

DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT. 1976

GEOCRES No. 3165-102

DIST. 9 REGION

W.P. No. 5-80-01
formerly 437-64-00

CONT. No. 81-51

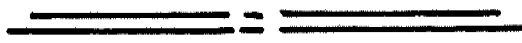
W. O. No.

STR. SITE No. 3-287 R.W.

HWY. No. 417

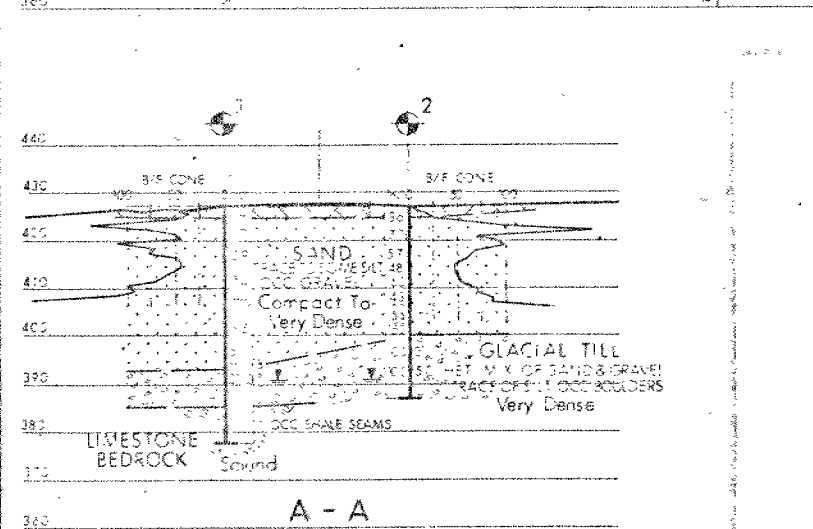
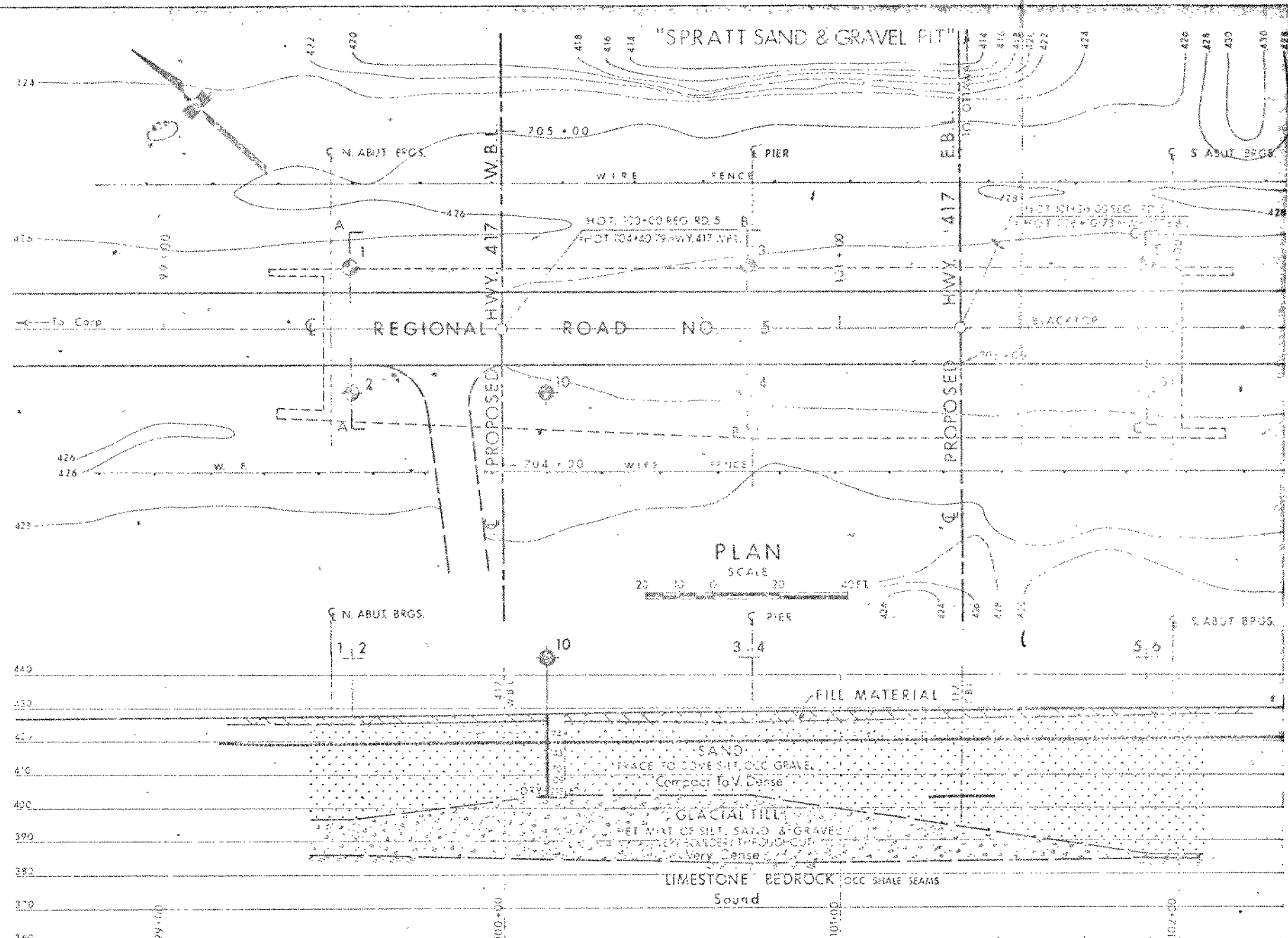
LOCATION Retaining Wall at
N Abut, Reg. Rd. 5 Underpass

No of PAGES -



OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.

REMARKS:



RECORD OF BOREHOLE No. 10												
LOCATION: STA. 100 + 13, c/a 19' R.R. Line, P.L. #53		ORIGINATED BY: J.D.W.										
BOREHOLE TYPE: EX. BY GRAVE		COMPILED BY: A.Z.D.										
DATE: April 29, 1971		CHECKED BY: J.D.W.										
SOIL PROFILE		SAMPLES		GROUND WATER CONDITIONS	ELEVATION (FEET)	SHEAR STRENGTH (PSF)		WATER CONTENT (%)			UNIT WEIGHT (PCF)	REMARKS
DEPTH (FEET)	DESCRIPTION	NUMBER	TYPE			VALUES	UNCONFINED	FIELD VANE	Wp	W		
0.0	Ground level					20	40	60	80			
0.0	Gravel (11%)											
0.0	Sand, trace some silt, occasional gravel	1	SS	75	420							
0.0	Uniformly Graded - Irregularly Stratified	2	SS	100	410							
0.0	Brown											
0.0	Very Dense	3	SS	100	400							
0.0	End of Borehole	4	SS	210	400							42.41 (15)
	Mix. of Silt, Sand & Gravel											
	Glacial Till											
	Very Dense											

IMPERIAL

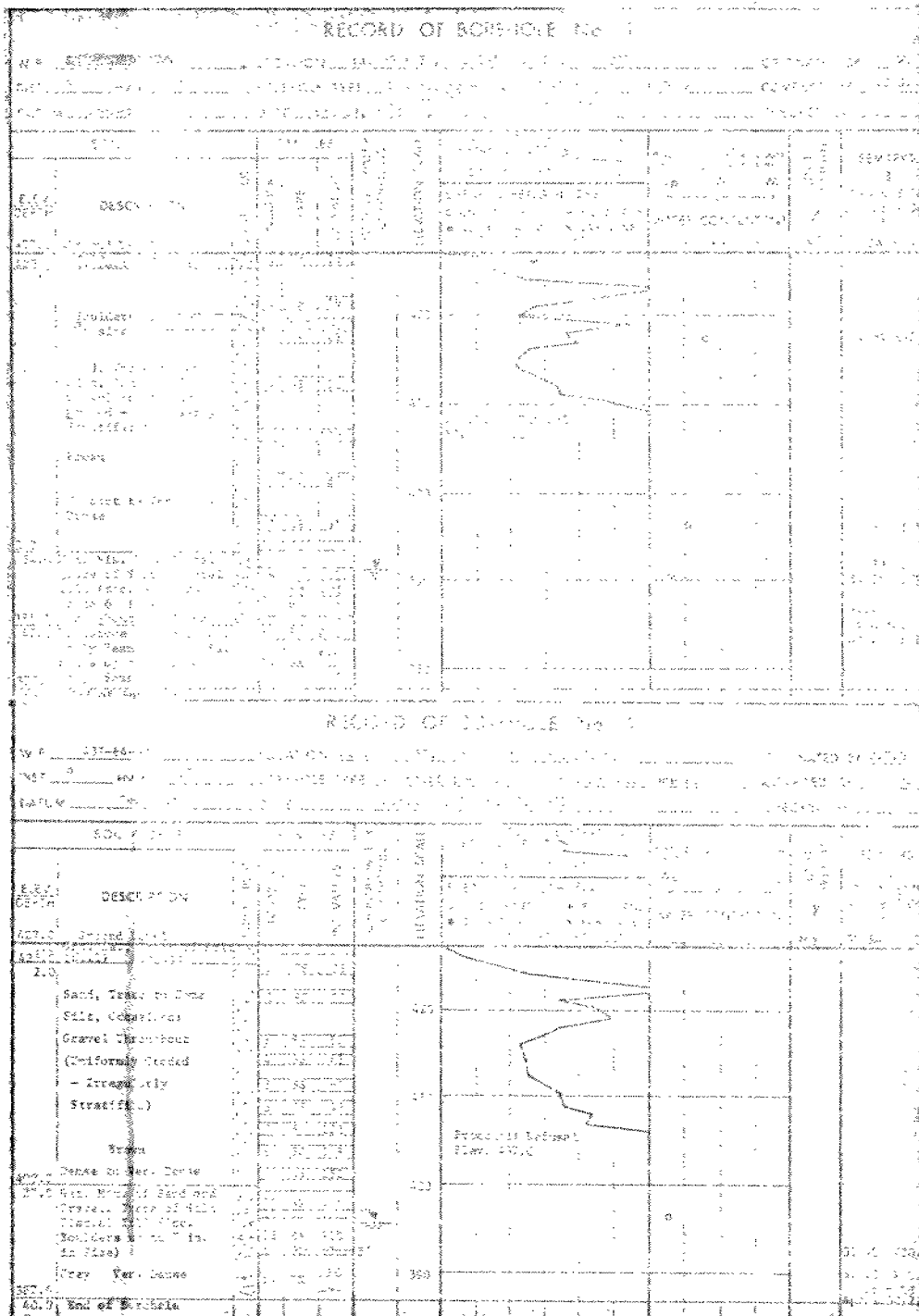
CONT No
WP No

BORE HOLE & SOIL INFORMATION
ADAPTED FROM M.T.C. CONT 76-12

SHEET

- NOTE:
- DRAWING PROVIDED FOR INFORMATION OF CONTRACTOR.
 - SURFACE CONDITIONS AND PROFILE MAY NOT BE AS SHOWN.

LEGEND



DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

DATE	BY	DESCRIPTION
DESIGN	CHECK	LOADING
DRAWING	CHECK	SITE No 3-5-67 P. 4

DISTRICT No 9
CONT No
WP No 5-80-02
 REG. RD. #5 UNDERPASS-HWY 417
 RETAINING WALL
 GENERAL ARRANGEMENT



METRIC

DIMENSIONS ARE IN MILLIMETRES
 UNLESS OTHERWISE SHOWN.
 ELEVATIONS, COORDINATES, CURVE
 AND ALIGNMENT DATA ARE IN METRES.
 STATIONS ARE IN KILOMETRES + METRES.

NOTES

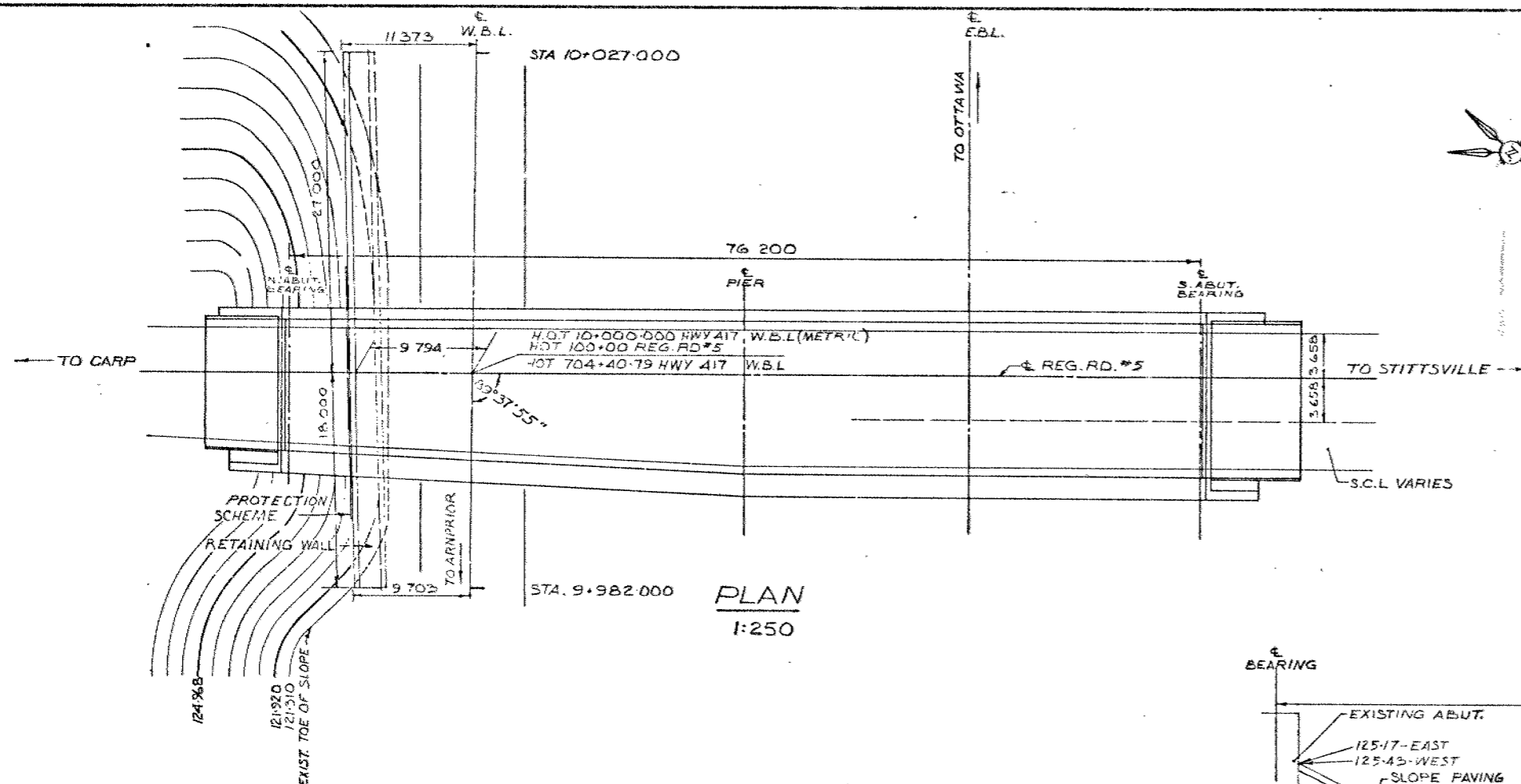
- REINFORCING STEEL GRADE 400.
- REINFORCING BARS WITH THE DESIGNATION 'C' AT THE END OF BAR MARK SHALL BE COATED BARS.
- CLEAR COVER TO REINFORCING STEEL 75 mm.
- CLASS OF CONCRETE 30 MPa.
- CLASS OF CONC. IN SLOPE PAVING 20 MPa.
- GRANULAR BACKFILL
- QUANTITY - 559 m³

CONCRETE QUANTITIES

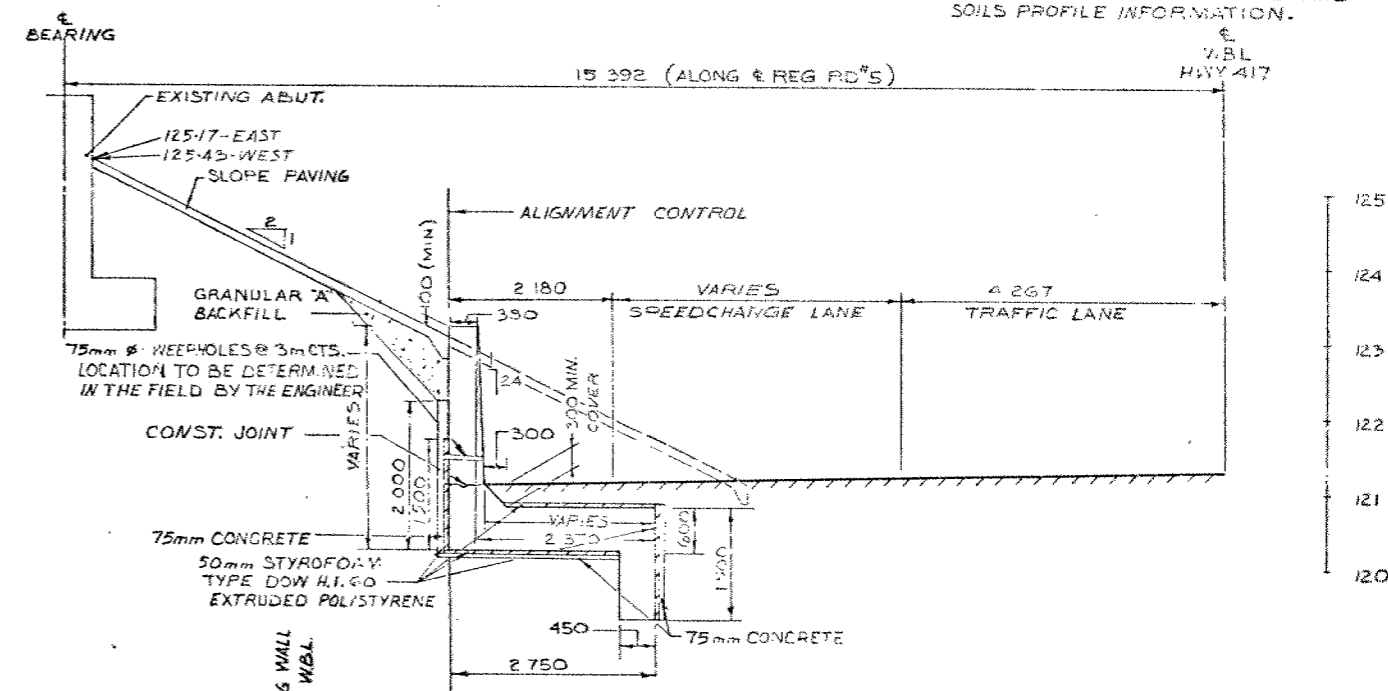
- CONCRETE IN RETAINING WALL - 33 m³
- CONCRETE IN SLOPE PAVING - 0.5 m³

LIST OF DRAWINGS

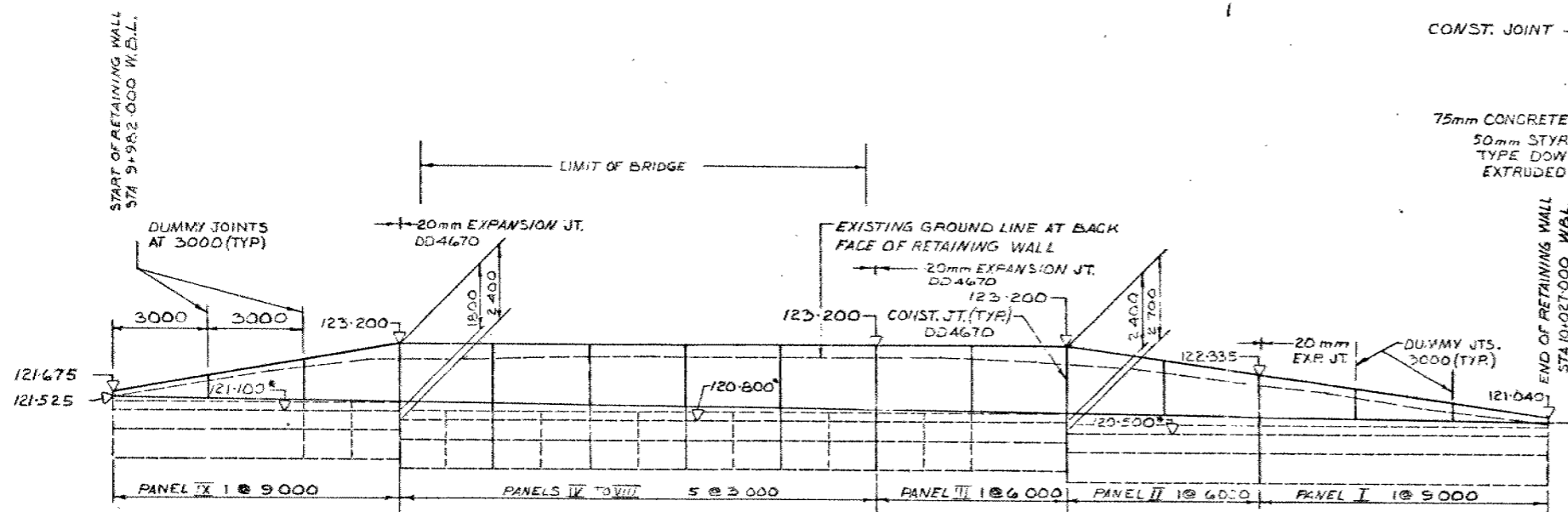
- DWG. 1 - GENERAL ARRANGEMENT
- DWG. 2 - DETAILS & REINFORCING
- DWG. 3 - PROTECTION SCHEME
- DWG. 4 - ADAPTED SOPE HOLE AND SOILS PROFILE INFORMATION.



PLAN
 1:250



TYPICAL SECTION UNDER STRUCTURE
 1:50



FRONT ELEVATION
 1:100

BM 120.584
 CUT x OF D.I.C.B. 27011
 OF 9+973.000 W.B.L.

* ELEVATION TOP OF FOOTING.

DRAWING NOT TO BE SCALED
 100 mm ON ORIGINAL DRAWING

REVISIONS	DATE	BY	DESCRIPTION	DATE	BY

WEST

EAST

METRIC

CONT No
WP No 5-80-02

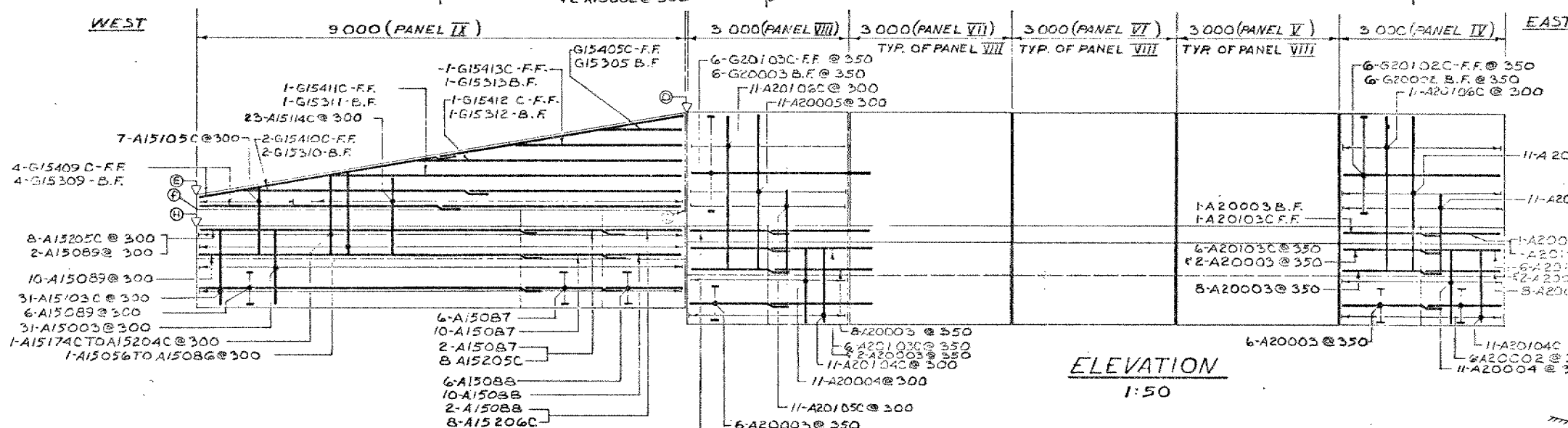
REG. RD. NO. 5 UNDERPASS-HWY. 417
RETAINING WALL
DETAILS & REINFORCING

SHEET

DIMENSIONS ARE IN MILLIMETRES
UNLESS OTHERWISE SHOWN.
ELEVATIONS, COORDINATES, CURVE
AND ALIGNMENT DATA ARE IN METRES.
STATIONS ARE IN KILOMETRES + METRES.

NOTES

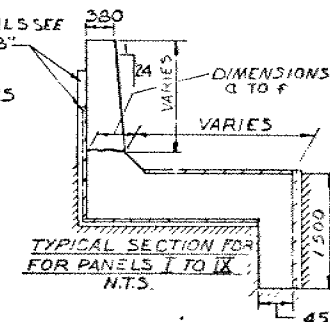
- FRONT FILL TO BE PLACED AND COMPACTED BEFORE PLACING BACKFILL TO RETAINING WALL.
- FOOTINGS TO BE POURED AGAINST UNDISTURBED MATERIAL.
- THIS DRAWING TO BE READ IN CONJUNCTION WITH SHEET 1.
- F.F. DENOTES FRONT FACE.
B.F. DENOTES BACK FACE.
- AN ALTERNATIVE SCHEME MAY BE APPROVED BY THE ENGINEER.
- DRAWINGS OF EXISTING STRUCTURE, AND FOUNDATIONS INFORMATION AVAILABLE FOR INSPECTION AT THE REGIONAL CONSTRUCTION OFFICE.



ELEVATION
1:50

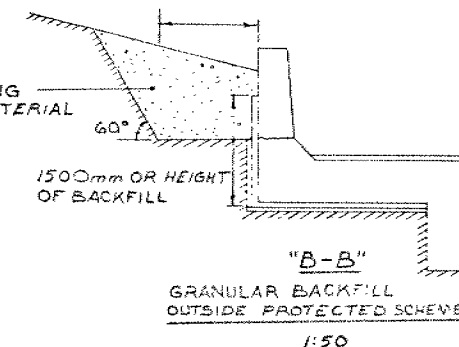
ELEVATIONS			
PT.	ELEV.	PT.	ELEV.
A	121.540	F	120.500
B	122.535	G	120.800
C	123.200	H	121.100
D	123.200	I	121.100
E	121.675	J	121.100

FOR DETAILS SEE
"A-A" & "B-B"



TYPICAL SECTION FOR
PANELS VII TO IX
N.T.S.

FREE DRAINING
GRANULAR MATERIAL



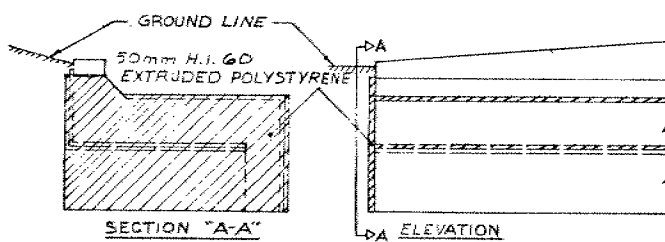
"A-A"

GRANULAR BACKFILL
WITHIN PROTECTION SCHEME

"B-B"

GRANULAR BACKFILL
OUTSIDE PROTECTED SCHEME

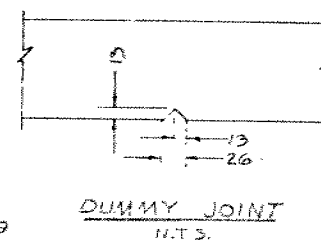
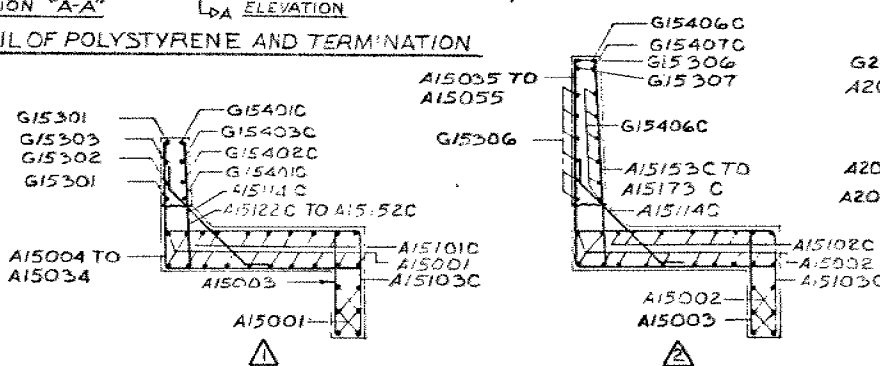
1:50



SECTION "A-A"

ELEVATION

DETAIL OF POLYSTYRENE AND TERMINATION



DUMMY JOINT
N.T.S.

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS	DATE	BY	DESCRIPTION
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

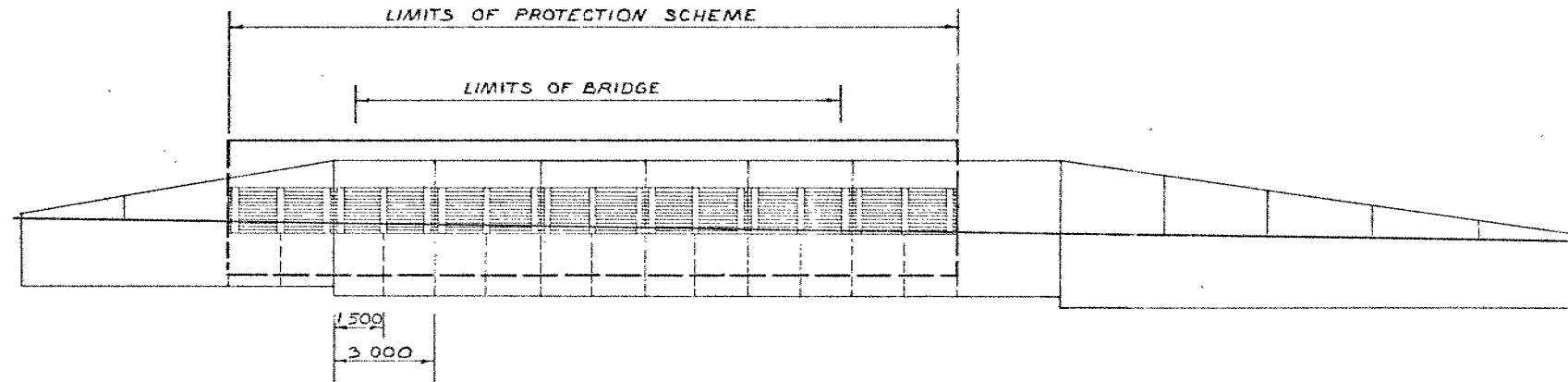
METRIC

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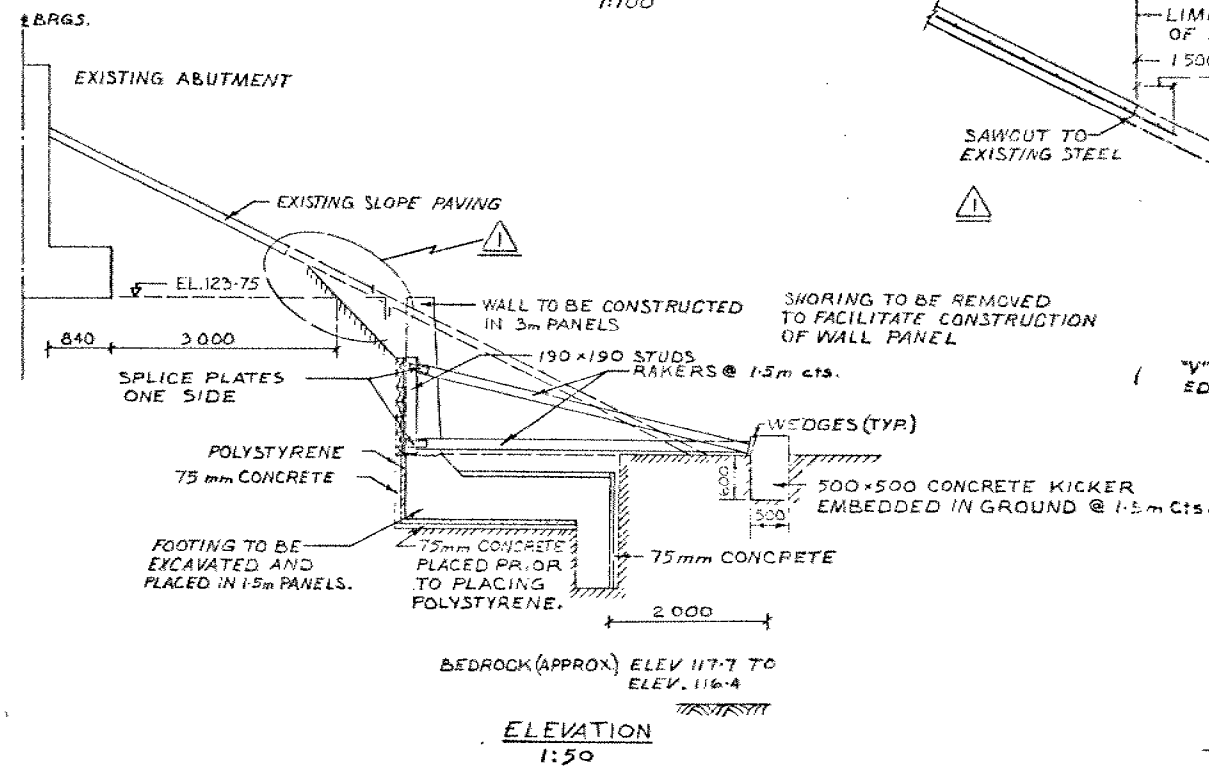
CONT No
WP No 5-80-02

REG. RD #5 UNDERPASS-HWX 417
RETAINING WALL
PROTECTION SCHEME

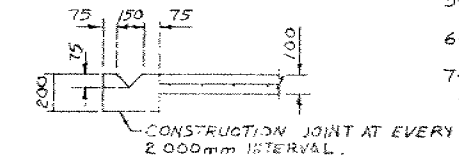
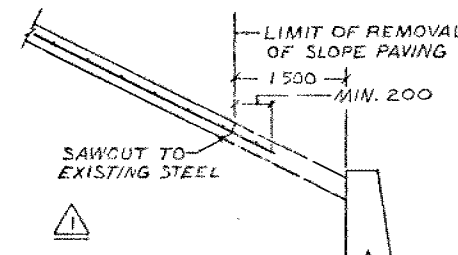
SHEET



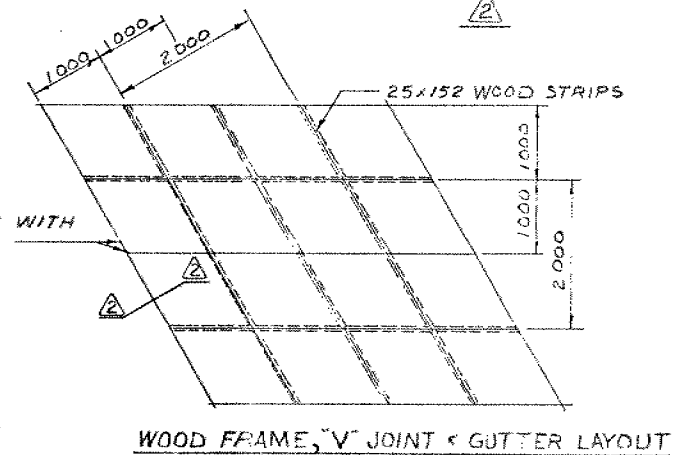
FRONT ELEVATION
PROTECTION SCHEME
1:100



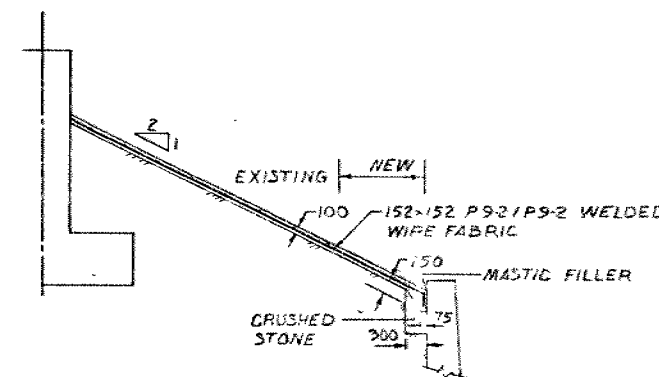
ELEVATION
1:50



GUTTER DETAIL



WOOD FRAME, V JOINT & GUTTER LAYOUT



RECONSTRUCTED SLOPE PAVING

SEQUENCE OF CONSTRUCTION

- 1-REMOVE SLOPE PAVING TO LIMIT SHOWN.
- 2-IN LENGTHS OF 3.0m EXCAVATE AS SHOWN TO ELEVATION OF TOP OF RETAINING WALL FOOTING. ERECT LAGGING STUDS, RAKERS AND KICKERS.
- 3-EXCAVATE AND PLACE FOOTING IN 1.5m LENGTHS.
- 4-IN LENGTHS OF 3.0m REMOVE LAGGING STUDS AND RAKERS, FORM AND PLACE RETAINING WALL PANELS.
- 5-REMOVE FORMS AND KICKERS.
- 6-BACKFILL PANEL.
- 7-WHEN ALL PANELS HAVE BEEN CONSTRUCTED RECONSTRUCT SLOPE PAVING.

NOTES:

- TIMBER TO BE #2 CONSTRUCTION GRADE SPRUCE OR EQUAL OF FULL DIMENSIONS INDICATED.
- HARDWOOD WEDGES TO BE SET TO PREVENT MOVEMENT OF SHORING.
- KICKERS ARE TO BE 10x20 MPa MIN.
- FORMS AND BRACES SHALL NOT BE REMOVED UNTILL CONCRETE IN WALL REACHES 75% OF THE SPECIFIED STRENGTH.
- STUDS TO BE TOENAIL TO LAGGING AT EACH PLANK.
- ADJACENT PANELS SHALL NOT BE CONSTRUCTED SIMULTANEOUSLY.
- BACK OF RETAINING WALL TO BE POURED AGAINST UNDISTURBED MATERIAL TO LEVEL 2.0m ABOVE BOTTOM OF FOOTING.

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS	DATE	BY	DESCRIPTION	DATE

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: Mr. B. R. Davis,
Bridge Engineer,
Bridge Office,
Admin. Bldg.

FROM: Foundation Section,
Materials & Testing Office,
Room 107, Lab. Bldg.

ATTENTION: Mr. S. McCombie
Bridge Planning Engr.

DATE: May 17, 1971

OUR FILE REF.

IN REPLY TO

JUN - 8 1971

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For
Proposed Underpass Structure
At the Crossing of Hwy. #417 and
Regional Road No. 5, Twp. of Huntley
Reg. Mun. of Ottawa-Carleton
District No. 9 (Ottawa)
W.O. 71-11019 -- W.P. 437-64-00

Attached, we are forwarding to you our detailed foundation investigation report on the subsoil conditions existing at the above structure site.

We believe that the factual data and recommendations contained therein, will prove adequate for your design requirements. Should additional information be required, please do not hesitate to contact our Office.

AGS/MdeF
Attach.

cc: Messrs. B. R. Davis
F. G. Allen
D. W. Farren
S. J. Markiewicz
J. E. Callaghan
T. C. Kingsland (2)
M. R. Ernesaks (2)
J. E. Gruspier
B. J. Giroux
B. A. Singh

E. R. SAINT

Foundations Files
Gen. Files

A. G. Stermac
A. G. Stermac
PRINCIPAL FOUNDATION ENGINEER

814. 1, 2. 8/10

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 - 4.3) Sand, trace to some Silt.
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-

FOUNDATION INVESTIGATION REPORT
For
Proposed Underpass Structure
At the Crossing of Hwy. #417 and
Regional Road No. 5, Twp. of Huntley
Reg. Mun. of Ottawa-Carleton
District No. 9 (Ottawa)
W.O. 71-11019 -- W.P. 437-64-00

1. INTRODUCTION:

The Foundation Section was requested to carry out a subsurface investigation for the proposed underpass structure at the crossing of Hwy. #417 and Regional Road No. 5, in the Township of Huntley, Regional Municipality of Ottawa-Carleton. The request was contained in a memo from Mr. T. C. Kingsland, Regional Bridge Planning Engineer, Eastern Region, dated March 18, 1971. An investigation was subsequently carried out by this Section to determine the subsoil and groundwater conditions at this site.

This report contains the results of the investigation, together with the recommendations pertaining to the foundations of the proposed structure as well as considerations pertaining to the necessary cut treatment.

2. DESCRIPTION OF THE SITE AND GEOLOGY:

The site is located in the vicinity of Regional Road No. 5, approximately 1-1/4 miles north of the Village of Stittsville, in the Township of Huntley, Regional Municipality of Ottawa-Carleton.

North-South running Regional Road No. 5 is a two-lane paved roadway with wide shoulders; 3 to 4 feet deep ditches run parallel to the driving surface.

The terrain in the area is gently undulating in relief between elevations 426 and 430. An exception to this pattern

2. DESCRIPTION OF THE SITE AND GEOLOGY: (cont'd.) ...

occurs immediately to the east of the road. This area has been commercially developed as a source for sand and gravel (Spratt Sand and Gravel Pit). The base of the pit, during April, 1971, generally was found to vary from elevation 373 to 385 - i.e., approximately 40 to 50 feet below the level of the surrounding terrain. The highest slopes of the pit are standing at about 1:1. In those areas not commercially developed, the land is grass-covered.

Physiographically the site is situated in the region known as the "Smith Falls Limestone Plain". In the vicinity of the site the surficial deposit is composed of marine beach sands and gravels laid down during an interglacial stage of the Wisconsinan glacial period. The thickness of this deposit generally ranges between 25 and 40 feet. The sands and gravels are underlain by a competent glacial till of morainic origin. The overburden is followed by limestone bedrock of the Trenton-Black River formations, Ordovician Period.

3. FIELD AND LABORATORY WORK:

Ten sampled boreholes, four of which were accompanied by a dynamic cone penetration test, were put down during the course of the field investigation. The majority of the boreholes were put down using diamond drill rigs adapted for soil sampling purposes. Three of the borings, however, were advanced with a continuous flight power auger.

Samples of the overburden were obtained, at specified intervals, in a 2" O.D. split-spoon sampler, which was hammered into the soil in accordance with the specifications for the Standard Penetration Test. The same method was used to advance the dynamic cone penetration test. The boulders within the overburden, as well as the bedrock, were cored in either AXT or BX size.

3. FIELD AND LABORATORY WORK: (Cont'd.) ...

The groundwater level conditions across the site were determined, during the period of the investigation, by recording the water levels in the open boreholes.

The stratigraphical sequence encountered at the individual boring locations are described on the Record of Borelog sheets appended to this report.

The locations and elevations of all the borings were surveyed in the field by personnel from the Kingston Regional Engineering Surveys Section; they are shown on Drawings No. W.O. 71-11019A and B, together with estimated stratigraphical sections and profiles across the site.

All the samples were subjected to a careful visual examination in the field and subsequently in the laboratory. Following this inspection, laboratory tests were carried out on certain samples to determine the engineering properties of the various soil types, namely:

Natural Moisture Content
Grain-size Distribution

The results of the laboratory testing are plotted on the Record of Borelog sheets; the grain-size distribution curves are plotted on Figures No. 1 and 2, contained in Appendix I of this report.

4. SUBSOIL AND BEDROCK CONDITIONS:

4.1) General:

The surficial deposit across the site is composed of a compact to very dense sand with a trace to some silt and gravel. The thickness of this deposit ranges from 20.5 to 42 feet. The sand is underlain by a 1 to 22.5 foot thick competent bouldery glacial till sheet. The overburden is underlain by sound limestone bedrock which was encountered at depths ranging from 40 to 43 feet below the original ground surface.

4. SUBSOIL AND BEDROCK CONDITIONS: (cont'd.) ...

4.1) General: (cont'd.) ...

The boundaries between the various deposits, as determined in the boreholes, are shown on the accompanying borelog sheets. The stratigraphical sections and profiles, shown on Drawings No. W.O. 71-11019A and B, have been inferred from this data.

From ground surface downward, the various soil types encountered are described as follows:

4.2) Roadway Fill:

Between 1.5 and 3 feet of fill was encountered at those borings put down along Regional Road No. 5. The fill is primarily composed of a compact to dense ('N' values between 14 and 36 blows/ft.) brown sand to gravelly sand with a trace of silt.

4.3) Sand, trace to some Silt:

The surficial deposit across the site is composed of a brown, uniformly graded, irregularly stratified sand with a trace to some silt and occasional gravel sizes. The thickness of the deposit varies from 20.5 to 42 feet, being most extensive in the vicinity of Station 102+00 (Regional Road No. 5 chainage). Occasional bouldery zones are present at random locations throughout the deposit, the boulders were up to 9 inches in size. At a few of the boring locations a layer of silty fine sand to silt was encountered near the base of this deposit. The thickness of this layer generally ranges between 1.5 and 2.5 feet. Grain-size distribution tests were performed on samples obtained within the sand; the results are plotted on Figure No. 1 in Appendix I.

Standard penetration tests were carried out within this deposit; the results are plotted on the Record of Borelog sheets. The testing gave 'N' values which vary from 19 blows/ft., near the surface of the deposit, increasing with depth to as many as 188 blows/ft. Based on these values, it is estimated that the relative density of this granular subsoil ranges from compact to very dense.

4. SUBSOIL AND BEDROCK CONDITIONS: (cont'd.) ...

4.4) Glacial Till:

The sand deposit is underlain by a competent brown to grey bouldery glacial till sheet. The thickness of the glacial till, where fully penetrated, was found to vary between 1 foot (B.H. #5) and 22.5 feet (B.H. #4). The matrix of the till is composed of a heterogeneous mixture of sand and gravel with some silt. As mentioned above, this deposit is very bouldery throughout; in order to advance the borings through this zone, it was necessary to use diamond drilling techniques (refer to the individual borelog sheets). The boulders encountered varied anywhere from 6 to 16 inches in size. Grain-size distribution testing was carried out on samples obtained from the matrix of the glacial till; the results are plotted on Figure No. 2.

Standard penetration tests, performed wherever possible within this deposit, gave 'N' values which range from 156 blows/ft. to 175 blows for 5 inches. Based on these results, it is estimated that the relative density of the till matrix is very dense.

4.5) Limestone Bedrock:

The glacial till sheet is underlain by bedrock. Bedrock was proven in 3 of the borings by obtaining between 7.5 and 10 feet of either AXT or BX size rock core samples. The surface of the bedrock is located between 40 and 43 feet below the original ground surface, corresponding to elevations ranging from 382 to 385.

The bedrock is grey limestone with random shale interbeds. In addition, occasional sand seams, up to 2 inches thick, were present throughout. The bedrock is sound.

5. GROUNDWATER CONDITIONS:

Groundwater level observations have been carried out, during the period of the investigation, in the open boreholes. The results are plotted on the Record of Borelog sheets and summarized on Drawings No. W.O. 71-11019A and B. These observations

5. GROUNDWATER CONDITIONS: (cont'd.) ...

indicate that the groundwater level varies between elevations 391 and 396, which corresponds to depths of from 32 to 36 feet below the existing ground surface.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to construct an underpass structure at the crossing of Hwy. #417 and Regional Road No. 5, in the Township of Huntley, Regional Municipality of Ottawa-Carleton. Present proposals call for a 38-foot wide, two-span structure (118' - 118'). Hwy. #417, in the vicinity of the crossing, will have two paved lanes in both the Eastbound and Westbound direction; a wide median is proposed between the lanes.

The proposed profile grades of Hwy. #417 and Regional Road No. 5, in the vicinity of the crossing, will be at about elevations 404 and 423, respectively. At these grades Hwy. #417 will be located approximately 25 feet below the existing ground surface, while Regional Road No. 5 will be between 5 and 6 feet below this level.

West of the proposed structure, between Stations 695+00 and 705+00 (Hwy. #417 chainage), the profile grade of Hwy. #417 will vary between elevations 418 and 404, respectively. This section will be located within a cut (refer to grade line shown on Drawing No. W.O. 71-11019B). The maximum depth of the cut will be of the order of 23 feet. East of the structure, where Hwy. #417 will cross Spratt Sand and Gravel Pit, up to 13 feet of fill will be required in order to reach the proposed profile grade of Hwy. #417.

The predominant deposit across the site is composed of a 20.5 to 42 foot thick compact to very dense sand with a trace to some silt. The sand is underlain by between 1 and 22.5 feet of competent bouldery glacial till. This overburden sequence is underlain by sound grey limestone bedrock, the surface of which varies between elevations 382 and 385.

6. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

6.2) Cut Sections:

As discussed in the previous sub-section, Hwy. #417 will be located within a cut, both at the proposed structure location as well as west of this point. This cut will extend up to 25 feet below the existing ground surface. The major portion of the cut will be carried out within the competent sand deposit; in some localized areas, however, it will extend through this deposit, terminating after penetrating a few feet into the bouldery glacial till sheet (refer to the drawings attached). The excavation will be carried out above the groundwater level recorded during the period of the field investigation (April, 1971).

No stability problems are anticipated for the permanent cut slopes, provided standard 2:1 slopes are maintained and the excavation is carried out in accordance with current D.H.O. practices, namely, Specification DD 223.

The major portion of the subsoil excavated will be material from the upper uniform sand deposit. The gradation of this soil falls on the outer boundary (fine side) specified for Granular Class 'C' material, the limits of which are superimposed on Figure No. 1. This material would, therefore, be acceptable as fill in other areas as required.

6.3) Fill Sections:

Immediately east of the structure, fills up to 13 feet in height are to be constructed. These fills will be placed directly over a competent granular and/or glacial till. No stability problems are, therefore, anticipated for fills of the height contemplated, provided standard 2:1 slopes are employed.

The settlement, induced in the foundation subsoil by the fill loading, will be elastic in nature and negligible in magnitude.

6. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

6.4) Structure Foundations:

6.4.1) Centre Pier (Refer to B.H.'s No. 3 and 4) -

The pier foundation will be located in the competent bouldery glacial till deposit; it can, therefore, be supported on a spread footing. At least 4 feet of earth cover should be provided to the base of the footing for frost protection purposes - i.e., it can be located at or below elevation 400. A footing founded in this manner could be designed using an allowable bearing value of up to 5 t.s.f.

The base of the pier footing excavation will be located above the groundwater level recorded during the period of the investigation. No major dewatering problems are, therefore, anticipated. Any surface run-off could be handled using normal techniques, such as pumping.

Settlement will be induced in the foundation subsoil by the applied footing pressure. This settlement will be negligible in magnitude, however, since the subsoil is particularly competent.

6.4.2) Abutments (Refer to B.H.'s No. 1, 2, 5 and 6) -

It is understood that the abutments will be 'perched' within the approach cuts. This being the case, they will be founded within the dense to very dense zone of the upper sand deposit. The abutments can be supported on spread footings, provided:

- i) the edge of the footings nearest the forward cut slopes be located no closer than 10 feet from the slopes, and
- ii) that the permanent forward slopes be trimmed no steeper than 2:1.

Footings meeting these specifications could be designed using an allowable bearing value of up to 3.5 t.s.f. in design.

6. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

6.4) Structure Foundations: (cont'd.) ...

6.4.2) Abutments (Refer to B.H.'s No. 1, 2, 5 and 6) -

(cont'd.) ...

Settlement will be induced in the underlying foundation subsoil by the applied pressure of the abutment footings. The magnitude of this settlement, which will take place during or immediately following the construction period, should not exceed 1/2 inch.

Based on the comments made in the previous paragraphs, the differential settlement between the spread footing-supported abutments and adjacent centre pier, should be less than 1/2 inch.

7. MISCELLANEOUS:

The field work, performed during the period of April 19 and 29, 1971, was carried out under the supervision of Mr. J. D. Weibe, Student Technician (Field).

The equipment used was owned and operated by Dominion Soil Investigation Limited, Toronto.

This report was written by Mr. B. T. Darch, Senior Foundation Engineer, and reviewed by Mr. M. Devata, Supervising Foundation Engineer.

May, 1971

APPENDIX I

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 1

FOUNDATION SECTION

JOB 71-11019 LOCATION Sta. 99 + 55, o/s 19' lt. (Reg. Rd. #5) ORIGINATED BY J.D.W.
W.P. 437-64-00 BORING DATE April 19, 20 and 21, 1971 COMPILED BY A.E.D.
DATUM Geodetic BOREHOLE TYPE Washboring - NX, BX Casing - BX Rock Core CHECKED BY

Dynamic Cone Penetration Test

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT --- W _L PLASTIC LIMIT --- W _P WATER CONTENT --- W			BULK DENSITY γ P.C.F. GR. SA. S. CL.	REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	W _p	W	W _L		
427.1	Ground Level														
425.0	Gr. sa. trace of org. matter (fill), compact	1	SS	15											
2.0															
	Boulders up to 6" in size	2	SS	19											
		2A	BXT	40%	420										
		3	SS	29											
	sand, trace to some silt, occasional gravel (uniformly graded- irregularly stratified)	4	SS	82	410										
		5	SS	170											
	Brown	6	SS	85	400										
	Compact to v. dense	7	SS	51											
393.1		8	SS	95	378"										
34.0	Het. Mix. sand & gra. trace of silt Glacial Till (occ. boulders up to 6" in size throughout)	9	SS	210	390										
		10	BX	40%											
		11	BX	15%											
385.1		12	BX	25%											
		13	BX	80%											
42.0	Limestone Bedrock, occ. shaly seams (Random sa. seams up to 1" thick)	14	BX	75%	380										
377.6	Grey Sand														
49.5	End of Borehole														

Practical Refusal
Elev. 407.2

0 96 (4)

6 80 (14)

▼ 391.0
54 34 (12)

W.L. in
open BH,
Apr. 30/71

DEPARTMENT OF HIGHWAYS- ONTARIO

MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 2

FOUNDATION SECTION

JOB W.O. 71-11019

LOCATION Sta. 99 + 55, o/s 19' rt. (Reg. Rd. #5)

ORIGINATED BY B.T.D.

W.P. 437-64-00

BORING DATE April 26, 28, and 29, 1971

COMPILED BY A.F.D.

DATUM Geodetic

BOREHOLE TYPE Washboring - NX, BX Casing

CHECKED BY

Dynamic Cone Penetration Test

SOIL PROFILE		STRAT. PLOT	SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FC					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION		NUMBER	TYPE		20	40	60	80	100	w_p	w	w_L		
427.0	Ground Level														
425.0	0.00 ss, trace of sl. (fill), compact		1	SS 36											
2.0	Sand, trace to some silt, occasional gravel throughout (Uniformly graded - irregularly stratified)		2	SS 77	420										
			3	SS 57											
			4	SS 48											
			5	SS 60	410										
			6	SS 43											
	Brown		7	SS 123											
			8	SS 178											
			9	SS 152	400										
400.0	Dense to v. dense		10	BX 144											
27.0	Het. Mix. of sand & gravel, trace of sl., Glacial Till (occ. boulders up to 7 in. in size)		11	SS 100/3"											
			12	BX 91											
			13	SS 100/5"											
387.0	Grey v. dense		14	BX 24											
40.0	End of Borehole														

Practical Refusal
Elev. 407.0

31 40 (20)

▼ 391.0
= W.L. in
open gr.
Apr. 30/71

Practical Refusal
Elev. 407.0

31 40 (20)

391.0
W.L. in
open BH.
Apr. 30/71

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 3

FOUNDATION SECTION

JOB 71-11019

LOCATION Sta. 100 + 73, o/s 19' Lt. (Reg. Rd. #5)

ORIGINATED BY B.T.D.

W.P. 437-64-00

BORING DATE April 21, 22, and 23, 1971

COMPILED BY A.E.D.

DATUM Geodetic

BOREHOLE TYPE Washboring - NX, BX, AX Casing

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE						LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.						WATER CONTENT %				
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE						w_p — w — w_L 10 20 30				
428.0	Ground Level																
0.0	Sa., some gra. & si.		1	SS	26	420											
425.0	(Fill) compact																
3.0	Sand, trace to some silt, occasional gravel		2	SS	41												
	(Uniformly graded - irregularly stratified)		3	SS	54												
	Brown		4	SS	45	410											
			5	SS	109												
402.5	Dense to v. dense		6	SS	82	400											
25.5	Het. Mix. of silt, sa. & gra., Glacial Till, (Boulders up to 16" in size throughout)		7	BX	85% Rec												
391.3	(Grey) v. dense		8	AXT	47% Rec												
36.7	End of Borehole					390											

W.L. in open BH
Apr. 30/71

396.0

4 36 (50)

▼ 396.0
W.L. in
open BH
Apr. 30/71

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 4

FOUNDATION SECTION

JOB 71-11019

LOCATION Sta. 100 + 73, o/s 19' rt. (Reg. Rd. #5)

ORIGINATED BY J.D.W.

W.P. 437-64-00

BORING DATE April 21, 22, 26 and 27, 1971

COMPILED BY B.T.D.

DATUM Geodetic

BOREHOLE TYPE Washboring - NX, BX, AX Casing
BX and AXT Rock Core

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.				WATER CONTENT % 10 20 30				
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE								
428.1	Ground Level														
0.0	sa. some gra. & si.		1	SS	14										
425.1	(Fill) Brown, Compact		2	SS	150/5"										
3.0	Boulders up to 9" in size		3	BX	38%	420									
	sand, trace to some silt, occasional gravel sizes (Uniform-irregularly stratified)		4	SS	21										
	Brown		5	SS	93	410									
404.4	Compact to v. dense		6	SS	163										
23.7	Het. Mix. of silt, sand & gravel		7	SS	124										
	Glacial Till		8	BX	100%										
	Very bouldery throughout-boulders up to 10" in size		9	BX	65%	400									
	Grey to Brown		10	SS	156										
	very dense		11	BX	39%										
			12	SS	66/5"										
			13	BX	50%										
			14	SS	175/5"										
			15	BX	23%	390									
			16	SS	283										
382.1			17	AXT	56% Rec										
46.0	Limestone Bedrock numerous shale seams		18	AXT	100% Rec	380									
	Grey				95%										
372.1	Sound		19	AXT	Rec										
56.0	End of Borehole					370									

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

JOB 71-11019
W.P. 437-64-00
DATUM Geodetic

RECORD OF BOREHOLE No. 5

FOUNDATION SECTION

LOCATION Sta. 101 + 91, o/s 19' lt. (Reg Rd. #5)
BORING DATE April 19, 20, and 21, 1971
BOREHOLE TYPE NX, BX Casing - BX Rock Core
Dynamic Cone Penetration Test

ORIGINATED BY B.T.D.
COMPILED BY A.E.D.
CHECKED BY

SOIL PROFILE		STRAT PLOT	SAMPLES		ELEV SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT ——— w_L PLASTIC LIMIT ——— w_p WATER CONTENT ——— w			BULK DENSITY γ P.C.F.	REMARKS		
ELEV. DEPTH	DESCRIPTION		NUMBER	TYPE		BLOWS / FOOT	20	40	60	80	100	SHEAR STRENGTH PS F ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE				WATER CONTENT % 10 20 30	
428.8	Ground Level																
427.3	sa. some gra. (fill) Brown Dense		1	SS	33												
1.5	Sand, trace to to some silt occasional gravel throughout)		2	SS	56												
			3	SS	76												
	Brown		4	SS	52												0 86 (14)
	Dense to very dense		5	SS	49												
			6	SS	78												0 88 (12)
			7	SS	73												
			8	SS	80												
			9	SS	72												
			10	SS	98												
			11	SS	65												
385.3	si., brown, v. dense		12	SS	135/10"												
381.1	glacial till, v. dense		13	SS	135/10"												
44.7	Limestone Bedrock, seams of shale, occ. sand seams up to 2" thick		14	BX	69%												
			15	BX	75%												
			16	BX	83%												
374.1	Grey Sand		17	BX	71%												
54.7	End of Borehole																

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 6

FOUNDATION SECTION

JOB 71-11019

LOCATION Sta. 101 + 91, o/s 19' rt. (Reg. Rd. #5)

ORIGINATED BY J.D.W.

WP 437-64-00

BORING DATE April 23, and 26, 1971

COMPILED BY A.E.D.

DATUM Geodetic

BOREHOLE TYPE NX Casine

CHECKED BY

Dynamic Cone Penetration Test

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT ——— w_L PLASTIC LIMIT ——— w_p WATER CONTENT ——— w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE				
428.5	Ground Level														
426.5	Trace of gra. & silt (fill) compact	1	SS	19											
2.0	Sand, trace to some silt, occ. gravel	2	SS	75											
	uniformly graded-irregularly stratified	3	SS	33											
		4	SS	45											
		5	SS	37											
	Brown	6	SS	41											
	Dense to v. dense	7	SS	45											
		8	SS	58											
		9	SS	109											
		10	SS	125											
		11	SS	135											
		12	SS	103											
386.3															
42.2	End of Borehole Probable Bedrock														

Practical Refusal
Elev. 402.5

395.0
W.L. in open BH
Apr. 30/71

Practical Refusal

Elev. 402.5

▼ 395.0

W.L. in

open BH

Apr. 30/71

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 7

FOUNDATION SECTION

JOB 71-11019 LOCATION Sta. 704 + 00, E.B.L. - G. (Reg. Rd. #5) ORIGINATED BY J.D.W.
W.P. 437-64-00 BORING DATE April 28, 1971 COMPILED BY A.E.D.
DATUM Geodetic BOREHOLE TYPE Continuous Flight Auger (Penndrill) CHECKED BY ///

SOIL PROFILE			SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT						LIQUID LIMIT ——— w_L PLASTIC LIMIT ——— w_p WATER CONTENT ——— w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F.						w_p ——— w ——— w_L 10 20 30				
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE										
430.4	Ground Level					430											GR, SA, SI, CL
0.0	sand, trace to some silt, occ. gravel Uniformly graded - irregularly stratified Brown Dense to very dense		1	SS	33												BH dry 0 81 (19) Apr. 28/71
			2	SS	80												
			3	SS	70	420											
			4	SS	110												
			5	SS	97	410											
			6	SS	102												
			7	SS	100	400											
			8	SS	150												
393.9																	0 85 (15)
36.5	End of Borehole					390											

BH dry

0 81 (19)

Apr. 28/71

0 85 (15)

FOUNDATION SECTION

JOB 71-11019	LOCATION Sta. 700 + 68, W.B.L. - 2 (Reg. Rd. "5")	ORIGINATED BY P.T.D.
W.P. 437-64-00	BORING DATE April 26, 1971	COMPILED BY A.B.D.
DATUM Geodetic	BOREHOLE TYPE Continuous Flight Auger (Penndrill)	CHECKED BY

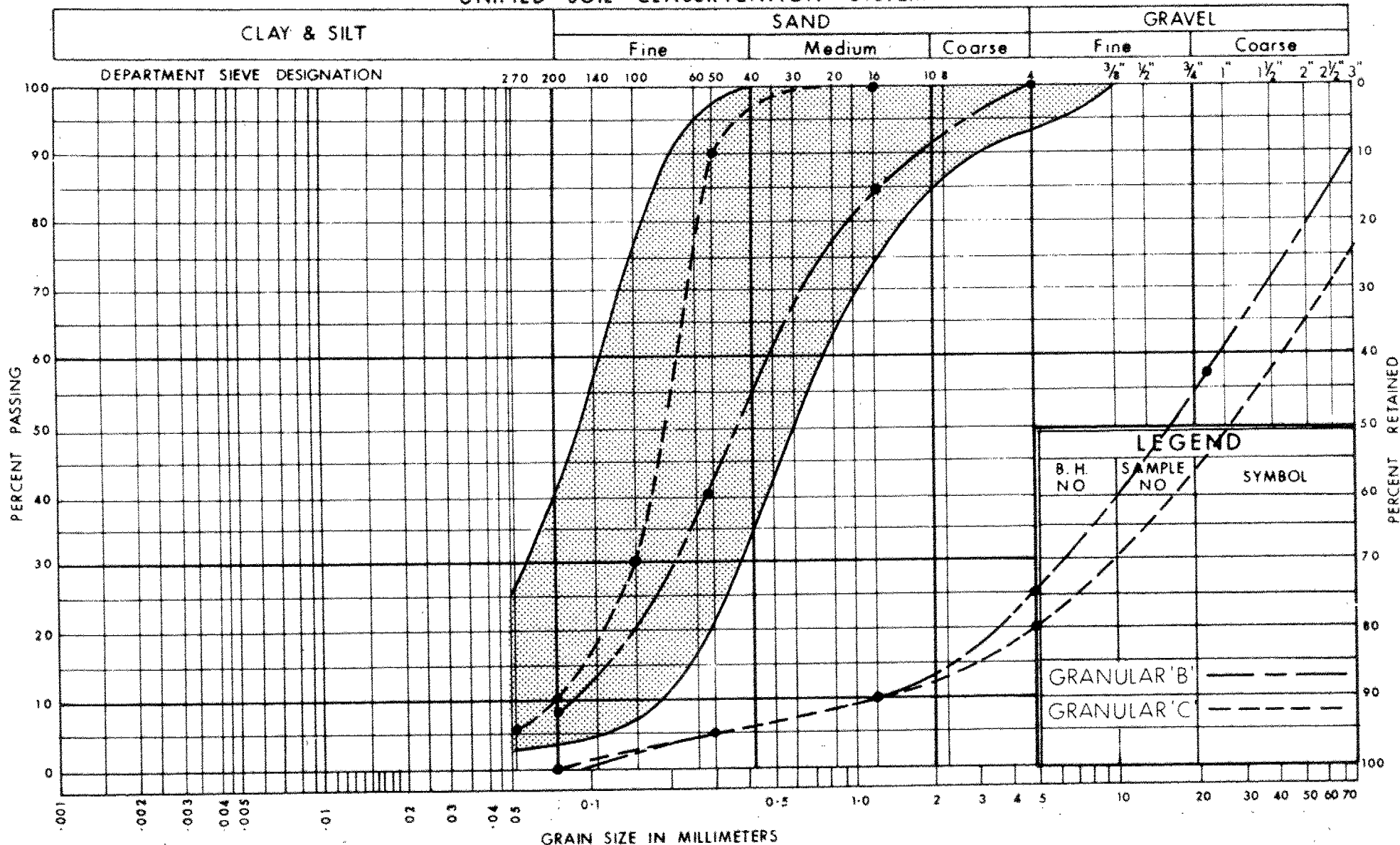
SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE			LIQUID LIMIT --- WL PLASTIC LIMIT --- WP WATER CONTENT --- W			BULK DENSITY γ P.C.F.	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV SCALE	SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE			Wp W Wl WATER CONTENT % 10 20 30			
28.2	Ground Level												
0.0	sand, trace of silt, uniformly graded - irregular- ly stratified very dense		1	SS	57	420							
			2	SS	63								
			3	SS	168								
	sand and gravel		4	SS	175	410							
			5	SS	132								
	Silty fine sand		6	SS	100/4"	400							
396.9													
31.3	End of Borehole					390							

FOUNDATION SECTION

CHECKED BY

SOIL PROFILE		STRAT. PLOT	SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT ———— W _L PLASTIC LIMIT ———— W _p WATER CONTENT ———— W			BULK DENSITY Y P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION		NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH PS F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE	W _p ————— W _L WATER CONTENT % 10 20 30				
23.6	Ground Level											
0.0	sand, trace to some silt				420							BH dry, April 30, 1971
	uniformly graded - irregularly stratified		1	SS 78								
			2	SS 65	410							
	Brown Very dense		3	SS 89								
02.1	Silty fine sand		4	SS 92								
21.5	End of Borehole				400							
					390							

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT OF HIGHWAYS
**MATERIALS and
TESTING
DIVISION**

GRAIN SIZE DISTRIBUTION

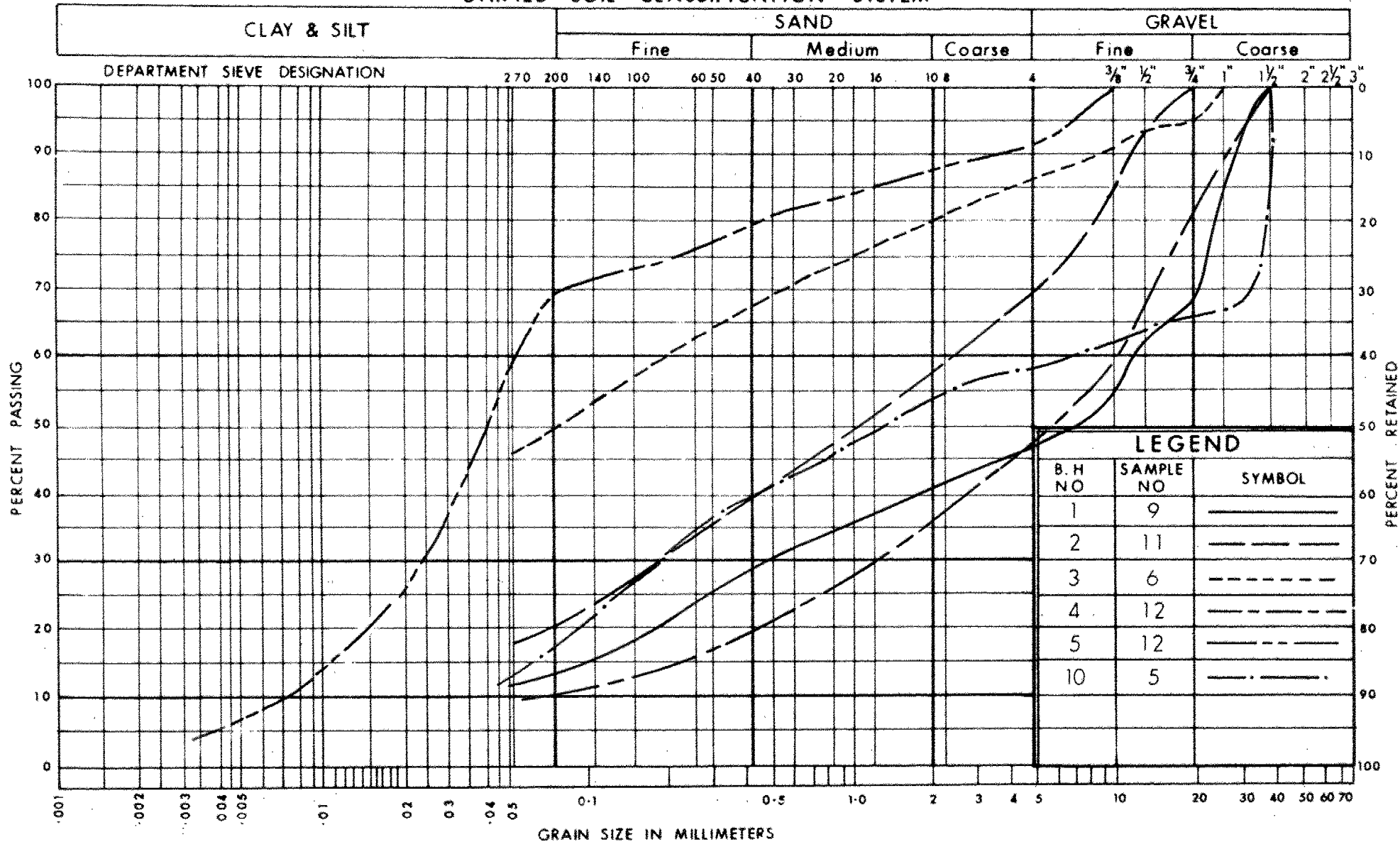
SAND
TRACE TO SOME GRAVEL

W.P. No. 437-64-00

JOB No. 70-11019

FIG. 1

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

GRAIN SIZE DISTRIBUTION
GLACIAL TILL
HET. MIXTURE OF SILT, SAND & GRAVEL

W.P. No. 437-64-00

JOB No. 70-11019

FIG. 2

ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N' - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 12 INCHES INTO THE SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREELY A DISTANCE OF 30 INCHES.

DYNAMIC PENETRATION RESISTANCE :- THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 2 INCH, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS, 12 INCHES INTO THE SUBSOIL, THE DRIVING ENERGY BEING 350 FOOT POUNDS PER BLOW.

DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS :-

<u>CONSISTENCY</u>	<u>'N' BLOWS / FT.</u>	<u>c LB. / SQ. FT.</u>	<u>DENSENESS</u>	<u>'N' BLOWS / FT.</u>
VERY SOFT	0 - 2	0 - 250	VERY LOOSE	0 - 4
SOFT	2 - 4	250 - 500	LOOSE	4 - 10
FIRM	4 - 8	500 - 1000	COMPACT	10 - 30
STIFF	8 - 15	1000 - 2000	DENSE	30 - 50
VERY STIFF	15 - 30	2000 - 4000	VERY DENSE	> 50
HARD	> 30	> 4000		

TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.B.	SCRAPER BUCKET SAMPLE	O.S.	OESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE
S.T.	SLOTTED TUBE SAMPLE		
	P.H. SAMPLE ADVANCED HYDRAULICALLY		
	P.M. SAMPLE ADVANCED MANUALLY		

SOIL TESTS

Qu	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Qcu	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Qd	DRAINED TRIAXIAL	S	SENSITIVITY

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

γ	UNIT WEIGHT OF SOIL (BULK DENSITY)
γ_s	UNIT WEIGHT OF SOLID PARTICLES
γ_w	UNIT WEIGHT OF WATER
γ_d	UNIT DRY WEIGHT OF SOIL (DRY DENSITY)
γ'	UNIT WEIGHT OF SUBMERGED SOIL
G	SPECIFIC GRAVITY OF SOLID PARTICLES $G = \frac{\gamma_s}{\gamma_w}$
e	VOID RATIO
n	POROSITY
w	WATER CONTENT
S_v	DEGREE OF SATURATION
w_L	LIQUID LIMIT
w_p	PLASTIC LIMIT
I_p	PLASTICITY INDEX
s	SHRINKAGE LIMIT
I_L	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$
I_c	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$
e_{max}	VOID RATIO IN LOOSEST STATE
e_{min}	VOID RATIO IN DENSEST STATE
I_D	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
	RELATIVE DENSITY D_r IS ALSO USED
h	HYDRAULIC HEAD OR POTENTIAL
q	RATE OF DISCHARGE
v	VELOCITY OF FLOW
i	HYDRAULIC GRADIENT
k	COEFFICIENT OF PERMEABILITY
j	SEEPAGE FORCE PER UNIT VOLUME
m_v	COEFFICIENT OF VOLUME CHANGE = $\frac{-\Delta e}{(1+e)\Delta\sigma}$
c_v	COEFFICIENT OF CONSOLIDATION
C_c	COMPRESSION INDEX = $\frac{\Delta e}{\Delta \log_{10} \sigma}$
T_v	TIME FACTOR = $\frac{c_v t}{d^2}$ (d, DRAINAGE PATH)
U	DEGREE OF CONSOLIDATION
τ_f	SHEAR STRENGTH
c'	EFFECTIVE COHESION INTERCEPT
ϕ'	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
c_u	APPARENT COHESION
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
μ	COEFFICIENT OF FRICTION
S_t	SENSITIVITY

GENERAL

π	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e \sigma$ OR $\ln \sigma$	NATURAL LOGARITHM OF σ
$\log_{10} \sigma$ OR $\log \sigma$	LOGARITHM OF σ TO BASE 10
t	TIME
g	ACCELERATION DUE TO GRAVITY
V	VOLUME
W	WEIGHT
M	MOMENT
F	FACTOR OF SAFETY

STRESS AND STRAIN

u	PORE PRESSURE
σ	NORMAL STRESS
$\bar{\sigma}$	NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED)
τ	SHEAR STRESS
ϵ	LINEAR STRAIN
γ	SHEAR STRAIN
ν	POISSON'S RATIO (μ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
η	COEFFICIENT OF VISCOSITY

EARTH PRESSURE

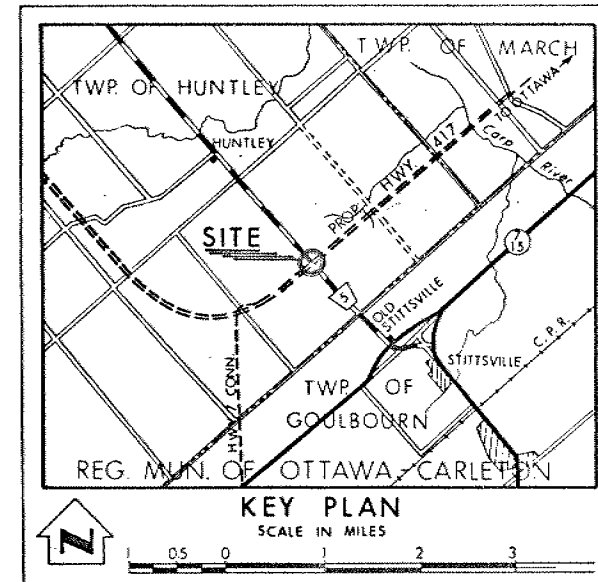
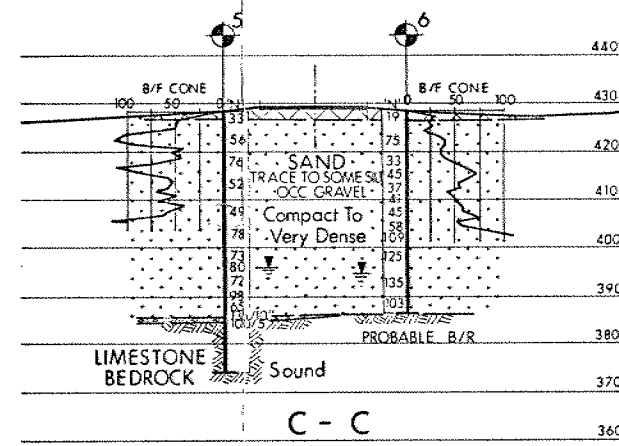
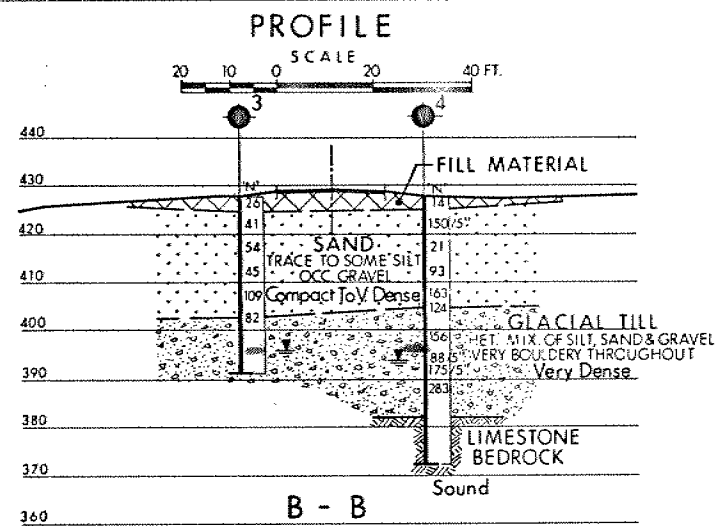
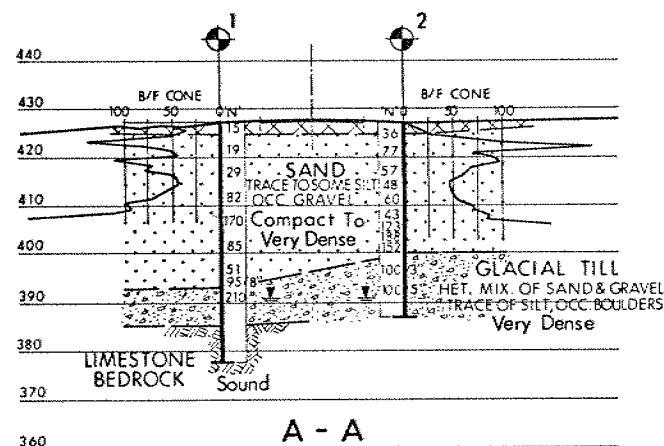
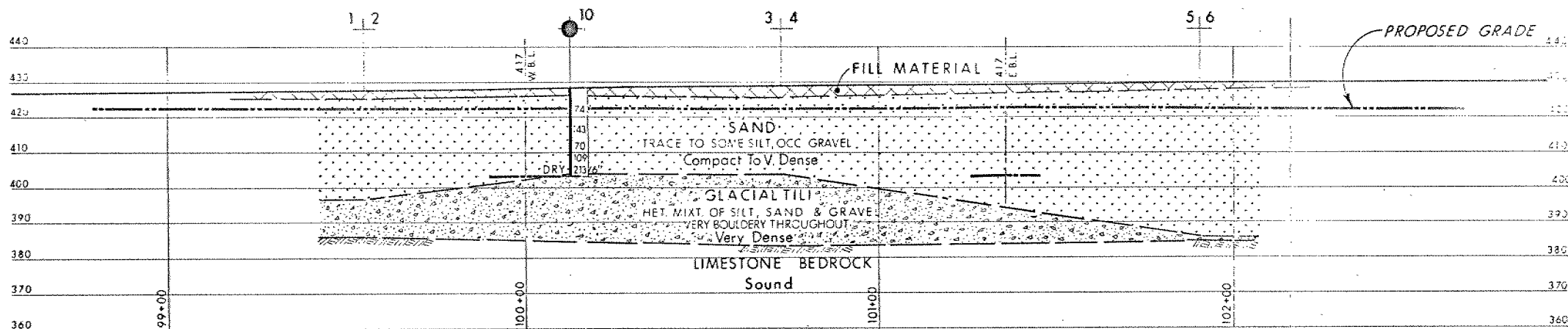
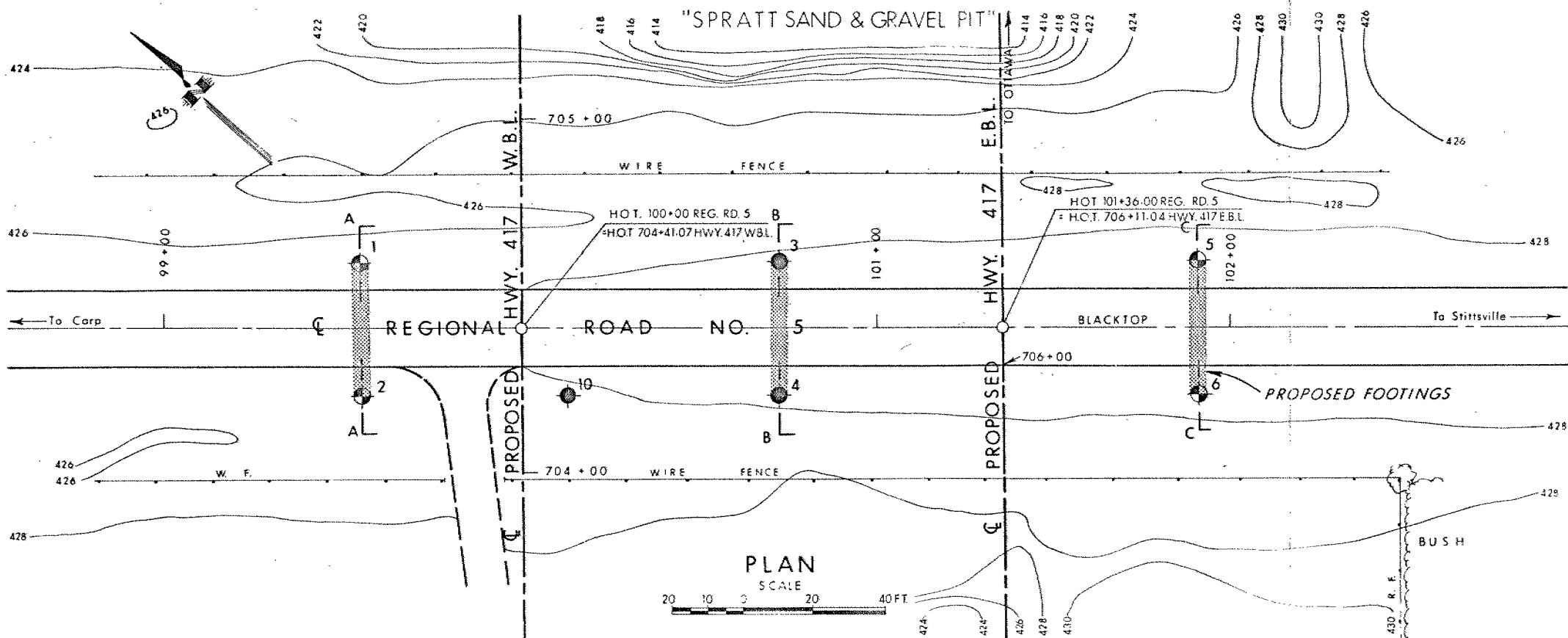
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_0	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
k_s	MODULUS OF SUBGRADE REACTION

SLOPES

H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
β	ANGLE OF SLOPE TO HORIZONTAL



LEGEND			
	Bore Hole		
	Cone Penetration Test		
	Bore Hole & Cone Test		
	Water Levels established at time of field investigation, APRIL, 1971		

NO.	ELEVATION	STATION	OFFSET
1	427.1	99+55	19' LT.
2	427.0	99+55	19' RT.
3	428.0	100+73	19' LT.
4	428.1	100+73	19' RT.
5	428.8	101+91	19' LT.
6	428.5	101+91	19' RT.
10	427.8	100+13	19' 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 and may be subject to considerable error.

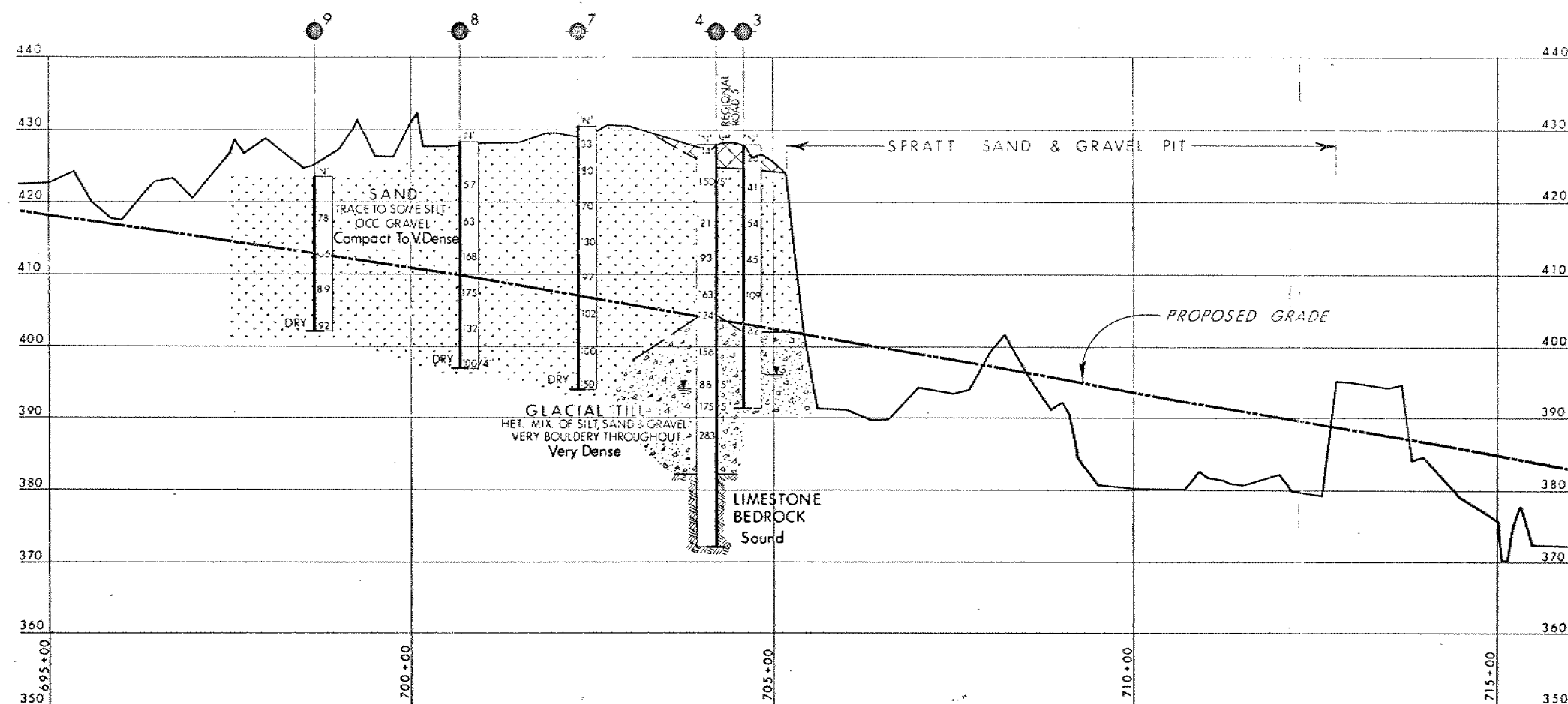
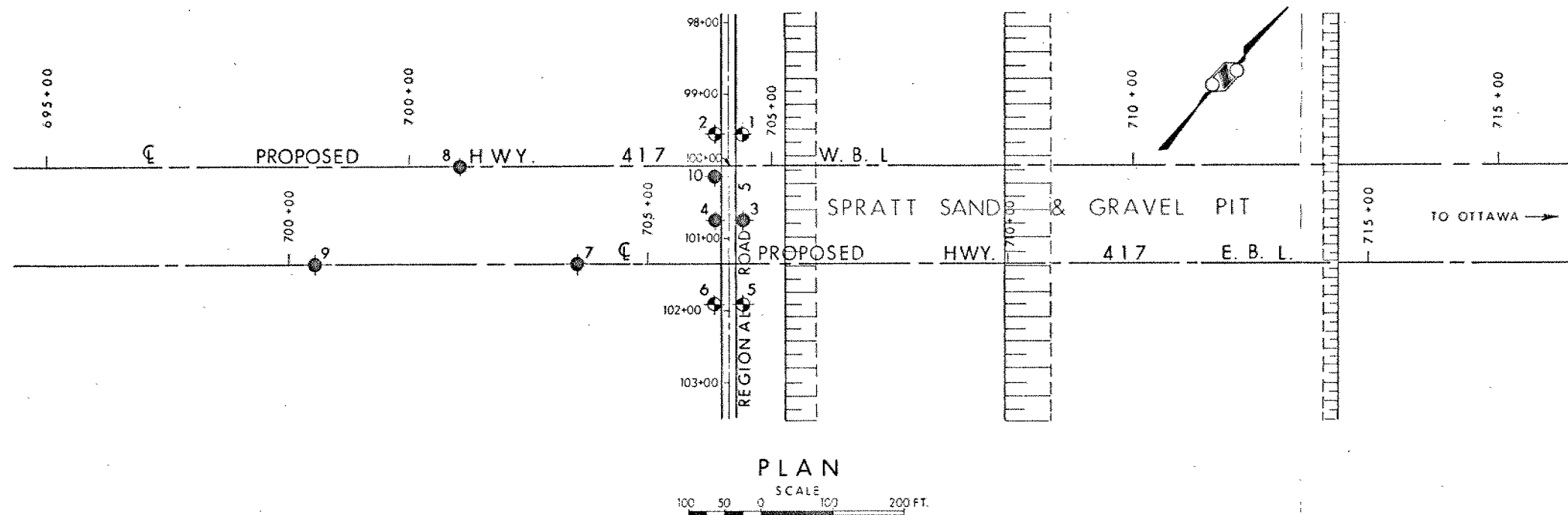
REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS-ONTARIO
MATERIALS & TESTING OFFICE-FOUNDATION SECTION

REGIONAL ROAD 5
HIGHWAY NO. 417 E.B.L. & W.B.L. DIST. NO. 9
REG. MUN. OF OTTAWA - CARLETON
TWP. HUNTLEY LOT 3 CON. 2 & 3

BORE HOLE LOCATIONS & SOIL STRATA

SUBMD. B.T.D.	CHECKED	W.P. NO. 437-64-00	M.A.T. DRAWING NO.
DRAWN BY	CHECKED	JOB NO. 71-11019	71-11019A
DATE MAY 18, 1971	SITE NO.	BRIDGE DRAWING NO.	
APPROVED	PRINCIPAL FOUNDATION ENGINEER	CONT. NO.	



SEE DWG. 71-11019A

KEY PLAN
SCALE IN MILES

LEGEND

- Bore Hole
- Cone Penetration Test
- Bore Hole & Cone Test
- Water Levels established at time of field investigation, APRIL, 1971

NO.	ELEVATION	STATION	OFFSET
7	430.4	701+00	CL E.B.L.
8	428.2	700+68	CL W.B.L.
9	423.6	700+35	CL E.B.L.

NOTE

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REVISIONS	DATE	BY	DESCRIPTION

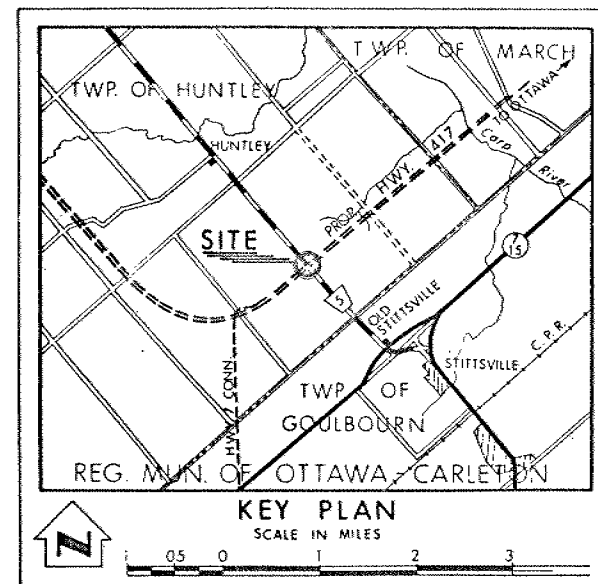
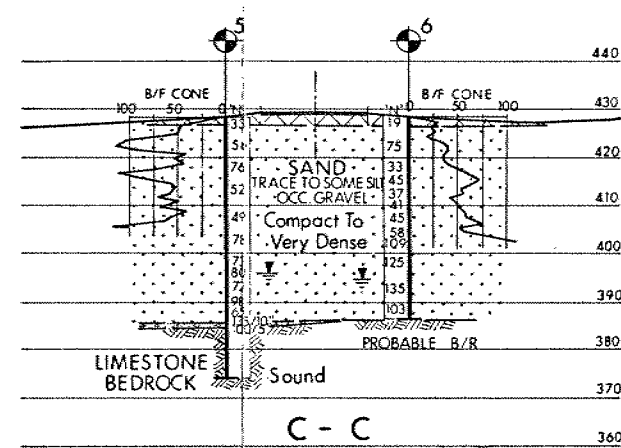
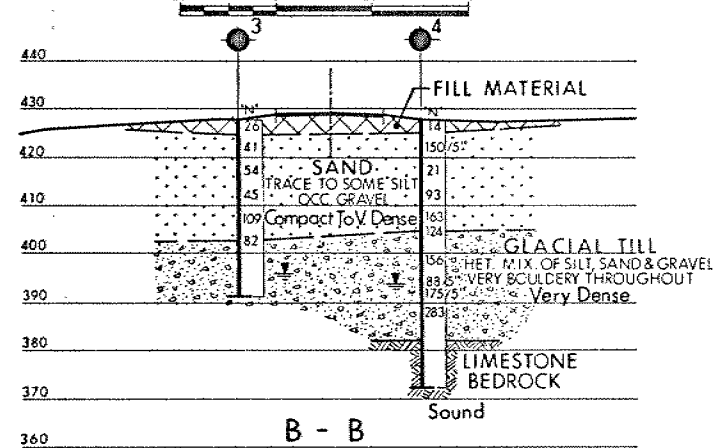
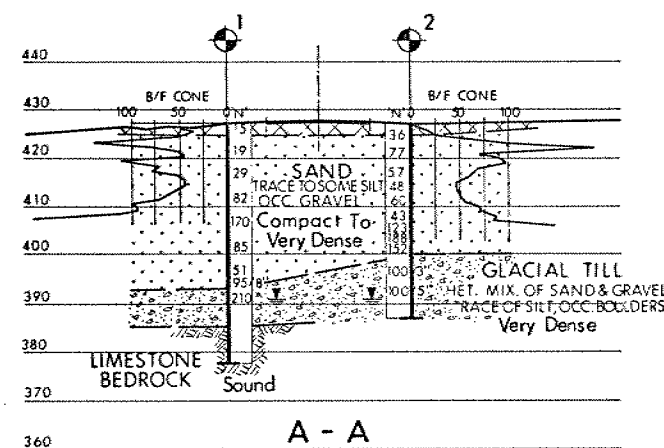
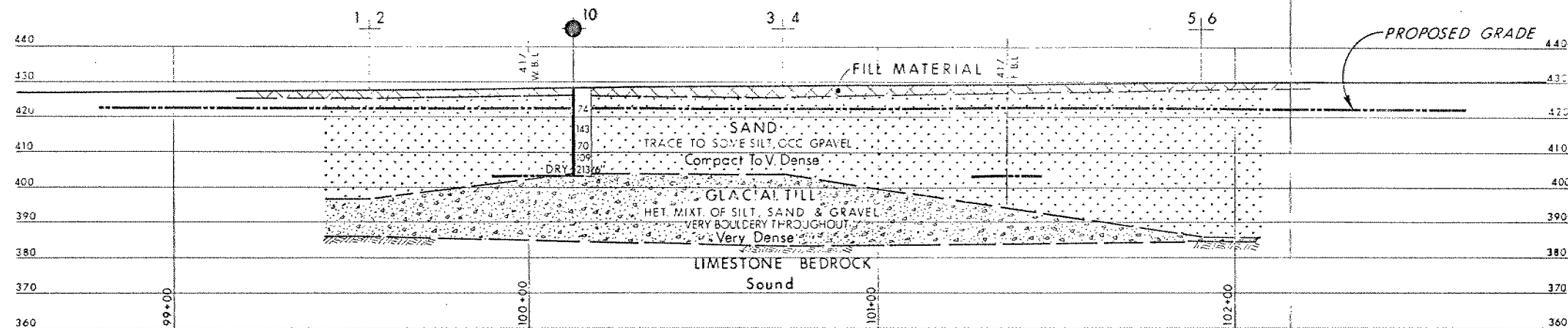
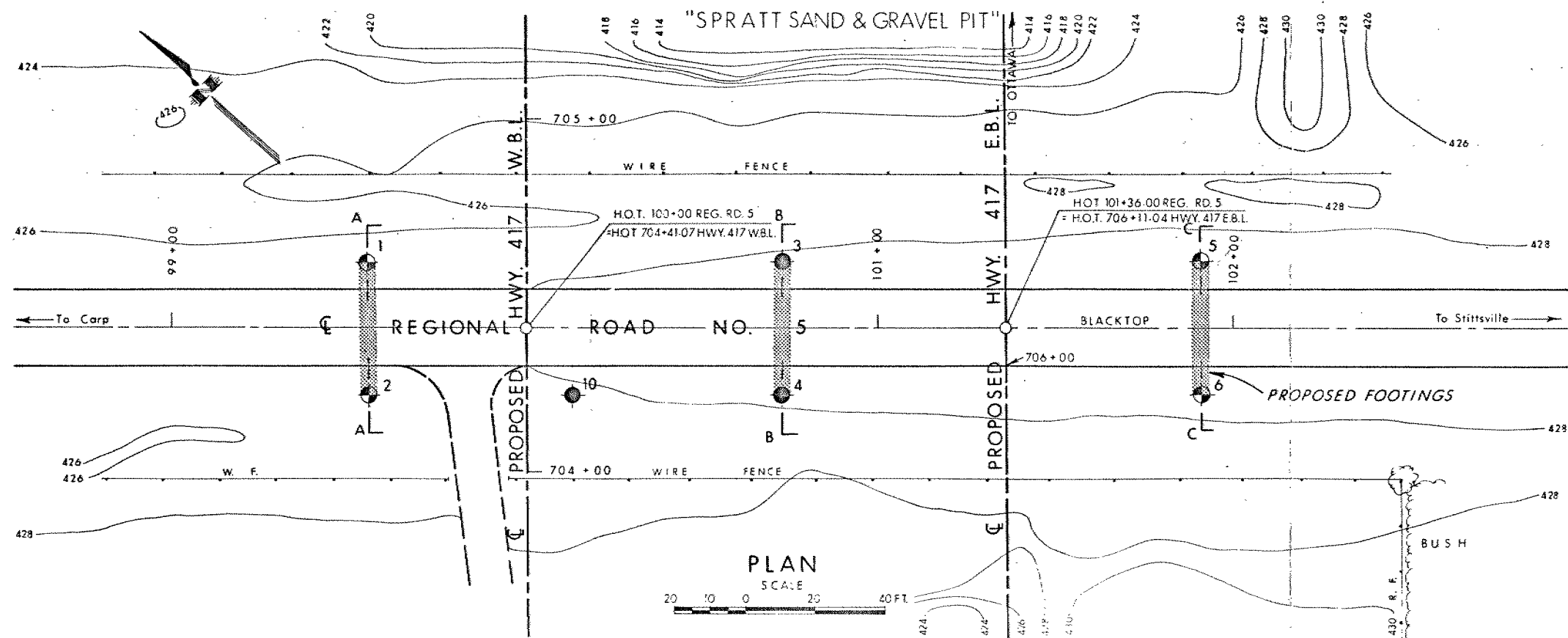
DEPARTMENT OF HIGHWAYS-ONTARIO
MATERIALS & TESTING OFFICE-FOUNDATION SECTION

REGIONAL RD. 5

HIGHWAY NO. 417 E.B.L. & W.B.L. DIST. NO. 9
REG. MUN. OF OTTAWA - CARLETON
TWP. HUNTLEY LOT 3 CON. 2 & 3

BORE HOLE LOCATIONS & SOIL STRATA

SUBMD. B.T.D.	CHECKED	W.P. NO. 437-64-00	M&T. DRAWING NO.
DRAWN	CHECKED	JOB NO. 71-11019	71-11019B
DATE	MAY 25, 1971	SITE NO.	BRIDGE DRAWING NO.
APPROVED		CONT. NO.	
PRINCIPAL FOUNDATION ENGINEER			



LEGEND			
	Bore Hole		
	Cone Penetration Test		
	Bore Hole & Cone Test		
	Water Level established at time of field investigation APRIL 1971		

NO	ELEVATION	STATION	OFFSET
1	427.1	99+55	19' LT.
2	427.0	99+55	19' RT.
3	428.0	100+73	19' LT.
4	428.1	100+73	19' RT.
5	428.8	101+91	19' LT.
6	428.5	101+91	19' RT.
10	427.8	100+13	19' RT.

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REVISIONS	DATE	BY	DESCRIPTION

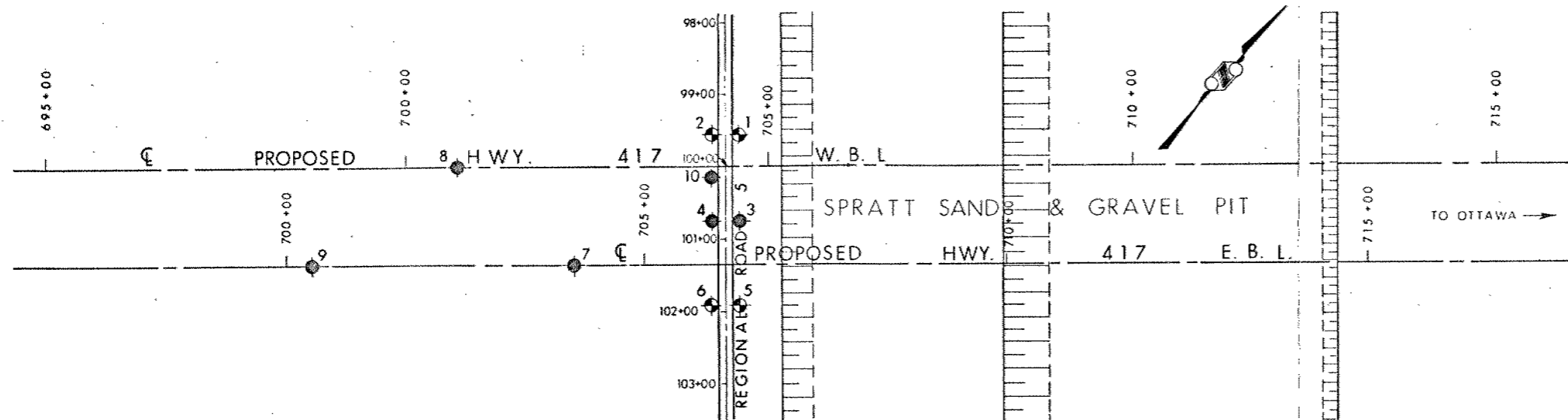
DEPARTMENT OF HIGHWAYS-ONTARIO
MATERIALS & TESTING OFFICE-FOUNDATION SECTION

REGIONAL ROAD 5

HIGHWAY NO. 417 E.B.L. & W.B.L. DIST. NO. 9
REG. MUN. OF OTTAWA - CARLETON
TWP. HUNTLEY LOT 3 CON. 2 & 3

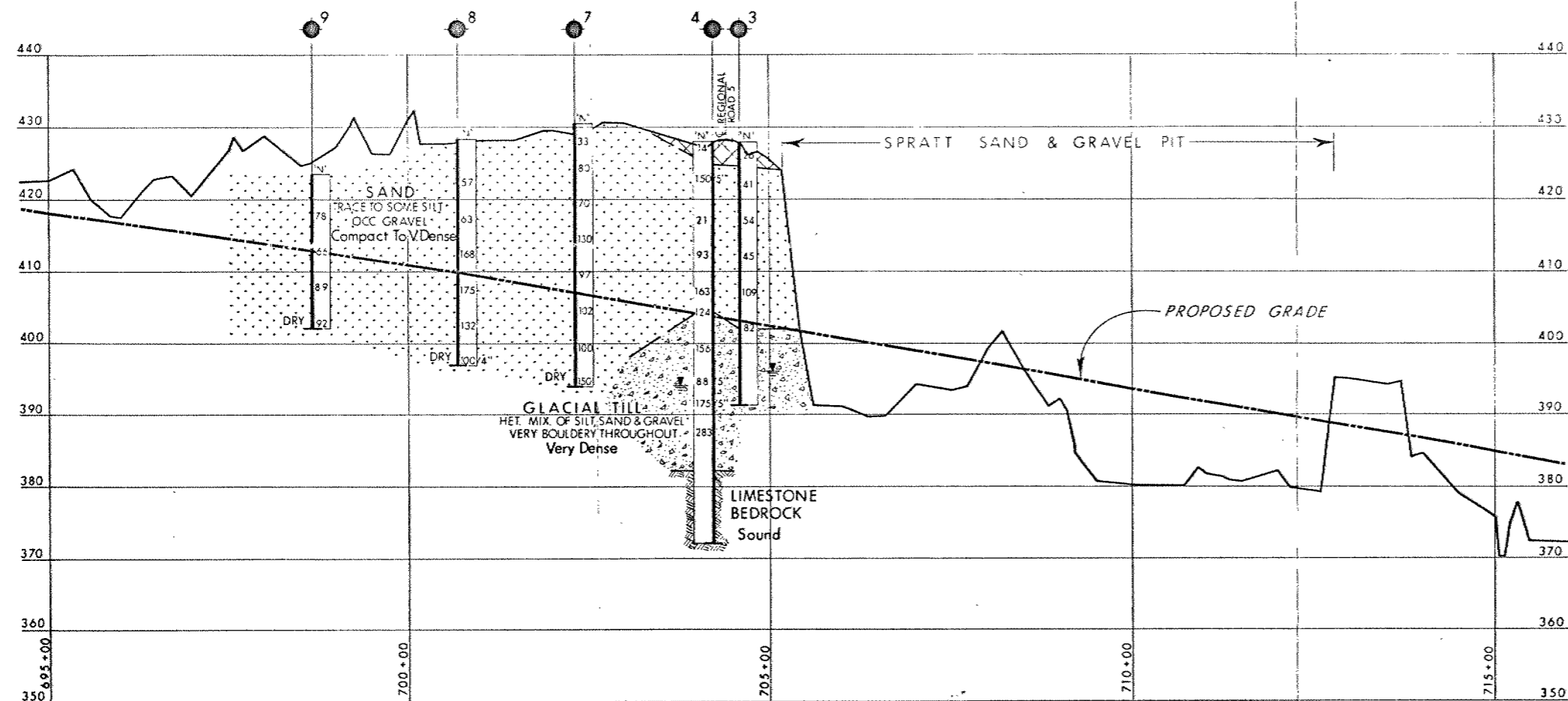
BORE HOLE LOCATIONS & SOIL STRATA

SUBM'D B.T.D. CHECKED <input checked="" type="checkbox"/>	W.P. NO. 437-64-00	M.&T. DRAWING NO. 71-11019A
DRAWN BY <input checked="" type="checkbox"/>	JOB NO. 71-11019	BRIDGE DRAWING NO.
DATE MAY 18, 1971	SITE NO.	CON. NO.
APPROVED <input checked="" type="checkbox"/>	PRINCIPAL FOUNDATION ENG. NEER	



PLAN

SCALE 100 50 0 100 200 FT.



PROFILE HWY. 417 W.B.L.

SCALE
HORIZ. 100 50 0 100 200 FT.
VERT. 10 5 0 10 20 FT.

SEE DWG. 71-11019A

KEY PLAN
SCALE IN MILES

LEGEND

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- Bore Hole & Cone Test
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DEPARTMENT OF HIGHWAYS-ONTARIO
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REGIONAL RD. 5

HIGHWAY NO. 417 E.B.L. & W.B.L. DIST. NO. 9
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BORE HOLE LOCATIONS & SOIL STRATA

SUBMITTAL	CHECKED	WP NO. 437-64-00	M&T. DRAWING NO.
DRAWN	CHECKED	JOB NO. 71-11019	71-11019B
DATE MAY 25, 1971	SITE NO.	BRIDGE DRAWING NO.	
APPROVED	PRINCIPAL FOUNDATION ENGINEER	CONT. NO.	