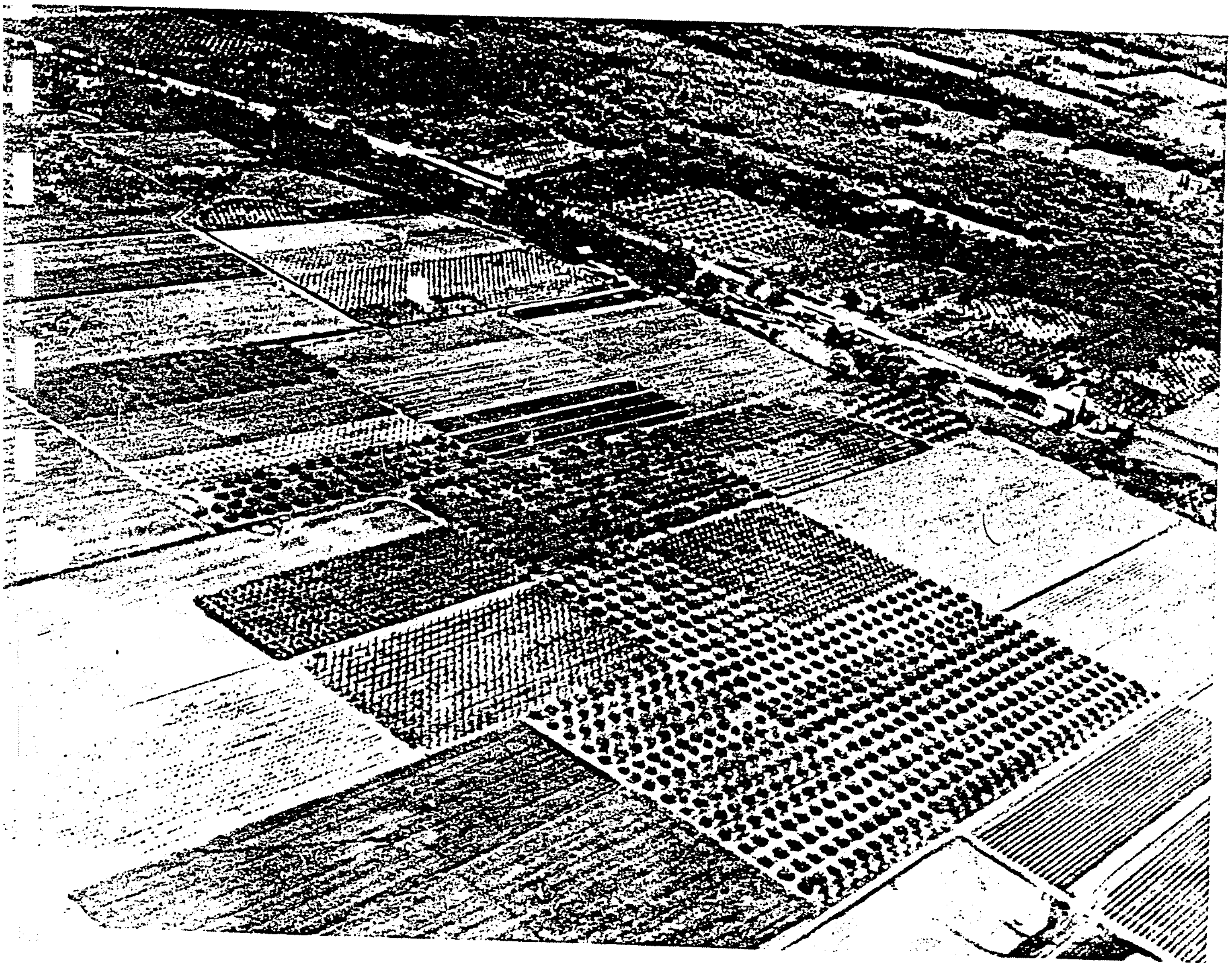
1983

REFERENCE 6

Draft

SOIL SURVEY OF
Niagara County, New York



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Soil Conservation Service
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one 434-4949

United States Department of Agriculture
Soil Conservation Service
In cooperation with
Cornell University Agricultural Experiment Station

Issued October 1972

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Buffalo, N.Y. 14225

5-40

Rosslyn Center
1700 N. Moore
Arlington, Va 22209

The available moisture capacity is only moderate because rooting is shallow. Maintenance of good tilth is difficult. Most areas require surface nage.

presentative profile of Lockport silt loam in town of Newfane on east side of Ewings Road, 3/10 mile south of McKee Road; idle area:

Ap--0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine and medium, granular structure; slightly hard, friable; abundant fine roots; a few stones (sandstone and granite); slightly acid; abrupt, smooth boundary. 6 to 9 inches thick.

A2--6 to 8 inches, brown (7.5YR 5/4) heavy silt loam; common, medium, faint, strong-brown (7.5YR 5/6) and brown (7.5YR 5/2) mottles; moderate, fine and medium, subangular blocky structure; slightly hard, friable, slightly sticky; grayish-brown (10YR 5/2) peds; plentiful fine roots; slightly acid; clear, wavy boundary. 0 to 6 inches thick.

Bt--8 to 23 inches, reddish-brown (2.5YR 4/4) heavy silty clay loam to silty clay; common, fine, faint, red (2.5YR 4/6) mottles; moderate and strong, medium, prismatic structure breaking to moderate, medium, angular blocky structure; hard, firm, sticky; thin clay films on most of the ped faces; thicker films in pores; a few dusky-red (2.5YR 3/2) clay films along vertical channels; brown (7.5YR 5/2) coats on prism faces; few roots; less than 5 percent coarse fragments; slightly acid in upper part, to neutral in lower part; clear, wavy boundary. 11 to 22 inches thick.

C--23 to 36 inches, reddish-brown (2.5YR 4/4), partly weathered shale; some greenish-gray (5GY 5/1) shale; weak, medium, platy structure; extremely firm; no roots; calcareous; clear, smooth boundary. 0 to 15 inches thick.

R--36 inches +, dusky-red (2.5YR 3/2) shale bedrock; calcareous.

Thickness of the solum ranges from 18 to 35 inches, and depth to unweathered shale rock ranges om 20 to 40 inches. The solum ranges from medium id to neutral. Coarse fragments may be present in any horizon, and many profiles commonly have glacial erratics in the surface layer or in the lum.

The Ap horizon has a hue of 10YR or 7.5YR, values of 3 to 5 when the horizon is moist, and chroma of 2 or 3. When the Ap horizon is dry, values are eater than 5.5. The A2 horizon is dominantly silt am, but it ranges from silt loam to silty clay loam. The A2 horizon is absent in some profiles. Where present, the A2 horizon ranges from 10YR to 5 [illegible] in hue, is 5 or 6 in value, and ranges from 2 t 4 in chroma.

The Bt horizon consists of more than one layer in some places and has a total thickness of 12 inches or more. The Bt horizon has ranges of 10YR t 5YR in hue, 4 or 5 in value, and ranges from 3 to [illegible] n chroma. It is clay loam and has a clay content of 35 to 55 percent. The upper part of the Bt horizon contains grayish or brownish silt coats on ped or prism surfaces. Clay films are present in the B horizon.

The C horizon is absent in some profiles. It has platy structure imparted by the underlying shale, contains greenish weathered shale in some places, and is neutral to moderately alkaline. The shale is neutral or calcareous. It ranges from easily penetrated soft shale to very hard, thinly bedded sandstone.

The Lockport soils formed in deposits similar to those of the Lairdsville soils. They have a finer textured B horizon and less depth to shale than Ovid soils. They are better drained, have a finer textured B horizon, and are shallower to shale than Cazenovia soils. The Lockport soils are similar to the Odessa soils and Lakemont soils in texture and color, but Lockport soils are moderately deep to shale.

Lockport silt loam (Lo).--This soil is level to nearly level and occurs in large flat areas that are influenced by the underlying bedrock. The average area is about 100 acres in size. Many areas are roughly oblong.

Most commonly included with this soil in mapping are better drained Claverack or Lairdsville soils that occur on small knolls. Also included are a few areas of Ovid, Hilton, Appleton, and other deep soils that formed in glacial till. In addition, a few areas of deep, clayey soils such as Churchville, Odessa, or Lakemont soils are included. A fairly large acreage of similar but poorly drained soil that is less than 40 inches to shale is included. These poorly drained areas are indicated by the symbol for wet spots.

Permeability is moderately slow in the surface layer and is very slow in the subsoil. Runoff is slow because of the nearly level topography. This soil has many limitations for farming. It dries out slowly in the spring and becomes baked during the hot weather. Because the soil is sticky when wet and hard when dry, it needs to be cultivated at a favorable moisture content. If the soil is cultivated when wet, hard clods or a crusty surface will form. If it is cultivated and planted when dry, seed germination and crop growth are poor.

This soil is well suited to hay, pasture, woods, or wildlife. If surface drainage is adequate, the soils are fairly suited to grain, some vegetables, and some fruit crops. Grapes do fairly well on this soil. Locally, stones in the surface layer are a problem. (Capability unit IIIw-2; woodland suitability group 3w1)

Madalin Series

The Madalin series consists of deep, poorly drained to very poorly drained soils that have a medium-textured surface layer and a moderately fine textured to fine textured subsoil. These soils developed in calcareous, lake-deposited clay and silt.

They are level to nearly level and occupy areas within the basins of old glacial lakes. In the southern part of Niagara County, Madalin soils are in areas that were occupied by glacial Lake Tonawanda. North of the limestone escarpment, they are in areas that were occupied by glacial Lake Iroquois. Most areas receive runoff from surrounding high areas and lack natural outlets. Slopes are less than 3 percent.

In a representative profile, a Madalin soil that has been cultivated has a very dark gray, slightly acid silt loam surface layer 6 inches thick. The upper part of the subsoil is light brownish-gray silty clay loam 4 inches thick. It is slightly acid and has distinct, yellowish-brown mottles. The middle part of the subsoil is light brownish-gray silty clay and is between depths of 10 inches and 17 inches. This layer is firm and plastic, and it has common, distinct, strong-brown mottles. The light olive-gray silty clay lower part of the subsoil extends to a depth of 26 inches. This layer is firm and plastic, and it has distinct, yellowish-brown mottles. Reaction is neutral. The substratum is calcareous, light olive-gray silty clay. It is firm when moist and plastic when wet.

These soils have a seasonal high water table that is on or just below the surface. Early in spring and in other excessively wet periods, these soils are often ponded. Because the subsoil and substratum are very slowly permeable, water may remain at or near the surface for long periods. The depth available for rooting depends on depth to the water table. If these soils are not drained, plant roots are confined mainly to a depth of less than 18 inches. The available moisture capacity is moderate.

Representative profile of Madalin silt loam in town of Cambria on west side of Budd Road, about one-fifth mile south of U.S. Highway No. 104 (Ridge Road) and 1 1/2 miles west of Warrens Corners; cultivated area:

Ap--0 to 6 inches, very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) when dry; moderate, fine, granular structure; friable; abundant fine roots; slightly acid; clear, irregular boundary. 6 to 8 inches thick.

B21tg--6 to 10 inches, light brownish-gray (10YR 6/2) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, prismatic structure that breaks to moderate, coarse, blocky structure; firm; plastic; plentiful fine roots; very thin, very dark gray (10YR 3/1) clay films on block faces; very dark gray (10YR 3/1) coats on prism faces; slightly acid; gradual, wavy boundary. 3 to 6 inches thick.

B22tg--10 to 17 inches, light brownish-gray (10YR 6/2) silty clay; common, medium, distinct, strong-brown (7.5YR 5/6) mottles; weak, coarse, prismatic structure breaking to moderate, medium, blocky structure; firm, plastic; plentiful fine roots on prism faces; few in ped interiors; very thin clay films on ped faces; slightly acid; gradual, wavy boundary. 6 to 12 inches thick.

B23tg--17 to 26 inches, light olive-gray (5Y 6/2) silty clay; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, prismatic structure breaking to moderate, medium, blocky structure; firm, plastic; thin clay films on ped faces; neutral; gradual, wavy boundary. 6 to 15 inches thick.

Cg--26 to 50 inches, light olive-gray; (5Y 6/2) silty clay; common, distinct, yellowish-brown (10YR 5/6) mottles; weak, thin, platy structure; firm, plastic; no roots; calcareous.

The solum ranges from 24 to 40 inches in thickness, and this thickness corresponds well with the depth to carbonates. Reaction generally ranges from medium acid to neutral, but it is mildly alkaline in the lower part of the solum in some places. Coarse fragments generally are absent, but in some places a few pebbles and stones are present in any horizon. Bedrock is at a depth of more than 40 inches.

The Ap horizon dominantly is 10YR in hue, 2 or 3 in value, and 1 or 2 in chroma. If this horizon is dry, value is 5 or less. The Ap horizon is less than 10 inches thick and less than one-third the thickness of the solum. An A2 horizon occurs in some places and ranges from 10YR to 5Y in hue and 5 to 7 in value; its chroma is less than 2. The A2 horizon may or may not be mottled. Where this horizon is mottled, the mottles are distinct or prominent. The A2 horizon ranges from silty loam to silty clay loam.

The Bt horizon has hues ranging from 10YR to 5Y and values ranging from 4 to 6. Chromas of 2 or less are dominant in 60 percent or more of the soil between the bottom of the Ap horizon and a depth of 30 inches. The Bt horizon ranges from silty clay loam to clay and has an average clay content of 35 to 55 percent. The lower part of the B horizon is mildly alkaline in some places.

The C horizon is similar to the B horizon in color. Below a depth of 30 inches, the C horizon has chroma of more than 2. Mottling is generally less and not so contrasting as in the B horizon. The C horizon generally is similar to the B horizon in texture, but it consists of varved silt and clay in some places. Glacial till occurs below a depth of 40 inches in some places. The C horizon is calcareous.

The Madalin soils formed in deposits similar to those of the moderately well drained to well drained Hudson, the somewhat poorly drained Rhinebeck, and the very poorly drained Fonda soils. They have a Bt horizon that is lacking in Fonda soils. Madalin soils are wetter than Churchville soils, and they lack the glacial till that occurs within a depth of 40 inches in the Churchville soils and the Madalin soils, loamy subsoil variant. The Madalin soils have a finer textured B horizon than Canandaigua soils.

Madalin silt loam (0 to 2 percent slopes) (Ma).--This soil occurs on broad flats or in narrow drainageways in the basins of old glacial lakes. Areas range from 5 to more than 100 acres in size. Most as are roughly oblong.

Most commonly included with this soil in mapping are small areas of the better drained Rhinebeck soils at a slightly higher elevation and the similar Fonda soils in depressions or along drainageways. In the towns of Porter and Lewiston, there are common inclusions in which glacial till fragments are mixed into, or are present as thin layers in, the lacustrine silt and clay. Several areas are underlain by firm glacial till at a depth of 40 inches or more. Also included are areas of Churchville soils and the loamy subsoil variant of Madalin soils. Areas of Niagara or Canandaigua soils also are included in some places. In a few included areas, the surface layer is sandy, and in places there are inclusions of Cosad or Cheektowaga soils. Most areas where the surface layer is sandy or gravelly are shown on the soil map by the appropriate symbol.

Undrained areas of this soil are better suited to pasture, trees, or wetland wildlife than to cultivated crops. If the soil is adequately drained and well managed, cultivated crops can be grown. This soil should be cultivated at the proper moisture content. If it is cultivated when wet, hard clods or crusty surfaces generally form. If the soil is cultivated when too dry, germination and crop growth are poor. Cultivation at the wrong time damages soil structure and tilth. Runoff is slow, and drainage is commonly difficult because a suitable outlet is lacking. (Capability unit IVw-1; woodland suitaty group 5w1)

Madalin Series, Loamy Subsoil Variant

The Madalin series, loamy subsoil variant, consists of deep, poorly drained to very poorly drained, medium-textured soils that are underlain by loamy glacial till. These soils formed in glacial lake sediments of silt and clay. The glacial till that underlies the lacustrine cap at a depth of 20 to 40 inches normally has not been altered by soil-forming processes.

These soils are level to nearly level and occur in or adjacent to areas that formerly were glacial lakes. They are mostly south of the limestone escarpment, where they are associated with Ovid, Odessa, Lakemont, and Fonda soils. A fairly large acreage is north of the escarpment in the town of Lewiston. Slopes are 2 percent or less.

A representative profile of a Madalin soil, loamy subsoil variant, has a very dark brown silt loam surface layer 8 inches thick. The upper part of the subsoil is gray to olive-gray, firm, neutral, plastic silty clay. It has strong-brown and gray mottles and extends to a depth of 16 inches. The lower part of the subsoil is grayish-brown, firm, plastic silty clay that has many strong-brown and gray mottles and is neutral. It grades into a grayish-brown mixture of silty clay lake sediments and reddish-brown silt loam glacial till. This mixed layer is firm, is about 10 percent stone fragments by volume, and is erratically calcareous. A substratum of reddish-brown silt loam glacial till occurs at a depth of 32 inches. It is calcareous, contains enough sand to give a gritty feel, and is 10 to 15 percent stone fragments.

The seasonal high water table is at or near the surface during spring and excessively wet periods. Some areas are ponded for short periods during the growing season. In spring the water table generally is perched above the fine-textured subsoil and the slowly permeable underlying glacial till. Because of slow permeability and the position of these soils, water is removed very slowly. Roots are confined mainly to the surface layer. Available moisture capacity is only moderate because depth of rooting is restricted.

Representative profile of Madalin silt loam, loamy subsoil variant, in the town of Lockport, three-fourths mile north of State Route 77 and 100 feet west of Richardson Road; cultivated area:

Ap--0 to 8 inches, very dark brown (10YR 2/2); heavy silt loam; gray (10YR 5/1) dry; weak, medium, granular structure; friable; abundant fine roots; neutral; abrupt, smooth boundary. 6 to 8 inches thick.

B21tg--8 to 16 inches, gray (5Y 5/1) to olive-gray (5Y 5/2) silty clay; many, medium, prominent strong-brown (7.5YR 5/6) mottles at center of aggregates occupy 30 percent of matrix; gray (5Y 5/1) ped and prism faces; moderate, medium, blocky structure; firm when moist, plastic when wet; distinct clay films on 5 to 10 percent of the ped faces and thicker films in most of the pores; few fine roots; neutral; clear, wavy boundary. 6 to 10 inches thick.

B22tg--16 to 26 inches, grayish-brown (2.5Y 5/2) silty clay; many, medium, distinct, strong-brown (7.5YR 5/6) mottles that occupy 25 to 30 percent of the matrix; strong, coarse, prismatic structure breaking to moderate, medium, blocky structure; firm when moist, plastic when wet; olive-gray (5Y 5/2) and light-gray (5Y 6/1) ped and prism faces; ped and prism faces have thin, nearly continuous clay films less than 1 millimeter thick; pores have clay films thicker than 1 millimeter; very few roots; neutral; no coarse fragments; clear, wavy boundary. 8 to 12 inches thick.

B3g--26 to 32 inches, grayish-brown (2.5Y 5/2) silty clay and reddish-brown (5YR 5/4) silt loam that have common, medium and coarse, distinct, yellowish-red (5YR 5/6) and red (2.5YR 4/6) mottles; some mixing of upper lake sediments and lower glacial till; moderate, medium, subangular blocky structure; firm; 10 percent coarse fragments; very few roots; erratically calcareous; abrupt, wavy boundary. 0 to 12 inches thick.

IIC--32 to 50 inches, reddish-brown (5YR 5/4) silt loam; numerous lime streaks; 10 to 15 percent coarse fragments; friable to firm; small sand pockets; weak, medium, platy structure; no roots; calcareous.

Thickness of the solum and depth to carbonates ranges from 20 to 34 inches. Bedrock is at a depth of more than 40 inches. The solum formed in fine-textured lake sediments, and the underlying contrasting material is glacial till deposits. Coarse fragments generally are absent in the solum, but in some profiles there may be up to 10 percent coarse fragments in any horizon. The underlying glacial till contains more than 5 percent but less than 35 percent coarse fragments.

The Ap horizon has a hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 2 or 1. It is less than 10 inches thick and less than one-third the thickness of the solum. Reaction is slightly acid to neutral. The Btg horizons have hues of 5Y to 2.5YR, values of 4 to 6, and a chroma of 1 or 2. These horizons normally contain mottles that have chroma greater than 2, but the percentage of chroma greater than 2 is less than 40 percent of the total area. The Btg horizons range from silt loam to clay and have an average clay content of more than 35 percent but less than 60 percent. The Btg horizons have moderate or strong, prismatic or blocky structure. They are slightly acid to moderately alkaline. The B3g horizon is absent in some places, but normally there is some mixing of the contrasting deposits, especially near the contact area.

The underlying IIC horizon ranges from 5Y to 2.5YR in hue, is 4 or 5 in value, and ranges from 2 to 4 in chroma. This horizon ranges from fine sandy loam to silt loam. The silt loam normally contains enough sand to give a gritty feel. It is gravelly or nongravelly and has a clay content of less than 18 percent. Coarse fragments make up 5 to 35 percent of this horizon and range from fine pebbles to large boulders. The IIC horizon is calcareous.

The Madalin soils, loamy subsoil variant, formed in deposits similar to those of the somewhat poorly drained Churchville soils. They are wetter and have a finer textured B horizon than Ovid soils. They are similar to normal Madalin soils except that they are moderately shallow over glacial till. The B horizon of these soils is finer textured than that of Canandaigua soils.

Madalin silt loam, loamy subsoil variant (Md).--This soil is level to nearly level. It occupies nearly level to slightly depressional areas at the margin of old glacial lakebeds. The individual areas range from less than 5 to more than 100 acres in size. They have no characteristic shape but, in most places, are fairly narrow strips that separate the deep, lake-laid sediments from surrounding glacial till.

Most commonly included with this soil in mapping are small areas of similar but better drained Churchville soils. Also included are coarser textured Ovid or Sun soils that formed in till, and deeper Odessa, Rhinebeck, Lakemont, and normal Madalin soils that formed in deeper clayey lacustrine deposits. A few areas have shale rock within 6 feet of the surface.

Unless drained, this soil is not suited to most cultivated crops. This soil is fairly well suited to well suited to pasture. It also is well suited to soft maple, white ash, and similar trees. With adequate drainage, this soil can be used for most hay and grain crops, but it is poorly suited to vegetables and most fruit crops.

Good tilth is difficult to maintain. Runoff is slow, and good outlets are difficult to locate in many places. If the soil is cultivated when wet, hard clods or a crusty surface forms. Germination and crop growth are poor if the soil is cultivated when it is too wet. (Capability unit IVw-1; woodland suitability group 5w1)

Made Land

Made land (Me) consists of areas that have been filled with stones, old masonry materials, brick, and other waste. These areas have been covered with a thin mantle of soil material. There is no profile development. These areas can be used for community development if they are filled, compacted, and leveled. Commonly, they are already leveled and have slopes of less than 3 percent. Most areas occur near the cities of Niagara Falls, Lockport, and North Tonawanda. Most of the acreage of Made land has little if any value for farming. Areas can be used for certain kinds of town and country planning, but the land varies so widely that onsite investigation is needed to determine its suitability for individual uses. (Capability unit and woodland suitability group not assigned)

Massena Series

The Massena series consists of deep, somewhat poorly drained to poorly drained, moderately coarse textured soils. These soils developed in calcareous glacial till deposits that have been capped by silty and sandy lacustrine material and disturbed by wave or other lake activity. These level or nearly level soils occupy wave-washed areas that are north of U.S. Highway No. 104 (Ridge Road). They occur in depressions or along drainageways, mainly in the towns of Wilson, Newfane, and Hartland. Slopes are less than 3 percent.

A representative profile of a Massena soil has a very dark gray fine sandy loam surface layer that is slightly acid and 8 inches thick. It is underlain by a very friable, pale-brown loamy fine sand layer that is slightly acid, distinctly mottled, and 9 inches thick. The upper part of the subsoil is at a depth of 23 inches. It is friable, brown gravelly fine sandy loam that is neutral, has many distinct mottles, and is 6 inches thick. The lower part of the subsoil is between depths of 25 to 29 inches. It consists of firm, grayish-brown silt loam that is prominently mottled, contains a few stone fragments, and is neutral in the upper part and weakly calcareous in the lower part. Between depths of 29 and

Ovid Series

The Ovid series consists of deep, somewhat poorly drained soils. These soils formed in calcareous glacial till. The glacial till is generally modified somewhat by glacial lake sediments of silt and clay. Ovid soils are level to gently sloping. Slopes range from 0 to 8 percent.

A representative profile of an Ovid soil has a dark grayish-brown silt loam surface layer. The surface layer contains less than 5 percent stone fragments, is neutral, and is 6 inches thick. It is underlain by friable, pale-brown silt loam that is distinctly mottled and contains less than 5 percent stone fragments. This layer is neutral and 5 inches thick. The subsoil is between depths of 11 and 24 inches. It consists of firm, mottled, reddish-brown silty clay loam. The subsoil contains between 5 and 10 percent stone fragments and is neutral. The substratum is at a depth of 24 inches. It consists of very firm, reddish-brown heavy loam. It contains about 15 percent stone fragments and is calcareous.

These soils have a seasonal high water table that rises to just below the surface layer early in spring and in excessively wet periods. The water table is usually perched above the moderately slowly permeable to slowly permeable subsoil and the slowly permeable glacial till. Roots are confined mainly to the surface layer early in spring. As the water table falls, some roots extend downward to the very firm, calcareous glacial till, but most roots are confined to the uppermost 20 inches of soil. Because of the fairly shallow rooting depth, the available moisture capacity is only moderate.

Representative profile of Ovid silt loam, 0 to 2 percent slopes, 300 yards east of Miller Road and about one-half mile south of State Route 31; idle area:

Ap--0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam, light brownish-gray (10YR 6/2) to light-gray (10YR 7/2) when dry; moderate, fine, subangular blocky structure; friable; less than 5 percent coarse fragments; abundant roots; neutral; abrupt, smooth boundary. 5 to 8 inches thick.

A2--6 to 11 inches, pale-brown (10YR 6/3) silt loam; few, medium, distinct, strong-brown (7.5YR 5/6) to yellowish-brown (10YR 5/6) mottles; weak, fine to very fine, subangular blocky structure; friable; less than 5 percent coarse fragments; plentiful roots; neutral; clear, wavy boundary. 4 to 6 inches thick.

B2t--11 to 20 inches, reddish-brown (5YR 4/3) silty clay loam; few, fine, faint, reddish-brown (5YR 4/4) mottles and distinct, yellowish-red (5YR 4/6) mottles, and few, medium, distinct, light brownish-gray (10YR 6/2) mottles; moderate, medium, angular blocky structure in weak medium prisms; firm; dark reddish-gray (5YR 4/2) ped coats; clay films evident in pores; some greenish-gray (5GY 5/1) ped coats in lower part; few roots; between 5 and 10 percent coarse fragments; neutral; clear, wavy boundary. 6 to 20 inches thick.

B3--20 to 24 inches, reddish-brown silty clay loam, similar to B2t horizon but weakly calcareous; clear, wavy boundary. 0 to 5 inches thick.

C--24 to 50 inches, reddish brown (5YR 4/3) heavy loam; moderate, medium, platy structure; very firm; approximately 15 percent coarse fragments; calcareous.

Thickness of the solum ranges from 20 to 36 inches. Depth to carbonates ranges from 18 to 36 inches. Bedrock is at a depth of more than 40 inches. The solum is medium acid to mildy alkaline. Content of coarse fragments ranges from 1 to 25 percent and typically increases with depth. A chroma of 2 or less is dominant on ped faces, but chroma of more than 2 is dominant on the matrix from top of the A2 horizon to a depth of 30 inches.

The Ap horizon is 10YR or 7.5YR in hue and 2 or 3 in chroma. The Ap horizon is 3 or 4 in value when moist and more than 5.5 when dry. The A2 horizon is absent in some profiles. Where present, the A2 horizon is 10YR or 7.5YR in hue, ranges from 4 to 6 in value, and is 2 or 3 in chroma. Mottles are distinct or prominent. The Bt horizon has hues ranging from 7.5YR to 2.5YR, value of 4 or 5, and chroma of 3 or 4. Ped faces have a dominant chroma of 2 or less. The clay content of the Bt horizon averages between 28 and 35 percent. The Bt horizon is generally clay loam or silty clay loam. Carbonates are present in the lower part of some, but not all, profiles.

The C horizon above a depth of 40 inches is comparable in color to the Bt horizon, but its texture is generally slightly coarser. Structure is typically platy.

Ovid soils formed in deposits similar to those of the moderately well drained to well drained Cazenovia soils. Ovid soils are wetter than Hilton soils and have a finer textured Bt horizon. They have a coarser textured Bt horizon than Churchville soils. Ovid soils have a coarser textured Bt horizon than Lockport soils and are more than 3 1/2 feet to rock. Ovid soils are better drained than Sun soils.

Ovid silt loam, 0 to 2 percent slopes (OvA).--This soil has the profile described as representative for the series. It is in large, nearly level areas that normally are near the beds of old postglacial lakes. These areas are at a slightly higher elevation than the lakebed proper. Areas range from about 5 to more than 100 acres in size. The average-sized area is 20 acres or more. The areas normally are roughly oblong.

Most commonly included with this soil in mapping are areas of Churchville, Cazenovia, Cayuga, and Appleton soils. Churchville and Cayuga soils are included in areas where clay caps the underlying glacial till. Cazenovia soils are similar to this Ovid soil but are better drained. Appleton soils are similar to this Ovid soil in drainage but are coarser textured. Brown inclusions of similarly textured soils are common north of the limestone escarpment. Some areas near the limestone escarpment have inclusions of soils that are moderately deep to limestone. Gravelly or stony areas are generally indicated on the soil map by the appropriate symbols.

This soil is suited to grain, hay, pasture, and trees. Under good management, it can be used for other crops such as vegetables and fruit. Dominant management needs on this soil are adequate systems of surface and subsurface drainage. The maintenance of tilth may be difficult if this soil is cropped intensively. Locally, gravel or stones hinder cultivation and the growth of certain crops. (Capability unit IIIw-1; woodland suitability group 3w2)

Ovid silt loam, 2 to 6 percent slopes (OvB).--This soil has a profile similar to that described as representative for the series, except that the surface layer is thinner in some places, more coarse fragments are in the surface layer in many places, and the subsoil is generally directly under the plow layer. This soil occupies undulating areas near beds of old glacial lakes. In many places it occurs along drainageways where the landscape is dissected. Areas range from about 5 to 50 acres in size. The average-sized area is about 10 acres. In many places the areas are roughly oblong.

Most commonly included with this soil in mapping are areas of Cazenovia, Cayuga, and Churchville soils. The Cazenovia soil is similar to this Ovid soil but better drained. The Cayuga soil is finer textured in the upper part and better drained, and the Churchville is finer textured. Coarser textured Hilton and Appleton soils are minor inclusions. Brown inclusions of similarly textured soils are common north of the limestone escarpment. Some areas near the limestone escarpment have inclusions of soils that are moderately deep to limestone. Gravelly or stony areas are generally indicated on the soil map by the appropriate symbols.

This soil is suited to grain, hay, pasture, and trees. Under good management, it can be used for vegetables, fruit, and other crops. Dominant management needs are surface and subsurface drainage. Some erosion control measures are necessary if this soil is used intensively. In intensively cultivated areas the maintenance of good tilth is difficult. Locally, gravel or stones hinder the growth and cultivation of certain crops. (Capability unit IIIw-5; woodland suitability group 3w2)

Ovid silt loam, limestone substratum, 0 to 3 percent slopes (OwA).--This soil differs from Ovid silt loam, 0 to 2 percent slopes, because it is underlain by limestone bedrock at a depth ranging from 3 1/2 to 6 feet. In most places this soil contains larger coarse fragments than Ovid silt loam, 0 to 2 percent slopes. This soil occupies areas near the limestone escarpment or other areas where limestone bedrock is at a depth of 3 1/2 to 6 feet. Areas range from about 5 to 50 acres in size. They are roughly oblong in most places.

Commonly included with this soil in mapping are areas of Churchville soils that occur where lake-laid clay caps the glacial till. Commonly included are small areas of a soil that is less than 3 1/2 feet to bedrock. In other included areas bedrock is at a depth of more than 6 feet. In a few places areas of the coarser textured Appleton soils are included. In some included areas south of the villages of Gasport and Middleport, the soil is underlain by gray shale rather than hard dolomitic limestone.

This soil is not so well suited to crops as Ovid silt loam, 0 to 2 percent slopes. In many places it has slightly finer texture, more stones, and bedrock within 6 feet of the surface. It can be used for most crops grown in the area, but it is not so well suited as the deeper Ovid soils. Vegetables or fruit generally are not suited. Drainage is needed but is difficult to establish in many places because of the stones and bedrock. (Capability unit IIIw-1; woodland suitability group 3w2)

Ovid silt loam, limestone substratum, 3 to 8 percent slopes (OwB).--This soil has a profile that differs from the one described as representative for the series mainly because bedrock is at a depth ranging from 3 1/2 to 6 feet. In most places this soil contains larger coarse fragments than the soil with the profile described as representative. It occupies areas near the limestone escarpment or other areas where the limestone bedrock is at a depth of 3 1/2 to 6 feet. Areas range from about 5 to 50 acres in size. They generally are roughly oblong and are parallel to the escarpment areas.

Included with this soil in mapping are some fairly large areas of Churchville soils where lake-laid clay caps the glacial till. Commonly included are small areas that are less than 3 1/2 feet to bedrock. In some places soils that are more than 6 feet to rock are included. The better drained Cazenovia, Hilton, and Cayuga soils are minor inclusions. Some areas of this soil south of the villages of Gasport and Middleport are underlain by gray shale rather than hard dolomitic limestone.

This soil is not so well suited to crops as Ovid silt loam, 0 to 2 percent slopes. In many places, texture is slightly finer, the soil contains more stones, and bedrock is within 6 feet of the surface. This soil can be used for most crops grown in the area but is not so well suited as the deeper Ovid soils. Vegetables or fruits generally are not suited. Drainage is needed but, in many places, is difficult to establish because of stones and bedrock. Also, there is a moderate hazard of erosion if this soil is cultivated and not protected. (Capability unit IIIw-5; woodland suitability group 3w2)

Phelps Series

The Phelps series consists of deep, moderately well drained, medium-textured, gravelly soils. These soils formed in neutral to mildly alkaline glacial outwash and glacial beach deposits of sand and

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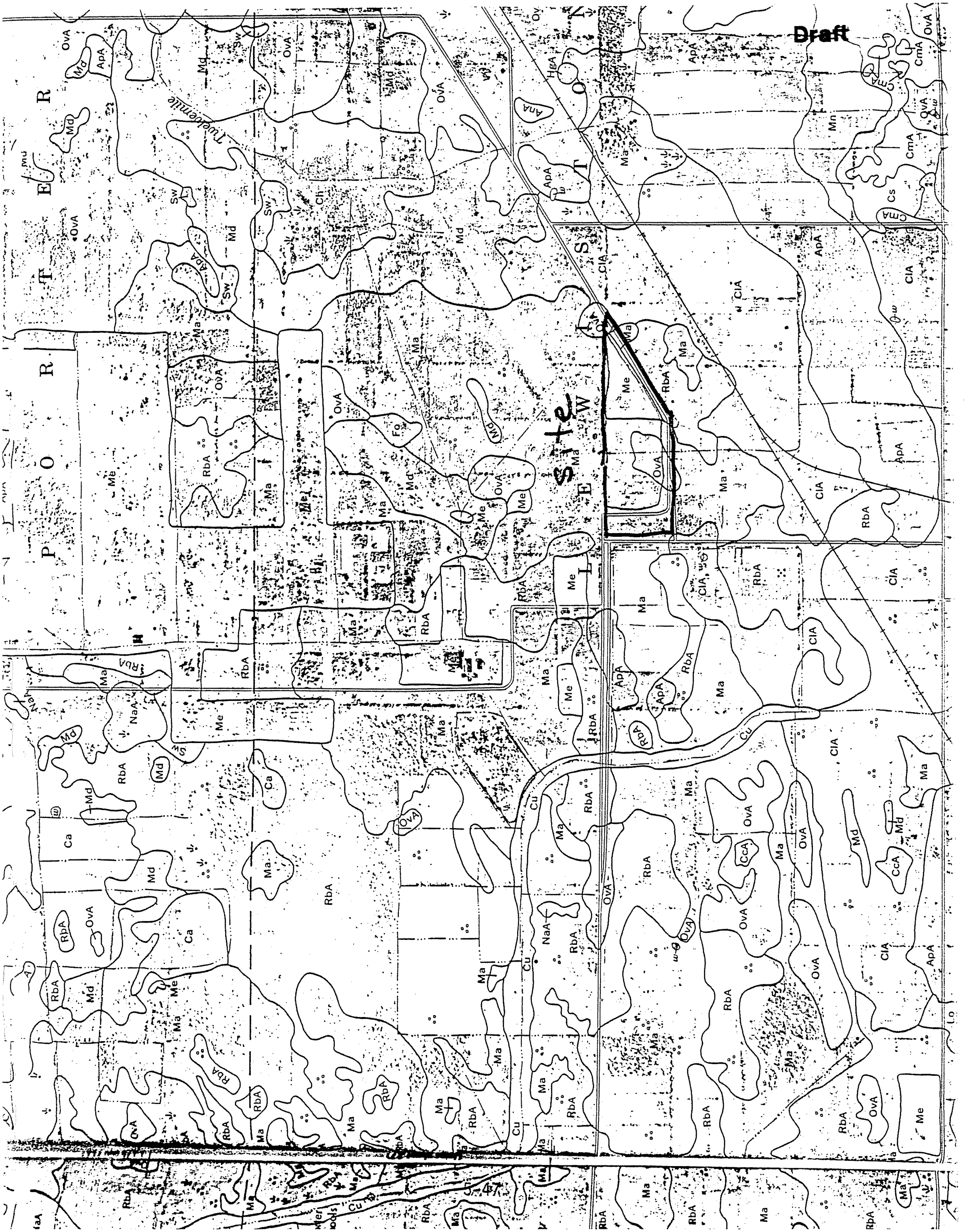

Site
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Phase II (Fifth Round) Work Plan Engineering Investigations and Evaluations at Inactive Hazardous Waste Disposal Sites

Town of Lewiston Landfill Site
Lewiston, N.Y., Niagara County
NYSDEC ID No.:932076

Prepared For:

New York State Department of Environmental Conservation

Prepared by:

Western Site Investigation Section
Bureau of Hazardous Site Control
Division of Hazardous Waste Remediation
October, 1989

Draft

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1.0 INTRODUCTION

All work will be conducted in conformance with the NYSDEC Phase II Generic Work Plan and Guidelines presented in Schedule 4 of the Contract, and this document.

The Town of Lewiston Landfill Site (NYSDEC ID No.:932076) is adjacent to the intersection of Harold and Pletcher Roads in the Town of Lewiston, Niagara County, New York. The operational lifespan of the landfill is uncertain; however, it is known that the landfill was used by the Town and Village of Lewiston primarily to dispose of household refuse, hauled by Niagara Sanitation. Some industrial wastes, in the form of crushed battery cases were also disposed of at this site. According to forms filed with the NYSDEC, the status of the landfill was changed from active to inactive on October 1, 1972, and officially closed on August 25, 1979. Before the Town of Lewiston owned the landfill, the site was owned by the US Government and may have been part of a TNT manufacturing facility.

The Town of Lewiston Landfill is in a rural area and covers 16 acres, sharing a common boundary with a facility operated by Modern Landfill, Inc. located to the north. The Lewiston Landfill is fairly level with a mounded section approximately eight feet high in the center. Drainage swales border the site on three sides and partially dissect the site. The border swales are extensive laterally, but the dissecting swales vary in extent. Both types of swales are no more than three feet deep and three feet across and in March, 1985, were filled or partially filled with standing water.

The site is crossed by an east-west-trending gas pipeline owned and operated by Tenneco Corporation. Tenneco drilled six ten-foot deep monitoring wells flanking the pipeline. Two of these locations are shown in Figure 2. Low levels of heavy metals were found in ground water samples from these wells. Lead was found at twice the NYS Class GA quality standard of .025 mg/l. Composite soil samples were below detection limits for the metals tested. As a result of this small scale study, in 1987 Tenneco received permission to carry out routine maintenance on the pipeline.

The site is located on the Ontario Plain, approximately two miles north of the Niagara Escarpment. The Niagara River is approximately four miles to the west and Lake Ontario is five miles to the north. Glacial till ranging in thickness from 0 to 20 feet in thickness comprises the greater part of the surficial deposits on the Ontario Plain. In some areas, a layer of lacustrine clay or sand, ranging from 0 to 90 feet thick, deposited in Glacial Lake Iroquois, overlies the till. Underlying the surficial till is a sequence of interbedded glacio-lacustrine deposits, till and locally extensive alluvial sand and gravel deposits. This complex sequence is underlain by Pre-Wisconsin glacial till, which is underlain by the Silurian Queenston Shale, which has an average thickness of 1,200 feet.

No viable aquifers for large-scale groundwater use have been identified, in spite of the aerial extent of the glacial deposits. One well, the Jowdy well, located 2,500 feet east of the site is the only known well drawing water from the glacial deposits in the vicinity of the site. The Jowdy well is a dug well reaching a depth of 28 feet, and the Queenston Shale is reported to occur 15 feet below the surface in this well.

A confined water-bearing zone has been identified in the upper fractured zone of the Queenston Shale. This zone possesses a sufficient amount of groundwater for limited domestic use and is confined by the Pre-Wisconsin till and the overlying glacio-lacustrine deposits. Insufficient data are available to assess the hydraulic gradients and flow patterns in this area of the Queenston Shale.

The soils reported to occur in this area include the Madalin silt loam and small areas of the better drained Churchville soils. Other soils reported to occur at this site are coarser textured ovid or sunsoils formed in till and deeper Odessa, Rhinebeck, Lakemont, and normal Madalin soils which formed in deeper clayey lacustrine deposits.

NUS completed an investigation of the site in October, 1983, for the EPA and a Phase I Investigation of this site was completed by Wehran Engineering, P.C. in January, 1987. The Phase I Investigation included results of soil and water sample analyses from 1982. One sample had a high lead concentration (82 ug/g) in the soil and high concentrations of arsenic (21 ug/l), iron (7 mg/l) and TOC (220 mg/l) in the water. Another sample had a high concentration of antimony (65 ug/g) in the soil. The final report of the Phase I Investigation is available.

2.0 OBJECTIVES

The objective of a Phase II investigation is to determine if hazardous wastes have been disposed of in the site, if contaminants exist in the various mediums (air, groundwater, surface water, or soils) and whether or not threats to human health or the environment exist. Information gathered relative to the above will allow the Department to reclassify the site or, if warranted, delist it.

In order to accomplish the above Phase II Objectives the following investigation tasks will be performed:

- site reconnaissance and data compilation
- geophysical survey
- test borings
- monitoring well installation
- in-situ permeability testing

REFERENCE 8

reb
1

Draft

Uncontrolled Hazardous Waste Site Ranking System

A Users Manual
(HW-10)

Originally Published in
the July 16, 1982, *Federal Register*

United States
Environmental Protection
Agency

1984

REFERENCE 9

Dangerous Properties of Industrial Materials

Sixth Edition

N. IRVING SAX

Assisted by:
Benjamin Feiner/Joseph J. Fitzgerald/Thomas J. Haley/Elizabeth K. Weisburger

VNR VAN NOSTRAND REINHOLD COMPANY
NEW YORK CINCINNATI TORONTO

TABLE I

EPA Hazard Ranking System Waste Characteristics Values (Toxicity/Persistence Matrix)

cal/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
napthene	9	3
ldehyde	6	6
c Acid	6	6
tone	6	6
tylaminoflourene	18	9
in	18	9
onia	9	9
ine	12	9
racene	15	9
enic	18	9
ic Acid	18	9
ic Trioxide	18	9
estos	15	9
um	18	9
zene	12	9
idine	18	9
pyrene	18	9
zopyrene, NOS	18	9
llium & Compounds NOS	18	9
ryllium Dust, NOS	18	9
s (2-Chloroethyl) Ether	15	9
s (2-Ethylhexyl Phthalate	12	3
omodichloromethane	15	6
omoform	15	6
omethane	15	9
dmium	18	9
rbon Tetrachloride	18	9
lordane	18	9
lorobenzene	12	6
roform	18	6
Chlorophenol	12	6
Chlorophenol	15	9
Chlorophenol	12	6
romium	18	9
r um, Hexavalent (Cr^{+6})	18	9

le I (cont.)

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emical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Chromium, Trivalent (Cr^{+3})	15	6
Copper & Compounds, NOS	18	9
Creosote	15	6
Cresols	9	6
4-Cresol	12	9
Cupric chloride	18	9
Cyanides (soluble salts), NOS	12	9
Cyclohexane	12	6
DDE	18	9
DDT	18	9
Diaminotoluene	18	6
Dibromochloromethane	15	6
1, 2-Dibromo, 3-chloropropane	18	9
Di-N-Butyl-Phthalate	18	6
1, 4-Dichlorobenzene	15	6
ichlorobenzene, NOS	18	6
1, 1-Dichloroethane	12	6
1, 2-Dichloroethane	12	9
1, 1-Dichloroethene	15	9
1, 2-cis-Dichloroethylene	12	3
1, 2-trans-Dichloroethylene	12	3
Dichloroethylene, NOS	12	3
2, 4-Dichlorophenol	18	6
2, 4-Dichlorophenoxyacetic Acid	18	9
Dicyclopentadiene	18	9
Dieldrin	18	9
2, 4-Dinitrotoluene	15	9
Dioxin	18	9
Endosulfan	18	9
Endrin	18	9
Ethylbenzene	9	6
Ethylene Dibromide	18	9
Ethylene Glycol	9	6
Ethyl Ether	15	3
Ethylmethacrylate	12	6

Chemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Fluorine	18	9
Formaldehyde	9	9
Formic Acid	9	6
Heptachlor	18	9
Hexachlorobenzene	15	6
Hexachlorobutadiene	18	9
Hexachlorocyclohexane, NOS	18	9
Hexachlorocyclopentadiene	18	9
Hydrochloric Acid	9	6
Hydrogen Sulfide	18	9
Indene	12	6
Iron & Compounds, NOS	18	9
Isophorone	12	6
Isopropyl Ether	9	3
Kelthane	15	6
Kepone	18	9
Lead	18	9
Lindane	18	9
Magnesium & Compounds, NOS	15	6
Manganese & Compounds, NOS	18	9
Mercury	18	9
Mercury Chloride	18	9
Methoxychlor	15	6
4, 4-Methylene-Bis-(2-Chloroaniline)	18	9
Methylene Chloride	12	6
Methyl Ethyl Ketone	6	6
Methyl Isobutyl Ketone	12	6
4-Methyl-2-Nitroaniline	12	9
Methyl Parathion	9	9
2-Methylpyridine	12	6
Mirex	18	9

able I (cont.)

Draft

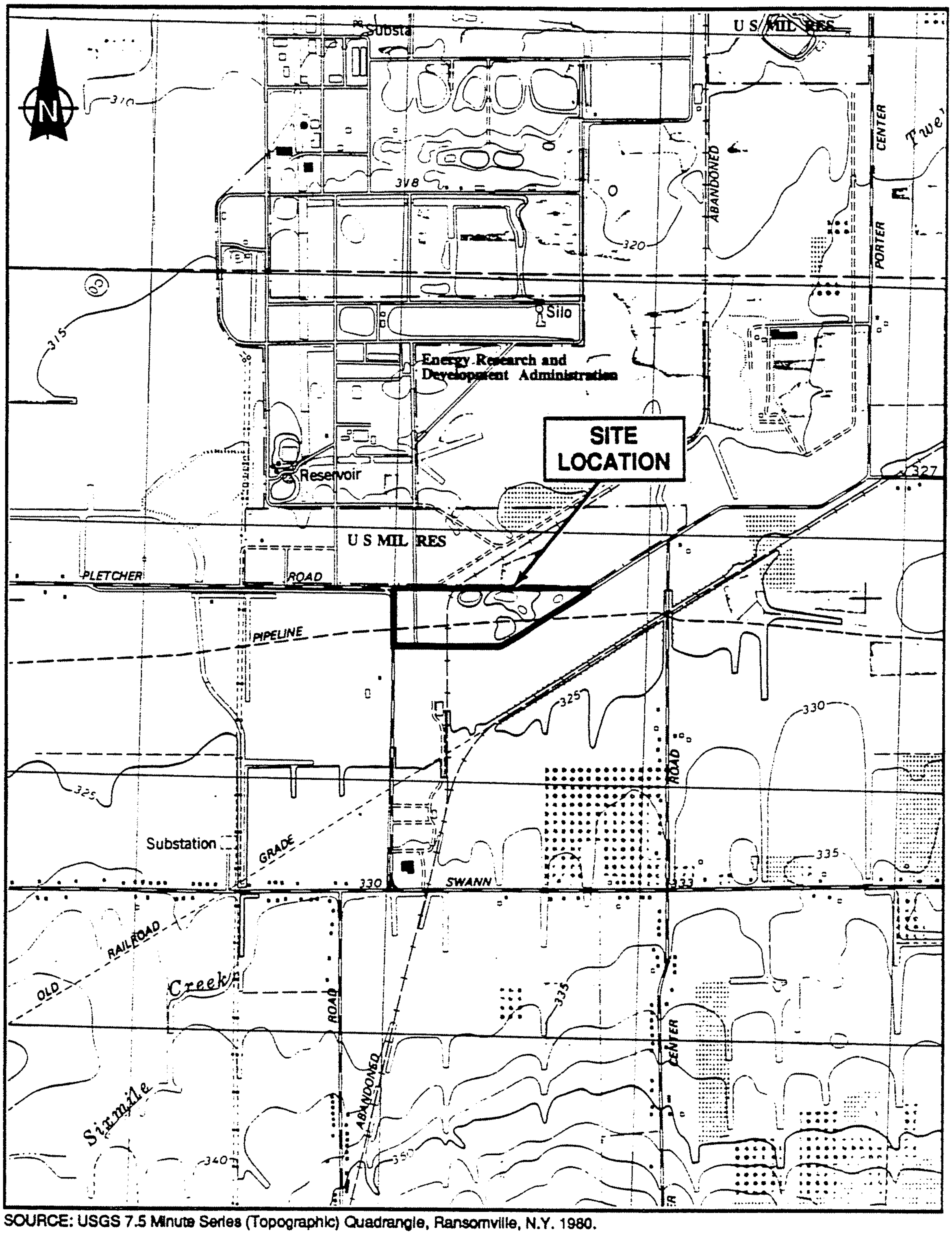
hemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
aphthalene	9	6
Nickel & Compounds, NOS	18	9
itric Acid	9	9
itroaniline, NOS	18	9
Nitrogen Compounds, NOS	12	0
itroguanidine	12	9
itrophenol, NOS	15	9
m-Nitrophenol	15	
o-Nitrophenol	12	
p-Nitrophenol	15	
Nitrosodiphenylamine	12	6
Parathion	9	9
Pentachlorophenol (PCP)	18	9
Pesticides, NOS	18	9
Phenanthrene	15	9
Phenol	12	9
Phosgene	9	9
Polybrominated Biphenyl (PBB), NOS	18	9
Polychlorinated Biphenyls (PCB), NOS	18	9
otassium Chromate	18	9
adium & Compounds, NOS	18	9
adon & Compounds, NOS	15	9
D (Cyclonite)	15	
, 4-D, Salts & Esters	18	9
elenium	15	9
evin (Carbaryl)	18	9
odium Cyanide	12	9
tyrene	9	6
ulfate	9	0
ulfuric Acid	9	9
, 5-T	18	9
1, 2, 2-Tetrachloroethane	18	9
trachloroethane, NOS	18	9
1, 2, 2-Tetrachloroethene	12	6

Draft

Chemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Tetraethyl Lead	18	9
Tetrahydrofuran	15	6
Thorium & Compounds, NOS	18	9
Toluene	9	6
TNT	12	
Toxaphene	18	9
Tribromomethane	18	9
1, 2, 4-Trichlorobenzene	15	6
1, 3, 5-Trichlorobenzene	15	6
1, 1, 1-Trichloroethane	12	6
1, 1, 2-Trichloroethane	15	6
Trichloroethane, NOS	15	6
Trichloroethene	12	6
1, 1, 1-Trichloropropane	12	6
1, 1, 2-Trichloropropane	12	6
1, 2, 2-Trichloropropane	12	6
1, 2, 3-Trichloropropane	15	9
Uranium & Compounds, NOS	18	9
Varsol	12	6
Vinyl Chloride	15	9
Xylene	9	6
Zinc & Compounds, NOS	18	9
Zinc Cyanide	18	9

REFERENCE 10

ANALYTICAL DATA
(APPENDIX D THIS REPORT)



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangle, Ransomville, N.Y. 1980.

SCALE 1:25,000

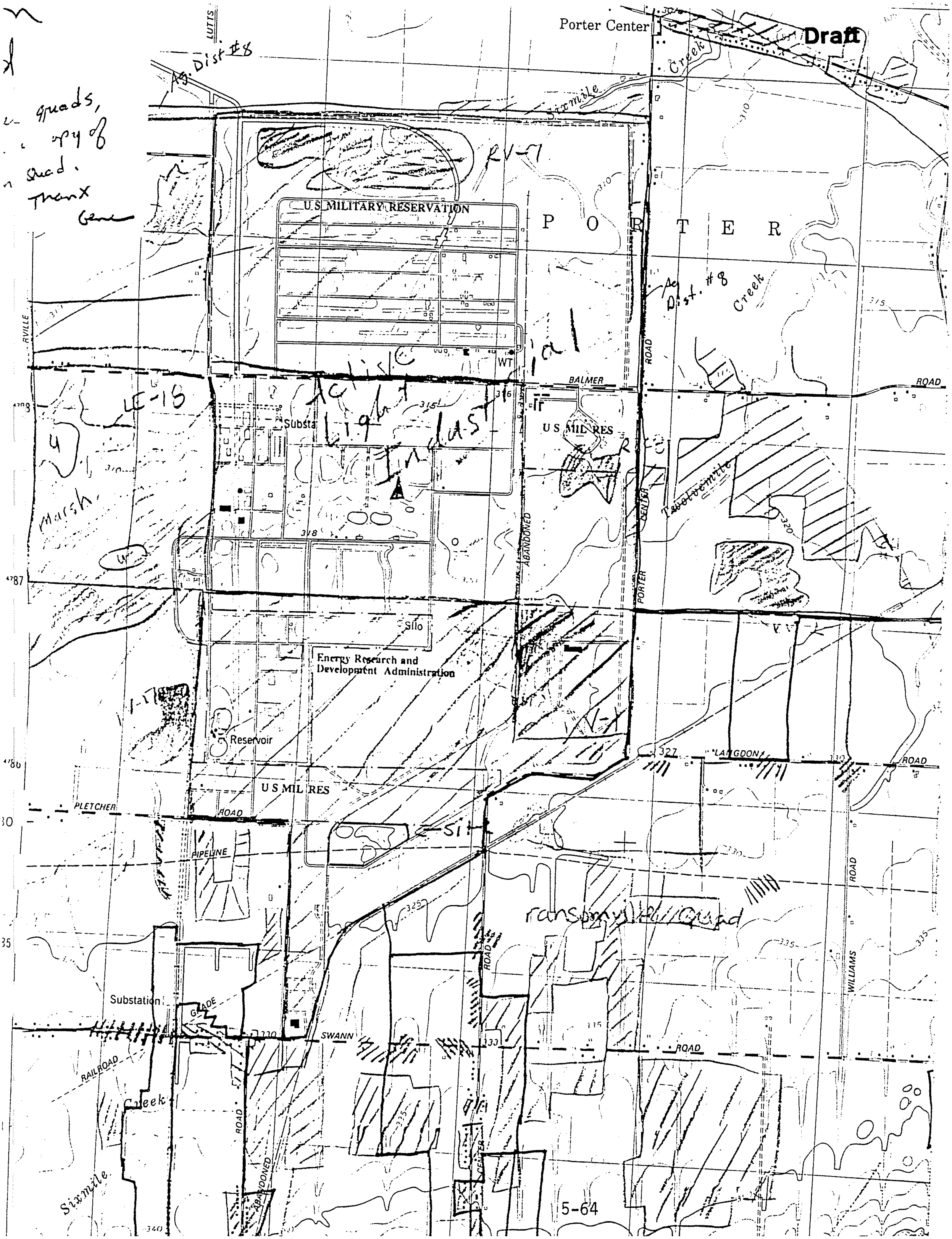
0 .5 1 Mile

0 .5 1 Kilometer

Figure 1-1
SITE LOCATION MAP, TOWN OF LEWISTON LANDFILL

quads,
opy of
Quad.
Thanx
Gene

Draft



REFERENCE 11

Draft

INTERVIEW ACKNOWLEDGMENT FORM

SITE NAME: Town of Lewiston Landfill

I.D. NUMBER: 932076

PERSON CONTACTED: Ronald Gwozdek

DATE: 4-2-90

PHONE NUMBER: 439-6109

AFFILIATION: Niagara County Health Department

ADDRESS: 5467 Upper Mountain Rd.

CONTACT PERSON(S): J. Vangalio
R. Leichner

TYPE OF CONTACT: Personal Interview

INTERVIEW SUMMARY

Mr. Gwozdek told us that there is only one municipal well in the county which is in the Town of Royalton, Village of Middleport. The rest of the county is on municipal water from the Niagara River. We had copies made of a file containing test data from the Village of Middleport well.

Water intakes for Niagara County are on U.S.G.S. maps. The Niagara Falls quad shows the Niagara Falls and Niagara County intakes. The Tonawanda West Quad shows the Lockport and North Tonawanda intakes and also the Tonawanda intakes which are not in Niagara County. Mr. Gwozdek recommended that we contact Mr. Paul Dickey, of the Department of Health in Niagara Falls, for specific water information relating to hazardous waste sites. The Department of Health has no list of people using well water because they test wells only on request. Mr. Gwozdek suggested that we contact the Town Water Superintendents to find out who is connected to the water supply. He provided us with a list of the water superintendents.

ACKNOWLEDGMENT

I have read the above transcript and I agree that it is an accurate summary of the information verbally conveyed to Ecology and Environment, Inc. interviewer(s) (as revised below, if necessary).

Revisions (please write in any corrections needed to above transcript)

Signature: __________ Date: 04-16-90

REFERENCE 12

Draft

INTERVIEW ACKNOWLEDGMENT FORM

SITE NAME: Town of Lewiston Landfill

I.D. NUMBER: 932076

PERSON CONTACTED: Steve Reiter

DATE: April 20, 1990

PHONE NUMBER: 754-8218

AFFILIATION: Town of Lewiston Water District

ADDRESS: 1445 Swann Road
Lewiston, NY 14092

CONTACT PERSON(S): Judy Vangalio

TYPE OF CONTACT: phone interview

INTERVIEW SUMMARY

Within one mile of the site, only Sam Jowdy's residence uses a private well. His residence is located on Porter-Center Road. The remaining residence are tied into public water provided by the Niagara County Water District. The intake is located in the Niagara River.

Their is a slim possibility that wells may be used for irrigation, but he cannot be sure. Mr. Reiter does not have such records.

ACKNOWLEDGMENT

I have read the above transcript and I agree that it is an accurate summary of the information verbally conveyed to Ecology and Environment, Inc. interviewer(s) (as revised below, if necessary).

Revisions (please write in any corrections needed to above transcript)

Signature: Steven L. Reiter Date: 29 May 90

REFERENCE 13

MENT OF COMMERCE
ES, Secretary

WEATHER BUREAU
F. W. Reichelderfer, Chief

3

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

Prepared by
DAVID M. HERSHFIELD
Cooperative Studies Section, Hydrologic Services Division
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture

REFERENCE 14

Draft

INTERVIEW ACKNOWLEDGMENT FORM

SITE NAME:	Town of Leviston Landfill	I.D. NUMBER:	932076
PERSON CONTACTED:	Sue Casey	DATE:	3/30/90
		PHONE NUMBER:	716-439-6170
AFFILIATION:	Niagara County Environmental Mgmt. Council		
ADDRESS:	County Courthouse Lockport, NY	CONTACT PERSON(S):	Judy Vangalio Kirsten Neumaier Ralinda Leichner

TYPE OF CONTACT: personal interview and file search

INTERVIEW SUMMARY

We were informed that the Highway Department, located at 225 S. Niagara Street, Lockport, NY had aerial photos of the county over several years. We were also told that the Health Department at 5467 Upper Mountain Road, Lockport, NY might have water information and that we could pickup a directory of county phone numbers in the legislative offices at the Courthouse.

We gathered land use information from maps at this office on 3/30, 4/3 and 4/4/90.

ACKNOWLEDGMENT

I have read the above transcript and I agree that it is an accurate summary of the information verbally conveyed to Ecology and Environment, Inc. interviewer(s) (as revised below, if necessary).

Revisions (please write in any corrections needed to above transcript)

Signature: Celeste J Rich Date: 4/24/90

REFERENCE 15

16

INTERVIEW ACKNOWLEDGMENT FORM

SITE NAME: Town of Lewiston Landfill

I.D. NUMBER: 932076

PERSON CONTACTED: Burrell Buffington

DATE: 4/10/90

PHONE NUMBER: 518-783-3932

AFFILIATION: NY Natural Heritage Program

ADDRESS: 700 Troy-Schenectady Road
Albany, NY 12110

CONTACT PERSON(S): Judy Vangalio
Ralinda Leichner

TYPE OF CONTACT: map search

INTERVIEW SUMMARY

No significant habitats were found within 1.5 miles of the site after looking at the Significant Habitat Maps (1980) prepared by the Habitat Inventory Unit of the NYSDEC Division of Fish and Wildlife Bureau of Wildlife.

No endangered species, wildlife management, or wildlife refuge areas are located within 1.5 miles of the site. This was based on the Natural Heritage maps.

ACKNOWLEDGMENT

I have read the above transcript and I agree that it is an accurate summary of the information verbally conveyed to Ecology and Environment, Inc. interviewer(s) (as revised below, if necessary).

Revisions (please write in any corrections needed to above transcript)

Signature: Burrell Buffington

Date: 4/25/90

REFERENCE 16

NATIONAL REGISTER OF HISTORIC PLACES 1966-1988

New York County—Continued

Stuyvesant Square Historic District, Roughly bounded by Nathan D. Perleman Pl., 3rd Ave., E. 18th and E. 15th Sts., New York, 11/21/80, C, 80002723

Surrogate's Court, 31 Chambers St., New York, 1/29/72, C, NHL, 72000888

Sutton Place Historic District, 1—21 Sutton Pl. & 4—16 Sutton Sq., New York, 9/12/85, C, 85002294

Theodore Roosevelt Birthplace National Historic Site, 28 E. 20th St., New York, 10/15/66, B,c,e, 66000054

Third Judicial District Courthouse, 425 Avenue of the Americas, New York, 11/09/72, C, NHL, 72000875

Tiffany and Company Building, 401 5th Ave., New York, 6/02/78, A,C, NHL, 78001886

Tilden, Samuel J., House, 14—15 Gramercy Park South, New York, 5/11/76, B,C, NHL, 76001251

Town Hall, 113—123 W. 43rd St., New York, 4/23/80, A,C, 80002724

Trinity Chapel Complex, 15 W. 25th St., New York, 12/16/82, C,a, 82001205

Trinity Church and Graveyard, Broadway and Wall St., New York, 12/08/76, A,C,a,d, NHL, 76001252

Tudor City Historic District, Roughly bounded by Fourty-third St., First Ave., Fourty-first St., and Second Ave., New York, 9/11/86, C, 86002516

Turtle Bay Gardens Historic District, 226-246 E. 49th St. and 227-245 E. 48th St., New York, 7/21/83, A,C, 83001750

Tweed Courthouse, 52 Chambers St., New York, 9/25/74, B,C, NHL, 74001277

U.S. Customhouse, Bowling Green, New York, 1/31/72, C, NHL, 72000889

U.S. General Post Office, 8th Ave. between 31st and 33rd Sts., New York, 1/29/73, C, 73002257

US Courthouse, 40 Foley Sq., New York, 9/02/87, A,C, 87001596

USS INTREPID (aircraft carrier), Intrepid Sq., New York, 1/14/86, A,g, NHL, 86000082

Union Theological Seminary, W. 120th St. and Broadway, New York, 4/23/80, A,C,a, 80002725

United Charities Building Complex, 105 E. 22nd St,. 289 Park Ave. S. and 111-113 E. 22nd St., New York, 3/28/85, B,C, 85000661

University Club, 1 W. 54th St., New York, 4/16/80, C, 80002726

University Settlement House, 184 Eldridge St., New York, 9/11/86, A, 86002515

Upper East Side Historic District, Roughly bounded by 3rd and 5th Aves., 59th and 79th Sts., New York, 9/07/84, C, 84002803

Van Rensselar, Stephen, House, 149 Mulberry St., New York, 6/16/83, C, 83001751

Vanderbilt, Mrs. Graham Fair, House, 60 E. 93rd St., New York, 10/29/82, C, 82001206

Villard Houses, 29 1/2 50th St., 24—26 E. 51st St., and 451, 453, 455, and 457 Madison Ave., New York, 9/02/75, B,C,a, 75004210

WAVERTREE, Pier 17, foot of Fulton St., New York, 6/13/78, A,C, 78001887

Waldo, Gertrude Rhinelander, Mansion, 867 Madison Ave., New York, 5/06/80, C, 80002727

Warburg, Felix M., Mansion, 1109 5th Ave., New York, 10/29/82, C, 82001207

Watson, James, House, 7 State St., New York, 7/24/72, C,a, 72000891

Webster Hotel, 40 W. 45th St., New York, 9/07/84, C, 84002806

West 67th Street Artists' Colony Historic District, 1—39 and 40—50 W. 67th St., New York, 7/11/85, A,C, 85001522

West 73rd-74th Street Historic District, 73rd, 74th Sts. and Columbus Ave., New York, 9/08/83, C, 83001752

West 76th Street Historic District, W. 76th St., New York, 7/24/80, C, 80002728

West End Collegiate Church and Collegiate School, W. End Ave. and W. 77th St., New York, 5/06/80, C,a, 80002729

Westchester House, 541—551 Broome St., New York, 3/20/86, A,C, 86000450

Woolworth Building, 233 Broadway, New York, 11/13/66, A,C, NHL, 66000554

Yiddish Art Theatre, 189 Second Ave., New York, 9/19/85, A,C, 85002427

Niagara County

Adams Power Plant Transformer House, Buffalo Ave. near Portage Rd., Niagara Falls, 6/11/75, A,C, NHL, 75001212

Deveaux School Historic District, 2900 Lewiston Rd., Niagara Falls, 6/05/74, A,a, 74001281

Fort Niagara Light [U.S. Coast Guard Lighthouses and Light Stations on the Great Lakes TR], Niagara River, Youngstown, 7/19/84, A,C, 84002809

Frontier House, 460 Center St., Lewiston, 7/08/74, A,C, 74001278

Herschell, Allan, Carousel Factory, 180 Thompson St., North Tonawanda, 4/18/85, A,C, 85000856

Holley-Rankine House, 525 Riverside Dr., Niagara Falls, 10/04/79, B,C, 79003793

Lewiston Mound, Address Restricted, Lewiston vicinity, 1/21/74, D, 74001279

Lewiston Portage Landing Site, Address Restricted, Lewiston vicinity, 7/18/74, A,D, 74001280

Lockport Industrial District, Bounded roughly by Erie Canal, Gooding, Clinton, and Water Sts., Lockport, 11/11/75, A,C, 75001211

Lowertown Historic District, Roughly bounded by Erie Canal and New York Central RR, Lockport, 6/04/73, A,C, 73001225

Moore, Benjamin C., Mill, Pine St. on the Erie Canal, Lockport, 6/19/73, A,C, 73001226

Niagara Falls Public Library, 1022 Main St., Niagara Falls, 6/05/74, A,C, 74001282

Niagara Reservation, Niagara Reservation, Niagara Falls, 10/15/66, A, NHL, 66000555

Old Fort Niagara, N of Youngstown on NY 18, Youngstown vicinity, 10/15/66, A,D, NHL, 66000556

Riviera Theatre, 27 Webster St., North Tonawanda, 3/20/80, A,C, 80002731

Thirty Mile Point Light [U.S. Coast Guard Lighthouses and Light Stations on the Great Lakes TR], Niagara River, Somerset, 7/19/84, A,C, 84003922

U.S. Customhouse, 2245 Whirlpool St., Niagara Falls, 7/16/73, A,C, 73001227

Union Station, 95 Union Ave., Lockport, 12/02/77, A,C, 77000966

Whitney Mansion, 335 Buffalo Ave., Niagara Falls, 1/17/74, B,C, 74001283

Williams, Johann, Farm, 10831 Cayuga Dr., Niagara Falls, 1/10/80, A,C,a, 80002730

Oneida County

Arsenal House, 514 W. Dominick St., Rome, 7/18/74, A,C, 74001284

Boonville Historic District, Schuyler, Post, W. Main and Summit Sts., Boonville, 11/16/79, A,C, 79001608

Clinton Village Historic District, North, South, East, West Park Rows, Marvin, Williams, Chestnut, Fountain, College and Utica Sts., Clinton, 6/14/82, A,C, 82003389

Conkling, Roscoe, House, 3 Rutger St., Utica, 5/15/75, B, NHL, 75001214

Erwin Library and Pratt House, 104 and 106 Schuyler St., Boonville, 8/14/73, A,B,C, 73001228

First Baptist Church of Deerfield, Herkimer Rd., Utica, 7/11/85, C,a,d, 85001497

First Congregational Free Church, 177 N. Main St., Oriskany Falls, 1/25/79, A,C,a, 79001609

First Presbyterian Church, 1605 Genesee St., Utica, 11/03/88, C,a, 88002172

Five Lock Combine and Locks 37 and 38, Black River Canal, NY 46, Boonville, 3/20/73, A,C, 73001229

Floyd, Gen. William, House, W side of Main St., Westernville, 7/17/71, B, NHL, 71000549

Fort Stanwix National Monument, Bounded by Dominick, Spring, Liberty, and James Sts., Rome, 10/15/66, A,e, NHL, 66000057

Fountain Elms, 318 Genesee St., Utica, 11/03/72, B,C, 72001599

Gansevoort-Bellamy Historic District, Roughly bounded by Liberty, Stuben, and Huntington Sts. to Bissel, Rome, 11/12/75, C,a,g, 75001213

Hamilton College Chapel, Hamilton College campus, Clinton, 11/03/72, A,C,a, 72000892

Jervis Public Library, 613 N. Washington St., Rome, 11/04/82, B,C, 82001208

Lower Genesee Street Historic District, Roughly bounded by Genesee, Liberty, Seneca, and

REFERENCE 17

Draft

Lewiston Town
Environmental Enforcement Officer
Kenneth J. Shipman
1375 Ridge Road
Lewiston, New York 14092
754-8213

October 30, 1990

Ecology and Environmental, Inc.
Buffalo Corporate Center
368 Pleasantview Drive
Lancaster, New York 14086

Attention: Judy Vangalio

Dear Ms. Vangalio,

You had recently requested a Fire and Explosion hazard determination for the Town of Lewiston Landfill, site code 932076.

During part of the time this landfill was in operation up to 1972, Mr. Calvin Schultz was a Town of Lewiston employee working next to the landfill area and is knowledgeable about what types of waste that were disposed of in the landfill.

At the present time Mr. Schultz is a Town of Lewiston Councilman. Because of his passed knowledge of the Landfill and his present position in the Town Government, he is the most qualified person to determine the level of fire and explosion hazard concerning this site.

Therefore, I have held a meeting with Mr. Schultz to discuss your request and it was concluded that no fire or explosion hazards exist at site 932076 based on knowledge of the type of solid waste that was accepted at that site.

If you have any questions please call me at 716-754-8213 extension 258.

Sincerely,

Kenneth J. Shipman
Environmental Enforcement Officer

concurrence: Calvin C Schultz
Calvin C. Schultz
Councilman

KJS/dg
cc: Town Clerk
E.E.O File

REFERENCE 18

Source: Niagara County Health Department
Niagara Falls Office

Draft 19

2/18/72

LEWISTON DISPOSAL

1. None + OPEN BURNING

2. Evidence of on site burning:
The ashes and remains of charred wood and refuse has been found at various inspections of site.

3. Dumping into Water:
Refuse has been found in contact with collected surface water.
   (a) A pond of standing water over a past dumping area that has protruding refuse.
   (b) A pit area below the present dumping area that had collected surface water in direct contact with deposited refuse. Both areas had a means of draining water to surrounding drainage ditches.

4. Leachate observed at the site:
The liquid found in the two areas above (3.) were found to have decomposition of organic materials as did surrounding drainage ditches.

5. Leaching into a water course:
Leaching is not directly into a water course but from surrounding ditches through a net-work of ditches it can be traced to nearby creeks.

6. Refuse not confined to a manageable area:
In the past the area used for disposal of refuse was too much an area for operation of site. They had two disposal areas, one for residents and one for concerns engaged in the offensive waste business. The time and equipment given to an area was far from suitable. Inspections showed that the requirements of Part 19 were not met. At present the area used for disposal of refuse would be suitable if operated correctly.

7. Unsatisfactory daily soil cover:
Many inspections have shown that coverage has not been daily or completed with 6 inches of cover.

8. Refuse protruding through completed areas:
Completed area is to mean area that has received their final deposit of refuse. Unless a site is closed, it becomes questionnable as to an area being a completed area. There does exist many areas on the site that have not received refuse for very long periods. These areas are not covered properly.

9. Improper spreading and compaction of refuse:
Refuse in most cases is not spreadout and compacted properly. The equipment operator simply pushes refuse over a bank or knocks down mounds to allow compaction, but layers of refuse in most cases are too thick for suitable compaction.

10. Pooling of Water:
There are areas of pooling water in that areas have had poor coverage or are in need of additional coverage.

11. Evidence of rodents and insects:
    Have not seen rodent or evidence of rodents on the site but operation of this site makes it a certainty they do exist. Insects can be found in abundance during warm weather.

12. Blowing paper problem:
    There has always been the problem of paper scattered about the site. No method is used to confine papers. The policing up of paper is not done to any effective degree.

13. Salvaging of refuse creating a nuisance:
    None to my knowledge.

14. Approach road impassable to vehicular traffic during part of the year:
    Roadway has been passable during the year but difficult to move on at times.

15. Control of site:
    Control of site has been satisfactory with gates installed.

SERVICE REQUEST

File **Draft**

Mr. Harlan Walker the operator of the Lewiston Landfill requested an appointment with myself at 10:30 a.m. on November 10, 1971 at the Lewiston Landfill site to discuss the written notice I sent to him on November 4, 1971 regarding the unproper maintenance of the site, which specified the violations and gave him till November 12, 1971 to make the needed corrections.

At this meeting I notified the operator of the site of the corrections that are needed to meet the requirements of Part 19, Chapter I of the New York State Sanitary Code which are as follows:

1. That the present dumping area that was filled with septic water be properly covered and graded to allow surface water to drain off.

2. That the area known as the old resident dumping area, which has filled with water that was in a septic condition, be covered properly and be graded to allow surface water to drain off.

3. That the drainage ditch dug through a past dumping area be covered or dug out to be clear of refuse, and that should he choose to keep this drainage ditch, that surrounding deposited refuse be covered so as not to allow leaching to said ditch to occur.

4. That surrounding drainage ditches be cleaned of paper, cardboard and any refuse.

5. That the area of burned trees, brush and lumber be cleared.

6. That the areas of mixed refuse cover be dressed up with suitable cover material.

During my tour of the site with Mr. Walker I found a large pit has been dug to dump refuse into. I informed Mr. Walker that the method used to dispose of refuse was their responsibility but in the event that the pit collects surface water that causes leaching with refuse that the pit area would then be unacceptable. We spoke of a lift station in a low area of the pit to allow surface water to be pumped out before it becomes leachate liquid.

Mr. Walter felt he would need another week past the November 12, 1971 deadline to complete corrections. I informed him that at this time no exemption as to the time would be given in that it was now the 10th of the month and they had 8 days to correct from the time of written notice and that some of the corrections needed, date back many months from a past written notice to correct. I have, however, said that if on my inspection of the site on November 12, 1971, that were I to find a great deal done and done well, I would grant more time because they have shown good faith to comply with the requirements of governing codes.

EPA 2070–13

5.5

EPA

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT

PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION **Draft**

01 State NY	02 Site Number 932076

II. SITE NAME AND LOCATION

01 Site Name (Legal, common, or descriptive name of site) Town of Lewiston Landfill	02 Street, Route No., or Specific Location Identifier Harold and Pletcher Roads

03 City Lewiston	04 State NY	05 Zip Code 14092	06 County Niagara	07 County Code	08 Cong. Dist.

09 Coordinates Latitude 4 3 1 2 3 0 .N	Longitude 7 8 5 8 3 0 __.W	10 Type of Ownership (Check One) [ ] A. Private [ ] B. Federal [ ] C. State [ ] D. County [ ] E. Municipal [x] F. Other Town [ ] G. Unknown

III. INSPECTION INFORMATION

01 Date of Inspection 5 / 18 / 90 Month Day Year	02 Site Status [ ] Active [x] Inactive	03 Years of Operation 1964 | 1972 Beginning Year Ending Year [ ] Unknown

04 Agency Performing Inspection (Check all that apply)

[ ] A. EPA [ ] B. EPA Contractor ______________ (Name of Firm) [ ] C. Municipal

[ ] D. Municipal Contractor ______________ (Name of Firm) [ ] E. State [ ] F. State Contractor Ecology and Environment, Inc. Engineering P.C. (Name of Firm)

[ ] G. Other (Specify) ______________

05 Chief Inspector G. Florentino	06 Title Senior Geologist	07 Organization E & E	08 Telephone No. (716) 684-8060
09 Other Inspectors B. Meyers	10 Title Geologist	11 Organization E & E	12 Telephone No. (716) 684-8060
			( )
			( )

13 Site Representatives Interviewed K. Shipman	14 Title Envir. Enfor. Off.	15 Address Town of Lewiston, NY	16 Telephone No. (716) 754-8213
F. Mahar	Hwy. Supervisor	Town of Lewiston, NY	(716) 754-8213
			( )
			( )
			( )

17 Access Gained by (Check one) Permission	18 Time of Inspection 1,000 hours	19 Weather Conditions overcast, occassional rain, 60°F

IV. INFORMATION AVAILABLE FROM

01 Contact Walter Demick	02 Agency/Organization NYSDEC - Albany			03 Telephone No. (518) 457-9538
04 Person Responsible for Site Inspection Form J. Griffis	05 Agency	06 Organization E & E	07 Telephone No. (716) 684-8060	08 Date 05 / 19 / 90 Month Day Year

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 2 - WASTE INFORMATION

Draft

I. IDENTIFICATIO	
01 State	02 Site Number
NY	932076

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 Physical States
(Check all that apply)

[x] A. Solid
[ ] B. Powder, Fines
[ ] C. Sludge
[ ] D. Other Battery Casings
(Specify)

[ ] E. Slurry
[ ] F. Liquid
[ ] G. Gas

02 Waste Quantity at Site
(Measure of waste quantities must be independent)

Tons __________
Cubic Yards __________
No. of Drums __________

Unknown

03 Waste Characteristics (Check all that apply) Unknown

[ ] A. Toxic
[ ] B. Corrosive
[ ] C. Radioactive
[ ] D. Persistent
[ ] E. Soluble

[ ] F. Infectious
[ ] G. Flammable

[ ] H. Ignitable
[ ] I. Highly volatile
[ ] J. Explosive
[ ] K. Reactive
[ ] L. Incompatible

[ ] M. Not applicable

III. WASTE TYPE

Category	Substance Name	01 Gross Amount	02 Unit of Measure	03 Comments
SLU	Sludge			
OLW	Oily waste			
SOL	Solvents			
PSD	Pesticides			
OCC	Other organic chemicals			
IOC	Inorganic chemicals			
ACD	Acids			
BAS	Bases			
MES	Heavy Metals			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 Category	02 Substance Name	03 CAS Number	04 Storage/Disposal Method	05 Concentration	06 Measure of Concentration

V. FEEDSTOCKS (See Appendix for CAS Numbers)

Category	01 Feedstock Name	02 CAS Number	Category	01 Feedstock Name	02 CAS Number
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

NYSDEC 1987 Phase I Investigation
NYSDEC 1989 Phase II Work Plan

Draft

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 State	02 Site Number
NY	932076

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [x] A. Groundwater Contamination   02 [x] Observed (Date 5/87)   [x] Potential   [ ] Alleged
03 Population Potentially Affected 3   04 Narrative Description

Groundwater wells installed on Tennessee Gas right-of-way bisecting the Lewiston Site indicated low levels of toluene and high levels of lead (exceeding drinking water standards) in some of the wells.

01 [x] B. Surface Water Contamination   02 [x] Observed (Date 1982)   [x] Potential   [ ] Alleged
03 Population Potentially Affected 250   04 Narrative Description:

High levels of arsenic, iron, and TOC from surface water collected from an on-site drainage ditch by the Town of Lewiston.

01 [ ] C. Contamination of Air   02 [ ] Observed (Date ____)   [ ] Potential   [ ] Alleged
03 Population Potentially Affected ____   04 Narrative Description:

No record

01 [ ] D. Fire/Explosive Conditions   02 [ ] Observed (Date ____)   [ ] Potential   [ ] Alleged
03 Population Potentially Affected ____   04 Narrative Description:

No record

01 [x] E. Direct Contact   02 [x] Observed (Date 5/18/90)   [x] Potential   [ ] Alleged
03 Population Potentially Affected 250   04 Narrative Description:

No fences, easily accessible, observed during E & E site inspection. Population within 1-mile radius is 250. Battery casings exposed on surface.

01 [x] F. Contamination of Soil   02 [x] Observed (Date 1982)   [x] Potential   [ ] Alleged
03 Area Potentially Affected 16 acres   04 Narrative Description:

High concentration of lead and antimony found in samples collected by Town of Lewiston.

01 [ ] G. Drinking Water Contamination   02 [ ] Observed (Date ____)   [ ] Potential   [ ] Alleged
03 Population Potentially Affected ____   04 Narrative Description:

No record

01 [ ] H. Worker Exposure/Injury   02 [ ] Observed (Date ____)   [ ] Potential   [ ] Alleged
03 Workers Potentially Affected ____   04 Narrative Description:

No record

01 [ ] I. Population Exposure/Injury   02 [ ] Observed (Date ____)   [ ] Potential   [ ] Alleged
03 Population Potentially Affected ____   04 Narrative Description:

No record

Draft

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS (Cont.)

I. IDENTIFICATION

01 State	02 Site Number
NY	932076

II. HAZARDOUS CONDITIONS AND INCIDENTS (Cont.)

01 [ ] J. Damage to Flora   02 [ ] Observed (Date ________)   [ ] Potential   [ ] Alleged

04 Narrative Description:

No record

01 [ ] K. Damage to Fauna   02 [ ] Observed (Date ________)   [ ] Potential   [ ] Alleged

04 Narrative Description:

No record

01 [ ] L. Contamination of Food Chain   02 [ ] Observed (Date ________)   [ ] Potential   [ ] Alleged

04 Narrative Description:

No record

01 [ ] M. Unstable Containment of Wastes (Spills/Runoff/Standing liquids, Leaking drums)   02 [ ] Observed (Date ________)   [ ] Potential   [ ] Alleged

03 [ ] Population Potentially Affected ________   04 Narrative Description:

No record

01 [ ] N. Damage to Offsite Property   02 [ ] Observed (Date ________)   [ ] Potential   [ ] Alleged

04 Narrative Description:

No record

01 [ ] O. Contamination of Sewers, Storm/ Drains, WWTPs   02 [ ] Observed (Date ________)   [ ] Potential   [ ] Alleged

04 Narrative Description:

No record

01 [ ] P. Illegal/Unauthorized Dumping   02 [ ] Observed (Date ________)   [ ] Potential   [ ] Alleged

04 Narrative Description:

No record

05 Description of Any Other Known, Potential, or Alleged Hazards

None

III. TOTAL POPULATION POTENTIALLY AFFECTED 250 within 1-mile radius

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

NYSDEC 1987 Phase I Investigation
NYSDEC 1989 Phase II Work Plan
USGS 1980 Ransomville, New York 7.5 Minute Quadrangle (topographic)
E & E 1987 Report on Site Characterization of Tennessee Gas Pipeline Study
Town of Lewiston 1982 Report on Samples from Landfill
NUS 1983 Site Inspection

Draft

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 4 - PERMIT AND DESCRIPTIVE INFORMATION	I. IDENTIFICATION 01 State NY	02 Site Number 932076

II. PERMIT INFORMATION

01 Type of Permit Issued (Check all apply)	02 Permit Number	03 Date Issued	04 Expiration Date	05 Comments
[ ] A. NPDES NA				
[ ] B. UIC				
[ ] C. AIR				
[ ] D. RCRA				
[ ] E. RCRA Interim Status				
[ ] F. SPCC Plan				
[ ] G. State (Specify)				
[ ] H. Local (Specify)				
[ ] I. Other (Specify)				
[ ] J. None				

III. SITE DESCRIPTION

01 Storage Disposal (Check all that apply)	02 Amount	03 Unit of Measure	04 Treatment (Check all that apply)	05 Other
[ ] A. Surface Impoundment			[ ] A. Incineration	[ ] A. Buildings On Site
[ ] B. Piles			[ ] B. Underground Injection	
[ ] C. Drums, Above Ground			[ ] C. Chemical/Physical	None
[ ] D. Tank, Above Ground			[ ] D. Biological	
[ ] E. Tank, Below Ground			[ ] E. Waste Oil Processing	
[X] F. Landfill	16	acres	[ ] F. Solvent Recovery	06 Area of Site
[ ] G. Landfarm			[ ] G. Other Recycling Recovery	
[ ] H. Open dump			[x] H. Other none (specify)	16 Acres
[ ] I. Other (Specify)				

07 Comments
None

IV. CONTAINMENT

01 Containment of Wastes (Check one)

[ ] A. Adequate, Secure [ ] B. Moderate [x] C. Inadequate, Poor [ ] D. Insecure, Unsound, Dangerous

02 Description of Drums, Diking, Liners, Barriers, etc.
No record

V. ACCESSIBILITY

01 Waste Easily Accessible: [x] Yes [ ] No
02 Comments:
Crushed battery casings exposed on surface

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

NYSDEC 1987 Phase I Investigation
NYSDEC 1989 Phase II Work Plan
NUS 1983 Site Inspection

Draft

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT

EPA

PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 State	02 Site Number
NY	932076

II. DRINKING WATER SUPPLY

01 Type of Drinking Supply (Check as applicable)

	Surface	Well
Community	A. [x]	B. [ ]
Non-community	C. [ ]	D. [x]

02 Status

Endangered	Affected	Monitored
A. [ ]	B. [ ]	C. [x]
D. [x]	E. [ ]	F. [ ]

03 Distance to Site

A >3 (mi)

B 0.35 0.47 (mi)

III. GROUNDWATER

01 Groundwater Use in Vicinity (Check one)

[ ] A. Only Source for Drinking

[x] B. Drinking (Other sources available) Commercial, industrial, irrigation (No other water sources available)

[ ] C. Commercial, industrial, irrigation (Limited other sources available)

[ ] D. Not Used, Unusable

02 Population Served by Groundwater 3

03 Distance to Nearest Drinking Water Well 0.35 0.47 (mi)

04 Depth to Groundwater 5.5 (ft)

05 Direction of Groundwater Flow north/northwest

06 Depth to Aquifer of Concern 25 (ft)

07 Potential Yield of Aquifer low (gpd)

08 Sole Source Aquifer Unknown [ ] Yes [x] No

09 Description of Wells (including usage, depth, and location relative to population and buildings)

There are no drinking water wells on site. There is only one drinking water well known to exist within a 3-mile radius (0.35 mile NE of site).
0.47

10 Recharge Area

[ ] Yes

[ ] No

Comments: Unknown

11 Discharge Area

[ ] Yes

[ ] No

Comments: Unknown

IV. SURFACE WATER

01 Surface Water (Check one)

[x] A. Reservoir, Recreation, Drinking Water Source

[ ] B. Irrigation, Economically Important Resources

[ ] C. Commercial, Industrial

[ ] D. Not Currently Used

02 Affected/Potentially Affected Bodies of Water

Name:	Affected	Distance to Site
Niagara River	[ ]	3.6 (mi)
Six-Mile Creek	[ ]	0.6 (mi)
Twelve-Mile Creek	[ ]	0.7 (mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 Total Population Within

One (1) Mile of Site	Two (2) Miles of Site	Three (3) Miles of Site
A. 250 No. of Persons	B. 700 No. of Persons	C. 2,600 No. of Persons

02 Distance to Nearest Population 0.35 0.47 (mi)

03 Number of Buildings Within Two (2) Miles of Site 275

04 Distance to Nearest Off-Site Home 0.2 (mi)

05 Population Within Vicinity of Site (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

The area surrounding the site is rural to semi-rural. There are approximately 70 buildings within a 1-mile radius. Modern Landfill is adjacent to the site on the north side.

Draft

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA (Cont.)

I. IDENTIFICATION

01 State: NY

02 Site Number: 932076

VI. ENVIRONMENTAL INFORMATION

01 Permeability of Unsaturated Zone (Check one)

[ ] A. $10^{-6} - 10^{-8}$ cm/sec   [ ] B. $10^{-4} - 10^{-6}$ cm/sec   [x] C. $10^{-4} - 10^{-3}$ cm/sec   [ ] D. Greater than 10^{-3} cm/sec

02 Permeability of Bedrock (Check one)

[ ] A. Impermeable (Less than 10^{-6} cm/sec)   [x] B. Relatively Impermeable ($10^{-4} - 10^{-6}$ cm/sec)   [ ] C. Relatively Permeable ($10^{-2} - 10^{-4}$ cm/sec)   [ ] D. Very Permeable (Greater than 10^{-2} cm/sec)

03 Depth to Bedrock: 25 (ft)

04 Depth of Contaminated Soil Zone: unknown

05 Soil pH: unknown

06 Net Precipitation: 5 (in)

07 One Year 24-Hour Rainfall: 2.3 (in)

08 Site Slope: 0-2 %

Direction of Site Slope: none

Terrain Average Slope: 0-2 %

09 Flood Potential

Site is in 500 Year Floodplain

10 [ ] Site is on Barrier Island, Coastal High Hazard Area, Riverine Floodway

11 Distance to Wetlands (5 acre minimum)

ESTUARINE NA   OTHER

A. ____ (mi)   B. 0.55 (mi)

12 Distance to Critical Habitat (of endangered species)

____ (mi)   None

Endangered Species: ____

13 Land Use in Vicinity

Distance to:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREA; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS PRIME AG LAND	AG LAND
A. 0.5 (mi)	B. 0.2 (mi)	C. 0.3 (mi)	D. 0.25 (mi)

14 Description of Site in Relation to Surrounding Topography

The site is relatively flat except in areas of mounding of 8-10 feet. The surrounding areas to the east, west, and south are also flat. The area immediately to the north is higher in elevation due to active landfill operations.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

NYSDEC 1987 Phase I Investigation
NYSDEC 1989 Phase II Work Plan
NUS 1983 Site Inspection
USGS 1980 Ransomville, New York 7.5 Minute Quadrangle
Climatic Atlas of US 1983
State Wetland Maps
In Flood Insurance Rate Maps
Soil Survey of Niagara County 1972

Draft

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 State	02 Site Number
NY	932076

II. SAMPLES TAKEN - No samples taken during S.I.

Sample Type	01 Number of Samples Taken	02 Samples Sent to	03 Estimated Date Results Available
Groundwater			
Surface Water			
Waste			
Air			
Runoff			
Spill			
Soil			
Vegetation			
Other			

III. FIELD MEASUREMENTS TAKEN

01 Type	02 Comments
OVA	Increased readings above background near mulch piles caused by methane
Mini-Rad	No readings above background
02/Explosimeter	No readings above background

IV. PHOTOGRAPHS AND MAPS

01 Type [x] Ground [ ] Aerial

02 In Custody of Ecology and Environment Engineering, P.C.
(Name of Organization or Individual)

03 Maps
[x] Yes
[ ] No

04 Location of Maps
E & E log books

V. OTHER FIELD DATA COLLECTED (Provide narrative description of sampling activities)

None

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E & E site inspection May 18, 1990

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 7 - OWNER INFORMATION

I. IDENTIFICATION Draft

01 State	02 Site Number
NY	932076

II. CURRENT OWNER(S)			PARENT COMPANY (if applicable)		
01 Name Town of Lewiston		02 D+B Number	08 Name		09 D+B Number
03 Street Address (P.O. Box, RFD #, etc.) 1375 Ridge Road		04 SIC Code	10 Street Address (P.O. Box, RFD #, etc.)		11 SIC Code
05 City Lewiston	06 State NY	07 Zip Code 14092	12 City	13 State	14 Zip Code
01 Name		02 D+B Number	08 Name		09 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	10 Street Address (P.O. Box, RFD #, etc.)		11 SIC Code
05 City	06 State	07 Zip Code	12 City	13 State	14 Zip Code
01 Name		02 D+B Number	08 Name		09 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	10 Street Address (P.O. Box, RFD #, etc.)		11 SIC Code
05 City	06 State	07 Zip Code	12 City	13 State	14 Zip Code
01 Name		02 D+B Number	08 Name		09 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	10 Street Address (P.O. Box, RFD #, etc.)		11 SIC Code
05 City	06 State	07 Zip Code	12 City	13 State	14 Zip Code

III. PREVIOUS OWNER(S) (List most recent first)			IV. REALTY OWNER(S) (if applicable, most recent first)		
01 Name U.S. Government		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code
01 Name		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code
01 Name		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Town of Lewiston NYSDEC 1987 Phase I Investigation NYSDEC 1989 Phase II Work Plan

EPA

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT

PART 8 - OPERATOR INFORMATION - NA

Draft

I. IDENTIFICATION

01 State
NY

02 Site Number
932076

II. CURRENT OPERATOR (if different from Owner)

01 Name
Town of Lewiston

02 D+B Number

03 Street Address (P.O. Box, RFD #, etc.)
1375 Ridge Road

04 SIC Code

05 City
Lewiston

06 State
NY

07 Zip Code
14092

08 Years of Operation
1964 to 1972

09 Name of Owner
Town of Lewiston

OPERATOR'S PARENT COMPANY (if applicable)

10 Name

11 D+B Number

12 Street Address (P.O. Box, RFD #, etc.)

13 SIC Code

14 City

15 State

16 Zip Code

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 Name
U.S. Government

02 D+B Number

03 Street Address (P.O. Box, RFD #, etc.)

04 SIC Code

05 City

06 State

07 Zip Code

08 Years of Operation

09 Name of Owner During This Period

01 Name

02 D+B Number

03 Street Address (P.O. Box, RFD #, etc.)

04 SIC Code

05 City

06 State

07 Zip Code

08 Years of Operation

09 Name of Owner During This Period

01 Name

02 D+B Number

03 Street Address (P.O. Box, RFD #, etc.)

04 SIC Code

05 City

06 State

07 Zip Code

08 Years of Operation

09 Name of Owner During This Period

PREVIOUS OPERATORS' PARENT COMPANIES (if applicable)

10 Name

11 D+B Number

12 Street Address (P.O. Box, RFD #, etc.)

13 SIC Code

14 City

15 State

16 Zip Code

10 Name

11 D+B Number

12 Street Address (P.O. Box, RFD #, etc.)

13 SIC Code

14 City

15 State

16 Zip Code

10 Name

11 D+B Number

12 Street Address (P.O. Box, RFD #, etc.)

13 SIC Code

14 City

15 State

16 Zip Code

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Draft

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION

01 State
NY

02 Site Number
932076

II. ON-SITE GENERATOR - NA

01 Name None	02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code

05 City	06 State	07 Zip Code

III. OFF-SITE GENERATOR(S) - NA

01 Name None	02 D+B Number	01 Name	02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code
05 City / 06 State / 07 Zip Code		05 City / 06 State / 07 Zip Code	
01 Name	02 D+B Number	01 Name	02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code
05 City / 06 State / 07 Zip Code		05 City / 06 State / 07 Zip Code	

IV. TRANSPORTER(S) - NA

01 Name None	02 D+B Number	01 Name	02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code
05 City / 06 State / 07 Zip Code		05 City / 06 State / 07 Zip Code	
01 Name	02 D+B Number	01 Name	02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code
05 City / 06 State / 07 Zip Code		05 City / 06 State / 07 Zip Code	

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION **Draft**

01 State	02 Site Number
NY	932076

II. PAST RESPONSE ACTIVITIES

01 [ ] A. Water Supply Closed   02 Date   03 Agency
04 Description:
None on record

01 [ ] B. Temporary Water Supply Provided   02 Date   03 Agency
04 Description:
None on record

01 [ ] C. Permanent Water Supply Provided   02 Date   03 Agency
04 Description:
None on record

01 [ ] D. Spilled Material Removed   02 Date   03 Agency
04 Description:
None on record

01 [ ] E. Contaminated Soil Removed   02 Date   03 Agency
04 Description:
None on record

01 [ ] F. Waste Repackaged   02 Date   03 Agency
04 Description:
None on record

01 [ ] G. Waste Disposed Elsewhere   02 Date   03 Agency
04 Description:
None on record

01 [x] H. On-Site Burial   02 Date Prior to 1972   03 Agency
04 Description:
Landfill for household refuse

01 [ ] I. In Situ Chemical Treatment   02 Date   03 Agency
04 Description:
None on record

01 [ ] J. In Situ Biological Treatment   02 Date   03 Agency
04 Description:
None on record

01 [ ] K. In Situ Physical Treament   02 Date   03 Agency
04 Description:
None on record

01 [ ] L. Encapsulation   02 Date   03 Agency
04 Description:
None on record

01 [ ] M. Emergency Waste Treatment   02 Date   03 Agency
04 Description:
None on record

01 [ ] N. Cutoff Walls   02 Date   03 Agency
04 Description:
None on record

01 [ ] O. Emergency Diking/Surface Water Diversion   02 Date   03 Agency
04 Description:
None on record

01 [ ] P. Cutoff Trenches/Sump   02 Date   03 Agency
04 Description:
None on record

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 10 - PAST RESPONSE ACTIVITIES (Cont.)

I. IDENTIFICATION **Draft**

01 State	02 Site Number
NY	932076

II. PAST RESPONSE ACTIVITIES (Cont.)

01 [ ] Q. Subsurface Cutoff Wall 02 Date ______ 03 Agency ______
04 Description:
None on record

01 [ ] R. Barrier Walls Constructed 02 Date ______ 03 Agency ______
04 Description:
None on record

01 [x] S. Capping/Covering 02 Date 8/25/79 03 Agency ______
04 Description:
Landfill officially closed on 8/25/79

01 [ ] T. Bulk Tankage Repaired 02 Date ______ 03 Agency ______
04 Description:
None on record

01 [ ] U. Grout Curtain Constructed 02 Date ______ 03 Agency ______
04 Description:
None on record

01 [ ] V. Bottom Sealed 02 Date ______ 03 Agency ______
04 Description:
None on record

01 [ ] W. Gas Control 02 Date ______ 03 Agency ______
04 Description:
None on record

01 [ ] X. Fire Control 02 Date ______ 03 Agency ______
04 Description:
None on record

01 [ ] Y. Leachate Treatment 02 Date ______ 03 Agency ______
04 Description:
None on record

01 [ ] Z. Area Evacuated 02 Date ______ 03 Agency ______
04 Description:
None on record

01 [ ] 1. Access to Site Restricted 02 Date ______ 03 Agency ______
04 Description:
None on record

01 [ ] 2. Population Relocated 02 Date ______ 03 Agency ______
04 Description:
None on record

01 [ ] 3. Other Remedial Activities 02 Date ______ 03 Agency ______
04 Description:
None on record

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

NYSDEC 1987 Phase I Investigation
NYSDEC 1989 Phase II Work Plan
NUS Site Inspection 1983

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION **Draft**	
01 State	02 Site Number
NY	932076

II. ENFORCEMENT INFORMATION

01 Past Regulatory/Enforcement Action [x] Yes [ ] No

02 Description of Federal, State, Local Regulatory/Enforcement Action

EPA site inspection by NUS Corporation in 1983
NYSDEC Phase I Investigation by Wehran Engineering, P.C. completed in January 1987

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

NYSDEC files
DOH files

6

6. REFERENCES

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Appendices

APPENDIX A

SITE SPECIFIC HEALTH AND SAFETY PLAN AND DRILLING SITE SAFETY CHECKLIST

Draft

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SITE SAFETY PLAN

Version 988

A. GENERAL INFORMATION

Project Title: Town of Lewiston Landfill

Project No.: YQ-1000

TDD/Pan No.:

Project Manager: G. Florentino

Project Dir.: J. Griffis

Location(s): Near intersection of Harold and Pletcher Roads, Town of Lewiston, NY

Prepared by: G. Florentino

Date Prepared: 4/11/90

Approval by: G. Wunsten / Health/Safety Group

Date Approved: 4/20/90

Site Safety Officer Review: 9

Date Reviewed:

Scope/Objective of Work: Site reconnaissance and geophysical survey.

Proposed Date of Field Activities: Week ending 5/19/90

Background Info: Complete: [X] Preliminary (No analytical data available) [ ]

Documentation/Summary:

Overall Chemical Hazard:	Serious [ ] Low [ ]	Moderate [X] Unknown [ ]
Overall Physical Hazard	Serious [ ] Low [X]	Moderate [ ] Unknown [ ]

B. SITE/WASTE CHARACTERISTICS

Waste Type(s):

Liquid [ ]	Solid [X]	Sludge [ ]	Gas/Vapor [ ]

Characteristic(s):

Flammable/ Ignitable [ ]	Volatile [ ]	Corrosive [ ]	Acutely Toxic [X]
Explosive [ ]	Reactive [ ]	Carcinogen [ ]	Radioactive* [ ]

Other:

Physical Hazards:

Overhead [ ]	Confined* Space [ ]	Below Grade [ ]	Trip/Fall [X]
Puncture [X]	Burn [ ]	Cut [ ]	Splash [ ]
Noise [ ]	Other:		

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*Requires completion of additional form and special approval from the Corporate Health/Safety group. Contact RSC or HQ.

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Site History/Description and Unusual Features (see Sampling Plan for detailed description): Municipal Landfill, no known hazardous materials disposed on site other than broken battery casings. Inactive since 10/1/72, closed 8/25/79. Previously used by US Government possibly as TNT Manufacturing Facility.

Locations of Chemicals/Wastes: Landfilled wastes (buried in cells)

Estimated Volume of Chemicals/Wastes: unknown

Site Currently in Operation Yes: [ ] No: [X]

C. HAZARD EVALUATION

List Hazards by Task (i.e., drum sampling, drilling, etc.) and number them. (Task numbers are cross-referenced in Section D)

Physical Hazard Evaluation: Task 1. Site Reconnaissance

Task 2. Geophysical Survey

No physical hazards expected for either task other than trip/fall.

Chemical Hazard Evaluation:

Compound	PEL/TWA	Route of Exposure	Acute Symptoms	Odor Threshold	Odor Description
Heavy Metals					
(Sb, As, Cd, Cr,					
Cu, Pb, Hg, Ni,					
Zn, Fe)	(See Attached Hazard Evaluation Sheets)				

Note: Complete and attach a Hazard Evaluation Sheet for major known contaminant.

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D. SITE SAFETY WORK PLAN

Site Control: Attach map, use back of this page, or sketch of site showing hot zone, contamination reduction, zone, etc.

Perimeter identified? [Y] Site secured? [Y]

Work Areas Designated? [N] Zone(s) of Contamination Identified? [Y]

Personel Protection (TLD badges required for all field personnel):

Anticipated Level of Protection (Cross-reference task numbers to Section C):

	A	B	C	D
Task 1				X
Task 2				X
Task 3				
Task 4				

(Expand if necessary)

Modifications: Enter site in level D with adequate air monitoring crew should be prepared to upgrade to level C.

Action Levels for Excavation of Work Zone Pending Reassessment of Conditions:

- Level D: O_2 <19.5% or >25%, explosive atmosphere >10% LEL, organic vapors above background levels, particulates >_____ mg/m^3, other _______________.
- Level C: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapor (in breathing zone) >5 ppm, particulates >_____ mg/m^3, other ___________.
- Level B: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors (in breathing zone) >500 ppm, particulates >_____ mg/m^3, other _____________.
- Level A: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors >500 ppm, particulates >_____ mg/m^3, other _________.

Air Monitoring (daily calibration unless otherwise noted):

Contaminant of Interest	Type of Sample (area, personal)	Monitoring Equipment	Frequency of Sampling
Volatile Organics	Area	HNu 10.2eV	Continuous

(Expand if necessary)

Decontamination Solutions and Procedures for Equipment, Sampling Gear, etc.:

1. Scrub with brushes in TSP solution.
2. Rinse with deionized water.
3. Rinse with methanol, then air dry.
4. Triple rinse with deionized water.

* Note: Decon activities requiring solvent use necessitates wearing APR W/GMC-H cartridges, protective clothing, as well as impermeable gloves.

Personnel Decon Protocol: Following disposal of expendables, the crew will wash hand/face as soon as possible. Water, pump soap, and paper towels should be available at the hot line.

Decon Solution Monitoring Procedures, if Applicable: N/A

Special Site Equipment, Facilities, or Procedures (Sanitary Facilities and Lighting Must Meet 29 CFR 1910.120):

Where survey equipment etc. is to used, tripod ends will be polywrapped to avoid need for decon.

Site Entry Procedures and Special Considerations: None. Obtain permission to enter site from site owners.

Work Limitations (time of day, weather conditions, etc.) and Heat/Cold Stress Requirements:

Daylight, no work during thunderstorms; no intrusive or sampling activities permitted.

General Spill Control, if applicable: N/A

Investigation-Derived Material Disposal (i.e., expendables, decon waste, cuttings):

Expendbales will be doubled - bagged, labelled, and brought back to E & E's ASC for disposal. Determine, prior to commencement, what will be done with decon liquids.

Sample Handling Procedures Including Protective Wear:

No samples will be collected at this time.

Team Member*	Responsibility
G. Forentino	Team Leader
B. Meyers	Site Safety Officer

*All entries into exclusion zone require Buddy System use. All E & E field staff participate in medical monitoring program and have completed applicable training per 29 CFR 1910.120. Respiratory protection program meets requirements of 29 CFR 1910.134, and ANSI Z88.2 (1980).

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E. EMERGENCY INFORMATION

(Use supplemental sheets, if necessary) .

LOCAL RESOURCES

(Obtain a local telephone book from your hotel, if possible)

Ambulance 911

Hospital Emergency Room Mt. St. Mary's Hospital 716-297-4800

Poison Control Center Niagara County 716-278-4511

Police (include local, county sheriff, state) Niagara County Sheriff 716-439-9393

Fire Department 911

Airport N/A

Agency Contact (EPA, State, Local USCG, etc.) NYSDEC 518-457-9538 (Albany) Valarie Lauzze

Local Laboratory E & E ASC 4285 Genesse Street 716-631-0630

UPS/Fed. Express N/A

Client/EPA Contact

Site Contact Robert L. Wadlinger, Supervisor, Town of Lewiston 716-754-8213

SITE RESOURCES

Site Emergency Evacuation Alarm Method Blast Van Horn

Water Supply Source N/A

Telephone Location, Number N/A

Cellular Phone, if available N/A

Radio N/A

Other N/A

EMERGENCY CONTACTS

1. Dr. Raymond Harbison (Univ. of Florida) .... (501) 221-0465 or (904) 462-3277, 3281
   Alachua, Florida (501) 370-8263 (24 hours)
2. Ecology and Environment, Inc., Safety Director
   Paul Jonmaire .... (716) 684-8060 (office)
   (716) 655-1260 (home)
3. Regional Office Contact .... see above (home)
   (office)
4. FITOM, TATOM, or Office Manager .... N/A (home)

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MEDTOX HOTLINE

1. Twenty-four hour answering service: (501) 370-8263

   What to report:

   - State: "this is an emergency."
   - Your name, region, and site.
   - Telephone number to reach you.
   - Your location.
   - Name of person injured or exposed.
   - Nature of emergency.
   - Action taken.

2. A toxicologist, (Drs. Raymond Harbison or associate) will contact you. Repeat the information given to the answering service.

3. If a toxicologist does not return your call within 15 minutes, call the following persons in order until contact is made:

   a. **24 hour hotline - (716) 684-8940**
   b. Corporate Safety Director - Paul Jonmaire - home # (716) 655-1260
   c. Assistant Corp. Safety Officer - Steven Sherman - home # (716) 688-0084

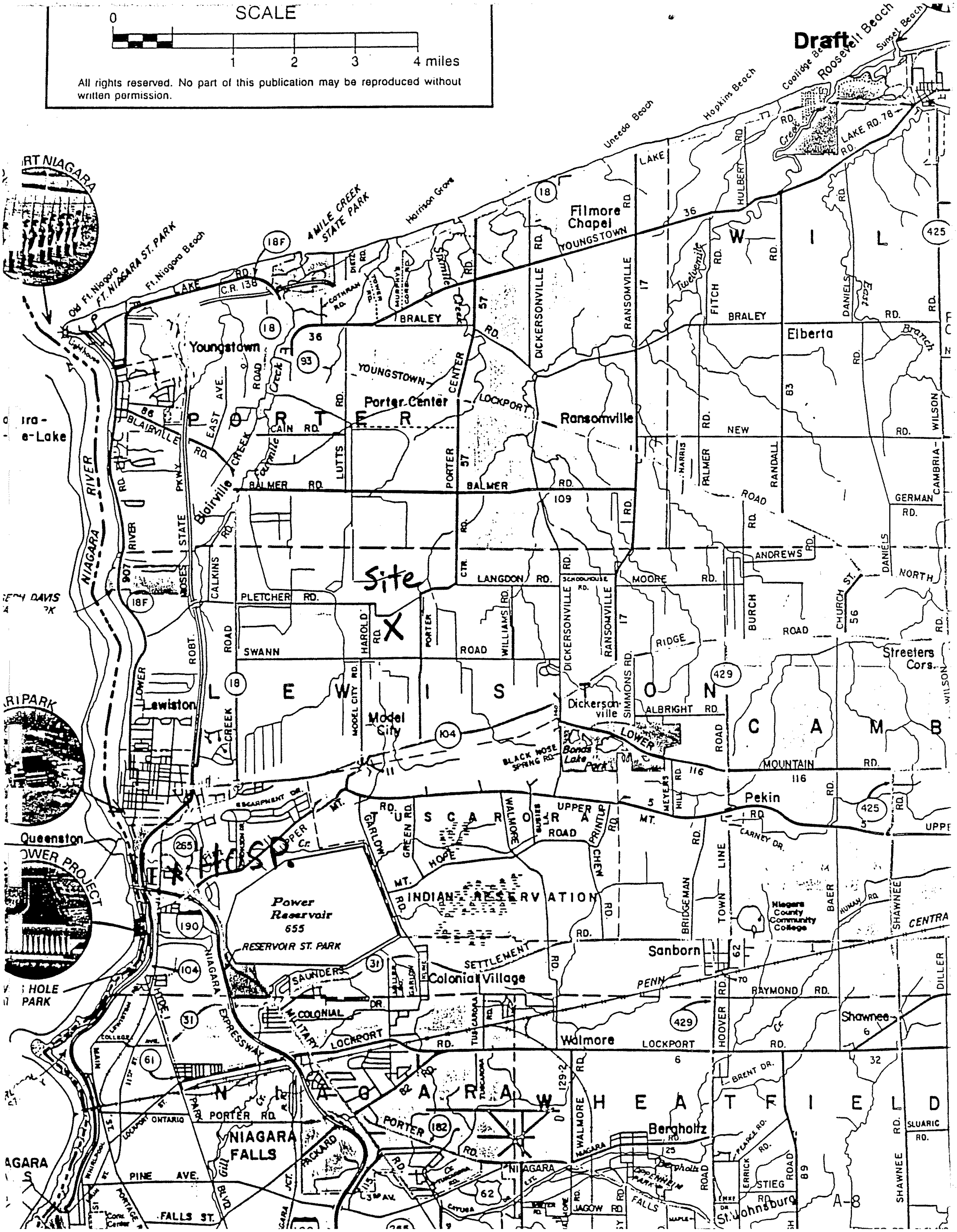
EMERGENCY ROUTES

(NOTE: Field Team must Know Route(s) Prior to Start of Work)

Directions to hospital (include map) Mt. St. Mary's Hospital: 5300 Military Road, Lewiston. Take Pletcher Road east to Creek Road (RT 18), turn left and head south to Rt. 104. Continue south on Rt. 18 (may also be called Rt. 104) to Military Road. Make left and hospital will be on right side.

Emergency Egress Routes to Get Off-Site

- -


SCALE
0
1
2
3
4 miles
Draft
Roosevelt Beach
Sunset Beach
Coolidge Beach
Hopkins Beach
Uneeda Beach
Harrison Grove
4 MILE CREEK STATE PARK
FT. NIAGARA ST. PARK
Ft. Niagara Beach
Old Ft. Niagara
Lighthouse
Youngstown
Porter Center
Ransomville
Filmore Chapel
Elberta
P O R T E R
W I L
L E W I S T O N
C A M B
T U S C A R O R A
INDIAN RESERVATION
N I A G A R A
W H E A T F I E L D
Lewiston
Model City
Dickersonville
Bonds Lake Park
Pekin
Streeters Cors.
Sanborn
Colonial Village
Walmore
Bergholtz
Shawnee
St. Johnsburg
NIAGARA FALLS
Queenston
POWER PROJECT
Power Reservoir 655
RESERVOIR ST. PARK
Niagara County Community College
NIAGARA RIVER
YOUNGSTOWN RD.
LOCKPORT RD.
BALMER RD.
LANGDON RD.
PLETCHER RD.
SWANN RD.
MOORE RD.
RIDGE ROAD
NEW RD.
BRALEY RD.
MOUNTAIN RD.
UPPER MT. RD.
LOWER MT. RD.
SAUNDERS SETTLEMENT RD.
PENN
RAYMOND RD.
PORTER RD.
PINE AVE.
FALLS ST.
NIAGARA FALLS BLVD.
EXPRESSWAY
18
18F
93
104
429
425
31
61
62
182
190
265
Site
X
Hosp.

F. EQUIPMENT CHECKLIST

PROTECTIVE GEAR

Level A	No.	Level B	No.
SCBA		SCBA	
SPARE AIR TANKS		SPARE AIR TANKS	
ENCAPSULATING SUIT (Type ______________)		PROTECTIVE COVERALL (Type ______________)	
SURGICAL GLOVES		RAIN SUIT	
NEOPRENE SAFETY BOOTS		BUTYL APRON	
BOOTIES		SURGICAL GLOVES	
GLOVES (Type __________________________)		GLOVES (Type _________________________)	
OUTER WORK GLOVES		OUTER WORK GLOVES	
HARD HAT		NEOPRENE SAFETY BOOTS	
CASCADE SYSTEM		BOOTIES	
5-MINUTE ESCAPE COOLING VEST		HARD HAT WITH FACE SHIELD	
		CASCADE SYSTEM	
		MANIFOLD SYSTEM	
Level C		Level D	
ULTRA-TWIN RESPIRATOR	X	ULTRA-TWIN RESPIRATOR (Available)	X
POWER AIR PURIFYING RESPIRATOR		CARTRIDGES (Type GMC-H)	X
CARTRIDGES (Type GMC-H)	X	5-MINUTE ESCAPE MASK (Available)	
5-MINUTE ESCAPE MASK		PROTECTIVE COVERALL (Type Tyvek)	X
PROTECTIVE COVERALL (Type Tyvek)	X	RAIN SUIT	X
RAIN SUIT	X	NEOPRENE SAFETY BONDS	
BUTYL APRON		BOOTIES	X
SURGICAL GLOVES	X	WORK GLOVES	X
GLOVES (Type __________________________)		HARD HAT WITH FACE SHIELD	
OUTER WORK GLOVES		SAFETY GLASSES	
NEOPRENE SAFETY BOOTS			
HARD HAT WITH FACE SHIELD			
BOOTIES	X		
HARDHAT			

INSTRUMENTATION	No.
OVA	
THERMAL DESORBER	
O2/EXPLOSIMETER W/CAL. KIT	
PHOTOVAC TIP	
HNu (Probe 10.2 ev)	X
MAGNETOMETER	
PIPE LOCATOR	
WEATHER STATION	
DRAEGER PUMP, TUBES ____________	
BRUNTON COMPASS	X
MONITOX CYANIDE	
HEAT STRESS MONITOR	
NOISE EQUIPMENT ______________	
PERSONAL SAMPLING PUMPS	
RADIATION EQUIPMENT	
DOCUMENTATION FORMS	
PORTABLE RATEMETER	
SCALER/RATEMETER	
NaI Probe	
ZnS Probe	
GM Pancake Probe	
GM Side Window Probe	
MICRO R METER	
ION CHAMBER	
ALERT DOSIMETER	
POCKET DOSIMETER	
FIRST AID EQUIPMENT	
FIRST AID KIT	X
OXYGEN ADMINISTRATOR	
STRETCHER	
PORTABLE EYE WASH	X
BLOOD PRESSURE MONITOR	
FIRE EXTINGUISHER	

DECON EQUIPMENT	No.
WASH TUBS	X
BUCKETS	X
SCRUB BRUSHES	X
PRESSURIZED SPRAYER	X
DETERGENT (Type TSP)	X
SOLVENT (Type Methanol)	X
PLASTIC SHEETING	
TARPS AND POLES	
TRASH BAGS	
TRASH CANS	X
MASKING TAPE	
DUCT TAPE	X
PAPER TOWELS	X
FACE MASK	
FACE MASK SANITIZER	
FOLDING CHAIRS	
STEP LADDERS	
DISTILLED WATER	X
SAMPLING EQUIPMENT	
8 OZ. BOTTLES	
HALF-GALLON BOTTLES	
VOA BOTTLES	
STRING	
HAND BAILERS	
THIEVING RODS WITH BULBS	
SPOONS	
KNIVES	
FILTER PAPER	
PERSONAL SAMPLING PUMP SUPPLIES	

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VAN EQUIPMENT	No.
TOOL KIT	X
HYDRAULIC JACK	
LUG WRENCH	
TOW CHAIN	
VAN CHECK OUT	
Gas	
Oil	
Antifreeze	
Battery	
Windshield Wash	
Tire Pressure	
MISCELLANEOUS	
PITCHER PUMP	
SURVEYOR'S TAPE	X
100 FIBERGLASS TAPE	
300 NYLON ROPE	
NYLON STRING	
SURVEYING FLAGS	X
FILM	X
WHEEL BARROW	
BUNG WRENCH	
SOIL AUGER	
PICK	
SHOVEL	
CATALYTIC HEATER	
PROPANE GAS	
BANNER TAPE	
SURVEYING METER STICK	
CHAINING PINS & RING	
TABLES	
WEATHER RADIO	
BINOCULARS	
MAGAPHONE	

MISCELLANEOUS (Cont.)	No.
SHIPPING EQUIPMENT	
COOLERS	
PAINT CANS WITH LIDS, 7 CLIPS EACH	
VERMICULITE	
SHIPPING LABELS	
DOT LABELS: "DANGER"	
"UP"	
"INSIDE CONTAINER COMPLIES ..."	
"HAZARD GROUP"	
STRAPPING TAPE	
BOTTLE LABELS	
BAGGIES	
CUSTODY SEALS	
CHAIN-OF-CUSTODY FORMS	
FEDERAL EXPRESS FORMS	
CLEAR PACKING TAPE	

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Antimony

Date 4/17/90

DOT Name/U.N. No. 2871

Job No. 9Q-1000

CAS Number 7440360

References Consulted (circle):

[✓ NIOSH/OSHA Pocket Guide] Verschueren Merck Index Hazardline Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other: SAX 6th. ed.

Chemical Properties: (Synonyms: Antimony Black, Antimony Regulus, Antymon)

Chemical Formula Sb

Molecular Weight 121.75

Physical State Silvery or gray lustrous metal

Solubility (H_2O) insol 18/100 g @20°C

Boiling Point 1635°

Flash Point NA

Vapor Pressure/Density 1mm @886°

Freezing Point 630°

Specific Gravity 6.684 @25°

Odor/Odor Threshold

Flammable Limits

Incompatabilities can react mod. to violently with NH_4 NO_3, hologens, Br N_3, Br N_3, Br F_3, ClO, ClF_3, HNO_3, KNO_3, KM_3O_4, K_2O_2, $NaNO_3$, oxidents

Biological Properties:

TLV-TWA 0.5 mg/m^3

PEL 0.3 mg/m^3

Odor Characteristic

IDLH 100 mg/m^3

Human

Aquatic

Rat/Mouse

Route of Exposure inhalation, skin and eye contact

Carcinogen

Teratogen

Mutagen

Handling Recommendations: (Personal protective measures)

Prevent skin and eye contact

Monitoring Recommendations:

Particulate filter; acid; atomic absorption spectrometry

Disposal/Waste Treatment:

Check with local POTW

Health Hazards and First Aid:

wash skin immediately with soap and water, flush eyes with large amounts of water.

Symptoms: Acute: irritation of nose, throat and mouth, cough, dizziness, headache, nausea, vomiting,

Chronic: diarrhea cramps, insomnia, anorexia, skin irritation, cardiac

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Arsenic
Date 4/17/90
DOT Name/U.N. No. 1556
Job No. YQ - 1000
CAS Number 7440382

References Consulted (circle):

NIOSH/OSHA Pocket Guide Verschueren Merck Index [✓ Hazardline] Chris (Vol. II)
Toxic and Hazardous Safety Manual ACGIH Other: SAX 6th ed., Codes of Fed. Reg., Si

Chemical Properties: (Synonyms: Grey arsenic, metallic aresenic, colloidal arsenic Arsenicals, Arsenic-75, Arsenic Black, Arsen)

Chemical Formula AS
Molecular Weight 74.92
Physical State silver to Black
Solubility (H_2O) insol
Boiling Point subl @612^0
Flash Point
Vapor Pressure/Density 1 mm @372^0
Freezing Point 814^0 A 36 atm
Black X-tals 5.724 @140
Specific Gravity Black arnor 4.7
Odor/Odor Threshold
Flammable Limits
Incompatabilities Bromide ozide, dirubidium, acetylide, hologens, pallodium, zinc, platinum, NCl$_3$, Ag NO$_3$, Cr O$_3$, NA$_2$ O$_2$, hexafluoro isopropyl ioeneamino lithium

Biological Properties:

TLV-TWA Air: 200 ug/m^3
PEL 10 ug/m^3
Odor Characteristic
IDLH Non-specified
Human
Aquatic
Rat/Mouse
Route of Exposure inhalation, absorption thru skin, skin and eye contact
Carcinogen X
Teratogen
Mutagen X

Handling Recommendations: (Personal protective measures)

Avoid any possible contact with skin and eyes.

Monitoring Recommendations:

Filters, atomic absorption spectrometry

Disposal/Waste Treatment:

RCRA HW D004 max conc. 5.0 mg/l
Check with local POTW

Health Hazards and First Aid:

Wash skin immediately with soap and water; flush eyes for 15 min with water

Symptoms: Acute: Ulceration of nasal septum, dermatitis; gastrointestinal disturbances, peripherol neuropathy

Chronic: respiratory irration, hyperemic pigmentation of skin

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Cadmium

Date 4/17/90

DOT Name/U.N. No. 2570

Job No. YQ-1000

CAS Number 7440439

References Consulted (circle):

[✓ NIOSH/OSHA Pocket Guide] Verschueren Merck Index Hazardline Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other: Codes of Fed. Reg., SAX 6th ed.

Chemical Properties: (Synonyms: None)

Chemical Formula Cd

Molecular Weight 112.40

Physical State Silver-white

Solubility (H_2O)

Boiling Point 767 ± 2^0

Flash Point

Vapor Pressure/Density $1mm\ @394^0$

Freezing Point 320.9^0

Specific Gravity 8.642

Odor/Odor Threshold

Flammable Limits

Incompatabilities Strong oxidizers, elemental sulfur, selenium, tellerium

Biological Properties:

TLV-TWA $0.05\ mg/m^3$

PEL $0.2\ mg/m^3$

Odor Characteristic

IDLH $40\ mg.m^3$

Human

Aquatic

Rat/Mouse

Route of Exposure inhalation, skin

Carcinogen exper

Teratogen exper

Mutagen

Handling Recommendations: (Personal protective measures)

avoid contact with skin and eyes

Monitoring Recommendations:

particulate filter; acid; atomic absorption spectrometry

Disposal/Waste Treatment:

RCRA HW D006 max cone 1.0 mg/l

Check with local POTW for low conc.

Health Hazards and First Aid:

soap wash

flush eyes immediately with water

Symptoms: Acute: pulmonary edema, dysnea, cough, tight chest, substernal pain, headache, chills, muscular aches,

Chronic: nausea, diarrhea, anosmia, emphysema, protemuria,

anemia

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Chromium

Date 4/17/90

DOT Name/U.N. No.

Job No. YQ-1000

CAS Number 7440-47-3

References Consulted (circle):

[✓ NIOSH/OSHA Pocket Guide] Verschueren Merck Index [✓ Hazardline] Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other: codes of Fed. Reg.

OH505000

Chemical Properties: (Synonyms: Chrome, ASTM 1481, Chromium metal)

Chemical Formula Cr

Molecular Weight 52

Physical State steel gray, lustrous hard, brittle

Solubility (H_2O) insol 1g/100 H_2O @20°C

Boiling Point 4784°

Flash Point auteign 752°F

Vapor Pressure/Density 0.10 mm

Freezing Point 3452°

Specific Gravity 7.14

Odor/Odor Threshold

Flammable Limits

Incompatabilities strong oxidizers, acids, strong alkalies, metal in powdered form is explosive

Biological Properties:

TLV-TWA 0.5 mg/m^3

PEL 1.0 mg/m^3

Odor Characteristic

IDLH 500 mg/m^3

Human

Aquatic

Rat/Mouse

Route of Exposure inhalation, skin or eye contact (depends on oxidation state)

Carcinogen indef (animal)

Teratogen

Mutagen

Handling Recommendations: (Personal protective measures)

Prevent repeated or prolonged skin contact: wear impervious clothing, gloves, and faceshield

Monitoring Recommendations:

particulate filter; acid, atomic absorption spectrometry or Ion exchange chromotography

Disposal/Waste Treatment:

RCRA HW D007 max conc. 5.0 mg/l

check with local POTW for low conc.

Health Hazards and First Aid:

wash skin immediately with soap or mild detergent and water

wash eyes immediate with large amounts of water

Symptoms: Acute: respiratory irration, dermatitis, eczema, dizziness, vomiting, protemuria, hematuria, oliguria, anuria, uremia, shock

Chronic:

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Copper

Date 4/17/90

DOT Name/U.N. No.

Job No. YQ-1000

CAS Number 7440-50-8

References Consulted (circle):

[✓ NIOSH/OSHA Pocket Guide] Verschueren Merck Index Hazardline Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other:

Chemical Properties: (Synonyms: none)

Chemical Formula Cu

Molecular Weight

Physical State odorless solids

Solubility (H_2O)

Boiling Point

Flash Point

Vapor Pressure/Density

Freezing Point

Specific Gravity

Odor/Odor Threshold

Flammable Limits

Incompatabilities Acetylene gas, magnesium metal

Biological Properties:

TLV-TWA 1 mg/m^3

PEL 1 mg/m^3

Odor Characteristic

IDLH NA

Human

Aquatic

Rat/Mouse

Route of Exposure inhalation, skin and eye contact

Carcinogen

Teratogen

Mutagen

Handling Recommendations: (Personal protective measures)

Prevent repeated prolonged exposure to skin

Protect eyes

Monitoring Recommendations:

particulate filter; acid; atomic absorption spectrometry

Disposal/Waste Treatment:

Check with local POTW

Health Hazards and First Aid:

Wash skin promptly with sopa and water

flush eyes immediately with large amounts of water

Symptoms: Acute: irritation of mucus membrane and phorynx,

nasal perforation, eye irritant, metal taste, dermatitis

Chronic:

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Lead

Date 4/17/90

DOT Name/U.N. No. 2291

Job No. 90 - 1000

CAS Number 7439-92-1

References Consulted (circle):

[✓ NIOSH/OSHA Pocket Guide] Verschueren Merck Index [✓ Hazardline] Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other: Codes of Fed. Reg.

Lead flake, KS-4, Lead S2, SI, Plumbum, OH 512510

Chemical Properties: (Synonyms: White lead, C.I., pigment metal 4, C.I. 77575

Chemical Formula Pb

Molecular Weight 207.19

Physical State bluish-white silver gray metal

Solubility (H_2O) insol 1g/100 @20°C

Boiling Point 3164°

Flash Point incombust.

Vapor Pressure/Density 0.00mm

Freezing Point 622°

Specific Gravity 11.3437@61°

Odor/Odor Threshold

Flammable Limits

Incompatabilities Strong oxidizers, peroxides, active metals, sodium, potassium

Biological Properties:

TLV-TWA 0.15 mg/m^3

PEL 0.05 mg/m^3 OSHA

Odor Characteristic

IDLH non-specified

Human

Aquatic

Rat/Mouse

Route of Exposure inhalation, ingestion, (skin only for organic compound)

Carcinogen indef. (animal)

Teratogen

Mutagen

Handling Recommendations: (Personal protective measures)

coveralls, gloves, hats, face shields, goggles

Monitoring Recommendations:

particulate filter; HNO3; atomic absoprtion, spectrometry or ion exchange chromotography

Disposal/Waste Treatment:

RCRA HW D008 max, conc. 5,0 mg/1

check with local POTW for low conc.

Health Hazards and First Aid:

Wash skin immediately with sopa or mild detergent, wash eyes with large amounts of water

Symptoms: Acute: sperm count depression, insomnia, headache, optic neuritis, constipation, abdominal pain, vomiting, diarrhea

Chronic: weight loss, anemia, encepholopathy, cranial nerve paralysis convulsions, visual disturbance, muscular atrophy.

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Mercury

Date 9/17/90

DOT Name/U.N. No. 2809

Job No. YQ-1022

CAS Number 7439-97-6

References Consulted (circle):

[✓ NIOSH/OSHA Pocket Guide] Verschueren Merck Index [✓ Hazardline] Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other: Codes of Fed. Reg.

NA2809, Colloidal mercury, NCIC 60399, OH5 14020

Chemical Properties: (Synonyms: metallic mercury, inorganic mercury, quicksilver

Chemical Formula Hg

Molecular Weight 201

Physical State Silvery-white heavy, mobile liquid metal

Solubility (H_2O) insol, 1g/100 @20°C

Boiling Point 674°

Flash Point non-flam

Vapor Pressure/Density .0012@20°C

Freezing Point -38°

Specific Gravity 13.5939

Odor/Odor Threshold

Flammable Limits

Incompatabilities acetylene gas, ammonia

Biological Properties:

TLV-TWA 0.05 mg/m^3

NIOSH PEL 0.1. mg/m^3

Odor Characteristic

IDLH 28 mg/m^3

Human

Aquatic

Rat/Mouse

Route of Exposure inhalation, skin eye contact, skin absorption

Carcinogen indef. in animals

Teratogen

Mutagen

Handling Recommendations: (Personal protective measures)

Prevent skin contac; wear impervious clothing, gloves, faceshield, and goggles to prevent eye contact

Monitoring Recommendations:

Adsorption tube; thermal desopr; atomic absorption spectrometry

Disposal/Waste Treatment:

RCRA HW D009 max. conc. 0.2. mg/l

check with local POTW for low conc.

Health Hazards and First Aid:

Primary skin irritant and sensitizer, nephrotoxix, and meurotoxin wash from skin and eyes promptly if contaminated

Symptoms:

Acute: metallic taste, thirst, abdominal pain, vomiting, and bloody diarrhea. Inhalation--dyspnea, cough, stomatitis, salivation

Chronic: pulmonary disturbances, anuria, skin disorders, anemia leukopenia, liver damage, loosening of teeth, peripherial peripherial neuropathy weight loss, and nephritis

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Nickel

Date 4/17/90

DOT Name/U.N. No. 1378

Job No. VQ-1020

CAS Number 7440020

References Consulted (circle):

[✓ NIOSH/OSHA Pocket Guide] Verschueren Merck Index [✓ Hazardline] Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other: SAX 6th. ed.

Chemical Properties: (Synonyms: Nickel sponge, pulverized nickel, raney alloy, CI.77775, Nickel catalyst, wet (DOT), nickel)

Chemical Formula NI

Molecular Weight 58.71

Physical State Silver-gray powder

Solubility (H_2O) insol 1g/@200° 100g H20

Boiling Point 2730°

Flash Point

Vapor Pressure/Density 1mm@1810°

Freezing Point 1455°

Specific Gravity 8.90A25°

Odor/Odor Threshold

Flammable Limits

Incompatibilities Aluminum, aluminum trichloride, ethylene, p-dioxan, wood hydrogen, methanol, non-mentals, oxidants, sulfur, compounds, $Ni (NO_3)_2$

Biological Properties:

TLV-TWA 1 mg/m3

PEL 1 mg/m3

Odor Characteristic

IDLH NA

Human

Aquatic

Rat/Mouse

Route of Exposure inhalation, skin absorption, eye contact

Carcinogen X (refining)

Teratogen

Mutagen

Handling Recommendations: (Personal protective measures)

Prevent skin contact: wear impervous clothing, gloves, faceshield, goggles

Monitoring Recommendations:

Particulate filter; acid; atomic absorption spectrometry

Disposal/Waste Treatment:

Check with local POTW

Health Hazards and First Aid:

Wash skin immediately with soap or mild detergent

wash eyes with large amount of water

Symptoms: Acute: dermatitis, asthma, skin sensitivity, diarrhea, nausea, vomiting,

Chronic: Pulmonary/Respiration: hermorrhage, inflamation, edema, and cancer, Paranal sinus cancer

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Zinc

Date 4/17/90

DOT Name/U.N. No. 1383

Job No. YQ-1000

CAS Number 7440-66-6

References Consulted (circle):

NIOSH/OSHA Pocket Guide Verschueren Merck Index [✓ Hazardline] Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other: SAX 6th. ed.

Chemical Properties: (Synonyms: Emanoy zinc dust, UN1436, Zinc dust, jasad, zinc powder, asarco 215, C.I. 77945, C.I. pigment black 16 ~~C.I. pigment metal~~

Chemical Formula Zn Molecular Weight 65.37

Physical State Blue Powder Solubility (H_2O) insol 1g/100g @20°C H_2O Boiling Point 908°

Flash Point nonflam Vapor Pressure/Density 1 mm @487° Freezing Point 419.8°

Specific Gravity 7.14@25° Odor/Odor Threshold ______ Flammable Limits ______

Incompatabilities thermal decomposition products are hazardous, NH NO^3, Ba O_2 $Ba(NO_3)_2$, Cd, CS_2, ClF, CrO_3, F_2, hydrazine menonitrate, hydroxylamine, Pb $(N_3)_2$, Mn Cl_2, HNO_3, perfomic acid, $KClO_3$, K_2O_2, NaO_2, S, Te, H2O, AS2O3

Biological Properties:

TLV-TWA 5 mg/m^3 PEL ______ Odor Characteristic ______

IDLH NA Human ______ Aquatic ______ Rat/Mouse ______

Route of Exposure ______

Carcinogen ______ Teratogen ______ Mutagen ______

Handling Recommendations: (Personal protective measures)

wear impervious clothing, gloves, faceshield

Monitoring Recommendations:

filter, atomic absorption spectrometry

Disposal/Waste Treatment:

contact local POTW

Health Hazards and First Aid:

zinc fumes cause metal-fume fever, Fumes from soluble zinc salts may cause pulmonary edema, with cyanosis and dyspnea, wash eyes with water, wash skin w/soap

Symptoms: Acute: fever, chills, nausea and vomiting, muscualr arches and weakness, skin irritation, throat, cough, abdominal cramps, diarrhea, tremors, hypothermai, headache, metallic taste

Chronic:

DRILLING SITE SAFETY CHECKLIST

- All E&E drilling personnel will have read and understood the terms of E&E drilling SOP.

- Daily inspection of rig and components - obvious or questionable safety conditions will be cause for work interruption.

- Only approved drillers will remain in proximity to borehole during drilling and in any event, an approximate 4' x 8' super exclusion area will be in place around moving auger. No personnel will enter this zone while drilling is ongoing.

- Continuous O_2/explosimeter monitoring at borehole using remote sampling hose.

- All field team members will be briefed on planned drilling operations and possible problems before work commences on day one. All will be shown location and operation of "kill switches". These switches will be operationally checked each morning.

- Fire extinguisher(s) will be staged next to rig before drilling/refueling operations.

- Welding/cutting activities will only be performed at a distance from ignition sources approved as safe by the Site Safety Officer (SSO), Team Leader.

- Appropriate personnel protective equipment (based on hazards associated with assumed well contaminants) will be worn as directed by the SSO and terms of the site safety plan. As a minimum, steel-toed boots, hard-hats, and face shields will be worn during any active drilling.

- Outrigger stabilizers must be in place before drilling commences. The rig must also be leveled.

- Drill rig boom must be horizontal during movement of rig. It will not be erected within 25 feet of overhead lines.

- Electrical storms within earshot of the job site will be cause for work termination until deemed safe by the SSO and Team Leader.

- Where underground utilities are suspected in a vacinity of operations, the local utilities shall be contacted. Where utilities are identified, they shall be marked using flags.

- Where buried drums, etc. are suspected, a full survey of drilling zone is required using appropriate instrumentation prior to ground breaking.

DRILLING SITE SAFETY CHECKLIST continued:

- Only trained, experienced staff will operate the cathead. Personnel must be knowledgeable in safe good practive procedures for cathead use.
- Only properly licensed staff will drive the drill rig. A daily safety check of the vehicle will be carried out by the driver, per E&E protocol.
- Climbing on vertical boom is not permitted by E&E staff.

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APPENDIX B

PHOTOGRAPHIC LOGS

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill E & E Job No.: YQ-1030

Camera: Make Kodak Fling SN: N/A

Photographer: Gene Florentino, E & E Date/Time: 5/22/90

Lens: Type Single Reflex SN: N/A Frame No.: 1-10

Comments: View to north of GW-3A/3B grid near northeast corner of site.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ-1030

Camera: Make Kodak Fling

SN: N/A

Photographer: Gene Florentino, E & E

Date/Time: 5/22/90

Lens: Type Single Reflex

SN: N/A

Frame No.: 1-11

Comments: View to west of mulch piles in northeast corner of site.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill E & E Job No.: YQ-1030

Camera: Make Kodak Fling SN: N/A

Photographer: Gene Florentino, E & E Date/Time: 5/22/90

Lens: Type Single Reflex SN: N/A Frame No.: 1-12

Comments: View to south of GW2A/2B grid.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ-1030

Camera: Make Kodak Fling

SN: N/A

Photographer: Gene Florentino, E & E

Date/Time: 5/22/90

Lens: Type Single Reflex

SN: N/A

Frame No.: 1-13

Comments: View of battery casing pile.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill E & E Job No.: YQ-1030

Camera: Make Kodak Fling SN: N/A

Photographer: Gene Florentino, E & E Date/Time: 5/22/90

Lens: Type Single Reflex SN: N/A Frame No.: 1-14

Comments: View to south of battery casing pile.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ-1030

Camera: Make Kodak Fling

SN: N/A

Photographer: Gene Florentino, E & E

Date/Time: 5/22/90

Lens: Type Single Reflex

SN: N/A

Frame No.: 1-15

Comments: View to north of battery casing pile.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ-1030

Camera: Make Kodak Fling

SN: N/A

Photographer: Gene Florentino, E & E

Date/Time: 5/22/90

Lens: Type Single Reflex

SN: N/A

Frame No.: 1-16

Comments: View to west of GW-4A/4B grid area.

02[UZ]YQ1080:D3167/3905

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill E & E Job No.: YQ-1030

Camera: Make Kodak Fling SN: N/A

Photographer: Gene Florentino, E & E Date/Time: 5/22/90

Lens: Type Single Reflex SN: N/A Frame No.: 1-17

Comments: View to north of mulch area.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ-1030

Camera: Make Kodak Fling

SN: N/A

Photographer: Gene Florentino, E & E

Date/Time: 5/22/90

Lens: Type Single Reflex

SN: N/A

Frame No.: 1-18

Comments: View to northeast along access road.

02[UZ]YQ1080:D3167/3905

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ-1030

Camera: Make Kodak Fling

SN: N/A

Photographer: Gene Florentino, E & E

Date/Time: 5/22/90

Lens: Type Single Reflex

SN: N/A

Frame No.: 1-19

Comments: View to east of gas pipeline.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill E & E Job No.: YQ-1030

Camera: Make Kodak Fling SN: N/A

Photographer: Gene Florentino, E & E Date/Time: 5/22/90

Lens: Type Single Reflex SN: N/A Frame No.: 1-20

Comments: View to west from ballast-covered road of gas pipeline.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ-1030

Camera: Make Kodak Fling

SN: N/A

Photographer: Gene Florentino, E & E

Date/Time: 5/22/90

Lens: Type Single Reflex

SN: N/A

Frame No.: 1-21

Comments: View to north of slag berm in northwest corner of facility.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ-1030

Camera: Make Kodak Fling

SN: N/A

Photographer: Gene Florentino, E & E

Date/Time: 5/22/90

Lens: Type Single Reflex

SN: N/A

Frame No.: 1-22

Comments: View to west of northern border.

02[UZ]YQ1080:D3167/3909

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ-1030

Camera: Make Kodak Fling

SN: N/A

Photographer: Gene Florentino, E & E

Date/Time: 5/22/90

Lens: Type Single Reflex

SN: N/A

Frame No.: 1-23

Comments: View to east of northern border.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ-1030

Camera: Make Kodak Fling

SN: N/A

Photographer: Gene Florentino, E & E

Date/Time: 5/22/90

Lens: Type Single Reflex

SN: N/A

Frame No.: 1-24

Comments: View to west of GW 1A/1B grid area.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

Date/Time: 7/18/90 1300

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-1

Comments: American Auger ATV drill rig on GW-1B looking northwest toward Harold Road.

02[UZ]YQ1080:D3167/3910

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

Date/Time: 7/18/90 1346

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-2

Comments: Boring Number: GW-1B. Split Spoon Run 11: 26.0-28.0 0.45'/2.0 recovery. This split spoon penetrated bedrock (The Queenston Shale).

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

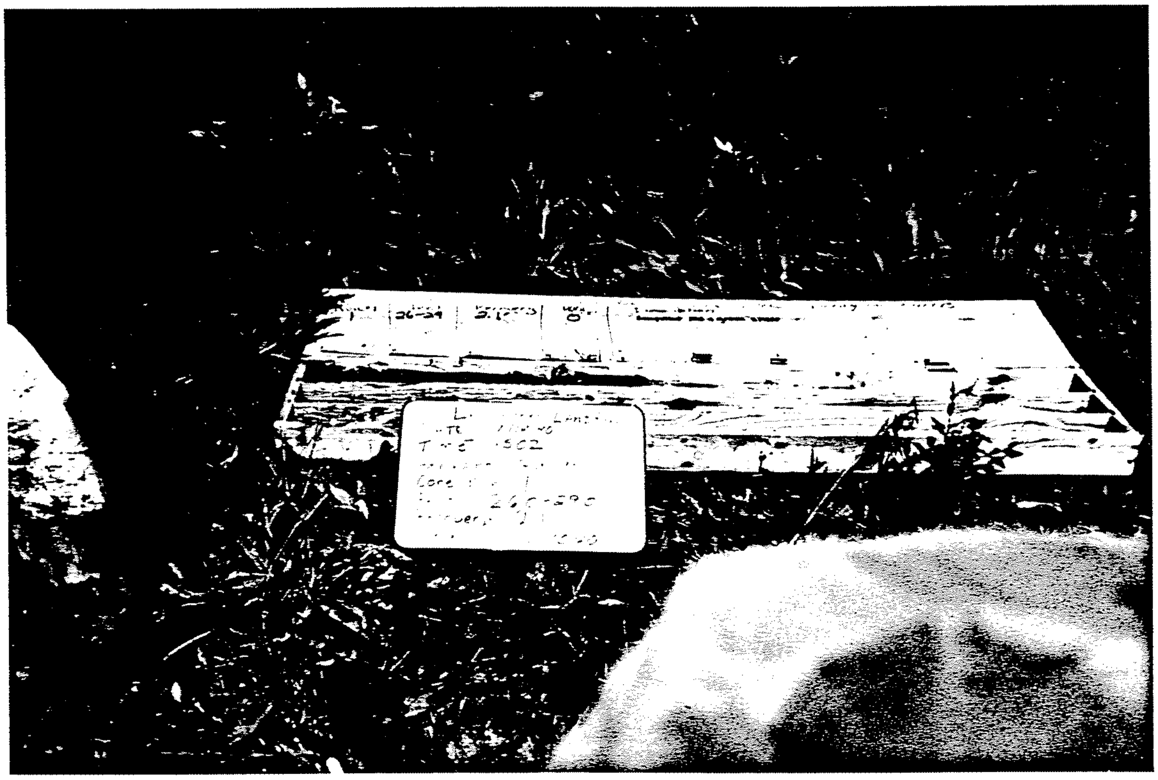
Date/Time: 7/18/90 1502

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-3

Comments: Boring Number: GW-1B. Core Run 1: 26.0-29.0 2.1'/3.0 recovery. RQD = 0. This shale exhibited many zones of weakness. The green section showed multiple zones of clay, which is an indication of the presence of groundwater.



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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

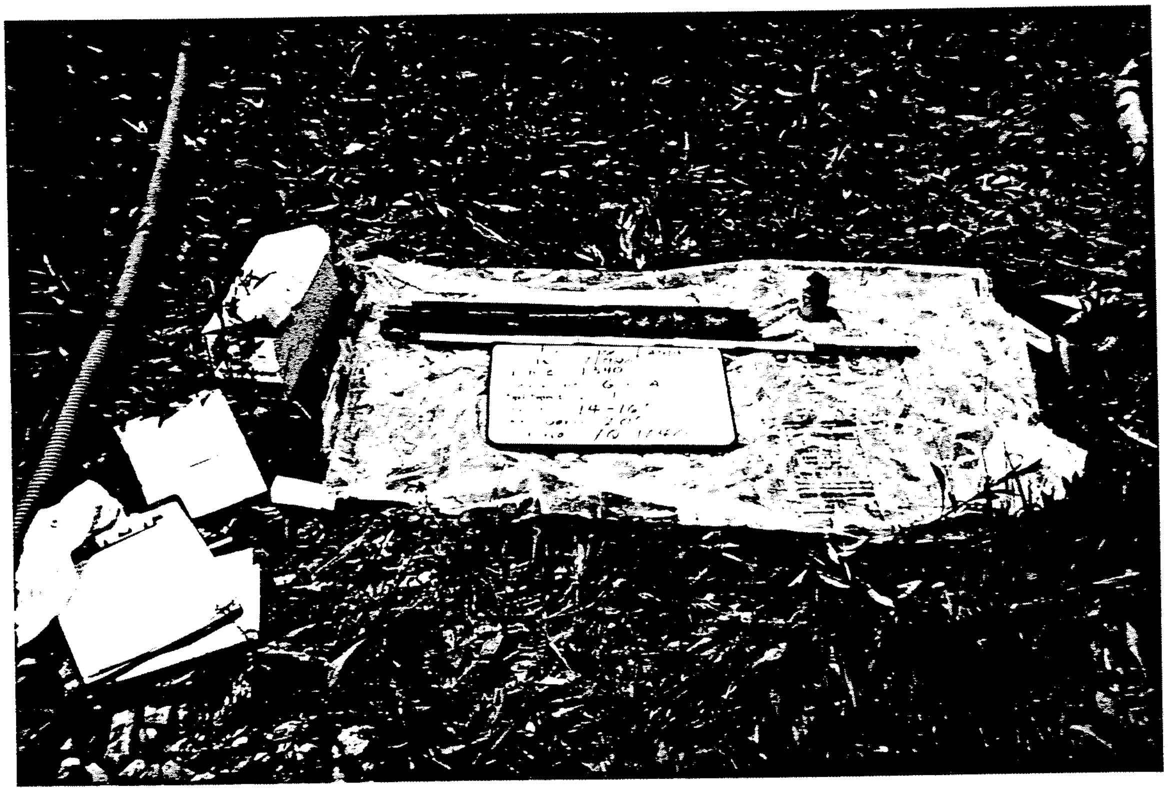
Date/Time: 7/18/90 1346

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-4

Comments: Boring Number: GW-1A. Split Spoon Run 1: 14.0-16.0 2.0'/2.0' recovery.



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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

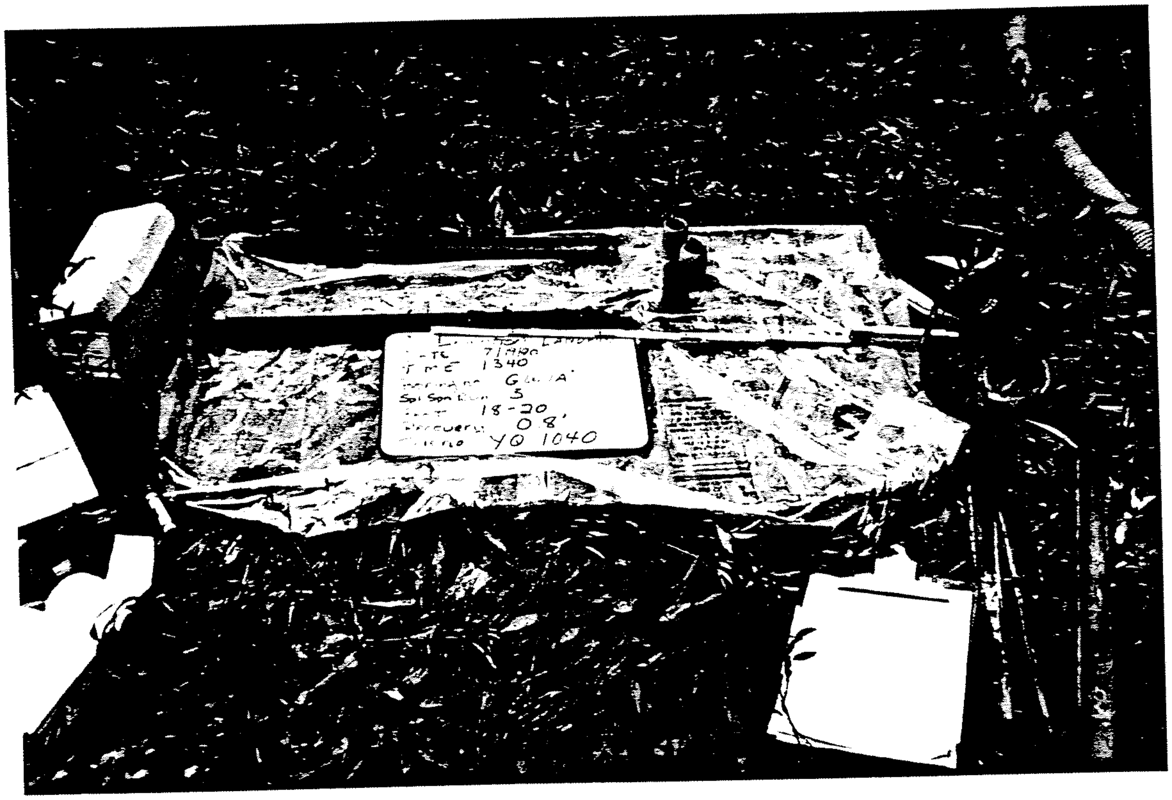
Date/Time: 7/19/90 1351

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-5

Comments: Boring Number: GW-1A. Split Spoon Run 3: 18.0-20.0 0.8'/2.0' recovery. This split spoon penetrated the lower aquaclude (till).



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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

Date/Time: 7/19/90 1531

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-6

Comments: Boring Number: GW-1A. Tremie of bentonite seal.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

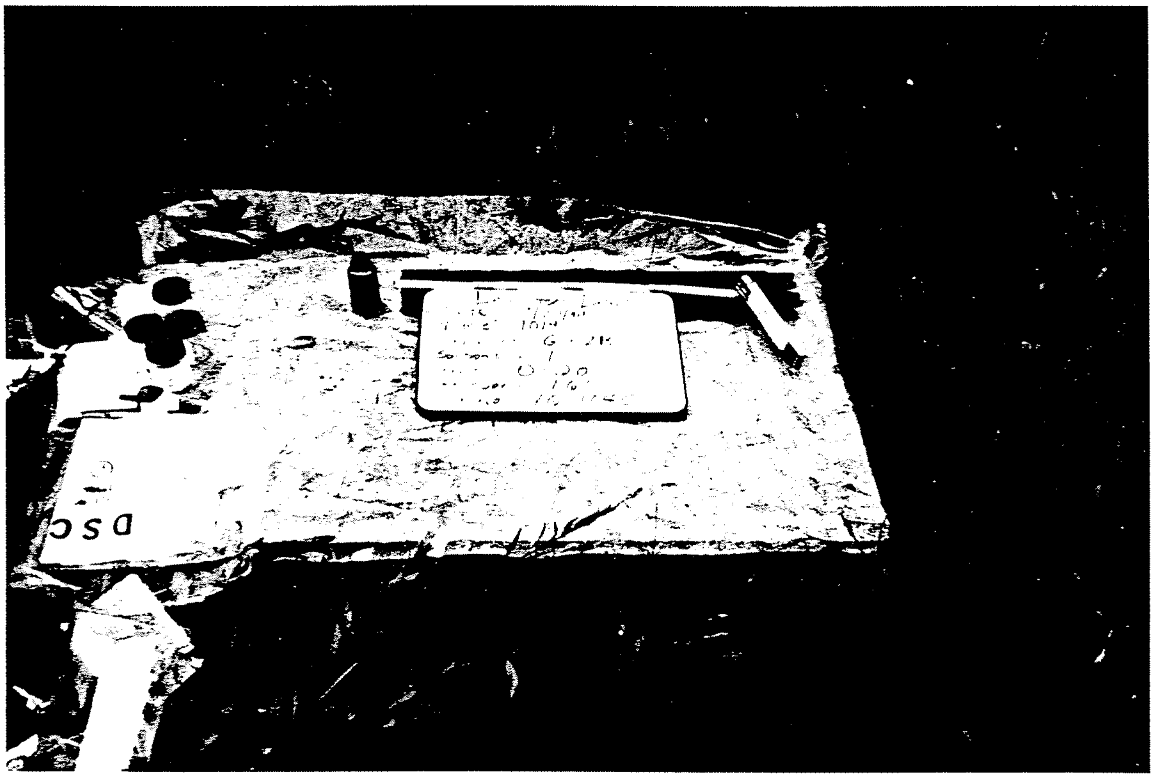
Date/Time: 7/20/90 1019

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-7

Comments: Boring Number: GW-2B. Split Spoon Run 1: 0.0-2.0 1.6'/2.0' recovery. NOTE: Heavy rains throughout the day.



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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

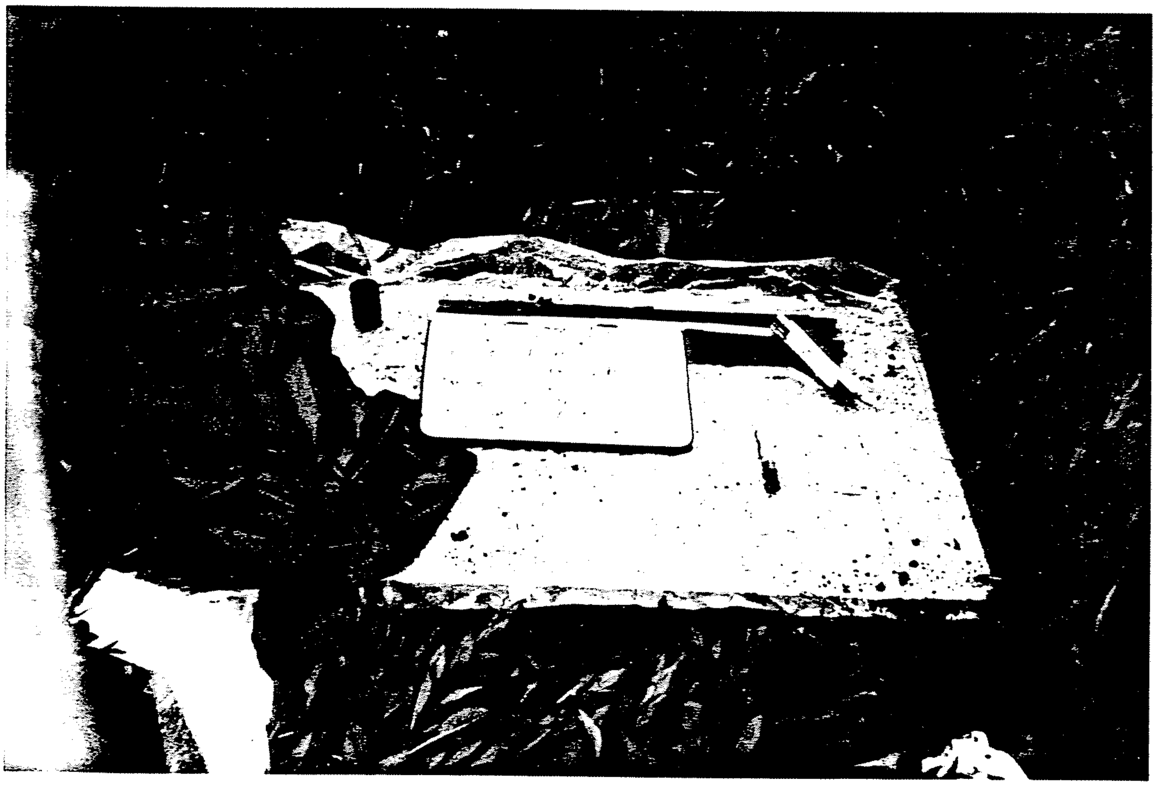
Date/Time: 7/20/90 1031

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-8

Comments: Boring Number: GW-2B. Split Spoon Run 2: 2.0-4.0 1.25'/2.0' recovery.



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PHOTOGRAPHIC RECORD

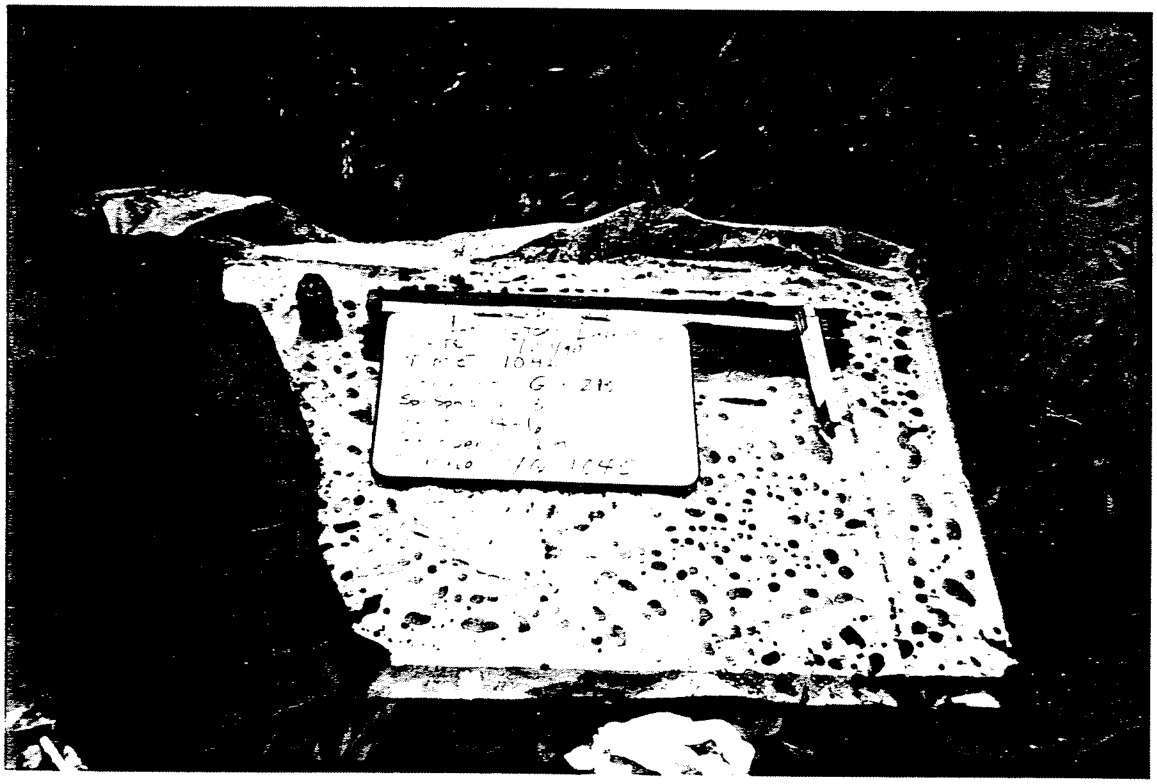
Client: NYSDEC Phase II Lewiston Landfill E & E Job No.: YQ1040

Camera: Make Kodak Fling SN:

Photographer: Carol Waddell, E & E Date/Time: 7/20/90 1042

Lens: Type Single Reflex SN: Frame No.: Roll 2-9

Comments: Boring Number: GW-2B. Split Spoon Run 3: 4.0-6.0 2.0'/2.0' recovery.



ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

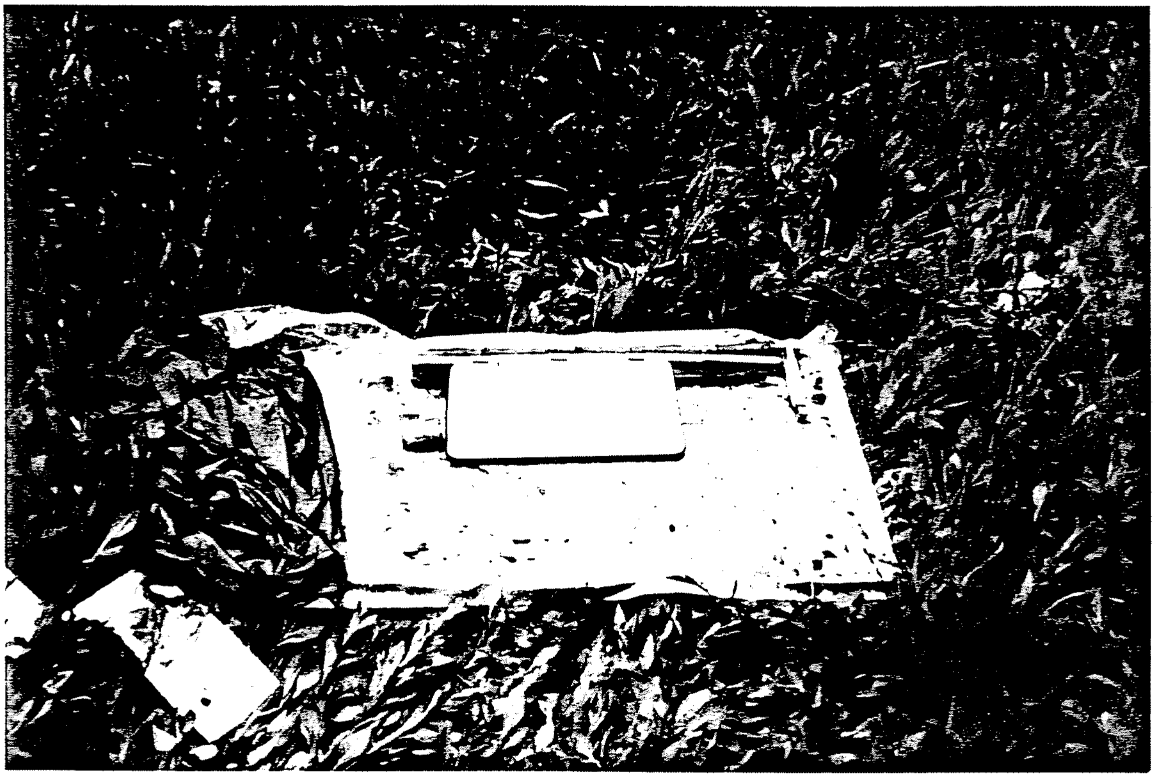
Date/Time: 7/20/90 1050

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-10

Comments: Boring Number: GW-2B. Split Spoon Run 4: 6.0-8.0 2.3'/2.0' recovery.



Draft

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

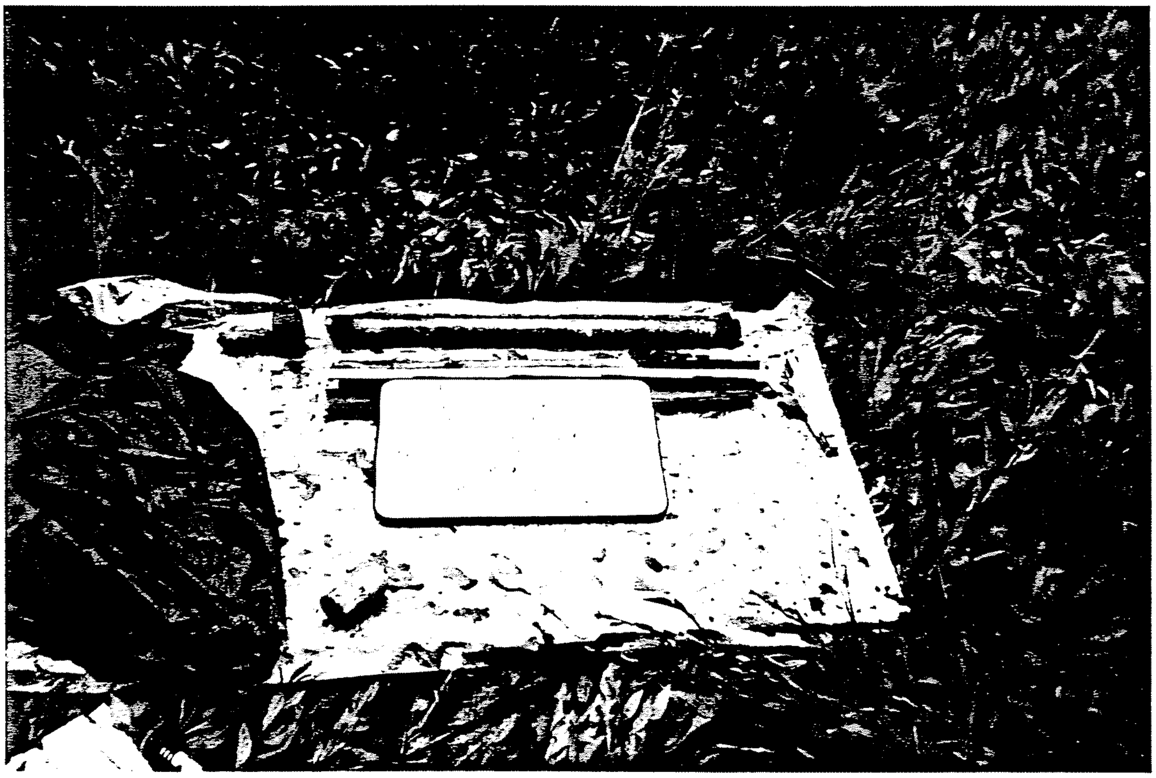
Date/Time: 7/20/90 1059

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-11

Comments: Boring Number: GW-2B. Split Spoon Run 5: 8.0-10.0 1.65'/2.0' recovery.



Draft

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

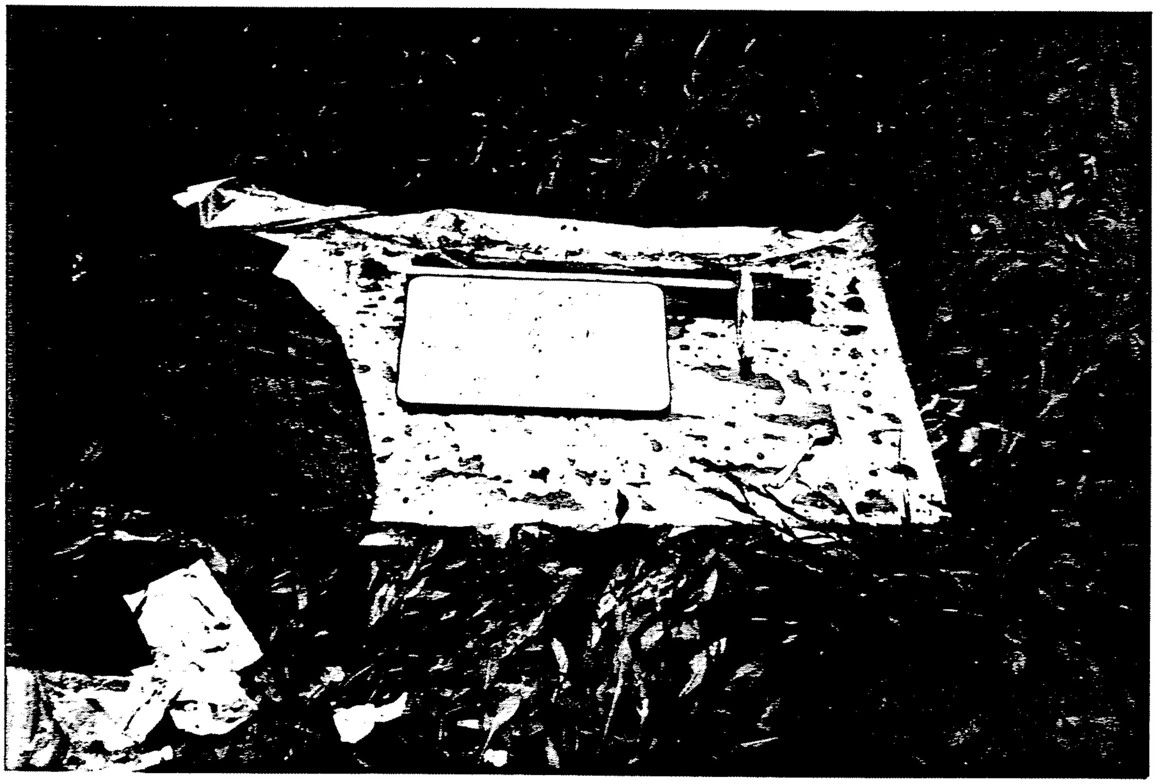
Date/Time: 7/20/90 1106

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-12

Comments: Boring Number: GW-2B. Split Spoon Run 6: 10.0-12.0 1.3'/2.0' recovery.



Draft

ecology and environment, inc.

PHOTOGRAPHIC RECORD

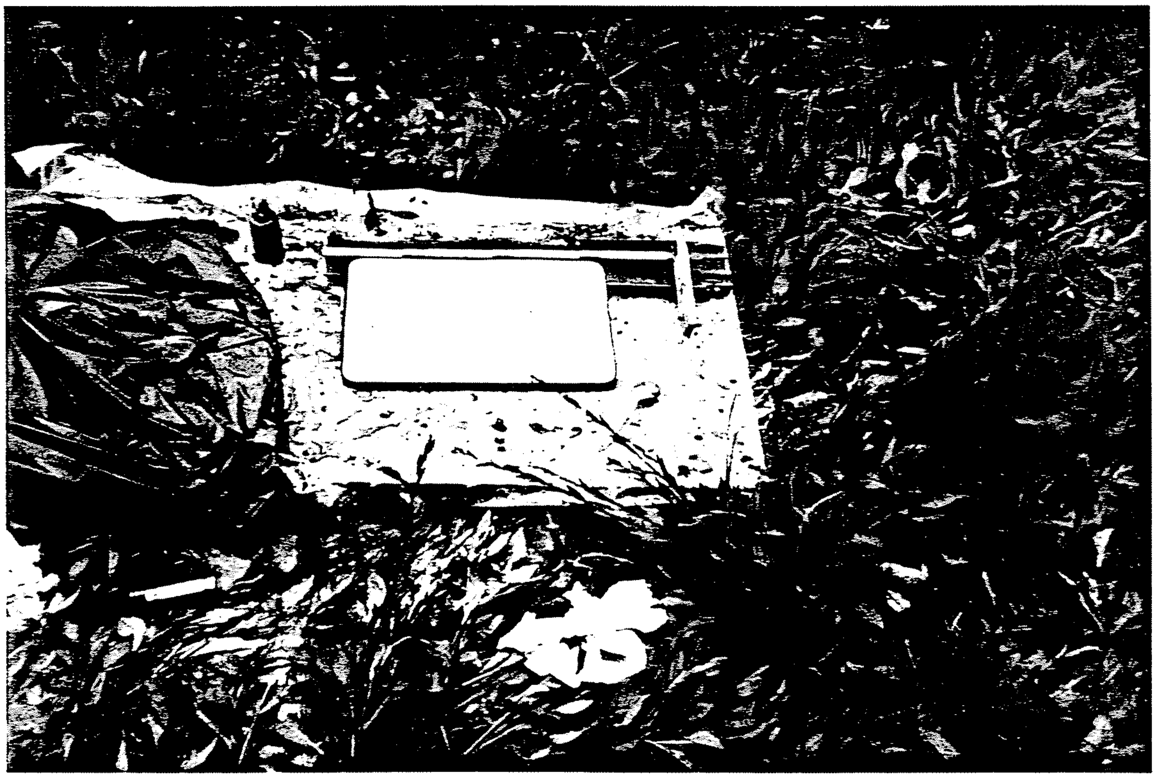
Client: NYSDEC Phase II Lewiston Landfill E & E Job No.: YQ1040

Camera: Make Kodak Fling SN:

Photographer: Carol Waddell, E & E Date/Time: 7/20/90 1114

Lens: Type Single Reflex SN: Frame No.: Roll 2-13

Comments: Boring Number: GW-2B. Split Spoon Run 7: 12.0-14.0 1.9'/2.0' recovery.



Draft

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

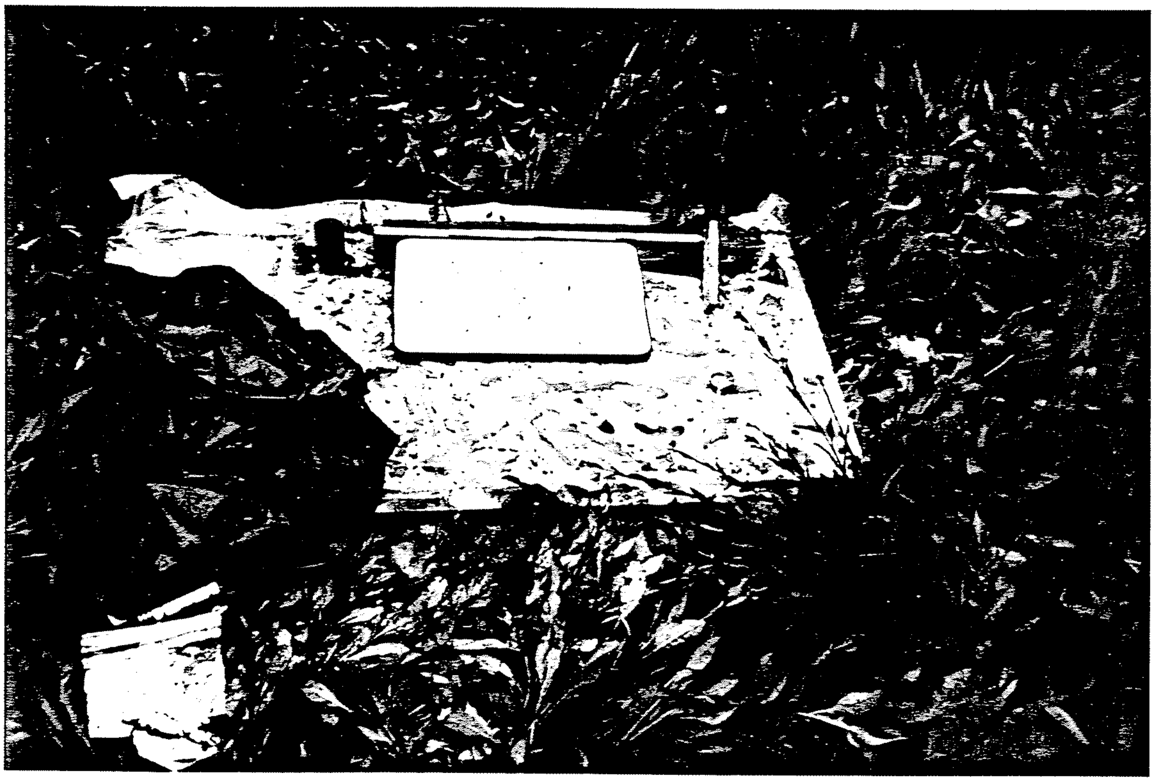
Date/Time: 7/20/90 1121

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-14

Comments: Boring Number: GW-2B. Split Spoon Run 8: 14.0-16.0 1.7'/2.0' recovery.



ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

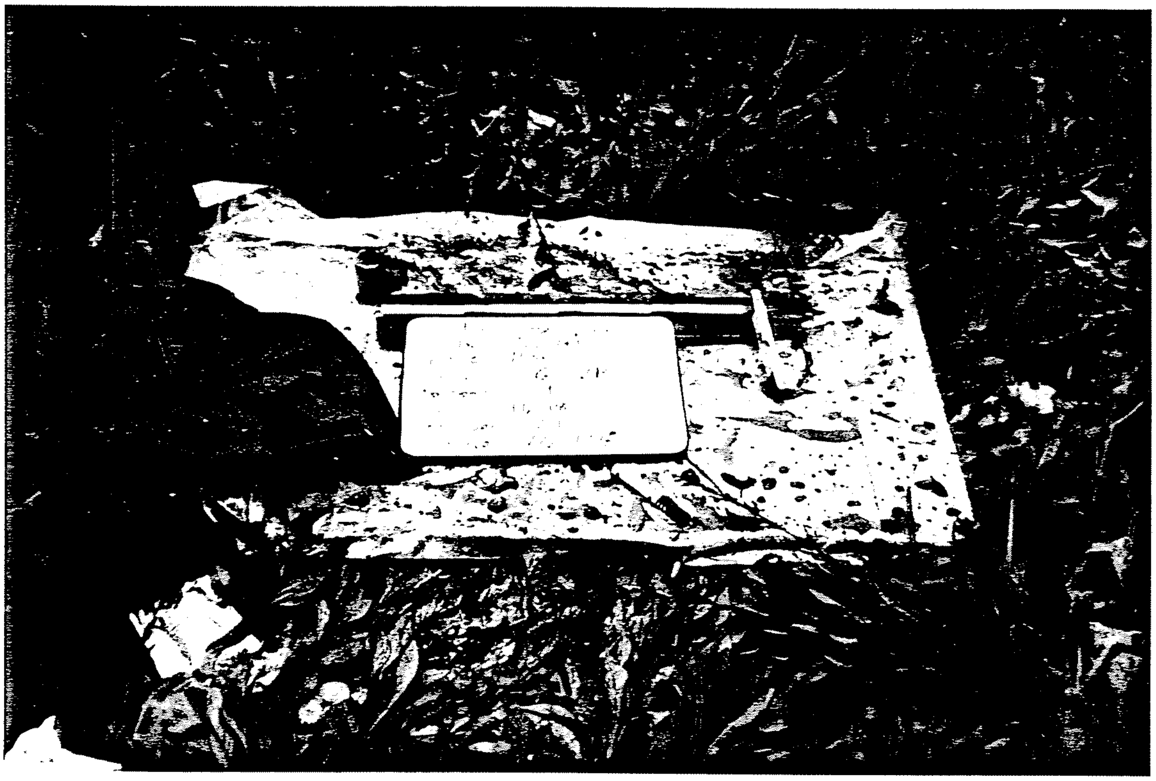
Date/Time: 7/20/90 1132

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-15

Comments: Boring Number: GW-2B. Split Spoon Run 9: 16.0-18.0 2.0'/2.0' recovery.



Draft

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

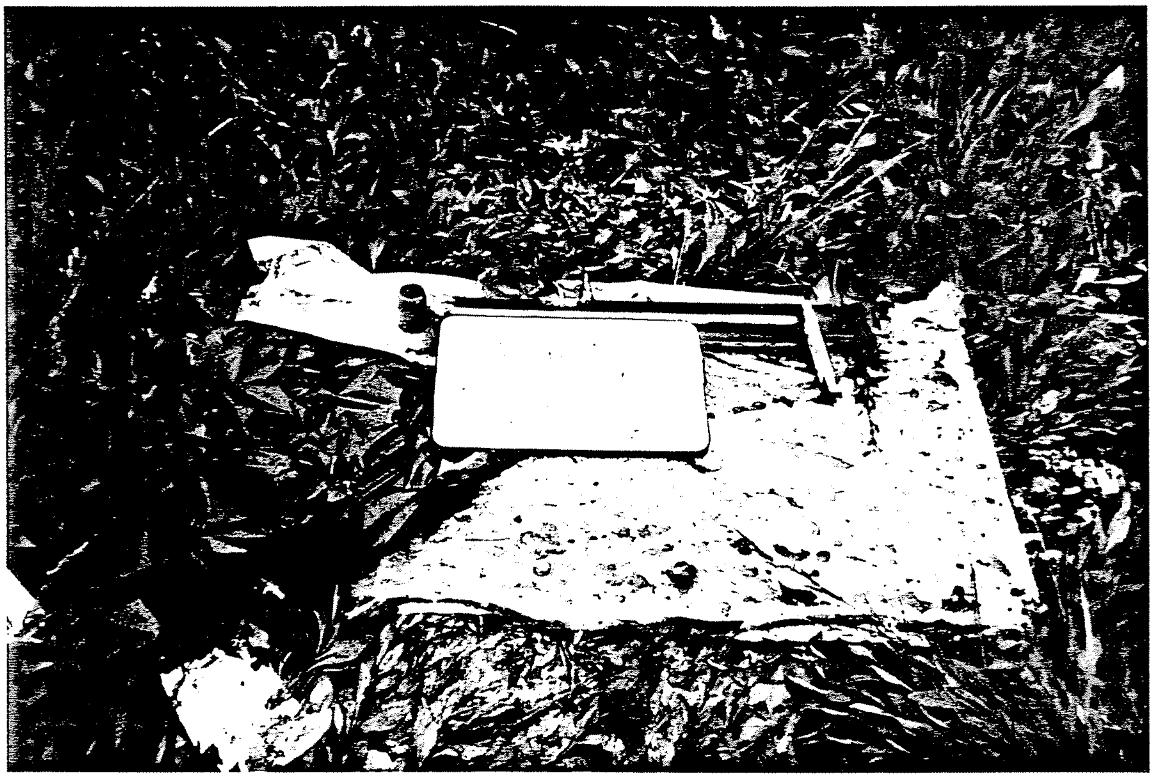
Date/Time: 7/20/90 1140

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-16

Comments: Boring Number: GW-2B. Split Spoon Run 10:18.20.0 0.2'/2.0' recovery.



ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

Date/Time: 7/20/90 1152

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-17

Comments: Boring Number: GW-2B. Split Spoon Run 11: 20.0-22.0 1.7'/2.0' recovery.

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PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

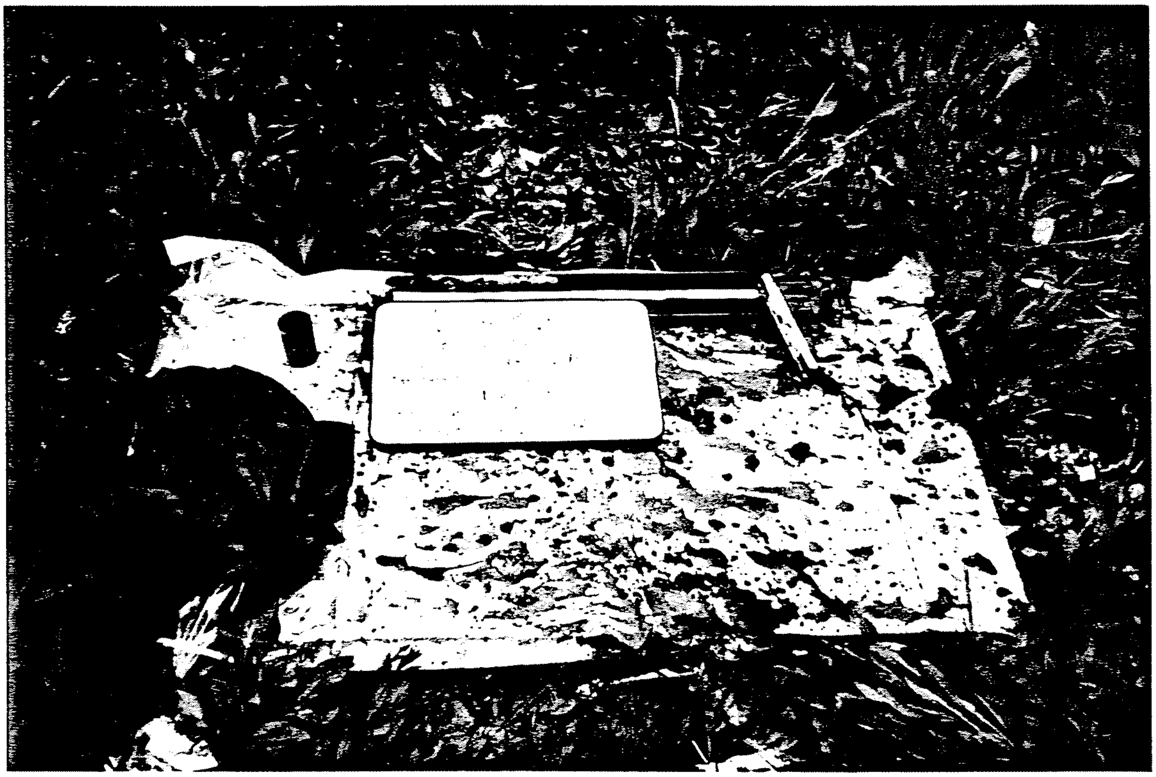
Date/Time: 7/20/90 1202

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-18

Comments: Boring Number: GW-2B. Split Spoon Run 12: 22.0-24.0 0.7'/2.0' recovery.



ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

Date/Time: 7/20/90 1223

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-19

Comments: Boring Number: GW-2B. Split Spoon Run 13: 24.0-26.0 0.8'/2.0' recovery.

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

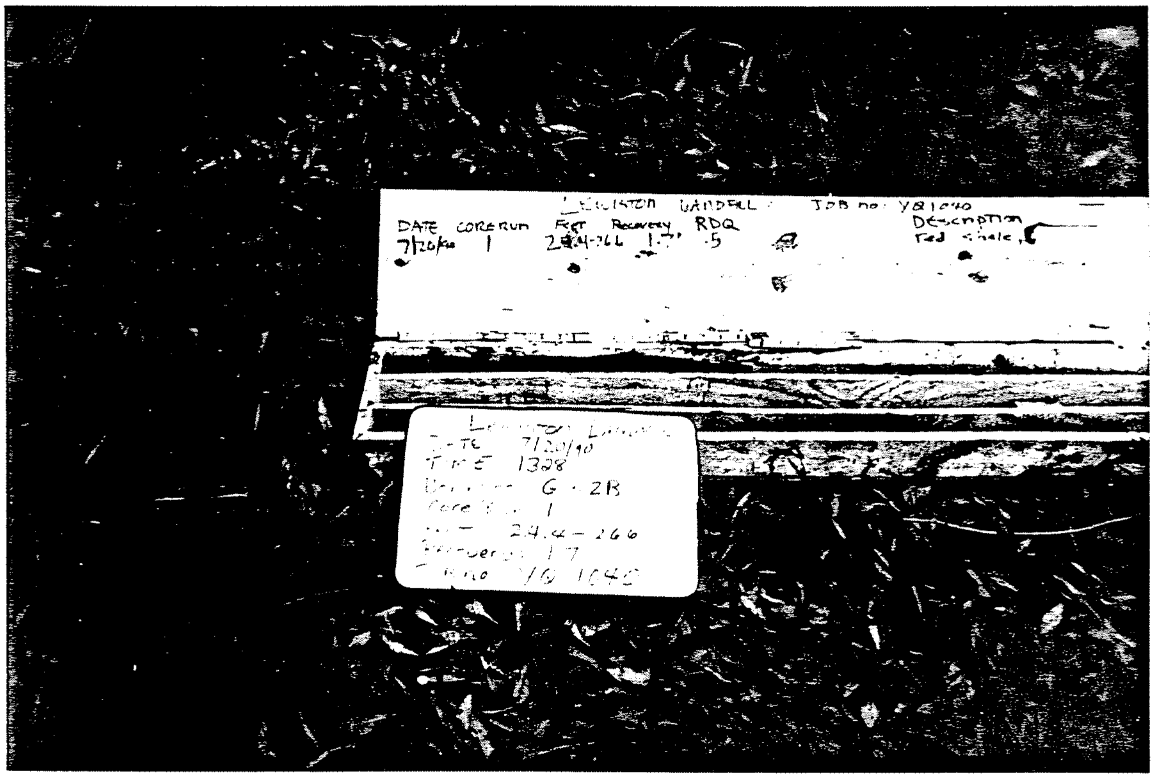
Date/Time: 7/20/90

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-20

Comments: Boring Number: GW-2B. Core Run 1: 24.4-26.6 1.7'/2.2 recovery. RQD = 0.5. This shale exhibited many zones of weakness. The green section showed multiple examples of decomposition to clay, an indication of the presence of groundwater.



Draft

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

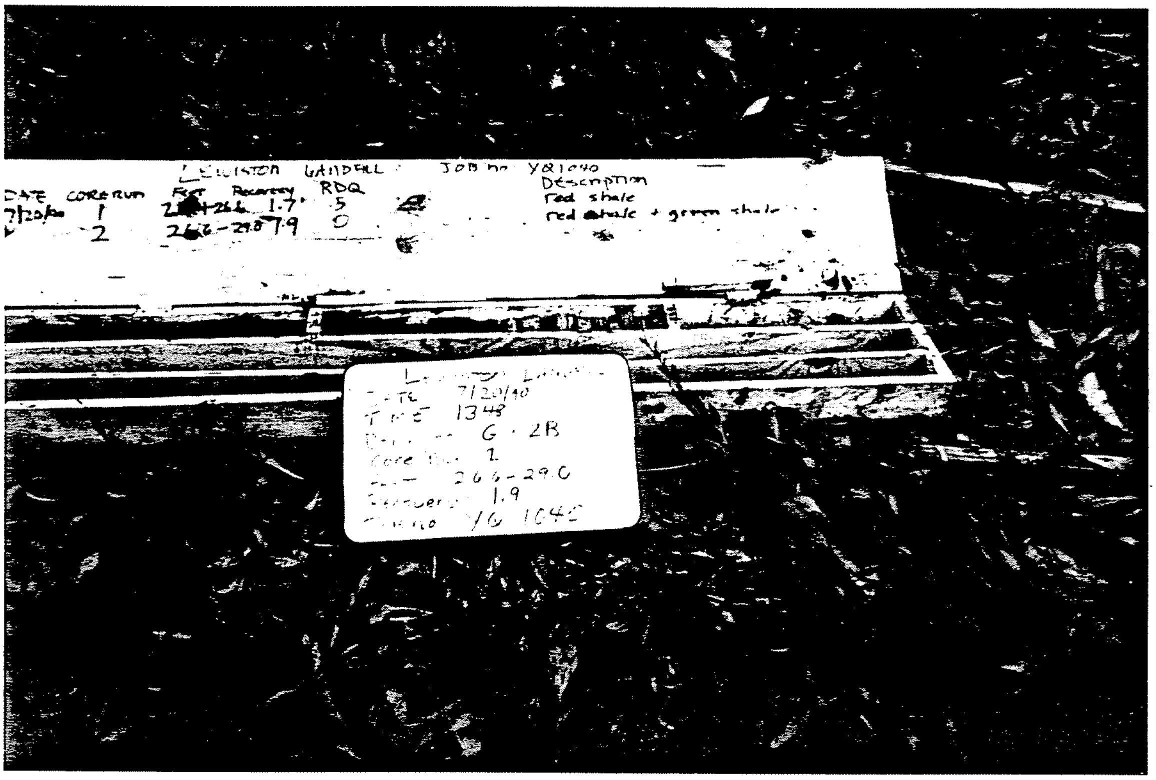
Date/Time: 7/20/90 1348

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-21

Comments: Boring Number: GW-2B. Core Run 2: 26.6-29.0 1.9'/2.4 recovery. RQD = 0.0. This shale exhibited many zones of weakness. Several of these zones showed decomposition to clay, especially in the green section, which is an indication of the presence of groundwater.



Draft

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

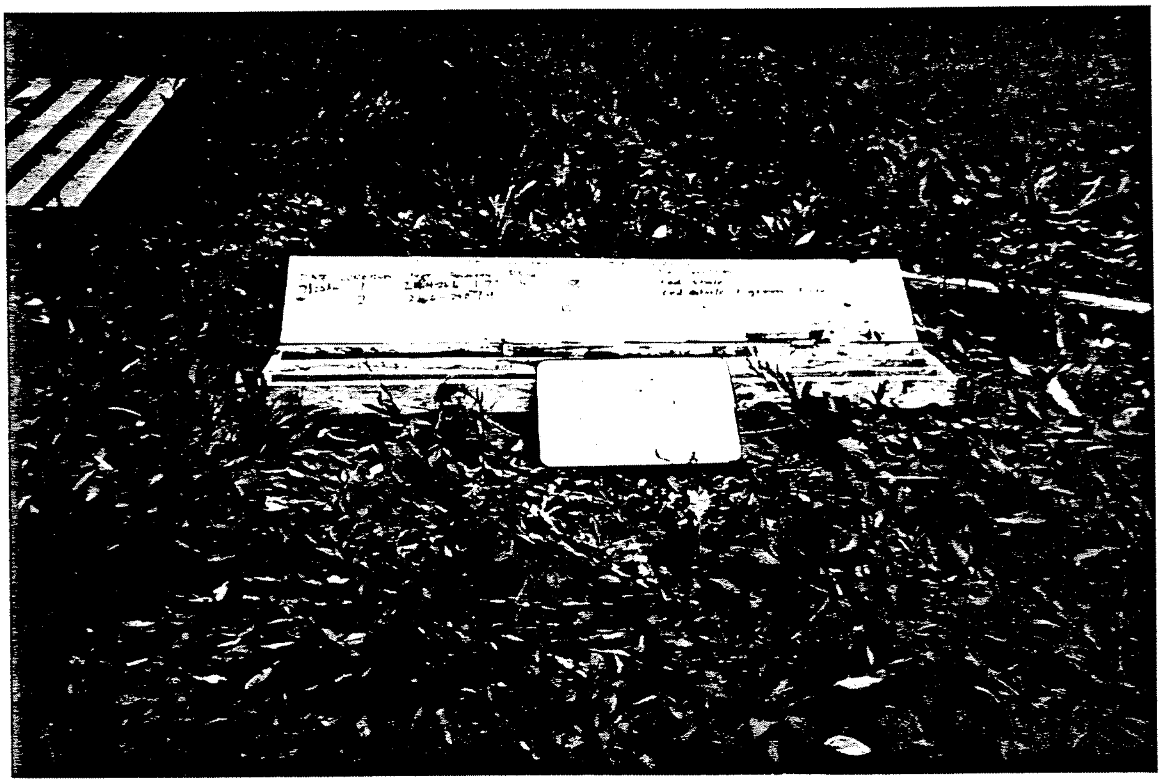
Date/Time: 7/20/90 1348

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-22

Comments: Boring Number: GW-2B. Entire core: 24.4-29.0. NOTE: Heavy rains throughout the day saturated the core box, making writing difficult.



Draft

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

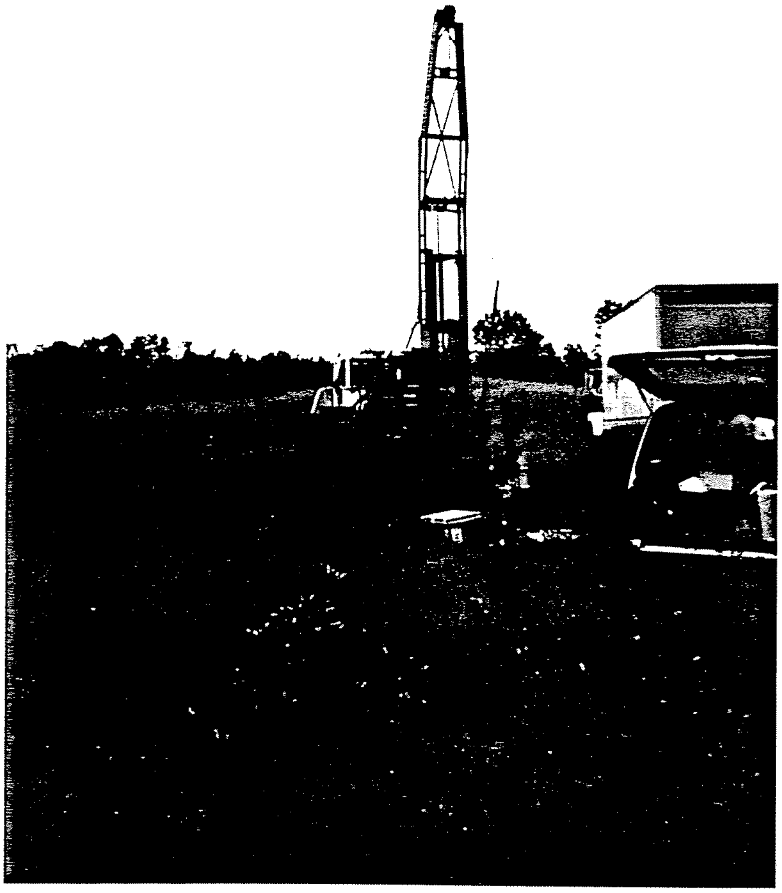
Date/Time: 7/18/90 1404

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-23

Comments: American Auger ATV drill rig on GW-2B looking north from Tenneco well nearest to GW-2B.



Draft

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC Phase II Lewiston Landfill

E & E Job No.: YQ1040

Camera: Make Kodak Fling

SN:

Photographer: Carol Waddell, E & E

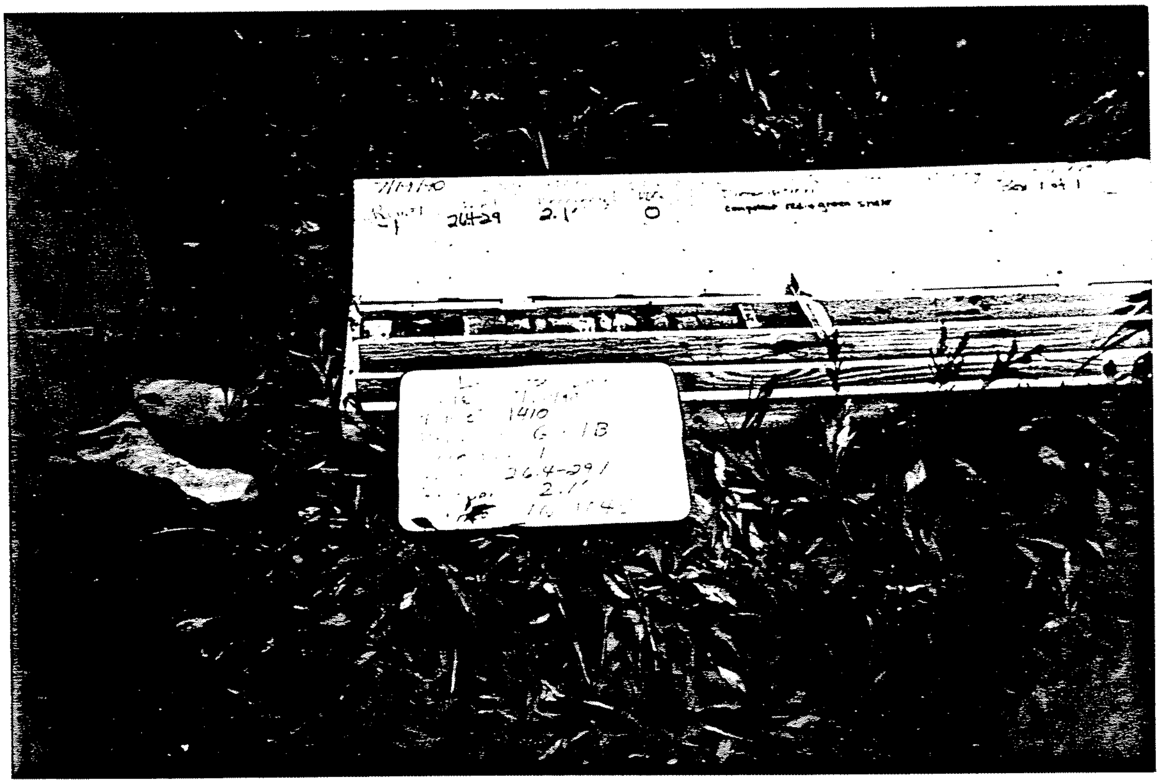
Date/Time: 7/20/90 1410

Lens: Type Single Reflex

SN:

Frame No.: Roll 2-24

Comments: Boring Number: GW-1B. Entire core: 26.4-29.1. This shale exhibited many zones of weakness. The green section exhibited multiple clay zones, which indicate the presence of groundwater.



02[UZ]YQ1080:D3167/3913

APPENDIX C

GEOPHYSICAL SURVEY

Draft
YQ-1030 D2970

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

PHASE II INVESTIGATIONS
GEOPHYSICAL SURVEY

Town of Lewiston Landfill Site
Site Number 932076
Town of Lewiston, Niagara County

November 1990

Prepared for:

New York State Department
of Environmental Conservation
50 Wolf Road, Albany, New York 12233
Thomas C. Jorling, Commissioner

Division of Hazardous Waste Remediation
Michael J. O'Toole, Jr., P.E., Director

Prepared by:

Ecology and Environment Engineering, P.C.

Draft
YQ-1030 D2970

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

PHASE II INVESTIGATIONS
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Michael J. O'Toole, Jr., P.E., Director

Prepared by:

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

1. INTRODUCTION

Ecology and Environment Engineering, P.C. (E & E) prepared this geophysical investigation report for the Lewiston Landfill site (I.D. No. 932076) located near the intersection of Harold and Pletcher Roads in the Town of Lewiston, New York, under contract to the New York State Department of Environmental Conservation (NYSDEC). The geophysical investigation consisted of an EM31 (electromagnetic terrain conductivity) survey and a portable proton magnetometer (total earth field magnetics) survey. This report includes field data (Appendix A) and contour maps (Appendix B) for the geophysical survey performed at this site on May 22, 1989 as part of the Phase II Investigation (Fifth Round). Additionally, interpretations of the data generated, along with conclusions, are provided in this report.

2. OBJECTIVES

The geophysical survey program at the Lewiston Landfill site was designed to achieve several general goals. The main objectives of the geophysical methods used were to optimize the locations of the eight proposed groundwater monitoring wells; reduce the risks associated with drilling into unknown terrain and wastes; reduce overall project time and cost; improve the accuracy and confidence of the investigation; identify the existence and boundaries of buried waste or groundwater contamination plumes; and determine vertical and horizontal anomalies.

3. METHODS

For the purpose of performing ground conductivity (EM31) and geomagnetic (magnetometer) surveys, grid coordinates were established in locations that correspond to the four proposed on-site groundwater monitoring wells.

Survey grids 1 through 4 included the proposed locations of groundwater monitoring wells GW-1A through GW-4B as follows:

Geophysical Survey Grid No.	Proposed Monitoring Well Included
1	GW-1A GW-1B
2	GW-1A GW-2B
3	GW-3A GW-3B
4	GW-4A GW-4B

The X and Y axes of each survey grid were oriented east-west and north-south, respectively. A total of four survey grids were established at the site. Survey grid coordinate 0,0 is located in the southwest corner of each contour map. Two semi-permanent wooden stakes mark the proposed well locations within each grid for reference during drilling.

The dimensions (40 feet by 40 feet) and station spacing (10 feet) of each survey grid and survey line remained constant. Both horizontal and vertical dipole readings in north-south/east-west orientations were recorded at each survey grid node while performing the electromagnetic ground conductivity survey using the Geonics, Ltd., EM31 Ground Conductivity Meter. The effective depths of penetration provided by the EM31 in the vertical and horizontal dipole modes is ≤18 feet and ≤9 feet, respectively. These depths were considered adequate to delineate any buried materials that may be encountered while drilling. Magnetic readings were recorded at each node in a north-south orientation using the EG+G Geometrics Memory Magnetometer (Model G-856).

All conductivity and magnetic field data were recorded in two separate logbooks dedicated to this site investigation. Magnetometer data were reduced by correcting the reading, when appropriate, for diurnal variation based on background station readings. EM31 conductivity data were averaged for north-south and east-west orientations for both vertical and horizontal dipole positions. The reduced geophysical data (see Appendix A) were then plotted and contoured for each survey (see Appendix B).

4. DATA INTERPRETATION

The purpose of interpreting the results of the magnetometer and EM31 surveys is to provide a probable explanation for anomalous geophysical contours. The presence of buried utilities, metal objects, wastes, and contaminant plumes is often manifest as relatively elevated or decreased station readings and gradient values. The following interpretations are based on the contour maps generated from magnetometer and EM31 data which are listed in Tables A-1 and A-2 in Appendix A. Survey grids 1 through 4 encompass each of the eight groundwater monitoring well locations as proposed by NYSDEC in the Phase II Investigation Work Plan for the Lewiston Landfill site (see Figure 4-1).

The following discussion provides details of each of the six survey grids:

Survey Grid Area No. 1

A review of magnetometer data contours at the No. 1 survey grid location indicates that this 1,600-square-foot survey area contains no significant geomagnetic anomalies. The risk of drilling into any shallow ferrous material within this survey area is expected to be minimal.

Electromagnetic conductivity values measured with the EM31 in both vertical and horizontal dipole modes indicate an increase in ground conductivity from southwest to northeast. The gradual increase in values indicates the absence of near-surface metal debris within the survey grid. The increase in conductivity may be caused by variations in soil types and/or moisture content. It may also represent the presence of a contamination plume to the northeast.

The installation of the proposed monitoring wells GW-1A and GW-1B at the location indicated on the contour map are acceptable because the

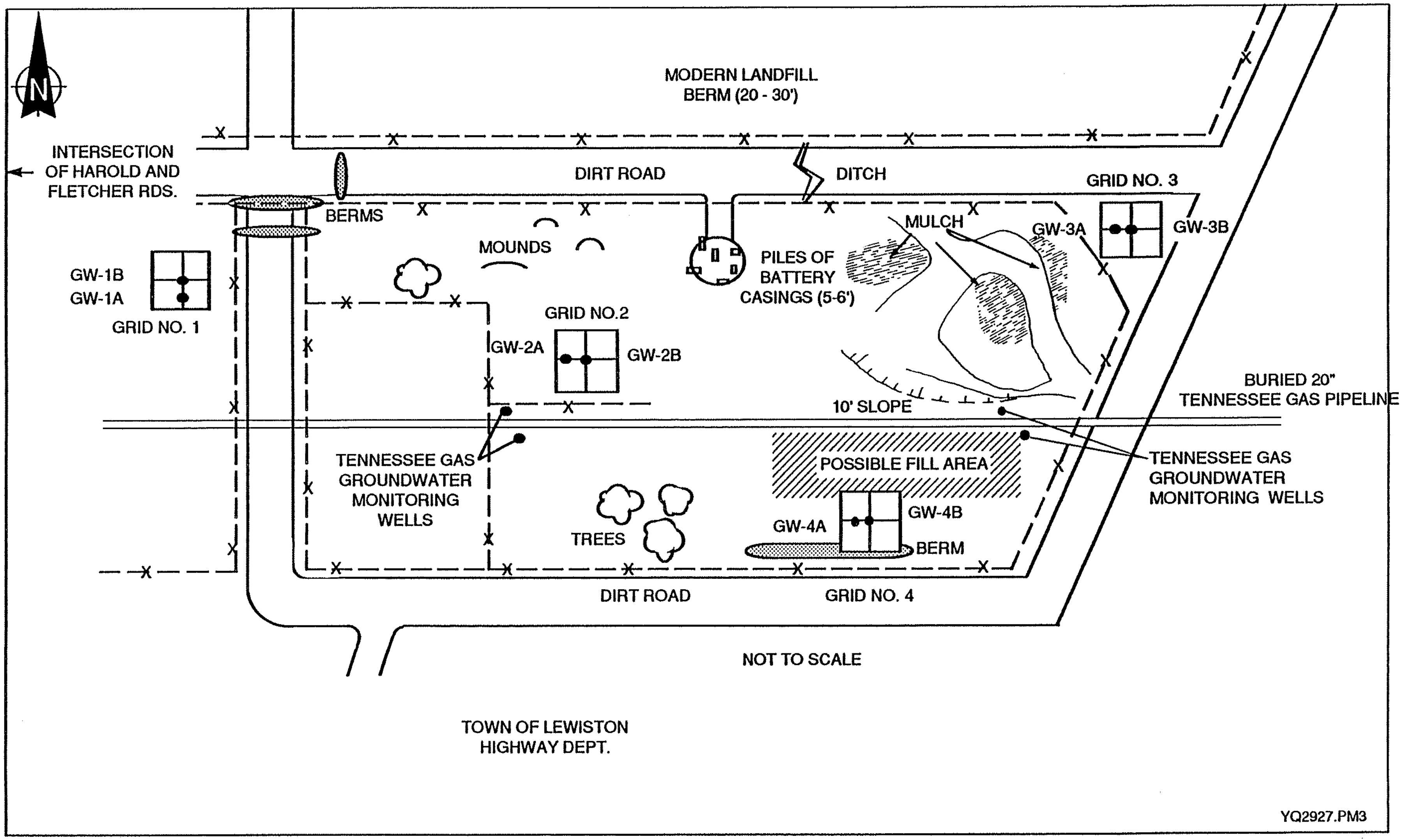


Figure 4 - 1
GEOPHYSICAL SURVEY AND PROPOSED GROUNDWATER MONITORING WELL LOCATIONS
LEWISTON LANDFILL, LEWISTON, NEW YORK

]

location is free from subsurface metal debris and/or utilities. However, if currently unforeseen field conditions dictate, the well locations may be moved to any other area within the survey grid.

Survey Grid Area No. 2

A review of magnetometer data contours at the No. 2 survey grid location indicates that this 1,600-square-foot survey area contains a large elongated geomagnetic anomaly oriented north/south in the northwest portion of the survey grid. The source of this apparent anomalous area is unknown, however, it may represent the presence of a buried pipe or railroad spur. This anomalous area is centered between grid coordinates 10,10 to 10,40. Another possible anomaly is located in the southeast corner of the grid. The center of this anomaly appears to be outside the grid area. The risk of drilling into any shallow ferrous material within survey area No. 2 is expected to be minimal if the northwest and southeast corners are avoided.

Electromagnetic conductivity values measured with the EM31 also partially indicate an anomalous area between grid coordinates 10,0 to 10,40. This anomaly is not as well defined as the magnetic anomaly, however, the presence of an elongated metallic object is highly probable. The EM31 did not indicated an anomaly in the southeast corner of the grid, possibly because the object is outside the grid area and less sensitive to the EM31 with respect to the magnetometer.

The installation of proposed monitoring well GW-2A at the location indicated on the contour map is unacceptable. The location of GW-2B is acceptable. If currently unforeseen field conditions dictate, the well locations may be moved to the east side of the survey grid, avoiding the west side between grid coordinates 0,0 to 0,40 and 10,0 to 10,40.

Survey Grid Area No. 3

A review of magnetometer data contours at the No. 3 grid location indicates that this 1,600-square-foot survey area contains a substantial geomagnetic anomaly in the northern half of the grid. The risk of drilling into shallow ferrous material within the southern portion of this grid area is expected to be minimal.

Electromagnetic conductivity values measured with the EM31 in both vertical and horizontal dipole modes were relatively high throughout the grid area, and increased from southeast to northwest. A negative conductivity value was recorded at grid coordinate 0,40. Negative meter readings indicates very high conductivity beyond the capabilities of the instrument. The shape of the contours generally coincide with magnetic contours, therefore, the northern half of the grid area should be avoided.

The installation of proposed monitoring wells GW-3A and GW-3B at the locations indicated on the contour map are unacceptable. The locations should be moved to the southeast corner of the survey grid between grid coordinates 20,0 to 40,0 and 20,10 to 40,10.

Survey Grid Area No. 4

A review of magnetometer data contours at the No. 4 grid location indicates that this 1,600-square-foot survey area contains a substantial geomagnetic anomaly throughout the entire grid area. The risk of drilling into shallow ferrous material within this grid area is expected to be high. However, the area along the southern border of the grid may be free of fill material. Field observations noted a small berm along the southern edge of the grid which may represent the fill boundary. The wells should be drilled on or to the south of this berm. There is only a narrow strip of ground capable of supporting a drilling rig due to this location's proximity to the access road and adjacent drainage ditch.

Electromagnetic conductivity values measured in the survey area with the EM31 were relatively high throughout the grid area. Lower values on the berm along the southern border of the survey grid indicate the absence of near-surface metal debris.

The installation of the proposed monitoring wells GW-4A and GW-4B at the locations indicated on the contour map are unacceptable. The well location should be moved to the southern border of the survey grid at grid coordinates 0,0 or 20,0 to 40,0.

5. CONCLUSIONS AND RECOMMENDATIONS

Based upon the interpretations of the data discussed in Section 4, the proposed locations of three of the eight groundwater monitoring wells (Nos. GW-1A, GW-1B and GW-2B) appear to be acceptable with only minor adjustments. The other five wells (GW-2A, GW-3A, GW-4A, and GW-4B) should be moved to other areas within each of their respective survey grids to avoid potential impact with subsurface features.

Prior to drilling, the local underground-utility locating service should be contacted to indicate possible public utilities buried in the vicinity of each of the drill sites. Aerial photographs of the site should also be checked to help determine the extent of the fill area. All proposed well locations will be confirmed with a NYSDEC representative prior to the commencement of drilling.

APPENDIX A

MAGNETOMETER AND EM31 SURVEY DATA

Table A-1

MAGNETOMETER READINGS

LEWISTON LANDFILL

Survey Grid No. 1

Station #	Raw Data (Gammas)	Corrected Data* (Gammas)
0,0	56,433	56,423
0,10	56,467	56,458
0,20	56,415	56,406
0,30	56,467	56,459
0,40	56,462	56,454
10,40	56,452	56,444
10,30	56,483	56,476
10,20	56,394	56,387
10,10	56,480	56,473
10,0	56,479	56,473
20,0	56,450	56,446
20,10	56,383	56,377
20,20	56,375	56,378
20,30	56,475	56,470
20,40	56,471	56,467
30,40	56,472	56,468
30,30	56,383	56,380
30,20	56,380	56,377
30,10	56,465	56,463
30,0	56,447	56,445
40,0	56,459	56,457
40,10	56,451	56,450
40,20	56,455	56,454
40,30	56,368	56,367
40,40	56,382	56,382

[UZ]YQ1030:D2970, #3328, PM = 30

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at an on-site base station.

Table A-1 (Cont.)

MAGNETOMETER READINGS

LEWISTON LANDFILL

Survey Grid No. 2

Station #	Raw Data* (Gammas)
0,0	56,431
0,10	56,448
0,20	56,538
0,30	56,337
0,40	56,434
10,40	56,525
10,30	56,554
10,20	56,633
10,10	56,535
10,0	56,432
20,0	56,435
20,10	56,532
20,20	56,524
20,30	56,442
20,40	56,440
30,40	56,547
30,30	56,447
30,20	56,433
30,10	56,440
30,0	56,444
40,0	56,500
40,10	56,528
40,20	56,536
40,30	56,431
40,40	56,549

[UZ]YQ1030:D2970, #3328, PM=30

*Data has not been corrected for natural magnetic fluctuations (i.e., drift) because the data obtained at the on-site base station indicated drift was negligible.

Table A-1 (Cont.)

MAGNETOMETER READINGS

LEWISTON LANDFILL

Survey Grid No. 3

Station #	Raw Data (Gammas)	Corrected Data* (Gammas)
0,0	56,078	56,088
0,10	56,636	56,646
0,20	57,691	57,700
0,30	58,004	58,013
0,40	58,430	58,438
10,40	57,627	57,635
10,30	58,473	58,481
10,20	57,419	57,426
10,10	56,595	56,602
10,0	56,412	56,418
20,0	56,031	56,037
20,10	56,195	56,201
20,20	56,841	56,845
20,30	58,704	58,709
20,40	57,199	57,203
30,40	57,281	57,285
30,30	58,371	58,375
30,20	56,379	56,382
30,10	56,114	56,117
30,0	56,103	56,105
40,0	56,069	56,071
40,10	56,180	56,182
40,20	56,277	56,278
40,30	58,068	58,069
40,40	57,198	57,198

[UZ]YQ1030:D2970, #3328, PM-30

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at an on-site base station.

Table A-1 (Cont.)

MAGNETOMETER READINGS

LLEWISTON LANDFILL

Survey Grid No. 4

Station #	Raw Data (Gammas)	Corrected Data* (Gammas)
0,0	57,601	57,588
10,0	58,057	58,045
20,0	56,740	56,728
30,0	57,440	57,429
40,0	57,575	57,564
10,40	57,582	57,572
10,30	56,141	56,131
10,20	57,203	57,194
10,10	58,787	58,778
10,0	57,746	57,738
20,0	57,569	57,561
20,10	58,471	58,464
20,20	57,537	57,530
20,30	56,593	56,587
20,40	57,819	57,813
30,40	56,890	56,885
30,30	56,628	56,523
30,20	57,896	57,892
30,10	58,062	58,058
30,0	57,068	57,065
40,0	57,026	57,023
40,10	57,920	57,918
40,20	57,939	57,937
40,30	56,607	56,606
40,40	56,603	56,603

[UZ]YQ1030:D2970, #3328, PM = 30

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at an on-site base station.

Table A-2

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

LEWISTON LANDFILL

Survey Grid No. 1

Station #	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	36.5	26.0
0,10	39.5	29.0
0,20	34.0	32.0
0,30	40.5	32.0
0,40	44.0	34.5
10,40	53.0	37.0
10,30	50.5	36.5
10,20	47.0	36.0
10,10	42.0	32.5
10,0	37.5	27.5
20,0	42.0	29.5
20,10	44.5	34.5
20,20	48.0	38.5
20,30	51.0	38.5
20,40	54.0	39.0
30,40	54.0	41.5
30,30	53.5	40.5
30,20	52.0	40.0
30,10	47.5	37.0
30,0	43.0	34.0
40,0	44.0	33.5
40,10	51.5	39.0
40,20	51.5	39.0
40,30	55.0	39.5
40,40	54.5	39.5

[UZ]YQ1030:D2970, #3329, PM = 30

Table A-2 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

LEWISTON LANDFILL

Survey Grid No. 2

Station #	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	55.5	43.0
0,10	56.0	50.0
0,20	59.5	43.5
0,30	58.0	44.0
0,40	60.5	44.0
10,40	62.5	44.0
10,30	61.0	43.5
10,20	60.0	42.0
10,10	58.0	40.0
10,0	57.5	38.0
20,0	54.5	39.0
20,10	55.5	42.5
20,20	58.5	42.0
20,30	57.5	41.5
20,40	59.5	43.5
30,40	60.5	44.0
30,30	59.5	43.5
30,20	57.5	44.5
30,10	57.5	41.5
30,0	52.5	40.5
40,0	55.5	38.5
40,10	56.0	41.0
40,20	58.0	42.5
40,30	59.0	42.0
40,40	60.5	42.0

[UZ]YQ1030:D2970, #3329, PM = 30

Table A-2 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

LEWISTON LANDFILL

Survey Grid No. 3

Station #	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	76.5	48.0
0,10	63.0	117.5
0,20	89.0	152.5
0,30	105.0	115.0
0,40	Negative	172.5
10,40	60.0	117.5
10,30	65.0	125.0
10,20	65.0	142.5
10,10	57.5	95.0
10,0	62.5	37.5
20,0	51.0	31.0
20,10	65.5	60.0
20,20	60.5	99.0
20,30	29.0	114.0
20,40	62.5	66.5
30,40	59.0	58.0
30,30	17.5	92.0
30,20	52.5	72.0
30,10	59.5	43.5
30,0	50.0	30.0
40,0	48.0	33.0
40,10	54.0	34.5
40,20	49.0	52.5
40,30	18.5	79.0
40,40	50.5	58.5

[UZ]YQ1030:D2970, #3329, PM = 30

Table A-2 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

LEWISTON LANDFILL

Survey Grid No. 4

Station #	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	95.5	60.0
0,10	115.0	107.5
0,20	120.5	115.0
0,30	115.0	90.0
0,40	111.5	105.0
10,40	100.0	101.0
10,30	129.0	116.0
10,20	120.0	160.0
10,10	112.5	125.0
10,0	104.0	170.0
20,0	101.0	57.5
20,10	130.0	115.0
20,20	137.5	175.0
20,30	137.5	130.0
20,40	112.5	100.0
30,40	120.0	135.0
30,30	160.0	200.0
30,20	180.0	208.5
30,10	130.0	95.0
30,0	90.0	55.0
40,0	87.5	55.0
40,10	115.0	87.5
40,20	150.0	195.0
40,30	249.0	229.0
40,40	137.5	145.0

[UZ]YQ1030:D2970, #3329, PM = 30

NA = Not applicable; no reading taken due to proximity of metal fence.

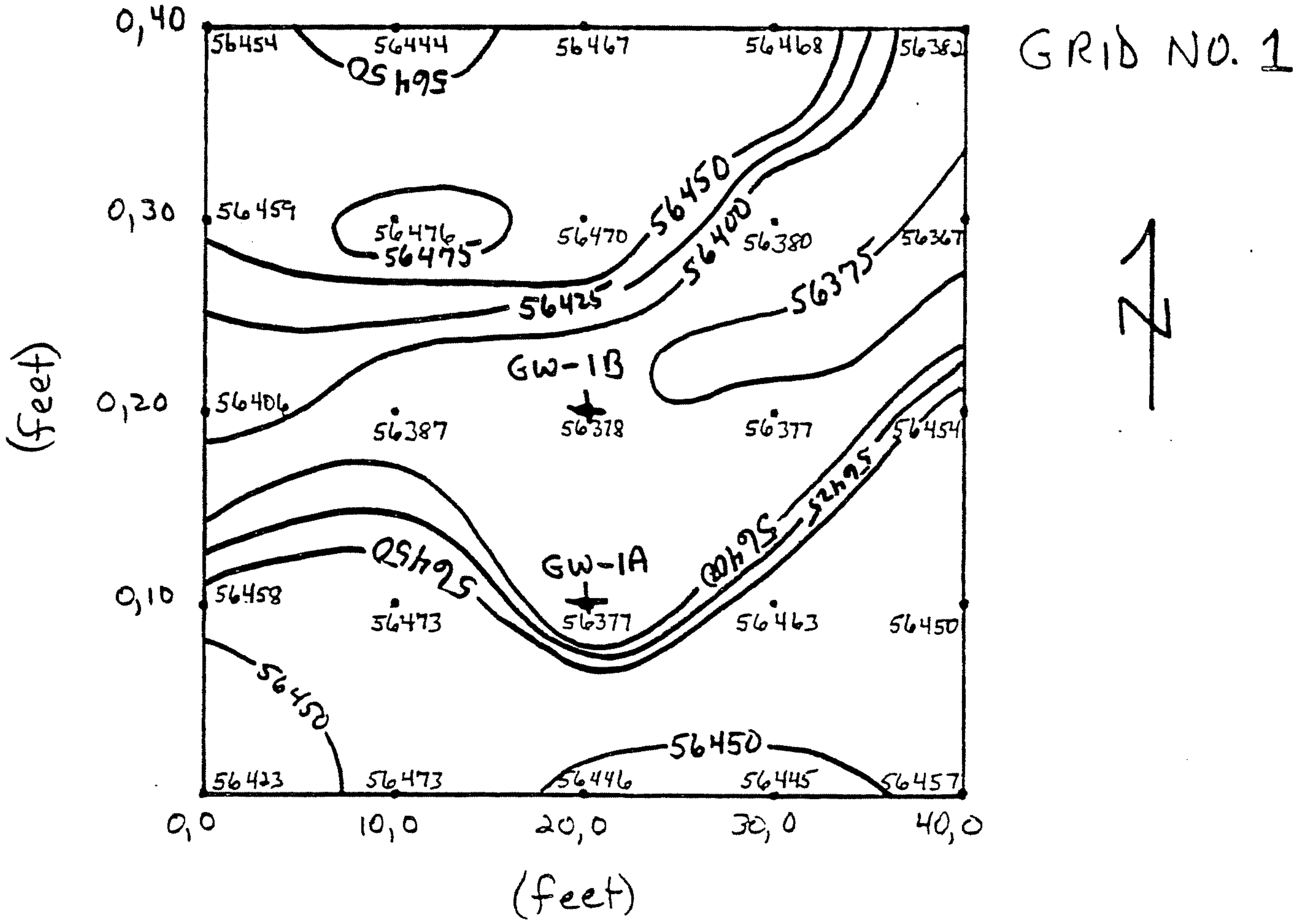
APPENDIX B

MAGNETOMETER AND
EM31 SURVEY CONTOUR MAPS

TOWN OF LEWISTON
LANDFILL SITE
NYSDEC ID No. 932076

MAGNETOMETER SURVEY

GRID NO. 1



READINGS IN GAMMAS

CONTOUR INTERVAL = 25 GAMMAS

✦ = Proposed monitoring well location stake

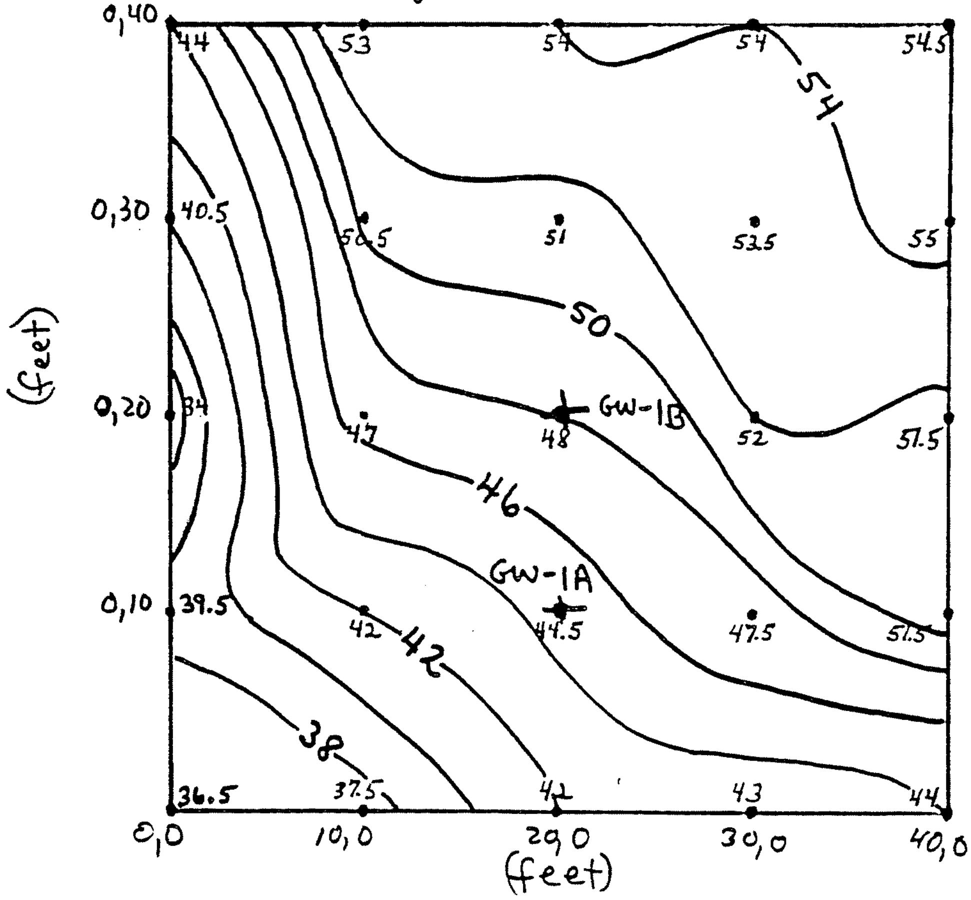
TOWN OF LEWISTON LANDFILL SITE
NYSDEC ID NO. 932076

Draft

EM31 GOUND CONDUCTIVITY SURVEY
(Readings in Millimhos/meter)

GRID NO. 1

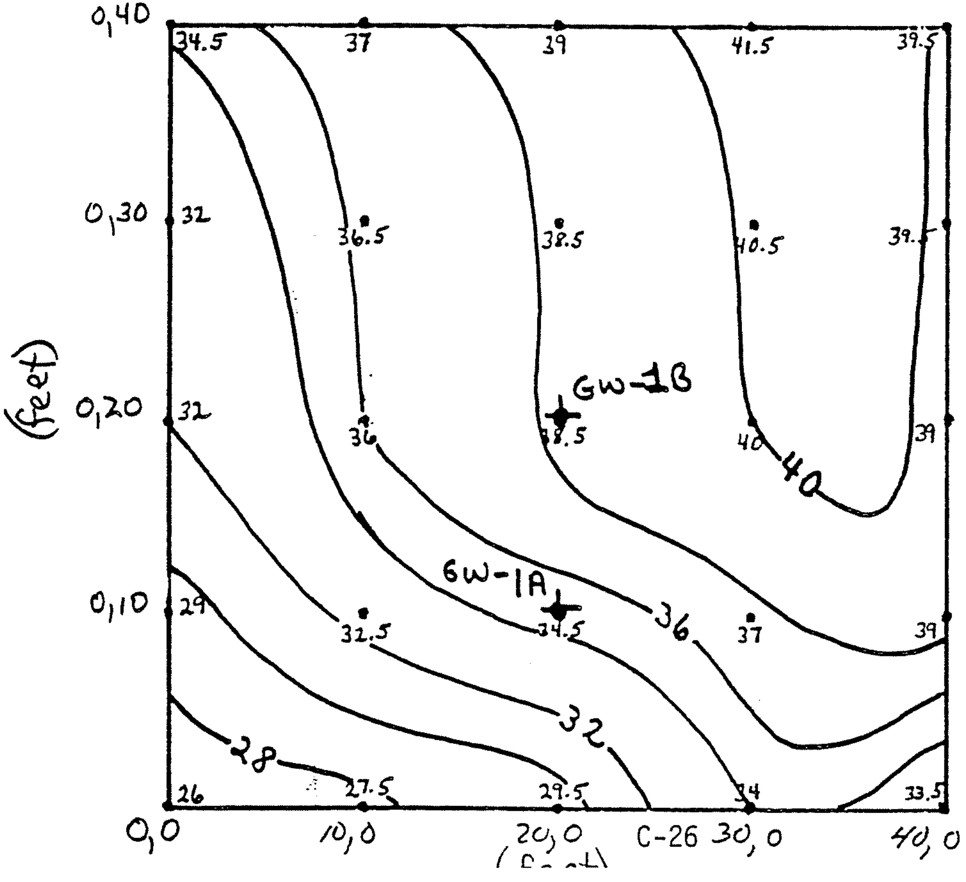
VERTICAL DIPOLE



Contour Interval = 2 millimhos/m

✚ = Proposed monitoring well location stake

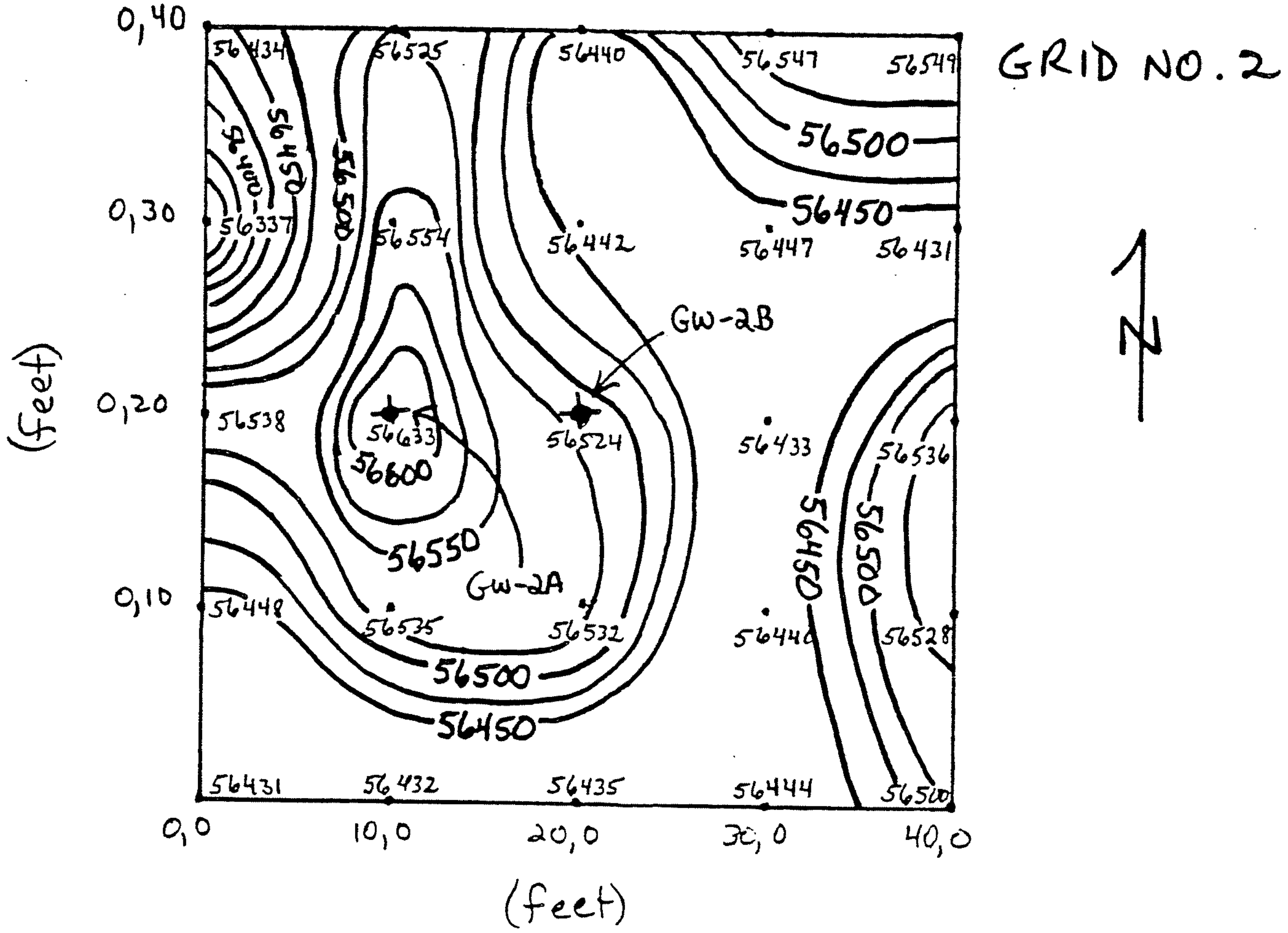
HORIZONTAL DIPOLE



Contour Interval = 2 millimhos/m

TOWN OF LEWISTON
LANDFILL SITE
NYSDEC ID No. 932076

MAGNETOMETER SURVEY



READINGS IN GAMMAS

CONTOUR INTERVAL = 25 GAMMAS

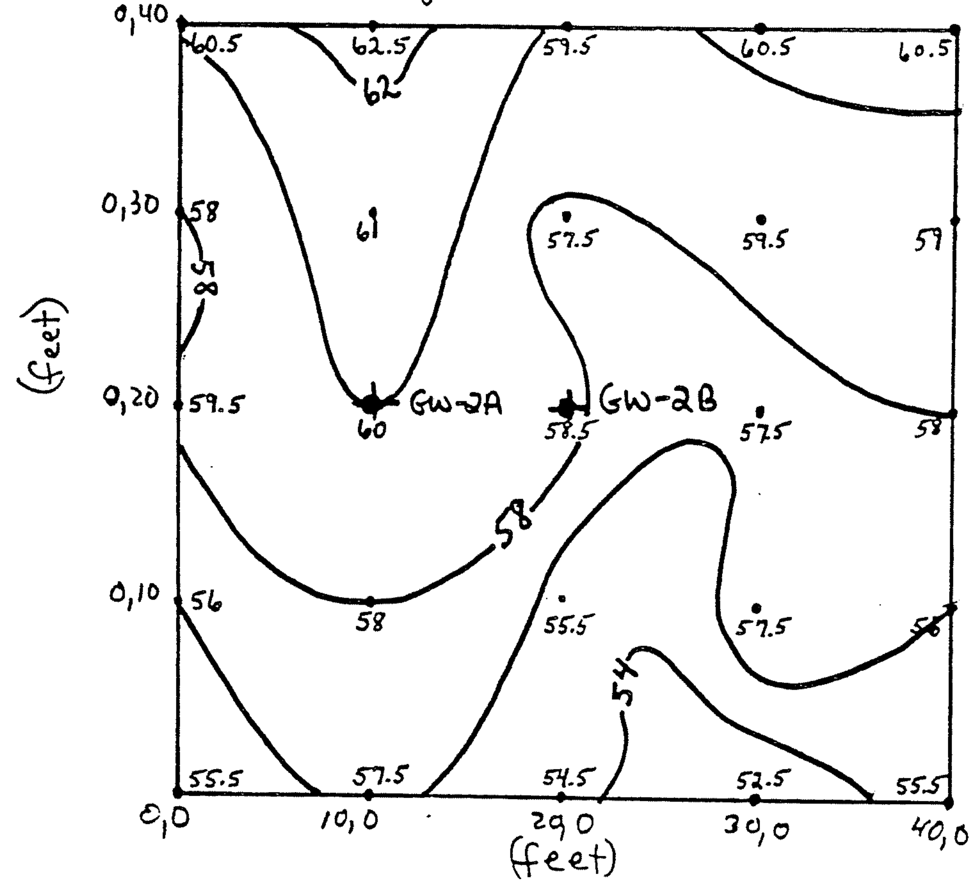
TOWN OF LEWISTON LANDFILL SITE
NYSDEC ID NO. 932076

Draft

EM31 GOUND CONDUCTIVITY SURVEY
(Readings in millimhos/meter)

GRID NO. 2

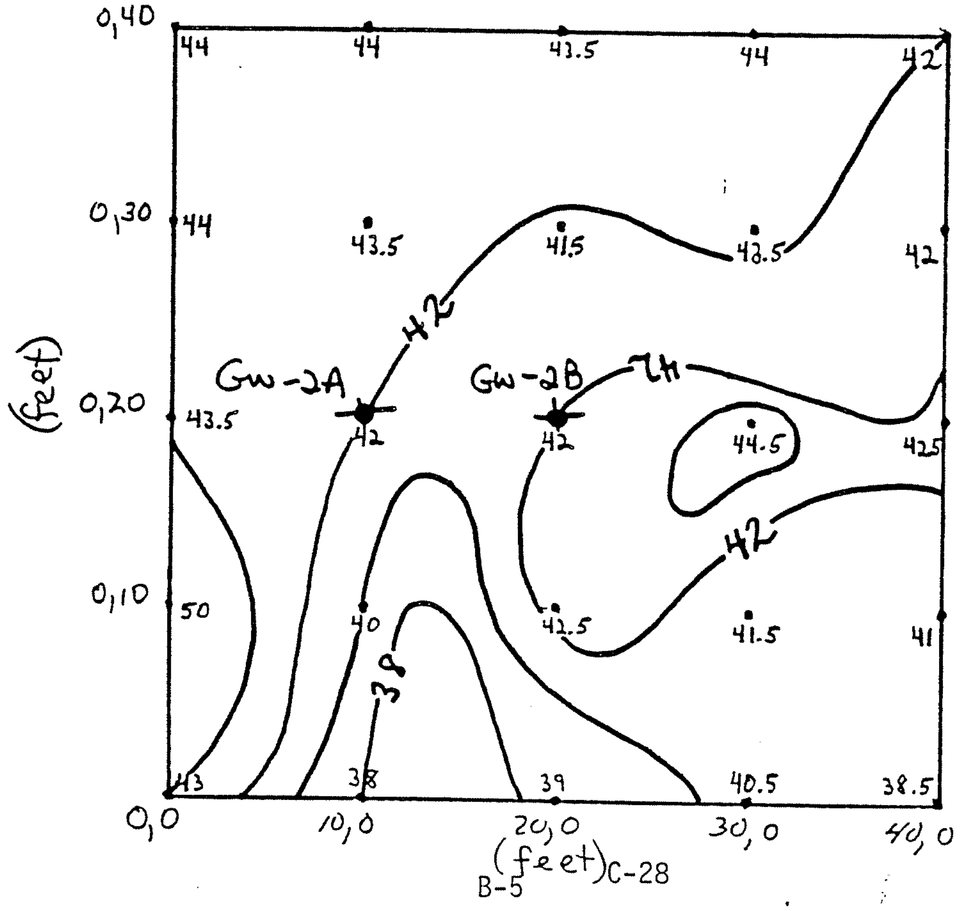
VERTICAL DIPOLE



Contour Interval = 2 millimhos/m

= Proposed monitoring well location stake

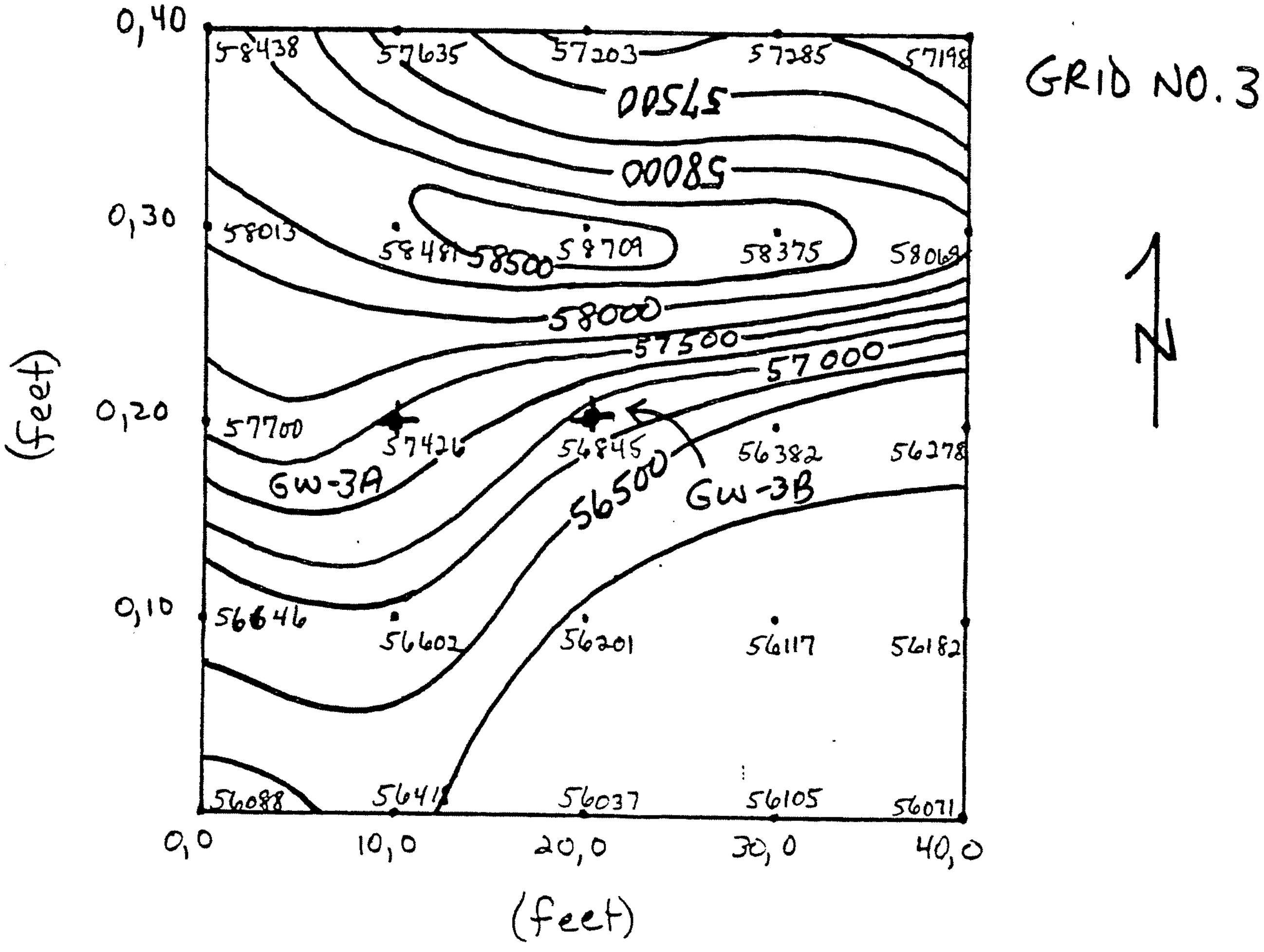
HORIZONTAL DIPOLE



Contour Interval =

TOWN OF LEWISTON
LANDFILL SITE
NYSDEC ID No. 932076

MAGNETOMETER
SURVEY



READINGS IN GAMMAS

CONTOUR INTERVAL = 250 GAMMAS

✦ = Proposed Monitoring well location stake

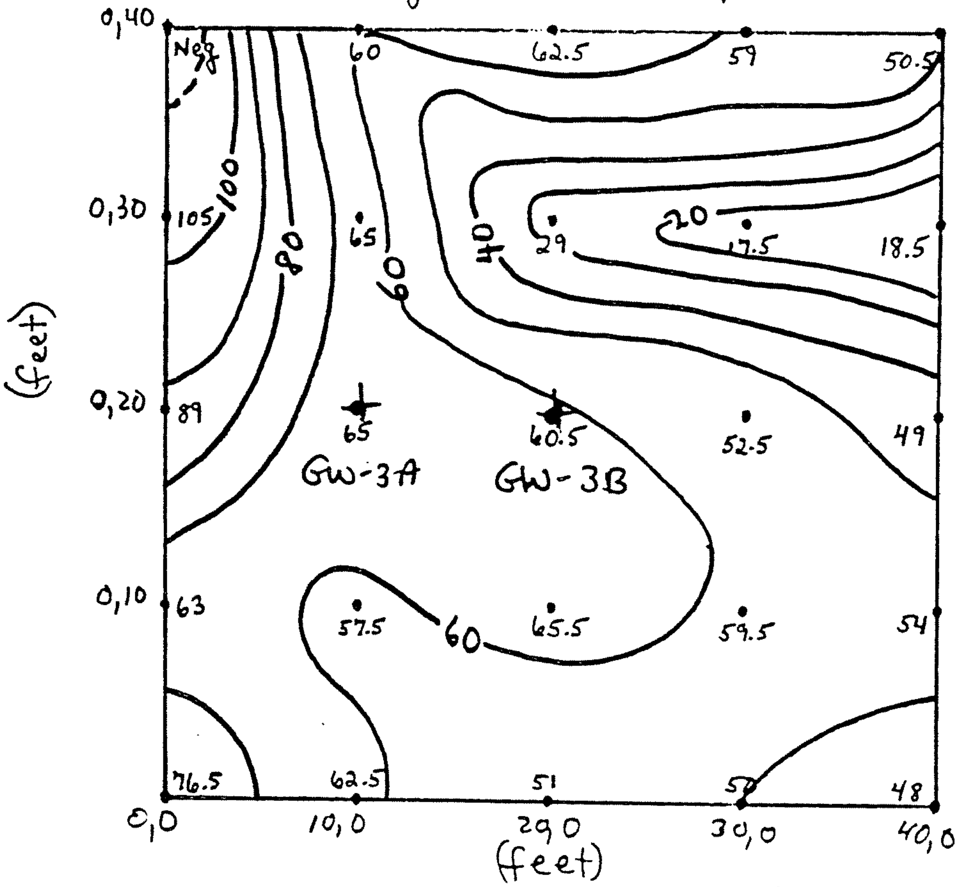
TOWN OF LEWISTON LANDFILL SITE
NYSDEC ID NO. 932076

Draft

EM31 GOUND CONDUCTIVITY SURVEY
(Readings in Millimhos/meter)

GRID NO. 3

VERTICAL DIPOLE

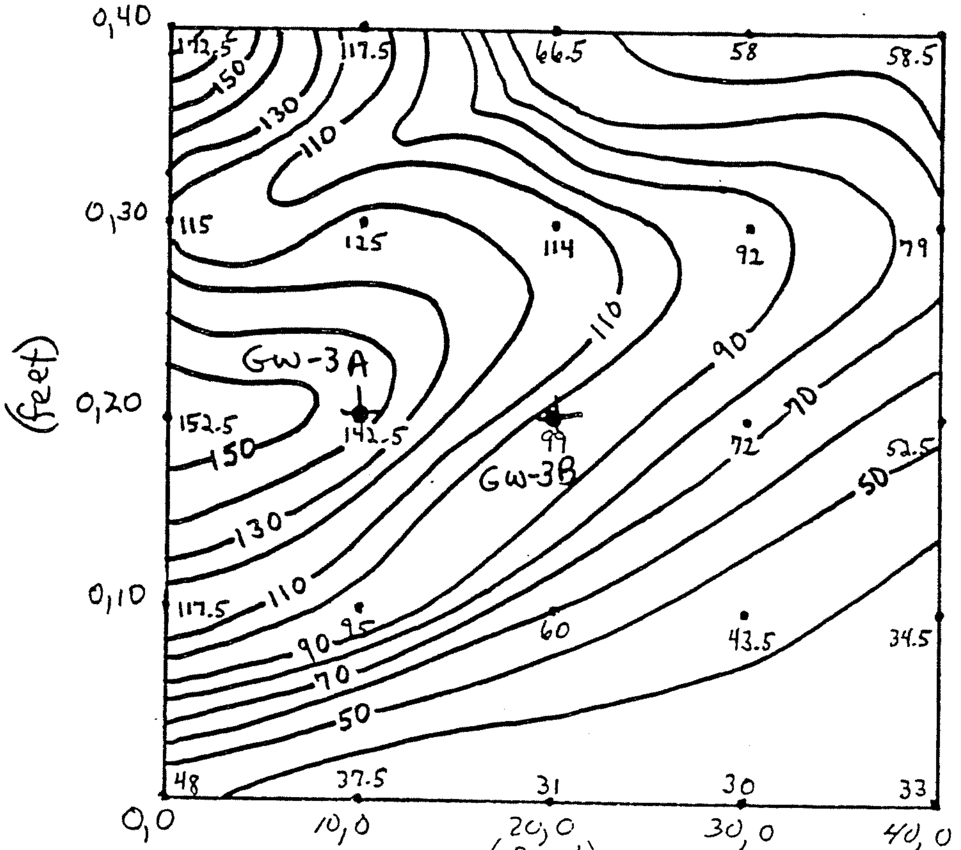


Contour Interval = 10 millimhos/m

- - - - = area of negative meter reading (very high conductivity)

✚ = Proposed monitoring well location stake

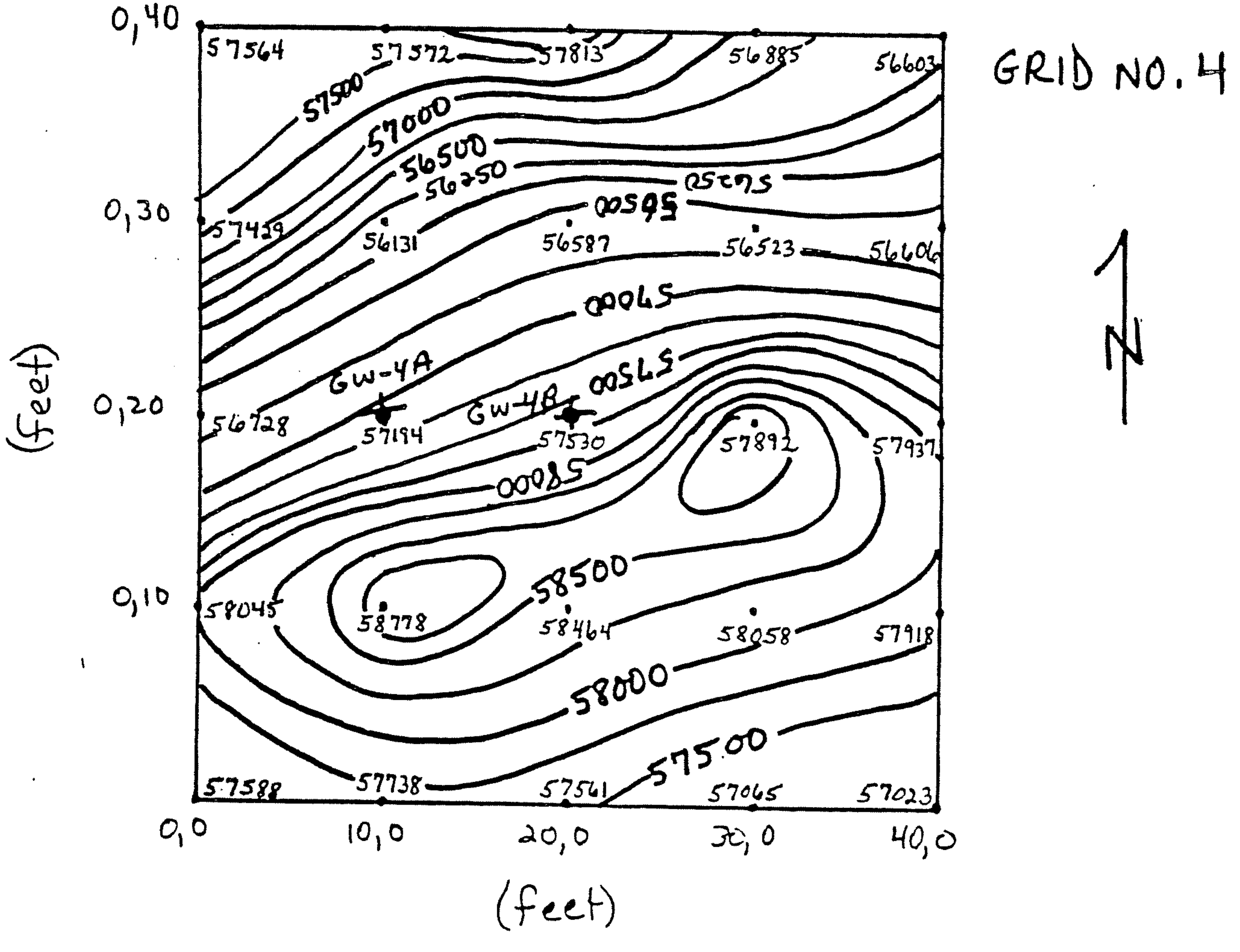
HORIZONTAL DIPOLE



Contour Interval = 10 millimhos/m

TOWN OF LEWISTON
LANDFILL SITE
NYSDEC ID No. 932076

MAGNETOMETER
SURVEY



READINGS IN GAMMAS

CONTOUR INTERVAL = 250 GAMMAS

✦ = Proposed monitoring well location stake

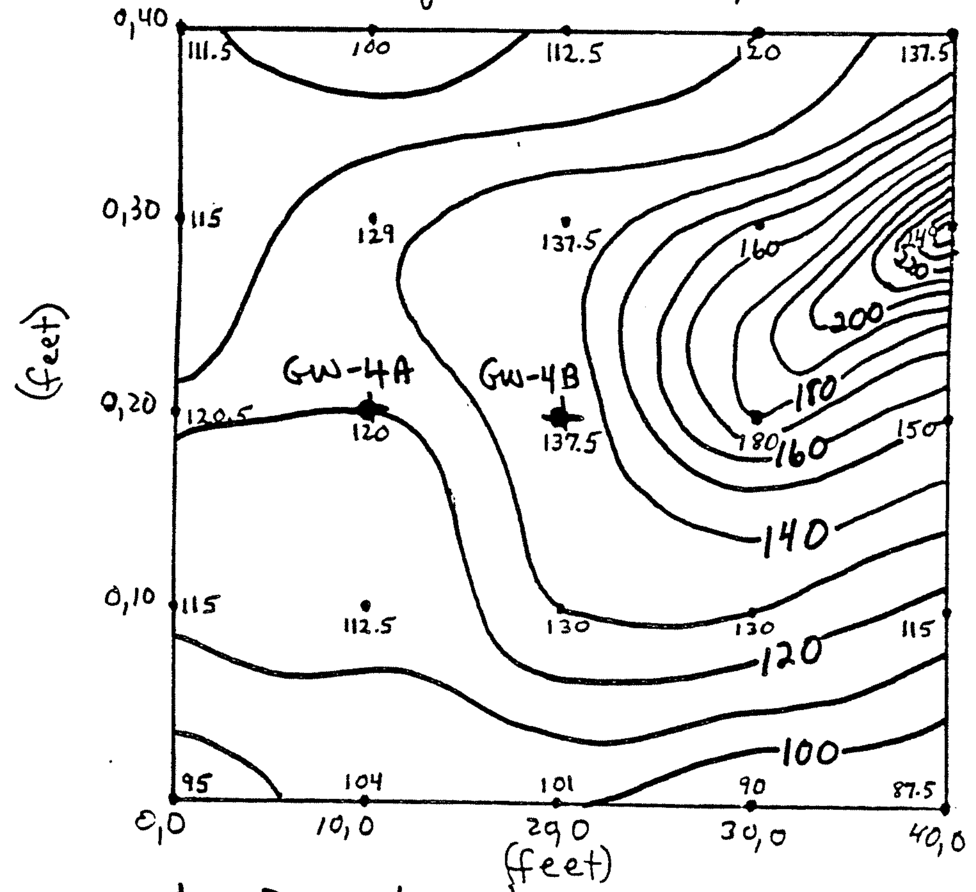
TOWN OF LEWISTON LANDFILL SITE
NYSDEC ID NO. 932076

Draft

EM31 GOUND CONDUCTIVITY SURVEY
(Readings in millimhos/meter)

GRID NO. 4

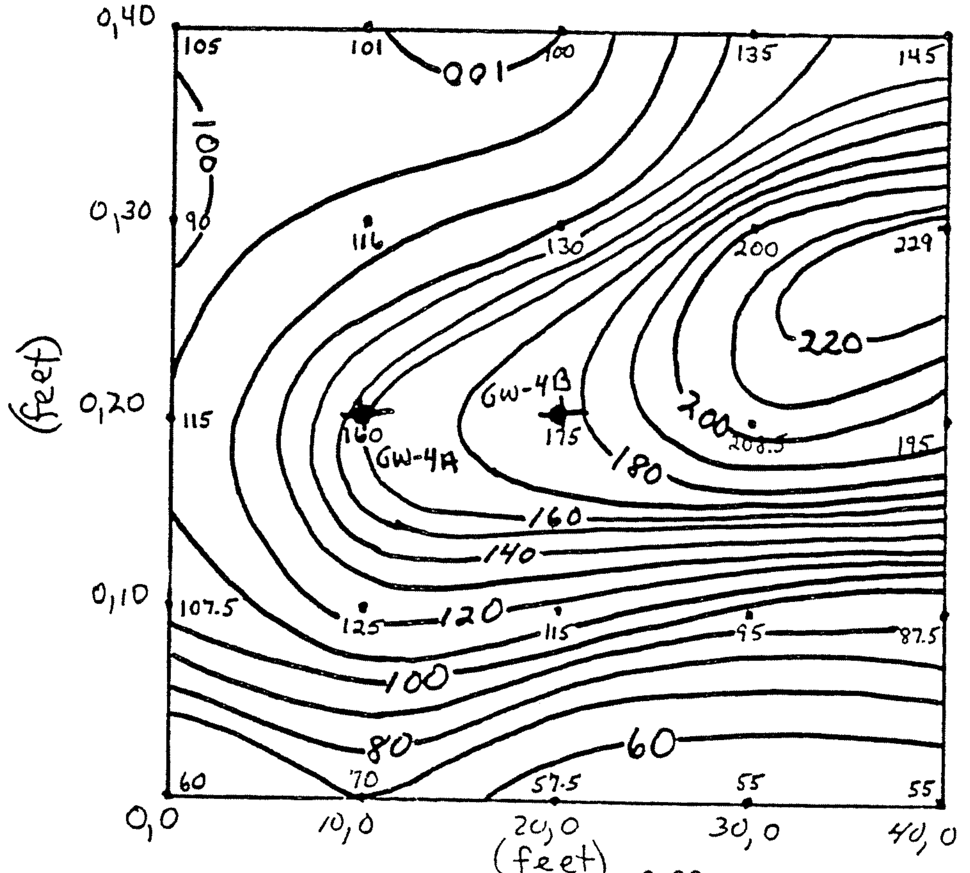
VERTICAL DIPOLE



Contour Interval = 10 millimhos/m

✦ = Proposed monitoring well location stake

HORIZONTAL DIPOLE



Contour Interval = 10 millimhos/m

APPENDIX D

DRILLING LOGS FOR GROUNDWATER MONITORING WELLS

Draft

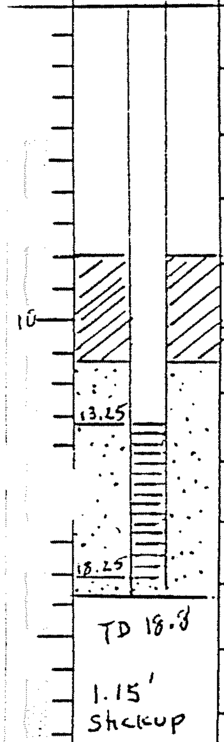
DATE
STARTED 7/19/90
NISHED 7/19/90
IEET 1 OF 1

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW1A
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT YQ1040
Lewiston Landfill
DEC Phase II

LOCATION upgradient GW1A
overburden well



SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12
14-16'		3	2
		1	7
		12	18
		70	29
		50/5'	

PROFILE Cl Sl Sd Gr

CL CL

CL+ML (varve)

ML/CL

FIELD IDENTIFICATION OF SOILS

0-14' see GW1B augered to 14'
14-16: 2.0/2.0 'rec

14-15.2: Clay, (CL)
moist, mottled red;
yellow dark brown +
grey, plastic, silty
cohesive, stiff, small gravel
massive - some lamination
15.2-16.0 - Varved clay
alternating red +
gray bands (CL)
gray: moist-wet-
to saturated at bottom
clay, very plastic
soft, cohesive
2-6" long (CL) (CL+ML)
red: silty clay-silt
moist, low plasticity
at top -≤1" wide
saturated w/ free
standing water at 16.0'

16-18.0 - 0.0'/2.0' recovery
No recovery

18-20: 0.8'/2.0 recovery
18-18.8 red silt - silty clay (ML+CL)
pebbly (2-3%) sparse
large cobbles ≤2" (<1%)
saturated, sandy, low
plasticity, cohesive
(red varve zone?)
18.5 - large cobble limestone

NOTES

cuttings
dry - 0-6'
medium
brown
small balls

6.0 - red
clay, moist
medium balls
2-3" dia

10 -
grey clay
soft, moist
-wet,
sandy, silt
sparse cobble
<1"
large balls
3-4" dia

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Draft

DATE
STARTED 7/16/90
FINISHED 7/18/90
SHEET 1 OF 5

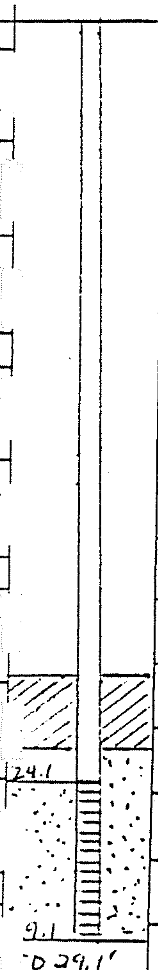
E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW1B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ1040
Lewiston Landfill
DEC Phase II

LOCATION GW1B

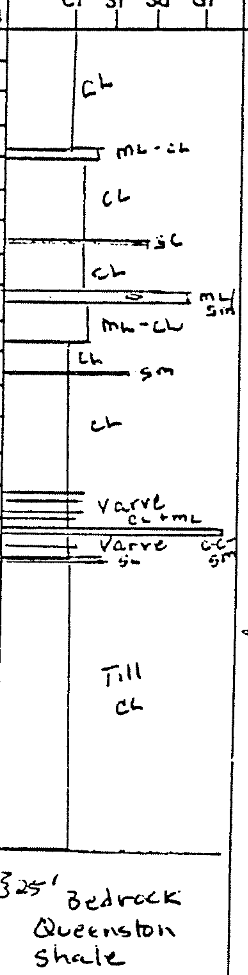
WELL DIAGRAM



BLOWS ON SAMPLER

0–6 12–18	6–12 18–24
2	5
6	6
4	7
11	13
9	10
10	11
4	5
8	13
5	10
6	4
2	2
3	3
2	1
2	2
2	1
2	3
3	4
14	11
38	50/4"
12	12
23	29
50/4.5'	

PROFILE



FIELD IDENTIFICATION OF SOILS

Surface condition: overgrown

0-2.0: 8.5"/2.0' recovery

0.0-0.4: dark brown clayey silty loam, moist, plastic, rootlets throughout cohesive, massive

0.4-0.85: silty clay (CL), yellow light brown, rust brown banding, dry, low to non plastic, ~~non~~ cohesive small size debris (<.001) small pebbles

2.0-4.0'; 1.25'/2.0' recovery

2.0-2.7 grey + yellow mottled, red brown CLAY (CL) sparse pebbles <1%. ~~non~~-massive, silty cohesive, plastic, stiff

2.7-3.25 - red clay (CL) laminated, grey coated fractures, plastic cohesive, moist-dry stiff

4.0-6.0: 2.1'/2.0' rec

4.0-4.21: silt - (ML-CL) silty clay, light brown, dry - massive low plasticity 1% coarse sand 1% gravel

4.7-6.1: red clay, dry laminated

NOTES

cutting: dry dark brown

OVA: 0ppm AB
HNU: 0ppm AB
O2/Expl: 0 LEL

OBSERVATIONAL sample

OVA: 0ppm AB
HNU: 0ppm AB
O2/Exp: 0 LEL

grainsize
atterburg limits

OVA: 0ppm
HNU - 0ppm
O2/Exp: 0 LEL

CLASSIFICATION/BY Carol Warbell E+E

DATE
STARTED 7/16
FINISHED 7/18
SHT 2 OF 5

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW1B
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT YQ1040
Lewiston Landfill

LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0–6 / 6–12 / 12–18 / 18–24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						4.4-6.1 red clay (CL) silty laminated plastic sparse pebbles, moist plastic, cohesive, stiff	OBS. sample
						6.0 - 8.0: 1.3'/2.0' recovery	OVA: 0ppm Hnu: 0ppm O2/Exp: 0LEL
						6.0 - 6.7' : red laminated clay, w/ rusty banding (CL) same as above and (6.7- Break) soft clayey silt red (ML) low plasticity, moist massive, 6.7-6.95- same red clay/silt 6.95: light brown (SC) fine sand, moist low plasticity, clayey	
						6.95 - 7.3 - same red clay	OBS. sample
						8.0-10.0 0.8'/2.0' recovery 8.0 - 8.3: Red laminated clay same as above	OVA: 0ppm Hnu: 0ppm O2/Exp: 0LEL
						8.3 - 8.8. red brown clayey silt & sand + gravel (ML)/(SM) moist, low plasticity massive, low cohesion 10% gravel (≤ 0.05') fine sand to silt stiff	OBS. sample.

088

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ecology and environment

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E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

A.:
RTED 7/16/90
INISHED 7/18/90
HEET 3 OF 5

HOLE NUMBER GW1B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT Y(Q 1040
Lewiston Landfill

LOCATION

PTH	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0-6 / 6-12 / 12-18 / 18-24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						10-12.0 : 1.6 /2.0' recovery 10.0 - 10.2: light brown, silt to silty clay, massive dry-moist, v. coarse sand (1%) (ML-CL)	cuttings: Small Balls OVA: 0ppm Hnu: 0ppm O2/Exp: 0LEL
						10.2 - 11.6 - grey (red) clay (CL), moist-wet very plastic, massive sparse pebbles <1%, soft 10.8 sand, light brown clayey, moist, pod	
						12-14.0 1.0'/2.0' recovery sam as above wet-saturated no free H2O visible	OVA: 0ppm Hnu: 0ppm O2/Exp: 0LEL
						14.0-16.0 : 2.0/2.0' recovery 14.0-14.4 - grey brown clay (CL), very plastic sparse pebbles, soft moist, massive	OVA: 0ppm Hnu: 0ppm O2/Exp: 0LEL
						14.4 -15.1 - red grey clay (CL) very wet - saturated mottled, very plastic massive, soft, massive	
						15.1 - 15.8 . varves alternating red + grey layers 0.05' dry red layers laminated stiff, silty clay - silt (ML) 0.3' gray layers wet soft very plastic clay (CL)	cuttings: large Balls
						15.8 - 16.0 - gravel - fine (GC-SM) tp silty, red-grey sand - fine - clayey saturated free H2O	(water zone)

640088

D-5 CLASSIFICATION/BY Carl Waddell E+C

Draft

DATE
STARTED 7/16/90
FINISHED 7/18/90
S. .T 4 OF 5

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW1B
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT YQ1040
Lewiston Landfill

LOCATION

	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0–6 / 6–12 / 12–18 / 18–24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						16.0-18.0 1.0'/2.0 recovery 16.0-16.7 (same varves) grey clay free standing water gravelly, 5% small (<0.01') very soft, very plastic	cuttings: large Balls of gray clay
						16.7-18.0 - red silt (SM-CL) - clayey silt (ML), pebbles + cobbles (< 0.1') (1%)	0.25. sample
						- saturated, sandy massive, cohesive low plastic	OVA: 0ppm Hnu: 0ppm O_2/Exp: OLE
						18-20.0 1.0/2.0 rec red + grey mottled clay (CL) w/ very soft very plastic saturated (free H_2O) cohesive cobbles sparse (≤ 2")	OVA: 0ppm Hnu: 0ppm O_2/Exp. OLE grainsize 16-20'
						19.0 - limestone - refusal with auger + split spoon Begin coring - NOTE: Should be Queenston Shale in bedrock - This may be a boulder	
						Rockcore run 1: 19- 19.0-19.6 - limestone boulder	2.5 recovery
						19.6-22.8: Red clay + Brown Till, moist, tight, low plastic, silty, sandy massive, low cohesion Cobbles < 2.5" common 20% cobbles + pebbles very stiff, firm sand (15%)	cored like rock soft at 21-22' most washed out

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Draft

DATE
STARTED 7/16
FINISHED 7/18
SHEET 5 OF 5

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW1B
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT Lewiston Landfill
YR 1040

LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6, 6/12, 12/18, 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						21 -22ft: Brown clay soft, massive moist plastic, cobbles <1.5" 22-24: same sandy Till	OVA: 0ppm Hnu: 0ppm Exp/O_2 = 0LEL
						24-26: no recovery	augering very slowly – very loose slurry coming up probably from coming H_2O
						26-27: 26.0 - 26.45: green fissile shale w/ red spots dry, fractured. refusal set up for core run: 26-29.0' Nx Core Run 1: 2.1/3.0' rec	
						26.4 26.6 - shale - green competent 26.6 - 26.9 . SHALE red, fissile, weathered & fractured, non competent clay layers 26.9 - green shale	Change in H_2O to white 27.5' Back to red at 28.5 → (water zone)
						26.95 - 27.1 red shale competent, fractures at 26.7, 26.9 27.0	RDQ = 0
						27.1 - 27.4 green shale 27.23 - 27.4 - non competent clay rich layers, soft multiple horizontal fractures	(water zone)
						27.4 - 28.1 - red shale competent ~~at~~ Broken fractures 27.45, 27.5 27.7	

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Draft

DATE
STARTED 7/20/90
FINISHED 7/20/90
SHEET 1 OF 6

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

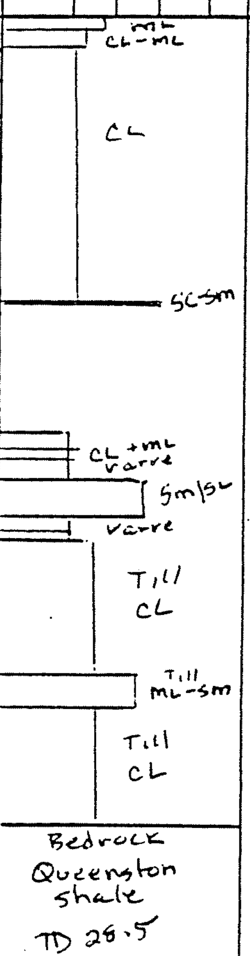
HOLE NUMBER GW
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT YQ1040
Lewistn Landfill

LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 – 12/18	BLOWS ON SAMPLER 6/12 – 18/24
				5	4
				6	10
				5	7
				10	14
5'				7	9
				12	25
				4	5
				7	11
				6	4
10				4	5
				3	4
				4	7
				8	4
				5	13
15				6	6
				8	15
				11	17
				15	15
				8	10
20				12	21
				37	42
				45	50/4"
				50/5"	
				51/5"	100/6"

PROFILE



FIELD IDENTIFICATION OF SOILS

0.0-2.0: 1.6 rec
0.0-0.7: silt, (ML)
medium brown, clayey
noncohesive, dry
rootlets throughout

0.7-1.1: Silty clay (CL)-
clayey silt (ML)
mottled yellow brown
+ medium brown + gray
dry, low cohesion,
low plasticity, massive

1.1-1.6: CLAY (CL)
silty, dry, plastic
cohesive, massive, stiff
mottled red + gray
w/ yellow spots,
gray on fractures
sparse pebbles ≤ 1/2"

2.0-4.0: 1.25/2.0 rec
2.0-3.25: CLAY (CL)
mottled red + gray
plastic, stiff, moist
cohesive, massive
sparse pebbles.

4.0-6.0: 2.0/2.0 rec
4.0-4.9: CLAY (CL)
light-medium brown
silty, plastic, stiff
cohesive, moist-dry
gray mottling

NOTES

OVA: Opp
on samp

Obs
sample
1.0-1.3

obs.
sample
3.0-3.2

OVA: Opp
on samp

OVA: Opp
on samp

obs
sample
4.8-5.1

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E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

Draft

HOLE NUMBER GW2B
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT YQ1040
Lewiston landfill

LOCATION

WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6, 6/12, 12/18, 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
					4.9-6.0 : CLAY (CL) red + gray mottled moist, massive, plastic silty, cohesive, sparse pebbles ≤ 1", stiff	grain size analysis 5-6'
					6.0-8.0 : 2.3/2.0 rec CLAY (CL): red + gray mottled, moist, laminated plastic, cohesive sparse pebbles, stiff	OVA = 0ppm obs sample 7.0-7.3'
					8.0-10.0 : 1.65'/2.0 rec	Ova = 0ppm
					8.0-9.0: CLAY (CL) mottled medium brown red + gray, soft plastic, moist laminated to massive cohesive	
					9.0-9.1 : Sand (SC-SM) light brown, wet non cohesive, low plasticity	obs sample 9.0-9.2
					9.1-9.65: same clay as 8.0-9.0	
					10.0-12.0: 1.3'/2.0 rec	OVA = 0ppm
					10.0-11.3: CLAY (CL) medium brown with red and gray mottling, moist laminated plastic cohesive	obs sample 10.5-10.7

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SUBSURFACE LOG

HOLE NUMBER GW2B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ1040
Lewiston Landfill

LOCATION

WELL DIAGRAM
SAMPLE TYPE
SAMPLE NO.
BLOWS ON SAMPLER 0 6 | 6 12 | 12 18 | 18 24
PROFILE Cl Sl Sd Gr

FIELD IDENTIFICATION OF SOILS	NOTES
10.0 – 11.3 (cont)	
stiff, sparse pebbles	
(CL 1%)	
12.0 – 14.0: 1.9/2.0 rec	OVA: 0ppm
12.0 – 12.9: CLAY (CL)	
Brown + red mottled	
moist, laminated	
plastic, very soft	
cohesive	
12.9 – 13.9: CLAY (CL)	
gray + red varve	
red: silt – silty clay	
(ML) low cohesion, low	
plasticity, wet-moist	obs sample
stiff < 1/8"	12.8 – 13.0
gray: CLAY, (CL)	
wet, very soft	
very plastic, massive	
cohesive	
Very sparse silt	
layers.	
14.0 – 16.0: 1.7/2.0 rec	
14.0 – 14.7; same as	Obs sample
above	14.6 – 14.8
14.7 – 15.7 Sand (SM-SC)	grain size
medium brown-tan	analysis
w/ sparse black spotting	14.8 – 15.7
low plasticity, silty	
clayey, saturated	
(free H_2O) fine-medium	
grained	

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SUBSURFACE LOG

HOLE NUMBER GW2B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ1040 Lewiston Landfill
LOCATION

WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
					16-18.0 : 2.0/2.0 rec	OVA=0ppm
					16.0-16.7 : same gray. varve clay w/ thin red silt ~~zones~~ <1/16" highly plastic, moist very soft, cohesive no free H2O visible	
					16.7-18.0 - Till (ML-SM) silt - sand, sparse fines (clay ≤ 10%) 20% sand, red, sparse large cobbles ≤ 3" moist, low plasticity low cohesion, stiff	Obs sample 16.6-16.8
					18.0-20.0 : 0.2'/2.0' rec	
					18.0-18.2 : same as above	Obs sample 18.0-18.2 OVA=0ppm
					20.0-22.0 : 1.7/2.0 rec	
					20.0-20.6 : CLAY (CL) silty, light red brown sandy, cohesive, moist soft, massive, plastic	OVA=0ppm
					20.6-20.7 : limestone cobble	
					20.7-21.7 : SILT - SAND (ML-SM) TILL moist, red brown massive, low plasticity non cohesive, sparse large cobbles ≤ 2" (clay < 10%)	Obs sample 20.7-20.9

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SUBSURFACE LOG

HOLE NUMBER [illegible]
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT VQ1040
Lewiston Landfill

LOCATION ~~off south west corner of firehouse~~
near cyclone on SW side of plant

WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6, 6/12, 12/18, 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
					22-24.0 : 0.7 rec 22.0-22.7: CLAY (CL) (Till) mottled red, brown yellow + gray clay. silty, dry-moist laminated, massive (chaotic) cohesive cobbles ≤ 2" < 1%	OVA = 0 ppm on sample obs sample 22.2-22.4 aquaclude
					24.0-26.0: 0.8 rec 24.0-24.8: CLAY (Till) (CL) silty, dry-moist cohesive, plastic massive 24.8 water saturated zone at bottom spoon full of H_2O	aquaclude obs sample 24.2-24.4 H_2O zone OVA: 0ppm on sample higher in hole due to steam from heated auger & spl spn bit
					1st Rock Core Run 24.8-26.6: 1.7'/2.0 rec 24.8-25.2: gneissic boulder 25.2-26.6 : SHALE red, competent, sandy 25.8-26.0: clay zone non competent, H_2O rich zone Breaks: 25.5, 25.55 25.85-26.0, 26.35 26.43 (probably Queenston)	RQD = 0.5/1.7

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D-12 CLASSIFICATION/BY Carol Waddey

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SUBSURFACE LOG

HOLE NUMBER 6602B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ 1040
Lewiston Landfill

LOCATION

WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
					26.6-29.0: 1.9/2.4 rec 26.6-27.5: SHALE red, sandy, competent breaks 26.9, 27.1-27.2 27.5-28.5: SHALE Green, competent very broken 28.1- CLAY, green non competent layer	RDQ= 0.0 Water zone

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SUBSURFACE LOG

HOLE NUMBER GW1A
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT YQ1040

LOCATION upgradient GW1A
overburden well

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	PROFILE Cl Sl Sd Gr
10								
		14-16'		3	2	1	7	
				12	18	70	29	
				50/5"				

FIELD IDENTIFICATION OF SOILS

0-14' see GW1B
14-16: 2.0/2.0'rec

14-15.2: Clay, (CL)
moist, mottled red;
yellow dark brown +
grey, plastic, silty
Cohesive, stiff, small gravel
massive - some lamination

15.2-16.0 - Varved clay
alternating red +
gray bands (CL)
gray: moist-wet-
to saturated at bottom
clay, very plastic
soft, cohesive
2-6" long
red: silty clay-silt
moist, low plasticity
at top - ≤1" wide
saturated w/ free
standing water at 16.0'

16-18.0 - 0.0'/2.0' recovery
No recovery

18-20: 0.8'/2.0 recovery
18-18.8 red silt - silty clay (ML+CL)
pebbly (2-3%) sparse
large cobbles ≤2" (<1%)
saturated, sandy, low
plasticity, cohesive
(red varve zone?)
18.8 - large cobble limestone

NOTES

cuttings
dry - 0-6'
medium
brown
small balls

6.0 - red
clay, moist
medium balls
2-3" dia

10 -
grey clay
soft, moist
-wet,
sandy, silty
Sparse cobbles
<1"
large balls
3-4" dia

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WELL INSTRUMENTATION LOG

Draft

Project Name: Lewiston Landfill

Project No.: YQ1040

Client: NYS DEC

Location: GW1A

Start Date: 7/19/90

Completion Date: 7/19/90

Drilling Method: HSA

Driller: L. Penrod

Screen Type:
☒ Continuous Slot
☐ Perforated ☐ Louvre
☐ Other:

Screen Material:
☐ Stainless Steel
☒ Plastic
☐ Other:

Screen Length (ft/m): 5'

Screen Diameter (in/cm): 2"

Screen Slot Size: 0.01

Well Casing Material: steel (Protective casing)

Well Casing Diameter (in/cm): 4" (Protective casing)

Hole Diameter: 6"

Water Level in Completed Borehole (ft/m): 4.75 BGS 7/20/90

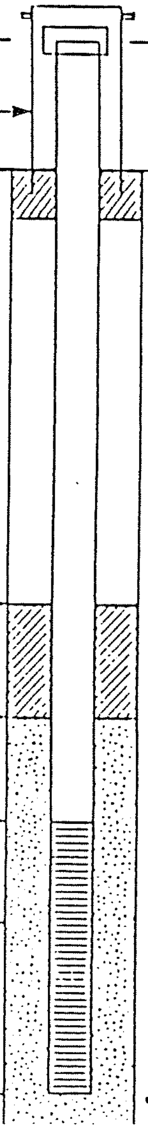
Development Method:

Development Duration:

Cap Type:

rotective Casing

Ground Surface



Depth of Borehole: 18.8 (ft/

Stick Up: 1.16 (ft/

SAMPLING METHODS:

Split Spoon: Size:

Depths:

Shelby Tube: Size:

Depths:

Remarks:

Quantity of Material Used:

Filter Pack: 2 bags

Bentonite Pellets: 1/2 bag

Cement:

Cement/ Bentonite: 2 bags%

Grout:

Top of Seal at 8.0 (ft/m)*

Bottom of Seal at 11.5 (ft/m)*

Top of Screen at 13.25 (ft/m)*

Pack Type:
☐ Sand Size
☐ Gravel
☐ Natural

Bottom of Screen at 18.25 (ft/m)*

Bottom of Hole at 18.8 (ft/m)*

*Note: All Dimensions are Below

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SUBSURFACE LOG

HOLE NUMBER GW1B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ1040
Lewiston Landfill

LOCATION GW1B

DEPTH – FT | WELL DIAGRAM | SAMPLE TYPE | SAMPLE NO. | PROFILE: Cl Sl Sd Gr

0
20

BLOWS ON SAMPLER

0/6 12/18	6/12 18/24
2	5
6	6
4	7
11	13
9	10
10	11
4	5
8	13
5	10
6	4
2	2
3	3
2	1
2	2
2	1
2	3
3	4
14	11
38	50/4"
12	12
23	29
5	2 3.25'
50/4.5'	

FIELD IDENTIFICATION OF SOILS

Surface condition: overgrown

0-2.0: 8.5"/2.0' recovery

0.0-0.4: dark brown clayey silty loam, moist, plastic, rootlets throughout cohesive, massive

0.4 - 0.55: silty clay (CL), yellow light brown, rust brown banding, dry, low to non plastic, ~~non~~ cohesive small size debris (<.001) small pebbles

2.0-4.0'; 1.25'/2.0' recovery

2.0-2.7 grey + yellow mottled red brown CLAY (CL) sparse pebbles <1%, ~~Acu~~-massive, silty cohesive, plastic, stiff

2.7-3.25- red clay (CL) laminated, grey coated fractures, plastic cohesive, moist-dry stiff

4.0-6.0: 2.1'/2.0' rec

4.0-4.21: silt-(ML-CL) silty clay, light brown, dry- massive low plasticity 1% course sand 1% gravel

4.7-6.1. red clay, dry laminated

NOTES

cutting: dry dark brown
OVA: 0ppm AB
HNU: 0ppm AB
O2/Expl: 0 LEL
OBSERVATIONAL sample

OVA: 0ppm AB
HNU: 0ppm AB
O2/Exp: 0 LEL

grain size + atterburg limits

grain size
atterburg limits

OVA: 0ppm
HNU- 0ppm
O2/Exp: 0 LEL

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DATE
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SHEET 2 OF 5

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW1B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ1040
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0–6 / 12–18	BLOWS ON SAMPLER 6–12 / 18–24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
							4.4-6.1 red clay (CL) silty laminated plastic sparse pebbles, moist plastic, cohesive, stiff	OBS. sample
							6.0-8.0: 1.3'/2.0' recovery ~~sandy~~	OVA: 0ppm Hnu: 0ppm O2/Exp: OLCL
							6.0-6.7: red laminated clay, w/ rusty banding (CL) same as above)	
							(6.7- Break) soft clayey silt red, low plasticity, moist massive, ~~sparse pebbles~~	
							6.7-6.95- same red clay	
							6.95: light brown (SC) fine sand, moist low plasticity, clayey	OBS. sample
							6.95 - 7.3 - same red clay	
							8.0-10.0 0.8'/2.0' recovery	OVA: 0ppm Hnu: 0ppm O2/Exp: OLCL
							8.0-8.3: Red laminated clay same as above	
							8.3 - 8.8: red brown clayey silt w sand & gravel (ML) moist, low plasticity massive, low cohesion 10% gravel (≤ 0.05') fine sand to silt stiff	OBS. sample.

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DATE
STARTED 7/16/90
FINISHED 7/18/90
SHEET 3 OF 5

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW13
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT YQ 1040
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6, 6/12, 12/18, 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						10-12.0 : 1.6 /2.0' recovery 10.0 - 10.2: light brown, silt-silty clay, massive dry-moist, v. coarse sand (1%) (ML-CL)	cuttings: Small Balls OVA: 0ppm Hnu: 0ppm O2/Exp: 0LEL
						10.2 - 11.6 - grey(red) clay (CL), Moist-wet very plastic, massive sparse pebbles <1%, soft 10.8 sand, light brown clayey, moist, pocl	
						12-14.0 1.0'/2.0' recovery same as above wet-saturated no free H2O visible	OVA: 0ppm Hnu: 0ppm O2/Exp: 0LEL
						14.0-16.0 : 2.0/2.0' recovery 14.0-14.4 - grey brown Clay (CL), very plastic sparse pebbles, soft moist, massive	OVA: 0ppm Hnu: 0ppm O2/Exp: 0LEL
						14.4 -15.1 - red grey clay (CL) very wet - saturated mottled, very plastic massive, soft, massive	
						15.1 - 15.8 · varves alternating red + grey layers 0.05' dry red layers laminated stiff, silty clay - silt (ML) 0.3' gray layers wet soft very plastic clay (CL)	cuttings: large Balls
						15.8 - 16.0 - gravel- fine (GC-SM) top silty, red-grey sand - fine - clayey saturated free H2O	(water zone)

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DATE
STARTED 7/16/90
FINISHED 7/18/20
SHEET 4 OF 5

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW1B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ1040
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	PROFILE Cl	Sl	Sd	Gr	FIELD IDENTIFICATION OF SOILS	NOTES
												16.0-18.0 1.0'/2.0 recovery 16.0-16.7 (same varves) grey clay free standing water gravelly 5% small (<0.01') very soft, very plastic	cuttings: large Balls of gray clay
												16.7-18.0 - red silt (SM-CL) - clayey silt (ML), pebbles + cobbles (< 0.1') (1%) - saturated, sandy massive, cohesive low plastic	025. sample OVA: 0ppm Hnu: 0ppm O_2/Exp: OLE
												18-20.0 1.0/2.0 rec red + grey mottled clay (CL) w/ very soft very plastic saturated (free H_2O) cohesive Cobbles sparse (≤ 2")	OVA: 0ppm Hnu: 0ppm O_2/Exp. OLE grainsize 16-20'
												19.0 - limestone - refusal Both auger + split spoon Begin coring - NOTE: Should be Queenston Shale in bedrock - This may be a boulder	
												Rock core run 1: 19- 19.0-19.6 - limestone boulder 19.6-22.8: Red clay + Brown Till, moist, tight, low plastic, silty, sandy massive, low cohesion Cobbles .< 2.5" common 20% cobbles + pebbles very stiff, firm sand (15%)	2.5 recovery cored like rock soft at 21-22' most washed out

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DATE
STARTED 7/16/20
FINISHED 7/18/20
SHEET 5 OF 5

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW1B
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT YQ1040
Lewiston Landfill

LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0-6 / 6-12 / 12-18 / 18-24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						21 -22?: Brown clay soft, massive moist plastic, sandy, cobbles <1.5" 22-24: Same Till	OVA: 0ppm Hnu: 0ppm Exp/O_2 = 0ppm
						24-26: no recovery 26-27: 26.0 – 26.45: green fissile shale w/ red spots dry, fractured. refusal set up for core run: 26-29.0'	augering very slowly – very loose slurry coming up probably from coring H_2O
						Nx Core Run 1: 2.1/3.0' rec 26.426.6- shale -green competent 26.6-26.9 : SHALE red, fissile, weathered & fractured, non competent clay layers 26.9- green shale	Change in H_2O to white 27.5' Back to red at 28.5' → (water zone)
						26.95- 27.2 red shale competent, fractures at 26.7, 26.9 27.0	RQD = 0
						27.2 - 27.4 green shale 27.23 - 27.4 - non competent clay rich layers, soft multiple horizontal fractures	(water zone)
						27.4 - 28.1 - red shale competent at Broken fractures 27.45, 27.5 27.7	

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WELL INSTRUMENTATION LOG

Project Name: Lewiston Landfill

Project No.: YQ1040

lient: DEC

Location: GW1B

Start Date: 7/16

Completion Date: 7/18/90

Drilling Method: HSA, HQ

Driller:

Screen Type:
☒ Continuous Slot
☐ Perforated ☐ Louvre
☐ Other:

Screen Material:
☐ Stainless Steel
☒ Plastic
☐ Other:

Screen Length (ft/m): 5'

Screen Diameter (in/cm): 2"

Screen Slot Size: 0.01

Well Casing Material: steel

Well Casing Diameter (in/cm):

Hole Diameter: 6"

Water Level in Completed Borehole (ft/m): 4.5' BGS 7/18/90

Development Method:

Development Duration:

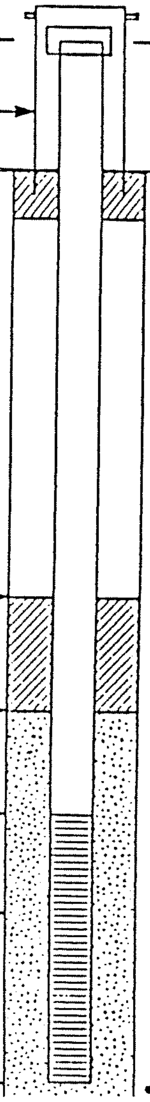
Cap Type:

rotective Casing

Ground Surface

Depth of Borehole: (ft/r

Stick Up: (ft/r



SAMPLING METHODS:

Split Spoon: Size:

Depths:

Shelby Tube: Size:

Depths:

Remarks:

Quantity of Material Used:

Filter Pack: 1 bag

Bentonite Pellets: 1/3 bag

Cement:

Cement/ Bentonite: %

Grout: 4 bags

Top of Seal at 20.75 (ft/m)*

Bottom of Seal at 23.0 (ft/m)*

Top of Screen at 24.1' (ft/m)*

ick Type:
] Sand Size
] Gravel
☐ Natural

Bottom of Screen at 29.1 (ft/m)*

Bottom of

*Note: All Di

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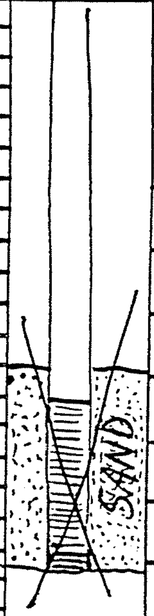
DATE STARTED 7-23-90 FINISHED SHEET 1 OF 1	E + E DRILLING AND TESTING CO., INC. SUBSURFACE LOG	HOLE NUMBER GW-2A SURFACE ELEVATION GROUNDWATER DEPTH ( )

PROJECT YQ-1040
Lewiston Landfill

LOCATION



DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0–6	6–12	12–18	18–24	PROFILE (Cl Sl Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
5									0' to 14' (see GW-2B) Augered To 14'	
10 13 15				8	8	6	8		S.S. #1, 14' to 16', Comp. Rec. 14' to 14.7' dry, brown-gray crumbly clay with <10% rounded and angular pebbles. non-plastic, non-cohesive, some silt 14.7' to 16' moist clay, red & gray mottled, cohesive and plastic no inclusions. (wet @ 16.0')	moist water @ 16'
18 19 20				8	8	11	12		S.S #2, 16' to 18', Comp. Rec., 16' to 16.3', same as above 16.3' to 18', fine grained red sand with 20% pebbles and cobbles (Both rounded and Angular)	Saturated
	BOH @ 18.35'			50				50 for 0.5'	S.S. #3, 18' - 18.5' Same as above with more and larger Cobbles, 35%.	Saturated
									B.O.H @ 18.50' BGS Screened from 13.35' to 18.35'	Saturated

See Well Instrumentation Log

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WELL INSTRUMENTATION LOG

Draft

Project Name: Lewiston Landfill Phase II

Project No.: YQ-1040

Client: NYSDEC

Location: GW-2A

Start Date: 7-23-90

Completion Date: 7-24-90

Drilling Method: Hollow Stem Auger

Driller: Lee PenRod

Screen Type:
☒ Continuous Slot
☐ Perforated ☐ Louvre
☐ Other:

Screen Material:
☐ Stainless Steel
☒ Plastic (PVC)
☐ Other:

Screen Length (ft/m): 5'

Screen Diameter (in/cm): 2" ID

Screen Slot Size: .010"

Well Casing Material: PVC

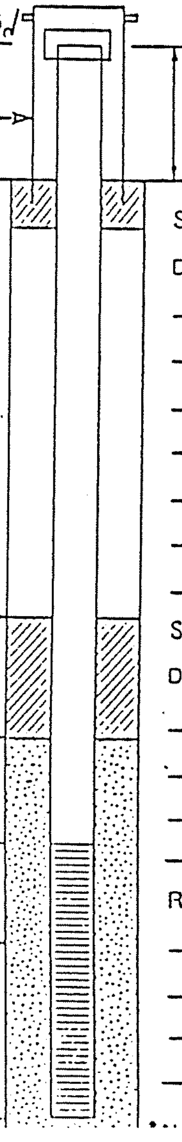
Well Casing Diameter (in/cm): 2" ID

Hole Diameter: 6"

Water Level in Completed Borehole (ft/m):

Development Method:

Development Duration:



Cap Type: PVC slotted

Protective Casing

Ground Surface

Depth of Borehole: (ft/m)

Stick Up: (ft/m)

SAMPLING METHODS:

Split Spoon: Size:

Depths:

Quantity of Material Used:

Filter Pack: 1 1/2 bags

Bentonite ~~Pellets:~~ slurry 1 bag

Cement: 2 bags

Cement/ Bentonite: 90/10 %

Grout: 10 ft

Top of Seal at 10' (ft/m)*

Bottom of Seal at 12.5' (ft/m)*

Top of Screen at 13.35' (ft/m)*

Shelby Tube: Size:

Depths:

Type:
☒ Sand Size
☐ Gravel
☐ Natural

Remarks:

Bottom of Screen at 18.35' (ft/m)*

Bottom of

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SHEET 1 OF 6

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW2B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ1040
Lewiston Landfill
LOCATION

DEPTH – FT 5 10 20

WELL DIAGRAM | SAMPLE TYPE | SAMPLE NO. | PROFILE Cl Sl Sd Gr

BLOWS ON SAMPLER 0/6, 12/18	6/12, 18/24
5	4
6	10
5	7
10	14
7	9
12	25
4	5
7	11
6	4
4	5
3	4
4	7
8	4
5	13
6	6
8	15
11	17
15	15
8	10
12	21
37	42
45	50/4"
50/5"	
51/5"	100/6"

FIELD IDENTIFICATION OF SOILS

0.0-2.0: 1.6 rec

0.0-0.7: silt, (ML)
medium brown, clayey
noncohesive, dry
rootlets throughout

0.7-1.1: Silty clay (CL)-
clayey silt (ML)
mottled yellow-brown
+ medium brown + gray
dry, low cohesion,
low plasticity, massive

1.1-1.6: CLAY (CL)
silty, dry, plastic
cohesive, massive, stiff
mottled red + gray
w/ yellow spots,
gray on fractures
sparse pebbles ≤ 1/2"

2.0-4.0: 1.25/2.0 rec

2.0-3.25: CLAY (CL)
mottled red + gray
plastic, stiff, moist
cohesive, massive
sparse pebbles.

4.0-6.0: 2.0/2.0 rec

4.0-4.9: CLAY (CL)
light - medium brown
silty, plastic, stiff
cohesive, moist-dry
gray mottling

NOTES

OVA: 0ppm on sample

Obs sample 1.0-1.3

obs. Sample 3.0-3.2

OVA: 0ppm on sample

OVA: 0ppm on sample

obs sample 4.8-5.1

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DATE
STARTED 7/20/90
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SHEET 2 OF 6

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW2-13
SURFACE ELEVATION ____
GROUNDWATER DEPTH ____
( )

PROJECT YQ1040
Lewiston landfill

LOCATION ____

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	PROFILE Cl SI Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
									4.9-6.0: CLAY (CL) red + gray mottled moist, massive, plastic silty, cohesive, sparse pebbles ≤ 1", stiff	grain size analysis 5-6'
									6.0-8.0; 2.3/2.0 rec CLAY (CL): red + gray mottled, moist, laminated plastic, cohesive sparse pebbles, stiff	OVA = 0ppm obs sample 7.0-7.3'
									8.0-10.0: 1.65/2.0 rec	Ova = 0ppm
									8.0-9.0: CLAY (CL) mottled medium brown red + gray, soft plastic, moist laminated to massive cohesive	
									9.0-9.1: Sand (SC-SM) light brown, wet noncohesive, low plasticity	obs sample 9.0-9.2
									9.1-9.65: same clay as 8.0-9.0	
									10.0-12.0: 1.3'/2.0 rec	OVA = 0ppm
									10.0-11.3: CLAY (CL) medium brown with red and gray mottling, moist laminated plastic cohesive	obs sample 10.5-10.7

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SHEET 3 OF 6

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW2B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ1040
Lewiston Landfill
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	PROFILE Cl	Sl	Sd	Gr	FIELD IDENTIFICATION OF SOILS	NOTES
												10.0 – 11.3 (cont) stiff, sparse pebbles (<1%)	
												12.0 – 14.0: 1.9/2.0 rec	OVA: 0ppm
												12.0 – 12.9: CLAY (CL) Brown + red mottled moist, laminated plastic, very soft cohesive	
												12.9 – 13.9: CLAY (CL) gray + red varve red: silt - silty clay (ML) low cohesion, low plasticity, wet-moist stiff < 1/8"	obs sample 12.8 - 13.0
												gray: CLAY, (CL) wet, very soft very plastic, massive cohesive Very sparse silt layers.	
												14.0 - 16.0: 1.7/2.0 rec	
												14.0 - 14.7: same as above	Obs sample 14.6 - 14.8
												14.7 - 15.7 Sand (SM-SC) medium brown-tan w/ sparse black spotting low plasticity, silty clayey, saturated (free H_2O) fine-medium grained	grain size analysis 14.8 - 15.7

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DATE
STARTED 7/20/90
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SHEET 4 OF 6

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW2-B
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT YQ 1040 Lewiston Landfill
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6, 6/12, 12/18, 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						16-18.0 : 2.0/2.0 rec	OVA=0ppm
						16.0-16.7 : same gray varve clay w/ thin red silt ~~zones~~ <1/16" highly plastic, moist very soft, cohesive no free H_2O visible	
						16.7-18.0 - Till (ML-SM) silt - sand, sparse fines (clay ≤ 10%) 20% sand, red, sparse large cobbles ≤ 3" moist, low plasticity low cohesion, stiff	obs sample 16.6-16.8
						18.0-20.0 : 0.2'/2.0' rec	obs sample 18.0-18.2
						18.0-18.2 : same as above	OV.A =0ppm
						20.0-22.0 : 1.7/2.0 rec	
						20.0-20.6 : CLAY (CL) silty, light red brown sandy, cohesive, moist soft, massive, plastic	OVA =0ppm
						20.6-20.7 : limestone cobble	
						20.7-21.7 : SILT-SAND (ML-SM) TILL moist, red brown massive, low plasticity non cohesive, sparse large cobbles ≤ 2" (clay < 10%)	obs sample 20.7-20.9

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Draft GW-2B

DATE
STARTED 7/19/90
FINISHED 7/20/90
SHEET 5 OF 6

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER ~~A46028~~
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ1040
Lewiston Landfill

LOCATION ~~off south west~~ ~~[illegible] of firehouse~~ near cyclone on SW side of plan

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						22-24.0 : 0.7 rec	OVA = 0 ppm on sample
						22.0-22.7: CLAY (CL) mottled red, brown yellow + gray clay. silty, dry-moist laminated – massive (chaotic) cohesive cobbles ≤ 2" < 1%	obs sample 22.2-22.4 aquaclude
						24.0-26.0: 0.8 rec	
						24.0-24.8: CLAY (CL) silty, dry-moist cohesive, plastic massive	aquaclude obs sample 24.2-24.4
						24.8 water saturated zone at bottom spoon full of H_2O	H_2O zone OVA: 0 ppm on sample higher in hole due to steam from heated auger + spl spn bit
						1st Rock Core Run 24.8-26.6: 1.7'/2.0 rec 24.8-25.2: gneissic boulder 25.2-26.6 : SHALE red, competent, sandy 25.8-26.0: clay zone non competent, H_2O rich zone Breaks: 25.5, 25.55 25.85-26.0, 26.35 26.43 (probably Queenstn)	RDQ = 0.5/1.7

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SHEET 6 OF 6

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER 6102B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ 1040
Lewiston Landfill
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6, 6/12, 12/18, 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						26.6 – 29.0 : 1.9/2.4 rec	RDQ = 0.0
						26.6 – 27.5: SHALE red, sandy, competent breaks 26.9, 27.1 – 27.2	
						27.5 – 28.5: SHALE Green, competent very broken 28.1 – CLAY, green non competent layer	water zone

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WELL INSTRUMENTATION LOG

Draft

Project Name: Lewiston Landfill Phase II

Project No.: YQ-1040

Client: NYSDEC

Location: GW-2B

tart Date: 7-20-90

Completion Date: 7-23-90

Drilling Method: HSA & HQ coring

Driller: Lee Penrod

creen Type:
☒ Continuous Slot
☐ Perforated ☐ Louvre
☐ Other:

Screen Material:
☐ Stainless Steel
☒ Plastic, PVC
☐ Other:

Screen Length (ft/m): 5'

Screen Diameter (in/cm): 2" ID

Screen Slot Size: .010"

Well Casing Material: PVC

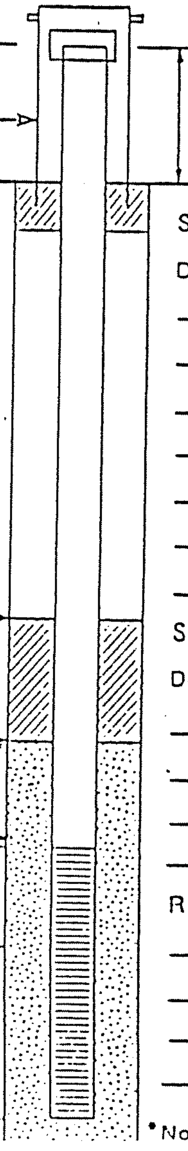
Well Casing Diameter (in/cm): 2" ID

Hole Diameter: 6" & 3¼"

Water Level in Completed Borehole (ft/m):

Development Method:

Development Duration:



Cap Type: PVC

ective Casing steel

Ground Surface

Depth of Borehole: 29.6' (ft/m)

Stick Up: 2' (ft/m)

Quantity of Material Used:
ilter Pack: sand 1 Bag
Bentonite ~~Pellets~~ Slurry, 5 gal.
ement: 2 bags
Cement/ Bentonite: 90/10 %
rout:

Top of
eal at 20.25' (ft/m)*

Bottom of
eal at 22.9' (ft/m)*

Top of
creen at 23.9' (ft/m)*

Type:
☐ Sand Size
☐ Gravel
☐ Natural

ottom of
creen at 28.9' (ft/m)*

Bottom of 29.6'

SAMPLING METHODS:

Split Spoon: Size:

Depths:

Shelby Tube: Size:

Depths:

Remarks:

*Note: All Dimensions are Below

Recorded By: Robert A. [illegible]

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DATE
STARTED 7-25-90
FINISHED 7-25-90
SHEET 1 OF 1

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-3A
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT Lewiston Landfill phase II
NYSDEC
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
									0' to 20', see GW-3B log	
				14	14	9	25		S.S.#1, 20' to 22', 1.0' Recovery 0'-0.6' clay + silt with some black mottling, and little sand 0.6' to 1.0', course to fine sand with silt and some clay.	saturated
				14	36	*50 → 0.5'		Clayey	22' to 24', Complete Recovery 22' to 23.2' same as above with slightly more clay. (wet) 23.2' to 24', Tight red Till. silt with ~30% pebbles, ranging to 10% pebbles. (Dry)	saturated then dry.

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WELL INSTRUMENTATION LOG

Draft

Project Name: Lewiston Landfill Phase II

Project No.: YQ-1040

nt: NYSDEC

Location: GW-3A

tart Date: 7-25-90

Completion Date: 7-25-90

Drilling Method: HSA & HQ coring

Driller: Lee Penrod

creen Type:
☒ Continuous Slot
☐ Perforated ☐ Louvre
☐ Other:

Screen Material:
☐ Stainless Steel
☒ Plastic PVC
☐ Other:

Screen Length (ft/m): 5'

Screen Diameter (in/cm): 2" ID

Screen Slot Size: .010"

Well Casing Material: Sch. 40 PVC

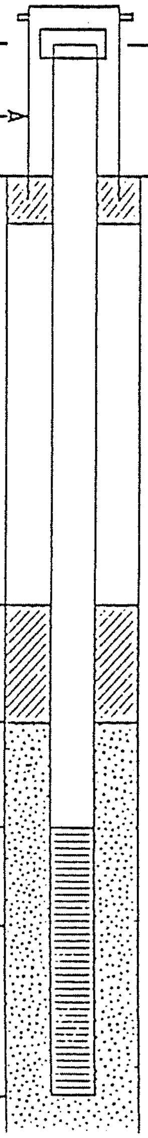
Well Casing Diameter (in/cm): 2" ID

Hole Diameter: 6"

Water Level in Completed
orehole (ft/m): 7.15' BGS

Development Method:

Development Duration:



Cap Type:

otective Casing

Ground Surface

Depth of Borehole: 24' (ft/m

Stick Up: 1.4' (ft/m

SAMPLING METHODS:

Split Spoon: Size:

Depths:

Quantity of Material Used:

ilter Pack: 2 bags

Bentonite Pellets: 1 bucket

ement: 2 bags

Cement/ Bentonite: 90/10 %

rout:

Top of
eal at 15' (ft/m)*

Bottom of
eal at 17.25' (ft/m)*

Top of
creen at 18.25' (ft/m)*

Shelby Tube: Size:

Depths:

P Type:
☐ and Size
☐ Gravel
☐ Natural

Remarks:

Bottom of
creen at 23.25' (ft/m)*

Bottom of
Hole at 24' (ft/m)*

D-32

*Note: All Dimensions are Below Ground Surface (BGS).

Recorded By: Roberta Meyers

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DATE
STARTED 7-24-90
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SHEET 1 OF 3

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-3B
SURFACE ELEVATION
GROUNDWATER DEPTH
(   )

PROJECT YQ-1040
Lewiston Landfill Phase II

LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 12/18	BLOWS ON SAMPLER 6/12 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
				8 12	12 11	0.25' 0.5'	S.S.#1, 0'-2', 0.5' Recovery 0' to 0.25', Brown silt loam with numerous roots, pebbles and some clay. 0.25' to 0.5', light brown silty clay with numerous small pebbles (rounded & Angular) Densely packed, hard. non-plastic	Dry
				6 7	6 12		S.S.#2, 2'-4', 1.2' Recovery Dense, hard, Brown to gray silty clay with some small pebbles, and limonitic (rust) staining.	Dry + Apparent fill material
				10 10	9 20		S.S.#3, 4'-6', Complete Recovery 4' to 4.6' Brown-Red crumbly clay with silt. 4.6' to 5.1' Brown silty clay with silt and rust staining, (Piece of glass) 5.1' to 5.6' crumbly gray clay. 5.6' to 6.0' mix of red, gray & brown clay, slightly plastic.	Dry Apparent fill material
				6 7	6 13		S.S.#4, 6'-8', Complete Recovery mix of red and gray clay with no pebbles, becoming slightly plastic and cohesive. Also a single silt band @ 7.3'	Dry To slightly moist Natural material
				5 5	5 11		S.S#5, 8'-10', 1.8' Recovery, brown clay with <10% rounded pebbles massive, cohesive, slightly plastic	slightly moist

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DATE
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SHEET 2 OF 3

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-3B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ-1040 Lewiston Landfill NYSDEC Phase II
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
				5	5	4	7		S.S. #6, 10'-12', 0.7' Recovery Brown silty clay, crumbly non-plastic, less cohesive than above with more silt.	Slightly moist
				5	4	3	5		S.S. #7, 12'-14', 0.8' Recovery Dense clayey silt with numerous small pebbles and verticle moist clay seams.	Dry moist seams
				2	3	4	5		S.S. #8, 14'-16', Comp. Recovery highly plastic gray clay with red mottling, cohesive with little silt.	moist
				4	4	2	4		S.S. #9, 16'-18', Comp. Recovery highly plastic, gray clay with single sand seam @ 16.35'. (grainsize taken)	Saturated
				6	6	3	20	21.6'	S.S. #10, 18'-20', 0.4' Recovery Same as above with few angular cobbles and 2 additional sand seams.	Saturated
				7	6	7	2		S.S. #11, 20' to 22', Comp. Rec. 20' to 21.6' same gray clay as above. 21.6' to 22' fine grained red sand. grainsize Taken	Saturated

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DATE
STARTED 7-24-90
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SHEET 3 OF 3

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-3B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT Lewiston Phase II
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 12/18	BLOWS ON SAMPLER 6/12 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
				7 50	15		S.S. #12, 22' to 23.5', 1.0 Recovery 0' to 0.3', same gray plastic clay 0.3' to 0.6', Angular limestone cobbles with silt + sand 0.6' to 1.0' Dense Till, red silt and sand with some pebbles. Augered to 24'	Saturated then dry Dry
				14	50		S.S. #13, 24'-25', Comp. Rec. same Dense red Till Augered to 26'	DRY
				13 *50 → .4'	43		S.S. #14, 26' to 28', Refusal @ 27.4' Same as above 0.7' recovery becoming weathered shale. Augered to 27.5' (Refusal)	DRY
							Core Run #1, 27.5' to 32.5' 4.0' Recovery. From 27.5' to 31.5' weathered red shale with 1.0' wash out over the 4' section. Numerous horizontal, vert. and high Angle Fractures. Also three extremely weath. zones of shale/clay ranging from .15' to 0.6' in thickness. From 31.5' to 32.5' more competent, less frac. (only horiz. frac.), no clay green shale from 31.5' to 32.15', Red shale from 32.15' to 32.5'	Saturated RQD=19%

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WELL INSTRUMENTATION LOG

Draft

Project Name: Lewiston Landfill Phase II

Project No.: YQ-1040

lient: NYSDEC

Location: GW-3B

tart Date: 7-24-90

Completion Date: 7-25-90

Drilling Method: HSA and HQ coring

Driller: Lee Pendrod

creen Type:
☒ Continuous Slot
☐ Perforated ☐ Louvre
] Other:

Screen Material:
☐ Stainless Steel
☒ Plastic PVC
☐ Other:

Screen Length (ft/m): 5'

Screen Diameter (in/cm): 2" ID

Screen Slot Size: .010"

Well Casing Material: PVC

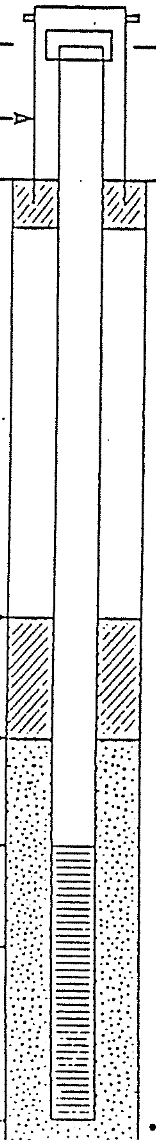
Well Casing Diameter (in/cm): 2" ID

Hole Diameter: 6" + 3.25"

Water Level in Completed Borehole (ft/m): 6.85' BGS

Development Method:

Development Duration:



Cap Type: PVC

ective Casing

Ground Surface

Depth of Borehole: 32.5' (ft/m)

Stick Up: 2' (ft/m)

Quantity of Material Used:

ilter Pack: ½ bag

Bentonite ~~Pellets~~ slurry: 1, 5 gal pal

ement: 4 bags

ement/ Bentonite: 90/10 %

rout:

Top of
eal at 23.75' (ft/m)*

Bottom of
al at 26.5 (ft/m)*

Top of
creen at 27.5 (ft/m)*

F Type:
] Sand Size
] Gravel
☐ Natural

ottom of
creen at 32.5' (ft/m)*

Bottom of 32.5'

SAMPLING METHODS:

Split Spoon: Size: 2'

Depths:

Shelby Tube: Size:

Depths:

Remarks: The bentonite slurry (5 gal) was tremied down the hole.

- Used 1 bag benseal Total, grout + seal.

Recorded By: Robert A. M

*Note: All Dimensions are Below

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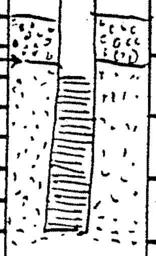
E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-3C
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT Lewiston Landfill
Phase II

LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
3 5 10									for soil desciption see GW-3B log. *Installed well to a TD of 10'. soil was slightly moist from ~6' to 10'. Installed as follows: 5' .010" PVC screen 5' Sch. 40 PVC riser 2' stickup sand from 10' to 4.5' Bentonite granual seal 4.5' to 3' 90% portland cement/10% bentonite from 3' to surface.	

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DATE
STARTED 7-27-90
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SHEET 1 OF 1

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-4A
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT

LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 — 12/18	BLOWS ON SAMPLER 6/12 — 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
							Augered to 20' See GW-4B description	
				2 2	2 2		S.S. #1, 20' to 22'; 0.4' Recovery med. brown silt with clay and few small rounded pebbles	Dry, pushed a cobble
				1 4	5 15		S.S. #2, 22' to 24', Comp. Rec red fine grained sand with silt + some clay. Numerous pebbles (rounded).	Saturated
							Augered to 24.5'	

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WELL INSTRUMENTATION LOG

Draft

Project Name: Lewiston Landfill Phase II

Project No.: YQ-1040

nt: NYSDEC

Location: GW-4A

tart Date: 7-27-90

Completion Date: 7-27-90

Drilling Method: Hollow stem Auger

Driller: Lee Penrod

creen Type:
☒ Continuous Slot
] Perforated ☐ Louvre
] Other:

Screen Material:
☐ Stainless Steel
☒ Plastic PVC
☐ Other:

Screen Length (ft/m): 5'

Screen Diameter (in/cm): 2" ID

Screen Slot Size: .010"

Well Casing Material: PVC

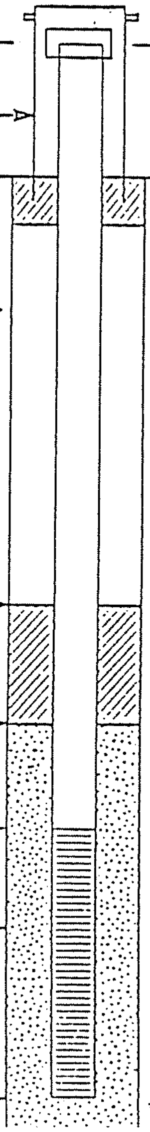
Well Casing Diameter (in/cm): 2" ID

Hole Diameter: 6"

Water Level in Completed
orehole (ft/m):

Development Method:

Development Duration:



Cap Type: PVC

rotective Casing steel

Ground Surface

Depth of Borehole: 24.5' (ft/m)

Stick Up: (ft/m)

SAMPLING METHODS:

Quantity of Material Used:

lter Pack:

Bentonite Pellets: 1, 5gal bucket

ement:

Cement/ Bentonite: 90/10 %

rout:

Top of
eal at 15.35' (ft/m)*

Bottom of
eal at 18' (ft/m)*

Top of
creen at 19' (ft/m)*

P Type:
] and Size
] Gravel
☐ Natural

ottom of
creen at 24' (ft/m)*

Bottom of
Hole at 24.5' (ft/m)*

Split Spoon: Size:

Depths:

Shelby Tube: Size:

Depths:

Remarks:

*Note: All Dimensions are Below

Recorded By: Robert A Meyers

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DATE
STARTED 7-26-90
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SHEET 1 OF

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-4B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT YQ-1040 Lewiston Landfill Phase II
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0 / 6	6 / 12	12 / 18	18 / 24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
				4	8	9	9		S.S. #1, 0'-2', 1.25' Recovery Dense, non-plastic silty clay with few small pebbles	Dry
				4	6	9	9		S.S. #2, 2'-4', 1.30' Recovery med. Brown clayey silt loam with few small rounded pebbles	Dry
				6	6	9	15		S.S. #3, 4'-6', 1.3' Recovery 0'-0.7', same as above (dry) 0.7'-1.3', gray silty clay moderately plastic & cohesive with some rust mottling and few rounded small pebbles. moist	Dry to moist
				4	9	9	9		S.S. #4, 6'-8', 0.3' Recovery med. brown clayey silt loam.	slightly moist
				8	8	9	12		S.S. #5, 8'-10', complete Recovery Gray clay with a spiral layering centered in the S.S. Sample, Has yellowish, brown, and gray coloring. Top view of cross section →  plasic & cohesive, no pebbles.	slightly moist
				~~4~~	~~5~~	~~5~~	~~8~~			
				4	5	5	8		S.S. #6, 10'-12', 1.1' Recovery med. brown clay with some silt and few rounded pebbles.	moist

640088

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DATE
STARTED 7-26-90
FINISHED
SHEET 2 **OF**

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW 4B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT Lewiston Landfill
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0–6	6–12	12–18	18–24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
				3	3	4	8		S.S. #7 12'-14' 1.2' Recovery brown silty clay, Plastic and cohesive few Pebbles	moist
				4	5	4	7		S.S. #8, 14'-16', Complete recovery gray clay with few inclusions highly plastic + cohesive Also a 0.4' band of brown tight silt with 10% rounded pebbles @14.8 to 15.2'	wet, but no free water
				2	1	2	2		S.S. #9, 16'-18', Complete Rec. Same fine gr. gray clay as above with few rounded pebbles.	Saturated
				2	2	2	4		S.S. #10, 18' to 20', 1.4' Recovery Same as above with red clay mottling.	Saturated
				1	2	2	2		S.S. #11, 20' to 22', Comp. Rec. 20' to 21.3' Same as above 21.3' to 22' Silt with clay Same color, but non plastic.	Saturated
				4	6	6	21		S.S. #12, 22' to 24' 1.0' Rec 0' to 0.6' same as above 0.6' to 1.0' dense red silty Till (dry)	Saturated
				47	50→0.35'				S.S. #13, 24' to 26', Comp. Rec. Lg. Limestone Cobble + same red Till	Dry

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DATE
STARTED 7-26-90
FINISHED 7-26-90
SHEET 3 OF 3

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-4B
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT Lewiston Landfill Phase II NYSDEC
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						Augered to 27	
						Cored Till, No recovery 27' to 29'	
						Cored 29' to 32', weathered red shale gradually becoming more competent. 29' to 30.2' → highly weathered with (2) large (.4') clay/shale zones 30.2' to 32', red shale with numerous horizontal Frac. B.O.H @ 32'	RQD 12%

640088

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WELL INSTRUMENTATION LOG

Draft

Project Name: Lewiston Landfill Phase II

Project No.: YQ-1040

nt: NYSDEC

Location: GW-4B

Start Date: 7-26-90

Completion Date: 7-26-90

Drilling Method: HSA + HQ coring

Driller: Lee Penrod

Screen Type:
☒ Continuous Slot
☐ Perforated ☐ Louvre
☐ Other:

Screen Material:
☐ Stainless Steel
☒ Plastic PVC
☐ Other:

Screen Length (ft/m): 5'

Screen Diameter (in/cm): 2" ID

Screen Slot Size: .010"

Well Casing Material: PVC

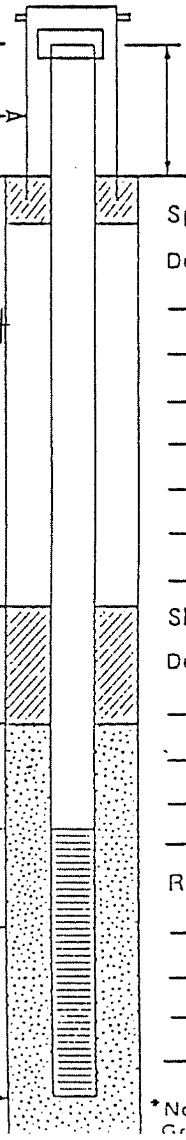
Well Casing Diameter (in/cm):

Hole Diameter: 6" + 3.25"

Water Level in Completed Borehole (ft/m):

Development Method:

Development Duration:



Cap Type: PVC

otective Casing steel

Ground Surface

Depth of Borehole: 32' (ft/m

Stick Up: (ft/m

SAMPLING METHODS:

Split Spoon: Size:

Depths:

Quantity of Material Used:

Filter Pack:

Bentonite Pellets: 1, 5 gal bucket

Cement:

Cement/ Bentonite: 90/10 %

Grout:

Top of Seal at 22.85' (ft/m)*

Shelby Tube: Size:

Depths:

Bottom of Seal at 25.5' (ft/m)*

Top of Screen at 26.15' (ft/m)*

k Type:
Sand Size
☐ Gravel
☐ Natural

Remarks:

Bottom of Screen at 31.15' (ft/m)*

Bottom of Hole at 32' (ft/m)*

*Note: All Dimensions are Below Ground Surface (BGS).

Recorded By: Robert A Myers

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TEST BORING LO

Project No. 9054 Client MODERN LANDFILL, INC.
Boring No. B-9
Project SANITARY LANDFILL
Date Start 4/4/79
Location TOWN OF LEWISTON, NIAGARA CO., NEW YORK
Date Finish 4/4/79
Type of Rig CME
Driller EMPIRE SOILS
Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log
	GROUT 1" PVC CSG. SAND VYON		1& 1A	SS	2 4	3 9	7	
			2& 2A	SS	9 15	11 15	26	
5			3	SS	12 15	12 16	27	
			4& 4A	SS	12 18	16 20	34	
10	PIEZOMETER IN ADJACENT 6-1/2' DEEP BORING WELL POINT IS 1' of 1½ O.D. VYON		5	SS	9 11	9 12	20	
			6	SS	9 12	11 14	23	
			7,7A 7B	SS	20 60	32 14+	92	
15			8	SS	22 30	22 40	52	
			9	SS	28+	48+	48+	
			10	SS	100+ 58+	28+ 158+	216+	
20			11	SS	24+ 158+	54+ 18+	212+	
			12	SS	30+ 30+	30+ 150/5"	60+	
25								
30								
35								
40								

Classification "O" Elev. = 321.41	Remarks
Dark brown organic Clayey SILT w/roots 0'-9"	firm, moist
TILL Mottled brown light brown and gray CLAY & SILT trace coarse Sand, trace fine Gravel w/fine roots 3'-0"	stiff, moist
Brown Clayey SILT to SILT & CLAY some c-f Sand, little (+) c-f Gravel 6'-6"	very stiff, moist, @ 6' becoming saturated
GLACIOLACUSTRINE CLAY Brown and gray Silty CLAY, trace fine Gravel w/thin light gray vertical Silty CLAY seams 13'-0"	
OUTWASH Brown SILT 13'-6"	hard, satura
Brown c-f SAND, little c-f Gravel, trace (+) Silt 14'-0"	medium, dens saturated
PRE-WISCONSIN TILL Red-brown fine SAND, little (-) c-f Gravel, little Silt Gravel is subangular 17'-0"	very dense, moist
Red-brown fine SAND and Silt, little c-f Gravel Gravel is subangular 22'-6"	very dense moist
BEDROCK Red-brown decomposed Shale 22'-11"	
END OF BORING	+ 300 lb. hammer 30" drop

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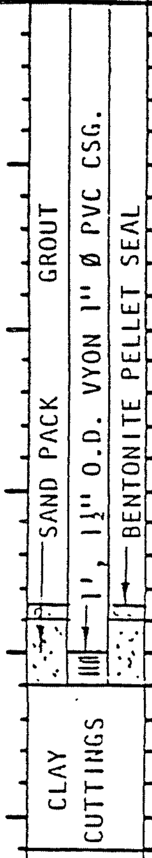
WEHRAN ENGINEERING
CONSULTING ENGINEERS

TEST BORING LO

Project No. 9054 Client MODERN LANDFILL, INC.
Boring No. B-16
Project SANITARY LANDFILL
Date Start 4/25/79
Location TOWN OF LEWISTON, NIAGARA COUNTY, NEW YORK
Date Finish 4/25/79
Type of Rig CME
Driller EMPIRE SOILS
Inspector ASK



Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "O" Elev. = 320.93	Remarks
			1	SS	1 2	1 4	3		Dark gray organic Clayey SILT	very soft, wet
			2	SS	4 16	5 19	21		TILL 0'-6" Mottled gray and yellow-brown CLAY & SILT to Silty CLAY, trace fine Gravel, trace fine Sand w/few fine roots, thin vertical light gray CLAY seams 6'-0"	firm, mois
5			3	SS	10 22	20 27	42			becoming hard
			4	SS	19 25	22 17	47			
10			5	SS	5 6	7 9	13		GLACIOLACUSTRINE CLAY Gray and brown Silty CLAY	
			6	SS	4 3	4 3	7		From 9'-3" to 18'-11" occasional very thin beds and laminations of: light brown and brown fine SAND red-brown and brown SILT	hard to firm, mois varved desiccated to 10'
			7	SS	3 3	3 3	6			
15			8	SS	1 2	3 3	5			
			9	SS	1 2	3 3	5			
20			10	SS	1 4	3 3	7		OUTWASH 19'-0" Gray and brown c-f SAND, little Clayey SILT, little c-f Gravel	loose, saturated
			11	SS	4 8	9 8	17		PRE-WISCONSIN TILL 20'-6"	
			12	SS	8 14	12 14	26		Red-brown Clayey SILT, some fine Sand, little c-f Gravel	medium dens saturated
25			13	SS	10 70	17 110	87		BEDROCK 23'-10' Red-brown decomposed Shale 26'-0" END OF BORING	hard, damp
30										
35										
40										

SHEET 1 OF 1

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CONSULTING ENGINEERS

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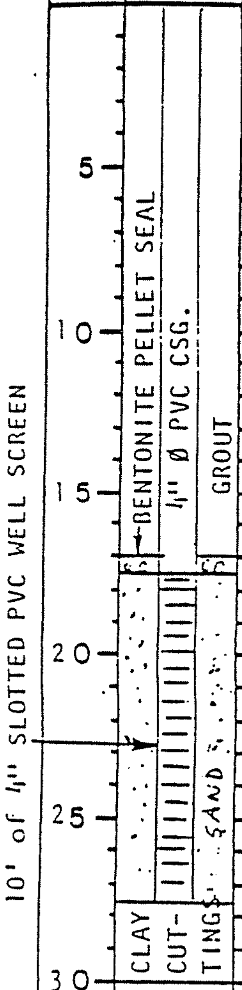
TEST BORING LO

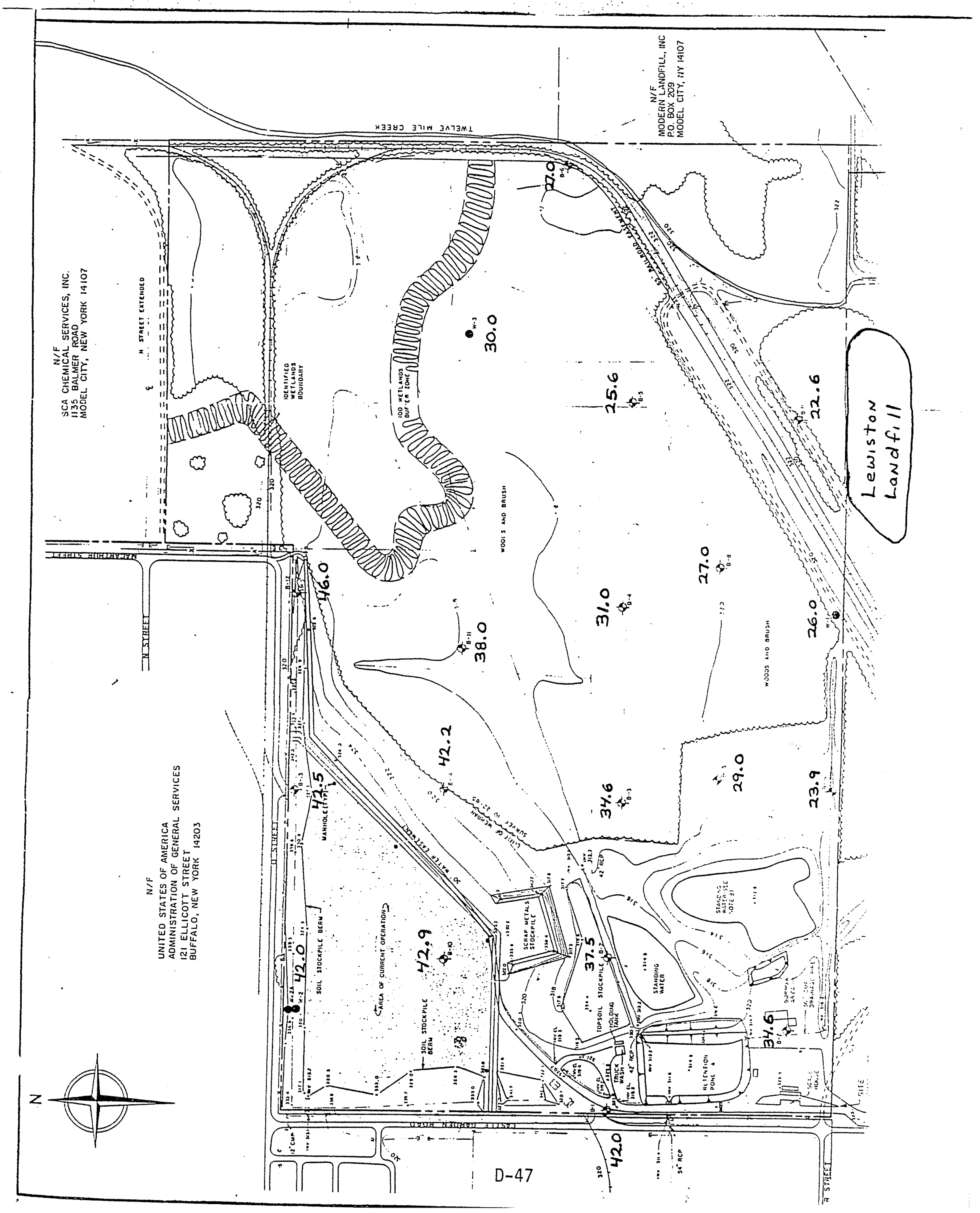
Project No. 9054 Client MODERN LANDFILL, INC.
Boring No. W-1
Project SANITARY LANDFILL
Date Start 4/6/79
Location TOWN OF LEWISTON, NIAGARA CO., NEW YORK
Date Finish 4/9/79
Type of Rig CME
Driller EMPIRE SOILS
Inspector ASK



Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "O" Elev. = 322.47	Remarks
			1	SS	1 4	2 7	6		Dark gray organic Clayey SILT w/roots 1'-6"	firm, moist
			2-	US	3" 22"P	Ø ST 15"R			TILL Mottled brown and yellow-brown CLAY & SILT, trace coarse Sand 3'-0"	stiff, moist
5			3	SS	20 30	28 3"Ø57	58			
			4	US	18"P 4	17"R 5			Brown Clayey SILT, trace fine Sand, trace m-f Gravel w/vertical light gray CLAY seams 6'-6"	stiff, moist
			5	SS	5 3	6 3	10			
10			6	SS	5 5	4 4	8		GLACIOLACUSTRINE CLAY Brown and red-brown Silty CLAY Infrequent very thin beds of light brown SILT Infrequent lamination of yellow-brown fine SAND becoming gray and brown @ 13'-0" 17'-6"	firm, moist varved wet from 11'-0"
			7	SS	3 1	3 1	7			
15			8	SS	3 3	3 3	4			
			9	SS	3 3	4 16	6			
			10	SS	17	16	33		OUTWASH Brown fine SAND, little Silt, trace m-f Gravel 19'-6"	dense, saturated
20			11&1	ASS	10	65			PRE-WISCONSIN TILL Red-brown SILT, little (+) fine Sand, little m-f Gravel w/decomposed red shale fragments	very dense, moist
			12	SS	185	105+				
			13	SS	200+	60+				
			14	SS	150+	48+				
			15&15A	SS	120+	48+				
			16	SS						
25			17	SS	80+ 40+	25+ 42+	82+		BEDROCK 26'-0" Red-brown and gray-green decomposed Shale	hard, damp
			18	SS	25+ 45+	43+ 40+	88+			
			19	SS	10+ 26+	10+ 130+	36+			
30					100+/1"				30'-1"	
									END OF BORING	+300 lb. hammer 30" drop
35										
40										

SHEET 1 OF 1

Draft


N/F
SCA CHEMICAL SERVICES, INC.
1135 BALMER ROAD
MODEL CITY, NEW YORK 14107
N/F
MODERN LANDFILL, INC
P.O. BOX 209
MODEL CITY, NY 14107
N/F
UNITED STATES OF AMERICA
ADMINISTRATION OF GENERAL SERVICES
121 ELLICOTT STREET
BUFFALO, NEW YORK 14203
TWELVE MILE CREEK
N STREET EXTENDED
MACARTHUR STREET
N STREET
O STREET
R STREET
CASTLE GARDEN ROAD
IDENTIFIED WETLANDS BOUNDARY
100' WETLANDS BUFFER ZONE
WOODS AND BRUSH
WOODS AND BRUSH
Lewiston Landfill
27.0
30.0
25.6
22.6
27.0
31.0
26.0
38.0
46.0
42.2
42.5
34.6
29.0
23.9
42.9
42.0
37.5
34.6
42.0
MANHOLE (TYP)
30" WATER EASEMENT
LIMIT OF WETLAND SURVEY
SOIL STOCKPILE BERM
AREA OF CURRENT OPERATIONS
SOIL STOCKPILE BERM
SCRAP METALS STOCKPILE
TOPSOIL STOCKPILE
HOLDING TANK
TRUCK WASH
STANDING WATER
STANDING WATER SEE NOTE 3
RETENTION POND A
SCALE HOUSE
SITE
N

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CONSULTING ENGINEERS

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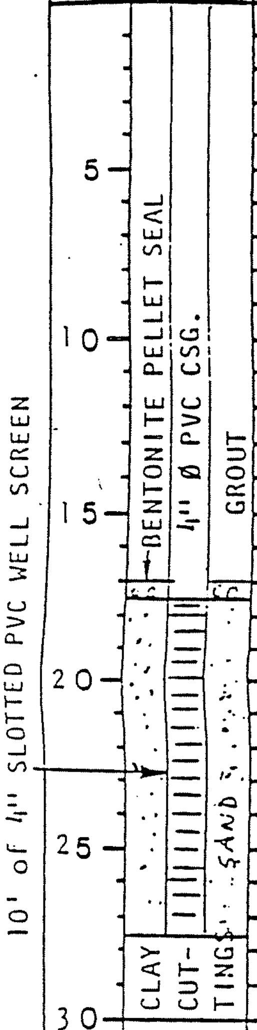
TEST BORING L

Project No. 9054 Client MODERN LANDFILL, INC.
Boring No. W-1
Project SANITARY LANDFILL
Date Start 4/6/
Location TOWN OF LEWISTON, NIAGARA CO., NEW YORK
Date Finish 4/9/
Type of Rig CME
Driller EMPIRE SOILS
Inspector ASK



Depth	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft
		1	SS	1	2	6
				4	7	
		2	US	3"	Ø ST	
				22"P	15"R	
5		3	SS	20	28	58
				30	3"Ø57	
		4	US	18"P	17"R	
		5	SS	4	5	10
				5	6	
10		6	SS	3	3	8
				5	4	
		7	SS	5	4	7
				3	3	
		8	SS	1	1	4
15				3	3	
		9	SS	3	3	6
				3	4	
		10	SS	3	16	33
				17	16	
20		11&1	AS	S10	65	
		12	SS	185	105+	
		13	SS	200+	60+	
		14	SS	150+	48+	
		15& 15A	SS	120+	48+	
		16	SS			
25		17	SS	80+	25+	82+
				40+	42+	
		18	SS	25+	43+	88+
				45+	40+	
		19	SS	10+	10+	36+
30				26+	130+	
				100+/	1"	
35						
40						

Classification "O" Elev. = 322.47	Remar
Dark gray organic Clayey SILT w/roots 1'-6"	firm, m
TILL Mottled brown and yellow-brown CLAY & SILT, trace coarse Sand 3'-0"	stiff, moist
Brown Clayey SILT, trace fine Sand, trace m-f Gravel w/vertical light gray CLAY seams 6'-6"	stiff, moist
GLACIOLACUSTRINE CLAY Brown and red-brown Silty CLAY Infrequent very thin beds of light brown SILT Infrequent lamination of yellow-brown fine SAND becoming gray and brown @ 13'-0" 17'-6"	firm, m varved from 1l
OUTWASH Brown fine SAND, little Silt, trace m-f Gravel 19'-6"	dense, satura
PRE-WISCONSIN TILL Red-brown SILT, little (+) fine Sand, little m-f Gravel w/decomposed red shale fragments	very de moist
BEDROCK 26'-0" Red-brown and gray-green decomposed Shale 30'-1"	hard, c
END OF BORING	+300 lt hammer 30" dr

CONSULTING ENGINEERS

TEST BORI Draft LO

Project No. 9054 Client MODERN LANDFILL, INC.

Project SANITARY LANDFILL

-ocation TOWN OF LEWISTON, NIAGARA COUNTY, NEW YORK

:e of Rig CME

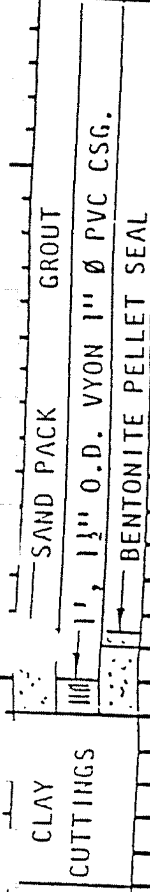
Driller EMPIRE SOILS

Boring No. B-16

Date Start 4/25/79

Date Finish 4/25/79

Inspector ASK



"0" Elev. = 320.93

Dep	Elev-ation	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification	Remarks
			1	SS	1 2	1 4	3		Dark gray organic Clayey SILT	very soft, wet
			2	SS	4 16	5 19	21		TILL 0'-6" Mottled gray and yellow-brown	
5			3	SS	10 22	20 27	42		CLAY & SILT to Silty CLAY, trace fine Gravel, trace fine Sand	firm, moist
			4	SS	19 25	22 17	47		w/few fine roots, thin vertical light gray CLAY seams 6'-0"	becoming hard
0			5	SS	5 6	7 9	13		GLACIOLACUSTRINE CLAY Gray and brown Silty CLAY	
			6	SS	4 3	4 3	7		From 9'-3" to 18'-11"	hard to
			7	SS	3 3	3 3	6		occasional very thin beds and laminations of:	firm, moist varved
5			8	SS	1 2	3 3	5		light brown and brown fine SAND red-brown and brown SILT	desiccated to 10'
			9	SS	1 2	3 3	5			
0			10	SS	1 4	3 3	7		OUTWASH 19'-0"	
			11	SS	4 8	9 8	17		Gray and brown c-f SAND, little Clayey SILT, little c-f Gravel	loose, saturated
			12	SS	8 14	12 14	26		PRE-WISCONSIN TILL 20'-6" Red-brown Clayey SILT, some fine Sand, little c-f Gravel	medium dens saturated
			13	SS	10 70	17 110	87		BEDROCK 23'-10' Red-brown decomposed Shale 26'-0"	hard, damp

END OF BORING

SHEET 1 OF 1

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CONSULTING ENGINEERS

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TEST BORING L

Project No. 9054 Client MODERN LANDFILL, INC.
Project SANITARY LANDFILL
Location TOWN OF LEWISTON, NIAGARA CO., NEW YORK
Type of Rig CME
Driller EMPIRE SOILS
Boring No. B-9
Date Start 4/4/7
Date Finish 4/4/7
Inspector ASK

"O" Elev. = 321.41

GROUT
1" PVC CSG.
SAND
VYON
PIEZOMETER IN ADJACENT 6-1/2' DEEP BORING
WELL POINT IS 1' of 1½ O.D. VYON

Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft
1 & 1A	SS	2	3	
		4	9	7
2 & 2A	SS	9	11	
		15	15	26
3	SS	12	12	
		15	16	27
4 & 4A	SS	12	16	
		18	20	34
5	SS	9	9	
		11	12	20
6	SS	9	11	
		12	14	23
7, 7A 7B	SS	20	32	
		60	14+	92
8	SS	22	22	
		30	40	52
9	SS	28+	48+	48+
10	SS	100+	28+	
		58+	158+	216+
11	SS	24+	54+	
		158+	18+	212+
12	SS	30+	30+	
		30+	150/5"	60+

Classification	Remarks
Dark brown organic Clayey SILT w/roots 0'-9"	firm, mois
TILL Mottled brown light brown and gray CLAY & SILT trace coarse Sand, trace fine Gravel w/fine roots 3'-0"	stiff, mois
Brown Clayey SILT to SILT & CLAY some c-f Sand, little (+) c-f Gravel 6'-6"	very stiff, moist, @ 6' becoming saturated
GLACIOLACUSTRINE CLAY Brown and gray Silty CLAY, trace fine Gravel w/thin light gray vertical Silty CLAY seams 13'-0"	
OUTWASH Brown SILT 13'-6"	hard, satura
Brown c-f SAND, little c-f Gravel, trace (+) Silt 14'-0"	medium, dens saturated
PRE-WISCONSIN TILL Red-brown fine SAND, little (-) c-f Gravel, little Silt Gravel is subangular 17'-0"	very dense, moist
Red-brown fine SAND and Silt, little c-f Gravel, Gravel is subangular 22'-6"	very dense moist
BEDROCK Red-brown decomposed Shale 22'-11"	
END OF BORING	+ 300 lb. hammer 30" drop

APPENDIX E

GEOTECHNICAL ANALYSES

Draft

Project No. 11420

TOLEDO TESTING LABORATORY, INC.

Sheet 1 Of 1

TABULATION OF TEST DATA

Test Boring or Test Pit Number	Sample Number	Depth of Sample Tip	Elevation of Sample Tip	Standard Penetration (Number of Blows/Foot Unless Otherwise Stated)	Natural Water Content (Percent of Dry Weight)	In-Place Dry Density (Pounds per Cubic Foot)	Unconfined Compressive Strength (PSF)		Particle Size Distribution							Atterberg Limits			Group Designation and Index (Unified Soil Classification)
									Gravel (Percent)	Coarse Sand (Percent)	Medium Sand (Percent)	Fine Sand (Percent)	Silt (Percent)	Clay (Percent)	Colloids (Percent)	Liquid Limit (Percent)	Plastic Limit (Percent)	Plasticity Index (Percent)	
	GW-1A	4'-6'							1	3	2	6	28	60		36	19	17	A-6b (CL)
	GW-1B	16'-20'							11	4	3	4	33	45					
	GW-2B	6'-8'							0	2	2	5	23	68					
	GW-2B	14'-16'							5	2	3	23	52	15					
	GW-2A	14'-16'							2	1	1	4	40	52					
	GW-2A	16'-18'							10	7	12	19	44	8					
	GW-3B	21.5'-22'							7	4	5	22	56	6					
	GW-3A	22'-24'							10	7	13	13	40	17					
	GW-4B	4'-6'							1	7	2	9	36	45					
	GW-4B	16'-18'							1	2	2	5	23	67					

Figure 1

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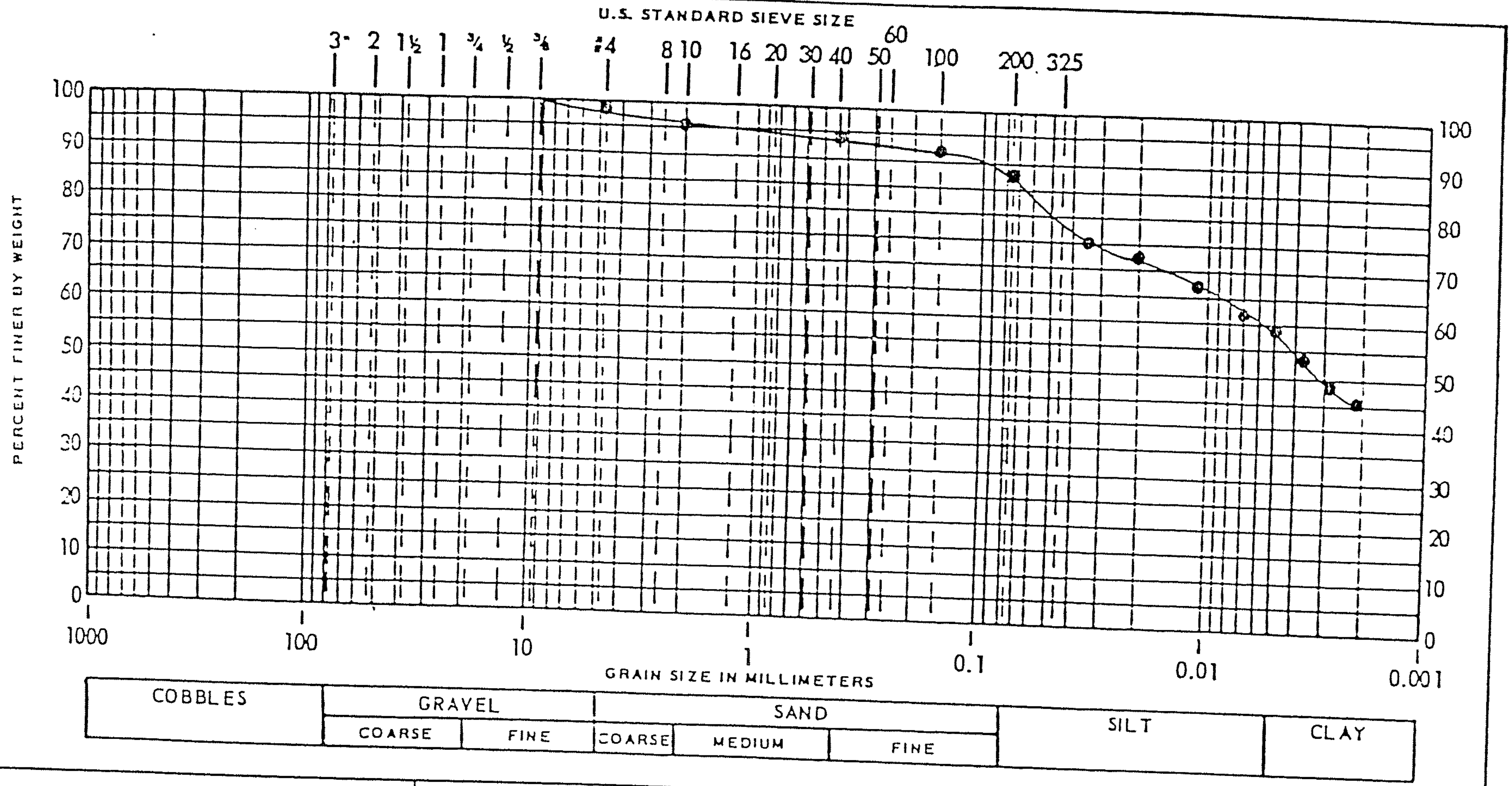
SOIL CLASSIFICATION SHEET



PROJECT Lewiston Landfill
Your Project No. YQ-1040
BORING NO.
SAMPLE NO. GW-1A
DEPTH 4.0' to 6.0'
CLASSIFICATION Silty clay, little sand, trace of gravel

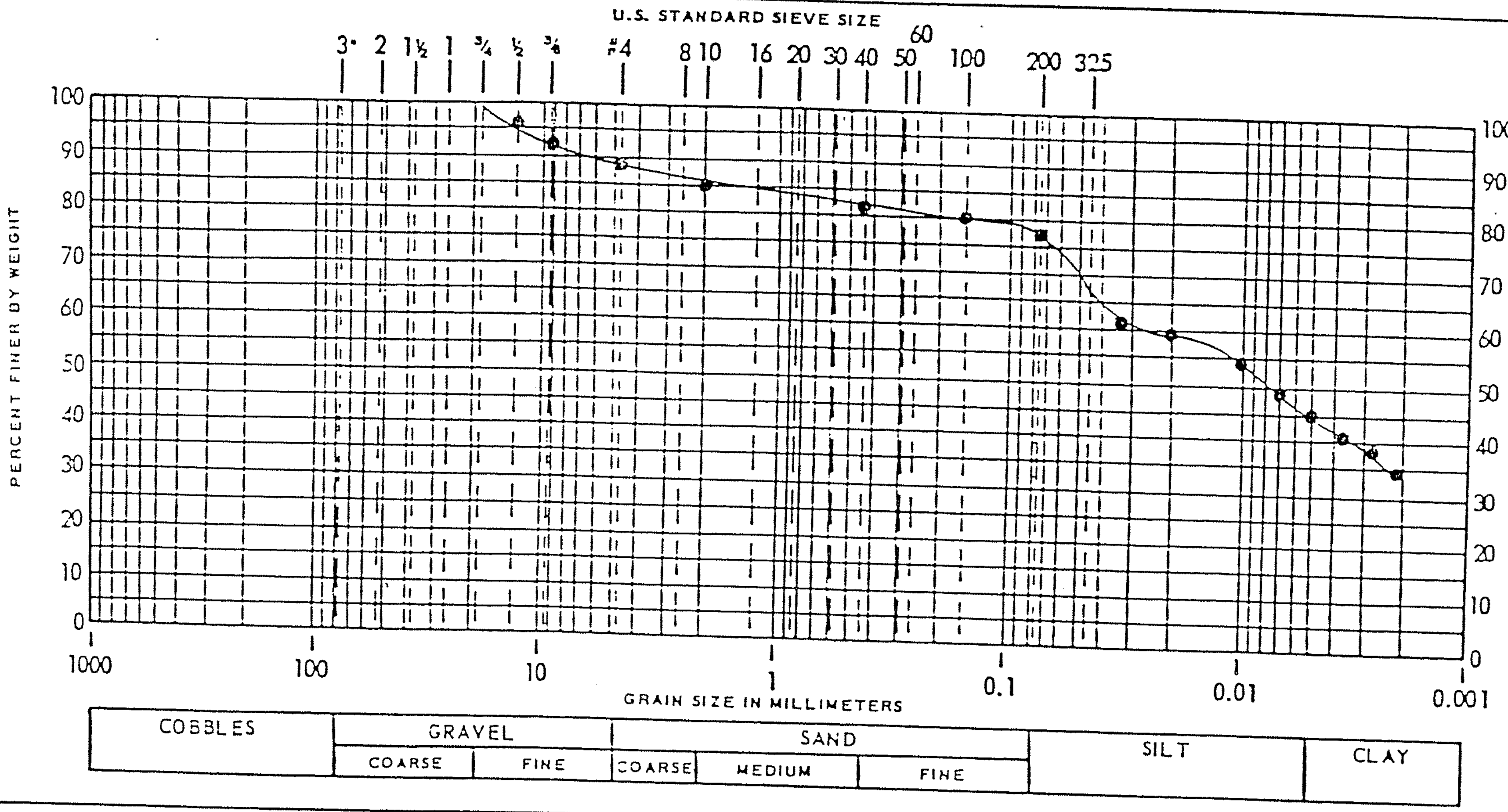
NATURAL % MOISTURE
LIQUID LIMIT 36
PLASTIC LIMIT 19
PLASTICITY INDEX 17
COLOR Brown
REMARKS T.T.L. Job No. 11420
Your P.O. NO. 54964

Toledo Testing Laboratory, Inc.

Figure 2

Draft

SOIL CLASSIFICATION SHEET



PROJECT Lewiston Landfill
Your Project No. YQ-1040
BORING NO.
SAMPLE NO. GW-1B
DEPTH 16.0' to 20.0'
CLASSIFICATION Silty clay, little sand and gravel

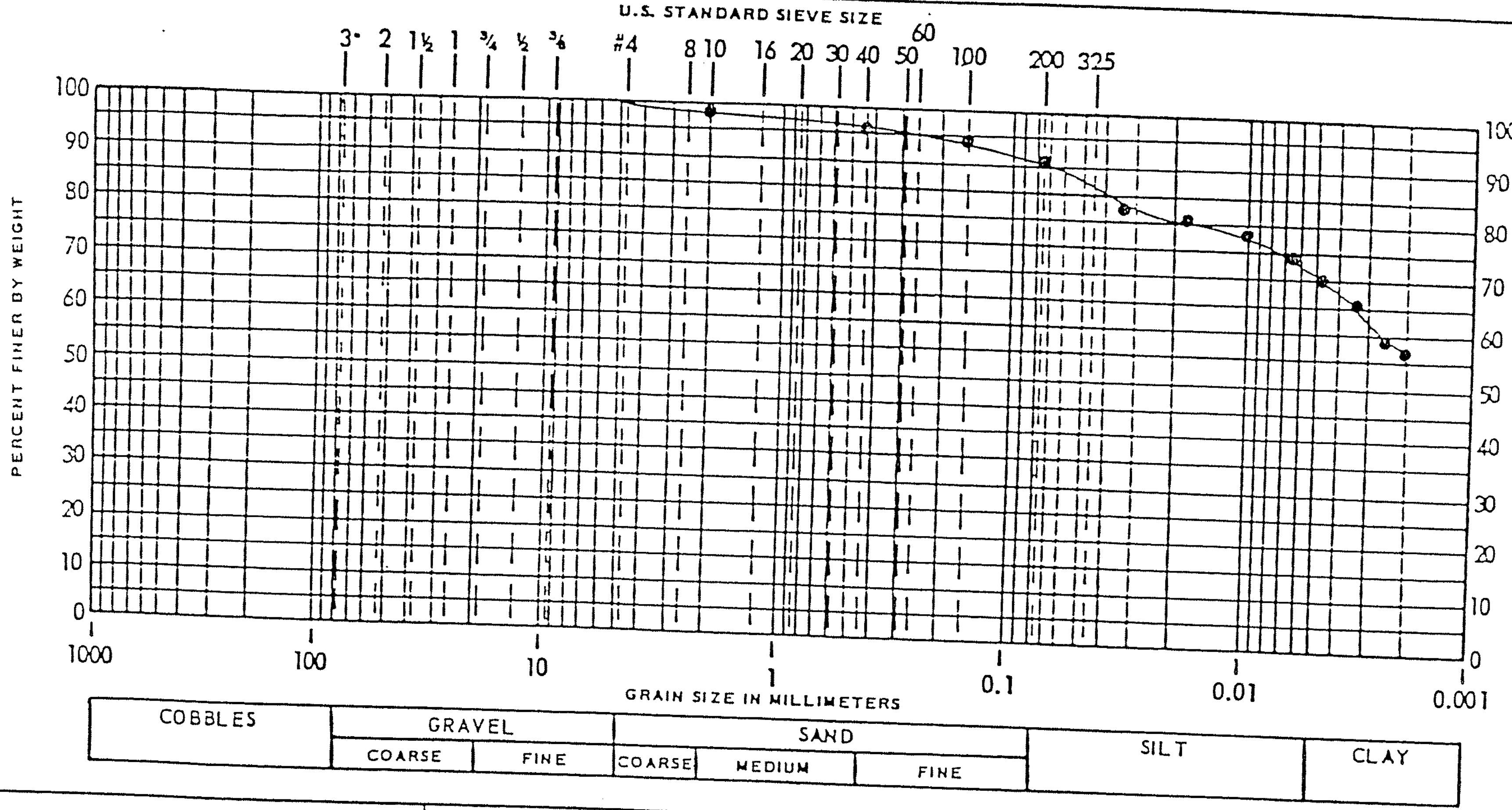
NATURAL % MOISTURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
COLOR Grey
REMARKS T.T.L. Job No. 11420
Your P.O. No. 54964

Toledo Testing Laboratory, Inc.

Figure 3

Draft

SOIL CLASSIFICATION SHEET



PROJECT Lewiston Landfill
Your Project No. YQ-1040
BORING NO.
SAMPLE NO. GW-2B
DEPTH 6.0' to 8.0'
CLASSIFICATION Silty clay, trace of sand

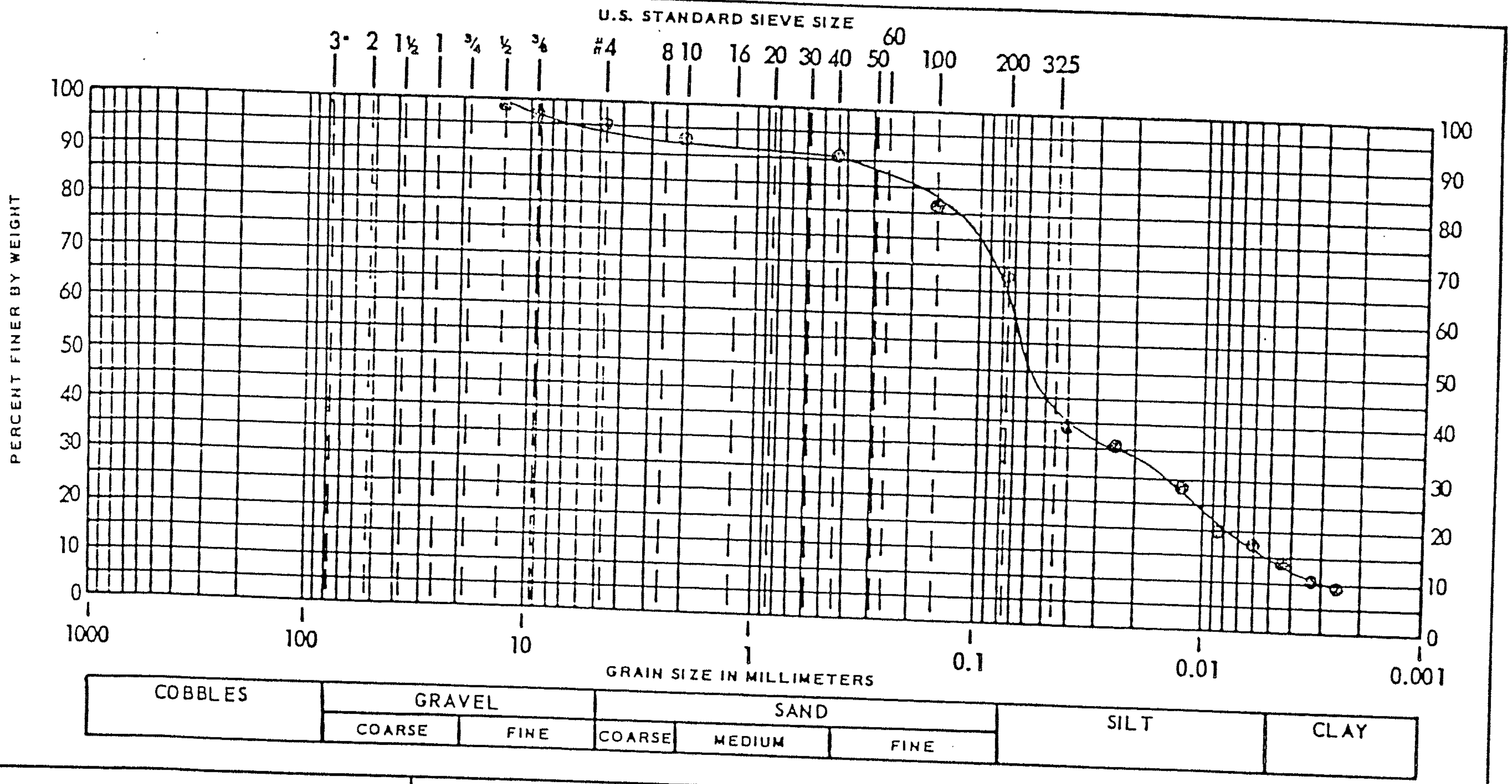
NATURAL % MOISTURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
COLOR Brownish grey
REMARKS T.T.L. Job No. 11420
Your P.O. No. 54964

Toledo Testing Laboratory, Inc.

Figure 4

Draft

SOIL CLASSIFICATION SHEET



PROJECT Lewiston Landfill
Your Project No. YQ-1040
BORING NO.
SAMPLE NO. GW-2B
DEPTH 14.0' to 16.0'
CLASSIFICATION Sandy silt, little clay, trace of gravel

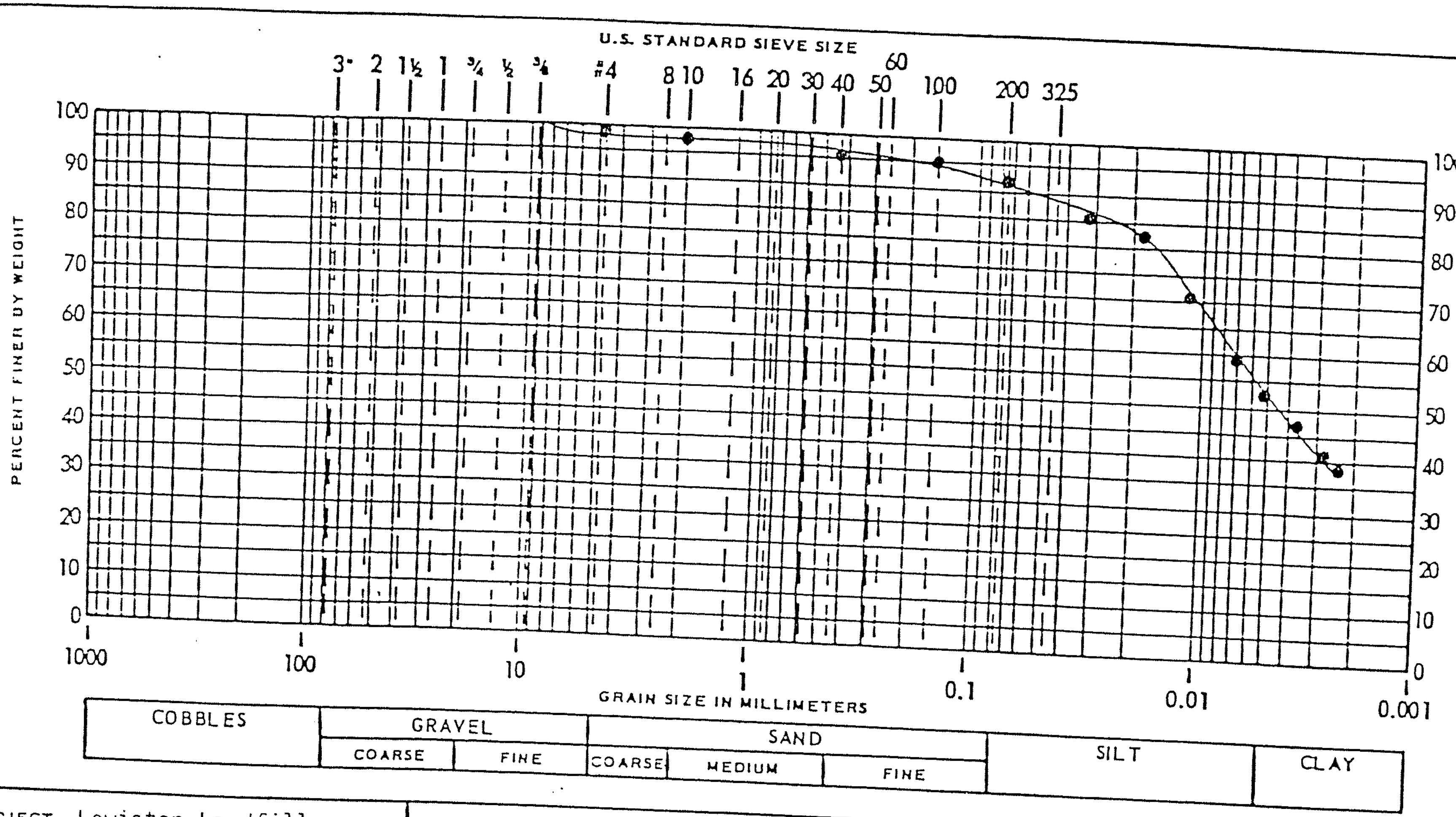
NATURAL % MOISTURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
COLOR Brownish grey
REMARKS T.T.L. Job No. 11420
Your P.O. No. 54964

Toledo Testing Laboratory, Inc.

Figure 5

Draft

SOIL CLASSIFICATION SHEET



PROJECT Lewiston Landfill
Your Project No. YQ-1040
BORING NO.
SAMPLE NO. GW-2A
DEPTH 14.0' to 16.0'
CLASSIFICATION Silty clay, trace of sand and gravel

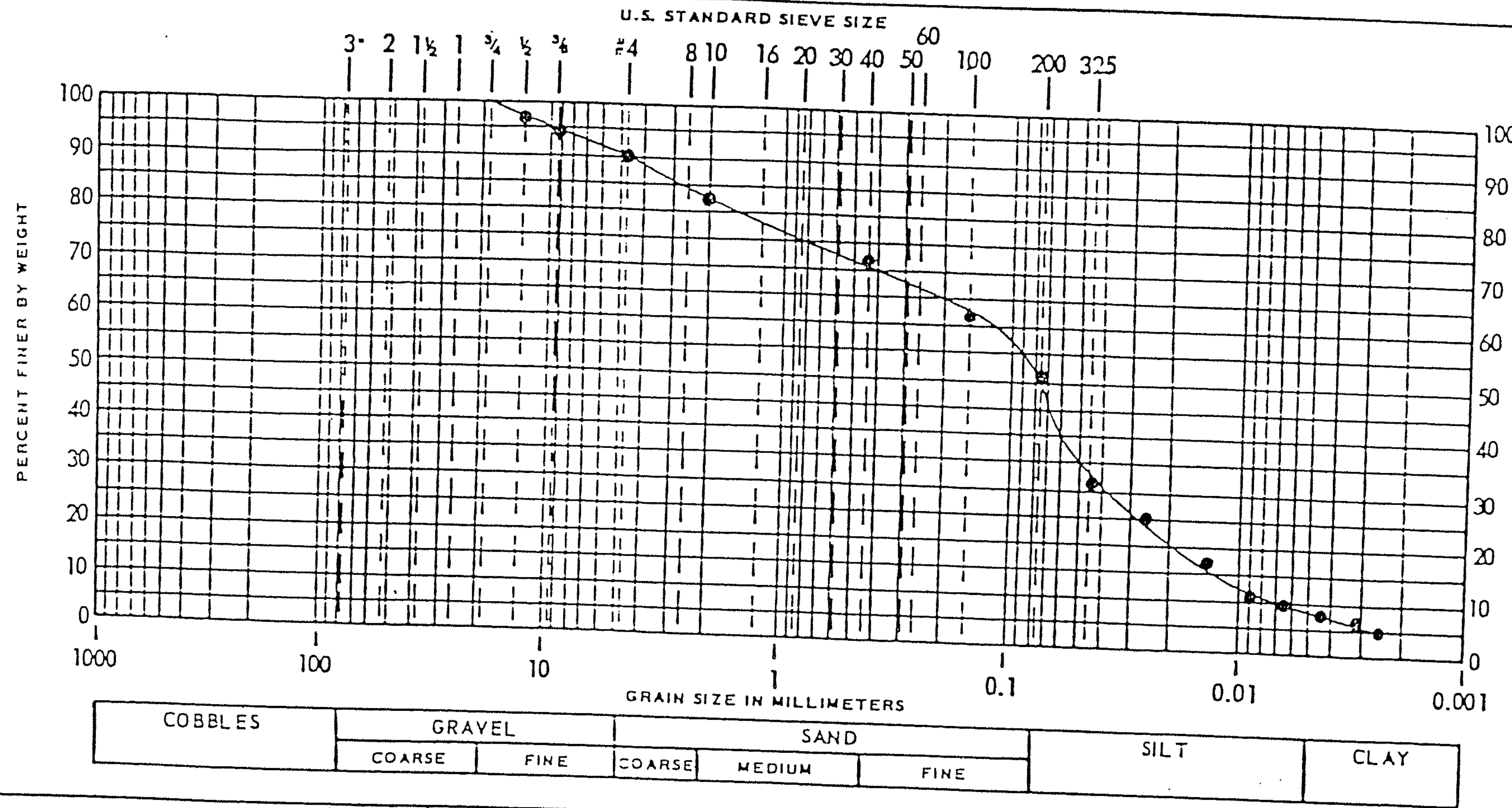
NATURAL % MOISTURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
COLOR Grey
REMARKS T.T.L. Job No. 11420
Your P.O. No. 54964

Toledo Testing Laboratory, Inc.

Figure 6

Draft

SOIL CLASSIFICATION SHEET



PROJECT Lewiston Landfill
Your Project No. YQ-1040
BORING NO.
SAMPLE NO. GW-2A
DEPTH 16.0' to 18.0'
CLASSIFICATION Sandy silt, trace of gravel and clay

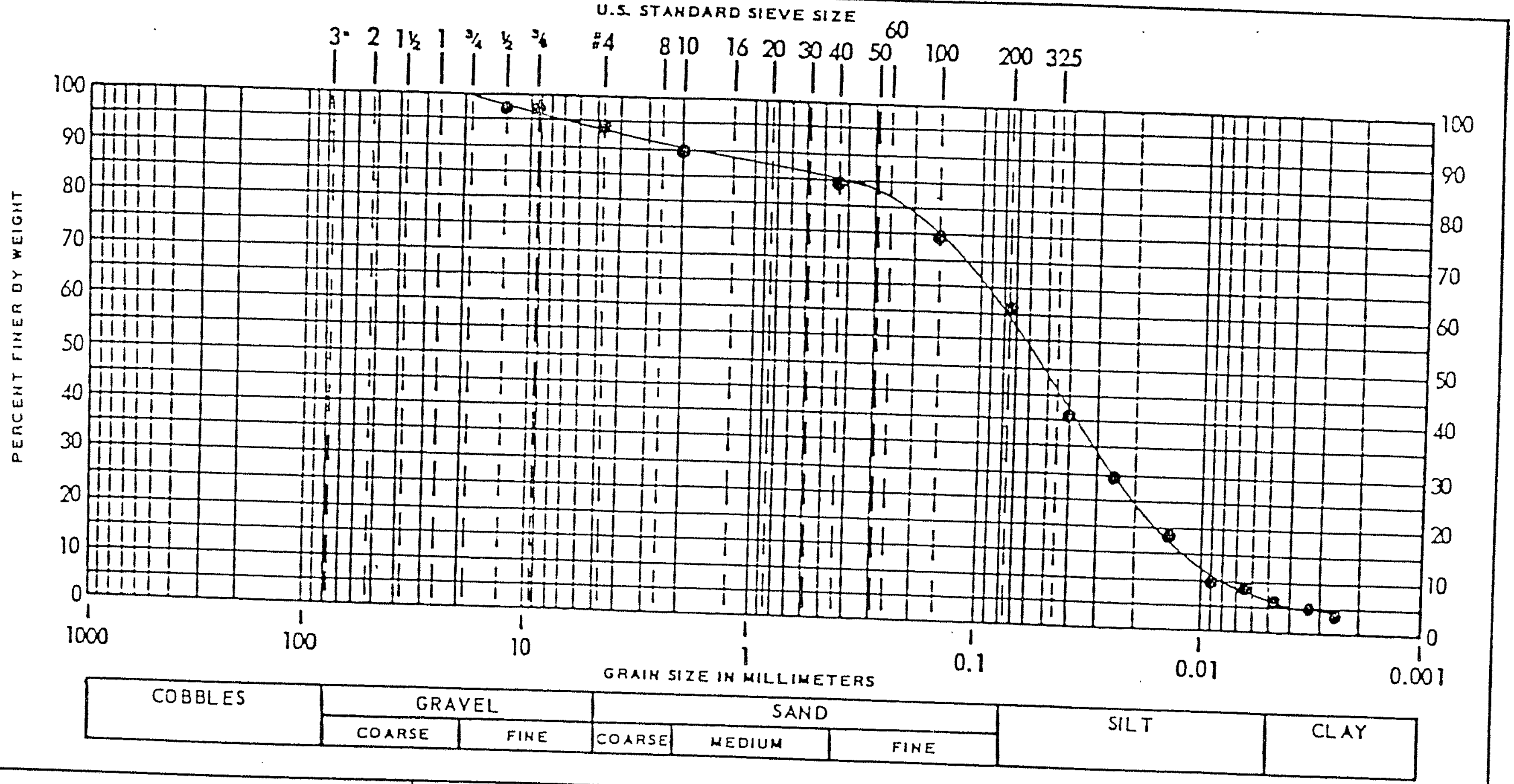
NATURAL % MOISTURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
COLOR Reddish Brown
REMARKS T.T.L. Job No. 11420
Your P.O. No. 54964

Toledo Testing Laboratory, Inc.

Figure 7

Draft

SOIL CLASSIFICATION SHEET



PROJECT Lewiston Landfill
Your Project No. YQ-1040

BORING NO.

SAMPLE NO. GW-3B

DEPTH 21.5' to 22.0'

CLASSIFICATION Sandy silt, trace of gravel and clay

NATURAL % MOISTURE

LIQUID LIMIT

PLASTIC LIMIT

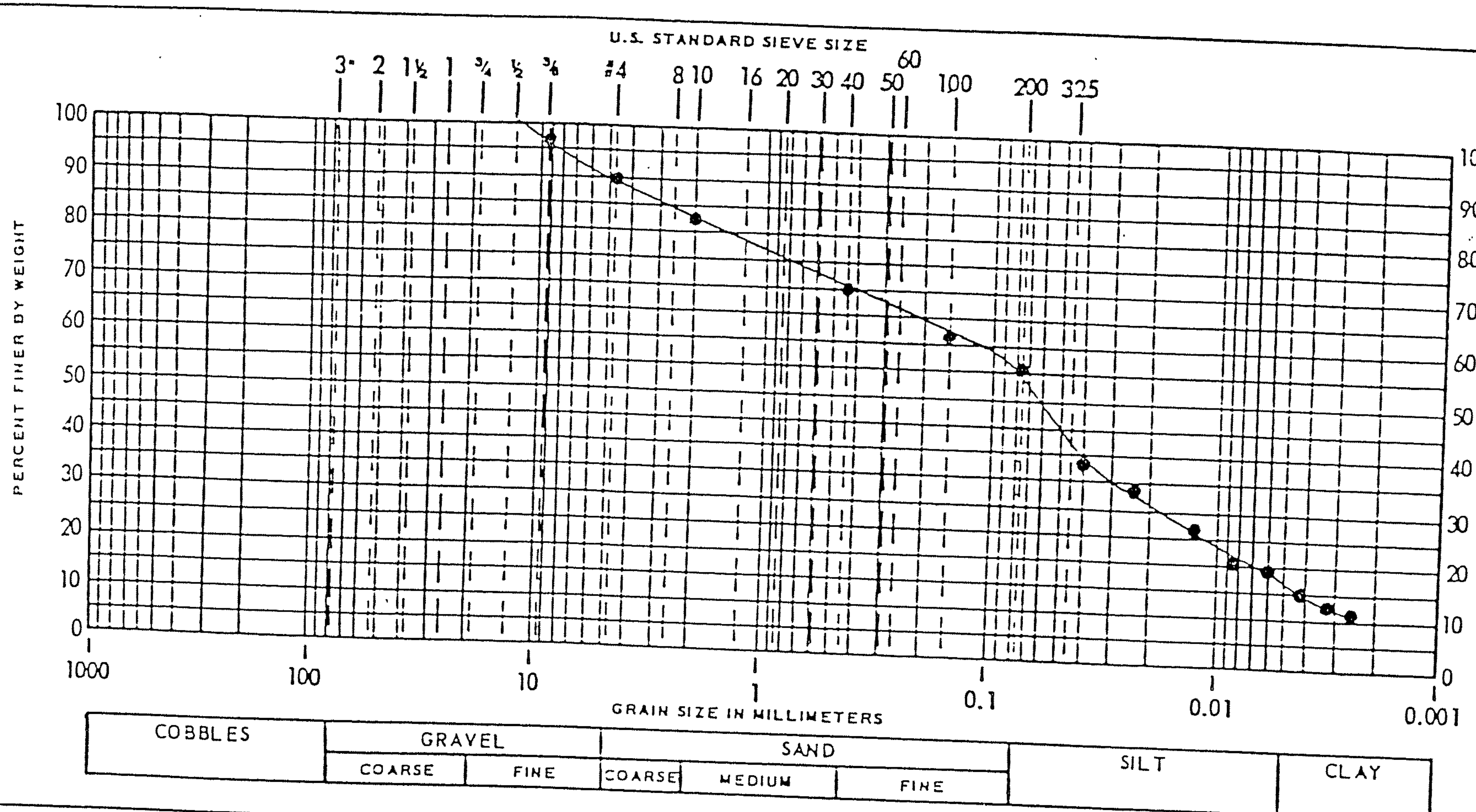
PLASTICITY INDEX

COLOR Brown

REMARKS T.T.L. Job No. 11420
Your P.O. No. 54964

Toledo Testing Laboratory, Inc.

SOIL CLASSIFICATION SHEET



PROJECT Lewiston Landfill
Your Project No. YQ-1040

BORING NO.

SAMPLE NO. GW-3A

DEPTH 22.0' to 24.0'

CLASSIFICATION Sandy silt, little clay and gravel

NATURAL % MOISTURE

LIQUID LIMIT

PLASTIC LIMIT

PLASTICITY INDEX

COLOR Reddish Brown

REMARKS T.T.L. Job No. 11420
Your P.O. No. 54964

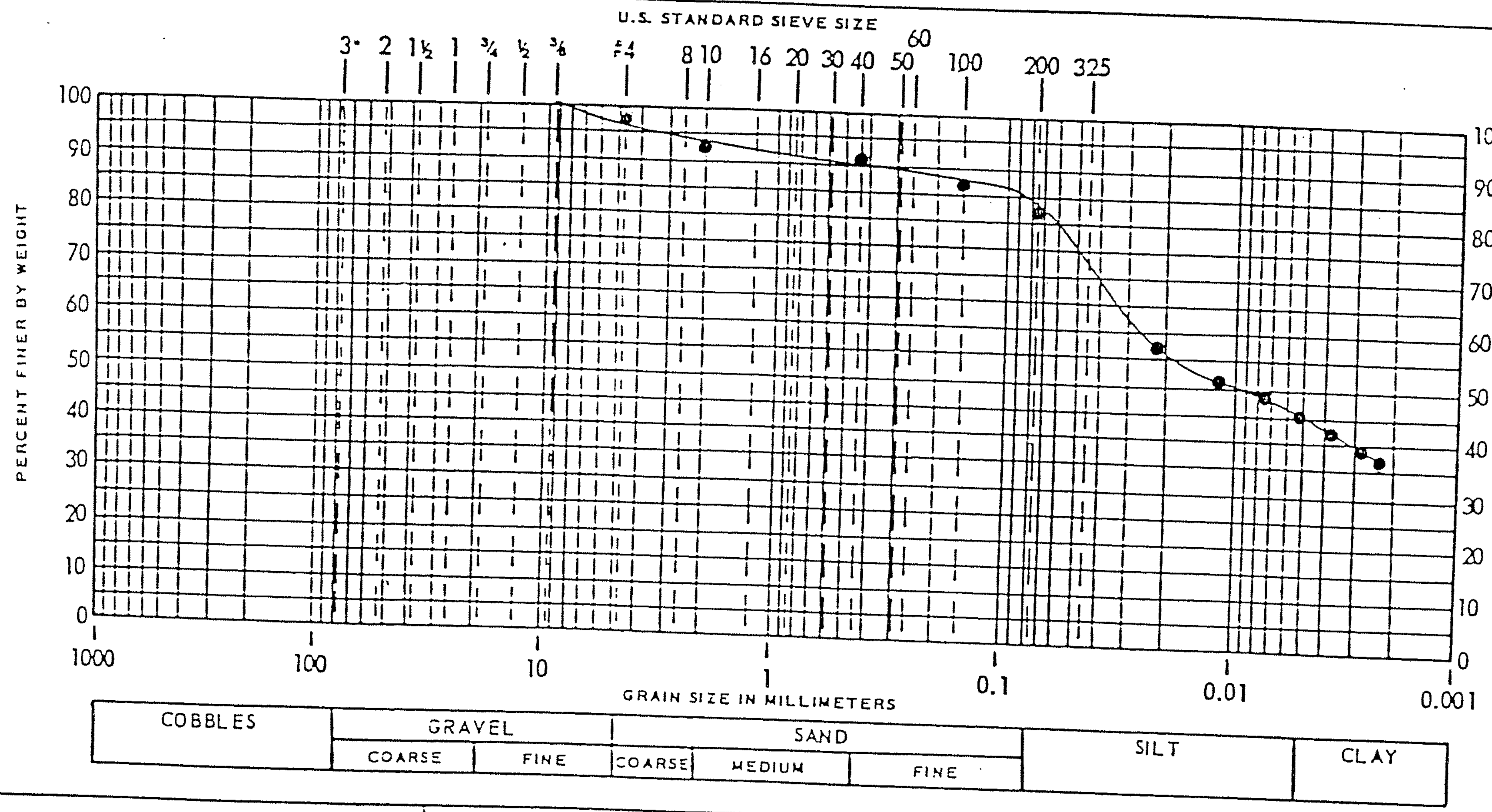
Toledo Testing Laboratory, Inc.

Draft

Figure 9

Draft

SOIL CLASSIFICATION SHEET



PROJECT Lewiston Landfill
Your Project No. YQ-1040
BORING NO.
SAMPLE NO. GW-4B
DEPTH 4.0' to 6.0'
CLASSIFICATION Silty clay, little sand, trace of gravel

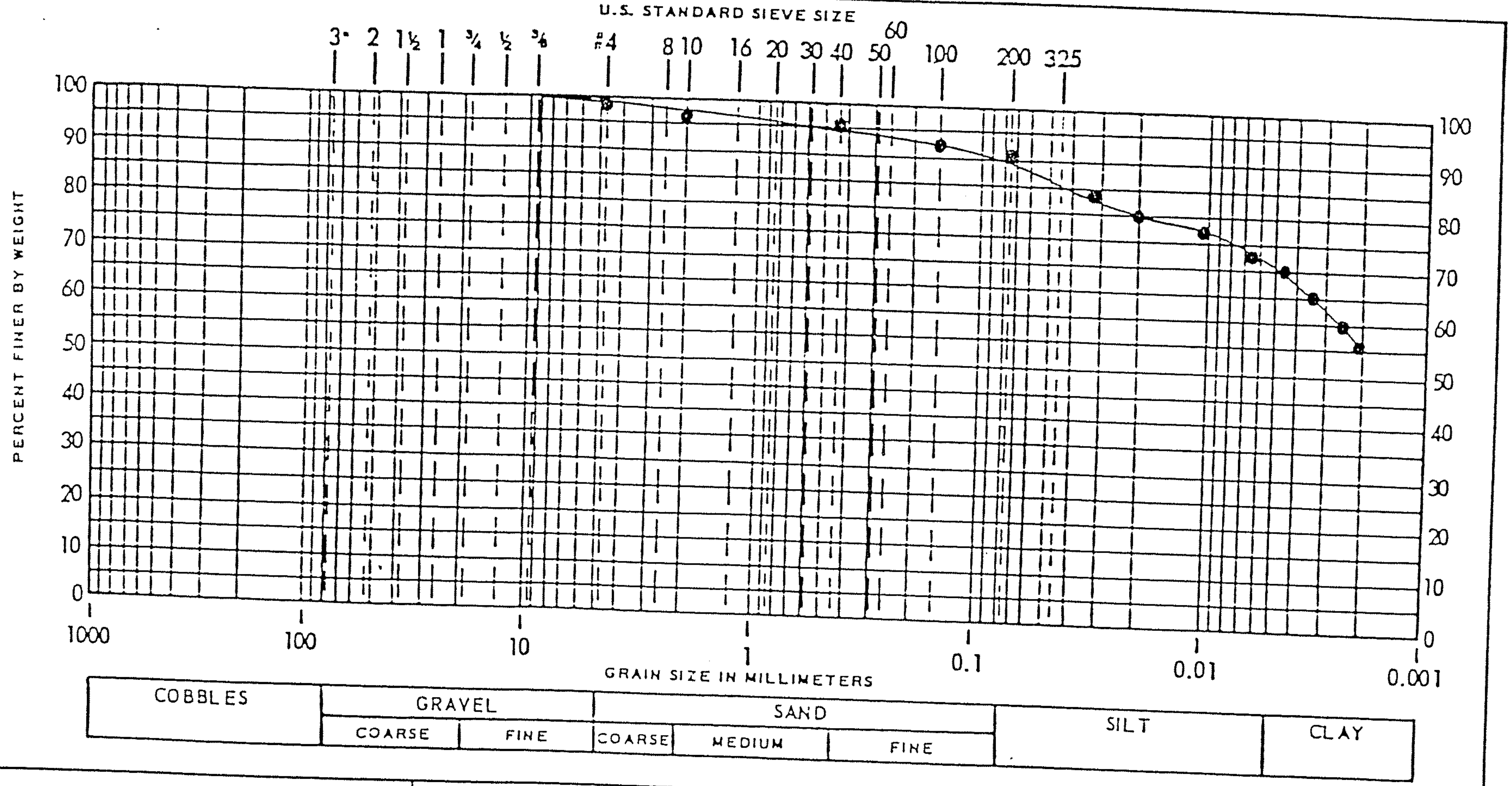
NATURAL % MOISTURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
COLOR Greyish Brown
REMARKS T.T.L. Job No. 11420
Your P.O. No. 54964

Toledo Testing Laboratory, Inc.

Figure 10

Draft

SOIL CLASSIFICATION SHEET



PROJECT Lewiston Landfill
Your Project No. YQ-1040
BORING NO.
SAMPLE NO. GW-4B
DEPTH 16.0' to 18.0'
CLASSIFICATION Silty clay, trace of sand and gravel

NATURAL % MOISTURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
COLOR Grey
REMARKS T.T.L. Job No. 11420
Your P.O. No. 54964

Toledo Testing Laboratory, Inc.

Figure 11

APPENDIX F

RAW ANALYTICAL DATA SUMMARIES

QUALIFIER CODE LEGEND

ORGANIC ANALYSES

U - Indicates compound was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture. For example, 10 U for phenol in water if the sample final volume is the protocol-specified final volume. If a 1 to 10 dilution of extract is necessary, the reported limit is 100 U. For a soil sample, the value must also be adjusted for percent moisture. For example, if the sample had 24% moisture and a 1 to 10 dilution factor, the sample quantitation limit for phenol (330 U) would be corrected to:

$$\left(\frac{330\ U}{D}\right) \times df \qquad \text{where } D = \frac{100 - \%\ \text{moisture}}{100}$$

and df = dilution factor

$$\text{at 24\% moisture, } D = \frac{100 - 24}{100} = 0.76$$

$$\left(\frac{330\ U}{.76}\right) \times 10 = 4{,}300\ U \text{ rounded to the appropriate number of significant figures}$$

For soil samples subjected to GPC cleanup procedures, the CRQL is also multiplied by 2 to account for the fact that only half of the extract is recovered.

J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data TIC indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero. For example, if the sample quantitation limit is 10 µg/L, but a concentration of 3 µg/L is calculated, report it as 3J. The sample quantitation limit must be adjusted for both dilution and percent moisture as discussed for the U flag, so that if a sample with 24% moisture and a 1 to 10 dilution factor has a calculated concentration of 300 µg/L and a sample quantitation limit of 430 µg/kg, report the concentration as 300J on Form I.

C - This flag applies to pesticide results where the identification has been confirmed by GC/MS. Single component pesticides ≥10 ng/µl in the final extract shall be confirmed by GC/MS.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. This flag must be used for a TIC as well as for a positively identified TCL compound.

E - This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis. This flag will not apply to pesticides/PCBs analyzed by GC/EC methods. If one or more compounds have a response greater than full scale, the sample or extract must be diluted and re-analyzed according to the specifications in Exhibit D. All such compounds with a response greater than full scale should have the concentration flagged with an "E" on the Form I for the original analysis. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses shall be reported on separate Form I's. The Form I for the diluted sample shall have the "DL" suffix appended to the sample number.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is re-analyzed at a higher dilution factor, as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted samples, and all concentration values reported on that Form I are flagged with the "D" flag.

A - This flag indicates that a TIC is a suspected aldol-condensation product.

X - Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the Sample Data Summary Package and the Case Narrative. If more than one is required, use "Y" and "Z" as needed. If more than five qualifiers are required for a sample result, use the "X" flag to combine several flags as needed. For instance, the "X" flag might combine the "A," "B," and "D" flags for some sample.

INORGANIC ANALYSES

C - Concentration qualifier: Enter "B" if the reported value is less than the Contract Required Detection Limit (CRDL) but greater than the Instrument Detection Limit (IDL). If the analyte was analyzed for but not detected, a "U" must be entered.

Q - Q qualifier: Specified entries and their meanings are as follows:

E - The reported value is estimated because of the presence of interference. An explanatory note must be included under Comments on the Cover Page (if the problem applies to all samples) or on the specific FORM I-IN (if it is an isolated problem).

M - Duplicate injection precision not met.

N - Spiked sample recovery not within control limits.

S - The reported value was determined by the Method of Standard Additions (MSA).

W - Post-digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance (see Exhibit E).

* - Duplicate analysis not within control limits.

+ - Correlation coefficient for the MSA is less than 0.995.

Entering "S," "W," or "+" is mutually exclusive. No combination of these qualifiers can appear in the same field for an analyte.

M - Method qualifier: Enter:

P - for ICP;

A - for Flame AA;

F - for Furnace AA;

CV - for Manual Cold Vapor AA;

AV - for Automated Cold Vapor AA;

AS - for Semi-Automated Spectrophotometric;

C - for Manual Spectrophotometric;

T - for Titrimetric; and

NR - if the analyte is not required to be analyzed.

APPENDIX G

SUBSURFACE SOIL, GROUNDWATER, SURFACE SOIL, SURFACE WATER/SEDIMENT, AND WASTE SAMPLING PROCEDURES

Subsurface Soil Sampling

Ten subsurface soil samples were collected during drilling for geotechnical analysis. All of the samples were collected using a decontaminated split-spoon sampler driven by a 140-pound hammer on the drill rig. Blow counts and total recovery were recorded for each sample (see Appendix D). After retrieving the sample, it was screened with the HNu and a pre-cleaned stainless steel spoon was used to place the samples in 8-ounce jars.

Groundwater Sampling

One groundwater sample was obtained from each of the nine wells on site and analyzed for TCL organics and inorganics. A dedicated, decontaminated PVC bailer was used with new, dedicated nylon rope at each well. Prior to sampling, a groundwater-level reading was obtained, along with a total depth-of-well, Ph, temperature, conductivity, and turbidity. An amount equaling three standing water volumes was calculated and purged prior to sampling. The first bottles to be filled were those containing sample water for volatile organic compound analysis. This was to minimize the turbidation of the water so that the volatile content would remain intact. The second bottles to be filled were those for total metals.

Prior to filling, all sample bottles were labeled with waterproof ink and labels were covered with clear mylar tape. After all bottles were filled, the bailer was placed in the well and suspended above the water table, and the well casing lid was locked. The filled bottles were packed into coolers containing vermiculite and ice, then transported at the end of the day back to E & E's ASC for analysis. All samples for metals were preserved by adding concentrated nitric acid to the sample until the pH of the sample was lowered to less than 2. All samples for cyanide analysis were preserved by the addition of sodium hydroxide. Pellets of NaOH were added until the pH was raised to greater than 12.

Surface Soil Sampling

Six locations were selected for surface soil sampling. All samples were analyzed for TCL organic and inorganic compounds. Samples S-3, S-4, S-5, and S-6 were analyzed for EP toxicity as per request of NYSDEC. The individual soil sample was obtained from the top 6 inches of topsoil by using a pre-cleaned stainless steel spoon to fill a pre-cleaned, acid-rinsed, 8-ounce clear glass soil jar equipped with a Teflon-lined lid. This volume served for total metals, base/neutral and acid extractables analysis and pesticide/PCB, and cyanide analyses. In addition to the 8-ounce jar, two 40-ml clear glass vials, each equipped with Teflon septum, were filled for volatile organic analysis.

Surface Water/Sediment Sampling

Four points were delineated in the work plan as locations at which both a surface water and sediment (SW/SWS) sample would be obtained; however, due to dry conditions during the sampling period, only one surface water sample was obtained along with the four sediment samples. The field locations were matched as closely as possible to the locations described in the work plan. These samples were analyzed for TCL organics and inorganics.

Sediment samples were obtained by using a pre-cleaned stainless steel spoon to fill an 8-ounce pre-cleaned, acid-rinsed jar equipped with a Teflon-lined lid. This volume served for total metals, base/neutrals and acid extractables, pesticide/PCB, and cyanide analyses. In addition to the 8-ounce jar, two 40-ml glass vials, each equipped with a Teflon septum, were filled with sediment for volatile organics analysis.

Waste

Two waste samples were collected at the Lewiston Site. The samples were refuse material mixed with soil. The samples were collected using the sample procedures outlined in the surface soil sampling section, and all of the samples were analyzed for TCL organics and inorganics.

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm results.

CODES RELATING TO QUANTITATION

J = Analyte present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value expected to be lower.

L = Analyte present. Reported value may be biased low. Actual value expected to be higher.

[ ]= Inorganic analyte present. As values approach the IDL the quantitation may not be accurate.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

UL = Not detected, quantitation limit is probably higher.

DATA SUMMARY FORM: VOLATILES 2

Page 2 of ____

Site Name: Lewiston Landfill

Case #: 9001.831 Sampling Date(s): 7/27/90, 8/8/90, 8/9/90

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	GW-1A		GW-1B		GW-2A		GW-2B		GW-3A		GW-3B		GW-3C		GW-4A		GW-4B	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	Location																		
CRQL	COMPOUND																		
5	*1,2-Dichloropropane																		
5	Cis-1,3-Dichloropropene																		
5	Trichloroethene																		
5	Dibromochloromethane																		
5	1,1,2-Trichloroethane																		
5	*Benzene																		
5	*Trans-1,3-Dichloropropene																		
5	Bromoform																		
10	4-Methyl-2-pentanone																		
10	2-Hexanone			13															
5	*Tetrachloroethene																		
5	1,1,2,2-Tetrachloroethane																		
5	*Toluene																		
5	*Chlorobenzene																		
5	*Ethylbenzene																		
5	*Styrene																		
5	*Total Xylenes																		

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: VOLATILES 1

Page 1 of ____

Site Name: Lewiston Landfill

Case #: 9001.831 Sampling Date(s): 7/27/90, 8/8/90, 8/9/90

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	GW-1A		GW-1B		GW-2A		GW-2B		GW-3A		GW-3B		GW-3C		GW-4A		GW-4B	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	Location																		
CRQL	COMPOUND																		
10	Chloromethane																		
10	Bromomethane																		
10	*Vinyl Chloride																		
10	Chloroethane																		
5	*Methylene Chloride	9	B	8	B	6	B	8	B	12	B	620		8	B	10	B	9	B
10	Acetone	14	B	36	B	10	B	24	B	19	B	28	B	17	B	14	B	21	B
5	Carbon Disulfide																		
5	*1,1-Dichloroethene																		
5	1,1-Dichloroethane																		
5	*Total-1,2-Dichloroethene																		
5	Chloroform					1	B												
5	*1,2-Dichloroethane																		
10	*2-Butanone			16															
5	*1,1,1-Trichloroethane																		
5	*Carbon Tetrachloride																		
10	Vinyl Acetate																		
5	Bromodichloromethane																		

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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Page 3 of ____

DATA SUMMARY FORM: VOLATILES 1

Site Name: Lewiston Landfill

Case #: 9001.831 Sampling Date(s): 7/27/90, 8/8/90, 8/9/90

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	SW-4		DW-01		GW-2A MS		GW-2A MSD		VBLKW1		VBLKW2		VBLKW4					
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0					
	Location			Drill Water															
CRQL	COMPOUND																		
10	Chloromethane																		
10	Bromomethane																		
10	*Vinyl Chloride																		
10	Chloroethane																		
5	*Methylene Chloride	7	B	6	B	9	B	10	B	4	J	10		10					
10	Acetone	18	B	19	B	12	B	7	B	16		23		13					
5	Carbon Disulfide																		
5	*1,1-Dichloroethene																		
5	1,1-Dichloroethane																		
5	*Total-1,2-Dichloroethene																		
5	Chloroform			25								1	J	1	J				
5	*1,2-Dichloroethane																		
10	*2-Butanone																		
5	*1,1,1-Trichloroethane																		
5	*Carbon Tetrachloride																		
10	Vinyl Acetate																		
5	Bromodichloromethane			11															

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: VOLATILES 2

Page 4 of ___

Site Name: Lewiston Landfill

Case #: 9001831 Sampling Date(s): 7/27/90, 8/8/90, 8/9/90

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	SW-4	DW-01	GW-2A MS	GW-2A MSD	VBLKW1	VBLKW2	VBLKW4		
	Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0			
	Location		Drill Water							
CRQL	COMPOUND									
5	*1,2-Dichloropropane									
5	Cis-1,3-Dichloropropene									
5	Trichloroethene									
5	Dibromochloromethane		5							
5	1,1,2-Trichloroethane									
5	*Benzene									
5	Trans-1,3 Dichloropropene									
5	Bromoform									
10	4-Methyl-2-pentanone									
10	2 Hexanone									
5	*Tetrachloroethene									
5	1,1,2,2-Tetrachloroethane									
5	*Toluene									
5	*Chlorobenzene									
5	*Ethylbenzene									
5	*Styrene									
5	*Total Xylenes									

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: VOLATILES 1

Site Name: Lewiston Landfill, NYS DEC Phase II

SOIL SAMPLES
(ug/Kg)

Case #: 9001.831 Sampling Date(s): 8/8/90, 8/9/90
SDG No. DW-01

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

Sample No.	S-1		S-2		S-3		S-4		S-5		S-6		S-6RE		SED-1		SED-1RE	
Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
% Moisture	14		14		8		11		14		46		46		22		22	
Location											more acceptable				more acceptable			
COMPOUND																		
Chloromethane																		
Bromomethane																		
Vinyl Chloride																		
Chloroethane																		
Methylene Chloride	7	B	9	B	9	B	9	B	8	B	16	B	37	B	10	B	10	B
Acetone			5	B									10	B			9	B
Carbon Disulfide																		
1,1-Dichloroethene																		
1,1-Dichloroethane																		
Total-1,2-Dichloroethene																		
Chloroform	2	B	2	B	3	B	1	B	2	B	4	B	3	B			2	B
1,2-Dichloroethane																		
2-Butanone																		
1,1,1-Trichloroethane													17					
Carbon Tetrachloride																		
Vinyl Acetate																		
Bromodichloromethane																		

RDL = Contract Required Detection Limit

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DW-0) Date(s): 8/8/90, 8/9/90 Phase II

LATILES

SOIL SAMPLES
(ug/Kg)

2

Page 6 of

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

Sample No.	S-1	S-2	S-3	S-4	S-5	S-6	S-6RE	SED-1	SED-1RE
Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
% Moisture	14	14	8	11	14	46	46	22	22
Location									
COMPOUND									
1,2-Dichloropropane									
Cis-1,3-Dichloropropene									
Trichloroethene									
Dibromochloromethane									
1,1,2-Trichloroethane									
Benzene									
Trans-1,3-Dichloropropene									
Bromoform									
4-Methyl-2-pentanone									
-Hexanone									
etrachloroethene									
,2,2-Tetrachloroethane									
uene									
robenzene									
benzene									
e									
Xylenes									
Contract Required Quantitation Limit									

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DATA SUMMARY FORM: V O L A T I L E S 1

Site Name: Lewiston Landfill

Case #: 900.831 Sampling Date(s): 8/8/90, 8/9/90

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	SED-2		SED-3		SED-3 RE		SED-4		W-1		W-2		W-2 RE		S-3 MS		S-3 MSD	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	% Moisture	16		30		30		46		14		46		46		8		8	
	Location			more acceptable								more acceptable							
CRQL	COMPOUND																		
10	Chloromethane																		
10	Bromomethane																		
10	Vinyl Chloride																		
10	Chloroethane																		
5	Methylene Chloride	8	B	9	B	9	B	14	B	23	B	37	B	19	B	8	B		
10	Acetone	10	B	10	B			23	B	15	B	220*	B			4	B	3	B
5	Carbon Disulfide																		
5	1,1-Dichloroethene																		
5	1,1-Dichloroethane																		
5	Total-1,2-Dichloroethene																		
5	Chloroform																		
5	1,2-Dichloroethane							2	B	5	B	8	B	10	B	2	B	2	B
10	2-Butanone																		
5	1,1,1-Trichloroethane							4	J										
5	Carbon Tetrachloride																		
10	Vinyl Acetate																		
5	Bromodichloromethane																		

CRDL = Contract Required Detection Limit

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* Value is above ten times blank, but still considered lab contamination since not detected in the reanalysis of W-2.

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DATA SUMMARY FORM: VOLATILES 2

Site Name: Lewiston Landfill

Case #: 9001.831 Sampling Date(s): 8/8/90, 8/9/90

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	SED-2	SED-3	SED-3RE	SED-4	W-1	W-2	W-2RE	S-3MS	S-3MSD
	Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	% Moisture	16	30	30	46	14	46	46	8	8
	Location									
CRQL	COMPOUND									
5	1,2-Dichloropropane									
5	Cis-1,3-Dichloropropene									
5	Trichloroethene									
5	Dibromochloromethane									
5	1,1,2-Trichloroethane									
5	Benzene									
5	Trans-1,3-Dichloropropene									
5	Bromoform									
10	4-Methyl-2-pentanone									
10	2-Hexanone									
5	Tetrachloroethene									
5	1,1,2,2-Tetrachloroethane									
5	Toluene									
5	Chlorobenzene					5 J	7 J			
5	Ethylbenzene									
5	Styrene					5 J				
5	Total Xylenes									

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: VOLATILES 1

Site Name: Lewiston Landfill

Case #: 9001.831 Sampling Date(s): 8/8/90, 8/9/90

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	VBLKS1		VBLKS2		VBLKS3		VBLKS4		VBLKS5									
	Dilution Factor	1.0		1.0		1.0		1.0		1.0									
	% Moisture	—		—		—		—		—									
	Location																		
RQL	COMPOUND																		
10	Chloromethane																		
10	Bromomethane																		
10	Vinyl Chloride																		
10	Chloroethane																		
5	Methylene Chloride	8		8		8		5		10									
10	Acetone			4	J					5	J								
5	Carbon Disulfide																		
5	1,1-Dichloroethene																		
5	1,1-Dichloroethane																		
5	Total-1,2 Dichloroethene																		
5	Chloroform					1	J			2	J								
5	1,2-Dichloroethane																		
0	2-Butanone																		
	1,1,1-Trichloroethane																		
	Carbon Tetrachloride																		
0	Vinyl Acetate																		
	Bromodichloromethane																		

CRDL = Contract Required Detection Limit

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DATA SUMMARY FORM: VOLATILES 2

Site Name: Lewiston Landfill

Case #: 9001,83/ Sampling Date(s): 8/8/90, 8/9/90

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	VBLKS1	VBLKS2	VBLKS3	VBLKS4	VBLKS5				
	Dilution Factor	1.0	1.0	1.0	1.0	1.0				
	% Moisture	—	—	—	—	—				
	Location									
CRQL	COMPOUND									
5	1,2-Dichloropropane									
5	Cis-1,3-Dichloropropene									
5	Trichloroethene									
5	Dibromochloromethane									
5	1,1,2-Trichloroethane									
5	Benzene									
5	Trans-1,3-Dichloropropene									
5	Bromoform									
10	4-Methyl-2-pentanone									
10	2-Hexanone									
5	Tetrachloroethene									
5	1,1,2,2-Tetrachloroethane									
5	Toluene									
5	Chlorobenzene									
5	Ethylbenzene									
5	Styrene									
5	Total Xylenes									

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 1

Site Name: Lewiston Landfill

Case #: 9001,831 Sampling Date(s): 7/27/90, 8/8/90
8/9/90

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	GW-1A		GW-2A		GW-3A		GW-3B		GW-3C		GW-4A		SW-4		DW-01			
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0			
	Location																		
CRQL	COMPOUND																		
10	Phenol																		
10	bis(2-Chloroethyl)ether																		
10	2-Chlorophenol																		
10	***1,3-Dichlorobenzene**																		
10	***1,4-Dichlorobenzene**																		
10	Benzyl Alcohol																		
10	1,2-Dichlorobenzene																		
10	2-Methylphenol																		
10	bis(2-Chloroisopropyl)ether																		
10	4-Methylphenol																		
10	N-Nitroso-di-n-propylamine																		
10	Hexachloroethane																		
10	Nitrobenzene																		
10	Isophorone																		
10	2-Nitrophenol																		
10	2,4-Dimethylphenol																		
50	Benzoic Acid																		
10	bis(2-Chloroethoxy)methane																		
10	2,4-Dichlorophenol																		
10	1,2,4-Trichlorobenzene																		
10	Naphthalene																		
10	4-Chloroaniline																		

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: B N A S 2

Site Name: Lowiston Landfill

WATER SAMPLES
(ug/L)

Case #: 9001.831 Sampling Date(s): 7/29/90, 8/8/90
8/9/90

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	GW-1A		GW-2A		GW-3A		GW-3B		GW-3C		GW-4A		SW-4		DW-01			
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0			
	Location																		
RQL	COMPOUND																		
10	Hexachlorobutadiene																		
10	4-Chloro-3-methylphenol																		
10	2-Methylnaphthalene																		
10	Hexachlorocyclopentadiene																		
10	2,4,6-Trichlorophenol																		
50	2,4,5-Trichlorophenol																		
10	2-Chloronaphthalene																		
50	2-Nitroaniline																		
10	Dimethylphthalate																		
10	Acenaphthylene																		
10	2,6-Dinitrotoluene																		
50	3-Nitroaniline																		
10	Acenaphthene																		
50	2,4-Dinitrophenol																		
50	4-Nitrophenol																		
0	Dibenzofuran																		
0	2,4-Dinitrotoluene																		
0	Diethylphthalate					1	B			9	B								
0	4-Chlorophenyl-phenylether																		
0	Fluorene																		
0	4-Nitroaniline																		
0	4,6-Dinitro-2-methylphenol																		

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: B N A S 3

Site Name: Lewiston Landfill

WATER SAMPLES
(ug/L)

Case #: 9001.831 Sampling Date(s): 7/29/90, 8/8/90
8/9/90

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	GW-1A		GW-2A		GW-3A		GW-3B		GW-3C		GW-4A		SW-4		DW-01			
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0			
	Location																		
CRDL	COMPOUND																		
10	N-Nitrosodiphenylamine																		
10	4-Bromophenyl-phenylether																		
10	***Hexachlorobenzene**																		
50	***Pentachlorophenol**																		
10	Phenanthrene																		
10	Anthracene																		
10	Di-n-butylphthalate	25	B	23	B	12	B	10	B	20	B	9	B	6	B	3	B		
10	Fluoranthene																		
10	Pyrene																		
10	Butylbenzylphthalate																		
20	3,3-Dichlorobenzidine																		
10	Benzo(a)anthracene																		
10	Chrysene																		
10	bis(2 Ethylhexyl)phthalate	24	B	26	B	7	B	12	B	21	B	11	B	16	B	24	B		
10	Di-n-octylphthalate																		
10	Benzo(b)fluoranthene																		
10	Benzo(k)fluoranthene																		
10	Benzo(a)pyrene																		
10	Indeno(1,2,3-cd)pyrene																		
10	Dibenz(a,h)anthracene																		
10	Benzo(g,h,i)perylene																		

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: B N A S 1

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Site Name: Lewiston Landfill

WATER SAMPLES
(ug/L)

Case #: 9001.831 Sampling Date(s): 7/27/90, 8/8/90
8/9/90

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	GW-2AMS		GW-2AMSD		SBLKS1		SBLKS2		SBLKS3									
	Dilution Factor	1.0		1.0		1.0		1.0		1.0									
	Location																		
CRQL	COMPOUND																		
10	Phenol																		
10	bis(2-Chloroethyl)ether																		
10	2-Chlorophenol																		
10	*1,3-Dichlorobenzene																		
10	*1,4-Dichlorobenzene																		
10	Benzyl Alcohol																		
10	1,2 Dichlorobenzene																		
10	2-Methylphenol																		
10	bis(2-Chloroisopropyl)ether																		
10	4-Methylphenol																		
10	N-Nitroso-di-n propylamine																		
10	Hexachloroethane																		
10	Nitrobenzene																		
10	Isophorone																		
10	2-Nitrophenol																		
10	2,4-Dimethylphenol																		
50	Benzoic Acid																		
10	bis(2-Chloroethoxy)methane																		
10	2,4-Dichlorophenol																		
10	1,2,4-Trichlorobenzene																		
10	Naphthalene																		
10	4-Chloroaniline																		

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 2

Site Name: Lewiston Landfill

WATER SAMPLES
(ug/L)

Case #: 9021.83) Sampling Date(s): 7/27/90, 8/8/90
8/9/90

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	GW-2AMS		GW-2AMSD		SBLKS1		SBLKS2		SBLKS3									
	Dilution Factor	1.0		1.0		1.0		1.0		1.0									
	Location																		
RQL	COMPOUND																		
10	Hexachlorobutadiene																		
10	4-Chloro-3-methylphenol																		
10	2-Methylnaphthalene																		
10	Hexachlorocyclopentadiene																		
10	2,4,6-Trichlorophenol																		
50	2,4,5-Trichlorophenol																		
10	2-Chloronaphthalene																		
50	2-Nitroaniline																		
10	Dimethylphthalate																		
10	Acenaphthylene																		
10	2,6-Dinitrotoluene																		
50	3-Nitroaniline																		
0	Acenaphthene																		
50	2,4-Dinitrophenol																		
0	4-Nitrophenol																		
0	Dibenzofuran																		
0	2,4-Dinitrotoluene																		
0	Diethylphthalate																		
0	4-Chlorophenyl-phenylether																		
0	Fluorene																		
0	4-Nitroaniline																		
0	4,6-Dinitro-2-methylphenol																		

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: B N A S 3

WATER SAMPLES
(ug/L)

Site Name: Lewiston Landfill

Case #: 9001.831 **Sampling Date(s):** ~~7/27/90, 8/8/90~~ 8/9/90

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	GW-2A MS		GW-2A MSD		SBLKW1		SBLKW2		SBLKW3									
	Dilution Factor	1.0		1.0		1.0		1.0		1.0									
	Location																		
CRDL	COMPOUND																		
10	N-Nitrosodiphenylamine																		
10	4-Bromophenyl-phenylether																		
10	***Hexachlorobenzene**																		
50	***Pentachlorophenol**																		
10	Phenanthrene																		
10	Anthracene																		
10	Di-n-butylphthalate	2	B	14	B			6	J	2	J								
10	Fluoranthene																		
10	Pyrene																		
10	Butylbenzylphthalate																		
20	3,3-Dichlorobenzidine																		
10	Benzo(a)anthracene																		
10	Chrysene																		
10	bis(2-Ethylhexyl)phthalate	7	B	8	B	10		14		6	J								
10	Di-n-octylphthalate																		
10	Benzo(b)fluoranthene																		
10	Benzo(k)fluoranthene																		
10	Benzo(a)pyrene																		
10	Indeno(1,2,3-cd)pyrene																		
10	Dibenz(a,h)anthracene																		
10	Benzo(g,h,i)perylene																		

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: B N A S 1

Site Name: Lewiston Landfill, NYSDEC Phase II

SOIL SAMPLES
(ug/Kg)

Case #: 9001.831 Sampling Date(s): 8/8/90, 8/9/90
SDG No. DW-01

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

RQL	Sample No.	S-1	S-2	S-3	S-3RE	S-4	S-5	S-6	SED-1	SED-2
	Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	% Moisture	14	14	8	8	11	14	46	22	16
	Location				more acceptable					
	COMPOUND									
330	Phenol									
330	bis(2-Chloroethyl)ether									
330	2-Chlorophenol									
330	1,3-Dichlorobenzene									
330	1,4-Dichlorobenzene									
330	Benzyl Alcohol									
330	1,2-Dichlorobenzene									
330	2-Methylphenol									
330	bis(2-Chloroisopropyl)ether									
330	4-Methylphenol									
330	N-Nitroso-di-n-propylamine									
330	Hexachloroethane									
330	Nitrobenzene									
330	Isophorone									
330	2-Nitrophenol									
330	2,4-Dimethylphenol									
1600	Benzoic Acid									
330	bis(2-Chloroethoxy)methane									
330	2,4-Dichlorophenol									
330	1,2,4-Trichlorobenzene									
330	Naphthalene									
330	4-Chloroaniline									

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 2

Site Name: Lewiston Landfill, NYS DEC Phase II

SOIL SAMPLES
(ug/Kg)

Case #: 9001.831 Sampling Date(s): 8/8/90, 8/9/90

SDG No. DW-01

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	S-1	S-2	S-3	S-3RE	S-4	S-5	S-6	SED-1	SED-2
	Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	% Moisture	14	14	8	8	11	14	46	22	16
	Location									
RQL	COMPOUND									
330	Hexachlorobutadiene									
330	4-Chloro-3-methylphenol									
330	2-Methylnaphthalene									
330	Hexachlorocyclopentadiene									
330	2,4,6-Trichlorophenol									
1600	2,4,5-Trichlorophenol									
330	2-Chloronaphthalene									
1600	2-Nitroaniline									
330	Dimethylphthalate									
330	Acenaphthylene									
330	2,6-Dinitrotoluene									
1600	3-Nitroaniline									
330	Acenaphthene									
1600	2,4-Dinitrophenol									
1600	4-Nitrophenol									
330	Dibenzofuran									
330	2,4-Dinitrotoluene									
330	Diethylphthalate									
330	4-Chlorophenyl-phenylether									
330	Fluorene									
1600	4-Nitroaniline									
1600	4,6-Dinitro-2-methylphenol									

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 3

Site Name: Lewiston Landfill, NYSDEC Phase II

SOIL SAMPLES
(ug/Kg)

Case #: 9001.831 Sampling Date(s): 8/8/90, 8/9/90

SDG No. DW-01

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	S-1	S-2	S-3	S-3RE	S-4	S-5	S-6	SED-1	SED-2
	Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	% Moisture	14	14	8	8	11	14	46	22	16
	Location									
CRQL	COMPOUND									
330	N-Nitrosodiphenylamine									
330	4-Bromophenyl-phenylether									
330	Hexachlorobenzene									
1600	Pentachlorophenol									
330	Phenanthrene	55 J						70 J		65 J
330	Anthracene									
330	Di-n-butylphthalate	180 B	270 B	200 B	180 B	530 B	940 B	930 B	360 B	550 B
330	Fluoranthene	110 J						73 J	55 J	110 J
330	Pyrene	81 J						70 J	52 J	85 J
330	Butylbenzylphthalate									
1600	3,3-Dichlorobenzidine									
330	Benzo(a)anthracene	53 J								
330	Chrysene	67 J							65 J	84 J
330	bis(2-Ethylhexyl)phthalate	130 B	290 B	230 B	220 B	370 B	580 B	890 B	550 B	450 B
330	Di-n-octylphthalate									
330	Benzo(b)fluoranthene	85 J				42 J	46 J		86 J	140 J
330	Benzo(k)fluoranthene	39 J								
330	Benzo(a)pyrene	55 J						67 J		65 J
330	Indeno(1,2,3-cd)pyrene	46 J						63 J		57 J
330	Dibenz(a,h)anthracene									
330	Benzo(g,h,i)perylene	46 J						75 J		61 J

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 1

Site Name: Lewiston Landfill

SOIL SAMPLES
(ug/Kg)

Case #: 9001.831 Sampling Date(s): 8/8/90, 8/9/90

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	SED-3		SED-30L		SED-4		W-1		W-2		SBLK S1		S-3MS		S-3MSD			
	Dilution Factor	1.0		2.0		2.0		10.0		10.0		1.0		1.0		1.0			
	% Moisture	30		30		46		14		46		—		8		8			
	Location																		
QL	COMPOUND			more acceptable															
30	Phenol																		
30	bis(2-Chloroethyl)ether																		
30	2-Chlorophenol																		
30	1,3-Dichlorobenzene																		
30	1,4-Dichlorobenzene																		
30	Benzyl Alcohol																		
30	1,2 Dichlorobenzene																		
30	2-Methylphenol									1400	J								
30	bis(2-Chloroisopropyl)ether																		
30	4-Methylphenol																		
30	N-Nitroso-di-n-propylamine																		
0	Hexachloroethane																		
10	Nitrobenzene																		
10	Isophorone																		
0	2-Nitrophenol																		
0	2,4-Dimethylphenol																		
00	Benzoic Acid																		
0	bis(2-Chloroethoxy)methane																		
0	2,4-Dichlorophenol																		
0	1,2,4-Trichlorobenzene																		
0	Naphthalene	100	J	77	J			3300	J										
0	4-Chloroaniline																		

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 2

Site Name: Lewiston-Landfill

SOIL SAMPLES
(ug/Kg)

Case #: 9001831 Sampling Date(s): 8/8/90, 8/9/90

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	SED-3		SED-3DL		SED-4		W-1		W-2		SBLKS1		S-3MS		S-3MSD			
	Dilution Factor	1.0		2.0		2.0		10.0		10.0		1.0		1.0		1.0			
	% Moisture	30		30		46		14		46		—		8		8			
	Location			more acceptable															
CRQL	COMPOUND																		
330	Hexachlorobutadiene																		
330	4-Chloro-3-methylphenol																		
330	2-Methylnaphthalene	140	J	95	J														
330	Hexachlorocyclopentadiene																		
330	2,4,6-Trichlorophenol																		
1600	2,4,5-Trichlorophenol																		
330	2-Chloronaphthalene																		
1600	2-Nitroaniline																		
330	Dimethylphthalate																		
330	Acenaphthylene	410	J	280	J														
330	2,6-Dinitrotoluene																		
1600	3-Nitroaniline																		
330	Acenaphthene	120	J	72	J														
1600	2,4-Dinitrophenol																		
1600	4-Nitrophenol																		
330	Dibenzofuran	340	J	240	J														
330	2,4-Dinitrotoluene																		
330	Diethylphthalate							92	B	150	B								
330	4-Chlorophenyl-phenylether																		
330	Fluorene	660		470	J														
1600	4-Nitroaniline																		
1600	4,6-Dinitro-2-methylphenol																		

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 3

Site Name: Lewiston Landfill

SOIL SAMPLES
(ug/Kg)

Case #: 9001.931 **Sampling Date(s):** 8/8/90, 8/9/90

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

CRQL	COMPOUND																		
	Sample No.	SED-3		SED-3DL		SED-4		W-1		W-2		SBLKS1		S-3MS		S-3MSD			
	Dilution Factor	1.0		2.0		2.0		10.0		10.0		1.0		1.0		1.0			
	% Moisture	30		30		46		14		46		—		8		8			
	Location			more acceptable															
330	N-Nitrosodiphenylamine																		
330	4-Bromophenyl-phenylether																		
330	Hexachlorobenzene																		
1600	Pentachlorophenol																		
330	Phenanthrene	7900	J	6700		380	J	310	J	640	J								
330	Anthracene	1700		1400															
330	Di-n-butylphthalate	320	B	250	B	400	B	1800	B	470	B	240	J	270	B	270	B		
330	Fluoranthene	11000	J	9800		1100	J	950	J	490	J			37	J	77	J		
330	Pyrene	7700	J	7000		1000	J	1500	J	670	J								
330	Butylbenzylphthalate							3800	B										
1600	3,3-Dichlorobenzidine																		
330	Benzo(a)anthracene	6100		4700		650	J	830	J										
330	Chrysene	5900		4400		720	J	1300	J										
330	bis(2-Ethylhexyl)phthalate	480	B	430	B	470	B	51000	B	5600	B	210	J	1600	B	1800	B		
330	Di-n-octylphthalate							2200	B	240	J								
330	Benzo(b)fluoranthene	6300		4700		890	J	1100	J	500	J			58	J	79	J		
330	Benzo(k)fluoranthene	2900		2400		560	J	820	J	230	J								
330	Benzo(a)pyrene	4100		3400		690	J	720	J	340	J								
330	Indeno(1,2,3-cd)pyrene	2900		2300		530	J	670	J	220	J								
330	Dibenz(a,h)anthracene	880		770	J	140	J	200	J										
330	Benzo(g,h,i)perylene	2300		2000		490	J	610	J	270	J								

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: PESTICIDES AND PCBS

Site Name: Lewiston Landfill, NYS DEC_ Phase II

WATER SAMPLES
(ug/L)

Case #: 9001.831 Sampling Date(s): 7/27/90, 8/9/90
8/8/90
SDG No. DW-1

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	DW-01		GW-1A		GW-2A		GW-3A		GW-3B		GW-3C		GW-4A		SW-4		PBLKW1	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	Location	Drill Water		GW-1A		GW-2A		GW-3A		GW-3B		GW-3C		GW-4A		SW-4			
CRQL	COMPOUND																		
0.05	alpha-BHC																		
0.05	beta-BHC																		
0.05	delta-BHC																		
0.05	*Gamma-BHC (Lindane)																		
0.05	*Heptachlor																		
0.05	Aldrin																		
0.05	Heptachlor Epoxide																		
0.05	Endosulfan I																		
0.10	Dieldrin																		
0.10	4,4'-DDE																		
0.10	*Endrin																		
0.10	Endosulfan II																		
0.10	4,4'-DDD																		
0.10	Endosulfan Sulfate																		
0.10	4,4'-DDT																		
0.5	*Methoxychlor																		
0.10	Endrin ketone																		
0.5	*Alpha-Chlordane																		
0.5	*Gamma-Chlordane																		
1.0	*Toxaphene																		
0.5	*Aroclor-1016																		
0.5	*Aroclor-1221																		
0.5	*Aroclor-1232																		
0.5	*Aroclor-1242																		
0.5	*Aroclor-1248																		
1.0	*Aroclor-1254											0.70	J						
1.0	*Aroclor-1260																		

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CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: PESTICIDES AND PCBS

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Site Name: Lewiston Landfill, NYS DEC Phase II

Case #: 9001.831 Sampling Date(s): 7/27/90, 8/9/90

SDG No. DW-1

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

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	Sample No. Dilution Factor Location	GW-2AMS 1.0	GW-2AMSD 1.0	PBLKW3 1.0	PBLKW4 1.0				
DL	COMPOUND								
05	alpha-BHC								
05	beta-BHC								
05	delta-BHC								
05	*Gamma-BHC (Lindane)								
05	*Heptachlor								
05	Aldrin								
05	Heptachlor Epoxide								
05	Endosulfan I								
10	Dieldrin								
10	4,4'-DDE								
10	*Endrin								
10	Endosulfan II								
10	4,4'-DDD								
10	Endosulfan Sulfate								
10	4,4'-DDT								
5	*Methoxychlor								
10	Endrin ketone								
5	*Alpha-Chlordane								
5	*Gamma-Chlordane								
	*Toxaphene								
5	*Aroclor-1016								
5	*Aroclor-1221								
5	*Aroclor-1232								
5	*Aroclor-1242								
5	*Aroclor-1248								
	*Aroclor-1254								
	*Aroclor-1260								

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: PESTICIDES AND PCBS

Site Name: Lewiston Landfill, NYS DEC Phase II

SOIL SAMPLES
(ug/Kg)

Case #: 9001.831 Sampling Date(s): 8/8/90, 8/9/90

SDG No. DW-01

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	S-1	S-2	S-3	S-4	S-5	S-6	SED-1	SED-2	SED-3
	Dilution Factor	2.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	5.0
	% Moisture	14	14	8	dec.	14	46	22	16	30
	Location									
RQL	COMPOUND									
8	alpha-BHC									
8	beta-BHC									
8	delta-BHC									
8	Gamma-BHC (Lindane)									
8	Heptachlor									
8	Aldrin									
8	Heptachlor Epoxide									
8	Endosulfan I									
16	Dieldrin									
16	4,4'-DDE			36		53				52 J
16	Endrin									
16	Endosulfan II									
16	4,4'-DDD					48				56 J
16	Endosulfan Sulfate									
16	4,4'-DDT			43		20				
80	Methoxychlor									
16	Endrin ketone									
80	Alpha-Chlordane									
80	Gamma-Chlordane									
160	Toxaphene									
80	Aroclor-1016									
80	Aroclor-1221									
80	Aroclor-1232									
80	Aroclor-1242									
80	Aroclor-1248									
160	Aroclor-1254									
160	Aroclor-1260									

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CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: PESTICIDES AND PCBS

Site Name: Lewiston Landfill

Case #: 9001.83/ Sampling Date(s): 8/8/90, 8/9/90

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	SED-4	W-1	W-2	PBLKS3	PBLKS3	S3-MS	S-3-MSD		
	Dilution Factor	1.0	50	1.0	1.0	1.0	2.0	2.0		
	% Moisture	46	Dec.	46	—	—	8	8		
	Location									
CRQL	COMPOUND									
8	alpha-BHC									
8	beta-BHC									
8	delta-BHC									
8	Gamma-BHC (Lindane)									
8	Heptachlor									
8	Aldrin									
8	Heptachlor Epoxide									
8	Endosulfan I									
16	Dieldrin									
16	4,4'-DDE						60	54		
16	Endrin									
16	Endosulfan II									
16	4,4'-DDD									
16	Endosulfan Sulfate									
16	4,4'-DDT									
80	Methoxychlor									
16	Endrin ketone									
80	Alpha-Chlordane									
80	Gamma-Chlordane									
160	Toxaphene									
80	Aroclor-1016									
80	Aroclor-1221									
80	Aroclor-1232									
80	Aroclor-1242									
80	Aroclor-1248			5400						
160	Aroclor-1254		10000*							
160	Aroclor-1260									

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CRQL = Contract Required Quantitation Limit

* Result confirmed by GC/MS

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DATA SUMMARY FORM: INORGANICS

WATER SAMPLES
(ug/L)

Site Name: Lewiston Landfill

Case #: 9001-831 Sampling Date(s): 7/27/90, 8/8/90, 8/9/90

+Due to dilution, sample quantitation limit is affected. See dilution table for specifics.

	Sample No.	DW-1		GW-1A		GW-1B		GW-2A		GW-2B		GW-3A		GW-3B		GW-3C		GW-4A		
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		
	Location																			
CRDL	ANALYTE																			
200	Aluminum	254	B	947	B	5590		803	B	404	B	256	B	94	B	5420		497	B	
60	Antimony																			
10	*Arsenic			3.7				2.0		1.7						3.7		2.1		
200	Barium	22.5		35.9		28.4		23.6		13.9		29.8		283		95.7		162		
5	Beryllium																			
5	*Cadmium																			
5000	Calcium	37700		296000		422000		312000		364000		169000		289000		155000		142000		
10	*Chromium																			
50	Cobalt																			
25	Copper																			
100	Iron	60	B	2670		12600		2220		5010		1130		214	B	9140		1070		
5	*Lead	4.4		3.0		2.0		4.5								5.8		5.0		
5000	Magnesium	7740		239000		223000		416000		311000		211000		4430		129000		69100		
15	Manganese	2.2		526		356		409		278		228		5.2		896		56.5		
0.2	Mercury																			
40	*Nickel			10.7		14.5		19.2												
5000	Potassium	1220		14400		26900		13500		19700		27300		253000		4390		473000		
5	Selenium		UL		UL		UL		UL		UL		UL		UL		UL		UL	
10	Silver																			
5000	Sodium	9210		192000		292000		336000		402000		182000		436000		43200		684000		
10	Thallium		UL		UL		UL		UL		UL		UL		UL		UL		UL	
50	Vanadium															10.6				
20	Zinc	6.3		11.3		18.8		8.4		9.0				36.8		37.8		115		
10	*Cyanide																			

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CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: INORGANICS

Site Name: Lewiston Landfill

WATER SAMPLES
(ug/L)

Case #: 9001.831 Sampling Date(s): 7/27/90, 8/8/90, 8/9/90

+Due to dilution, sample quantitation limit is affected.
See dilution table for specifics.

	Sample No.	GW-4B		SW-4	
	Dilution Factor	1.0		1.0	
	Location				
CRDL	ANALYTE				
200	Aluminum	294	B	2000	B
60	Antimony				
10	*Arsenic			10.1	
200	Barium			80.1	
5	Beryllium				
5	*Cadmium				
5000	Calcium	456000		54800	
10	*Chromium				
50	Cobalt				
25	Copper				
100	Iron	2860		4270	
5	*Lead				
5000	Magnesium	34600		36900	
15	Manganese	655		779	
0.2	Mercury				
40	*Nickel			10.3	
5000	Potassium	47200		7620	
5	Selenium		UL		UL
10	Silver				
5000	Sodium	592000		65100	
10	Thallium		UL		UL
50	Vanadium				
20	Zinc			35.3	
10	*Cyanide				

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CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: INORGANICS

Site Name: Lewiston Landfill, NYS DEC Phase II

Case #: 9001-831 Sampling Date(s): 7/27/90, 8/9/90

SOIL SAMPLES
(mg/Kg)

+Due to dilution, sample quantitation limit is affected.
See dilution table for specifics.

	Sample No.	S-1		S-2		S-3		S-4		S-5		S-6		SED-1		SED-2		SED-3		SED-4	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	% Solids	85.9		86.1		92.1		88.7		85.8		54.2		78.1		84.0		70.3		54.5	
	Location	Background																			
CRDL	ANALYTE																				
40	Aluminum	8340		10900		13000		15700		15400		9790		15400		14400		15500		14800	
12	Antimony		UL		UL		UL		UL		UL		UL		UL		UL		UL		UL
2	Arsenic	13.7		3.4		3.3		3.1		2.4		2.3		3.3		3.1		6.3		3.7	
40	Barium	74.2		76.5		110		134		138		425		94.7		114		193		129	
1	Beryllium							0.27		0.25				0.29		0.35					
1	Cadmium					2.0		2.2		4.8		5.0		3.3		2.7		3.6		2.9	
1000	Calcium	3290	J	3490	J	41300	J	31800	J	44600	J	64800	J	39400	J	13600	J	27100	J	23600	J
2	Chromium	15.5		12.8		18.2		21.0		21.3		16.5		20.5		18.9		25.8		21.1	
10	Cobalt	3.1		6.1		7.6		11.2		12.3		49.0		11.2		9.3		12.1		9.6	
5	Copper	28.3		18.3		27.4		22.4		65.3		48.4		30.3		25.6		155		30.6	
20	Iron	12000		20100		25600		30600		55000		50500		29200		23200		29800		25000	
1	*Lead	59.4		12.3		14.9		10.7		123		194		30.2		38.1		543		556	
1000	Magnesium	1820		3040		9700		8480		11900		4980		10600		6710		9950		7510	
3	Manganese	143		274		626		920		628		469		649		423		570		788	
0.2	Mercury											0.17				0.12		0.34		0.15	
8	Nickel	12.3		13.9		22.6		24.2		28.9		14.7		29.4		22.5		28.3		24.3	
1000	Potassium	1090		513		1670		1810		2280		1650		2800		1600		3100		1980	
1	Selenium		UL		UL		UL		UL		UL		UL		UL		UL		UL		UL
2	Silver																				
1000	Sodium					338		150		187		410		241		165		202		308	
2	Thallium																				
0	Vanadium	14.3		19.8		24.8		29.3		28.7		20.6		30.9		25.4		31.2		24.6	
	Zinc	45.2		46.9		64.8		77.2		339		262		97.6		124		420		114	
	Cyanide																				

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CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: INORGANICS

SOIL SAMPLES
(mg/Kg)

Site Name: Lewiston Landfill

Case #: 9001.831 **Sampling Date(s):** 7/27/90 8/8/90 8/9/90

+Due to dilution, sample quantitation limit is affected.
See dilution table for specifics.

	Sample No.	W-1		W-2	
	Dilution Factor	1.0		1.0	
	% Solids	85.8		54.3	
	Location				
RDL	**ANALYTE**				
40	Aluminum	18900		19600	
12	Antimony		UL		UL
2	Arsenic	6.2		2.4	
40	Barium	192		105	
1	Beryllium	0.30			
1	Cadmium	10.9		11.5	
1000	Calcium	24700	J	32200	J
2	Chromium	33.1		39.5	
10	Cobalt	16.6		14.4	
5	Copper	193		61.4	
20	Iron	89700		161000	
1	***Lead**	885		162	
1000	Magnesium	8640			
3	Manganese	687		938	
0.2	Mercury	0.77		0.17	
3	Nickel	74.8		69.5	
1000	Potassium	1790		1750	
1	Selenium		UL		UL
2	Silver				
000	Sodium	181		315	
	Thallium				
0	Vanadium	23.2		39.9	
	Zinc	767		189	
	Cyanide				

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CRDL = Contract Required Detection Limit

***Action Level Exists**

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BNA

DATA SUMMARY FORM: TENTATIVELY INDENTIFIED COMPOUNDS

Site Name: Lewiston Landfill

Case #: 9001.831 Sampling Date: 8/8/90

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((1 - % moisture/100)

	Sample No.	SED-3									
	Dilution Factor	1.0									
	% Moisture	30									
	Location										
CRQL	COMPOUND										
	9H-Fluoren-9-one	810	J								
	CAS # 486259										
	4H-Cyclopenta[def]	900	J								
	phenanthene										
	CAS # 203643										

CRQL = Contract Required Quantitation Limit

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Results of Analysis of EP Toxicity Extracts Job Number :9001.960

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : YQ-1000 LEWISTON LANDFILL PHASE II
SAMPLE ID LAB :EE-90-82552 MATRIX: SOLID
SAMPLE ID CLIENT: S-3 UNITS : MG/L

PARAMETER		RESULTS	Q	DETECTION LIMIT	REGULATORY LEVEL
Mercury		ND		0.00080	0.20
Arsenic	(ICP)	ND		0.50	5.0
Barium	(ICP)	ND		5.0	100
Cadmium	(ICP)	ND		0.10	1.0
Chromium	(ICP)	ND		0.50	5.0
Lead	(ICP)	ND		0.50	5.0
Selenium	(ICP)	ND		0.50	1.0
Silver	(ICP)	ND		0.50	5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

Results of Analysis of EP Toxicity Extracts Job Number :9001.960

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : YQ-1000 LEWISTON LANDFILL PHASE II
SAMPLE ID LAB :EE-90-82553
SAMPLE ID CLIENT: S-4

MATRIX: SOLID
UNITS : MG/L

PARAMETER		RESULTS	Q	DETECTION LIMIT	REGULATORY LEVEL
Mercury		ND		0.00080	0.20
Arsenic	(ICP)	ND		0.50	5.0
Barium	(ICP)	ND		5.0	100
Cadmium	(ICP)	ND		0.10	1.0
Chromium	(ICP)	ND		0.50	5.0
Lead	(ICP)	ND		0.50	5.0
Selenium	(ICP)	ND		0.50	1.0
Silver	(ICP)	ND		0.50	5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

Results of Analysis of EP Toxicity Extracts Job Number :9001.960

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : YQ-1000 LEWISTON LANDFILL PHASE II
SAMPLE ID LAB :EE-90-82554 MATRIX: SOLID
SAMPLE ID CLIENT: S-5 UNITS : MG/L

PARAMETER		RESULTS	Q	DETECTION LIMIT	REGULATORY LEVEL
Mercury		ND		0.00080	0.20
Arsenic	(ICP)	ND		0.50	5.0
Barium	(ICP)	ND		5.0	100
Cadmium	(ICP)	ND		0.10	1.0
Chromium	(ICP)	ND		0.50	5.0
Lead	(ICP)	ND		0.50	5.0
Selenium	(ICP)	ND		0.50	1.0
Silver	(ICP)	ND		0.50	5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

Results of Analysis of EP Toxicity Extracts Job Number :9001.960

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : YQ-1000 LEWISTON LANDFILL PHASE II
SAMPLE ID LAB :EE-90-82555
SAMPLE ID CLIENT: S-6
MATRIX: SOLID
UNITS : MG/L

PARAMETER		RESULTS	Q	DETECTION LIMIT	REGULATORY LEVEL
Mercury		ND		0.00080	0.20
Arsenic	(ICP)	ND		0.50	5.0
Barium	(ICP)	ND		5.0	100
Cadmium	(ICP)	ND		0.10	1.0
Chromium	(ICP)	ND		0.50	5.0
Lead	(ICP)	ND		0.50	5.0
Selenium	(ICP)	ND		0.50	1.0
Silver	(ICP)	ND		0.50	5.0

QUALIFIERS: C = COMMENT
ND = NOT DETECTED
J = ESTIMATED VALUE
B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

APPENDIX H

AERIAL PHOTOGRAPHS