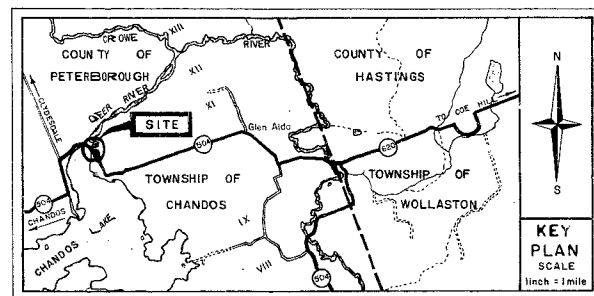
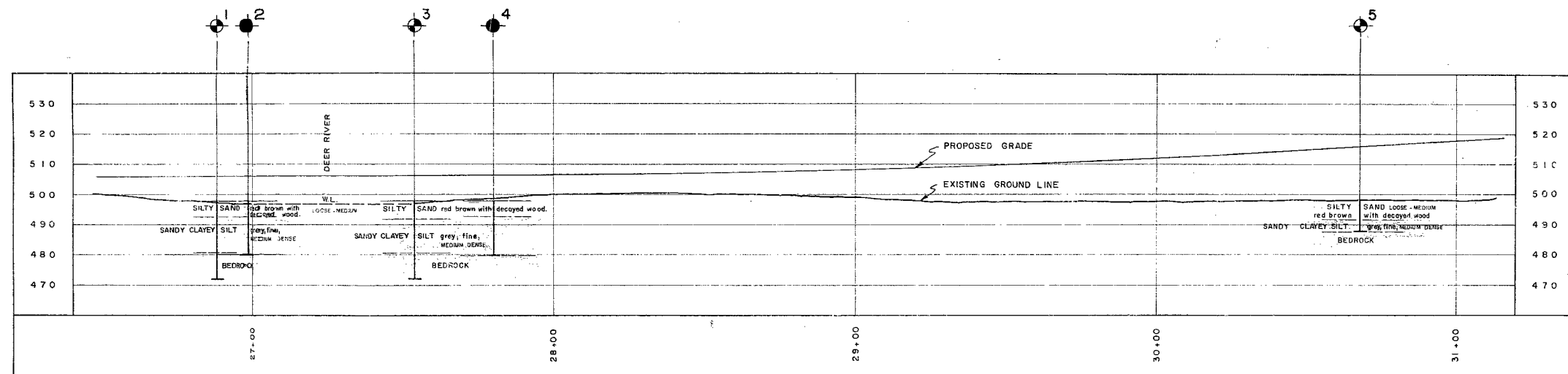
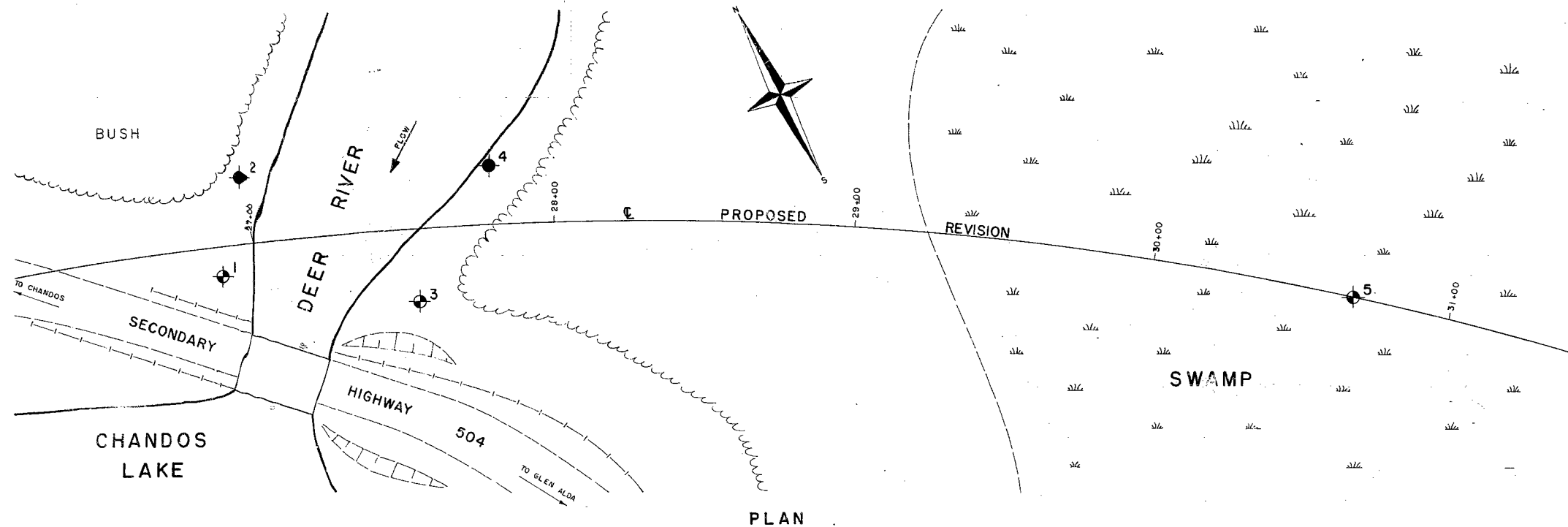


#61-F-9

Hwy. # 504

CROSSING

DEER RIVER



LEGEND			
●	BORE HOLE		
⊙	BORE & PENETRATION HOLE		
HOLE	ELEVATION	STATION	DISTANCE FROM C
1	498.0	26+88	10' RT.
2	498.0	26+98	22' LT.
3	498.0	27+54	25' RT.
4	498.0	27+80	20' LT.
5	498.0	30+68	C

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH SECTION		
PROPOSED CROSSING DEER RIVER 8 SECONDARY HWY. 504		
ORIGINATED V. KORLU DRAWN D. MUMFORD CHECKED APPROVED	DISTRICT NO. 10 W.D. NO. 366-61-1 SCALE 1 inch = 20 feet	DATE 16 FEBRUARY 1960 JOB NO. 61-F-9 DRAWING NO. 61-F-9A

25-506

Mr. A. M. Toye,
Bridge Engineer.
Materials & Research Section.

February 27, 1961.

D.H.C. FOUNDATION INVESTIGATION
REPORT.
W.J. 61-F-9 -- W.O. 366-61-1.

Attention: Mr. C. McGhie.

No W.P.

Re: Hwy. No. 50+ & Deer River Crossing
Twp. of Chandon, District No. 10.

Attached hereto, we are forwarding to you the
Soil Investigation Report for the above mentioned location.

We believe the factual data and recommendations
contained in this report are self-explanatory, and should
prove adequate for your future design work.

Should you require any further assistance with
respect to this project, please do not hesitate to call on
our Office.

L. G. Soderman,
PRINCIPAL FOUNDATION ENGR.
Per:

A. G. Sternac
(A. G. Sternac,
SUPERVISING FOUNDATION ENGR.)

AGS/MCEP
Attach.

cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
H. D. McMillan
J. Ford
C. E. Robertson
J. E. Gruspler
A. Watt
Foundations Office
Gen. Files.

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 - 4.4) Bedrock
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5. DISCUSSION & RECOMMENDATIONS
6. SUMMARY
7. MISCELLANEOUS

FOUNDATION REPORT

For

Hwy. No. 504 and Deer River Crossing

Twp. of Chandos, District No. 10.

W.J. 61-F-9 -- W.O. 366-61-1

1. INTRODUCTION:

It is proposed to realign the existing road (Hwy. 504) at Deer River crossing, and construct a new bridge. The site is about 10 miles north-east of Apsley in the Twp. of Chandos.

The soil investigation was carried out in order to determine the subsoil stratification, the soil properties and recommend the type of foundations to support the new structure.

The results of the investigation together with the discussion and recommendations, are given in this report.

2. DESCRIPTION OF SITE & GEOLOGY:

The Deer River flows through a hilly terrain into Chandos Lake. The topography of the area is rugged and hilly with bedrock outcrops forming ridges and thick bush and forest covering the surface.

Geologically, the area is in the Precambrian Shield. This shield consists mainly of granite rocks, but includes also remnants and patches of volcanic and sedimentary rocks.

cont'd /2 ...

3. FIELD & LABORATORY WORK:

The investigation was carried out by means of a core-drill machine adapted for soil sampling. During the investigation five boreholes were made, two holes on each side of the river and one hole about 300 ft. to the east of the river, for fill stability analysis.

In granular soils, samples were taken by means of a 2" O.D. split barrelled spoon sampler. The dimensions of the spoon sampler and the energy used in driving it, conform to the requirements of the Standard Penetration Test.

The split spoon samples were visually examined in the field and representative samples were brought to the laboratory for further tests.

The logs of the boreholes and their location shown on Drawing No. 61-F-9A are attached under Appendix I.

4. SOIL TYPES ENCOUNTERED:

4.1) General.

The investigations at the site revealed the following subsoil conditions:

The top material is loose, red-brown medium silty sand and organic matter (decayed wood). This material is underlain by a layer of grey fine sandy, clayey silt. Underlying this overburden material, is bedrock.

4. SOIL TYPES ENCOUNTERED: (Cont'd)...

4.2) Red-brown silty sand with decayed wood.

This layer extends from the surface down to elevation 492 ft. It is a recent deposit consisting of mainly fine to medium sand with silt. It contains a considerable amount of organic material, mainly decayed wood. The layer is in a loose state and being below water level, is in a submerged condition.

4.3) Silt with some fine sand and clay, respectively.

The grain size distribution curves indicate that the material is mainly silt with some fine sand in the upper part and becoming clayey with depth.

This layer was intersected at approximately elevation 492.0' and it extended down to about elevation 480.0 where bedrock was encountered.

The material is non-plastic and the average recorded Standard Penetration Test value was N=19. When this value is corrected for the lack of overburden, the result indicates the layer to be in a dense state of compaction.

The material is fully saturated, i.e., it is submerged being below the ground water table.

4.4) Bedrock.

Bedrock was contacted at about elevation 480 ft.,

cont'd /4 ...

4. SOIL TYPES ENCOUNTERED: (Cont'd)...

4.4) Bedrock.

and AXT core samples were extracted. The samples show that the bedrock is Crystalline Dolomite with Mica.

4.5) Ground Water.

During the time of the investigation the creek water level was at elevation 497 ft. Below this elevation the subsoil is in a submerged condition.

5. DISCUSSION AND RECOMMENDATIONS:

The subsoil at the investigated site is predominantly granular material of favourable properties. Preference, therefore, will be given to the use of spread footings for foundations.

The average recorded value of the Standard Penetration Test for the granular layer overlying bedrock is N=19, indicating a medium density. In reality, this layer is in a dense state of packing and an 'N' value of 35 to 40 is representative. The recorded lower 'N' values are due to the lack of overburden and should be corrected in accordance with data published by Gibbs and Holtz.

For the calculation of the safe bearing pressure an assumption of the footing depth and width has been done. For a footing 5 ft. wide and 6 ft. below ground level, elevation 492 ft., a safe bearing pressure of about 6 t.s.f.

5. DISCUSSION AND RECOMMENDATIONS: (Cont'd)...

was calculated. This figure is based on the shear failure criterion only. When the settlement criterion is considered also, a value of 3 t.s.f. is arrived at. This implies that settlements will be within tolerable limits.

The proposed footing elevation (492 ft.) is below the recorded water level (497 ft.) and dewatering of the excavation becomes necessary. Sheet piles driven around the excavation are recommended. The depth to which the sheet piles will have to be driven will depend on:

- 1) The excavation depth
- 2) The excavation width
- 3) The hydrostatic head, i.e., the height of the ground or river water level above the excavation bottom.

When the above information becomes available, the sheet piling depth can be accurately determined.

6. SUMMARY:

It is recommended to found the structure on spread footings. A safe bearing pressure of 3 t.s.f. for a footing about 5 ft. wide and 6 ft. below ground level can be used. Settlements will be within tolerable limits.

Sheet piling driven around the excavation is recommended. The depth to which the sheet piling should be driven will be determined when more data becomes available,

6. SUMMARY: (Cont'd)...

as outlined in the report. Dewatering of the excavation can be achieved with ordinary sump pumps.

7. MISCELLANEOUS:

The field work was carried out during Feb. 6 to Feb. 9, 1961, under the supervision of Project Foundation Engineer, V. Korlu. All the laboratory testing was done by the Materials and Research Section.

REPORT PREPARED BY:

V. Korlu
V. Korlu,
Project Foundation Engr.

February 1961.

REPORT APPROVED BY:

A. C. Stermac
A. C. Stermac,
Supervising Fdn. Engr.

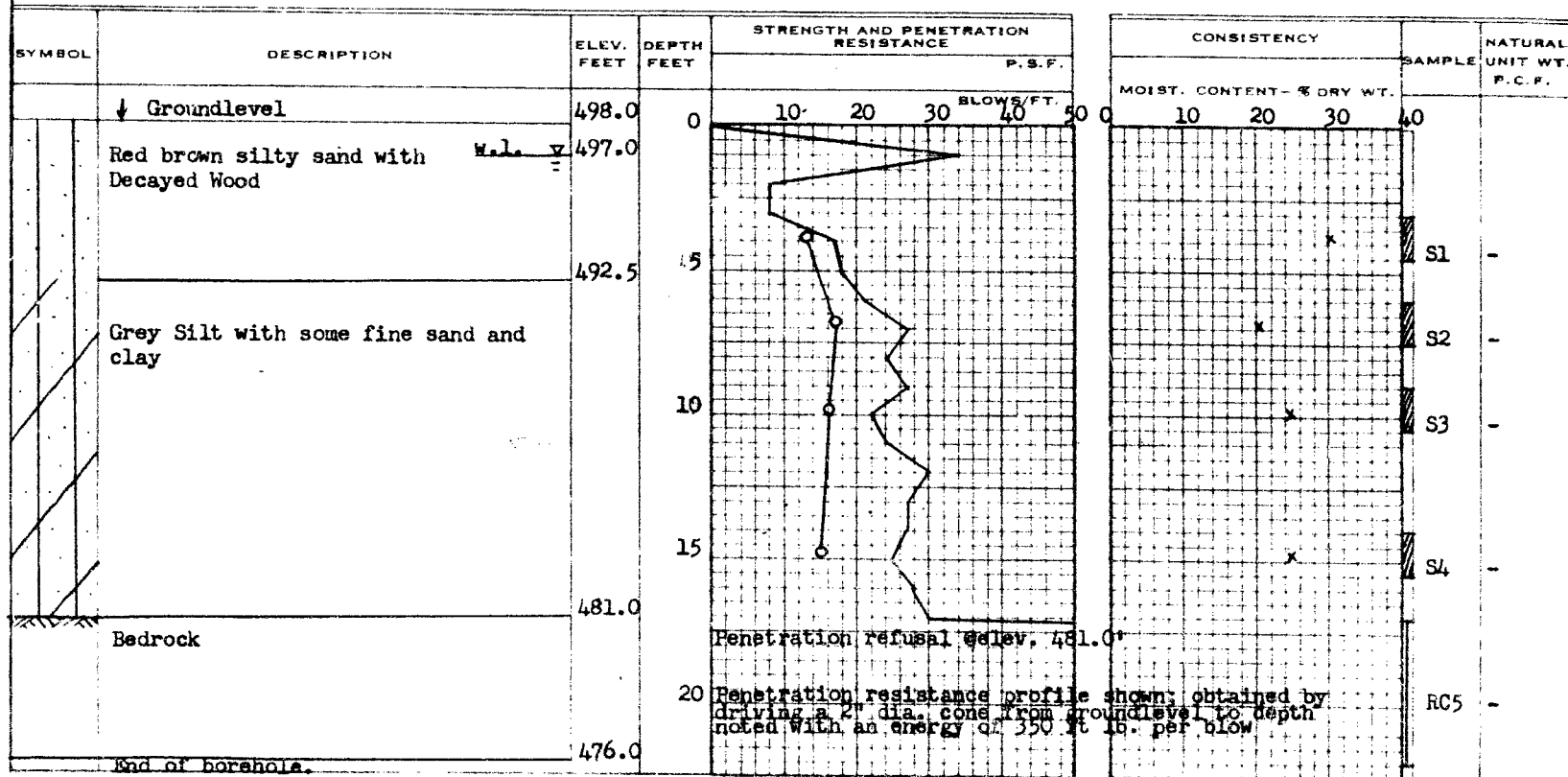
APPENDIX I.

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.O. 366-61-1 BORE HOLE NO. 1
JOB 61-F-9 STATION 26+88 (10' Rt.)
DATUM 498.0' COMPILED BY B.K.
BORING DATE Feb. 6/61. CHECKED BY V.K.

LEGEND

1/2 UNCONFINED COMPRESSION (Q_u) — O
VANE TEST (C) AND SENSITIVITY (S) — +
NATURAL MOISTURE AND LIQUIDITY INDEX — LI
LIQUID LIMIT — X
PLASTIC LIMIT —



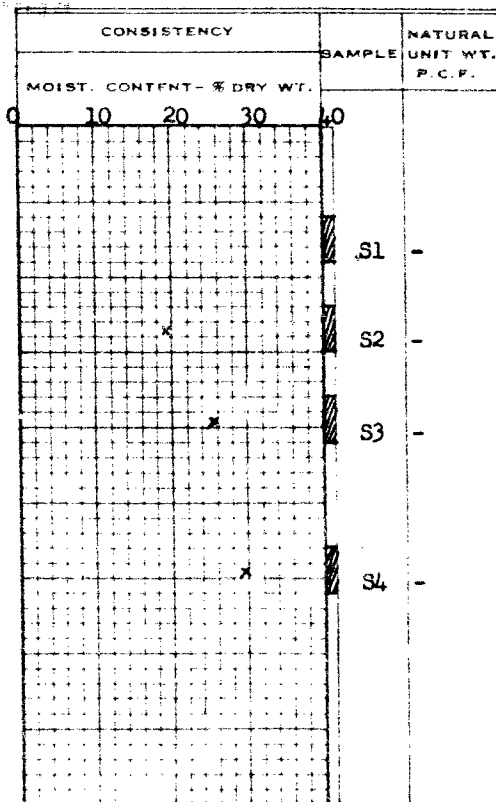
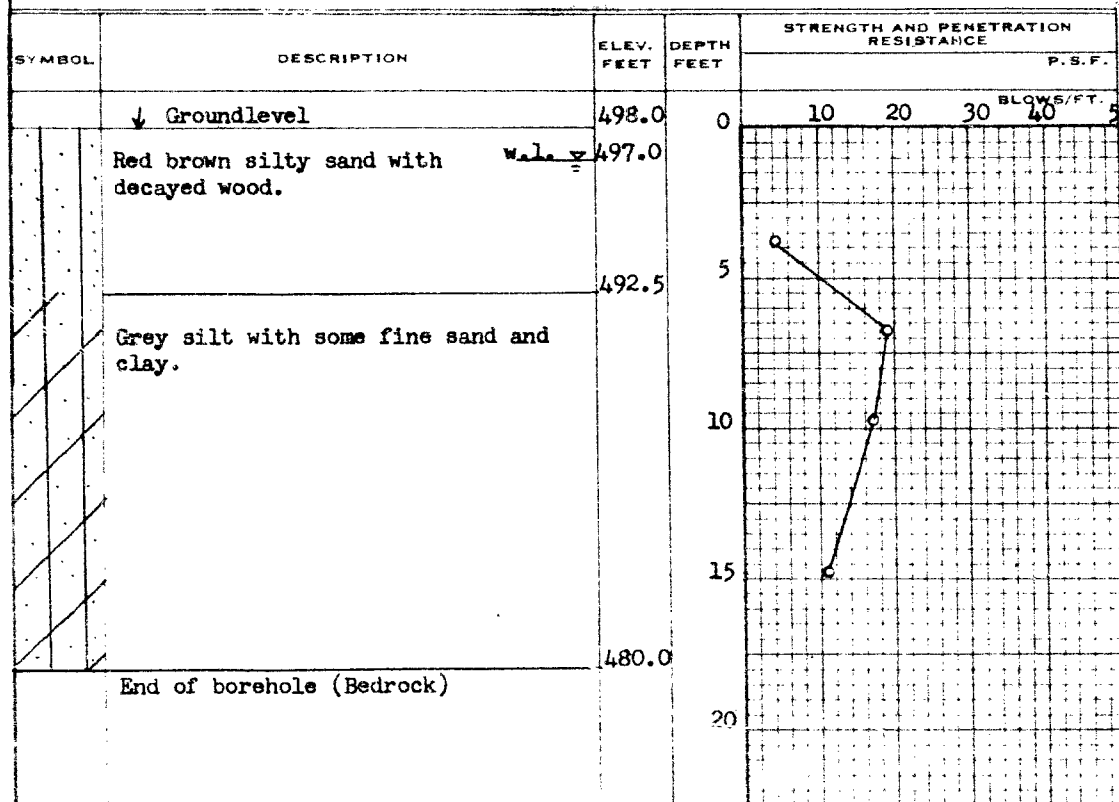
DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.O. 366-61-1 BORE HOLE NO. 2
JOB 61-P-9 STATION 26+98 (22' Lt.)
DATUM 498.0' COMPILED BY B.K.
BORING DATE Feb. 7/61 CHECKED BY V.K.

2" DIA. SPLIT TUBE
2" SHELBY TUBE
2" SPLIT TUBE
2" DIA. CONE
2" SHELBY
CASING

LEGEND

1/2 UNCONFINED COMPRESSION (Q_u)
VANE TEST (C) AND SENSITIVITY (S)
NATURAL MOISTURE AND LIQUIDITY INDEX
LIQUID LIMIT
PLASTIC LIMIT

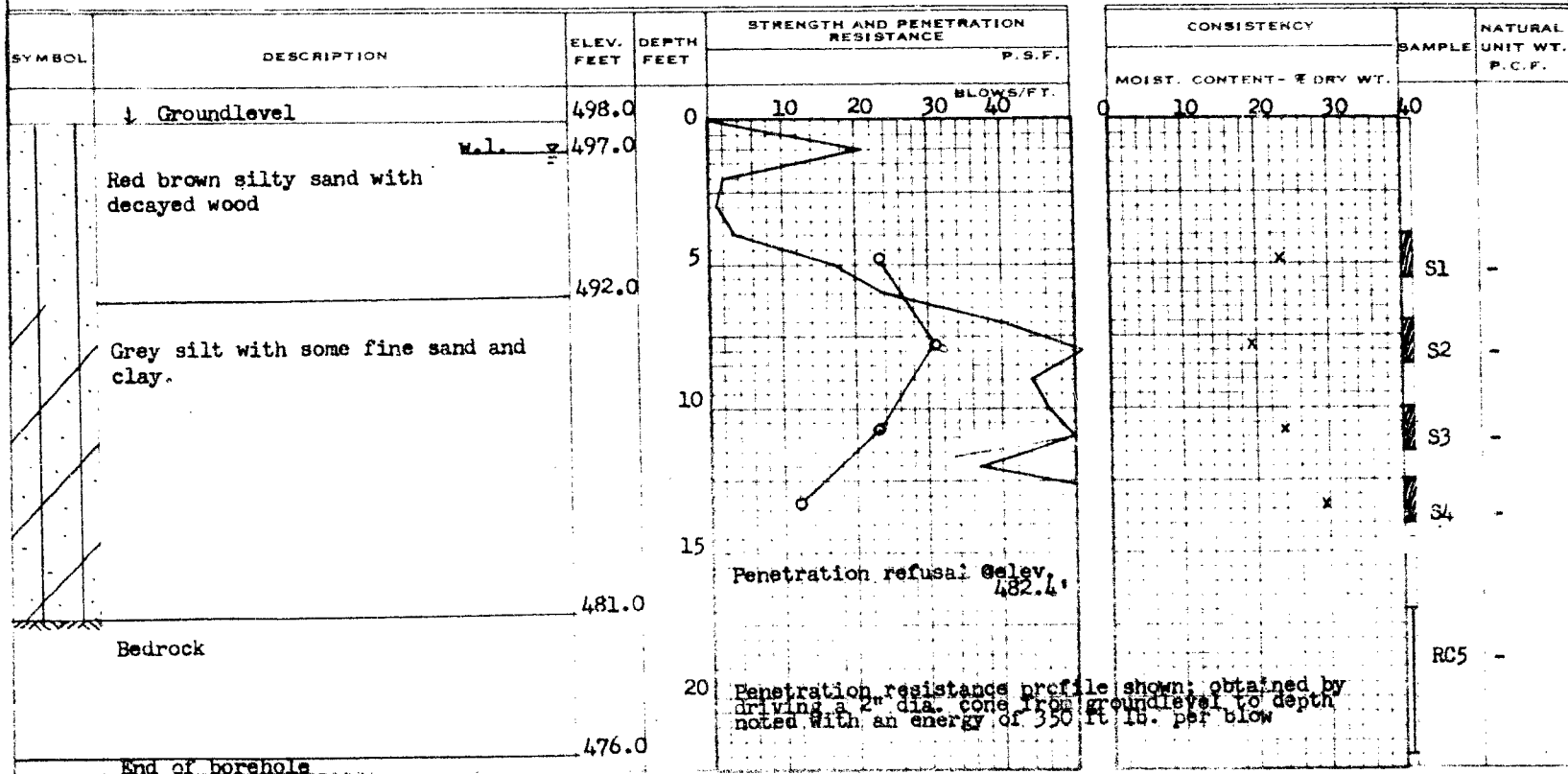


DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.D. 366-61-1 BORE HOLE NO. 3
JOB 61-F-9 STATION 27+54 (25' Rt.)
CAUM 498.0' COMPILED BY B.K.
BORING DATE Feb. 7/61 CHECKED BY V.K.

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) — O
VANE TEST (C) AND SENSITIVITY (S) — +
NATURAL MOISTURE AND LIQUIDITY INDEX — LI
LIQUID LIMIT — X
PLASTIC LIMIT —

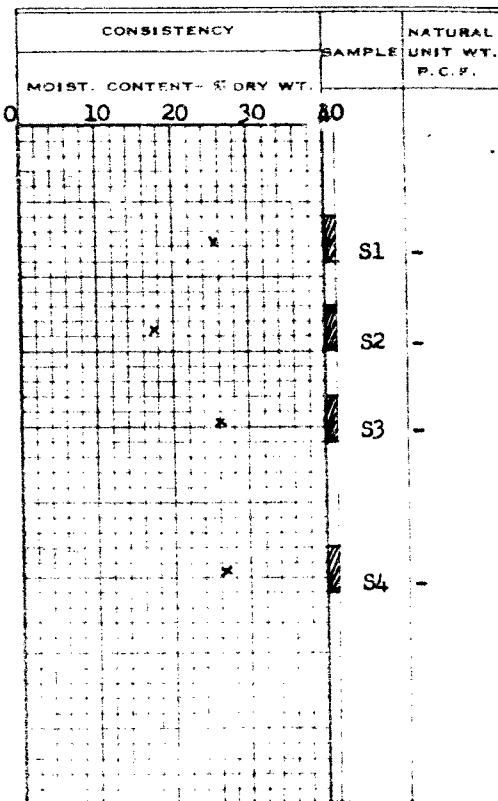
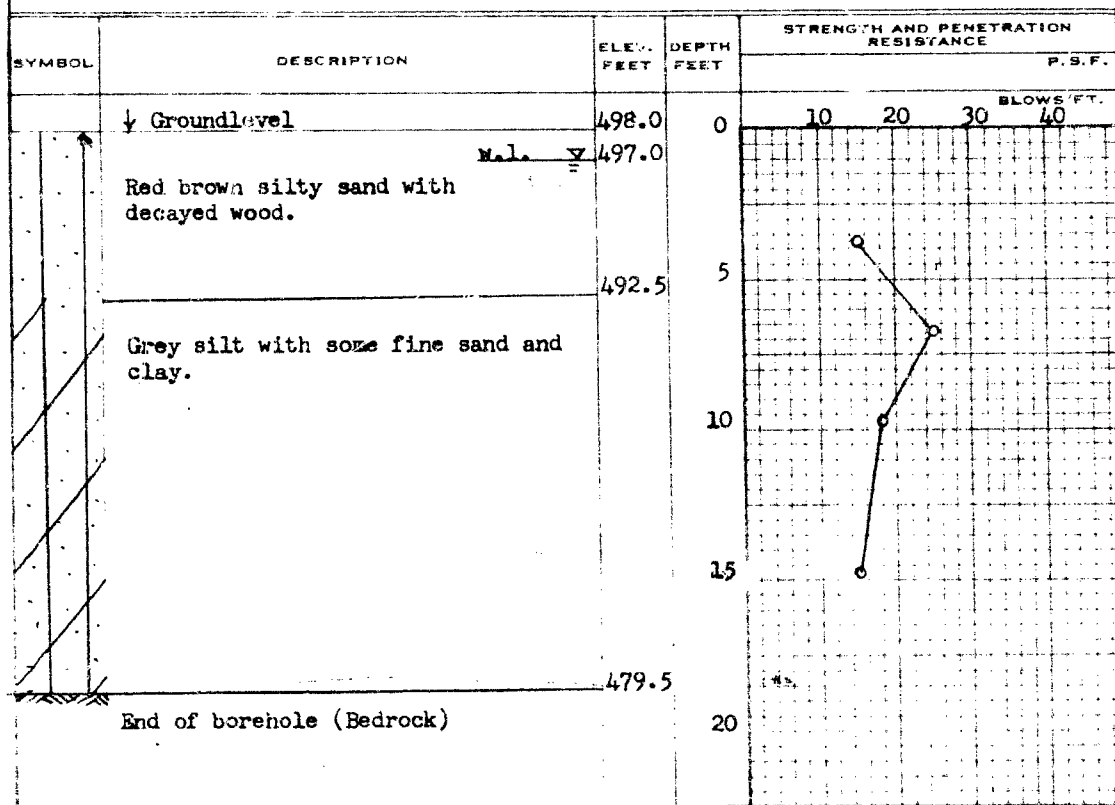


DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W^O 366-61-1 BORE HOLE NO. 4
JOB 61-F-9 STATION 27+80 (20' Lt.)
DATUM 498.0' COMPILED BY B.K.
BORING DATE Feb. 8/61 CHECKED BY V.K.

LEGEND

1/2 UNCONFINED COMPRESSION (Q_u) — O
VANE TEST (C) AND SENSITIVITY (S) — +
NATURAL MOISTURE AND LIQUIDITY INDEX — LI
LIQUID LIMIT — X
PLASTIC LIMIT —

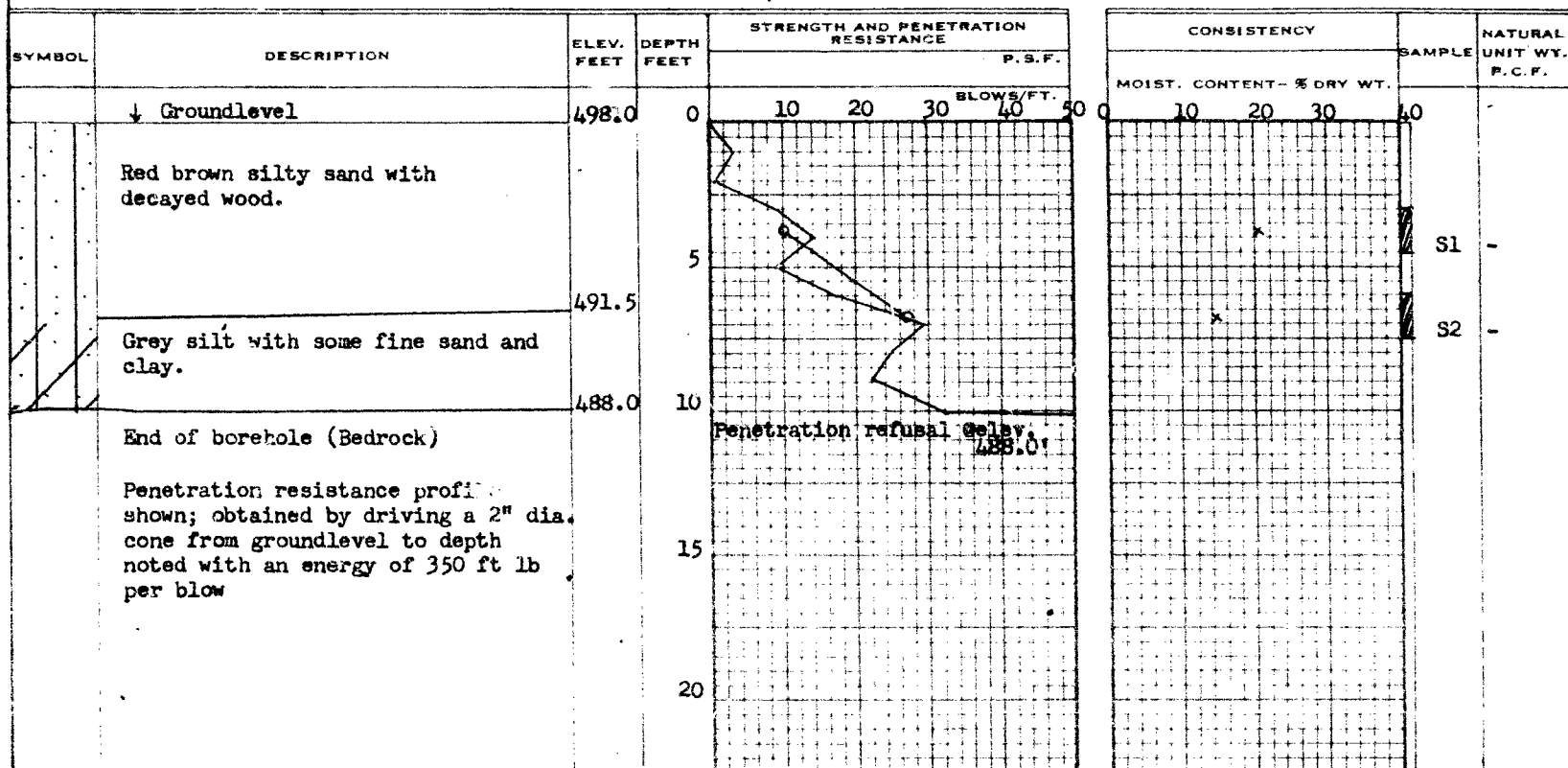


DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W 366-61-1 _____ BORE HOLE NO. 5 _____
JOB 61-F-9 _____ STATION 30-68 E _____
DATUM 498.0' _____ COMPILED BY B.K. _____
BORING DATE Feb. 9/61 _____ CHECKED BY V.K. _____

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) _____	O
VANE TEST (C) AND SENSITIVITY (S) _____	+ S
NATURAL MOISTURE AND LIQUIDITY INDEX _____	LI
LIQUID LIMIT _____	X
PLASTIC LIMIT _____	



SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-9

W 366-61-1

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
1	S1	3'-4.5'	Red brown silty sand with decayed wood.	13	30.2	-	-	-	-	
	S2	6'-7.5'	Grey fine sandy silt.	17	20.4	-	-	-	-	
	S3	9'-10.5'	Grey clayey silt.	16	24.6	-	-	-	-	
	S4	14'-15.5'	Grey clayey silt.	15	24.8	-	-	-	-	
	RC5	17'-22'	Bedrock Crystalline Dolomite with Mica	-	-	-	-	-	-	
2	S1	3'-4.5'	Red brown silty sand with decayed wood.	4	97.0	-	-	-	-	
	S2	6'-7.5'	Grey fine sandy silt.	19	19.2	-	-	-	-	
	S3	9'-10.5'	Grey clayey silt.	17	25.4	-	-	-	-	
	S4	14'-15.5'	Grey clayey silt.	11	29.8	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-9

W. 366-61-1

HOLE NO.	SAMP NO	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
3	S1	4'-5.5'	Red brown silty sand with decayed wood.	23	23.2	-	-	-	-	
	S2	7'-8.5'	Grey fine sandy silt.	31	19.2	-	-	-	-	
	S3	10'-11.5'	Grey Silt	23	23.9	-	-	-	-	
	S4	12.5'-14'	Grey clayey silt.	12	29.4	-	-	-	-	
	RC5	17'-22'	Bedrock Crystalline Dolomite with Mica	-	-	-	-	-	-	
4	S1	3'-4.5'	Red brown silty sand with decayed wood.	15	25.2	-	-	-	-	
	S2	6'-7.5'	Grey fine sandy silt.	25	17.7	-	-	-	-	
	S3	9'-10.5'	Grey clayey silt.	18	26.0	-	-	-	-	
	S4	14'-15.5'	Grey fine sandy, clayey silt.	15	26.6	-	-	-	-	

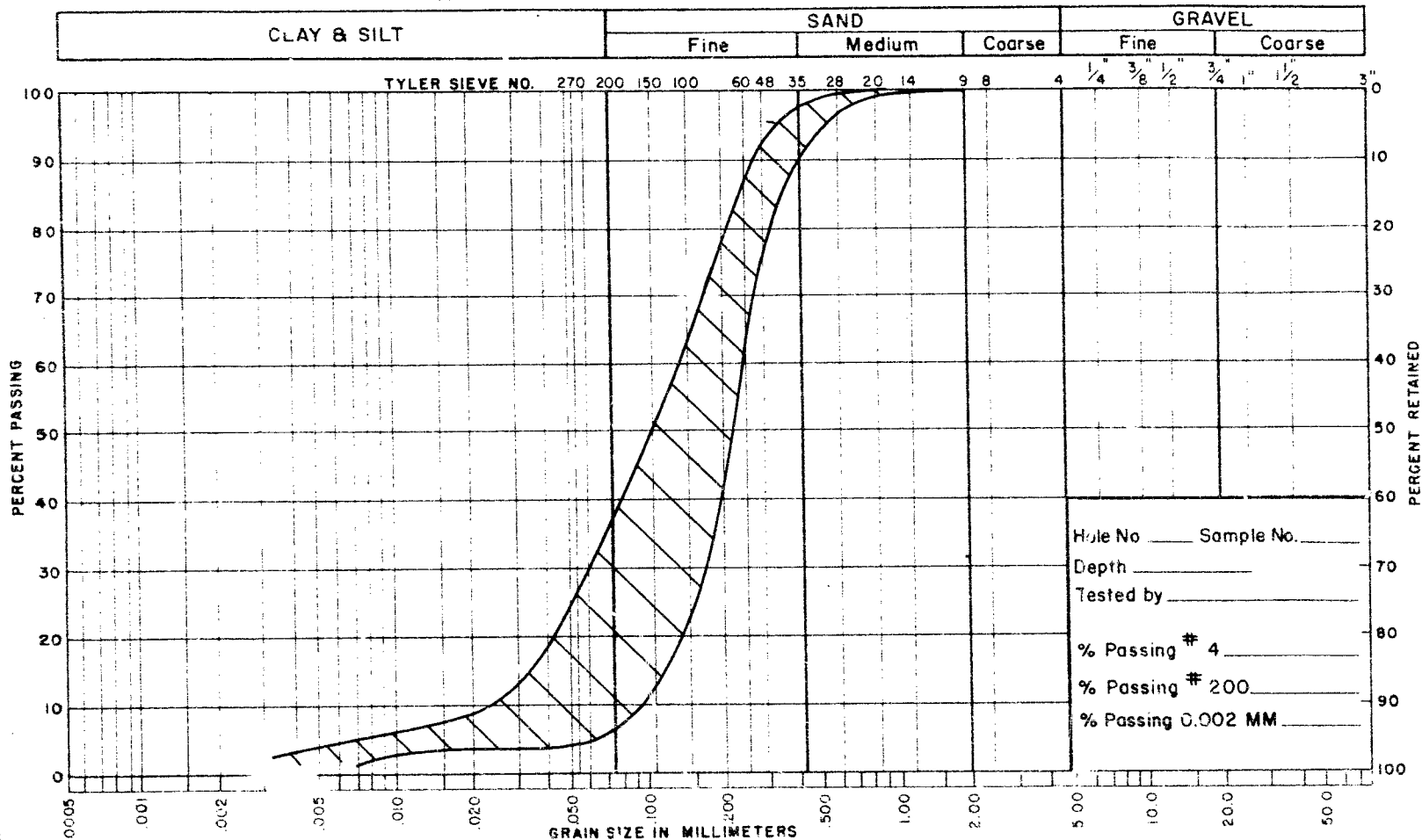
SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-9

W. 366-61-1

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
5	S1	3'-4.5'	Red brown silty sand with decayed wood.	10	20.3	-	-	-	-	
	S2	6'-7.5'	Grey clayey silt.	27	14.5	-	-	-	-	
			S denotes split spoon							
			RC " rock core							

UNIFIED SOIL CLASSIFICATION SYSTEM



NOTES RED BROWN SILTY SAND WITH DECAYED WOOD

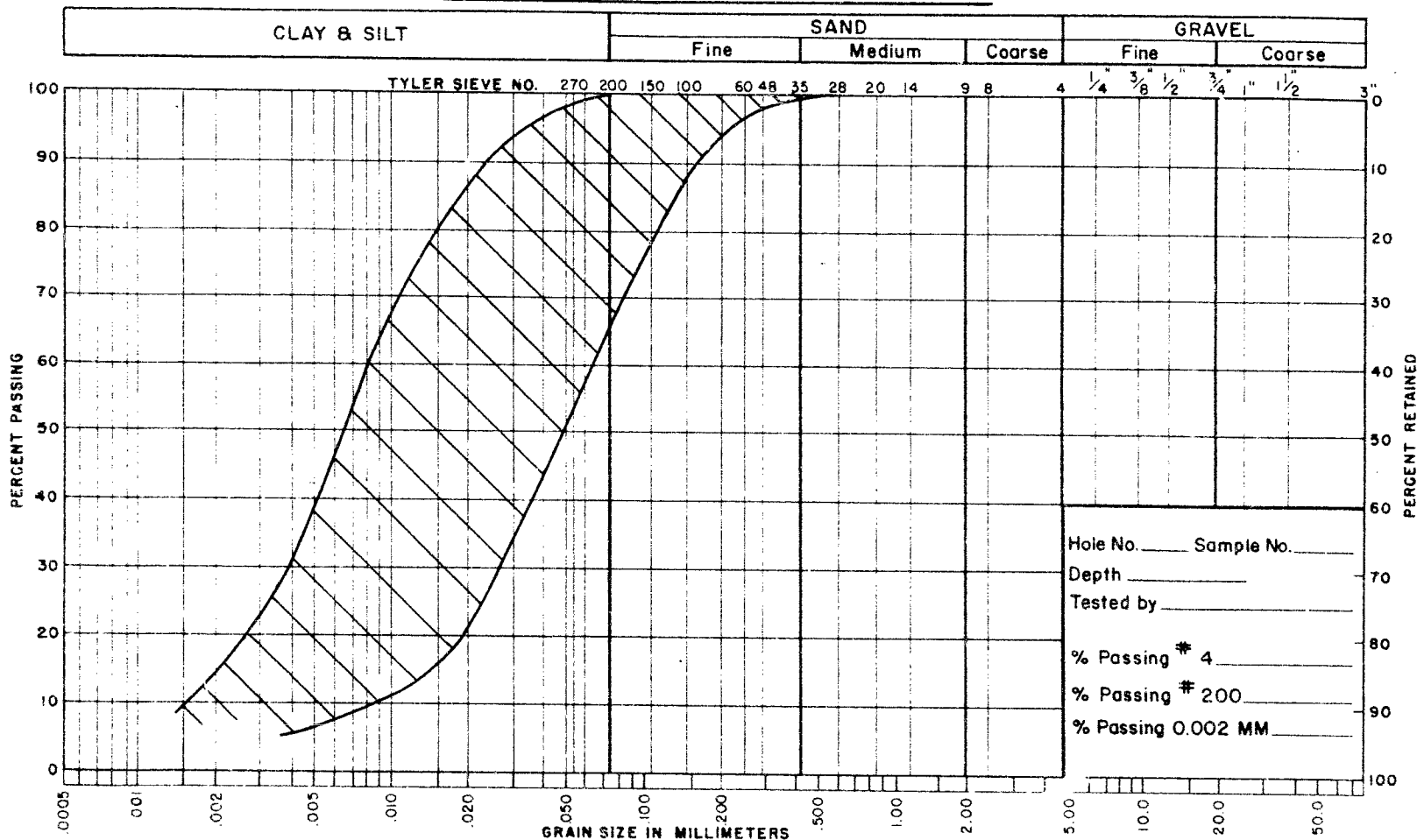
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION
GRAIN SIZE DISTRIBUTION

Job No. 61-F-9

W# No. 366-61-1

Location DEER RIVER

UNIFIED SOIL CLASSIFICATION SYSTEM



NOTES GREY FINE SANDY, CLAYEY SILT

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION
GRAIN SIZE DISTRIBUTION

Job No. 61-F-9 W# No. 366-61-1

Location DEER RIVER

DEER RIVER 61-F-9

NOTE:

IT WAS AGREED THAT FOOTINGS OF THE TWIN BOX CULVERT CAN BE PLACED AT ELEVATION 493.5. THIS IS HIGHER THAN RECOMMENDED IN THE REPORT (492.0).

THE HIGHER ELEVATION WAS AGREED TO BECAUSE THE STRUCTURE WILL BE A BOX CULVERT WHERE LOAD I.E. PRESSURES WILL BE SMALL.

IT WAS POINTED OUT THAT THE DISTRICT SHOULD BE ADVISED TO EXCAVATE AND REPLACE WITH GRANULAR MATERIAL ANY DECAYED ORGANIC MATTER THAT WOULD BE ENCOUNTERED.

AGS

DISCUSSION WITH JOHN CURTIS