

#60-F-296-C

W.P. # 35-59

W.P. # 227-60

Hwy. # 401 E.

SERVICE RD.

Mr. A. M. Foye,
Bridge Engineer.

Materials & Research Section.

Attention: Mr. J. McCombie.

February 10, 1960.

FOUNDATION REPORT - by

Universal Geotechnique, Ltd.

at Proposed Diversion - Wilton Creek Crossing,
Hwy. 401 and Service Road, District No. 8
W.P. 35-59 and W.P. 227-60.

This memo accompanies the foundation report submitted by Universal Geotechnique, Ltd., defining the soil conditions at the above noted structure locations. You will note that the borings carried out and reported on, cover the location of the structure for Hwy. 401, and also, the structure for the Service Road.

Reference to the factual data presented in the report, shows that the limestone bedrock is overlain by a stratum of loose silt and sand. The thickness of overburden varies between 30 ft. - 40 ft. across the site. The penetration tests carried out in the stratum of non-cohesive material indicates that support for structure footings cannot be obtained through the use of simple spread footings. Small displacement "H" piles should be driven to practicable refusal, which will be obtained at the contact of the limestone bedrock - elevations varying from 324.0' to 312.0'.

The subsoil has sufficient strength to safely support the proposed embankments which can be designed utilizing standard soil slopes. Stripping of the 1 - 2 ft. of topsoil should be carried out prior to placement of embankment fill.

If there are any queries with respect to the contents of the attached report, or our foregoing comments, please do not hesitate to contact the Foundation Office.

J. / JMF

attach.

cc: Messrs. A. M. Foye (2)

H. A. Tregaskes

C. G. Cassay

H. J. Ford

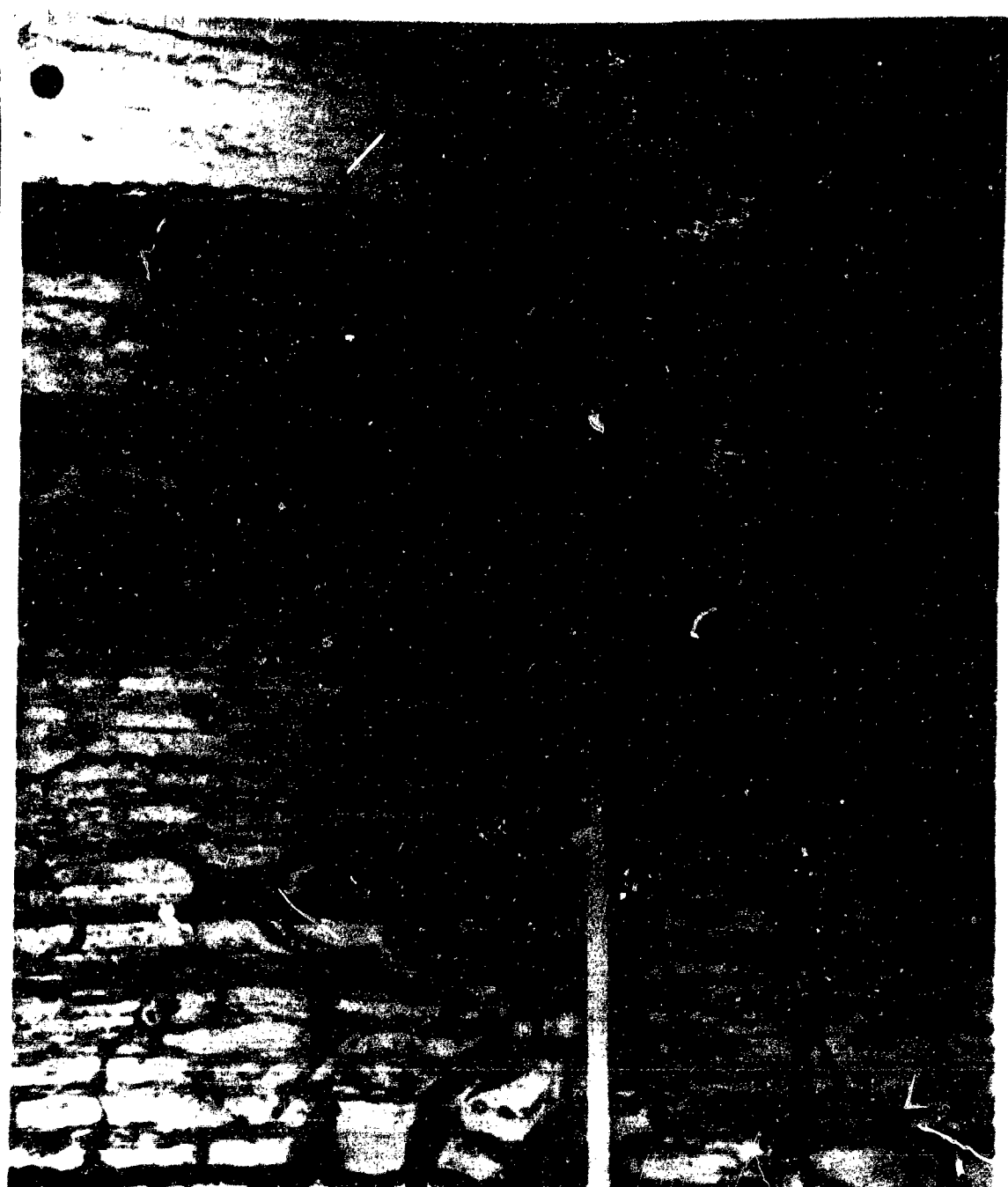
J. A. Sharpe

J. A. Crispier

L. G. Loderman,

PRINCIPAL CIVIL & FOUNDATIONS ENGINEER

Foundation Office -- Gen. Files.



TYPICAL CUT IN BEDROCK IN TRENTON - BLACK RIVER FORMATION
(Somewhat disintegrated due to blasting and weathering)

CONDITION OF ORIGINAL PHOTOGRAPH



TYPICAL CUT IN BEDROCK IN TRENTON - BLACK RIVER FORMATION
(Somewhat disintegrated due to blasting and weathering)

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82-60-219

REPORT

ON

FOUNDATION INVESTIGATION

for

PROPOSED DIVERSION - WILTON CREEK CROSSING

HIGHWAY 401 & SERVICE ROAD

COUNTY OF LENNOX & ADDINGTON

ONTARIO DEPARTMENT OF HIGHWAYS

(W.P. 35-59 & W.P. 227-60)

REPORT

on

FOUNDATION INVESTIGATION

for

PROPOSED DIVERSION - WILTON CREEK CROSSINGHIGHWAY 401 & SERVICE ROADCOUNTY OF LENNOX & ADDINGTONONTARIO DEPARTMENT OF HIGHWAYS

(W.P. 35-59 & W.P. 227-60)

INTRODUCTION

The Ontario Department of Highways are planning a diversion of Wilton Creek and a crossing of Highway 401 and a Service Road a few miles west of Odessa.

To determine the subsurface conditions for purposes of foundation design the Materials & Research Section of the D.H.O. authorized Universal GEOTECHNIQUE Limited to proceed with an investigation at the proposed site in accordance with their requirements as stated in a letter of authorization dated 15th of January, 1960, and this Report contains the results of the subsurface exploration together with information relative to foundation design.

AVAILABLE INFORMATION

D.H.O. plan F.3056-2 indicated the tentatively chosen locations for 6 exploratory boreholes and dynamic penetration tests and profile F.3056-4 showed Line A of Highway 401 at the crossing of Wilton Creek. This drawing also showed an ice level in the creek at elevation 356.1 on March 22, 1950, with the creek bed at an approximate elevation of 350.

Drawing N° 2 accompanying this Report has been reproduced from D.H.O. plans and shows the actual positions of the boreholes as carried out on the site.

Two bridges are involved, one carrying the Service Road over Wilton Creek (structure W.P. 227-60) and the other carrying Highway 401 over Wilton Creek (structure W.P. 35-59).

THE SITE

The site is situated about 3-1/2 miles west of Odessa and just to the west of the Camden Road crossing of Wilton Creek.

SUBSURFACE EXPLORATION

Subsurface exploration was carried out during the period 13th of January to 1st of February, 1960, and comprised 6 exploratory boreholes and 6 dynamic cone penetration tests located in positions as shown on drawing N° 2. The weather during the period of exploration was characterized by frequent snowfalls which delayed progress, the snow being so deep that a tractor had difficulty in operating in respect to winching the drilling rig into position.

The locations of the boreholes were staked and the ground surface elevations adjacent to the boreholes obtained by a D.H.O. Survey Crew who supplied this information to the Soils Engineer in charge of field operations at the site.

During the operation of soil boring soil samples were obtained generally at intervals of 2-1/2 feet to a depth of 15 feet and thereafter at intervals of about 5 feet and where noticeable changes of strata occurred the depths of such changes were recorded.

The state of compaction of essentially cohesionless strata and the general consistency of cohesive strata were determined by standard penetration tests taken during the operation of soil sampling. (The standard penetration test, as referred to in this Report, involves the recording of the number of blows (N) of a 140 lb. hammer falling 30 inches that are required to drive a 2 inch diameter split barrel sampler 1 foot into the soil at the bottom of the borehole).

A continuous record of the general state of compaction or consistency of the strata was also obtained adjacent to the boreholes by means of dynamic cone penetration tests carried to depths where virtually refusal conditions were encountered and the results of these tests are given on drawings included in the appendix.

Rock was encountered in all boreholes and diamond core drilling was carried out in each hole to prove bedrock. Drilling to prove bedrock was generally restricted to a depth of about 5 feet as this depth gave sufficient information for positive identification and classification.

Visual examination and classification of all soil samples and rock cores was carried out in the laboratory and a few samples were subjected to additional examination and testing. The descriptions of the strata obtained from the foregoing examination together with the results of the standard penetration tests are given on the borehole logs included with this Report.

Subsurface conditions given in this Report are those indicated by material encountered in the boreholes. The accuracy of extrapolation to obtain the soil profile should be associated directly with the geological conditions and inversely with the spacing of the boreholes.

GEOLOGICAL FEATURES

The site is situated in a region known as the Napanee Plain which consists of a thin mantle of glacial drift underlain by limestone. The generally level topography of the region is interrupted by drumlines and alluvial filled valleys which are occupied by meandering rivers and creeks. These existing rivers and creeks follow the older palaeozoic valleys that were eroded in the limestone and which have subsequently been filled by alluvial deposits. Wilton Creek is an excellent example of an ageing river system.

The actual sites of the bridges are situated at the bottom of a valley having a subdued drumlin on its north side whilst the south slope of the valley exhibits pronounced terracing.

From the information obtained from the exploratory boreholes it may be concluded that the strata down to the explored depths can be classified as follows: For the purposes of this Report the location of the two bridges will be assumed to comprise a single site unless specific mention is made to the contrary.

TOP SOIL

Dark brown loam containing organic matter and extending to a depth of over 2 feet in parts covers the site with the exception of an area in the vicinity of borehole BH.5.

ALLUVIAL DEPOSITS (Mainly Silts)

Under this classification are included the organic silts, silts, and sandy silts that were encountered in all the boreholes. These deposits exist in generally a loose state and vary in thickness from about 5 feet to 15 feet.

ALLUVIAL DEPOSITS (Mainly Sands)

These deposits underlie the silts and consist mainly of silty sands, sand, and sands and gravels. The state of compaction of these materials range from loose to firm and they vary in thickness from 18 feet in borehole BH.2 to about 37 feet in borehole BH.5.

BEDROCK

The bedrock consists of limestones of the Trenton - Black River formation and is classified as sound rock.

GROUND WATER

The water table encountered during the period of exploration tended to follow the topography and dropped from an elevation of about 355.5 in BH.1 to an average elevation of about 352.5 in boreholes BH.3, 4, and 5. Water under artesian pressure was encountered in the sands and the sands and gravels existing under the finer materials consisting of the silts. A loss in pressure was observed in those boreholes nearer the centre of the valley, water rising to elevation 358 in borehole BH.4 and to 367.4 in borehole BH.2.

pH of the artesian water in the boreholes ranged from 5.8 to 6.2, whilst the pH of the groundwater as first encountered ranged from 6.0 to 6.4.

LABORATORY TESTS

In addition to visual examination of all soil samples and rock cores certain of the soil samples obtained with thin walled sampling tubes were subjected to closer examination and moisture contents obtained.

DISCUSSION

The results of the subsurface exploration disclosed that beneath a few feet of topsoil there exists 40 to 50 feet of alluvial deposits lying directly on the bedrock which was encountered at elevations varying from about 312 to about 324.

The alluvial deposits have been divided into materials coming generally within the silt range and materials lying closer to the bedrock which are predominantly within the sand range. However, these deposits vary in their state of compaction and the silts especially are in a loose state, the standard penetration test giving an N value of 3 or 4 in conditions where a 2" diameter thin walled sampler could be pushed into the deposit by hand.

Thus it is very clear that normal spread footings would not provide satisfactory foundations to the proposed bridges and bearing piles to rock are indicated as the most suitable form of foundation.

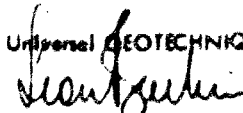
CONCLUSIONS

The results of the subsurface exploration and subsequent study indicate the following conclusions with respect to foundation design for both the bridges contemplated on the site under discussion.

- (1) The overburden consists of alluvial deposits of predominantly silts and sands with the coarser materials existing at lower elevations. These deposits are in a loose to very loose state of compaction.
- (2) Bedrock underlies the site at a depth of less than 50 feet below the ground surface. In the six exploratory boreholes the bedrock elevations varied from about 324 to 312 indicating a valley in the bedrock along the line of the meandering Wilton Creek.
- (3) The groundwater as first encountered during the period of exploration varied from elevation 356 at the north of the site in BH.1 to 352 at the south of the site in BH.5. Water under artesian pressure was observed when the boreholes penetrated into the coarser alluvial deposits. In borehole BH.2 the water rose to elevation 367.4 and flowed at the rate of 19 g.p.h. from an orifice at elevation 363.7.
- (4) The alluvial deposits do not constitute a satisfactory bearing stratum for normal spread footings and bearing piles driven to the bedrock are considered the most appropriate means of support.
- (5) Bearing piles driven to the required resistance just beneath the surface of the bedrock should preferably be H section steel piles although other types that can be effectively and satisfactorily driven to obtain a secure toe-hold in the rock need not be excluded.

If steel H section piles are adopted they can be designed to carry a working load based on an allowable stress in the steel of 9000 lbs./sq. inch provided adequate driving resistance in the rock is ensured and there is no danger that scour may lower the soil below the pile caps.

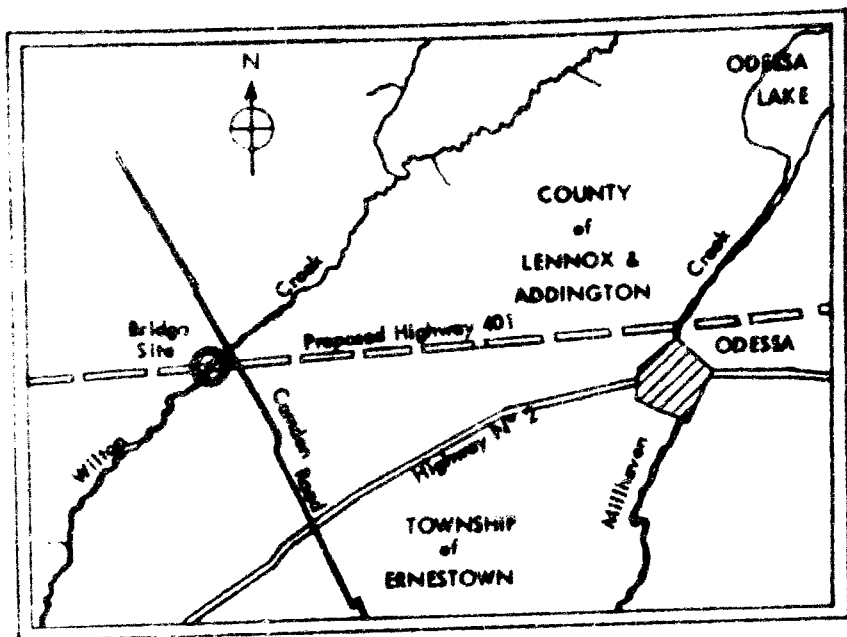
Universal GEOTECHNIQUE Limited,



L. Boskin, P. Eng.
Engineering Geologist.

Report N° T.416/60

February, 1960.



KEY PLAN

Scale: 1" = 1 Mile

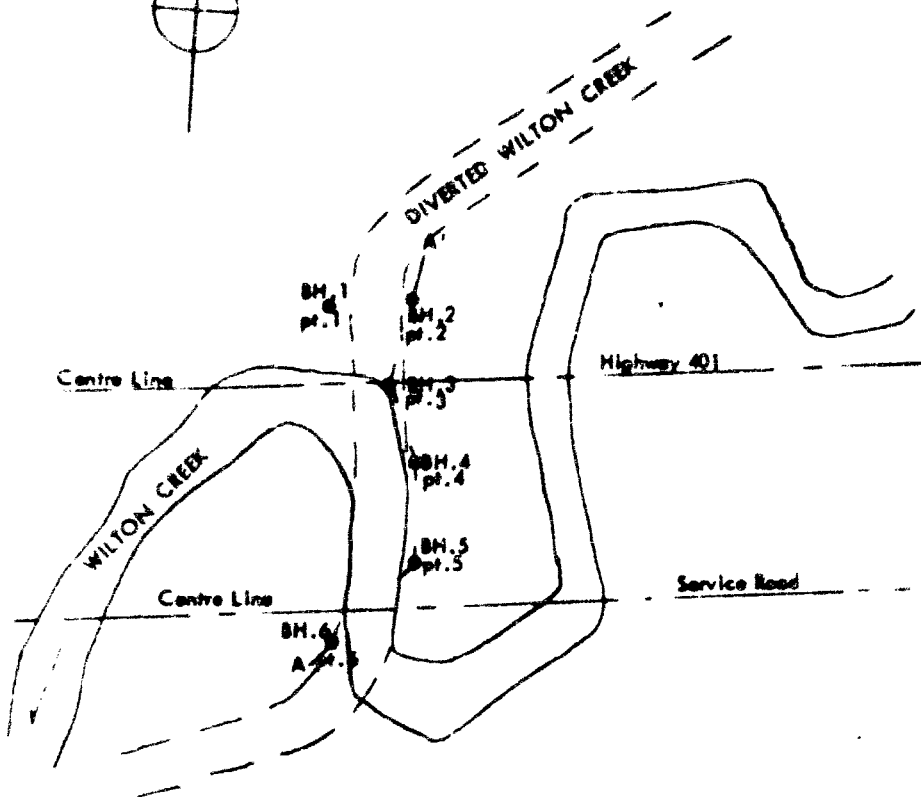
PROJECT Highway 401, Willan Creek Crossing

TITLE Key Plan

DWG NO. 1 ORDER NO. T.416/60



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SCALE

1" = 100'-0"

This sketch is a copy of part of plan N° F3056-2 supplied by D.H.O.

PROJECT Highway 401, Wilton Creek Crossing

TITLE Borehole Location Plan

DWG NO 2 ORDER NO T.416/60

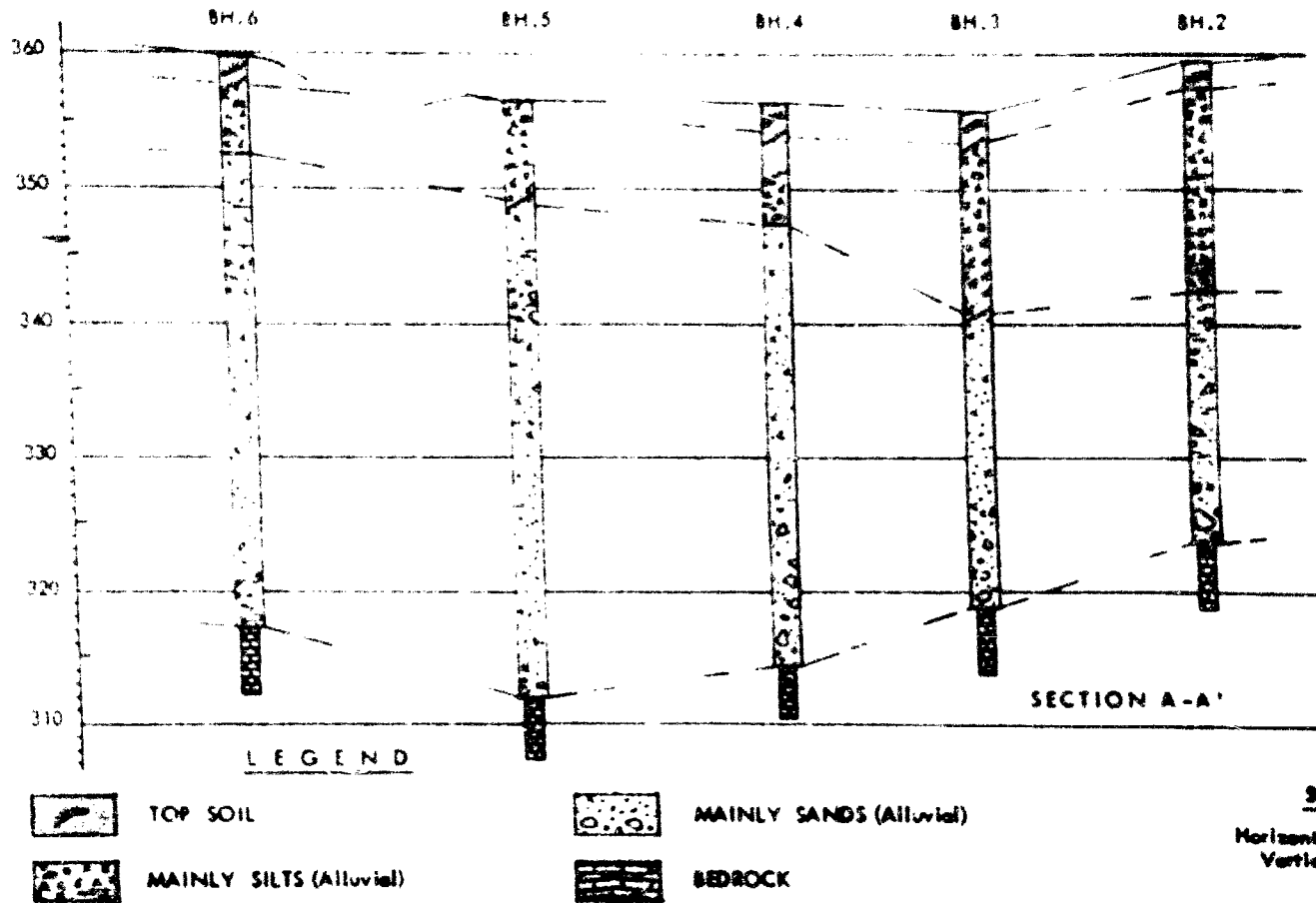


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PROJECT Highway 401, Wilton Creek Crossing
 Title Geological Section
 Dwg. No. 3
 Order No. T-416-60

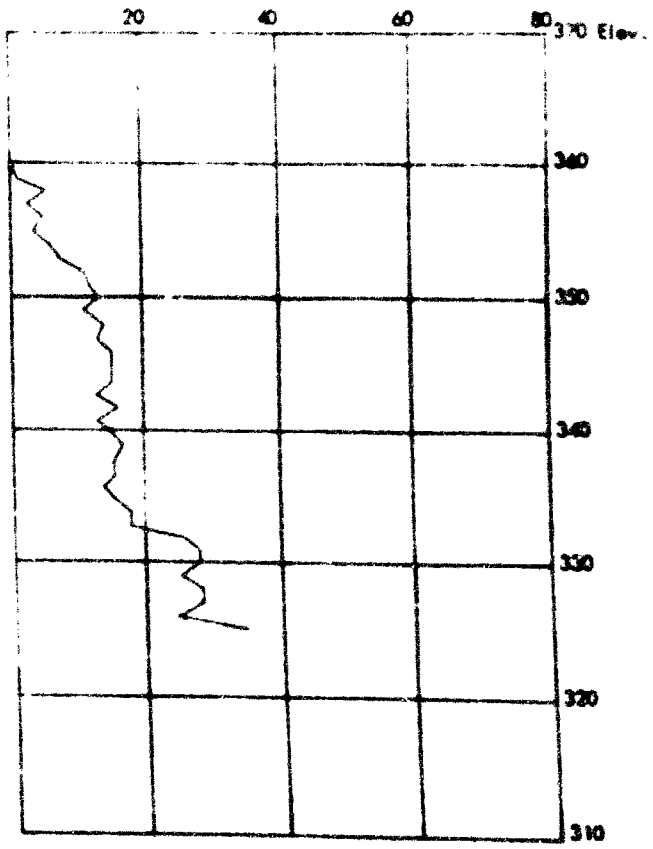


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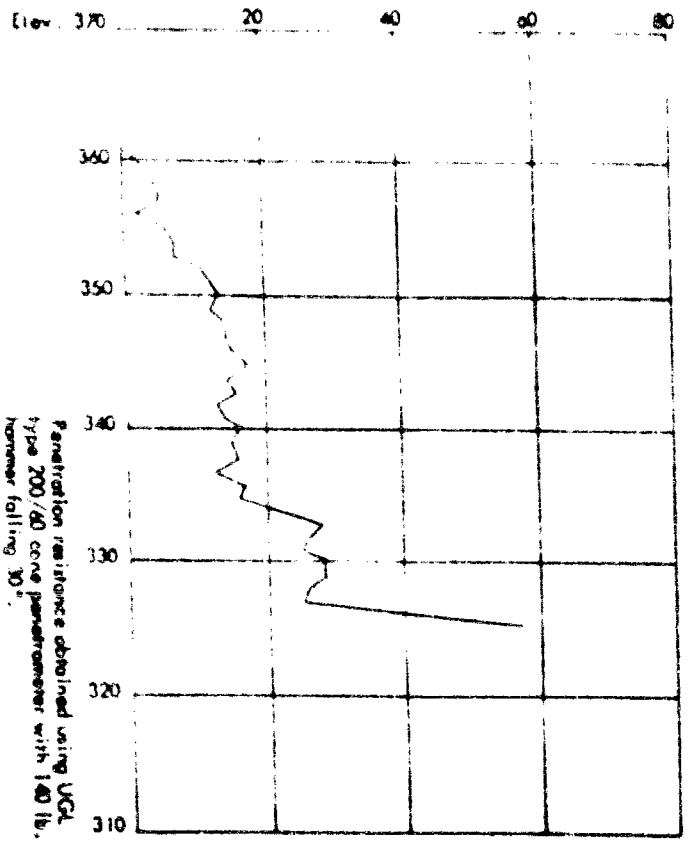
PT. 2

Blows Per Foot of Penetration



PT. 1

Blows Per Foot of Penetration



Penetration resistance obtained using UCA
type 200/60 cone penetrometer with 140 lb.
hammer falling 30".

NO. 101, Wilson Creek Crossing

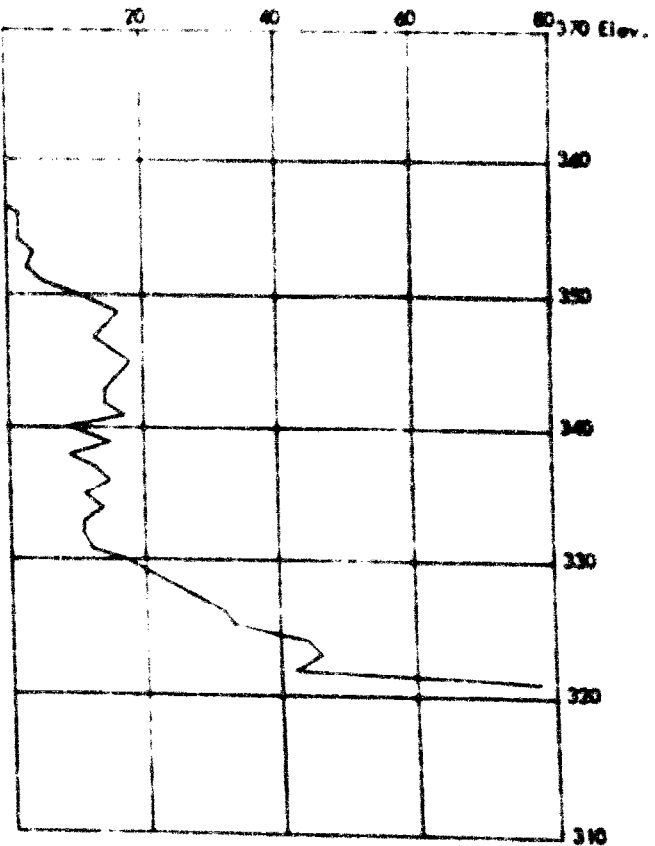
Dynamic Penetration Test Diagrams

ORDER NO. 1-414/60

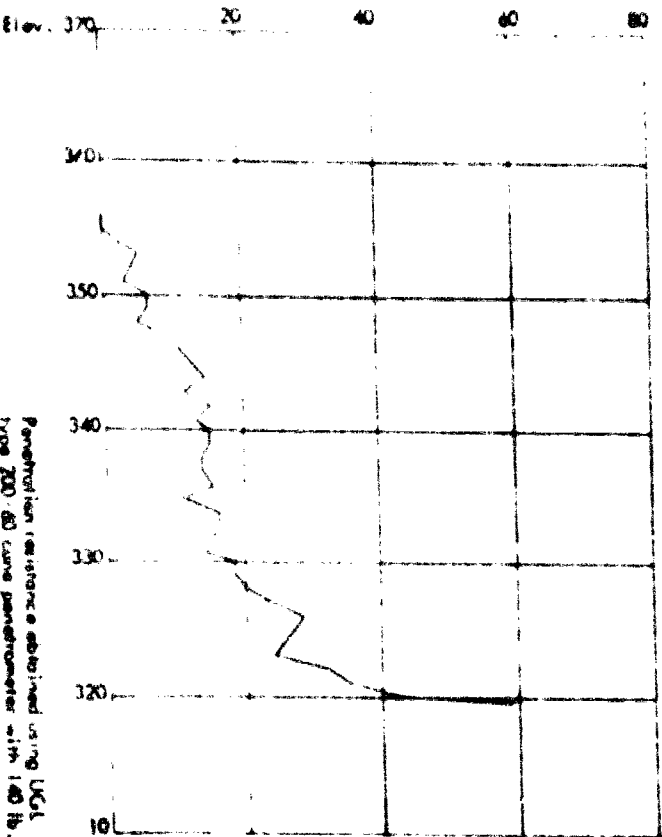


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PT. 4
Blows Per Foot of Penetration



PT. 3
Blows Per Foot of Penetration



Penetration resistance obtained using UC-1
Type 200-60 cone penetrometer with 140 lb.
hammer falling 30".

Product Highway 401, Wilton Creek Crossing

Title Dynamic Penetration Test Diagrams

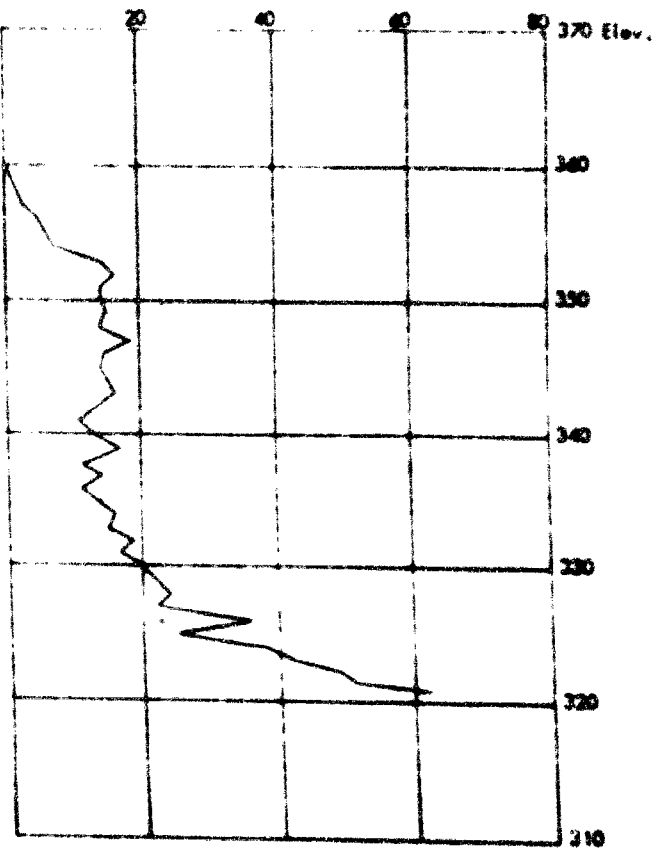
Page No. 5

Order No. T-410/60

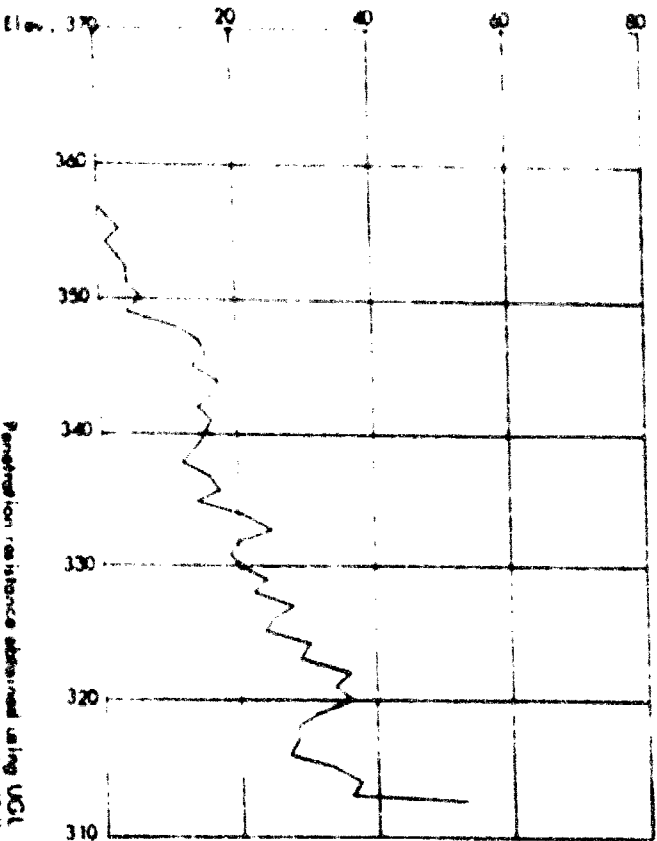


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PT. 6
Blows Per Foot of Penetration



PT. 5
Blows Per Foot of Penetration



Penetration resistance obtained using UCL
Type 200/60 cone penetrometer with 140 lb.
hammer falling 30".

PROJECT: Highway 401, William Creek Crossing
TITLE: Dynamic Penetration Test Diagrams

Order No. 1,416-60



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SOIL MECHANICS LABORATORY

BOREHOLE LOGPROJECT Highway 401, Wilton Creek Crossing - W.P. 35-59 &ORDER NO. I-416/60CLIENT Ontario Department of Highways

W.P. 227-60

BOREHOLE NO. BH-1DIAMETER 2 1/2"CASING BXBOREHOLE LOCATION See PlanINCLINATION VerticalBEARING ---

DESCRIPTION OF STRATA	ELEVATION	LOG NO. SAMPLE	DEPTH	THICKNESS	N	REMARKS
Brown loam with organic matter.	360.6		Zero			
Loose brown clayey SILT with traces of organic matter, iron stained.		• 1			8	Damp. Medium to high dry strength.
Firm grey SILT. Traces of organic matter.		• 2			14	Damp. Medium dry strength.
		• 3				No recovery.
Loose to firm grey SILT.		• 4			14	Wet. Medium dry strength.
Loose to firm grey SILT with dark thin clayey seams.		• 5			10	do
Loose grey very silty fine SAND.		• 6			9	Wet. Low to medium dry strength.
		• 7			14	do
		• 8			6	Water under artesian pressure. Wet. Low dry strength.
Loose grey fine SAND with thin layers of grey silty clay.		• 9			9	do
		• 10	36'-0"			Wash sample. 37'-0" to 42'-0" core recovery 90%.
Grey limestone with dark bedded bedritic joints filled with prillaceous material, calcite veins. Bound rock.			41'-0"			
			End of Borehole			

SOIL MECHANICS LABORATORY**BOREHOLE LOG**

PROJECT Highway 401, Wilton Creek Crossing - W.P. 35-59 & W.P. 227-60
 CLIENT Ontario Department of Highways

ORDER NO T.416/60BOREHOLE NO BH.2 DIAMETER 2-1/2" CASING BXBOREHOLE LOCATION See Plan INCINATION Vertical BEARING ---

DESCRIPTION OF STRATA	ELEVATION	LOG	SAMPLE	DEPTH	THICKNESS	N	REMARKS
Dark brown loam with organic matter.	359.7			Zero			
Loose to firm grey-brown clayey SILT with traces of organic matter.			• 1	2'-0"		11	Moist. Medium to high dry strength.
Firm grey somewhat sandy SILT with thin layers of silty clay. Some iron staining. Traces of organic matter.			• 2	3'-6"	Free Water	11	Moist. Medium dry strength.
Loose to firm grey SILT.			• 3			12	Wet. Medium dry strength.
							No recovery.
Loose to firm grey sandy SILT with occasional thin layer of silty clay.			• 4			14	Wet. Low to medium dry strength.
Loose do			• 5			8	do
do							do
Loose grey clayey SAND with fine to medium subangular gravel.			• 6	7'-6"		7	Wet. Clayey sand: Medium to high dry strength.
Grey sandy SILT.			• 7	20'-6"		30	Wet. High N due to coarse gravel.
Grey clayey SAND with fine to coarse subangular gravel.							
Loose grey silty SAND.			• 8			9	Wet. Low dry strength.
Loose grey somewhat clayey SAND with fine to medium subangular gravel.			• 9			8	Moist. Medium to high dry strength. Water under artesian pressure rising to el. 367.4'. Water flowing at 19 gals./hr. at el. 363.7'
Loose grey fine to coarse SAND with fine to coarse gravel.			• 10	36'-0"		10/10"	Wet. No dry strength. 35'-10" to 41'-0" bore recovery 80%.
Grey to buff finely crystalline limestone with thin dendritic healed joints filled with dark argillaceous material. White concentrations of calcite.							
Sand and rock.				41'-0"			End of Borehole

SOIL MECHANICS LABORATORY

BOREHOLE LOG

PROJECT Highway 401, Wilton Creek Crossing - W.P. 35-59 &ORDER NO. I.416/80CLIENT Ontario Department of Highways

W.P. 227-80

BOREHOLE NO. BH.3DIAMETER 2-1/2"CASING BXBOREHOLE LOCATION See PlanINCLINATION VerticalBEARING ---

DESCRIPTION OF STRATA	ELEVATION	LEGEND	SAMPLE	DEPTH	THICKNESS	N	REMARKS
Loose dark brown loam with some organic matter.	355.9		• 1	Zero		7	Damp. Medium to high dry strength.
Loose grey SILT with traces of organic matter. Some iron staining.			• 2	Free Water		5	Wet. Medium dry strength.
Loose grey SILT with dark grey seams of clayey silt.			• 3			10	do
Loose grey SILT occasional fine gravel.			• 4			9	do
Loose to firm sandy SILT.			• 5			12	Wet. Low to medium dry strength.
Loose grey silty SAND.			• 6			9	Wet. Low dry strength.
Loose grey sandy SILT.			• 7			5	Wet. Medium dry strength.
Loose grey fine silty SAND.			• 8			5	Wet. Low dry strength.
Fine to coarse sand & gravel.			• 9	28'-0"			Water under artesian pressure rising to el. 360.7'
do			• 10				Wash sample.
Gray to buff finely crystalline limestone. Dendritic healed joints filled with dark argillaceous material. Open jointing at 45° to parallel to core length. Fairly sound rock.				37'-0"			37'-0" to 42'-0" core recovery 80%.
				42'-0"			End of Borehole

SCALE: 1" = 5'-0" • DISTURBED SAMPLE

■ UNDISTURBED SAMPLE

SOIL MECHANICS LABORATORY

BOREHOLE LOGPROJECT Highway 401, Wilton Creek Crossing - W.P. 35-59 BORDER NO I.416/60CLIENT Ontario Department of Highways

W.P. 227-60

BOREHOLE NO BH.4DIAMETER 2-1/2"CASING BXBOREHOLE LOCATION See PlanINCLINATION VerticalBEARING ---

DESCRIPTION OF STRATA	ELEVATION	DEPTH	THICKNESS	N	REMARKS
Loose dark brown loam with organic matter.	356.4	Zero			
Loose grey medium to coarse SAND.		Free Water		4	Damp.
Very loose grey clayey SILT with dark organic pockets, occasional shell fragments.				4	Wet.
Grey somewhat silty fine SAND with occasional gravel. Exhibits crossbedding.		9'-0"		3	Moist. Medium dry strength.
Very loose grey SILT with thin layers of silty clay.				3	Wet. Medium dry strength.
Loose grey fine silty SAND.				4	Low dry strength.
do				4	Wet. Low to medium dry strength.
do				8	Wet.
do				8	Low dry strength.
do				8	do
do				8	do
Fine to medium SAND with gravel.		28'-9"			Artesian pressure. Water rose to el. 358.0
do					Wash sample.
do					do
do					do
Grey to buff finely crystalline limestone with healed dendritic joints filled with dark argillaceous material. Sound rock.		42'-0"			42'-0" to 46'-0" core recovery 93%.
		46'-0"			
		End of Borehole			

SOIL MECHANICS LABORATORY**BOREHOLE LOG**PROJECT Highway 401, Wilton Creek Crossing - W.P. 35-59 & W.P. 227-60 ORDER NO. I.416/60CLIENT Ontario Department of HighwaysBOREHOLE NO. BH.5 DIAMETER 2-1/2" CASING BXBOREHOLE LOCATION See Plan INCLINATION Vertical BEARING ---

DESCRIPTION OF STRATA	ELEVATION	LEGEND	SAMPLE	DEPTH	THICKNESS	N	REMARKS
Very loose dark brown sandy SILT with high percentage of organic matter.	356.5		• 1	Zero		4	Wet. Low to medium dry strength.
				Free Water			
Very loose dark grey fine to medium SAND, with organic matter. Wood & shell fragments.			• 2			2	Wet. No dry strength.
Black organic SILT with same shell fragments.			• 3			4	Moist.
Grey SILT.			• 4			13	Wet. Low dry strength.
Loose grey fine silty SAND.			• 5			8	do
do			• 6			7	Wet. Medium to high dry strength.
Loose grey clayey SAND with fine to medium subangular gravel.			• 7			6	Wet. Low dry strength.
Loose grey silty SAND.			• 8			6	do
				23'-0"			
Loose grey fine SAND.			• 9			11	do
			• 10				Water under artesian pressure rising to el. 359.5' and flowing at same elevation at a rate of 8 gals./hr. Wash sample.
Grey fine to coarse SAND.			• 11				do
do							
				44'-6"			
Grey to buff finely crystalline limestone with dendritic healed seams filled with dark argillaceous material. Occasional white concentrations of calcite. Sound rock.							44'-6" to 49'-0" core recovery 80%
				49'-0"			
				End of Borehole			

SCALE: 1" = 5'-0" • DISTURBED SAMPLE

■ UNDISTURBED SAMPLE

SOIL MECHANICS LABORATORY

BOREHOLE LOG

PROJECT Highway 401, Wilton Creek Crossing - W.P. 35-59 &

ORDER NO T.416/60

CLIENT Ontario Department of Highways

W.P. 227-60

BOREHOLE NO BH.6

DIAMETER 2-1/2"

CASING BX

BOREHOLE LOCATION See Plan

INCLINATION Vertical

BEARING

DESCRIPTION OF STRATA	ELEVATION	LOG	SAMPLE	DEPTH	THICKNESS	N	REMARKS
Brown loam with some organic matter, iron stained.	359.9			Zero			
Loose brown SILT, iron stained, little clay.			• 1			7	Damp. Medium to high dry strength.
Loose black organic SILT with lenses of sand and shell fragments.			• 2			7	Moist. Medium dry strength.
Loose to firm grey silty SAND.			• 3	7'-0"		10	Wet. Low to medium dry strength.
do With seams of dark silty clay, occasional gravel.			• 4			37	Wet. Medium dry strength.
Firm grey sandy SILT with thin layers of grey clay.			• 5			8	Wet. Low dry strength.
Loose grey fine silty SAND.			• 6			7	do
do			• 7			5	do
do			• 8				Water under artesian pressure. Wash sample.
Grey fine to coarse SAND.			• 9				Wash sample.
do			• 10				Wash sample.
Grey fine to coarse SAND & GRAVEL.				-6"			42'-6" - 47'-6" core recovery 90%.
Grey to buff finely crystalline limestone with healed dendritic joints filled with dark grey argillaceous material. Sound rock.				47'-6"			End of Borehole

SCALE 1" = 5'-0" • DISTURBED SAMPLE

■ UNDISTURBED SAMPLE

Mr. E. A. Cash,
District Engineer,
Kingston, Ontario.

May 25, 1961.

Re: SITE VISIT -- Wednesday,

Materials & Research Section,
(Foundations Office).

May 24th, 1961.

Attention: Mr. W. G. Scott, Const. Engr.

Re: Wilton Creek Crossing, Hwy. 401 & Service Road,
(M.P. 15-59) -- District #8.

As per your request related to us by Mr. Al. McKim from the Bridge Division, the undersigned has visited the above site on Wednesday, May 24th, 1961.

The following observations were made:-

Presently, the Contractor is working on the West abutment. Continuous pumping of the water from the excavation is applied. The drawing-down of the water level in the excavation resulted, in many instances, in unstable excavation bottom or boiling conditions.

At the South corner of the West abutment, a 4-inch concrete working slab was poured within the footing forms. This operation was only partly successful because the slab was damaged by the water uplift pressures and by the washing-out of cement from concrete.

The Contractor is proceeding with the excavation of the material between the piles, applying constant pumping. The pump sump is constantly silting up because of the boiling of the material.

It is believed that the encountered difficulties will decrease as the construction proceeds to the North.

Two more important operations have to be completed by the Contractor in the immediate and near future:-

1. Excavation and construction of the East abutments and retaining walls.
2. Erection of the falsework for the bridge deck.

Both operations require careful preparations in order to avoid serious and unnecessary consequences.

cont'd. /2 ...

Ad. 1. A much more serious problem exists on the East than on the West abutments. The water is much closer and therefore, boiling conditions will occur more readily. Besides that, the cofferdam at this location is much higher and closer to the future excavation, and its overall stability becomes questionable in view of the necessary excavation. Unstable excavation bottom conditions could very well result in the cofferdam failing. To avoid this, two alternative construction procedures are given here for your consideration:-

a) Interlocking steel sheet piling should be driven around and below the excavation bottom to a depth equal to the distance of the water in the creek above the excavation bottom. For example, if the creek water level is 356.0, the footing - i.e., excavation bottom elevation 346.0, the sheet piles should be driven to elevation 336.0. When determining the sheet piling location, provision should be made for the batter of the 'H' piles.

b) Well points should be installed around the excavation and the area dewatered by pumping. About three-foot centres of points should be the lower limit. The points would have to be driven some 3 feet below the excavation bottom in order to provide adequate dewatering.

In both mentioned procedures, the stability of the excavation bottom would be assured.

Ad. 2. The original proposal called for the framework poles to be supported by piles. Later, this proposal was changed to spread footings resting on dumped rock fill. Because of the piping conditions that have loosened the subsoil, the Contractor was asked by the Bridge Division to drive piles as requested in the original proposal. Because rock fill has already been placed, this would require driving of piles through the rock fill. Attempts have been made to do this, but some of the piles buckled and broke.

Two alternative solutions for the pole supports are proposed for your consideration:-

a) The leveling of the present rock fill and its compaction with a heavy roller; placing of a few additional feet of rock fill in 6-inch compacted layers. This would then permit the use of spread footings for the pole supports. A few test pits should be excavated in the present rock fill in order to determine its depth. The supervision of these excavations as well as the choice of their locations, should be conducted by a Soils Engineer from the Kingston Office. It is suggested that the overall thickness of the final rock fill layer, be not less than 6 feet of which not less than 3 feet should be new fill.

cont'd. /3 ...

b) Partial excavation or complete removal of the rock fill layer, in order to enable the driving of timber piles as presently requested.

We believe that both above mentioned procedures would equally well serve the desired purpose.

If there is any additional information or recommendations that you might require, please feel free to call on our Office.

L. G. Cederman,
PRINCIPAL FOUNDATION ENGR.
Per.

AC-/MdeF

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

cc: Messrs. A. McKim
J. E. Gruspiet
L. F. Radie

Foundations Office
Gen. Files.

Mr. S. McConchie

March 26, 1959

Bridge Planning Engineer

Materials and Research Section

Re: WP35-59 Hwy. 401 Wilton Creek

and

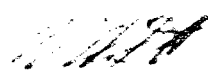
WP36-59 Hwy. 401 Camden Rd. Interchange

Our Foundation Section will be undertaking foundation investigation of the above projects, employing core drilling equipment and commencing April 2, 1959 approx.

These projects are shown on Schedules 13 & 14, respectively, of the 1960-61 Programme, as indicated on the verifax copies of the proposed schedules submitted by Mr. R. Strain.

L.G. Soderman
Principal Soils & Foundations Engineer

NDC:is
c.c. to L.B. Walker
T. Kovich
J. Gruspier
Files
N.D.S.


Per: N.D. Smith

Mr. E. Post,

Regional Property Supervisor.

Materials & Research Section.

April 28 1959.

Re: W.P. 35-59, Hwy. 401 -
Damages to Property,
Part Lot 20, Con. 5.

Enclosed, for your information, is Materials
and Research Section Property Damage Report, in connection
with the above.

/MdeF
Encl.

L. G. Soderman,
PRINCIPAL SOILS & FOUNDATION ENGINEER

DEFECTS IN NEGATIVE DUE TO
CONDITION OF ORIGINAL DOCUMENT

*From letter
made out by
JH.*

Mr. E. Post

Regional Property Supervisor

M & R. Section, Kingston

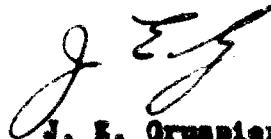
April 20, 1959

W.P. 35-59, Hwy. 401, Damages

to property, part Lot 20, Con. 5

A foundation investigation was recently carried out at Wilton Creek on Highway 401. In the process of moving the drill rig to and from the site, it was necessary to cross a farmer's fields. The land was in a soft condition and the fields were rutted.

The owner of the property was contacted and he will be in to see you with regard to a claim for damages.



J. E. Graspier
Regional Soils Engineer

JEG/jfj

c.c. Mr. L. G. Soderman

*From Bill
moved out by
JW.*

Mr. E. Post

Regional Property Supervisor

M & R. Section, Kingston

April 20, 1959

W.P. 35-59, Hwy. 401, Damages
to property, part Lot 20, Con. 5

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J. E. Gruspier
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c.c. Mr. L. G. Soderman

SEE 40 12111