GEOTECHNICAL/GEOHYDROLOGICAL CONSIDERATIONS FOR THE NEW BUFFALO INDUSTRIAL PARK

Prepared for:

Olson & Terzian, P.C.
Buffalo, New York

Prepared by:

Goldberg-Zoino Associates of New York, P.C.
Buffalo, New York

January, 1984

GZA

GZA OF NEW YORK, P.C.
GOLDBERG·ZOINO ASSOCIATES OF NEW YORK, P.C.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

DONALD T GOLDBERG
WILLIAM S ZOINO
JOSEPH D GUERTIN JR
JOHN E AYRES
JOHN P SULLIVAN
STEVEN J TRETTEL
JAMES H REYNOLDS
CONSULTANTS:
WALTER E JAWORSKI
STANLEY M BEMBEN

JAMES H. REYNOLDS,
GENERAL MANAGER

February 13, 1984
File: R5613/5615

Olson & Terzian, P.C.
The Crosby Building
Suite 601
170 Franklin Street
Buffalo, New York 14202

Attention: Mr. Arthur F. Robinson, P.E.
Vice-President

Re: Final Geotechnical/Geohydrological Report for the New Buffalo Industrial Park

Gentlemen:

In accordance with our proposal, we hereby submit our final report entitled "Geotechnical/Geohydrological Considerations for the New Buffalo Industrial Park".

We appreciate the opportunity to work with you on this project and look forward to being of continued service in the future. Should you have any additional questions or comments, please do not hesitate to contact GZA.

Very truly yours,

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.

Raymond L. Kampff
Project Geohydrologist

Donald R. McMahon, P.E.
Geotechnical Engineer

Richard F. Flanagan, P.E.
Associate & Chief Engineer

RLK/DRM/RFF/dek

SUITE 1000 RAND BUILDING
BUFFALO, NY 14203
716/856-8980

NEWTON UPPER FALLS, MA
BUFFALO, NY
CONNECTICUT RIVER VALLEY
PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL CONSIDERATIONS
FOR THE NEW BUFFALO INDUSTRIAL PARK

TABLE OF CONTENTS

GZA

PAGE NO.

GZA

LIST OF FIGURES

GZA

LIST OF APPENDICES

GZA

1.00 INTRODUCTION

The City of Buffalo Department of Community Development, Erie County and the Erie County Industrial Development Agency are jointly implementing plans to develop the New Buffalo Industrial Park to house primarily light industrial and service firms. The proposed New Buffalo Industrial Park is located on an approximately 135 acre site near the eastern boundary of the City of Buffalo, and approximately bounded by William Street to the north, South Ogden Street to the east, Dingens Street to the south, and Bailey Avenue to the west. A project locus map is presented as Figure 1.

Goldberg-Zoino Associates of New York, P.C. (GZA), acting as a geotechnical/geohydrological consultant, has prepared this final report for the project designers, Olson and Terzian, P.C. It summarizes GZA's recent field, office and laboratory studies at the New Buffalo Industrial Park site and makes various engineering and construction recommendations.

1.10 STUDY OBJECTIVES

GZA was initially engaged to explore subsurface conditions at the site and to evaluate how these conditions would affect the design and construction of roadways, utilities, and future building foundations. Subsequent to GZA's initial assignment the Erie County Department of Environment and Planning (DEP) reported that areas within the site may have, in the past, received industrial and potentially contaminated fill. Thus, GZA was assigned the task of initiating geohydrologic studies at the site to locate and quantify these suspected fills, determine their impact on ground water and surface water, and to evaluate the affect of such wastes on the site's planned construction.

1.20 PURPOSE AND SCOPE

GZA's work included the following to accomplish the previously stated objectives:

1. Reviewed available, relevant data to assist in characterizing the past and present site conditions,
2. Engaged a test boring and test pit subcontractor,
3. Monitored and logged 23 test borings,
4. Monitored and logged 55 test pits,
5. Monitored ground water levels in observation wells,
6. Collected ground water and surface water samples for analytical testing,

7. Completed soils laboratory identification tests on selected soil samples,

8. Retained soil samples from several test pits for analytical chemical testing,

9. Analyzed the data to make appropriate foundation and construction recommendations, and

10. Completed a geohydrologic assessment of the site to determine ground water conditions.

2.00 SITE HISTORY

Documentation of the previous uses of the site is not extensive. Data sources are limited to old city surveys, fire insurance maps and aerial photographs. Several small industries have been located on the site near the existing peripheral streets, but the interior of the site has been either occupied by railroad yards or remained undeveloped. Undeveloped portions have been used for miscellaneous dumping activities.

The 1891 Buffalo City Atlas (see Figure 2) indicates that the railroad embankment, currently bisecting the site, was in place and owned by the Delaware, Lackawanna and Western Railroad. The area southeast of the embankment was previously occupied by a Lehigh Valley Railroad switching yard with car and locomotive maintenance facilities. These buildings, now demolished, were constructed of either brick and stone or wood. East of the railroad embankment/Dingens Street intersection (near the current Kintex Building location) several railroad tracks crossed Dingens Street at grade and there were several adjacent wood frame structures. The area west of the railroad embankment, along Dingens Street, was generally undeveloped. A brick yard, reputedly owned by the Bush Brothers, was located near the intersection of Bailey Avenue and Dingens Street. The north-central and northwest sections of the site were occupied by a large Erie and Western Railroad yard. Several small, presumably wood frame, structures were located at the site's northwestern and northeastern corners.

Examination of subsequent various aerial photographs and maps indicates that fill has been deposited randomly throughout the site. The majority of landfilling apparently occurred between the 1920's and the early 1950's and was generally concentrated in the area west of the railroad embankment and south of the former Erie and Western rail lines. The current pond in the approximate center of the site was at one time much larger but its size has been reduced by filling. It is not certain who did this filling but the nearby railroads are suspected. Other potential parties could be some former industries identified on early Sanbourn Fire Underwriter maps. This may include a former fuel processing facility located near the current NFS building. This facility manufactured and processed coal, coke, and charcoal, and waste residue could likely have been disposed in open areas of the site.

Figure 3 is a combination of aerial photographs taken of the site in 1958. A lumber yard was in operation in the northwestern corner along the railroad tracks bordering the site's northern edge. The 1958 photograph also shows a waste processing and recycling facility, presumably for automotive wastes, located

on Bailey Avenue north of the Dingens Street intersection and now the site of a machine shop and the former A&R Waste Building. Behind this location various haul roads are evident on the photograph (Figure 3). Mounds of apparent fill can be distinguished along the haul roads, and it is reasonable to expect that much of this material was from the waste processing facility.

3.00 SITE EXPLORATIONS AND TESTING

GZA's site exploration consisted of 23 soil and rock test borings, converting 17 of these borings into ground water monitoring wells, 55 test pits, various soil identification tests, and analytical testing of both soil and ground water samples. An exploration plan showing the location of test borings, test pits, and monitoring locations is presented as Figure 4.

3.10 Test Borings

Test borings were done in two phases for this project. The initial test borings (B-1 through B-20) were done in May and June, 1983, by Earth Dimensions, Inc. of East Aurora, New York and the secondary phase borings (B-21 through B-23) were done in October, 1983, by Parratt-Wolff, Inc. of East Syracuse, New York.

Earth Dimensions, Inc. used a truck mounted Mobile B-34 drill rig and Parratt-Wolff, Inc. used a truck mounted CME-55 drill rig. All borings were similarly drilled and the process consisted of augering overburden material between sampling depths with hollow stem augers (either 3.5 or 3.75 inch inside diameter (I.D.)) to permit NX-size rock coring. Soil samples were obtained at 5-foot intervals by driving a standard split-spoon sampler (2 foot (ft.) long by 1.375 inch I.D.) with a 140-pound hammer falling 30 inches (ASTM D-1586). The number of blows required to drive the sampler 12 inches is defined as the Standard Penetration Test (SPT) N-value. Rock was cored in 8 of the test borings using a double tube NX size core barrel with a diamond bit, to verify top of rock elevations.

GZA personnel observed drilling procedures and prepared stratigraphic logs based upon material collected from the test borings. Additionally, a model PI 101 photoionization analyzer manufactured by H-Nu Systems, Inc. was used to scan soil samples and the air near the test borings for the presence of potentially harmful organic vapors. Overburden samples were visually classified in the field by GZA using the Unified Soil Classification System. Rock samples were examined by GZA to determine the rock type, structure, percentage of core recovery and Rock Quality Designation (RQD). Core recovery is the ratio of the sample length recovered divided by the length of core run, expressed as a percentage. RQD is defined as the summation of all pieces of core greater than 4 inches in length divided by the core run length and expressed as a percentage. In both cases core sections broken by drilling or handling are fitted together and considered as one piece.

Boring locations were selected by GZA, and Olson & Terzian, P.C. determined ground surface elevations. Figure 4 presents

the location of all test borings and the boring logs are included in Appendix A. Additionally, the results of the test borings are summarized on Table I "Summary of Test Boring Quantities" located on the next page.

3.20 Test Pits

Fifty-five test pits were made at the locations shown on Figure 4 by the Boyd and Brown Construction and Development Corporation. Test pits designated with a "TP" prefix were completed in May and June, 1983 and those with a "TP-II" designation were completed in November, 1983. A Model 580C Case backhoe and a John Deere Model 310A backhoe, both with a 14 ft. reach, were used to excavate the test pits. GZA personnel monitored the excavation of each of the test pits and prepared stratigraphic logs indicating the classification of in-situ materials. The PI 101 photoionizer was also used during excavation of most of the test pits to scan air samples for the presence of potentially harmful organic vapors.

Test pit elevations are only approximate as they were estimated from topographic site plans prepared at two foot contours. Test pit logs prepared by GZA representatives for each of the test pits are included in Appendix B.

Soil and fill samples were retained from several of the pits along the railroad embankment for laboratory classification testing. Grain size analyses and one Atterberg Limit Determination were done on these samples to determine the suitability of these soils as pavement subbase and general construction fill. The results of these analyses are presented graphically in Appendix C. Additional samples of fill material were collected from selected test pits for analytical chemical testing and this work is discussed in Section 3.40.

3.30 Monitoring Wells

Observation wells were installed in 17 boreholes at varying depths throughout the site to characterize the site's ground water regime. These wells consist of 1.5 inch I.D. and 0.75inch I.D. Schedule 40 flush coupled PVC pipe with slotted well screens varying between 2 and 10 ft. long, depending upon subsurface conditions. Backfill within the annular space surrounding the well consists of #4 ROK sand around the screened section of the well and an approximate one foot thick bentonite seal above the sand. In-situ clay material with a cement grout plug at the ground surface covers the bentonite on the majority of the wells. Wells B-21, B-22, and B-23 contain a mixture of grout and one percent bentonite slurry above the bentonite seal to the ground surface.

TABLE I: SUMMARY OF TEST BORING QUANTITIES

Test Boring Number	Date Completed	Ground Surface Elevation (ft.) (City Datum)	Depth of Boring (ft.) / BOH Elev. (ft.) (City Datum)	TOR Elevation (ft.) (City Datum)
B-1	5/23/83	30.48	27.8 / 2.7 *	
B-2	5/31/83	31.22	20.5 / 10.7 *	
B-3	5/31/83	31.57	19.6 / 12.0	14.9
B-4	5/30/83	33.03	15.0 / 18.0 *	
B-5	5/30/83	33.84	18.9 / 14.9 **	
B-6	6/2/83	33.92	29.8 / 3.1	6.6
B-7	5/24/83	29.34	21.5 / 7.8 *	
B-8	5/26/83	25.92	34.8 / -8.9	-4.2
B-9	5/23/83	22.23	35.0 / -12.8 *	
B-10	6/3/83	30.61	28.0 / 2.6 *	
B-11	5/24/83	25.07	36.1 / -11.0	-6.8
B-12	5/20/83	24.66	26.5 / -1.8 *	
B-13	5/18/83	23.04	34.1 / -11.1 *	
B-14	6/1/83	33.08	32.6 / 0.5 *	
B-15	5/27/83	29.27	16.5 / 7.5 *	
B-16	5/18/83	25.67	31.4 / -5.7	-0.9
B-17	5/19/83	26.00	28.1 / -2.1	0.2
B-18	5/20/83	25.49	33.3 / -7.8 *	
B-19	5/27/83	29.69	31.2 / -1.5	1.7
B-20	5/17/83	29.46	26.0 / 3.5	6.3
B-21	10/27/83	26.16	24.0 / 2.2 **	
B-22	10/28/83	34.87	32.1 / 2.8 **	
B-23	10/28/83	23.80	36.2 / -12.4 **	

Notes: BOH = Bottom of Hole
TOR = Top of Rock

* Split Spoon Refusal

** Auger Refusal

Details of individual well installations are presented on the boring logs in Appendix A and summarized in Table II "Monitoring Well Details", on the following page. GZA monitored water levels in each of the wells and these data are presented as Appendix D.

3.40 Field and Laboratory Analytical Testing

Test samples were collected from various locations during the course of this study for analytical testing. These samples were collected from monitoring wells, surface water supplies, and test pits, as discussed below.

Ground water samples were collected from selected monitoring wells on several occasions using stainless steel bailers with teflon check-valves. Prior to sampling, the bailers were cleaned with laboratory grade detergent followed by successive rinses with analytical grade methanol and distilled water. A separate bailer was used to sample each well so as to prevent cross-contamination and, prior to collecting each test sample, a minimum of three volumes of water were purged from the well. The samples collected were appropriately preserved and delivered to ARO Laboratories of Buffalo, New York, following United States Environmental Protection Agency (EPA) Chain of Custody procedures. Additionally some split samples were retained by GZA for Gas Chromatographic (GC) screening to detect volatile organic constituents using GZA's in-house equipment.

Surface water samples were collected on several occasions from the ponded water, immediately north-east of the stone stockpile. This water was handled similarly to the ground water samples and one sample was delivered to ARO Laboratories for analysis.

Overburden samples from the fills were collected during the test pit explorations. Selected split samples, representative of the different fills found at the site, were collected. One was delivered to ARO Laboratories, for analysis, following EPA Chain of Custody Procedures and the other was screened by GZA with a GC.

In-situ testing for pH, specific conductance, and temperature was done by GZA on each sample at the time of sampling. Additionally, the H-Nu photoionizer was used to test many of the samples in the field for the presence of organic contamination. The results of these tests and those of ARO are presented in Appendix E, and Section 5.00 discusses the results of this analytical testing.

TABLE II
MONITORING WELL DETAILS

Well Number	Elevation of Screened Interval (City Datum - ft.)	Material Type Around Screened Interval
B-1	3.5 - 8.3	Silty fine SAND (Glacial Till)
B-2	11.2 - 16.0	Glacial Till to Silty CLAY
B-5	15.8 - 20.4	Glacial Till to Silty CLAY
B-6	20.7 - 30.3	Misc. Fill
B-7	10.3 - 15.1	Saturated Silty CLAY
B-8	8.9 - 18.5	Misc. Fill
B-9	(-10.3) - (-5.5)	Sandy SILT (Glacial Till)
B-10	3.6 - 8.4	Glacial Till to Silty CLAY
B-11	7.9 - 17.5	Silty CLAY to Misc. Fill
B-12	12.7 - 17.5	Misc. Fill
B-13	3.0 - 5.0	Saturated Silty CLAY
B-16	0.7 - 2.7	Fine Sandy SILT (Glacial Till)
B-18	(-7.1) - (-5.1)	Silty CLAY
B-19	1.7 - 6.5	Fine Sandy SILT (Glacial Till)
B-21	3.2 - 8.0	Glacial Till to Silty CLAY
B-22	2.8 - 7.6	Glacial Till to Silty CLAY
B-23	(-12.4) - (-7.6)	Silty fine SAND (Glacial Till)

GZA

4.00 SITE CONDITIONS

This section presents a brief discussion of the existing land use at the New Buffalo Industrial Park Site and of GZA's interpretation of subsurface conditions. These interpretations are based on a review of available data and the results of the subsurface exploration program.

4.10 Current Land Use

Today the approximately 135 acre site consists of largely undeveloped land with various owners. A 20 to 25 ft. high abandoned railroad embankment bisects the site running from the eastern edge of the NFS property at Dingens Street to the northeast corner of the site. The central section of the site is dominated by an approximate 4-acre pond with connecting drainage ways. This pond is reported to be approximately 5 ft. deep with some random, isolated areas as deep as 10 ft.

Laboratory tests of the embankment material (see Appendix C) indicate that the material within the embankment is similar to the on-site natural silts and silty clays found during the explorations. Thus, it is possible that on-site materials were used to construct the embankment and that the pond was a borrow pit. It is also possible that, following construction of the embankment, the borrow pit filled with run-off and rain water to create the pond as the natural materials, with their typically low permeability, act as a seal retaining the pond's water.

Currently, the area immediately surrounding the pond is being filled with predominantly construction debris, stone, concrete, etc. from unidentified sources, as observed by GZA personnel during field studies.

Immediately west of the pond is a large stockpile of stone reputedly owned by the Pinto Equipment Company, who operates on-site rock crushing equipment to process the stone into construction materials. Several small businesses and structures, including a collison shop and a diner, are located west of the stone stockpile, and along Bailey Avenue. East of the NFS property, on Dingens Street, the only active areas are the Kintex Bldg. (210 Dingens Street) and an employee parking lot for the UPS building, located on the south side of Dingens Street. The remaining areas are largely vacant with the exception of a Niagara Mohawk Power Corporation (NMPC) substation located along Bailey Avenue. NMPC also maintains a 90 ft. to 110 ft. wide right-of-way containing transmission lines extending from their substation to the site's northeast corner. North of the NMPC right-of-way, there are frequent rail lines which are remnants of the earlier Erie & Western Railroad. These lines, which are not currently in active service, were, during this study, used for railcar storage.

A gas well owned by Niagara Frontier Services, is located approximately 200 ft. west of the railroad embankment in the north central section of the site near test boring B-15. An approximate 4 inch diameter cast iron pipeline approximately 3 to 4 ft. below ground surface connects the gas well to NFS energy plant located on the Dingens Street property.

The existing surface conditions and current land uses are summarized on Figure 5.

4.20 Fill Material

Significant portions of the project site have, in the past, been subjected to landfilling with fills ranging in thickness from 3 ft. to 14 ft. Typically these fills are best classified as randomly deposited heterogeneous fill materials consisting of the following:

- uncontrolled soil fills (clay, silt, sand, and gravel of various percentages);
- construction debris (bricks, concrete, wood, etc.);
- junk fill (rubbish, glass, paper, etc.); and
- suspected industrial fills (coal, oil soaked materials, sludges, etc.).

Strength and density properties of the fill materials are difficult to characterize because of the fill variability. The commonly used N-values (as determined by the Standard Penetration Test, ASTM D-1586) for estimating the relative density of overburden materials, do not, in many cases, accurately represent the actual conditions within these heterogeneous fills because of obstructions encountered while testing. The bottom of the fill materials, at the site, is often defined by a thin layer of organic material (roots, decaying plants, black discoloration) thought to be the original ground surface. The currently estimated bottom of fill elevation (i.e. top of natural overburden materials) is presented as Figure 6.

Although the fill is variable, some generalizations can be made regarding its consistency throughout the site. To facilitate this discussion the site has been divided according to fill type. It should be noted that these divisions are based on the general fills expected and since the material is heterogeneous, variations may be encountered during construction. These divisions are presented on Figure 5 and a brief discussion of each of the sections is presented below:

AREA "A"

Fill consists of black cinders, wood ties and wood chips, large concrete obstructions and brick fragments. The concrete obstructions may be buried foundations. As shown in Figure 3, this area once contained a saw mill and lumber yard complex and thus fills typical of this type of operation should be expected during construction.

AREA "B"

This area, between the NMPC right-of-way and the embankment, was apparently never significantly developed and generally remained open lands. The accessibility of this open area apparently made it a particularly attractive location for the disposal of waste materials. Area B can be subdivided into three areas based upon the prominent fill types located during the explorations.

Area B-1 contains junk fill and rubbish with industrial fill either intermixed throughout or concentrated in isolated sections. For example, an apparent sludge deposit (see test results in Section 5.00) was located near the stone pile in the location presented on Figure 5. This 4 to 5 ft. thick deposit may extend under the stone pile and, as will be discussed in section 5.00, precautions will be required when handling this material. While the source of the fill materials in area B-1 is uncertain, the former junk yard, and waste processing facility identified on Figure 3, and the nearby railroads are likely sources.

Fill in Area B-2 contains a significant quantity of building rubble, and significant quantities of coal and oil soaked soils. This area's proximity to the former fuel processing plant, now the site of the NFS building (see Figure 3) would indicate that these materials are probably waste by-products of that operation.

Area B-3 is dominated by construction debris consisting of concrete slabs, large stone, wood timbers, empty drums, etc. Judging by the nature and condition of this material, this area is the most recent fill area on the project site. In fact, filling was occurring immediately east of the pond during GZA's work at the site and these fills were observed to be predominantly construction debris and soil.

AREA "C"

This section was apparently not subjected to significant filling. However, this area is low and was often flooded during GZA's explorations making it impossible to complete many test pits in this area. The limited explorations in Area C did indicate

that some soil fills have been placed in this area. These fills could have been placed when the NFS gas well (Figure 5) and pipeline were constructed, for either haul roads for drill rig access or as spoil from the gas pipeline trench.

AREA "D"

This area, east of the railroad embankment, does not appear to contain significant thicknesses of fill. Since the area formerly was operated as a rail yard with a round house and maintenance area for the Lehigh Valley Railroad, there are buried foundations present. The approximate locations of these suspected foundations are shown on Figures 2 and 3. The area also contains various amounts of coal and oil waste, particularly near the site's eastern property line, behind the Super Duper Plaza. Also, since the area contained frequent rail lines, ballast and structural fill for the rail lines should be expected.

4.30 Naturally Deposited Overburden

Naturally deposited soils underlying fills at the New Buffalo Industrial Park site consist of lacustrine silts and clays overlying glacial till. As shown on the geologic profiles (Figures 8 and 9, Legend Sheet for these profiles presented as Figure 7), the natural soils typically consist of the following sequence, beginning immediately below the fills:

- A thin veneer of organic material, generally less than one foot thick which represents the former ground surface and topsoil of the site. This layer was not present in all borings and it may have been stripped in areas, prior to filling at the site.

- An approximately 2 to 8 ft. layer of hard silt (ML) to a silt-clay mixture (ML-CL) underlies the former topsoil. Typically, this material is light brown to olive green with a trace of fine gravel and has occasional high angle silt to fine sand seams throughout.

- Beneath the above clays and silts is a silty clay (CL) varying in thickness from 8 to 25 ft. Generally, this brown to gray clay is saturated and has a soft to medium stiff consistency. This lacustrine clay often contains varves and lenses of gray silt to fine sand varying in thickness from less than Ø.25 inch to more than Ø.5 inches.

- Below the clay and immediately above top of rock, a generally dense to very dense glacial till deposit is found. The till varies in thickness but generally ranges from 2 to 5 ft. and is a gray fine sandy silt (ML) to silty fine sand (SM) matrix with some fine to coarse gravel and rock fragments. The till layer thickens occasionally to as much as 13 feet, and it

is generally part of the site's uppermost aquifer with a permeability estimated to range from 10^{-3} to 10^{-4} cm/sec. This stratum also often contains large boulders and cobbles (see boring B-20) which may be mistaken for top of rock.

4.40 Bedrock

Bedrock is the Onondaga Limestone Formation which is a gray massive bedded limestone with occasional thin shale partings and nodules of hard chert. Top of rock is slightly to moderately weathered along discontinuities and bedding planes. The rock quality is generally "good" to "excellent", based on the RQDs which average 75%.

The rock surface generally dips in a southerly to southeasterly direction through the site. The rock surface is estimated to be approximately Elevation (Elev.) 18 (City of Buffalo Datum) in the northwest corner (boring B-4) and is Elev. -12.8 along the Dingens Street boundary. Rock surface elevations in the local area often vary several feet over short distances.

Rock surface contour lines are presented on Figure 10. As shown, the rock at the site is generally lowest in the center of the site along a roughly north-northeast to south-southwest axis, indicating the presence of a buried glacial valley. However, additional borings would be required for confirmation.

4.50 Ground Water

Three ground water systems have been identified at the site. The glacial till and fractured top of rock represents the primary ground water aquifer. This system is a confined aquifer by the essentially impermeable overlying silty clays and unfractured bedrock below. Water levels, determined by measurement of wells sealed within this zone, ranged from approximately 10 to 15 ft. below ground surface. As shown by the ground water contour map presented as Figure 11 ground water in the glacial till/top of rock aquifer flows east-southeasterly at an approximate gradient of less than one percent, apparently towards the Buffalo River.

The second ground water system identified at the site is within the saturated silty clay. Ground water is essentially "trapped" within the interstices of this material and for practical purposes it should be considered an aquiclude with no significant off-site flow because of the material's low permeability, estimated to be approaching 10^{-8} cm/sec. Water levels measured in wells located in this zone are within several feet of the ground surface.

Above the silty clays a perched ground water system is found within the granular miscellaneous fills of the site. The amount of water and flow d)rections of this ground water system are dependent upon several factors including the nature

of fill materials and proximity to surface water supply and discharge points. Typically, water within the fills is found at depths of 3 to 5 ft. and often is distinguished by a petroleum odor.

4.60 Surface Water

The source and flow directions of surface water at the site is uncertain. It is probable that the pond in the center of the site was created by its filling with run-off precipitation and discharge from perched water systems. Because of the low permeability of underlying natural deposits, it is unlikely that surface waters discharge into prominent ground water systems of the glacial till and bedrock at the site.

The remnants of man-made drainage ways are evident at the site, particularly along the former rail lines. However, no significant surface drainage was noted at the site attributable to the siltation and disrepair of discharge conduits installed by the railroads. In fact, the effect of the plugged discharge conduits is stagnant water that floods low areas of the site for much of the year.

5.00 GEOHYDROLOGIC CONSIDERATIONS

Significant amounts of landfilling have been done throughout the site and the nature of the fills placed during landfilling is extremely variable. Thus, this geohydrologic assessment was undertaken to determine and quantify site conditions, the nature of wastes, and their impact on nearby ground water and surface water supplies. This section discusses GZA's findings to date and presents our current recommendations, based on these findings.

5.10 Analytical Test Results

Analytical testing was done on various samples collected by GZA according to the procedures discussed in Section 3.40. These tests were done in two phases; Phase 1 in May-June, 1983 and Phase 2 in November-December, 1983. The Phase 1 work was done to complete an initial assessment of the geohydrologic conditions at the site and Phase 2 work was done to expand upon these earlier findings.

5.11 Analysis of Soil Samples

Soil samples were collected from the test pits within the miscellaneous fills and tested via analytical methods for various parameters. Table III "Analytical Test Samples from the Miscellaneous Fill Material" on the next page summarizes the soil samples tested to date and analytical results of this testing are included in Appendix E.

Testing of the miscellaneous fill samples varied with each sample. However, the procedure for most of the test pits consisted of initially using the H-Nu photoionizer to monitor the air quality during excavation for the presence of potentially harmful organic vapors and then testing the samples in the lab via analytical techniques. Significant organic vapor levels were not detected during test pit explorations, with the exception of several test pits done in the landfill area designated B-1, on Figure 5. The organic vapor readings measured during excavation of test pits TP-II-7 and TP-II-9 were elevated and thus appropriate precautions were taken while sampling this material. It should be noted however, that a screening of this material with a GC did not reveal significant organic contaminants other than methane gas, which is a common by-product of decaying refuse.

The Phase 1 analytical testing program of the soil samples was implemented to obtain preliminary information on the nature and extent of contamination within the fill. Thus, initially these soil samples were prepared by ARO laboratories via extraction and digestion techniques and analyzed by infra-red (IR) Spectroscopy to determine the presence of major constituents (> 0.1%) via functional group classification. The IR spectra did not show any major constituents to be present other than hydrocarbons. Subsequent testing, by ARO, via gas chromatographic

Table III

Analytical Test Samples from the
Miscellaneous Fill Material

Test Pit	Approximate Sample Depth	Remarks
PHASE 1		
TP-4	4.0 ft.	Purple sludge with intermixed soils, distinct odor
TP-13	2.5 ft.	Sandy gravel fill contaminated with oil; distinct petroleum or tar-like odor.
TP-16A	5.0 ft.	Black "tar" fill
TP-33	3.5 ft.	Black sandy fill contaminated with oil, distinct oil odor
TP-59	0.5 ft.	Blue/purple sludge deposit with distinct odor
PHASE 2		
TP-II-1	1.5 ft.	Black tar or asphalt like material, distinct petroleum odor.
TP-II-3	4.0 ft.	Black coal fragments
TP-II-5	0.4 ft.	Purple/blue sludge intermixed with soil
	6.0 ft.	Gray ashes and cinders
TP-II-6	4.0 ft.	Dark blue sludge and cinders, slight odor
	4.4 ft.	Black granular construction debris intermixed with industrial fill, slight odor

GZA

Table III (contd.)

Test Pit	Approximate Sample Depth	Remarks
TP-II-7	5.0 ft.	Purple/blue fibrous deposit intermixed with sludge, distinct odor
	7.5 ft.	Black fibrous fill material
TP-II-9	1.0 ft.	Fine red-brown foundry sand with petroleum odor
TP-II-10	3.0 ft.	Black granular soil containing oil, petroleum odor.

(GC) analysis of the concentrated extracts confirmed this finding. The GC curves indicated that the major hydrocarbons present in the samples are apparently severely weathered diesel fuel and/or motor oil. Volatile constituents of the hydrocarbons (i.e. carbon #8-12) were not found in significant quantities indicating that these may have volatilized since the materials were deposited.

The purple sludge material in TP-59 appeared to be a dye, or a dye by-product. This material was thus analyzed by ARO for aniline, substituted anilines, and nitro-aromatics (nitro-benzene etc.) and none were detected at elevated levels.

The sludge material in TP-4 was analyzed for various heavy metals, and significant quantities of lead (399.Ø mg/kg) and chromium (21.Ø mg/kg) were detected. Additionally, the pH of a 5Ø% slurry of the TP-4 sample was 4.8, which is a very low value. The nature and consistency of this material would seem to indicate a paint or dye by-product that could have been classified as a hazardous waste and thus additional testing was required. Phase 2 tests were thus done to determine, primarily, if the sludge material found in TP-4 was "hazardous" and if petroleum based fills at the site were contaminated with polychlorinated biphenyls (PCB's).

The EP Toxicity Test is used as a guideline for determining if a given sample is hazardous. The test requires that a standardized quantity of treated water be run through a sample of a waste, compacted in specified equipment, and that the resulting leachate be tested for various parameters.

The EPA designated maximum contaminant levels (MCL) for this leachate (as specified in the Code of Federal Regulations Section 40 Part 261.24) are as follows:

Contaminant	Maximum Concentration parts per million (ppm)
Arsenic	5.Ø
Barium	1ØØ.Ø
Cadmium	1.Ø
Chromium	5.Ø
Lead	5.Ø
Mercury	Ø.2
Selenium	1.Ø
Silver	5.Ø

The EP Toxicity Test (heavy metal fraction) was done on two samples collected during Phase 2 (TP-II-7 (5.Ø ft.) and TP-II-9 (1.Ø ft.)). The TP-II-7 sample contained a purple sludge,

similar to that found in TP-4, and the TP-II-9 sample was typical of other industrial fills found at the site. The test results (see Appendix E) indicated that these materials were not hazardous, as the metal content of the leachate was below the designated MCL's.

The above samples and a sample from TP-II-5 (6.0 ft.) were also tested for their reactivity potential (as described in the Code of Federal Regulation Section 40 Part 261.23). The test results, as presented in Appendix E, indicate that these samples are classified as nonreactive according to EPA guidelines.

Samples from the test pits were also routinely tested for pH by creating a 50% slurry by weight with prepurified water and measuring the pH of the sample with an electronic probe. Several samples, as listed below, had a very low, or acidic, pH.

Sample Location	Depth	pH
TP-4	4.5 ft.	4.8
TP-II-6	4.0 ft.	5.1
TP-II-6	4.4 ft.	4.4
TP-II-7	5.0 ft.	2.6

These acidic materials could be detrimental to any underground utilities or structures that may be installed within or near these fills. GZA's studies suggest that the low pH is probably associated with the purple sludge-like deposits found near the stone pile in the location presented on Figure 5. Presently it appears that the low pH material is a relatively localized occurrence as the pH of ground water in nearby wells is near neutral (pH = 7.0). No wells, however, were installed within the fills west of the stone pile. Thus, low pH ground water, moving toward the pond and drainage way along the NMPC right-of-way, is possible. Precautions such as expanded corrosivity studies are recommended to determine if pretreatment techniques, use of alternative materials, or removal of the acidic fills are required prior to construction.

The analytical testing of fills containing significant amounts of petroleum (TP-13, TP-II-1, TP-II-3, and TP-II-7) included testing for Polychlorinated Biphenyl (PCB) concentrations. The results (Appendix E) indicate that PCB's are not present in elevated quantities, as the samples tested contained less than 1.0 mg/kg. of PCB's.

Four samples, collected during Phase 2 work (TP-II-6, 4.0 ft.; TP-II-6, 4.4 ft.; TP-II-5; and TP-II-10), were examined for volatile organics in GZA's laboratory using a gas chromatograph.

The samples were relatively free of organic contamination although TP-II-5 did contain a significant amount of methane gas and apparently a trace amount of a benzene derivative. The location of TP-II-5, near the former landfill (designated B-1, Figure 5), indicates that these results are reasonable.

5.12 Analysis of Ground Water and Surface Water Samples

Phase 1 ground water sampling and testing was done to obtain preliminary information on the quality of water at the site. To this end, samples were collected from wells sealed within various soil types and tested for selected parameters. Appendix E includes a "Log of Analytical Testing" listing the different tests done during Phase 1 and it also presents the results of these tests.

As shown in Appendix E, ground water in several of the wells had concentrations of lead, chromium, and phenols that exceeded the New York State Department of Environmental Conservation Class GA (potable water supplies) standards. Generally, these wells (B-1, B-8, B-11, and B-12) are located adjacent to the former landfill designated area "B" on Figure 5. Gas Chromatographic tests on water from these wells for various organic constiuents did not, however, indicate elevated levels as shown in Appendix E.

The preliminary results of Phase 1 necessitated additional Phase 2 testing to determine primarily if the apparent contamination found in the ground water near fill area "B" was leaving the site. Therefore, an expanded ground water testing program was done in November-December, 1983 and test results are included in Appendix E.

Phase 2 ground water samples were tested for an expanded list of parameters including the EPA designated priority pollutant metals. The samples tested included ground water collected from three wells (B-21, B-22 and B-23) sealed within the glacial till/fractured top of rock zone which, as discussed in Section 4.50, was identified as the primary aquifer at the site. Wells B-21 and B-22 are located near the site's property lines, positions downgradient of fill areas, and thus they represent ground water exiting the site. Well B-23 is located immediately downgradient of fill area "B", shown in Phase 1 to contain apparently contaminated water and thus in a position to indicate contaminent migration. A sample was also collected from well B-12 which contained the highest lead and chromium levels during Phase 1.

All four samples were passed through a 0.45 micron filter prior to chemical analysis so as to determine dissolved constituents of the ground water. The rationale for such testing being that constituents dissolved within the ground water are the best representation of the mechanism of ground water transport, as sediments would not likely be transported off-site by the ground water.

The results of this testing (Appendix E) indicate the ground water in wells B-21, B-22 and B-23 is relatively free of dissolved heavy metal contamination, indicating that contamination is not impacting off-site water supplies. Additionally the levels of dissolved metals measured in B-12 were below class GA standards suggesting that the earlier high lead and chromium levels found in some of the the wells tested during Phase 1 were due to sediments in the ground water and not dissolved constituents of the water.

The ground water samples collected in Phase 2 were also analyzed using GZA's laboratory GC. The screening indicated they were free of volatile organic contamination, other than methane in B-12.

Limited surface water testing was done because off-site drainage is insignificant and thus off-site contamination of water was not considered a problem. One sample of the pond water was tested and the concentrations of the limited parameters tested are below class GA standards.

6.00 GEOTECHNICAL ENGINEERING CONSIDERATIONS

Geotechnical engineering considerations for the design and construction of the infrastructure are presented in this section. A general discussion on various foundation systems for structures on individual parcels is presented and the potential uses of the existing railroad embankment soil are addressed.

6.10 Roadways

6.11 Design Considerations

The proposed roadway locations are shown in Figure 4. The typical road section will consist of a 40-foot wide, 9-inch thick reinforced concrete slab. The slab will be supported by a layer of subbase material overlying the existing subgrade soil, which is miscellaneous fill. The fill thickness and consistency vary and therefore the suitability of the fill for supporting pavements will also vary. Generally, the fill is expected to be adequately stable for pavement support in areas where railroad tracks currently exist. Fill in these areas is expected to consist primarily of slag, cinders and ballast. It is expected to be relatively dense from the many years of supporting railroad traffic, and it should be relatively free draining. The suitability of the fill in other areas will vary and will need to be addressed during construction.

A rigid pavement system has been designed and therefore the recommended subbase material type and thickness are based primarily on drainage considerations. The recommended subbase thickness is 6 inches. The subbase should be a clean, open graded sand and gravel, or preferably, a crushed stone. The material should satisfy the subbase material specification of the New York State Department of Transportation (NYSDOT). Longitudinal subbase drains, under the curbs, would further enhance the drainage characteristics of the pavement system.

6.12 Construction Considerations

The site's subsurface conditions are variable and the successful performance of the pavement system is highly dependent upon the execution of appropriate construction procedures, particularly the subgrade preparation. The purpose of this section is to provide basic roadway construction guidelines and to identify areas of potential construction difficulty.

In general, after the roadway subgrade elevation has been established, the subgrade surface stability should be tested before proceeding with the subbase layer construction. Density testing in fill soils is inappropriate and therefore, the surface stability should be evaluated by proofrolling with equipment described in the NYSDOT Specifications (a 30-ton gross weight evenly distributed on 4 wheels). Proofrolling should identify

loosely deposited or unsuitable soils near the subgrade surface and underlying soft areas. A qualified geotechnical engineer should be retained during construction to observe proofrolling operations and the response of the subgrade.

There are several remedial measures that should be implemented if a proofrolling test fails and they are dependent upon the subgrade's response to proofrolling. Areas of disturbed, but suitable soil at the surface should be compacted using either a vibratory roller for granular soils or a sheepsfoot roller for cohesive soils. If the soil at the subgrade surface is unsuitable, i.e. refuse, organics, etc. or a proofrolling test result suggests the presence of an underlying soft area, the road subgrade will need to be overexcavated. The overexcavated area should then be backfilled with crushed stone to achieve the necessary subgrade stability. Specific overexcavation procedures will depend upon the horizontal extent of the unstable pocket and its stiffness. Each pocket should be evaluated independently, but generally, the less severe areas can be corrected by over-excavating 0.5 to 1.0 foot and backfilling with the specified subbase material. Extensive unstable areas could be corrected by overexcavating 1 to 2 feet, depending on the severity, and backfilling with a very coarse crushed stone, such as "blast shot rock". Extensive unstable areas are likely to extend deeper than the overexcavation depth, but a very coarse grained soil will tend to "bridge" over it. The unprocessed stone in the on-site stockpile appears to be a suitable material for deeper overexcavations, provided particles with dimensions exceeding the overexcavation depth are first removed.

Old foundations protruding to the subgrade surface should be removed to at least 2 feet below the roadway subgrade elevation and the remaining pit should be backfilled. Backfilling should be done in lifts, compacted to 90% of the maximum dry density as determined by ASTM D-1557, Method C, "Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using a 10-pound Rammer and an 18-inch Drop". If a coarse grained backfill, i.e. crushed stone, is used, the appropriate moisture content will be determined by the material properties. However, if a fine-grained soil, i.e. silty fine sand or clay is used, then the moisture content should be specified as $\pm$ 1% of the optimum as determined by ASTM D-1557, Method C.

The proposed location of Gateway Drive begins at Bailey Avenue, continues easterly to the central portion of the site, curves to the right and continues south to an intersection on Dingens Street, see Figure 4. Reference Line stationing begins at Bailey Avenue. The fill thickness increases gradually from about 3 feet near Bailey Avenue to about 13 feet near Station 20+00. This area is presently undeveloped but much of it was occupied by a lumber yard (see Section 2.00). Some soft fill and old foundations were observed during explorations and should be expected in this area.

Gateway Drive, from approximately Station 20+00 to the existing railroad embankment, will pass through the former Erie and Western railroad yard and then a swampy area. Extensive explorations in these areas were not possible because tracks still occupy the railroad yard and the swamp prevented access. However, the soil conditions can be inferred with reasonable accuracy using surrounding soil data and information from old maps. All maps showing former site uses indicate the presence of the existing railroad yard. Therefore, the fill will probably be similar to that found east of the railroad embankment (former Lehigh Valley Railroad Yard) and is expected to consist primarily of cinders and slag. Large buried foundations are not expected in this area. Drainage of the swamp will be required and the ground surface will probably consist of a layer of soft sediment and organics overlying the natural silts and clays. The soft sediments may need to be removed prior to construction.

Gateway Drive, south of the railroad embankment, will pass through the former Lehigh Valley Railroad Yard. Some of the fill will consist of the cinders and slag ballast placed during construction of the railroad. Since abandonment of the railroad however, several industries have used this area as a disposal site. The fill thickness is expected to vary from 3 to 6 feet (possibly more). Concrete or stone building foundations should also be expected in this area, particularly within 600 feet of Dingens Street (see former site maps, Figures 2 and 3).

The proposed Enterprise Avenue begins at Bailey Avenue, extends easterly across the site intersecting Gateway Drive and ends at South Ogden Street, see Figure 4. Explorations were not done from Station 0+00 (Bailey Avenue) to Station 5+00 because an existing, frequently used haul road and existing building with connecting buried utilities limited access. However, fill through this area is expected to be about 5 feet thick.

The fill thickness along Enterprise Avenue varies from about 5 to 11 feet between Stations 6+00 and 11+00. The consistency of the fill is very irregular and includes scrap metal, building rubble, construction debris, and industrial wastes. The nature of the industrial waste deposits is summarized in Section 5.00 and removal or neutralization of some of these deposits may be required. The section from Station 11+00 to the railroad embankment will probably consist of disposed construction debris ranging from 6 to 14 feet thick.

Enterprise Avenue, east of the railroad embankment, passes through the former Lehigh Valley Railroad yard. Fill in this area is thinner, about 4 feet, and is expected to consist primarily of slag and cinders. Some small railroad structures are shown near the proposed Enterprise Avenue location (see Figure 2) but no foundations were encountered during explorations. The probability of encountering massive foundations in this area is less likely than elsewhere.

The recommended crushed stone subbase should be compacted to 95% of the maximum dry density as determined by ASTM D-1557, Method C. The compacted subbase density should be measured regularly as part of the construction quality control program.

6.20 Underground Utilities

6.21 Design Considerations

Underground utilities for the New Buffalo Industrial Park will include storm sewers, sanitary sewers, water lines and private utilities such as gas, electricity, and telephone. It is understood that the storm sewers will be located beneath the proposed roads and the remaining utilities will be located outside of the road limits, but within the 66-foot-wide right-of-way, i.e. beneath sidewalks. It is understood that storm sewers will be reinforced concrete pipe, sanitary sewers will be tile pipe, and the water lines will be ductile iron pipe. It is also understood that storm and sanitary sewers will be supported by a continuous concrete cradle. The cradle will be 12 inches thick below the pipe and extend to the pipe springline. It will also span the trench.

The effects of corrosion on buried utilities should be examined particularly with respect to concrete materials. There may be pockets of corrosive materials that will be unknown until exposed by excavation.

Storm sewers will range from about 5 to 20 feet below the existing grade and will range in diameter from 18 to 60 inches. Two alternative sewer designs have been proposed; one for a 5 year flood, the second for a ten year flood. Generally, the 10 year flood proposal has associated large storm sewer pipes at greater depths as shown on the Geologic Profiles, Figures 12, 13 and 14. The storm sewer, under Gateway Drive, will be founded mostly on the natural, stiff silty clay (see Geologic Profile, Figure 12). The stiff silty clay will provide adequate support for the pipe and manholes. Under Enterprise Avenue, portions of the sewer will be founded on a thin fill layer between Stations 0+00 and 25+00 (see Geologic Profiles, Figures 13 and 14). The suitability of the fill for pipe support will vary and will require evaluation during construction. Overexcavation of the fill with subsequent backfilling may be required in isolated areas. Overexcavation is not presently expected to be extensive and the depths are not expected to exceed two feet. From about Station 25+00 to South Ogden Street, the sewer will be founded on the silty clay, glacial till or even possibly rock, depending upon the design alternative selected, see Figure 14. All of these materials should provide adequate support for the pipe.

Industrial wastes and refuse have been deposited along Enterprise Avenue, between Bailey Avenue and Gateway Drive. Methane and hydrogen sulfide gases have been observed in this

area (probably from the rubbish decompostion) and GZA recommends containing these gases in this area. It is possible for these gases to travel through any permeable sewer trench backfill to the remainder of the site. This gas migration can be limited by (1) the use of a well graded sewer backfill with more than about 20% fines (i.e. finer than the #200 sieve) or (2) the use of clay barriers or dams at regular intervals along the sewer alignment if an open-graded (uniform) crushed stone backfill is used. The use of a well graded sewer backfill is preferred. If clay dams are necessary the recommended spacing will depend upon the actual conditions encountered during construction. It is presently anticpated that a 300-foot spacing would be appropriate. The dams should be about 5 feet long (in the pipe direction) and should extend from the pipe or cradle to the road subgrade surface. Test data indicate that the material within the railroad embankment should be a suitable source for the proposed clay dams.

It is understood that sanitary sewers will be 8-inch diameter pipes, shallower than the storm sewers, and will be located primarily in the fill deposits. Some overexcavation of unsuitable fills or building foundations should be expected in isolated areas to adequately support the sanitary sewer. The amount of overexcavation will depend upon actual conditions encountered during construction but is not expected to be excessive and recommended depths will probably not exceed one foot.

The water lines will be about 5 feet deep and located in the fills. Some of the fill, particularly along Enterprise Avenue between Bailey Avenue and Gateway Drive, is very acidic and will be corrosive to the ductile iron water pipe. A corrosive protection coating is recommended in this area.

6.22 Construction Considerations

Excavating the fills and natural clays should be moderately easy except where obstructions are encountered. Test boring data suggest that some till excavation and possibly some rock excavation should be expected if the 10 year flood design alternative, as shown on Figures 12, 13 and 14 is selected. Till excavation will vary from moderately difficult to difficult because of the varying density and the presence of boulders, see Boring B-20, Appendix A. Any rock excavation is expected to require drilling and blasting. The sewer excavations may be open cut, provided OSHA excavation standards are implemented.

Rock surface data under Enterprise Avenue from Station 35+00 to South Ogden Street are limited but suggest that the rock surface is near the 10 year flood design sewer invert. Depending upon the design alternative selected, some rock excavation may be required. Since the surrounding area is developed, blasting specifications should be restrictive to limit vibration damage to nearby structures. A qualified geotechnical engineer should review the contractor's blasting design before any blasting

is permitted. The limited rock surface data prohibit an accurate estimate of rock excavation quantities.

Some construction dewatering for the utility installations will be necessary to maintain a stable trench bottom. This is necessitated by the perched water table in the fill. The volume of water inflows will vary throughout the site, with the depth of the excavation, the type of fill material, and with the contractor's excavation procedures. A sophisticated dewatering system, such as well points, is not presently anticipated. If the sewer invert does not extend into the glacial till stratum and the contractor takes appropriate construction steps, groundwater control could be limited to sumps within the excavation. Some simple steps that the contractor can take to assist in controlling groundwater inflows are:

(1) Begin the excavation at the deepest point and proceed to the shallower point, and

(2) Keep the length of the excavation open at any one time to a minimum,

If the sewer invert extends into the glacial till stratum or rock, a formal dewatering system such as deep wells (rock, till) or well points (till) will probably be necessary to adequately depress the water table. It is recommended the water table be depressed at least one foot below the invert. The dewatering system should have provisions for corrosion.

The stability of the trench base will be an indicator of the dewatering system effectiveness and therefore should be regularly inspected. Any unstable bases should be corrected before installing the sewer pipe to limit the potential for future settlements.

It is presently anticipated that excavation spoil from the storm sewer will generally be unacceptable backfill material because the sewer is located beneath the roads. There are essentially two backfill materials that would be suitable for the storm sewer backfill, the on-site railroad embankment material and a well-graded crushed stone. Each material has associated advantages and disadvantages as listed below:

Railroad Embankment Material

(1) Advantages

- It is comparatively inexpensive because it is already on-site.

- When properly compacted, it has a relatively low permeability to (1) limit the migration of gases along the sewer alignment and, (2) assist in construction ground water control during construction.

(2) Disadvantages

- The in-situ moisture content may need to be adjusted to achieve satisfactory compaction results.

- It will be comparatively less workable after extended rainy periods.

A Crushed Stone Material

(1) Advantages

- Typically, this material dries quickly, thus making it workable shortly after extended rainy periods.

(2) Disadvantages

- The permeability is expected to be relatively high unless the amount of fines is about 20% or greater by weight. The high permeability will enable on-site gases (methane and hydrogen sulfide) to migrate through the backfill and will make construction groundwater control more difficult.

- This type of material at an acceptable gradation is not available on-site and thus its use is expected to be more costly.

Some spoil from the sanitary sewer and water line excavations may be suitable material for backfilling these excavations because these utilities will not be under the roads. Spoil, such as railroad cinders, will be acceptable for backfill in these trenches. Industrial wastes and refuse however, should not be considered suitable for any backfilling purposes. Unsuitable backfill soils may be used for architectural grading (i.e. non-bearing material). This would reduce the amount of off-site disposal.

Proper backfilling of the storm sewer excavation is necessary to form a firm foundation for the overlying pavement structure. It is recommended that the storm sewer backfill, i.e. the material between the sewer and the pavement subgrade elevation, be compacted to 90% of the maximum dry density as determined by ASTM D1557, Method C. The backfill lift thickness should be limited to 6 inches and the maximum particle size should be limited to 4 inches if a vibratory drum roller is used. Lighter equipment will decrease the allowable lift thickness. The moisture content should be controlled to achieve satisfactory results. If a fine grained backfill is selected, the moisture content should be within 1% of optimum as determined by ASTM D1557, Method C. It is understood that sidewalks will overlie sanitary sewers and water lines and therefore backfilling requirements are less.

6.30 Building Foundations

The geotechnical program for the New Buffalo Industrial Park was developed to obtain generalized site subsurface data to permit recommendations concerning only the infrastructure design and construction. Foundation designs for individual parcels will require geotechnical programs designed specifically for that parcel. However, based on the available geotechnical data, some foundation generalizations can be made.

Generally, founding buildings on fill soils is not recommended. For light to moderate weight buildings, excavation of the fill and replacement with controlled structural backfill may be an economical alternative because it would permit a shallow foundation, i.e. spread footings or a mat. If the fill is thick, a deep foundation may be more economical. A deep foundation would generally consist of end bearing piles or caissons bearing on sound rock (the Onondaga Limestone Formation). The corrosive nature of some on-site fills may affect steel or concrete piles and will need to be addressed as part of the specific foundation design.

Natural soils at the site are capable of supporting light to moderate weight buildings. Natural soil strengths vary somewhat throughout the site but the minimum allowable bearing capacity ranges from 1.5 to 2 tons per square foot (tsf). There are areas where the natural soil bearing capacity will be higher but a review on a site by site basis will be required. It may be possible to use slab-on-grade floor slabs, depending on the structure's use and weight. All exterior shallow foundations and those in unheated areas should be buried 4 feet for frost protection.

Portions of the existing pond are on a parcel which will be developed. It is recommended that the pond be drained and all bottom sediments removed. The sediment should be chemically tested to determine the appropriate means of disposal. Any subsequent backfilling should be controlled to make the parcel suitable for development.

6.40 Uses of the Railroad Embankment Materials

Material in the existing railroad embankment appears to be very consistent. Test pit explorations within the railroad embankment suggest that it is silty clay with a cinder and gravel cover. The silty clay moisture contents, based on GZA laboratory tests, range from 12.8% to 15.5% and average 13.8%. The liquid limit is 25%, the plastic limit is 17% and the plastic index is 8%. Grain size analyses show that approximately 60% is finer than the No. 200 sieve (0.074mm). Grain size distribution curves and a summary of this soil testing are presented in Appendix C.

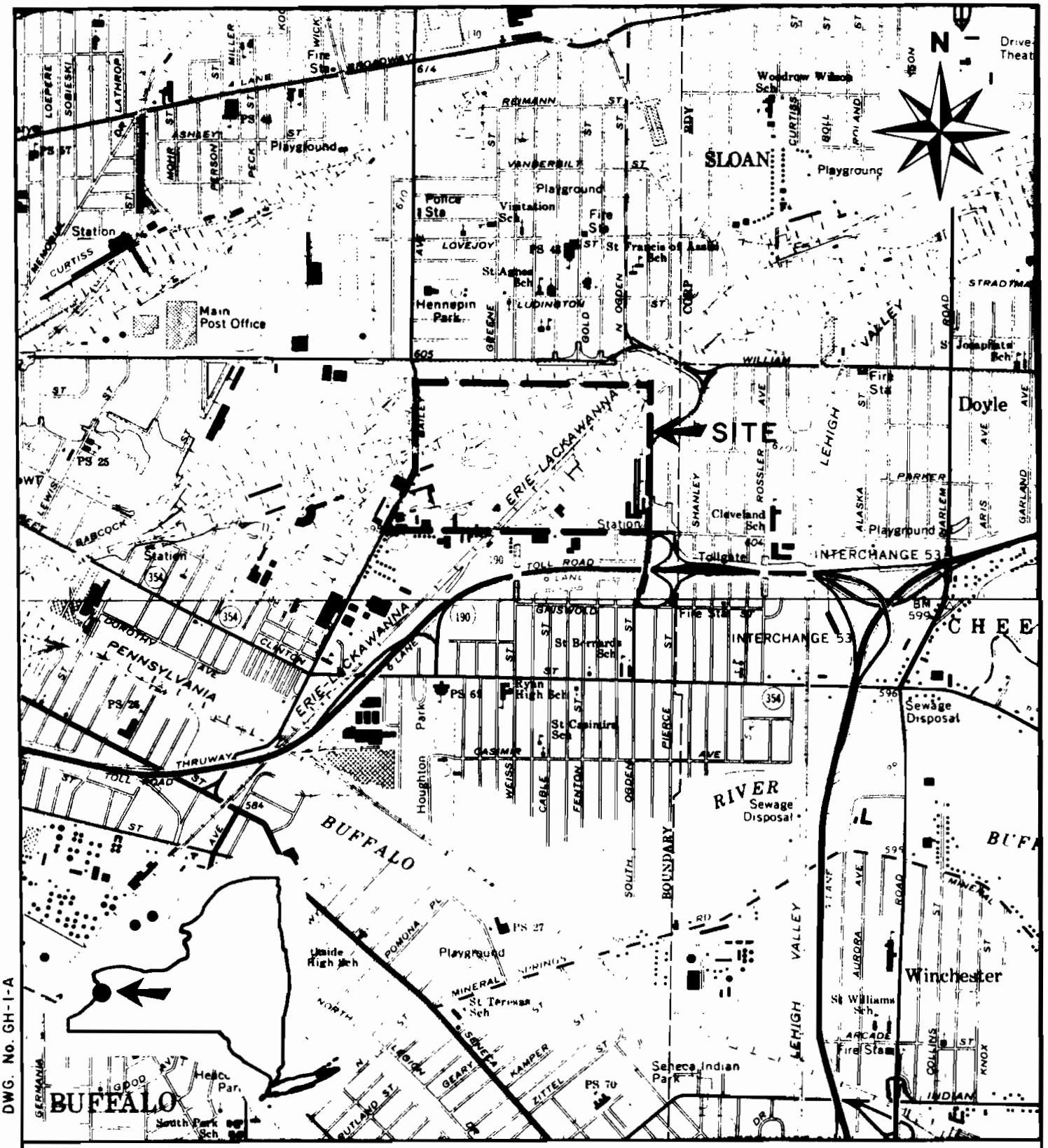
This material may have several ueful applications in the construction of the Industrial Park infrastructure, such as:

(1) Common Backfill;

(2) Clay Barriers;

(3) Storm Sewer Backfill.

The moisture content of the embankment material will proabably need to be adjusted to achieve the desired compaction results.



FROM: USGS BUFFALO, N.Y. (N.E. & S.E.) QUADRANGLE MAP, 1965

FILE No. R5613/15 DWG. No. GH-1-A

GZA

NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

LOCUS PLAN

JAN. 1984 FIGURE No. 1

APPENDIX A

Test Boring Logs

B-1 Through B-23

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-1

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 606.49/30.48
DATUM US Lake Survey/City of Buffalo
LOCATION North East of A&R Waste
DATE STARTED 5/23/83 COMPLETED 5/23/83
ENGINEER R. Kampff

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 6 UNDISTURBED -
THICKNESS OF OVERBURDEN 27.8 ft. TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 578.69/2.68
TOTAL DEPTH OF HOLE 27.8 ft. (Split Spoon Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		Equipment Installed
1	3, 10, 21, 23	S-1	44		S-1 (0.0'-2.0') 100% Sample Recovery		1		Miscellaneous Fill, brown with orange pockets, sandy silt w/ intermixed cinders, concrete, and brick fragments, damp
2							2		
3							3		
4							4		...changes to: silty clay FILL, evidence of organics @ ≈ 5.0 ft. (original ground surface?)
5	6, 12, 15, 18	S-2	33		S-2 (4.5'-6.5') 42% Sample Recovery		5		
6							6		SILT & CLAY, red-brown, hard, gray silt varves throughout, pocket of tan fine sand @ 6.2', damp, slightly plastic (ML-CL)
7							7		
8							8		
9							9		
10	3, 5, 6, 5	S-3	11		S-3 (9.5'-11.5') 58% Sample Recovery		10		Silty CLAY, red-brown, stiff, trace coarse sand, damp, slightly plastic (CL)
11							11		
12							12		
13							13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 **BORING NO.** B-1

DEPTH (FT.)	BLOWS PER 0.5 FT	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
									Equipment Installed
15	2	S-4	10		S-4 (14.5'-16.5') 100% Sample Recovery		15		...grades to: SILT & CLAY, occasional fine sand pockets, wet, very slightly plastic (ML-CL)
16	3						16		
	5								
17	5						17		
18							18		
19							19		
20	1	S-5	6		S-5 (19.5'-21.5') 92% Sample Recovery		20		Silty CLAY, red-brown, medium stiff, trace fine gravel, 1/8"+ thick gray-brown silt lenses throughout, saturated, plastic (CL)
21	2						21		
	3								
22	3						22		
23							23		
24							24		
25	1	S-6	7		S-6 (24.5'-26.5') 88% Sample Recovery		25		Silty fine SAND, gray, loose, little fine-medium subangular gravel, trace+ clay, saturated, very slightly plastic (SM-Glacial Till)
26	1						26		
	2								
27	5				No Recovery		27		
28	50/0"						28		Refusal with Split Spoon Sampler @ 27.8 ft.

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-2

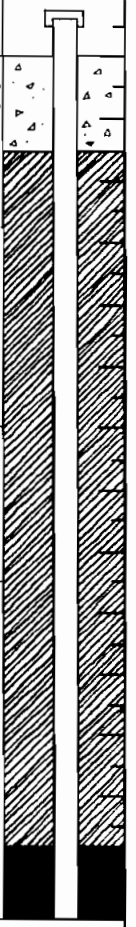
CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 607.23/31.22
DATUM US Lake Survey/City of Buffalo
LOCATION ~ 300 ft. east of Bailey Ave.
near Niagara Mohawk
DATE STARTED 5/31/83 COMPLETED 5/31/83
ENGINEER R. Kampff

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL _____
OVERBURDEN SAMPLES: DISTURBED 5 UNDISTURBED -
THICKNESS OF OVERBURDEN 20.5 ft. TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 586.73/10.72
TOTAL DEPTH OF HOLE 20.5 ft. (Split Spoon Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	6 14 16 12	S-1	28		S-1 (0.0'-2.0') 79% Sample Recovery		1		Miscellaneous Fill, black, medium dense, fine-medium sand, little silt, with ash, gravel, coal fragments, damp
2							2		
3							3		
4							4		
5	6 8 12 23	S-2	35		S-2 (4.5'-6.5') No Recovery Redrive spoon to collect sample		5		
6							6		SILT & CLAY, brown w/gray silt and fine sand lenses, hard, occasional pockets of tan fine sand, silt and fine sand occur in high angle lenses, moist, slightly plastic (ML-CL)
7							7		
8							8		
9							9		
10	10 15 17 15	S-3	32		S-3 (9.5'-11.5') No Recovery Redrove spoon to collect sample		10		Silty CLAY, red-brown w/gray 1/8"-1/4" bands of silt, hard, saturated, plastic, (CL)
11							11		
12							12		
13							13		
14							14		

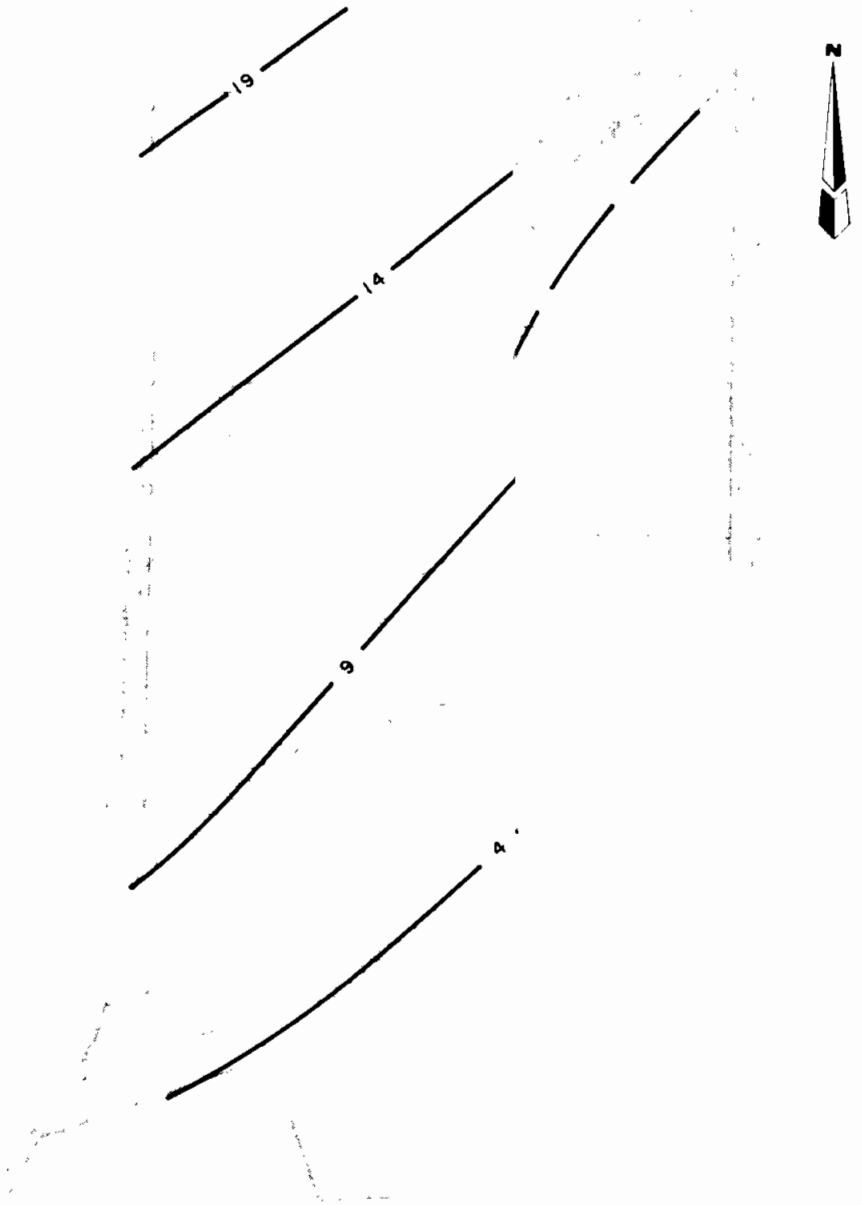
Equipment Installed



DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES:



NOTES:

1) TOP OF ROCK EXPLORATIO
2) ELEVATION C)
3) THIS DRAWIN

GZA

NEW BUFFALO INDUSTRIAL PARK

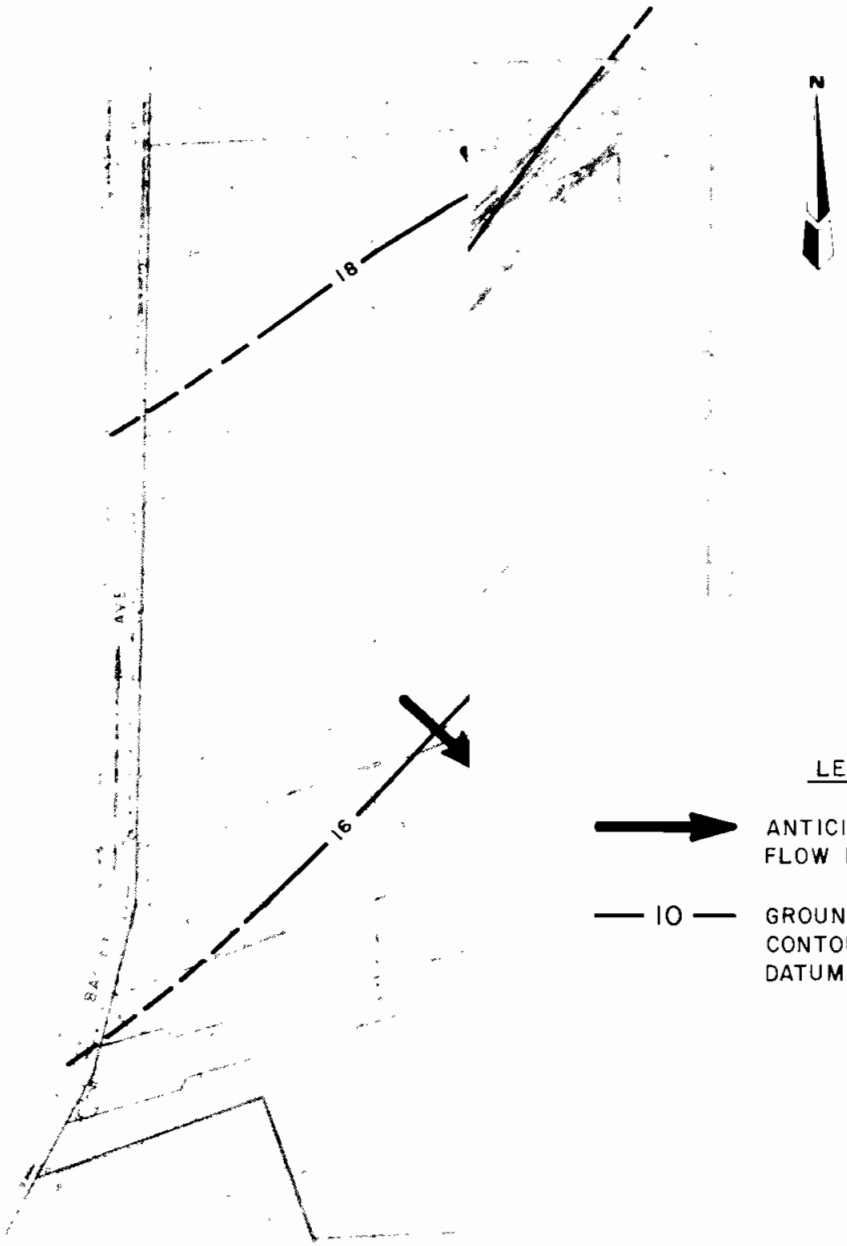
BUFFALO, NEW YORK

ESTIMATED TOP OF ROCK CONTOURS

JANUARY 1984

FIGURE No. 10

FILE No. R5613/15 DWG. No. GH-2-C



LEGEND

ANTICIPATED GROUND WATER FLOW DIRECTION

— 10 — GROUND WATER ELEVATION CONTOUR CITY OF BUFFALO DATUM

NOTES:

1) GRO
SPAC

2) THIS (ft.)

NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

APPROXIMATE GROUND WATER CONTOURS: CONFINED AQUIFER GLACIAL TILL/ FRACTURED BEDROCK

JANUARY 1984

FIGURE No. 11

FILE No. R5613/15 DWG. No GH-3-C

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 **BORING NO.** B-2

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
									Equipment Installed
15	1	S-4	6		S-4 (14.5'-16.5') 100% Sample Recovery		15		...grades to: medium stiff, trace fine gravel beginning @ ≈ 16.2 ft.
	2								
16	2						16		
	4								
17							17		
18							18		
19							19		
20	20	S-5	40		S-5 (19.5'-20.5') 68% Sample Rec.		20		Silty fine-medium SAND, gray, dense, little fine-medium sub-angular gravel trace clay, wet, very slightly plastic (SM-Glacial Till)
	20								
21	50/0"						21		Split Spoon Refusal @ 20.5 ft.

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES: Note: Groundwater level @ 14.0 ft. through augers upon completion.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-3

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT Nx Size Rock Core

SURFACE ELEV. 607.58/31.57
DATUM US Lake Survey/City of Buffalo
LOCATION ~ 650 ft. south east of William & Bailey Street intersection
DATE STARTED 5/31/83 COMPLETED 5/31/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 4 UNDISTURBED -
THICKNESS OF OVERBURDEN 16.7 ft. TOP OF ROCK ELEVATION 590.88/14.87
DEPTH DRILLED INTO ROCK 2.9 ft. BOTTOM OF HOLE ELEVATION 587.98/11.97
TOTAL DEPTH OF HOLE 19.6 ft.

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	2, 9, 10, 7	S-1	17		S-1 (0.0'-2.0') 40% Sample Recovery		1		Miscellaneous Fill, black, medium dense, silty sand, trace clay w/roots, cinders, brick fragments, damp
2							2		
3							3		
4							4		
5	3, 12, 17, 30	S-2	47		S-2 (4.5'-6.5') 88% Sample Recovery		5		Clayey SILT, tan-brown mottled orange, hard, brown and gray silt to fine sand lenses throughout, damp, slightly plastic (ML)
6							6		
7							7		
8							8		
9							9		
10	7, 16, 21, 21	S-3	42		S-3 (9.5'-11.5') 67% Sample Recovery		10		Silty CLAY, red-brown, hard, trace fine gravel, trace tan fine sand occurring in random pockets, moist, slightly plastic (CL)
11							11		
12							12		
13							13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	D OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-3

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15	1	S-4	29		S-4 (14.5'-16.5') 100% Sample Recovery		15		SILT, gray, very stiff, some clay, little fine-medium sand, wet, slightly plastic (ML-Glacial Till)
16	3						16		Top of Rock 16.7 ft.
	5								ONONDAGA LIMESTONE
	24								H, SO, F-S
17	50/0"	C-1	93%	83%	C-1 (16.7'-19.6')		17		H, SO, S along shale parting
18							18		H, O. S-M
19							19		DB along shale parting
20							20		Bottom of Hole 19.6 ft.

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES: Groundwater level 12.5' through augers prior to rock coring.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-4

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 609.04/33.03
DATUM US Lake Survey/City of Buffalo
LOCATION North property line
200 ft. east of Bailey Ave.
DATE STARTED 5/30/83 0820 COMPLETED 5/30/83 1100
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 4 UNDISTURBED -
THICKNESS OF OVERBURDEN 15.0 ft. TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 594.04/18.03
TOTAL DEPTH OF HOLE 15.0 ft. (Split Spoon Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
1	5	S-1	13		S-1 (0.0'-2.0') 29% Sample Recovery		1		Miscellaneous Fill, brown, very stiff, sandy silt, with wood fragments, damp
2	8						2		
3	8						3		Difficulty in augering because of obstructions- buried air hose and wood fragments observed.
4	5						4		
5	2	S-2	19		S-2 (4.5'-6.5') 60% Sample Recovery		5		Possible topsoil w/roots (Original Ground Surface?)
6	5						6		Clayey SILT, tan w/orange mottling, stiff, high angle gray silt varves throughout, damp, slightly plastic (ML)
7	8						7		
8	11						8		
9							9		
10	8	S-3	44		S-3 (9.5'-11.5') 100% Sample Recovery		10		Silty varved CLAY, brown w/orange mottling, hard, gray silt lenses throughout, damp, moderately plastic (CL)
11	15						11		
12	21						12		
13	23						13		
14							14		
15	3	S-4	6		S-4 (14.5'-15.0') 100% Rec.		15		Sandy SILT, gray, medium stiff, little clay, trace medium gravel and rock fragments, wet, very slightly plastic (ML-SM - Glacial Till) Split Spoon Refusal @ 15.0 ft.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES: Groundwater level @ 12.2 ft. upon completion w/augers removed.

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

BORING NO. B-4 SHEET 1 OF 1

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-5

CONTRACTOR Earth Dimensions, Inc.
DRILLER Don Owens
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 609.85/33.84
DATUM US Lake Survey/City of Buffalo
LOCATION North property line
~ 650 ft. East of Bailey Ave.
DATE STARTED 5/30/83 COMPLETED 5/30/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 4 UNDISTURBED -
THICKNESS OF OVERBURDEN 18.9 ft. TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 590.95/14.94
TOTAL DEPTH OF HOLE 18.9 ft. (Auger Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	4, 8, 12, 40	S-1	20		S-1 (0.0'-2.0') 83% Sample Recovery		1		Miscellaneous Fill, brown, gravelly sand w/ brick fragments (pcs. > 1"), damp
2							2		Difficult augering through obstructions (concrete)
3							3		
4							4		
5	8, 10, 9, 10	S-2	19		S-2 (4.5'-6.5') 75% Sample Recovery		5		...changes to: black w/ wood fibers, cinders, wet
6							6		
7							7		SILT, gray-brown w/ orange mottling and occasional black discoloration, very stiff, some clay, gray high angle silt to fine sand lenses, damp, slightly plastic (ML)
8							8		
9							9		
10	12, 25, 41, 47	S-3	88		S-3 (9.5'-11.5') 100% Sample Recovery		10		Silty CLAY, brown, hard, distinctly mottled, moist, slightly plastic (CL)
11							11		
12							12		
13							13		
14							14		

Equipment Installed

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 **BORING NO.** B-5

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION	Equipment Installed
15	4	S-4	19		S-4 (14.5'-16.5') 96% Sample Recovery		15		...grades to: very stiff, trace fine gravel (encountered @ ≈ 16.0 ft.), moderately plastic (CL)	
	6									
16	8						16			
	11									
17							17		Drilling Change (frequent gravel and cobbles) possible Glacial Till	
18							18			
19	50/0"						19		Bottom of Hole	

Auger Refusal @ 18.9 ft.

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-6

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Moblie B-34
SAMPLING METHOD Split Spoon-Standard Sample
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT NX Rock Core

SURFACE ELEV. 608.93/33.92
DATUM US Lake Survey/City of Buffalo
LOCATION North Property Line
1250 ft. East of Bailey Ave.
DATE STARTED 6/1/83 COMPLETED 6/2/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL ____
OVERBURDEN SAMPLES: DISTURBED 6 UNDISTURBED -
THICKNESS OF OVERBURDEN 26.3 ft. TOP OF ROCK ELEVATION 582.63/6.62
DEPTH DRILLED INTO ROCK 3.5 ft. BOTTOM OF HOLE ELEVATION 579.13/3.12
TOTAL DEPTH OF HOLE 29.8 ft.

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		Equipment Installed
1	5, 8, 12, 10	S-1	22		S-1 (0.0'-2.0') 40% Sample Recovery		1		Miscellaneous Fill, brown, medium dense, silty fine sand, w/ organics and ash, damp.
2							2		Note: between 2'&4' black granular fill material with ash and coal fragments, slight petroleum odor
3							3		
4							4		
5	1, 4, 2, 8	S-2	6		S-2 (4.5'-6.5') 46% Sample Recovery		5		Miscellaneous Fill, black, loose, coal and ash fragments, w/ occasional pieces of brick, moist+
6							6		
7							7		
8							8		Material returned on augers is brown clayey SILT (ML)
9							9		
10	4, 20, 37, 61	S-3	98		S-3 (9.5'-11.5') 58% Sample Recovery		10		Silty CLAY, tan-brown, hard, trace fine sand (generally occurring in discontinuous pockets), high angle gray silt varves throughout, moist, slightly plastic (CL)
11							11		
12							12		
13							13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES:

1. Note: Well installed in a new hole (B6A) 14.5 ft. deep located approximately 5 ft. east of B-6.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL · GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-6

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
									Equipment Installed
15	2	S-4	18		S-4 (14.5'-16.5') 73% Sample Recovery		15		...grading to: dark brown, very stiff with occasional gray silt varves, moderately plastic
	5								
16	8						16		
	10								
17							17		
18							18		
19							19		
20	1	S-5	38		S-5 (19.5'-21.5') 67% Sample Recovery		20		Silty fine SAND gray, dense, little fine-medium subangular gravel, trace clay, wet, very slightly plastic (SM-Glacial Till)
	10								
21	11						21		
	27								
22							22		
23							23		
24							24		
25	55	S-6	100+		S-6 (24.5'-25.4') 89% Sample Rec.		25		...grading to: very dense
	100/.4								
26							26		Top of Rock 26.3 ft.
	50/0								
27		C-1	89%	89%	C-1 (26.3'-29.8')		27		Fractured rock ONONDAGA LIMESTONE H, O, SM
28							28		LA, C, F-S
29							29		H, C, S
30							30		Bottom of Hole 29.8 ft.

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-7

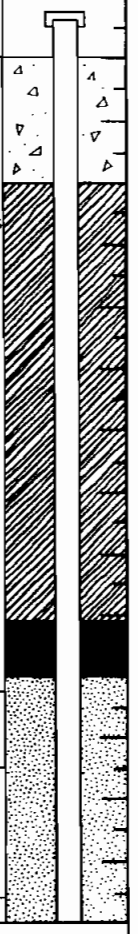
CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 605.35/29.34
DATUM US Lake Survey/City of Buffalo
LOCATION Near stone stockpile
DATE STARTED 5/23/83 COMPLETED 5/24/83
ENGINEER R. Kampff

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 5 UNDISTURBED -
THICKNESS OF OVERBURDEN - TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK BOTTOM OF HOLE ELEVATION 583.85/7.84
TOTAL DEPTH OF HOLE 21.5 ft.

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	ROD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	10, 26	S-1	*		S-1 (0.0'-2.0') 58% Sample Recovery		1		Miscellaneous Fill, brown-black silty gravel material w/ cinders, ash, concrete, and tile fragments, damp
2	26, 35						2		
3							3		Difficult augering-frequent obstructions
4							4		
5	2, 2	S-2	8		S-2 (4.5'-6.5') 38% Sample Recovery		5		...changes to: loose material, with evidence of organics
6	6, 2						6		
7							7		
8							8		
9							9		
10	23, 27	S-3	35		S-3 (9.5'-11.5') 92% Sample Rec. 2-Samples Collected		10		
11	19, 16						11		SILT, olive green, hard, little fine sand, trace clay, wet, very slightly plastic (ML)
12							12		SILT & CLAY, red brown, hard, wet, slightly plastic (ML-CL)
13							13		
14							14		Easier augering noted by driller

Equipment Installed



DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES: * "N" value may have been influenced by obstructions encountered during sampling.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 **BORING NO.** B-7

DEPTH (FT.)	BLOWS PER 0.5 FT	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	ROD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
									Equipment Installed
15	2	S-4	14		S-4 (14.5'-16.5') 75% Sample Recovery		15		Silty CLAY, red-brown, stiff, occasional brown silt to fine sand lenses throughout, wet, plastic (CL)
	5								
16	6						16		
	8								
17							17		
18							18		
19							19		
20	1	S-5	4		S-5 (19.5'-16.5') 100% Sample Recovery		20		...grades to: soft, with gray silt varves
	1								
21	2						21		
	2								
22							22		Bottom of Hole 21.5 ft.

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES: Groundwater level 17.2 ft. through augers upon completion.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-8

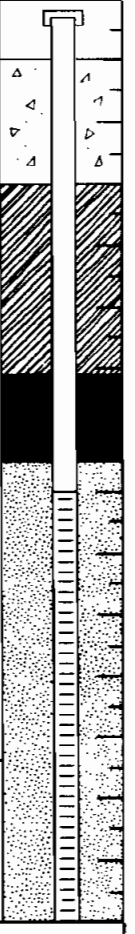
CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT NX Size Rock Core

SURFACE ELEV. 601.93/25.92
DATUM US Lake Survey/City of Buffalo
LOCATION Adjacent to Niagara Frontier Services parking lot
DATE STARTED 5/25/83 COMPLETED 5/26/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 7 UNDISTURBED -
THICKNESS OF OVERBURDEN 30.1 ft. TOP OF ROCK ELEVATION 571.83/-4.18
DEPTH DRILLED INTO ROCK 4.7 ft. BOTTOM OF HOLE ELEVATION 567.13/-8.88
TOTAL DEPTH OF HOLE 34.8 ft.

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	2, 9, 8, 4	S-1	12		S-1 (0.0'-2.0') 40% Sample Recovery		1		Miscellaneous Fill, black, sandy gravel size w/ cinders, organics, and brick fragments, damp
2							2		
3							3		
4							4		
5	5, 4, 3, 6	S-2	9		S-2 (4.5'-6.5') 29% Sample Recovery		5		...changes to: loose, with frequent organic material
6							6		
7							7		Difficult augering
8							8		
9							9		Oil or grease evident on augers
10	1, 3, 8, 12	S-3	20		S-3 (9.5'-11.5') 60% Sample Recovery		10		Miscellaneous Fill, gray-brown, very stiff, silt, some clay, brick fragments (10.2'-10.7'), cinders (10.7'-11.2'), wet
11							11		
12							12		Note: .1 ft. of brown clayey SILT in bottom of split spoon for S-3
13							13		
14							14		

Equipment Installed



DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 **BORING NO.** B-8

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	ROD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION	Equipment Installed
15	1	S-4	15		S-4 (14.5'-16.5') 77% Sample Recovery		15		Clayey SILT, brown, stiff, trace gravel, damp, slightly plastic (ML-CL)	
16	4						16			
	7									
	8									
17							17			
18							18			
19							19		Silty varved CLAY, red-brown, medium stiff, lenses of gray silt to fine sand - 1/8" thick, wet, moderately plastic (CL)	
20	1	S-5	7		S-5 (19.5'-21.5') 73% Sample Recovery		20			
	1									
21	3						21			
	4									
22							22			
23							23			
24							24			
25	1	S-6	5		S-6 (24.5'-26.5') 100% Sample Recovery		25		...grades to: saturated	
	1									
26	2						26			
	3									
27							27			
28							28			
29							29			
30	20	S-7			S-7 (29.5'-30.1')		30		Sandy SILT, gray, little fine gravel, trace clay, wet, very slightly plastic (SM-ML-Glacial Till)	
	50/.1'				S-7 100% Sample Recovery				Top of Rock 30.1 ft.	
31							31		H, O, M H, SO, S H, SO, S ONONDAGA LIMESTONE H, SO, S	
32		C-1	96%	92%	C-1 (30.1'-34.8')		32		H, O, SM	
33							33		H, SO, S	
34							34		H, SO, S	
35							35		Bottom of Hole 34.8 ft.	

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES: The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

GOLDBERG-ZOINQ ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-9

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 598.24/22.23
DATUM US Lake Survey/City of Buffalo
LOCATION Near railroad embankment
~ 150 ft. North of Dingens St.
DATE STARTED 5/20/83 COMPLETED 5/23/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 8 UNDISTURBED -
THICKNESS OF OVERBURDEN 35.0 ft. TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 563.24/-12.77
TOTAL DEPTH OF HOLE 35.0 ft. (Split Spoon Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		Equipment Installed
1	14, 40	S-1	*		S-1 (0.0'-2.0') 33% Sample Recovery		1		0-0.2' Topsoil and roots Miscellaneous Fill, black, sandy silt, with cinders, brick, and concrete fragments, damp Note: Hit large piece of concrete @ 1 ft. while augering-hole relocated approximately 2 ft. south
2	27, 14						2		
3							3		
4							4		
5	2	S-2	26		S-2 (4.5'-6.5') 75% Sample Recovery		5		
6	7, 12, 14						6		3' black, organic material and roots (original ground surface) Clayey SILT, brown w/ gray high angle varves, very stiff, damp, slightly plastic (ML-CL)
7							7		
8							8		
9							9		
10	6	S-3	53		S-3 (9.5'-11.5') 71% Sample Recovery		10		...grades to: SILT, hard, some clay with orange mottled silt and fine sand varves (ML)
11	18, 23, 30						11		
12							12		
13							13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES: * "N" value may have been influenced by obstructions encountered during sampling.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-9

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
									Equipment Installed
15	1	S-4	7		S-4 (14.5'-16.5') 83% Sample Recovery		15		Silty CLAY, red-brown, medium stiff, wet, slight-moderately plastic (CL)
	2								
16	3						16		
	4								
17							17		
18							18		
19							19		
20	1	S-5	5		S-5 (19.5'-21.5') 100% Sample Recovery		20		Same as previous sample
	1								
21	2						21		
	3								
22							22		Augering more difficult
23							23		
24							24		
25	1	S-6	12		S-6 (24.5'-26.5') 75% Sample Recovery		25		Clayey SILT, gray, stiff, little fine-medium sand, trace fine gravel, wet, very slightly plastic (ML-Glacial Till)
	3								
26	6						26		
	6								
27							27		
28							28		
29							29		
30	6	S-7	68		S-7 (29.5'-31.5') 17% Sample Recovery		30		...grading to sandy silt, very dense, little fine-medium gravel and rock fragments, trace clay (SM-Glacial Till)
	13								
31	26						31		
	42								
32							32		Cobbles encountered during augering
33							33		
34							34		
35	30	S-8			S-8 (34.5'-35.0')		35		Same as previous sample
	50/0"								Bottom of Hole @ 35.0 ft. Split Spoon Refusal

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES: The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-10

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 606.62/30.61
DATUM US Lake Survey/City of Buffalo
LOCATION ~ 1800 ft. East of Bailey Ave.
~300 ft.+ South of Northern Property Line
DATE STARTED 6/2/83 COMPLETED 6/3/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL ____
OVERBURDEN SAMPLES: DISTURBED 6 UNDISTURBED -
THICKNESS OF OVERBURDEN 28.0 ft. TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 578.62/2.61
TOTAL DEPTH OF HOLE 28.0 ft. (Split Spoon Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		Equipment Installed
1	1, 1, 2, 9	S-1	11		S-1 (0.0'-2.0') 19% Sample Recovery		1		Miscellaneous Fill, brown, sandy silt, w/ brick fragments, wood pieces, roots, damp
2							2		
3							3		
4							4		
5	7	S-2	*		S-2 (5.0'-5.9')		5		Miscellaneous Fill, brown, silty sand, trace clay, gravel fragments, piece of wood in bottom of sample, wet
6	100/.4				S-2 56% Sample Recovery		6		
7							7		
8							8		
9							9		
10	1	S-3	4		S-3 (10.0'-12.0') 80% Sample Recovery, Two Samples Taken		10		...change to: dark brown-black, soft, silty clay, with organics and wood fragments
11	3, 10, 13		23				11		Miscellaneous Fill? gray w/ brown sand pockets, silty fine-medium sand, damp organic odor
12							12		
13							13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES: * "N" value may not be representative because of obstructions encountered during sampling.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-10

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15							15		
	3				S-4 (15.0'-17.0') 85% Sample Recovery				Silty CLAY, red-brown, hard, occasional high angle gray silt varve, moist, slightly plastic (CL)
16	10	S-4	39				16		
	16								
17	23						17		
18							18		
19							19		
20							20		
	2				S-5 (20.0'-22.0') 100% Sample Recovery				...grades to: medium stiff, with gray silt varves throughout, wet, moderately plastic
21	3	S-5	8				21		
	3								
22	5						22		
23							23		
24							24		
25							25		
	1				S-6 (25.0'-27.0') 85% Sample Recovery				
26	3	S-6	14				26		Silty SAND, gray, medium dense, little fine-medium subangular gravel, trace clay, wet, very slightly plastic (SM-Glacial Till)
	5								
27	9						27		
28	50/0"						28		Split Spoon Refusal @ 28.0 ft.

Equipment Installed

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-11

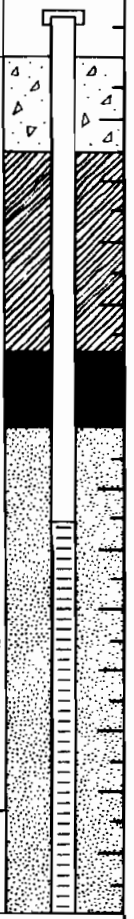
CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT NX Rock Core

SURFACE ELEV. 601.08/25.07
DATUM US Lake Survey/City of Buffalo
LOCATION East end of Landfill area
DATE STARTED 5/24/83 COMPLETED 5/24/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 7 UNDISTURBED -
THICKNESS OF OVERBURDEN 31.9 ft. TOP OF ROCK ELEVATION 569.18/-6.83
DEPTH DRILLED INTO ROCK 4.2 ft. BOTTOM OF HOLE ELEVATION 564.98/-11.03
TOTAL DEPTH OF HOLE 36.1 ft.

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	4, 12, 18, 14	S-1	32		S-1 (0.0'-2.0') 56% Sample Recovery		1		Miscellaneous Fill, black, sandy fill with organics, glass, brick fragments, wet
2							2		Difficult augering 2.5'-3.5 '
3							3		
4							4		...change to: silty sand fill, loose, no glass in sample
5	4, 3, 5, 3	S-2	8		S-2 (4.5'-6.5') 42% Sample Recovery		5		
6							6		
7							7		
8							8		
9							9		
10	2, 3, 3, 2	S-3	5		S-3 (9.5'-11.5') 25% Sample Recovery		10		...change to: silt, some clay, with wire mesh, and paper scraps noted in sample NOTE: black oil sediment at the bottom of sample
11							11		
12							12		
13							13		
14							14		

Equipment Installed



DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 **BORING NO.** B-11

DEPTH (FT.)	BLOWS PER 0.5 FT	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
									Equipment Installed
15	2	S-4	16		S-4 (14.5'-16.5') 79% Sample Recovery		15		Silty CLAY, brown, very stiff, trace medium sand, wet, moderately plastic (CL)
16	5						16		
	6								
	10								
17							17		
18							18		
19							19		
20	1	S-5	11		S-5 (19.5'-21.5') 83% Sample Recovery		20		...grades to: stiff, saturated
	4								
21	5						21		
	6								
22							22		
23							23		
24							24		
25	1	S-6	7		S-6 (24.5'-26.5') 92% Sample Recovery		25		...grades to: medium stiff, red-brown varved silty clay
	1								
26	3						26		
	4								
27							27		
28							28		
29							29		
30	1	S-7	6		S-7 (29.5'-31.5') 100% Sample Recovery		30		...grades to occasional gray varves of silt and fine sand
	2								
31	2						31		Sandy SILT, brown, medium stiff some clay, trace fine gravel and rock fragments, wet, slightly plastic (ML-SM- Glacial Till)
	4								
32	50/0	C-1	74%	74%	C-1 (31.9'-36.1')		32		Top of Rock 31.9 ft.
33							33		H, SO, S
									H, SO, SM
34					NOTE: REC. & RQD. low because of rock left in hole		34		LA, SO, S ONONDAGA LIMESTONE
35							35		H, O, S
36							36		NOTE: 1.1 ft of core left in the hole
									Bottom of Hole 36.1 ft.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES: 5/24/83 Groundwater level 8.0 ft. through augers prior to rock coring.

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-12

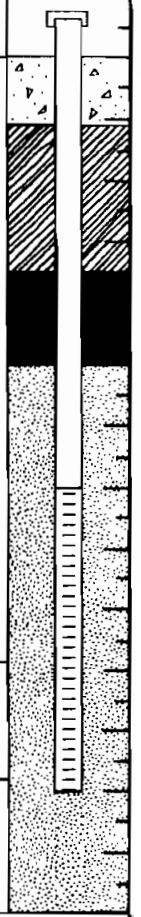
CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 600.67/24.66
DATUM US Lake Survey/City of Buffalo
LOCATION East end of Landfill Area
DATE STARTED 5/20/83 COMPLETED 5/20/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 6 UNDISTURBED -
THICKNESS OF OVERBURDEN - TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 574.17/-1.84
TOTAL DEPTH OF HOLE 26.5 ft.

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	3 8 13 11	S-1	24		S-1 (0.0'-2.0') 62% Sample Recovery		1		Miscellaneous Fill, dark brown, clayey silt, with cinders, roots, and black organic material, damp
2							2		
3							3		
4							4		
5	1 1 2 2	S-2	4		S-2 (4.5'-6.5') 23% Sample Recovery		5		...change to black, soft, with oil material intermixed in sample, wet
6							6		
7							7		
8							8		
9							9		...change to: very stiff, occasional brick fragments, distinct petroleum odor
10	8 8 20 24	S-3	48		Two Samples Taken S-3 (9.5'-11.5') 62% Sample Recovery		10		SILT, brown, hard, some red clay generally in ¼" thick bands, moist, slightly plastic (ML-CL)
11							11		
12							12		
13							13		
14							14		

Equipment Installed



DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-12

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION	Equipment Installed
15	2	S-4	18		S-4 (14.5'-16.5') 50% Sample Recovery		15		Silty CLAY, brown, very stiff, trace fine sand, tan silt to fine sand lenses ~ 1/8" thick throughout, wet, slightly plastic (CL)	
16	6						16			
	8									
	10									
17							17			
18							18			
19							19			
20	2	S-5	14		S-5 (19.5'-21.5') 67% Sample Recovery		20		...grades to: stiff, trace fine gravel	
	4									
21	6						21			
	8									
22							22			
23							23			
24							24			
25	1	S-6	6		S-6 (24.5'-26.5') 100% Sample Recovery		25		...grades to: gray silt varves throughout	
	1									
26	2						26		Black fine sand layer @ 26.0 ft.	
	4									
									Bottom of Hole @ 26.5 ft.	

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (± 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (~ 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

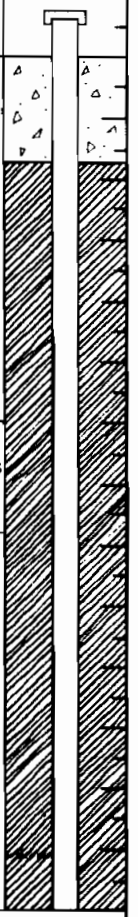
FILE NO. R5613 BORING NO. B-13

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 599.05/23.04
DATUM US Lake Survey/City of Buffalo
LOCATION ~ 600 ft. North of Dingens Street adjacent to railroad embankment
DATE STARTED 5/18/83 COMPLETED 5/18/83
ENGINEER R. Kampff

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 7 UNDISTURBED -
THICKNESS OF OVERBURDEN 34.1 ft. TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 564.95/-11.06
TOTAL DEPTH OF HOLE 34.1 ft. (Split Spoon Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		Equipment Installed
1	11, 21, 18, 16	S-1	34		S-1 (0.0'-2.0') 54% Sample Recovery		1		Miscellaneous Fill, black, dense, cinder and gravel fill, some silt, organic odor, moist
2							2		
3							3		
4							4		
5	2, 9, 19, 27	S-2	46		S-2 (4.5'-6.5') 44% Sample Recovery		5		NOTE: black silty clay with roots (Original Ground Surface ?)
6							6		SILT & CLAY, olive green, hard, occasional tan fine sand and silt pockets moist, slightly plastic (ML-CL)
7							7		
8							8		
9							9		Silty CLAY, brown, hard, trace coarse sand, moist, slightly plastic (CL)
10	8, 22, 40, 50	S-3	90		S-3 (9.5'-11.5') 92% Sample Recovery		10		
11							11		...grades to: varved clay with 1/8" thick gray silt lenses @ low angles
12							12		
13							13		
14							14		



DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
NA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

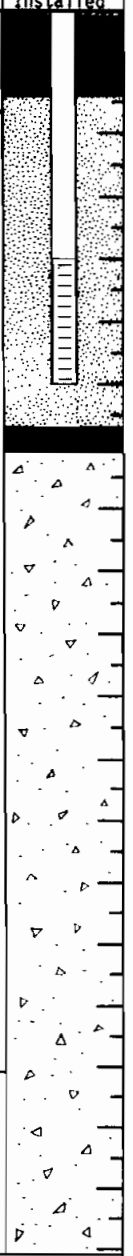
-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-13

DEPTH (FT.)	BLOWS PER 0.5 FT	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	ROD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15	6	S-4	26		S-4 (14.5'-16.5') 54% Sample Recovery		15		...grades to: very stiff, trace fine sand, occasional pockets of fine gray sand, mottled orange beginning @ 16.2 ft., wet
16	10						16		
	13								
	13								
17							17		Augering becomes very easy
18							18		
19							19		
20	1	S-5	7		S-5 (19.5'-21.5') 100% Sample Recovery		20		...grades to: CLAY, medium stiff red-brown with 1/8" to 1/4" thick gray silt lenses, saturated, plastic
21	1						21		
	3								
	4								
22							22		
23							23		
24							24		
25	1	S-6	4		S-6 (24.5'-26.5') 100% Sample Recovery		25		...grades to: soft
26	1						26		
	2								
	2								
27							27		
28							28		
29							29		
30	1	S-7	6		S-7 (29.5'-31.5') 100% Sample Recovery		30		Same as previous sample
31	1						31		Clayey SILT, gray-brown, medium stiff, trace fine-medium sand, wet, slightly plastic (ML-Glacial Till)
	3								
	3								
32							32		
33							33		
34	50/0"						34		Bottom of Hole 34.1 ft. Split Spoon Refusal
35							35		
36							36		

Equipment Installed



DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

5/18/83 13:20 Groundwater level 29.3 ft. through augers upon completion of drilling

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-14

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 609.09/33.08
DATUM US Lake Survey/City of Buffalo
LOCATION ~ 150 ft. South of active railroad along William Street
DATE STARTED 5/31/83 COMPLETED 6/1/83
ENGINEER R. Kampff

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL _____
OVERBURDEN SAMPLES: DISTURBED 7 UNDISTURBED -
THICKNESS OF OVERBURDEN 32.6 ft. TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 576.49/0.48
TOTAL DEPTH OF HOLE 32.6 ft. (Split Spoon Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	18	S-1	25		S-1 (0.0'-2.0') 46% Sample Recovery		1		Miscellaneous Fill, black, silty sand with brick fragments, ash, cinders, and organics throughout, damp
2	33						2		
3	13						3		
4	12						4		
5	9	S-2	20		S-2 (4.5'-6.5') 38% Sample Recovery		5		Same as above with pieces of wood and concrete
6	13						6		
7	7				*See note below		7		
8	37						8		
9							9		
10	8	S-3	71		S-3 (9.5'-11.5') 73% Sample Recovery		10		SILT, brown mottled orange, hard, some clay, trace fine sand (tan color occurring in pockets), high angle gray silt lenses throughout, trace organics (possible original ground surface at ~ 10 ft.), moist, very slightly plastic (ML)
11	19						11		
12	31						12		
13	40						13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES: *Hit obstruction @ 7.0 ft. in original borehole relocated 10 ft. west and re-drilled.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 **BORING NO.** B-14

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15	4	S-4	24		S-4 (14.5'-16.5') 65% Sample Recovery		15		Varved silty CLAY, red-brown with gray colored varves, very stiff, trace fine sand occurring with silt in varves 1/8" to 1/4" thick, moist, slightly plastic (CL)
	9								
16	12						16		
	12								
17							17		
18							18		
19							19		
20	1	S-5	5		S-5 (19.5'-21.5') 100% Sample Recovery		20		...grades to: medium stiff, saturated, plastic - no evidence of sand in varves.
	1								
21	2						21		
	3								
22							22		
23							23		
24							24		
25	2	S-6	11		S-6 (24.5'-26.5') 79% Sample Recovery		25		Silty SAND, gray, medium dense, little fine-medium subangular gravel, little clay, saturated, slightly plastic (SM-Glacial Till)
	4								
26	6						26		
	5								
27							27		
28							28		
29							29		
30	1	S-7	16		S-7 (29.5'-31.5') 75% Sample Recovery		30		...grades to: some fine-coarse subangular gravel and rock fragments, trace clay, very slightly plastic
	4								
31	7						31		
	9								
32	50/0"						32		Bottom of Hole
									Split Spoon Refusal @ 32.6 ft.
33							33		The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-15

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. ~ 600.01/29.27
DATUM US Lake Survey/City of Buffalo
LOCATION ~ 100 ft. Southwest of NFS Gas well
DATE STARTED 5/27/83 COMPLETED 5/27/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 4 UNDISTURBED -
THICKNESS OF OVERBURDEN - TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION ~583.51/7.5
TOTAL DEPTH OF HOLE 16.5 ft.

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	8, 17, 14, 18	S-1	32		S-1 (0.0'-2.0') 62% Sample Recovery		1		Topsoil and Roots Miscellaneous Fill, brown, dense, silty sand, damp, nonplastic
2							2		
3							3		
4							4		
5	1, 3, 4, 4	S-2	8		S-2 (4.5'-6.5') 38% Sample Recovery		5		Miscellaneous Fill, gray-brown, medium stiff, clayey silt with brick fragments, evidence of black petroleum contaminated soil, wet
6							6		
7							7		
8							8		NOTE: piece of slag retrieved from augers
9							9		NOTE: organic fibers and roots found in test pit 15A @ 9 ft. (original ground surface)
10	8, 17, 22, 26	S-3	48		S-3 (9.5'-11.5') 100% Sample Recovery		10		Silty varved CLAY, red-brown with tan-gray varves, hard, trace fine sand, fine sand to silt pocket tan colored @ 10.5 ft., moist, slightly plastic (CL)
11							11		
12							12		
13							13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-15

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15	1	S-4	7		S-4 (14.5'-16.5') 100% Sample Recovery		15		...grades to: medium stiff, wet, slightly plastic to moderately plastic
	1								
16	3						16		
	4								
17							17		16.5 ft. Bottom of Hole The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-16

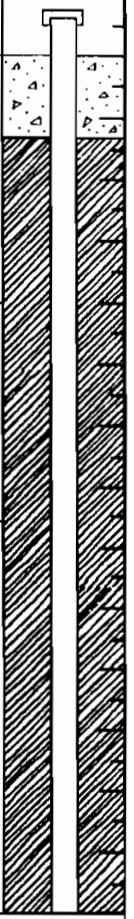
CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon- Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT Nx Rock Core

SURFACE ELEV. 601.68/25.67
DATUM US Lake Survey/City of Buffalo
LOCATION 250 ft. West of Twin Fair parking lot
DATE STARTED 5/17/83 COMPLETED 5/18/83
ENGINEER R. Kampff

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBUROEN SAMPLES: DISTURBED 6 UNDISTURBED -
THICKNESS OF OVERBURDEN 26.6 ft. TOP OF ROCK ELEVATION 575.08/-0.93
DEPTH DRILLED INTO ROCK 4.8 ft. BOTTOM OF HOLE ELEVATION 570.28/-5.73
TOTAL DEPTH OF HOLE 31.4 ft.

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	4, 5, 16, 25	S-1	41		S-1 (0.0'-2.0') 54% Sample Recovery		1		Miscellaneous Fill, black, sand, gravel, cinders (railroad ballast), wet, nonplastic
2							2		
3							3		
4							4		
5	6, 11, 23, 31	S-2	54		S-2 (4.5'-6.5') 79% Sample Recovery		5		Fine sandy SILT, brown mottled tan-orange, trace clay, trace fine gravel, moist, slightly plastic (ML)
6							6		
7							7		
8							8		
9							9		
10	9, 19, 25, 25	S-3	50		S-3 (9.5'-11.5') 60% Sample Recovery		10		Silty CLAY, red-brown, hard, varved with orange-tan fine sand lenses and gray silt varves, moist, (CL) NOTE: evidence of organic material @ 11.0 ft.
11							11		
12							12		
13							13		
14							14		

Equipment Installed



DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-16

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15	1	S-4	7		S-4 (14.5'-16.5') 100% Sample Recovery		15		...grades to: CLAY, medium stiff, little silt, wet, moderately plastic
16	2						16		
	3								
	4								
17							17		
18							18		
19							19		
20	1	S-5	7		S-5 (19.5'-21.5') 100% Sample Recovery		20		...grades to: trace fine-medium gravel between 21.0' and 21.5'.
	1								
21	4						21		
	3								
22							22		
23							23		
24							24		
25	1	S-6	10		S-6 (24.5'-26.5') 92% Sample Recovery		25		Sandy SILT, gray-brown, stiff, little fine-medium subangular gravel and rock fragments, trace clay, wet, very slightly plastic (SM-ML-Glacial Till)
26	2						26		Top of Rock 26.6 ft.
	4								
	6								
27		C-1	97%	81%	C-1 (26.6'-31.4')		27		H, O, SM
28							28		H, SO, S ONONDAGA LIMESTONE H, C, F wavy
29							29		LA, O, S.
									H, O, SM brown stain LA, SO, S Frequent chert nodules beginning @ 28.5'
30							30		H, SO, S
31							31		LA, SO, S
									Bottom of Hole 31.4 ft.

Equipment Installed

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES: 5/17/83 Groundwater level 15.1 ft. through augers prior to rock coring.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL · GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-17

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT Nx Rock Core

SURFACE ELEV. 602.01/26.00
DATUM US Lake Survey/City of Buffalo
LOCATION ~ 250 ft. West of Super Duper parking lot
DATE STARTED 5/19/83 COMPLETED 5/19/83
ENGINEER R. Kampff

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 8 UNDISTURBED
THICKNESS OF OVERBURDEN 25.8 ft. TOP OF ROCK ELEVATION 576.21/0.20
DEPTH DRILLED INTO ROCK 2.3 ft. BOTTOM OF HOLE ELEVATION 573.91/-2.1
TOTAL DEPTH OF HOLE 28.1 ft.

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	14, 24, 19, 18	S-1	37		S-1 (0.0'-2.0') 62% Sample Recovery		1		Dark brown sandy silt TOPSOIL & ROOTS Miscellaneous Fill, black, sand, silt, and cinders, damp, non-plastic
2							2		
3							3		
4							4		SILT, olive-green with orange pockets of fine sand, very stiff, little clay, moist, very slightly plastic (ML)
5	6, 10, 19, 25	S-2	16 44		Two Samples S-2 (4.5'-6.5') 79% Sample Recovery		5		
6							6		
7							7		SILT, brown, hard, some clay, tan silt to fine sand varves throughout sample, moist, slightly plastic (ML)
8							8		
9							9		
10	3, 4, 7, 6	S-3	13		S-3 (9.5'-11.5') 100% Sample Recovery		10		Silty CLAY, red-brown, stiff, wet, moderately plastic (CL)
11							11		
12							12		
13							13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 **BORING NO.** B-17

DEPTH (FT.)	BLOWS PER 0.5 FT	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15	1	S-4	4		S-4 (14.5'-16.5') 100% Sample Recovery		15		...grades to: soft, with gray silt lenses ¼" thick throughout
16	1						16		
	2								
	2								
17							17		
18							18		
19							19		
20	6	S-5	37		S-5 (19.5'-21.5') 67% Sample Recovery		20		Silty fine-medium SAND, gray, trace clay, trace fine-medium subangular gravel, wet, very slightly plastic (SM-Glacial Till)
	13								
21	11						21		
	26								
22							22		
23							23		
24							24		
25	31	S-6	100+		S-6 (24.5'-25.8') 92% Sample Recovery		25		Fine-medium GRAVEL, gray, very dense, some coarse-medium sand, wet, nonplastic (GW)
	50								
26	50/.3'	C-1	93%	52%	C-1 (25.8'-28.1')		26	LA, SO, F	Top of Rock 25.8 ft.
								H, SO, S	
27							27	H, O, SM	ONONDAGA LIMESTONE
								H, SO, F	
28							28	H, SO, S	
									Bottom of Hole 28.1 ft.
									The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES: 5/19/83 Groundwater level 6.3 ft. through augers before rock coring.
5/19/83 Groundwater level 9.1 ft. through augers following rock coring.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-18

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 601.50/25.49
DATUM US Lake Survey/City of Buffalo
LOCATION ~ 50 ft. West of UPS parking lot
DATE STARTED 5/19/83 COMPLETED 5/20/83
ENGINEER R. Kampff

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 7 UNDISTURBED -
THICKNESS OF OVERBURDEN 33.3 ft. TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 568.2/-7.81
TOTAL DEPTH OF HOLE 33.3 ft. (Split Spoon Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		Equipment Installed
1	2	S-1	41		S-1 (0.0'-2.0') 54% Sample Recovery		1		Miscellaneous Fill, black, dense, cinders, gravel, sand, with roots, moist, non-plastic
2	12						2		...changes to: brown, silty clay fill
3	22						3		
4	19						4		
5	4	S-2	9		S-2 (4.5'-6.5') 50% Sample Recovery Two Samples Taken		5		Miscellaneous Fill, brown-black, loose sand, gravel with organics, moist
6	3						6		
7	4						7		
8	5						8		
9							9		
10	11	S-3	85		S-3 (9.5'-11.5') 50% Sample Recovery		10		SILT, brown, hard, some clay, moist, slightly plastic (ML)
11	26						11		
12	37						12		
13	48						13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-18

DEPTH (FT.)	BLOWS PER 0.5 FT	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15	2	S-4	13		S-4 (14.5'-16.5') 88% Sample Recovery		15		Silty CLAY, red-brown with occasional gray silt varves, stiff, wet, moderately plastic (CL)
	4								
16	5						16		
	8								
17							17		Drilling becomes easier @ 17.5 ft.
18							18		
19							19		
20	1	S-5	4		S-5 (19.5'-21.5') 100% Sample Recovery		20		...grades to: soft, trace fine sand with gray silt lenses 1/8" - 1/4" thick throughout
	1								
21	2						21		
	2								
22							22		
23							23		
24							24		
25	1	S-6	3		S-6 (24.5'-26.5') 100% Sample Recovery		25		Same as previous sample
	1								
26	1						26		
	2								
27							27		
28							28		
29							29		
30	1	S-7	6		S-7 (29.5'-31.5') 88% Sample Recovery		30		...grades to: medium stiff, little fine-medium gravel beginning @ 31.0 ft.
	1								
31	3						31		
	3								
32							32		Frequent gravel and cobbles detected while augering (Glacial Till?)
33							33		
	50/0"								Bottom of Hole 33.3 ft. Split Spoon Refusal
34							34		The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

Equipment Installed

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-19

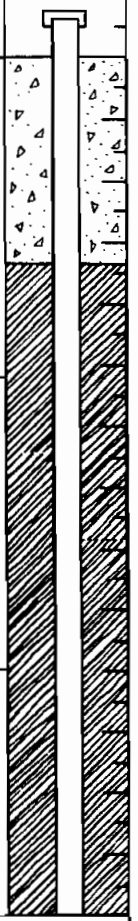
CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT Nx Rock Core

SURFACE ELEV. 605.70/29.69
DATUM US Lake Survey/City of Buffalo
LOCATION Extreme Northeast corner of site.
DATE STARTED 5/27/83 COMPLETED 5/27/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 6 UNDISTURBED -
THICKNESS OF OVERBURDEN 28.0 ft. TOP OF ROCK ELEVATION 577.7/1.69
DEPTH DRILLED INTO ROCK 3.2 ft. BOTTOM OF HOLE ELEVATION 574.5/-1.51
TOTAL DEPTH OF HOLE 31.2 ft.

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	13, 20, 41, 16	S-1	*		S-1 (0.0'-2.0') 60% Sample Recovery		1		Miscellaneous Fill, brown, gravelly sand, trace clay, wet, very slightly plastic
2							2		
3							3		
4							4		Miscellaneous Fill, gray-brown, silt and clay, with wood fibers, damp, very slightly plastic
5	2, 9, 22, 32	S-2	54		S-2 (4.5'-6.5') 58% Sample Recovery		5		SILT, brown with orange mottling, hard, some clay, high angle gray fine sand-silt seams throughout, damp, slightly plastic (ML)
6							6		
7							7		
8							8		
9							9		
10	6, 17, 21, 27	S-3	48		S-3 (9.5'-11.5') 100% Sample Recovery		10		Silty CLAY, brown, hard, trace coarse sand, gray silt to fine sand varves throughout, wet, slightly plastic (CL)
11							11		
12							12		
13							13		Augering becomes easier
14							14		

Equipment Installed



DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES: "N" value may not be representative of conditions because of obstructions encountered during sampling.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 **BORING NO.** B-19

DEPTH (FT)	BLOWS PER 0.5 FT	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15	1	S-4	5		S-4 (14.5'-16.5') 100% Sample Recovery		15		...grades to: red-brown medium stiff, with gray silt lenses throughout, moderately plastic
	1								
16	2						16		
	3								
17							17		
18							18		
19							19		
20	1	S-5	4		S-5 (19.5'-21.5') 100% Sample Recovery		20		...grades to: soft
	1								
21	2						21		
	2								
22							22		
23							23		
24							24		
25	1	S-6	6		S-6 (24.5'-26.5') 100% Sample Recovery		25		...grades to: trace fine gravel
	1								
26	3						26		Sandy SILT, gray-brown, medium stiff, little clay, trace fine gravel, wet, slightly plastic (ML-SM-Glacial Till)
	3								
27							27		
28	50/0"						28		Top of Rock 28.0 ft.
29		C-1	95%	92%	C-1 (18.0'-31.2')		29		Broken Rock H, SO, S H, C, F H, C, F ONONDAGA LIMESTONE
30							30		H, SO, S H, SO, S
31							31		Bottom of Hole 31.2 ft.

Equipment Installed

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-20

CONTRACTOR Earth Dimensions, Inc.
DRILLER Doug Oscar
TYPE OF DRILL RIG Mobile B-34
SAMPLING METHOD Split Spoon-Standard Sampling
CASING 3½" I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT Nx Rock Core

SURFACE ELEV. 605.47/29.46
DATUM US Lake Survey/City of Buffalo
LOCATION 150 ft. North of Twin Fair parking lot & 100 Ft West of South Ogden St.
DATE STARTED 5/17/83 COMPLETED 5/17/83
ENGINEER R. Kampff

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL
OVERBURDEN SAMPLES: DISTURBED 5 UNDISTURBED
THICKNESS OF OVERBURDEN 21.0 ft. TOP OF ROCK ELEVATION 582.27/6.26
DEPTH DRILLED INTO ROCK 5.0 ft. BOTTOM OF HOLE ELEVATION 579.47/3.46
TOTAL DEPTH OF HOLE 26.0 ft.

DEPTH (FT)	BLOWS PER 0.5 FT	SAMPLE TYPE, NO & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		
1	8	S-1	*		S-1 (0.0'-2.0') 75% Sample Recovery		1		Topsoil & Roots Miscellaneous Fill, black, silty sand with cinders, gravel, and brick fragments, damp
2	17						2		
3	39						3		Cobbles and coarse gravel size material encountered during augering
4	45						4		
5	13	S-2	95		S-2 (4.5'-6 5') 100% Sample Recovery		5		Clayey SILT, red-brown, hard, trace coarse sand occurring in random pockets, gray silt to fine sand varves throughout, moist, slightly plastic (ML)
6	22						6		
7	35						7		
8	60						8		Easier augering
9							9		
10	5	S-3	14		S-3 (9.5'-11.5') 79% Sample Recovery		10		Silty CLAY, red-brown with gray varves, stiff, trace fine sand, wet, slightly plastic (CL)
11	5						11		
12	7						12		
13	7						13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES: * "N" values may not be representative because of obstructions encountered while sampling.

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT Buffalo Industrial Park

FILE NO. R5613 BORING NO. B-20

DEPTH (FT.)	BLOWS PER 0.5 FT	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15	1	S-4	9		S-4 (14.5'-16.5') 100% Sample Recovery		15		...grades to medium stiff, no varves evident
	3								
16	4						16		
	5								
17							17		
18							18		
19							19		
	13	S-5	29		S-5 (19.0'-20.1') 31% Sample Rec.				Silty SAND, gray, medium dense, little fine-medium gravel and rock fragments, wet, nonplastic (SM-Glacial Till)
20	16						20		
	50/.1'								Auger Refusal 21.0'
21							21		
22							22		Zone of broken rock (possible boulders and cobbles)
23		C-1	50%	37%	C-1 (21.0'-26.0')		23		Estimated Top of Rock 23.3 ft.
24							24		
25							25		H, SO, S H, SO, S ONONDAGA LIMESTONE
26							26		Bottom of Hole 26.0 ft.

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL · GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT New Buffalo Industrial Park

FILE NO. R5615 BORING NO. B-21

CONTRACTOR Parratt-Wolff, Inc.
DRILLER Bill Rice
TYPE OF DRILL RIG CME-55
SAMPLING METHOD Split Spoon - Standard Sampling
CASING 3 3/4 in. I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 602.17/26.16
DATUM US Lake Survey/City of Buffalo
LOCATION East of Super Duper
See location plan
DATE STARTED 10/27/83 COMPLETED 10/27/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL ____
OVERBURDEN SAMPLES: DISTURBED 5 UNDISTURBED -
THICKNESS OF OVERBURDEN - TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 578.17/2.16
TOTAL DEPTH OF HOLE 24.0 ft. (Auger Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		Equipment Installed
1	4, 7, 9, 5	S-1	14		S-1 (0.0'-2.0') 55% Sample Recovery		1		MISCELLANEOUS FILL, brown, medium dense, fine-coarse sand and fine gravel with cinders and metal fragments, damp
2							2		
3							3		
4							4		
5	2, 5, 7, 8	S-2	15		S-2 (5.0'-7.0') 100% Sample Recovery		5		Clayey SILT, brown with gray silt lenses, stiff, trace fine sand, trace fine gravel, damp, slightly plastic (ML)
6							6		
7							7		
8							8		
9							9		
10	1, 2, 1, 2	S-3	3		S-3 (10.0'-12.0') 70% Sample Recovery		10		Silty CLAY, gray with occasional olive green silt lenses, soft, wet, moderately plastic (CL)
11							11		
12							12		
13							13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

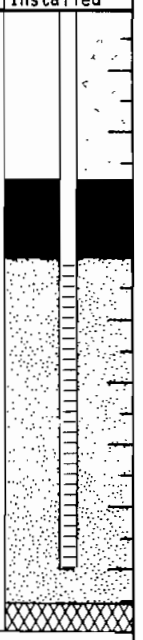
-BORING LOG-

PROJECT New Buffalo Industrial Park

FILE NO. R5615 BORING NO. B-21

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15							15		
	1	S-4	9		S-4 (15.0'-17.0') 100% Sample Recovery				...grades to: stiff, little fine-medium sand beginning at 16.5 ft.
16	1						16		
	2								
17	7						17		Note: Augering becomes more difficult at 17.2 ft.
18							18		
19							19		
20							20		
	3								Fine-medium SAND, gray-brown, loose, little silt, trace fine-medium gravel, trace clay, wet, very slightly plastic (SM-Glacial Till)
21	3	S-5	5		S-5 (20.0'-22.0') 100% Sample Recovery		21		
	3								
22	2						22		Note: Difficult augering 22-24 ft.; frequent boulders and rock fragments
23							23		
24							24		Bottom of Hole 24.0 ft. Auger Refusal

Equipment Installed



DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT New Buffalo Industrial Park

FILE NO. R5615 BORING NO. B-22

CONTRACTOR Parratt-Wolff, Inc.
DRILLER Bill Rice
TYPE OF DRILL RIG CME-55
SAMPLING METHOD Split Spoon - Standard Sampling
CASING 3 3/4 in. I.D. - Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 610.88/34.87
DATUM US Lake Survey/City of Buffalo
LOCATION See location plan
DATE STARTED 10/28/83 COMPLETED 10/28/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL _____
OVERBURDEN SAMPLES: DISTURBED 7 UNDISTURBED -
THICKNESS OF OVERBURDEN - TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 578.78/2.77
TOTAL DEPTH OF HOLE 32.1 ft. (Auger Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
0							0		Equipment Installed
1	2, 4, 6, 9	S-1	15		S-1 (0.0'-2.0') 65% Sample Recovery		1		TOPSOIL & ROOTS Miscellaneous Fill, brown, medium dense, fine-medium sand, some silt, trace fine-medium gravel, damp, nonplastic
2							2		
3							3		
4							4		
5	3, 3, 4, 4	S-2	8		S-2 (5.0'-7.0') 55% Sample Recovery		5		Same as previous sample
6							6		
7							7		
8							8		
9							9		
10	1, 1, 2, 2	S-3	4		S-3 (10.0'-12.0') 85% Sample Recovery		10		...grades to: very loose little fine-medium gravel, wet
11							11		
12							12		...grades to: black, trace organic material (original ground surface?)
13							13		
14							14		

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL LA LOW ANGLE (≤ 45°) HA HIGH ANGLE (> 45°) T VERTICAL	C CLOSED SO SLIGHTLY OPEN O OPEN	F FRESH S SLIGHT SM SLIGHT TO MODERATE M MODERATE MV MODERATE TO SEVERE V SEVERE	HB HAMMER BREAK

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT New Buffalo Industrial Park

FILE NO. R5615 BORING NO. B-22

DEPTH (FT.)	BLOWS PER 0.5 FT	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
15							15		
	3								Clayey SILT, brown with gray/tan silt lenses, very stiff, trace fine sand, moist, slightly plastic (ML)
16	4	S-4	25		S-4 (15.0'-17.0') 40% Sample Recovery		16		
	11								
17	14						17		
18							18		
19							19		
20							20		
	3								
21	3	S-5	8		S-5 (20.0'-22.0') 80% Sample Recovery		21		Silty varved CLAY, red-brown with high angle gray silt varves, stiff, moist, slightly plastic (CL)
	4								
22	4						22		
23							23		
24							24		
25							25		...grades to: medium stiff
	1								
26	2	S-6	5		S-6 (25.0'-27.0') 95% Sample Recovery		26		
	2								
27	3						27		
28							28		
29							29		
30							30		
	5								
31	10	S-7	15		S-7 (30.0'-31.8') 100% Sample Recovery		31		Sandy SILT, brown, stiff, little fine-medium gravel, trace clay, wet, very slightly plastic (ML-Glacial Till)
	5								
32	50/.3'						32		

Equipment Installed

Bottom of Hole 32.1 ft.

Auger Refusal

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL · GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT New Buffalo Industrial Park

FILE NO. R5615 BORING NO. B-23

CONTRACTOR Parratt-Wolff, Inc.
DRILLER Bill Rice
TYPE OF DRILL RIG CME-55
SAMPLING METHOD Split Spoon - Standard Sampling
CASING 3 3/4 inch I.D. Hollow Stem Augers
SIZE AND TYPE OF BIT No Rock Core

SURFACE ELEV. 599.81/23.80
DATUM US Lake Survey/City of Buffalo
LOCATION See location plan
DATE STARTED 10/28/83 COMPLETED 10/28/83
ENGINEER R. Laport

DIRECTION OF HOLE: VERTICAL ☒ INCLINED ☐ DEGREES FROM VERTICAL _____
OVERBURDEN SAMPLES: DISTURBED 8 UNDISTURBED -
THICKNESS OF OVERBURDEN - TOP OF ROCK ELEVATION -
DEPTH DRILLED INTO ROCK - BOTTOM OF HOLE ELEVATION 563.61/-12.4
TOTAL DEPTH OF HOLE 36.2 ft. (Auger Refusal)

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION	Equipment Installed
0	5						0			
1	14	S-1	28		S-1 (0.0'-2.0') 35% Sample Recovery		1		Miscellaneous Fill, brown, medium dense, sand and fine-coarse gravel, some silty clay, occasional cinders, damp	
	10									
2	18						2			
3							3			
4							4			
5							5		Clayey SILT, mottled brown, stiff, with occasional fine sand-silt lenses, wet, slightly plastic (ML)	
	3									
6	4	S-2	11		S-2 (5.0'-7.0') 85% Sample Recovery		6		...grades to: moist	
	4									
7	7						7			
8							8			
9							9			
10							10		...grades to: very stiff, occasional tan fine sand lenses	
	5									
11	8	S-3	28		S-3 (10.0'-12.0') 95% Sample Recovery		11			
	13									
12	15						12			
13							13			
14							14			
15							15			

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL - GEOHYDROLOGICAL CONSULTANTS

-BORING LOG-

PROJECT New Buffalo Industrial Park

FILE NO. R5615 BORING NO. B-23

DEPTH (FT.)	BLOWS PER 0.5 FT.	SAMPLE TYPE, NO. & LOCATION	N-VALUE OR % REC.	RQD %	REMARKS	LEGEND	DEPTH (FT.)	CORE BREAKS	SOIL AND ROCK DESCRIPTION
	2								
16	3	S-4	8		S-4 (15.0'-17.0') 90% Sample Recovery		16		Silty varved CLAY, brown, medium stiff, moist, moderately plastic (CL)
	4								
17	4						17		
18							18		
19							19		
20							20		...grades to: red-brown @ 21.0 ft., soft, trace coarse sand
	2								
21	2	S-5	4		S-5 (20.0'-22.0') 100% Sample Recovery		21		
	2								
22	2						22		
23							23		
24							24		
25							25		...grades to: ¼" thick silt lenses throughout
	2								
26	2	S-6	3		S-6 (25.0'-27.0') 100% Sample Recovery		26		
	1								
27	2						27		
28							28		
29							29		
30							30		
	1								
31	1	S-7	3		S-7 (30.0'-32.0') 100% Sample Recovery		31		Same as previous sample
	2								
32	1						32		
33							33		
34							34		
35							35		Silty SAND, gray, medium dense, little fine-coarse gravel, trace clay, wet, very slightly plastic, (SM-Glacial Till)
	11	S-8	20		S-8 (35.0'-36.2') 100% Sample Rec.				
36	9						36		
	50/.2'								Bottom of Hole 36.2 ft. - Auger Refusal -

Equipment Installed

DISCONTINUITY CLASSIFICATION

ORIENTATION	DEGREE OF OPENING	WEATHERING	SPECIAL FEATURES
H HORIZONTAL	C CLOSED	F FRESH	HB HAMMER BREAK
LA LOW ANGLE (≤ 45°)	SO SLIGHTLY OPEN	S SLIGHT	
HA HIGH ANGLE (> 45°)	O OPEN	SM SLIGHT TO MODERATE	
T VERTICAL		M MODERATE	
		MV MODERATE TO SEVERE	
		V SEVERE	

MISCELLANEOUS NOTES:

The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.

APPENDIX B

Test Pit Logs

-Phase 1 designated with "TP" done May-June, 1983

-Phase 2 designated with "TP II" done November, 1983

TEST PIT FIELD LOG

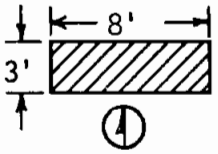
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION SW Crn. of stone pile	TEST PIT No. 4 FILE No. R5613 DATE 6-1-83

GZA ENGINEER R. Laport WEATHER overcast	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY ____ cu.yd. REACH 14 ft	GROUND ELEV. ≃605/≃29 TIME STARTED 12:45 TIME COMPLETED 13:05

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'	Miscellaneous Fill, fine-medium sand	E		
2'	Miscellaneous Fill, silty clay with intermixed rocks (≃4" diameter) and pieces of wood	E		
3'		E		
4'		E		
5'	Purple sludge material Miscellaneous Fill, black, fine-medium sand, some silt, distinct petroleum	E M		1
6'				
7'	Bottom of Hole (Refusal) 6.3 ft.	D		
8'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.	-		
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS: 1. Groundwater @ 5.6 ft. upon completion of excavation.

TEST PIT PLAN



VOLUME = 5.6 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION S. side of stone pile	TEST PIT No. 5 FILE No. R5613 DATE 6-1-83

GZA ENGINEER R. Laport
WEATHER overcast

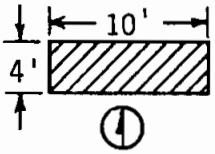
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ~14 ft.

GROUND ELEV. ≈609/≈33
TIME STARTED 09:45
TIME COMPLETED 10:25

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, brown, consisting of pieces of concrete (2'x2'x3'), bricks, scrap metal, curbstone	D		
1'		M		
2'		M		
3'		D		
4'	Layer of intact and broken sandstone blocks @ 3.5'-4.2'	E		
5'	Miscellaneous Fill, intermixed black and rust, fine-coarse sand size material with frequent scrap metal pieces, bottles	E		
6'		E		
7'		E		
8'		E		
9'	- Numerous bricks between 9.1 ft. and bottom of test pit	E		
10'	Bottom of Pit 10.1 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. No groundwater seepage noted prior to backfill.
2. Minor sloughing of sides @ 7.0 ft.

TEST PIT PLAN



VOLUME = 15 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

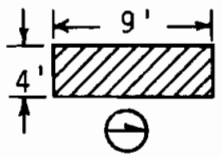
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION 100' SE of Stonepile	TEST PIT No. 6 FILE No. R5613 DATE 6-1-83

GZA ENGINEER R. Laport WEATHER overcast & cool	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY ___ cu.yd. REACH ~14 ft.	GROUND ELEV. ≈604/≈28 TIME STARTED 10:30 TIME COMPLETED 10:50

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, orange-brown, silty clay, with numerous bricks, concrete pieces (3'x3'x0.3'), and curbstone	M		1
1'				
2'		M		
3'		D		
4'		D		
5'	Bottom of Test Pit 4.0			
6'	Obstruction prevented further excavation			
7'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
8'				
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS: 1. 0-1ft. contaminated with a black oily substance.

TEST PIT PLAN



VOLUME = 5.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

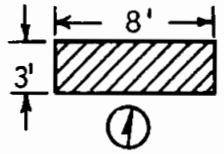
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION ~100' South of Pond	TEST PIT No. 7 FILE No. R5613 DATE 6-1-83

GZA ENGINEER R. Laport WEATHER overcast & cool	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY ____ cu.yd. REACH ____ ft	GROUND ELEV. ≃610/≃34 TIME STARTED 11:05 TIME COMPLETED 11:40

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, orange, silty clay intermixed with several "A" and "B" sized concrete blocks	M		
1'		D		
2'		D		
3'		D		
4'		M		
5'		M		
6'	Miscellaneous Fill, black sandy silt intermixed with oil and white granular material (industrial fill?)	M		
7'		E		
8'		-		
9'	Bottom of Hole (8.5')			
10'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
11'				
12'				
13'				
14'				

REMARKS: -Minor sloughing of sidewalls upon completion of excavation.
-No groundwater seepage noted during excavation.

TEST PIT PLAN



VOLUME = 7.6 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽2 G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION in R.R. Embankment	TEST PIT No. 9 FILE No. R5613 DATE 6-2-83

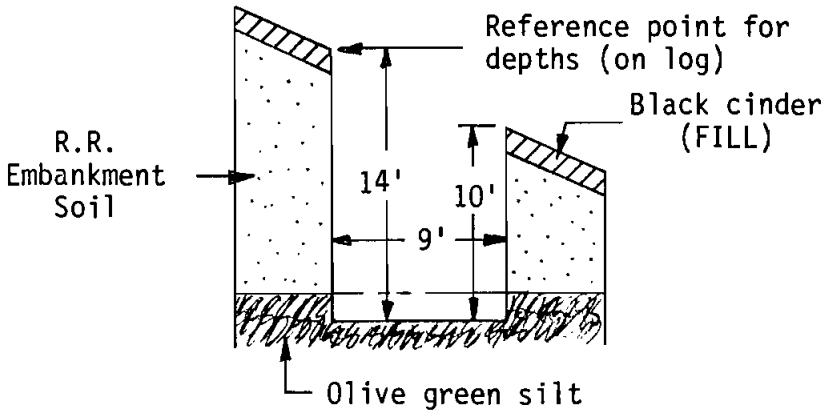
GZA ENGINEER R. Laport
WEATHER sunny & warm

EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ~14 ft.

GROUND ELEV. ≈614/≈38
TIME STARTED 14:05
TIME COMPLETED 14:35

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0				
1'	Topsoil & Roots	E-M		
2'	Miscellaneous Fill, black, medium-coarse gravel size cinders with occasional wood fragments	E-M		
3'		E-M	3-A	
4'	Miscellaneous Fill, brown, silt and clay, little sand, fine-medium gravel, damp	E-M		
5'		E-M		2
6'		E-M		
7'		E-M		
8'		E-M		
9'		E-M		
10'		E-M		
11'		E-M		
12'		E-M		
13'	Olive green SILT, some clay, little fine sand occurring in pockets (ML)	E-M		
14'		E-M		
	Bottom of Hole ~14 ft.			

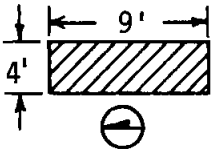
Cross Section of R.R. Embankment



*Not to scale

REMARKS:
1. No water seepage observed during excavation.
2. Bag sample collected from 5.0'.
3. Moderate sloughing of sides upon completion.

TEST PIT PLAN



VOLUME = 16 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS
F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT
E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER
ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION 200 ft.± East of Kintex	TEST PIT No. 11 FILE No. R5613 DATE 6-2-83

GZA ENGINEER R. Laport
WEATHER sunny & warm

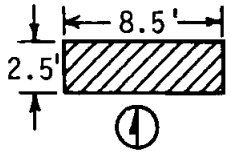
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ~14 ft

GROUND ELEV. ≈602/≈26
TIME STARTED 13:35
TIME COMPLETED 13:55

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'	Miscellaneous Fill, orange, slag, cinders and brick fragments (industrial fill)	E		
2'		E		
3'		E		
4'		E		1
5'		E		
6'	Varved clayey SILT, tan-brown mottled red with gray silt lenses throughout, damp, slightly plastic (ML)	E		
7'	Silty CLAY, brown, with gray silt lenses, and fine sand pockets, damp, moderately plastic (CL)	E		
8'		E		
9'		E		2
	Bottom of Hole (9.0')			
10'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
11'				
12'				
13'				
14'				

REMARKS:
1. Groundwater seepage of ~½ gpm. @ ≈4.0 ft.
2. Sides cut vertical and test pit remained stable upon completion of excavation.

TEST PIT PLAN



VOLUME = 7.1 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

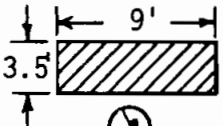
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION 100' NE of Kintex	TEST PIT No. 12 FILE No. R5613 DATE 6-1-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY ____ cu.yd. REACH ~14 ft	GROUND ELEV. ≈602/≈26 TIME STARTED 15:35 TIME COMPLETED 16:00

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots	E		
1'	Miscellaneous Fill, black, clayey silt with brick fragments, scrap metal, wood pieces (2 ft. in length), bottles, tile fragments	E		
2'		D		
3'		E		
4'		E		1
5'		E		
6'		E		
7'		E		
8'	Silty CLAY, brown, with gray silt lenses throughout, damp, slightly plastic (CL)	E		
9'	Bottom of Hole 9.0 ft.			
10'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
11'				
12'				
13'				
14'				

REMARKS: 1. Minor groundwater seepage @ 5.0'.
2. Minor sloughing; on North face at ≈6', and South face at ≈7.5'.

TEST PIT PLAN



VOLUME = 10.5 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION ~400' East of Kintex	TEST PIT No. 13 FILE No. R5613 DATE 6-1-83

GZA ENGINEER R. Laport
WEATHER partly cloudy

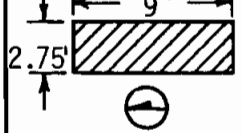
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ~14 ft.

GROUND ELEV. ≃603/≃27
TIME STARTED 16:05
TIME COMPLETED 16:20

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots	E		
1'	Miscellaneous Fill, black, sandy gravel, some silt, with wood pieces (>4"), concrete pieces (4"-12"), and overall strong oil or tar odor	E		
2'		M		1
3'		D		
4'	Frequent brick fragments	D		
5'	Clayey SILT, brown, occasional tan silt lenses throughout, trace organics, damp, very slightly plastic (ML)	D		
6'		D		
7'		D		
8'		D		2
9'	Bottom of Hole 8.8 ft.			
10'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
11'				
12'				
13'				
14'				

REMARKS:
1. Black leachate with petroleum odor @ 3 ft.
2. Minor sloughing of sides upon completion.

TEST PIT PLAN



VOLUME = 8.1 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

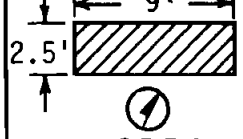
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION 200 ft. East of Bailey	TEST PIT No. 14 FILE No. R5613 DATE 5-31-83

GZA ENGINEER R. Laport WEATHER overcast	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY ___ cu.yd. REACH ~14 ft.	GROUND ELEV. ≈608/≈32 TIME STARTED 14:00 TIME COMPLETED 14:15

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0 – 1'	Dark brown Topsoil & Roots, with occasional brick fragments	E		
1' – 2'	Miscellaneous Fill, brown mottled orange, silty clay, moderately plastic, damp	E		
2' – 3'		E		
3' – 4'	Miscellaneous Fill, black, cinders with oil contamination	E		
4' – 5'	Clayey SILT, tan, with frequent silt to fine sand lenses throughout, damp very slightly plastic (ML)	E		
5' – 6'		E		
6' – 7'		E		
7' – 8'		E		
8' – 9'	Silty CLAY, brown, with gray silt lenses. moist, slightly plastic (CL)	E		
9' – 10'				1
10' – 11'	Bottom of Hole 9.8 ft.			
11' – 12'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12' – 13'				
13' – 14'				

REMARKS: 1. Sides cut vertical & remained stable upon completion.

TEST PIT PLAN



VOLUME = 8.1 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION 500' East of Bailey	TEST PIT No. 15 FILE No. R5613 DATE 5-31-83

GZA ENGINEER R. Laport
WEATHER rainy & cool

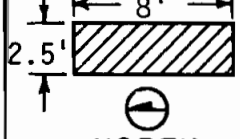
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ~14 ft.

GROUND ELEV. ≈610/≈34
TIME STARTED 13:15
TIME COMPLETED 13:55

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'		E		
2'	Miscellaneous Fill, brown, silty clay with brick fragments	E		
3'		E		1
4'	Miscellaneous Fill, black, silt intermixed with oil	E		2
5'	Frequent bricks and brick fragments	E		
6'	Silty CLAY, red-brown, with gray silt lenses, damp, slightly plastic (ML-CL)	E		
7'		E		
8'		E		
9'	Silty CLAY, brown, occasional fine sand pockets, damp, slightly plastic (CL)	E		
10'		E		3
	Bottom of Hole 10.0 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Groundwater seepage @ 3.0 ft.
2. Black leachate with petroleum odor @ ≈3.5 ft.
3. Minor sloughing of sides upon completion.

TEST PIT PLAN



VOLUME = 7.4 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

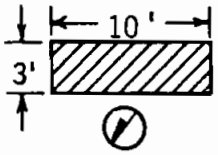
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION 10' West of B-15	TEST PIT No. 15A FILE No. R5613 DATE 6-8-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 310A CAPACITY ____ cu.yd. REACH ~14 ft.	GROUND ELEV. ≈601/≈25 TIME STARTED 11:50 TIME COMPLETED 12:15

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Black, sandy silt, Topsoil & Roots	E		
1'		E		
2'		E		1
3'	Miscellaneous Fill, gray-brown, silt with vitrified clay pipe fragments, brick fragments, and black contaminated soil.	E		
4'		E		
5'		E		
6'		E		
7'		E		
8'	Miscellaneous Fill, gray, silt, with brick fragments, and pieces of wood, intermixed with oil	E		
9'	Lightly varved silty CLAY, red-brown, with gray silt lenses (some @ high angles) moist, slightly plastic (CL)	E		
10'		E		2
11'	Bottom of Hole 10 ft. The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Groundwater seepage @ 2.7 ft.
2. Minor sloughing of sides upon completion.

TEST PIT PLAN



VOLUME = 11.1 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 16 FILE No. R5613 DATE 5-31-83

GZA ENGINEER R. Laport
WEATHER sunny & warm

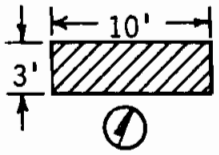
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ~14 ft

GROUND ELEV. ≈609/≈33
TIME STARTED 11:25
TIME COMPLETED 11:50

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, dark brown, sandy silt, with wood timbers (> 2 ft. long), and white material (industrial fill?)	E		
1'		E		
2'		E		
3'	Change to silty clay fill	E		
4'	Clayey SILT, brown with gray silt lenses, damp, very slightly plastic (ML)	E		1
5'		E		
6'		E		
7'	SILT & CLAY, tan, trace fine sand, damp, slightly plastic (ML-CL)	E		
8'		E		
9'		E		
10'	Bottom of Hole 10 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS: 1. Groundwater seepage @ ~ 4.5 ft.

TEST PIT PLAN



VOLUME = 11.1 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 16A FILE No. R5613 DATE 6-8-83

GZA ENGINEER R. Laport
WEATHER sunny & warm

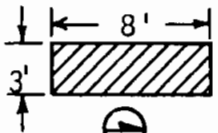
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 310A
CAPACITY ____ cu.yd. REACH ~14 ft

GROUND ELEV. ≃608/≃32
TIME STARTED 10:05
TIME COMPLETED 10:30

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, brown, with bricks, brick fragments, and wood fragments	E		
1'				
2'		E		
3'		E		
4'		E		
5'		M		
6'	Layer of black "tar" fill	M		1
7'	Varved clayey SILT, tan-brown, with black discoloration along gray silt lenses (leachate intrusion) (ML)	M		
8'	Bottom of Hole 7.0'			2
9'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.	-		
10'				
11'				
12'				
13'				
14'				

REMARKS:
1. Black leachate flowing into the hole @ ≃ 10 gpm from ≃5.0 ft.
2. Moderate to severe sloughing of sides during excavation.

TEST PIT PLAN



VOLUME = 6.2 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS
F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT
E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER
ELAPSED TIME TO READING (HRS.)
G.W.L

TEST PIT FIELD LOG

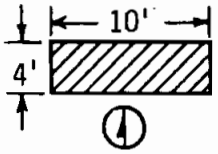
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 17 FILE No. R5613 DATE 6-1-83

GZA ENGINEER R. Laport WEATHER overcast	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY ____ cu.yd. REACH ____ ft.	GROUND ELEV. ≈607/≈31 TIME STARTED 9:10 TIME COMPLETED 9:25

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'	Miscellaneous Fill, black, sand and silt with numerous bricks, scrap metal large concrete blocks (6"-36"), and wood pieces > 3' long	E		
2'		E		
3'		E		
4'		E		
5'	Miscellaneous Fill, black, silt, contaminated with oil or tar	E		1
6'	Sandy SILT tan, little clay, damp, very slightly plastic, (ML)	E		
7'	Clayey SILT, tan-gray, little fine sand, damp, very slightly plastic (ML)	E		
8'		E		
9'	Bottom of Hole 8 ft.	-		
10'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
11'				
12'				
13'				
14'				

REMARKS: 1. Groundwater seepage @ 5.0 ft.
2. Minor sloughing of sides during excavation.

TEST PIT PLAN



VOLUME = 11.9 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L.

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 18 FILE No. R5613 DATE 5-31-83

GZA ENGINEER R. Laport
WEATHER sunny & warm

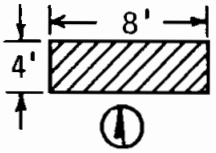
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ~14 ft.

GROUND ELEV. ≈606/≈30
TIME STARTED 12:10
TIME COMPLETED 12:30

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, black, sand and silt, with scrap metal, brick fragments, wood timbers > 3' in length.	E		
1'		E		
2'		E		
3'		E		
4'	Miscellaneous Fill, gray, clayey silt	E		1
5'		E		
6'	Miscellaneous Fill, fine sand, brown, trace gravel, damp	E		
7'		E		
	Bottom of Hole ≈ 7 ft.			
8'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS: 1. Groundwater seepage @ 3.7 ft.
2. Severe sloughing and undercutting of sides due to the fine sand layer.

TEST PIT PLAN



VOLUME = 8.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

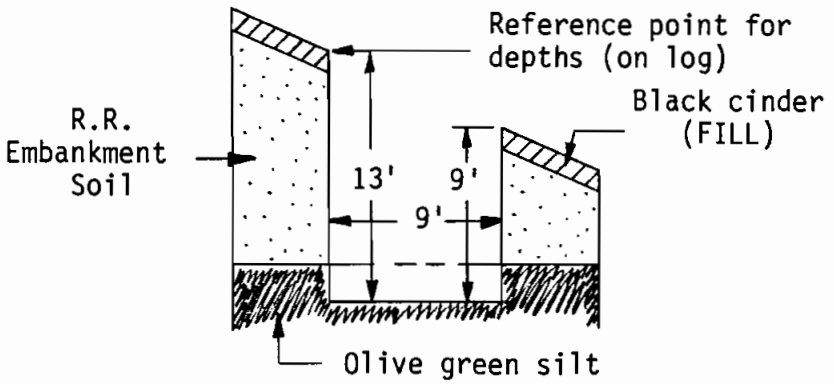
GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

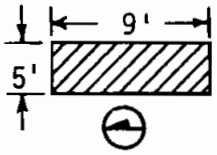
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION RR embankment	TEST PIT No. 20 FILE No. R5613 DATE 6-2-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY ___ cu.yd. REACH ~14 ft.	GROUND ELEV. ≃613/≃37 TIME STARTED 11:00 TIME COMPLETED 11:45

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots	E-M		
1'	Miscellaneous Fill, black, cinders	E-M		
2'	Miscellaneous Fill, red-brown, silt and clay, light sand, trace fine-medium gravel, with wood fragments, pieces of shale	E-M		
3'		E-M		
4'		M		
5'	Cross Section of R.R. Embankment	M		
6'		E-M		
7'		E-M		
8'		E-M		
9'		E-M		
10'	*Not to scale	E-M		1
11'	SILT, olive green, some clay, trace fine sand, in scattered pockets, damp, very slightly plastic (ML)	E-M		
12'		E-M		
13'	Bottom of Hole ~ 13 ft.	E-M		
14'				

REMARKS:
1. Slight groundwater seepage @ ~ 1.5'.
2. Severe sloughing of sides during excavation.

TEST PIT PLAN



VOLUME = 15.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

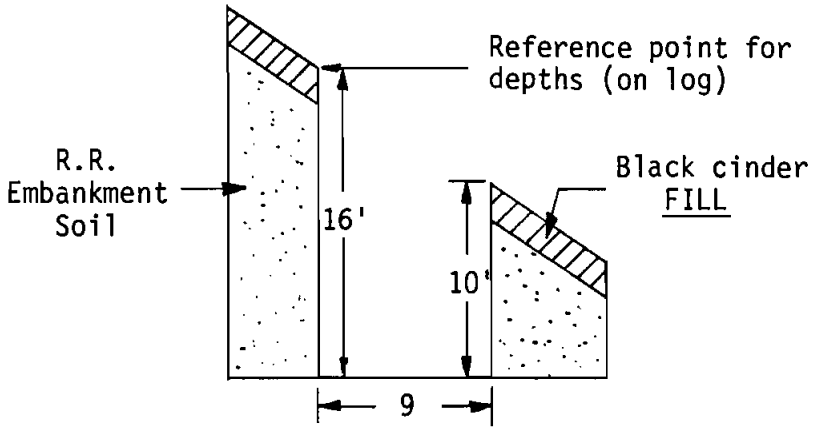
TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION RR embankment	TEST PIT No. 21 FILE No. R5613 DATE 6-2-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY cu.yd. REACH ~14 ft.	GROUND ELEV. ≈616/≈40 TIME STARTED 12:35 TIME COMPLETED 13:05

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots	E		
1'		E		
2'	Miscellaneous Fill, black, cinders	E		
3'	Miscellaneous Fill, red-brown, silty clay, little fine-coarse gravel, little sand, damp	E		
4'		E		
5'		E		1
6'		E		
7'		E		
8'		E		
9'		E		
10'		E		
11'		E		
12'		E		
13'		E		
14'		E		2

Cross section of R.R. Embankment

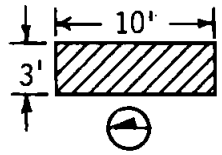


*Not to scale

Bottom of Hole ~ 16 ft.

REMARKS:
1. Soil sample collected for testing @ ≈ 5.0 ft.
2. Moderate sloughing of sides upon completion of excavation.

TEST PIT PLAN



VOLUME = 13 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽2 G.W.L.

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION ~ 300' E of Chem. Bank	TEST PIT No. 25 FILE No. R5613 DATE 6-1-83

GZA ENGINEER R. Laport
WEATHER overcast

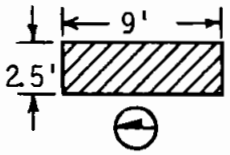
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 580C
CAPACITY ___ cu.yd. REACH ~14 ft

GROUND ELEV. ≈603/≈27
TIME STARTED 14:15
TIME COMPLETED 14:30

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots, black, fine-medium sand with brick fragments, concrete (2' long x 2' in diameter)	E		
1'		E		
2'	Miscellaneous Fill, red-brown, silty clay, with rust colored industrial fill between 2' & 2.5'	E		
3'		E		1
4'	Clayey SILT, brown, with gray silt to fine sand lenses throughout, damp, slightly plastic (ML)	E		
5'		E		
6'		E		
7'		E		
8'		E		
9'	Fine sandy SILT, brown, trace clay, with frequent gray silt lenses, damp, very slightly plastic (ML-SM)	E		2
10'	Bottom of Hole @ 9.7 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Minor groundwater seepage.
2. Minor sloughing of sides upon completion of excavation.

TEST PIT PLAN



VOLUME = 8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L.

TEST PIT FIELD LOG

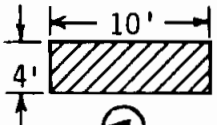
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION Btwn. Chem.Bank & Super.D.	TEST PIT No. 26 FILE No. R5613 DATE 6-1-83

GZA ENGINEER R. Laport WEATHER overcast	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY cu.yd. REACH ~14 ft	GROUND ELEV. ≃604/≃28 TIME STARTED 13:45 TIME COMPLETED 14:10

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, sand and gravel, with a layer of bricks between 1 & 2.5 ft. and numerous bricks and brick fragments throughout	D		
1'				
2'		E-M		
3'		E		
4'	Miscellaneous Fill, dark brown, sandy silt, with pockets of black oil contaminated soil	E		1
5'		E		3
6'		E		
7'		E		
8'		E		2
9'	SILT, gray-brown, some clay, with pockets of tan fine sand, damp, very slightly plastic (ML)	E		
10'	Bottom of Hole @ 10.0 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Water flowing into test pit @ ~ 1 gpm from ≃ 4.0 ft.
2. Minor groundwater seepage @ ≃ 8.0 ft.
3. Old building foundation @ ≃ 4.3 ft. on east wall of test pit.

TEST PIT PLAN



VOLUME = 14.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

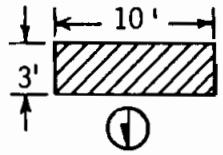
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION UPS parking lot	TEST PIT No. 27 FILE No. R5613 DATE 6-1-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY cu.yd. REACH ~14 ft.	GROUND ELEV. ≃602/≃26 TIME STARTED 15:05 TIME COMPLETED 15:30

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Asphalt			
1'	Coarse gravel and crushed stone (road sub-base)	E		
2'	Miscellaneous Fill, black, sand and silt, with brick fragments	E		
3'		E		
4'	- 3" thick pieces of wood	E		
5'	Clayey SILT, brown, little medium-coarse sand, gray silt lenses throughout, damp, very slightly plastic (ML)	E		1
6'		E		
7'		E		
8'		E		
9'		E		
10'		E		2
11'	Bottom of Hole @ 9.8 ft.			
12'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
13'				
14'				

REMARKS:
1. Groundwater flowing @ ~ 2 gpm from Southeast corner of test pit @ 4.5 ft.
2. Minor sloughing of sides upon completion of excavation.

TEST PIT PLAN



VOLUME = 10.9 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ 2 G.W.L

TEST PIT FIELD LOG

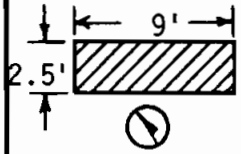
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION ~ 200 ft. S. of Kintex	TEST PIT No. 28 FILE No. R5613 DATE 6-2-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY cu.yd. REACH ~14 ft.	GROUND ELEV. ≈598/≈22 TIME STARTED 15:40 TIME COMPLETED 16:00

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots	E		
1'	Miscellaneous Fill, black, gravel and crushed stone	E		
2'	Miscellaneous Fill, tan-brown, fine-medium sand with brick fragments, wire, tile pieces	E		1
3'	Clayey SILT, gray-brown, occasional pockets of tan fine sand, and lenses of gray silt, damp, slightly plastic (ML)	E		
4'		E		
5'		E		
6'		E		
7'	Varved silty CLAY, red-brown, with gray silt to fine sand lenses throughout, damp, slightly plastic (CL)	E		
8'		E		
9'		E		
10'	Bottom of Hole @ 10.0 ft.	E		2
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Groundwater seepage from Southwest corner of test pit @ 2.7 ft.
2. Sides cut vertical and remain stable upon completion of excavation.

TEST PIT PLAN



VOLUME = 8.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

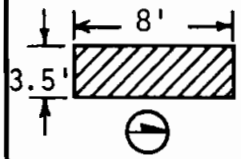
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION W. of Kintex	TEST PIT No. 29 FILE No. R5613 DATE 6-2-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY cu.yd. REACH 14 ft.	GROUND ELEV. ≈599/≈23 TIME STARTED 16:20 TIME COMPLETED 16:45

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'	Miscellaneous Fill, black, cinders, with old railroad tie (~ 6 ft. long)			
2'	Miscellaneous Fill, gray-brown, fine-medium sand, some clay, with cinders, brick fragments			1
3'				
4'				
5'	Miscellaneous Fill, black, cinders			
6'	SILT, brown, some clay, occasional pockets of tan fine sand, gray silt to fine sand lenses, damp, very slightly plastic (ML)			
7'				
8'				
9'				
10'				2
	Bottom of Hole 10.0 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Slight groundwater seepage @ 2.0 ft.
2. Minor sloughing of sides upon completion.

TEST PIT PLAN



VOLUME = 10.4 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION R.R. embankment	TEST PIT No. 30 FILE No. R5613 DATE 6-2-83

GZA ENGINEER R. Laport
WEATHER sunny & warm

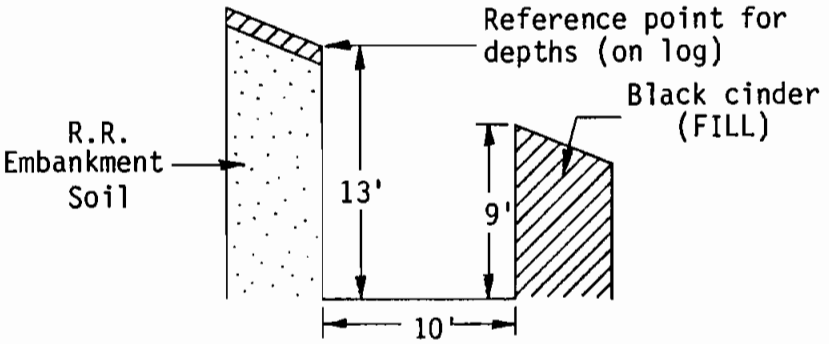
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ~14 ft

GROUND ELEV. ≈611/≈35
TIME STARTED 15:10
TIME COMPLETED 15:35

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	R.R. embankment: Topsoil & Roots			
1'	Miscellaneous Fill, black, cinders with sand, gravel, and brick fragments	E		
2'		E		
3'		E		
4'	Brown fine sand Red-brown silty clay, little fine-coarse gravel and sand	E		
5'		E		
6'		E		
7'		E		
8'		E		
9'		E		
10'		E		
11'		E		
12'		E		
13'	Bottom of Hole ~ 13 ft.	E		
14'				

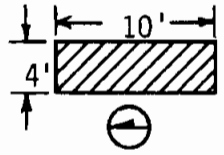
Berm adjacent to embank.: Miscellaneous Fill, black, cinders
1 "B" sized boulder, brick fragments

Cross Section of R.R. Embankment & Berm



REMARKS: 1. Moderate-severe sloughing of sides during excavation of test pit.
Note: Depths estimated due to sloughing.

TEST PIT PLAN



VOLUME = 15.6 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS
F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT
E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER
ELAPSED TIME TO READING (HRS.) ▽ G.W.L.

TEST PIT FIELD LOG

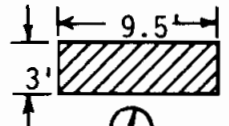
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 32 FILE No. R5613 DATE 6-2-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY cu.yd. REACH ~14 ft.	GROUND ELEV. ≈601/≈25 TIME STARTED 13:10 TIME COMPLETED 13:30

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'	Miscellaneous Fill, black, gravel with cinders and crushed stone	E		
2'	- frequent brick fragments	E		
3'	Miscellaneous Fill, gray, fine sandy silt, trace clay with wood fragments, pieces of rock (> 3")	E		1
4'		E		
5'	Layer of oil or tar contaminated gravelly fill	M		
6'	Silty CLAY, gray-brown, trace sand, damp, moderately plastic (CL)	M		
7'		M		
8'	- material becomes stiffer	M		
9'		M		
10'		M		2
11'	Bottom of Hole @ 9.8 ft.			
12'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
13'				
14'				

REMARKS:
1. Groundwater flowing into test pit @ ~ 2 gpm from East & West faces at a depth of ~ 2.7 ft.
2. Moderate sloughing of sides upon completion.

TEST PIT PLAN



VOLUME = 10.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) 2 G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION ~300' W. of Super Duper	TEST PIT No. 33 FILE No. R5613 DATE 6-2-83

GZA ENGINEER R. Laport
WEATHER sunny & mild

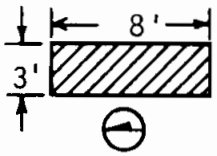
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ~14 ft.

GROUND ELEV. ≈602/≈26
TIME STARTED 9:35
TIME COMPLETED 10:00

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots	E		
1'	Miscellaneous Fill, black, sand and silt with crushed stone, pieces of wood	E		
2'		E		
3'	Miscellaneous Fill, black, gravel with strong oil or tar odor	E		1
4'	Miscellaneous Fill, brown, gravelly clay with oil contaminated layer between 4.8 ft. & 5.2 ft.	E		
5'		E		
6'	Silty CLAY. brown, gray silt to fine sand lenses throughout, damp, slightly plastic (CL)	E		
7'		E		
8'		E		
9'		E		2
10'	Bottom of Hole @ 9.4 ft.	E		
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Groundwater with oil contamination flowing @ ~ 2 gpm from East & South faces of test pit @ a depth of ~ 3 ft.
2. East walled caved easily during excavation.

TEST PIT PLAN



VOLUME = 8.4 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS
F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT
E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER
ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 34 FILE No. R5613 DATE 6-2-83

GZA ENGINEER R. Laport
WEATHER sunny

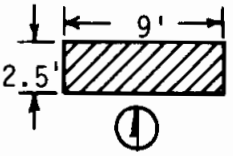
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ~14 ft.

GROUND ELEV. ≃606/≃30
TIME STARTED 9:05
TIME COMPLETED 9:30

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'	Miscellaneous Fill, black, gravelly sand	E		
2'	Change to: light brown, sand	E		
3'	Miscellaneous Fill, sand and silt with wood and brick fragments	E		1
4'	Varved clayey SILT, brown, occasional fine sand lenses, damp, very slightly plastic (ML)	E		
5'		E		
6'	Varved silty CLAY, red-brown with gray silt lenses (some high angle), damp, slightly plastic (CL)	E		
7'		E		
8'		E		
9'		E		2
	Bottom of Hole 9.0 ft.			
10'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
11'				
12'				
13'				
14'				

REMARKS:
1. Groundwater seeping into test pit @ ~ 3 ft.
2. Minor sloughing of side walls upon completion.

TEST PIT PLAN



VOLUME = 7.5 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

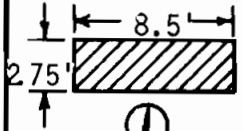
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION Near S.Ogden; 50'S of RREmb.	TEST PIT No. 35 FILE No. R5613 DATE 6-2-83

GZA ENGINEER R. Laport WEATHER sunny & cool	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY ____ cu.yd. REACH ~14 ft.	GROUND ELEV. ≃605/≃29 TIME STARTED 8:30 TIME COMPLETED 9:00

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, black gravel and cinders	E		
1'	Miscellaneous Fill, black, silty sand	E		
2'		E		
3'		E		
4'	Miscellaneous Fill, gray, gravelly sand with scrap metal, orange discoloration	E		
5'	Clayey SILT, gray, damp, very slightly plastic (ML)	E		
6'	Varved, silty CLAY, red-brown with gray silt to fine sand lenses throughout, damp, slightly plastic, (CL)	E		
7'		E		
8'		M		
9'		M		1,2
10'	Bottom of Hole 8.8 ft. The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
11'				
12'				
13'				
14'				

REMARKS:
1. No groundwater encountered.
2. Sides cut vertical and remain stable upon completion of test pit.

TEST PIT PLAN



VOLUME = 7.6 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

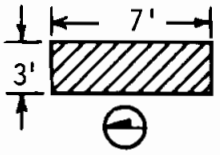
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 37 FILE No. R5613 DATE 5-31-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY ____ cu.yd. REACH ~14 ft	GROUND ELEV. ≈607/≈31 TIME STARTED 10:55 TIME COMPLETED 11:20

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots	E		
1'	Miscellaneous Fill, black, sand and silt with brick fragments	E		
2'		E		
3'	Change to: granular fill	E		
4'	Clayey SILT, light brown, damp, very slightly plastic (ML)	E		
5'		E		
6'		E		
7'	Varved silty CLAY, red-brown, damp, slightly plastic (CL)	E		
8'		E		
9'		E		
10'	- pocket of tan clayey silt	E		1,2
11'	Bottom of Hole 10.6 ft.	E		
12'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
13'				
14'				

REMARKS:
1. No groundwater encountered.
2. Sides cut vertical and remain stable upon completion of excavation.

TEST PIT PLAN



VOLUME = 7.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽2 G.W.L

TEST PIT FIELD LOG

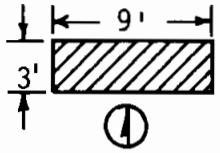
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 38 FILE No. R5613 DATE 6-1-83

GZA ENGINEER R. Laport WEATHER sunny & cool	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY ____ cu.yd. REACH ~14 ft.	GROUND ELEV. ≃608/≃32 TIME STARTED 8:30 TIME COMPLETED 9:00

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots	E		
1'	Miscellaneous Fill, brown, sandy silt with numerous bricks, large pieces of concrete (6"-36")	E	5 A & B	
2'		E		
3'		E		1
	Miscellaneous Fill, black granular material contaminated with oil	E		
4'	Miscellaneous Fill, dark brown, silty sand with pockets of black oil contaminated soil	E		2
5'		E		
6'	Clayey SILT, light brown, occasional pockets of tan fine sand, damp, very slightly plastic (ML)	E		
7'		E		
8'		E		
9'	Varved silty CLAY, red-brown with occasional fine sand pockets, damp, slightly plastic (CL)			
10'	Bottom of Hole 9.0 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Moderate sloughing of side walls between 2.0 & 2.8 ft.
2. Groundwater seepage @ 5.1 ft.

TEST PIT PLAN



VOLUME = 9.0 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

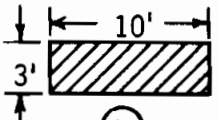
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION Landfill near A&R waste	TEST PIT No. 39 FILE No. R5613 DATE 6-13-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 310A CAPACITY cu.yd. REACH ~14 ft.	GROUND ELEV. ≃610/≃34 TIME STARTED 15:20 TIME COMPLETED 15:50

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, brown, sand and silt with bricks, scrap metal, intact glass bottles, 5 gal. rusted can	E		
1'		E		
2'		E		
3'		E		
4'		E		
5'		E		
6'		M		
7'	Miscellaneous Fill, gray-white with rust discoloration, sand, with scrap metal	M		
8'		M		
9'		M		
10'	Miscellaneous Fill, black, granular material with oil odor	M		
11'	Layer of coarse gravel and cobbles	M		1
12'	Bottom of Hole 10.8 ft. The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
13'				
14'				

REMARKS: 1. Slight sloughing of sides upon completion.

TEST PIT PLAN



VOLUME = 12 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

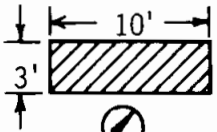
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION 25' S. of pond	TEST PIT No. 44 FILE No. R5613 DATE 6-8-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE John Deere MODEL 310A CAPACITY ____ cu.yd. REACH ~14 ft.	GROUND ELEV. ≈604/≈28 TIME STARTED 13:05 TIME COMPLETED 13:30

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots	E		
1'		E		
2'	Miscellaneous Fill, brown, silty sand with brick fragments, intact bottles, pieces of tile.	E		
3'		E		
4'		E		
5'		E		1
6'	Miscellaneous Fill, silty clay, with strands of ¼" wire	E		
7'		E		
8'	Miscellaneous Fill, black, sand with brick fragments, strands of ¼" wire	E		
9'		E		2
10'	Clayey SILT, gray-brown, with black leachate intrusion along gray silt lenses, damp, very slightly plastic (ML)	E		
11'		E		3
12'	Bottom of Hole 11 ft.			
13'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
14'				

REMARKS:
1. Groundwater seepage @ 5.0 ft.
2. Oil contaminated water seeping into test pit @ 8.2 ft.
3. Minor sloughing of side walls upon completion.

TEST PIT PLAN



VOLUME = 12.2 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 46 FILE No. R5613 DATE 6-8-83

GZA ENGINEER R. Laport
WEATHER sunny & warm

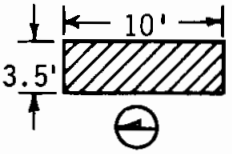
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE Case MODEL 310A
CAPACITY ____ cu.yd. REACH ~14 ft.

GROUND ELEV. ≃606/≃30
TIME STARTED 10:45
TIME COMPLETED 11:15

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots	E		
1'		E		
2'	Miscellaneous Fill, brown, silty clay	E		
3'		E		1
4'	Change to: silty clay with boulders	E		
5'		E	4 "A"	
6'	Layer of fiberous organic material (orig. ground surface?)	E		2
7'	Varved silty CLAY, red-brown with gray silt lenses (some high angle), damp, slightly plastic (CL)	E		
8'		E		
9'		E		
10'		E		
11'	Bottom of Hole 10.6 ft.	E		
12'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
13'				
14'				

REMARKS:
1. Groundwater seepage from all faces @ ~ 2 ft.
2. Severe sloughing of side walls between 3.2 & 6.0 ft. (2'-4' undercutting of East and West walls).

TEST PIT PLAN



VOLUME = 13.7 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L.

TEST PIT FIELD LOG

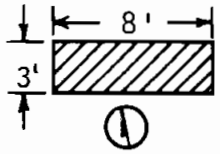
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 47 FILE No. R5613 DATE 6-8-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 310A CAPACITY ____ cu.yd. REACH ~14 ft.	GROUND ELEV. ≃603/≃27 TIME STARTED 11:15 TIME COMPLETED 11:45

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'	Miscellaneous Fill, black sand and cinders	E-M		
2'		E-M		
3'		E-M		1
4'	Miscellaneous Fill, red-brown, clay, some silt	E-M		
5'		E-M		
6'	Miscellaneous Fill, gravel and sand	E-M		
7'	Miscellaneous Fill, brown, clayey silt with gray silt lenses	E-M		
8'		E-M		
9'	Layer of black oil contaminated fill Clayey SILT, brown, with gray silt lenses throughout damp, very slightly plastic (ML)	E-M		2
10'	Bottom of Hole 9.9 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Groundwater seepage @ ~2.8 ft.
2. Moderate sloughing of side walls ≃ 20 minutes after completion of test pit.

TEST PIT PLAN



VOLUME = 8.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) — G.W.L

TEST PIT FIELD LOG

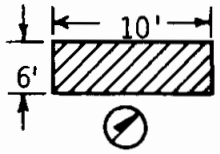
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 49 FILE No. R5613 DATE 5-31-83

GZA ENGINEER R. Laport WEATHER overcast	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY cu.yd. REACH ~14 ft.	GROUND ELEV. ≃610/≃34 TIME STARTED 14:42 TIME COMPLETED 15:10

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'	Miscellaneous Fill, black, cinders, sand and silt with numerous pieces of wood > 4' in length, bricks, concrete blocks > 2' in length, scrap metal	M		
2'		M		
3'		M		
4'	- Old buried foundation (5'x2'x1')	M		
5'		M		
6'		M		
7'		M		1
	Miscellaneous Fill, yellow-tan, sandy silt			
8'		M		
9'	Silty CLAY, red-brown, trace sand, with gray silt varves (some @ high angles), damp, slightly plastic (CL)	M		
10'		M		2
	Bottom of Hole @ 9.7 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Groundwater seepage @ 6.7 ft.
2. Moderate sloughing of side walls upon completion.

TEST PIT PLAN



VOLUME = 21.6 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) — G.W.L

TEST PIT FIELD LOG

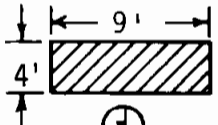
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION	TEST PIT No. 50 FILE No. R5613 DATE 5-31-83

GZA ENGINEER R. Laport WEATHER overcast & cool	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 580C CAPACITY ___ cu.yd. REACH ~14 ft.	GROUND ELEV. ≃609/≃33 TIME STARTED 8:40 TIME COMPLETED 9:10

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, dark brown, sand and silt with bricks, brick fragments, scrap metal, concrete masonry block	E		
1'		E		
2'		E		
3'		E		
4'		E		
5'	-wood timbers ~ 6' long	E		
6'		E		
7'		E		1
8'		E		
9'		E		
10'		E		2
11'	Bottom of Hole 9.8 ft.			
12'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
13'				
14'				

REMARKS:
1. Groundwater flowing into test pit @ ~ 6.5 ft.
2. Minor sloughing of side walls upon completion.

TEST PIT PLAN



NORTH

VOLUME = 13.1 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

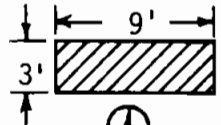
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION ≃400' West of B-19	TEST PIT No. 51 FILE No. R5613 DATE 6-8-83

GZA ENGINEER R. Laport WEATHER sunny & cool	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE Case MODEL 310A CAPACITY ___ cu.yd. REACH ~14 ft.	GROUND ELEV. ≃606/≃30 TIME STARTED 8:20 TIME COMPLETED 8:40

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, black, cinders and sand with brick and stone fragments, several 8' long R.R. ties, wood fragments	E-M		
1'				
2'		E-M		
3'		E-M		
	Miscellaneous Fill, rust colored, silt and clay with brick fragments			
4'		E-M		1
	Varved clayey SILT, light brown, gray silt lenses (some high angle) throughout, occasional pockets of tan fine sand, damp, very slightly plastic (ML)			
5'		E-M		
6'		E-M		2
	Bottom of Hole 6.0 ft.			
7'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
8'				
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS:
1. Groundwater flowing into test pit from N face @ ~ ½ gpm at a depth of 3.8 ft.
2. Minor sloughing of side walls upon completion.

TEST PIT PLAN



NORTH

VOLUME = 6 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

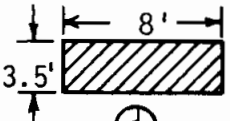
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION 100' S. of Del.Hud. RR line	TEST PIT No. 52 FILE No. R5613 DATE 6-8-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE John Deere MODEL 310A CAPACITY ___ cu.yd. REACH ~14 ft	GROUND ELEV. ≈610/≈34 TIME STARTED 8:45 TIME COMPLETED 9:10

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'	Miscellaneous Fill, dark brown, gravel and sand with brick fragments, coarse gravel, pieces of glass, tile fragments	E		
2'		E		
3'		E		
4'		E		
5'		E		
6'	Miscellaneous Fill, brown, gravelly sand with a pocket of rust colored granular (industrial fill?) between 5.5' & 6.5'	E		
7'		E		1, 2
8'		E		
9'		E		
	Bottom of Hole @ 9.0 ft.			
10'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
11'				
12'				
13'				
14'				

REMARKS:
1. Moderate groundwater inflow @ 7.0 ft.
2. Severe sloughing of sand layer between 5 & 7 ft. during excavation.

TEST PIT PLAN



VOLUME = 9.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

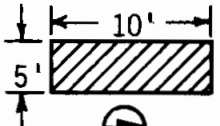
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 53 FILE No. R5613 DATE 6-8-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE John Deere MODEL 310A CAPACITY ___ cu.yd. REACH ~14 ft.	GROUND ELEV. ≃610/≃34 TIME STARTED 9:20 TIME COMPLETED 9:35

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'	Miscellaneous Fill, brown, sand and silt with bricks, brick and wood fragments, concrete piece (1'x1.5'x1.5') scrap metal, railroad ties 2' in length	E		
2'		M		
3'		E		
4'		E		
5'		E		1
6'		E		
7'		E		
8'	Varved clayey SILT, olive green, gray silt lenses (some high angle) throughout, occasional pockets of tan fine sand, damp, very slightly plastic (ML)	E		
9'		E		2
10'	Bottom of Hole 8.6 ft. The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
11'				
12'				
13'				
14'				

REMARKS:
1. Significant groundwater inflow from South face of test pit @ ≃4.8 ft.
2. Moderate sloughing of side walls upon completion.

TEST PIT PLAN



VOLUME = 15.9 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

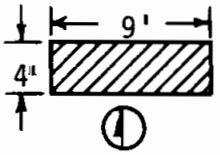
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 54 FILE No. R5613 DATE 6-8-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE John Deere MODEL 310A CAPACITY ___ cu.yd. REACH ~14 ft.	GROUND ELEV. ≈609/≈33 TIME STARTED 9:40 TIME COMPLETED 9:55

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots			
1'	Miscellaneous Fill, brown, sand and silt with numerous bricks, scrap metal, several pieces of concrete (6"-36")	E		
2'		E		
3'		E		
4'		E		
5'		E		
6'	Layer of rusted scrap metal	E		
	Layer of black, granular fill with wood fibers, pieces of tar	E		1
7'	Varved silty CLAY, brown, with gray silt lenses (some high angle), damp, very slightly plastic (CL)	E		
8'		E		
9'		E		2
10'	Bottom of Hole 9.6 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS: 1. Groundwater seepage @ ~ 6.5 ft.
2. Moderate sloughing of side walls upon completion.

TEST PIT PLAN



VOLUME = 12.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20-35%
AND	35-50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 55 FILE No. R5613 DATE 6-13-83

GZA ENGINEER R. Laport
WEATHER sunny & warm

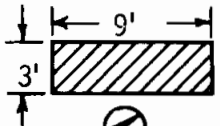
EXCAVATION EQUIPMENT
CONTRACTOR Boyd & Brown
OPERATOR Tony Barbalato
MAKE John Deere MODEL 310A
CAPACITY ____ cu.yd. REACH ~14 ft

GROUND ELEV. ≈604/≈28
TIME STARTED 13:10
TIME COMPLETED 13:30

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, brown, sand and silt with bricks, brick fragments, scrap metal, vitrified clay pipe pieces, wood fragments	E		
1'		E		
2'		E		
3'		E		
4'	Miscellaneous Fill, white and orange, sand and silt, intermixed with suspected industrial fill.	E		
5'		E-M		
6'	Miscellaneous Fill, black sandy silt, with intact bottles, rubbish, leachate and oil contamination throughout	E-M		
7'		E		1
8'		E		2
9'		E		3
10'	Bottom of Hole 10 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Groundwater seepage @ 8.0 ft. with oil contamination.
2. Soil sample collected from ≈ 9.0 ft.
3. Slight sloughing of side walls upon completion.

TEST PIT PLAN



VOLUME = 10 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

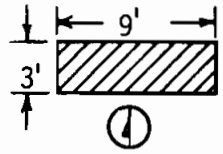
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION 200'S of Stone Pile	TEST PIT No. 56 FILE No. R5613 DATE 6-13-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE John Deere MODEL 310A CAPACITY ___ cu.yd. REACH ~14 ft	GROUND ELEV. ≈604/≈28 TIME STARTED 13:35 TIME COMPLETED 13:55

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, brown, gravel and sand with bricks, brick fragments, broken glass	E		
1'		E		
2'		E		
3'		E		
4'	Miscellaneous Fill, orange-rust, sand with white material (industrial fill?) intermixed along South and West faces	E		
5'		E		
6'	Miscellaneous Fill, brown, sand and gravel with scrap metal, several intact bottles	E		
7'		E		
8'		E		
9'		E		1
10'		E		2
11'	Bottom of Hole @ 10.3 ft.	E		
12'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
13'				
14'				

REMARKS:
1. Water flowing from South and North faces @ ~ 9.0 ft.
2. Slight sloughing of sides upon completion.

TEST PIT PLAN



VOLUME = 10 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

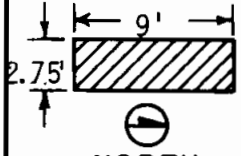
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See location plan	TEST PIT No. 57 FILE No. R5613 DATE 6-13-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE John Deere MODEL 310A CAPACITY ____ cu.yd. REACH ~14 ft.	GROUND ELEV. ≃602/≃26 TIME STARTED 14:00 TIME COMPLETED 14:15

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Topsoil & Roots	E		
1'	Miscellaneous Fill, dark brown, sand and silt with wood pieces (6 ft. in length), bricks, scrap metal	E	2 A	
2'		E		
3'		E		
4'		E		
5'	Miscellaneous Fill, black, silt and clay with scrap metal, intact bottles, leather shoe; evidence of oil on water and in soil, material has a strong petroleum odor	E		1
6'		E		2
7'		E		
8'		E		
9'		E		
10'	Miscellaneous Fill, gray, silty clay, intermixed with wood fibers	E		3
11'	Bottom of Hole @ 10.2 ft.			
12'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
13'				
14'				

REMARKS:
1. Groundwater level @ 4.0 ft. upon completion of excavation.
2. Soil sample collected for testing @ ≃ 6.0 ft.
3. Minor sloughing of sides during excavation.

TEST PIT PLAN



VOLUME = 9.4 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

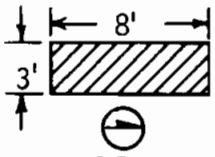
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION Near Power Bldg. of NFS	TEST PIT No. 58 FILE No. R5613 DATE 6-13-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE John Deere MODEL 310A CAPACITY ___ cu.yd. REACH ~14 ft.	GROUND ELEV. ≃604/≃28 TIME STARTED 14:25 TIME COMPLETED 14:40

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, brown, sand with bricks and brick fragments	E		
1'		E		
2'	Miscellaneous Fill, white and orange, with glass fragments, intact bottles, bricks and brick fragments	E		
3'		E		
4'		E		
5'	Miscellaneous Fill, black, sand, silt and clay with scrap metal; oil contamination	E		
6'		E		1
7'		E		2
8'		E		
9'		E		3
10'	Bottom of Hole @ 10 ft.			
11'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
12'				
13'				
14'				

REMARKS:
1. Water filled hole to 7' upon completion.
2. Soil sample collected for testing @ 7.5 ft.
3. Minor sloughing of sides upon completion.

TEST PIT PLAN



VOLUME = 8.9 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) — G.W.L

TEST PIT FIELD LOG

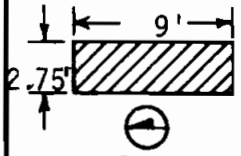
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION 75' E. of A&R waste	TEST PIT No. 59 FILE No. R5613 DATE 6-13-83

GZA ENGINEER R. Laport WEATHER sunny & warm	EXCAVATION EQUIPMENT CONTRACTOR Boyd & Brown OPERATOR Tony Barbalato MAKE John Deere MODEL 310A CAPACITY ____ cu.yd. REACH ~14 ft.	GROUND ELEV. ≈607/≈31 TIME STARTED 14:50 TIME COMPLETED 15:15

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Asphalt			
1'	Miscellaneous Fill, purple gravel contaminated with sludge like material, distinct odor	E		
2'	Miscellaneous Fill, light gray sand and silt with occasional intact bottles	E		2
3'		E		
4'	- scrap metal, numerous strands of ¼" wire	E		
5'		E		
6'		E		
7'		E		1
8'		E		
9'		E		
10'		E		3
	Bottom of Hole 10 ft.			
11'				
12'	The stratification lines represent the approximate boundary between soil and rock types. The actual transition may be gradual.			
13'				
14'				

REMARKS:
1. Slight seepage of groundwater with oil on surface of water.
2. Soil sample for testing from ≈ 7.0 ft.
3. Sides cut vertical and remained stable upon completion of excavation.

TEST PIT PLAN



VOLUME = 9.2 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See Location Plan	TEST PIT No. II-1 FILE No. R5615.1 DATE 11/8/83

GZA ENGINEER R. Laport
WEATHER overcast & cool

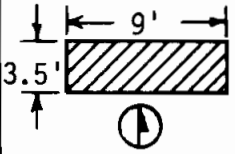
EXCAVATION EQUIPMENT
CONTRACTOR Bella-Vista
OPERATOR
MAKE Case MODEL 580C
CAPACITY ___ cu.yd. REACH ~14 ft.

GROUND ELEV. ≈602/≈26
TIME STARTED 08:15
TIME COMPLETED 08:35

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	TOPSOIL AND ROOTS			
1'	Miscellaneous Fill, black, sand silt intermixed with coal, cinders, and oil, distinct petroleum odor	E		
2'		E		A
3'		E		1
4'		E		
5'	Clayey SILT, tan-brown, random pockets of clay, moist, slightly plastic (ML)	E		
	Bottom of Hole 5.0 ft.			
6'				
7'				
8'				
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS:
A - Sample collected for analytical testing at 1.5 ft.
1 - Significant ground water inflow @ 3.0 ft. filling test pit with 3 ft. of water after 15 minutes

TEST PIT PLAN



VOLUME = 5.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS
F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT
E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER
ELAPSED TIME TO READING (HRS.) 2 G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See Location Plan	TEST PIT No. II-2 FILE No. R5615.1 DATE 11-8-83

GZA ENGINEER R. Laport
WEATHER overcast & cool

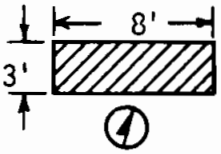
EXCAVATION EQUIPMENT
CONTRACTOR Bella-Vista
OPERATOR
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ≃14 ft.

GROUND ELEV. ≃602/≃26
TIME STARTED 08:45
TIME COMPLETED 09:10

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0 – 1'	Miscellaneous Fill, dark brown with rust staining, cinders, ash, cobbles and pieces of cement, damp	D		1
1' – 2'		D		
2' – 3'	Fine sandy SILT, brown, trace clay occurring in pockets, moist+, slightly plastic (ML)	E		
3' – 4'		E		2
4'	Bottom of Hole 4.0 ft.			
5'				
6'				
7'				
8'				
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS:
1. Fills cemented making excavation difficult
2. Cement pad and abandoned foundations located in the vicinity of the test pit

TEST PIT PLAN



VOLUME = 3.6 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS
F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT
E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER
ELAPSED TIME TO READING (HRS.)
▽2 G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See Location Plan	TEST PIT No. II-3 FILE No. R5615.1 DATE 11-8-83

GZA ENGINEER R. Laport
WEATHER overcast & cool

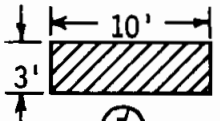
EXCAVATION EQUIPMENT
CONTRACTOR Bella-Vista
OPERATOR
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ≈14 ft

GROUND ELEV. ≈608/≈32
TIME STARTED 14:00
TIME COMPLETED 14:10

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	TOPSOIL & ROOTS	E		
1'	Miscellaneous Fill, orange-brown, silty clay	E		
2'	Layer of black organic material, no odor	E		
3'	Miscellaneous Fill, brown silty clay, damp, slightly plastic	E		
4'	Layer of coal fragments with petroleum odor	E		A
5'	Clayey SILT, brown, little fine sand, occasional pockets of silt with evidence of black contamination, damp, very slightly plastic (ML)	E		
6'		E		
7'	Note: No evidence of black contamination beginning @ 6.5 ft.	E		
8'	Bottom of Hole 8.0 ft.			1
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS: A - Sample collected for analytical testing at 4.0 ft.
1 - Sides cut vertical and remain stable upon completion.

TEST PIT PLAN



NORTH

VOLUME = 8.9 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See Location Plan	TEST PIT No. II-4 FILE No. R5615.1 DATE 11/8/83

GZA ENGINEER R. Laport
WEATHER overcast & cool

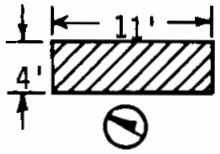
EXCAVATION EQUIPMENT
CONTRACTOR Bella-Vista
OPERATOR
MAKE Case MODEL 580C
CAPACITY cu.yd. REACH ≃14 ft.

GROUND ELEV. ≃608/≃32
TIME STARTED 14:20
TIME COMPLETED 14:35

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	TOPSOIL & ROOTS			
1'	Miscellaneous Fill, brown, sand and silt, with frequent bricks, pieces of wood and scrap metal	M		1
2'		M		
3'		E		
4'		E		
5'	Note: Thin layer of black contamination with petroleum odor	E		
6'	Silty CLAY, brown, occasional tan silt lenses and pockets of red-brown clay, damp, moderately plastic (CL)	E		
7'		E		
8'		E		
8'	Bottom of Hole 8.0 ft.			
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS: 1 - Buried foundation along west wall of test pit.

TEST PIT PLAN



VOLUME = 13.1 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See Location Plan	TEST PIT No. II-5 FILE No. R5615.1 DATE 11/8/83

GZA ENGINEER R. Laport
WEATHER overcast & cool

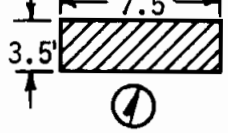
EXCAVATION EQUIPMENT
CONTRACTOR Bella-Vista
OPERATOR
MAKE Case MODEL 580C
CAPACITY cu.yd. REACH ≃14 ft.

GROUND ELEV. ≃607/≃31
TIME STARTED 09:15
TIME COMPLETED 10:10

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Crushed Stone & Cinders			
1'	Industrial Fill - Purple fibrous sludge	E		A
2'	Miscellaneous Fill, brown, clayey silt with pieces of wood, scrap metal, broken metal drums (empty), brick fragments, and glass	M		
3'		E		
4'	Note: Layer of white ash from 3.0 ft. to 3.5 ft.	E		
5'		M		B
6'		E		
7'		E		1
8'	Bottom of Hole 7.5 ft.			
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS:
A - Sample of sludge collected for analytical testing from .5 ft.
B - Sample collected for analytical testing
1 - Slight ground water seepage from ≃7.0 ft.

TEST PIT PLAN



NORTH

VOLUME = 7.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See Location Plan	TEST PIT No. II-6 FILE No. R5615.1 DATE 11/8/83

GZA ENGINEER R. Laport
WEATHER overcast & cool

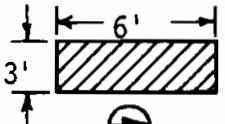
EXCAVATION EQUIPMENT
CONTRACTOR Bella-Vista
OPERATOR
MAKE Case MODEL 580C
CAPACITY ____ cu.yd. REACH ≃ ft.

GROUND ELEV. ≃605/≃29
TIME STARTED 10:10
TIME COMPLETED 10:30

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	TOPSOIL & ROOTS			
1'	Miscellaneous Fill, brown, silty fine sand, trace clay, damp, nonplastic	E		
2'		E		
3'	Miscellaneous Fill, construction debris, bricks, concrete, wood, etc.	M		
4'	Industrial Fill -purple sludge with pockets of white "chalky" material	E		A
5'	Miscellaneous Fill, considerable debris with frequent large pieces of concrete and cobbles difficult to excavate	M		1
6'		D		2
7'	Bottom of Hole 5.8 ft.			
8'				
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS:
A - Sample of sludge collected from 4.3 ft. for analytical testing
1 - Ground water inflow @ ≃4.5 ft.
2 - Minor undercutting of sidewalls below sludge layer

TEST PIT PLAN



NORTH

VOLUME = 3.9 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

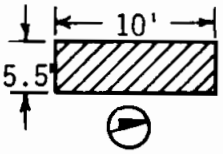
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See Location Plan	TEST PIT No. II-7 FILE No. R5615.1 DATE 11/8/83

GZA ENGINEER R. Laport WEATHER overcast & cool	EXCAVATION EQUIPMENT CONTRACTOR Bella-Vista OPERATOR MAKE Case MODEL 580C CAPACITY cu.yd. REACH ≃14 ft.	GROUND ELEV. ≃605/≃29 TIME STARTED 11:50 TIME COMPLETED 12:15

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, brown, silty fine sand with bricks, concrete and wood	M		
1'	Pocket of light gray industrial fill	M		
2'	Construction debris - numerous bricks, tile & concrete pieces	E		
3'	Miscellaneous Fill, brown, sand and silt with occasional concrete and pieces of brick	E		
4'		E		A
5'	Industrial Fill - purple/green fibrous sludge material	E		
6'		E		1
7'	Miscellaneous Fill, black, medium-coarse sand with cinders saturated with oil, distinct petroleum odor	E		
8'		E		B
9'				
10'	Bottom of Hole 9.5 ft.			
11'				
12'				
13'				
14'				

REMARKS:
A - Sample of sludge collected from 5.0 ft. for analytical testing
1 - Ground water seeping into test pit @ 6.4 ft. - oil noted
B - Sample collected from 7.5 ft. for analytical testing

TEST PIT PLAN



VOLUME = 19.4 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

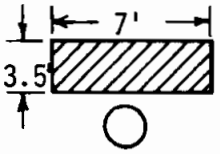
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See Location Plan	TEST PIT No. II-8 FILE No. R5615.1 DATE 11/8/83

GZA ENGINEER R. Laport WEATHER overcast & cool	EXCAVATION EQUIPMENT CONTRACTOR Bella-Vista OPERATOR MAKE Case MODEL 580C CAPACITY ___ cu.yd. REACH ≃14 ft.	GROUND ELEV. ≃609/≃33 TIME STARTED 11:25 TIME COMPLETED 11:45

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	Miscellaneous Fill, brown, silty clay mixed with concrete blocks, bricks, wire, plastic scraps, wood (railroad ties and logs), occasional ash and coal fragments	D		
1'		D		1
2'		D		
3'		M		
4'		M		
5'	Miscellaneous Fill, gray, sandy material with cement like odor	M		
6'	Construction debris and large rock fragments	M		2
7'	Bottom of Hole 7.0 ft.			
8'				
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS:
1 - Ground water seepage from 2.0 ft. filling test pit to 6.5 ft. prior to backfilling
2 - Sloughing of side walls during excavation

TEST PIT PLAN



VOLUME = 6.4 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L.

TEST PIT FIELD LOG

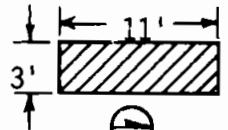
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See Location Plan	TEST PIT No. II-9 FILE No. R5615.1 DATE 11/8/83

GZA ENGINEER R. Laport WEATHER overcast & cool	EXCAVATION EQUIPMENT CONTRACTOR Bella-Vista OPERATOR MAKE Case MODEL 580C CAPACITY cu.yd. REACH ≃14 ft.	GROUND ELEV. ≃604/≃28 TIME STARTED 12 :30 TIME COMPLETED 12:55

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	TOPSOIL & ROOTS with black staining	E		
1'	Industrial Fill - red-brown, fine-medium sand (foundry sand?) with bricks, scrap metal and occasional organics	M		A
2'		E		1
3'	Note: contact varies from 3.0 ft. to 4.0 ft.	E		
4'	Miscellaneous Fill, brown, fine sand with organic material, ash and occasional pockets of white granular industrial fill	E		
5'		E		
6'	Miscellaneous Fill, brown, silty clay with occasional brick and concrete	E		
7'		E		2
8'	Bottom of Hole 8.0 ft.			
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS:
A - Sample collected from 1.0 ft. for analytical testing
1 - Significant photoionizer reading of 30 ppm
2 - Slight ground water inflow @ 7.5 ft.

TEST PIT PLAN



NORTH

VOLUME = 9.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION Buffalo Industrial Park LOCATION See Location Plan	TEST PIT No. II-10 FILE No. R5615.1 DATE 11/8/83

GZA ENGINEER R. Laport
WEATHER overcast & cool

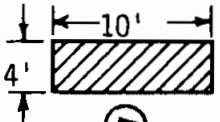
EXCAVATION EQUIPMENT
CONTRACTOR Bella-Vista
OPERATOR
MAKE Case MODEL 580C
CAPACITY cu.yd. REACH ≃14 ft.

GROUND ELEV. ≃605/≃29
TIME STARTED 12:30
TIME COMPLETED 12:50

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	TOPSOIL & ROOTS			
1'	Miscellaneous Fill, black, medium sand, with pieces of concrete, bricks, wood fragments, and organics (roots to ≃6 ft.), damp, nonplastic			
2'				
3'				A
4'				
5'				
6'				
7'				1
	Bottom of Hole 7.0 ft.			
8'				
9'				
10'				
11'				
12'				
13'				
14'				

REMARKS: A - Sample collected for analytical testing from 3.0 ft.
1 - No ground water encountered during excavation

TEST PIT PLAN



VOLUME = 10.4 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

APPENDIX D

Ground Water Level Data

SUMMARY OF WATER TABLE OBSERVATION

PROJECT: New Buffalo Industrial Park

FILE: R5613

TABLE NO. _____

WELL NO.	B-1
SURFACE ELEV.	30.48
MONITORING PT.	31.54
TIP ELEV.	4.99

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
5/30/83	09:07	13.59	16.89	
5/30/83	09:07 09:25			Bail 12 Bailers & Sample
6/3/83	15:22	15.47	15.01	
6/9/83	14:25	15.20	15.28	
6/10/83	14:07	15.70	14.78	Bail dry (20x+) Water Sample
7/28/83	11:45	15.85	14.63	
8/1/83	14:20	15.73	14.75	
10/17/83	14:42	16.19	14.29	
10/31/83	11:45	16:03	14.45	

WELL NO.	B-2
SURFACE ELEV.	31.22
MONITORING PT.	35.00
TIP ELEV.	13.73

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
6/3/83	16:02	8.42	22.8	
6/9/83	14:16	8.09	23.13	
6/10/83	12:39	8.20	23.02	Casing kinked bailed 10x
6/22/83	16:22	9.45	21.77	
7/28/83	11:21	9.83	21.39	
8/1/83	13:09	9.49	21.73	
10/17/83	14:57	9.39	21.83	
10/31/83	10:15	9.10	22.12	

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

SUMMARY OF WATER TABLE OBSERVATION

PROJECT: New Buffalo Industrial Park

FILE: R5613

TABLE NO. _____

WELL NO.	B-5
SURFACE ELEV.	33.84
MONITORING PT.	34.95
TIP ELEV.	18.10

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
6/3/83	16:06	14.63	19.21	
6/9/83	14:45	14.64	19.20	
6/10/83	12:59	14.70	19.14	Bailed 10x+ Sample
6/22/83	15:28	15.92	17.92	Perm. Test
7/28/83	11:25	16.26	17.58	
8/1/83	14:03	16.02	17.82	
10/17/83	15:06	16.03	17.81	
10/31/83	10:20	17.79	16.05	

WELL NO.	B-6
SURFACE ELEV.	32.92
MONITORING PT.	35.17
TIP ELEV.	26.43

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
6/9/83	14:49	5.86	27.06	
6/10/83	13:26	6.00	26.92	Bailed 16x & Samp. for Cond.
7/28/83	11:31	7.63	25.29	
8/1/83	13:17	7.43	25.49	

REPROCRAFT

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

SHEET___OF___

SUMMARY OF WATER TABLE OBSERVATION

PROJECT: New Buffalo Industrial Park

FILE: R5613

TABLE NO. _____

WELL NO.	B-7
SURFACE ELEV.	29.34
MONITORING PT.	31.34
TIP ELEV.	12.6

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
5/24/83	09:10	17.2		Measured through augers
5/30/83	09:52	6.65	22.69	
5/30/83	09:52-10:20			Bail 15+ Bailers
6/3/83	15:13	6.76	22.58	
6/9/83	14:29	6.89	22.45	
6/10/83	15:04	6.84	22.50	Bail 17x+ Sample
7/28/83	11:55	7.81	21.53	
8/1/83	14:27	7.19	22.15	
10/17/83	14:48	6.22	23.12	

WELL NO.	B-8
SURFACE ELEV.	25.92
MONITORING PT.	28.17
TIP ELEV.	14.18

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
5/30/83	11:58	6.48	19.44	Bail 25 & sample
6/3/83	15:00	6.61	19.31	
6/13/83	11:21	6.63	19.29	Bail 27x & sample
7/28/83	12:27	7.25	18.67	
8/1/83	14.57	7.21	18.71	

REPROCRAFT

GZA GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

SHEET___OF___

SUMMARY OF WATER TABLE OBSERVATION

PROJECT: New Buffalo Industrial Park

FILE: R5613

TABLE NO. _____

WELL NO.	B-9
SURFACE ELEV.	22.23
MONITORING PT.	24.16
TIP ELEV.	-7.76

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
5/30/83	14:10	4.02		
5/30/83	14:10-14:25			Bail 19+ Bailers & Samp.
6/3/83	14:42	9.30	12.93	
6/9/83	13:31	9.19	13.04	
6/13/83	11:53	9.26	12.97	Bail 19x+ & Sample
7/28/83	12:33	9.69	12.54	
8/1/83	15:12	9.42	12.81	
10/17/83	14:39	9.58	12.65	
10/31/83	10:56	9.80	12.43	

WELL NO.	B-10
SURFACE ELEV.	30.61
MONITORING PT.	33.38
TIP ELEV.	13.12

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
6/9/83	14:54	4.32	26.29	
6/10/83	14:45	4.30	26.31	Bail Dry 15x & Sample
6/22/83	15:52	4.73	25.88	
7/28/83	11:37	5.55	25.06	
8/1/83	13:37	5.26	25.35	
10/17/83	15:20	4.56	26.05	
10/31/83	10:41	4.74	25.87	
11/1/83	10:55	4.65	25.96	

GZA GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

SUMMARY OF WATER TABLE OBSERVATION

PROJECT: New Buffalo Industrial Park

FILE: R5613

TABLE NO. _____

WELL NO.	B-11
SURFACE ELEV.	25.07
MONITORING PT.	26.74
TIP ELEV.	12.58

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
5/30/83	11:08	3.50	21.57	
5/30/83	11:08-11:25			Bail 22 bailers & Sample
6/3/83	15:08	3.68	21.39	
6/9/83	14:32	3.85	21.22	
6/10/83	14:17	3.85	21.22	Bail 19x & Sample
7/28/83	12:01	5.33	19.74	
8/1/83	14:35	5.14	19.93	

WELL NO.	B-12
SURFACE ELEV.	24.66
MONITORING PT.	27.02
TIP ELEV.	15.71

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
5/30/83	11:20	1.30	23.36	
6/3/83	15:06	1.50	23.16	Bail 25x & Sample
6/9/83	14:35	1.49	23.17	
6/10/83	14:39	1.60	23.06	Bail 16x & Sample
7/28/83	12:05	2.67	21.99	
8/1/83	14:40	2.24	22.42	
11/21/83	15:43	1.12	23.53	Bail 15x & Sample

REPROCRAFT

GZA GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

SHEET___OF___

SUMMARY OF WATER TABLE OBSERVATION

PROJECT: New Buffalo Industrial Park

FILE: R5613

TABLE NO.

WELL NO.	B-13
SURFACE ELEV.	23.04
MONITORING PT.	24.51
TIP ELEV.	4.05

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
6/9/83	13:36	2.27	20.77	
6/22/83	11:36	2.88	20.16	Perm. Test
7/28/83	12:36	4.76	18.28	
8/1/83	15:23	4.27	18.77	
11/1/83	11:34	3.76	19.28	

WELL NO.	B-16
SURFACE ELEV.	25.67
MONITORING PT.	27.63
TIP ELEV.	1.68

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
5/17/83	9:20	15.10	10.57	Through Augers
5/30/83	15:29	15.37	10.30	
5/30/83	15:29-15:45			Bail 15x & Sample
6/3/83	15;45	15.44	10.23	
6/9/83	13:41	15.39	10.28	
6/10/83	16:01	15.54	10.13	Bail 16x & Sample
6/22/83	10:00	15.54	10.13	
7/28/83	13:00	16.64	9.03	
8/1/83	15:37	15.30	10.37	
10/17/83	14:01	15.65	10.02	
10/31/83	11:30	15.96	9.71	

REPROCRAFT

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

SHEET___ OF ___

SUMMARY OF WATER TABLE OBSERVATION

PROJECT: New Buffalo Industrial Park

FILE: R5613

TABLE NO. _____

WELL NO.	B-18
SURFACE ELEV.	25.49
MONITORING PT.	27.68
TIP ELEV.	-6.0

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
5/30/83	14:45	9.35	16.14	
5/30/83	14:45 15:00			Bail 22 bailers & Sample
6/3/83	15:40	9.37	16.12	
6/9/83	13:51	9.36	16.13	
6/10/83	16:07	9.40	16.09	Bail 17x & Sample
6/22/83	10:27	9.58	15.91	Perm Test.
7/28/83	12:44	10.05	15.44	
8/1/83	15:30	9.79	15.70	
10/17/83	14:32	9.82	15.67	
10/31/83	11:17	9.79	15.70	

WELL NO.	B-19
SURFACE ELEV.	29.69
MONITORING PT.	31.19
TIP ELEV.	4.2

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
6/3/83	15:54	17.87	11.82	Grout settled bckfld. w nat. soil
6/9/83	14:01	17.82	11.87	
6/13/83	16:12	18.00	11.69	
6/22/83	9:29	19.56	10.13	Perm. Test
7/28/83	13:05	19.83	9.86	
8/1/83	15:43	19.43	10.26	
10/17/83	14:11	19.59	10.10	
10/31/83	11:35	19.44	10.25	

REPROCRAFT

GZA GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

SHEET___OF___

SUMMARY OF WATER TABLE OBSERVATION

PROJECT: New Buffalo Industrial Park

FILE: R5615

TABLE NO. _____

WELL NO.	B-21
SURFACE ELEV.	26.16
MONITORING PT.	
TIP ELEV.	5.67

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
10/31/83	11:22	3.19	22.97	
11/1/83	11:55	3.13	23.03	Well Purged ≃6 volumes
11/21/83	14:10	2.89	23.27	Well Purge ≃7 vol. & samp.

WELL NO.	B-22
SURFACE ELEV.	34.87
MONITORING PT.	
TIP ELEV.	5.88

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
10/31/83	10:29	8.67	26.20	
11/1/83	10:24	8.53	26.34	Well Purged ≃5 volumes
11/21/83	16:05	7.82	27.05	Purged ≃6 vol. & sample

REPROCRAFT

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

SHEET ___ OF ___

SUMMARY OF WATER TABLE OBSERVATION

PROJECT: New Buffalo Industrial Park

FILE: R5615

TABLE NO. _____

WELL NO.	B-23
SURFACE ELEV.	23.80
MONITORING PT.	
TIP ELEV.	

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS
10/31/83	11:03	10.13	13.67	
11/1/83	11:10	10.26	13.54	Well Purged ≈3 volumes
11/21/83	14:55	9.59	14.21	Well Purged ≈5 Vol. & Samp.

WELL NO.	
SURFACE ELEV.	
MONITORING PT.	
TIP ELEV.	

DATE	TIME	GW DEPTH FROM SURFACE	GW ELEV.	REMARKS

REPROCRAFT

GOLDBERG-ZOINO ASSOCIATES OF N.Y., P.C.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

SHEET___OF___

APPENDIX C

Soils Laboratory Test Results

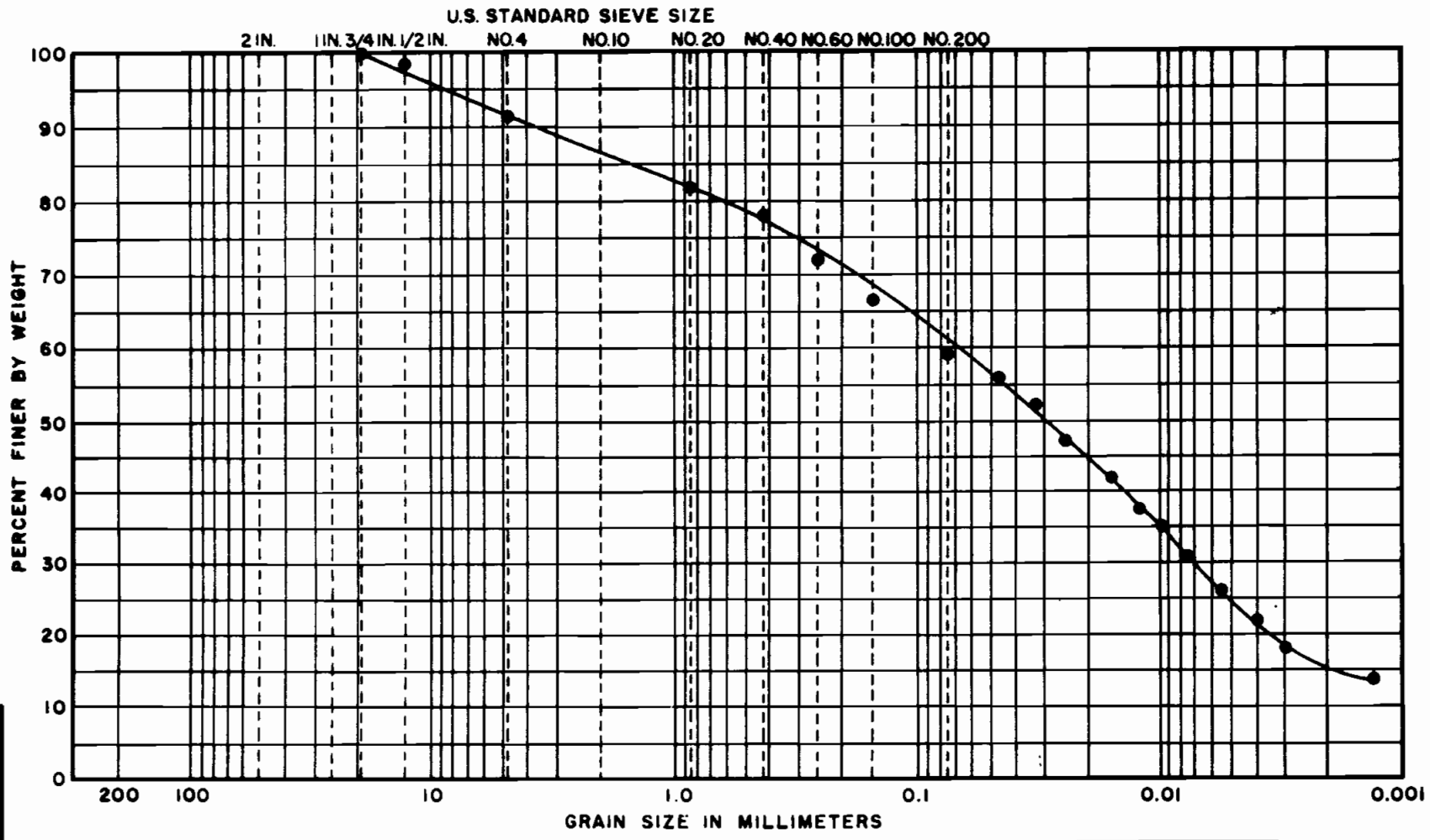
LABORATORY DATA SUMMARY

PROJECT– New Buffalo Industrial Park

PROJECT NO.– R5613

BORING NO.	SAMPLE NO.	DEPTH FT.	IDENTIFICATION TESTS					
			WATER CONTENT %	LL %	PL %	SIEVE -200 %	HYD -2μ %	G_S
	TP-9	5.0	15.5	25.4	16.8	61.0	15.0	2.65 Assumed
	TP-20	5.0	14.1	-	-	59.0	14.5	2.65 Assumed
	TP-21	5.0	12.9	-	-	59.5	15.0	2.65 Assumed
	TP-30	5.0	12.8	-	-	57.0	15.0	2.65 Assumed

GZA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM

BORING NO.	SAMPLE NO.	SYM.	SAMPLE DESCRIPTION
TP9		●	Railroad Embankment Material

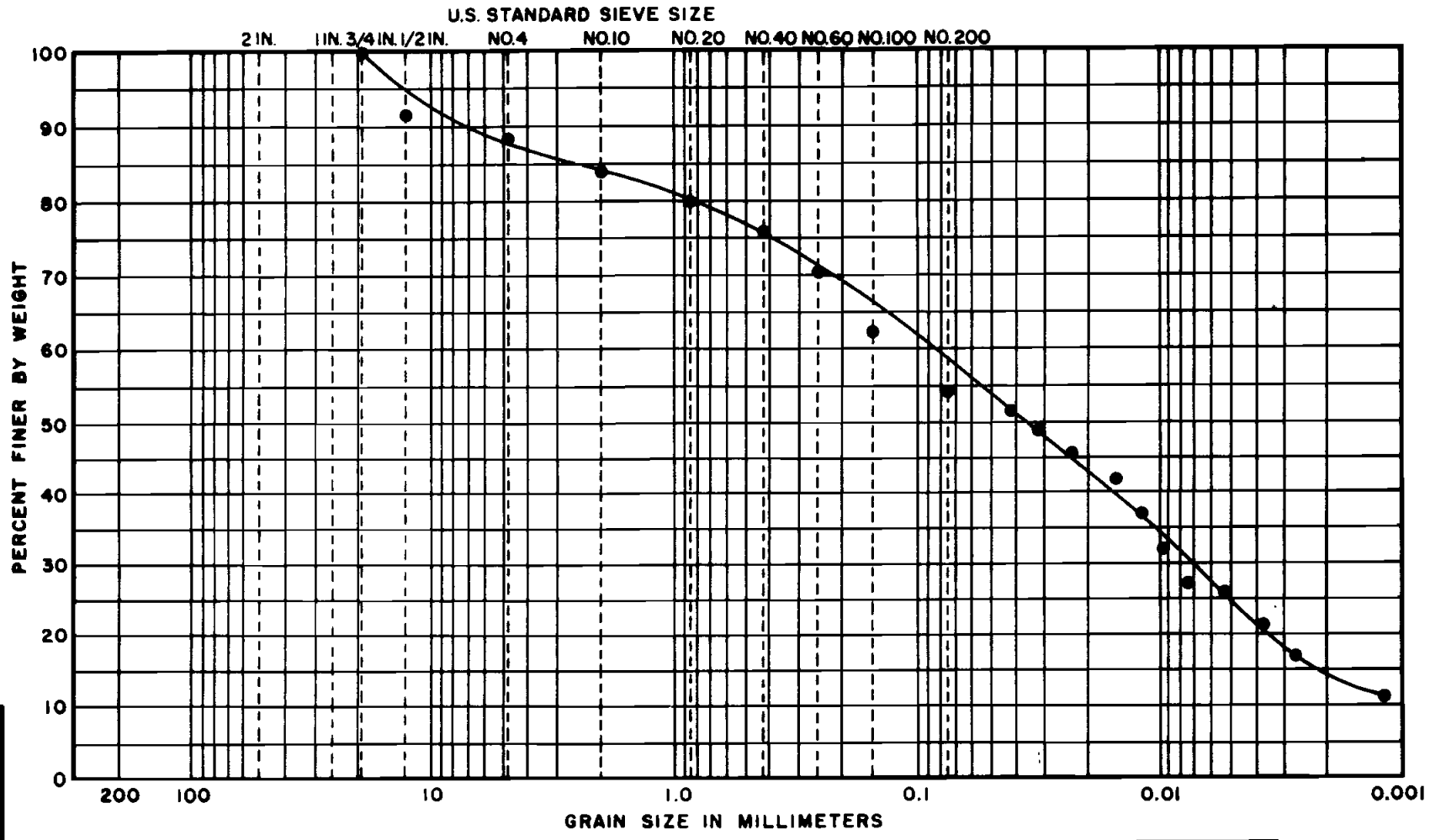
GRADATION TESTS

Figure C-1

GZA

GRADATION TESTS

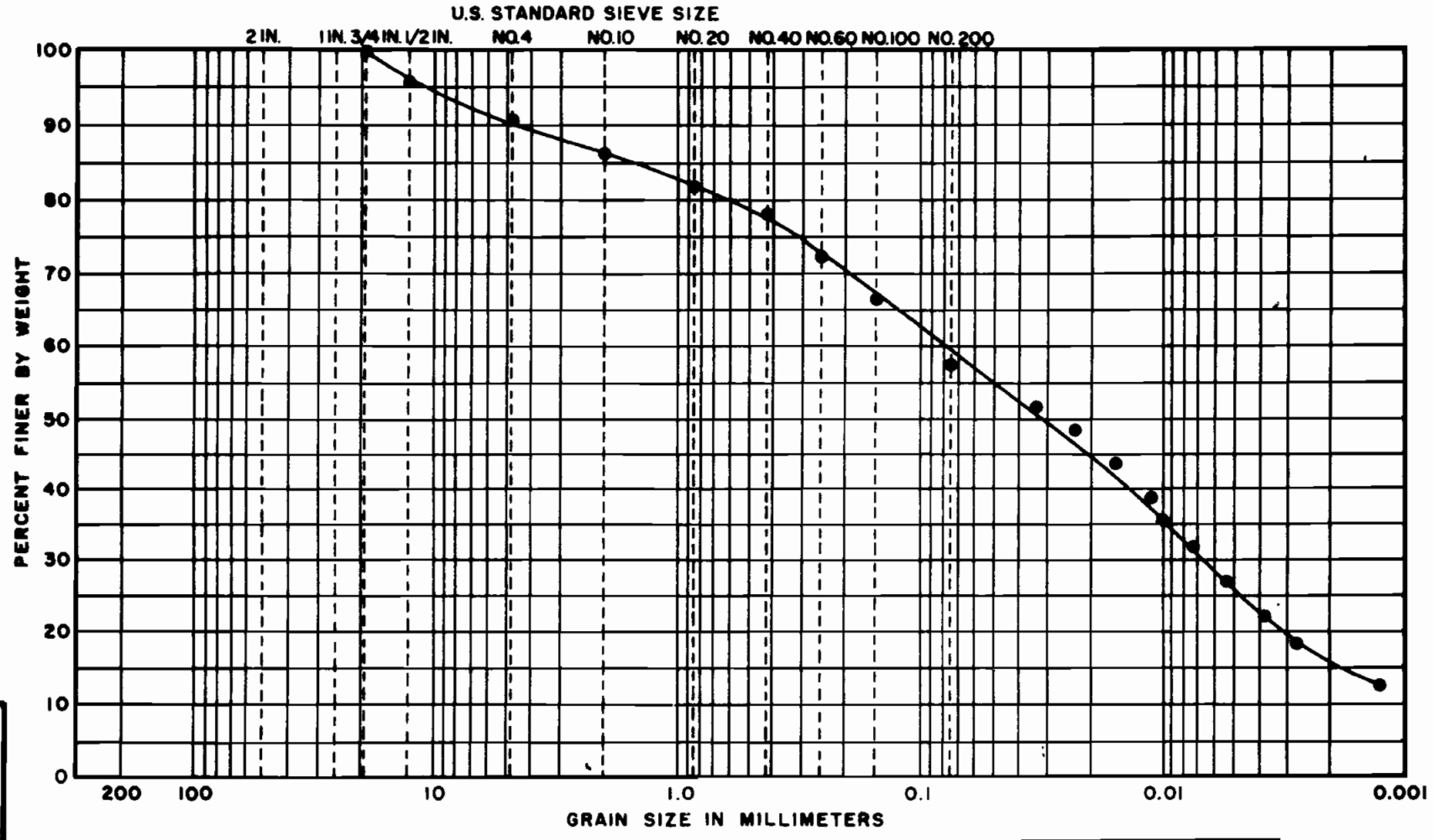
Figure C-2



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM

BORING NO.	SAMPLE NO.	SYM.	SAMPLE DESCRIPTION
TP20		●	Railroad Embankment Material



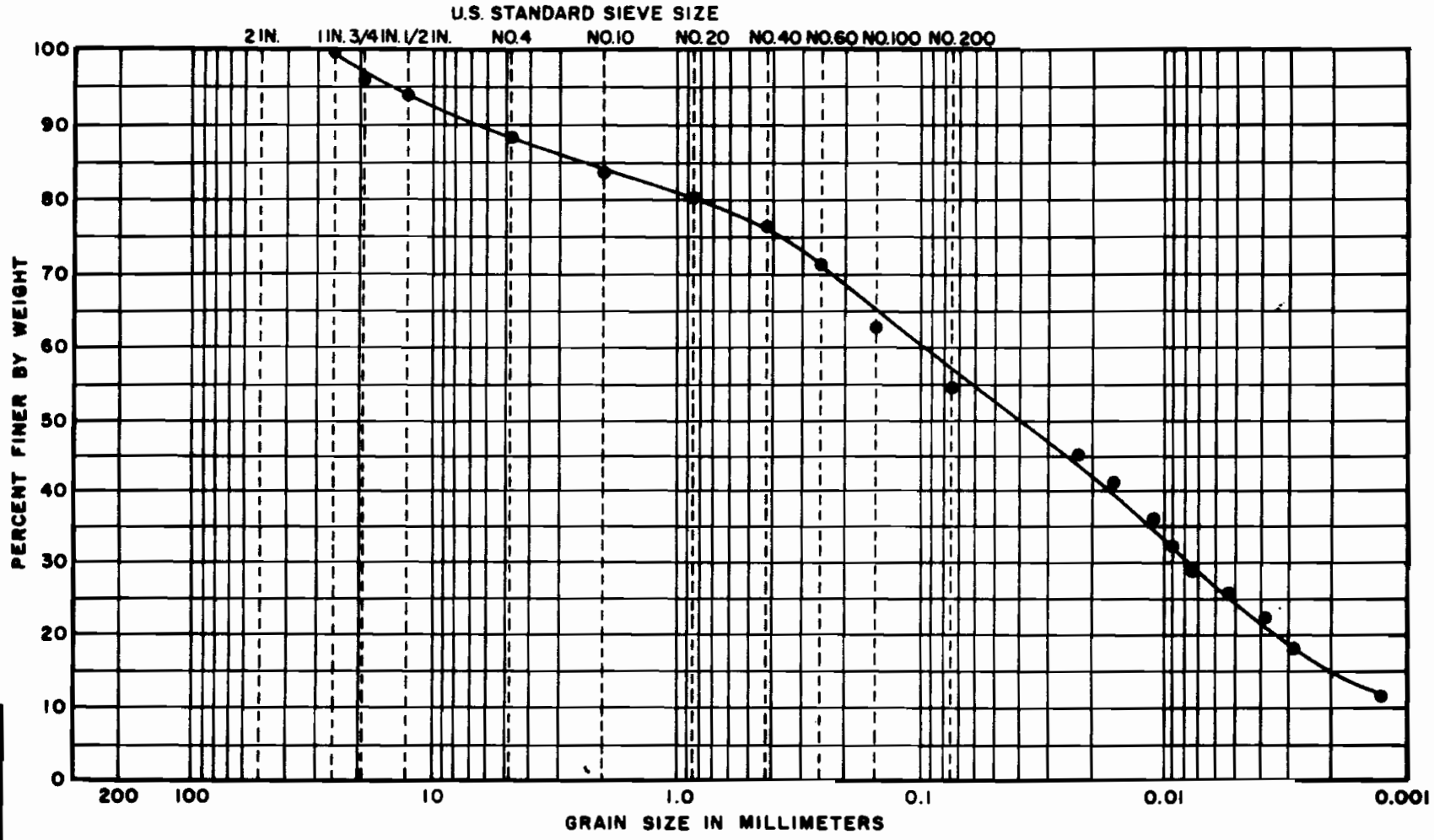
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM

BORING NO.	SAMPLE NO.	SYM.	SAMPLE DESCRIPTION
TP21		●	Railroad Embankment Material

GRADATION TESTS

Figure C-3



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM

BORING NO.	SAMPLE NO.	SYM.	SAMPLE DESCRIPTION
TP30		●	Railroad Embankment Material

GRADATION TESTS

Fiaure C-4

APPENDIX E

Analytical Test Results

LOG OF ANALYTICAL TESTING

PROJECT: NEW BUFFALO INDUSTRIAL PARK
FILE: R5615

PHASE 1

Sampling Date: 5-30-83

Sample Locations: B-1, B-7, B-8, B-11, B-12, B-16, & B-18
Test Parameters: In-situ tests for pH, specific conductance and temperature. Samples screened with a Century Systems model OVA-128 organic vapor analyzer with gas chromatograph option.
Tested by: GZA

Sampling Date: 6-6-83

Sample Locations: TP-4, TP-13, TP-16A, TP-33, TP-59 (soil samples), B-12 and B-18 (ground water samples)
Test Parameters; All soil samples extracted, concentrated and analyzed by infra-red spectroscopy.

- TP-4 tested for Arsenic, chromium, lead and pH.
- TP-13 tested for PCB's
- TP-59 tested for aniline and substituted anilines and nitro-aromatics
- B-12 and B-18 tested for COD, pH, Phenols, TOC, Arsenic, Chromium, Lead, Mercury, Benzene, Toluene, Xylene, Ethylbenzene and PAH's
- B-12 and B-18 also tested in the field for temperature and specific conductance

Tested by: GZA representatives collected the samples and did in-situ tests; ARO Corporation Buffalo Division did all remaining tests.

Sampling Date: 6/10/83

Sample Locations: B-1, B-15, B-7, B-11, B-12, B-16 (ground water samples) Pond (surface water sample)

Test Parameters: B-1, B-11 tested for COD, pH, Phenols, TOC, Arsenic, Chromium, Lead, Zinc

- B-5, B-7, B-16, and pond tested for COD, pH, TOC, Chromium, Lead and Zinc.

GZA

- All samples tested in the field for specific conductance and temperature

Tested by: GZA representatives collected samples and did in-situ testing; ARO Corporation Buffalo Division did all remaining tests.

Sampling Date: 6/13/83

Sample Locations: B-8, B-9 and B-19 (ground water samples)

Test Parameters: B-8 tested for COD, pH, Phenols, TOC, Arsenic, Chromium, Lead, and Zinc.

- B-9 and B-19 tested for COD, pH, and TOC

- B-8, B-9 and B-19 in-situ specific conductance and temperature.

Tested by: GZA representatives collected samples and did in-situ testing; ARO Corporation Buffalo Division did all remaining tests

PHASE 2

Sampling Date: 11/9/83

Sample Locations: Soil samples from the following:

TPII-1 (1.5 ft.), TPII-3 (4.0 ft.), TPII-5 (0.4 ft.), TPII-5 (6.0 ft.), TPII-6 (4.0 ft.), TPII-6 (4.4 ft.), TPII-7 (5.0 ft.), TPII-7 (7.5 ft.), TPII-9 (1.0 ft.), and TPII-10 (3.0 ft.)

Test Parameters: TPII-1 (1.5 ft.), TPII-3 (4.0 ft.) and TPII-7 (7.5 ft.) tested for PCB's

- TPII-5 (6.0 ft.), TPII-7 (5.0 ft.), and TPII-7 (7.5 ft.) tested for reactivity

- TPII-7 (5.0 ft.) and TPII-9 (1.0 ft.) tested for metal fraction of EP Toxicity Test

- TPII-5 (0.4 ft.), TPII-6 (4.0 ft.), TPII-6 (4.4 ft.), TPII-10 (13.0 ft.) tested for pH

- TPII-5 (6.0 ft.), TPII-6 (4.0 ft.), TPII-6 (14.4 ft.) and TPII-10 (3.0 ft.) screened for valatile organics with a GC

GZA

Tested by: GC screening by GZA, all other testing by ARO Corporation Buffalo Division.

Sampling Date: 11/21/83

Sample Locations: B-12, B-21, B-22, and B-23 (ground water samples)

Test Parameters: filtered samples tested for Arsenic, Barium, Cadmium, Hexavalent Chromium, Lead, Mercury, Selenium and Silver

- in-situ tests for specific conductance and temperature
- all samples screened via a GC for volatile organics.

Tested by: In-situ testing and GC screened by GZA, all other tests by ARO Corporation Buffalo Division.

GZA

Historical Summary of Analytical Test Results

HISTORICAL SUMMARY OF ANALYTICAL TEST RESULTS

PROJECT: New Buffalo Industrial Park/ Buffalo, New York **GZA FILE:** R5615

TEST PARAMETER	UNITS	QUALITY STANDARD	B-1		B-5		B-6	B-7		B-8		
			5/30/83	6/10/33	6/10/83	6/22/83	6/10/83	5/30/83	6/10/83	5/30/83	6/10/83	6/13/83
pH	Standard Units	6.5 - 8.5 (1)	7.35	7.45	7.28			7.15	6.89		7.16	
Specific Conductivity	µmhos/cm		1000		1200	990	600	730	1470	820		1070
Chemical Oxygen Demand (COD)	mg/l			47.0	4.0				32.0		11.0	
Total Organic Carbon (TOC)	mg/l			18.0	2.0				12.0		4.0	
Phenols (total)	mg/l	0.001 (1)		0.002							0.006*	
Arsenic	mg/l	0.025 (1)		LT 0.001							LT 0.001	
Barium	mg/l	1.0 (1)										
Cadmium	mg/l	0.01 (1)										
Chromium	mg/l	0.05 (1)		0.011	LT 0.001				0.001		0.071*	
Chromium (Hexavalent)	mg/l	0.05 (1)										
Lead	mg/l	0.025 (1)		0.033*	0.009				0.021		0.220*	
Mercury	mg/l	0.002 (1)										
Selenium	mg/l	0.02 (1)										
Silver	mg/l	0.05 (1)										
Zinc	mg/l	5.0 (1)		0.112	0.011				0.060		1.83	
Benzene	µg/l											
Toluene	µg/l											
Xylene	µg/l											
Ethylbenzene	µg/l											
Polynuclear Aromatic Hydrocarbon	µg/l											

1. New York Department of Environmental Conservation Class GA ground water standards

HISTORICAL SUMMARY OF ANALYTICAL TEST RESULTS

PROJECT: New Buffalo Industrial Park/Buffalo, New York **GZA FILE:** R5615

TEST PARAMETER	UNITS	QUALITY STANDARD	B-9			B-10		B- 11		B-12		
			5/30/83	6/13/83	6/22/83	6/10/83	6/22/83	5/30/83	6/10/83	5/30/83	6/10/83	11/21/83
pH	Standard Units	6.5 - 8.5 (1)		7.89					6.98		7.62	
Specific Conductivity	µmhos/cm		430	429	440	260	345	1580	1090	910	910	960
Chemical Oxygen Demand (COD)	mg/l			4.0					22.0		29.0	
Total Organic Carbon (TOC)	mg/l			1.0					8.0		11.0	
Phenols (total)	mg/l	0.001 (1)							0.004*		.004*	
Arsenic	mg/l	0.025 (1)							LT 0.001			LT 0.001*
Barium	mg/l	1.0 (1)										0.332*
Cadmium	mg/l	0.01 (1)										0.005*
Chromium	mg/l	0.05 (1)							0.009		0.192*	
Chromium (Hexavalent)	mg/l	0.05 (1)										LT 0.001*
Lead	mg/l	0.025 (1)							0.042		0.240	LT 0.001*
Mercury	mg/l	0.002 (1)										LT 0.002*
Selenium	mg/l	0.02 (1)										LT 0.001*
Silver	mg/l	0.05 (1)										LT 0.001*
Zinc	mg/l	5.0 (1)							0.045			
Benzene	µg/l										LT 1.0	
Toluene	µg/l										LT 1.0	
Xylene	µg/l										2.0	
Ethylbenzene	µg/l										LT 1.0	
Polynuclear Aromatic Hydrocarbon	µg/l										N.D.	

* Sample passed through 0.45 µ filter prior to analysis

1 New York Department of Environmental Conservation Class GA ground water standards

HISTORICAL SUMMARY OF ANALYTICAL TEST RESULTS

PROJECT: New Buffalo Industrial Park/Buffalo, New York **GZA FILE:** R5615

TEST PARAMETER	UNITS	QUALITY STANDARD	B-13	B-16		B-18		B-19		B-21	B-22	B-23
			5/30/83	6/10/83	6/22/83	6/10/83	6/22/83	6/13/83	6/22/83	11/21/83	11/21/83	11/21/83
pH	Standard Units	6.5 - 8.5 (1)		7.75		7.80		7.60				
Specific Conductivity	µmhos/cm		3390	590	590	420	421	700	720			
Chemical Oxygen Demand (COD)	mg/l			4.0		19.0		4.0				
Total Organic Carbon (TOC)	mg/l			1.0		8.0		1.0				
Phenols (total)	mg/l	0.001 (1)				0.011						
Arsenic	mg/l	0.025 (1)								LT 0.001*	LT 0.001*	LT 0.001*
Barium	mg/l	1.0 (1)								0.351*	0.165*	0.133*
Cadmium	mg/l	0.01 (1)								0.001*	LT 0.001*	LT 0.001*
Chromium	mg/l	0.05 (1)		LT 0.001		0.039						
Chromium (Hexavalent)	mg/l	0.05 (1)								LT 0.001*	0.001*	LT 0.001*
Lead	mg/l	0.025 (1)		0.002		0.108				LT 0.001*	LT 0.001*	LT 0.001*
Mercury	mg/l	0.002 (1)								LT 0.0002*	LT 0.0002	LT 0.0002*
Selenium	mg/l	0.02 (1)								LT 0.001*	LT 0.001*	LT 0.001*
Silver	mg/l	0.05 (1)								LT 0.001*	LT 0.001*	LT 0.001*
Zinc	mg/l	5.0 (1)		0.007								
Benzene	µg/l					LT 1.0						
Toluene	µg/l					LT 1.0						
Xylene	µg/l					300						
Ethylbenzene	µg/l					LT 1.0						
Polynuclear Aromatic Hydrocarbons	µg/l					ND						

* Sample passed through 0.45 µ filter prior to analysis

1 New York Department of Environmental Conservation Class GA ground water standards

HISTORICAL SUMMARY OF ANALYTICAL TEST RESULTS

PROJECT: New Buffalo Industrial Park/Buffalo, New York **GZA FILE:** R5615

TEST PARAMETER	UNITS	QUALITY STANDARD	Pond	TP-4	TP-13	TPII-1(1.5')	TPII-3(4.0')	TP-II-5	TPII-6(4.0')	TPII-6(4.6'	TPII-7(5.0')	TPII-7(7.5')
			6/10/83	6/6/83	6/6/83	11/8/83	11/8/83	11/8/83	11/8/83	11/8/83	11/8/83	11/8/83
pH	Standard Units	6.5 - 8.5 (1)	7.95									
Specific Conductivity	µmhos/cm		1000									
Chemical Oxygen Demand (COD)	mg/l		32.0									
Total Organic Carbon (TOC)	mg/l		13.0									
Chromium	mg/l	0.05 (1)	LT 0.001									
Lead	mg/l	0.025 (1)	0.010									
Zinc	mg/l	5.0 (1)	0.005									
Arsenic	mg/kg			LT 0.001								
Chromium	mg/kg			21.0							48.6	
Lead	mg/kg			399.0								LT 1.0
PCB's	mg/kg				LT 1.0	LT 1.0	LT 1.0					
pH (50% slurry)	Standard Units			4.8				6.40	5.12	4.41	2.6	
EP - Toxicity Procedure												
Arsenic	mg/l	5.0 (2)									0.004	
Barium	mg/l	100.0 (2)									0.288	
Cadmium	mg/l	1.0 (2)									0.002	
Chromium	mg/l	5.0 (2)									LT 0.001	
Lead	mg/l	5.0 (2)									0.177	
Mercury	mg/l	.2 (2)									0.0002	
Selenium	mg/l	1.0 (2)									0.895	
Silver	mg/l	5.0 (2)									LT 0.001	
Reactivity												
Cyanides	mg/l							0.003			0.002	
Sulfides	mg/kg							LT 1.0			LT 1.0	

1 New York Department of Environmental Conservation Class GA ground water standards

2 Maximum concentration of contaminants for characteristic of EP toxicity

HISTORICAL SUMMARY OF ANALYTICAL TEST RESULTS

PROJECT: New Buffalo Industrial Park/Buffalo, New York **GZA FILE:** R5615

TEST PARAMETER	UNITS	QUALITY STANDARD	TPII-9(1.0')	TPII-10(3.0')
pH	Standard Units			
Specific Conductivity	mhos/cm			
Chemical Oxygen Demand (COD)	mg/l			
Total Organic Carbon (TOC)	mg/l			
Chromium	mg/l			
Lead	mg/l			
Zinc	mg/l			
Arsenic	mg/kg			
Chromium	mg/kg			
Lead	mg/kg			
PCB's	mg/kg			
pH (50% slurry)	Standard Units		7.49	8.20
EP - Toxicity Procedure				
Arsenic	mg/l	5.0 (2)	0.008	
Barium	mg/l	100.0 (2)	0.564	
Cadmium	mg/l	1.0 (2)	LT 0.001	
Chromium	mg/l	5.0 (2)	LT 0.001	
Lead	mg/l	5.0 (2)	0.012	
Mercury	mg/l	.2 (2)	LT 0.0002	
Selenium	mg/l	1.0 (2)	0.94	
Silver	mg/l	5.0 (2)	LT 0.001	
Reactivity				
Cyanides	mg/l		0.006	
Sulfides	mg/kg		LT 1.0	

1 New York Department of Environmental Conservation Class GA ground water standards

2 Maximum concentration of contaminants for characteristic of EP toxicity

Test Results Submitted By
The ARO Corporation Buffalo Division

GZA

Mr. Raymond Laport
Goldberg Zoino Associates of
New York, P.C.
Suite 1000, Rand Building
14 Lafayette Square
Buffalo, New York 14203

June 21, 1983

Re: File R 5615

Dear Mr. Laport:

Samples TP-4, TP-33, TP-13, and TP-16 were extracted, concentrated and analyzed by infra-red (IR) spectroscopy to determine the presence of major (>0.1%) constituents via functional group classification. The IR spectra did not show any major constituents to be present other than hydrocarbons. This was verified by gas chromatographic (GC) analysis of the concentrated extracts. The GC curves show the presence of what appears to be either a severely weathered diesel fuel and/or a motor oil type material. A similar GC pattern was also obtained for the extract of TP-59.

Sample TP-59 was analyzed for the presence of aniline and substituted anilines. None were detected at levels greater than 10.ppb. TP-59 was further analyzed for the presence of nitro-aromatics (nitro-benzene, etc.) Again, none were detected at levels greater than 10.ppb.

In reference to the hydrocarbon nature of the material isolated by extraction from the various TP samples; it appears that if originally a diesel fuel was present, the more volatile constituents (carbon #8-12) have volatilized off leaving a more complex material enriched in the higher boiling constituents. This is similar in appearance to a motor oil type product and makes differentiation impossible.

In our work to date, we have found little evidence to cause concern except for the presence of the high levels of lead.

Sincerely,
The ARO Corporation/Buffalo Division

Bernard J. Grucza Ph.D.
Director, Environmental Laboratory

environmental testing laboratory
The ARO Corporation, Buffalo Division • 3695 Broadway, Buffalo, NY 14227 • Telephone (716) 683-0440 • Telex 9-1250

THE ARO CORPORATION
BUFFALO DIVISION
3695 BROADWAY, BUFFALO, N.Y. 14227

TELEPHONE 716-683-0440
TELEX 9-1250

ANALYTICAL RESULTS

Customer: GOLDBERG ZOINO ASSOCIATES OF N.Y., P.C. Attn: Ray Laport

DATE: COLLECTED: 6/10/83 RECEIVED: 6/10/83 COMPLETED: 6/21/83

P.O. NO. File R 5615 ARO W.O. 20,825W

TEST	B-1	B-11	B-9	B-19	B-8
Chemical Oxygen Demand, mg/L	47.	22.	4.	4.	11.
pH	7.45	6.98	7.89	7.60	7.16
Phenols, ppm	0.002	0.004	---	---	0.006
Total Organic Carbon, mg/L	18.	8.	1.	1.	4.
Arsenic, ppm	<0.001	<0.001	---	---	<0.001
Chromium, ppm	0.011	0.009	---	---	0.071
Lead, ppm	0.033	0.042	---	---	0.220
Zinc, ppm	0.112	0.045	---	---	1.83

Bernard J. Grucza Ph.D.
Director, Environmental Laboratory

THE ARO CORPORATION
BUFFALO DIVISION
3695 BROADWAY, BUFFALO, N.Y. 14227

TELEPHONE 716-683-0440
TELEX 9-1250

ANALYTICAL RESULTS

Customer: GOLDBERG ZOINO ASSOCIATES OF N.Y. P.C. Attn: Ray Laport

DATE: COLLECTED: 6/10/83 RECEIVED: 6/10/83 COMPLETED: 6/21/83

P.O. NO. File R 5615 ARO W.O. 20,825W

TEST	B-5	B-7	B-16	Pond	
Chemical Oxygen Demand, mg/L	4.	32.	4.	32.	
pH	7.28	6.89	7.75	7.95	
Total Organic Carbon, mg/L	2.	12.	1.	13.	
Chromium, ppm	< 0.001	0.001	< 0.001	< 0.001	
Lead, ppm	0.009	0.021	0.002	0.010	
Zinc, ppm	0.011	0.060	0.007	0.005	

Bernard J. Grucza

Bernard J. Grucza, Ph.D.
Director, Environmental Laboratory

THE ARO CORPORATION
BUFFALO DIVISION
3695 BROADWAY, BUFFALO, N.Y. 14227

TELEPHONE 716-683-0440
TELEX 9-1250

ANALYTICAL RESULTS

Customer: GOLDBERG ZOINO ASSOCIATES OF N.Y., P.C. Attn: Ray Laport

DATE: COLLECTED: 6/10/83 RECEIVED: 6/10/83 COMPLETED: 6/21/83

P.O. NO. File R 5615 ARO W.O. 20,825W

TEST	B-12	B-18			
Chemical Oxygen Demand, mg/L	29.	19.			
pH	7.62	7.80			
Phenols, ppm	0.004	0.011			
Total Organic Carbon, mg/L	11.	8.			
Arsenic, ppm	<0.001	<0.001			
Chromium, ppm	0.192	0.039			
Lead, ppm	0.240	0.108			
Mercury, ppm	0.0009	0.0002			
Benzene, ppb	<1.	<1.			
Toluene, ppb	<1.	<1.			
Xylene, ppb	2.	300.			
Ethylbenzene, ppb	<1.	<1.			
Polynuclear Aromatic Hydrocarbons	None detected - individual limits all <1.ppb				

Bernard J. Grucza

Bernard J. Grucza, Ph.D.
Director, Environmental Laboratory

THE ARO CORPORATION
BUFFALO DIVISION
3695 BROADWAY, BUFFALO, N.Y. 14227

ARO

TELEPHONE 716-683-0440
TELEX 9-1250

ANALYTICAL RESULTS

Customer: GOLDBERG ZOINO ASSOCIATES OF N.Y. P.C. Attn: Ray Laport

DATE: COLLECTED: 6/10/83 RECEIVED: 6/10/83 COMPLETED: 6/21/83

P.O. NO. File R 5615 ARO W.O. 20,825W

TEST	TP-4	TP-13			
Arsenic, mg/Kg	<0.001	---			
Chromium, mg/Kg	21.0	---			
Lead, mg/Kg	399.	---			
PCB's, mg/Kg	---	<1.			
pH (50% Slurry)	4.8	---			

Bernard J. Grucza

Bernard J. Grucza, Ph.D.
Director, Environmental Laboratory

FILE No. R5615

PROJECT Buffalo Industrial Park SHEET 1 OF 1

LOCATION Buffalo, New York COLLECTOR Raymond Lapott

STATION NUMBER	SEQUENCE NUMBER	DATE	TIME	SERIAL NUMBER	STATION LOCATION	SAMPLE TYPE	REMARKS
TP-4				098		Soil	previously collected
TP-13				198		Soil	while digging
TP-16A				298		Soil	test pits
TP-33				398		Soil	5/31/83 - 6/2/83
B-18	001	6/6/83	1343	400	near Hinter; 20' west of NFS parking lot	bailer	1 bottle (2L)
B-12	002	6/6/83	1433	500	near NFS;	bailer	1 bottle (2L)
						TOTAL No. OF CONTAINERS	2

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
1. Raymond Lapott	6/6/83 1516		2.		
RELINQUISHED BY: (Signature) 3.	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature) 4.	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) 5.	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature) 6. R. J. Guerra	RECEIVED FOR LAB BY:	DATE/TIME 6/6/83 3:20 PM

RETURN TO: Goldberg-Zoino Assoc of N.Y. PC ; 74 Lafayette Sq, Suite 1000 The Rand Bldg 14203

GOLDBERG-ZOINO & ASSOCIATES, INC.

FILE No. R5615

PROJECT Buffalo Industrial Park SHEET 1 OF 1

LOCATION Buffalo, N.Y. COLLECTOR Raymond Lapart / [illegible]

STATION NUMBER	SEQUENCE NUMBER	DATE	TIME	SERIAL NUMBER	STATION LOCATION	SAMPLE TYPE	REMARKS
B-5	001	6/10/83	13:06	100	bottle #1	bailer	1 bottle
B-1	002	6/10/83	14:07	200	"	"	3 bottles
B-11	003	6/10/83	14:22	300		"	3 bottles
B-12	004	6/10/83	14:47	400		"	5 bottles
SW-P1	005	6/10/83	15:07	799	pond water bot #2	"	1 bottle
B-7	006	6/10/83	15:29	500	bot #3	"	1 bottle
B-16	007	6/10/83	16:01	600	bot #4	"	1 "
B-18	008	"	16:28	700		"	5 bottles
						TOTAL No. OF CONTAINERS	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
1. Raymond Lapart	6/10/83 1715		2.		
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
3.			4.		Pete Makar
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	RECEIVED FOR LAB BY:	DATE/TIME
5.			6.		6-10-83 5:15 P

RETURN TO:

GZA GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

FILE No. R5615

PROJECT Buffalo Industrial Park SHEET 1 OF 1

LOCATION Buffalo, New York COLLECTOR Raymond Lapsat

STATION NUMBER	SEQUENCE NUMBER	DATE	TIME	SERIAL NUMBER	STATION LOCATION	SAMPLE TYPE	REMARKS
B-8	001	6/13/83	1116	100	adj. to NFS Parking lot	bailer	3 bottles
B-9	002	6/13/83	1153	200	300' N. of NFS	bailer	1 bottle
B-19	003	6/13/83	1622	300		bailer	1 "
						TOTAL No. OF CONTAINERS	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
1. Raymond Lapsat	6/13/83 1642		2.		
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
3.			4.		
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	RECEIVED FOR LAB BY:	DATE/TIME
5.			6.	H Holmes	6/13/83 1742

RETURN TO:

THE ARO CORPORATION
BUFFALO DIVISION
3695 BROADWAY, BUFFALO, N.Y. 14227

TELEPHONE 716-683-0440
TELEX 9-1250

December 8, 1983

Mr. Ray Laport
Goldberg-Zoino Associates
Suite 1000
Rand Building
Buffalo, NY 14203

Re: Soil Samples - Buffalo Industrial Park

Dear Mr. Laport:

Enclosed are the results for the above referenced samples. From the tests performed, the materials would be classed as non-toxic and non-reactive. Sample #6 may present corrosion problems because of the low pH. Also, #6 and #8 have fairly high selenium values but they are not above the limit (1.0ppm) for this procedure.

Please contact me if you have any questions or require additional information.

Sincerely,
The ARO Corporation/Buffalo Division

Bernard J. Gruza

Bernard J. Gruza, Ph.D.
Director, Environmental Laboratory

BJG/skg

Enc.

THE ARO CORPORATION
BUFFALO DIVISION
3695 BROADWAY, BUFFALO, N.Y. 14227

TELEPHONE 716-683-0440
TELEX 9-1250

ANALYTICAL RESULTS

CUSTOMER: GOLDBERG-ZOINO ASSOCIATES OF NY, P.C.

DATE COLLECTED: 11/8/83 RECEIVED: 11/9/83 COMPLETED: 12/5/83

P.O. NO. _____ ARO W.O. 20,955W-8019/23

SOIL SAMPLES - BUFFALO INDUSTRIAL PARK

TEST	TPII-1 (1.5') #1	TPII-5 (6.0') #3	TPII-7 (5.0') #6	TPII-7 (7.5') #7	TPII-9 (1.0') #8	TPII-3 (14.0') #10
PCB's, mg/Kg	<1.	---	---	<1.	---	<1.
(1) Cyanides; ppm	---	0.003	0.002		0.006	
Sulfides; mg/Kg	---	<1.	<1.		<1.	
Arsenic, ppm	---	---	0.004		0.008	
Barium, ppm	---	---	0.288		0.564	
Cadmium, ppm	---	---	0.002		<0.001	
Chromium, ppm	---	---	<0.001		<0.001	
Lead, ppm	---	---	0.177		0.012	
Mercury, ppm	---	---	0.0002		<0.0002	
Selenium	---	---	0.895		0.94	
Silver	---	---	<0.001		<0.001	
Initial pH 5% Slurry			2.60		7.49	

(1) EP-Toxicity Procedure - Distilled Water
Note: Metals reported on EP-Toxicity Procedure

Bernard J. Gruzza

Bernard J. Gruzza, Ph.D.
Director, Environmental Laboratory

GZA GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS

FILE No. B5615.1

PROJECT GEOHYDROLOGIC STUDIES FOR JOB No. B5615.1 SHEET 1 OF 1

LOCATION _____ COLLECTOR Raymond Lapsett Raymond L. Ramoff

STATION NUMBER	SEQUENCE NUMBER	DATE	TIME	SERIAL NUMBER	STATION LOCATION	SAMPLE TYPE	REMARKS
TP-II-1	001	11/8/83	820	002		Soil sample	1 bottle
TP-II-3	010	"	1410	102		" "	" "
TP-II-5	003	"	930	202		" "	" "
TP-II-7	006	"	1205	302		" "	" "
TP-II-7	007	"	1205	402		" "	" "
TP-II-9	008	"	1245	502		" "	" "
						TOTAL No. OF CONTAINERS	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
1. R. Ramoff	11/9/83 1147	Ruth Motz	2.		
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
3.			4.		
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	RECEIVED FOR LAB BY:	DATE/TIME
5.			6.		

RETURN TO:

THE ARO CORPORATION
BUFFALO DIVISION
3695 BROADWAY, BUFFALO, N.Y. 14227

ARO

TELEPHONE 716-683-0440

RECEIVED
DEC - 7 1983
Goldberg—Zoino Assoc.
of New York, P.C.

ANALYTICAL RESULTS

Attn: Ray Laport

CUSTOMER: GOLDBERG-ZOINO ASSOCIATES Suite 1000, Rand Bldg. Buffalo 14203

DATE COLLECTED: 11/21/83 RECEIVED: 11/21/83 COMPLETED: 12/2/83

P.O. NO. File R5615.1 ARO W.O. 20,965W-8068/71

TEST	B-12 Groundwater #1	B-21 Groundwater #2	B-22 Groundwater #3	B-23 Groundwater #4	
Arsenic	<0.001	<0.001	<0.001	< 0.001	
Barium	0.332	0.351	0.165	0.133	
Cadmium	0.005	0.001	<0.001	<0.001	
Chromium (+6)	<0.001	<0.001	0.001	<0.001	
Lead	<0.001	< 0.001	<0.001	<0.001	
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	
Selenium	<0.001	<0.001	< 0.001	<0.001	
Silver	<0.001	<0.001	<0.001	< 0.001	

ALL RESULTS IN PPM (mg/L)

ALL SAMPLES FILTERED THRU 0.45µ FILTER PRIOR TO ANALYSIS

Bernard J. Gruczа

Bernard J. Gruczа, Ph.D.
Director, Environmental Laboratory

GZA GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GROUNDWATER/ENVIRONMENTAL

FILE No. R5615.1

PROJECT Geohydrologic Studies for Job R5615.1 SHEET 1 OF 1

LOCATION Buffalo, New York COLLECTOR R. KAMPFF/G. KLAWINSKI

STATION NUMBER	SEQUENCE NUMBER	DATE	TIME	SERIAL NUMBER	STATION LOCATION	SAMPLE TYPE	REMARKS
B-12	001	11/21/83	1547			Groundwater - bailer	GZA #1
B-21	002	"	1435			Groundwater - air lift pump	GZA #2
B-22	003	"	1623			" "	GZA #3
B-23	004	"	1517			" "	GZA #4
						TOTAL No. OF CONTAINERS	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
1. R. Kampff	11/21/83 1642		2.		
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
3.			4.		
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	RECEIVED FOR LAB BY:	DATE/TIME
5.			6.	K. Holmes	11/21/83 4:40

RETURN TO:

THE ARO CORPORATION
BUFFALO DIVISION
3695 BROADWAY, BUFFALO, N.Y. 14227

ARO

TELEX 9-1250

RECEIVED
JAN 16 1984
Goldberg—Zoino Assoc. of New York, P.C.

ANALYTICAL RESULTS

Attn: Ray Laport

CUSTOMER: GOLDBERG-ZOINO ASSOCIATES Suite 1000, Rand Bldg. Buffalo 14203

DATE COLLECTED: ? RECEIVED: 1/10/84 COMPLETED: 1/11/84

P.O. NO. N/C ARO W.O. N/C 8252-55

TEST	pH				
GZA # 2	6.40	TP II-5 (10.4 ft)			
4	5.12	TP II-6 (14.0 ft.)			
5	4.41	TP II-6 (14.4 ft)			
9	8.20	TP II-10 (3.0 ft)			

Bernard J. Gruca

Bernard J. Gruca, Ph.D.

APPENDIX F

Limitations

APPENDIX F

LIMITATIONS

Explorations

1. The analyses and recommendations submitted in this report are based in part upon the data obtained from subsurface explorations and field test results. The nature and extent of variations between these explorations or results may not become evident, until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the boring logs.

3. Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature and other factors occurring from the time measurements were made.

Analysis

4. The analysis and conclusions submtted in this report are based in part upon chemical test data provided by others and are contingent upon their validity. These data have been reviewed and interpretations made in the text and on the figures included with this report. It should also be noted that fluctuations in the types and levels of contaminants and variations in their flow paths will occur due to changes in seasonal water table fluctuations, alteration of disposal characteristics, as well as other factors.

Review

5. In the event that any changes in the nature, design, or location of the proposed roads and utilities are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by Goldberg-Zoino Associates of New York, P.C. It is recommended that this firm be provided the opportunity for a general review of final design and specifications

in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications.

Construction

6. It is recommended that this firm be retained to provide soil engineering and geohydrologic monitoring services during construction of the excavation and foundation phases of the work. This is to observe compliance with the design concepts, specifications, or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

Use of Report

7. This report has been prepared for the exclusive use of Olson & Terzian, P.C. for specific application to the New Buffalo Industrial Park in Buffalo, New York, in accordance with generally accepted soil, foundation and ground water engineering practices. No other warranty, expressed or implied, is made.

8. This engineering report has been prepared for this project by Goldberg-Zoino Associates of New York, P.C. This report was for design purposes only and may not be sufficient to prepare an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to design considerations only.

9. The information presented in this Report, is not of sufficient detail for individual parcel development. A subsequent geotechnical engineering program should be implemented to provide recommendations and designs with regard to foundation systems, associated subsurface installations, and site modifications for the development of each parcel or portion thereof.

ELEVATION (ft.) CITY DATUM

35 30 25 20 15 10 5 0 -5

B-4 EL.34.0 EL.33.03 | TP-15 | TP-16 EL.33.0 | TP-16A EL.32.0 | TP-18 EL.30.0 | TP-II-8 EL.29.0 | B-11 EL.25.07 | TP-57 EL.26.0 | B-12 EL.24.66 | TP-32 EL.25.0 | B-17 EL.26.00 | TP-26 EL.28.0

OFFSET 60' SOUTH
OFFSET 104' NORTH
OFFSET 12' NORTH
OFFSET 72' SOUTH
OFFSET 72' SOUTH
OFFSET 28' NORTH
OFFSET 136' SOUTH
OFFSET 66' SOUTH
OFFSET 200' NORTH
OFFSET 100' SOUTH

RAILROAD EMBANKMENT
ELEVATION AT TOP OF EMBANKMENT APPROX 40.0'

PONDED WATER

EXISTING GROUND SURFACE

13 Brick Fragments
19 Oil
44
6

Industrial Fill
Oil (ML)

Wood Timbers
Concrete Blocks
Cement Like Odor

MISCELLANEOUS FILLS

SILT and CLAY (ML-CL)

SPLIT SPOON REFUSAL

(CL)

ONONDAGA LIMESTONE FORMATION

INFERRED TOP OF ROCK

32 Petroleum Odor
8
5
16
11
7
6

OW
OW

24
4 Petroleum Odor
48
18
14
6

Cinders
Oil and Tar

(ML - CL)

37 Oil
16
44
13
4
37

Silt with Oil Contamination

Silty Varved CLAY (CL)

Glacial Till-Silty fine SAND (SM)

NOTES:

1) THE STRATIFICATION LINES ARE BASED UPON INTERPOLATION BETWEEN WIDELY SPACED BORINGS AND THUS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES. THE ACTUAL TRANSITION MAY BE GRADUAL.

2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. THESE DATA HAVE BEEN REVIEWED AND INTERPRETATIONS MADE IN THE TEXT OF THIS REPORT. HOWEVER, IT MUST BE NOTED THAT FLUCTUATIONS IN THE LEVEL OF THE GROUND WATER MAY OCCUR DUE TO VARIATIONS IN RAINFALL, TEMPERATURE AND OTHER FACTORS AT THE TIME MEASUREMENTS WERE MADE.

SCALE
HORIZONTAL 0 250 500(ft.)
VERTICAL 0 5 10 (ft.)

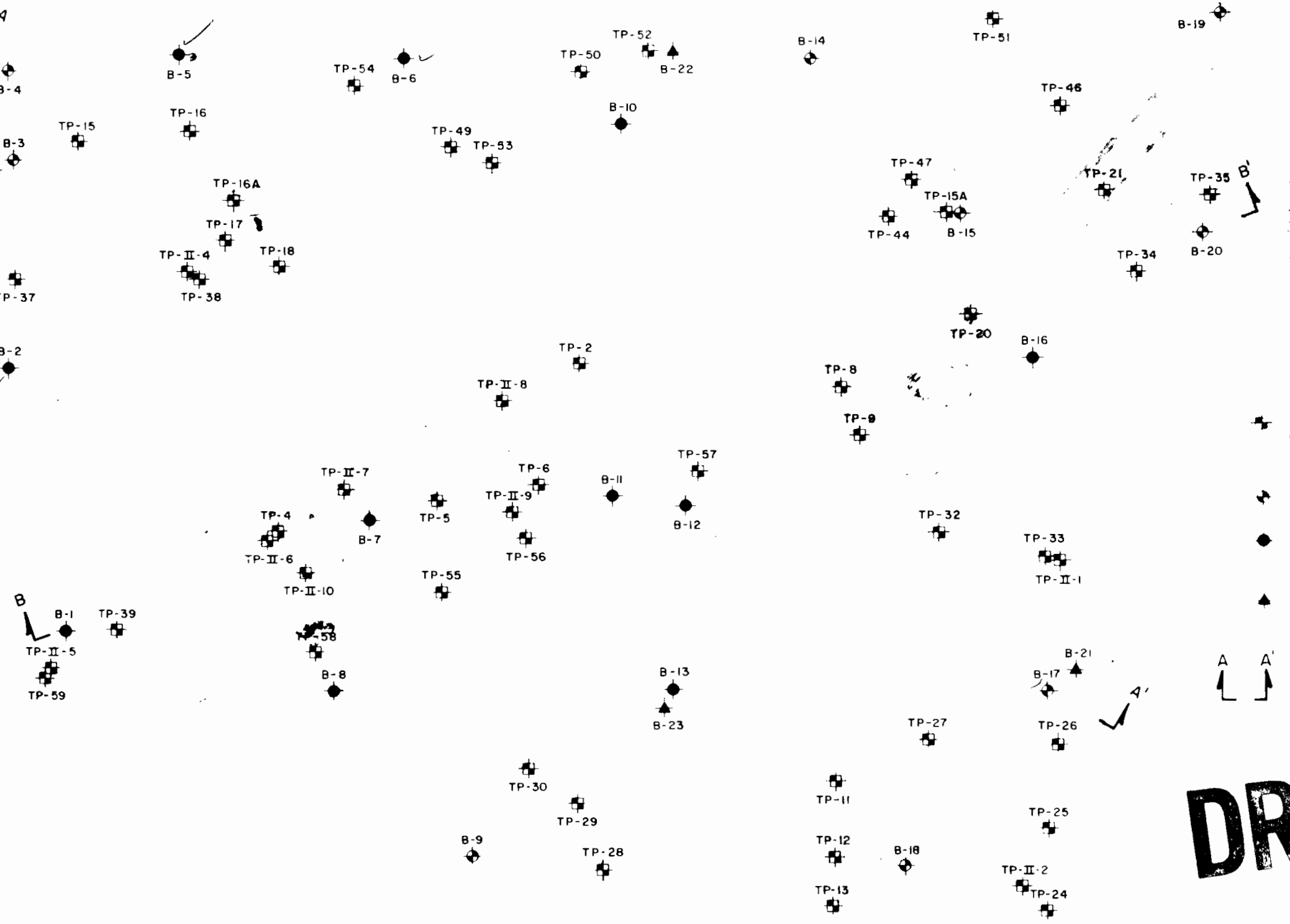
GZA

FILE No. R5613/15 DWG. No. GH-2-B

NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

GEOLOGIC PROFILE SECTION A-A'

JANUARY 1984 FIGURE No. 8



NOTES 1) EXPLORATIONS WERE LOCATED IN THE FIELD BY GZA AND PLOTTED ON BASE PLAN MAP PREPARED BY OLSON & TERZIAN, P.C. THE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED

2) THIS DRAWING WAS ADAPTED FROM BASE PLAN MAP PREPARED BY OLSON & TERZIAN, P.C.

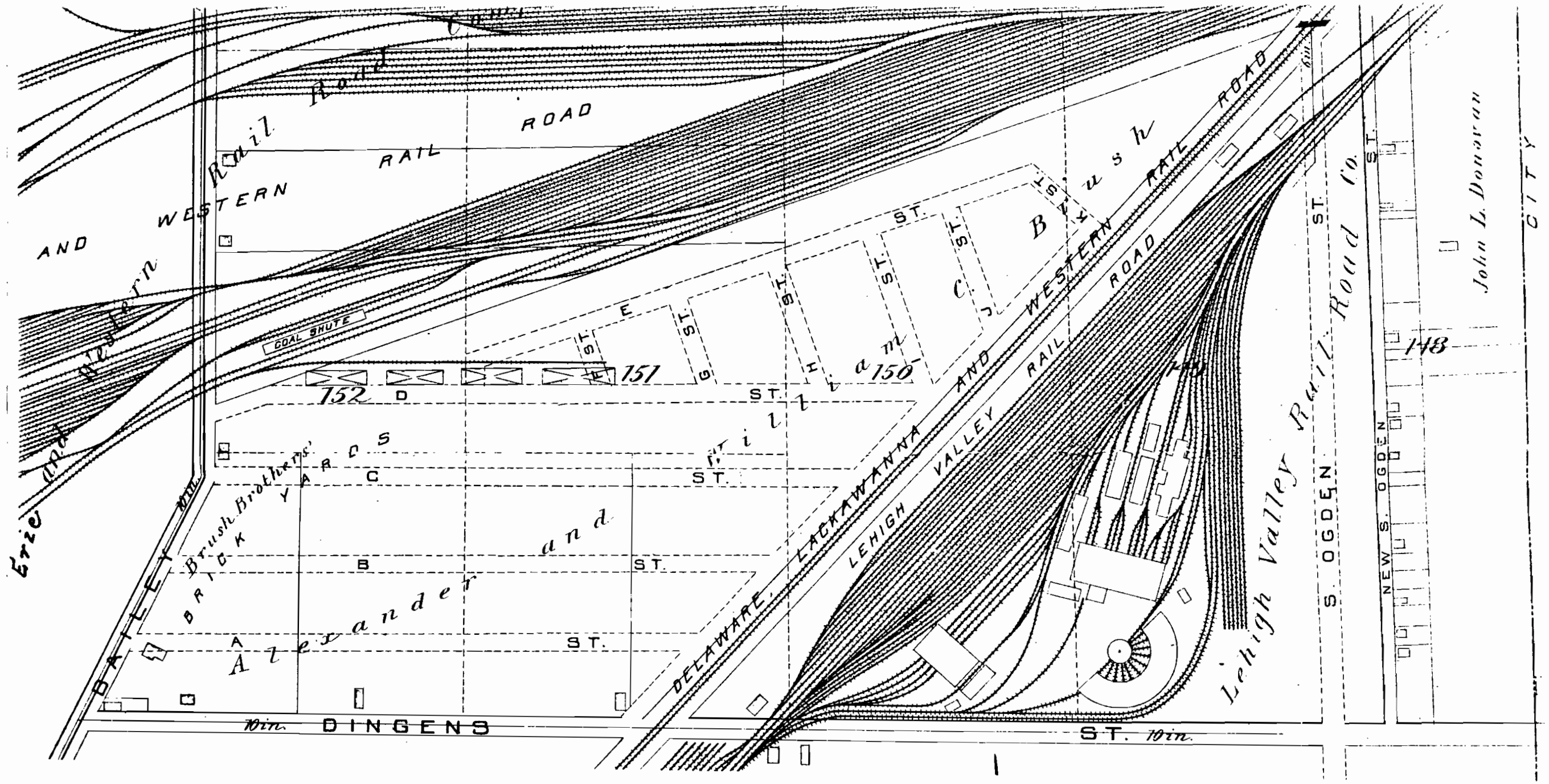
GZA

NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

EXPLORATION LOCATION PLAN
1983 SAMPLING PROGRAM

JANUARY 1984 FIGURE No. 3

FILE No. R5613/15 DWG No. GH-1-C

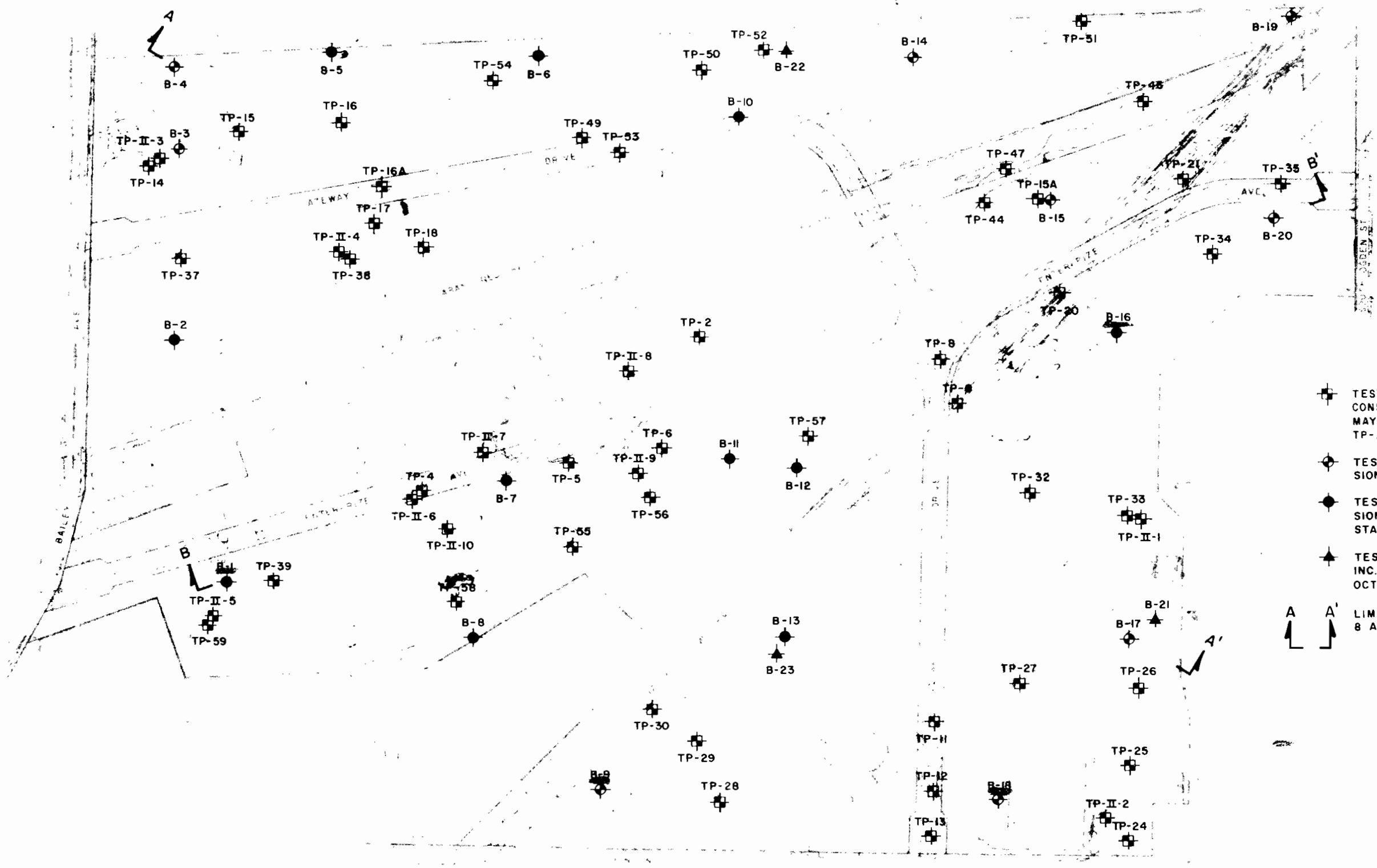


NOT TO SCALE

NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

1891 SITE MAP
Source: Buffalo City Atlas

JANUARY 1984 FIGURE No. 2



FILE No. R5613/15 DWG. No. GH-1-C

NOTES: 1) EXPLORATIONS WERE LOCATED IN THE FIELD BY GZA AND PLOTTED ON BASE PLAN MAP PREPARED BY OLSON & TERZIAN, P.C. THE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

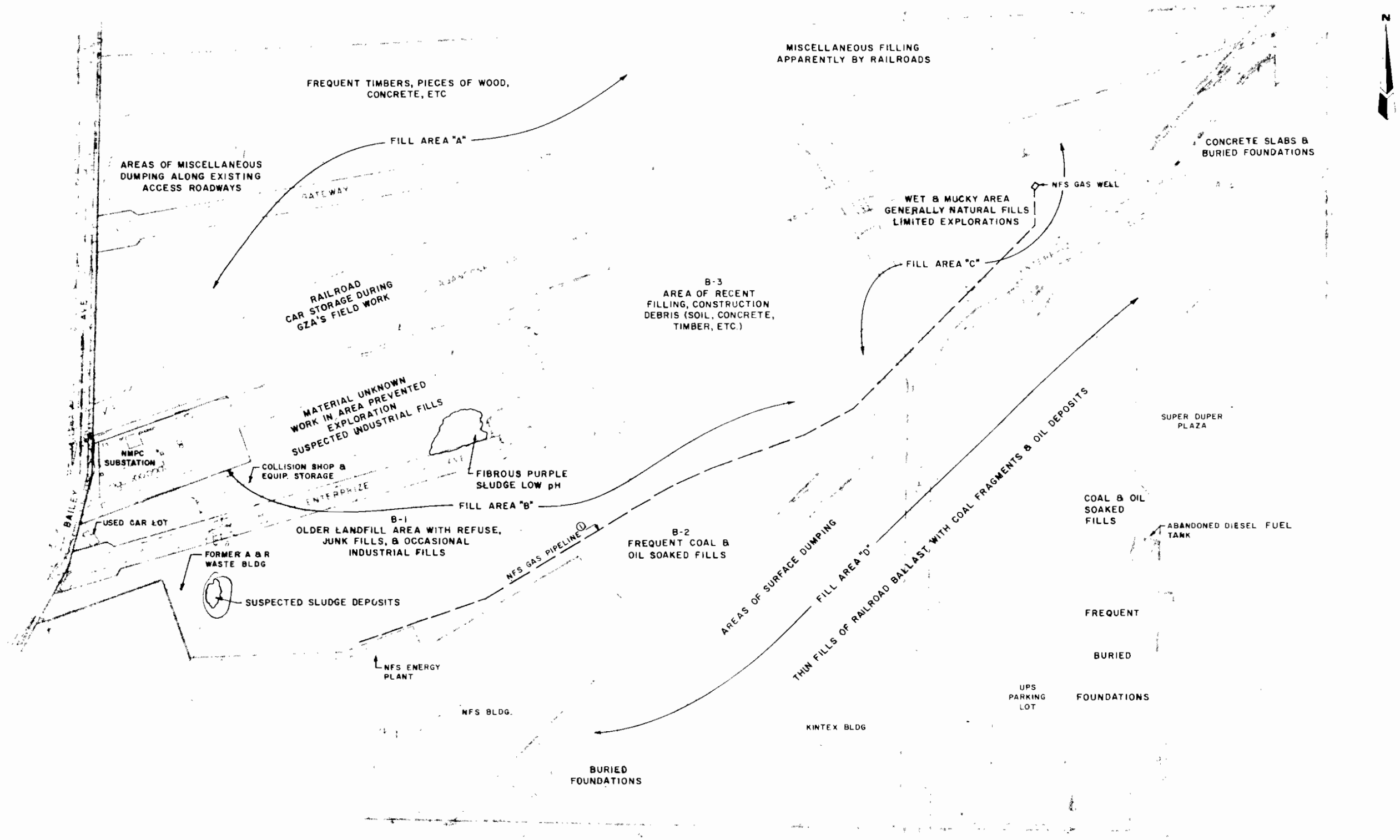
2) THIS DRAWING WAS ADAPTED FROM BASE PLAN MAP PREPARED BY OLSON & TERZIAN, P.C

SCALE 0 150 300 450 (ft.)

NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

EXPLORATION LOCATION PLAN

JANUARY 1984 FIGURE No. 4



NOTES:

1) GAS WELL AND PIPELINE LOCATIONS SHOWN ARE APPROXIMATE AND ACTUAL LOCATIONS SHOULD BE VERIFIED WITH NFS PRIOR TO CONSTRUCTION
2) FILL TYPES ARE GENERALIZED BASED ON A LIMITED NUMBER OF EXPLORATIONS AND VARIATIONS MAY OCCUR DURING CONSTRUCTION.
3) THIS DRAWING WAS ADAPTED FROM BASE PLAN MAP PREPARED BY OLSON & TERZIAN, P.C.

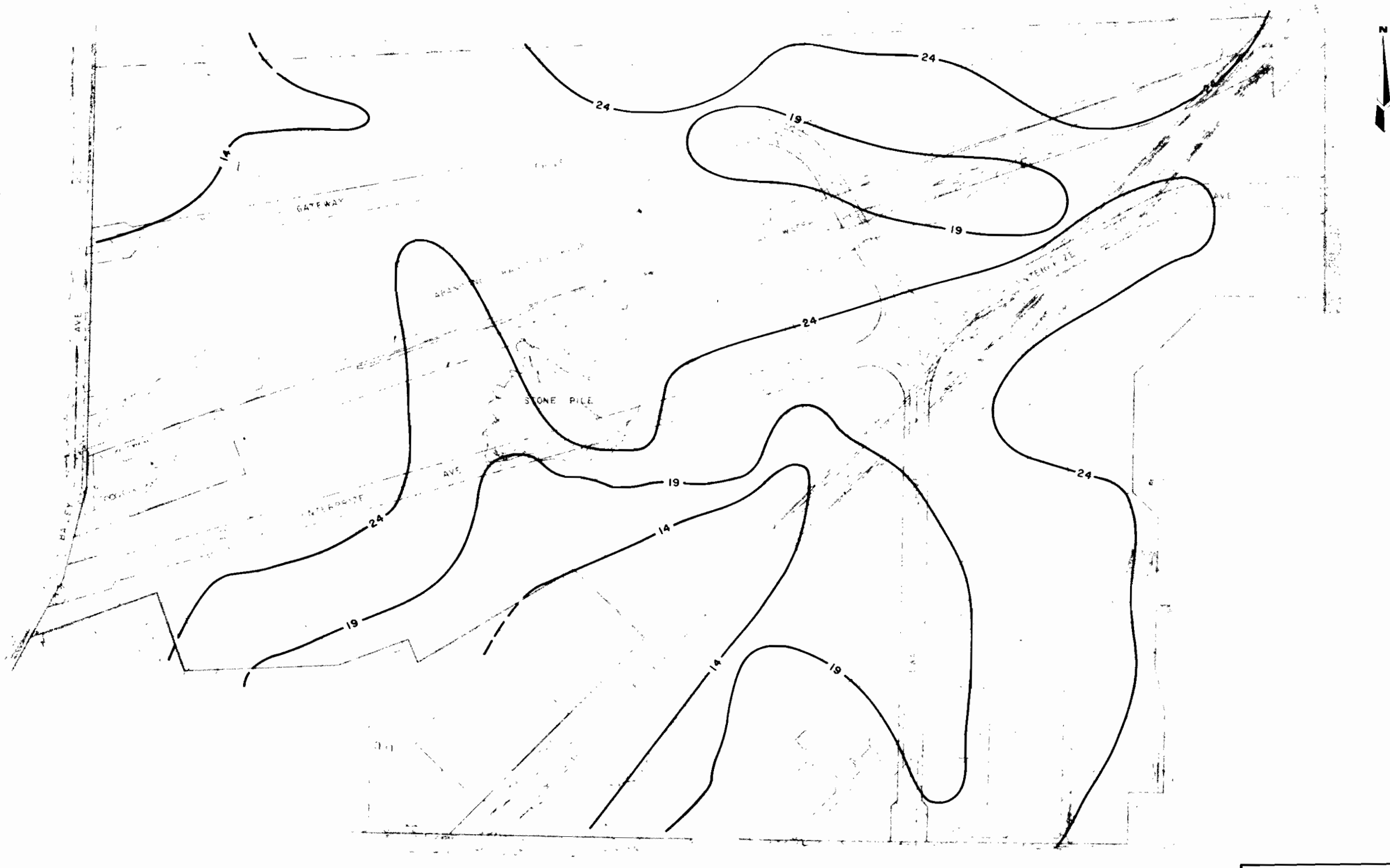
SCALE 0 150 300 450 (ft)

NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

EXISTING LAND USES AND FILL AREAS

JANUARY 1984 FIGURE No. 5

FILE No. R5613/15 DWG. No. GH-8-C



NOTES:

1) BOTTOM OF FILL ELEVATIONS WERE ESTIMATED BY INTERPOLATING WIDELY SPACED EXPLORATION DATA. ACTUAL CONDITIONS MAY DIFFER.

2) ELEVATION CONTOURS ARE PRESENTED AS CITY OF BUFFALO DATUM

3) THIS DRAWING WAS ADAPTED FROM BASE PLAN MAP PREPARED BY OLSON & TERZIAN, P.C.

SCALE 0 150 300 450 (ft.)

GZA

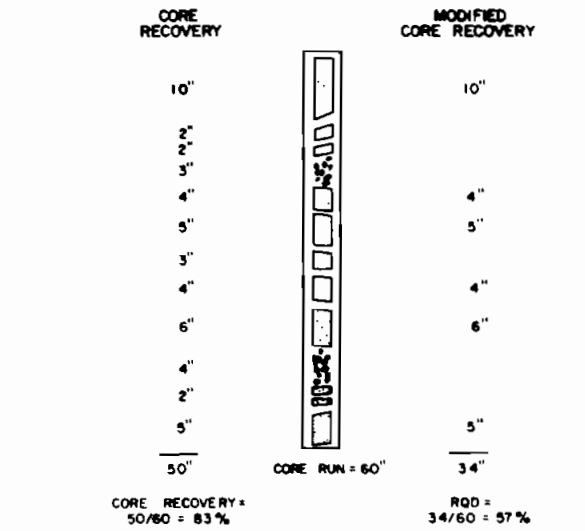
FILE No. R5613/15 DWG. No. GH-9-C

NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

ESTIMATED BOTTOM OF FILL ELEVATION CONTOURS

JANUARY 1984 FIGURE No. 6

ROCK QUALITY DESIGNATION (RQD)



REFERENCE
D.U. DEERE, in Rock Mechanics in Engineering Practice, Stagg & Zienkiewicz, ed., Wiley, 1968

NOTES:

1) Descriptions ond classifications are based on visual inspection of samples and boring operations, unless otherwise noted in the text.
2) The stratum lines are based upon interpolatian between borings and may not represent actual subsurface conditions.
3) Water level readings have been made in the drill holes at times ond under conditions stated an the boring logs. Fluctuations in the level of the ground water may occur due to other factors than those present at the time measurements were made.
4) For a more detailed description of soil and rock types see the boring logs in Appendix A.
5) For boring locotions see figure 4, Exploration Locatian Plan.

KEY TO DENSITY & CONSISTENCY DESCRIPTION OF GRANULAR & COHESIVE SOILS

Number of Blows per ft, N	Relative Density	Number of Blows per ft, N	Consistency
		Below 2	Very soft
0-4	Very loose	2-4	Soft
4-10	Loose	4-8	Medium
10-30	Medium	8-15	Stiff
30-50	Dense	15-30	Very stiff
Over 50	Very dense	Over 30	Hard

SOIL CLASSIFICATION CHART
(UNIFIED SOIL CLASSIFICATION SYSTEM)

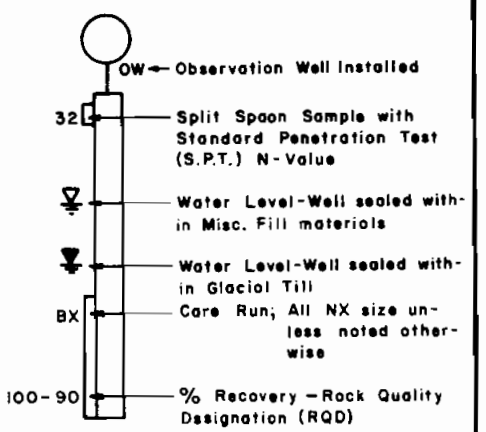
MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS More than 50% of material larger than NO. 200 sieve	GRAVELS More than 50% of coarse fraction larger than NO 4 sieve	Clean Gravels (little or no fines)		GW	Well-graded gravels, gravel-sand mixtures, little or no fines
				GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		Gravels with appreciable amounts of fines		GM	Silty gravels, gravel-sand-silt mixtures
				GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS Less than 50% of coarse fraction larger than NO 4 sieve	Clean Sands (little or no fines)		SW	Well-graded sands, gravelly sands, little or no fines
				SP	Poorly-graded sands, gravelly sands, little or no fines
		Sands with appreciable amounts of fines		SM	Silty sands, sand-silt mixtures
				SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS Less than 50% of material larger than NO 200 sieve	SILTS AND CLAYS Low Plasticity Liquid Limit < 50%			ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
				CL	Inorganic clays of low to medium plasticity gravelly clays, sandy clays, silty clays, lean clays
				OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS High Plasticity Liquid Limit > 50%			MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils
				CH	Inorganic clays of high plasticity, fat clays
				OH	Organic clays of medium to high plasticity, organic silts
	Highly Organic Soils			Pt	Peat, humus, swamp soils with high organic contents
	Miscellaneous Fill			FILL	Miscellaneous fill may belong in any divison but is identified as FILL

Note: Dual symbols indicate borderline soils classifications

ROCK CLASSIFICATION CHART

	On	Onondaga Limestone Formation

LEGEND FOR BORINGS

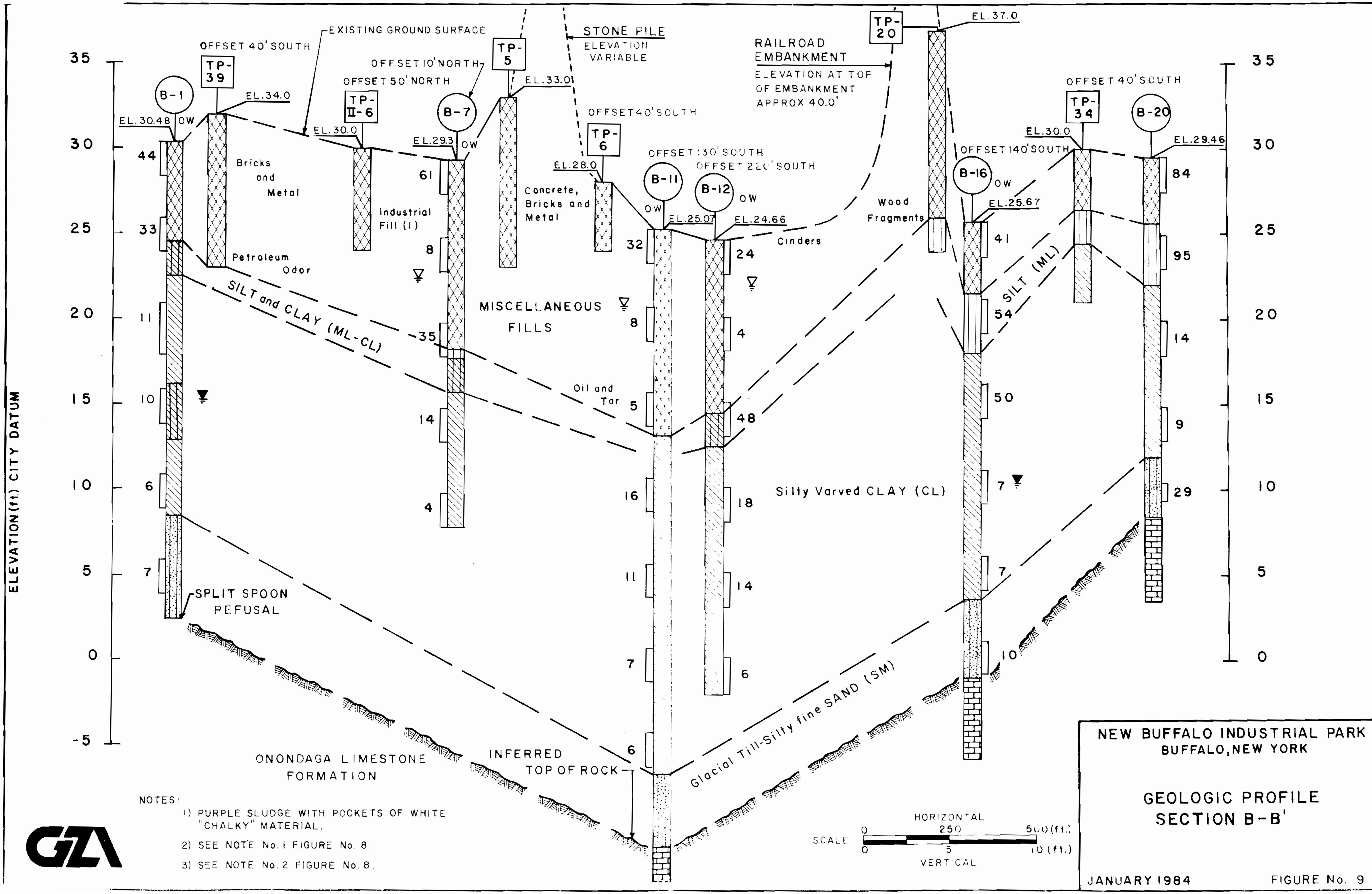


NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

LEGEND FOR GEOLOGIC PROFILES AND BORING LOG SHEETS

FIGURE No. 7

FILE No. R5613/15 DWG. No. GH-4-B



ELEVATION (ft.) CITY DATUM
35
30
25
20
15
10
5
0
-5
EXISTING GROUND SURFACE
OFFSET 40' SOUTH
TP-39
EL.34.0
B-1
EL.30.48
OW
44
33
11
10
6
7
Bricks and Metal
Petroleum Odor
SILT and CLAY (ML-CL)
SPLIT SPOON REFUSAL
OFFSET 50' NORTH
TP-II-6
EL.30.0
Industrial Fill (I.)
OFFSET 10' NORTH
B-7
EL.29.3
OW
61
8
-35
14
4
TP-5
EL.33.0
STONE PILE
ELEVATION VARIABLE
OFFSET 40' SOUTH
TP-6
EL.28.0
Concrete, Bricks and Metal
MISCELLANEOUS FILLS
Oil and Tar
OFFSET: 30' SOUTH
B-11
OW
EL.25.07
32
8
5
16
11
7
6
OFFSET 220' SOUTH
B-12
OW
EL.24.66
24
4
48
18
14
6
Cinders
RAILROAD EMBANKMENT
ELEVATION AT TOP OF EMBANKMENT APPROX 40.0'
TP-20
EL.37.0
Wood Fragments
OFFSET 140' SOUTH
B-16
OW
EL.25.67
41
54
50
7
7
10
SILT (ML)
Silty Varved CLAY (CL)
Glacial Till-Silty fine SAND (SM)
OFFSET 40' SOUTH
TP-34
EL.30.0
B-20
EL.29.46
84
95
14
9
29
ONONDAGA LIMESTONE FORMATION
INFERRED TOP OF ROCK
SCALE
HORIZONTAL
0
250
500 (ft.)
0
5
10 (ft.)
VERTICAL
GZA
FILE No. R5613/15
DWG No. GH-3-B

NOTES:

1) PURPLE SLUDGE WITH POCKETS OF WHITE "CHALKY" MATERIAL.

2) SEE NOTE No. 1 FIGURE No. 8.

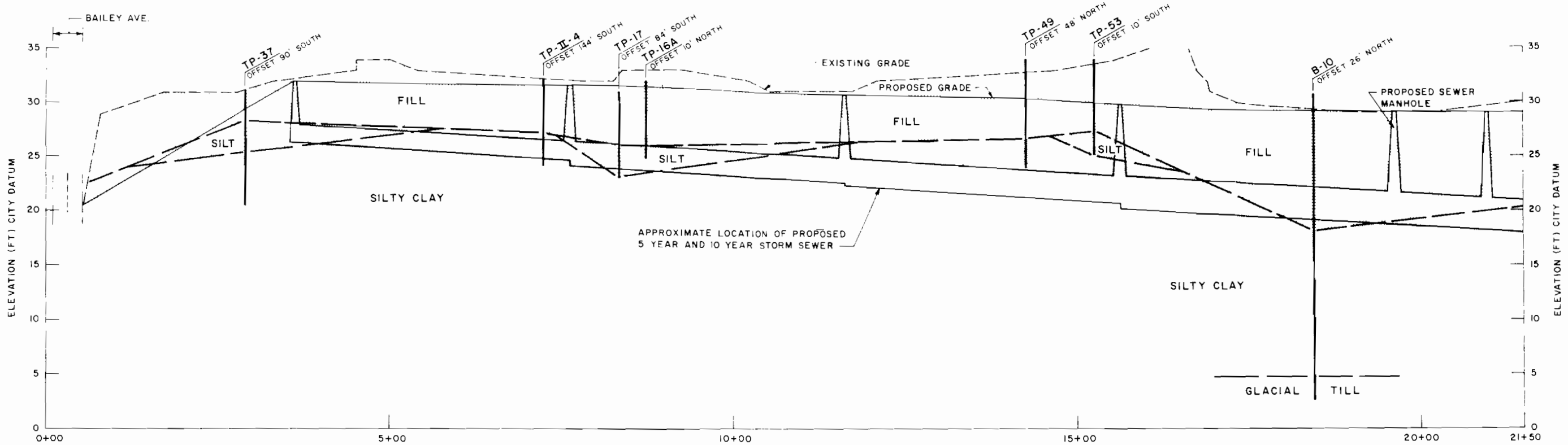
3) SEE NOTE No. 2 FIGURE No. 8.

NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

GEOLOGIC PROFILE
SECTION B-B'

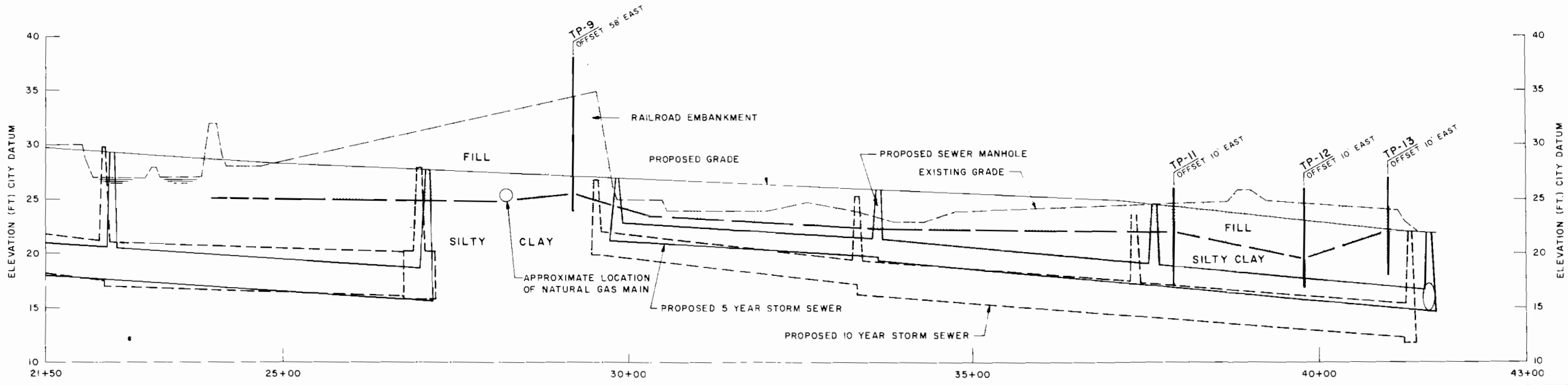
JANUARY 1984

FIGURE No. 9



GATEWAY DRIVE

STA. 0+00 TO STA. 21+50



GATEWAY DRIVE

STA. 21+50 TO STA. 43+00

NOTES:

1) STORM SEWER PROFILE PREPARED BY OLSON & TERZIAN, PC
2) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL AND ROCK TYPES THE ACTUAL TRANSITION MAY BE GRADUAL

SCALE -HORIZONTAL- 0 80 160 240 (ft) -VERTICAL- 0 5 10 15 (ft)

GZA

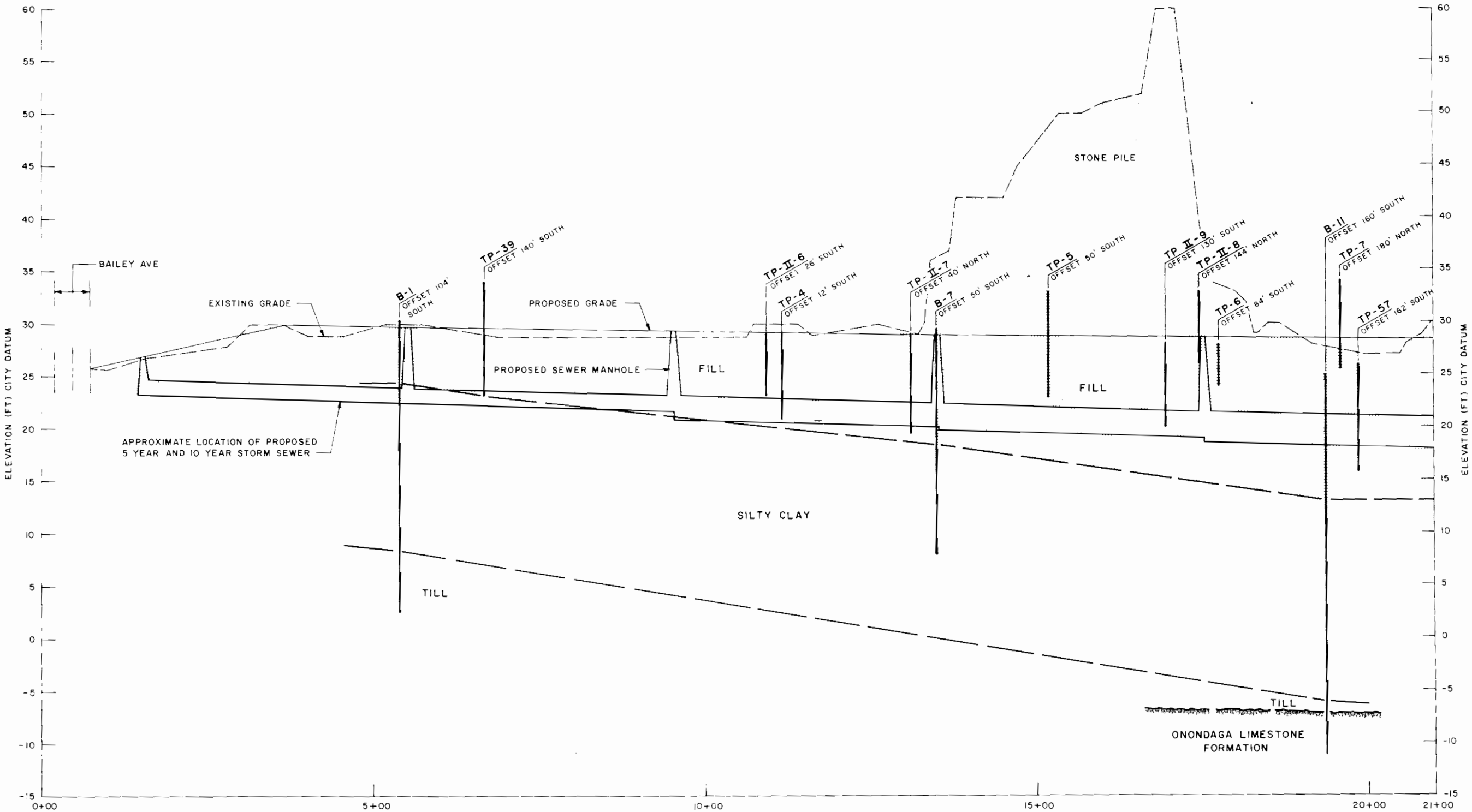
NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

STRATIGRAPHIC PROFILE GATEWAY DRIVE

STA. 0+00 TO STA. 43+00

JANUARY 1984 FIGURE No. 12

FILE No R5613/15 DWG. No. GH-4-C



ENTERPRISE AVENUE

STA. 0+00 TO STA. 21+00

NOTES:

1) STORM SEWER PROFILE PREPARED BY OLSON & TERZIAN, P.C.

2) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL AND ROCK TYPES. THE ACTUAL TRANSITION MAY BE GRADUAL.

SCALE
- HORIZONTAL -
0 80 160 240 (ft)
0 5 10 15 (ft)
- VERTICAL -

GZA

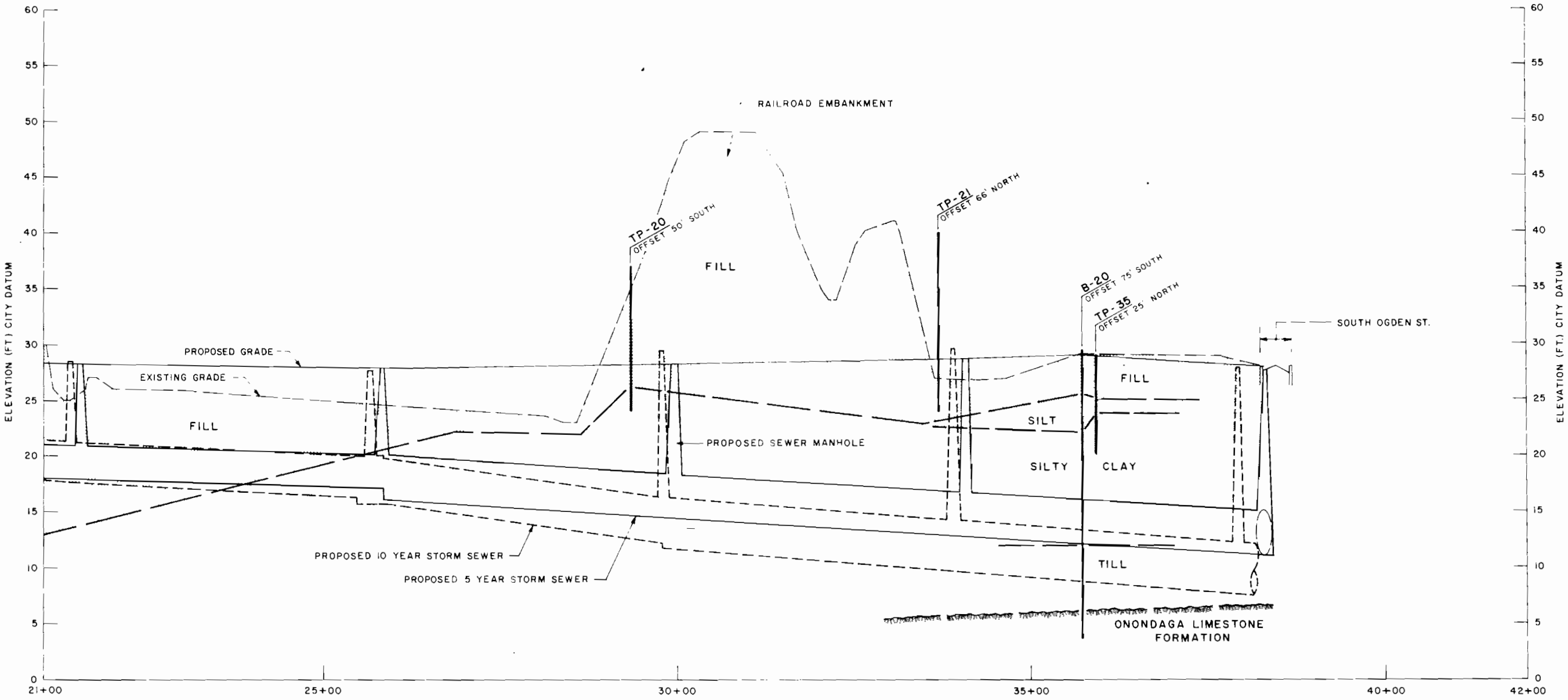
NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

STRATIGRAPHIC PROFILE
ENTERPRISE AVENUE
STA. 0+00 TO STA. 21+00

JANUARY 1984

FIGURE No. 13

FILE No R5613/15 DWG No GH-5-C



ENTERPRISE AVENUE

STA. 21+00 TO STA. 42+00

NOTES

1) STORM SEWER PROFILE PREPARED BY OLSON & TERZIAN, P.C.

2) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL AND ROCK TYPES. THE ACTUAL TRANSITION MAY BE GRADUAL.

SCALE
-HORIZONTAL-
0 80 160 240 (ft)
0 5 10 15 (ft)
-VERTICAL-

GZA

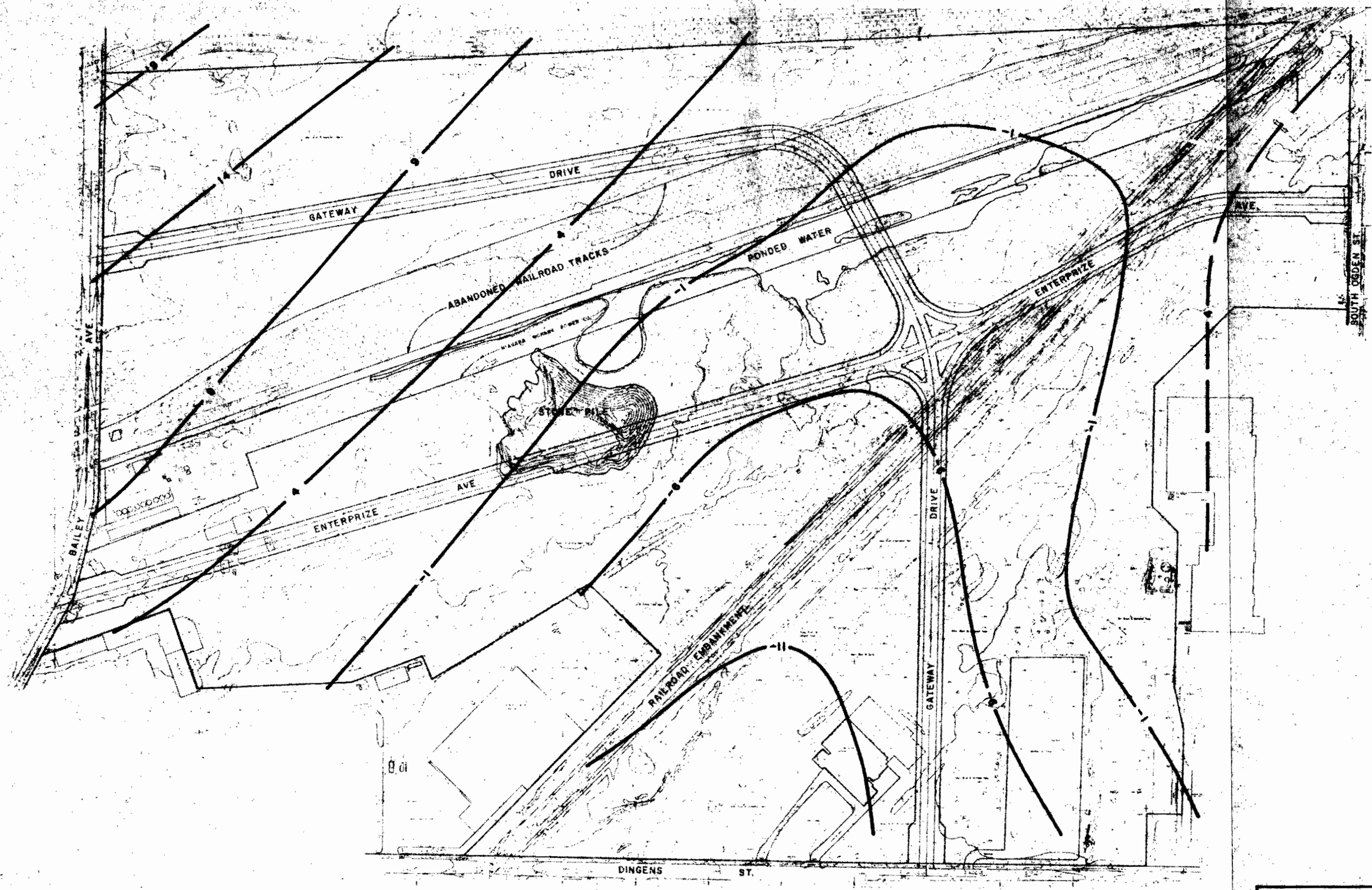
NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

STRATIGRAPHIC PROFILE
ENTERPRISE AVENUE
STA. 21+00 TO STA. 42+00

JANUARY 1984

FIGURE No. 14

FILE No R5613/15 DWG. No. GH-6-C



NOTES:

1) TOP OF ROCK ELEVATION CONTOURS WERE ESTIMATED BY INTERPOLATING WIDELY SPACED EXPLORATION DATA. ACTUAL CONDITIONS MAY DIFFER.

2) ELEVATION CONTOURS ARE PRESENTED AS CITY OF BUFFALO DATUM.

3) THIS DRAWING WAS ADAPTED FROM BASE PLAN MAP PREPARED BY OLSON & TERZIAN, P.C.

SCALE 0 150 300 450 (ft)

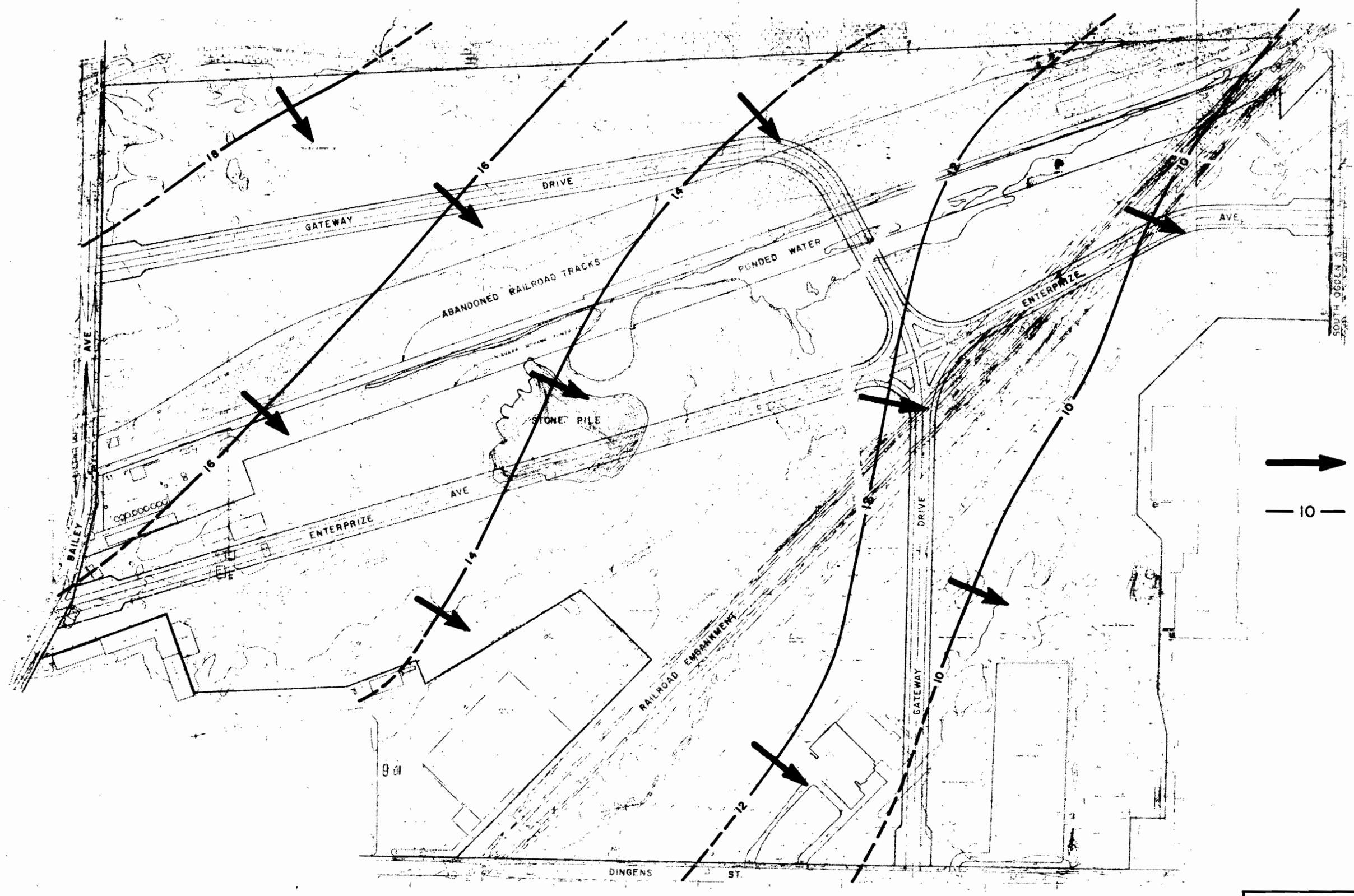
GZA

NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

ESTIMATED TOP OF ROCK CONTOURS

JANUARY 1984 FIGURE No. 10

FILE No. R5615/18 DWG. No. GH-2-C



LEGEND

→ ANTICIPATED GROUND WATER FLOW DIRECTION

— 10 — GROUND WATER ELEVATION CONTOUR CITY OF BUFFALO DATUM

NOTES:

1) GROUND WATER ELEVATION CONTOURS WERE ESTIMATED BY INTERPOLATING WIDELY SPACED EXPLORATION DATA. ACTUAL CONDITIONS MAY DIFFER.

2) THIS DRAWING WAS ADAPTED FROM BASE PLAN MAP PREPARED BY OLSON & TERZIAN, P.C.

SCALE 0 150 300 450 (ft.)

GZA

FILE No. R5613/15 DWG. No. GH-3-C

NEW BUFFALO INDUSTRIAL PARK
BUFFALO, NEW YORK

APPROXIMATE GROUND WATER CONTOURS: CONFINED AQUIFER GLACIAL TILL/ FRACTURED BEDROCK

JANUARY 1984 FIGURE No. 11