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TECHNICAL MEMORANDUM
SUMMARY OF EXISTING DATA
MALLARD NORTH LANDFILL
HANOVER PARK, ILLINOIS

OCTOBER 1995

Prepared For:

FOREST PRESERVE DISTRICT OF DUPAGE COUNTY

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SEPTEMBER 1995

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1. INTRODUCTION

This Technical Memorandum (TM) has been prepared pursuant to EMCON Proposal No. 98009-502.000 submitted on May 5, 1995 to the Forest Preserve District of DuPage County (District). The purpose of this TM is to summarize available data and reports generated for the Mallard North Landfill (MNL) in Hanover Park, Illinois. The TM will be used as the basis for preparation of a feasibility study (FS) that examines potential remedial alternatives for the MNL. This work is being undertaken by the District on a voluntary basis.

1.1 Site Description

The MNL is located in Section 7, T. 40 N., R. 10 E., DuPage County, Illinois, in the City of Hanover Park approximately 28 miles west-northwest of downtown Chicago. The site is fenced along the north and portions ot the west sides of the landfill. A concrete wall along its northern boundary extends below ground and runs roughly east-west, separating the landfill from a residential area. A new residential housing development (Tall Oaks Subdivision) was recently completed along the western boundary of the landfill. A waste water treatment plant, two schools, and Mallard Lake Landfill are also within a one-mile radius of the site. The West Branch of the DuPage River (WBDR) bounds the landfill on the east, south, and southwest. MNL is currently owned and maintained by the District. The northern boundary of Mallard Lake Landfill, an operating solid waste disposal facility, is located immediately south of MNL on the other side of the WBDR. A 90-ton bridge was recently constructed between the two landfills to facilitate transportation of material between the two sites (Figure 1-1).

MNL has been the subject of numerous studies in recent years, primarily regarding gas production from decomposing refuse and its possible uses. These studies have provided useful information on the landfill's internal structure helping to verify a wide variety of geological/geophysical data.

1.2 Objectives

The primary objectives of this TM are to:

- summarize currently available information concerning the MNL;
- evaluate existing data and develop a conceptual site model for use during the FS process;
- identify potential data needs to proceed with an FS or remedy implementation; and
- develop an initial list of remedial alternatives that will be examined in detail in the FS.

To prepare this TM, EMCON conducted a thorough review of available files at the District's offices; evaluated and interpreted existing data; obtained additional information from outside sources; and performed a limited amount of supplemental field work. Although this TM provides detailed information regarding site conditions, it is not intended to be equivalent to a remedial investigation report under CERCLA.

2. PHYSICAL SITE CHARACTERISTICS

2.1 Waste Disposal Practices

E & E Hauling operated MNL from 1966 to 1974. Prior to landfilling, the WBDR was diverted from what is now the central section of the landfill to its current position (Figure 1-1). Artificial liners, leachate collection or gas collection systems were not constructed within or beneath the refuse. Local municipal wastes consisting of wood, various paper products, plastics, rubber, cloth, glass, and metal were reported to have been landfilled at the site. There is no documentation of disposal of any hazardous waste at the site. There is also no available documentation regarding the daily operation of the landfill (e.g. use of daily cover, segregation of waste).

The District conducts ongoing maintenance at the landfill, which includes placement of additional cover material when necessary, pumping and disposal of leachate from the leachate extraction (E-series) wells, and maintenance of the landfill gas flares. About 10,000 gallons of leachate from extraction wells in the southeast corner of the site (Figure 1-1) are pumped per week and transported by tanker truck for disposal at the City of Wheaton or Glenbard wastewater treatment plant.

2.2 Surface Topography

The topography of MNL approximates a mound which slopes from a high point of about 817 feet above mean sea level (MSL) in the center of the site toward the WBDR to the east, west, and south (about 765 feet above MSL). Side slopes are steepest on the west and south sides of the landfill. Settlement of solid waste has occurred and is an ongoing maintenance issue (see Section 2.3).

The 100-year flood elevation is at about 769 ft above MSL where the WBDR enters the site on the east and about 767.6 feet above MSL where the River departs on the west. Based on field investigations conducted in August 1986, the 100-year floodplain is below the elevation of refuse near the banks of the River (RUST, 1994).

Prior to operation of the landfill, the WBDR was diverted to its present configuration (Figure 1-1). Construction details concerning this diversion project were not available for review.

2.3 Characteristics of the Existing Landfill Cover

No documentation was available concerning the type and thickness of final cover on the landfill. The cover is exposed in certain areas, and its thickness is variable as a result of ongoing placement of new material by the District. Based on the age of the landfill, it is probable that the cover does not meet existing Subtitle D standards.

In 1987, a field study of infiltration, soil-moisture conditions and runoff at MNL was conducted (Booth and Price, 1989). That study indicated that since closure of the landfill in 1974, subsidence of up to 0.6 meters had occurred, which was evident from stranding of vent well cement bases above ground level and depressions in which ponds intermittently formed. Numerous fractures of the cover were mapped by Bogner et. al. (1986). Most of the landfill fractures trended north-south, except on the north side, where they trended east-west. The fractures studied by Booth and Price ranged up to several hundred meters in length and varied in width, depth and openness, in some places being open to 13 cm (5.1 inches) wide and 50 cm (19.7 inches) deep.

Booth and Price hypothesized that the subsidence depressions and fractures in the landfill cover were infiltration routes to the refuse and modified the water-balance characteristics of the landfill. The study examined the hydrologic significance of these features through a series of field measurements of soil-moisture tension (using tensiometers and soil moisture blocks), infiltration tests, runoff experiments, and pond monitoring. Other data included

laboratory measurements of bulk density, hydraulic conductivity, clay mineralogy, and particle size analysis of landfill cover samples.

Twenty-six (26) samples of the cover material were submitted for laboratory analysis for permeability. The hydraulic conductivities of the 26 samples were determined using a falling-head permeameter. The results of these tests illustrated that small hydraulic conductivity was closely related to bulk density and hence to depth. The highest hydraulic conductivities occurred primarily in the samples from the upper 10 cm of the landfill cover, whereas samples from below 20 cm tended to have lower hydraulic conductivities. The results of the hydraulic conductivity tests are summarized in Table 2-1.

The conclusions from the study were as follows:

(1) Soil moisture tensions remained low, indicating moist conditions in the fractures. At unfractured sites, tensions in the upper (0.3m) zone fluctuated considerably in response to climate conditions; in some areas, tensions also fluctuated in the deeper (0.6m) zone.

(2) Experiments with ring and sprinkler infiltrometers and measurements of natural runoff indicated that infiltration was generally high and runoff low across the site, so that during most rainstorms most incident water infiltrated. Infiltration rates were high and applied water penetrated readily to depth in open fractures, but in closed fractures and unfractured sites, infiltration was rapid only into the upper zone.

(3) Ephemeral ponds in the subsidence depressions collected runoff and added infiltration to the landfill. Leachate did not discharge significantly from the landfill to the ponds.

(4) Laboratory studies of bulk density and hydraulic conductivity suggested that the landfill cover consisted of an upper topsoil and a lower compacted layer, the upper layer being less dense and more permeable than the lower.

Based on the results of the field work, a simple model of infiltration processes into the landfill was hypothesized as follows:

> "Most rainfall that falls onto the landfill infiltrates into the upper topsoil layer, runoff fractions being low. The infiltrating water most probably travels along the upper boundary of the lower compacted layer until it reaches one of the many fractures that cross the landfill. There, it percolates more deeply, maintaining moisture levels in the fracture and probably penetrating to the refuse. Percolation through the fractures is probably via discrete cracks (an extreme case being in the open-fracture infiltration); the fracture-fill material itself seems no different from the ambient cover material, and closed fractures have low infiltration rates. In the closed subsidence depressions, the runoff and interflow also collect in the ponds and from there percolate into the landfill. The fractures and subsidence features thus increase considerably the percolation into the landfill compared with what would be expected from standard models that assume a non-fractured cover and tabulated runoff and soil-moisture conditions."

2.4 Regional Geology

North central DuPage County is situated in the Wheaton Morainal Country of the Interior Lowlands Physiographic Province. Surface elevations of the area range from 700 to 820 feet above MSL. The area is part of a complex of late Wisconsinan age moraines which were formed by ice moving out of the Lake Michigan basin less than 22,000 years ago. The south-flowing east and west branches of the DuPage River drain the area. The MNL is situated near the western edge of the WBDR, at the western edge of the Valparaiso Moraine. Surface topography is hummocky (gently rolling), typical of relatively young glaciated landscapes where deposition was dominant over erosion.

The surficial geology, comprised of glacial drift is approximately 110 to 150 feet thick and is underlain by Silurian age dolomite bedrock. The bedrock surface of the area gently dips regionally eastward toward Lake Michigan. Glacial deposits were strongly influenced by the topography of the bedrock surface. Deep valleys mapped on the bedrock surface developed during pre-Wisconsinan time and were subsequently filled by Wisconsinan deposits. A prominent pre-Wisconsinan and possibly pre-glacial drainage divide on the bedrock surface (elevations greater than 650 feet MSL) cuts across the southern half of DuPage County. The Drainage divide provided separation of surface waters draining into the Lake Michigan Basin from waters entering the Mississippi River Drainage Basin (Bogner, 1988).

The majority of geologic materials overlying the Silurian dolomite bedrock in north-central DuPage County resulted from direct deposition by glacial ice during late Wisconsinan time. Related glaciofluvial (meltwater streams flowing from glaciers) and glaciolacustrine (derived from glacial lakes) deposits, alluvial deposits from modern river channels, surficial loess (buff-colored calcareous wind-blown silt) and deposits colluvial (loose deposits at the foot of cliffs and slopes deposited by gravity) are present. Detailed subsurface investigations performed at the MNL have provided sufficient geotechnical data to classify geologic materials beneath the site into separate geotechnical units (Bogner, 1988), which is discussed in detail in Section 2.5.

2.5 Regional Stratigraphy

The two major regional Pleistocene units present near the MNL are the Wadsworth Till Member of the Wedron Formation and the Lemont Drift, which underlies the Wadsworth Till. The Lemont Drift lies immediately above the Silurian dolomite bedrock. The Lemont Drift consists of a complex sequence of sandy silt till; sediment flow deposits; glaciofluvial sands and gravels; and fine grained glaciolacustrine deposits. This sequence is overlain by fine-grained glacial till materials correlated to the Wadsworth Till Member of the Wedron Formation. The Wadsworth Till is overlain by modern alluvial materials which are present in

the current valley of the WBDR. The modern alluvium is mapped collectively as the Cahokia Alluvium (William and Frye, 1970).

2.6 Regional Hydrogeology

On the Illinois State Geological Survey scale with ratings from A-1, representing the greatest potential for contamination of shallow aquifers, to G, representing the lowest potential for contamination of shallow aquifers, the region which includes MNL is rated B-2. Ratings are based on the capacities of materials to accept, transmit, restrict or remove chemical constituents from groundwater.

The Illinois State Geological Survey Stack Unit Map (Berg et. al., 1984) characterizes the subsurface in this region of DuPage County as follows:

> "sand and gravel within 20 feet of the surface, overlain by relatively impermeable till or other fine grained material. Till or dense bedrock always underlie water-bearing materials. Two to five-foot thick, continuous, shallow deposits of this sand and gravel are used for residential wells through much of south-central Illinois. In northern Illinois, where deeper aquifers are plentiful, these deposits are generally not used, but the potential for use remains. Geologic limitations: The potential for groundwater contamination is high because wastes...will be in contact with water-bearing sand and gravel. Also, the potential for surface water contamination is high because water may flow along contacts between materials with different textures (such as sand and gravel over dense bedrock), then discharge on slopes."

2.7 Site Geology

The uppermost till sequence correlated to the Wadsworth Till defined by William and Frye (1970) can be subdivided into four mappable subunits (Bogner, 1988). The subunits are defined as follows:

W1: Gray silty clay till, trace sand and gravel; water content 20-25%; generally no interbedded lenses or pockets of fluvial or lacustrine material. Upper part usually oxidized brown with water content 15-20% and more dispersed sand and gravel in the till matrix--gradational contact to unoxidized gray W1.

W1/W2: Gray silty sand, clayey sand and gravel, clayey silt: diamicton (deposited underneath glaciers), fluvial, lacustrine material. Highly variable but almost always present; maximum thickness 15 feet. This material occasionally overlies W3 where W2 has been removed. Tentatively interpreted as melt-out deposit due to lateral persistence, variable lithology, and lack of evidence for glacial retreat and re-advance at this stratigraphic position.

W2: Gray silty clay till, little sand and gravel; water content 15-20%; may contain pockets and discontinuous lenses of fluvial or lacustrine material.

W3: Gray clayey silt to sandy silt till, little to some sand and gravel; water content 10-15%; may contain pockets and discontinuous lenses of sand, gravel, and silt that are locally thick.

W4: Gray silty clay till, little to some sand and gravel; water content 15-20%; may contain pockets and discontinuous lenses of fluvial and lacustrine material.

The Lemont Drift underlies the W1-W4 sequence of the Wadsworth Till, and is comprised of sandy silt diamictons and related glaciolacutrine and glaciofluvial materials. The Lemont

Drift has been the subject of study by Bretz (1955), Horberg and Potter (1955), Bogner (1973), Johnson et. al. (1985), and Hansel et. al. (1986). The Lemont Drift sequence can be characterized as proglacial (in front of glacier) lacustrine materials overlain by a coarsening-upward sequence of proglacial sands and gravels overlain by a sandy till. The sandy silt till may be overlain by fluvial or lacustrine materials related to the retreat of Lemont ice or the advance of Wadsworth ice, however, one or more of these units may be absent in a given location, and discontinuous fluvial, lacustrine or sediment flow deposits may be locally present. The Lemont sequence has been mapped and subdivided into five subunits L1 through L5 (Bogner, 1988). The L1-L4 series correspond to the sequential events of Lemont depositional environments. The L-5 subunit was included to indicate the frequent presence of a basal bedrock rubble zone. The L1-L5 subunit series is characterized as follows:

L1: Fluvial sand and gravel, silty sand; lacustrine silt/clayey silt--Lemont outwash or proglacial Wadsworth.

L2: Gray sandy silt, some gravel; water content <15%; generally >20% sand and gravel; lodgment till (characterized by compact fissile structure; containing stones oriented with their long dimensions generally parallel to the direction of ice movement) or melt-out till or sediment flow.

L3: Gray sand and gravel, coarsening upward; top of proglacial Lemont sequence (fluvial).

L4: Gray silt, silty clay, fine sand; generally massive (homogeneous in texture or fabric); bottom of proglacial Lemont sequence (lacustrine).

L5: Gray angular dolomite fragments with sand and gravel; bedrock rubble.

The upper Lemont/lower Wadsworth boundary is characterized by discontinuous fluvial and lacustrine materials. The Lemont/Wadsworth interface is specifically characterized as follows (Bogner, 1988):

> Wadsworth/Lemont interface--may be thin cobble zone or thin sand, gravel, silt, or silty clay present; Lemont surface may be oxidized to brown colors; generally sharp contrast in blow counts (N) between Wadsworth sequence (N<30) and Lemont sequence (N>40); sharp decrease in water content when overlain by W4. Top of Lemont generally 700-725 feet above MSL.

The Cahokia Alluvium (recent alluvium) mapped at the site is characterized by silty clay, silt and sand deposited in modern rivers; it may contain organic debris (shells, wood, roots); it is characterized by high water content (>25%), low unconfined compressive strength (<1 tons per square foot [TSF]), and N values less than 15.

Bogner described cross-section WE4 (in the southern part of MNL) as a surficial alluvial sequence. The alluvial materials included silty clay to clayey gravel, often containing organic debris, and exhibiting high water contents and low compressive strengths. Bogner interpreted this to represent a former channel of the WBDR, occurring in other MNL perimeter cross-sections. W1 was cut out and was missing where the alluvium was present, with a sand and gravel outwash sequence underlying the alluvium. The sand and gravel was mapped as the W1/W2 interface. W2 and W3 are generally present, with W4 missing in borings P-120A and P-121A. The top of the Lemont Drift was encountered at 700 to 725 feet MSL, including sands and gravels (L1) and silt (L2).

Cross-section WE-5, along the northern boundary of MNL, was described as including surficial alluvium toward the eastern extremity of the section near the present channel of the WBDR. In all other borings, W1 was present. The W1/W2 interface was generally present but thin (less than 10 feet). The W1/W2 interface was not present toward the eastern part of the section where W1 is directly underlain by W3.

Cross-sections NS6 and NS7 were described as also containing surficial alluvium. NS6, along the eastern perimeter of the site, showed the alluvium or W1 directly underlain by W3. W4 was mapped to be generally present across the section. The top of the Lemont Drift occurs at 720 to 725 feet MSL and mainly consists of silt (L2), with boring B-117A indicating a 5 foot thick sequence of L1.

Cross-section NS7, along the western perimeter of the site, is shallow. Alluvium is penetrated in borings G-114S and G-115. In borings G-116, alluvium is absent and W1 overlies W2. The W1/W2 interface consisting of sands and gravel is present in borings G-114S and G-115.

Cross-section A-A' (Figure 2-5) runs southwest-northwest through the middle of MNL. Geologic units encountered include the Cahokia alluvium underlain by W1/W2 interface in boring G-114 near the southwest corner of the landfill. The W1/W2 interface is underlain by sequences of W2, W3 and W4 and encountered in borings DV-11 and DV-12. Boring DV-3 is characterized by clay fill underlain by 67 feet of refuse, underlain by W4 (gray silty clay). W4 is encountered in boring DV-5, overlain by approximately 25 feet of refuse and four feet of clay fill. In boring G-108, the W1/W2 interface is encountered, overlain by W1 (gray silty clay).

Cross-section B-B' (Figure 2-5) runs north-south approximately through the middle of the landfill. Geologic units encountered in this profile include W1 underlain by W1/W2 in boring G-101. Boring DV-1 is characterized by W1 overlain by approximately 37 feet of refuse, and seven feet of clay fill. The W1/W2 interface is encountered in boring DV-9, overlain by approximately 73 feet of refuse, and four feet of clay fill. Boring DV-13 extends to the W1/W2 interface, overlain by approximately 56 feet of refuse and four feet of clay fill. Boring G-112 is characterized by W1/W2 overlain by 39 feet of W1.

Cross-section C-C' (Figure 2-6) runs west-east just south of the middle of the landfill. Three of the borings included in the profile (P-125, P-127 and P-129) were advanced to define the stratigraphic and hydrogeologic conditions in the floodplain to the west of the landfill. All three borings include sections of the W1/W2 interface, ranging from 13 to 24 feet in thickness. Boring G-115 includes the Cahokia alluvium overlain by W3 (silt), overlain by W1. Boring DV-8 includes the alluvium overlain by approximately 50 feet of refuse, overlain by four feet of clay fill. Borings DV-4, DV-3 and DV-10 are characterized by W1 overlain by thick sections of refuse (38 to 68 feet), overlain by approximately four feet of clay fill. Boring G-110 exhibits the Cahokia alluvium underlain by primarily by W1, with thin sections of W1/W2 and W3.

2.8 Site Hydrogeology

2.8.1 Water-Bearing Units

The upper-most water-bearing unit in the vicinity of MNL is a sand or sand and gravel unit generally located between about 740 and 765 feet above MSL. Most of the monitoring wells and piezometers installed at the site monitor this zone. The deeper water-bearing unit is the Cahokia alluvium and W1/W2 interface, which appears to be hydraulically connected to the upper water-bearing unit. Based on a review of the site geologic cross-sections, the upper-most water-bearing zone in the landfill is hydraulically connected to and discharges to the WBDR.

2.8.2 Groundwater Flow Direction

Static water level measurements were acquired on August 30, 1995 using an electronic water level indicator capable of measurement within 0.01 feet. The tops of the well casings were previously surveyed vertically to within 0.01 feet of an arbitrary on-site datum plane of 100 feet. Measured water levels were between about 5.23 feet and 28.71 feet below land surface (bls). From this data, a potentiometric surface map was generated and is provided as Figure 2-

7. Assuming that the water levels obtained during the water level survey conducted on August 30, 1995 represent static levels, the groundwater flow direction was to the south.

2.8.3 Estimated Groundwater Velocity

Groundwater flow rates are a function of the following parameters:

- Hydraulic Gradient;
- Effective Porosity; and
- Hydraulic Conductivity (K).

For this assessment, a hydraulic gradient of 4.0×10^{-2} ft/ft was determined from the site potentiometric map presented in Figure 2-7, which represents the potentiometric surface on August 30, 1995. The surficial water-bearing units underlying the site are primarily comprised of sand (Figures 2-1 through 2-6). Based on published ranges of porosity (Freeze and Cherry, 1979), a value of 30 percent was assumed. In the absence of site-specific data, hydraulic conductivity values between 1×10^{-1} and 1.0×10^{-3} cm/sec were used to calculate groundwater flow velocity in the upper water-bearing unit (Freeze and Cherry, 1979).

Groundwater flow velocity was calculated from the standard formula derived from Darcy's law:

$$V = KI/n$$

where V = average flow velocity;
K = hydraulic conductivity;
I = hydraulic gradient; and
n = porosity.

Using the above formula, the calculated average groundwater flow velocity in the upper water-bearing unit is between 0.38 and 38 feet per day.

2.8.4 Landfill Leachate

Based on historic water levels measured in monitoring wells and pizometers at the site, it appears that most of the waste in MNL is at or below the water table. Since details of the landfill are not available, the degree of waste saturation cannot be accurately determined without further study. The maximum volume of leachate is estimated to be on the order of 61 million gallons, assuming fully saturated conditions (RUST, 1994).

3. SUMMARY OF EXISTING ANALYTICAL DATA

3.1 Groundwater Monitoring Well Data

The existing groundwater monitoring well network consists of monitoring wells and piezometers around the perimeter of the landfill. Construction details are listed in Tables 3-1 and 3-2 and the locations are shown on Figure 1-1. Based on groundwater monitoring data obtained from the District, certain monitoring wells were first sampled for chemical constituents in May 1984. Sampling events were generally conducted semi-annually, and typically included analysis of indicator parameters such as chloride; sulfate; total dissolved solids (TDS); total organic carbon (TOC); and volatile organic compounds (VOCs). The monitoring well network was last sampled in June 1994.

3.1.1 Volatile Organic Compounds

Since May 1984, VOCs have been detected in 8 monitoring wells (Table 3-3). VOCs above the Class I groundwater standard (Illinois Administrative Code Part 620) have been detected in only four of these wells (G-102, G-112S, G-116, and G-122). However, based on the August 1995 potentiometric surface map (Figure 2-7), well G-102 is upgradient from the landfill and G-116 is sidegradient. The following tables summarize VOC analytical data from wells G-102 and G-106:

VOCs Detected in Well G-102

Parameter (ug/L)	5/28/85	8/2/85	1/3/86	7/25/88
Benzene	26.4	<1	<1	<1
Chlorobenzene	1.0	<1	<1	<1

VOCs Detected in Well G-116

Parameter (ug/L)	5/28/85	8/2/85	1/3/86	6/12/87	7/25/88
Benzene	7.6	<1	<1	<1	<1
1,1,1-Trichloroethane	<1	<1	2.6[1]	<1	<1
Trichloroethylene	<1	<1	1.4[1]	<1	<1

[1] concentration in quality assurance sample. Compound not detected in original sample.

As shown above, benzene was detected only one time (May 1985) in wells G-102 and G-116.

Well G-112S is located on the south side (hydraulically downgradient) from the landfill. Between May 1985 and January 1993, this well was sampled on 10 occasions. Between 1985 and 1987, 1,2-dichloroethane (1,2-DCA) and/or trichloroethene (TCE) were detected in G-112S just above their respective Class I groundwater standards. However, samples collected in 1988, 1992, and 1993 did not contain any VOCs above the Class I standards. Groundwater data from well G-112S are summarized in Table 3-4.

3.1.2 Inorganic Compounds

An initial assessment of inorganic constituents in groundwater was performed by reviewing data from well G-112S and G-112D. Chloride and TDS were used as indicators of potential impact. Since May 1984, chloride and TDS concentrations have experienced an upward trend in both wells (Figures 3-1 and 3-2). The January 1993 data indicated that G-112S contained 1,515 mg/L chloride and 4,096 mg/L TDS. The Class I groundwater standards for chloride and TDS are 200 mg/L and 1,200 mg/L, respectively. Class II standards for chloride and TDS are equivalent to the Class I standards. Chloride and TDS concentrations in G-112D showed a similar trend, though at lower concentrations. In January 1993, the chloride and TDS concentrations in G-112D were 575 mg/L and 1,712 mg/L, respectively.

3.2 Leachate Well Data

Available chemical data for landfill leachate is primarily from analyses related to the routine disposal of leachate from existing extraction wells. Leachate samples are analyzed for the following parameters:

- biochemical oxygen demand (BOD);
- sodium;
- total solids;
- TCLP metals;
- TCLP VOCs;
- TCLP base/neutral compounds;
- TCLP acid extractable compounds;
- TCLP pesticides/herbicides; and
- polychlorinated biphenyls (PCBs).

None of the compounds listed above have been detected above the regulatory threshold for hazardous waste characteristics or above the threshold for acceptance of the leachate by the local POTW.

3.3 Surface Water Data

Surface water samples have been collected upstream and downstream from the landfill near monitoring wells G-108 and G-115, respectively. Samples were submitted for analysis of volatile priority pollutants, inorganics, and other indicator parameters. Using chloride and TDS as indicator parameters, the data collected to date indicate that upstream and downstream concentrations of TDS and chloride are not significantly different (Figure 3-3). During certain monitoring events, the upstream concentrations of these parameters were greater than the downstream concentrations. Therefore, it appears that the landfill has not affected surface water quality in the WBDR.

3.4 Landfill Gas Data

Routine landfill gas measurements have been made in selected monitoring points dating to March 1990. Between March 1990 and December 1993, measurable gas was consistently detected only in Monitoring Wells G-116 and G-119, and sporadically in G-112S, G-115, and G-120S. However, landfill gas measurements have been limited by liquid levels above the screened interval in the monitoring points, rendering them relatively ineffective. Although the well screens in Monitoring Wells G-115, G-116, and G-119 were submerged during measurements made between March 1990 and December 1993, landfill gas has consistently been measured in wells G-115 and G-116 (Figure 3-4). As shown in Figure 3-4, there is not a strong correlation between liquid levels and the amount of measured landfill gas. Since landfill gas was detected even where the wells screens were submerged, it appears that the gas is present as bubbles in the liquid, or that the gas is able to accumulate in the wells as a result of fluctuating (decreasing) liquid levels in the monitoring points. However, all water level data collected between March 1990 and December 1993 indicate that these levels were above the screened intervals. Therefore, it is likely that the landfill gas, where present, is able to migrate vertically upward in the well casings until it reaches the air/water interface.

Landfill gas generation rates cannot be determined at this time since most of the monitoring points are submerged. However, the generation rates have likely decreased significantly since 1974, when the landfill stopped receiving solid waste.

4. CONCEPTUAL SITE MODEL

This section presents a qualitative assessment of current conditions at the landfill with respect to its potential to cause environmental or human health concerns. A quantitative risk assessment was beyond the requested scope of services. Therefore, it is important to note that MNL may not require remedial action to comply with current State and Federal regulations.

4.1 Impacted Media and Chemicals of Concern

Based on a review of existing data collected to date, no specific potential source areas were identified. VOCs in groundwater have been detected hydraulically downgradient from the landfill at wells G-112S, G-112D, G-119, and G-122. The most recent chemical data indicates that the groundwater quality meets Class I standards for organic constituents but exceeds Class I and Class II standards for selected inorganic constituents.

Landfill gas is being generated at the landfill, though in relatively limited quantities, probably as a result of elevated liquid levels.

There is no indication that surface water quality has been affected by operation of the landfill.

4.2 Release and Transport Mechanisms

4.2.1 W1/W2 Interface

As shown in geologic cross-sections of MNL by Bogner and EMCON, the W1/W2 interface, consisting of sands and gravels with high porosities and hydraulic conductivities, is present underneath most or all of the landfill. The W1/W2 interface is frequently in direct contact with thick sections of refuse. The majority of the boring logs described the interface as very damp to wet, indicating saturated conditions laterally beneath the landfill. The Cahokia

alluvium was encountered in each profile, indicating past and present channels of the WBDR. The alluvium exists under saturated conditions in each of the borings where encountered. The above-described geotechnical units may behave as migration pathways for groundwater and leachate migration into the WBDR and regionally connected extensions of the W1/W2 interface. However, at the present time, there is no evidence that the WBDR has been impacted.

The sands encountered in borings completed beenath the refuse at the landfill have been mapped as either Cahokia alluvium or the W1/W2 interface. Underlying these sands are less permeable units of the Wadsworth Till (W-2 through W-4), consisting of clayey silts, sandy silts, and silty clays. The Lemont Drift underlies the Wadsworth Till beneath the landfill. The Lenont Drift contains sands and gravels forming a continuous aquifer with the underlying Silurian dolomite. Thicker sand and gravel sequences may be present near the MNL and Mallrd Lake landfills based on boring logs east and south of these sites (Bogner, 1988). There is currently no infromation regarding the thickness of the Lemont Drift directly beneath the MNL and no data on groundwater quality in the Lemont Drift.

4.2.2 Former River Channel

Boring logs for borings completed into the landfill near the former channel indicate that there is hydraulic communication between the alluvium and the W1/W2 interface (Figures 2-5 and 2-6). Therefore, the former channel of the WBDR may act as a conduit for groundwater migration off the site, presumably to the west, which is the former direction of surface water flow.

4.2.3 Groundwater Discharge/Recharge Areas

Three borings were advanced to evaluate the stratigraphic and hydrogeologic conditions in the WBDR floodplain west of the landfill (Figure 2-6). Sand and gravel units were encountered in each boring, ranging from 13 to 24 feet thick. These units are probably a

western lateral extension of the W1/W2 interface. Based on a review of site-specific geologic cross-sections (Figures 2-5 and 2-6) and the potentiometric surface map (Figure 2-7), groundwater in the vicinity of the landfill and leachate generated in the landfill most likely discharges to the WBDR. However, based on chemical analyses performed to date, landfill operations do not appear to have impacted the water quality in the WBDR. Potable water is supplied by a municipal system, so the likelihood of ingestion of impacted groundwater or leachate by local residents is small.

4.3 Human and Environmental Receptors

The MNL is bordered by residential areas to the north and to the south, and by a school to the east. There are no indications that these potential human receptors have been impacted by affected media (e.g. groundwater, landfill gas) at the landfill.

5. PRELIMINARY REMEDIAL ACTION OBJECTIVES

Based on the conceptual site model presented in Section 4, the following preliminary remedial action objectives have been developed:

Site Medium	Preliminary Objective(s)
Groundwater	• Minimize migration of impacted groundwater to surface water. • Prevent ingestion by any receptor.
Leachate	• Prevent direct contact. • Minimize migration to groundwater and surface water.
Landfill Contents	• Prevent direct contact
Landfill Gas	• Minimize gas migration and inhalation by receptors
Surface Water	• Prevent ingestion

6. REMEDIAL ALTERNATIVES

Based on the information reviewed to date, the following alternatives will be evaluated in detail in the Feasibility Study:

Alternative Number	Description
1	Continuation of current activities (with and without an upgrade of the existing landfill cover and leachate collection system).
2	Cap in place and upgrade existing leachate collection system.
3	Cap in place and install new perimeter leachate collection system (with possible partial waste removal/relocation).
4	Complete waste removal and restoration (with possible mining of selected materials).

The above alternatives were assembled to provide a range of protective remedial options.

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FIGURES

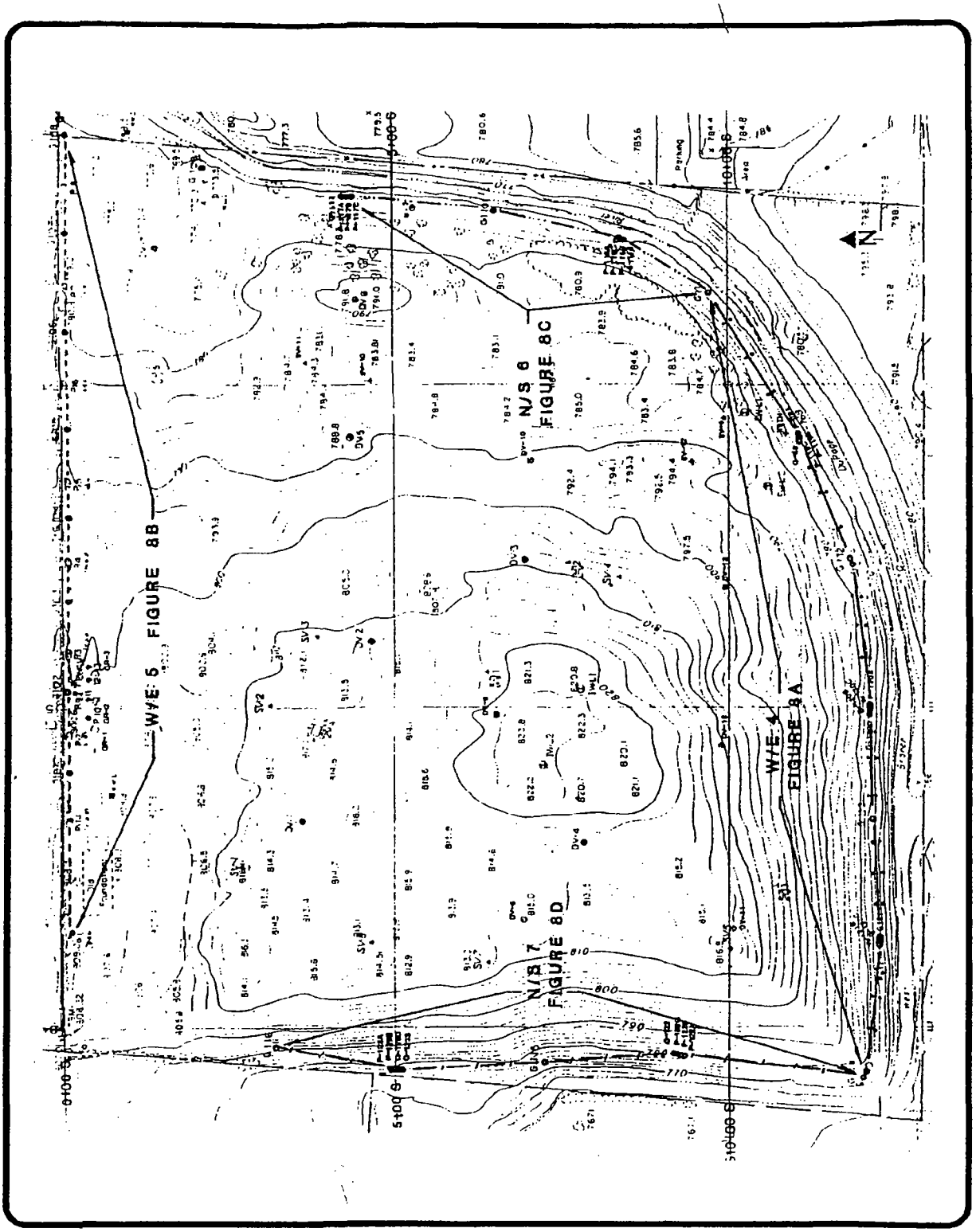

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FIGURE 2-1
MALLARD NORTH
HANOVER PARK, ILLINOIS
LOCATION MAP FOR
MALLARD NORTH CROSS SECTIONS

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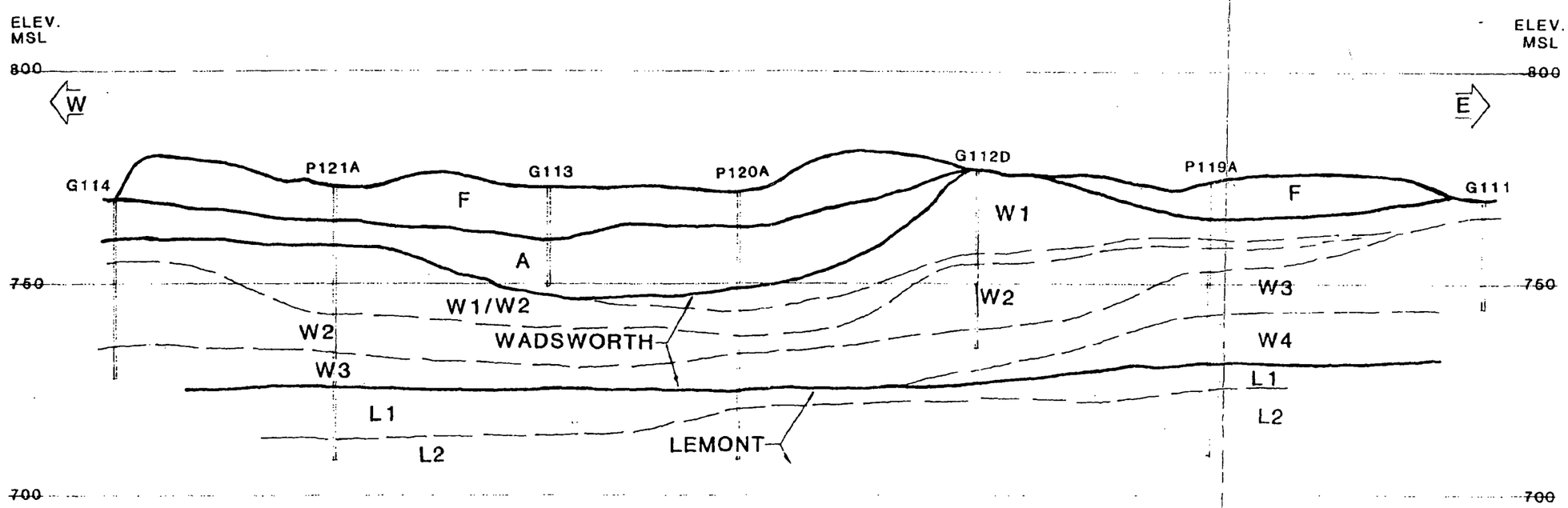

MALLARD LAKE CROSS SECTION (North)

Horiz. Scale 1"/100'
Vert. Scale 1"/25'

SOURCE: BOGNER, 1988 FIGURE 8A.

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FIGURE 2-2

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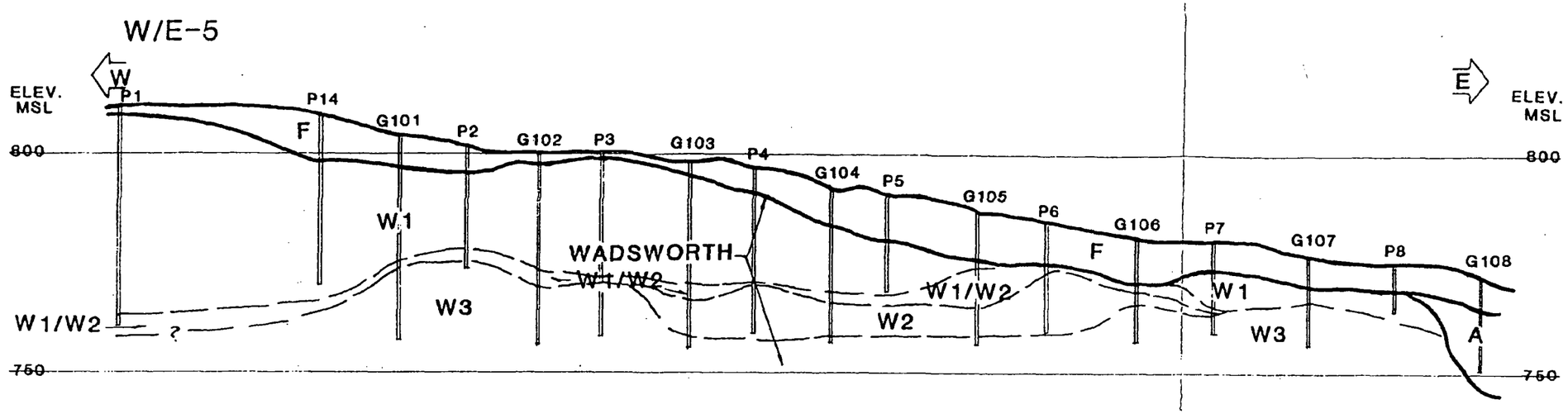

MALLARD LAKE CROSS SECTION (North)

Horiz. Scale 1"/100'
Vert.Scale 1"/25'

SOURCE: BOGNER, 1988 FIGURE 8B.

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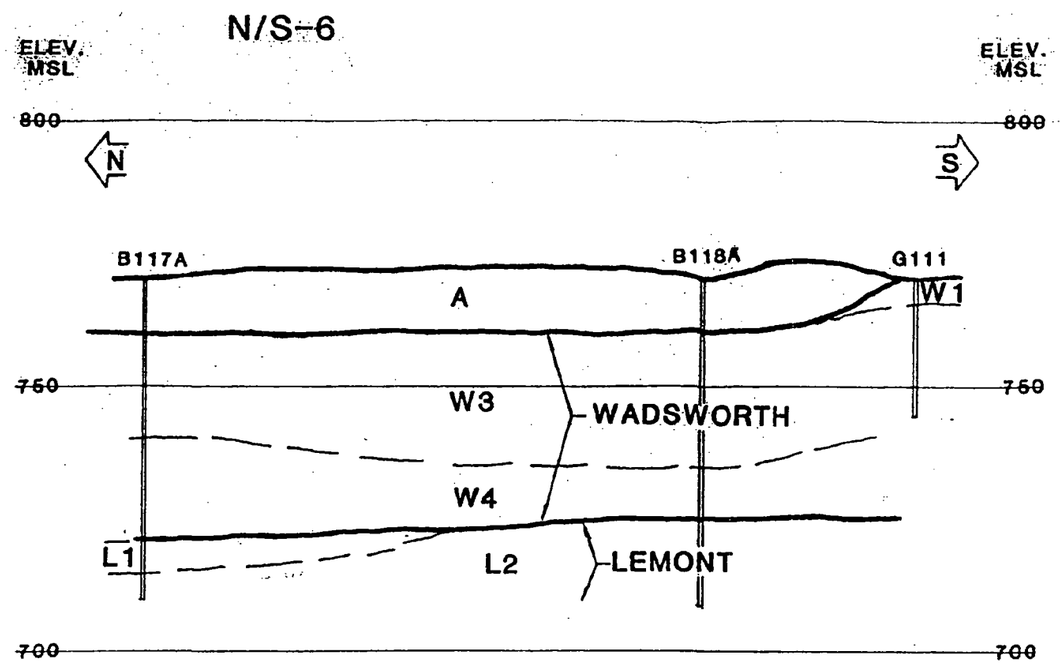
FIGURE 2-3



MALLARD LAKE CROSS SECTION (North)
Horiz. Scale 1"/100'
Vert. Scale 1"/25'

SOURCE: BOGNER, 1988 FIGURE 8C, 8D.

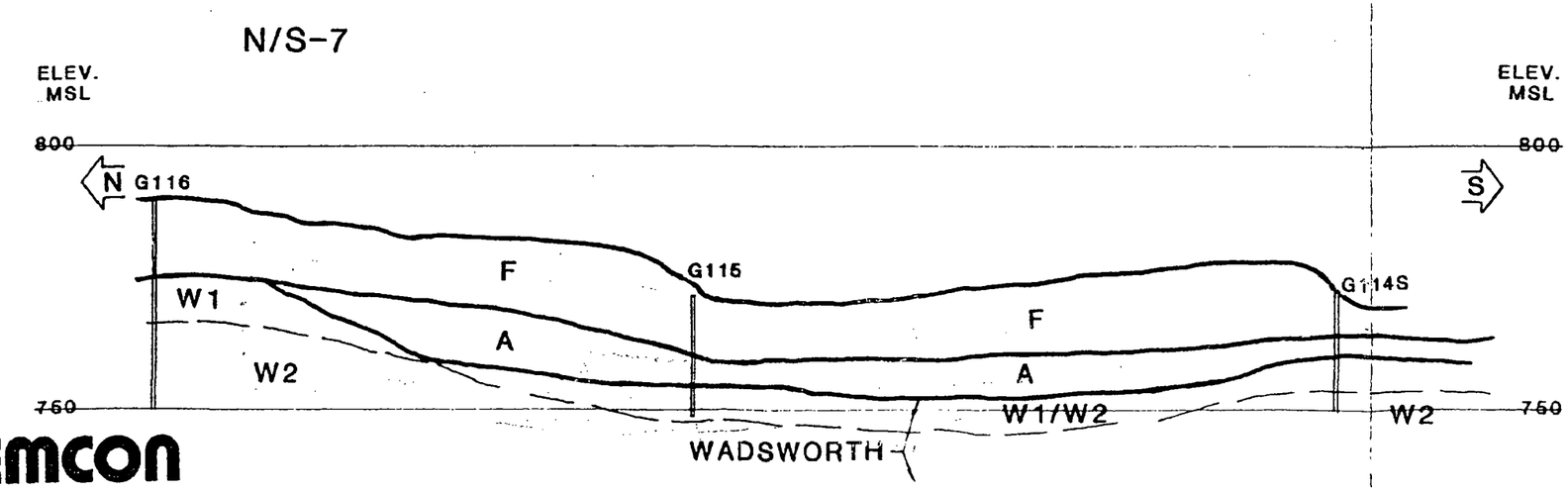


FIGURE 2-4

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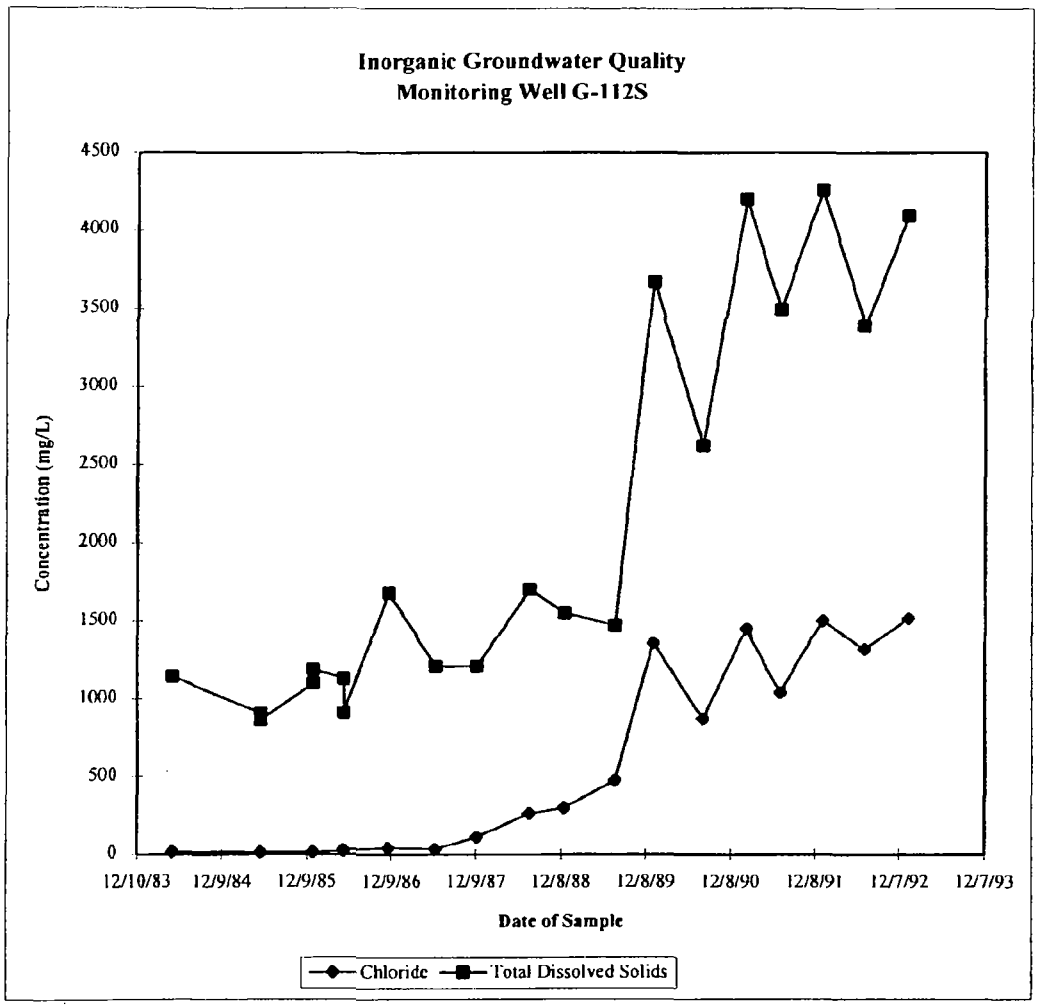

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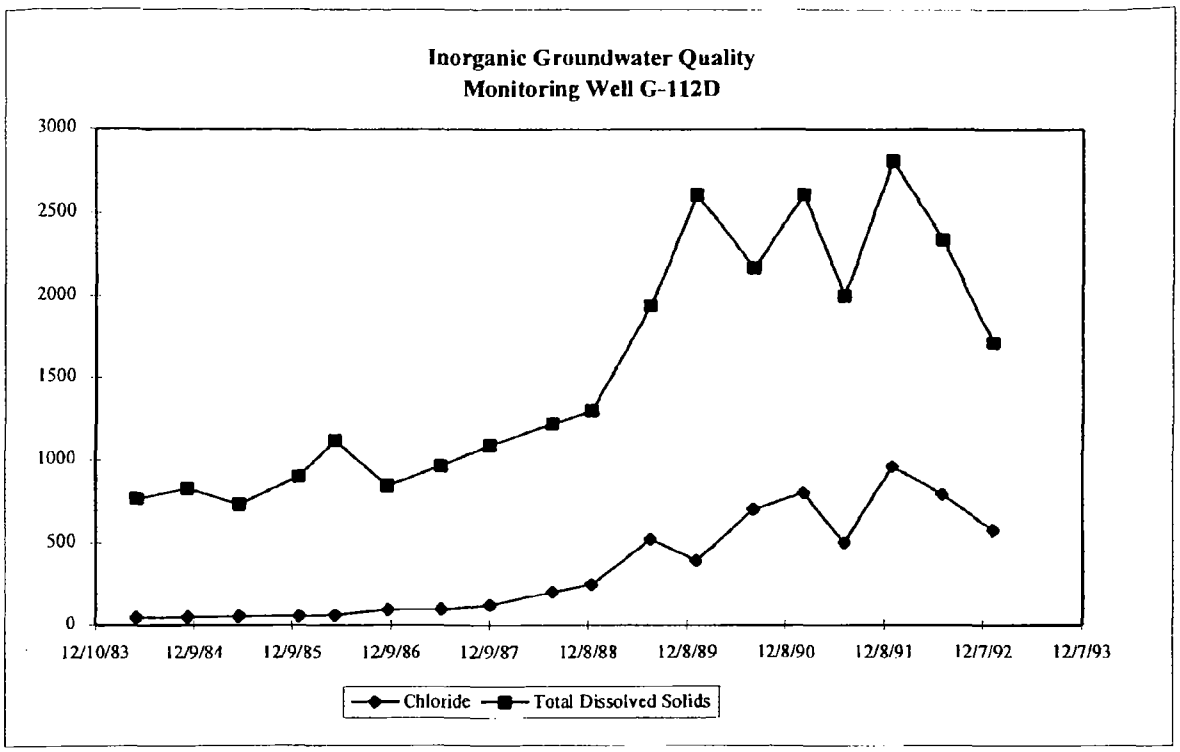

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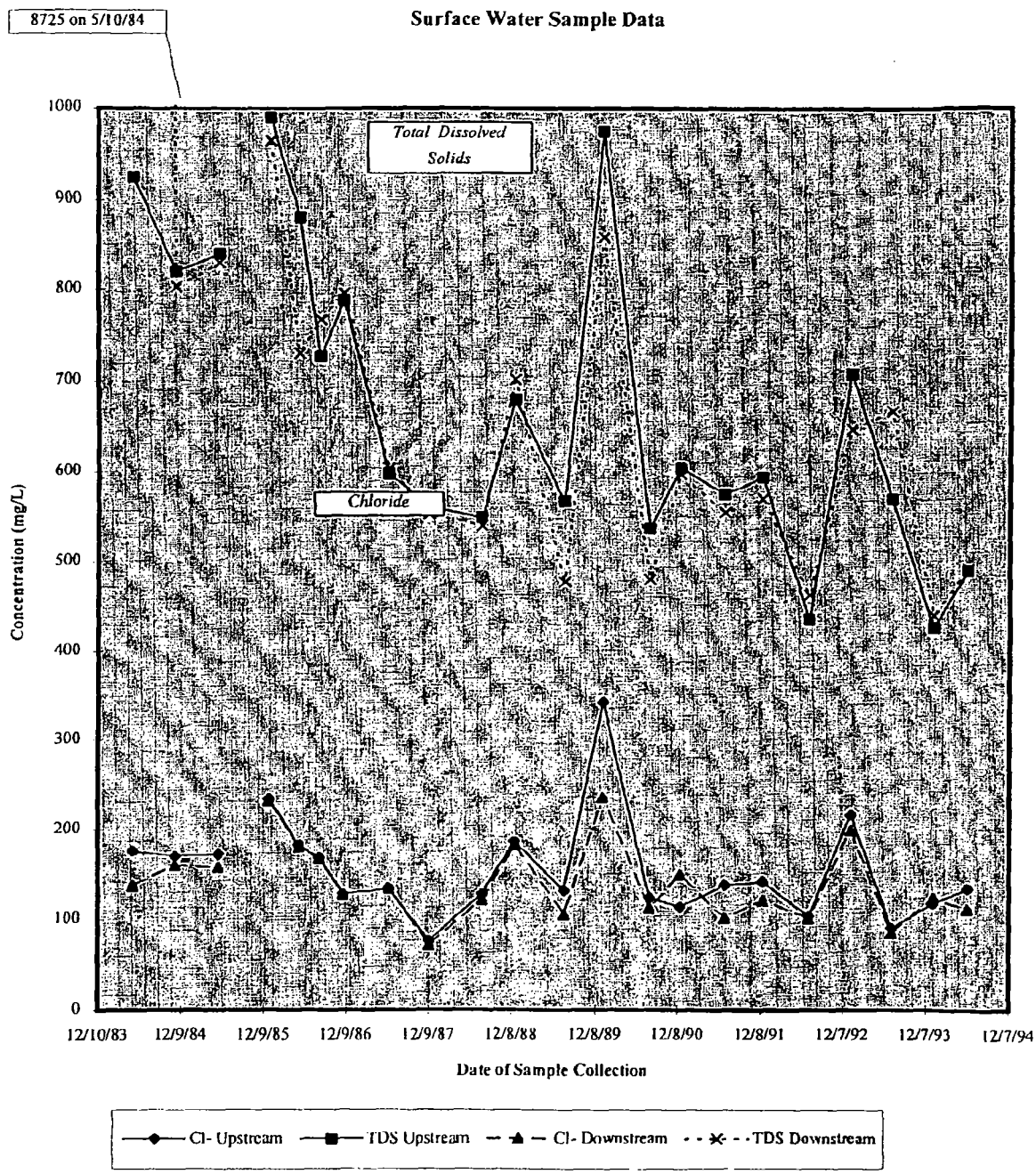

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FIGURE 3-13
MALLARD NORTH
HANOVER PARK, ILLINOIS

SURFACE WATER SAMPLE DATA

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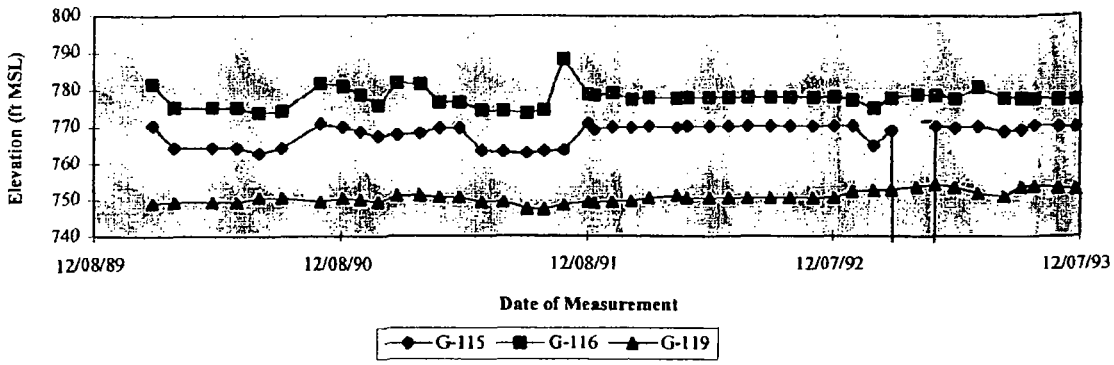
Water Level Data



Landfill Gas Measurements

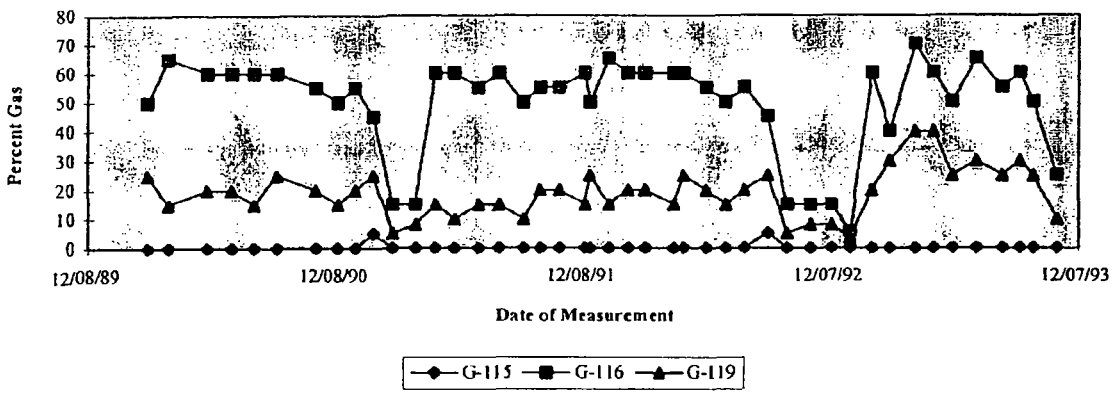


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FIGURE 3-24
MALLARD NORTH
HANOVER PARK, ILLINOIS
WATER LEVEL AND LANDFILL GAS LEVEL

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TABLES

Table 1-1

Hydraulic Conductivity Data
Mallard North Landfill, Hanover Park, Illinois

Sample I.D	Location	Depth (cm)	Hydraulic conductivity (cm/sec)		Bulk density (g/cm^3)
			High	Low	
S-4	Fracture	4	2.99×10^{-3}	6.39×10^{-4}	0.99
D-7	Fracture	5	4.21×10^{-3}	6.85×10^{-4}	0.94
D-12	West side	5	4.39×10^{-5}	6.20×10^{-6}	1.29
D-2	West side	5	3.09×10^{-5}	1.10×10^{-6}	1.39
S-3	Pond area	7	1.20×10^{-3}	1.10×10^{-4}	1.13
S-14	Gully	7	2.10×10^{-6}	2.19×10^{-7}	2.01
S-9	Fracture	8	1.05×10^{-2}	9.00×10^{-7}	NA
S-13	Pond area	8	1.02×10^{-3}	6.00×10^{-5}	1.16
S-7	Non-fractured	8	4.75×10^{-4}	4.43×10^{-5}	1.17
S-8	Non-fractured	8	8.85×10^{-4}	9.43×10^{-5}	1.23
S-21	Area D	8	9.49×10^{-4}	5.15×10^{-4}	1.26
S-10	Fracture	8	5.15×10^{-5}	1.36×10^{-7}	1.26
S-19	Non-fractured	8	8.80×10^{-4}	2.58×10^{-4}	1.36
S-5	Dead area	8	3.62×10^{-3}	1.54×10^{-5}	1.38
S-11	Near fracture	8	5.76×10^{-4}	3.32×10^{-5}	1.41
S-12	Pond area	8	3.12×10^{-5}	1.00×10^{-7}	1.83
S-18	Coarse top	8	4.49×10^{-4}	5.00×10^{-8}	1.90
D-6	Pond area	20	5.66×10^{-4}	4.85×10^{-5}	1.16
S-20	Fracture	20	1.51×10^{-4}	1.00×10^{-7}	1.38
S-24	Area A	25	9.90×10^{-6}	1.70×10^{-6}	1.36
D-3	Central	25	6.00×10^{-7}	1.00×10^{-7}	1.83
D-13	West slope	30	6.36×10^{-4}	7.38×10^{-5}	1.64
S-15	Gully	30	NA	2.84×10^{-8}	1.79
D-9	South slope	30	5.58×10^{-8}	NA	1.94
S-23	Area A	30	3.34×10^{-8}	2.26×10^{-8}	1.74
S-22	Area D	35	5.84×10^{-8}	3.84×10^{-8}	1.63

Source: Booth and Price, 1988.
NA - not available.

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Table 3-1

Monitoring Well Construction Details (7/3/89)
Mallard North Landfill, Hanover Park, Illinois

Location	North Coordinate	East Coordinate	Top of Rim	Top of PVC	Ground Elevation	Depth (ft bls)	Well Screen Interval
G-101	-10.41	393.86	806.01	805.96	804.10	47.0	762.10-757.10
G-102	-8.66	526.36	802.24	802.26	800.56	43.0	762.56-757.56
G-103	-9.37	660.58	798.72	798.83	797.84	41.0	761.84-756.84
G-104	-10.52	791.59	793.81	793.84	792.94	35.0	762.94-757.94
G-105	-10.64	924.92	787.79	787.75	786.41	29.0	762.41-757.41
G-106	-10.21	1077.36	781.50	781.50	780.43	23.0	762.43-757.43
G-107	-10.29	1232.36	777.83	777.84	776.06	19.0	761.80-756.80
G-108	-10.40	1386.79	773.67	773.51	771.57	19.0	757.57-752.57
G-109	-221.63	1333.71	771.19	771.27	770.44	18.0	761.94-752.44
G-110	-670.46	1268.18	770.97	770.94	771.32	29.0	767.32-742.32
G-111	-973.60	1144.02	772.70	772.52	769.80	26.0	
G-112S	-1184.24	728.50	776.12	775.82	774.44	24.0	755.44-750.44
G-112D	-1187.76	720.69	775.83	775.20	773.77	42.0	
G-113			774.98	774.91	772.73	22.0	
G-114S	-1203.39	-79.51	772.82	772.36	770.08	20.0	
G-114D	-1208.91	-70.97	773.25	772.86	771.17	42.0	734.17-729.17
G-115	-727.73	-53.65	774.59	774.48	772.10	22.0	755.10-750.10
G-116	-326.25	-30.11	792.69	792.63	790.70	38.0	757.10-752.10
G-117	-426.68	1293.99	772.95	772.09	770.57	22.5	753.07-748.07
G-118	-849.43	1218.54	771.35	771.26	769.42	22.5	751.92-746.92
G-119	-1106.98	911.86	776.71	776.47	775.08	33.5	746.58-741.58
G-120S	-1221.10	495.00	774.79	774.70	772.67	25.5	752.17-747.17
G-120D	-1221.21	498.15	774.71	774.72	772.69	52.0	725.69-720.69
G-121	-1226.44	141.70	774.72	774.65	772.79	25.0	752.79-747.79
G-122	-921.74	-42.04	781.82	781.70	779.87	28.0	756.87-751.87
G-123S	-510.19	-67.51	777.93	777.91	776.23	18.0	763.23-758.23
G-123D	-504.86	-67.39	777.94	777.73	776.44	35.0	742.44-741.44
G-124	-478.07	-425.02			764.70	32.2	737.50-732.50

Elevations in feet Mean Sea Level
Negative (-) Coordinates are South and West
ft bls - feet below land surface

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Table 3-2

Liquid Probe Construction Details
Mallard North Landfill, Hanover Park, Illinois

Location	North Coordinate	East Coordinate	Top of Casing	Top of PVC	Ground Elevation	Depth (ft bls)	Screened Interval
P-117A	-430.73	1293.70	772.82	772.67	770.59	60.0	712.59-710.59
P-117B	-433.79	1292.39	772.97	772.82	770.81	51.5	721.31-719.31
P-117C	-436.79	1291.78	772.95	772.39	770.85	40.0	732.85-730.85
P-118A	-839.61	1224.28	771.43	771.24	769.05	60.0	711.05-709.05
P-118B	-845.57	1220.77	771.42	771.43	769.76	48.0	723.76-721.76
P-118C	-842.79	1222.30	771.71	771.46	769.20	40.0	731.20-729.20
P-119A	-1104.18	925.64	776.20	776.16	774.13	65.0	711.13-709.13
P-119B	-1104.70	920.65	776.58	776.48	774.31	55.0	721.31-719.31
P-119C	-1105.30	916.36	777.01	776.82	774.93	45.0	731.93-729.93
P-120A	-1221.25	503.59	774.70	774.47	772.64	64.0	710.64-708.64
P-120C	-1221.27	499.94	775.05	774.71	772.69	39.0	735.69-733.69
P-121A	-1226.76	126.69	774.75	774.77	772.56	64.0	710.56-708.56
P-121B	-1227.78	131.51	774.59	774.55	772.61	51.0	723.61-721.61
P-121C	-1227.23	135.56	774.68	774.58	772.83	38.0	736.83-734.83
P-122A	-933.67	-47.43	781.03	780.73	779.05	68.0	713.05-711.05
P-122B	-929.25	-45.35	781.67	781.51	779.59	63.0	718-59-716.59
P-122C	-925.94	-44.47	781.54	781.45	779.84	33.0	748.84-746.84
P-123A	-496.10	-69.29	777.58	777.58	775.83	60.4	717.43-715.43
P-123B	-499.13	-67.72	778.05	777.93	776.32	45.3	733.02-731.02
P-125	-738.69	-523.70	769.14	769.11	767.00	30.0	745.30-743.10
P-126A	-320.80	-808.09	767.86	768.03	765.30	99.0	670.30-667.30
P-126B	-325.57	-808.15	767.88	768.04	765.30	69.5	700.70-698.50
P-126C	-329.84	-808.12	768.13	768.18	765.10	46.5	722.80-720.60
P-126D	-333.01	-808.20	767.98	768.11	765.10	30.0	738.10-735.90
P-127	-711.79	-889.99	769.61	769.67	767.50	28.0	745.00-742.80
P-128	-270.70	-1209.56	766.17	766.13	764.00	30.0	741.70-739.50
P-129	-700.89	-1257.80	767.04	766.95	764.90	24.0	744.60-742.40

Elevations in feet Mean Sea Level
Negative (-) Coordinates are South and West
Ground elevations measured 11/87.
ft bls - feet below land surface

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Table 3-3

Monitoring Wells in Which VOCs Have Been Detected
Mallard North Landfill, Hanover Park, Illinois

Chemical	G101	G102	G112D	G112S	G116	G119	G122	G123D
Benzene	X	X		X	X		X	X
Chlorobenzene		X						
1,2-Dichloroethane			X	X				
1,1,1-Trichloroethane				X	X		X	
1,1-Dichloroethane			X	X		X		
Chloroform						X		
1,1-Dichloroethylene				X				
trans-1,2-Dichloroethylene				X				
1,2-Dichloropropane				X				
Ethylbenzene				X				
Dichlorobromethane								
Tetrachloroethylene							X	
Trichloroethylene				X	X			
cis-1,2-Dichloroethylene			X	X		X		
Xylenes				X		X		

X - Chemical detected at least once in monitoring well.

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Table 3-4

Groundwater Sample Data Summary - G112S (East)
Mallard North Landfill, Hanover Park, Illinois

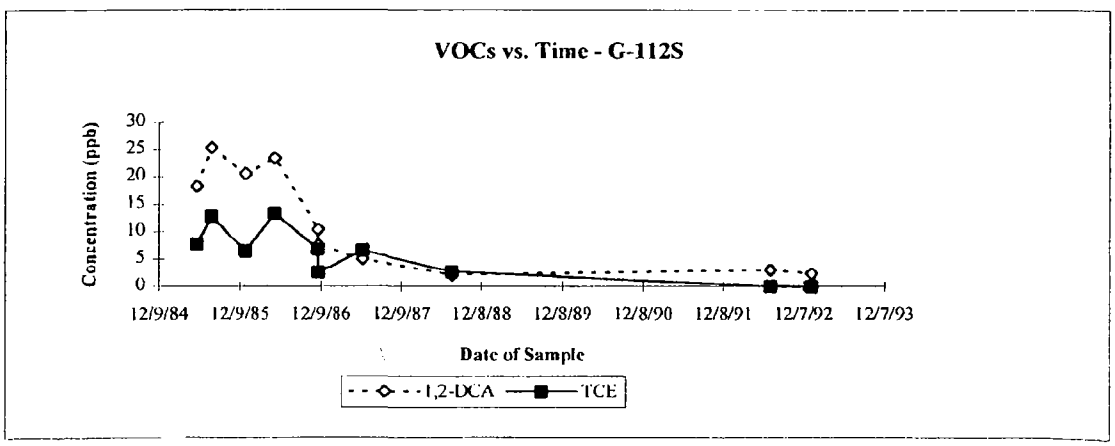
Parameter	5/28/85	8/2/85	1/3/86	5/14/86	11/25/86	Class I Standard [1]
Benzene	<1.0	<1.0	<1.0	4.3	9	5
1,2-Dichloroethane	18.3	25.3	20.5	23.4	10.4	5
1,1-Dichloroethane	16.9	15.4	8.5	7.2	4.8	NE
trans-1,2-Dichloroethene	2.7	3.3	1.9	2.6	1.9	NE
1,2-Dichloropropane	1	1.1	<1.0	1.3	<1.0	5
Tetrachloroethene	2.4	1	1.5	<1.0	1.8	5
Trichloroethene	7.7	12.7	6.4	13.3	6.7	5
cis-1,2-Dichloroethene	41	37.1	19.9	40	19.6	70
Xylenes	2	2	<1.0	3.8	2.3	10000

Parameter	11/26/86	6/15/87	7/26/88	7/9/92	1/12/93	Class I Standard [1]
Benzene	1.5	<1.0	<1.0	<1.0	3.9	5
1,2-Dichloroethane	7.5	5	2.1	3	2.3	5
1,1-Dichloroethane	2	1.7	2.1	3.2	2.7	NE
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	NE
1,2-Dichloropropane	<1.0	<1.0	<1.0	<1.0	<1.0	5
Tetrachloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	5
Trichloroethene	2.6	6.5	2.7	<1.0	<1.0	5
cis-1,2-Dichloroethene	7.4	4.3	4	1.6	2.6	70
Xylenes	<1.0	<1.0	<1.0	<1.0	<1.0	10000

All values in units of ug/L (parts per billion)

[1] Groundwater standard from 35 IAC Part 620.

NE - Not established.



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APPENDIX A

APPENDIX

SOIL BORING LOGS

MONITORING WELLS (G-SERIES)
LIQUID PROBES (B-SERIES)

TEST BORINGS AND MONITORING STATIONS,

PROJECT NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL

BORING 101 G-101 DATE STARTED 10-8-80 DATE COMPLETED 10-8-80 JOB 17,823

ELEVATIONS

GROUND SURFACE 803.6

END OF BORING 756.6

WATER TABLE

AT END OF BORING -38.0'

24 HOURS - 7.2'

While Drilling -13.0'

SHEET 1 OF 2

Distance Below Surface in Feet	LENGTH RECOVERY	SAMPLE NO.	TYPE	N	WC	Q_u*	% DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
0		1a/b	SS	12	19.8 / 23.3					FILL - Brown to dark brown silty CLAY and black clayey TOPSOIL, trace sand, gravel, grass and pieces of plastic wrap
		2a/b	SS	10	22.4 / 21.3					
5		3a/b	SS	23	16.3					
		4a/b	SS	13	31.4 / 21.0	1.5		7.0 / 7.7	796.6 / 795.9	Black clayey TOPSOIL
10		5a/b	SS	21	19.5 / 19.7	4.5+ / 4.5+		9.0	794.6	Tough brown silty CLAY, little sand, trace gravel, moist (CL); occasional silty clayey sand seam
		6a/b	SS	25	20.2 / 19.8	4.5+ / 4.5+				Hard to very tough brown and grayish-brown silty CLAY, trace sand and gravel, moist (CL)
		7a/b	SS	31	20.3 / 21.6	4.5+ / 4.5+				
15		8a/b	SS	23	21.0 / 19.3	3.5 / 4.25		15.5	788.1	
		9a/b	SS	29	18.6 / 17.7	4.25 / 4.25				Hard to tough gray silty CLAY, trace sand and gravel, moist (CL) occasional silt seams above -17'
20		10a/b	SS	20	20.7 / 20.2	2.5 / 2.5				
		11a/b	SS	23	22.4 / 21.7	3.0 / 2.75				
		12a/b	SS	17	21.3 / 24.9	1.5 / -				
25		13a/b	SS	12	22.2 / 23.0	1.75 / 1.5				
		14a/b	SS	16	24.1 / 21.5	2.5 / 2.5				
30		15a/b	SS	12	14.7 / 14.4	1.5 / 1.5		29.0	774.6	Tough brownish-gray silty CLAY, little to some sand, trace gravel, moist (CL); occasional clayey silt seams
		16a/b	SS	41	10.3 / 12.3	3.5 / 3.8		31.0	772.6	
		17a/b	SS	28	11.8 / 11.7	4.3 / 4.0				Very tough to hard gray very silty CLAY, some sand, trace gravel, moist (CL)
35		18a/b	SS	21	14.0 / 13.0			35.0	758.6	Firm gray clayey SILT, trace sand and gravel, moist (ML); occasional silt seams
		19a/b	SS	16	15.7 / 15.3	2.3		37.5	766.1	Very tough gray silty CLAY, little sand and gravel, moist (CL)
40		20a	SS	33	17.2	2.5				

Boring Log continued

DRILL RIG NO. 79

TESTING SERVICE *-Approximate unconfined compression strength based on measurements with

FPD 016179

PROJECT NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL

BORING 101(Cont'd) DATE STARTED 10-8-80 DATE COMPLETED 10-8-80 JOB 17,823

G-101

ELEVATIONS

GROUND SURFACE 803.6

END OF BORING 756.6

WATER TABLE

AT END OF BORING -38.0'

24 HOURS - 7.2'

While Drilling -13.0'

Distance Below Surface in Feet	LENGTH RECOVERY	SAMPLE NO.	TYPE	N	WC	Q_u*	γ_d DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
40		20b	SS	33	15.5	3.0				
		21a b	SS	19	17.2 14.6	2.8 3.5				Very tough gray silty CLAY, little sand and gravel, moist (CL)
		22a b	SS	39	12.2 11.6	4.5+ 4.5+		43.0	760.6	Hard gray very silty CLAY, little to some sand and gravel, moist (CL)
45		23a b	SS	40	12.7 13.1	4.5+ 4.5+				
50										
55										
60										
65										
70										
75										
80										

End of Boring at -47.0 Feet

No gas was detected during drilling operations.

The bottom of the monitoring well was installed at a depth of -47.0 feet; backfill with gravel to -7.0 feet and then sealed with Bentonite.

*-Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 79

PROJECT TEST BORINGS AND MONITORING STATIONS, NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL.

BORING 102 (G-102) DATE STARTED 10-8-80 DATE COMPLETED 10-9-80 JOB 17,823

ELEVATIONS

GROUND SURFACE 800.1

END OF BORING 757.1

WATER TABLE

AT END OF BORING 35.0'

24 HOURS ----

WHILE DRILLING 38.7'

SHEET 1 OF 2

SAMPLE NO.	TYPE	N	WC	Q_u*	DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
1a, 1b	SS	12	23.0, 17.2			3.2	796.9	FILL - Black clayey TOPSOIL, & brown & gray silty CLAY, trace sand & gravel
2a, 2b	SS	18	13.6, 14.0	4.5+, 3.0		5.0	795.1	Hard to very tough brown very silty CLAY, trace to little sand, trace gravel, moist (CL); 1" clayey sand seam at 4.0 feet.
3a, 3b	SS	12	18.4, 18.4	4.5+, 4.5+				
4a, 4b	SS	15	19.6, 19.5	4.5+, 4.5+				Hard brown silty CLAY, trace sand & gravel, moist (CL): occasional silt seams
5a, 5b	SS	18	20.3, 20.7	4.5+, 4.5+				
6a, 6b	SS	27	19.5, 18.7	4.5+		13.0	787.1	
7a, 7b	SS	26	19.5, 20.5	4.5+, 4.5+		15.0	785.1	Hard brown & gray silty CLAY, trace sand & gravel, moist (CL)
8a, 8b	SS	19	19.8, 19.2	3.5, 3.0				Very tough gray silty CLAY, trace sand & gravel, moist (CL): 2-inch wet sand & gravel seam at 21.5 feet
9a, 9b	SS	20	18.7, 20.2	3.5, 3.25				
10a, 10b	SS	15	20.8, 20.7	3.5, 3.5				
11a, 11b	SS	15	22.5, 22.9	2.0, 2.5				
12a, 12b	SS	17	----, 21.6	3.9, 3.0				
13a, 13b	SS	20	22.4, 22.4	3.75, 3.5				
14a, 14b	SS	35	25.1, 16.0	3.5		27.5	772.6	Dense brown & gray SILT (ML) with numerous thin layers of fine to medium sand, very moist
15a, 15b	SS	13	18.5, 12.3	3.5		29.0	771.1	Laminated very tough gray silty CLAY & firm gray clayey SILT (CL-ML) with seams of silt, trace fine sand, moist to very moist
16a, 16b	SS	36	11.1, 13.8	4.5, 2.75		30.5	769.6	Very tough to hard gray silty CLAY, little to some sand & gravel, moist (CL); occasional clayey silt seams
17a, 17b	SS	33	10.5, 12.1	4.5+, 4.5+		35.0	765.1	Hard gray silty CLAY, little sand & gravel, moist (CL)
18a, 18b	SS	37	14.4, 13.4	4.5+, 4.5+				
19a, 19b	SS	53	14.1, 13.9	4.5+, 4.5+		38.7	761.4	Firm gray SAND & GRAVEL, saturated (SW-GW)
20a	SS	26	18.6			39.5	760.6	

Distance Below Surface in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40

BORING LOG CONTINUED

DRILL RIG NO. 79

TESTING SERVICE

*-Approximate unconfined compression strength based on measurements with

TEST BORINGS AND MONITORING STATIONS,

PROJECT NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL.

BORING 102(Cont.) DATE STARTED 10-8-80 DATE COMPLETED 10-9-80 JOB 17,823

G-10Z

ELEVATIONS

GROUND SURFACE 800.1

END OF BORING 757.1

WATER TABLE

AT END OF BORING 35.0'

24 HOURS ----

WHILE DRILLING 38.7'

Distance Below Surface in Feet	LENGTH RECOVERY	SAMPLE NO.	TYPE	N	WC	Q_u*	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
40		20b	SS	26	26.1	1.0				Tough to hard gray silty CLAY, little sand & gravel, moist (CL)
		21a	SS	32	18.9	4.25				
		21b			13.8	4.5+				
45										
50										
55										
60										
65										
70										
75										
80										

End of Boring at 43.0 feet.

No gas was detected during drilling operations.

The bottom of the monitoring well was installed at a depth of 42.0 feet; backfilled with gravel to 6.0 feet, and then sealed with bentonite.

*-Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 79

TEST BORINGS AND MONITORING STATIONS,
PROJECT NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL

BORING 103 DATE STARTED 10-9-80 DATE COMPLETED 10-9-80 JOB 17,823

G-103

ELEVATIONS

GROUND SURFACE 796.8

END OF BORING 755.8

WATER TABLE

AT END OF BORING Dry

24 HOURS 28.2'; caved at 29.2'

WHILE DRILLING Dry

SHEET 1 OF 2

SAMPLE NO.	TYPE	N	WC	Q_u*	% DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
						0		
1a	SS	18	13.4					FILL - Black clayey TOPSOIL with dark brown silty clay
1b			25.5	2.25		2.2	794.6	
						3.0	793.8	Very tough dark brown silty CLAY, moist (CL)
2a	SS	20	18.1	4.0				
2b			18.7	4.5+				
3a	SS	30	18.8	4.5+				
3b			19.5	4.5+				Hard brown silty CLAY, trace to little sand, trace gravel, moist (CL)
4a	SS	28	19.8	4.5+				
4b			17.6	4.5+				
5a	SS	18	19.6	4.5+				
5b			20.2	4.5+				
6a	SS	27	21.0	4.5+				
6b			21.2	4.5+		13.0	783.8	
7a	SS	18	19.1	4.0				
7b			19.5	3.75				
8a	SS	14	19.0	2.25				
8b			20.6	2.5				
9a	SS	13	22.3	2.25				
9b			20.4	2.5				Hard to very tough gray silty CLAY, trace sand & gravel, moist (CL)
10a	SS	16	----	3.0				
10b			20.7	3.25				
11a	SS	18	21.3	3.0				
11b			20.4	2.75				
12a	SS	15	20.7	3.5				
12b			22.3	3.5				
13a	SS	18	21.4	3.75				
13b			22.6	3.75				
14a	SS	19	18.9	4.25		27.7	769.1	
14b			15.7	----				Layers of firm brownish-gray clayey SILT (ML) & tough gray silty CLAY (CL), little sand, trace gravel, moist; a few wet sand & silt seams
15a	SS	17	13.5	----				
15b			15.8	1.5		31.0	765.8	
16a	SS	18	11.8	3.0				Very tough to hard brownish-gray very silty to silty CLAY, little to some sand & gravel, moist (CL), a few silt seams, occasional clayey silt layers below 35 feet.
16b			12.4	2.0				
17a	SS	18	17.4	4.0				
17b			15.9	4.0				
18a	SS	18	15.3	3.0				
18b			15.3	2.75		37.3	759.8	
19a	SS	27	15.6	----				Firm brownish-gray clayey SILT, little to some sand, trace gravel, moist (ML)
19b			15.7	----		39.0	757.8	
20a	SS	23	12.1	4.0				(see next sheet)

Distance Below Surface in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40

BORING LOG CONTINUED

DRILL RIG NO. 50

TESTING SERVICE

*-Approximate unconfined compression strength based on measurements with

PROJECT TEST BORINGS AND MONITORING STATIONS, NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL

BORING 103(Cont) DATE STARTED 10-9-80 DATE COMPLETED 10-9-80 JOB 17,823

G-103

ELEVATIONS

GROUND SURFACE 796.8

END OF BORING 755.8

WATER TABLE

AT END OF BORING Dry

24 HOURS

WHILE DRILLING Dry

SHEET 2 of 2

Distance Below Surface in Feet	LENGTH	RECOVERY	SAMPLE NO.	TYPE	N	WC	Q_u*	γ_d DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
40			20b	SS	23	12.3	4.5				Layers of hard gray silty CLAY, (CL) & firm gray clayey SILT (ML); little to some sand, trace gravel, moist
45											
50											
55											
60											
65											
70											
75											
80											

End of Boring at 41.0 feet.

No gas was detected during drilling operations.

The bottom of the monitoring well was installed at a depth of 41.0 feet; backfilled with gravel to 7.0 feet and sealed with bentonite.

*-Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 50

FPD 016184

TEST BORINGS AND MONITORING STATIONS,
NORTH OF EXISTING MALLARD LAKE LANDFILL

PROJECT

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL.

BORING 104 DATE STARTED 10-10-80 DATE COMPLETED 10-10-80 JOB 17,823

G-104

ELEVATIONS

GROUND SURFACE 791.8

END OF BORING 756.8

WATER TABLE

AT END OF BORING 32.0'

24 HOURS 17.5'

WHILE DRILLING 23.2'

Distance Below Surface in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40

LENGTH RECOVERY	SAMPLE NO.	TYPE	N	WC	Q_u*	γDRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							1.0	790.8	FILL - Black clayey TOPSOIL
	1a	SS	17	16.0					FILL - Brown silty CLAY & black clayey TOPSOIL, trace sand & gravel
	b			20.7					
	2a	SS	19	19.7					
	b			27.2					
	3a	SS	9	33.3					
	b			27.4	2.75		6.5	785.3	
							7.0	784.8	Very tough dark grayish-brown silty CLAY, moist (CL)
	4a	SS	24	25.8	3.5				
	b			22.1	2.5		8.7	783.1	Very tough brown silty CLAY, moist (CL)
	5a	SS	21	19.2	4.5+				
	b			18.9	4.5+				
	6a	SS	32	18.0	4.5+				Hard brown silty CLAY, trace sand & gravel, moist (CL); sand seam at 11.0 feet; occasional silt seams below 13 feet
	b			19.0	4.5+				
	7a	SS	21	16.5	4.0				
	b			22.3	4.5+				
	8a	SS	20	22.2	4.5+				
	b			20.7	4.5+		16.0	775.8	Hard brown & gray silty CLAY, trace sand & gravel, moist (CL)
	9a	SS	25	21.4	4.5+		17.5	774.3	
	b			23.0	3.5				
	10a	SS	11	20.4	3.5				Very tough to hard gray silty CLAY, trace sand & gravel, moist (CL)
	b			20.1	4.0				
	11a	SS	18	20.2	3.5				
	b			19.9	3.5				
							23.2	768.6	
	12a	SS	41	11.6					Dense to firm gray clayey SILT, some sand & gravel, moist (ML); occasional wet gravel seams; clayey sandy silt seam at 25.7 feet.
	b			10.1					
	13a	SS	18	11.2					
	b			11.6	4.25		26.0	765.8	Hard gray silty CLAY, little to some sand, trace gravel, moist (CL) occasional wet sand & gravel seams
	14a	SS	28	11.9	4.0				
	b			11.7	4.0				
							29.0	762.8	
	15a	SS	18	15.6	2.5				Very tough to hard grayish-brown to gray very silty CLAY, little sand, trace gravel, moist (CL); occasional clayey silt seams
	b			16.2	4.5+				
	16a	SS	24	17.9	2.5				
	b			17.3	3.0				
							33.0	758.8	
	17a	SS	19	14.3					Firm gray clayey SILT, little sand, trace gravel, moist (ML)
	b			12.5					

End of Boring at 35.0 feet.

No gas was detected during drilling operations.

The bottom of the monitoring well was installed at a depth of 35.0 feet; backfilled with gravel to 7.5 feet, and then sealed with bentonite.

*-Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 50

FPD 016185

PROJECT: TEST BORINGS AND MONITORING STATIONS, NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT: FOREST PERSERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL.

BORING: 105 DATE STARTED: 10-10-80 DATE COMPLETED: 10-13-80 JOB: 17,823

G-105

ELEVATIONS

GROUND SURFACE: 785.4

END OF BORING: 756.4

WATER TABLE

AT END OF BORING: -11.2'

24 HOURS: - 8.2'

While Drilling: -17.0'

SAMPLE NO.	TYPE	N	WC	Q_u*	% DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
						1.5	783.9	FILL - Black clayey TOPSOIL
1a, 1b	SS	16	24.3, 16.1					FILL - Brown silty CLAY, mixed with black clayey TOPSOIL, trace sand, gravel and grass, pieces of wood (from plant or tree) and piece of plastic paper at -10.5 feet
2	SS	9	20.2					
3a, 3b	SS	10	27.7, 28.2					
4a, 4b	SS	13	26.2, 29.3					
5a, 5b	SS	12	34.2, 31.8	1.5		10.5	774.9	
6	SS	16				12.0	773.4	Tough grayish-brown silty CLAY, moist (CL)
7a, 7b	SS	26	12.7, 10.1					Firm brown sandy very clayey SILT, some gravel (ML)
8a, 8b	SS	9	14.1, 13.5			15.0	770.4	Loose brown sandy clayey SILT, little gravel, very moist (ML)
9a, 9b	SS	9	15.2, 13.1			18.7	766.7	
10a, 10b	SS	23	13.2, 13.8			21.0	764.4	Firm brown to brown and gray clayey SILT, little to some sand and gravel, moist (ML)
11a, 11b	SS	23	17.1, 15.4	4.5+, 4.5+				Hard to very tough gray silty CLAY, trace sand and gravel, moist (CL)
12a, 12b	SS	39	18.2, 20.1	4.5, 4.5+				
13a, 13b	SS	40	20.5, 19.2	3.0, 4.5+				
						26.7	758.7	
14a, 14b	SS	25	11.9, 10.6					Dense to firm gray clayey SILT, some sand, trace gravel, moist (ML)

Distance Below Surface in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40

End of Boring at -30.0 Feet

No gas was detected during drilling operations.

The bottom of the monitoring well was installed at a depth of -29.0 feet; backfilled with gravel to -6.0 feet and then sealed with Bentonite.

*-Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 50

FPD 016186

TEST BORINGS AND MONITORING STATIONS,
PROJECT NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL

BORING 106 DATE STARTED 10-13-80 DATE COMPLETED 10-13-80 JOB 17,823

G-106

ELEVATIONS

GROUND SURFACE 779.6

END OF BORING 756.6

WATER TABLE

AT END OF BORING - 4.0'

24 HOURS -3.0', Caved at -8.5'

While Drilling -10.0'

SAMPLE NO.	TYPE	N	WC	Q_u*	γDRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
						1.0	778.6	FILL - Black clayey TOPSOIL
1a/b	SS	18	27.9 / 16.2					FILL - Brown silty CLAY and black clayey TOPSOIL, trace sand and gravel
2a/b	SS	13	29.1 / 29.4					
3a/b	SS	7	31.3 / 33.9					
						6.2	773.4	Black clayey TOPSOIL
4a/b	SS	10	38.1 / 31.1			7.7	771.9	Dark brown transitional silty CLAY, trace organic, very moist
						9.0	770.6	Loose brown gravelly clayey SAND and SILT grading to a clayey silty SAND and GRAVEL, very moist to wet
5a/b	SS	8						
6	SS	48	17.7	3.5		11.5	768.1	Very tough to tough brown very sandy silty CLAY, some gravel, moist (CL)
7a/b	SS	15	17.0 / 14.0	1.0 / 3.5		14.2	765.4	Firm brown to grayish-brown clayey SILT, some sand, trace to little gravel, moist (ML)
8a/b	SS	28	12.0 / 11.4			16.0	763.6	Firm gray very clayey SILT and hard gray very silty CLAY, little to some sand, trace gravel, moist (ML-CL)
9a/b	SS	20	11.5 / 11.7	4.5				
10a/b	SS	19	11.5 / 10.7	4.5+				
11a/b	SS	21	11.3 / 13.2	4.5+				

Distance Below Surface in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40

End of Boring at -23.0 Feet

No gas was detected during drilling operations.

The bottom of the monitoring well was installed at a depth of -23.0 feet; backfilled with gravel to -6.0 feet and then sealed with Bentonite.

*-Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 50

FPD 016187

PROJECT TEST BORINGS AND MONITORING STATIONS, NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL

BORING 107 DATE STARTED 10-13-80 DATE COMPLETED 10-13-80 JOB 17,823

G-107

ELEVATIONS

GROUND SURFACE 775.8

END OF BORING 756.8

WATER TABLE

AT END OF BORING "DRY"

24 HOURS -3.7', Caved at -8.5'

While Drilling "DRY"

SAMPLE NO.	TYPE	N	WC	Q_u*	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
						1.0	774.8	FILL - Black clayey TOPSOIL
1a, 1b	SS	17	14.5, 11.2					FILL - Brown silty CLAY and black clayey TOPSOIL, trace sand and gravel
2a, 2b	SS	19	15.0, 12.8					
3a, 3b	SS	17	22.3, 17.7	4.5+		6.0	769.8	
4a, 4b	SS	18	22.8, 19.7	4.5+, 4.5+				Hard brown silty CLAY, trace sand and gravel, moist (CL)
5a, 5b	SS	17	18.4, 17.4	4.5+				
						10.2	765.6	
6a, 6b	SS	19	15.0, 14.2	4.0		12.0	763.8	Firm brown clayey SILT, trace sand and gravel, moist (CL); 6" silt layer at -11.0'
7a, 7b	SS	24	13.2, 13.1	4.5+, 4.5+				Hard brown very silty CLAY, little sand, trace gravel, moist (CL)
8a, 8b	SS	14	10.3, 11.7	4.5, 4.0		15.0	760.8	
9a, 9b	SS	12	11.0, 10.8	4.25, 4.25				Hard gray very silty CLAY, little to some sand, trace gravel, moist (CL)

Distance Below Surface in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40

End of Boring at -19.0 Feet

No gas was detected during drilling operations.

The bottom of the monitoring well was installed at a depth of -18.5 feet; backfilled with gravel to -7.0 feet and then sealed with Bentonite.

*-Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 50

FPD 016188

PROJECT TEST BORINGS AND MONITORING STATIONS, NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL.

BORING 108 DATE STARTED 10-13-80 DATE COMPLETED 10-14-80 JOB 17,823

G-108

ELEVATIONS

GROUND SURFACE 770.4

END OF BORING 751.4

WATER TABLE

AT END OF BORING - 9.0'

24 HOURS - 5.3'

While Drilling -16.5'

SAMPLE NO.	TYPE	N	WC	Q_u*	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
1	SS	12	19.3					FILL - Black clayey TOPSOIL, trace brown silty CLAY and GRASS
2	SS	12	22.8					
						5.0	765.4	Black clayey TOPSOIL and dark brown transitional silty CLAY
3	SS	10	33.2					
4a	SS	9	30.5			7.5	762.9	
4b			28.2	1.5				Tough to stiff dark to light brown and gray silty CLAY, moist (CL)
5	SS	6	29.6	0.6				
6a	SS	5	27.2	0.6		11.7	758.7	Soft dark gray silty CLAY (slightly organic), trace roots and fibers, very moist (CH-OH)
6b			45.0					
						13.0	757.4	Very soft light gray very silty CLAY, very moist (CL)
7	SS	6	34.5	0.3				
8a	SS	15	36.0	0.3				
8b			17.9	1.0		16.0	754.4	Tough gray silty CLAY, little sand and gravel, moist (CL)
8c			13.6	-		16.5	753.9	
9a	SS	6	27.5	-		17.2	753.2	Firm gray fine to coarse SAND, trace small gravel, saturated (SW)
9b			14.9	-		18.0	752.4	Loose gray clayey sandy SILT, trace gravel, moist (ML)
9c			13.4	4.0				Hard brownish-gray silty CLAY, little sand and gravel, moist (CL)

Distance Below Surface in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40

End of Boring at -19.0 Feet

No gas was detected during drilling operations.

The bottom of the monitoring well was installed at a depth of -19.0 feet; backfilled with gravel to -9.5 feet and then sealed with Bentonite.

*-Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 50

FPD 016189

PROJECT TEST BORINGS AND MONITORING STATIONS, NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL

BORING 109 DATE STARTED 10-14-80 DATE COMPLETED 10-14-80 JOB 17,823

G-109

ELEVATIONS

GROUND SURFACE 768.7

END OF BORING 749.7

WATER TABLE

AT END OF BORING

24 HOURS - 3.8'

While Drilling -11.0'

SAMPLE NO.	TYPE	N	WC	Q_u*	% DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
						1.0	767.7	FILL - Black clayey TOPSOIL
1a b	SS	11	12.1 16.9					FILL - Brown silty CLAY mixed with black clayey TOPSOIL, trace sand and gravel
2	SS	6	25.4			4.5	764.2	
3a b	SS	5	43.3 38.4					Black clayey TOPSOIL and black organic CLAY, very moist (CH-OH)
4a b	SS	5	33.5 34.8	0.5		7.2	761.5	Soft dark gray and brown silty CLAY, very moist (CL)
5a b	SS	4	36.5 32.4	0.4 0.5		9.0	752.5	Soft light brown and gray silty CLAY, very moist (CL)
6a b	SS	3	53.5 66.1			11.0	757.7	Very soft dark grayish-brown to gray silty ORGANIC CLAY, trace vegetation, very moist (OH)
7a b	SS	5	45.6 -			14.5	754.2	
8	SS	23				15.0	753.7	Loose gray very clayey silty SAND and GRAVEL, very moist (SC)
9	SS	9	13.5 13.8	2.0 2.0		17.0	751.7	Firm gray medium to coarse SAND and small to large GRAVEL, saturated (SW-GW)
								Very tough brownish-gray very silty CLAY, little sand and gravel, moist (CL)

End of Boring at -19.0 Feet

No gas was detected during drilling operations.

The bottom of the monitoring well was installed at a depth of -18.0 feet; backfilled with gravel to -8.5 feet and then sealed with Bentonite

*-Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

Distance Below Surface in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40

TESTING SERVICE CORPORATION

DRILL RIG NO 50

FPD 016190

TEST BORINGS AND MONITORING STATIONS,
PROJECT NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, ILL

BORING 109A DATE STARTED 10-14-80 DATE COMPLETED 10-14-80 JOB 17,823

ELEVATIONS

GROUND SURFACE 768.7

END OF BORING 749.7

WATER TABLE

AT END OF BORING "DRY"

24 HOURS

While Drilling "DRY"

SAMPLE NO.	TYPE	LENGTH	RECOVERY	N	WC	Q_u*	% DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
								0.7	768.0	FILL - Black clayey TOPSOIL
1	SS			24	16.8 18.1					FILL - Brown silty CLAY, trace sand and gravel (CL)
2	SS			16	26.0 25.1	3.0 3.75		3.0	765.7	Very tough to hard brown silty CLAY, trace sand and gravel, moist (CL)
3	SS			27	22.1 14.7	4.5+ 4.3		6.0	762.7	Firm brown SILT, trace to little clay, trace sand and gravel, moist (ML)
4	SS			21	14.1 13.5			7.0	761.7	Firm brown to grayish-brown very clayey SILT, little sand, trace gravel, moist (ML)
5	SS			14	13.8 12.2	4.5		10.0	758.7	Hard brownish-gray to gray very silty CLAY, little sand and gravel, moist (CL)
6	SS			24	11.9 11.8	4.0 4.5+				
7	SS			18	11.2 11.5	4.5+		13.5	755.2	Firm gray clayey SILT, little to some sand and gravel, moist (ML)
8	SS			15	13.6 12.5	4.5+		15.5	753.2	Hard to very tough gray very silty CLAY, little sand, trace gravel, moist (CL)
9	SS			13	12.3 11.9	4.0 3.5				

Distance Below Surface in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40

End of Boring at -19.0 Feet

No gas was detected during drilling operations

No monitoring well was installed at this boring location.

TESTING SERVICE CORPORATION

DRILL RIG NO. 50

FPD 016191

PROJECT TEST BORINGS AND MONITORING STATIONS, NORTH OF EXISTING MALLARD LAKE LANDFILL

CLIENT FOREST PRESERVE DIST. OF DUPAGE CO., 881 W. ST. CHARLES RD., LOMBARD, IL

BORING 110 DATE STARTED 10-20-80 DATE COMPLETED 10-21-80 JOB 17,823

G-110

ELEVATIONS

GROUND SURFACE 768.8

END OF BORING 737.8

WATER TABLE

AT END OF BORING -28.0'

24 HOURS -22.0'

While Drilling -28.0'

SAMPLE NO.	TYPE	N	WC	Q_u*	% DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
						0.7	768.1	FILL - Black to dark brown clayey TOPSOIL
1a/b	SS	10	16.4 / 13.1			3.0	765.8	FILL - Brown silty CLAY, little sand and gravel (CL)
2a/b	SS	28	15.7 / 17.4			5.0	763.8	Hard brown and gray silty CLAY, little sand and gravel, moist (CL)
3a/b	SS	22	18.8 / 20.1	3.25 / 3.5				Very tough to tough gray silty CLAY, trace sand and gravel, moist (CL)
4a/b	SS	24	23.0 / 19.7	3.5 / 3.25				
5a/b	SS	27	12.9 / 14.9	1.75		11.0	757.8	Firm gray silty fine to medium SAND, little small gravel, trace clay, moist (SM)
6a/b	SS	13	10.7 / 13.2			12.5	756.3	
						13.0	755.8	Firm light gray clayey SILT, trace sand, moist (ML)
7a/b	SS	21	12.7 / 23.9	4.5 / 4.0				
8a/b	SS	15	16.1 / 16.8	2.25 / 1.75				Hard to tough gray silty CLAY, trace sand and gravel, moist (CL)
9a/b	SS	22	19.5 / 20.1	2.25 / 2.0				
						19.0	749.8	
10a/b	SS	19	23.2 / 14.1					Firm gray clayey SILT, trace sand and gravel, moist (ML)
11a/b	SS	20	17.0 / 16.3					
						23.0	745.8	
12a/b	SS	43	14.9 / 12.2	3.25				Very tough gray very silty CLAY, trace sand and gravel, moist (CL)
						24.5	744.3	
						25.0	743.8	Dense brownish-gray SILT, trace clay, sand and gravel, moist (ML)
13a/b	SS	17	12.1 / 11.4	3.0 / 3.0				
14a/b	SS	23	16.4 / -	2.5 / -				Very tough gray silty CLAY, little sand and gravel, moist (CL)
						28.0	740.8	
						28.5	740.3	Firm gray medium to large GRAVEL, trace clay and sand, saturated (GP)
15a/b	SS	21	16.9 / 17.2	3.3 / 4.5				Very tough to hard gray silty CLAY, trace sand and gravel, moist (CL)

Distance Below Surface in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40

End of Boring at -31.0 feet

No gas was detected during drilling operations.

The bottom of the monitoring well was installed at a depth of -29.0 feet; backfilled with gravel to -4.0 feet and then sealed with Bentonite.

*-Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 50

FPD 016192

SOIL BORING LOG

SOIL AND MATERIAL CONSULTANTS, INC.
8 WEST COLLEGE DRIVE • ARLINGTON HEIGHTS, ILLINOIS 60004

BORING NO: PMW 1 G-111
CLIENT: FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
LOCATION SITE: Mallard North

Proj. No. 6441 Date: 4/21/81 By:
Equipt. Used: CME Drill
Comments:

UNCONFINED COMPRESSION TEST, Strength (tons/sq. ft.)
1.0 2.0 3.0 4.0 5.0
PENETROMETER READING
WATER CONTENT, %
STANDARD "N" PENETRATION (blows/ft.)
10 20 30 40 50

Sample Range	Sample Recovery	DESCRIPTION OF MATERIAL	Unit Dry Wt. lbs/cu. ft.
		Existing Surface - Elev. ft:	
		Black topsoil, some clay, damp - (9.0")	
		Brown-gray clay, some silt, trace sand and gravel, damp, very tough	94.9
5	0		94.3
		Gray clay, some silt, trace sand and gravel, damp, tough	108.5
		Gray clay, some silt, trace sand and gravel, damp, very tough	111.0
10	0		
		Gray clay, some silt, trace sand and gravel, damp, hard	114.6
	0	Gray clay, some silt, trace sand and gravel, damp, very tough	105.7
			106.2
			102.7
20	0		105.7
			108.5
	0		107.4
0	0		
		End of Boring	
0	0		
	0		
0	0		

Water Encountered At none During Drilling Operations
Water Level _____ @ _____ Hours After Completion Of Boring

Page No. 1 of 1

FPD 016193

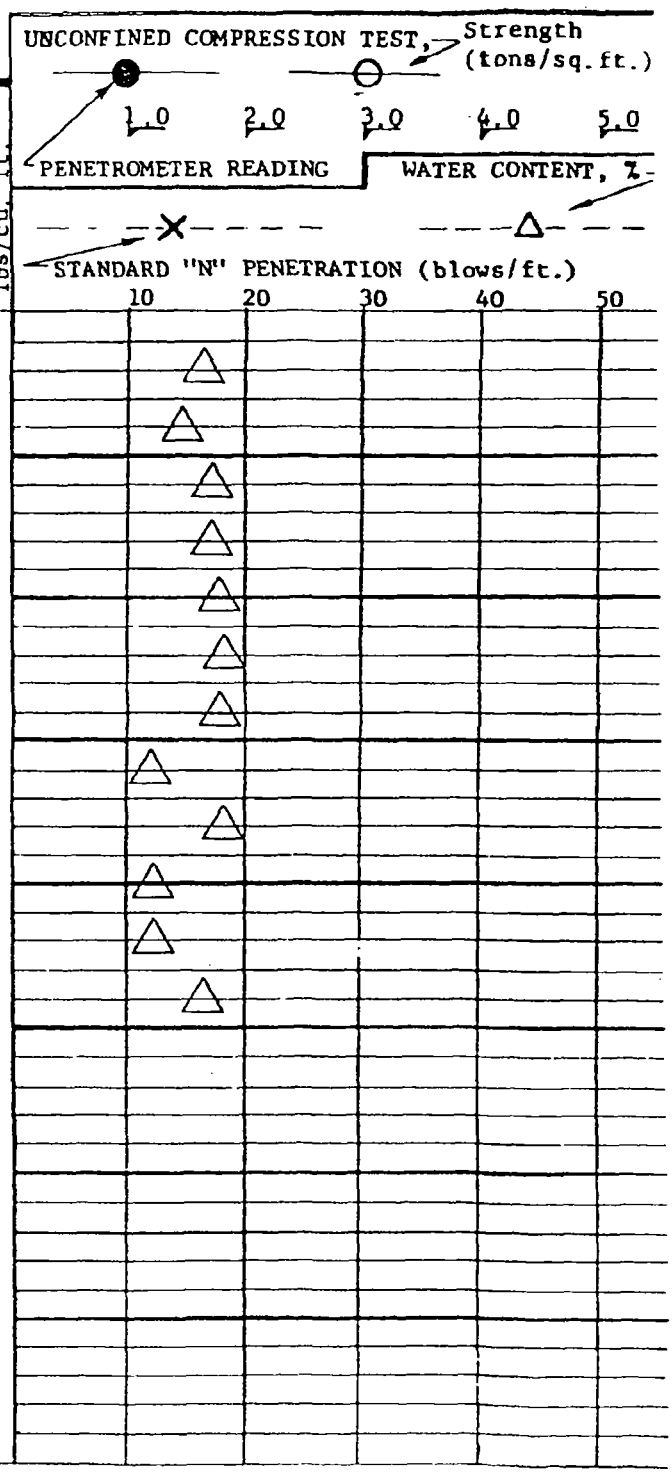
SOIL BORING LOG

SOIL AND MATERIAL CONSULTANTS, INC.
8 WEST COLLEGE DRIVE • ARLINGTON HEIGHTS, ILLINOIS 60004

BORING NO: PMW 2 (Shallow) G-112
CLIENT: FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
LOCATION SITE: Mallard North

Proj.No. 6441 Date: 4/29/81 By:
Equipt. Used: CME Drill
Comments:

Sample Range	Sample Recovery	DESCRIPTION OF MATERIAL	Unit Dry Wt. lbs/cu. ft.
		Existing Surface - Elev. ft:	
		Brown clay, some silt, trace sand and gravel, damp, very tough	
		Gray clay, some silt, trace sand and gravel, damp, very tough (Gray silt seam 1/2'-1' in thickness at 17.0')	
		Brown clay, some silt, trace sand & gravel damp to very damp, tough to very tough	
		Gray clay and silt, some sand, trace gravel, damp, very tough	
		End of Boring	



ter Encountered At none During Drilling Operations
ater Level _____ @ _____ Hours After Completion Of Boring

Page No. 1 of 1

FPD 016194

SOIL BORING LOG

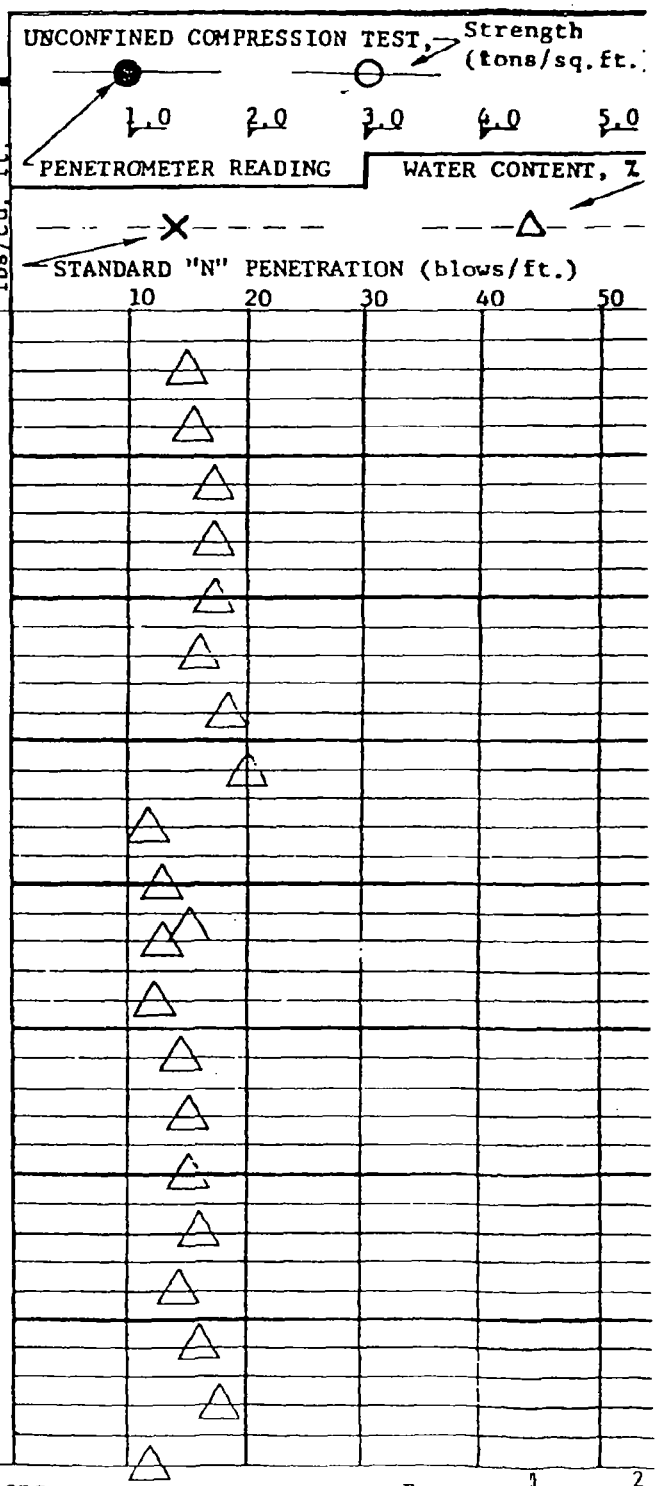
SOIL AND MATERIAL CONSULTANTS, INC.
8 WEST COLLEGE DRIVE • ARLINGTON HEIGHTS, ILLINOIS 60004

BORING NO: PMW 2 (Deep) G-112
CLIENT: FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
LOCATION SITE: Mallard North

Proj. No. 6441 Date: 4/27/81 By:
Equipt. Used: CME Drill
Comments:

Depth, ft.	Sample Range	Sample Recovery	DESCRIPTION OF MATERIAL	Unit Dry Wt. lbs/cu. ft.
			Existing Surface - Elev. ft:	
			Brown clay, some silt, trace sand and gravel, damp, very tough	
5	0			
10	0		Gray clay, some silt, trace sand and gravel, damp, very tough	
	0			
20	0			
			(a) see below	
	0		Brown clay, some silt, trace sand and gravel, damp, very tough	
0	0		Gray clay, some silt, trace sand and gravel, damp, very tough	
	0			
			Brown-gray clay, some silt, trace sand and gravel, damp, very tough	
	0		(b) see below	

UNCONFINED COMPRESSION TEST, Strength (tons/sq. ft.)
1.0 2.0 3.0 4.0 5.0
PENETROMETER READING
WATER CONTENT, %
STANDARD "N" PENETRATION (blows/ft.)
10 20 30 40 50



ter Encountered At 39.0' During Drilling Operations
Water Level _____ @ _____ Hours After Completion Of Boring

SOIL BORING LOG

SOIL AND MATERIAL CONSULTANTS, INC.
8 WEST COLLEGE DRIVE • ARLINGTON HEIGHTS, ILLINOIS 60004

BORING NO: PMW 2 (Deep)cont'd. G-112
CLIENT: FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
LOCATION SITE: Mallard North

Proj.No. 6441 Date: 4/28/81 By:
Equipt. Used: CME Drill
Comments:

Sample Range	Sample Recovery	DESCRIPTION OF MATERIAL	Unit Dry Wt. lbs/cu. ft.
		Existing Surface - Elev. ft:	
		Fine medium sand, some silt and gravel, trace clay and coarse sand, very damp to saturated, dense	
0			
		End of Boring	
0			
		(a) Brown clay and silt, some gravel, trace sand, damp to very damp, tough to very tough	
		(b) Fine-medium sand, some silt and gravel, trace clay and coarse sand, very damp to saturated, dense	

UNCONFINED COMPRESSION TEST, Strength (tons/sq.ft.)
1.0 2.0 3.0 4.0 5.0
PENETROMETER READING
WATER CONTENT, %
STANDARD "N" PENETRATION (blows/ft.)
10 20 30 40 50

Water Encountered At 39.0' During Drilling Operations
Water Level _____ @ _____ Hours After Completion Of Boring

FPD 016196

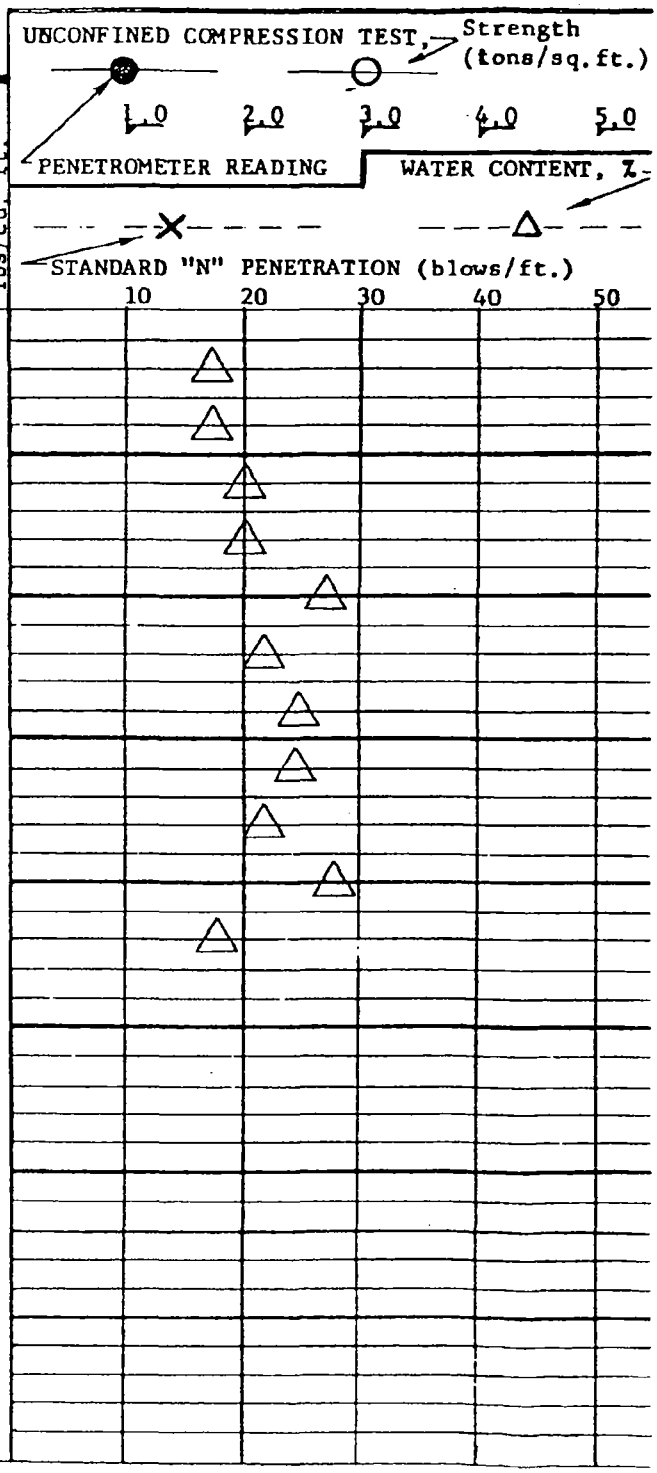
SOIL BORING LOG

SOIL AND MATERIAL CONSULTANTS, INC.
8 WEST COLLEGE DRIVE • ARLINGTON HEIGHTS, ILLINOIS 60004

BORING NO: PMW 3 G-113
CLIENT: FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
LOCATION SITE: Mallard North

Proj. No. 6441 Date: 5/8/81 By:
Equipt. Used: CME Drill
Comments:

Depth ft	Sample Range	Sample Recovery	DESCRIPTION OF MATERIAL	Unit Dry Wt. lbs/cu. ft.
			Existing Surface - Elev. ft:	
			Brown clay, some silt, trace sand gravel and topsoil, damp, very tough	
		0		
10		0	Brown clay and topsoil, some silt, trace sand and gravel, damp, very tough	
		0	Gray silt, some sand and clay, trace gravel, damp to very damp, dense	
0		0	Medium-coarse sand, some fine sand and silt, trace gravel, very damp to saturated dense	
		0		
		0	End of Boring	
0		0		
		0		
0		0		



Water Encountered At 12.0' During Drilling Operations
Water Level 12.0' @ 0 Hours After Completion Of Boring

Page No. 1 of 1

FPD 016197

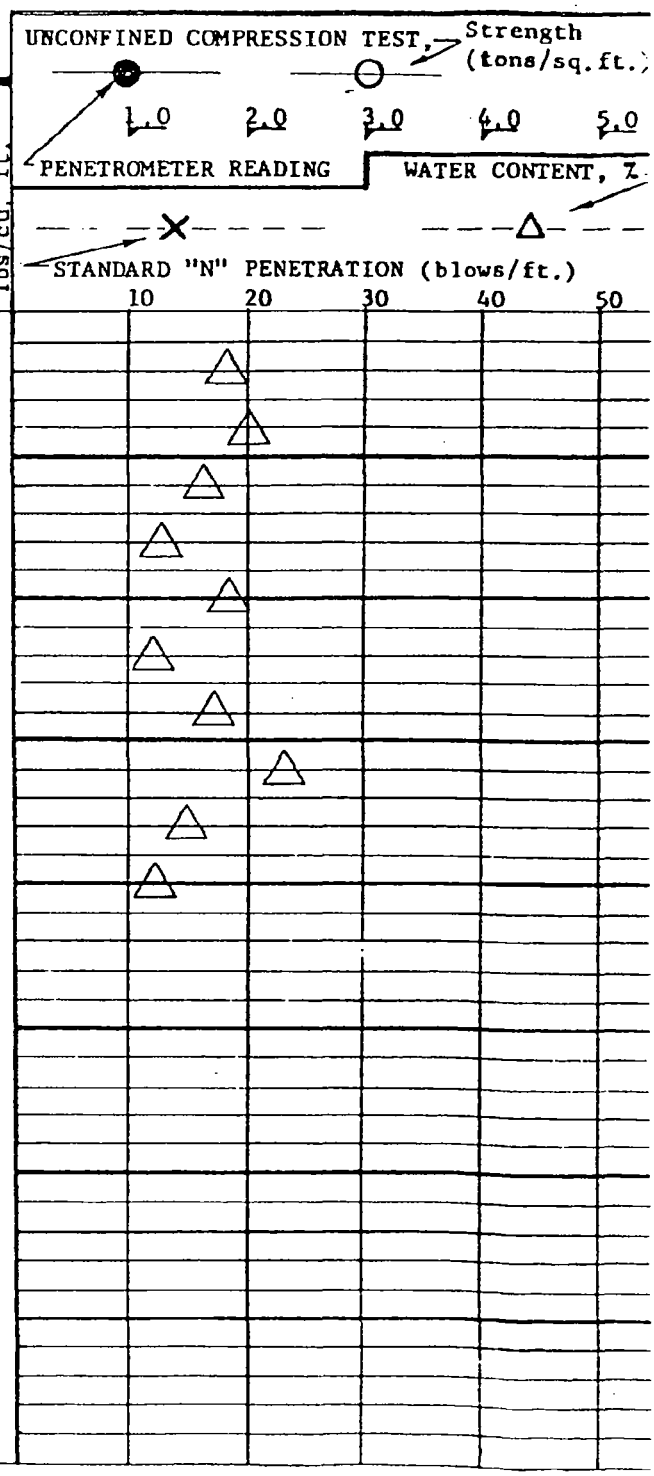
SOIL BORING LOG

SOIL AND MATERIAL CONSULTANTS, INC.
8 WEST COLLEGE DRIVE • ARLINGTON HEIGHTS, ILLINOIS 60004

BORING NO: PMW 4 (Shallow) G-114
CLIENT: FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
LOCATION SITE: Mallard North

Proj.No. 6441 Date: 5/6/81 By:
Equipt. Used: CME Drill
Comments:

Depth ft	Sample Range	Sample Recovery	DESCRIPTION OF MATERIAL	Unit Dry Wt. lbs/cu. ft.
			Existing Surface - Elev. ft:	
			Brown clay, some silt and topsoil, trace sand and gravel, damp, very tough	
5	0		Brown silt, some clay and gravel, trace sand, damp to very damp to saturated, dense to very dense	
10	0		Sand and gravel, trace silt, saturated	
	0			
			Gray clay, some silt, trace sand and gravel, damp to very damp, tough to very tough	
0	0			
			End of Boring	
	0			
0	0			
	0			
1	0			



Water Encountered At 7.0' During Drilling Operations
Water Level 5.5' @ _____ Hours After Completion Of Boring

Page No. 1 of 1

FPD 016198

SOIL BORING LOG

SOIL AND MATERIAL CONSULTANTS, INC.
8 WEST COLLEGE DRIVE • ARLINGTON HEIGHTS, ILLINOIS 60004

BORING NO: PMW 4 (Deep) G-114
CLIENT: FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
LOCATION SITE: Mallard North

Proj.No. 6441 Date: 5/7/81 By:
Equipt. Used: CME Drill
Comments:

UNCONFINED COMPRESSION TEST, Strength (tons/sq.ft.)
1.0 2.0 3.0 4.0 5.0
PENETROMETER READING
WATER CONTENT, %
STANDARD "N" PENETRATION (blows/ft.)
10 20 30 40 50

Sample Range	Sample Recovery	DESCRIPTION OF MATERIAL Existing Surface - Elev. ft:	Unit Dry Wt. lbs/cu. ft.
		Brown clay and silt, some gravel, trace sand and topsoil, damp, very tough	
	0	Brown silt, some clay and gravel, trace sand, damp, very dense	
10	0	Coarse sand and gravel, some fine-medium sand, trace silt, very damp to saturated, dense	
	0	Gray clay, some silt, trace sand and gravel, damp, very tough	
0	0	Gray silt, some sand, trace clay and gravel, damp, dense	
	0	Gray clay, some silt, trace sand and gravel, damp, very tough	
)	0	Gray silt, some clay and sand, trace gravel, damp to very damp, dense to very dense	
	0		

ter Encountered At 9.0' During Drilling Operations
Water Level___ @ Hours After Completion Of Boring

Page No. 1 of 2

FPD 016199

SOIL BORING LOG

SOIL AND MATERIAL CONSULTANTS, INC.
8 WEST COLLEGE DRIVE • ARLINGTON HEIGHTS, ILLINOIS 60004

BORING NO: PMW 4 (Deep) cont'd. G-114
CLIENT: FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
LOCATION SITE: Mallard North

Proj. No. 6441 Date: 5/7/81 By:
Equipt. Used: CME Drill
Comments:

Depth, ft.	Sample Range	Sample Recovery	DESCRIPTION OF MATERIAL	Unit Dry Wt. lbs/cu. ft.
			Existing Surface - Elev. ft:	
			Gray silt, some clay and sand, trace gravel damp to very damp, dense to very dense	
	0			
			End of Boring	
	0			

UNCONFINED COMPRESSION TEST, Strength (tons/sq.ft.)
1.0 2.0 3.0 4.0 5.0
PENETROMETER READING
WATER CONTENT, %
STANDARD "N" PENETRATION (blows/ft.)
10 20 30 40 50

Water Encountered At 9.0' During Drilling Operations
Water Level _____ @ _____ Hours After Completion Of Boring

Page No. 2 of 2

FPD 016200

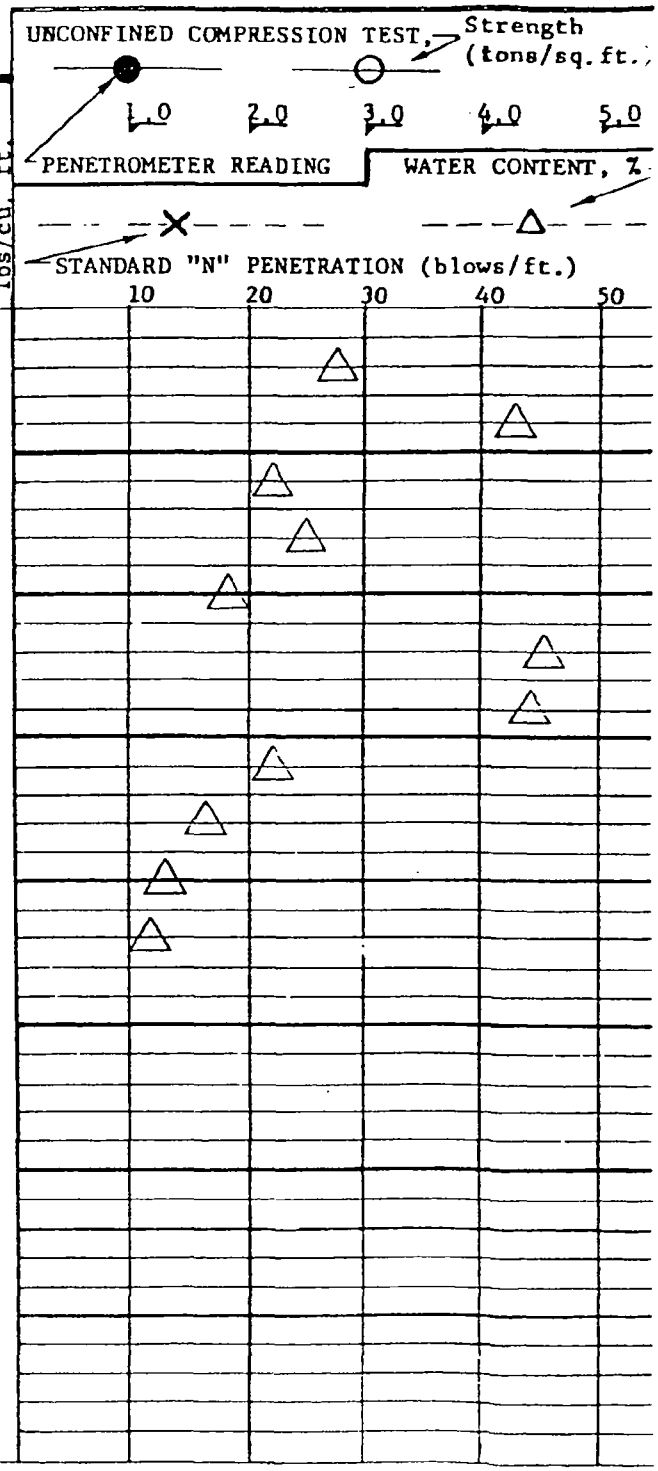
SOIL BORING LOG

SOIL AND MATERIAL CONSULTANTS, INC.
8 WEST COLLEGE DRIVE • ARLINGTON HEIGHTS, ILLINOIS 60004

BORING NO: PMW 5 G-115
CLIENT: FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
LOCATION SITE: Mallard North

Proj. No. 6441 Date: 5/11/81 By:
Equipt. Used: CME Drill
Comments:

Depth, ft	Sample Range	Sample Recovery	DESCRIPTION OF MATERIAL	Unit Dry Wt. lbs/cu. ft.
			Existing Surface - Elev. ft:	
5	0		Brown clay, some topsoil and silt, trace sand, damp to very damp, tough to very tough	
10	0			
			Black topsoil, some clay, trace sand and silt, damp, tough to very tough	
			Gray silt, some clay, trace sand and organic material, shell fragments, damp to very damp, tough	
5	0			
			Fine-medium sand, some silt, trace clay and coarse sand, very damp, dense	
			Medium-coarse sand, some gravel, trace fine sand and silt, very damp to saturated, dense	
20	0			
22	0			
			End of Boring	
0	0			
0	0			



Water Encountered At 12.0' During Drilling Operations
Water Level 10.0' @ 0 Hours After Completion Of Boring

Page No. 1 of 1

FPD 016201

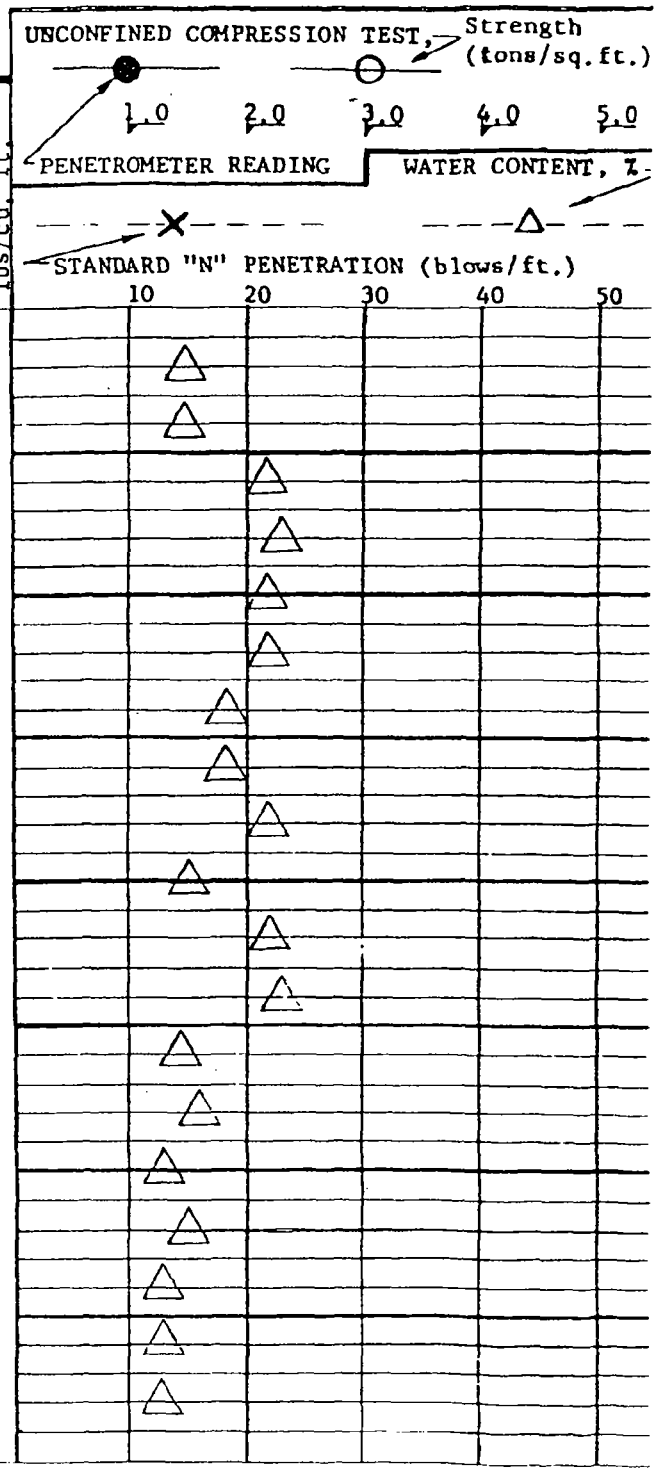
SOIL BORING LOG

SOIL AND MATERIAL CONSULTANTS, INC.
8 WEST COLLEGE DRIVE • ARLINGTON HEIGHTS, ILLINOIS 60004

BORING NO: PMW 6 G-116
CLIENT: FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
LOCATION SITE: Mallard North

Proj. No. 6441 Date: 5/13/81 By:
Equipt. Used: CME Drill
Comments:

Depth, ft	Sample Range	Sample Recovery	DESCRIPTION OF MATERIAL	Unit Dry Wt. lbs/cu. ft.
			Existing Surface - Elev. ft:	
5	0		Brown clay, some silt, trace sand and gravel, damp, very tough to tough to very tough	
10	0			
			Brown clay and gravel, some silt and topsoil, trace sand and brick, damp, very tough	
5	0		Brown clay, some silt, trace sand and gravel, damp, very tough to hard	
20	0			
	0		Gray clay, some silt, trace sand and gravel, damp, very tough	
0	0			
	0			
	0			
0	0		End of Boring	



Water Encountered At 25.0' During Drilling Operations
Water Level 30.0' @ 0 Hours After Completion Of Boring

Page No. 1 of 1

FPD 016202

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING G-124 DATE STARTED 11-18-87 DATE COMPLETED 11-19-87* JOB 24,911

* Monitoring Well Installed

ELEVATIONS

GROUND SURFACE 764.7

END OF BORING 731.2

S: 478.07

W: 425.02

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 5.6 FEET (759.1)

SHEET 1 OF 2

DISTANCE BELOW SURFACE IN FEET

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γDRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
1	SS	11	44.2					Black clayey TOPSOIL with roots and dark gray clayey sand (OL/CL)
2	SS	5	33.9					
3	SS	4	14.7			5.6	759.1	
4	SS	35						Dense gray small to large GRAVEL and fine to coarse SAND, little silt, trace clay, wet (GW/SW)
5	SS	31						
						10.0	754.7	
6 A/B	SS	56				10.5	754.2	Very dense gray silty fine to coarse SAND, little gravel, wet (SM)
7	SS	122	(POUND ON ROCK)					Firm to very dense gray small to large GRAVEL and fine to coarse SAND, little silt and clay in upper 2', occasional cobble, wet (GW/SW)
8	SS	24						
9 A/B	SS	15	-- / 18.6	-- / 1.5*		17.2	747.5	
10	SS	26	21.7	0.75*				Stiff to tough gray very silty CLAY, trace sand and gravel, moist (CL)
11 A/B	SS	6	17.5 / --	1.25* / --		20.5	744.2	
						22.0	742.7	Loose gray fine to medium SAND with small to large GRAVEL, wet (SP)
12 A/B/C	SS	27	16.9 / -- / 13.5	-- / -- / 4.5*		23.5 / 24.0	741.2 / 740.7	Firm gray, fining upward fine sandy SILT and silty fine SAND, coarse sand lag, wet (ML/SM)
13 A/B	SS	59	-- / 15.0	-- / 1.75*		25.7	739.0	Hard gray silty CLAY, little sand, trace gravel, moist (CL)
14	SS	23	15.3	2.0*				Very dense gray fine to coarse SAND, trace silt and clay, wet (SW)
15	SS	27	14.7	2.0*				Very tough gray silty CLAY, little sand, trace gravel, moist; occasional thin sand seams at 25.8', 26.0-26.1', 26.3-26.6' and 31.8' (CL)
16	SS	28	16.2	2.5*				

End of Boring at 33.5 Feet

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 103

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING G-124 DATE STARTED 11-18-87 DATE COMPLETED 11-19-87* JOB 24,911

ELEVATIONS

GROUND SURFACE 764.7

END OF BORING 731.2

S: 478.07

W: 425.02

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 5.6 FEET (759.1

SHEET 2 OF 2

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	▽DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS

DISTANCE BELOW SURFACE IN FEET: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

MONITORING WELL INSTALLATION NOTES

1). 4" Schedule 40 PVC Screen (.010" slot): 27.2 - 32.2'

2). 4" Schedule 40 PVC Riser: +2.7 - 27.2'

3). Coarse Silica Sand: 23.4 - 33.5'

4). Volclay Grout: 10.0 - 23.4'

5). Hole Plug Bentonite Chips: 4.0 - 10.0'

6). 6" x 5' Steel protector casing concreted into palce over monitoring well

TESTING SERVICE CORPORATION

DRILL RIG NO. _____

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-117A DATE STARTED 2-12-87 DATE COMPLETED 2-13-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 770.6

END OF BORING 710.6

S: 430.7

E: 1293.7

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 7.7 FEET

SHEET 1 OF 3

DISTANCE BELOW SURFACE IN FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
1	SS	10						Dark gray (trace brown) clayey TOPSOIL, moist (OL)
2	SS	28	18.8	4.5+*		2.2	768.4	
3	ST	PUSH	13.0		108.0			Hard medium brown silty CLAY, little sand, trace gravel, trace roots (mottled gray in these areas), moist (CL)
4A/B	SS	39	20.5 / --	4.5+* / --		7.7	762.9	
5A/B	SS	41	-- / --	-- / --		9.3	761.3	Dense light greenish brown clayey silty fine to coarse SAND, some small to medium gravel, wet (SM)
						10.0	760.6	
6	ST/SS	Crush / PUSH	11.3	4.5+*				Dense gray silty fine SAND with clay binder, few fine sand and clayey silt seams, moist (SM)
7	ST	PUSH	8.8		129.5			Hard gray very silty CLAY, some sand, little small gravel, moist; 1" fine sand seam at 22.5', wet (CL)
8	SS	20	11.4	4.5*				
9	ST	PUSH	9.6		133.5			
10	SS	30	12.6	4.0*				
11	ST	PUSH	12.2		121.2			
12	SS	34	13.6	4.5+*				
13	ST	PUSH	15.8	2.75*	116.6			
14	SS	47	14.2	4.5+*				
15	ST	PUSH	11.9	4.5+*	120.5	29.3	741.3	
16A/B	SS	42	-- / 13.8	-- / 4.5+*		31.1	739.5	Dense gray clayey sandy SILT, trace gravel, occasional reddish brown mottling, moist (ML)
17	ST	PUSH	13.4	4.5+*	123.8			Hard brownish gray very silty CLAY, little to some sand, trace gravel, moist (CL)
18A/B	SS	40	13.7 / 12.7	4.5+* / --		35.2	735.4	
19	ST	PUSH	13.9		117.8			Tough to hard gray silty CLAY with minor clayey SILT seams, little to some sand, moist (CL & ML)
20	SS	55	10.9					

TESTING SERVICE CORPORATION

DRILL RIG NO. 91

BORING LOG CONTINUED

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-117A DATE STARTED 2-12-87 DATE COMPLETED 2-13-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 770.6

END OF BORING 710.6

S: 430.7

E: 1293.7

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -7.7 FEET

SHEET 2 OF 3

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
21	ST	PUSH	7.3		140.9			Tough to hard gray silty CLAY with minor clayey SILT seams, little to some sand, moist, (CL & ML); gray clayey SILT seam @ 40-41', dark yellow gray silty SAND seam, 0.3' at 43.0' (CL & ML)
22A 22B	SS	44	18.0 15.6	2.0* 2.25*				
23	ST	PUSH	12.1	4.5+*	127.1			
24	SS	43	12.1	3.0*				
25	ST	PUSH	14.3		119.4			
						50.0	720.6	
26A 26B	SS	25	-- 17.4	-- 2.5*				Varves of dark yellowish gray sandy SILT, trace clay, very moist to wet, gray clayey SILT, very moist and silty CLAY, moist (ML & CL)
27	ST	PUSH	17.2		115.4			
28	SS	26	18.0	3.0*				
						56.0	714.6	
29	ST	PUSH	10.2		126.3			Hard gray very silty CLAY, little to some sand, trace gravel, moist, occasional thin SILT layers, 0.4' sandy silt lens at 59.0', wet (CL/ML)
30A 30B	SS	58	11.5 10.9	-- 4.5+*				

End of Boring at 60.0 Feet

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

DISTANCE BELOW SURFACE IN FEET: 40, 45, 50, 55, 60, 65, 70, 75, 80

LENGTH RECOVERY

TESTING SERVICE CORPORATION

DRILL RIG NO. 91

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-117A DATE STARTED 2-12-87 DATE COMPLETED 2-13-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 770.6

END OF BORING 710.6

S: 430.7
E: 1293.7

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -7.7 FEET

SHEET 3 OF 3

LENGTH	RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS

DISTANCE BELOW SURFACE IN FEET: 80, 85, 90, 95, 100, 105, 110, 115, 120

PIEZOMETER/MONITORING WELL INSTALLATION NOTES

	P-117A	P-117B	P-117C	G-117
1). End of Boring:	60.0	51.5	40.0	22.5
2). 1"* Schedule 40 PVC screen, .010" slots:	58.0-60.0	49.5-51.5	38.0-40.0	17.5-22.5
3). 1"* Schedule 40 PVC riser:	+2.4-58.0	+2.1-49.5	+1.7-38.0	+1.6-17.5
4). Coarse silica sand:	56.5-60.0	48.0-51.5	37.0-40.0	17.0-22.5
5). Bentonite pellets		47.5-48.0	35.5-37.0	15.0-17.0
6). Volclay grout:	3.0-56.5	3.0-47.5	3.0-35.5	3.0-15.0

7). Steel protector casing concreted into place over each piezometer/well

* 4" Schedule 40 PVC in monitoring well

TESTING SERVICE CORPORATION

DRILL RIG NO. _____

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-118A DATE STARTED 2-17-87 DATE COMPLETED 2-17-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 769.3

END OF BORING 709.3

S: 839.6
E: 1224.3

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 4.0 FEET

SHEET 1 OF 3

DISTANCE BELOW SURFACE IN FEET

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
1A	SS	28	35.8	--				Black clayey TOPSOIL, ROOTS, very moist (OL)
1B			21.2	3.75*		1.5	767.8	
						2.5	766.8	Very tough brownish gray silty CLAY, little sand, trace gravel, trace organic and wood pieces, moist (CL)
2	SS	20	21.6	1.5*				
3	ST	PUSH	14.8		115.2			Tough light yellowish gray silty CLAY, trace sand, trace to little gravel, moist (CL); occasional thin sand seams, wet
						6.0	763.3	
4	SS	24	12.5	2.0*				Very tough yellowish gray very silty CLAY, little to some sand, trace to little gravel, moist (CL)
						8.0	761.3	
5	ST	PUSH	12.4		125.0			Tough gray very silty CLAY, little sand and gravel, moist; occasional very moist seams of very clayey silt (CL)
6	SS	17	13.2	1.25*				
7	ST	PUSH	12.1		122.4			
						14.0	755.3	
8	SS	21	19.1	1.75*				Tough to very tough gray silty CLAY, trace to little sand, trace gravel, moist (CL)
9	ST	PUSH	17.5		112.1			
10	SS	18	18.4	2.25*				
11	ST	PUSH	15.1		114.3			
						22.0	747.3	
12	SS	20	17.1	2.5*				Very tough greenish gray silty CLAY, trace to little sand, trace gravel, moist (CL)
13	ST	PUSH	11.9		126.6			
						26.0	743.3	
14	SS	22	18.6	1.75*				Tough to very tough gray silty CLAY, trace to little sand and gravel, moist (CL)
15	ST	PUSH	11.1		125.6			
16	SS	24	17.5	2.25*				
17	ST	PUSH	16.1	1.75*	117.6			
						34.0	735.3	
18	SS	10	11.7					Firm brown very clayey SILT/very silty CLAY, trace to some sand, trace gravel, wet (ML/CL)
19	SS	10	14.0	1.5*				
20	ST	PUSH	12.0		141.6			

TESTING SERVICE CORPORATION

DRILL RIG NO. 91

BORING LOG CONTINUED

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-118A DATE STARTED 2-17-87 DATE COMPLETED 2-17-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 769.3

END OF BORING 709.3

S: 839.6
E: 1224.3

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -4.0 FEET

SHEET 2 OF 3

DISTANCE BELOW SURFACE IN FEET: 40, 45, 50, 55, 60, 65, 70, 75, 80

LENGTH	RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_U	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
		21 A/B	SS	22	10.9 15.2	1.25* 3.5*		41.0	728.3	Firm brown very clayey SILT/very silty CLAY, trace to some sand, trace gravel, wet (ML/CL)
		22	ST	PUSH	17.5		108.9			Very tough gray silty CLAY, trace to little sand, trace gravel, moist (CL)
								44.0	725.3	
		23	SS	36						Dense brownish gray silty fine SAND, trace gravel, wet (SM)
		24 A/B	SS	31	-- 15.8	-- 3.0*		46.5	722.8	
		25	ST	PUSH	15.5		121.3			Very tough gray silty CLAY, little sand, trace gravel, moist (CL) trace yellow/brown coloration in upper 2'
		26	SS	38	13.3	2.75*				
		27	ST	PUSH	11.6		128.4			
		28	SS	40	13.0	3.25*				
		29	ST	PUSH	12.8		121.1			
		30	SS	30	13.5	2.75*				
			End of Boring at			-60.0	Feet			

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 91

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-118A DATE STARTED 2-17-87 DATE COMPLETED 2-17-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 769.3

END OF BORING 709.3

S: 839.6

E: 1224.3

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 4.0 FEET

SHEET 3 OF 3

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS

DISTANCE BELOW SURFACE IN FEET: 80, 85, 90, 95, 100, 105, 110, 115, 120

PIEZOMETER/MONITORING WELL INSTALLATION NOTES

	P-118A	P-118B	P-118C	G-118
1). End of Boring	60.0	48.0	40.0	22.5
2). 1"* Schedule 40 PVC screen, .010" slot:	58.0-60.0'	46.0-48.0'	38.0-40.0'	17.5-22..
3). 1"* Schedule 40 PVC riser:	+2.4-58.0'	+2.4-46.0'	+2.4-38.0'	+2.1-17
4). Coarse silica sand:	57.0-60.0'	45.0-48.0'	37.5-40.0'	17.0-22..
5). Bentonite Pellets:	55.0-57.0'	43.0-45.0'	35.5-37.5'	14.0-17
6). Volclay Grout:	3.0-55.0'	3.0-43.0'	3.0-35.5'	3.0-14

7). Steel protector casing concreted into place over each piezometer/monitoring well

* 4" Schedule 40 PVC in monitoring well

TESTING SERVICE CORPORATION

DRILL RIG NO.

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-119A DATE STARTED 2-19-87 DATE COMPLETED 2-20-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 774.2

END OF BORING 710.2

S: 1097.4

E: 922.4

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -14.5 FEET (Leachate odor)

SHEET 1 OF 3

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
1	SS	14	18.4					FILL: Gray (with brown) silty CLAY, little sand, trace gravel, moist (See note at end of log) (CL)
2	SS	23	17.8					
3	SS	30	19.9					
4	SS	15	22.1					
						8.0	766.2	
5	SS	19	15.1					Tough to very tough gray silty CLAY, little sand, trace gravel, moist (CL)
6	SS	29	17.4	3.25*				
7	ST	PUSH	15.9	2.75*	113.9			
A			18.9	3.25*		14.5	759.7	
8B	SS	26	--	--		15.3	758.9	Firm gray fine to coarse silty SAND, little small gravel, wet; leachate stain and odor (SM)
C			16.7	4.5+*				
9	ST	PUSH	16.4	4.5+*	114.1			Hard brownish gray silty CLAY, little sand, trace gravel, moist (CL)
						18.0	756.2	
10	SS	19	10.0					Firm gray clayey SILT, little sand, trace gravel, moist to very moist (CL-ML)
						20.0	754.2	
11	ST	PUSH	16.3		112.7			
12A	SS	31	13.4	--				
12B			15.7	4.5+*				
13	ST	PUSH	9.0		128.3			Very tough to hard gray silty CLAY, little to some sand, trace gravel, moist; 3" clayey sand seams at 22' and 26', very moist to wet (CL)
14	SS	20	14.2	3.0*				
15	ST	PUSH	12.3		123.9			
16	SS	20	13.9	3.5*				
						32.0	742.2	
17	ST/SS	PUSH	13.3					Hard brownish gray very silty CLAY, some silt and sand pockets, moist (CL)
						34.0	740.2	
18	SS	21	13.3	3.0*				Very tough gray silty CLAY, little sand, trace gravel, moist (CL)
19	ST	PUSH	14.4	2.75*	118.4			
20	SS	21	16.6	3.5*				

TESTING SERVICE CORPORATION

DRILL RIG NO. 91

BORING LOG CONTINUED

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-119A DATE STARTED 2-19-87 DATE COMPLETED 2-20-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 774.2

END OF BORING 710.2

S: 1097.4

E: 922.4

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -14.5 FEET (Leachate odor)

SHEET 2 OF 3

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_U	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
21	ST	PUSH	16.7		112.8			Very tough gray silty CLAY, little sand, trace gravel, moist (CL)
22 A/B	SS	28	16.7 --	3.5* --		43.7	730.5	
23	SS	47	16.6	4.5+*				Hard brownish gray/brown very silty CLAY, trace to little sand, trace gravel, moist; 4" brown fine to coarse sand seam at 43.7', wet (CL)
24	ST	PUSH	16.4		116.9	48.0	726.2	
25	SS	9	10.5					Firm to dense clayey SILT with SAND and GRAVEL, moist (CL-ML)
26	SS	58	11.5					
27	SS	21	10.0					
28	SS	20	9.8					
29	SS	28	10.3					
30	SS	27	9.2					
31	SS	13	9.3					
32	SS	23	10.1					
	End of Boring at -64.0 Feet							

DISTANCE BELOW SURFACE IN FEET: 40, 45, 50, 55, 60, 65, 70, 75, 80

LENGTH RECOVERY

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

NOTE: B-119 "TH" (Test Hole) encountered refuse and leachate under artesian conditions, at 10'. This boring was abandoned and sealed with bentonite pellet A new boring, offset to the south, was started and advanced to a depth of 64.0'.

TESTING SERVICE CORPORATION

DRILL RIG NO. 91

FPD 016212

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-119A DATE STARTED 2-19-87 DATE COMPLETED 2-20-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 774.2

END OF BORING 710.2

S: 1097.4

E: 922.4

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -14.5 FEET (Leachate odor)

SHEET 3 OF 3

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS

DISTANCE BELOW SURFACE IN FEET: 80, 85, 90, 95, 100, 105, 110, 115, 120

PIEZOMETER/MONITORING WELL INSTALLATION NOTES

1). End of Boring:
2). 1"* Schedule 40 PVC screen, .010" slots:
3). 1"* Schedule 40 PVC riser:
4). Coarse silica sand:
5). Bentonite Pellets:
6). Volclay Grout:
7). Steel protector casing concreted into place over monitoring well.

* 4" Schedule 40 PVC in monitoring well

	P-119A	P-119B	P-119C	G-119
End of Boring:	65.0	55.0	45.0	33.5
1"* Schedule 40 PVC screen, .010" slots:	63.0-65.0'	53.0-55.0'	43.0-45.0'	28.5-33
1"* Schedule 40 PVC riser:	+2.1-63.0'	+2.3-53.0'	+2.1-43.0'	+1.6-28
Coarse silica sand:	61.0-65.0'	51.0-55.0'	41.5-45.0'	28.0-33
Bentonite Pellets:	59.0-61.0'	49.0-51.0'	39.5-41.5'	25.0-28
Volclay Grout:	3.0-39.0'	3.0-49.0'	3.0-39.5'	3.0-25

TESTING SERVICE CORPORATION

DRILL RIG NO.

FPD 016213

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-120A DATE STARTED 2-24-87 DATE COMPLETED 2-27-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 772.5

END OF BORING 708.5

S: 1229.5
E: 504.8

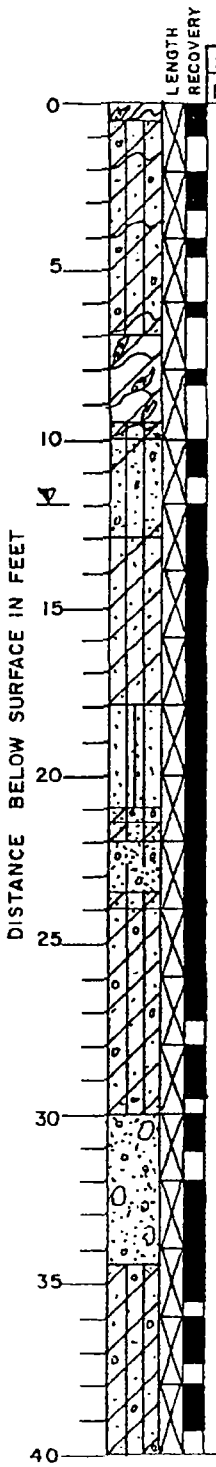
WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -12.0 FEET

SHEET 1 OF 3



SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
1	SS	18	18.1			0.5	772.0	Black clayey TOPSOIL, occasional roots, moist (OL)
2A/B	SS	34	17.4 / 24.1					FILL: Brown with gray silty CLAY, little sand, trace gravel, trace organic, moist
3	ST	PUSH	24.1		97.5			
4A/B	SS	22	22.5 / 33.7			7.0	765.5	
5A/B	SS	17	24.8 / 26.3	1.5*				Black clayey TOPSOIL with ROOTS, moist (OL)
						9.5	763.0	
						10.0	762.5	Tough dark brown to greenish gray silty CLAY, some sand, trace organic, trace gravel, very moist (CL)
6	ST	PUSH	14.6		114.7			
7A/B	SS	8				13.0	759.5	Loose brown/gray silty SAND, some clay, trace gravel, wet (SM)
8	SS	9	18.3	4.5*				Interbedded firm gray silty fine SAND layers and very tough silty CLAY layers wet to moist, respectively (SW/CL)
9	SS	17				18.0	754.5	
10	SS	14						Firm gray SILT, occasional thin sand seam, wet (ML)
11A/B	SS	30				21.0	751.5	Dense gray silty SAND, trace gravel, trace clay, wet (SM)
						21.6	750.9	
						22.0	750.5	Interbedded layers of gray silty CLAY and silty SAND, wet (CL & SM)
12A/B	SS	24	-- / 11.2	-- / 1.5*		23.6	748.9	
						24.0	748.5	Firm dark gray medium to very coarse SAND, trace silt, trace small gravel, wet (SW)
13	SS	23	22.4	3.5*				Tough gray silty CLAY with SAND layers (CL/SW)
14	ST	PUSH	18.8	1.75*	100.9			
15	SS	18	26.0	1.5*				Tough to very tough gray silty CLAY, little sand, trace gravel, trace silt partings, very moist (CL)
						30.0	742.5	
16	SS	31						Dense gray fine to coarse SAND and smal to large GRAVEL, occasional cobbles, wet (GW)
17	SS	39						
						34.5	738.0	
18A/B	SS	14	-- / 11.3	-- / 2.0*				Very tough gray very silty CLAY, trace sand and gravel, moist (CL)
19	SS	27	12.9	3.25*				
20	ST	PUSH	17.3	2.0*	111.3			
						40.0	732.5	

TESTING SERVICE CORPORATION

DRILL RIG NO. 91

BORING LOG CONTINUED

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-120A DATE STARTED 2-24-87 DATE COMPLETED 2-27-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 772.5

END OF BORING 708.5

S: 1229.5

E: 504.8

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -12.0 FEET

SHEET 2 OF 3

SAMPLE NO.	TYPE	N	WC	Q_U	% DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
21 A/B	SS	36				41.0	731.5	Dense gray fine SAND, trace silt, wet (SP)
22	SS	11						Firm yellowish gray sandy SILT, trace gravel, trace clay, wet (ML)
23	SS	27						
24	SS	20				47.0	725.5	
						48.0	724.5	Firm gray medium to very coarse SAND, little small gravel, wet (SW)
25	SS	34						Dense to very dense gray small to large GRAVEL, occasional cobbles, wet (GP/GW)
26	SS	107/9"				51.5	721.0	
27	SS	89/10"	15.6	4.5+*				
28	SS	100/10	13.4	4.5+*				Hard gray silty CLAY, little sand, trace gravel, moist (CL)
29	SS	95/11"	16.1	4.5+*				
30	SS	89/11"	15.4	4.5+*				
31	SS	94	13.8	4.5+*				
32	SS	98/11"	15.2	4.5+*				

End of Boring at -64.0 Feet

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

DISTANCE BELOW SURFACE IN FEET: 40, 45, 50, 55, 60, 65, 70, 75, 80

LENGTH RECOVERY

TESTING SERVICE CORPORATION

DRILL RIG NO. 91

FPD 016215

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-120A DATE STARTED 2-24-87 DATE COMPLETED 2-24-87 JOB 23,717

ELEVATIONS		WATER TABLE	
GROUND SURFACE	772.5	AT END OF BORING	
END OF BORING	708.5	24 HOURS	
S: 1229.5		WHILE DRILLING	-12.0 FEET
E: 504.8			

LENGTH	RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS

DISTANCE BELOW SURFACE IN FEET: 80, 85, 90, 95, 100, 105, 110, 115, 120

PIEZOMETER/MONITORING WELL INSTALLATION NOTES

1). End of Boring:
2). 1"* Schedule 40 PVC screen, .010" slot:
3). 1"* Schedule 40 PVC riser:
4). Coarse silica sand:
5). Bentonite Pellets:
6). Volclay Grout:
7). Steel protector casings concreted into place over monitorng wells/piezometers.

	P-120A	P-120C	G-120D	G-120S
End of Boring:	64.0	39.0	52.0	25.5
Screen, .010" slot:	61.5-63.5'	37.0-39.0'	47.0'52.0'	20.5-25.5'
Riser:	+2.2-61.5'	+2.1-37.0'	+2.3-47.0'	+2.4-20.5'
Coarse silica sand:	59.0-64.0'	36.0-39.0'	41.5-52.0'	19.0-25.5'
Bentonite Pellets:	57.5-59.0'	33.5-36.0'	37.5-41.5'	17.0-19.0'
Volclay Grout:	3.0-57.5'	3.0-33.5'	3.0-37.5'	3.5-17.0'

* 4" Schedule 40 PVC in monitoring wells

TESTING SERVICE CORPORATION

DRILL RIG NO

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-121A DATE STARTED 3-3-87 DATE COMPLETED 3-3-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 772.7

END OF BORING 708.7

S: 1248.5

E: 128.3

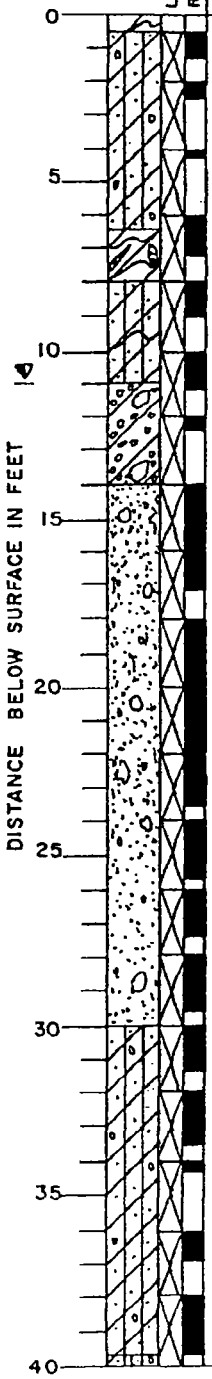
WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -11.0 FEET

SHEET 1 OF 3



SAMPLE NO.	TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
						0.5	772.2	Black clayey TOPSOIL, moist (OL)
1	SS	27						FILL: Brown (brown and gray @ 6') silty CLAY, little sand, trace gravel, moist (CL)
2	SS	14						
3	SS	50/3"						
						6.6	766.1	
4A/B	SS	25	-- / 40.6					Black clayey TOPSOIL, some roots, moist (OL)
						8.0	764.7	
5	SS	17	26.5	2.5*				Very tough brown and gray silty CLAY, trace to little sand, trace organic, moist (CL)
6	ST	PUSH	18.5		107.3	11.0	761.7	
7	SS	108/11"						Very dense brown and gray clayey GRAVEL, occasional cobbles, wet (GP)
						14.0	758.7	
8	SS	48						Dense to very dense gray fine to coarse SAND and small to large GRAVEL, occasional cobbles, wet (GW/GP)
9	SS	32						
10	SS	54						
11	SS	42						
12	SS	59						
13	SS	39						
14	SS	52						
15	SS	35						
						30.0	742.7	
16	SS	20	14.5	1.5*				Tough to very tough gray silty CLAY, trace sand and gravel, moist; 2" fine sand seam at 32.7' (CL)
17	SS	38	17.1	1.5*				
18	ST/SS	PUSH	20.0	2.0*				
19	ST	PUSH	18.0		108.9			
20A/B	SS	18	19.1 / --	2.25* / --				
						39.7	733.0	

TESTING SERVICE CORPORATION

DRILL RIG NO. 91

BORING LOG CONTINUED

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-121A DATE STARTED 3-3-87 DATE COMPLETED 3-3-87 JOB 23,71

ELEVATIONS

GROUND SURFACE 772.7

END OF BORING 708.7

S: 1248.5

E: 128.3

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -11.0 FEET

SHEET 2 OF 3

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_U	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
21	SS	30						Dense gray sandy SILT, trace gravel, trace clay layers, trace sand seams, wet; 9" boulder at 46.7' (ML)
22	SS	23						
23	SS	18						
24	SS	50/3"						
						48.0	724.7	
25	SS	64						Dense to very dense gray GRAVEL and SAND, occasional cobbles and boulders, wet (GP)
26	SS	21						
27	SS	59						
28	SS	55						
29	SS	53						
30 A/B	SS	60	-- / 18.7	-- / 4.0*				
						59.8	712.9	
31	SS	118/9"	15.6	4.5+*				Hard gray silty CLAY, little sand and gravel, 6" cobble at 62.0', damp to moist (CL)
32	SS	100/6"						
		End of Boring at -64.0 Feet						

DISTANCE BELOW SURFACE IN FEET: 40, 45, 50, 55, 60, 65, 70, 75, 80

LENGTH RECOVERY

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 91

FPD 016218

PROJECT MALLARD LAKE NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-121A DATE STARTED 3-3-87 DATE COMPLETED 3-3-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 772.7

END OF BORING 708.7

S: 1248.5

E: 128.3

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -11.0 FEET

SHEET 3 OF 3

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS

DISTANCE BELOW SURFACE IN FEET: 80, 85, 90, 95, 100, 105, 110, 115, 120

PIEZOMETER/ MONITORING WELL INSTALLATION NOTES

	P-121A	P-121B	P-121C	G-121
1). End of Boring:	64.0	51.0	38.0	25.0
2). 1"* Schedule 40 PVC screen, .010 slot:	62.0-64.0'	49.0-51.0'	36.0-38.0'	20.0-25.0
3). 1"* Schedule 40 PVC riser:	+2.4-62.0'	+2.1-49.0'	+2.3-36.0'	+1.8-20.0
4). Coarse Silica Sand:	61.7-64.0'	46.3-51.0'	34.0-38.0'	18.5-25.0
5). Bentonite Pellets:	60.7-61.7'	---	32.0-24.0'	16.5-18.5
6). Volclay Grout:	3.0-60.7'	3.0-46.3'	3.0-32.0'	3.0-16.5

7). Steel protector casings concreted into place over each piezometer/monitoring well

* 4" Schedule 40 PVC in monitoring well

TESTING SERVICE CORPORATION

DRILL RIG NO.

PROJECT MALLARD NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-122A DATE STARTED 4-23-87 DATE COMPLETED 4-29-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 779.1

END OF BORING 711.1

S: 933.7

W: 47.4

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -21.0 FEET

SHEET 1 OF 3

DISTANCE BELOW SURFACE IN FEET

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
1	SS	10	23.6					FILL: Brown to dark brown and dark gray silty CLAY, little sand, trace gravel, moist to very moist, occasional pieces of refuse, occasional topsoil and organics (CL)
2	SS	15	19.4					
3	SS	8	27.1					
4	SS	7	26.7					
5	SS	6	24.1					
6	SS	12	24.1					
7	SS	12	21.2					
8	SS	14	30.0					
9	ST	PUSH	29.9		93.9			
						18.0	761.1	Dark gray clayey TOPSOIL, organics, moist (OL)
10 A B	SS	9	35.6 38.2	1.0*		19.0	760.1	Tough dark gray silty CLAY, trace sand, trace organics, moist (CL)
11	ST	PUSH	28.4		95.5	21.0	758.1	Dense gray clayey SAND, trace silt, little gravel, interbedded seam of very silty clay/clayey silt, very moist to wet (SC)
12	SS	38						
13	SS	25						
						26.0	753.1	Dense gray fine to coarse SAND and small to large GRAVEL, wet (SW/GW)
14	SS	30						
15	SS	27						
16	SS	31						
17	SS	41						
						34.0	745.1	Very dense gray coarse SAND, little gravel, wet (SP)
18	SS	59						
19	SS	61						
						38.0	741.1	Dense gray fine to coarse SAND and small to large GRAVEL, wet (SW/GW)
20	SS	41						

TESTING SERVICE CORPORATION

DRILL RIG NO. 103

BORING LOG CONTINUED

PROJECT MALLARD NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-122A DATE STARTED 4-23-87 DATE COMPLETED 4-29-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 779.1

END OF BORING 711.1

S: 933.7

W: 47.4

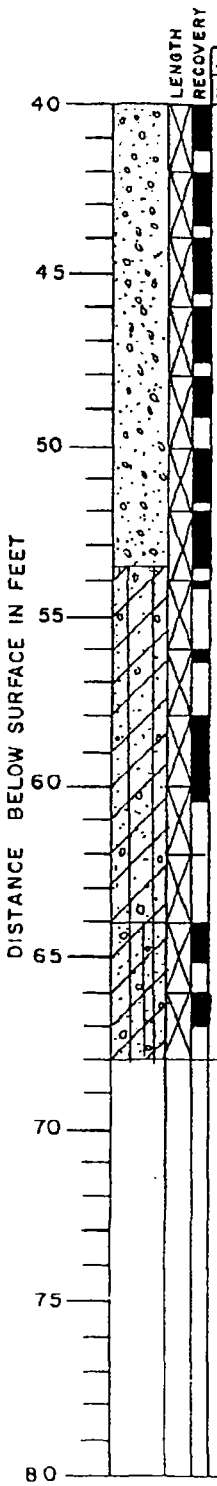
WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -21.0 FEET

SHEET 2 OF 3



SAMPLE NO.	TYPE	N	WC	Q_u	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
21	SS	32						Dense gray fine to coarse SAND and small to large GRAVEL, WET (SW/GW)
22	SS	37						
23	SS	34						
24	SS	32						
25	SS	51						
26	SS	50						
27 A	SS	35	--	--		53.6	725.5	
27 B			14.2	2.75*				
28	SS	20	23.0	DISTURBED				Very tough gray silty CLAY, little to some SAND, trace gravel, moist (CL)
29	SS	66/2"	25.7	2.5*				
30	ST	PUSH	13.6	1.75*	123.4			
31	SS	40	14.7	2.0*				
32	ST	PUSH				64.0	715.1	
33	SS	31						Firm brownish gray clayey SILT, little to some sand, some gravel, very moist to wet (ML)
34	SS	20						

End of Boring at -68.0 Feet

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 103

PROJECT MALLARD NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339 GLEN ELLYN, ILLINOIS

BORING B-122A DATE STARTED 4-23-87 DATE COMPLETED 4-29-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 779.1

END OF BORING 711.1

S: 933.7

W: 47.4

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -21.0 FEET

SHEET 3 OF 3

DISTANCE BELOW SURFACE IN FEET	LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
80										
85										
90										
95										
100										
105										
110										
115										
120										

PIEZOMETER/MONITORING WELL INSTALLATION NOTES

	P-122A	P-122B	P-122C	G-122
1). End of Boring:	68.0'	63.0'	33.0'	28.0'
2). 1" * Schedule 40 PVC screen (0.010" slot):	66.0-68.0'	61.0-63.0'	31.0-33.0'	23.0-28.0
3). 1"* Schedule 40 PVC riser:	+2.0-66.0'	+2.0-61.0'	+2.0-31.0'	+2.0-23.0
4). Coarse Silica Sand:	60.5-68.0'	58.0-63.0'	21.0-33.0'	21.0-28.0
5). Volclay Grout/Pellets @ G-122	53.6-60.5'	53.6-58.0'	3.0-21.0'	20.0-21.0
6). Natural cave:	21.0-53.6'	21.0-53.6'	---	---
7). Volclay Grout:	3.0-21.0'	3.0-21.0'	---	3.0-21.0

8). Steel protector casing concreted into place over each piezometer/monitoring well

* 4" Schedule 40 PVC in monitoring well

TESTING SERVICE CORPORATION

DRILL RIG NO. _____

PROJECT MALLARD NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-123A DATE STARTED 5-4-87 DATE COMPLETED 5-8-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 775.8

END OF BORING 715.8

S: 496.1

W: 69.3

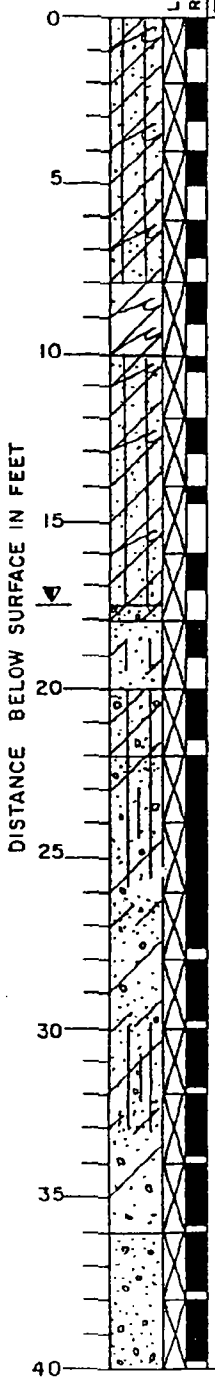
WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -17.6 FEET

SHEET 1 OF 3



LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
	1	SS	28	21.7					FILL: Dark brown to dark gray silty CLAY, little sand, trace organic, moist (CL)
	2	SS	21	21.6					
	3	SS	15	26.8					
	4A B	SS	22	22.4 19.4					
							8.0	767.8	
	5	SS	22						Dark gray clayey TOPSOIL, moist (OL)
	6	ST	PUSH	19.7		108.4	10.0	765.8	
	7	SS	9	--	1.5*				Tough dark brown to brown and gray silty CLAY, trace to little sand, little organics, moist to very moist (CL)
	8	ST	PUSH	24.5		100.8			
	9A B	SS	26	-- 15.3	1.25* --				
							17.6	758.2	
							18.0	757.8	Firm gray clayey SAND, little gravel, wet (SC)
	10	SS	14	19.3					Interbedded layers of firm gray silty SAND and silty CLAY, wet (SM & CL)
							20.0	755.8	
	11	SS	26	17.8					Firm gray very silty CLAY/very clayey SILT, some sand, little gravel, very moist (CL/ML)
							22.0	753.8	
	12	SS	26						Firm to very dense gray fine to coarse SAND, little clay, little silt, little gravel, wet, some seams of clayey sand and silty sand (SW/SC)
	13	SS	29						
	14	SS	45						
	15	SS	50						
	16	SS	62						
	17	SS	42						
	18	SS	51						
							36.0	739.8	
	19	SS	44						Dense gray medium to coarse SAND, trace to little gravel, wet (SW)
	20	SS	53						
							40.0	735.8	

TESTING SERVICE CORPORATION

DRILL RIG NO. 103

BORING LOG CONTINUED

PROJECT MALLARD NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-123A DATE STARTED 5-4-87 DATE COMPLETED 5-8-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 775.8

END OF BORING 715.8

S: 496.1

W: 69.3

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING -17.6 FEET

SHEET 2 OF 3

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_U	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
21	SS	29	15.1	2.5*				Very tough silty CLAY, little sand, trace gravel, 0.3' silty sand seam @ 42.0'
22	SS	31	14.9	3.0*				
23	ST	PUSH	13.5 10.7	2.0*	123.6	45.0	730.8	
24	SS	20	13.4	DISTURBED		48.0	727.8	Tough brown and gray very silty CLAY/ clayey SILT, little sand, trace gravel, moist to very moist (CL/ML)
25	SS	21	13.7	4.5+*				Very tough to hard gray very silty CLAY, little sand, trace gravel, occasional silt seams, moist to very moist (CL)
26	ST	PUSH	13.3	2.0*	124.1			
27	SS	22	13.6	3.5*				
28	ST	PUSH	17.3	3.25*	115.0	56.0	719.8	
29	SS	20	14.1	1.5*				Tough to very tough brownish gray very silty CLAY/clayey SILT, clayey sand seam @ 58.0-58.3', very moist to wet (CL/ML)
30	SS	26	15.4	2.25*				

End of Boring at -60.0 Feet

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

DISTANCE BELOW SURFACE IN FEET: 40, 45, 50, 55, 60, 65, 70, 75, 80

LENGTH RECOVERY

TESTING SERVICE CORPORATION

DRILL RIG NO. 103

FPD 016224

PROJECT MALLARD NORTH LANDFILL

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING B-123A DATE STARTED 5-4-87 DATE COMPLETED 5-8-87 JOB 23,717

ELEVATIONS

GROUND SURFACE 775.8

END OF BORING 715.8

S: 496.1

W: 69.3

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING

SHEET 3 OF 3

LENGTH	RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS

DISTANCE BELOW SURFACE IN FEET: 80, 85, 90, 95, 100, 105, 110, 115, 120

PIEZOMETER/ MONITORING WELL INSTALLATION NOTES

	P-123A	P-123B	G-123D	G-123S
1). End of Boring:	60.4'	45.3'	39.0'	18.0'
2). 1"* Schedule 40 PVC screen (.010" slot):	58.4-60.4'	43.3-45.3'	34.0-35.0'	13.0-18.(
3). 1"* Schedule 40 PVC riser:	+2.0-58.4'	+2.0-43.3'	+2.0-34.0'	+2.0-13.(
4). Coarse Silica Sand/Cave:	56.3-60.4'	42.0-45.3'	17.0-39.0'	13.0-18.(
5). Bentonite Pellets:	----	----	----	12.0-13.(
6). Volclay Grout:	41.0-56.3'	41.0-42.0'	3.0-17.0'	3.0-12.(
7). Natural formation cave:	20.0-41.0'	20.0-41.0'	----	----
8). Volclay Grout:	3.0-20.0'	3.0-20.0'		

9). Steel protector casings concreted into place over each piezometer/monitoring well

* 4" Schedule 40 PVC in monitoring well

TESTING SERVICE CORPORATION

DRILL RIG NO. _____

FPD 016225

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING P-125 DATE STARTED 11-20-87 DATE COMPLETED 11-23-87* JOB 24,911

* Piezometer Installed

ELEVATIONS

GROUND SURFACE 767.0

END OF BORING 737.0

S: 738.69

W: 523.70

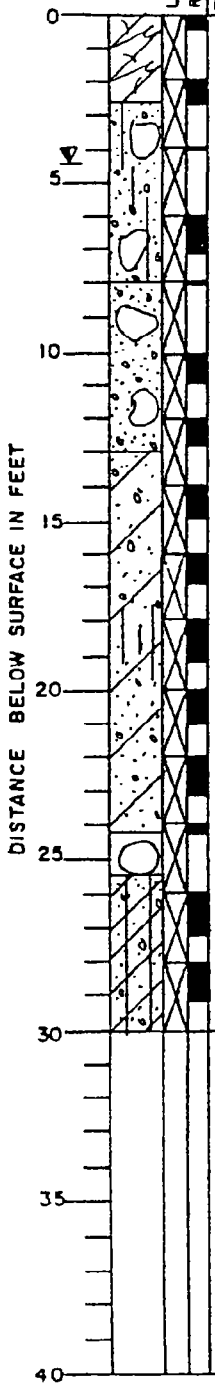
WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 4.5 FEET (762.5)

SHEET 1 OF 2



SAMPLE NO.	TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
1	SS	8	40.4					Black clayey TOPSOIL, little sand with roots, moist (OL)
2	SS	22				2.2	764.8	
3	SS	13						Loose to firm light brown fine to coarse SAND and small GRAVEL with silt, occasional cobble, damp to wet @ 4.5' (SW-SM)
4	SS	7	16.5			8.0	759.0	
5	SS	28						Firm gray small to large GRAVEL and COBBLES, some fine to coarse sand, wet (GW)
6	SS	22						
7	SS	22				13.0	754.0	
8	SS	22						Firm gray fine to coarse SAND and small to large GRAVEL, little silt after 18.0', trace clay, wet (SW/GW)
9	SS	25						
10	SS	25						
11	SS	23						
12	SS	40						
13	SS	100/5"				24.2	742.8	
						25.5	741.5	BOULDER
14	SS	26	13.0	3.75*				Very tough gray silty CLAY, little to some fine to coarse sand, trace small gravel, moist (CL)
15	SS	35	16.6	2.75*				
		End of Boring at -30.0 Feet						

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 103

FPD 016226

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING P-125 DATE STARTED 11-20-87 DATE COMPLETED 11-23-87* JOB 24,911

* Piezometer Installed

ELEVATIONS

GROUND SURFACE 767.0

END OF BORING 737.0

S: 738.69

W: 523.70

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 4.5 FEET (762.5)

SHEET 2 OF 2

DISTANCE BELOW SURFACE IN FEET	LENGTH	RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

PIEZOMETER INSTALLATION NOTES

1). 1" Schedule 40 PVC Screen (.010" slot): 21.7 - 23.9'

2). 1" Schedule 40 PVC Riser: +2.1 - 21.7'

3). Natural Backfill Cave: 4.0 - 30.0'

4). Hole Plug Bentonite Chips: 2.0 - 4.0'

5). 4" x 5' Steel protector casing concreted into place over piezometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. _____

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING P-126 DATE STARTED 11-9-87 DATE COMPLETED 11-17-87* JOB 24,911

* Piezometer Installations Completed

ELEVATIONS

GROUND SURFACE 765.3

END OF BORING 666.3

S: 320.80

W: 808.09

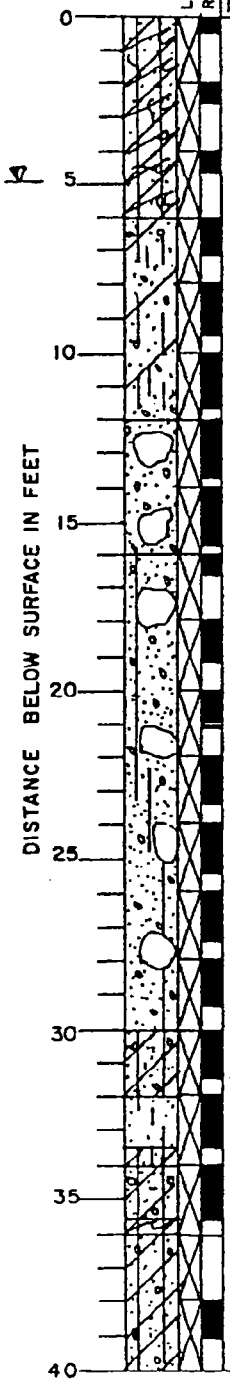
WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 5.0 FEET (760.3)

SHEET 1 OF 3



SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	∇DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
1	SS	12	30.2					Dark brown/black clayey TOPSOIL, littl sand, trace roots; grades into dark brown silty CLAY, moist to wet (OL/CL)
2	SS	9	34.1					
3	SS	10	34.8					
						6.0	759.3	
4	SS	22	13.7					Firm to very dense gray fine SAND and small GRAVEL, little silt, trace clay, fine silty sand from 8.0 - 10.0', wet (SP)
5	SS	19						
6	SS	63	10.5					
						12.0	753.3	
7	SS	81						Firm to very dense gray small to large GRAVEL, some sand, occasional cobbles, wet (GW)
8	SS	24						
						16.0	749.3	
9	SS	22						Firm to very dense gray fine to coarse SAND and small to large GRAVEL, little silt, occasional cobble, wet (GW/SW)
10	SS	22						
11	SS	44						
12	SS	60						
13	SS	58						
14	SS	58						
15	SS	33						
						30.0	735.3	
16	SS	22	17.1	2.75*				Very tough gray silty CLAY, little sand, trace gravel, moist (CL)
						32.0	733.3	
17 A	SS	31	--	--				Dense gray fine SAND, trace gravel, trace silt, wet (SP)
17 B			15.9	--		33.5	731.8	
						34.0	731.3	Dense gray clayey SILT, some sand, wet (ML)
18 A	SS	35	15.8	2.5*				Very tough gray very silty CLAY, litti sand, trace gravel, moist (CL)
18 B			20.0	1.5*		35.6	729.7	
						36.0	729.3	Tough gray with black silty CLAY with organics, moist (CL/OL)
19	SS	29						Tough to very tough gray very silty CLAY, little sand, trace gravel, moist (CL)
20	SS	20	10.3	1.75*				

TESTING SERVICE CORPORATION

DRILL RIG NO. 103

BORING LOG CONTINUED

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING P-126 DATE STARTED 11-9-87 DATE COMPLETED 11-17-87* JOB 24,911

* Piezometer Installation Completed

ELEVATIONS

GROUND SURFACE 765.3

END OF BORING 666.3

S: 320.80

W: 808.09

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 5.0 FEET (760.3)

SHEET 2 OF 3

DISTANCE BELOW SURFACE IN FEET

SAMPLE NO.	TYPE	N	WC	Q_U	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
21	SS	28	13.2	1.5*				
22	ST	PUSH	14.5	2.5*	119.5			Tough to very tough gray very silty CLAY, little sand, trace gravel; occasional thin silt seams from 50.0-58.0', moist (CL)
23	SS	14	15.1	1.0*				
24	ST	PUSH	16.2	2.5*	117.3			S-22 - K = 2.0 x 10^{-8} cm/sec; S-24 - K = 2.6 x 10^{-8} cm/sec; S-27 - K = 2.7 x 10^{-8} cm/sec; S-29A - K = 3.5 x 10^{-8} cm/sec
25	SS	43	11.4	2.75*				
26	SS	30	10.9					
27	ST	PUSH	13.2	3.0*	123.9			
28	SS	39	17.5	3.0*				
29A	ST	PUSH	15.3		116.4			
29B			15.6		108.2	58.0	707.3	
30	SS	30	11.3					Dense to very dense gray clayey SILT, little sand, trace gravel, wet (ML)
31	SS	78/11"	16.1			62.0	703.3	
32	SS	45	16.0	3.25*				Very tough gray very silty CLAY, little sand, trace gravel, moist (CL)
33	SS	60	39.2	2.25*				
34	ST	PUSH						
35	SS	69	17.4	2.0*				S-36 - K = 2.3 x 10^{-8} cm/sec
36	ST	PUSH	14.8	3.5*	116.5	71.3	694.0	
			--	--		72.0	693.3	Dense gray SILT, little clay, wet (ML)
37A	SS	32	18.1	2.0*		73.0	692.3	Very tough gray silty CLAY, little sand, trace gravel, moist (CL)
37B			--	--				
37C						74.0	691.3	Dense gray medium SAND and GRAVEL, wet (SP)
38	SS	52	14.8	3.0*				
39	SS	52	15.1	2.5*				Very tough gray silty CLAY, little sand, trace gravel, moist; 2" clay sand seam @ 74.5' (CL)
40	ST	PUSH	14.1	2.5*	119.0			S-40 x K = 2.3 x 10^{-8} cm/sec

TESTING SERVICE CORPORATION

DRILL RIG NO. 103

BORING LOG CONTINUED

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING P-126 DATE STARTED 11-9-87 DATE COMPLETED 11-9-87* JOB 24,911

*Piezometer Installations Completed

ELEVATIONS

GROUND SURFACE 765.3

END OF BORING 666.3

S: 320.80

W: 808.09

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 5.0 FEET (760.3)

SHEET 3 OF 3

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
41	SS	56	18.2	1.5*				Very tough gray silty CLAY, little sand, trace gravel, moist: 6" silty sand seam @ 81.0'
						82.8	682.5	
42A	SS	55	19.7	1.0*				Very dense gray clayey SILT, silty CLAY, occasional fine sand seams, wet (ML/CL)
42B			18.1	--				
43A	SS	65	18.9					
43B			19.2					
						86.4	678.9	
44A	SS	50						Very dense greenish gray clayey silty small to large GRAVEL and fine to coarse SAND, wet (GC/GM)
44B								
45	SS	54						
46	SS	28	10.1					
47	SS	75						
						94.0	671.3	
48	SS	88						Very dense gray silty very fine SAND, wet (SM)
49	SS	47						
						97.7	667.6	
								Weathered DOLOMITE BEDROCK

DISTANCE BELOW SURFACE IN FEET: 80, 85, 90, 95, 100, 105, 110, 115, 120

LENGTH RECOVERY

End of Boring at -99.0 Feet (Auger Refusal)

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

PIEZOMETER INSTALLATION NOTES

	P-126A	P-126B	P-126C	P-126D
End of Boring:	99.0	69.5	46.5	30.0
1" Schedule 40 PVC Screen (.010" Slot):	95.0-98.0'	64.6-66.8'	42.3-44.5'	27.0-29.
1" Schedule 40 PVC Riser:	+2.7-95.8'	+2.7-64.6'	+3.0-42.3'	+3.0-27.
Coarse Silica Sand:	92.7-99.0'	63.5-69.5'	41.0-46.5'	26.0-30.
Volclay Grout:	30.0-92.7'	30.0-63.5'	30.0-41.0'	-----
Natural Backfill/Cave:	4.0-30.0'	4.0-30.0'	4.0-30.0'	4.0-26.

4" x 5' Steel protector casing concreted into place over each piezometer with layer of Holeplug bentonite chips at bottom of concrete.

TESTING SERVICE CORPORATION

DRILL RIG NO. 103

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING P-127 DATE STARTED 11-23-87 DATE COMPLETED 11-23-87* JOB 24,911

* Piezometer Installed

ELEVATIONS

GROUND SURFACE 767.5

END OF BORING 739.5

S: 711.79
W: 889.99

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 6.0 FEET (761.5)

SHEET 1 OF 2

DISTANCE BELOW SURFACE IN FEET

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
1	SS	8	31.5					Dark brown clayey TOPSOIL with roots, moist (OL)
						2.1	765.4	
2	SS	9	37.9	2.5*		3.2	764.3	Very tough brown sandy silty CLAY, trace gravel, trace thin sand seams, moist (CL)
3	SS	19	12.2					Firm brown sandy SILT, little small gravel, trace clay, moist (ML)
						6.0	761.5	
4	SS	34	13.6					Firm to dense brown fine to coarse SAND, some small to large gravel, trace to little silt; 2" brown clay seam @ 9.0', wet (SM/SW)
5	SS	21						
						10.0	757.5	
6	SS	29						Firm gray fine to coarse SAND, some small to large gravel, little silt, wet (SW/SM)
7	SS	29						
						14.0	753.5	
8	SS	25						Firm gray small to large GRAVEL and fine to coarse SAND, little silt, trace clay; 3" sand seam @ 18.8', wet (GM/SM)
9	SS	21						
10	SS	22						
11	SS	13						
12	SS	8						
13A	SS	13	--	--		24.5	743.0	
13B			17.4	2.25*				Very tough gray very silty CLAY, little sand, occasional sand and gravel pockets, moist (CL)
14	SS	18	19.0	2.0*				

End of Boring at -28.0 Feet

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 103

FPD 016231

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING P-127 DATE STARTED 11-23-87 DATE COMPLETED 11-23-87* JOB

* Piezometer Installed

ELEVATIONS

GROUND SURFACE 767.5

END OF BORING 739.5

S: 711.79

W: 889.99

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 6.0 FEET (761.5)

SHEET 2 OF 2

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS

DISTANCE BELOW SURFACE IN FEET: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

PIEZOMETER INSTALLATION NOTES

1). 1" Schedule 40 PVC Screen (.010" slot) 24.5 - 24.7'

2). 1" Schedule 40 PVC Riser: +2.2 - 24.7'

3). Natural Backfill/Cave: 3.0 - 28.0'

4). Hole Plug Bentonite Chips: 2.0 - 3.0'

5). 4" x 5' Steel protector casing concreted into place over piezometer

TESTING SERVICE CORPORATION

DRILL RIG NO.

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING P-128 DATE STARTED 11-11-87 DATE COMPLETED 11-11-87* JOB 24,911

* Piezometer Installed

ELEVATIONS

GROUND SURFACE 764.0

END OF BORING 734.0

S: 270.70
W: 1209.56

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 4.8 FEET (759.2)

SHEET 1 OF 2

DISTANCE BELOW SURFACE IN FEET

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
1	SS	7	32.1					Black clayey TOPSOIL, trace sand with roots, moist (OL)
						2.0	762.0	
2	SS	4	32.9					Brownish gray CLAY, trace sand, trace organics, moist (CL/OL)
3 A/B	SS	16	32.7 --			4.8	759.2	
4	SS	30						Firm gray clayey silty fine to coarse SAND and GRAVEL, WET (SC)
						8.0	756.0	
5	SS	17						Firm gray fine to coarse SAND, some gravel in upper 2'; below 10' well sorted, wet (SW/SP)
6	SS	18						
7	SS	18						
8	SS	17						
9 A/B	SS	28				16.0	747.6	
10	SS	32						Firm to dense gray small to large GRAVEL and fine to coarse SAND; coarse sand layer from 20' to 22', wet (GW/SW)
11	SS	33						
12	SS	35						
13	SS	8						
						26.0	738.0	
14	SS	25	17.7	2.0*				Very tough gray sandy silty CLAY, little gravel, moist, gravel pocket from 27.6 - 28.0', wet (CL)
15	SS	15	9.8					

End of Boring at -30.0 Feet

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 53

FPD 016233

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING P-128 DATE STARTED 11-11-87 DATE COMPLETED 11-11-87* JOB 24,911

ELEVATIONS * Piezometer Installed WATER TABLE

GROUND SURFACE 764.0 AT END OF BORING

END OF BORING 734.0 24 HOURS

S: 270.70 WHILE DRILLING -4.8 FEET (759.2)

W: 1209.70 SHEET 2 OF 2

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS

DISTANCE BELOW SURFACE IN FEET: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

PIEZOMETER INSTALLATION NOTES

1). 1" Schedule 40 PVC Screen (.010" slot): 22.3 - 24.5'

2). 1" Schedule 40 PVC Riser: +2.1 - 22.3'

3). Coarse Silica Sand/Natural Backfill: 4.5 - 30.0'

4). Hole Plug Bentonite Chips: 3.0 - 4.5'

5). 4" X 5' Steel protector casing concreted into place over piezometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. _____

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING P-129 DATE STARTED 11-24-87 DATE COMPLETED 11-24-87* JOB 24,911

* Piezometer Installed

ELEVATIONS

GROUND SURFACE 764.9

END OF BORING 740.9

S: 700.89

W: 1257.80

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 4.0 FEET (760.9)

SHEET 1 OF 2

SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS
1	SS	8	57.5					Black clayey TOPSOIL with roots, trace gravel, moist (OL)
						2.1	762.8	
2	SS	4						Very loose gray with brown clayey silty SAND, trace small gravel, very moist (SM/SC)
						4.0	760.9	
3	SS	41						Dense brown small to large GRAVEL and fine to coarse SAND, little silt, wet (GW)
						6.0	758.9	
A			25.6					
4B	SS	39	--			7.2	757.7	Stiff brownish gray/black sandy CLAY, little organics, very moist (CL)
C			--					
5	SS	33						Firm to dense gray (brown in upper 0.3') small to large GRAVEL and fine to coarse SAND, occasional cobble, wet (GW)
6A/B	SS	21				11.0	753.9	
7	SS	18						Firm to dense gray fine to coarse SAND, trace small gravel, trace silt, wet (SW)
8	SS	36						
9	SS	44						
10	SS	31				19.9	745.0	
11	SS	31	14.2	2.5*				Tough to very tough gray silty CLAY, little to some fine to coarse SAND, trace small gravel, trace sand and gravel pockets, moist (CL)
12	SS	36	15.7	1.0*				
	End of Boring at -24.0 Feet							

DISTANCE BELOW SURFACE IN FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40

* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.

TESTING SERVICE CORPORATION

DRILL RIG NO. 103

FPD 016235

PROJECT MALLARD NORTH

CLIENT FOREST PRESERVE DISTRICT OF DU PAGE COUNTY, P. O. BOX 2339, GLEN ELLYN, ILLINOIS

BORING P-129 DATE STARTED 11-24-87 DATE COMPLETED 11-24-87* JOB 24,911

* Piezometer Installed

ELEVATIONS

GROUND SURFACE 764.9

END OF BORING 740.9

S: 700.89
W: 1257.80

WATER TABLE

AT END OF BORING

24 HOURS

WHILE DRILLING - 4.0 FEET (760.9)

SHEET 2 OF 2

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_{DRY}	DEPTH	ELEV.	SOIL DESCRIPTIONS

DISTANCE BELOW SURFACE IN FEET: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

PIEZOMETER INSTALLATION NOTES

1).	1" Schedule 40 PVC Screen (.010" slot):	20.3 - 22.5'
2).	1" Schedule 40 PVC Riser:	+2.0 - 20.3'
3).	Natural Backfill/Cave:	5.0 - 22.5'
4).	Hole Plug Bentonite Chips:	2.0 - 5.0'
5).	4" x 5' Steel protector casing concreted into place over piezometer	

TESTING SERVICE CORPORATION

DRILL RIG NO. _____