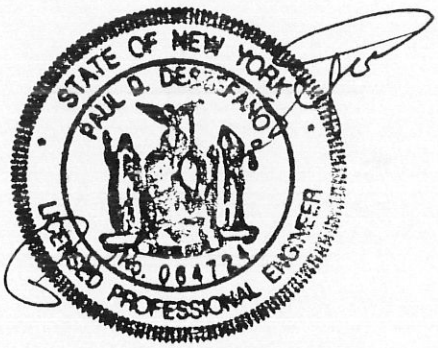
Huntingdon
Consulting Engineers Environmental Scientists

Empire Soils Investigations, Inc., Division
5 Knabner Road
Box 2199
Ballston Spa, New York 12020
(518)899-7491
Fax (518)899-7496

GEOTECHNICAL EVALUATION
PROPOSED MCDONALD'S RESTAURANT
RAMAPO SERVICE AREA
NEW YORK STATE THRUWAY

Prepared For:

C.T. MALE ASSOCIATES, P.C.
50 CENTURY HILL DRIVE
LATHAM, N.Y. 12110



Prepared By:

EMPIRE SOILS INVESTIGATIONS, INC.
BALLSTON SPA, NEW YORK 12020

FILE NO.: ATA-91-192
JANUARY 1992

TABLE OF CONTENTS

GEOTECHNICAL EVALUATION
PROPOSED MCDONALDS RESTAURANT
RAMAPO SERVICE AREA
NEW YORK STATE THRUWAY

I. INTRODUCTION

An investigation and evaluation of a proposed McDonald's Restaurant site at the New York State Thruway Ramapo Service Area was conducted as authorized by C.T. Male Associates, P.C. The purpose of our work was to evaluate the existing subsurface conditions and provide recommendations for the design and construction of building and sign foundations, subsurface drainage and surrounding pavements. Topographic site survey and general layout information was provided by C.T. Male Associates, P.C. The final location of the new restaurant building has not been established at the time of the report. However, the new building is proposed to be located in close proximity to the existing restaurant.

II. PROJECT AND SITE DESCRIPTION

We understand that the existing restaurant building and adjacent pavements located at this site will be demolished and replaced with a new two-story McDonald's Restaurant building, with surrounding parking areas. We also understand that the existing restaurant building contains a partial basement area. It is assumed that the proposed new McDonald's building will not require

construction at the same approximate elevation as the existing building's finished floor. The proposed new building will also require a higher than normal column load capacities due to its special architectural features. For the purpose of computing foundation settlements a maximum column load of 100 kips was assumed.

The site is relatively flat in the vicinity of the proposed building location and adjacent parking area. The entire service area site is relatively level with the adjacent south bound lane of the NYS Thruway and approximately 16 to 18 feet in elevation above the Ramapo River which borders the site to the west.

We understand that the proposed construction will require a subsurface drainage system to prevent stormwater runoff from discharging directly into the Ramapo River. The subsurface drainage system may consist of a combination of seepage pits and leach fields.

III. METHOD OF INVESTIGATION

The site's subsurface conditions were investigated through the advancement of test borings and visual classification of the recovered soil samples. A total of ten (10) test borings were advanced from 10 to 20 feet of depth below existing grades. A technician from our staff established their locations in the field through tape measurements from the existing building and

structures. The locations of these borings were also established to be in close proximity to the proposed building, seepage pits or leach fields and adjacent parking areas. Their locations are illustrated on the Subsurface Investigation Plan contained in Appendix A.

Soil samples were recovered at nominal intervals of five (5) feet or less. The samples were obtained according to ASTM D-1586, Standard Method for Penetration Test and Split-Barrel Sampling of Soils. A truck mounted drill rig equipped with hollow stem augers was used to advance the test borings.

Representative portions of the soil samples recovered in the field were placed in jars and transported to our office for visual classification by a geotechnical engineer. On the basis of these classifications and the driller's field records and observations, a log was prepared for each test boring. The logs are presented in Appendix B together with a sheet which explains the terms and symbols used in their preparation. Laboratory tests were performed on selected soil samples to obtain a representative grain size distribution of the in-situ soils for analysis of general permeability characteristics.

IV. RESULTS OF INVESTIGATION

The soil profiles were generally uniform at all test boring locations. Below the surficial asphalt pavement, the soils consisted of a well graded sand and gravel with little to trace amounts of silt found throughout the depths sampled. The driller noted some cobbles and possible boulders throughout most of the drilling depths. The sand and gravel was generally firm to compact in relative density at varying depths in each test boring.

Groundwater was found within the augers at a depth of 17.5 ft. below grade at test boring B-1 upon completion of drilling. No groundwater was discovered at the other test boring locations and the recovered soil samples were typically damp to moist throughout the sampling depth.

Laboratory results of grain size distribution test on selected soil samples at various depths throughout the site are shown in Appendix C.

V. CONCLUSIONS

Based on the site grade contours and the test borings, it appears that the site was filled with native sand and gravel materials to increase and level grades above the adjacent river for construction of the service area.

The fill and native soils which mantle the project site are considered suitable for the planned development using conventional spread foundations and slab-on-grade construction. The groundwater table is well below the depth where it will influence design and construction of foundations. Foundation excavations are likely to encounter obstructions such as large boulders and cobbles and therefore should be conducted with heavy equipment. The excavated native and fill soils are generally considered suitable for reuse as structural fill. They should, however, be graded to remove any large cobbles and boulders and to verify that they meet the gradation requirements specified for Select Granular material in Section VI.F of this report.

The native sand and gravel is relatively permeable and is considered suitable for construction of seepage pits and leach fields. However, it is our understanding that the site is mantled above an aquifer that serves as a water supply for the surrounding communities. We expect that the aquifer level below the site may be within one to two feet of the adjacent river level which may not provide for adequate separation below the proposed seepage pit or leach field levels according to minimum design standards.

VI. RECOMMENDATIONS

A. Site Preparation

The existing building structure should be demolished and all demolition debris removed together with foundation walls to a minimum of two (2) feet below grade level in existing slab areas and to top of existing footing levels. Existing pavements should be broken and removed to below the base course level at a minimum. The finished floor elevation for the new restaurant should be approximately equal to the existing building's elevation or a minimum of six (6) inches above abutting pavements. A select granular material as specified in paragraph F should be used to complete any grade increases and backfill areas where foundations were removed. In areas where loose fills are encountered below foundation grade, they should be removed and backfilled with a select granular material according to specifications outlined in paragraph F.

B. Foundation Design and Construction

Conventional spread foundations proportioned according to the McDonald's standard net allowable bearing pressure of 2000 pounds per square foot may be used to support the structure. A maximum net allowable bearing pressure of 4,500 pounds per square foot, however, may be used in the interest of economy. All foundations should have a minimum width of twenty four (24) inches even if this

results in a bearing pressure less than the recommended allowable. Exterior foundations should be seated at least four (4) feet below final exterior grades to provide frost protection. Interior foundations may bear at two (2) feet below the top of the floor slab if permitted by local building codes.

The sliding and overturning stability of foundations for any retaining walls, road signs or utility poles should be determined. Assuming adequate drainage provisions and a level backfill, the following parameters may be used for the stability analyses together with a factor of safety of 1.50.

- Maximum Allowable Foundation Edge Pressure 5000 psf
- Equivalent Fluid Weight of Level Backfill

  Active Pressure = 30 pcf

  Passive Pressure = 250 pcf
- Coefficient of Sliding Friction

  Along Base of Foundation = 0.45

Depth of embedment for pole foundations may be analyzed utilizing the following parameters:

- Maximum allowable Lateral Soil Bearing Capacity = 300 psf/ft. of depth
- Allowable Horizontal subgrade reaction constant (n_h) = 20 tons/ft^3)

Excavated foundation subgrades are expected to consist of firm to compact sand and gravel with occasional cobbles or large boulders. All cobbles or boulders greater than 8 inches in diameter should be removed and the remaining voids should be backfilled with Select Granular Fill in accordance with Section VI F. If any soft or organic matter is encountered at bearing grade elevation, they should be undercut to a firm and stable subgrade and backfilled with Select Granular Material in accordance with Section VI F. The loosened foundation bearing grades should be compacted to a density similar to their undisturbed state with vibrating plate or jumping-jack compactors. The final bearing grades should be firm, stable, and free of any loose soil, mud, water and frost.

The foundations should be backfilled with Select Granular Material as specified in paragraph F. Backfilling should be performed simultaneously on either side of foundation walls to prevent creating any unbalanced lateral earth pressures.

Foundation settlements are not expected to exceed one (1) inch. The settlements should occur quickly as each load increment is applied.

C. Floor Slab Design and Construction

The building's floor slabs should be constructed over a base course of processed sand and gravel which conforms to the gradation requirements specified for Type 4 material in Section 304-2.02 of the NYSDOT Standard Specifications. The base course layer should be at least six (6) inches in depth and compacted according to the 95 percent density specification, ASTM D-1557.

The slabs on grade may be designed and constructed following the procedures of the American Concrete Institute or Portland Cement Association using 300 pounds per cubic inch as the vertical modulus of subgrade reaction as determined from a one foot square plate.

D. Pavement Design

The entrance drive and parking lot for the new restaurant may be constructed as flexible pavements. Assuming any truck traffic is confined to a specific area and will not cross parking lot areas, two pavement sections may be employed; a light section for areas restricted to automobile parking and a heavy section for areas subject to truck traffic.

The following materials and specifications are recommended for each:

COURSE	MATERIAL DESCRIPTION	THICKNESS	NYSDOT SPECS
Truck Traffic - Entrance Drive			
Top	Asphaltic Concrete	1 1/2"	Section 401 Type 6
Binder	Asphaltic Concrete	3"	Section 401 Type 3
Base	Crusher-Run Stone	6"	Section 304 Type 2
Subbase	Processed Sand & Gravel	8"	Section 304 Type 4
Auto Traffic - Parking Lot			
Top	Asphaltic Concrete	1 1/2"	Section 401 Type 6
Binder	Asphaltic Concrete	2 1/2"	Section 401 Type 3
Base	Processed Sand & Gravel	8"	Section 304 Type 4

Prior to constructing the pavement sections the subgrade should be regraded to remove ruts and any loose soil. The base and subbase courses should be compacted to the 95 percent ASTM D-1557 density specification. Placement and compaction of the asphaltic concrete should be in accordance with the requirements of Section 400 of the NYSDOT Standard Specifications.

E. Subsurface Drainage

As previously stated, the subsurface soils are generally uniform throughout the site and will provide for good drainage. For design purpose, permeability constants are expected to range from 5×10^{-2} cm/sec to 5×10^{-4} cm/sec. It appears that the more permeable soils may be found in the vicinity of test boring B-4.

However, since an active water supply lies directly below the site, alternative collection, filtration, or barrier systems may be required to prevent possible contamination of the water supply.

The above permeability constants were estimated from laboratory analysis of selected soil samples and through published correlations with grain size distribution. If greater accuracy of soil permeability is required for final design of the subsurface drainage system, we recommend that field permeability testing be performed once the final selection and location of appropriate drainage systems are determined.

F. Site Fill and Backfill Requirements

Fill and backfill for the site should meet the following specifications:

Type	Application	Compaction
Select Granular Fill NYSDOT Section 202-2.02C	Under foundations and adjacent to structure.	Compact in maximum 6" lifts to 95
Select Granular Fill NYSDOT Section 203-2.02C (maximum particle size = 8")	Under grassed areas.	Compact in maximum 12" lifts to 90% ASTM D-1557
Select Granular Fill NYSDOT Section 203-2.02C	Under pavements and building floor slabs	Compact in maximum 8" lifts to 95% ASTM D-1557

Notes:

1. Excavated on-site soils and base course materials may be used as Select Granular Fill provided they meet the gradation requirements specified in NYSDOT Section 203-2.02C with the above exceptions indicated in parenthesis.

VII. CLOSURE

This report has been prepared to assist in the design and construction of a McDonald's Restaurant at the Ramapo Service Area of the NYS Thruway. The recommendations are presented on the basis of our understanding of the project as described herein and through the application of generally accepted soil and foundation engineering practices. No other warranties, expressed or implied, are made. Should there be any modifications in the building

location as presented on the Subsurface Investigation Plan, we should be notified so that we may review the changes and modify our recommendations as required.

It is recommended that the Geotechnical Engineer be provided the opportunity to review the final design and specification to ascertain that the recommendation presented herein have been properly interpreted and applied.

Important information which should be reviewed concerning the use and interpretation of this report is contained in Appendix D.

Submitted by:

EMPIRE SOILS INVESTIGATIONS, INC.

Paul DeStefano, P.E.
Geotechnical Engineering Manager
Eastern Region

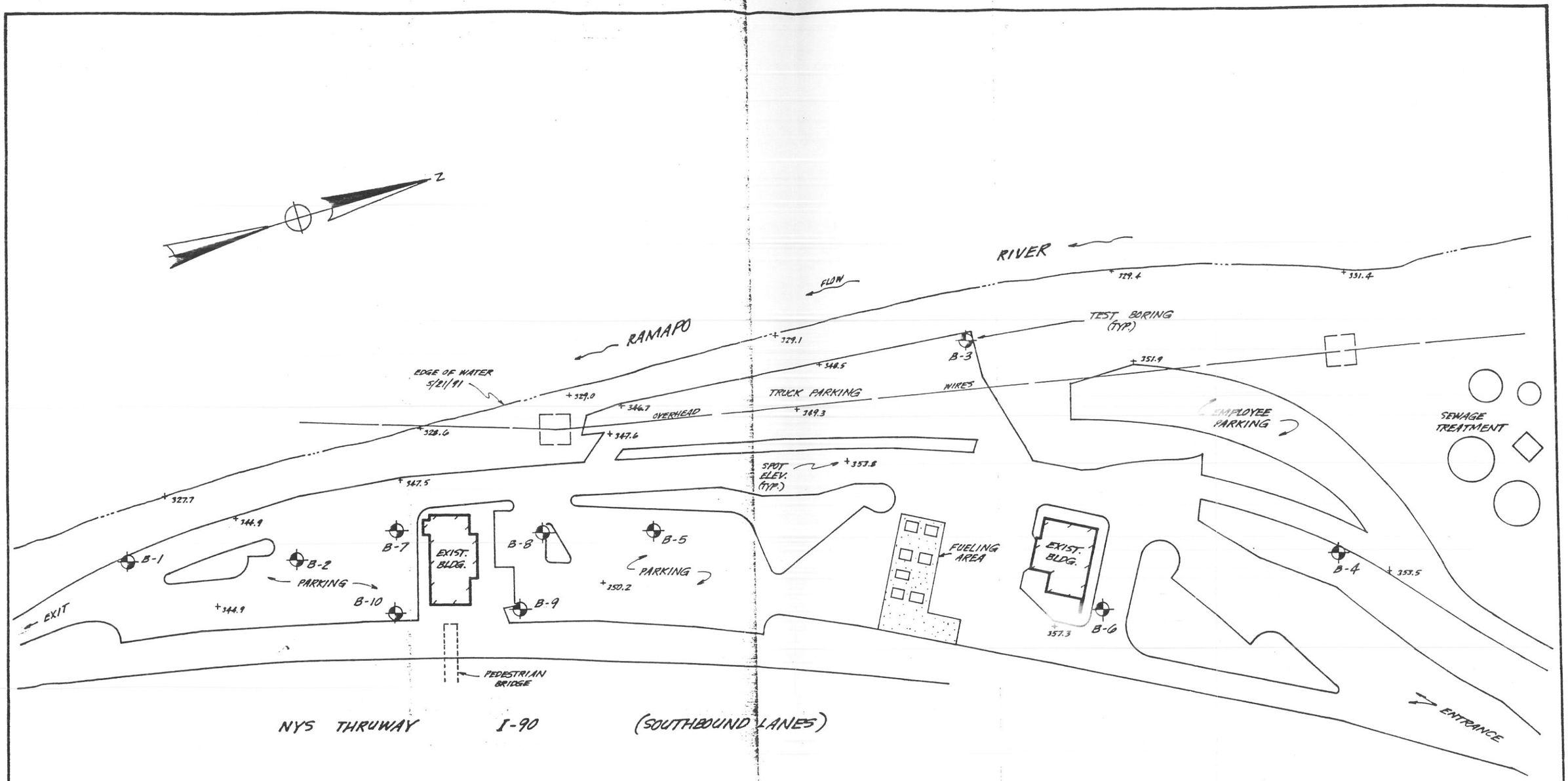
PD:ks

0522rama

SUBSURFACE INVESTIGATION

Ramapo S. A.

APPENDIX A



BASE MAP PREPARED BY C.T. MALE ASSOCIATES, P.C.

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE INVESTIGATION PLAN

PROPOSED McDONALD'S RESTAURANT
NYS THRUWAY
RAMAPO SERVICE AREA

DR. BY: JH	SCALE: 1" = 100'	PROJ. NO.: ATA-91-192
REV'D. BY:	DATE: 5/92	DRWG. NO.: 8

SUBSURFACE LOGS

APPENDIX B

DATE
STARTED 5/7/92
FINISHED 5/7/92
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-1
SURF. ELEV. See Plan
G. W. DEPTH See Note #1

PROJECT Proposed McDonald's Restaurant

LOCATION Ramapo Services Area
Rockland County, N.Y.

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0				18				ASPHALT PAVEMENT .4'±	Note #1: Water level observed at 17.5' of depth in casing at completion of drilling.
		1	17	10		27		Brown fine to coarse SAND and GRAVEL, trace silt	
				29					Note #2: Driller notes cobbles from 4 to 18.5 ft.
5		2	9	13		22			
				15					
10		3	17	16		33		Poor recovery; possible boulder	
				9					
15		4	12	26		38		Trace organics; rootlets	
				36				Becomes Wet	
20		5	37	31		68		(Moist to Wet-Firm to Very Compact)	
								End of Boring @ 20'	

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

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

CLASSIFICATION Visual by Geotechnical Engineer

METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Auger

B.T. Form H

DATE
STARTED 5/7/92
FINISHED 5/7/92
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-2
SURF. ELEV. See Plan
G. W. DEPTH See Note #1

PROJECT Proposed McDonald's Restaurant
NYS Thruway

LOCATION Ramapo Service Area
Rockland County, N.Y.

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0				22				ASPHALT PAVEMENT .4 ft.±	Note #1: No water observed in boring after completion of drilling.
		1	26	25		51		Brown fine to coarse SAND and GRAVEL	
				11					Note #2: Driller notes cobbles from 4.3 to 8.5 ft.
5		2	100/.3					Trace organics and silt	
				10					
10		3	14	32		46		Poor recovery (Damp-Very Compact to Compact)	
								End of Boring @ 10'	
15									

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

CLASSIFICATION Visual by Geotechnical Engineer

METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Augers

B.T. Form H

DATE
STARTED 5/8/92
FINISHED 5/8/92
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-3
SURF. ELEV. See Plan
G. W. DEPTH See Note #1

PROJECT Proposed McDonald's Restaurant
NYS Thruway

LOCATION Ramapo Service Area
Rockland County, N.Y.

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0				12				ASPHALT PAVEMENT .1 ft.±	Note #1: No water observed in boring at completion of drilling.
		1	31	17		48		Brown fine to coarse SAND and GRAVEL trace silt	
				9					
5		2	11	12		23		GRAVEL (Rock Fragments)	Note #2: Driller notes cobbles throughout drilling depth.
				36				Brown SAND, trace silt	
10		3	47	82		129		(Moist-Firm to Compact)	
								End of Boring at 10'	Note #3: Poor recovery of samples throughout drilling depth.

N = No. blows to drive 2 spoon 12 " with 140 lb pin wt falling 30 " per blow
C = No. blows to drive _____ casing _____ " with _____ lb weight falling _____ " per blow
METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Auger

CLASSIFICATION Visual by Geotechnical Engineer

B.T. Form H

DATE
STARTED 5/8/92
FINISHED 5/8/92
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-4
SURF. ELEV. See Plan
G. W. DEPTH See Note #1

PROJECT Proposed McDonald's Restaurant
NYS Thruway

LOCATION Remapo Service Area
Rockland County, N.Y.

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	8	9		19		Brown fine to coarse SAND, Some Gravel, trace silt and organics	Note #1: No water observed in borings at completion of drilling.
			10						
				26					
5		2	28	41		69		Brown fine to coarse SAND, Some Gravel, trace silt	Note #2: Driller noted cobbles throughout drilling depth.
				21					
10		3	19	13		32			
				37					
15		4	23	19		42		No recovery	
				23					
20		5	13	12		25		(Moist to Wet-Firm)	
								End of Boring @ 20'	

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

CLASSIFICATION Visual by Geotechnical Engineer

METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Auger

B.T. Form H

DATE
STARTED 5/6/92
FINISHED 5/6/92
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

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

PROJECT Proposed McDonald's Restaurant
NYS Thruway

LOCATION Ramapo Service Area
Rockland County, N.Y.

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0				11				ASPHALT PAVEMENT .3'±	Note #1: No water observed in boring after completion of drilling
		1	22	47		69		Brown fine to coarse SAND, Some Gravel, trace silt	
5		2	78	100/.2					Note #2: Driller noted cobbles and boulders throughout drilling depth
10		3	9 34	27		61		Becomes Rock fragments	
15		4	32 49	47		96		(Damp-Very Compact)	
		5	100/.2					End of Boring @ 18.2'	
20									

N = No. blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 " per blow
C = No. blows to drive _____ casing _____ " with _____ lb weight falling _____ " per blow
METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Auger

CLASSIFICATION Visual by Geotechnical Engineer

B-T Form H

DATE
STARTED 5/8/92
FINISHED 5/8/92
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-6
SURF. ELEV. See Plan
G. W. DEPTH See Note #1

PROJECT Proposed McDonald's Restaurant
NYS Thruway

LOCATION Remapo Service Area
Rockland County, N.Y.

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0				14				ASPHALT PAVEMENT .4'±	Note #1: No water observed in boring after completion of drilling
		1	12	14		26		Brown fine to coarse SAND, Some Gravel, trace silt	
				4					
5		2	5	14		19			
				10					
10		3	26	28		54		(Moist-Fine to Very Compact)	
								End of Boring @ 10'	

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

CLASSIFICATION Visual by Geotechnical Engineer

METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Augers

B.T. Form H

DATE
STARTED 5/7/92
FINISHED 5/7/92
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-7
SURF. ELEV. See Plan
G. W. DEPTH See Note #1

PROJECT Proposed McDonald's Restaurant
NYS Thruway

LOCATION Remapo Service Area
Rockland County, N.Y.

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0				12				ASPHALT PAVEMENT .4'±	Note #1: No water observed in boring after completion of drilling.
		1	21	100/.2				Brown fine to coarse SAND, Some Gravel, trace silt	
				35					Note #2: Driller noted cobbles to 13.5'
5		2	41	41		82		(Rock Fragments)	
				6					
10		3	32	13		45			
		4	100/.2					(Damp-Very Compact)	
15								End of Boring @ 13.7'	

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

CLASSIFICATION Visual by Geotechnical Engineer

METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Augers

P.T. Form H

DATE
STARTED 5/7/92
FINISHED 5/7/92
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-8
SURF. ELEV. See Plan
G. W. DEPTH See Note #1

PROJECT Proposed McDonald's Restaurant
NYS Thruway

LOCATION Rampo Service Area
Rockland County, N.Y.

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0				19				ASPHALT PAVEMENT .3'±	Note #1: No water observed in test boring at completion of drilling.
		1	11	21		32		Brown fine to coarse SAND, Some Gravel, trace silt	
		2		17					Note #2: Driller noted cobbles and boulders throughout drilling depth.
5				100/.3					
				8					
10		3	6	8		14		Poor Recovery	
				12					
15		4	21	24		45		(Damp-Compact)	
								End of Boring @ 15'	

N = No. blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 "per blow
C = No. blows to drive _____ casing _____ " with _____ lb weight falling _____ "per blow
METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Augers

CLASSIFICATION Visual by Geotechnical Engineer

B.T. Form H

DATE
STARTED 5/7/92
FINISHED 5/7/92
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-9
SURF. ELEV. See Plan
G. W. DEPTH See Note #1

PROJECT Proposed McDonald's Restaurant
NYS Thruway

LOCATION Ramapo Service Area
Rockland County, N.Y.

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0				8				ASPHALT PAVEMENT .3'±	Note #1: No water observed in boring after completion of drilling.
		1	11	14		25		Brown fine to coarse SAND and GRAVEL trace silt	
				22					Note #2: Driller noted cobbles to 12.5' of depth
5		2	24	31		55			
				6					
10		3	10	11		21			
		4	100/.3					(Damp-Firm)	
15								End of Boring @ 13.8'	

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

CLASSIFICATION Visual by Geotechnical Engineer

METHOD OF INVESTIGATION 3½" I.D. Hollow Stem Augers

DATE
STARTED 5/7/92
FINISHED 5/7/92
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. B-10
SURF. ELEV. See Plan
G. W. DEPTH See Note #1

PROJECT Proposed McDonald's Restaurant
NYS Thruway

LOCATION Ramapo Service Area
Rockland County, N.Y.

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0				10				ASPHALT PAVEMENT .3'±	Note #1: No water observed in boring at completion of drilling
		1	8	13		21		Brown fine to coarse SAND and GRAVEL, trace silt	
5		2	16	47		58			Note #2: Driller noted cobbles to 13.5' of depth
			11						
		3	8	7		15			
10			8						
				12					
15		4	11	10		21		(Damp-Firm)	
								End of Boring @ 15'.	

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

CLASSIFICATION Visual by Geotechnical Engineer

METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Auger

B.T. Form H

DATE
STARTED 5-1-86
FINISHED 5-1-86
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. B-175
SURF. ELEV. 325.6
G. W. DEPTH See Note #1

Project _____ LOCATION _____

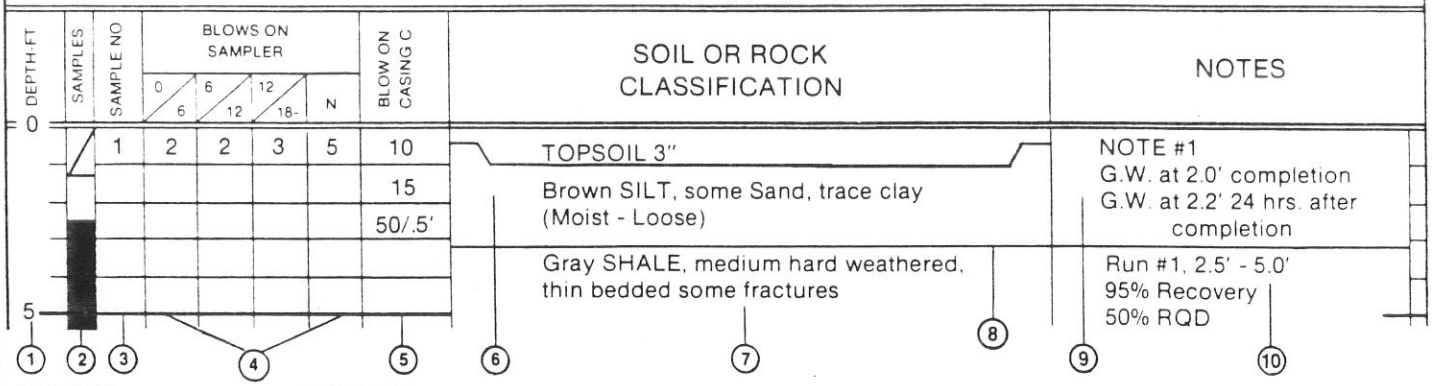


TABLE I

- Split Spoon Sample
- Shelby Tube Sample
- Auger or Test Pit Sample
- Rock Core

TABLE II

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on basis of plasticity.

Soil Type	Soil Particle Size	
Boulder	> 12"	Coarse Grained (Granular)
Cobble	3" - 12"	
Gravel - Coarse	3" - ¾"	
- Fine	¾" - #4	
Sand - Coarse	#4 - #10	
- Medium	#10 - #40	
- Fine	#40 - #200	
Silt-Non Plastic (Granular) Clay-Plastic (Cohesive)	<#200	Fine Grained

TABLE III

The following terms are used in classifying soils consisting of mixtures of two or more soil types. The estimate is based on weight of total sample.

Term	Percent of Total Sample
"and"	35 - 50
"some"	20 - 35
"little"	10 - 20
"trace"	less than 10

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

TABLE IV

The relative compactness or consistency is described in accord with the following terms.

Granular Soils		Cohesive Soils	
Term	Blows per Foot, N	Term	Blows per Foot, N
Loose	< 11	Very Soft	< 3
Firm	11 - 30	Soft	3 - 5
Compact	31 - 50	Medium	6 - 15
Very Compact	> 51	Stiff	16 - 25
		Hard	> 26

(Large particles in the soils will often significantly influence the blows per foot recorded during the Penetration Test.)

TABLE V

Varved	- Horizontal uniform layers or seams of soil(s).
Layer	- Soil deposit more than 6" thick.
Seam	- Soil deposit less than 6" thick.
Parting	- Soil deposit less than ¼" thick.
Laminated	- Irregular, horizontal and angled seams and partings of soil(s).

TABLE VI

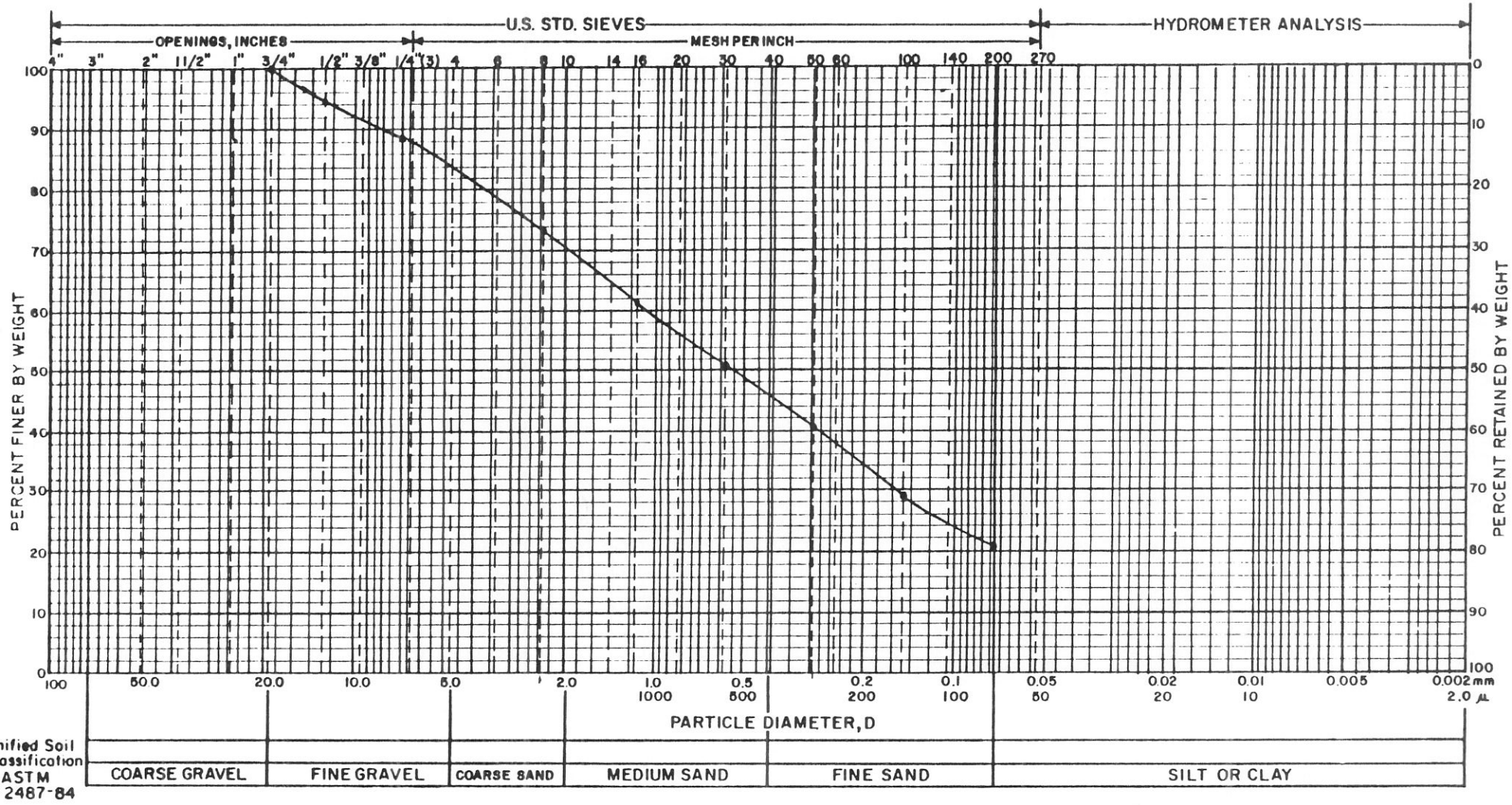
Rock Classification Terms Term		Meaning	
Hardness	Soft	Scratched by fingernail	
	Medium Hard	Scratched easily by penknife	
	Hard	Scratched with difficulty by penknife	
	Very Hard	Cannot be scratched by penknife	
Weathering	Very Weathered	Judged from the relative amounts of disintegration iron staining, core recovery, clay seams, etc.	
	Weathered		
	Sound		
Bedding	Laminated	Natural breaks in Rock Layers	(<1")
	Thin bedded		(1" - 4")
	Bedded		(4" - 12")
	Thick bedded		(12" - 36")
	Massive		(>36")

(Fracturing refers to natural breaks in the rock oriented at some angle to the rock layers.)

LABORATORY RESULTS

APPENDIX C

PARTICLE SIZE DISTRIBUTION CURVE



SAMPLE INFORMATION:

Boring No. 1, Sample No. 4

Depth = 13.5'-15'

Fine to coarse SAND Some Silt, little fine gravel

☐ **Insufficient Sample Size per ASTM D 422**

EMPIRE SOILS INVESTIGATIONS INC.

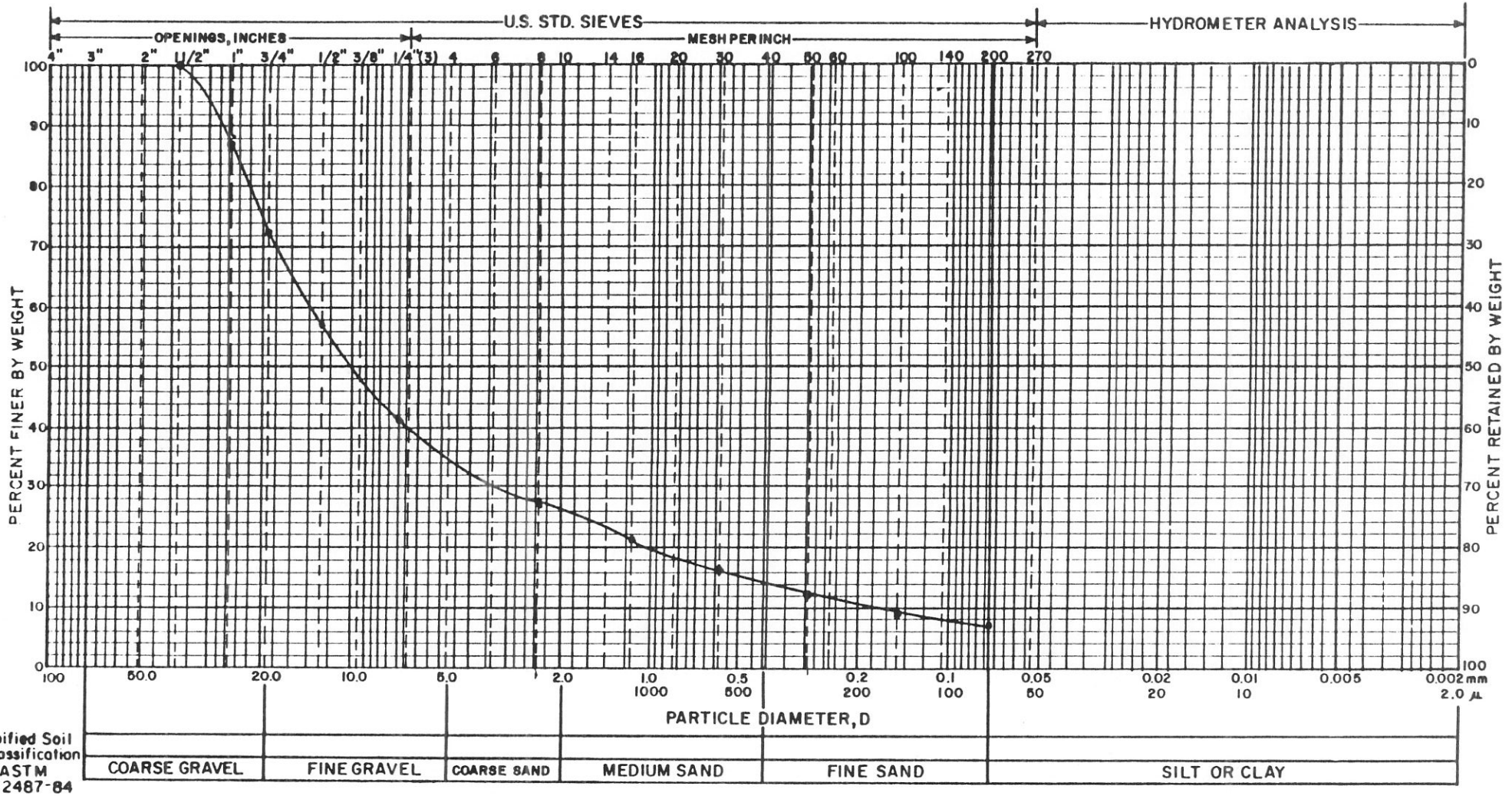
PARTICLE SIZE ANALYSIS

MCDONALDS RESTAURANT

RAMAPO

DR.BY: SB	CK'D.	DATE: 5/18/92	PROJ. NO. ATA-91-192

PARTICLE SIZE DISTRIBUTION CURVE



SAMPLE INFORMATION:

Boring No. 4; Samaple No. 3

Depth = 8.5'-10'

Fine to coarse GRAVEL with Some fineto coarse Sand, trace silt

☐ **Insufficient Sample Size per ASTM D 422**

EMPIRE SOILS INVESTIGATIONS INC.

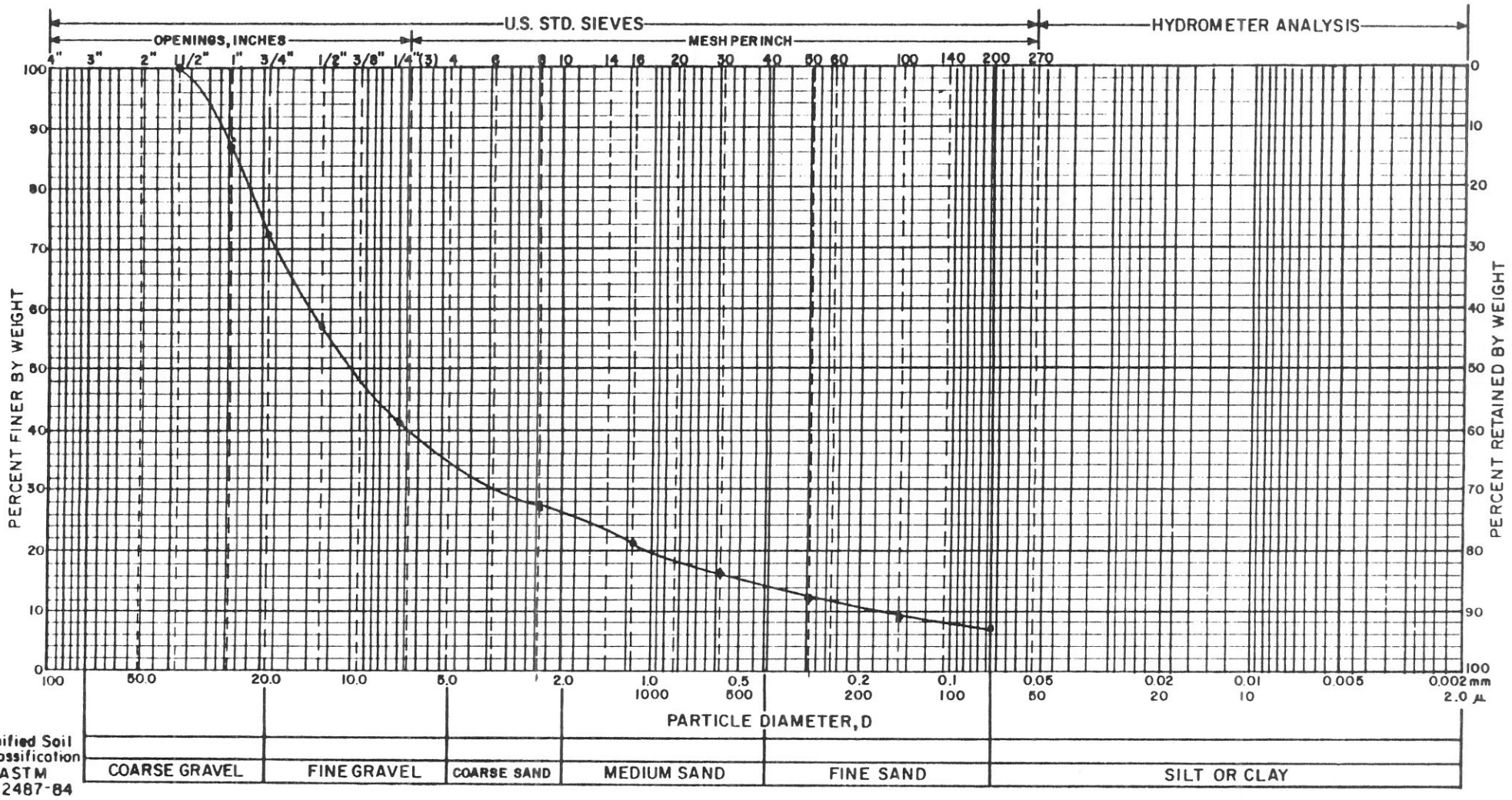
PARTICLE SIZE ANALYSIS

MCONDALDS RESTAURANT

RAMAPO

DR. BY: SB	CK'D.	DATE: 5/18/92	PROJ. NO. ATA-91-192

PARTICLE SIZE DISTRIBUTION CURVE



SAMPLE INFORMATION:

Boring No. 4; Samaple No. 3

Depth = 8.5'-10'

Fine to coarse GRAVEL with Some fineto coarse Sand, trace silt

☐ **Insufficient Sample Size per ASTM D 422**

EMPIRE SOILS INVESTIGATIONS INC.

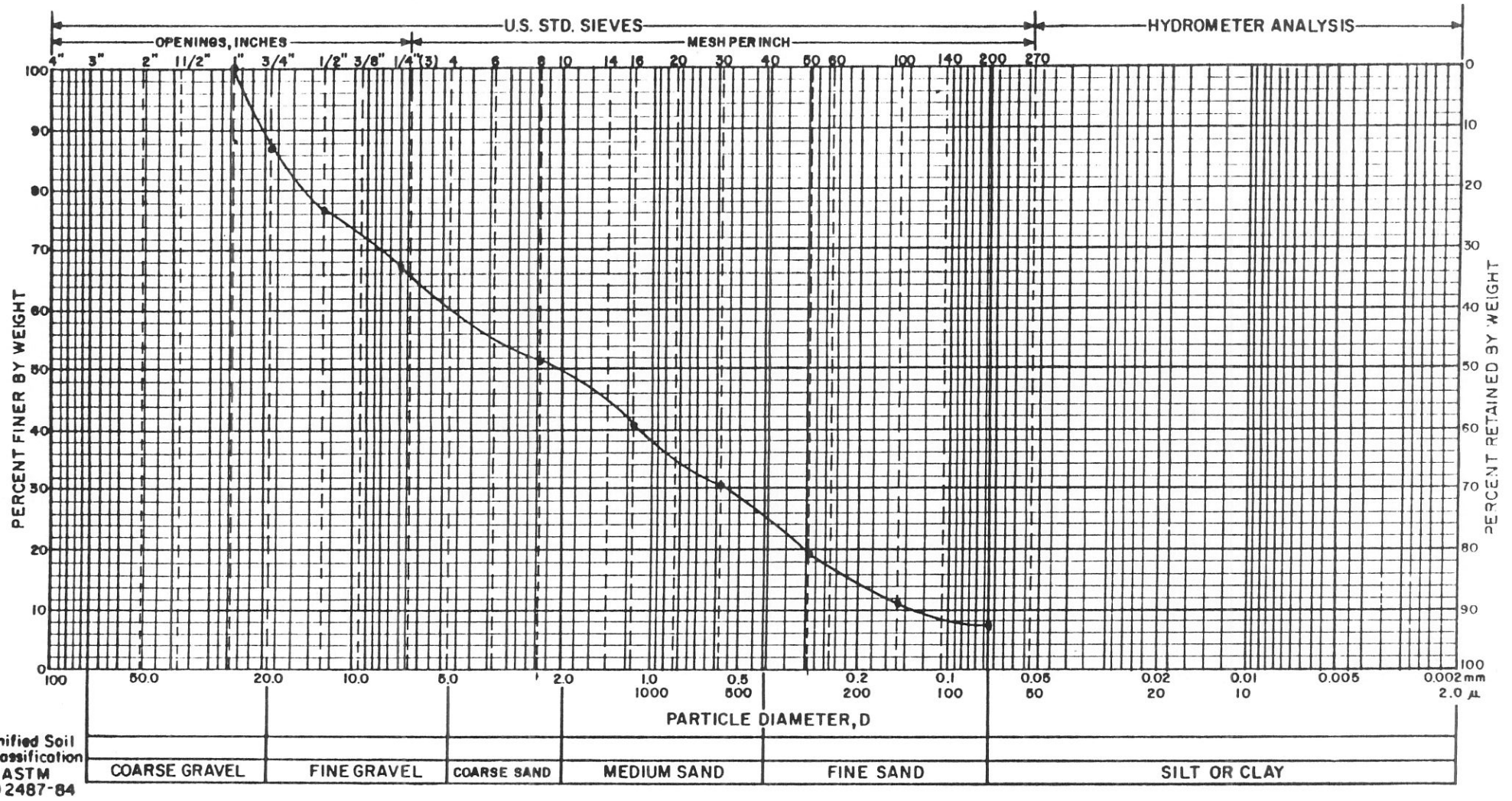
PARTICLE SIZE ANALYSIS

MCONDALDS RESTAURANT

RAMAPO

DR. BY: SB	CK'D.	DATE: 5/18/92	PROJ. NO. ATA-91-192

PARTICLE SIZE DISTRIBUTION CURVE



SAMPLE INFORMATION:

Boring No. 5; Sample No. 4

Depth = 15'-16.5'

Fine to coarse SAND and GRAVEL, trace silt

☐ **Insufficient Sample Size per ASTM D 422**

EMPIRE SOILS INVESTIGATIONS INC.

PARTICLE SIZE ANALYSIS

MCDONALDS RESTAURANT

RAMAPO

DR. BY: SB	CK'D.	DATE: 5/18/92	PROJ. NO. ATA-91-192

IMPORTANT INFORMATION ABOUT
YOUR GEOTECHNICAL ENGINEERING REPORT

APPENDIX D

IMPORTANT INFORMATION
ABOUT YOUR
GEOTECHNICAL ENGINEERING REPORT

More construction problems are caused by site subsurface conditions than any other factor. As troublesome as subsurface problems can be, their frequency and extent have been lessened considerably in recent years, due in large measure to programs and publications of ASFE/ The Association of Engineering Firms Practicing in the Geosciences.

The following suggestions and observations are offered to help you reduce the geotechnical-related delays, cost-overruns and other costly headaches that can occur during a construction project.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

A geotechnical engineering report is based on a subsurface exploration plan designed to incorporate a unique set of project-specific factors. These typically include: the general nature of the structure involved, its size and configuration; the location of the structure on the site and its orientation; physical concomitants such as access roads, parking lots, and underground utilities, and the level of additional risk which the client assumed by virtue of limitations imposed upon the exploratory program. To help avoid costly problems, consult the geotechnical engineer to determine how any factors which change subsequent to the date of the report may affect its recommendations.

Unless your consulting geotechnical engineer indicates otherwise, *your geotechnical engineering report should not be used*:

- When the nature of the proposed structure is changed, for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one;
- when the size or configuration of the proposed structure is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership, or
- for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems which may develop if they are not consulted after factors considered in their report's development have changed.

MOST GEOTECHNICAL "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site exploration identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are extrapolated by geotechnical engineers who then render an opinion about overall subsurface conditions, their likely reaction to proposed construction activity, and appropriate foundation design. Even under optimal circumstances actual conditions may differ from those inferred to exist, because no geotechnical engineer, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. *Nothing can be done to prevent the unanticipated, but steps can be taken to help minimize their impact.* For this reason, *most experienced owners retain their geotechnical consultants through the construction stage*, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

SUBSURFACE CONDITIONS CAN CHANGE

Subsurface conditions may be modified by constantly-changing natural forces. Because a geotechnical engineering report is based on conditions which existed at the time of subsurface exploration, *construction decisions should not be based on a geotechnical engineering report whose adequacy may have been affected by time.* Speak with the geotechnical consultant to learn if additional tests are advisable before construction starts.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Geotechnical engineers' reports are prepared to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Unless indicated otherwise, this report was prepared expressly for the client involved and expressly for purposes indicated by the client. Use by any other persons for any purpose, or by the client for a different purpose, may result in problems. *No individual other than the client should apply this report for its intended purpose without first conferring with the geotechnical engineer. No person should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.*

IMPORTANT INFORMATION
ABOUT YOUR
GEOTECHNICAL ENGINEERING REPORT

More construction problems are caused by site subsurface conditions than any other factor. As troublesome as subsurface problems can be, their frequency and extent have been lessened considerably in recent years, due in large measure to programs and publications of ASFE/ The Association of Engineering Firms Practicing in the Geosciences.

The following suggestions and observations are offered to help you reduce the geotechnical-related delays, cost-overruns and other costly headaches that can occur during a construction project.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

A geotechnical engineering report is based on a subsurface exploration plan designed to incorporate a unique set of project-specific factors. These typically include: the general nature of the structure involved, its size and configuration; the location of the structure on the site and its orientation; physical concomitants such as access roads, parking lots, and underground utilities, and the level of additional risk which the client assumed by virtue of limitations imposed upon the exploratory program. To help avoid costly problems, consult the geotechnical engineer to determine how any factors which change subsequent to the date of the report may affect its recommendations.

Unless your consulting geotechnical engineer indicates otherwise, *your geotechnical engineering report should not be used:*

- When the nature of the proposed structure is changed, for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one;
- when the size or configuration of the proposed structure is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership, or
- for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems which may develop if they are not consulted after factors considered in their report's development have changed.

MOST GEOTECHNICAL "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site exploration identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are extrapolated by geotechnical engineers who then render an opinion about overall subsurface conditions, their likely reaction to proposed construction activity, and appropriate foundation design. Even under optimal circumstances actual conditions may differ from those inferred to exist, because no geotechnical engineer, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. *Nothing can be done to prevent the unanticipated, but steps can be taken to help minimize their impact.* For this reason, *most experienced owners retain their geotechnical consultants through the construction stage,* to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

SUBSURFACE CONDITIONS CAN CHANGE

Subsurface conditions may be modified by constantly-changing natural forces. Because a geotechnical engineering report is based on conditions which existed at the time of subsurface exploration, *construction decisions should not be based on a geotechnical engineering report whose adequacy may have been affected by time.* Speak with the geotechnical consultant to learn if additional tests are advisable before construction starts.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Geotechnical engineers' reports are prepared to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Unless indicated otherwise, this report was prepared expressly for the client involved and expressly for purposes indicated by the client. Use by any other persons for any purpose, or by the client for a different purpose, may result in problems. *No individual other than the client should apply this report for its intended purpose without first conferring with the geotechnical engineer. No person should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.*