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G.I.-30 SEPT. 1976

GEOCRES No. 30M5-119

DIST. 4 REGION

W.P. No. 125-66-24

CONT. No. 79-80

W. O. No.

STR. SITE No. 10-140B

HWY. No. Q.E.W.

LOCATION W-N Ramp over Joshua Creek Str. Extension

No. of PAGES - —

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.

REMARKS:

ENGINEERING MATERIALS OFFICE
SOIL MECHANICS SECTION

WP 125-66-24 DIST 4

HWY 403 STR SITE 10-140B

N-W Ramp Over Joshua Creek

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TYPE	DISCARD AFTER	RECOMM. BY
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GEOCRES 30M5-119

DATE OCT 31 1978

FOUNDATION INVESTIGATION REPORT
For
N-W Ramp Over Joshua Creek
W.P. 125-66-24, Site 10-140B
Hwy. 403, District 4, Hamilton

INTRODUCTION

This report contains the results of a foundation investigation done at the site of the above mentioned structure. The fieldwork was carried out during the period of September 19 to September 21, 1978. It consisted of four sampled boreholes, two of which were accompanied by a dynamic cone penetration test. The borings were advanced by means of solid stem continuous flight augers and followed by diamond drilling techniques, to depths ranging from 10 to 23 feet below the ground surface. Bedrock was proven by obtaining up to 6.5 feet of BXL size rock core.

SITE AND GEOLOGY

The site is approximately 200 feet west of the existing crossing of QEW and Joshua Creek in the Town of Oakville, Regional Municipality of Halton.

At this location Joshua Creek meanders in a 30 to 50 foot wide floodplain valley floor. The valley is about 20 feet deep and about 200 feet wide from crest to crest. During the time of field investigation, Joshua Creek was about 10 to 15 feet wide and the water in the creek was about 1 to 2 feet deep. The area surrounding the site is covered with trees and bushes.

Physiographically, the site lies in the southern edge of the region referred to as the "South Slope". This region is a strip of land bounded by the Iroquois Plains on the south and the Peel Plains on the north. The region is characterized by glacial till overburden which is closely related to the underlying shale bedrock of Queenston and Dundas formations of the Ordovician Age.

SUBSURFACE CONDITIONS

General

At this site the overburden has an overall thickness of about 15 to 17 feet on the south side of the valley but it diminishes to 3 to 4 feet thick at the valley floor. The overburden generally consists of a glacial till composed of clayey silt, some sand and gravel. However, in the valley floor Joshua Creek has eroded the glacial till and redeposited a sandy gravel. Across the site the overburden is underlain by interbedded shale and limestone bedrock.

Factual data on the subsurface conditions is shown on the Borehole Record Sheets. The locations and elevations of the borings, together with the estimated stratigraphical sections are shown on Drawing No. 1256624-A. A description of the subsoil and bedrock conditions is given below.

Sandy Gravel

This flood plain deposit was encountered in the river valley extending from ground surface to bedrock for a thickness of 3 to 4 feet. This deposit is alluvial in origin and is composed of sandy gravel with some silt and trace of clay. Typical grain size distribution curves for material from this deposit are shown in Figure 1. The Standard Penetration Test 'N' values of 10 and 14 blows/foot indicate that this deposit has a loose to compact relative density.

Clayey Silt, Some Sand and Gravel (Glacial Till)

This deposit encountered on the south valley side, has a thickness of about 15 to 17 feet. It is a glacial till composed of clayey silt, some sand and gravel. Typical grain size distribution curves of the material from this deposit are shown in an envelope form on Figure 2. Geotechnical identity indices of the cohesive subsoil as determined from laboratory testing are summarized below.

			Range
Natural Moisture Content	(W)	%	9-12
Liquid Limit	(W_L)	%	29-34
Plastic Limit	(W_p)	%	16-18

The results of the Atterberg Limit testing are also plotted on the Plasticity Chart, Figure 3, which indicates this deposit is inorganic and cohesive with a low plasticity.

The Standard Penetration Test 'N' values ranged from 22 to 42 blows/foot, generally increasing with depth. It is inferred from this that the consistency of this cohesive deposit varies from very stiff to hard.

Bedrock (Interbedded Shale and Limestone)

Bedrock was encountered at elevation 394 in the valley floor and at elevation 396 to elevation 398 in the south valley side. Bedrock may be described as interbedded shale and limestone. Reference should be made to a detailed description of the rock cores by an MTC geologist,which is included in the Appendix of this report.

Groundwater Conditions

For construction purposes, the groundwater level may be assumed equal to the water level in the creek which was at elevation 397± during the time of investigation.

DISCUSSION AND RECOMMENDATIONS

A 45 foot long single span structure is being considered to carry Hwy. 403 over Joshua Creek. The profile grade of the highway at the creek crossing is proposed to be at approximately elevation 413.5. This will require an approach fill in the order of 15 feet high. Our recommendations with regard to the structure foundations and the approaches are as follows.

Structure Foundations

Our investigations revealed that bedrock exists at a very shallow depth in the area of the proposed footings for the single span structure. In view of this spread footings founded at or below elevation 392.0 within the upper portion of the somewhat weathered bedrock would be the most suitable foundation scheme. In such a case, the spread footings may be designed with an allowable pressure of 5 tsf. Differential settlements between the footings under the aforementioned pressure would be negligible and the structure can be designed as a rigid frame. The lateral forces on the footings can be assumed to be resisted by the frictional forces between the underside of the footing and the bedrock. To estimate the frictional resistance a coefficient of friction of 0.5 can be assumed.

Because the shale is a frost susceptible material, the underside of the footing should have a minimum of 4 feet of earth cover for frost protection purposes. If the footings are situated below the prevailing water level, a temporary dewatering scheme will be required to construct the footings in the dry. Such a scheme could consist of an impervious earth cofferdam to stop infiltration of water into the excavation. To prevent the shale from deterioration after it is exposed, the footing formation surface should be protected with 3 inches of mass concrete immediately after completion of excavation.

Approaches

The 15 foot high fills can be constructed with sideslopes of 2:1. Prior to placing the fill, the existing topsoil should be stripped as per current MTC practices.

Related Considerations

In order to relieve the buildup of hydrostatic pressure behind the abutment wall, free draining granular material should be used as backfill and suitable drainage measures consisting of weep holes and perforated pipes should be provided.

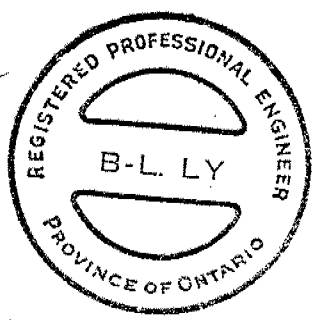
To estimate the lateral earth pressure induced on the abutment wall by the granular backfill, a coefficient of earth pressure of 0.5 should be used if the wall is rigid. If some movement at the top of the wall is permitted, a coefficient of earth pressure of 0.33 can be used.

MISCELLANEOUS

The fieldwork was supervised by Mr. V. Korlu. This report was prepared by Mr. B. Ly and was reviewed by Mr. M. Devata.

B. Ly

B. Ly, P. Eng.
Senior Engineer



M. Devata

M. Devata, P. Eng.
Supervising Engineer

October, 1978

APPENDIX

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Ontario

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE No 1

W P 125-66-24 LOCATION Sta. 30+11 o/s 18' Rt. Control Line N-W Ramp ORIGINATED BY V.K.

DIST 4 HWY 403 BOREHOLE TYPE Solid Stem Auger, BXL Core COMPILED BY V.K.

DATUM Geodetic DATE September 21, 1978 CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES 'N' VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (o UNCONFINED, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE)	PLASTIC LIMIT Wp / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L / WATER CONTENT (%) (10 20 30)	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
397.8	Ground Level										
0.0 / 394.3	Sandy Gravel With Some Clay and Silt		1	SS	10				o		45 29 19 7
3.5	Weathered		2	BXL	30%						
387.8	Sound, Interbedded Shale and Limestone Bedrock		3	BXL	100% Rec.		390				
10.0	End of Borehole Note: Water Level Not Established										

RECORD OF BOREHOLE No 2

W P 125-66-24 LOCATION Sta. 30+31 o/s 10' Lt. Control Line N-W Ramp ORIGINATED BY V.K.

DIST 4 HWY 403 BOREHOLE TYPE Solid Stem Auger, BXL Core Drill COMPILED BY V.K.

DATUM Geodetic DATE September 20, 1978 CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES 'N' VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (o UNCONFINED, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE)	PLASTIC LIMIT Wp / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L / WATER CONTENT (%) (10 20 30)	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
397.8	Ground Level										
0.0 / 394.3	Sandy Gravel With Some Clay and Silt		1	SS	14				o		68 16 13 3
3.5	Interbedded Shale and Limestone Bedrock		2	BXL	100%						
387.8			3	BXL	100% Rec.		390				
10.0	End of Borehole Note: Water Level Not Established										

$+^3$, $\times^5$: Numbers refer to Sensitivity

$\frac{20}{15 \diamond 5}$ (%) STRAIN AT FAILURE
10

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Ontario

HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE No 3

W P 125-66-24 LOCATION Sta. 29+64 o/s 10' Lt. Control Line N-W Ramp ORIGINATED BY V.K.

DIST 4 HWY 403 BOREHOLE TYPE Solid Stem Auger, BXL Core and Cone Test COMPILED BY V.K.

DATUM Geodetic DATE September 20, 1978 CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES 'N' VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (o UNCONFINED, • QUICK TRIAXIAL, + FIELD VANE, x LAB VANE)	PLASTIC LIMIT Wp / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) (10 20 30)	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
412.7	Ground Level										
0.0	Clayey Silt, Some Sand and Gravel Very Stiff to Hard		1	SS	24		410				4 10 55 31
			2	SS	100/ 6"						
			3	SS	29						7 13 49 31
	Brown		4	SS	42		400				
395.7	Grey		5	SS	36						
17.0	Weathered Interbedded Shale and Limestone Bedrock		6	BXL	100% Rec.		390				
389.7											
23.0	End of Borehole Note: Water Level Not Established										

RECORD OF BOREHOLE No 4

W P 125-66-24 LOCATION Sta. 29+45 o/s 13' Rt. Control Line N-W Ramp ORIGINATED BY V.K.

DIST 4 HWY 403 BOREHOLE TYPE Solid Stem Auger, BXL Core and Cone Test COMPILED BY V.K.

DATUM Geodetic DATE September 19, 1978 CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES 'N' VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (o UNCONFINED, • QUICK TRIAXIAL, + FIELD VANE, x LAB VANE)	PLASTIC LIMIT Wp / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) (10 20 30)	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
412.7	Ground Level										
0.0	Clayey Silt, Some Sand and Gravel Brown, Very Stiff to Hard		1	SS	22		410				4 10 48 38
			2	SS	31						
			3	SS	32						8 10 49 25
			4	SS	26		400				
397.9											
14.8	Interbedded Shale and Limestone Bedrock		5	BXL	100% Rec.			100/8"			
392.9											
19.8	End of Borehole Note: Water Level Not Established										

$+^3$, $\times^5$: Numbers refer to Sensitivity

15 (20 / 10) 5 (%) STRAIN AT FAILURE

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DIAMOND DRILL RECORD

HOLE NO. _____ SHEET NO. _____

PROPERTY: W.P.125-66-24
LOCATION: Josuha Creek, Oakville,Ontario.
LATITUDE:
DEPARTURE:
BEARING:

DIP: 90°
TOTAL FOOTAGE:

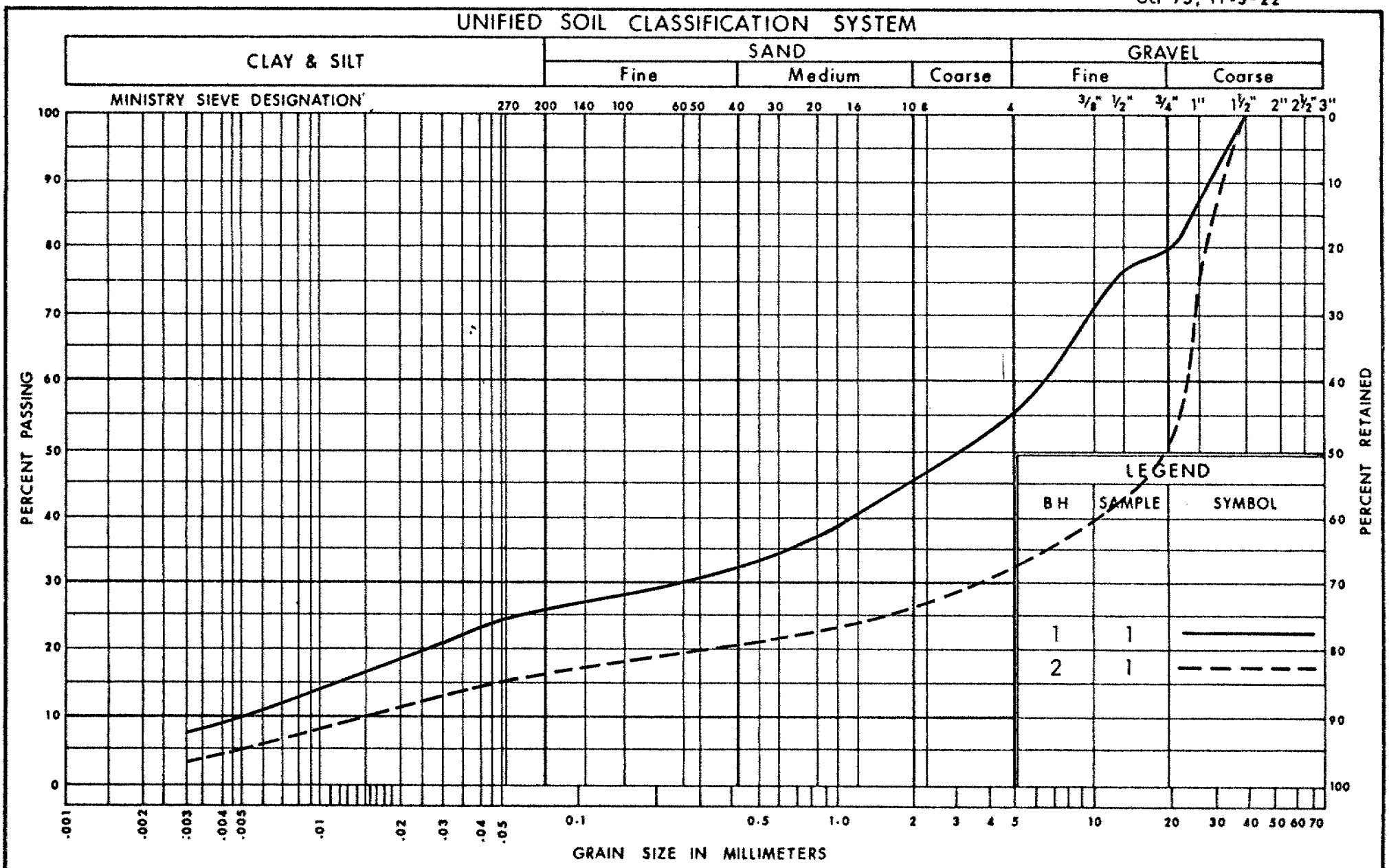
ELEV. COLLAR:
DATUM:
DATE STARTED:
DATE COMPLETED:
DRILLED BY:
LOGGED BY:

FOOTAGE FROM	FOOTAGE TO	FORMATION	SAMPLE NUMBER			REMARKS
		Hole #1				
3'5"	10'0"	Intermittent shale and limestone bedding throughout varying from two inches to 10" with the limestone. Limestone is hard, fine texture, light grey colour and slightly sandy. Shale is black, soft, fine texture and fissile.				ground core at top of hole, possibly shale, approximately 1.5' lost core.
		Hole #2				
3'5"	10'0"	Same as hole #1.				
		Hole #3				
18'0"	23'0"	Same as hole #1.				thickest limestone bed 8".
		Hole #4				
14'8"	19'8"	Same as hole #1.				thickest limestone 10".

DATE OF EXAMINATION: October 12th,1978

B.K.Glassford

08-MT-113



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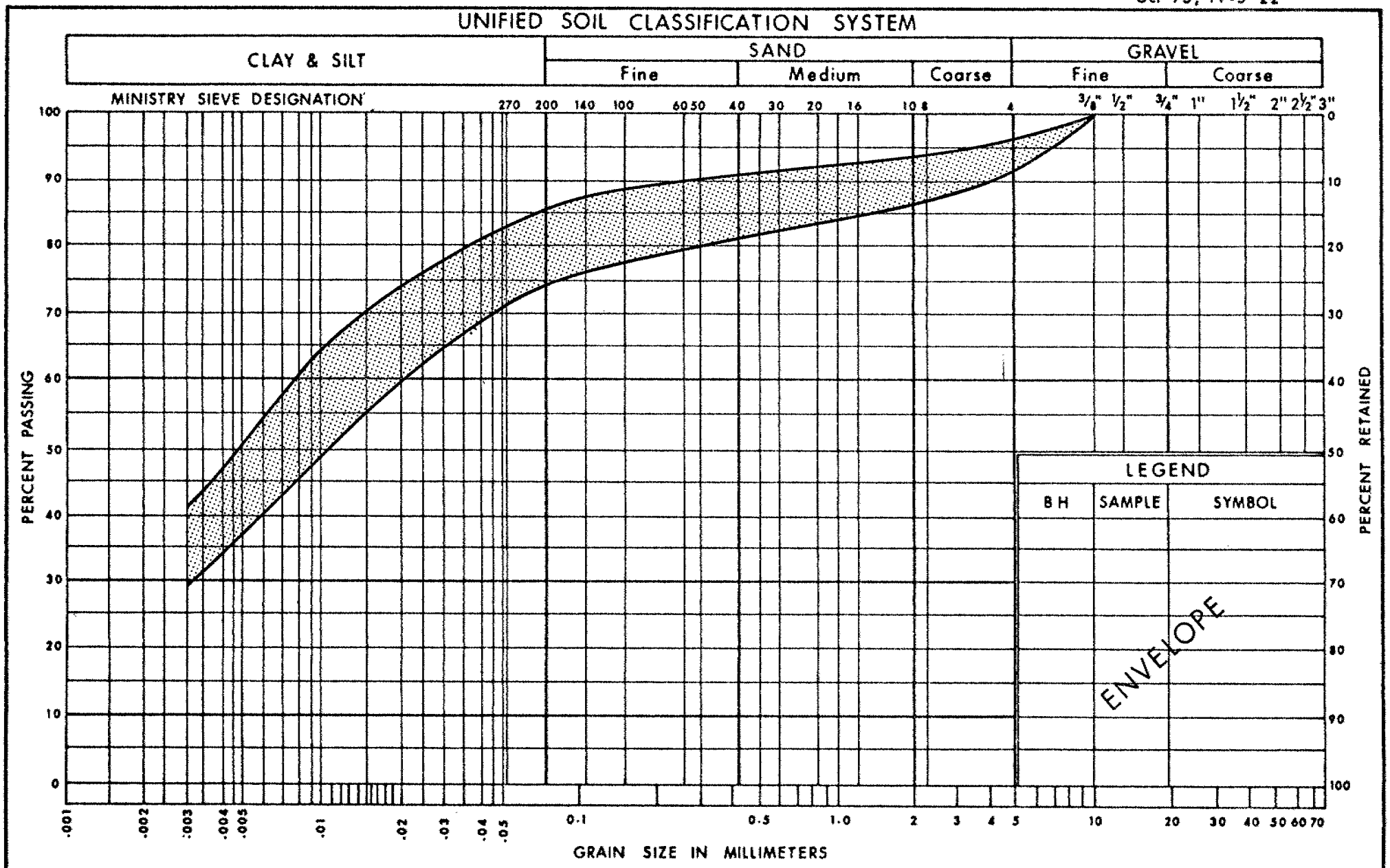
GRAIN SIZE DISTRIBUTION

SANDY GRAVEL, WITH SOME SILT & CLAY

FIG No 1

W P 125-66-24



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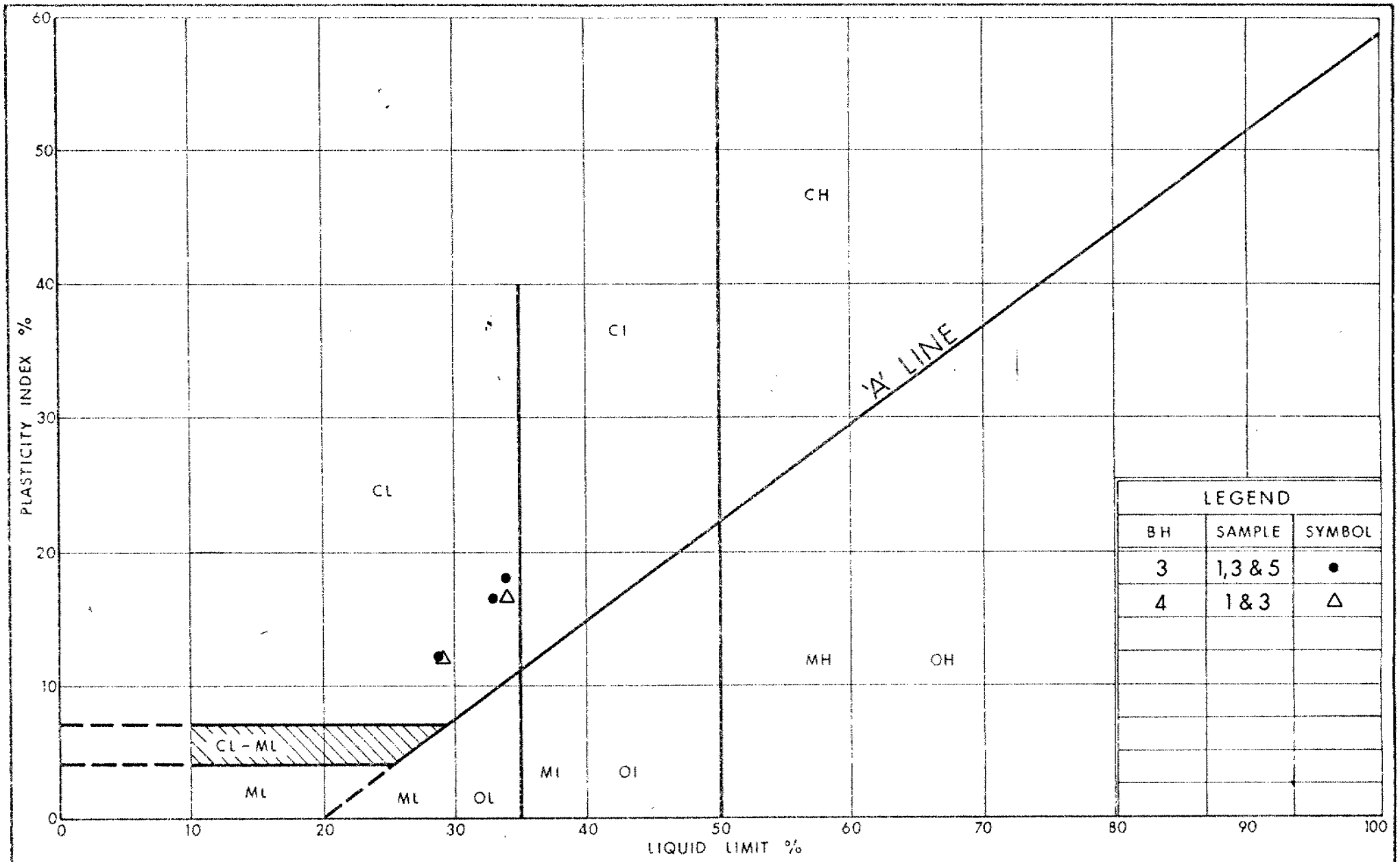
GRAIN SIZE DISTRIBUTION

CLAYEY SILT, SOME SAND & GRAVEL

FIG No 2

W P 125-66-24



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PLASTICITY CHART

CLAYEY SILT, SOME SAND & GRAVEL

FIG No 3
W P 125-66-24

EXPLANATION OF TERMS USED IN REPORT

'N' VALUE: AN INDICATOR OF SUBSOIL QUALITY. IT IS OBTAINED FROM THE STANDARD PENETRATION TEST (CSA STD. A119.1). SPT 'N' VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 2 INCH O.D. SPLIT-BARREL SAMPLER TO PENETRATE 12 INCHES INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WEIGHING 140 POUNDS, FALLING FREELY A DISTANCE OF 30 INCHES. FOR PENETRATIONS OF LESS THAN 12 INCHES 'N' VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. 'N' VALUES CORRECTED FOR OVERBURDEN PRESSURE ARE DENOTED THUS $\bar{N}$.

DYNAMIC CONE PENETRATION TEST (CSA STD. A119.3): CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (2" O.D. 60 CONE ANGLE) DRIVEN BY 350 FT-LB IMPACTS ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 12 INCH ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOIL QUALITY: SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSITY.

CONSISTENCY: COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH AS FOLLOWS:

S_u (PSF)	0 - 250	250 - 500	500 - 1000	1000 - 2000	2000 - 4000	> 4000
	VERY SOFT	*SOFT*	*FIRM*	*STIFF*	*VERY STIFF*	*HARD*

DENSENESS: COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF SPT 'N' VALUES AS FOLLOWS:

'N' (BLOW/FT)	0 - 5	5 - 10	10 - 30	30 - 50	> 50
	VERY LOOSE	*LOOSE*	*COMPACT*	*DENSE*	*VERY DENSE*

ROCK QUALITY: ROCKS ARE DESCRIBED BY THEIR COMPOSITION AND STRUCTURAL FEATURES AND/OR STRENGTH.

RECOVERY: SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH DRILLED IN THAT CORING RUN.

MODIFIED RECOVERY: SUM OF THOSE NATURALLY FRACTURED CORE PIECES, 4"+ IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (RQD), FOR MODIFIED RECOVERY, IS:

RQD (%)	0 - 25	25 - 50	50 - 75	75 - 90	90 - 100
	VERY POOR	*POOR*	*FAIR*	*GOOD*	*EXCELLENT*

JOINTING AND BEDDING:

SPACING	2"	2" - 12"	1' - 3'	3' - 10'	> 10'
JOINTING	*VERY CLOSE*	*CLOSE*	*MOD. CLOSE*	*WIDE*	*VERY WIDE*
BEDDING	*VERY THIN*	*THIN*	*MEDIUM*	*THICK*	*VERY THICK*

ABBREVIATIONS & SYMBOLS

LABORATORY TESTING

TRIAXIAL TESTS ARE DESCRIBED IN TERMS OF WHETHER THEY ARE
CONSOLIDATED (C) OR NOT (U)
ISOTROPICALLY (I) OR NOT (A)
AND SHEARED DRAINED (D) OR UNDRAINED (U)
WITH PORE PRESSURE MEASUREMENTS (BAR OVER SYMBOLS)
EG. $\overline{CIU}$ = CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENT
UNLESS OTHERWISE SPECIFIED IN REPORT ALL TESTS ARE IN COMPRESSION

FIELD SAMPLING

S S	SPLIT SPOON
W S	WASH SAMPLE
S T	SLOTTED TUBE SAMPLE
B S	BLOCK SAMPLE
C S	CHUNK SAMPLE
T W	THINWALL OPEN
T P	THINWALL PISTON
O S	OSTERBERG SAMPLE
F S	FOIL SAMPLE
R C	ROCK CORE
P H	T.W. ADVANCED HYDRAULICALLY
P M	T.W. ADVANCED MANUALLY

EARTH PRESSURE TERMS

μ	COEFFICIENT OF FRICTION
δ	ANGLE OF WALL FRICTION
k_o	COEFFICIENT OF EARTH PRESSURE AT REST
k_A	COEFFICIENT OF ACTIVE EARTH PRESSURE
k_p	COEFFICIENT OF PASSIVE EARTH PRESSURE
i	ANGLE OF INCLINATION OF SURCHARGE
w	SLOPE ANGLE-BACKFACE OF WALL
β	ANGLE OF SLOPE
N_γ, N_q, N_c	BEARING CAPACITY FACTORS
D_f	DEPTH OF FOOTING
B,L	FOOTING DIMENSIONS

INDEX PROPERTIES

γ	UNIT WEIGHT OF SOIL (BULK DENSITY)
γ_w	UNIT WEIGHT OF WATER
γ_d	UNIT DRY WEIGHT OF SOIL (DRY DENSITY)
γ'	UNIT WEIGHT OF SUBMERGED SOIL
G_s	SPECIFIC GRAVITY OF SOLIDS
e	VOIDS RATIO
e_o	INITIAL VOIDS RATIO
e_{max}	e IN LOOSEST STATE
e_{min}	e IN DENSEST STATE
D_r	RELATIVE DENSITY = $\frac{e_{max} - e}{e_{max} - e_{min}}$
n	POROSITY
w	WATER CONTENT
w_L	LIQUID LIMIT
w_p	PLASTIC LIMIT
w_s	SHRINKAGE LIMIT
I_p	PLASTICITY INDEX = $w_L - w_p$
I_L	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$
I_c	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$
A_c	ACTIVITY = $\frac{I_p \text{ of soil}}{\% < 2\mu m \text{ Soil Fraction}}$
Om	ORGANIC MATTER CONTENT
S_r	DEGREE OF SATURATION
S	SENSITIVITY = $\frac{S_u \text{ (undisturbed)}}{S_u \text{ (remoulded)}}$

STRENGTH PARAMETERS

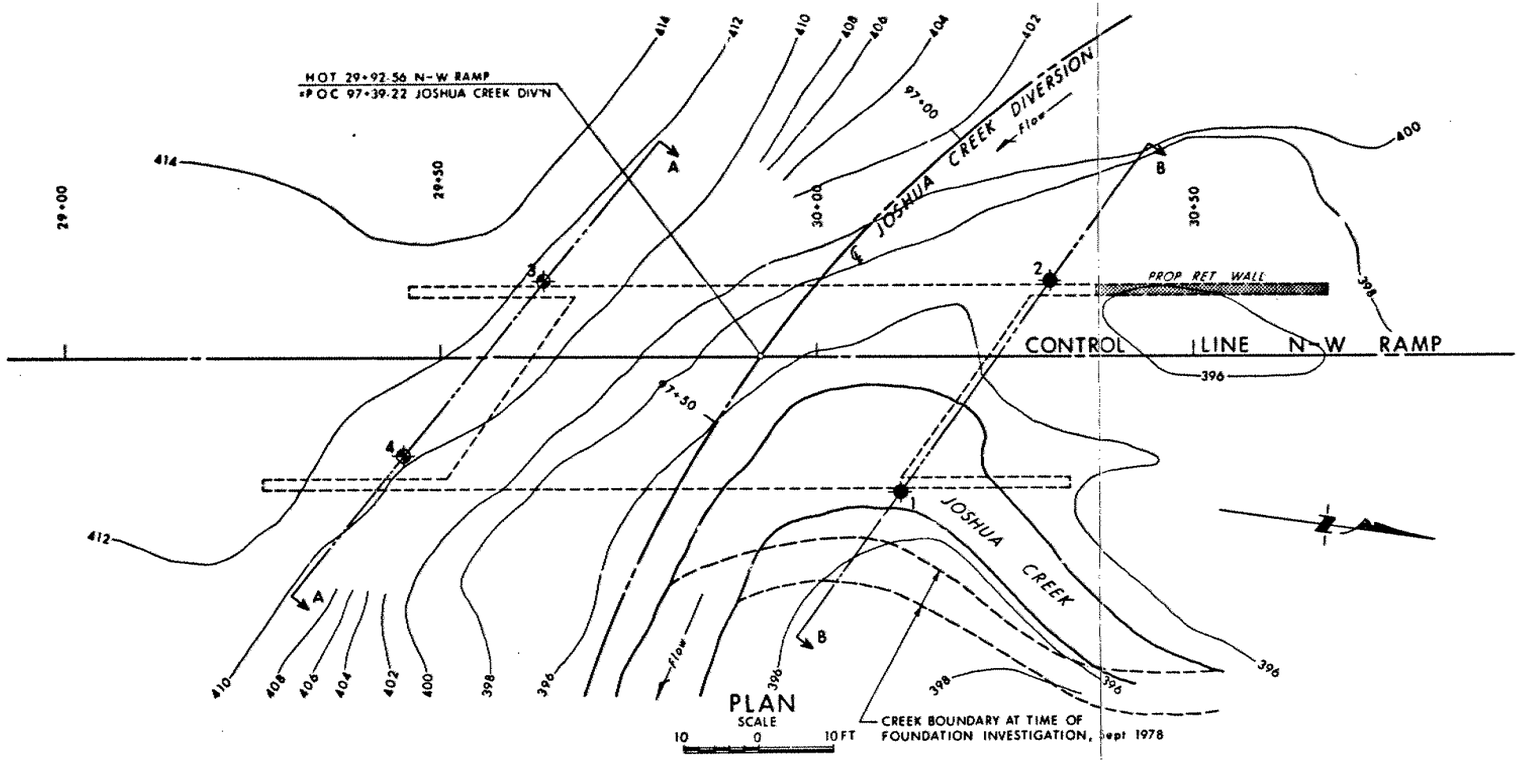
ϕ	ANGLE OF SHEARING RESISTANCE
τ_f	PEAK SHEAR STRENGTH
τ_R	RESIDUAL SHEAR STRENGTH
c	COHESION INTERCEPT
$\sigma_1, \sigma_2, \sigma_3$	NORMAL PRINCIPAL STRESSES
u	PORE WATER PRESSURE
u_e	EXCESS u
r_u	PORE PRESSURE RATIO
q_u	UNCONFINED COMPRESSIVE STRENGTH
s_u	UNDRAINED SHEAR STRENGTH
ϵ	LINEAR STRAIN
γ	SHEAR STRAIN
ν	POISSON'S RATIO
E	MODULUS OF ELASTICITY
G	MODULUS OF SHEAR DEFORMATION
k_s	MODULUS OF SUBGRADE REACTION
m,n	STABILITY COEFFICIENTS
A,B	PORE PRESSURE COEFFICIENTS

NOTE: EFFECTIVE STRESS PARAMETERS ARE DENOTED BY USE OF APOSTROPHE ABOVE THE SYMBOL, THUS:
ϕ' = EFFECTIVE ANGLE OF SHEARING RESISTANCE;
σ' = EFFECTIVE NORMAL STRESS

HYDRAULIC TERMS

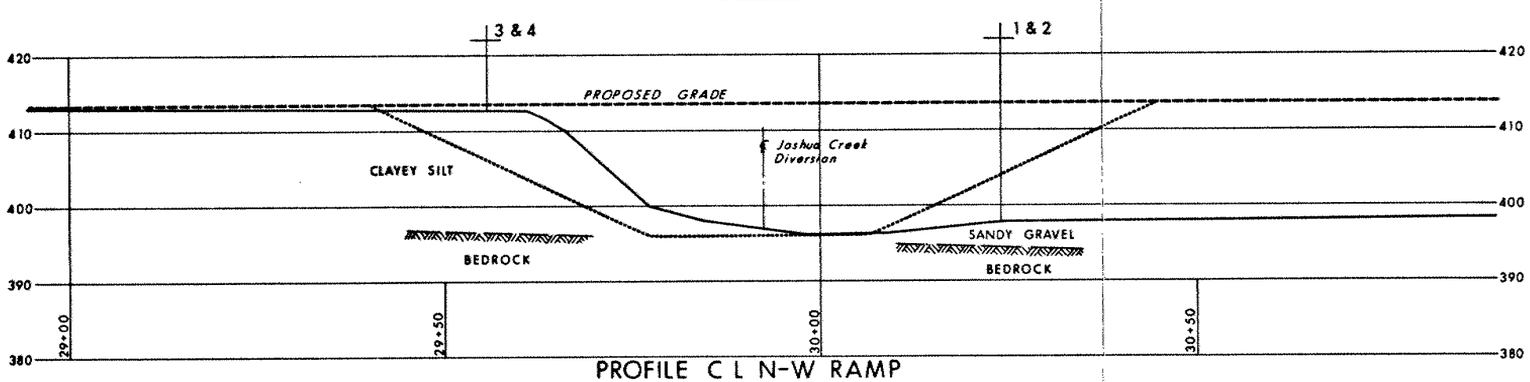
h	HYDRAULIC HEAD OR POTENTIAL
q	RATE OF DISCHARGE
v	VELOCITY OF FLOW
i	HYDRAULIC GRADIENT
j	SEEPAGE FORCE PER UNIT VOLUME
η	COEFFICIENT OF VISCOSITY
k	COEFFICIENT OF HYDRAULIC CONDUCTIVITY
k_h	k IN HORIZONTAL DIRECTION
k_v	k IN VERTICAL DIRECTION
m_v	COEFFICIENT OF VOLUME CHANGE
c_v	COEFFICIENT OF CONSOLIDATION
C_c	COMPRESSION INDEX
C_r	RECOMPRESSION INDEX
d	DRAINAGE PATH DISTANCE
T_v	TIME FACTOR
U	DEGREE OF CONSOLIDATION
O_r	OVERCONSOLIDATION RATIO (OCR)

HOT 29+92.56 N-W RAMP
=POC 97+39.22 JOSHUA CREEK DIV'N

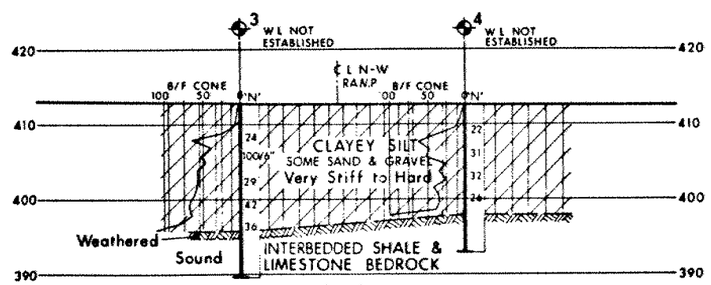


PLAN
SCALE 10 0 10 FT

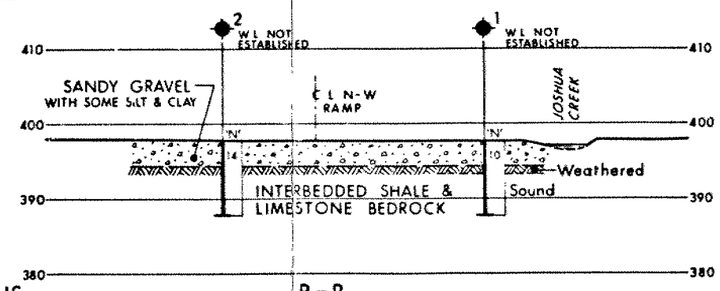
CREEK BOUNDARY AT TIME OF FOUNDATION INVESTIGATION, Sept 1978



PROFILE C L N-W RAMP
SCALE 10 0 10 FT



A-A



B-B

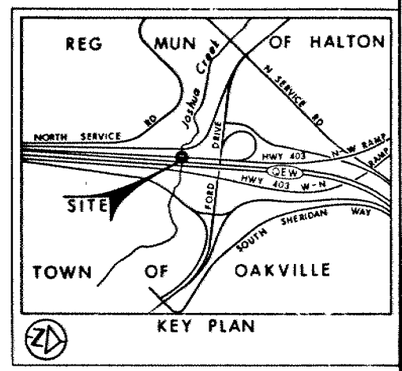
SECTIONS
SCALE 10 0 10 FT

CONT No
WP No 125-66-24

N-W RAMP OVER JOSHUA CREEK

BORE HOLE LOCATIONS & SOIL STRATA

SHEET



KEY PLAN

LEGEND

- Bore Hole
- Dynamic Cone Penetration Test (Cone)
- Bore Hole & Cone
- 'N' Blows/ft (Std Pen Test 350 ft lbs energy)
- CONE Blows/ft (60° Cone, 350 ft lbs energy)
- W L at time of investigation
  W L Not Established

No	ELEVATION	STATION	OFFSET
1	397.8	30+11	18' RT
2	397.8	30+31	10' LT
3	412.7	29+64	10' LT
4	412.7	29+45	13' RT

-NOTE-
The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence.

REVISIONS

DATE	BY	DESCRIPTION

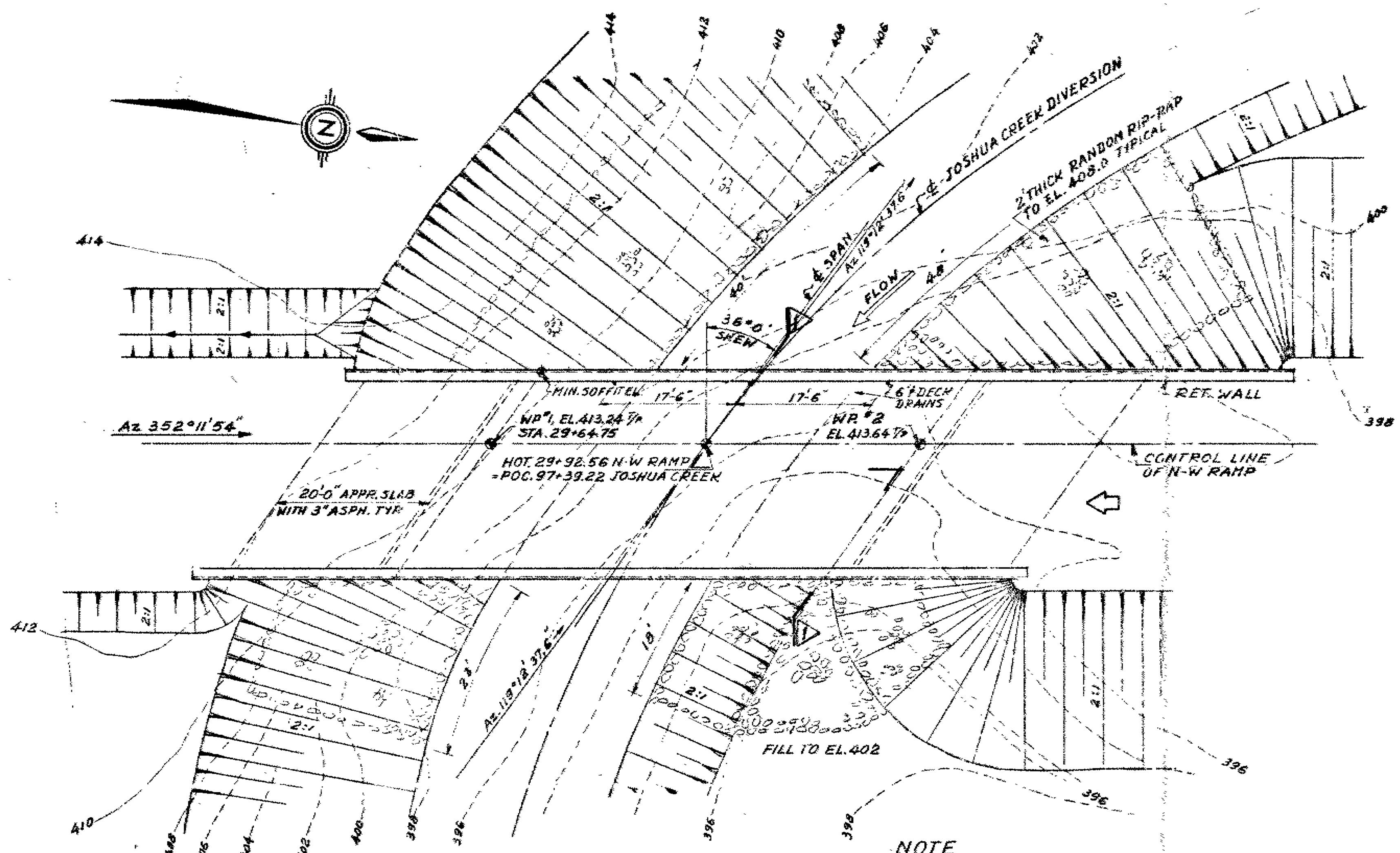
Geocres No 30M5-119

HWY No 403 DIST 4
SUBMITTED DATE Oct 26, 1978 SITE 10-140B
DRAWN CHECKED APPROVED DWG 1256624-A

DISTRICT No 4
CONT No
WP No 125-66-24

N-W RAMP OVER JOSHUA CREEK
GENERAL LAYOUT

SHEET

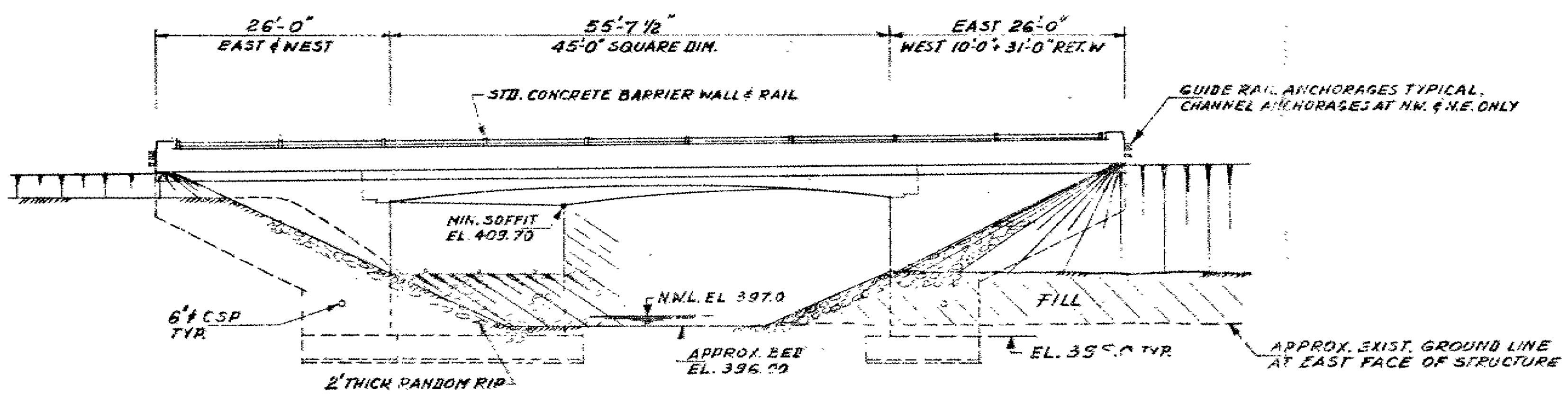


PLAN

SCALE: 1" = 10'-0"

NOTE

- W.P. DENOTES WORKING POINT
- T/P DENOTES TOP OF FINISHED PAVEMENT

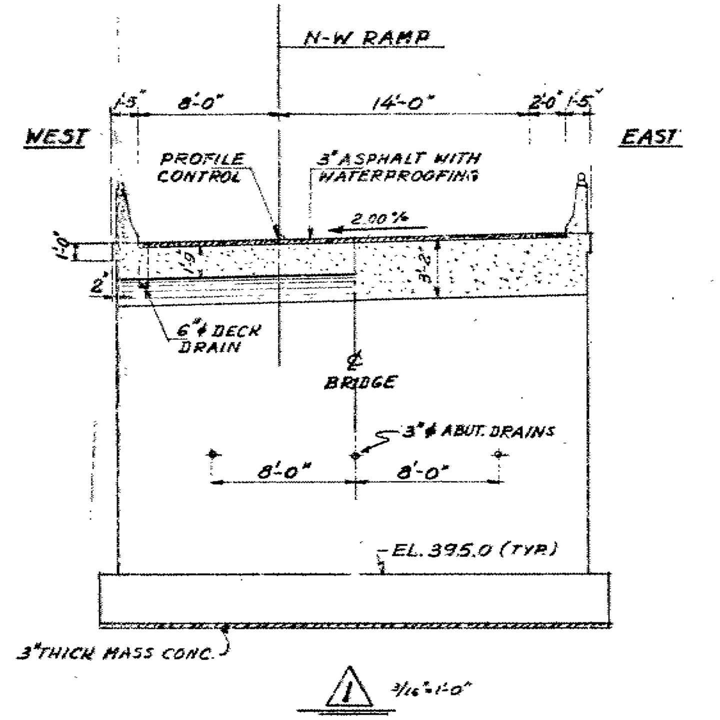


ELEVATION

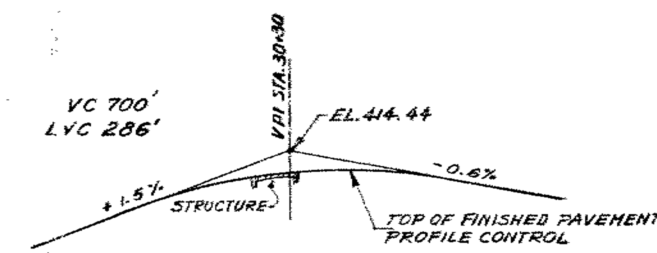
SCALE: 1" = 10'-0"

B.M. ELEV. 462.81

TOP OF S.W. BOLT ON SE LEG OF H TOWER 253 FT. LT., STA. 541+91 G.E.W.

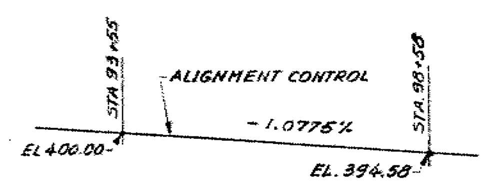


1 3/16" = 1'-0"



PROFILE OF N-W RAMP

N.T.S.



PROFILE OF JOSHUA CREEK

N.T.S.

CONCRETE QUANTITIES

CONCRETE QUANTITIES ARE LISTED BELOW FOR THE APPROPRIATE CONCRETE LUMP SUM TENDER ITEMS

1. CONCRETE IN BRIDGE .... 287 cu yd
2. CONCRETE IN RETAINING WALL .... 28 cu yd
3. CONCRETE IN BARRIER WALLS .... 15 cu yd
4. CONCRETE IN APPROACH SLABS .... 30 cu yd

NOTES

CLASS OF CONCRETE

DECK, ABUTMENTS, WING WALLS, STUB WALL & BARRIER WALLS .... 4000 psi
REMAINDER .... 3000 psi

GRADE OF REINFORCING STEEL

REINFORCING STEEL SHALL BE C.S.A. G30.12-M SERIES, GRADE 400

REINFORCING BARS WITH THE DESIGNATION 'C' AT THE END OF BAR MARKS SHALL BE COATED BARS

CLEAR COVER TO REINFORCING STEEL

FOOTINGS 3", ABUTMENTS 3", STUB WALL 3", DECK TOP 2", DECK BOTT. 1½", BARRIER WALLS 1½", RETAINING WALL 3", APPROACH SLABS 2", UNLESS NOTED OTHERWISE ON DRAWINGS.

CONSTRUCTION NOTES

FOOTINGS TO BE CAST ON AND AGAINST UNDISTURBED GROUND

BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH ABUTMENTS AND BOTH SIDES OF RETAINING WALL KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THEN 2 FEET

CONCRETE BARRIER WALL ABOVE RETAINING WALL SHALL BE CAST AFTER THE BACKFILL FOR RETAINING WALL HAS BEEN PLACED

LIST OF DRAWINGS

- 10-140B-1 GENERAL LAYOUT
- -"- 2 BORE HOLE LOCATIONS & SOILS STRATA
- -"- 3 FOOTINGS
- -"- 4 FRAME
- -"- 5 WING WALLS & RETAINING WALL
- -"- 6 BARRIER WALL
- -"- 7 20 FT. APPROACH SLAB
- -"- 8 STEEL RAILING (SINGLE TUBE)
- -"- 9 STANDARD DETAILS I
- -"- 10 STANDARD DETAILS II
- -"- 11 AS CONSTRUCTED ELEV & DIM.

FOR REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

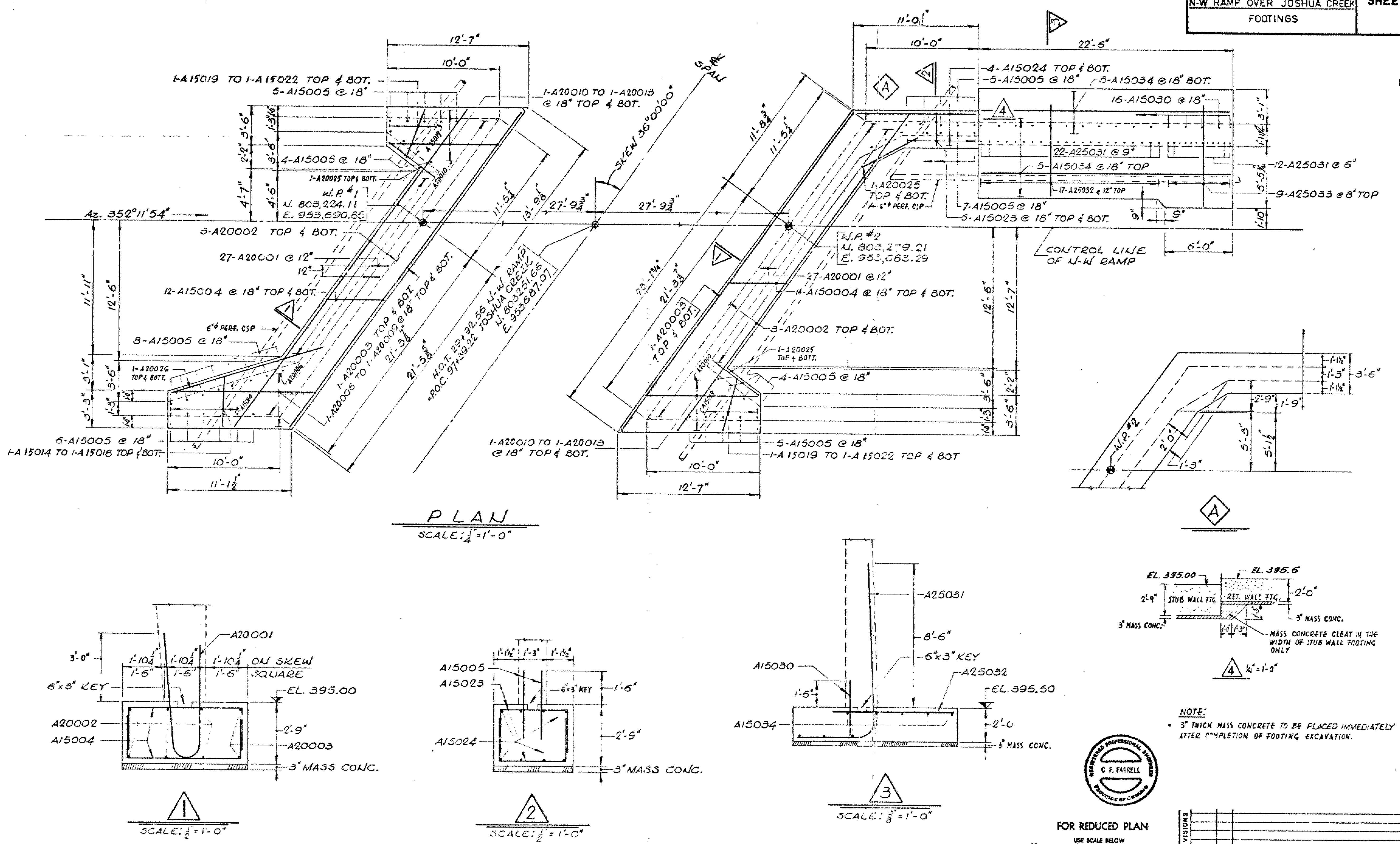
REVISIONS	DATE	BY	DESCRIPTION

DESIGN	CHECK	LOADING HS20-44	DATE
DRAWING	CHECK	SITE No 10-140B	DWG 1

CONT No
WP No 125-66-24

N-W RAMP OVER JOSHUA CREEK
FOOTINGS

SHEET



REVISIONS	DATE	BY	DESCRIPTION

DESIGN | CHECK | LOADING | DATE
DRAWING | CHECK | SITE No | DWG 3

Mr. G.C.E. Burkhardt
Head, Structural Section
Central Region
3501 Dufferin Street, Downsview

Soil Mechanics Section
Engineering Materials Office
Room 315, Central Building

78 09 29

Re: W.P. 125-66-24, Joshua Creek
Hwy. 403, District 4, Hamilton

Subsequent to the clearance of the long outstanding property problems, we have now completed our investigation of the subsurface conditions at this site. Due to the urgency of this project, we have been requested to submit preliminary information shortly after completion of the fieldwork so that design can proceed without further delay. Our findings and recommendations are as follows.

Our investigation revealed that bedrock exists at a very shallow depth at this site. Bedrock was encountered at the following elevations:

Location	Ref. Borehole	Ground Elev.	Approximate Bedrock Elev.
West limit of North Abutment	#2	397.8	394.3
East limit of North Abutment	#1	397.8	394.3
East limit of South Abutment	#4	412.7	397.9
West limit of South Abutment	#3	412.7	395.7

Creek Water Level: 397±

In view of the shallow depth to bedrock surface, spread footings founded within the upper portion of the somewhat weathered shale bedrock would be the most suitable foundation scheme. In such a case, the spread footings can be designed with an allowable pressure of 5 tsf. If the footings are situated below the prevailing water level, a temporary dewatering scheme will be required to construct the footings. Such a scheme could consist of an impervious earth cofferdam to stop infiltration of water into the excavation.

cont'd.....

A complete report, together with logsheets and drawings, will be submitted at a later date.

According to your Office, the structure will be supported on spread footings founded at elevation 392.0. This footing founding level is satisfactory based on our recent subsurface investigation results.

B. Ly

B. Ly
Senior Engineer

For: M. Devata
Supervising Engineer

BL/MD/gs

cc: C.S. Grebski
Files ✓