SITE EVALUATION REPORT

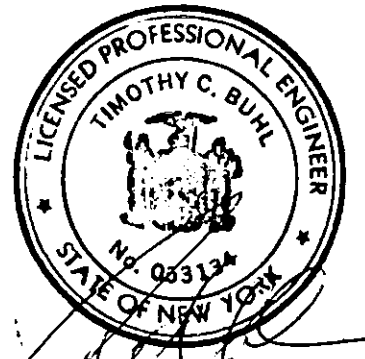
PROPOSED CORTLAND COUNTY INTERIM #2 LANDFILL SITE

SOLON, NEW YORK

PREPARED FOR

CORTLAND COUNTY SOLID WASTE COMMITTEE

CORTLAND COUNTY, NEW YORK



JANUARY 30, 1985

#8418

RESOURCE ENGINEERING

100 Port Watson Street • Cortland, New York 13045 • (607) 753-9621

CORTLAND COUNTY LEGISLATURE
COUNTY OFFICE BUILDING 60 CENTRAL AVENUE
P.O. BOX 5590
CORTLAND, NEW YORK 13045-5590

TELEPHONE (607) 753-5048

James R. O'Mara, Chairman
Mary Ellen Opera, Clerk

June 25, 1985

Commissioner Henry G. Williams
NYSDEC
50 Wolf Road
Albany, New York 12233-0001

RE: Cortland County Landfill
Permit Application

Dear Commissioner Williams:

On June 26, 1985, our Consulting Engineer, Mr. Timothy Buhl (Resource Engineering, P.C.) will transmit our above referenced application to your Region 7 Headquarters in Liverpool, New York. Our county staff, Resource Engineering and representatives from your Department have been in close contact with the development of this application.

I realize there are specified times involved that are necessary for the proper review of our information; but I am hopeful that your Department can expeditiously review our information and approve our plan in a timely fashion.

We, as are many other municipalities "under the gun" to close our existing site and open our new one by January of 1986.

In reality, our construction season is upon us and unless we have approval of our application in the near future, it will be difficult if not impossible to have our new site on line by the end of this construction season.

In our several previous meetings with Mr. Wolterding of your Albany Office and the representative from your Region 7 Office we have been assured of a timely review.

Your interest and cooperation in assisting the review of our plans will be appreciated.

Very truly yours,

James R. O'Mara, Chairman
Cortland County Legislature

JRO/jms
cc: D. Wolterding
L. Gross
F. Compagni
R. Pitman
J. Feuss

RESOURCE ENGINEERING
100 Port Watson Street
Cortland, N.Y. 13045
(607) 753-9621

LETTER OF TRANSMITTAL

DATE 4/19/85	JOB NO. 8418
ATTENTION	
RE: Cortland County Intern #2 Landfill	

TO Chuck Chernoff
NYS DEC

GENTLEMEN:

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	4/85		Preliminary Sketches & Tabulations

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

Chuck:
I'll Give You A Call Tuesday

COPY TO _____ SIGNED: Ken Teter

If enclosures are not as noted, kindly notify us at once.

RESOURCE ENGINEERING

27 North Church Street • Cortland, New York 13045 • (607) 753-9621

10 April

Mr. Chuck Chernoff
NYS Department of Environmental Conservation
7481 Henry Clay Blvd.
Liverpool, New York 13088

RE: Cortland County Interim #2 Landfill
Site Report and Final Application

Dear Mr. Chernoff:

To confirm our conversation yesterday, I have listed the most pertinent items below:

1. Additional groundwater elevations have been obtained reflecting seasonal fluctuations

2. The site drawings submitted with the report are mislabeled for wells D4, RE6 and D5, RE7. Each pair should be reversed as well as the water quality data for each.

3. The test well RE5 elevation (plate 2) should read 1690.60 and not 1669.55.

4. Additional soils data (pH, cation exchange capacity, Atterberg Limits) will be obtained this week.

5. To expedite the final design and assure Cortland County will have a viable site ready by year's end, we plan to address the areas of concern noted in your memorandum to Mr. Gross (3/14/85) as part of our complete permit application. I anticipate working closely with you during this period to assure completeness and compliance. Without continuing at this pace, I don't see how Cortland will be able to meet the timetable.

You mentioned yesterday that you will not be available over the course of the next two weeks, so by copy of this letter to Mr. Gross I am requesting some assurance that the plan I have outlined in No. 5 is acceptable.

Thank you for your consideration and I look forward to working with you.

Very truly yours,

RESOURCE ENGINEERING

Kenneth J. Teter
KJT/nls
cc: L. Gross
R. Pitman

RESOURCE ENGINEERING
27 NORTH CHURCH STREET
CORTLAND, NEW YORK 13045
(607) 753-9621

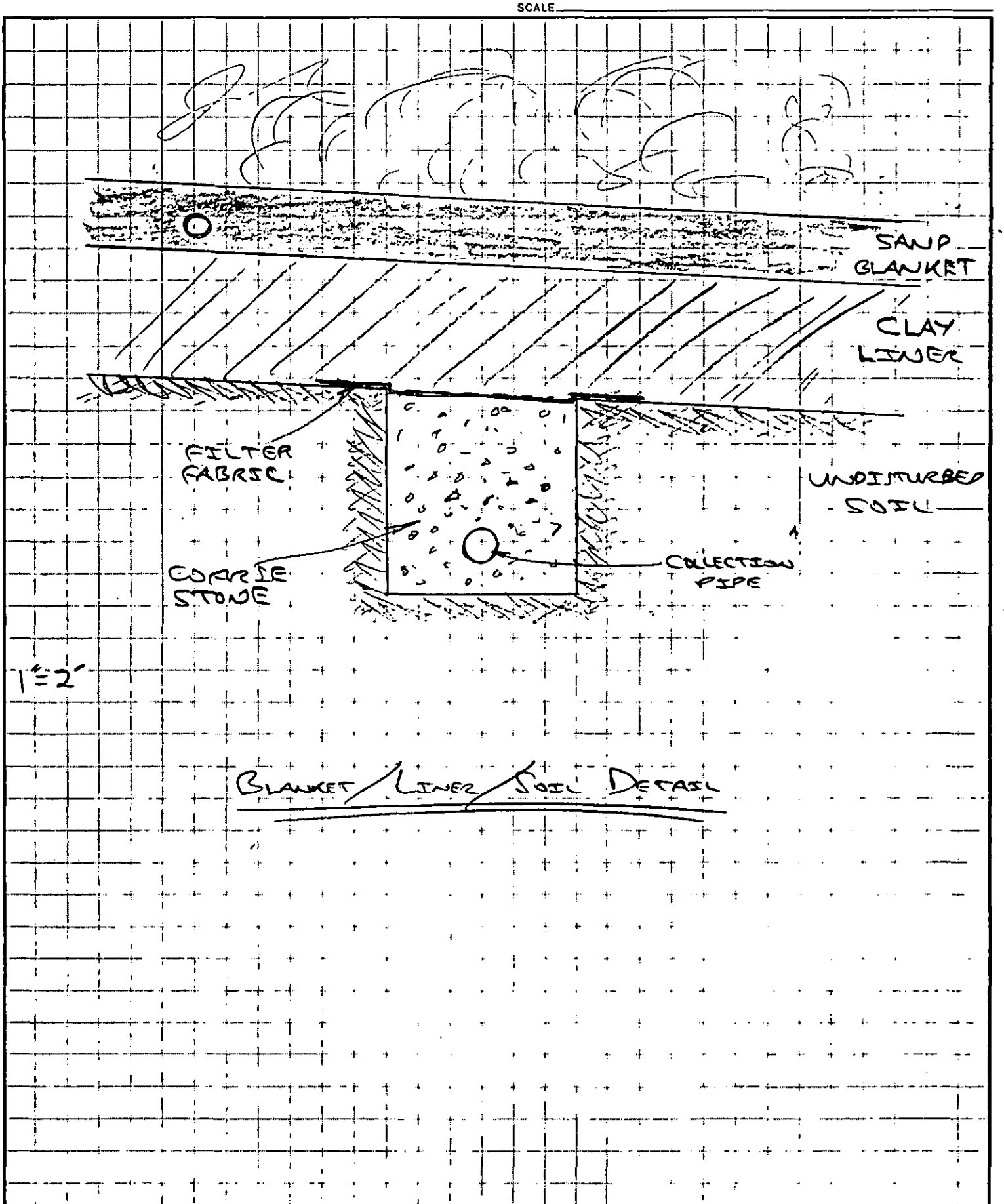
JOB Int. #2 Landfill

SHEET NO. _____ OF _____

CALCULATED BY KOT DATE 4/17/85

CHECKED BY _____ DATE _____

SCALE _____



Blanket / Liner / Soil Detail

RESOURCE ENGINEERING
27 NORTH CHURCH STREET
CORTLAND, NEW YORK 13045
(607) 753-9621

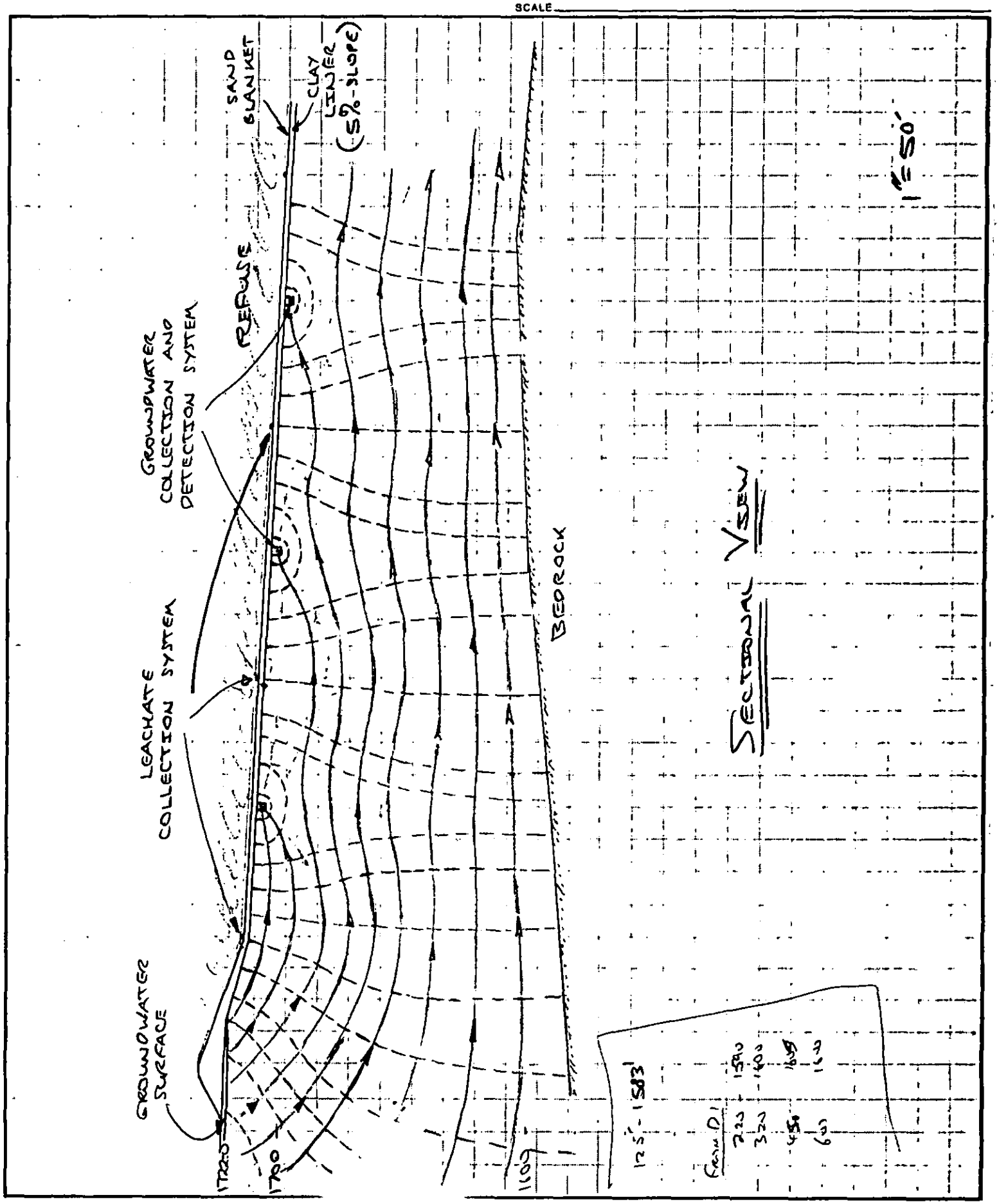
JOB Int. #2 Landfill

SHEET NO. _____ OF _____

CALCULATED BY KST DATE 4/18/85

CHECKED BY _____ DATE _____

SCALE _____



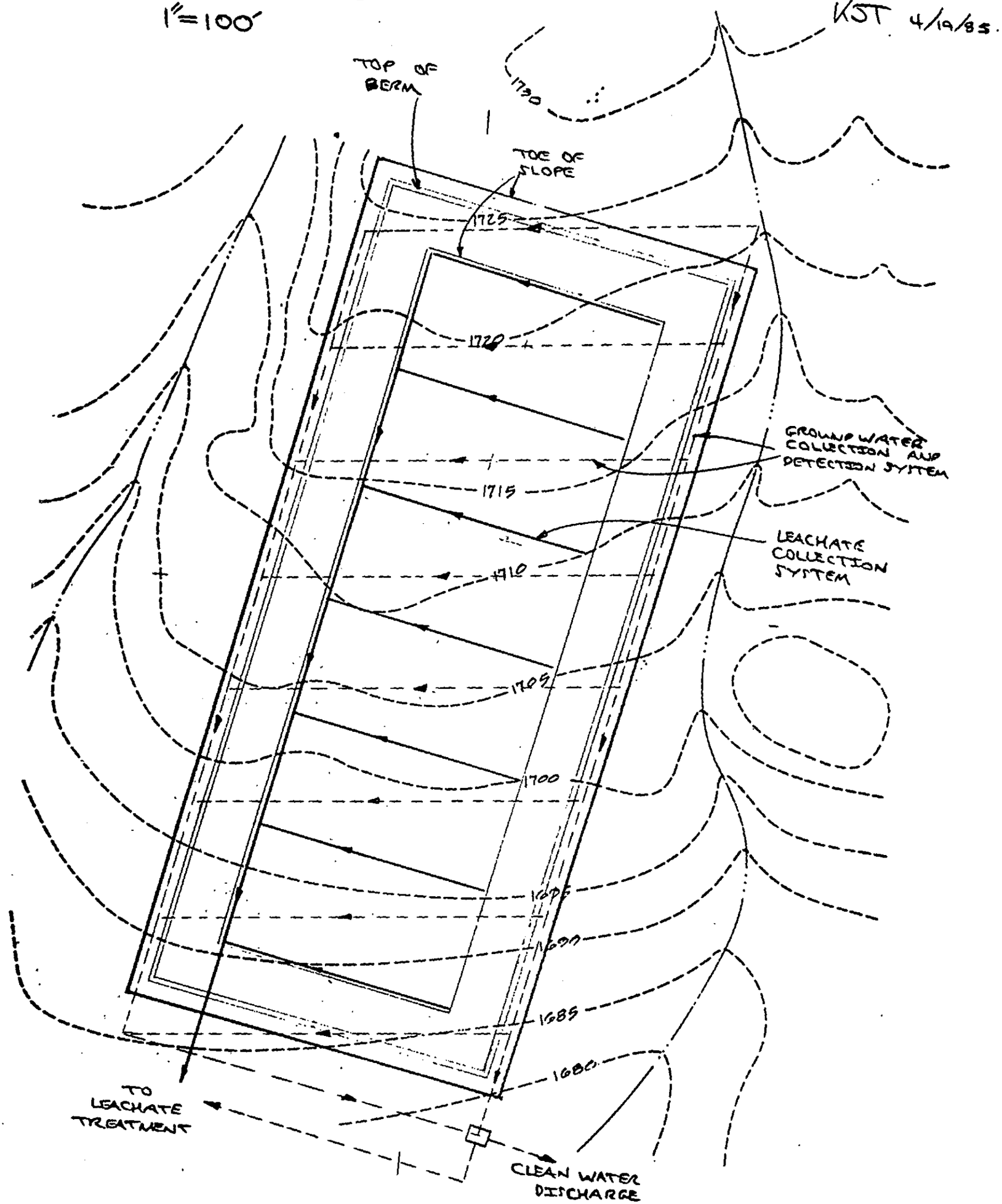

CORTLAND INT. #2
1"=100'
KST 4/19/85.
TOP OF BERM
TOE OF SLOPE
1730
1725
1720
1715
1710
1705
1700
1695
1690
1685
1680
GROUND WATER COLLECTION AND DETECTION SYSTEM
LEACHATE COLLECTION SYSTEM
TO LEACHATE TREATMENT
CLEAN WATER DISCHARGE

TABLE OF CONTENTS

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APPENDICES

SITE EVALUATION REPORT
PROPOSED CORTLAND COUNTY INTERIM #2 LANDFILL SITE
SOLON, NEW YORK

SECTION I - INTRODUCTION & BACKGROUND

In 1972, Cortland County acquired an existing refuse disposal site in order to establish its own Solid Waste Disposal Program for City and County residents. Prior to 1972, the site was basically an open dump, operated for some 20 years for various parties including the City of Cortland. Because little is known about the nature of the waste that actually was disposed, or the operating methods used, it is doubtful that current NYS Landfill Design & Operating Standards were ever met.

Since taking over the operation, the facility has been upgraded to a sanitary landfill, organized under the Cortland County Highway Department. Operations since that time have been generally adequate, but lack of applied cover material and leachate emissions have been recurring problems at different times during the past few years. Because of these difficulties, and due to the fact that the active area of the site is running out of usable space, the New York State Department of Environmental Conservation imposed a Consent Order Agreement upon the County which, in effect, mandated that past leachate problems be eliminated, and that the landfill be closed according to current DEC requirements. As part of the Closure Plan in the Consent Order, a Leachate Control Plan was prepared, as well as an Engineering Report discussing the final covering, grading, seeding, and water quality monitoring in and around the past refuse fill areas of the main landfill. The report and its engineering plans were submitted to and approved by the New York State Department of Environmental Conservation in the Spring of 1983. Initial grading, pond construction, and new ditchwork were performed over the Summer and Fall of 1983, with final closure of the present site scheduled for April of 1984.

In 1984, a new consent order agreement was imposed upon the County by the NYS Department of Environmental Conservation which mandated that operations at the existing landfill facility cease after December 31, 1985. As part of the closure plan in the Consent Order, an approvable remedial plan for leachate outbreaks and for groundwater contamination is to be submitted to the DEC by February 1, 1986 with the final site closure completed by August 1, 1986. The Consent Order also mandated that this preliminary site evaluation report for an interim refuse disposal area be submitted to the DEC by February 1, 1985. The consent order has given Cortland County until December 1, 1988 to submit final plans and specifications for a new long-term solution.

Because the County's present site must be closed immediately, and the County needs an additional 2 - 3 years to locate and license a new long-term disposal site of its own, it was decided that a small, short-term new landfill area should be developed on the County's property, adjacent to the existing facility. Such a new area would have the shortest lead time to implement and would have the smallest additional impact on the environment.

Cortland County is in the process of obtaining NYS Department of Environmental Conservation Construction and Operating Permits for the Interim Site located south of the major active landfill area, on County-owned property. This site will be ready for landfilling in mid-1985, but is a second choice site for a short-term facility since the County's original interim site was rejected by the DEC earlier in 1984. Since the new interim site is smaller in size than the one first proposed by the County, its useful life will be a maximum of 2 - 3 years, instead of 3 - 5 years available for the area first proposed.

The proposed interim landfill site is located southwest of existing landfill disposal area, on the same County owned property, located in the Town of Solon. Approximate site dimensions are 300' x 800', or 5.5 acres. If fully developed, total capacity would be approximately 420,000 CY of material, or a maximum useful life of approximately three years.

The next sections of this report and accompanying appendices describe in detail the suitability of this site for future interim landfill development.

SECTION II - EXISTING CONDITION, PROJECTED WASTE QUANTITIES

As shown on the Vicinity Map, Fig. 1, the Cortland County Landfill is located on Town Line Road in the Town of Solon, approximately two miles northeast of the Village of McGraw.

The total property consists of some 310 moderately sloping hilltop acres. Approximately 36 acres have been used for past landfilling, with an additional 80-85 acres having been stripped of earthen materials for daily and intermediate cover operations. Nearly all County landfilling activity has been in areas filled in pre-1972 operations, and all covering has been with the onsite Lordstown and Volusia Series soils, sometimes mixed with weathered shale.

As previously indicated, it is proposed to stop disposal operations at this present active landfill area in the Fall of 1985.

At the present time, the County's landfill receives approximately 35,000 tons of solid waste per year. The service area generally covers all of Cortland County and the City of Cortland, but two small communities, (the Towns of Truxton and Cuyler) still operate their own small Town landfills. In all probability one (or even both) of these small operations will close within the next three to five years, making all refuse that is generated within the County being disposed of at the Solon Site or the new long-term facility to be constructed elsewhere in the County. Even with the possible increases from these two Towns, the total loading at the site is not expected to change appreciably during the next three years, the maximum useful life of the proposed interim landfill area.

The next sections of this report describe the details of the site geology and hydrology.

SITE III - SITE DESCRIPTION AND ANALYSIS

A. General

The proposed interim landfill site is located southwest of the existing landfill disposal area on the same County owned property, in the Town of Solon. Approximate site dimensions are 300' x 800', or 5.5 acres. Relief on the site varies from a low of 1662' USGS on the property's southern extremity, to a high point of 1732' USGS on the northern portion of the site.

B. Geology and Soils

The bedrock underlying the proposed interim landfill site is of the upper Devonian Genesee group, which consists of shale, sandstone, siltstones, and interbedded limestones. The rock is highly fractured and jointed throughout the upper 20 feet. The joints and fractures are primarily orientated to the south-southeast. Depth to bedrock has a measured range of 69 to 157 feet across the site. (See Boring Logs - Appendix A)

The unconsolidated deposit soils encountered at the site consist of brown and gray silt and clay with significant amounts of sand and gravel. Most of the surficial material at the site consists of the Lordstown Channery silt loam and some Volusia Channery silt loam. The Lordstown is a well drained, medium textured soil found on the highest ridges and uplands. The Volusia often occurs below the well-drained Lordstown and is poorly drained due to a hard, dense fragipan at a depth of 8 to 14 inches. Both of these soils were formed in thin glacial till derived from sandstone, siltstone and coarse textured shale.

The glacial till soils which underlie the site are a dense gray with a low permeability. The soil borings indicate a silty sand and gravel averaging 27% gravel, 21% sand and 52% silt and clay.

The results of the laboratory permeability indicate the presence of a natural soil with very little permeability. This material has the potential of being used for either a landfill liner or cover material. (Permeabilities ranged from 2.45 x 10-8 to 6.14 x 10-8 cm/sec. - See Appendix A).

C. Groundwater and Surface Water Runoff

The site is located on a drainage divide and at the headwaters of Mosquito Creek and Maybury Brook, tributary streams of Trout Brook. Both of these streams flow south as they leave the subject area. At McGraw, approximately three and one-half miles upstream from the junction of Mosquito Creek and Trout Brook, Trout Brook flows west for approximately three miles and empties into the Tioghnioga River just east of the City of Cortland.

The regional surface water patterns surrounding the proposed interim landfill area are well defined. The drainage is a well developed, rectangular pattern. This rectangular pattern indicates that the surface drainage is controlled by the joint patterns within the bedrock.

The regional groundwater flow pattern parallels the general flow direction of surface drainage. The flow pattern is controlled by the existing topography and the distribution of unconsolidated aquifers. Recharge to the groundwater system is mainly from precipitation and by hydrologically connected surface water bodies.

Two aquifers were encountered beneath the proposed interim landfill area; one within the glacial till and associated deposits, and the other within the underlying Devonian bedrock. Both aquifers are poor water producers with the glacial till under water table conditions and the bedrock aquifer displaying artesian conditions.

The artesian condition is displayed in bedrock wells on the site which penetrate the bedrock till interface. This condition indicates that the interface between the till and the underlying bedrock is the important water-bearing zone in the study area.

Measured water levels beneath the site ranged from 1.61 to 118.49 feet. The direction of groundwater flow beneath the site is from the northeast to the southwest. This flow parallels the flow direction of the adjacent tributary streams to Trout Brook. (See Groundwater Contour Map, Appendix A).

Just north of the proposed landfill site, the vertical component of groundwater flow is downward from the surficial aquifer into the lower aquifer. Within the central portion of the site, the vertical component of flow is upwards. South of the proposed landfill site, the vertical component again reverses itself and becomes downward.

In general, due to the low permeability of the glacial till soils, the two aquifers are relatively isolated from each other. The majority of the groundwater flow in the overburden aquiferis within the upper weathered 15 feet of soil. The majority of the groundwater flow within the bedrock aquifer is within the weathered bedrock/glacial till contact.

SECTION IV - SUITABILITY OF SITE FOR FUTURE LANDFILL DEVELOPMENT

In evaluating this site for future interim landfill development, several site conditions became especially important. First, the site soils are deep, compacted, and impermeable. They display properties which make them suitable for use as a landfill liner or as cover material. It is suggested that for this site, the existing soils be compacted and used as a remolded liner instead of importing similar soils into the site for compaction as a landfill liner. This results in a savings of both time and money in the initial landfill construction process. A measured depth to bedrock of 69 to 157 feet across the site provides more than enough soil depth to meet the desired 25' deep soil buffer below the proposed liner elevation.

All borings show uniform and compact material throughout the site. Although no intermediate wells were drilled at this stage in the evaluation process, the uniformity of the soils, their compaction, and the extreme depth were enough indication of the basic soil conditions so that the expensive drilling techniques through the deeper overburden were not done. During construction of the proposed interim landfill, deeper wells will then be drilled and tested.

Another important site condition to be considered when evaluating this site for future interim landfill use is the artisian condition of the bedrock aquifer. The upward flow direction of the groundwater in this area is added protection against potential leachate leakage. If the proposed remolded liner fails, the uplift pressure will keep leachate within the landfill area, and the resultant mix of groundwater and leachate would then flow through the collection system proposed for the site.

The location of the interim landfill on this site means drainage areas will be affected by the development of the site. The remote location of the site coupled with the fact that a landfill already exists adjacent to the proposed site, greatly reduces the impact that this interim landfill will have on the surrounding area and on the environment.

Finally, the site is already owned by Cortland County. This is important in terms of the minimized social impacts of the proposed landfill and the realization that the plan can be implemented in a more timely fashion. This gives the County more time to plan for a long-term solution to their landfill problem.

SECTION V - CONCLUSIONS AND RECOMMENDATIONS

The December 31, 1985 closure of the Cortland County Landfill requires an interim landfill solution to be implemented in as timely a manner as possible while providing adequate environmental protection and minimal social impact.

As discussed in Section IV of this report, the site proposed for use as an interim landfill meets these requirements.

The presence of adequate soils on site for liner construction results in a saving of time and money in the construction process. Deep, impermeable and compact soils afford protection against leachate leakage. Artesian uplift pressures in the groundwater provide additional containment of leachate if leakage does occur. All drainage areas affected by the proposed site are in the same basin as the existing landfill -- no new drainage areas will be affected by the proposed site. All these factors minimize environmental impacts created by the proposed interim

landfill. The remote location of the site and its location adjacent to an existing landfill minimizes the social impact of the proposed landfill. Building the interim landfill on County owned land allows for implementation of the plan in a timely fashion and allows more time to be devoted to the planning and development of a long-term solution to the County's landfill problem.

Respectfully submitted

RESOURCE ENGINEERING

Timothy C. Buhl, P. E.
30 January 1985

APPENDIX A

HYDROLOGICAL EVALUATION - DUNN GEOSCIENCE

EMPIRE SOILS

DUNN GEOSCIENCE
Albany, NY Buffalo, NY
Harrisburg, PA

DUNN
GEOSCIENCE CORP.

[illegible]NORTHWAY LANE NORTH •
LATHAM, NEW YORK 12110
(518) 783-8102

HYDROGEOLOGIC EVALUATION
Of The
PROPOSED CORTLAND COUNTY
SANITARY LANDFILL FACILITY

Solon, New York

Prepared for:

Thomas J. Begley, President
CATOH ENVIRONMENTAL COMPANIES, INC.

Prepared by:

DUNN GEOSCIENCE CORPORATION

Jeffrey T. Wink
Hydrogeologist

Reviewed by:

D. Theodore Clark, CPG
Senior Hydrogeologist

Date:

January 21, 1985

1.0 INTRODUCTION

In August of 1984, Dunn Geoscience Corporation (DGC) entered into a contract with CATOH Environmental Companies, Inc., (CATOH) to determine and assess the geological and hydrological conditions at the site of the Cortland County Sanitary Landfill (SLF). The site is located in the Town of Solon in Cortland County (see Figure 1). A more detailed map of the site (prepared by Resource Engineering) appears in Appendix A.

This investigation was carried out using information supplied by CATOH consisting of a base map, test boring logs, well completion logs, and water-level information across the site. The investigation, evaluation and report were prepared by Mr. Jeffrey T. Wink, Geologist, and Mr. Eric L. Hanson, Senior Hydrogeologist, and reviewed by Mr. D. Theodore Clark, Hydrology Division Director of Dunn Geoscience Corporation, Latham, New York.

2.0 PURPOSE

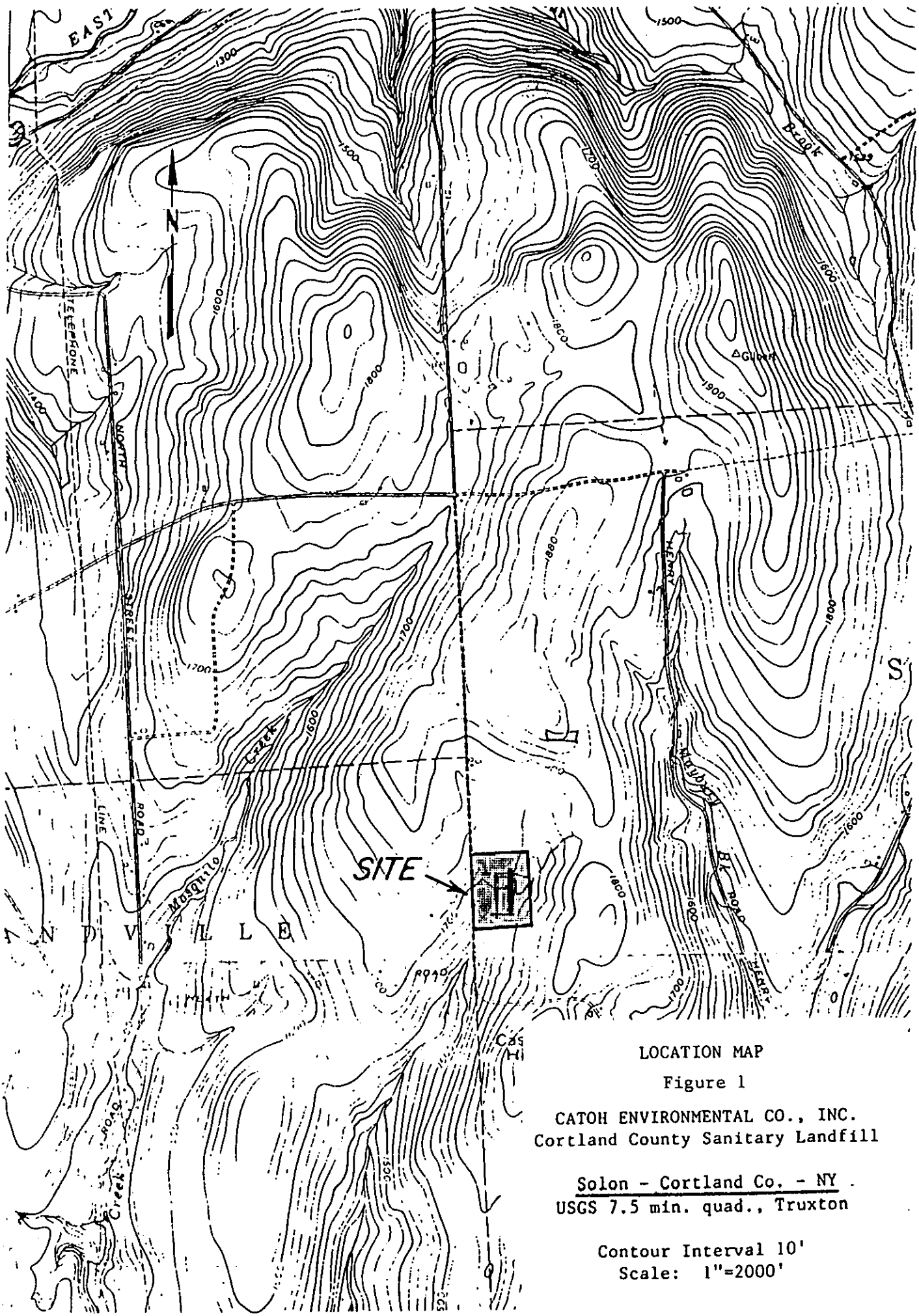
The investigation was conducted to determine the geologic and hydrologic conditions of the Cortland County SLF in the Town of Solon. DGC was responsible for preparing a written report and evaluating all information supplied by CATOH, complete with boring logs, test pit logs, rock core data, observation well sketches, summary tables of water levels, a bedrock contour map, water table map, bedrock fracture and bedding information.

3.0 SCOPE OF WORK

The scope of the investigation was divided into three phases.

3.1 Phase I

Provide CATOH Environmental Companies, Inc., with a professional geologist for limited on-site supervision during drilling.



LOCATION MAP

Figure 1

CATOH ENVIRONMENTAL CO., INC.
Cortland County Sanitary Landfill

Solon - Cortland Co. - NY
USGS 7.5 min. quad., Truxton

Contour Interval 10'
Scale: 1"=2000'

3.2 Phase II

CATOH would supply Dunn Geoscience with rock core collected during drilling at the Cortland County SLF.

CATOH would supply Dunn Geoscience with well completion diagrams, soil boring logs, test pit logs, water level information, and a base map of the Cortland County SLF.

3.3 Phase III

Dunn Geoscience Corporation personnel were to complete the following:

- o Describe and log bedrock core supplied by CATOH;
- o Create water table map and bedrock contour map; and,
- o Evaluate the geologic and hydrologic conditions at the Cortland County SLF from information supplied by CATOH.

4.0 GEOLOGY

4.1 Bedrock Geology

The bedrock underlying the Cortland SLF is the Upper Devonian Genesee Group, which consist of shale, sandstone, siltstones, and interbedded limestones which, as a whole, represent deposition in a prograding delta. The rock is gray to black and consists of tightly interbedded shales, siltstones and limestones (localized - sandstone layers were also encountered in D-6). The rock is highly fractured and jointed throughout the upper 20 feet. The joints and fractures are primarily oriented along individual bedding horizons which dip approximately 5 to 10 degrees to the south-southeast. Depth to bedrock had a measured range of 69 to 157 feet across the site. A detailed bedrock elevation contour map was constructed from boring information on the SLF site and is shown on Plate 1. Logs of the bedrock obtained from wells drilled

on site are located in Appendix B.

4.2 Unconsolidated Deposits

The unconsolidated deposits encountered within the SLF study area date back to the last glacial readvance (Late Woodfordian). The ice sheet moved across the Cortland County area in a south or southeast direction. The bedrock was eroded and scoured into its present configuration. As the ice sheet advancved over the area, a layer of glacial till was deposited directly over the bedrock. During the ice retreat, various outwash features were deposited in the major stream valleys by glacial lacustrine environments formed by blocked preglacial channels.

The soils encountered at the site consist of brown and gray silt and clay with significant amounts of sand and gravel. As mapped by the Soil Conservation Survey (SCS) (Seay, et al, 1961), most of the surficial material at the site consists of the Lordstown Channery silt loam and some Volusia Channery silt loam.

The Lordstown is a well drained, medium textured soil found on the highest ridges and uplands.

The Volusia often occurs below the well drained Lordstown and is poorly drained due to a hard, dense fragipan at depth of 8 to 14 inches.

Both of these soils were formed in thin glacial till derived from sandstone, siltstone, and coarse textured shale.

Soil boring logs from the site are located in Appendix C.

4.3 Glacial Till Soils

The glacial till soils which underlie the site are a dense gray till with a low permeability. The boring logs indicate a dense

soil as indicated by refusals of the split-spoon sampler to easily penetrate the till. The average penetration of the split-spoon is 25 blows per 6 inches for a 2-inch spoon (see Appendix C). The soil boring logs generally describe a silty sand and gravel as shown by the gradations. The glacial till averages 27% gravel, 21% sand, and 52% silt and clay. This till generally has a much higher silt and clay content than the average Catskill Plateau till which ranges approximately 35 to 40 percent silt and clay.

5.0 HYDROLOGY

5.1 Surface Water Hydrology

The regional surface water patterns surrounding the study area are well defined. The drainage is a well-developed rectangular pattern. This rectangular pattern indicates that the surface drainage is controlled by the joint patterns within the bedrock. All major drainage courses are controlled by pre-glacial drainage systems which are in turn controlled by joint patterns developed within the bedrock.

The site is located on a drainage divide and at the headwaters of Mosquito Creek and Maybury Brook, tributary streams of Trout Brook. Both of these streams flow south as they leave the subject area. At McGraw, approximtely three and one-half miles downstream from the landfill and approximately one mile upstream from the junction of Mosquito Creek and Trout Brook, Trout Brook flows west for approximately three miles and empties into Tioughnioga River just east of Cortland.

5.2 Groundwater Hydrology

The regional groundwater flow pattern parallels the general flow direction of surface drainage. The flow pattern is controlled both regionally and locally by the existing topography and the distribution of unconsolidated aquifers.

Recharge to the groundwater system is mainly from precipitation and by hydrologically connected surface water bodies. Locally, recharge from surface streams and bedrock highs may be important.

5.3 Site Hydrology

Two aquifers were encountered beneath the SLF study area; glacial till and associated deposits, and the underlying Devonian bedrock. Both aquifers are poor water producers. Regionally, the underlying bedrock is not considered an important aquifer; however, all wells constructed in bedrock at the SLF site display artesian conditions. The majority of the groundwater found in the aquifer is associated with zones of fracturing or jointing. Recharge to the aquifer occurs through percolation of precipitation and surface water infiltrating the shallow overlying unconsolidated deposits and exposed bedrock. Areas overlain by more permeable sandy till deposits are potentially more productive than areas overlain by less permeable (clayey) tills.

The overlying glacial till is also a low yielding aquifer. In localized areas where the till exhibits a high sand and relatively low clay content, it is potentially more productive.

The Genesee Group is regionally under artesian conditions.

The artesian condition displayed in the bedrock wells indicates that the interface between the till and the underlying bedrock is the important water-bearing zone in the study area. This situation is created by bedrock outcrops exposed upgrade from the SLF site overlain by shallow unconsolidated deposits. Water is transmitted through the shallow overburden into the fractures in the bedrock. Water is then confined to fractures in the bedrock and the bedrock-till interface by the overlying till aquitard. This artesian condition is displayed in all bedrock wells on the site which penetrate the bedrock till interface.

Measured water levels beneath the SLF, on October 19 and 26, 1984, ranged from 1.61 to 118.49 feet and are shown on Table 1. The water-level information collected was plotted, contoured, and interpreted to show localized groundwater elevation underlying the SLF site (see Plates 2 & 3).

The direction of groundwater flow beneath the site is from the northeast to southwest. This flow parallels the flow direction of the adjacent tributary screens to Trout Brook. Based on surficial lineations at the site and regional trends, the groundwater flow appears to be controlled by jointing and fractures in the underlying bedrock which are hydraulically connected to unconsolidated deposits and surface water bodies.

A groundwater elevation contour map of both the bedrock and the unconsolidated deposits were constructed and are shown on Plates 2 and 3, respectively.

Well completion logs from the site are located in Appendix D.

5.4 Inter-Relationship of Aquifers

The bedrock aquifer map was prepared based on data obtained from wells D-1 through D-6. The water level elevations, as plotted on Plate 3 using the elevations collected on October 26, 1984, shows a groundwater flow gradient to the south. The aquifer is artesian with the glacial till overburden providing the aquilude cap. The overlying glacial till does support a groundwater table within the top 15 feet of the formation. The flow gradient within the till is to the south, as shown on Plate 2. The glacial till is under water table conditions as compared to the artesian conditions of the bedrock aquifer. The water table is present within the weathered zone comprising the top 15 feet to this unit. Below 15 feet the groundwater is present as interstitial water within the till matrix.

Within the northern part of the proposed landfill site, the vertical component of the groundwater flow is downward from the surficial aquifer into the lower aquifer. This can be seen by comparing water-level data for D-1 (bedrock well) 1715.96 versus the overburden well DO-2, 1724.49. Within the central portion of the site, the vertical component of flow is upwards as shown below.

Bedrock Well	Well Level	Overburden Well	Well Level
D-2	1715.42	RE-4	1707.39
D-3	1700.33	RE-5	1669.55
D-6	1713.60	RE-8	1709.25

Within the southern part of the proposed landfill site, the vertical component again reverses itself and becomes downward. Compare data shown below.

Bedrock Well	Well Level	Overburden Well	Well Level
D-4	1571.42	RE-6	1670.86
D-5	1639.93	RE-7	1658.11

In general, due to the low permeability of the glacial till soils, the two aquifers appear to be relatively isolated. The majority of the groundwater flow in the overburden aquifer is within the upper weathered 15 feet of soil. This horizon has a higher permeability due to animal borings and plant root activity. The majority of the groundwater flow within the bedrock aquifer is within the weathered bedrock/glacial till contact.

5.5 Field Permeability Testing

The permeability tests were conducted on monitoring wells B-1, B-2, and B-3. Deionized water was quickly introduced into the well resulting in a rapid rise in the water level within the well. The water level was raised to the top of the casing and then allowed to drop for an established period of time. Water-level measurements were taken at regular intervals with a water level indicator to monitor the rate at which the added water permeated into the aquifer. The rate at which the water level in the well equalibrated was used to determine the hydraulic conductivity (K) of the aquifer. The assumptions of this method include: an unconfined, homogeneous and isotropic aquifer. The method is applicable to wells cased below the water table with uncased or screen extensions where the length of the well tested is 10X the radius of the casing. It is, therefore, applicable to all wells tested assuming a homogeneous and isotropic aquifer.

Calculations of hydraulic conductivity (K) were based on the following equations (Water Resources Technical Publication, Second Edition 1974, U.S. Dept. of the Interior):

1. $$Q = \frac{D\pi R^2}{T}$$

2. $$K = \frac{Q(2.54\ \text{cm/in})}{5.5\ RH}$$

Where:

Q = constant rate of flow into the hole (cubic in/sec)
D = drop in the water level in the casing (inches)
T = time it took for water level to drop (seconds)
R = radius of hole (inches)
H = differential head of water (inches) as measured to the groundwater level from the average measured drop during test
K = permeability (cm/sec)

The results of the permeability testing is listed below:

Well Number	Permeability Value
B-1	5.44×10^{-5}
B-2	6.49×10^{-4}
B-3	7.30×10^{-4}

The results indicate a soil with a higher than expected as compared to the laboratory value of 10^{-8}. A probable explanation for this discrepancy is the possibility of leaks developing around the casing or through the bentonite pellet seal.

5.6 Laboratory Permeability Testing

One laboratory permeability test was conducted on each test pit sample by Empire Soils. These results are listed in Appendix E. Included within these results are the test pit logs, soil gradations, proctor compaction test, the permeability results. The permeability test was conducted on a removed sample within a triaxial machine under constant head. The results of the permeability testing is listed below:

	Permeability Value	
Test Pit #	First Test	Second Test
TP-1	2.43×10^{-8}	2.46×10^{-8}
TP-2	6.13×10^{-8}	6.14×10^{-8}
TP-3	2.45×10^{-8}	2.45×10^{-8}
TP-4	4.22×10^{-8}	4.41×10^{-8}
TP-5	3.85×10^{-8}	4.07×10^{-8}

The results of the laboratory permeability indicate the presence of a natural soil with a very low permeability. This material has the potential of being used for either a landfill linear or cover material.

APPENDIX A

Dunn Geoscience Corporation
Core Log

Client CATOH ENVIRONMENTAL CO. INC.
Project CORTLAND LANDFILL
Location TOWN OF SOLON

Logged by JTW Date Logged 10/19/84
Drilling Co. CATOH ENVIRONMENTAL CO. INC.
Driller T.CROWELL. M. SKARDINSKI
Started 9/14/84 Finished 9/14/84

Hole D-1
Depth 157.5'
Elev. 1727.46
Core Dia. 4"

FORMATION	Member	Zone/Unit	Graphic Log 1" = 5'	Depth	Descriptive Log (ROCK TYPE: color, grain size, texture, bedding, minerals: remarks, etc)	Angle of Bedding to Core	% Core Recovery
				155	INTERBEDDED SILTSTONE & SHALE- Medium gray to medium dark gray (N4-N5), aphanitic (157.5-177.5') to fine grained, thinly bedded with cross-bedding throughout; localized fossils, fractures are oriented along bedding planes predominating along the Shale; Siltstone is locally calcareous, possibly due to a Calcite cementation; fractures decreasing in frequency towards 170.0' Shale & Siltstone becoming medium bedded towards 173.0' with frequent disturbed bedding surfaces.		RUN#1 REC=9. RQD=7. D=1 S=2 F=4
				160			
				165			RUN#2 Rec=9. RQD=77 D-1 S-2 F-3
				170			
				175			

Hole No. D-1
Sheet 1 of 1

Dunn Geoscience Corporation
Core Log

Client Catoh Environmental Co. Inc.
Project Cortland Landfill
Location Town of Solon

Logged by J. T. Wink Date Logged 10/19/84
Drilling Co. Catoh Environmental Comp., Inc.
Driller T. Crowell, A. Utter
Started 9/14/84 Finished 10/11/84

Hole D-2
Depth 118'
Elev. 1710.56'
Core Dia. 4"

FORMATION	Member	Zone/Unit	Graphic Log 1" = 5'	Depth	Descriptive Log — ROCK TYPE: color; grain size, texture; bedding; minerals; remarks, etc.	Angle of Bedding to Core	% Core Recovery
				120	INTERBEDDED SILTSTONE & LIMESTONE - Medium dark gray to medium gray (N4-N5), very fine (118-123.3') grained to aphinitic, thin to medium bedding, localized cross-bedding and disturbed bedding surfaces. Occasionally fossiliferous, fracturing predominantly along indivudual bedding planes		Run=1 Rec=4. RQD=35 D-1 S-2 F-4
				125	SHALE - Medium dark gray (N4) aphantic texture, thinly bedded (123.3-123.7) — term applied to igneous rxs		Run #2 Rec=4. RQO=64 D-1 S-2 F-3
				130	LIMESTONE - Medium gray (N4), apnanitic, medium bedded, extremely fossiliferous (123.7'-124.5') (Spirifer, little fracturing		
					SHALE - (same as 123.3-123.7) (124.4-127.0)		Run #3 Rec=5. RQO=95 D-1 S-1 F-2
				135	INTERBEDDED SILTSTONE & SHALE - Medium gray to medium light gray (N-5-N-6) (127.0'-138) very fine grained to aphanitic, extremely thinly bedded with cross-bedding throughout. Occasionally fossiliferous fractures occuring along bedding planes, one large fracture oriented 60° from horizontal at 30.4'.		Run #4 Rec=5. RQD=10 D-1 S-1 F-2
				140			

Hole No. D-2
Sheet 1 of 1

Dunn Geoscience Corporation
Core Log

Client Catoh Environmental Co. Inc.
Project Cortland Landfill
Location Town of Solon

Logged by JTW Date Logged 10/19/84
Drilling Co. Catoh Environmental Co. Inc.
Driller T. Crowell, M. Skardinski
Started 9.25.84 Finished 12/11/84

Hole D-3
Depth 100.00
Elev. 1694.24
Core Dia. 4"

FORMATION	Member	Zone/Unit	Graphic Log 1" = 5'	Depth	Descriptive Log ROCK TYPE: color, grain size, texture, bedding, minerals; remarks, etc	Angle of Bedding to Core	% Core Recovery
				100	INTERBEDDED SHALE & SILTSTONE-Medium dark gray to dark gray (N4-N-3) (100.0-107.6') aphanitic Stexture, cross-bedded with disturbed bedding surfaces. Slightly fossiliferous and calcareous. Fractures oriented along Shale horizons; highly broken throughout.		Run #1 Rec=2 RQD-5 D-1 S=2 F-3,4
				105	LIMESTONE-Medium dark gray (N4), aphanitic, medium bedded (107.6'-108.9') slightly fossiliferous, little fracturing.		Run #2 Rec=4 RQD=6 D-1 S-2 F-3
				110	SHALE-Medium dark gray (N4) aphanitic texture, thinly bedded (108.9-112.35')		Run #5 Rec=7 RQD=6 D-1 S-2 F-3
				115	INTERBEDDED SHALE & SILTSTONE-(Same as 100.0-107.6') Not as fractured. (112.35'-120.0')		Run #4 Rec=3 RQD=4 D-1 S-2 F-3

Hole No. D-3
Sheet 1 of 1

Dunn Geoscience Corporation
Core Log

Client Catoh Environmental Co. Inc.
Project Cortland Co. Landfill
Location Town of Solon

Logged by JTW Date Logged 10-12-84
Drilling Co. Catoh Environmental Co. Inc.
Driller T. Crowell, M. Skardinski
Started 9/25/84 Finished 12/11/84

Hole D-4
Depth 141'
Elev. 1672.75
Core Dia. 4"

Formation	Member	Zone/Unit	Graphic Log 1" = 5'	Depth	Descriptive Log — ROCK TYPE: color, grain size, texture, bedding, minerals, remarks, etc	Angle of Bedding to Core	% Core Recovery
					INTERBEDDED SHALE & SILTSTONE-Medium dark gray to dark gray (N4-N3), aphanitic texture, (141.0-153.15') tightly bedded with cross-bedding throughout; slightly fossiliferous and calcareous, fracturing predominating along Shale bedding planes; large fracture oriented 20° from the horizontal at 145.9.		Run #1 Rec=9 RQD=6 D-1 S-2 F-3
				145			
					DOLOMITE-Medium gray (N5), medium bedded, aphanitic texture, localized clasts of argillaceous material and pyrite nodules; large fractured stylolic surface at 153.55'.		Run #2 Rec=1 RDQ=8 D-1 S-2 F-3
				150			
					INTERBEDDED LIMESTONE & SHALE-Medium dark gray (N4-N5) aphanitic texture, medium to thinly bedded, localized cross bedding, extremely fossiliferous from 157.5-158.9 fracturing predominantly occurring along stylolic surfaces and bedding planes, (not as tightly fractured as above).		
				155			
					INTERBEDDED SHALE AND SILTSTONE-(same as 141-153.15') Not as highly fractured.		
				160			

Hole No. 4
Sheet 1 of 1

Dunn Geoscience Corporation
Core Log

Client Catoh Environmental Co. Inc.
Project Cortland Co. Landfill
Location Town of Solon

Logged by JTW Date Logged
Drilling Co. Catoh Environmental Co. Inc.
Driller T. Crowell, A. Utter
Started 9-27-84 Finished 10-12-84

Hole D-5
Depth 146.5'
Elev. 1663.05
Core Dia. 4"

Formation	Member	Zone/Unit	Graphic Log 1" 2.5'	Depth	Descriptive Log — ROCK TYPE: color, grain size, texture, bedding, minerals, remarks, etc	Angle of Bedding to Core	% Core Recovery
				145	SILTSTONE-Gray (W-5), very fine grained, nearly aphanitic, medium to thinly bedded, (146.5-148.55') localized Shale seam at 147.1', fractures in core predominating along bedding planes one every 0.3'.		Run #1 Rec=9. RQD=41 D-1 S-2 F-4
					LIMESTONE-Medium light gray (N-5), aphanitic, medium bedded, slightly fossiliferous (148.55-148.85') along the upper horizon from 148.55'-149.50', fracturing is along bedding planes which are oriented at 10-15 degrees from the horizontal.		
					INTERBEDDED LIMESTONE & SILTSTONE-Medium gray (N-5), fine grained to aphanitic, tightly (148.85-150') interbedded Siltstone & Limestone, very thinly bedded, some cross bedding. Fractures predominantly along bedding planes; slightly calcareous.		
				150	SHALE-Medium dark gray (N-4), thinly bedded & aphanitic texture, localized inclusions (150.0-150.40') of Limestone clasts.		
					INTERBEDDED LIMESTONE & SILTSTONE-(same as 148.85-150.0') Disturbed contact on upper (150.40-154.15') portion of bedding surface (possibly erosional or depositional) fossiliferous from 150.40', 150.65', 151.15', 151.50' & 152.30-152.50' extremely cross bedded and interbedded.		
				155	SILTSTONE-(same as 146.5-148.55')Large fracture across bedding planes at 155.0', (154.15-155.5') interbedded Shale seams scattered throught Siltstone slightly fossiliferous.		
					INTERBEDDED LIMESTONE & SILTSTONE-(same as 148.85-150-50') Not as fossiliferous, thinly (155.5-156.5) interbedded, very broken up from 156.2-156.5'		

RUN #2
REC=9.8
RQD=68
D=1
S=2
F=3,4

INTERBEDDED SHALE & SILTSTONE- Medium gray-medium dark gray (N-5-N-6), fine grained
(156.5-161.10') to aphanitic, extremely cross bedded, very thin bedding planes fracturing occurring along bedding surfaces.

160 LIMESTONE - Medium gray(N-5) aphanitic, slightly interbedded with clastic material
(161.10-166.5') (Siltstone or Shale) fractures occurring along bedding surfaces, large color change along stylolitic surface at 165.7'.

Hole No. D-5
Sheet 2 of 2

Dunn Geoscience Corporation
Core Log

Client CATOH ENVIRONMENTAL CO. INC.
Project CORTLAND CO. LANDFILL
Location TOWN OF SOLON

Logged by JTW Date Logged 10-19-84
Drilling Co. CATOH ENVIRONMENTAL CO. INC.
Driller T. CROWELL, A. UTTER
Started 9-27-84 Finished 10-12-84

Hole D-6
Depth 69'
Elev. 1712.79
Core Dia. 4"

Formation	Member	Zone/Unit	Graphic Log 1" 5'	Depth	Descriptive Log (ROCK TYPE: color, grain size, texture, bedding, minerals, remarks, etc)	Angle of Bedding to Core	% Core Recovery
				70	DOLOMITE- (69.0-69.5') Medium light gray (N6), aphanitic texture, highly fractured and broken, fractures are stained and water warn.		RUN#1 REC=4. RQD=0 D=2 S=2 F=5
					SILTSTONE- (69.5-72.0) Medium light gray(N6), fine grained to aphanitic, highly fractured and irregularly broken, fractures are water warn and stained, thinly bedded and slightly cross bedded. Coarsening downwards.		
				75	SANDSTONE - (72.0-74.0') Medium light gray to medium gray (N6-N5), subrounded fine grained quartz in a Calite cement matrix; slightly fossiliferous, thinly bedded, with occasional interbedded Limestone & Shale seams; fracturing is both oriented along bedding planes and irregular throughout core.		RUN#2 REC=7. RQD=27 D=2 S=2 F=4
				80	INTERBEDDED SILTSTONE & LIMESTONE- (74.0-76.0') Medium gray to medium dark gray (N5-N4), fine grained to aphanitic, thinly bedded with localized cross bedding; fractures are irregular and oriented along bedding planes. Slightly fossiliferous in areas.		
					SILTSTONE- (76.0-87.8') (same as 69.5-72.0') Localized seams of Limestone and occasional fossils.		RUN#3 REC=5. RQD=5? D=2 S=2 F=4.5
				85	INTERBEDDED SILTSTONE & SHALE- (87.8-88.6') Medium gray to medium dark gray(N5-N4), medium to thinly bedded, fine to aphanitic grain size, localized cross-bedding and fossiliferous zone; increasing fractures. Fractures are primarily along bedding planes, (few irregular fractures) localized straining along fractures.		
				90	SILTSTONE- (88.6 -89.0') (same as 69.5-72.0)		

Hole No. D-6
Sheet 1 of 1

CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started: 8/27/84
Date Completed: 8/27/84
Driller: M. Skardinski
Inspector:

Project No.: C275
Boring No.: B-1
Surface Elev.:
Groundwater Depth-Casing In: 9.6'
Below Ground Surf.-Casing Out:

Sheet 1 of 1

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
0	0.0-2.0'	1	20	14			34	Brown moist silt, little gravel and sand, trace clay.
					12	13	25	
	2.0-4.0'	2	15	11			26	Brown moist silt, some gravel and sand, trace clay.
					13	14	27	
5	4.0-6.0'	3	10	22	100/.2		100/.7	Brown moist silt, some gravel and sand, trace clay. 5.0'
	6.0-7.8'	4	29	25			54	Gray moist to damp gravel and cobbles, little sand and silt.
					19	100/.35	119/35	
	8.0-8.1'	5	100/.1				100/1	Gray wet to saturated gravel and cobbles, little sand and silt.
10								Boring terminated at 10.0'
								NOTE: advanced augers to 10.0'
								Installed monitor well
15								
20								
25								
30								
35								
40								

N = No. of blows to drive 2" spoon 12" w/ 140 lb. weight 30" each blow.
Casing Type: hollow stem auger

CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started: 8/28/84
Date Completed: 8/28/84
Driller: M. Skardinski
Inspector:

Project No.: C275
Boring No.: B-2
Surface Elev.:
Groundwater Depth-Casing In: none at completion of drilling
Below Ground Surf.-Casing Out:

Sheet 1 of 1

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
0	0.0-2.0'	1	5	6			11	Brown moist silt, little gravel and
					11	14	25	sand, trace clay.
	2.0-4.0'	2	14	12			26	Brown moist silt, little gravel and
					11	16	27	sand, trace clay.
5	4.0-6.0'	3	13	16			29	Brown moist silt, little gravel and
					25	70	95	sand, trace clay.
	6.0-6.1'	4	100/.1				100/.1	Brown moist silt, little gravel and
								sand, trace clay.
	8.0-10.0'	5	27	23			50	Gray moist silty gravel, little sand,
10					21	30	51	trace clay.
								Boring terminated at 10.0'
								NOTE: Installed monitor well
15								
20								
25								
30								
35								
40								

N = No. of blows to drive 2" spoon 12" w/ 140 lb. weight 30" each blow.
Casing Type: hollow stem auger

CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started: 8/27/84
Date Completed: 8/27/84
Driller: M. Skardinski
Inspector:

Project No.: C275
Boring No.: B-3
Surface Elev.:
Groundwater Depth-Casing In: 4.0'
Below Ground Surf.-Casing Out:

Sheet 1 of 1

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
0	0.0-2.0'	1	1	1			2	Brown moist silt, little clay, little
					15	34	49	gravel and sand.
	2.0-4.0'	2	23	15			38	Brown moist to wet silt, little clay,
					18	10	28	little gravel and sand.
5	4.0-6.0'	3	9	9			18	Brown wet silty very fine sand, little
					9	9	18	coarse to medium sand and fine gravel.
	6.0-8.0'	4	11	12			23	Brown wet silt, little gravel and sand,
					23	25	48	little clay.
	8.0-10.0'	5	9	14			23	Brown moist silt, little gravel and
					19	19	38	sand, little clay.
								Boring terminated at 10.0'
								NOTE: Installed monitor well

N = No. of blows to drive 2" spoon 12" w/ 140 lb. weight 30" each blow.
Casing Type: hollow stem auger

CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started: 8/30/84
Date Completed: 8/30/84
Driller: M. Skardinski
Inspector:

Project No.: C275
Boring No.: RE-5
Surface Elev.:
Groundwater Depth-Casing In: 8.0'
Below Ground Surf.-Casing Out:

Sheet 1 of 1

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
0	0.0-2.0'	1	1	1			2	Brown moist silt, little coarse to fine
					9	29	38	sand and fine gravel.
	2.0-4.0'	2	33	10			43	Brown moist silt, little coarse to fine
					11	13	24	sand and fine gravel.
5	4.0-6.0'	3	8	14			22	Brown moist silt, some sand and gravel.
					42	23	65	
	6.0-8.0'	4	44	34			78	Gray moist gravel and sand, some silt.
					28	20	48	
	8.0-10.0'	5	10	18			28	Brown wet sand and gravel, little
					23	31	54	clayey silt.
10	10.0-12.0'	6	26	23			49	Brown moist sand and gravel, little silt.
					32	25	57	
	12.0-14.0'	7	46	90			136	Brown moist sand and gravel, little silt.
					66	79	145	
15	14.0-16.0'	8	29	26			55	Brown moist sand and gravel, little silt,
					36	32	68	trace clay.
	16.0-18.0'	9	28	29			57	Brown moist silt, some sand and gravel.
					24	50	74	
	18.0-20.0'	10	26	40			66	Brown moist silt, some sand and gravel.
20					58	42	100	
	20.0-22.0'	11	31	30			61	Brown saturated sand and gravel, little
					32	32	64	clayey silt.
	22.0-24.0'	12	30	55			85	Gray wet silty sand and fine gravel,
					85	70	155	trace clay.
25	24.0-25.0'	13	67	93			160	Gray wet silty sand and fine gravel,
								trace clay.
								Boring terminated at 25.0'
								NOTE: Installed monitor well.
30								
35								
40								

N = No. of blows to drive 2" spoon 12" w/ 140 lb. weight 30" each blow.
Casing Type: hollow stem auger

CATOH Environmental Companies, Inc.

One Industrial Place, Savannah, New York 13146

Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Client: Cortland County .

Date Started: 8/29/84

Date Completed: 8/30/84

Driller: M. Skardinski

Inspector:

Project No.: C275
Boring No.: RE-6
Surface Elev.:
Groundwater Depth-Casing In: 7.0'
Below Ground Surf.-Casing Out:

Sheet 1 of 1

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
0	0.0-2.0'	1	2	3			5	Brown moist silt, little sand and gravel, trace clay.
					8	13	21	
	2.0-4.0'	2	16	32			48	Brown moist silt, little sand and gravel, trace clay.
					16	17	33	
	4.0-6.0'	3	8	10			18	Brown moist silt, little clay, little sand and gravel.
5					11	12	23	
	6.0-8.0'	4	12	15			27	Brown damp clayey silt, little fine gravel and coarse to fine sand. 7.5'
					14	18	32	
	8.0-10.0'	5	21	18			39	Brown saturated silty sand and gravel.
					18	17	35	
10	10.0-12.0'	6	18	16			34	Brown damp gravel and sand, some silt.
					18	28	46	
	12.0-13.35'	7	22	23	100/.35		100/.85	Gray moist silty sand and gravel.
	14.0-16.0'	8	29	53			82	Gray wet silt, little sand and gravel.
15					35	21	56	
	16.0-18.0'	9	16	28			44	Gray wet silt, little sand and gravel, trace clay.
					33	30	63	
	18.0-20.0'	10	33	28			61	Gray wet clayey silt, little sand and gravel.
					23	33	56	
20	20.0-22.0'	11	24	29			53	Gray wet silt, little sand and gravel, trace clay.
					23	44	67	
	22.0-24.0'	12	22	20			42	Gray wet clayey silt, little and gravel.
					77	51	128	
25	24.0-25.0'	13	37	43			80	Gray wet silt, little sand and gravel, trace clay.
								Boring terminated at 25.0'
								NOTE: Installed monitor well.
30								
35								
40								

N = No. of blows to drive 2" spoon 12" w/ 140lb. weight 30" each blow.

Casing Type: hollow stem auger

CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Client: Cortland County
Date Started: 8/28/84
Date Completed: 8/29/84
Driller: M. Skardinski
Inspector:

Project No.: C275
Boring No.: RE-7
Surface Elev.:
Groundwater Depth-Casing In: 6.5'
Below Ground Surf.-Casing Out:

Sheet 1 of 1

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
0	0.0-2.0'	1	2	3			5	Brown moist silt, trace sand and gravel.
					8	32	40	
	2.0-4.0'	2	35	26			61	Brown moist silt, little sand and gravel.
					51	27	78	
5	4.0-6.0'	3	7	13			20	Brown moist silt, little sand and gravel.
					13	15	28	
	6.0-8.0'	4	9	10			19	Brown wet silt, little sand and gravel.
					12	14	26	
	8.0-10.0'	5	7	14			21	Brown moist silt, some sand and gravel.
10					21	30	51	
	10.0-12.0'	6	18	22			40	Gray moist sand and gravel, little silt.
					36	24	60	
	12.0-13.1'	7	27	36	100/.1		100/.6	Gray moist silt, some sand and gravel, trace clay.
15	14.0-16.0'	8	32	34			66	Gray wet gravel, little sand, little
					74	88	162	silt, trace clay.
	16.0-18.0'	9	39	40			79	Brown saturated sand and gravel, little
					44	49	93	silt.
	18.0-19.3'	10	25	27	100/.3		127/.8	Gray moist silty sand and gravel.
20	20.0-22.0'	11	27	42			69	Gray moist silty sand and gravel.
					37	36	73	
	22.0-22.7'	12	40	100/.2			140/.7	Gray wet sand and gravel, little silt.
25	24.0-25.0'	13	20	23			43	Gray wet sand and gravel, little silt.
								Boring terminated at 25.0'
								NOTE: Installed monitor well.
30								
35								
40								

N = No. of blows to drive 2" spoon 12" w/ 140 lb. weight 30" each blow.
Casing Type: hollow stem auger

CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started: 8/28/84
Date Completed: 8/28/84
Driller: M. Skardinski
Inspector:

Project No.: C275
Boring No.: RE-8
Surface Elev.:
Groundwater Depth-Casing In: 9.0'
Below Ground Surf.-Casing Out:

Sheet 1 of 1

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
0	0.0-2.0'	1	6	11			17	Brown moist silt, little sand and
					8	5	13	gravel, trace clay.
	2.0-4.0'	2	23	47			70	Brown sand and gravel, trace silt.
					66	32	98	
	4.0-6.0'	3	23	17			40	Brown moist silt, some sand and gravel,
5					15	12	27	trace clay.
	6.0-8.0'	4	16	17			33	Brown moist sand and gravel, trace
					21	32	53	silt.
	8.0-10.0'	5	26	22			48	Brown moist silt, some sand and gravel.
					22	68	90	
10	10.0-12.0'	6	100/.4				100/.4	Brown moist silt, some sand and gravel.
	12.0-14.0'	7	36	77			113	Brown saturated sand and gravel, little
					47	37	84	silt, trace clay.
	14.0-16.0'	8	26	31			57	Gray moist silt, some sand and gravel.
15					40	62	102	
	16.0-16.5'	9	100/.5				100/.5	Gray saturated coarse to fine sand,
								little silt, trace fine gravel, trace clay.
	18.0-20.0'	10	30	41			71	Gray moist silt, little sand and fine
					34	98	132	gravel, trace clay.
20	20.0-22.0'	11	28	40			68	Gray moist silt, little sand and fine
					52	44	96	gravel, trace clay.
	22.0-24.0'	12	40	38			78	Gray moist silt, little sand and fine
					41	67	108	gravel, trace clay.
	24.0-25.0'	13	43	57			100	Gray moist silt, little sand and fine
25								gravel, trace clay.
								Boring terminated at 25.0'
								NOTE: Installed monitor well.
30								
35								
40								

N = No. of blows to drive 2" spoon 12" w/ 140 lb. weight 30" each blow.
Casing Type: ~~hollow stem auger~~

CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started:
Date Completed: 9/14/84
Driller: T. Crowell, M. Skardinski
Inspector:

Project No.: C275
Boring No.: D-1
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

Sheet 1 of 2

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
140								Drilled 6" diameter mud rotary to 157.0' (approximately 5' into competent bedrock)
145								No soils samples at owner's request Installed 4" diameter steel casing with float shoe to 157.0'
150								Installed cement/bentonite grout in the 4" casing x borehole wall annulus from -157.0' to ground surface.
155								Drilled float shoe and advanced the borehole to -157.5' with 3 7/8" tricone roller bit.
	RUN NO. 1 157.5-167.5' RECOVERED 9.8'							Gray shale with interbedded limestone.
160								
165								
	RUN NO. 2 167.5-177.5' RECOVERED 9.7'							Gray shale with interbedded limestone.
170								
175								boring terminated at 177.5'
180								

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

CATOH Environmental Companies, Inc.
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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started:
Date Completed: 9/14/84
Driller: T. Crowell, M. Skardinski
Inspector:

Project No.: C275
Boring No.: D-1
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
								Core drilled with NX series "M" double tube core barrel and diamond bit from 157.5' to 177.5' Reamed core hole with 3 7/8" diameter tricone roller bit. Installed 2" diameter PVC monitor well.

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started: 9/14/84
Date Completed: 10/11/84
Driller: T. Crowell, A. Utter
Inspector:

Project No.: C275
Boring No.: D-2
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
								Drilled 6" diameter mud rotary to 117.75' (approximately 5' into competent bedrock)
								No soils samples obtained at owner's request.
								Installaed 4" diameter steel casing with flöat shoe to 117.75'.
								Installed cement/bentonite grout in the 4" casing x borehole wall annulus from 117.75' to ground surface.
115								Drilled float shoe and advenced borehole to 118.0' with 3 7/8" diameter tricone roller bit.
	RUN NO 1 '							
120	118.0-123.0'							Gray shale with interbedded limestone.
	RECOVERED 4.5'							
	RUN NO. 2							
125	123.0-128.0'							
	RECOVERED 4.9'							
	RUN NO. 3							Gray shale with interbedded limestone.
130	128.0'133.0'							
	RECOVERED 5.2'							
	RUN NO. 4							
	133.0-138.0'							
135	RECOVERED 5.0'							
								Boring terminated at 138.0'
140								

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

CATOH Environmental Companies, Inc.
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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started: 9/14/84
Date Completed: 10/11/84
Driller: T. Crowell, A. Utter
Inspector:

Project No.: C275
Boring No.: D-2
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
								Core drilled with NX series "M" double tube core barrel and diamond bit from 118.0' to 138.0'.
								Reamed core hole with 3 7/8" diameter tricone roller bit.
								Installed 2" diameter PVC monitor well.

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started: 9/25/84
Date Completed: 12/11/84
Driller: T. Crowell, M. Skardinski
Inspector:

Project No.: C275
Boring No.: D-3
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
								Drilled 6" diameter mud rotary to 99.0' (approximately 5' into competent bedrock).
								No soils samples obtained at owner's request.
								Installed 4" diameter steel casing with float shoe to 99.0'.
								Installed cement/bentonite grout in the 4" casing x borehole wall annulus from 99.0' to ground surface.
100	RUN NO. 1 100.0-103.77 RECOVERED 2.9'							Drilled float shoe and advanced borehole to 100.0' with3 7/8" diameter tricone roller bit.
105	RUN NO. 2 103.77-108.77 RECOVERED 4.0'							Gray shale with interbedded limestone.
110	RUN NO. 3 108.77-116.77' RECOVERED 7.6'							Gray shale with interbedded limestone.
115	RUN NO. 4 116.77-120.0' RECOVERED 3.2'							
120								Boring terminated at 120.0'
125								

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

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Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started: 9/25/84
Date Completed: 10/11/84
Driller: T. Crowell, M. Skardinski
Inspector:

Project No.: C275
Boring No.: D-3
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
								Core drilled with NX series "M" double tube core barrel and diamond bit from 100.0' to 120.0'. Reamed core hole with 3 7/8" diameter tricone roller bit. Installed 2" diameter PVC monitor well

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started: 9/27/84
Date Completed: 10/12/84
Driller: T. Crowell, A. Utter
Inspector:

Project No.: C275
Boring No.: D-4
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

Sheet 1 of 2

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
								Drilled 6" diameter mud rotary to 140.5' (approximately 5' into competent bedrock).
								No soils samples obtained at owner's request.
								Installed 4" diameter steel casing with float shoe to 140.5'
								Installed cement/bentonite grout in the 4" casing x borehole wall annulus from 140.5' to ground surface.
140	RUN NO. 1							Drilled float shoe and advanced borehole to 141.0' with 3 7/8" diameter tricone roller bit.
	141.0-151.0'							
	RECOVERED 9.2'							
145								Gray shale with interbedded limestone.
150	RUN NO. 2							
	151.0-161.0'							Gray shale with interbedded limestone.
	RECOVERED 10.2'							
155								
160								Boring terminated at 161.0'
165								

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started: 9/27/84
Date Completed: 10/12/84
Driller: T. Corwell, A. Utter
Inspector:

Project No.: C275
Boring No.: D-4
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
								Core drilled with NX series "M" double tube core barrel and diamond bit from 141,0' to 161.0' Reamed core hole with 3 7/8" diameter tricone roller bit. Installed 2" diameter PVC monitor well.

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

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Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started:
Date Completed: 9/16/84
Driller: T. Crowell, M. Skardinski
Inspector:

Project No.: C275
Boring No.: D-5
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

Sheet 1 of 2

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
								Drilled 6" diameter mud rotary to 146.0' (approximately 5' into competent bedrock)
								No soils samples obtained at owner's request.
								Installed 4" diameter steel casing with float shoe to 146.0'
								Installed cement/bentonite grout in the 4" casing x borehole wall annulus from 146' to ground surface.
145								Drilled float shoe and advanced borehole to -146.5' with 3 7/8" diameter tricone roller bit.
	RUN NO. 1							
	146.5-156.5'							
	RECOVERED 9.9'							
150								Gray shale with interbedded limestone.
155								
	RUN NO. 2							
	156.5-166.5'							
	RECOVERED 9.8'							
160								Gray shale with interbedded limestone.
165								
								Boring terminated at 166.5'
170								

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started:
Date Completed: 9/16/84
Driller: T. Crowell, M. Skardinski
Inspector:

Project No.: C275
Boring No.: D-5
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
								Core drilled with NX series "M" double tube core barrel and diamond bit from 146.5' to 166.5'.
								Reamed core hole with 3 7/8" diameter tricone roller bit.
								Installed 2" diameter PVC monitor well.

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

CATOH Environmental Companies, Inc.
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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started:
Date Completed: 9/5/84
Driller: T. Crowell, A. Utter
Inspector:

Project No.: C275
Boring No.: D-6
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

Sheet 1 of 2

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
								Drilled 6" diameter mud rotary to 66.0' (approximately 5' into competent bedrock)
								No soils samples obtained at owner's request.
								Installed 4" diameter steel casing to 66.0'
								Installed cement/bentonite grout in the 4" casing x borehole wall annulus from -66.0' to ground surface.
65								Drilled to -69.0' with 3 7/8" diameter tricone roller bit.
70	RUN NO. 1 69.0-74.0' RECOVERED 4.5'							Gray shale with interbedded limestone.
75	RUN NO. 2 74.0-82.0' RECOVERED 7.7'							Gray shale with interbedded limestone.
80	RUN NO. 3 82.0-89.0' RECOVERED 6.5'							Gray shale with interbedded limestone.
85								
90								Boring terminated at 89.0'

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started:
Date Completed: 9/5/84
Driller: T. Crowell, A. Utter
Inspector:

Project No.: C275
Boring No.: D-6
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

DEPTH	SAMPLE DEPTH	SAMPLE NO.	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	MATERIAL DESCRIPTION
								Core drilled with NX series "M" double tube core barrel and diamond bit from 69.0 to 89.0' Reamed core hole with 3 7/8" diameter roller bit. Installed 2" diameter PVC monitor well.

N = No. of blows to drive_____spoon_____w/_____lb. weight_____ each blow.
Casing Type: _____

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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Project No.: C275
Boring No.: B-1
Surface Elev.:

Client: Cortland County
Date Started:
Date Completed: 8/27/84
Driller: M Skardinski
Inspector:

Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

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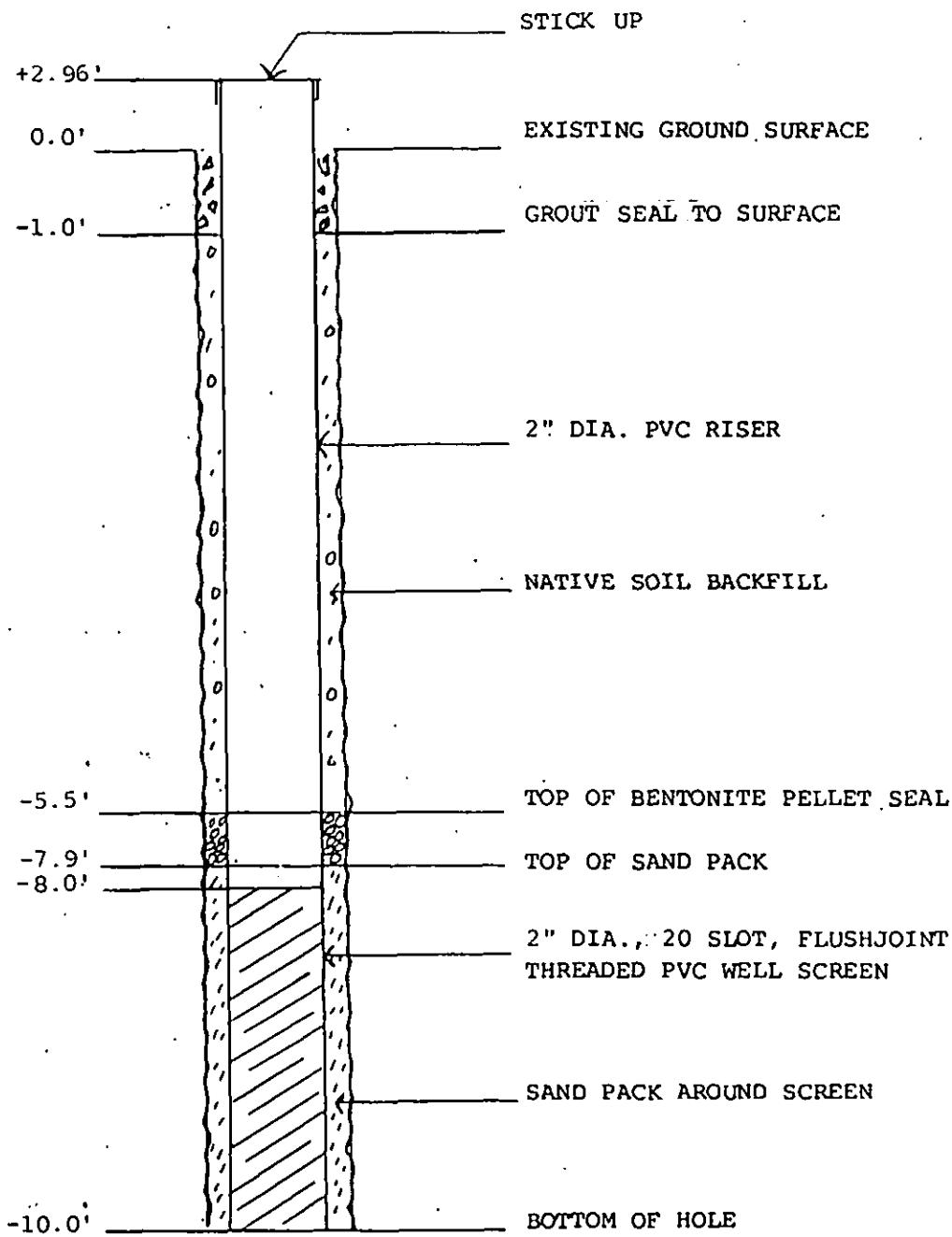

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Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Project No.: C275
Boring No.: B-2

Client: Cortland County
Date Started:
Date Completed: 8/28/84
Driller: M Skardinski
Inspector:

Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

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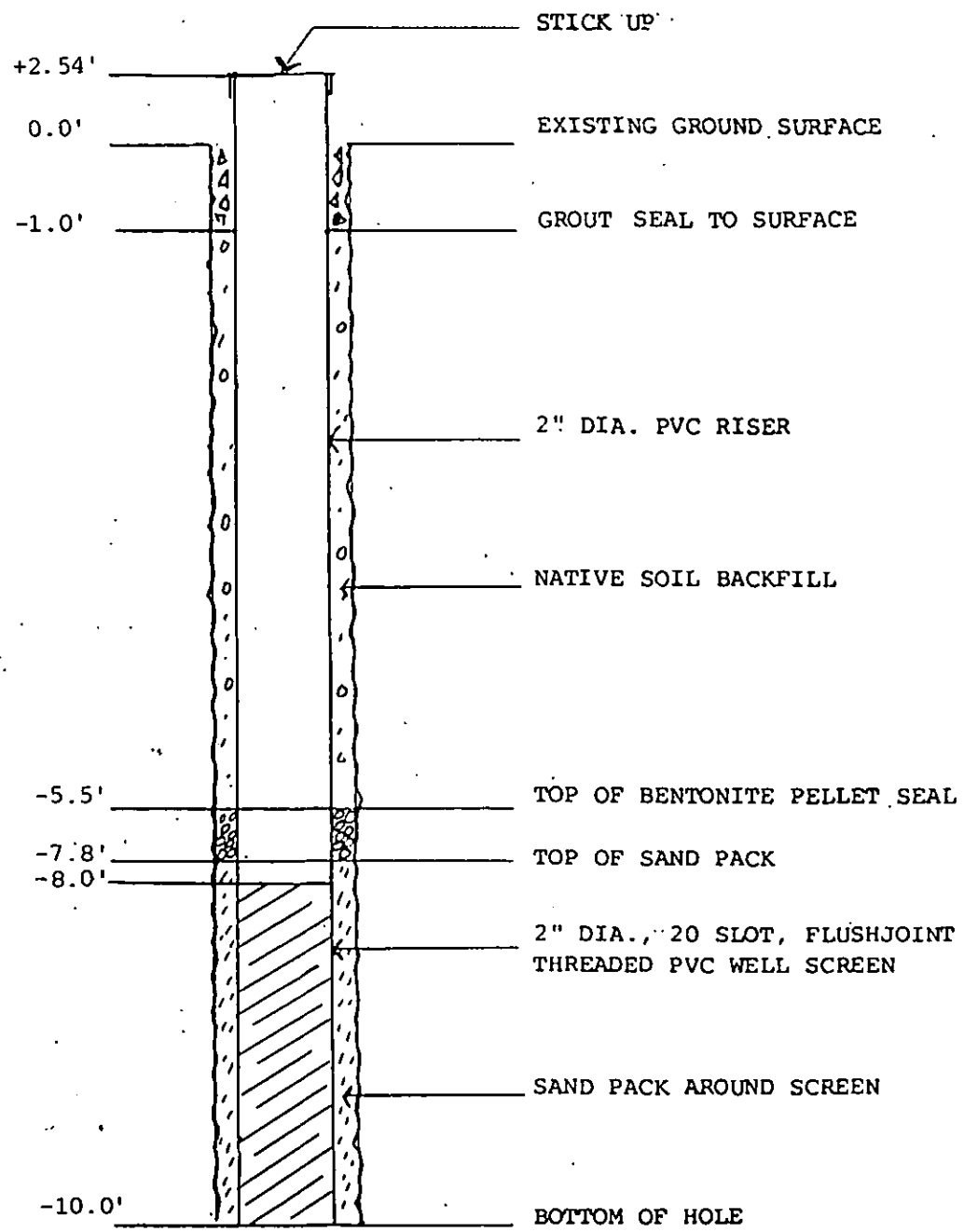

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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started:
Date Completed: 8/27/84
Driller: M Skardinski
Inspector:

Project No.: C275
Boring No.: B-3
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

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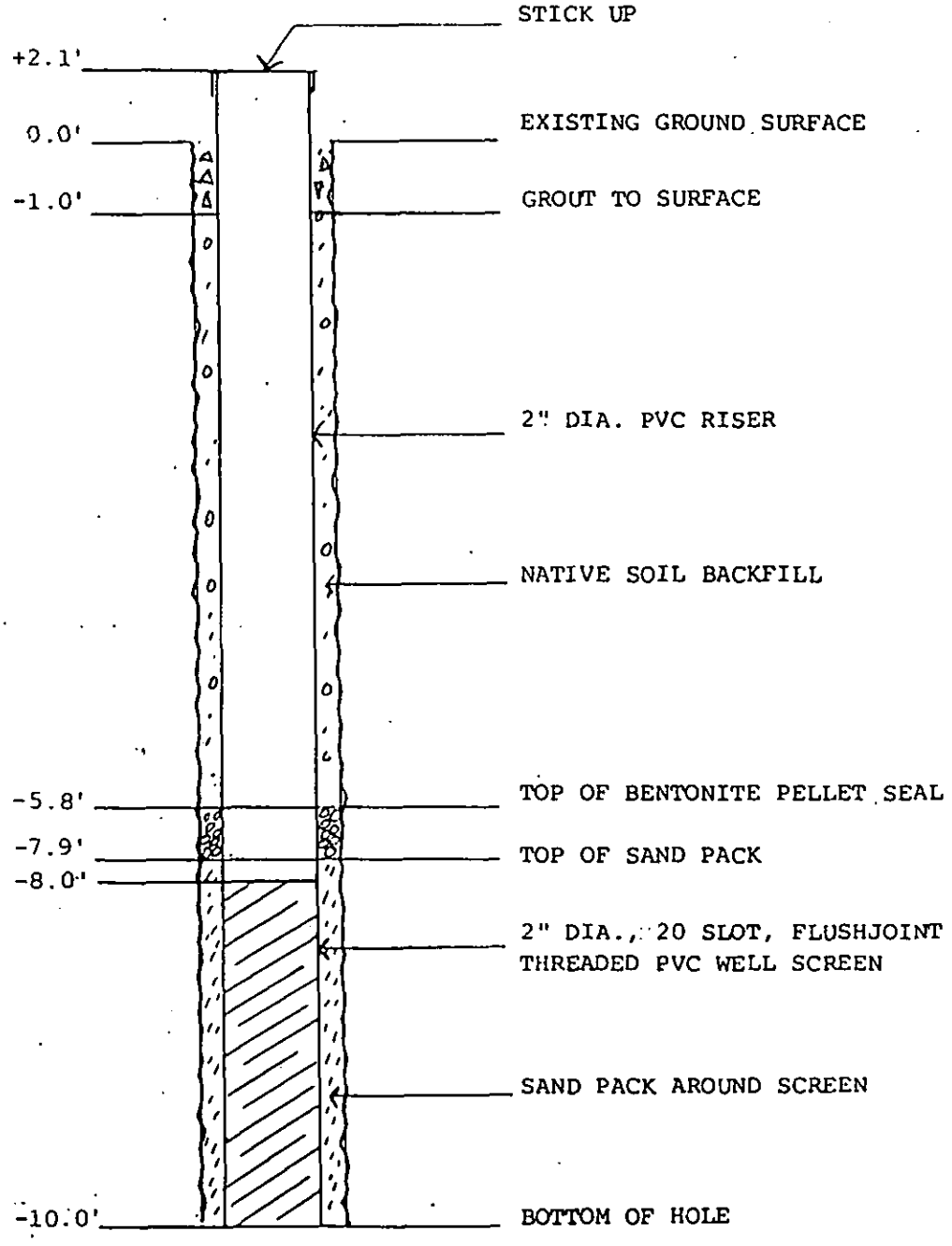

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Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Project No.: C275
Boring No.: RE-5

Client: Cortland County
Surface Elev.:
Date Started:
Groundwater Depth-Casing In:
Date Completed: 8/ D/84
Below Ground Surf.-Casing Out:
Driller: M Skardinski
Inspector:
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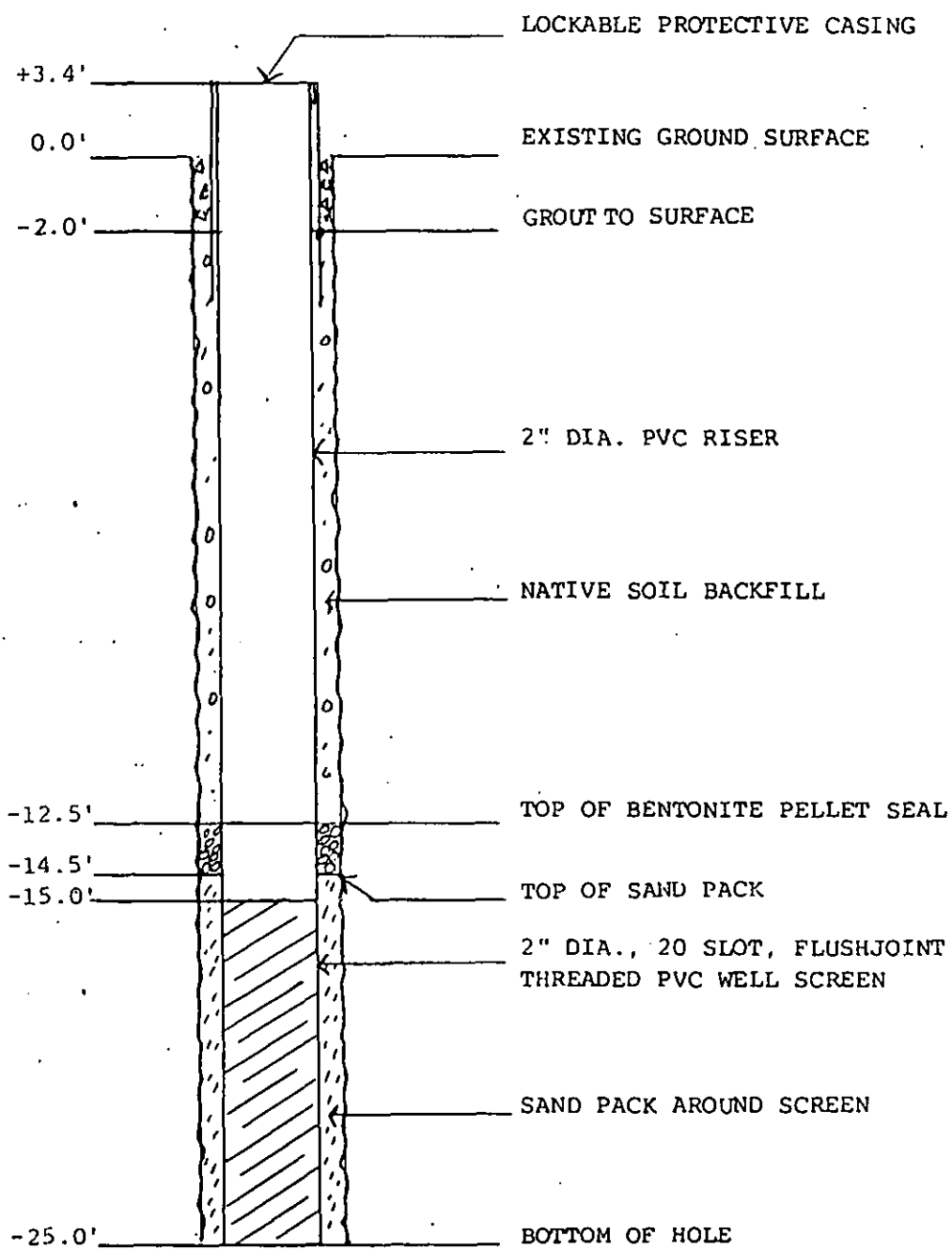

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One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Project No.: C275
Boring No.: RE-6

Client: Cortland County
Surface Elev.:

Date Started:
Groundwater Depth-Casing In:

Date Completed: 8/30/84
Below Ground Surf.-Casing Out:

Driller: M Skardinski

Inspector:

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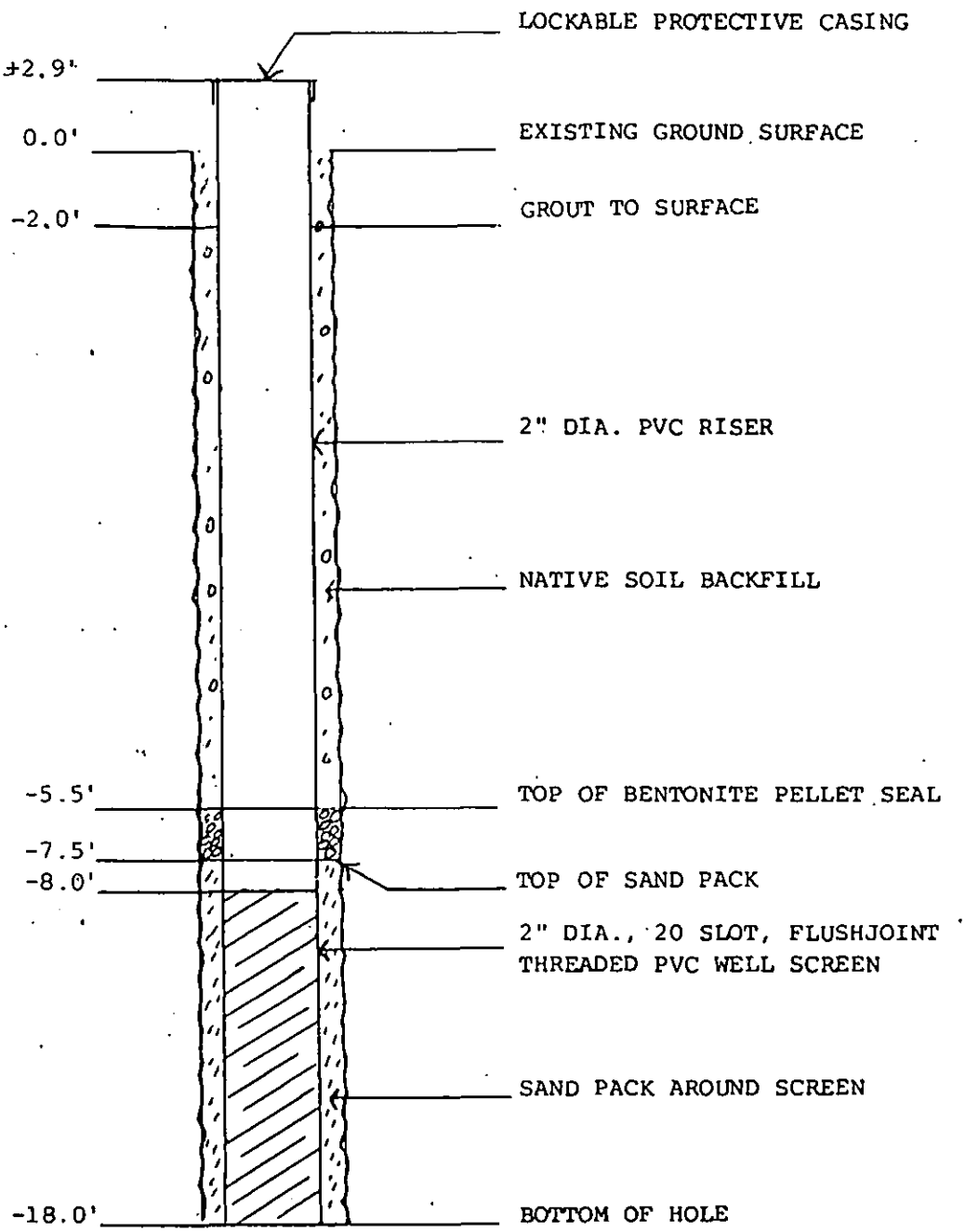

CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Project No.: C275
Boring No.: RE-7

Client: Cortland County
Surface Elev.:

Date Started:
Groundwater Depth-Casing In:

Date Completed: 8/29/84
Below Ground Surf.-Casing Out:

Driller: M Skardinski

Inspector:

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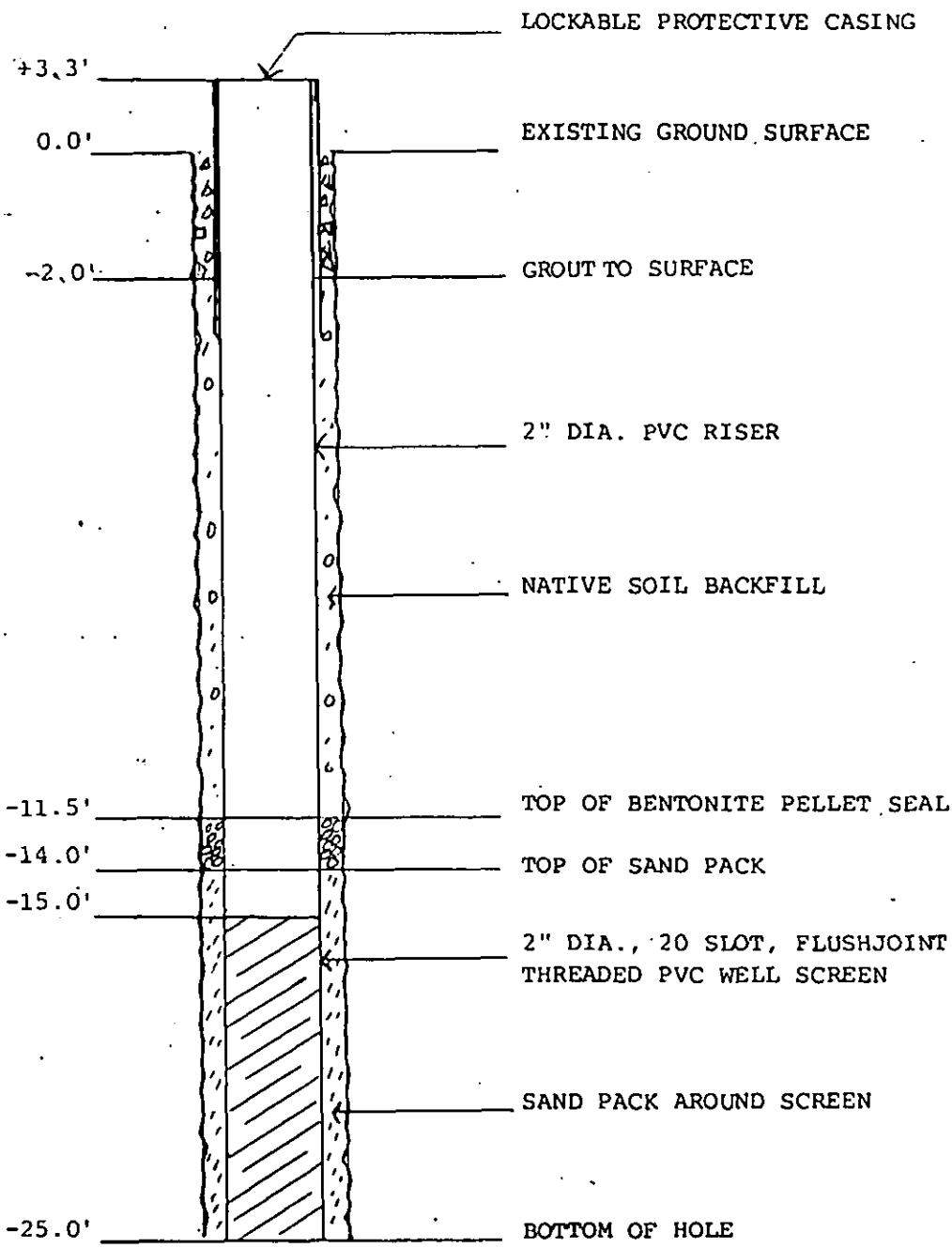

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One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Client: Cortland County

Date Started:

Date Completed: 8/28/84

Driller: M Skardinski

Inspector:

Project No.: C275
Boring No.: RE-8
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

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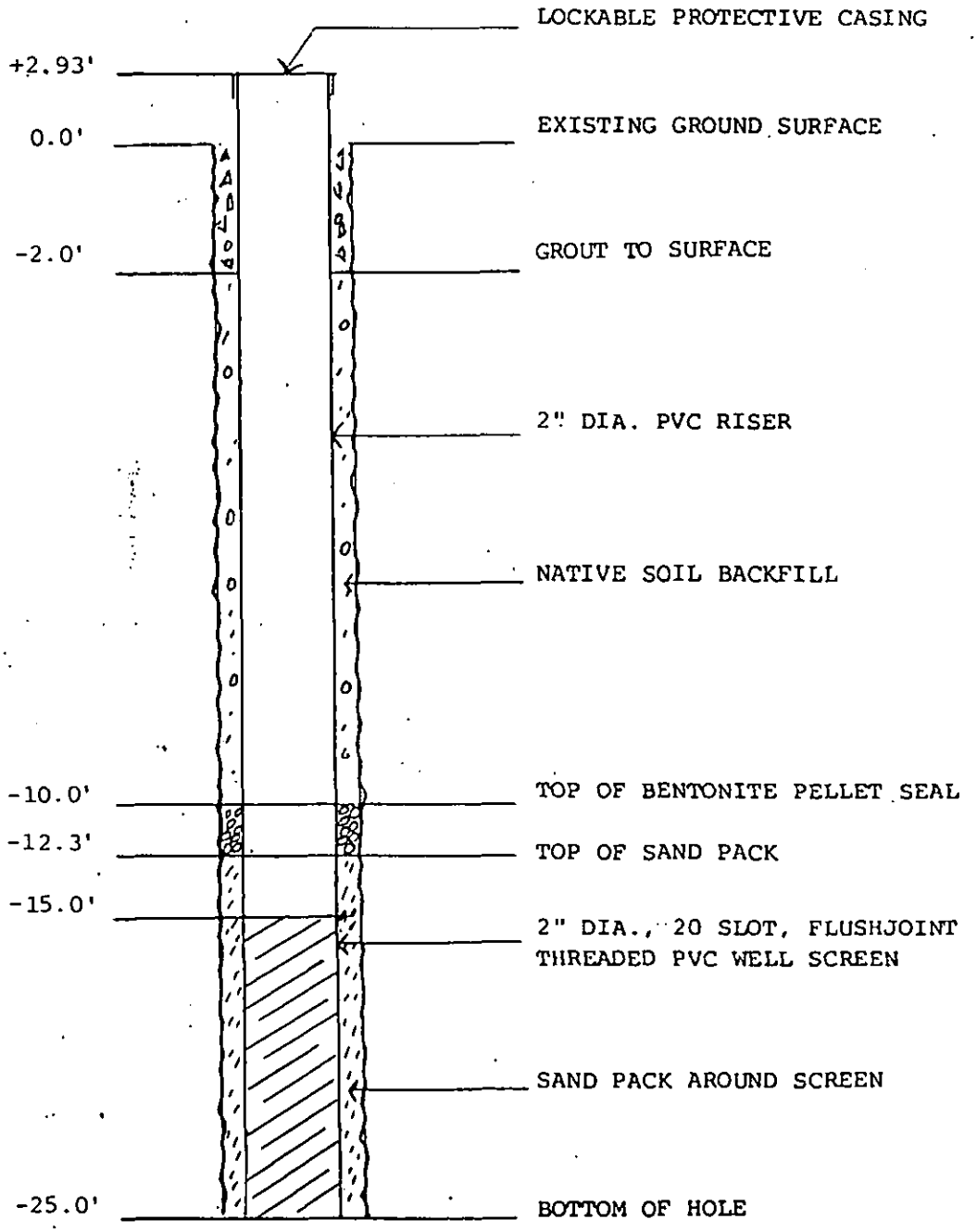

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Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Project No.: C275
Boring No.: D-1

Client: Cortland County
Surface Elev.:

Date Started:
Groundwater Depth-Casing In:

Date Completed: 9/14/84
Below Ground Surf.-Casing Out:

Driller: T. Crowell, M. Skardinski

Inspector:

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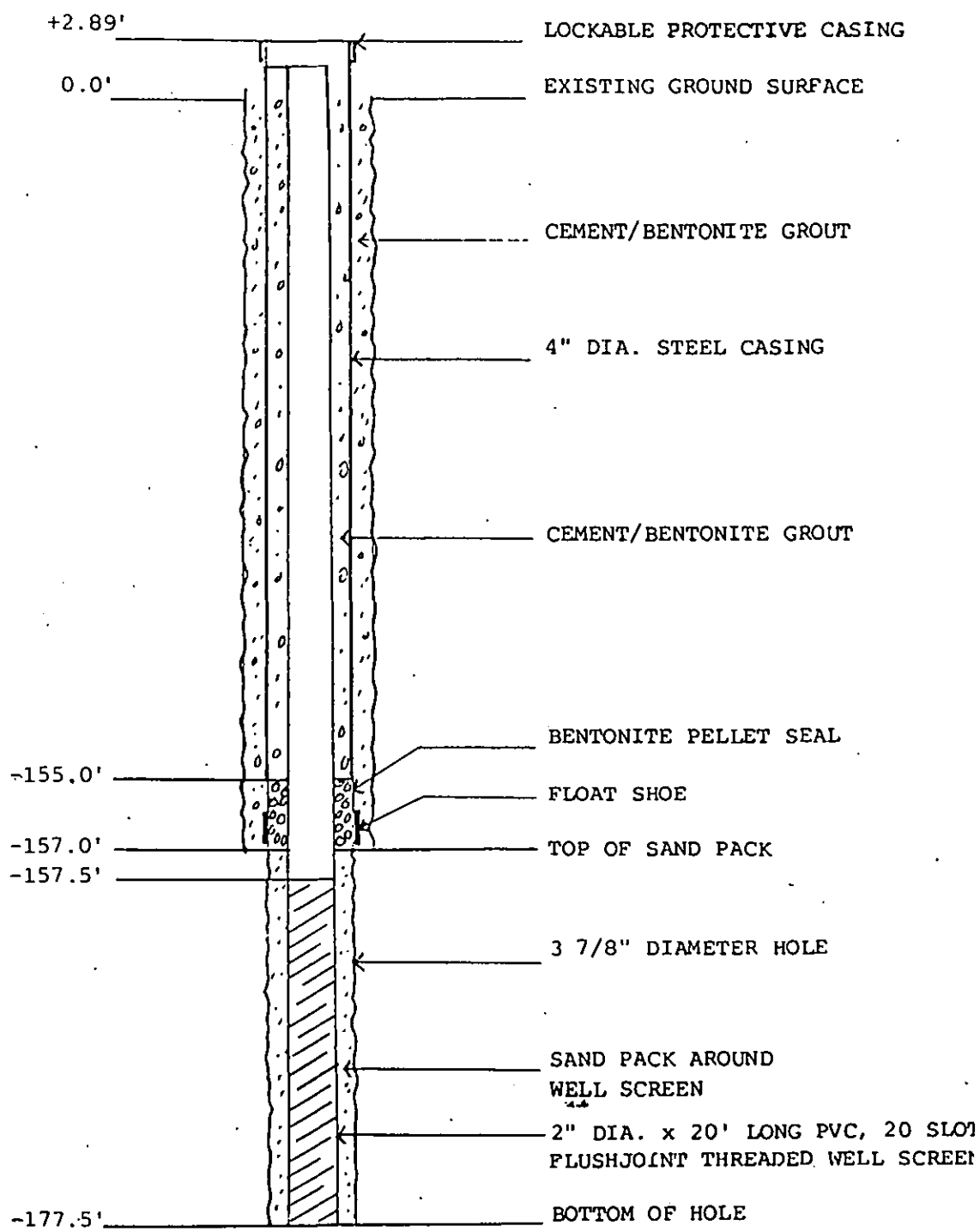


CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

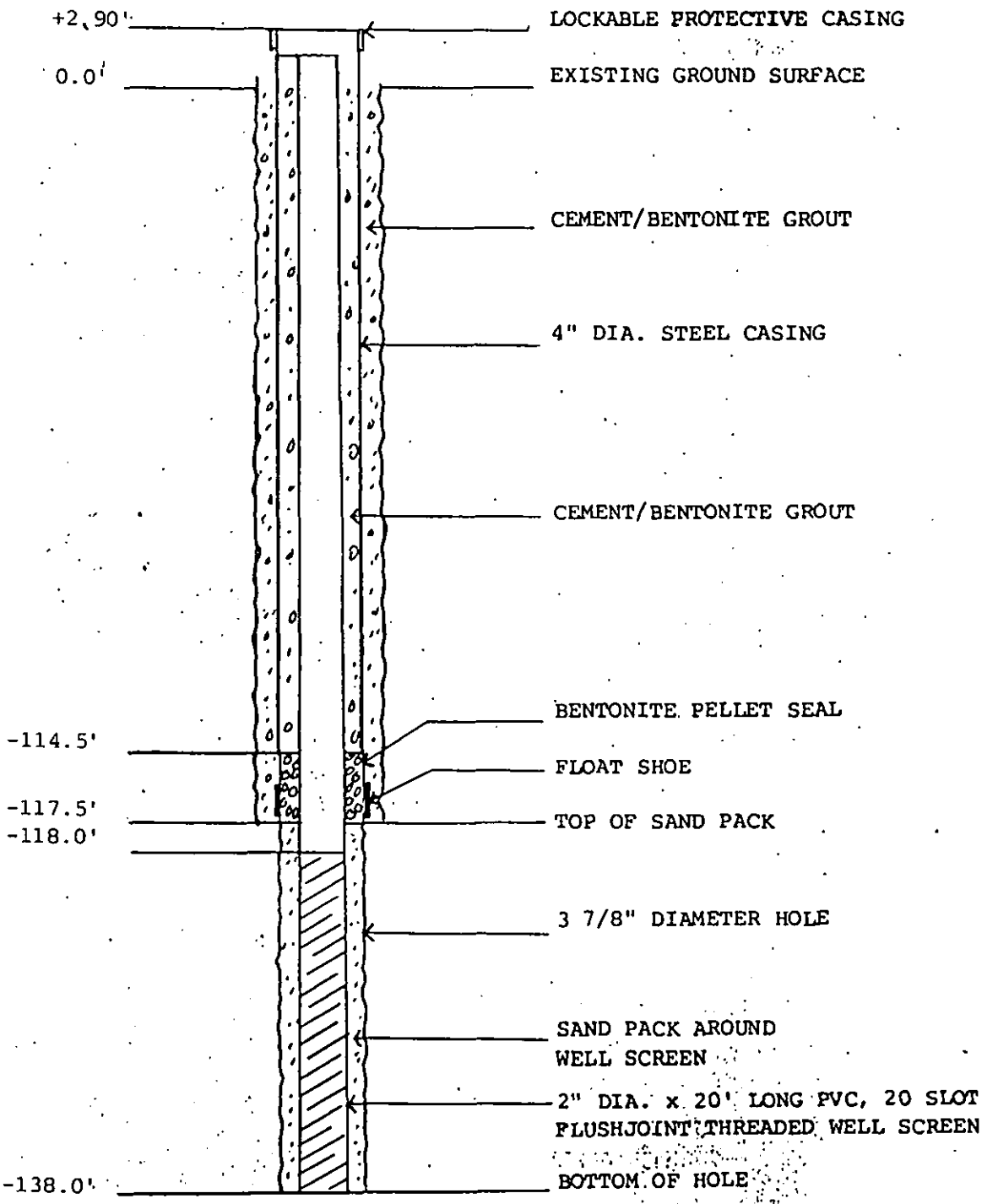
Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Project No.: C275
Boring No.: D-2
Surface Elev.:

Client: Cortland County
Date Started: 9/14/84
Date Completed: 10/11/84
Driller: T. Crowell, A. Utter
Inspector:

Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

Sheet 1 of 1



CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Client: Cortland County

Date Started: 9/25/84

Date Completed: 10/11/84

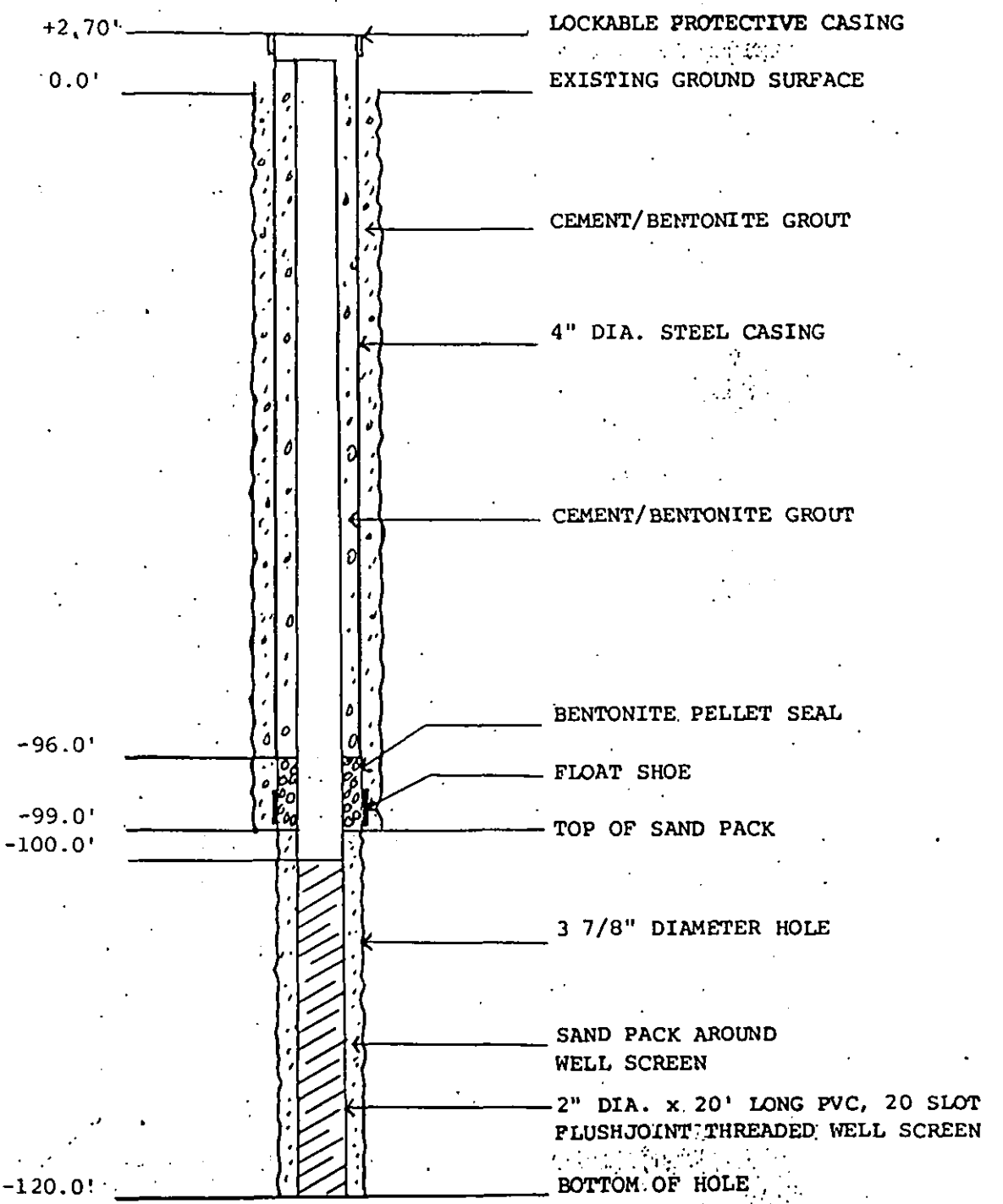
Driller: T. Crowell, M. Skardinski

Inspector:

Project No.: C275
Boring No.: D-3
Surface Elev.:

Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

Sheet 1 of 1



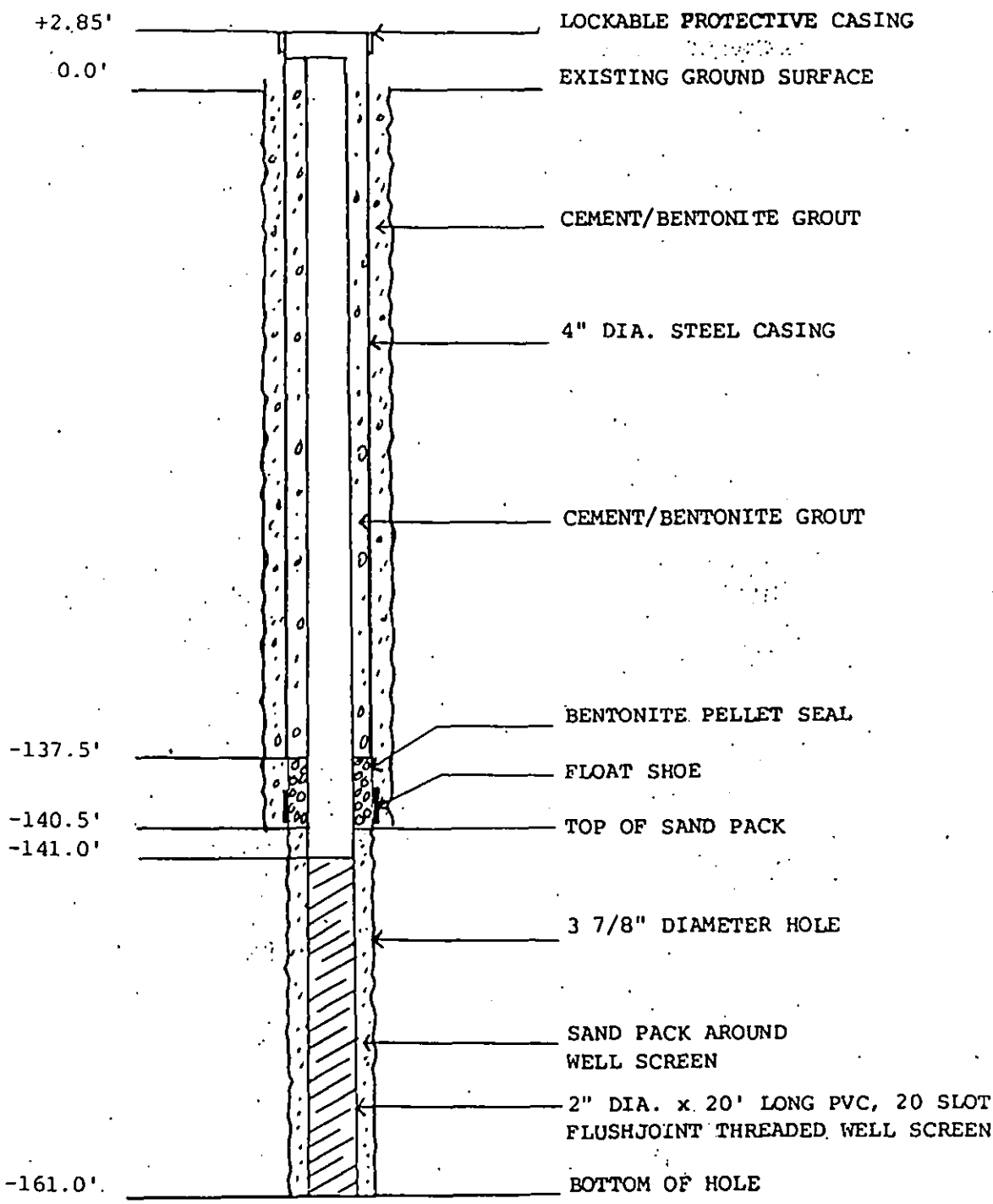
CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Client: Cortland County
Date Started: 9/27/84
Date Completed: 10/12/84
Driller: T. Crowell, A. Utter
Inspector:

Project No.: C275
Boring No.: D-4
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

Sheet 1 of 1



CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

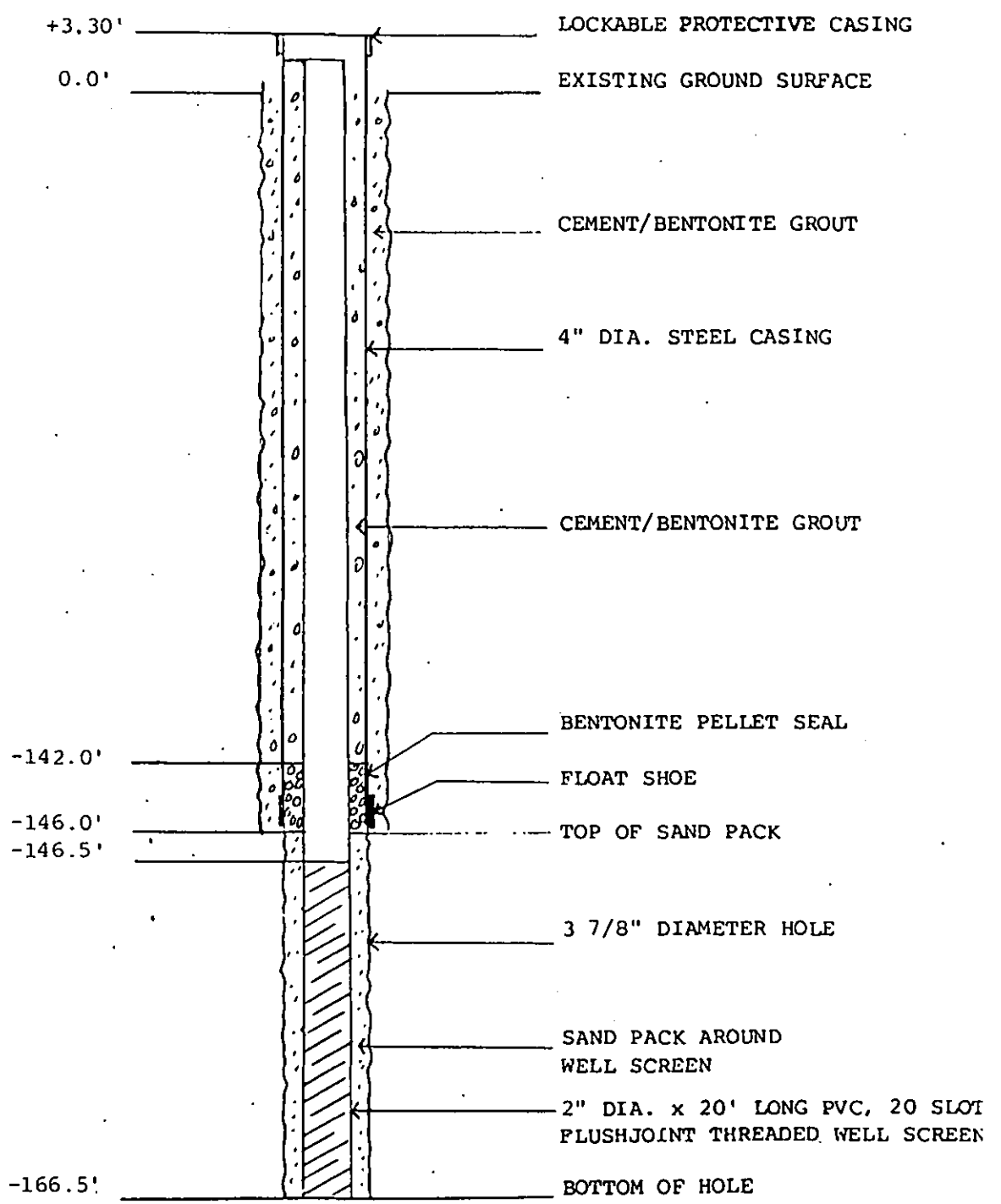
Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY

Project No.: C275
Boring No.: D-5

Client: Cortland County
Date Started:
Date Completed: 9/16/84
Driller: T. Crowell, M. Skardinski
Inspector:

Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

Sheet of

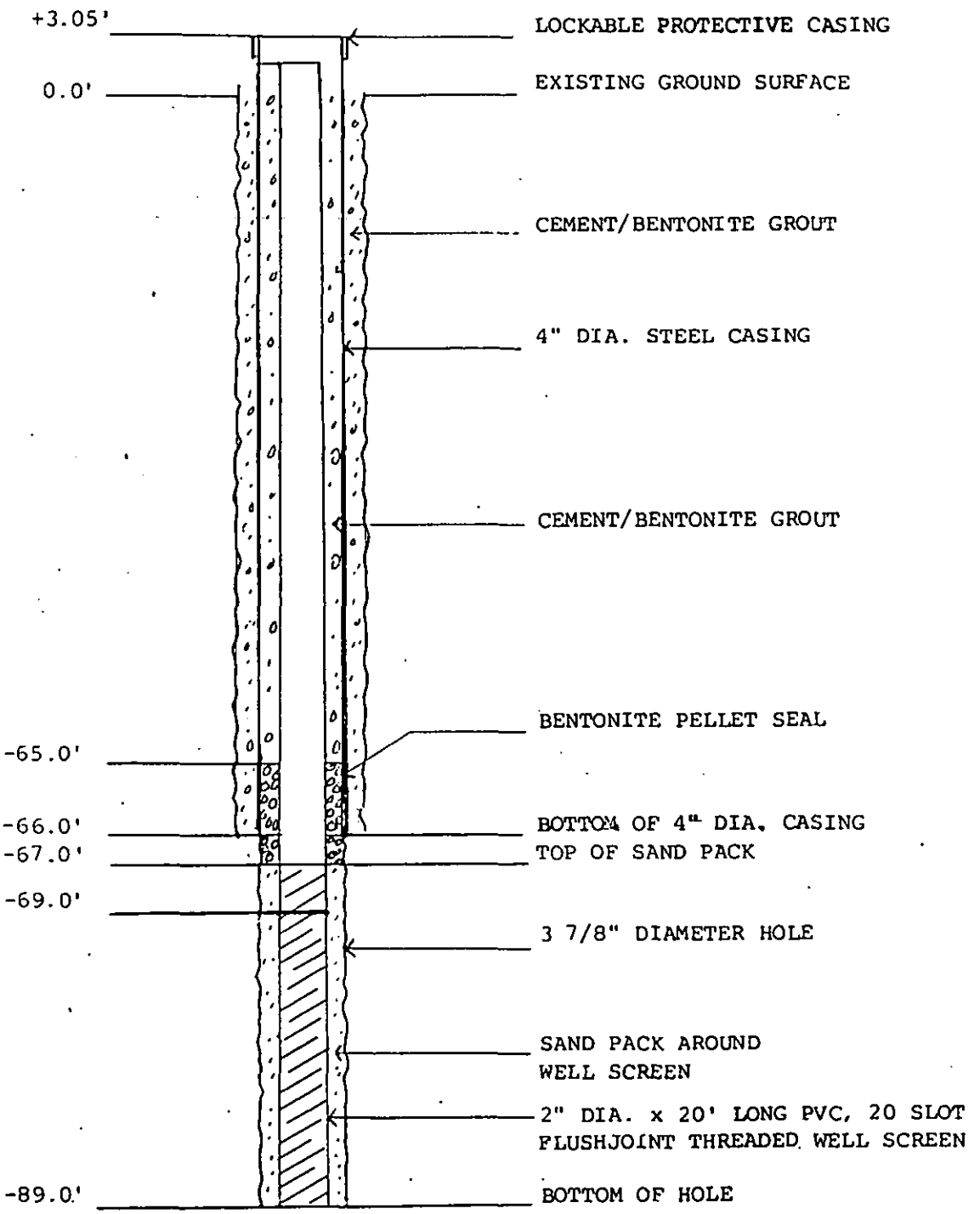


CATOH Environmental Companies, Inc.
One Industrial Place, Savannah, New York 13146
Phone: 315/365-2891

Project: Groundwater Observation Well Installation
Cortland County Landfill
Town of Solon, Cortland County, NY
Client: Cortland County
Date Started:
Date Completed: 9/5/84
Driller: T. Crowell, M. Skardinski
Inspector:

Project No.: C275
Boring No.: D-6
Surface Elev.:
Groundwater Depth-Casing In:
Below Ground Surf.-Casing Out:

Sheet of

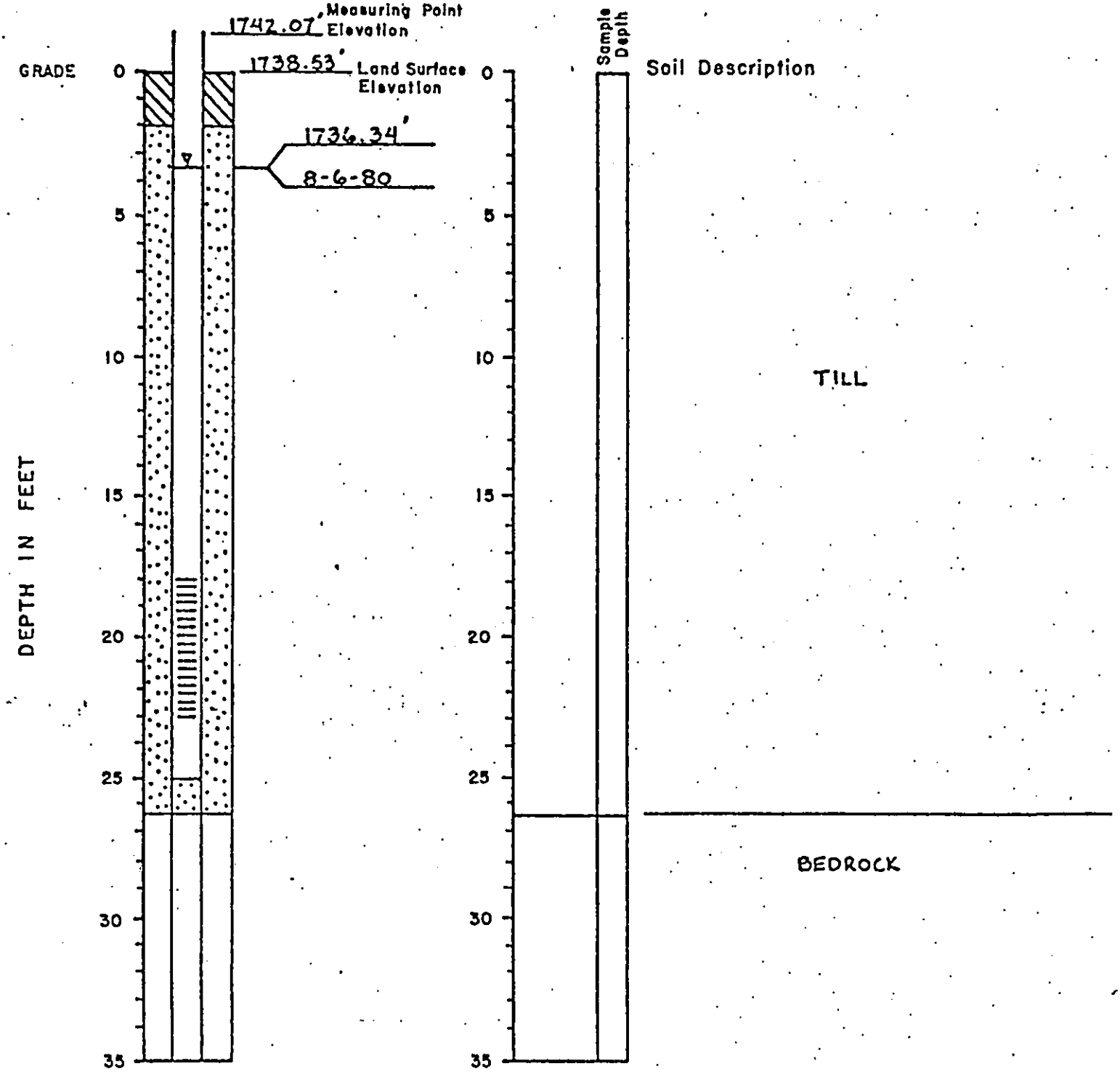


DUNN GEOSCIENCE CORP.
5 Northway Lane North
Latham, New York 12110

PROJECT: *RCRA Contract for Groundwater Quality Assessment*
PROJECT NO. *15-2-1831*
CONTRACT NO. *NYSDEC-C-162001*

DATE DRILLED: 11-14-79
DRILLED BY: ROCHESTER DRILLING
TOTAL DEPTH: 26.5'

SITE NAME: CORTLAND
WELL NO: DO-2 PAGE 1 of 1
REGION NO: 7 FACILITY NO: 12501



NOTE:
For test borings/monitoring wells in excess of 35 feet, the log and construction detail are continued on succeeding pages.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE INVESTIGATIONS
Test Borings – Land – Off-Shore
TESTING AND INSPECTION
Concrete – Soils – Asphalt – Steel
Chemical – Piles – Non-Destructive
45 Steel Street . Rochester, N. Y. 14606
Office: 716-458-0321
Telex: 978-462

PROJECT NO. 2165 PAGE 1 OF 2 BORING NO. 12S01-DO-2

PROJECT Cortland County SLF, Cortland County, New York

CLIENT Dunn Geoscience Corporation, Latham, New York

ELEVATION INSPECTOR WEATHER

DATE STARTED 11/14/79 COMPLETED 11/14/79 TECHNICIAN D. Sweeting

GROUND WATER – CASING IN – AT COMPLETION / TIME

BELOW SURFACE – CASING OUT – –WELLPOINT AT 25'0

Water level at completion with auger casing in - 15'4"

Water level at completion with well screen in - 12'9"

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
									Topsoil 0'4"
									Brown damp gravelly silt, little fine sand, trace of clay
		12	13	30		33	1	5'0"-6'0"	
									Cobbles noted
									Encountered water at 10'0"
									Soft layer 9'0" to 10'0"
		7	10	13		23	2	10'0"-11'6"	
		37	24	26		50	3	15'0"-16'6"	Appears water is moving through gravel layers - sample #3
									Cobbles noted
		29	32	32		64	4	20'0"-21'6"	
									Cobbles noted
									Trace of weathered and decomposed shale
		29	38	40		78	5	25'0"-26'6"	26'6"
									Boring terminated at 26'6"

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BL
C = NO. OF BLOWS TO DRIVE CASING WITH LB. WT. EA. BL

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE INVESTIGATIONS
Test Borings – Land – Off-Shore
TESTING AND INSPECTION
Concrete – Soils – Asphalt – Steel
Chemical – Piles - Non-Destructive
45 Steel Street . Rochester, N. Y. 14606
Office: 716-458-0821
Telex: 978-462

PROJECT NO. 2165 PAGE 2 OF 2 BORING NO. 12S01-DO-2

PROJECT Cortland County SLF, Cortland County, New York

CLIENT Dunn Geoscience Landfill, Latham, New York

ELEVATION INSPECTOR WEATHER

DATE STARTED 11/14/79 COMPLETED 11/14/79 TECHNICIAN D. Sweeting

GROUND WATER – CASING IN – AT COMPLETION / TIME

BELOW SURFACE – CASING OUT – -WELLPOINT AT 25'0"

Water level at completion with auger casing in - 15'4"

Water level at completion with well screen in - 12'9"

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS

Notes: Advanced test boring with hollow stem auger casin
Seasonal and climatic changes may alter the observed water levels
Observation well placed at 18'0" - 23'0" - 2" I
5 feet long
Top cap
Vented cap adapter
Stand pipe above ground
Bentonite seal 0'0"-2'
Sand backfill 2'0"-18
2" I.D. screen 18'0"-2
2" I.D. sump 23'0"-2
Bottom cap plug
Sand cushion 25'0"-2

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" FA.
C = NO. OF BLOWS TO DRIVE CASING WITH LB. WT. EA.

ROCHESTER DRILLING COMPANY, INC.

WELL POINT INSTALLATION SUBSURFACE INVESTIGATIONS
Test Borings – Land – Off-Shore
TESTING AND INSPECTION
Concrete – Soils – Asphalt – Steel
Chemical – Piles – Non-Destructive
45 Steel Street . Rochester, N. Y. 14606
Office: 716-453-0821
Telex: 978-462

SUMMARY SHEET

PROJECT Cortland County SLF, Cortland County PROJECT NUMBER 2165

DATE OF INSTALLATION 11/14/79 BORING NUMBER 12S01-DO-2

URFACE
EVATION

TAL HOLE
DEPTH
6'6"

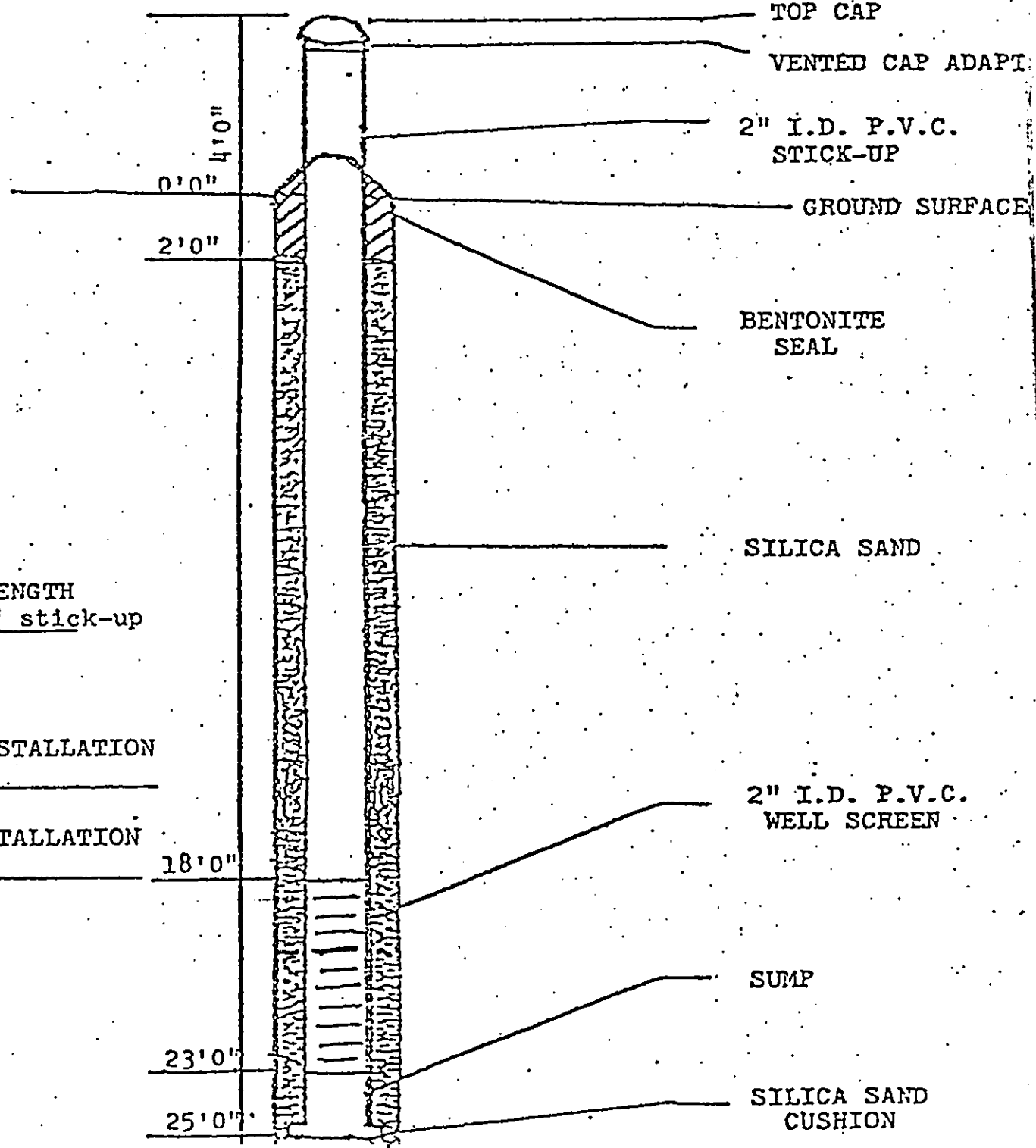
LL TIP
EVATION
23'0"

STALLED LENGTH
'0" + 4'0" stick-up

LL LEVELS

BEFORE INSTALLATION
15'4"

AFTER INSTALLATION
12'9"



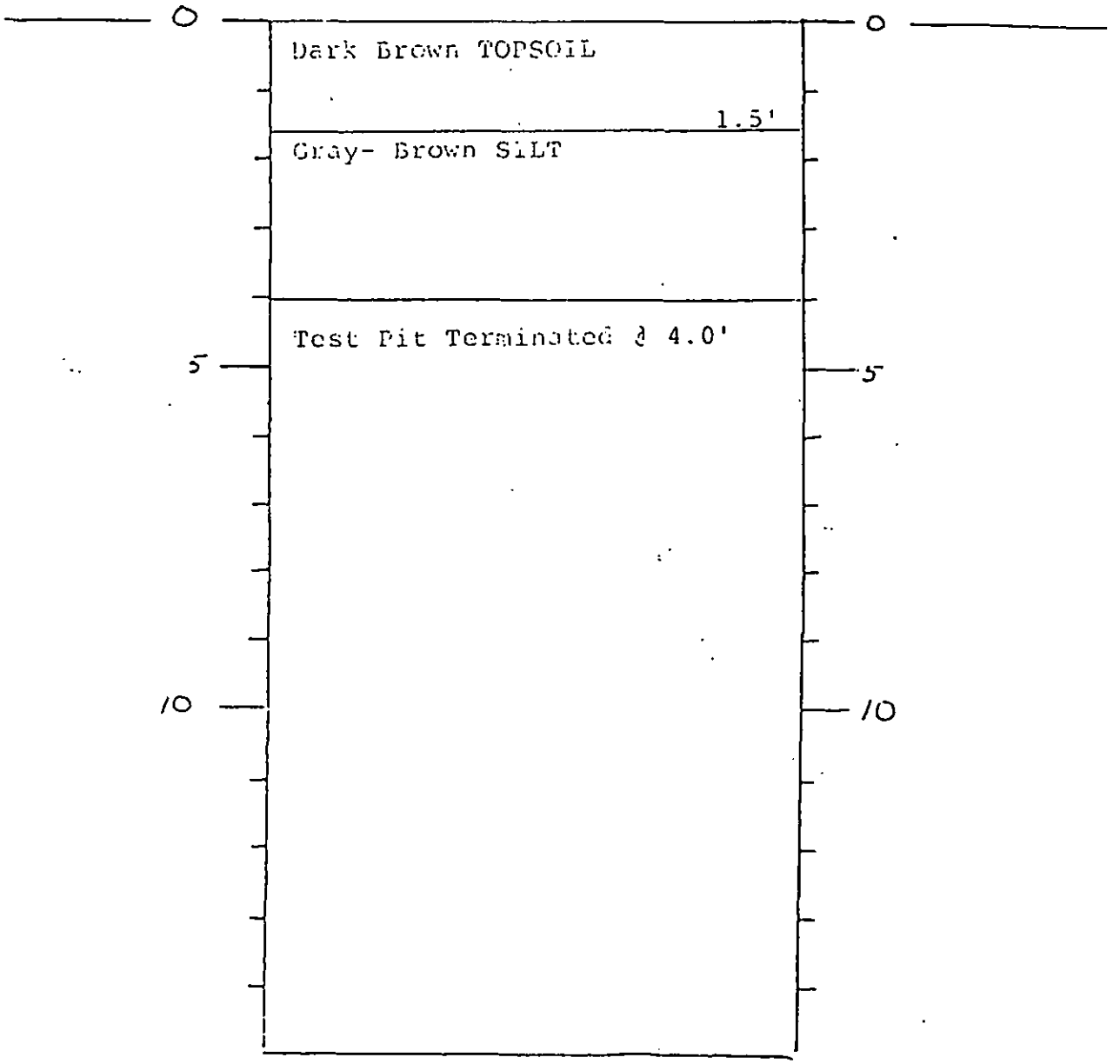
THOMSEN ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

SUBJECT Cortland County Landfill PROJECT NUMBER GTA-84-50

BY MR-L DATE 7/9/84 CHECKED BY ..... DATE ..... SHEET NUMBER ..... OF .....

TEST PIT LOG

TEST PIT TP-84-1



PROJECT NAME: Cortland Co. Landfill

LOCATION: Solon, N.Y.

LOGGED BY: MR-L

NOTES: Sample taken from 3.5' to 4.0'

Moisture Content = 11.8%

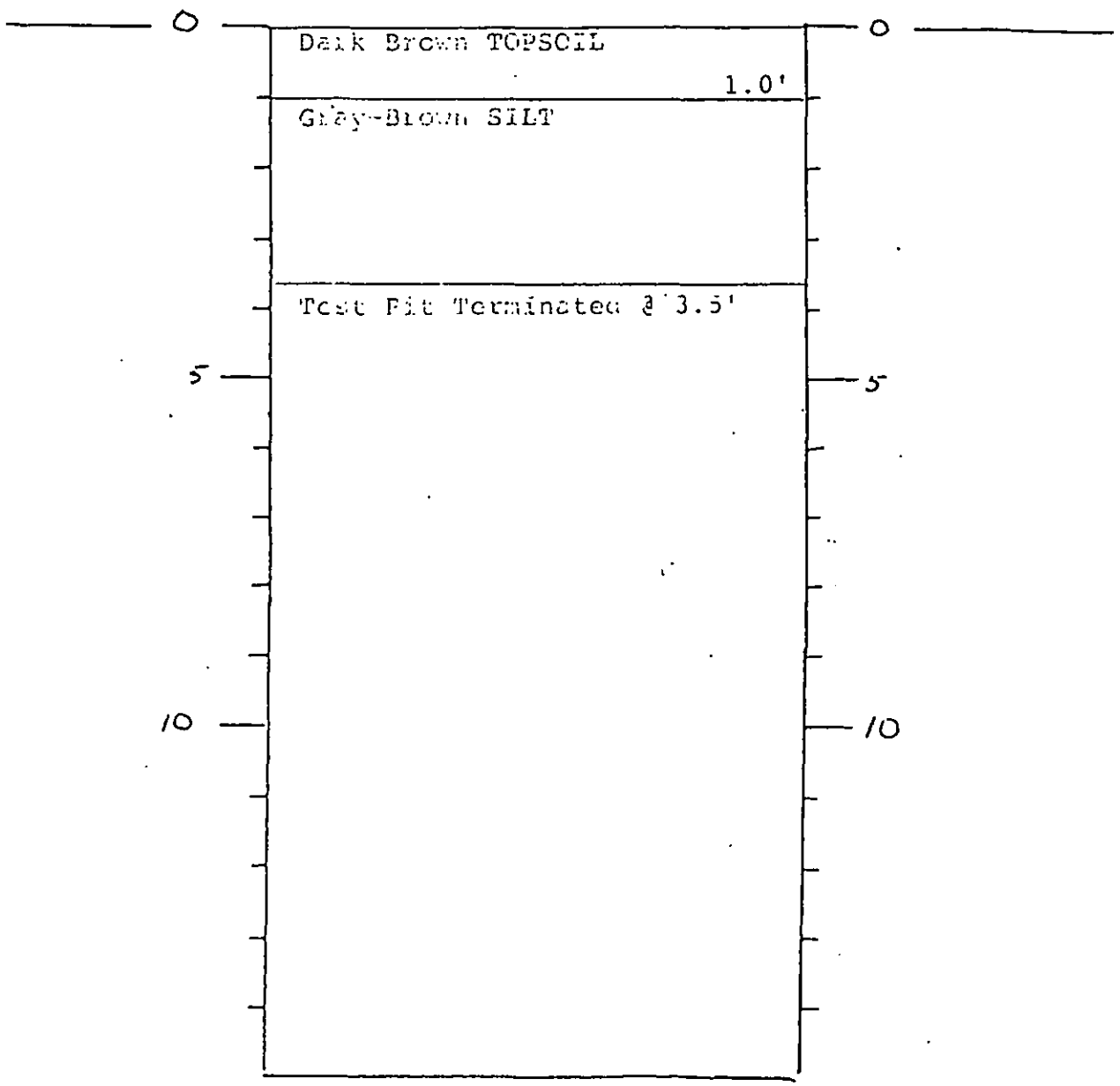
THOMSEN ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

SUBJECT Cortland County Landfill PROJECT NUMBER GTA-84-50

BY MR-L DATE 7/9/84 CHECKED BY ..... DATE ..... SHEET NUMBER ..... OF .....

TEST PIT LOG

TEST PIT TP-84-2



PROJECT NAME: Cortland Co. Landfill

LOCATION: Solon, N.Y.

LOGGED BY: MR-L

NOTES: Sample taken from 3.0' to 3.5'

Moisture Content = 12.3%

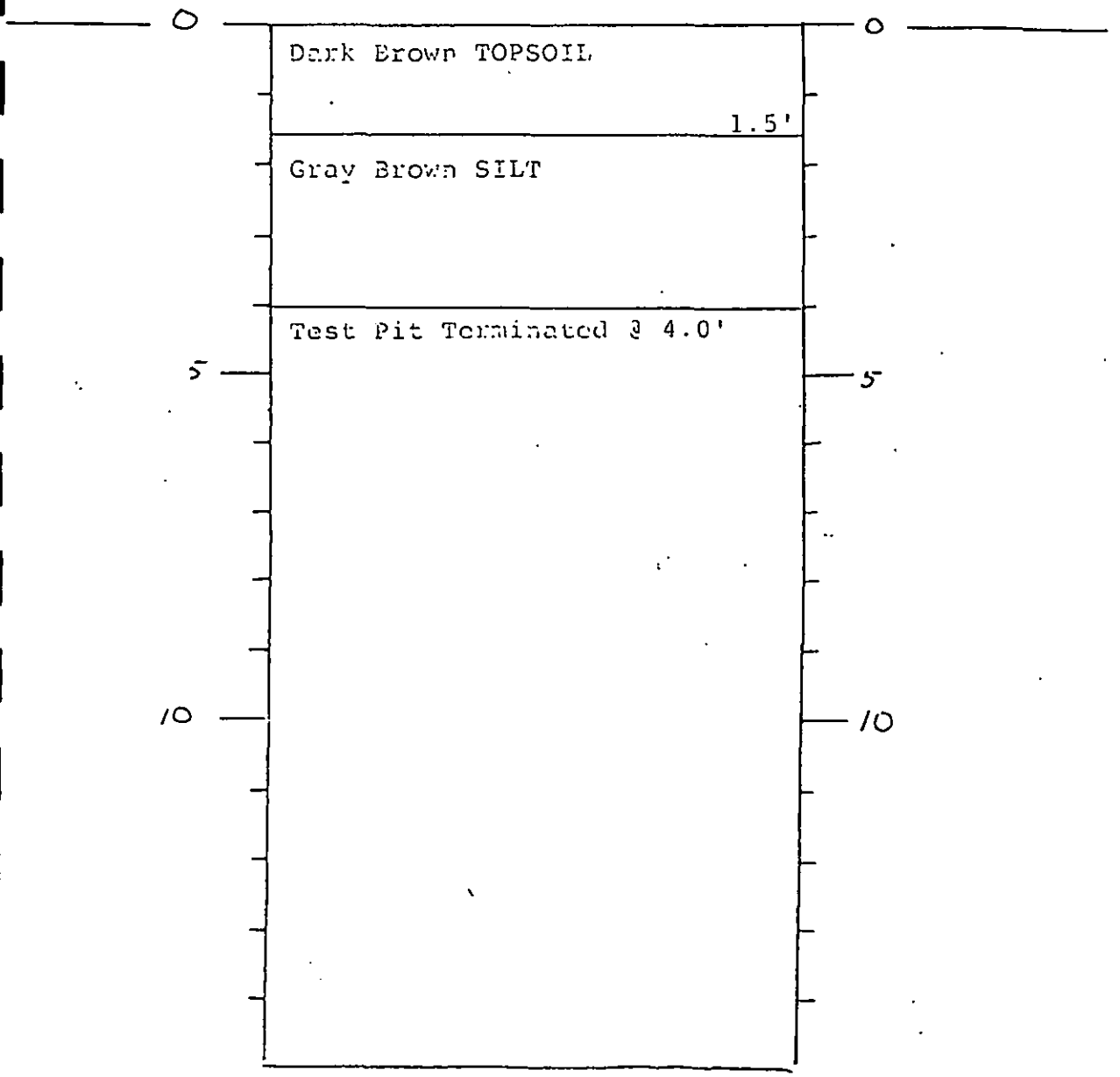
THOMSEN ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

SUBJECT Cortland County Landfill PROJECT NUMBER GTA-84-50

BY MR-L DATE 7/9/84 CHECKED BY ..... DATE ..... SHEET NUMBER ..... OF .....

TEST PIT LOG

TEST PIT TP-84-3



PROJECT NAME: Cortland Co. Landfill

LOCATION: Solon, N.Y.

LOGGED BY: MR-L

NOTES: Sample taken from 3.5' to 4.0'

Moisture Content - 12.4%

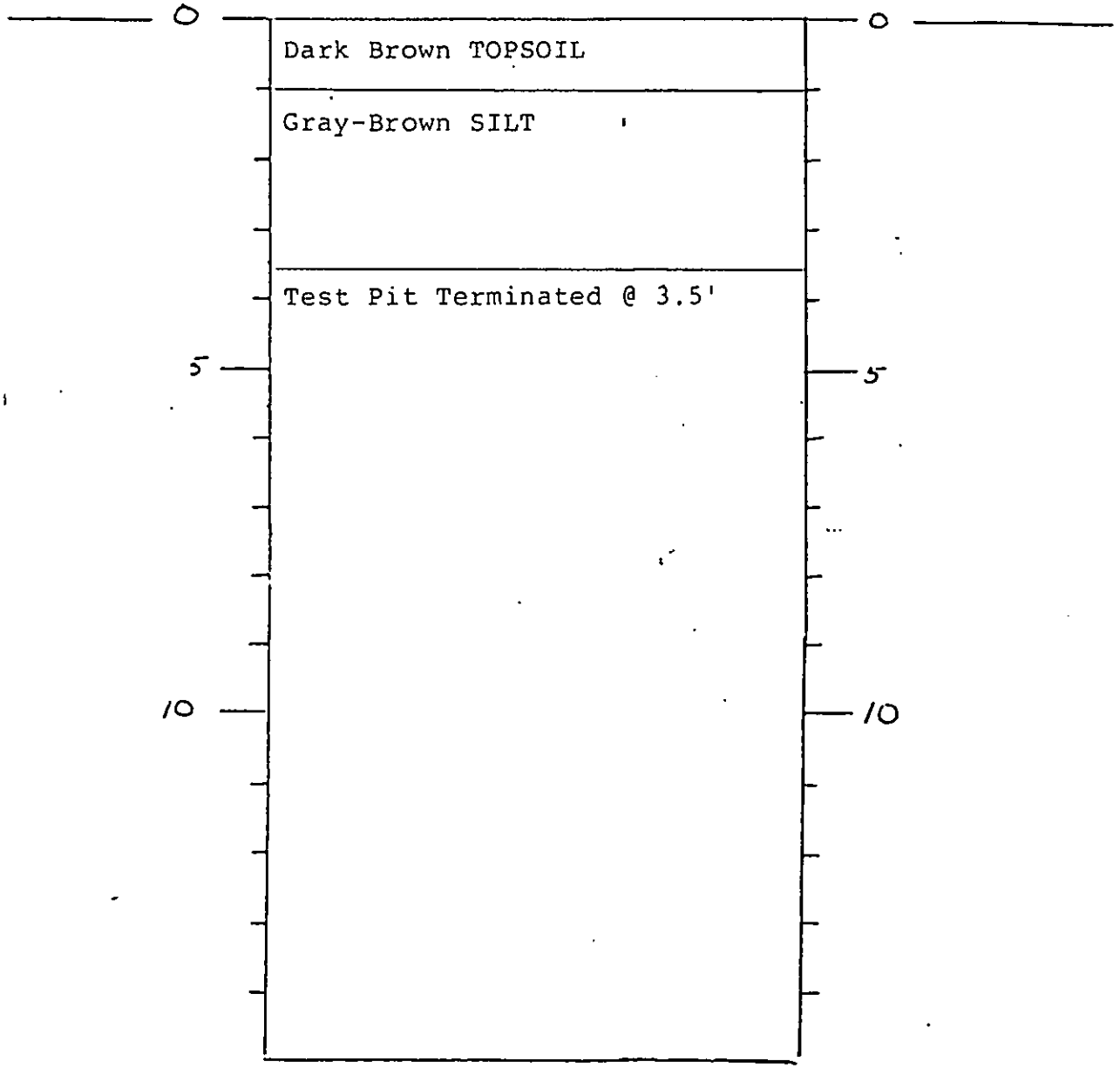
THOMSEN ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

SUBJECT Cortland County Landfill PROJECT NUMBER GTA-84-50

BY MR-L DATE 7/9/84 CHECKED BY ..... DATE ..... SHEET NUMBER ..... OF .....

TEST PIT LOG

TEST PIT TP-84-5



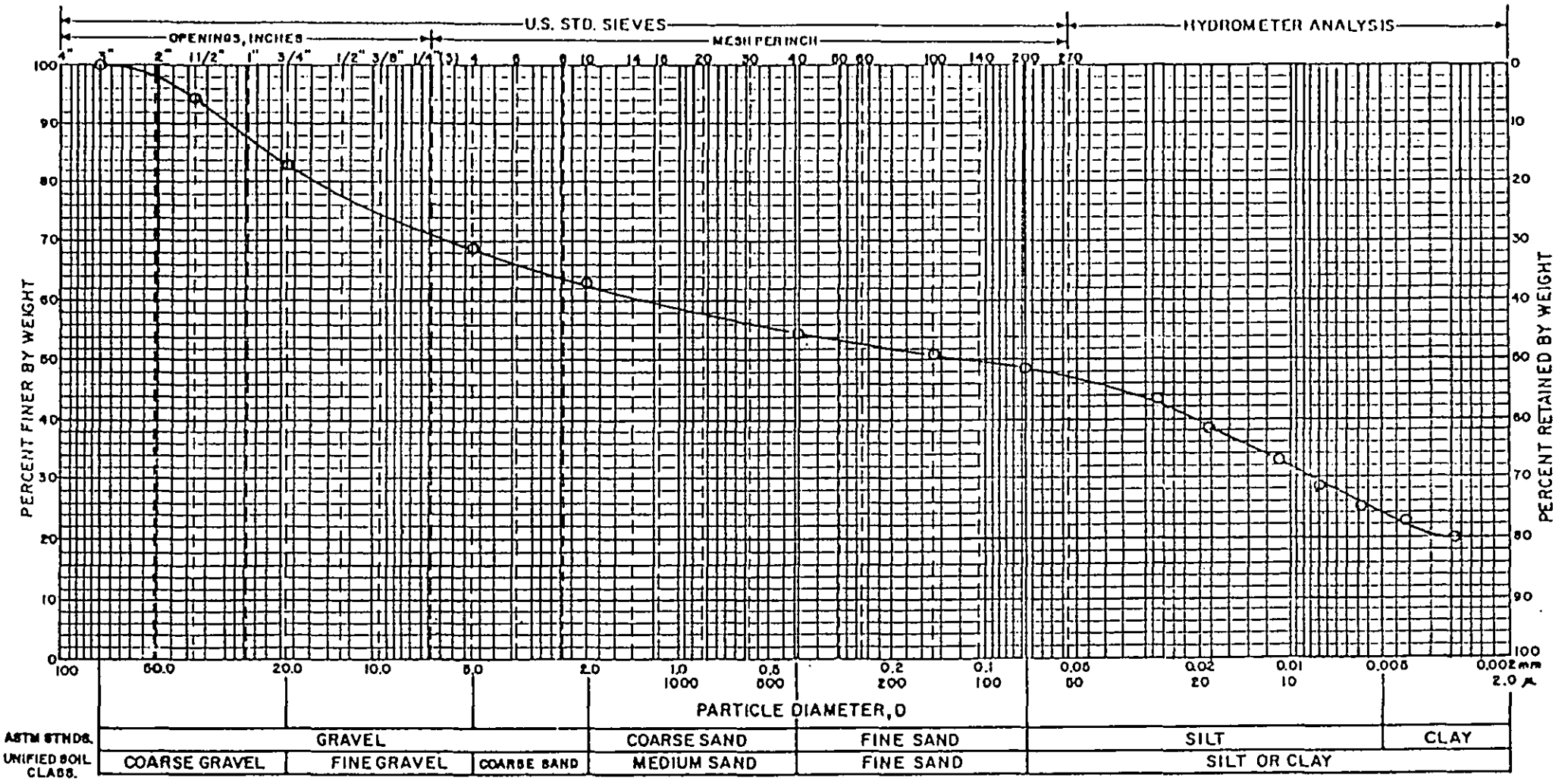
PROJECT NAME: Cortland Co. Landfill

LOCATION: Solon, New York

LOGGED BY: MR-L

NOTES: Sample taken from 3.0' to 3.5'
Moisture Content = 11.8%

GRAIN SIZE DISTRIBUTION CURVE



SAMPLE INFORMATION: Hole No.: TP-84-1

NOTE: VISUAL SOIL CLASSIFICATIONS ON E.S.I. SUBSURFACE LOGS ARE BASED ON THE UNIFIED SOIL CLASSIFICATION SYSTEM.

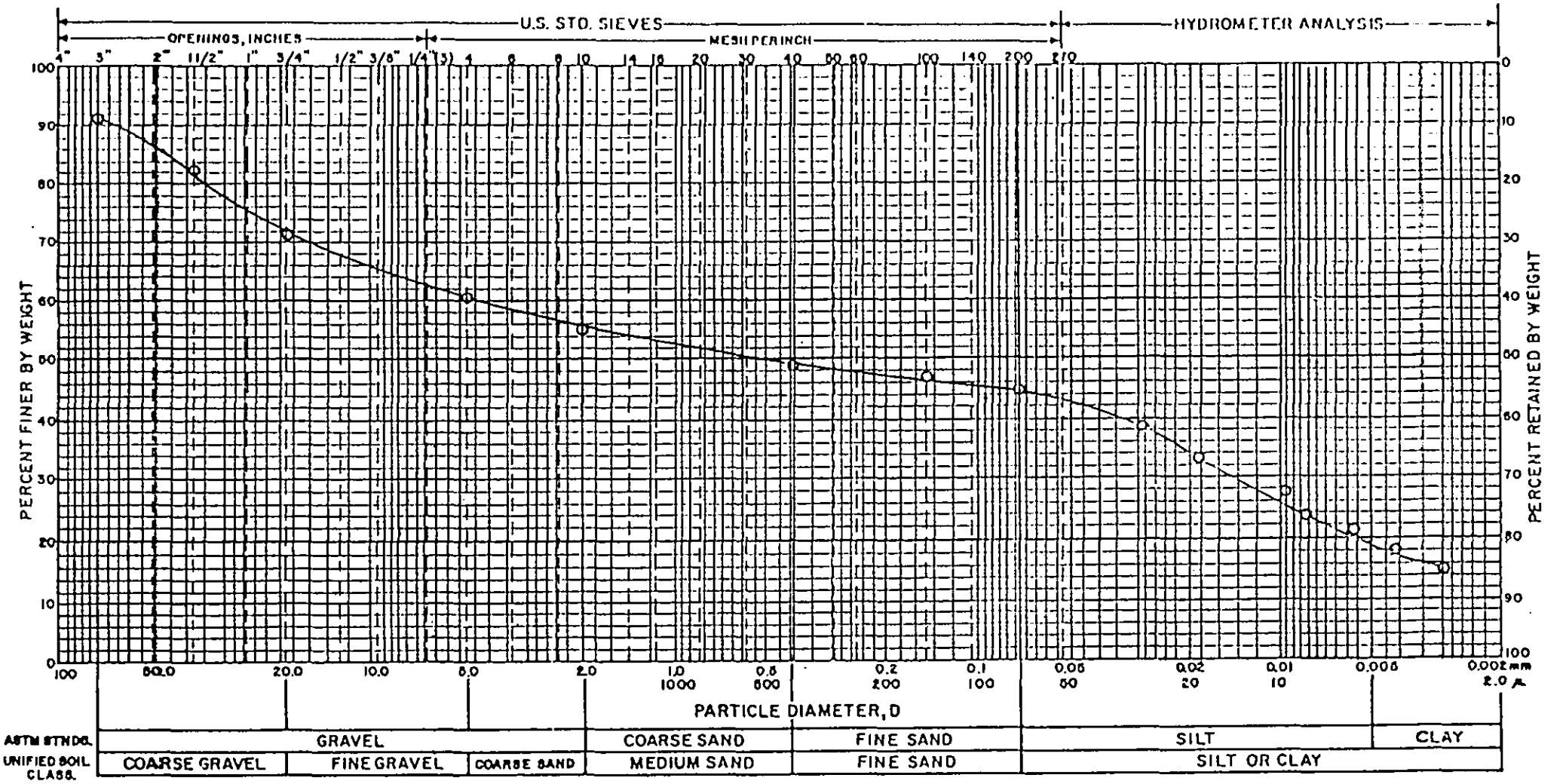
EMPIRE SOILS INVESTIGATIONS, INC.

MECHANICAL ANALYSIS

CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DR. BY:	CK'D.	DATE: 9/84	PROJ. NO. CTA-84-50

GRAIN SIZE DISTRIBUTION CURVE



SAMPLE INFORMATION:

Hole No. TP-84-2

NOTE: VISUAL SOIL CLASSIFICATIONS ON E.S.I. SUBSURFACE LOGS ARE BASED ON THE UNIFIED SOIL CLASSIFICATION SYSTEM.

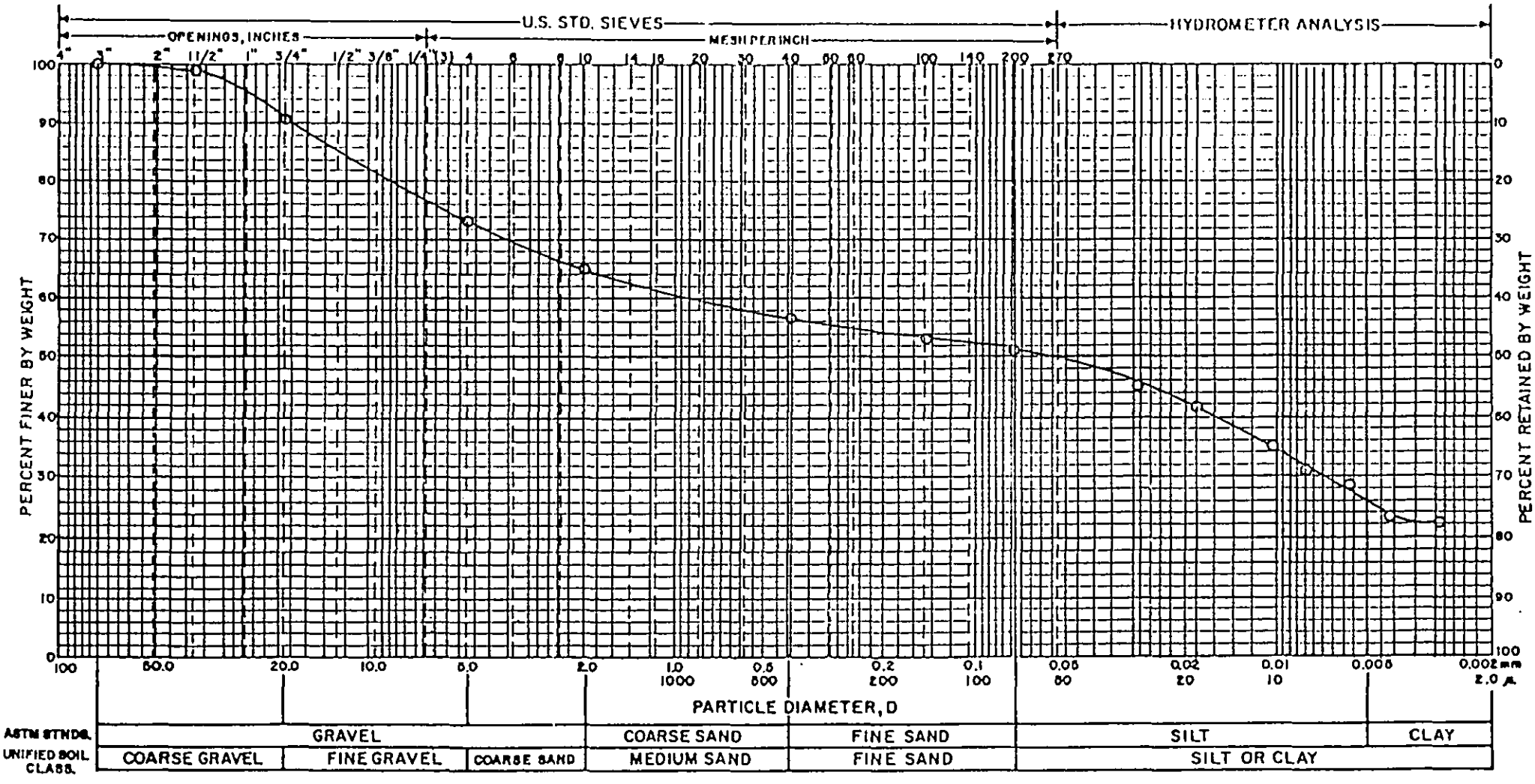
EMPIRE SOILS INVESTIGATIONS, INC.

MECHANICAL ANALYSIS

CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DR. BY:	CK'D.	DATE: 9/84	PROJ. NO. GTA-84-50

GRAIN SIZE DISTRIBUTION CURVE



SAMPLE INFORMATION: Hole No.: TP-84-3

NOTE: VISUAL SOIL CLASSIFICATIONS ON E.S.I. SUBSURFACE LOGS ARE BASED ON THE UNIFIED SOIL CLASSIFICATION SYSTEM.

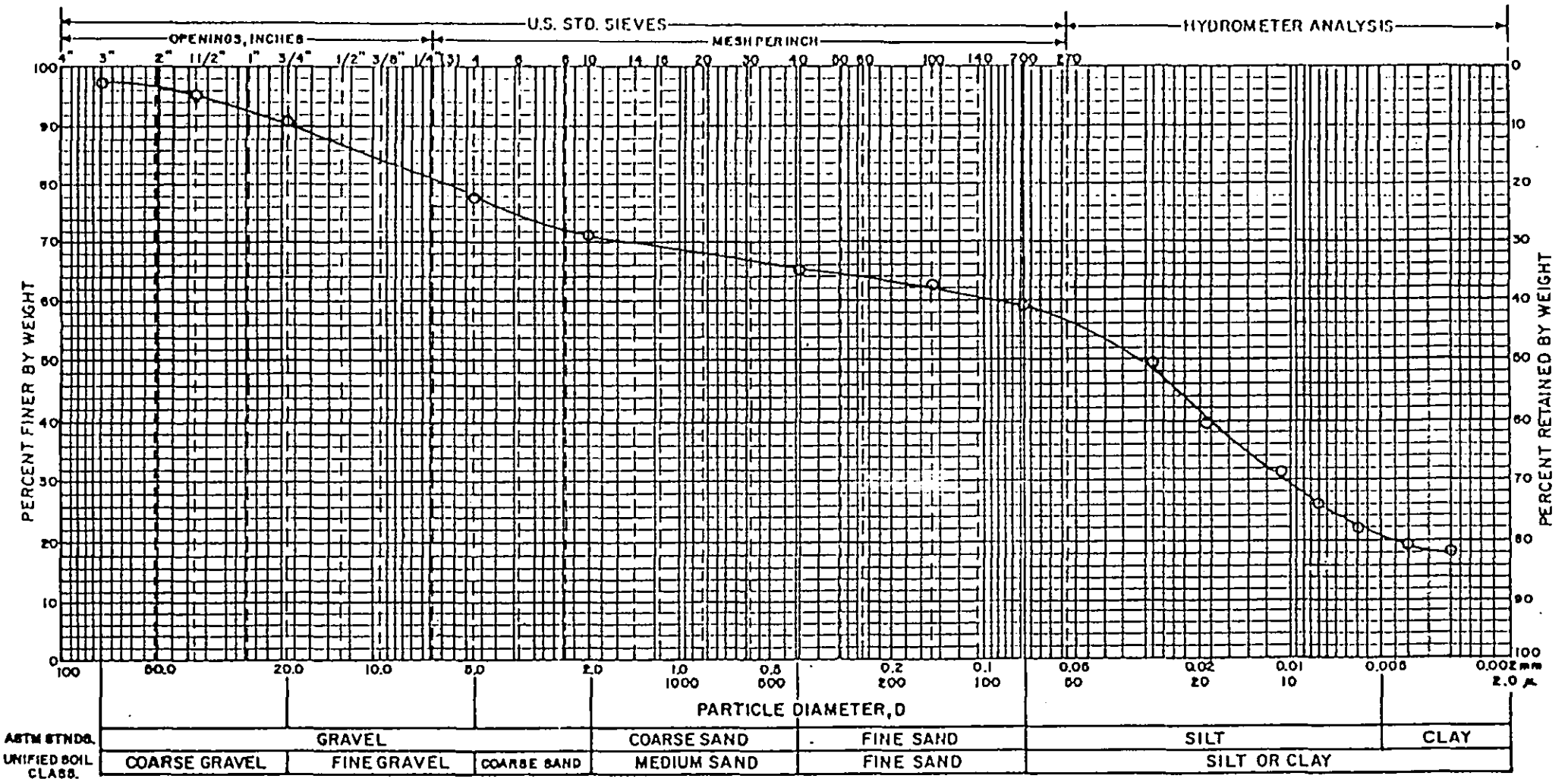
EMPIRE SOILS INVESTIGATIONS, INC.

MECHANICAL ANALYSIS

CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DR. BY:	CK'D.	DATE: 9/84	PROJ. NO. GTA-84-50

GRAIN SIZE DISTRIBUTION CURVE



SAMPLE INFORMATION: Hole No.: TP-84-4

NOTE: VISUAL SOIL CLASSIFICATIONS ON E.S.I. SUBSURFACE LOGS ARE BASED ON THE UNIFIED SOIL CLASSIFICATION SYSTEM.

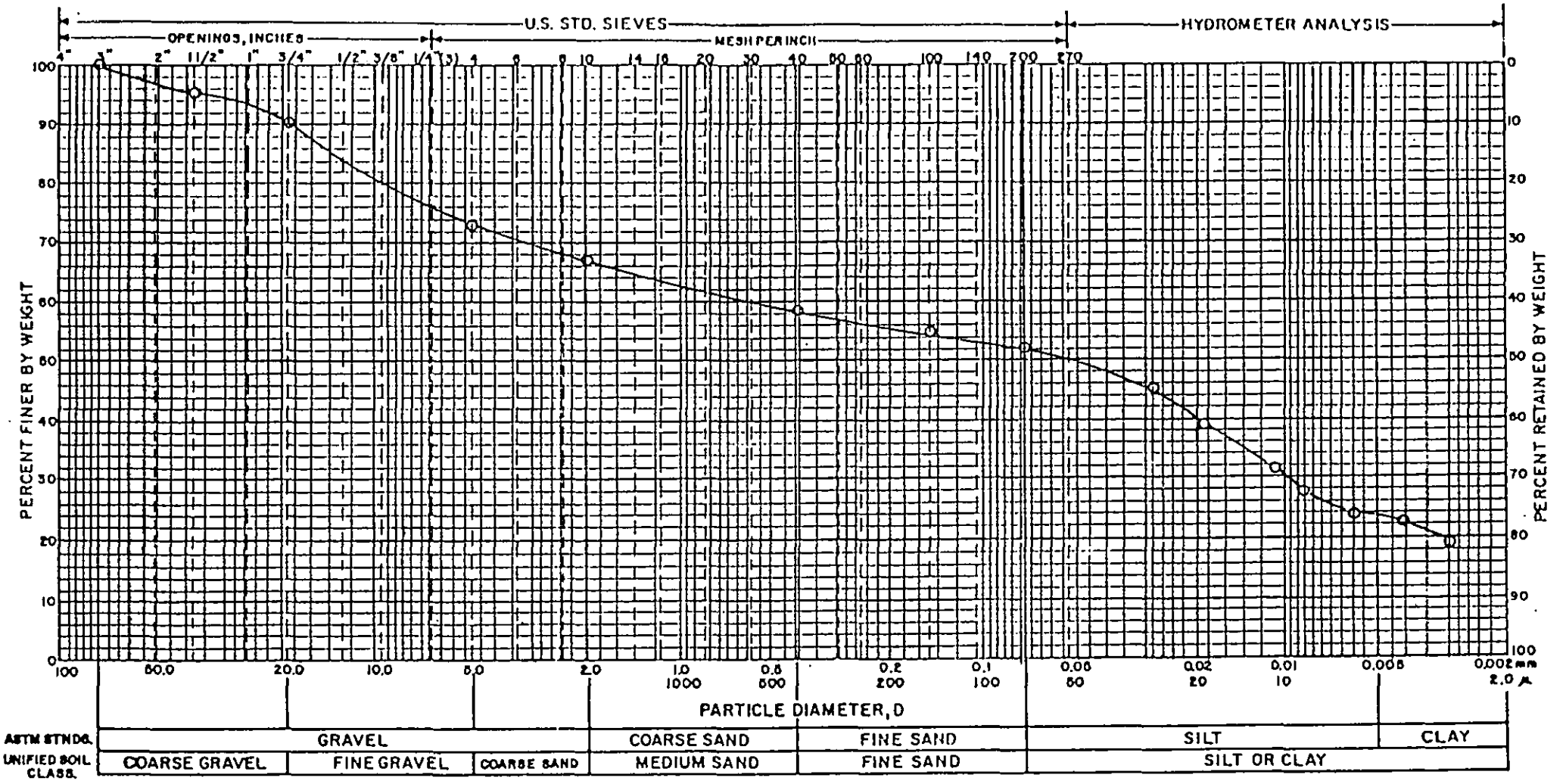
EMPIRE SOILS INVESTIGATIONS, INC.

MECHANICAL ANALYSIS

CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DR. BY:	CK'D.	DATE: 9/84	PROJ. NO. CTA-84-50

GRAIN SIZE DISTRIBUTION CURVE



SAMPLE INFORMATION: Hole No.: TP-84-5

NOTE: VISUAL SOIL CLASSIFICATIONS ON E.S.I. SUBSURFACE LOGS ARE BASED ON THE UNIFIED SOIL CLASSIFICATION SYSTEM.

EMPIRE SOILS INVESTIGATIONS, INC.

MECHANICAL ANALYSIS

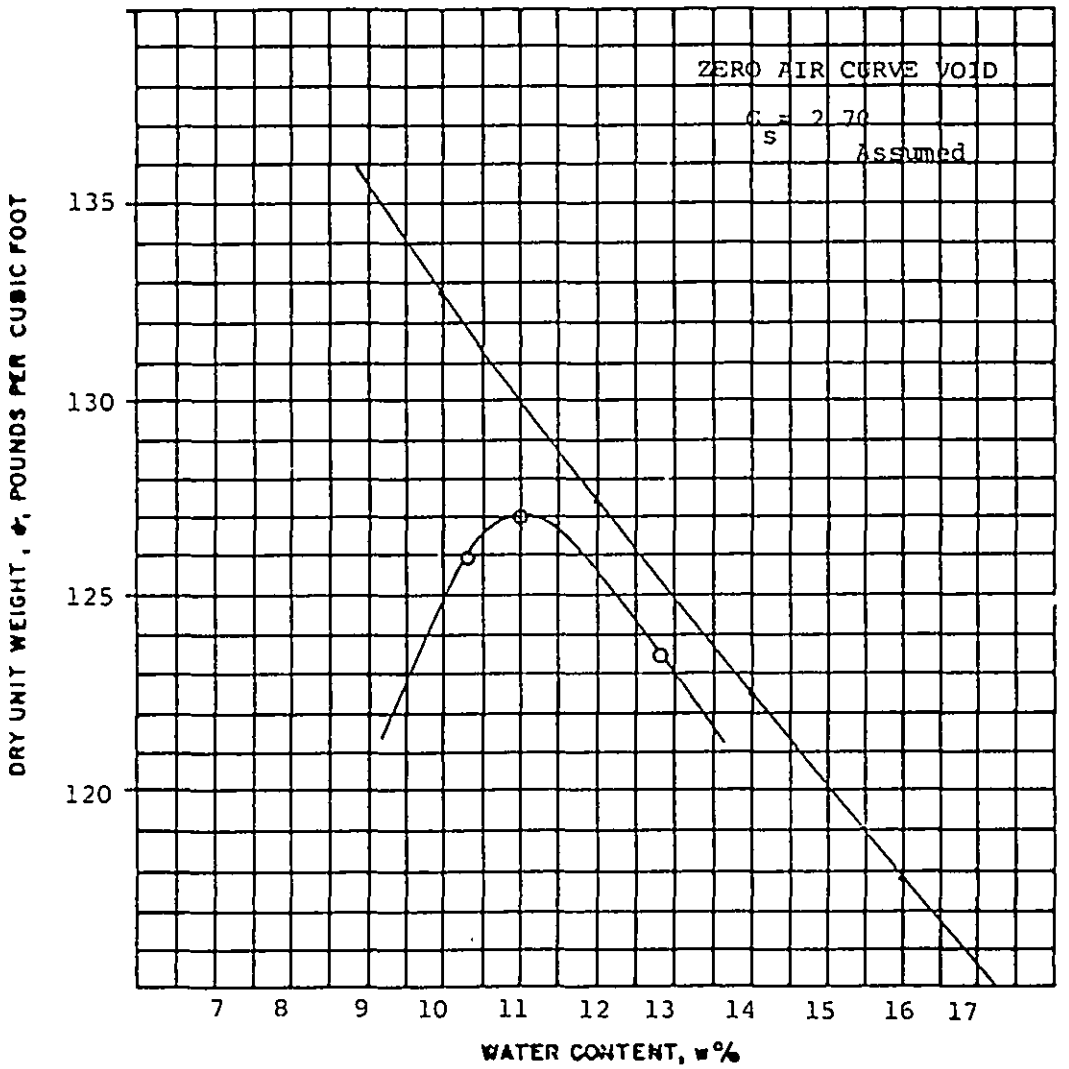
CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DR. BY:	CK'D.	DATE: 9/84	PROJ. NO.: TA-84-50

TEST METHOD	STANDARD PROCTOR TEST (AASHO T 99-70, ASTM D 698-70)				MODIFIED PROCTOR TEST (AASHO T 180-70, ASTM D 1557-70)			
MOLD DIAMETER, INCHES	4		6		4		6	
MOLD VOLUME, CUBIC FEET	0.033		0.076		0.033		0.076	
HAMMER WEIGHT, POUNDS	5.5		5.5		10		10	
HAMMER DROP, INCHES	12		12		18		18	
NUMBER OF LAYERS	3		3		5		5	
NUMBER OF BLOWS	25		56		25		56	
MAXIMUM MATERIAL SIZE	#4	3/4"	#4	3/4"	#4	3/4"	#4	3/4"
METHOD	A	C*	B	D*	A	C*	B	D*

*OVERSIZE MATERIAL MAY BE REPLACED WITH MATERIAL BETWEEN 3/4" AND THE #4 SIEVE. (NOTE 2 IN ASTM SPECIFICATIONS.)

MOISTURE-DENSITY RELATION



GRADATION OF SAMPLE	
SIEVE SIZE	% FINER BY WEIGHT
3	
3/4	
#4	
#10	
#40	
#200	

MAXIMUM DRY DENSITY 127.0 POUNDS PER CUBIC FOOT, OPTIMUM WATER CONTENT 11.0 %

SAMPLE INFORMATION: TP-84-1

METHOD OF TEST: ASTM D698-70, Method C using stone substitution

EMPIRE SOILS INVESTIGATIONS, INC.

PROCTOR COMPACTION TEST

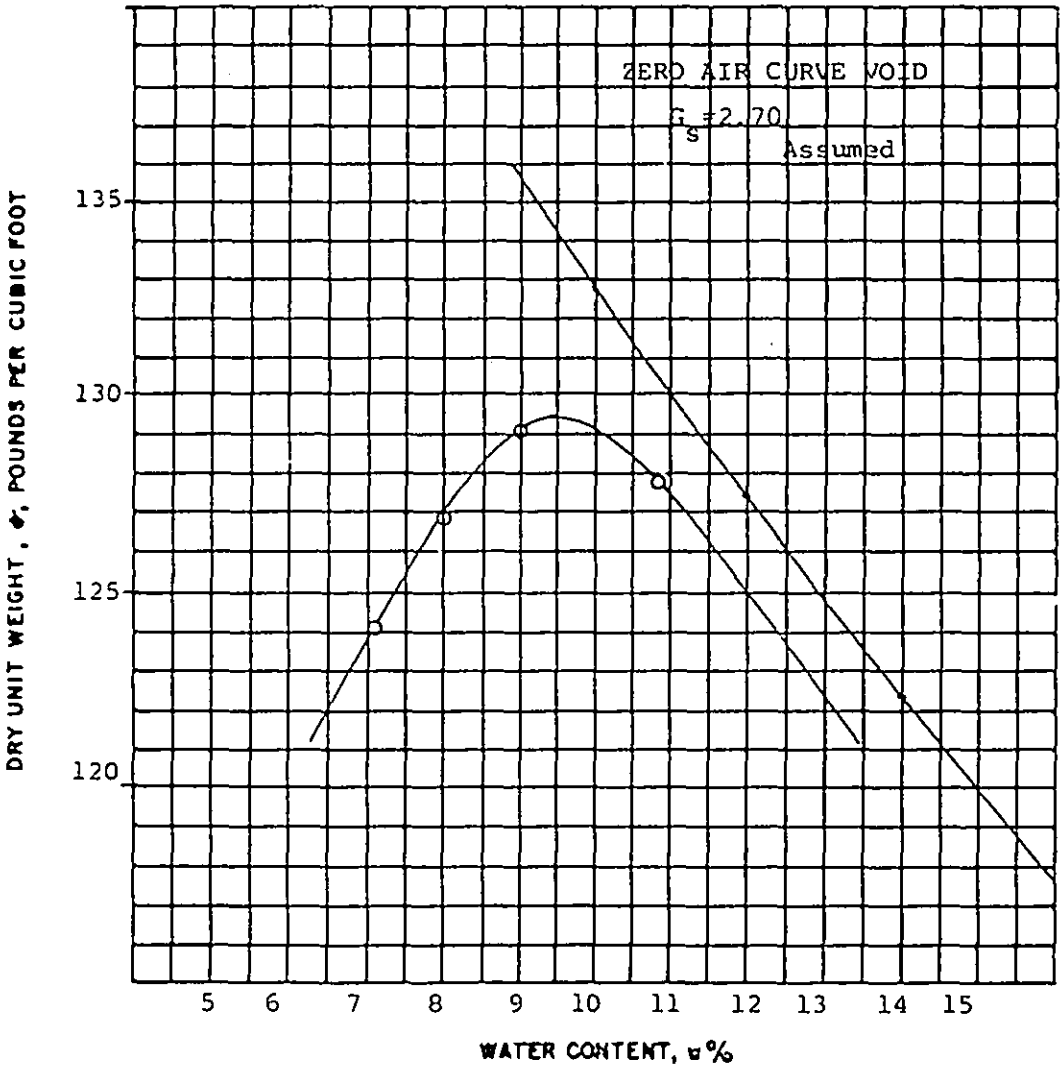
CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DR. BY:	CK'D.	DATE: 9/84	PROJ. NO. GTA-84-50

TEST METHOD	STANDARD PROCTOR TEST (AASHO T 99-70, ASTM D 698-70)				MODIFIED PROCTOR TEST (AASHO T 180-70, ASTM D 1557-70)			
MOLD DIAMETER, INCHES	4		6		4		6	
MOLD VOLUME, CUBIC FEET	0.033		0.075		0.033		0.075	
HAMMER WEIGHT, POUNDS	5.5		5.5		10		10	
HAMMER DROP, INCHES	12		12		18		18	
NUMBER OF LAYERS	3		3		5		5	
NUMBER OF BLOWS	25		56		25		56	
MAXIMUM MATERIAL SIZE	#4	3/4"	#4	3/4"	#4	3/4"	#4	3/4"
METHOD	A	C*	B	D*	A	C*	B	D*

*OVERSIZE MATERIAL MAY BE REPLACED WITH MATERIAL BETWEEN 3/4" AND THE #4 SIEVE. (NOTE 2 IN ASTM SPECIFICATIONS.)

MOISTURE-DENSITY RELATION



GRADATION OF SAMPLE	
SIEVE SIZE	% FINER BY WEIGHT
3	
3/4	
#4	
#10	
#40	
#200	

MAXIMUM DRY DENSITY 129.4 POUNDS PER CUBIC FOOT, OPTIMUM WATER CONTENT 9.4 %

SAMPLE INFORMATION: TP-84-2

METHOD OF TEST: ASTM D 698-70, Method C using stone substitution

EMPIRE SOILS INVESTIGATIONS, INC.

PROCTOR COMPACTION TEST

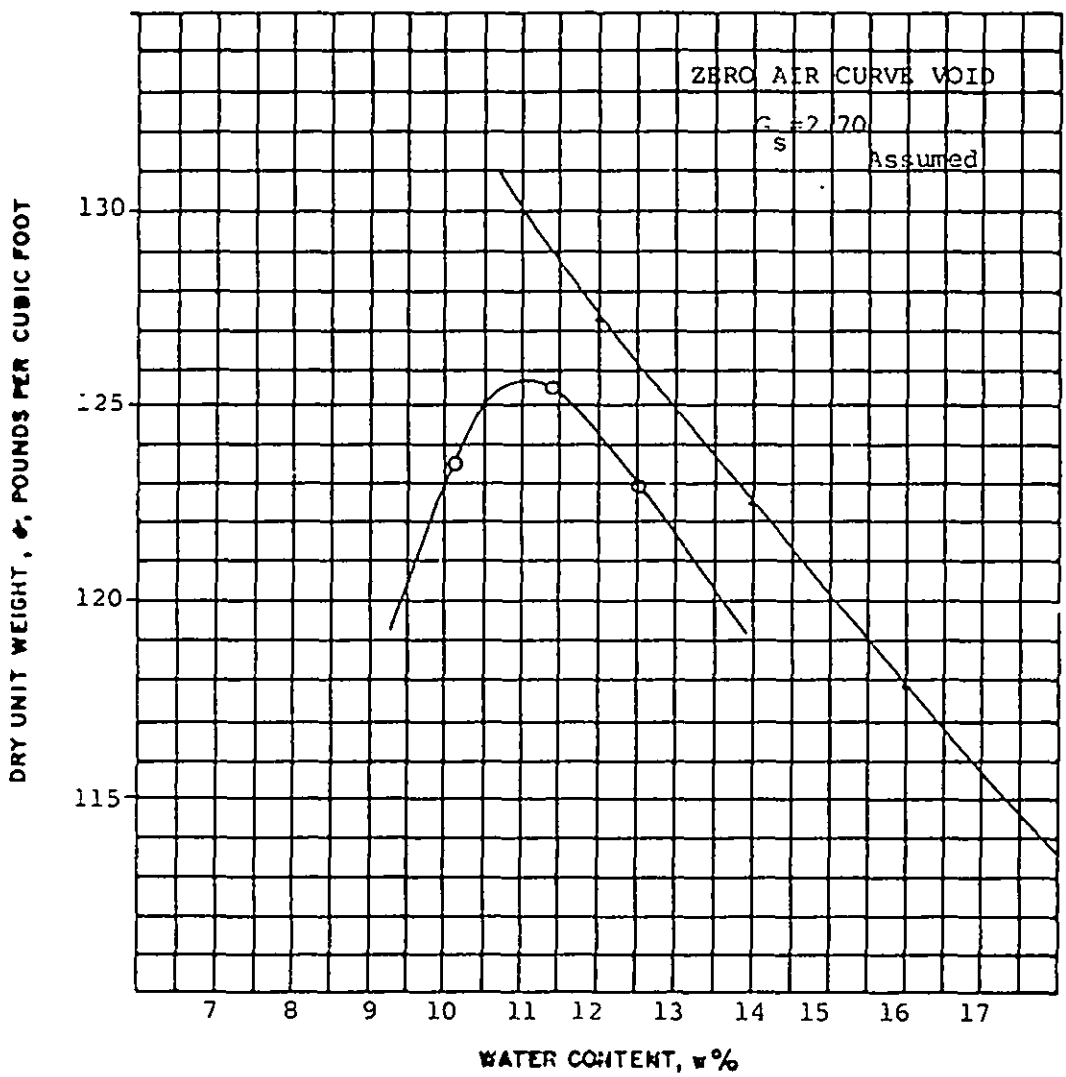
CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DR. BY:	CK'D.	DATE: 9/84	PROJ. NO. GTA-84-50

TEST METHOD	STANDARD PROCTOR TEST (AASHO T 99-70, ASTM D 698-70)				MODIFIED PROCTOR TEST (AASHO T 180-70, ASTM D 1557-70)			
MOLD DIAMETER, INCHES	4		6		4		6	
MOLD VOLUME, CUBIC FEET	0.033		0.075		0.033		0.075	
HAMMER WEIGHT, POUNDS	5.5		5.5		10		10	
HAMMER DROP, INCHES	12		12		18		18	
NUMBER OF LAYERS	3		3		5		5	
NUMBER OF BLOWS	25		56		25		56	
MAXIMUM MATERIAL SIZE	#4	3/4"	#4	3/4"	#4	3/4"	#4	3/4"
METHOD	A	C*	B	D*	A	C*	B	D*

*OVERSIZE MATERIAL MAY BE REPLACED WITH MATERIAL BETWEEN 3/4" AND THE #4 SIEVE. (NOTE 2 IN ASTM SPECIFICATIONS.)

MOISTURE-DENSITY RELATION



GRADATION OF SAMPLE	
SIEVE SIZE	% FINER BY WEIGHT
3	
3/4	
#4	
#10	
#40	
#200	

MAXIMUM DRY DENSITY 125.6 POUNDS PER CUBIC FOOT, OPTIMUM WATER CONTENT 11.1 %

SAMPLE INFORMATION: TP-84-3

METHOD OF TEST: ASTM D 698-70, Method C using stone substitution

EMPIRE SOILS INVESTIGATIONS, INC.

PROCTOR COMPACTION TEST

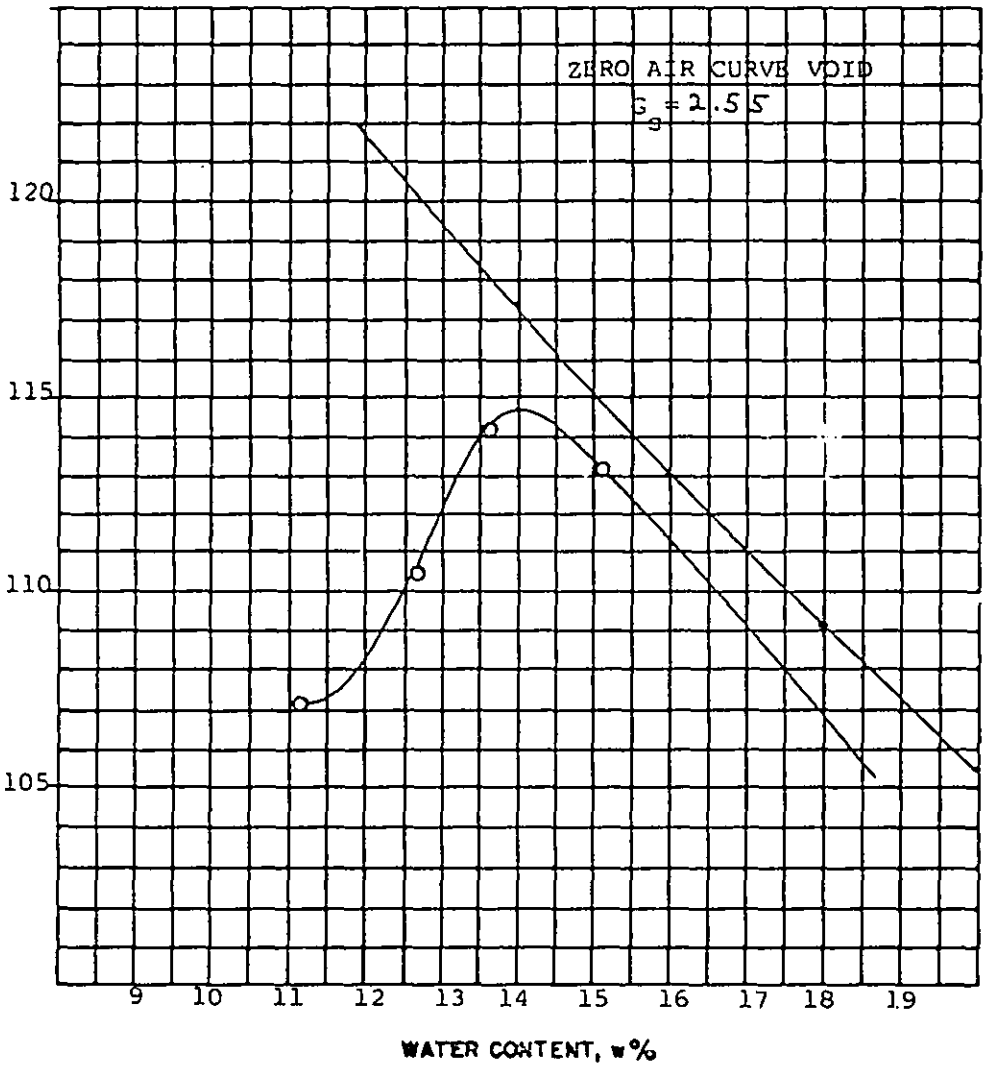
CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DR. BY:	CK'D.	DATE: 9/84	PROJ. NO. GTA-84-5

TEST METHOD	STANDARD PROCTOR TEST (AASHO T 99-70, ASTM D 698-70)				MODIFIED PROCTOR TEST (AASHO T 180-70, ASTM D 1557-70)			
MOLD DIAMETER, INCHES	4		6		4		6	
MOLD VOLUME, CUBIC FEET	0.033		0.075		0.033		0.075	
HAMMER WEIGHT, POUNDS	5.5		5.5		10		10	
HAMMER DROP, INCHES	12		12		18		18	
NUMBER OF LAYERS	3		3		5		5	
NUMBER OF BLOWS	25		56		25		56	
MAXIMUM MATERIAL SIZE	#4	3/4"	#4	3/4"	#4	3/4"	#4	3/4"
METHOD	A	C*	B	D*	A	C*	B	D*

*OVERSIZE MATERIAL MAY BE REPLACED WITH MATERIAL BETWEEN 3/4" AND THE #4 SIEVE. (NOTE 2 IN ASTM SPECIFICATIONS.)

MOISTURE-DENSITY RELATION



GRADATION OF SAMPLE	
SIEVE SIZE	% FINER BY WEIGHT
3	
3/4	
#4	
#10	
#40	
#200	

MAXIMUM DRY DENSITY 114.6 POUNDS PER CUBIC FOOT, OPTIMUM WATER CONTENT 14.0 %

SAMPLE INFORMATION: TP-84-4

METHOD OF TEST: ASTM D 698-70, Method C using stone substituion

EMPIRE SOILS INVESTIGATIONS, INC.

PROCTOR COMPACTION TEST

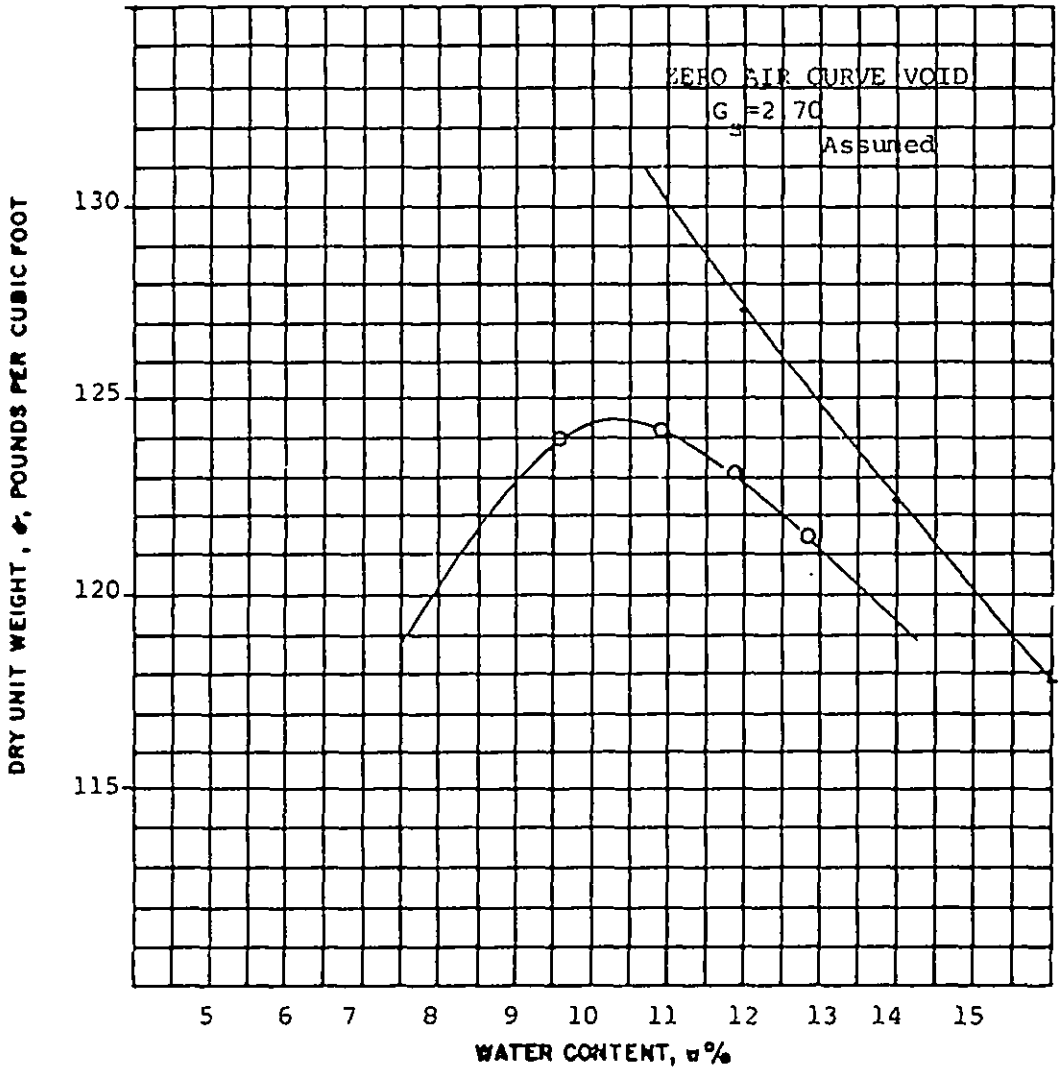
CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DR. BY:	CK'D.	DATE 9/84	PROJ. NO. GTA-84-50

TEST METHOD	STANDARD PROCTOR TEST (AASHO T 99-70, ASTM D 698-70)				MODIFIED PROCTOR TEST (AASHO T 180-70, ASTM D 1557-70)			
MOLD DIAMETER, INCHES	4		6		4		6	
MOLD VOLUME, CUBIC FEET	0.033		0.075		0.033		0.075	
HAMMER WEIGHT, POUNDS	5.5		5.5		10		10	
HAMMER DROP, INCHES	12		12		18		18	
NUMBER OF LAYERS	3		3		5		5	
NUMBER OF BLOWS	25		56		25		56	
MAXIMUM MATERIAL SIZE	#4	3/4"	#4	3/4"	#4	3/4"	#4	3/4"
METHOD	A	C*	B	D*	A	C*	B	D*

*OVERSIZE MATERIAL MAY BE REPLACED WITH MATERIAL BETWEEN 3/4" AND THE #4 SIEVE. (NOTE 2 IN ASTM SPECIFICATIONS.)

MOISTURE-DENSITY RELATION



GRADATION OF SAMPLE	
SIEVE SIZE	% FINER BY WEIGHT
3	
3/4	
#4	
#10	
#40	
#200	

MAXIMUM DRY DENSITY 124.3 POUNDS PER CUBIC FOOT, OPTIMUM WATER CONTENT 10.3 %

SAMPLE INFORMATION: TP-84-5

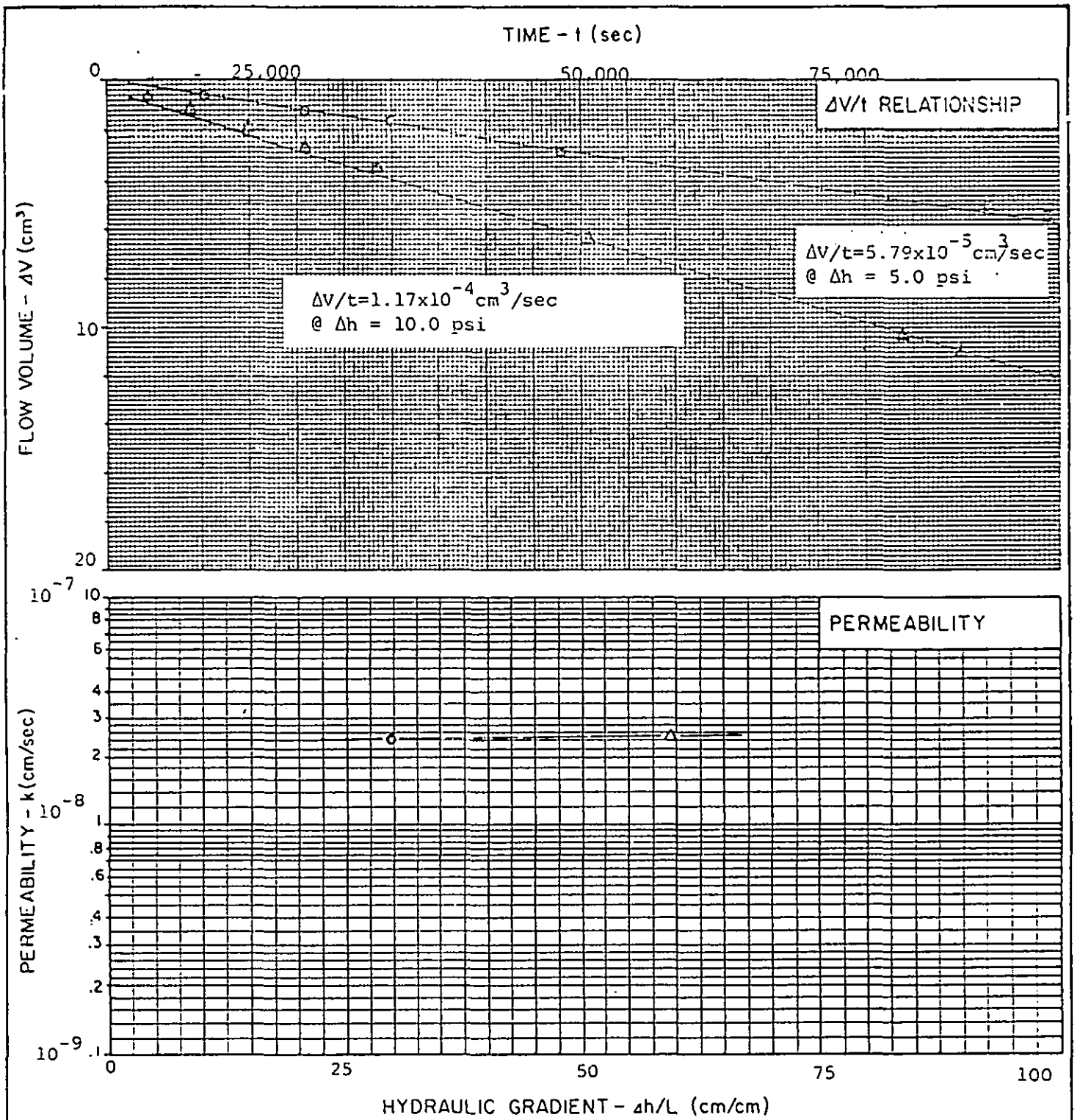
METHOD OF TEST: ASTM D 698-70, Method C using stone substitution

EMPIRE SOILS INVESTIGATIONS, INC.

PROCTOR COMPACTION TEST

CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DR. BY:	CK'D.	DATE: 9/84	PROJ. NO. GTA-84-50



TEST DATA:

TYPE OF PERMEAMETER	Constant Head, Triaxial	
SPECIMEN HEIGHT (cm)	11.79	
SPECIMEN DIAMETER (cm)	10.08	
DRY UNIT WEIGHT (pcf)	117.1	
MOISTURE CONTENT BEFORE TEST (%)	15.1	
MOISTURE CONTENT AFTER TEST (%)	13.8	
MAXIMUM DRY DENSITY (ASTM D 698) (pcf)	127.0	
OPTIMUM MOISTURE CONTENT (%)	11.0	
CELL CONFINING PRESSURE (psi)	95.0	95.0
TEST PRESSURE (psi)	85.0	90.0
BACK PRESSURE (psi)	80.0	80.0
DIFFERENTIAL HEAD (psi)	5.0	10.0
PERMEABILITY (cm/sec)	2.43×10^{-8}	2.46×10^{-8}

SAMPLE IDENTIFICATION:
Test Pit No. TP-84-1

VISUAL DESCRIPTION: Brown clayey silt, sand and gravel

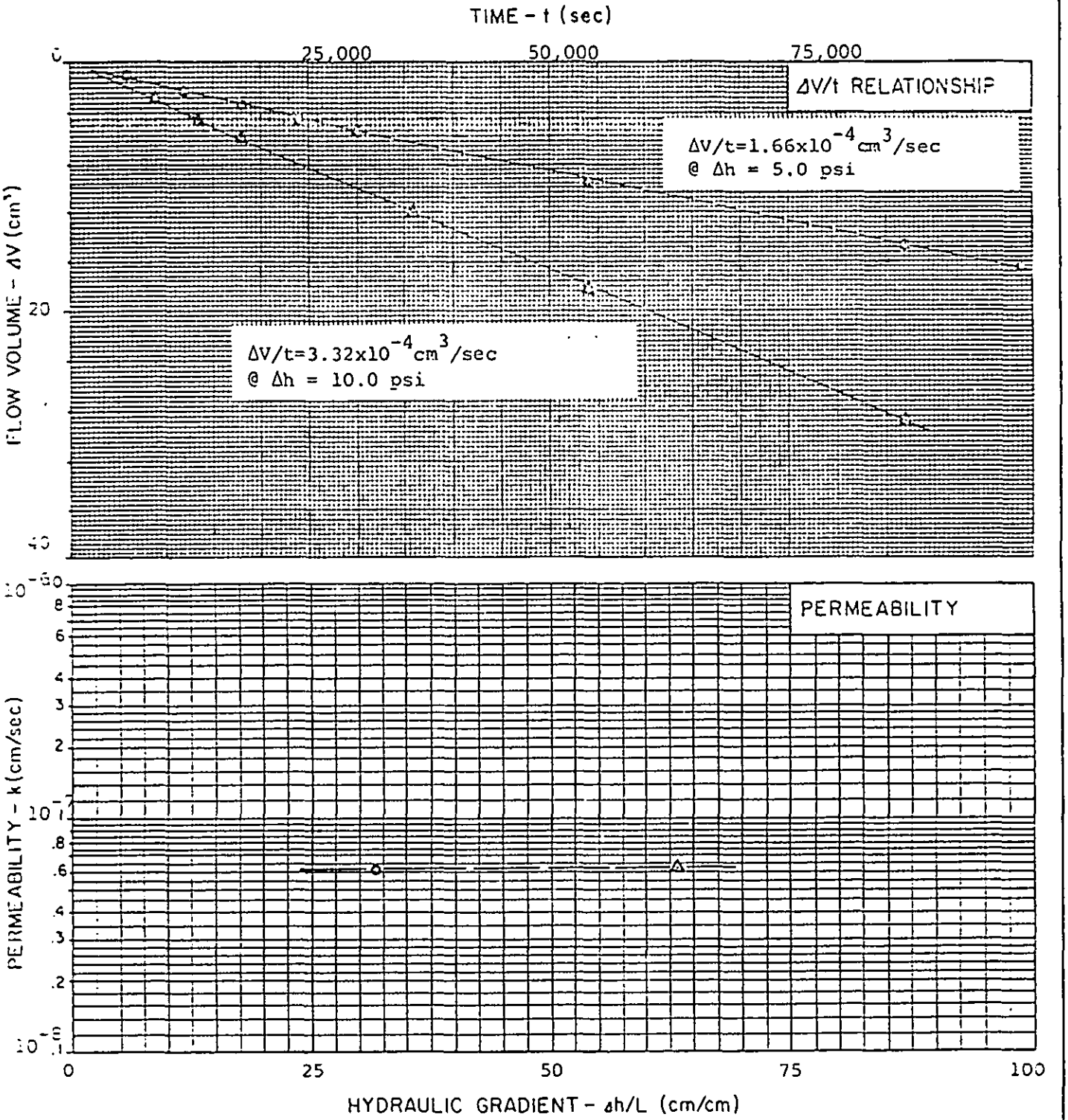
EMPIRE SOILS INVESTIGATIONS, INC.

PERMEABILITY TEST REPORT

CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DATE August, 1984

PROJ. NO. GTA-84-50



TEST DATA:

TYPE OF PERMEAMETER	Constant Head, Triaxial	
SPECIMEN HEIGHT (cm)		11.05
SPECIMEN DIAMETER (cm)		10.40
DRY UNIT WEIGHT (pcf)		118.7
MOISTURE CONTENT BEFORE TEST (%)		15.0
MOISTURE CONTENT AFTER TEST (%)		12.6
MAXIMUM DRY DENSITY (ASTM D698) (pcf)		129.4
OPTIMUM MOISTURE CONTENT (%)		9.4
CELL CONFINING PRESSURE (psi)	95.0	95.0
TEST PRESSURE (psi)	85.0	90.0
BACK PRESSURE (psi)	80.0	80.0
DIFFERENTIAL HEAD (psi)	5.0	10.0
PERMEABILITY (cm/sec)	6.13×10^{-8}	6.14×10^{-8}

SAMPLE IDENTIFICATION:
Test Pit No. TP-84-2

VISUAL DESCRIPTION: Brown SILT, SAND & GRAVEL, little clay

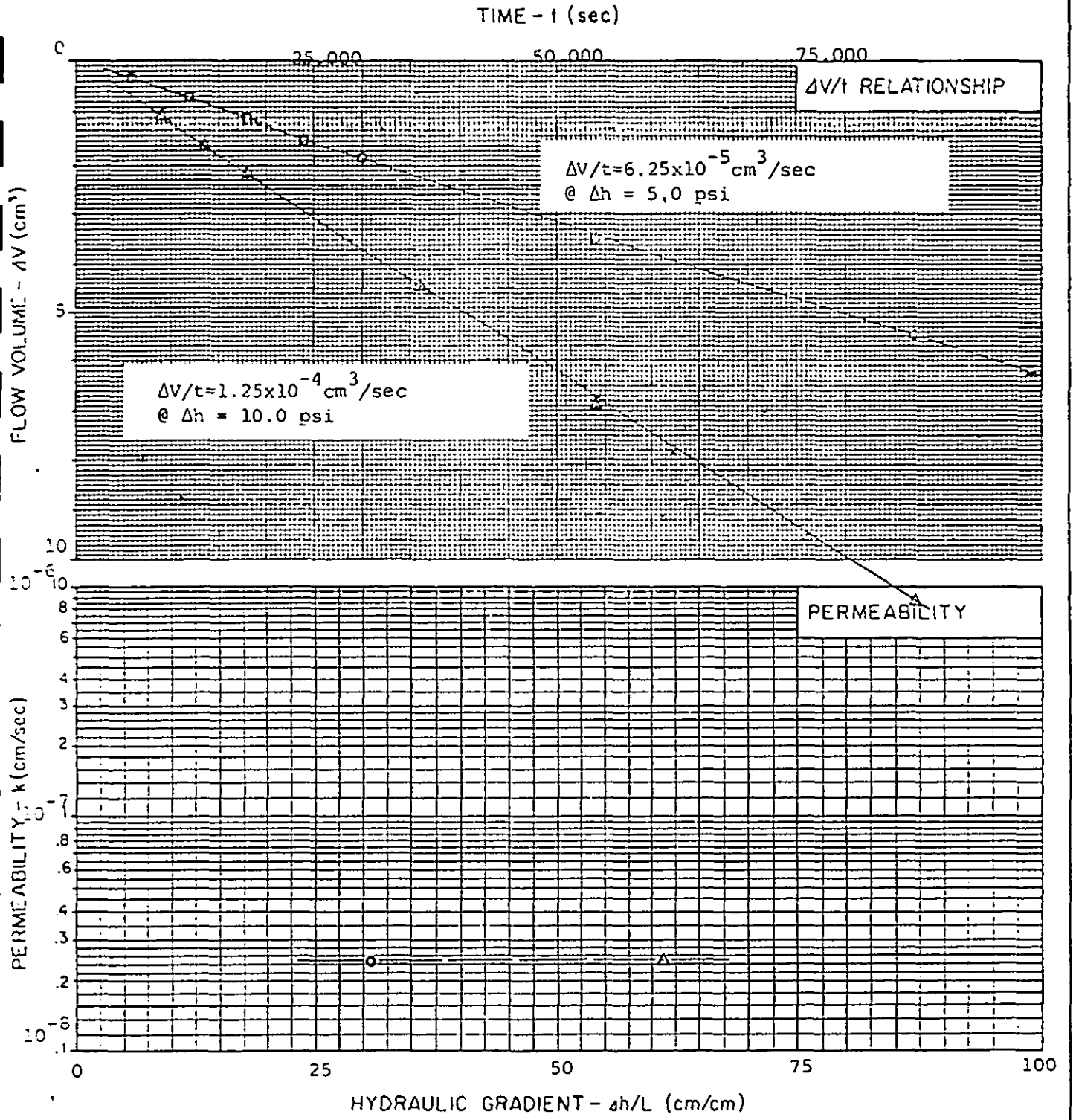
EMPIRE SOILS INVESTIGATIONS, INC.

PERMEABILITY TEST REPORT

CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DATE August, 1984

PROJ. NO.: GTA-84-50



TEST DATA:

TYPE OF PERMEAMETER	Constant Head, Triaxial	
SPECIMEN HEIGHT (cm)	11.41	
SPECIMEN DIAMETER (cm)	10.27	
DRY UNIT WEIGHT (pcf)	114.9	
MOISTURE CONTENT BEFORE TEST (%)	16.2	
MOISTURE CONTENT AFTER TEST (%)	14.5	
MAXIMUM DRY DENSITY (ASTM D 698) (pcf)	125.6	
OPTIMUM MOISTURE CONTENT (%)	11.1	
CELL CONFINING PRESSURE (psi)	95.0	95.0
TEST PRESSURE (psi)	85.0	90.0
BACK PRESSURE (psi)	80.0	80.0
DIFFERENTIAL HEAD (psi)	5.0	10.0
PERMEABILITY (cm/sec)	2.45×10^{-8}	2.45×10^{-8}

SAMPLE IDENTIFICATION:
Test Pit No. TP-84-3

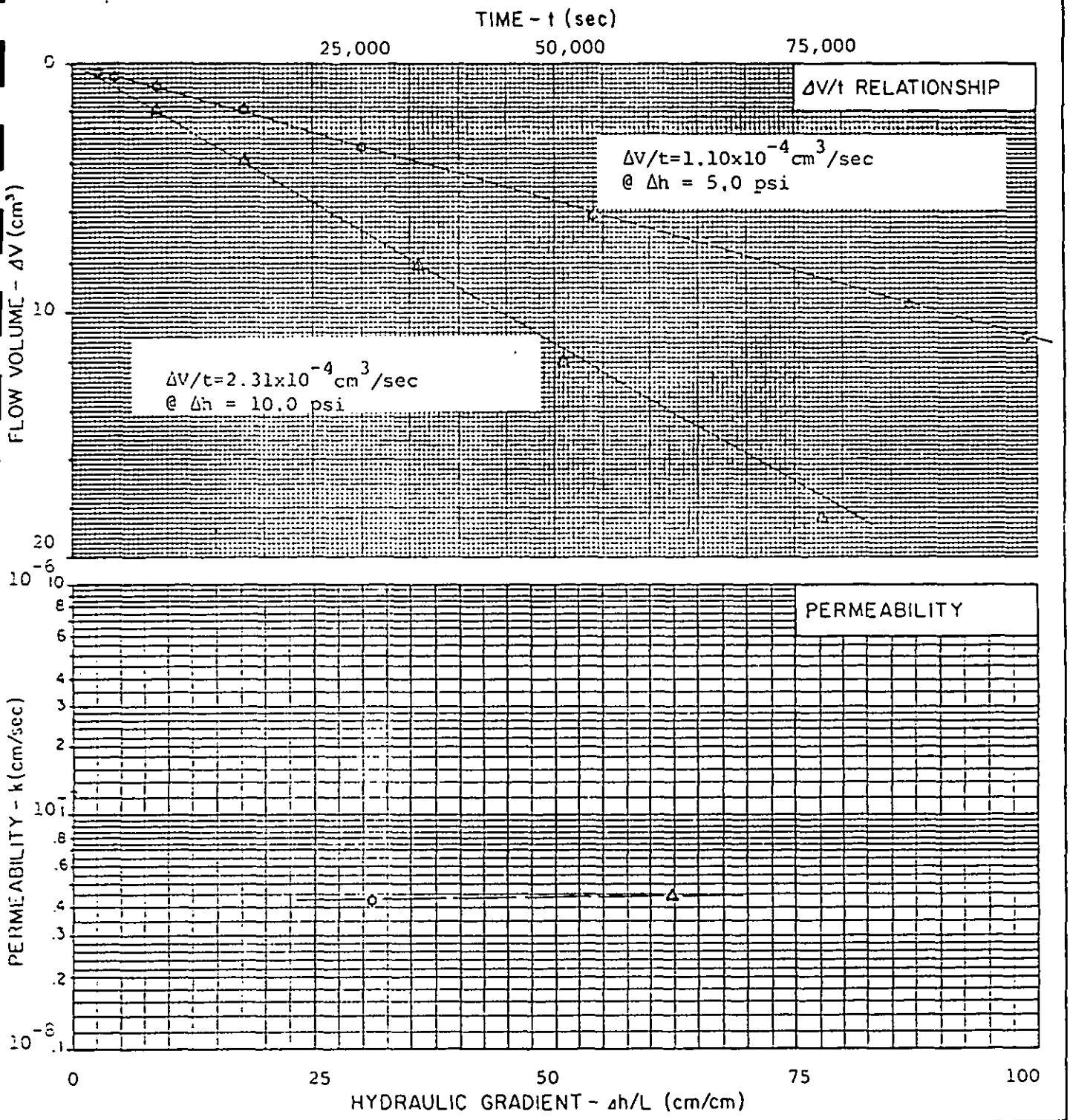
VISUAL DESCRIPTION: Brown SILT, SAND & GRAVEL, little clay

EMPIRE SOILS INVESTIGATIONS, INC.

PERMEABILITY TEST REPORT

CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DATE: August, 1984 | PROJ. NO.: GTA-84-50



TEST DATA:

TYPE OF PERMEAMETER	Constant Head, Triaxial	
SPECIMEN HEIGHT (cm)		11.29
SPECIMEN DIAMETER (cm)		10.34
DRY UNIT WEIGHT (pcf)		101.9
MOISTURE CONTENT BEFORE TEST (%)		21.9
MOISTURE CONTENT AFTER TEST (%)		18.7
MAXIMUM DRY DENSITY (ASTM D 698) (pcf)		114.6
OPTIMUM MOISTURE CONTENT (%)		14.0
CELL CONFINING PRESSURE (psi)	95.0	95.0
TEST PRESSURE (psi)	85.0	90.0
BACK PRESSURE (psi)	80.0	80.0
DIFFERENTIAL HEAD (psi)	5.0	10.0
PERMEABILITY (cm/sec)	4.22×10^{-8}	4.41×10^{-8}

SAMPLE IDENTIFICATION:
Test Pit No. TP-84-4

VISUAL DESCRIPTION: Brown SILT, SAND & GRAVEL, little clay

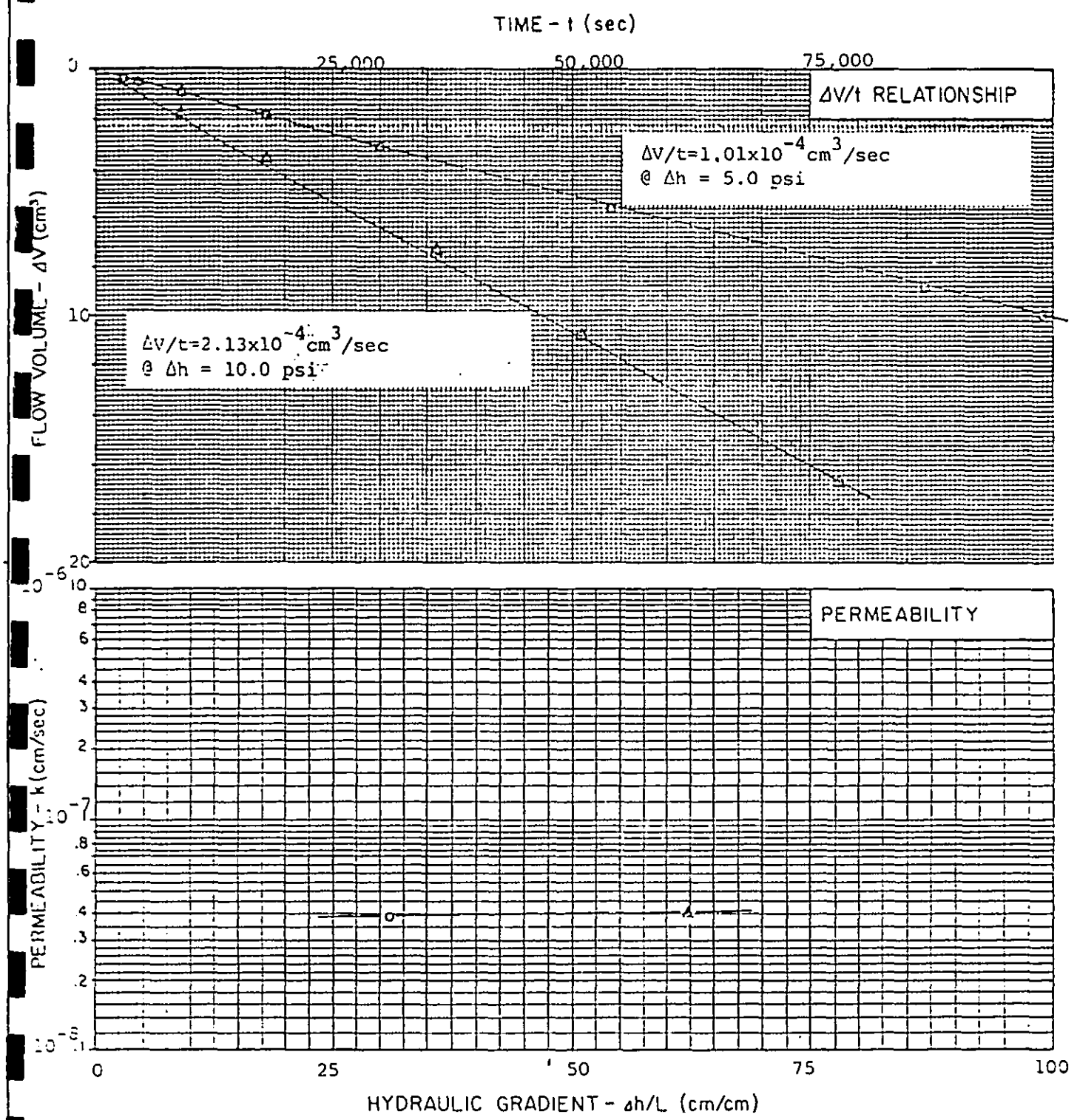
EMPIRE SOILS INVESTIGATIONS, INC.

PERMEABILITY TEST REPORT

CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DATE: August, 1984

PROJ. NO. GTA-84-50



TEST DATA:

TYPE OF PERMEAMETER	Constant Head, Triaxial	
SPECIMEN HEIGHT (cm)	11.31	
SPECIMEN DIAMETER (cm)	10.34	
DRY UNIT WEIGHT (pcf)	111.5	
MOISTURE CONTENT BEFORE TEST (%)	17.3	
MOISTURE CONTENT AFTER TEST (%)	14.9	
MAXIMUM DRY DENSITY (ASTM D 698) (pcf)	124.3	
OPTIMUM MOISTURE CONTENT (%)	10.3	
CELL CONFINING PRESSURE (psi)	95.0	95.0
TEST PRESSURE (psi)	85.0	90.0
BACK PRESSURE (psi)	80.0	80.0
DIFFERENTIAL HEAD (psi)	5.0	10.0
PERMEABILITY (cm/sec)	3.85×10^{-8}	4.07×10^{-8}

SAMPLE IDENTIFICATION:
Test Pit No. TP-84-5

VISUAL DESCRIPTION: Brown SILT, SAND & GRAVEL, little clay

EMPIRE SOILS INVESTIGATIONS, INC.

PERMEABILITY TEST REPORT

CORTLAND COUNTY LANDFILL
TOWN OF SOLON, NEW YORK

DATE August, 1984 | PROJ. NO. GTA-84-50

APPENDIX B

WATER QUALITY DATA - FRIEND LABORATORY

114 Form # 2

Approved by the Environmental Protection Agency for the:
[illegible]acteriological examination of Potable Water
Metals by Atomic Absorption
Wet Chemistry
[illegible]latile Organics
[illegible]sticides, Herbicides

Friend Laboratory, Inc.

446 BROAD STREET • WAVERLY, N.Y. 14892-1445
Phone (607) 565-2893

Chemical and Bacterial analysis of:
WATER
STREAM POLLUTION
WASTEWATER
SLUDGE
SOIL
DAIRY PRODUCTS
FOODS and MORE

Key For Report

< = Less Than
> = Greater Than
Pt. Co. U. = Platinum Cobalt Units
ppm = Parts per Million
ug/L = Micrograms per Liter
mg/L = Milligrams per liter
NTU = Nephelometric Turbidity Unit
ND = None Detected
uMHOS/cm = Micromhos per Centimeter

[illegible]ant Mgr.

Company Name / Address:
Cortland County Highway Dept.
ATTN: Mr. Ralph Pitman
P.O. Box 5590
Cortland, NY 13045

Date Received: 11/27/84

Pick up by: Randy

SAMPLE SOURCES

[illegible]nalysis Performed:	RE-8	RE-7	RE-6	RE-5	RE-4	DO-2
pH	7.8	12.0	9.2	7.8	7.8	7.8
[illegible]O.D. 5 [illegible]mg/L	25.0	8.8	6.9	30.0	8.6	10.3
[illegible]O.D. mg/L	28.0	24.0	36.0	20.0	28.0	40.0
Total Hardness mg/L	145.0	118.0	130.0	125.0	120.0	166.0
[illegible]eldahl Nitrogen mg/L	5.6	18.9	18.2	17.5	23.8	11.2
[illegible]ssolved Solids mg/L	300.0	140.0	365.0	345.0	365.0	265.0
Odor	2	6	3	2	2	2
Conductivity uMHOS/cm	370.0	540.0	5400.0	420.0	450.0	380.0
[illegible]hlorides mg/L	5.6	6.2	17.4	2.8	19.6	1.1
[illegible]monia Nitrogen as N mg/L	ND<0.1	ND<0.1	0.20	ND<0.1	ND<0.1	ND<0.1
Nitrate Nitrogen as N mg/L	0.22	2.40	11.8	0.32	0.25	0.24
[illegible]ulfate mg/L	9.0	43.0	59.0	41.0	28.0	24.0
[illegible]exachromium mg/L	ND<0.05	ND<0.05	0.25	ND<0.05	ND<0.05	ND<0.05
Detergent MBAS mg/L	ND<0.01	ND<0.01	ND<0.01	ND<0.01	ND<0.01	ND<0.01
[illegible]henols mg/L		0.13	0.14	0.10	0.13	0.13
[illegible]lkalinity as CaCO3 mg/L	153.9	1036.9	69.3	159.8	162.2	173.9
Color PtCoU	>70	10	10	>70	>70	5
Copper mg/L	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05
[illegible]n mg/L	2.40	0.79	0.52	2.11	1.07	2.61
[illegible]anganese	0.585	0.257	0.306	0.724	0.576	0.497
Zinc mg/L	ND<0.025	0.03	ND<0.025	ND<0.025	ND<0.025	ND<0.025
[illegible]senic mg/L	0.0084	0.0059	0.0069	0.005	0.0063	0.0052
[illegible]odium mg/L	18.4	240	22.3	18.8	31.4	21.1
Cadmium mg/L	ND<0.01	ND<0.01	ND<0.01	ND<0.01	ND<0.01	ND<0.01
[illegible]hromium mg/L	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05
[illegible]ad mg/L	ND<0.10	ND<0.10	ND<0.10	ND<0.10	ND<0.10	ND<0.10
Mercury mg/L	ND<0.0004	ND<0.0004	ND<0.0004	ND<0.0004	ND<0.0004	ND<0.0004
Selenium mg/L	ND<0.002	ND<0.002	ND<0.002	ND<0.002	ND<0.002	ND<0.002
[illegible]ver mg/L	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05

cc:

Date 12/11/84 pg

Approved By: Richard Friend
Manager

Comments:

[illegible]rm 1043

Approved by the Environmental Protection Agency for the:
acteriological examination of Potable Water
Metals by Atomic Absorption
Wet Chemistry
latile Organics
esticides, Herbicides

Friend Laboratory, Inc.

446 BROAD STREET ● WAVERLY, N.Y. 14892-1445
Phone (607) 565-2893

Chemical and Bacterial analysis of:
WATER
STREAM POLLUTION
WASTEWATER
SLUDGE
SOIL
DAIRY PRODUCTS
FOODS and MORE

Key For Report

< = Less Than
> = Greater Than
Pt. Co. U. = Platinum Cobalt Units
ppm = Parts per Million
ug/L = Micrograms per Liter
mg/L = Milligrams per liter
NTU = Nephelometric Turbidity Unit
ND = None Detected
uMHOS/cm = Micromhos per Centimeter

ant Mgr.

Company Name: Cortland County Highway Dept. - Cont'd.

Address

ate Received: 11/27/84

Pick up by: Randy

SAMPLE SOURCES

Analysis Performed:	D-1	D-2	D-3	D-4	D-5	D-6
pH	11.5	8.0	7.9	7.7	7.6	8.6
O.D. 5 XXmg/L	17.4	6.5	5.4	26.6	33.0	4.3
.O.D. mg/L	20.0	20.0	16.0	76.0	48.0	23.6
Total Hardness mg/L	60.0	145.0	101.0	140.0	126.0	105.0
eldahl Nitrogen mg/L	11.2	1.4	9.1	9.1	1.4	17.5
ssolved Solids mg/L	335.0	165.0	265.0	275.0	410.0	240.0
Odor	12	2	2	2	6	3
Conductivity uMHOS/cm	720.0	250.0	290.0	400.0	600.0	240.0
hlorides mg/L	0.5	ND<0.5	ND<0.5	5.0	2.2	1.7
monia Nitrogen as N mg/L	0.35	ND<0.1	ND<0.1	ND<0.1	ND<0.1	ND<0.1
Nitrate Nitrogen as N mg/L	0.61	0.56	0.19	0.25	0.27	0.19
ulfate mg/L	26.0	10.0	12.0	130.0	120.0	19.0
exachromium mg/L	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05
Detergent MBAS mg/L	ND<0.01	ND<0.01	ND<0.01	ND<0.01	ND<0.01	ND<0.01
henols mg/L	0.27	0.13	0.10	0.10	0.13	0.10
lkalinity as CaCO3 mg/L	216.2	124.6	130.4	166.9	169.2	47.0
Color PtCoU	10	<5	<5	70	70	<5
Copper mg/L	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05
on mg/L	3.40	0.13	0.28	12.8	4.42	0.51
anganese mg/L	0.306	0.347	0.377	3.04	0.587	0.268
Zinc mg/L	ND<0.025	ND<0.025	ND<0.025	ND<0.025	ND<0.025	ND<0.025
senic mg/L	0.0052	0.0042	0.0107	0.0072	0.0052	0.0048
odium mg/L	77.1	21.3	23.4	14.6	53.8	17.6
Cadmium mg/L	ND<0.01	ND<0.01	ND<0.01	ND<0.01	ND<0.01	ND<0.01
hromium mg/L	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05
ad mg/L	ND<0.10	ND<0.10	ND<0.10	ND<0.10	ND<0.10	ND<0.10
ercury mg/L	ND<0.0004	ND<0.0004	ND<0.0004	ND<0.0004	ND<0.0004	ND<0.0004
Selenium mg/L	ND<0.002	ND<0.002	ND<0.002	ND<0.002	ND<0.002	ND<0.002
lver mg/L	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05

cc:

Date 12/11/84 pq

Approved By: Richard Friend
Manager

Comments:

rm 1043

Approved by the Environmental Protection Agency for the:
acteriological examination of Potable Water
Metals by Atomic Absorption
Wet Chemistry
olatile Organics
esticides, Herbicides

Friend Laboratory, Inc.

446 BROAD STREET • WAVERLY, N.Y. 14892-1445
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Chemical and Bacterial analysis of:
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STREAM POLLUTION
WASTEWATER
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NTU = Nephelometric Turbidity Unit
ND = None Detected
uMHOS/cm = Micromhos per Centimeter

lant Mgr.

Company Name: Cortland County Highway Dept. - Cont'd.

Address

Date Received: 11/27/84

Pick up by: Randy

SAMPLE SOURCES

Analysis Performed:		B-1	B-2	B-3		
pH		7.3	7.6	7.5		
.O.D. 5 ~~2~~ mg/L		20.0	14.0	16.0		
.O.D. mg/L		ND<3.0	31.5	9.9		
Total Hardness mg/L		143.0	120.0	125.0		
jeldahl Nitrogen mg/L		12.6	10.5	4.9		
issolved Solids mg/L		300.0	275.0	230.0		
Odor		3	3	3		
Conductivity	uMHOS/cm	340.0	400.0	240.0		
Chlorides	mg/L	6.7	8.4	1.1		
mmonia Nitrogen as N	mg/L	ND<0.1	ND<0.1	ND<0.1		
Nitrate Nitrogen as N	mg/L	0.48	0.80	0.27		
Sulfate	mg/L	55.0	85.0	142.5		
Hexachromium	mg/L	ND<0.05	ND<0.05	ND<0.05		
Detergent MBAS	mg/L	ND<0.01	ND<0.01	ND<0.01		
Phenols	mg/L	0.10	0.10	0.10		
Alkalinity as CaCO3	mg/L	126.9	119.9	128.1		
Color	PtCoU	70	70	70		
Copper mg/L		ND<0.05	ND<0.05	ND<0.05		
on mg/L		1.89	2.83	17.6		
Manganese		0.316	0.454	3.32		
Zinc mg/L		0.07	0.07	0.07		
rsenic mg/L		0.0047	0.0059	0.0052		
Sodium		22.5	45.7	13.3		
Cadmium mg/L		ND<0.01	ND<0.01	ND<0.01		
Chromium mg/L		ND<0.05	ND<0.05	ND<0.05		
ead mg/L		ND<0.10	ND<0.10	ND<0.10		
Mercury mg/L		ND<0.0004	ND<0.0004	ND<0.0004		
Selenium mg/L		ND<0.002	ND<0.002	ND<0.002		
ilver mg/L		ND<0.05	ND<0.05	ND<0.05		

CC:

Date 12/11/84 pg

Approved By: Richard Friend
Manager

Comments:

Form 1043

Approved by the Environmental Protection Agency for the:
[illegible]cteriological examination
[illegible]of Potable Water
Metals by Atomic Absorption
Wet Chemistry
[illegible]latile Organics
[illegible]sticides, Herbicides

Friend Laboratory, Inc.

446 BROAD STREET ● WAVERLY, N.Y. 14892-1445
Phone (607) 565-2893

Chemical and Bacterial analysis of:
WATER
STREAM POLLUTION
WASTEWATER
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DAIRY PRODUCTS
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uMHOS/cm = Micromhos per Centimeter

[illegible]ant Mgr.

Company Name: Cortland County Highway Dept. - Cont'd.

[illegible]ddress

[illegible]ate Received: 11/27/84

Pick up by: Randy

[illegible]nalysis Performed:

SAMPLE SOURCES

	RE-8	RE-7	RE-6	RE-5	RE-4	DO-2
pH						
[illegible]O.D. 5 28 mg/L						
[illegible]O.D. mg/L						
Total Hardness mg/L						
[illegible]eldahl Nitrogen mg/L						
[illegible]ssolved Solids mg/L						
Suspended Solids mg/L						
Total Solids mg/L						
[illegible]latile Solids mg/L						
[illegible]Phenols ppb	ND<5.0					
[illegible]T.O.C. mg/L	5.0	7.3	4.9	3.6	1.7	0.3
Aluminum mg/L	0.8	1.6	ND<0.5	0.6	ND<0.5	0.5
Calcium mg/L	116.0	42.0	21.0	45.0	58.0	48.0
[illegible]on mg/L						
[illegible]ckel mg/L						
Zinc mg/L						
[illegible]senic mg/L						
[illegible]rium mg/L						
Cadmium mg/L						
[illegible]hromium mg/L						
[illegible]ad mg/L						
Mercury mg/L						
Selenium mg/L						
[illegible]ver mg/L						

[illegible]C:

Date 12/11/84 pg

Approved By: Richard Friend
Manager

Comments:

[illegible]rm 1043

Approved by the Environmental Protection Agency for the:
acteriological examination of Potable Water
Metals by Atomic Absorption
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Chemical and Bacterial analysis of:
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uMHOS/cm = Micromhos per Centimeter

lant Mgr.

Company Name: Cortland County Highway Dept. - Cont'd.

Address

Date Received: 11/27/84

Pick up by: Randy

SAMPLE SOURCES

Analysis Performed:		D-1	D-2	D-3	D-4	D-5	D-6
pH							
.O.D. 5 28 mg/L							
.O.D. mg/L							
Total Hardness mg/L							
jeldahl Nitrogen mg/L							
issolved Solids mg/L							
Suspended Sclids mg/L							
Total Solids mg/L							
olatile Solids mg/L							
T.O.C.	mg/L	5.3	0.3	1.7	4.9	4.2	1.6
Aluminum	mg/L	2.0	ND<0.5	ND<0.5	0.7	0.8	ND<0.5
Calcium	mg/L	5.0	23.0	24.0	57.0	51.0	17.0
on mg/L							
ickel mg/L							
Zinc mg/L							
rsenic mg/L							
arium mg/L							
Cadmium mg/L							
Chromium mg/L							
ead mg/L							
Mercury mg/L							
Selenium mg/L							
ilver mg/L							

CC:

Date 12/11/84 pg

Approved By: Richard Friend Manager

Comments:

orm 1043

Approved by the Environmental Protection Agency for the:
acteriological examination of Potable Water
Metals by Atomic Absorption
Wet Chemistry
olatile Organics
esticides, Herbicides

Friend Laboratory, Inc.

446 BROAD STREET ● WAVERLY, N.Y. 14892-1445
Phone (607) 565-2893

Chemical and Bacterial analysis of:
WATER
STREAM POLLUTION
WASTEWATER
SLUDGE
SOIL
DAIRY PRODUCTS
FOODS and MORE

Key For Report

< = Less Than
> = Greater Than
Pt. Co. U. = Platinum Cobalt Units
ppm = Parts per Million
ug/L = Micrograms per Liter
mg/L = Milligrams per liter
NTU = Nephelometric Turbidity Unit
ND = None Detected
uMHOS/cm = Micromhos per Centimeter

ant Mgr.

Company Name: Cortland County Highway Dept. - Cont'd.

ddress

Date Received: 11/27/84

Pick up by: Randy

SAMPLE SOURCES

Analysis Performed:		B-1	B-2	B-3		
pH						
.O.D. 5 28 mg/L						
.O.D. mg/L						
Total Hardness mg/L						
ieldahl Nitrogen mg/L						
ssolved Solids mg/L						
Suspended Solids mg/L						
Total Solids mg/L						
olatile Solids mg/L						
T.O.C.	mg/L	7.2	6.8	8.8		
Aluminum	mg/L	2.9	1.7	4.2		
Calcium	mg/L	37.0	28.0	37.0		
on mg/L						
ickel mg/L						
Zinc mg/L						
rsenic mg/L						
arium mg/L						
Cadmium mg/L						
Chromium mg/L						
ead mg/L						
Mercury mg/L						
Selenium mg/L						
lver mg/L						

CC:

Date 12/11/74 pg

Approved By: Richard Management

Comments:

rm 1043

RECEIVED JAN [illegible] 1985

Approved by the Environmental Protection Agency for the:
Bacteriological examination of Potable Water
Metals by Atomic Absorption
Wet Chemistry
Volatile Organics
Pesticides, Herbicides

Friend Laboratory, Inc

446 BROAD STREET • WAVERLY, N.Y. 14892-1145
Phone (607) 565-2893

Chemical and Bacterial analysis of:
WATER
STREAM POLLUTION
WASTEWATER
SLUDGE
SOIL
DAIRY PRODUCTS
FOODS and MORE

2nd Round - Background Water analysis

(PINE TREE SITE)

Key For Report

< = Less Than
> = Greater Than
Pt. Co. U = Platinum Cobalt Units
ppm = Parts per Million
ug/L = Micrograms per Liter
mg/L = Milligrams per liter
NTU = Nephelometric Turbidity Unit
ND = None Detected
uMHOS/cm = Micromhos per Centimeter

Plant Mgr.

Company Name: Cortland County Highway Dept.
ATTN: Mr. Ralph Pitman
Address: P.O. Box 5590
Cortland, NY 13045

Date Received: 12/28/84

Pick up by: Randy

SAMPLE SOURCES

		RE-8 Depth 6'10"	RE-7 Depth 32'10"	RE-6 Depth 40'9"	RE-5 Depth 5'2"	RE-4 Depth 8'2"
Aluminum	mg/L	27	2.8	1.4	20	14
Calcium as $CaCO_3$	mg/L	30	29	17	27	45
pH		7.3	12.0	11.0	7.6	7.5
B.O.D. 5 20 mg/L		2.4	1.5	15.6	3.6	1.8
C.O.D. mg/L		ND<3.0	ND<3.0	ND<3.0	ND<3.0	4.4
Total Hardness mg/L		142.0	119.0	125.0	120.0	100.0
Kjeldahl Nitrogen mg/L		5.6	17.5	16.8	16.1	3.10
Dissolved Solids mg/L		500.0	1110.0	550.0	560.0	370.0
Odor	Threshold #	2	6	3	3	3
Conductivity	uMHOS/cm	340.0	4900.0	680.0	340.0	460.0
Chlorides	mg/L	2.2	2.8	3.3	1.7	21.6
Ammonia Nitrogen as N	mg/L	0.13	0.86	1.3	ND<0.10	ND<0.10
Nitrate Nitrogen as N	mg/L	0.44	10.82	2.20	0.38	0.52
Sulfate	mg/L	15.0	34.5	62.0	33.0	22.0
Hexachromium	mg/L	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05
Detergents Anionic	mg MBAS/L	ND<0.01	ND<0.01	ND<0.01	ND<0.01	ND<0.01
Phenols	mg/L	0.2	0.2	0.16	0.20	0.20
Alkalinity as $CaCO_3$	mg/L	145.2	936.0	55.2	144.0	162.0
Color	Pt Co U	35	20	20	35	70
Copper	mg/L	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05
Iron mg/L		9.2	0.65	1.00	8.9	4.98
Manganese	mg/L	0.678	0.140	0.140	0.688	0.252
Zinc mg/L		0.026	ND<0.025	ND<0.025	ND<0.025	ND<0.025
Arsenic mg/L		ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0025
Sodium	mg/L	16.2	139	38	12.3	16.7
Cadmium mg/L		0.05	0.03	ND<0.01	ND<0.01	ND<0.01
Chromium mg/L		ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05
Lead mg/L		0.72	0.59	0.57	0.28	0.26
Mercury mg/L		ND<0.0004	0.0004	0.0006	0.0004	ND<0.0004
Selenium mg/L		ND<0.002	ND<0.002	ND<0.002	ND<0.002	ND<0.002
Silver mg/L		ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05

CC:

Date 1/16/85 pg

Approved By: W. S. L. Manager

Comments: T.O.C. to Follow

Form 1043

Approved by the Environmental Protection Agency for the:
Bacteriological examination of Potable Water
Metals by Atomic Absorption
Wet Chemistry
Volatile Organics
Pesticides, Herbicides

Friend Laboratory, Inc.

446 BROAD STREET ● WAVERLY, N.Y. 14892-1445
Phone (607) 565-2893

Chemical and Bacteri analysis of:
WATER
STREAM POLLUTIOI
WASTEWATER
SLUDGE
SOIL
DAIRY PRODUCTS
FOODS and MORE

2nd Round – Background Water Analysis (PINE TREE SITE)

Key For Report

< = Less Than
> = Greater Than
Pt. Co. U. = Platinum Cobalt Units
ppm = Parts per Million
ug/L = Micrograms per Liter
mg/L = Milligrams per liter
NTU = Nephelometric Turbidity Unit
ND = None Detected
uMHOS/cm = Micromhos per Centimeter

Plant Mgr.

Company Name: Cortland County Highway Dept. - Cont'd.

Address

Date Received: 12/28/84

Pick up by: Randy

SAMPLE SOURCES

		DO-2 Depth 5'5"	D-1 Depth 12'2"	D-2 Artesian	D-3 WELL FROZEN	D-4 Depth 6'2"
Aluminum	mg/L	16	1.0	<0.5		13
Calcium as CaCO3	mg/L	31	<10	17		28
pH		7.5	8.3	7.7		7.5
B.O.D. 5 ~~XX~~ mg/L		2.4	1.5	2.4		4.5
C.O.D. mg/L		ND<3.0	ND<3.0	ND<3.0		3.3
Total Hardness mg/L		180.0	68.0	145.0		150.0
Kjeldahl Nitrogen mg/L		18.2	8.4	3.5		6.72
Dissolved Solids mg/L		670.0	400.0	590.0		620.0
Odor Threshold #		3	2	6		3
Conductivity	uMHOS/cm	350.0	250.0	320.0		760.0
Chlorides	mg/L	1.7	1.1	2.8		4.4
Ammonia Nitrogen as N	mg/L	ND<0.10	0.10	ND<0.10		ND<0.10
Nitrate Nitrogen as N	mg/L	0.33	0.21	0.30		0.26
Sulfate	mg/L	20.0	22.0	10.0		20.0
Hexachromium	mg/L	ND<0.05	ND<0.05	ND<0.05		ND<0.05
Detergents Anionic mg	MBAS/L	ND<0.01	ND<0.01	ND<0.01		ND<0.01
Phenols	mg/L	0.10	0.10	0.16		ND<0.05
Alkalinity as CaCO3	mg/L	163.2	240.0	103.2		122.8
Color Pt Co U		70	20	<5		45
Copper	mg/L	ND<0.05	ND<0.05	ND<0.05		ND<0.05
Iron mg/L		2.37	0.79	0.23		2.80
Manganese	mg/L	0.418	0.126	0.185		0.462
Zinc mg/L		ND<0.025	ND<0.025	ND<0.025		ND<0.025
Arsenic mg/L		ND<0.0025	ND<0.0026	ND<0.0025		ND<0.0025
Sodium	mg/L	14.5	35.9	12.0		95.6
Cadmium mg/L		ND<0.01	ND<0.01	ND<0.01		ND60.01
Chromium mg/L		ND<0.05	ND<0.05	ND<0.05		ND<0.05
Lead mg/L		0.21	0.23	0.19		ND<0.1
Mercury mg/L		ND<0.0004	ND<0.0004	ND<0.0004		ND<0.0004
Selenium mg/L		ND<0.002	ND<0.002	ND<0.002		ND<0.002
Silver mg/L		ND<0.05	ND<0.05	ND<0.05		ND<0.05

CC:

Date 1/16/85 pg

Approved By: Manager

Comments: T.O.C. to Follow

Form 1043

Approved by the Environmental Protection Agency for the
[illegible]cteriologica examination
[illegible]f Potable Water
Metals by Atomic Absorption
[illegible]t Chemistry
[illegible]latile Organics
Pesticides, Herbicides

Friend Laboratory, Inc.

446 BROAD STREET • WAVERLY, N.Y. 14892-1145
Phone (607) 565-2893

Chemical and Bacterial analysis of
WATER
STREAM POLLUTION
WASTEWATER
SLUDGE
SOIL
DAIRY PRODUCTS
FOODS and MORE

2nd. Round - Background Water Analysis
(Pine TREE SITE)

Key For Report

< = Less Than
> = Greater Than
Pt. Co. U. = Platinum Cobalt Units
ppm = Parts per Million
ug/L = Micrograms per Liter
mg/L = Milligrams per liter
NTU = Nephelometric Turbidity Unit
ND = None Detected
uMHOS/cm = Micromhos per Centimeter

[illegible]ant Mgr.

Company [illegible]ame: Cortland County Highway Dept. - Cont'd.

Address

[illegible]te Received: 12/28/84

Pick up by: Randy

SAMPLE SOURCES

		D-5 Depth 7'2"	D-6 WELL FROZEN	B-1 Depth 2'10"	B-2 WELL FROZEN	B-3 Depth 2'9"
[illegible]uminum	mg/L	16		16		23
Calcium as $CaCO_3$	mg/L	52		30		48
pH		7.3		7.3		7.2
[illegible]O.D. 5 XX mg/L		4.2		13.2		8.4
[illegible]O D. mg/L		8.9		3.3		7.7
Total Hardness mg/L		133.0		2.1		1.4
[illegible]eldahl Nitrogen mg/L		32.2		2.1		1.4
[illegible]ssolved Solids mg/L		8080.0		540.0		510.0
Odor	Threshold #	2		3		3
[illegible]nductivity	uMHOS/cm	760.0		340.0		400.0
[illegible]lorides	mg/L	3.3		4.9		5.5
Ammonia Nitrogen as N	mg/L	0.10		0.10		ND<0.10
Nitrate Nitrogen as N	mg/L	0.70		0.28		1.03
[illegible]lfate	mg/L	100.0		45.0		130.0
[illegible]exachromium	mg/L	ND<0.05		ND<0.05		ND<0.05
Detergents Anionic	mg MBAS/L	ND<0.01		ND<0.01		ND<0.01
[illegible]henols	mg/L	ND<0.05		ND<0.05		ND<0.05
[illegible]kalinity as $CaCO_3$	mg/L	94.8		127.2		158.4
Color	Pt Co U	35		20		20
Copper	mg/L	ND<0.05		ND<0.05		ND<0.05
[illegible]n mg/L		2.21		2.38		4.79
[illegible]anganese	mg/L	0.212		0.442		0.373
Zinc mg/L		ND<0.025		ND<0.025		ND<0.025
[illegible]senic mg/L		ND<0.0025		ND<0.0025		ND<0.0025
[illegible]dium		78.8		16.7		8.2
Cadmium mg/L		ND<0.01		ND<0.01		ND<0.01
Chromium mg/L		ND<0.05		ND<0.05		ND<0.05
[illegible]ad mg/L		ND<0.1		0.19		0.21
Mercury mg/L		ND<0.0004		ND<0.0004		ND<0.0004
Selenium mg/L		ND<0.002		ND<0.002		ND<0.002
[illegible]ver mg/L		ND<0.05		ND<0.05		ND<0.05

CC:

Date 1/16/85 pg

Approved By: [signature] Manager

Comments: T.O.C. to Follow

[illegible]rm 1043

LAB SAMPLE NO. 298

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml >16

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

NAME
ADDRESS Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

APPROVED BY THE EPA AND STATE OF NEW YORK FOR BACTERIOLOGIC EXAMINATION OF POTABLE WATER.

Friend Laboratory, Inc.
BOX 311
WAVERLY, NY 14892-0311
607-565-2893

1/9/85
DATE

COMMENTS: ☐ Safe ☒ Unsafe

Manager

BACTERIOLOGICAL WATER REPORT –

Incubation Temp. –35° C

Date and Time Taken 12/28/84

Date and Time Inocu. 12/28/84

Taken By:

Analyst Sherwood

Sampling Point: D) –2

ANALYSIS OF RESULTS –

THIS WATER SAMPLE WAS TESTED AND IS NOT CURRENTLY IN COMPLIANCE WITH THE BACTERIOLOGICAL DRINKING WATER STANDARDS, AS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT OF THE ENVIRONMENTAL PROTECTION AGENCY.

Results reported 1/7/85

LAB SAMPLE NO. 299

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml >16

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

NAME
ADDRESS Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

APPROVED BY THE EPA AND STATE OF NEW YORK FOR BACTERIOLOGIC EXAMINATION OF POTABLE WATER.

Friend Laboratory, Inc.
BOX 311
WAVERLY, NY 14892-0311
607-565-2893

1/9/85
DATE

COMMENTS: ☐ Safe ☒ Unsafe

Manager

BACTERIOLOGICAL WATER REPORT –

Incubation Temp. –35° C

Date and Time Taken 12/28/84

Date and Time Inocu. 12/28/84

Taken By:

Analyst Sherwood

Sampling Point: RE-4

ANALYSIS OF RESULTS –

THIS WATER SAMPLE WAS TESTED AND IS CURRENTLY IN COMPLIANCE WITH THE BACTERIOLOGICAL DRINKING WATER STANDARDS, AS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT OF THE ENVIRONMENTAL PROTECTION AGENCY.

Results reported 1/7/85

LAB SAMPLE NO. 300

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml >16

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

NAME
ADDRESS Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

Friend Laboratory, Inc.
BOX 311
WAVERLY, NY 14892-0311
607-565-2893

1/9/85
DATE

COMMENTS: ☐ Safe ☒ Unsafe

Manager

BACTERIOLOGICAL WATER REPORT –

Incubation Temp. –35° C

Date and Time Taken: 12/28/84

Date and Time Inocu. 12/28/84

Taken By:

Analyst Sherwood

Sampling Point: RE-5

ANALYSIS OF RESULTS –

LAB SAMPLE NO. 303

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml >16

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

NAME
ADDRESS Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

APPROVED BY THE EPA AND STATE OF NEW YORK FOR BACTERIOLOGIC EXAMINATION OF POTABLE WATER.

Results reported 1/7/85

Friend Laboratory, Inc.
BOX 311
WAVERLY, NY 14892-0311
607-565-2893

1/9/85
DATE

COMMENTS: ☐ Safe ☒ Unsafe

Manager

BACTERIOLOGICAL WATER REPORT –

Incubation Temp. –35° C

Date and Time Taken: 12/28/84

Date and Time Inocu.: 12/28/84

Taken By:

Analyst: Sherwood

Sampling Point RE-8

ANALYSIS OF RESULTS –

THIS WATER SAMPLE WAS TESTED AND IS NOT CURRENTLY IN COMPLIANCE WITH THE BACTERIOLOGICAL DRINKING WATER STANDARDS, AS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT OF THE ENVIRONMENTAL PROTECTION AGENCY.

LAB SAMPLE NO. 302

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml <2.2

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

NAME
ADDRESS Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

APPROVED BY THE EPA AND STATE OF NEW YORK FOR BACTERIOLOGIC EXAMINATION OF POTABLE WATER.

Friend Laboratory, Inc.
BOX 311
WAVERLY, NY 14892-0311
607-565-2893

1/9/85
DATE

COMMENTS: ☒ Safe ☐ Unsafe

Manager

BACTERIOLOGICAL WATER REPORT –

Incubation Temp. –35° C

Date and Time Taken: 12/28/84

Date and Time Inocu.: 12/28/84

Taken By:

Analyst: Sherwood

Sampling Point: RE-7

ANALYSIS OF RESULTS –

THIS WATER SAMPLE WAS TESTED AND IS CURRENTLY IN COMPLIANCE WITH THE BACTERIOLOGICAL DRINKING WATER STANDARDS, AS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT OF THE ENVIRONMENTAL PROTECTION AGENCY.

LAB SAMPLE NO. 301

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml <2.2

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

NAME
ADDRESS Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

Friend Laboratory, Inc.
BOX 311
WAVERLY, NY 14892-0311
607-565-2893

1/9/85
DATE

COMMENTS: ☒ Safe ☐ Unsafe

Manager

BACTERIOLOGICAL WATER REPORT –

Incubation Temp. –35° C

Date and Time Taken: 12/28/84

Date and Time Inocu.: 12/28/84

Taken By:

Analyst: Sherwood

Sampling Point: RE-6

ANALYSIS OF RESULTS –

THIS WATER SAMPLE WAS TESTED AND IS

LAB SAMPLE NO. 295

Friend Laboratory, Inc.
BOX 311
WAVERLY, NY 14892-0311
607-565-2893

BACTERIOLOGICAL WATER REPORT –

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml <2.2

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

1/9/85
DATE

COMMENTS: ☒ Safe ☐ Unsafe

Manager

Incubation Temp. –35° C

Date and Time Taken: 12/28/84

Date and Time Inocu. 12/28/84

Taken By:

Analyst Sherwood

Sampling Point: D-2

NAME
ADDRESS

Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

ANALYSIS OF RESULTS –

THIS WATER SAMPLE WAS TESTED AND IS CURRENTLY IN COMPLIANCE WITH THE BACTERIOLOGICAL DRINKING WATER STANDARDS, AS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT OF THE ENVIRONMENTAL PROTECTION AGENCY.

APPROVED BY THE EPA AND STATE OF NEW YORK FOR BACTERIOLOGIC EXAMINATION OF POTABLE WATER.

LAB SAMPLE NO. 296

Friend Laboratory, Inc.
BOX 311
WAVERLY, NY 14892-0311
607-565-2893

BACTERIOLOGICAL WATER REPORT –

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml >16

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

1/9/85
DATE

COMMENTS: ☐ Safe ☒ Unsafe

Manager

Incubation Temp. –35° C

Date and Time Taken 12/28/84

Date and Time Inocu. 12/28/84

Taken By:

Analyst Sherwood

Sampling Point: D-4

NAME
ADDRESS

Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

ANALYSIS OF RESULTS –

THIS WATER SAMPLE WAS TESTED AND IS NOT CURRENTLY IN COMPLIANCE WITH THE BACTERIOLOGICAL DRINKING WATER STANDARDS, AS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT OF THE ENVIRONMENTAL PROTECTION AGENCY.

APPROVED BY THE EPA AND STATE OF NEW YORK FOR BACTERIOLOGIC EXAMINATION OF POTABLE WATER.

Results reported 1/7/85

LAB SAMPLE NO. 297

Friend Laboratory, Inc.
BOX 311
WAVERLY, NY 14892-0311
607-565-2893

BACTERIOLOGICAL WATER REPORT –

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml >16

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

1/9/85
DATE

COMMENTS: ☐ Safe ☒ Unsafe

Manager

Incubation Temp. –35° C

Date and Time Taken 12/28/84

Date and Time Inocu. 12/28/84

Taken By:

Analyst Sherwood

Sampling Point: D-5

NAME
ADDRESS

Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

ANALYSIS OF RESULTS –

THIS WATER SAMPLE WAS TESTED AND IS NOT CURRENTLY IN COMPLIANCE WITH

LAB SAMPLE NO. 292

BOX 311
WAVERLY, NY 14892-0311
607-565-2893

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml >16

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

1/9/85
DATE

COMMENTS: ☐ Safe ☒ Unsafe

Manager

Incubation Temp. –35° C

Date and Time Taken: 12/28/84

Date and Time Inocu.: 12/28/84

Taken By:

Analyst: Sherwood

Sampling Point: B-1

NAME
ADDRESS

Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

ANALYSIS OF RESULTS –

THIS WATER SAMPLE WAS TESTED AND IS NOT CURRENTLY IN COMPLIANCE WITH THE BACTERIOLOGICAL DRINKING WATER STANDARDS, AS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT OF THE ENVIRONMENTAL PROTECTION AGENCY.

APPROVED BY THE EPA AND STATE OF NEW YORK FOR BACTERIOLOGIC EXAMINATION OF POTABLE WATER.

Results reported 1/7/85

LAB SAMPLE NO. 293

Friend Laboratory, Inc.
BOX 311
WAVERLY, NY 14892-0311
607-565-2893

BACTERIOLOGICAL WATER REPORT –

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml >16

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

1/9/85
DATE

COMMENTS: ☐ Safe ☒ Unsafe

Manager

Incubation Temp. –35° C

Date and Time Taken: 12/28/84

Date and Time Inocu.: 12/28/84

Taken By:

Analyst: Sherwood

Sampling Point: B-3

NAME
ADDRESS

Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

ANALYSIS OF RESULTS –

THIS WATER SAMPLE WAS TESTED AND IS NOT CURRENTLY IN COMPLIANCE WITH THE BACTERIOLOGICAL DRINKING WATER STANDARDS, AS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT OF THE ENVIRONMENTAL PROTECTION AGENCY.

APPROVED BY THE EPA AND STATE OF NEW YORK FOR BACTERIOLOGIC EXAMINATION OF POTABLE WATER.

Results Reported 1/7/85

LAB SAMPLE NO. 294

Friend Laboratory, Inc.
BOX 311
WAVERLY, NY 14892-0311
607-565-2893

BACTERIOLOGICAL WATER REPORT –

RESULTS OF BACTERIOLOGIC TEST –

Total Coliform per 100 Ml >16

Standard Plate Count per Ml

Fecal Coliform MPN per 100 Ml

Chlorine Residual per Ml

1/9/85
DATE

COMMENTS: ☐ Safe ☒ Unsafe

Manager

Incubation Temp. –35° C

Date and Time Taken: 12/28/84

Date and Time Inocu.: 12/28/84

Taken By:

Analyst: Sherwood

Sampling Point: D-1

NAME
ADDRESS

Cortland County Landfill Dept.
P.O. Box 5590
Cortland, NY 13045

ANALYSIS OF RESULTS –

THIS WATER SAMPLE WAS TESTED AND IS NOT CURRENTLY IN COMPLIANCE WITH THE BACTERIOLOGICAL DRINKING WATER

[redacted]pproved by the Environmental Protection Agency for the:
Bacteriological examination of Potable Water
Metals by Atomic Absorption
Wet Chemistry
Volatile Organics
Pesticides, Herbicides

Friend Laboratory, Inc.

446 BROAD STREET, WAVERLY, N.Y. 14892-1445
Phone (607) 565-2893

Chemical and Bacterial analysis of
WATER
STREAM POLLUTION
WASTEWATER
SLUDGE
SOIL
DAIRY PRODUCTS
FOODS and MORE

Supplement to 2nd Round of Background Water Samples - Pine Tree Site

Key For Report

< = Less Than
> = Greater Than
Pt. Co. U. = Platinum Cobalt Units
ppm = Parts per Million
ug/L = Micrograms per Liter
mg/L = Milligrams per liter
NTU = Nephelometric Turbidity Unit
ND = None Detected
uMHOS/cm = Micromhos per Centimeter

Plant Mgr:

Company Name: Cortland County Highway Dept.
ATTN: Mr. Ralph Pitman
Address: P.O. Box 5590
Cortland, NY 13045

Date Received: Addendum to 12/28/84

Pick up by: Randy

SAMPLE SOURCES

Analysis Performed:		RE-8 Depth 6'10"	RE-7 Depth 32'10"	RE-6 Depth 40'9"	RE-5 Depth 5'2"	RE-4 Depth 8'2"
pH						
B.O.D 5 28 mg/L						
C O D mg/L						
Total Hardness mg/L						
Kjeldahl Nitrogen mg/L						
Dissolved Solids mg/L						
Suspended Solids mg/L						
Total Solids mg/L						
Volatile Solids mg/L						
T.O.C.	mg/L	6	6	12	2	4
Copper mg/L						
Iron mg/L						
Nickel mg/L						
Zinc mg/L						
Arsenic mg/L						
Barium mg/L						
Cadmium mg/L						
Chromium mg/L						
Lead mg/L						
Mercury mg/L						
Selenium mg/L						
Silver mg/L						

CC:

Date 1/24/85 pg

Approved By: W. Schmidt
Manager

Comments:

Form 1043

Approved by the Environmental Protection Agency for the:
Bacteriological examination of Potable Water
Metals by, Atomic Absorption
Wet Chemistry
Volatile Organics
Pesticides Herbicides

Friend Laboratory, Inc.

446 BROAD STREET, WAVERLY, N.Y. 14892-1445
Phone (607) 565-2893

Chemical and Bacterial analysis of
WATER
STREAM POLLUTION
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ND = None Detected
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Plant Mgr:

Company Name: Cortland County Highway Dept. - Cont'd.

Address

Date Received: Addendum to 12/28/84

Pick up by: Randy

SAMPLE SOURCES

Analysis Performed:		DO-2 Depth 5'5"	D-1 Depth 12'2"	D-2 Artesian	D-3 Well Frozen	D-4 Depth6'2"
pH						
B.O.D. 5 28 mg/L						
C.O.D mg/L						
Total Hardness mg/L						
Kjeldahl Nitrogen mg/L						
Dissolved Solics mg/L						
Suspended Solids mg/L						
Total Solids mg/L						
Volatile Solids mg/L						
T.O.C.	mg/L	3	2	3		4
Copper mg/L						
Iron mg/L						
Nickel mg/L						
Zinc mg/L						
Arsenic mg/L						
Barium mg/L						
Cadmium mg/L						
Chromium mg/L						
Lead mg/L						
Mercury mg/L						
Selenium mg/L						
Silver mg/L						

CC:

Date 1/24/85 pg

Approved By: W. Sil
Manager

Comments:

Form 1043

[redacted]proved by the Environmental Protection Agency for the:
[redacted]acteriological examination of Potable Water
[redacted]tals by Atomic Absorption
Wet Chemistry
[redacted]latile Organics
[redacted]sticides, Herbicides

Friend Laboratory, Inc.

446 BROAD STREET, WAVERLY, N.Y. 14892-1445
Phone (607) 565-2893

Chemical and Bacterial analysis of:
WATER
STREAM POLLUTION
WASTEWATER
SLUDGE
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Key For Report

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NTU = Nephelometric Turbidity Unit
ND = None Detected
uMHOS/cm = Micromhos per Centimeter

[redacted]nt Mgr
Compan, Name: Cortland County Highway Dept. - Cont'd.
[redacted]ress

Date Received: Addendum to 12/28/84
[redacted]ck up by: Randy

SAMPLE SOURCES

Analysis Performed:		D-5 Depth 7'2"	D-6 Well Frozen	B-1 Depth 2'10"	B-2 Well Frozen	B-3 Depth2'9"
pH						
B.O.D. 5 28 mg/L						
[redacted]O.D mg/L						
[redacted]tal Hardness mg/L						
Kjeldanl Nitrogen mg/L						
[redacted]ssolved Solids mg/L						
[redacted]spended Solids mg/L						
Total Solids mg/L						
[redacted]latile Solids mg/L						
T.O.C.	mg/L	5		3		3
[redacted]						
[redacted]						
Copper mg/L						
Iron mg/L						
[redacted]ckel mg/L						
[redacted]nc mg/L						
Arsenic mg/L						
[redacted]rium mg/L						
[redacted]admium mg/L						
Chromium mg/L						
[redacted]ead mg/L						
[redacted]ercury mg/L						
Selenium mg/L						
Silver mg/L						

[redacted]

CC:

Date 1/24/85 pg

Approved By: W. S. L. Manager

[redacted]omments:

[redacted]orm 1043

APPENDIX C

SITE MAP

check Dam

TO Shasta Cherry Vatrano Rd.

RESOURCE ENGINEERING

27 North Church Street • Cortland, New York 13045 • (607) 753-9621

27 June 1985

Mr. Larry Gross, P.E.
Regional Solid Waste Engineer
New York State Department of Environmental Conservation
7481 Henry Clay Blvd.
Liverpool, New York 13088

RE: Cortland County Interim #2 Landfill
Final Design Report Addendum

Dear Mr. Gross:

The recently submitted Design Report and Drawings included two important items that need additional attention. We are sending this letter and attachments as an addendum to the report and a discussion of each follows:

1. Groundwater and Leachate Collection System Piping

This report discussion describes the piping material for these underdrain systems as being 4" and 6" perforated PVC pipe (Schedule 40). A last minute change in the actual selection of the pipe resulted in the use of a heavy duty corrugated polyethylene pipe wrapped with a synthetic fabric. The material selected is the perforated sock tubing manufactured by Advanced Drainage Systems, Inc. The tubing is a rugged corrugated plastic wrapped with a polyester fabric. The perforations are slots cut into the side walls in the direction of the circular shape of the pipe. Enclosed with this letter are copies of pertinent product information. The installation of the tubing will be done in strict compliance with the manufacturers recommendations. Also, this same tubing was recently utilized at the Chautauqua County Landfill in western New York.

2. Leachate Treatment and Disposal

As the ultimate disposal of the leachate from the facility, the report describes a proposal to utilize the City of Cortland Sewage Treatment Plant. Preliminary discussions with the Chief Operator of the plant indicate that based on the anticipated quality and quantity of leachate to be treated, there should be no problem.

Enclosed please find a copy of the letter and its enclosures recently sent to the Wastewater Treatment Board. We anticipate a response shortly.

I apologize for having to make these last minute changes and we appreciate your consideration in accepting this letter as an addendum to the "official" submittal. If you have any questions, please call.

Sincerely,

RESOURCE ENGINEERING

Kenneth J. Teter

KJT/nls
CC: R. Pitman, Solid Waste Supervisor
D. Wolterding, New York State Department of Environmental Conservation

CORTLAND COUNTY INTERIM # 2 LANDFILL

LEACHATE DISPOSAL PROCEDURE

1. Leachate is collected at the landfill in the 20,000 gallon leachate storage tank. Once it is filled to approximately 60% of its capacity, a sample will be collected and analyzed.

2. The sample collected will be examined for the following parameters: pH, BOD, COD, Hardness, Ammonia Nitrogen, K. Nitrogen, Nitrate, Total Dissolved Solids, Specific Conductance, Chlorides, Sulfate, Phosphate, Phencls, TOC, TOH, Aluminum, Calcium, Copper, Cadmium, Chromium, Hexachromium, Iron, Manganese, Arsenic, Sodium, Lead, Mercury, Selenium, Silver, and Zinc.

3. The analysis results will be reviewed and based on the concentrations of key parameters, a conservative rate of discharge into the STP, suitable to the plant's capabilities, will be determined.

4. Once the storage tank at the landfill reaches 75% of its capacity, a private liquid waste hauler will be hired to transport the leachate to the Cortland STP.

5. At the plant, the leachate will be discharged into the system at the predetermined application rate.

6. Key parameters will be monitored at the plant to see if there is any significant negative impact on the effluent stream.

7. Based on the results of the effluent impact analysis, subsequent discharge rates will be adjusted accordingly.

RESOURCE ENGINEERING

27 North Church Street • Cortland, New York 13045 • (607) 753-9621

27 June 1985

Mr. Bud Ames, Chairman
Wastewater Treatment Board
251 Port Watson Street
Cortland, New York 13045

RE: Treatment of Leachate at STP
Proposed County Landfill Interim #2

Dear Mr. Ames:

We recently completed the design of the new Interim #2 Landfill for Cortland County and as required by the New York State Department of Environmental Conservation, the ultimate treatment and disposal of any leachate generated at the site must be addressed. As the Engineer for the County on this project, we are proposing that leachate collected at the new landfill be periodically trucked to the City STP for disposal. It is estimated that the maximum quantity to be treated would be 115,000 gallons during any given year. Also, due to the limited size and operating life of the facility, it could be years, if ever, before that volume is actually produced. Assuming the maximum amount, and based on an average 6 MGD flow at the plant, the leachate would only represent 0.005% of the total flow. Having discussed this with Mr. Sommerson, he doesn't foresee any special problems.

Enclosed please find the procedural format for testing and treating the leachate at the plant, along with a laboratory analysis of an actual leachate sample taken from the existing County Landfill in 1981. Please review the plan as outlined and feel free to contact me if there are any questions.

In order for Cortland County to receive a permit for the proposed landfill, the County must have written assurance from the Cortland City Wastewater Treatment Board that they are willing to dispose of the anticipated leachate. If the enclosed format is acceptable, please respond to the effect to either Mr. Ralph K. Pitman, Solid Waste Supervisor or our office. Your letter will then be forwarded to the Department of Environmental Conservation so that the project can continue to be reviewed.

Again, please call if you have any questions or wish to discuss the matter further.

Sincerely,

RESOURCE ENGINEERING

Kenneth J. Teter

cc: Ralph Pitman, County Solid Waste Supervisor
Larry Gross, NYSDEC Solid Waste Engineer

CORTLAND COUNTY LANDFILL

SAMPLING RESULTS

LEACHATE

(9/28/81)

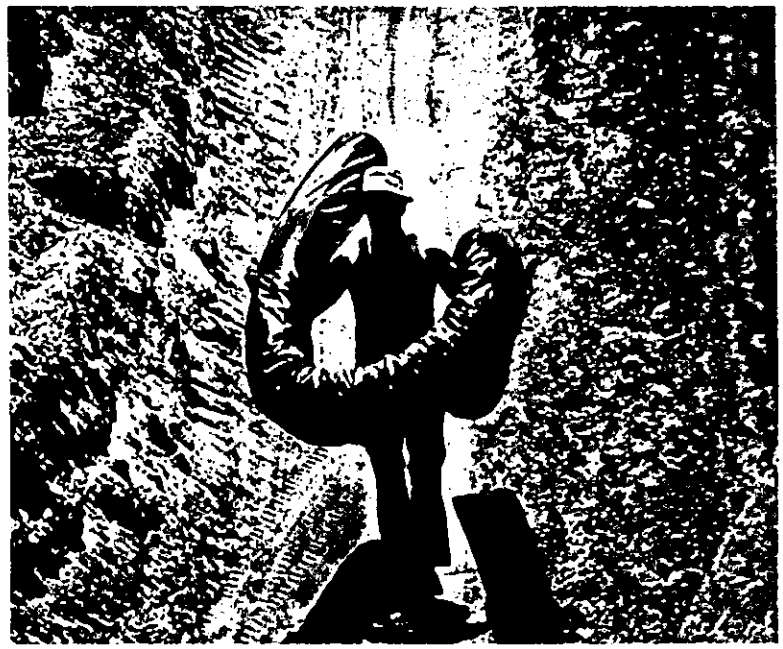
PARAMETER	RANGE OF VALUES *	TYPICAL LANDFILL *	CORTLAND SAMPLE
pH	3.7-8.5	7.5	6.3
BOD	9- 55,000	120	7200
COD	0- 89,000	800	15,580
TOC			4800
COLIFORM, TOTAL			2300
COLIFORM, FECAL			< 3
ALKALINITY	0- 20,900	3,400	2099.8
TOTAL SOLIDS	1000-45,000	4,400	11,618
TOTAL DISSOLVED SOLIDS	0- 42,300	4,270	10,678
TOTAL SETTLEABLE SOLIDS			1.5
TOTAL SUSPENDED SOLIDS			336
CONDUCTIVITY			9750
OIL AND GREASE			11.0
PHENOLS			<0.001
K. NITROGEN			254.8
NITRATE			3.9
CHLORIDE	34-2800	2300	590
FLUORIDE	0-2.13	0.27	0.60
SULFATE	1-1826	5.3	92
SULFIDE	0-0.13		< 0.1
CALCIUM	5-4000	170	420
SODIUM	0-7700	800	500
ARSENIC	0-11.6	0.038	0.011
ALUMINUM	0-122	0.27	1.21
BARIUM	0-5.4	0.08	1.55
CADMIUM	0-0.19	0.0037	0.04
CHROMIUM	0-33.4	0.053	0.23
HEXACHROMIUM			<0.05
COPPER	0-10	0.024	< 0.025
IRON	0.2-5500	24	254
LEAD	0-5.0	0.054	<0.05
MANGANESE	0.06-1400	0.6	69.0
MERCURY	0-0.064		< 0.0004
NICKEL	0.01-0.8	0.069	1.15
SELENIUM			< 0.005
ZINC	0-1000	0.5	7.15
HALOGENATED HYDROCARBONS:			
VOLATILE			<0.01
NON-VOLATILE			<0.002

* Effects Of Solid Waste Landfill Leachates On Receiving Waters, Robert D. Cameron, AWWA Journal, March 1978, P. 174

JOHN S. MacNEILL, JR., P.C., 74 NORTH WEST ST., HOMER, NEW YORK 13077

Table 1. Height of cover limits for ADS heavy duty corrugated polyethylene tubing installed with gravel or crushed stone envelope (Type No. 1)

I.D. (inches)	H-20 Live Load Minimum Cover, H (inches)	H-20 Minimum Bedding, B (inches)	Maximum Cover Height for Dead Load (Soil Cover) Plus Live Load (H-20) (feet)
6	12	4	230
8	12	4	
10	12	5	199
12	12	6	
15	15	6	132
18	18	8	



■ BEDDED on stone, pipe was covered with pervious gravel to surface. Plastic wrapping provided ultraviolet protection during outside storage.

Underdrainage Protects Groundwater at Landfill Site

BEFORE Avon, Connecticut's new sanitary landfill went into operation last summer, some tricky problems in underdrainage had to be solved. The economical solution devised by Town Engineer Tom Daukas and Project Engineer Ken Wassall involved the use of on-site materials and installation of a special underdrain for use in problem soils.

The rectangular 60-acre site lies in the northwest corner of Avon and runs from a residential area on the northeast, over a granite ridge, to the Farmington River on the west. Test borings and other investigation revelaed that both surface water and groundwater flowing toward the southeast would have to be diverted to prevent it from infiltrating the landfill cells and producing undesirable leachate.

A channel lined with crushed stone, running along the northern perimeter and part way along the eastern edge, intercepts surface water and conveys it into a pond and an open watercourse leading away from the landfill. Groundwater is collected by 1600 feet of continuous underdrain leading to a 15-inch reinforced concrete storm drain, which carries it off-site to an open waterway.

A factor in the design of the underdrainage system was the difference in permeability of the two types of soil found at the site. One is a thin layer of glacial drift made up of pervious sand and gravel through which water passes at the rate of 100 feet per day. This overlies a deeper layer of impervious glacial till made up of clay and silt, with a permeability rate of about one foot per day. The underlying granite rock also tends to trap water.

The different soil types were utilized in designing the underdrain system. Pervious sand and gravel were placed on one side of the underdrain to facilitate flow of groundwater into the system. The more impervious silt and clay were layered between the underdrain and the landfill cells to prevent excess water from reaching the refuse.

Because of the silty soil conditions, use of a filtered underdrain was essential for successful control of water infiltration. Such alternatives as an inverse graded filter system of coarse to finer grades of sand and gravel, or a drainage pipe wrapped on-site in a filtering fabric, were ruled out due to the high labor cost involved. Instead, the engineers selected Drain Guard,® a patented one-step drainage system developed by Advanced Drainage Systems, Inc.

Drain Guard combines corrugated polyethylene tubing with a factory-installed filtering sleeve of Cerex nylon, which permits high water inflow and does not mat down in fine soils. The restraining screen is lapped and sonic welded around the slotted, corrugated tubing to provide 360° protection for all openings in the drainage line. Screen openings are sized to permit passage of fine waterborne particles and colloids which block other filters, and to hold back large drain-plugging sand particles.

The Cerex fibers span the valleys between corrugations, increasing the effective inlet area, while the capillary action of the fibers attracts water and helps it enter the drain. This combination promotes more rapid drainage, even under adverse conditions. Avon engineers estimate that without such a screen the drain would become clogged within six months of installation.

Crews began installing Drain Guard in late May, after the storm drain had been constructed and the north-south landfill cell, excavated earlier, had dried out. Starting at the lowest point, where the underdrain entered the storm drain, the line was laid north, then west, for a total of about 1600 feet. The grade, starting from a 23-foot cut at the storm drain, sloped upward gradually to 10 feet below the surface.

All landfill cells are, or will be, graded to divert runoff to a 180-foot by 30-foot sedimentation basin at the south end of the north-south cell. Soil carried off by erosion settles in the basin and can be used for cover material as needed after the water drains off.

Westbury Construction Company, Watertown, Connecticut, installed the underdrain and excavated the north-south and the first of the east-west cells. Excavation of the final three cells, as well as present and future landscaping, will be provided by Avon town work crews. Avon plans to reclaim the site in 10 years as a town recreation area. □□□

Reprinted from PUBLIC WORKS MAGAZINE, June 1977

ADVANCED DRAINAGE SYSTEMS, INC.

TEST DATA

on

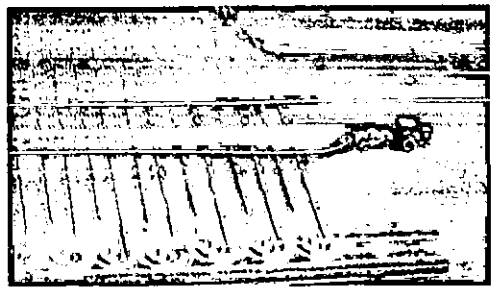
Corrugated Polyethylene Highway Tubing

Attribute	Specification AASHTO M252-76I	4" I.D. Tubing	6" I.D. Tubing	8" I.D. Tubing
Gram Weight:		143.6	343.0	510.0
Nominal Diameter	(4") 4.060/3.940"	4.048		
	(6") 6.090/5.910"		5.969	
	(8") 8.240/7.760"			8.190
Wall Thickness:	Min. .025"	.029	.032	.035
Perforations:				
Slot Length	(4") Max. 1.256"	1.149		
	(6") Max. 1.885"		1.625	
	(8") Max. 2.513"			1.375
Slot Width	Max. .125"	.076	.086	.094
Water Inlet Area	(4") Min. 1.3 sq.in./ft.	1.9		
	(6") Min. 1.9 sq.in./ft.		2.9	
	(8") Min. 2.6 sq.in./ft.			4.2
Pipe Stiffness:				
5% Deflection	Min. 30 PSI	41.6	50.0	39.6
10% Deflection	Min. 25 PSI	34.2	38.9	30.7
Stretch Resistance:	Max. 5/10%	3.7	4.9	5.0
Low Temperature Flexibility	Condition at 32^0F and bend over 13" dia. mandrel	OK	OK	OK

Note: The above test data is representative of typical values recorded by the ADS Quality Control Laboratory on production samples submitted for evaluation in accordance with the requirements in the AASHTO product specification.

For applications in agriculture, highway construction and the building industry, ADS has the synthetic drain envelope for every job.

Each is strong, non-biodegradable and gives you the excellent filtering and soil stabilizing characteristics you need. Both **DRAIN GUARD** and ADS **SOCK** perform equally well in the ground for the life of your drainage installation. And, because these materials are factory installed on ADS tubing, you'll save valuable labor costs in the field.



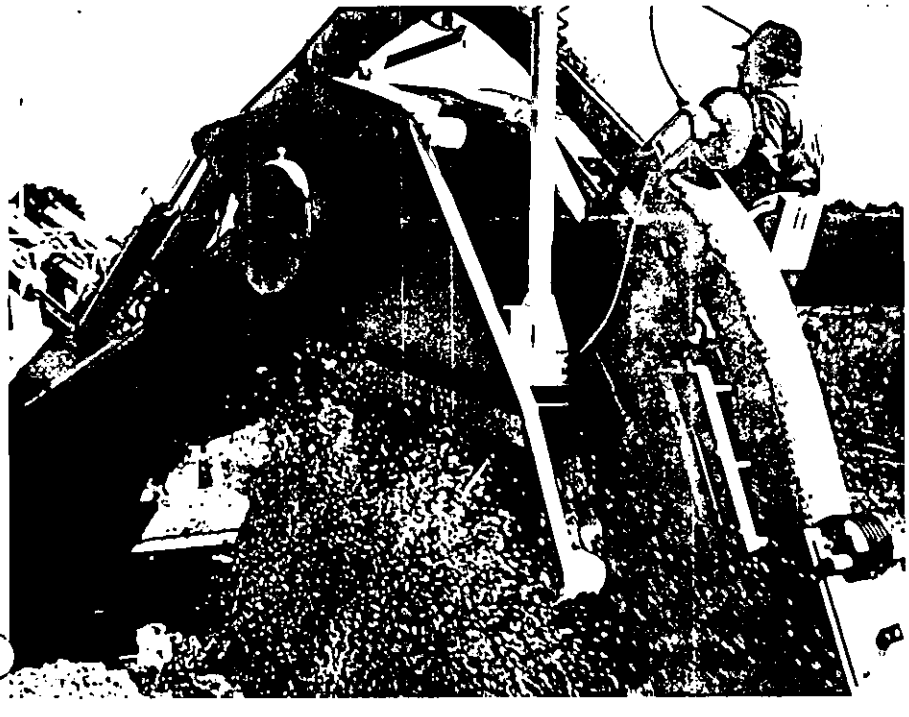
Choose the ADS Synthetic envelope that's right for each job.

ADS® DRAIN GUARD®

For normal routine installations. Manufactured of 100% nylon, tough and durable DRAIN GUARD weighs just 0.85 ounce per square yard. The material's unique bonding process gives you an ultra-porous filter that restrains and stabilizes the soil, yet allows free entry of water.

ADS® SOCK

For more rough-and-tumble installations. A polyester machine-knitted envelope that provides the needed water entry and sediment protection. SOCK weighs approximately three ounces per square yard. SOCK stretches to fit snugly over the tubing and gives the extra protection required by rough handling conditions.



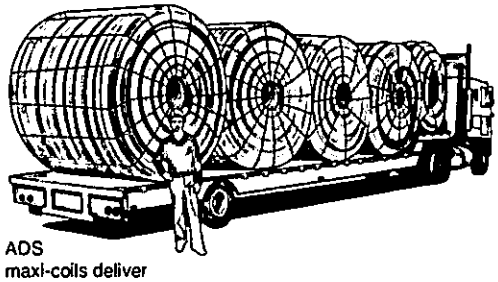
STANDARD FEATURES

ADS DRAIN GUARD and SOCK synthetic wrap materials — admit fine silt and clay; restrain sands and coarse silts — non-toxic, non-irritating — inert in soil — non-biodegradable — resist alkalis and acids — will not rot — not affected by freezing or thawing — continuous lengths– up to 5000′ — available for drainage tubing sizes from 3″ to 24″ diameter—factory applied ready for installation—lower labor costs in the field

TECHNICAL INFORMATION

	DRAIN GUARD	ADS SOCK
Material	Nylon (100%)	Polyester (100%)
Fabric	Spun-bonded	Knitted
Fiber size (denier per filament)	5	100 to 200
Filament	monofilament	24 to 50 filament yarn
Weight (ounces per square yard) (ASTM D 3776)	0.85	2.5 to 3.5
Burst Strength (pounds per square inch) (ASTM D 3786)	36	100
Air Permeability (CFM per square foot) (ASTM D 737)	700	500
Water Flow Rate (gpm per square foot at 3" head) (ADSTM 100)	530	350
Melt Temperature (ASTM D 276)	218° C. (425°F.)	258°C. (496°F.)

If either Drain Guard or Sock is not scheduled for immediate installation, protection from sunlight's ultra violet rays should be provided. Drain Guard is normally bagged in ultra violet resistant bags for shipment.
*Nominal values for Drain Guard and Sock Filter material.



ADS maxi-coils deliver 3,000 ft. of 4" tubing with synthetic wrap intact. Spool trailers enable up to 15,000 ft. of wrapped tubing to be brought on-site at one time.

Applicable Specifications
SCS Engineering Standards Code 606 — ASTM F 405 — ASTM F 667—ASTM—F 449—AASHTO M252, M294.

ADS®
ADVANCED DRAINAGE SYSTEMS, INC.

WATER TABLE DATA

Unconsolidated Aquifer

Well Name	Ground Elevation	Water Elevation 10/26/84	Water Elevation 12/28/84	Water Elevation 4/2/85	Ground to Water 10/26/84	Ground to Water 12/28/84	Ground to Water 4/2/85
B1	1720.09	1718.12	1720.22	1720.55	-1.97	+0.13	+0.46
B2	1707.13	1706.89	Frozen	1707.37	-0.24		+0.24
B3	1700.93	1699.08	1700.28	1700.43	-1.85	-0.65	-0.50
DO 2	1726.61	1724.49	1724.73	1725.60	-2.12	-1.88	-1.01
RE 4	1710.89	1707.39	1704.22	1708.19	-3.50	-6.77	-2.70
RE 5	1692.57	1690.60	1690.80	1691.42	-1.97	-1.77	-1.15
RE 6	1672.70	1670.86	1669.43	1670.90	-1.84	-3.27	-1.80
RE 7	1663.05	1658.11	1659.18	1661.15	-4.94	-3.87	-1.90
RE 8	1715.11	1709.25	1711.21	1711.86	-5.86	-3.90	-3.25

RESOURCE ENGINEERING
100 Port Watson St.
CORTLAND, NEW YORK 13045
(607) 753-9621

JOB Landfill Ext. #2 #8418
SHEET NO. ____ OF ____
CALCULATED BY KJT DATE 4/2/85
CHECKED BY ____ DATE ____
SCALE ____

WATER TABLE DATA

BEDROCK AQUIFER

WELL NAME	GROUND ELEVATION	BEDROCK ELEVATION	WATER ELEVATION 10/26/84	WATER ELEVATION 12/28/84	WATER ELEVATION 4/2/85	GROUND TO WATER 10/26/84	GROUND TO WATER 12/28/84	GROUND TO WATER 4/2/85
D1	1727.46	1572.85	1715.96	1718.18	1718.45	-11.50	-9.28	-9.01
D2	1710.56	1595.46	1715.42	Flow	Flow	+4.86	+	+
D3	1694.24	1596.94	1700.33	Frost	Flow	+6.09	+	+
D4	1674.01	1534.60	?	1636.11	1657.96	?	-37.90	-16.05
D5	1663.08	1519.85	163993	1633.55	1634.18	-23.15	-29.53	-28.90
D6	1712.79	1606.60	1713.60	Frost	171394	+0.81	+	+1.15

RESOURCE ENGINEERING
100 Port Watson St.
CORTLAND, NEW YORK 13045
(607) 753-9621

JOB Landfill Inv. #2 #8418
SHEET NO. ____ OF ____
CALCULATED BY KST DATE 4/2/85
CHECKED BY ____ DATE ____
SCALE ____

Cortland County Interim #2 Landfill

Soil Characteristics Summary

Site	P200 Content (%)	Clay Content (%)	Liquid Limit	Plastic Index	Field Perm. (cm/sec)	Lab Perm. (cm/sec)	pH	Cation Exch. Capacity ( )
TP1	44.9	16.0				3.70×10^{-8}		
TP2	52.5	19.5						
TP84-1	48.7	24.0				2.45×10^{-8}		
TP84-2	44.0	18.6				6.14×10^{-8}		
TP84-3	51.5	26.0				2.45×10^{-8}		
TP84-4	59.0	20.6				4.32×10^{-8}		
TP84-5	52.1	23.5				3.96×10^{-8}		
TP84-1A			27	9				
TP84-2A			23	5				
TP84-3A			26	8				
TP84-4A			26	7				
TP84-5A			26	8				
B1					5.44×10^{-5}			
B2 5-10 ft			30+	15+	6.49×10^{-4} / 1.62×10^{-5}			
B3					7.30×10^{-4}			
DO2								
RE4								
RE5					5.38×10^{-5}			
RE6					4.10×10^{-5}			
RE7								
RE8	40-43 max 1 below 20-25% min				5.70×10^{-6}			
Average	50.4	21.2	25.6	7.4	2.21×10^{-4}	3.84×10^{-8}		
Range	44.0-59.0	16.0-26.0	23-27	5-9	7.3×10^{-4} - 5.7×10^{-6}	6.14×10^{-8} - 2.45×10^{-8}		

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27 NORTH CHURCH STREET
CORTLAND, NEW YORK 13045
(607) 753-9621

JOB Int. #2 Landfill OF
SHEET NO.
CALCULATED BY KJT DATE 4/19/95
CHECKED BY DATE
SCALE