

City Of Oshawa
TOTTEN SIMS HUBICKI ASSOCIATES LIMITED
1500 Hopkins Street
WHITBY, Ontario
L1N 2C3

GEOCRESS No:
30M15-114

PRELIMINARY SOIL INVESTIGATION
ALBERT STREET BRIDGE
OSHAWA, ONTARIO

Job No. 2753

SEPTEMBER 1982





SITE INVESTIGATION SERVICES LIMITED

677 CROWN DRIVE PETERBOROUGH, ONT. PHONE 743-6850

September 28, 1982

Job 2753

Totten Sims Hubicki Assoc. Limited
1500 Hopkins Street
WHITBY, Ontario
L1N 2C3

Attention: Mr. David L. Babbs, P. Eng.

Dear Sir: Re: Albert Street Bridge, Oshawa
 Preliminary Soil Investigation

A preliminary soil investigation has been completed at the above site to obtain information for planning and costing of a replacement structure for the existing timber bridge. Information obtained from two borings is described in this letter-report and factors to consider in the design and construction of embankments and foundations are discussed.

The study was authorized by Mr. David L. Babbs of Totten Sims Hubicki Associates in a letter dated September 23, 1982.

FIELD WORK

Two borings were completed in abutment areas (see Figure 2 for location) using a truck-mounted power drill equipped with hollow stem augers. Samples were obtained with 2-inch diameter "split spoons" driven in accordance with standard penetration test procedures.

Groundwater levels on September 24, 1982 were determined by measurement in the open boreholes.

September 28, 1982

SITE CONDITIONS

General - The railway track at the bridge is in a cut that extends roughly 8 to 10 feet below the original ground level. Some fill has been added to the ground surface in both abutment areas.

A soil profile is shown on Figure 1 and more detailed soil descriptions and field test data are provided on Figures 3 and 4. Particle size analyses of typical samples are shown on Figures 5 and 6.

Soil Profile - Soils above elevations 40 feet at Borehole #1 and 38 feet at Borehole #2 consist of fill and topsoil. Native soil below the topsoil level consist primarily of stony sandy silt till that contains a trace to some clay and occasional cobbles. However, there are some lenses or seams of layered silts, sands and gravels within the till. At Borehole #2 these sand seams are a few inches thick. At Borehole #1, however, most of the soil between elevation 36.0 and 25.5 feet consists of layered soils within the range of sandy silt to silty gravelly sand.

Soil Density - The upper 2 to 3 feet of the native till soils is classified as dense on the basis of standard penetration resistances of 25 to 27 blows per foot. The remainder of the till and the lenses of layered soil within the till is very dense with penetration resistances of 69 to more than 100 blows per foot. The density increases with depth.

Both boreholes were terminated in extremely dense till soil when auger progress became very slow.

Groundwater - The groundwater level at Borehole #1 was 11.8 feet below the ground surface on September 24, 1982. This is near the ditch level of the railway.

DESIGN AND CONSTRUCTION CONSIDERATIONS

General - We understand that a four span structure is proposed and that approach fills will be 16 to 18 feet high.

September 28, 1982

Footings - The undisturbed dense to very dense native till soils and the layered soil lenses within the till are ideal for supporting the structure on conventional footings. An allowable bearing pressure of 5 tons per square foot can be assumed for preliminary design purposes.

Excavations - Excavation above the groundwater table and excavations in sandy silt till below the groundwater table should be straightforward with little or no sloughing expected. However, some sloughing can be expected where sandier lenses are encountered below the groundwater table. Generally we expect that such sloughing will occur slowly enough to permit placement of a covering skim coat of concrete or gravel bed without the need for dewatering. Some dewatering with sumps or other procedures may be required to control sloughing if coarse lenses are encountered.

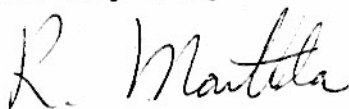
Approach Fills - The subsoils are competent to carry the approach fills without significant settlement. Side slopes of the fill can be the steepest feasible consistent with the type of fill or slope erosion protection provided.

ADDITIONAL STUDIES

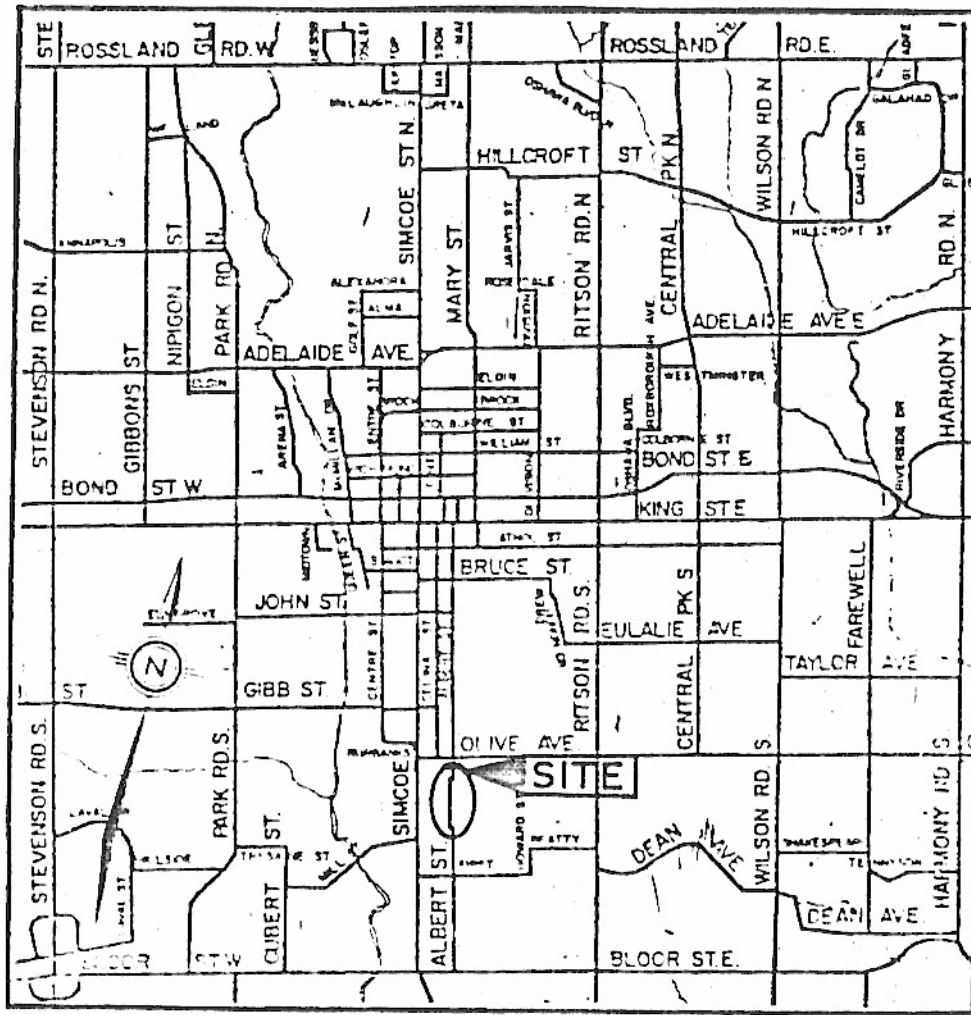
Some additional soil investigation work may be required for final design. The adequacy of available data should be reviewed when more detailed design information is available.

I trust that the information provided is adequate for your preliminary design requirements. Should you have any queries, however, or should you wish to proceed with final design studies, please do not hesitate to contact me.

Yours very truly



Robert E. Marttila, P. Eng.
Consulting Geotechnical Engineer



SITE INVESTIGATION SERVICES LIMITED

ALBERT STREET BRIDGE

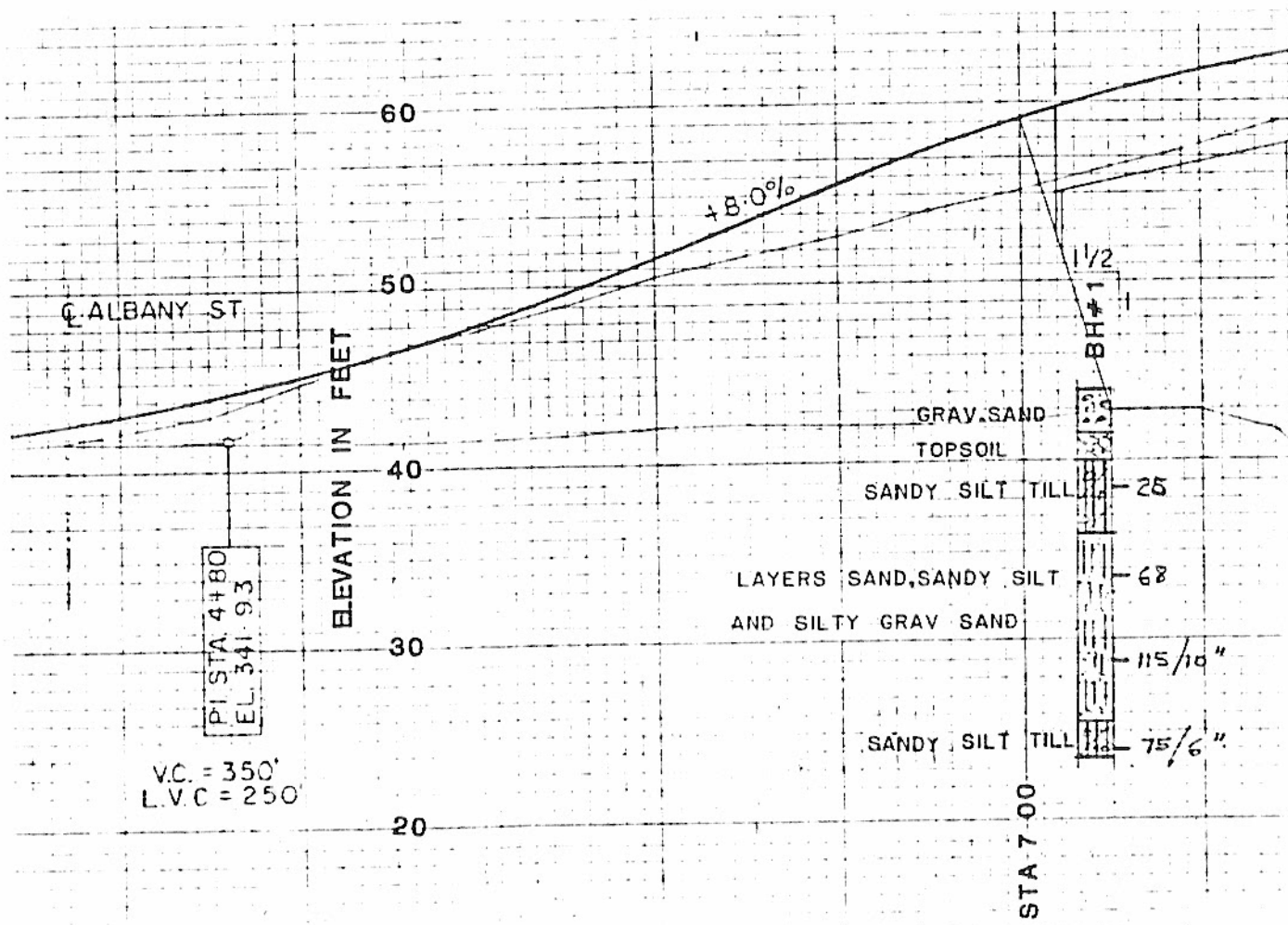
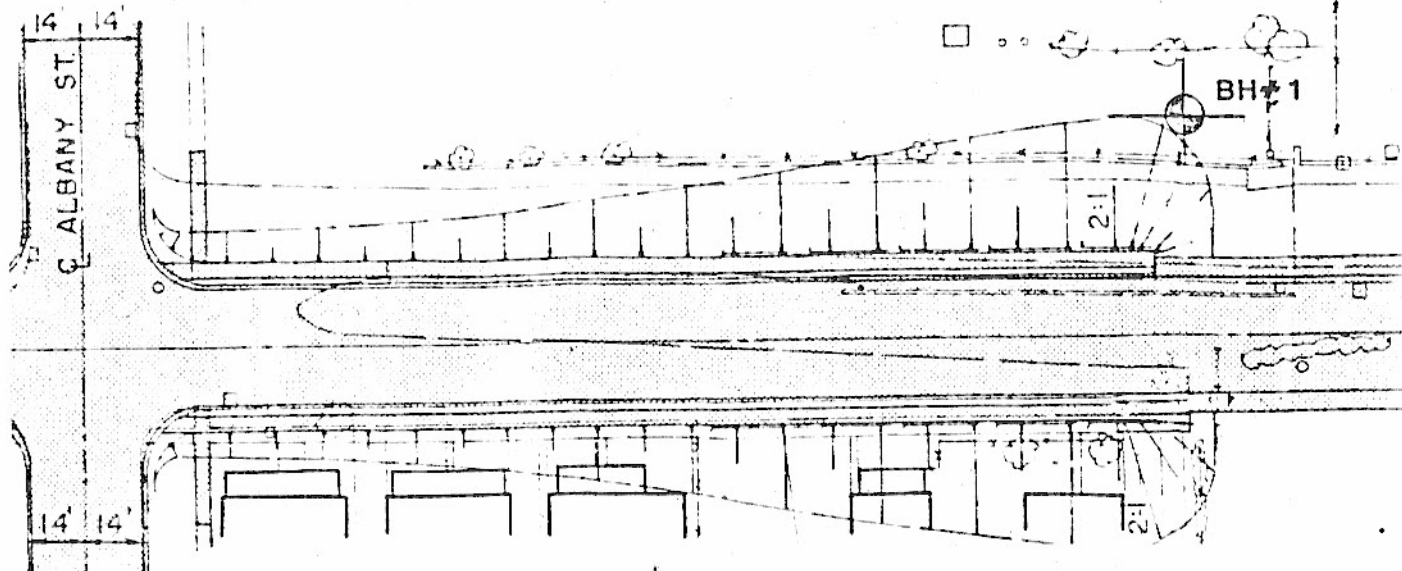
KEY PLAN

SCALE: 1:25,000

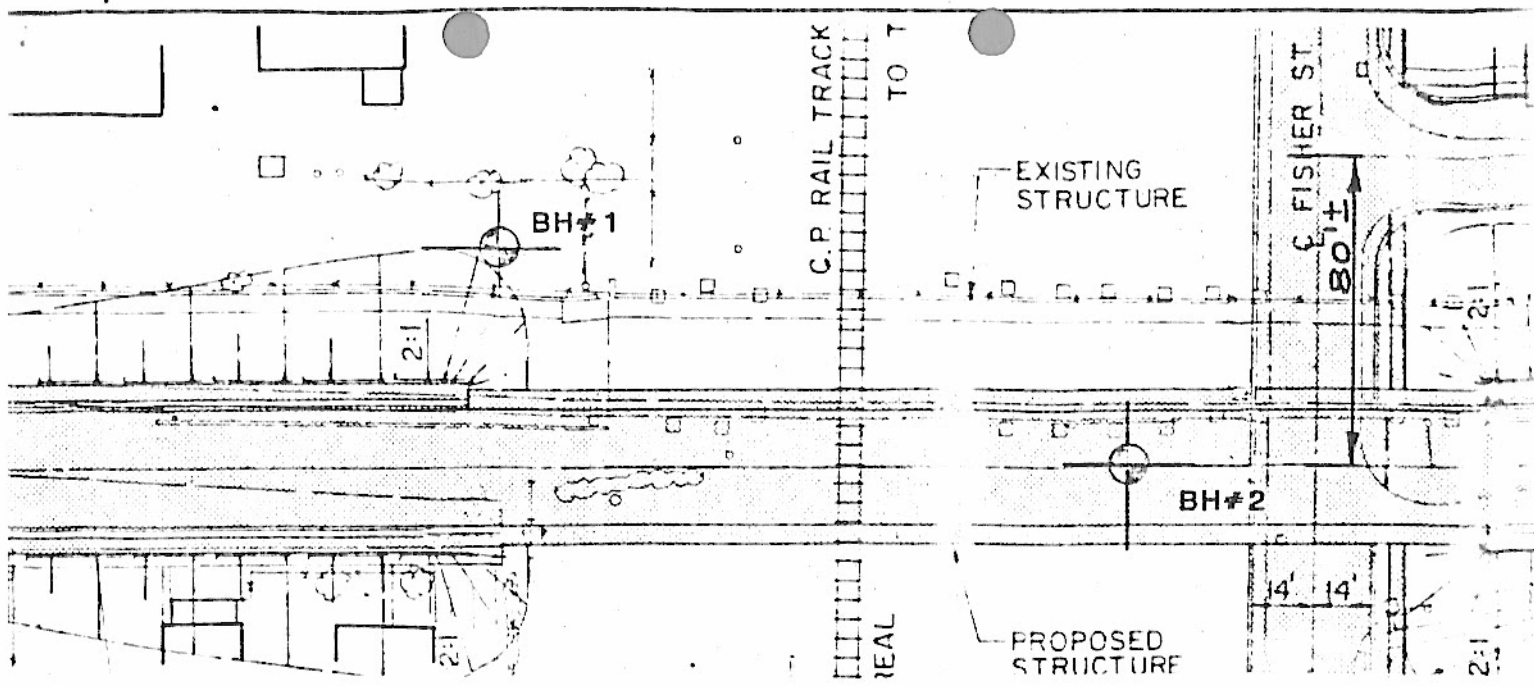
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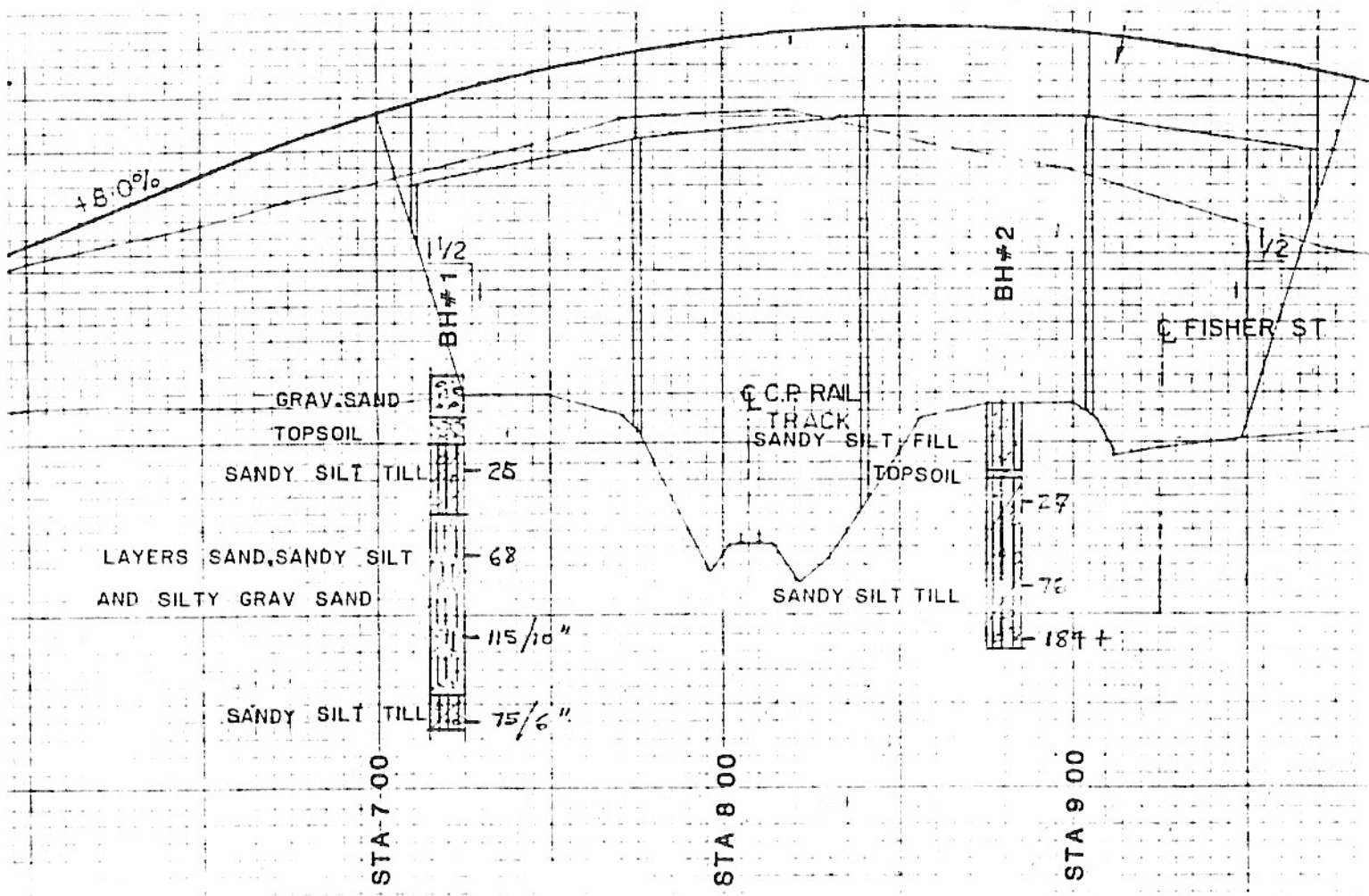
FIGURE: 1



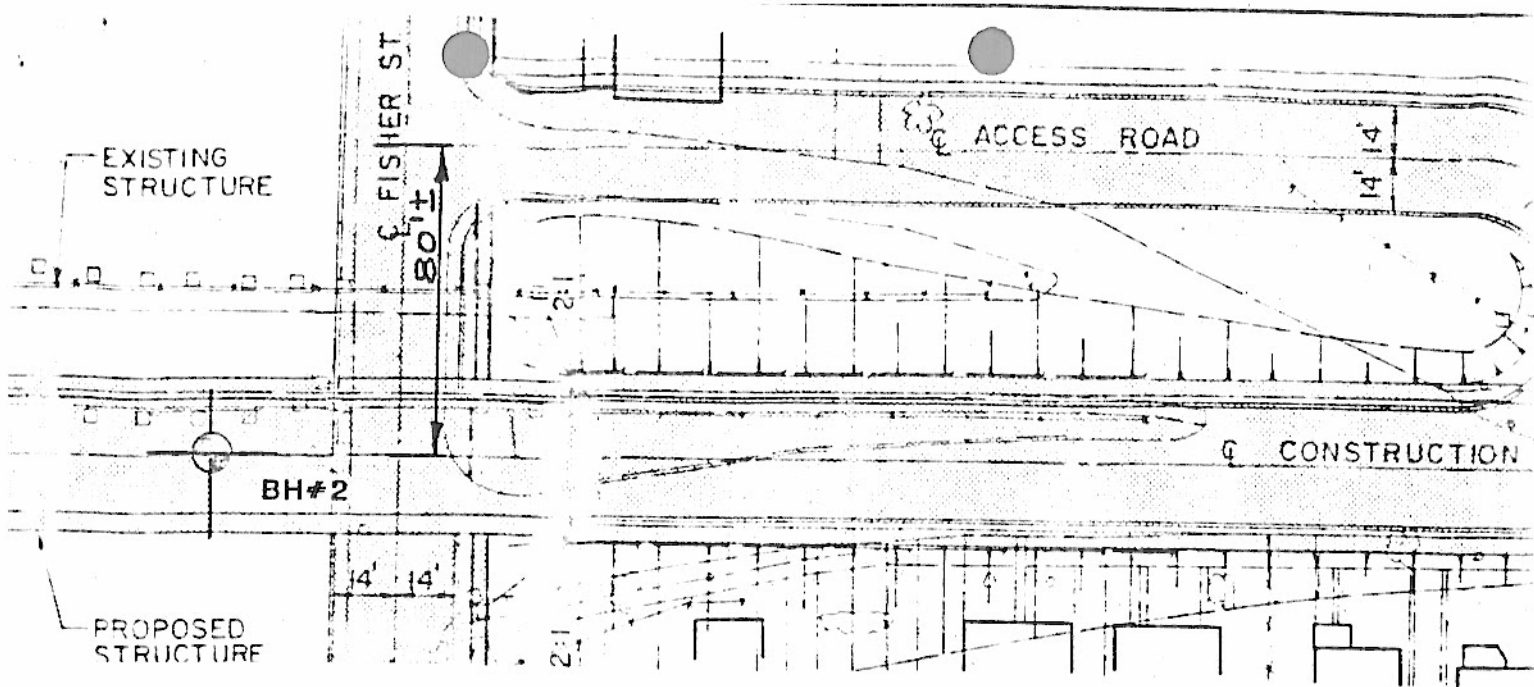
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DATE	SEPT.
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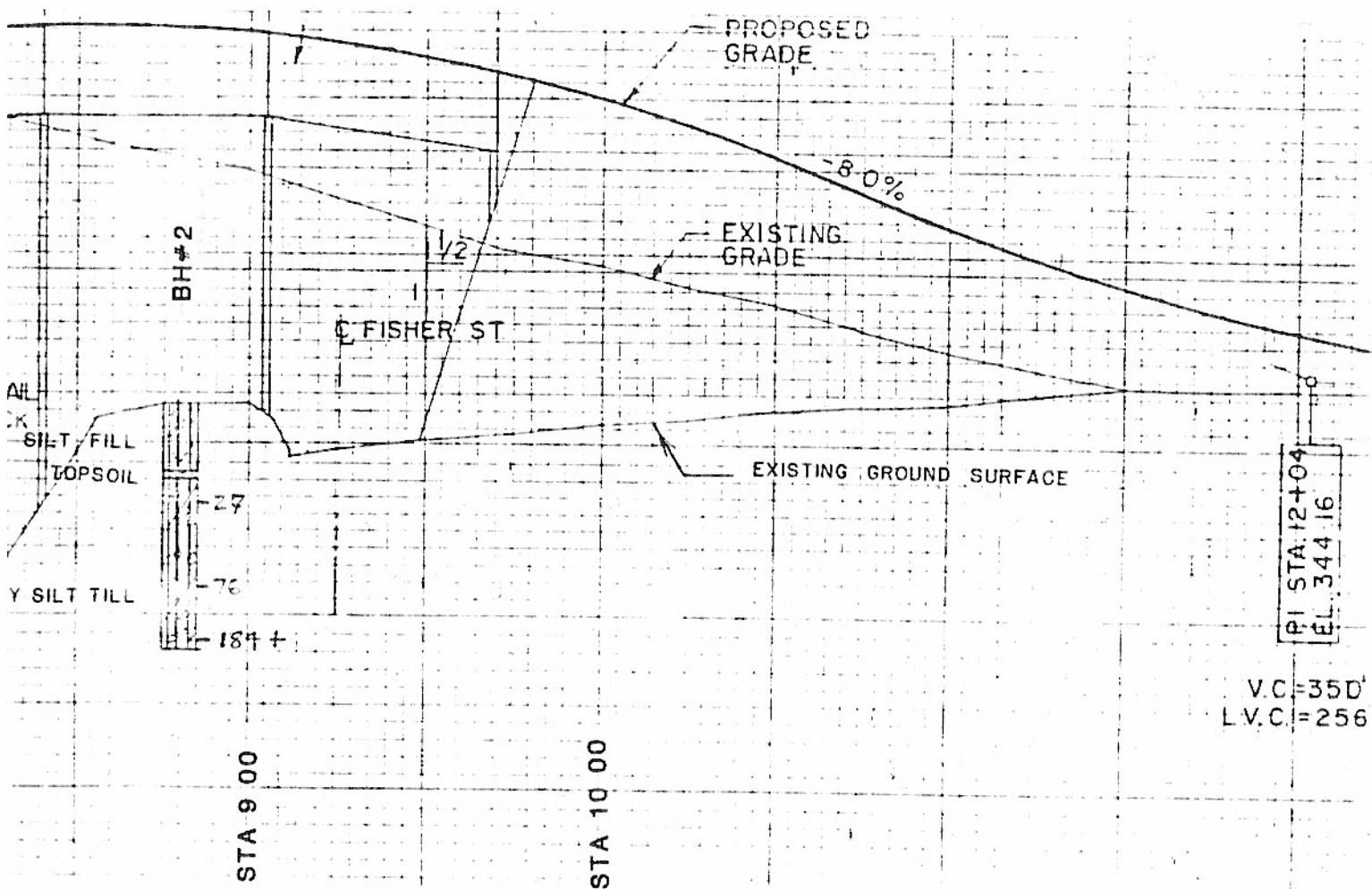
PLAN



JOB NO. 2753	SCALE	ALBERTA LOCATION
DATE SEPT. 1982	HORIZ. 1"=50'-0" VERT. 1"=10'-0"	
APP'D BY <i>R.E.M.</i>	DRAWN BY R.E.M.	



LAN



<p>SCALE</p> <p>HORIZ. 1"=50'-0"</p> <p>VERT. 1"=10'-0"</p> <p>DRAWN BY R.E.M.</p>	<p>SITE INVESTIGATION SERVICES LIMITED</p> <p>ALBERT STREET BRIDGE, OSHAWA</p> <p>LOCATION PLAN AND SOIL PROFILE</p>	<p>FIGURE</p> <p>2</p>
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BOREHOLE DATA and TEST SUMMARY

Project - ALBERT STREET BRIDGE		Date - September 24, 1982	JOB No: 2753	BOREHOLE No: 1
Location - OSHAWA, Ontario		Elevation Datum - Site Survey		
Hole Location - Station 7+20, 50' left		Type of Drill - Hollow Stem Auger (D-1)		

SOIL DESCRIPTION	SOIL SYMBOL	ELEVATION IN FEET	MOISTURE CONTENT and ATTERBERG LIMITS (%)			LAB. TESTS	SAMPLE TYPE AND NUMBER
			Plastic Limit	Moisture Content	Liquid Limit		
GRAVELLY SAND FILL		44.0					
TOPSOIL		40.0					
SANDY SILT TILL - brown stony sandy silt till, some clay - dense		36.0					
SAND-SILT - layers brown to grey fine sand, silty - gravelly sand and sandy silt - occasional cobbles - very dense		25.5					
SANDY SILT TILL - grey stoney sandy silt till - very dense		23.5					
END OF HOLE (very slow auger progress)							

DEPTH IN FEET	MOISTURE CONTENT and ATTERBERG LIMITS (%)		LAB. TESTS	SAMPLE TYPE AND NUMBER
	Plastic Limit	Moisture Content		
5				1
10				2
15				3
20				4
25				

PENETRATION RESISTANCE (Blows/Ft)		SHEAR STRENGTH (Kips/Ft²)	
2" O.D. Split Spoon	2" O.D. Comp	Field Vane - X	Unconfined Compression - C
40	80		
60	100		

LEGEND	
	Gravel
	Sand
	Clay

PENETRATION RESISTANCE (Blows/Ft)	
2" O.D. Split Spoon	2" O.D. Comp
40	80
60	100

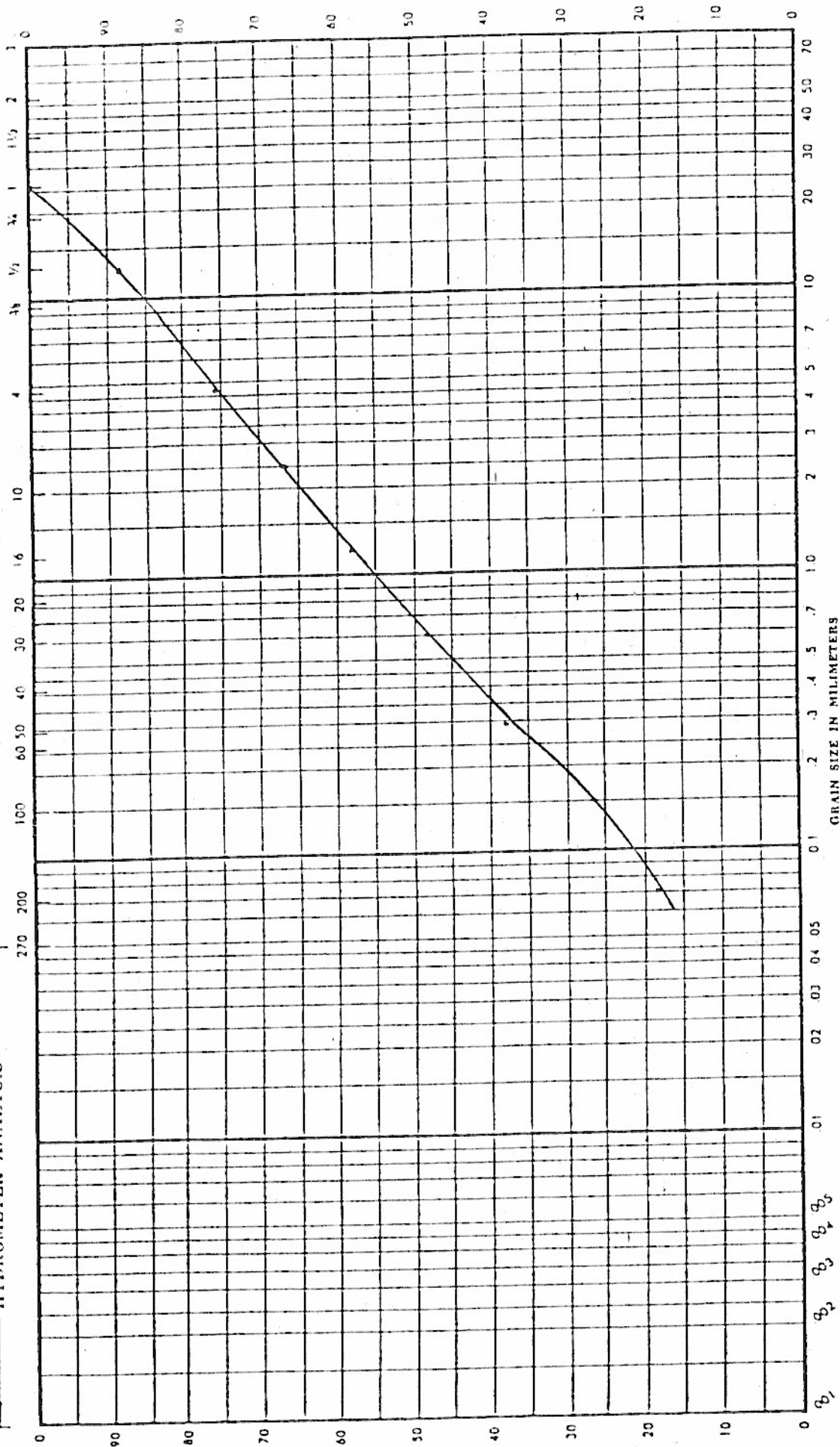
SHEAR STRENGTH (Kips/Ft²)	
Field Vane - X	Unconfined Compression - C

BOREHOLE DATA and TEST SUMMARY

Project - ALBERT STREET BRIDGE		Date - September 24, 1982		JOB No: 2753		BOREHOLE No: 2	
Location - OSHAWA, Ontario		Elevation Datum - Site Survey		LEGEND		<div>Gravel</div> <div>Sand</div> <div>Clay</div> <div>(See Appendix "A" for Other Symbols)</div>	
Hole Location - Station 8 + 80, Centreline		Type of Drill - Hollow Stem Auger (D-1)		PENETRATION RESISTANCE (Blows/Ft)		<div>2" O.D. Split Spoon</div> <div>20 40 60 80 100</div> <div>2" O.D. Cone</div>	
SOIL DESCRIPTION		MOISTURE CONTENT and ATTERBERG LIMITS (%)		LAB. TESTS		SHEAR STRENGTH (Kips/Ft ²)	
	ELEVATION IN FEET	Plastic Limit	Moisture Content	Liquid Limit		Field Vane - X Unconfined Compression - □	
	42.5						
SANDY SILT FILL							
- brown pebbly sandy silt fill							
TOPSOIL	38.5						
SANDY SILT TILL							
- brown stoney sandy silt till, trace to some clay							
- occasional cobbles and thin sand seams							
- dense to very dense							
END OF HOLE							
(very slow auger progress)							
						N = 184 +	

HYDROMETER ANALYSIS

STANDARD SIEVE SIZES



U.S. BUREAU OF SOILS		UNIFIED SYSTEM		M.I.T. SYSTEM	
Clay	Silt	Gravel	Gravel	Gravel	Gravel
Clay	Fine Silt	Medium Silt	Coarse Silt	Coarse Sand	Coarse Gravel
	Clay & Silt	Medium Sand	Fine Gravel		
		Coarse Sand			

JOB NO. 2753 LOCATION ALBERT ST. WY. HOLE No. 1 DEPTH 0.1 m

REMARKS _____

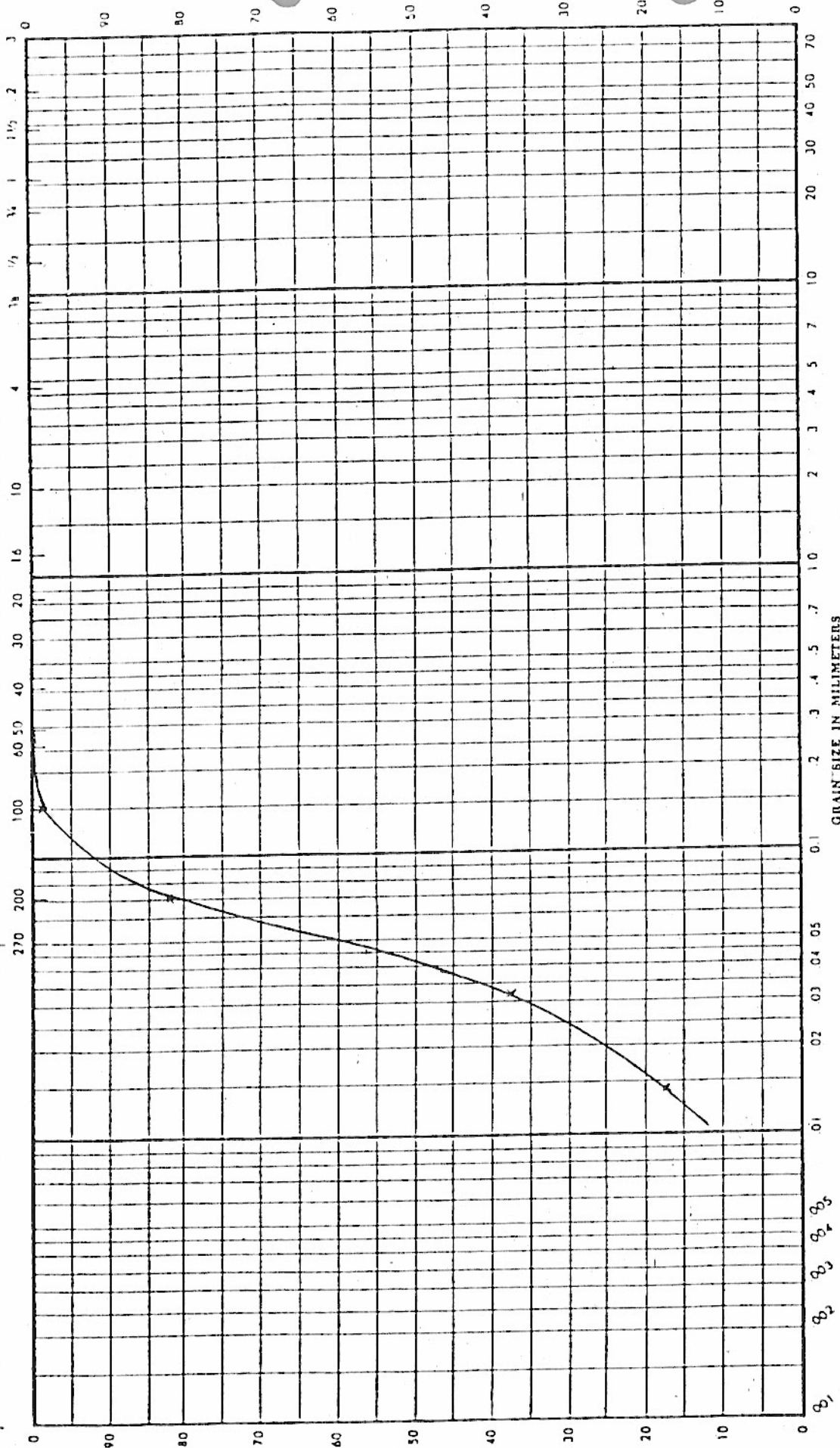
PMC(w) _____ % LL _____ % PL _____ % P.I. _____ %

FIGURE

HYDROMETER ANALYSIS

STANDARD SIEVE SIZES

PERCENT PASSING



Clay		Silt		Clay & Silt		Fine Silt		Medium Silt		Coarse Silt		Fine Sand		Medium Sand		Coarse Sand		Fine Gravel		Gravel		Coarse Gravel		Gravel		
Clay		Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Gravel	Coarse Gravel	Gravel	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Gravel	Coarse Gravel	Gravel	Coarse Gravel	Gravel	Coarse Gravel	Gravel	Coarse Gravel	Gravel	Coarse Gravel	Gravel
Clay		Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Gravel	Coarse Gravel	Gravel	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Gravel	Coarse Gravel	Gravel	Coarse Gravel	Gravel	Coarse Gravel	Gravel	Coarse Gravel	Gravel	Coarse Gravel	Gravel

JOB NO. 2753 LOCATION ALBERT ST. ST. DEPTH 145-15.0

REMARKS 5

FMC(w) %, L.L. %, P.L. %, P.I. %

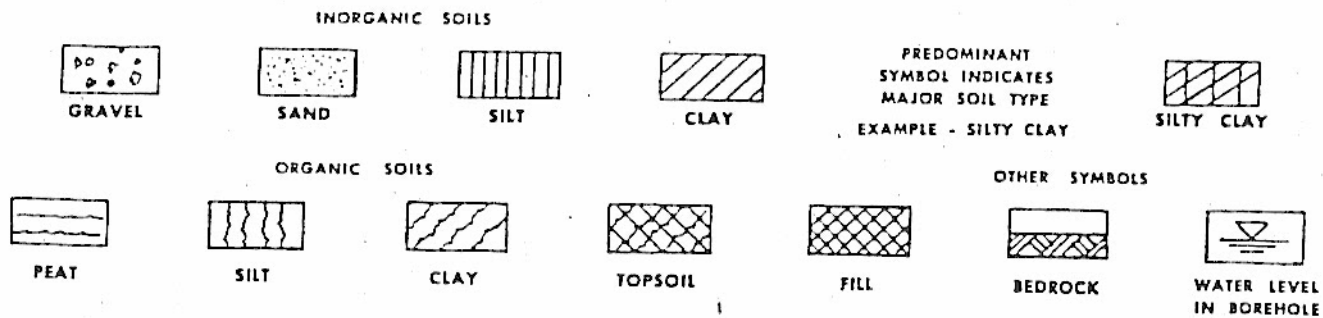
% Gravel % Sand % Very Fine Sand % Silt

FIGURE 5

EXPLANATION OF SYMBOLS AND TEST DATA

SOIL DESCRIPTION

A description of visible characteristics of the soil as determined in the field and altered, if necessary, on the basis of laboratory classification tests.



SAMPLES

Condition:



RELATIVELY
UNDISTURBED



DISTURBED



NOT
RECOVERED

Type:

D.S. - 1 1/8" ID Drive Sample
A.S. - Auger Sample

U - Thin-walled Tube Sample
UP - Piston Sample

PENETRATION RESISTANCE:

(N) Indicates number of blows, of a 140-lb. hammer falling 30 inches, required to drive a 2" OD Drive Sampler a distance of 1 foot into the soil. This resistance is used to assess the relative density of cohesionless soils and the relative consistency of cohesive soils.

OTHER TESTS

- M - Grain size analysis using sieves or hydrometer or both - plotted graphically on a separate sheet.
- V₁ - laboratory vane tests.
- γ_d - dry unit weight.
- C - consolidation test - results on separate sheet.
- T - triaxial compression test - results on a separate sheet.
- P - proctor compaction test.
- K - laboratory permeability test.

SOILS PROFILES:

Where soil profiles are shown on drawings the soil profile applies only to the borehole location and may be different at intermediate locations on the site.

GROUND WATER:

Ground Water levels are generally measured in the open boreholes and apply to conditions at the time of drilling. Seasonal ground water fluctuations should be expected at most sites.