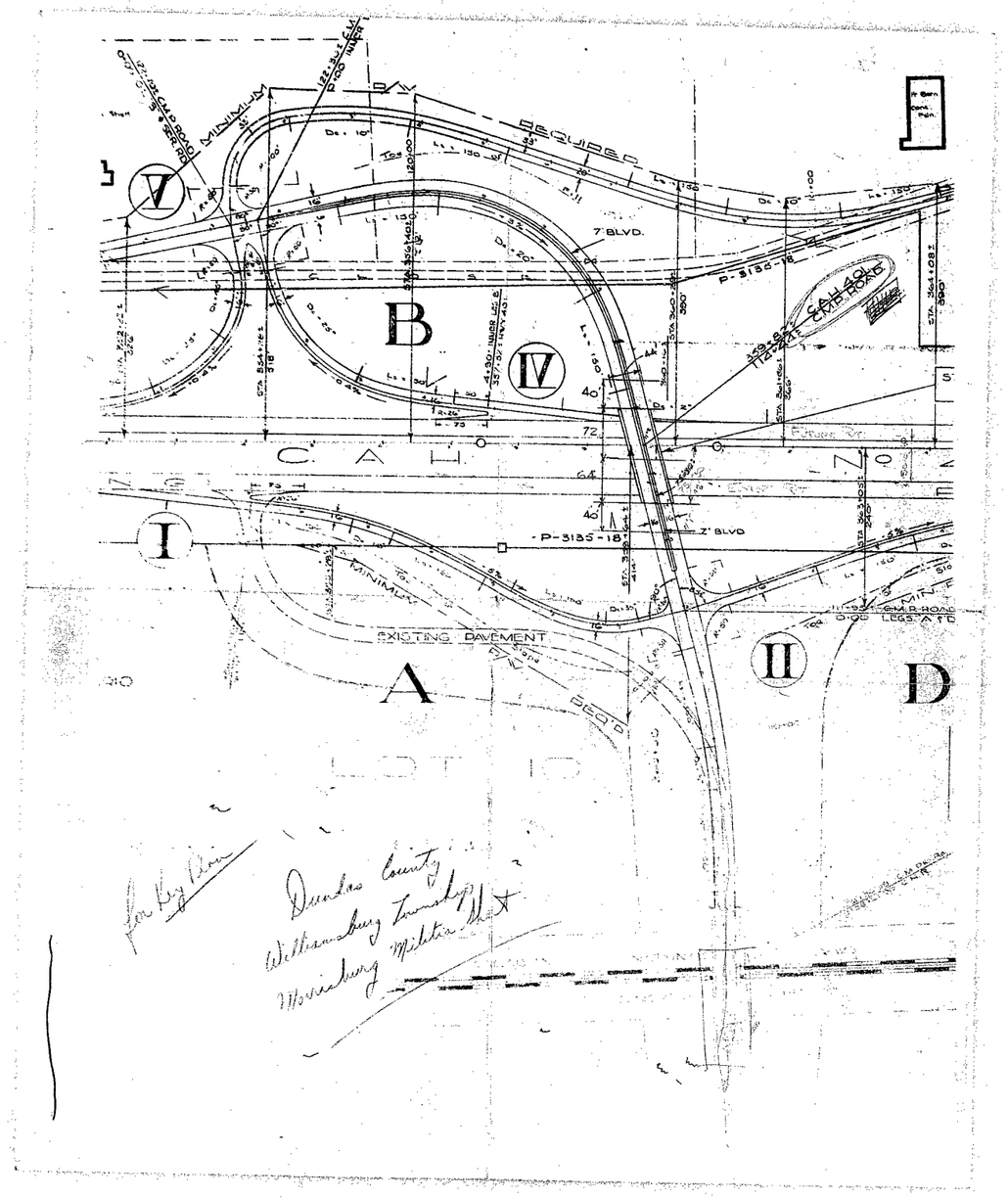
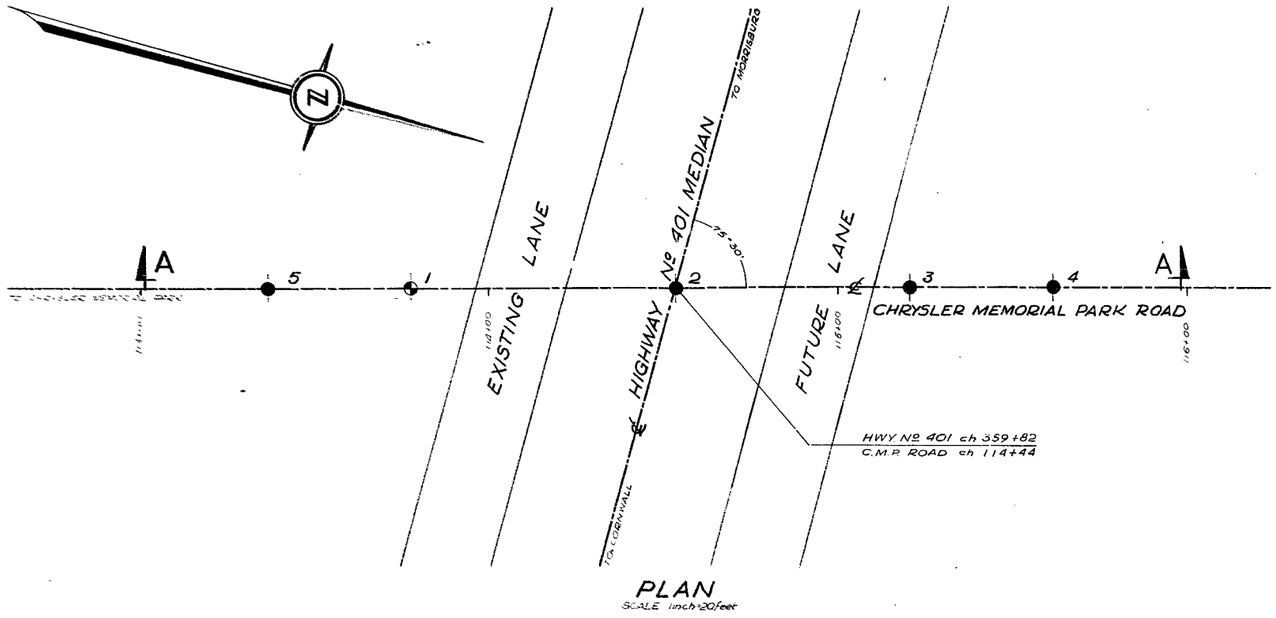
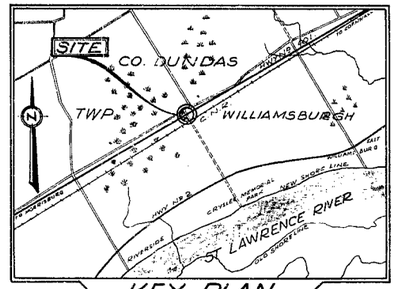
#61-F-43
W.P.# 1-61
Hwy. # 401
CHRYSLER
MEMORIAL PARK
RD. 6.2MILES
EAST OF
MORRISBURG





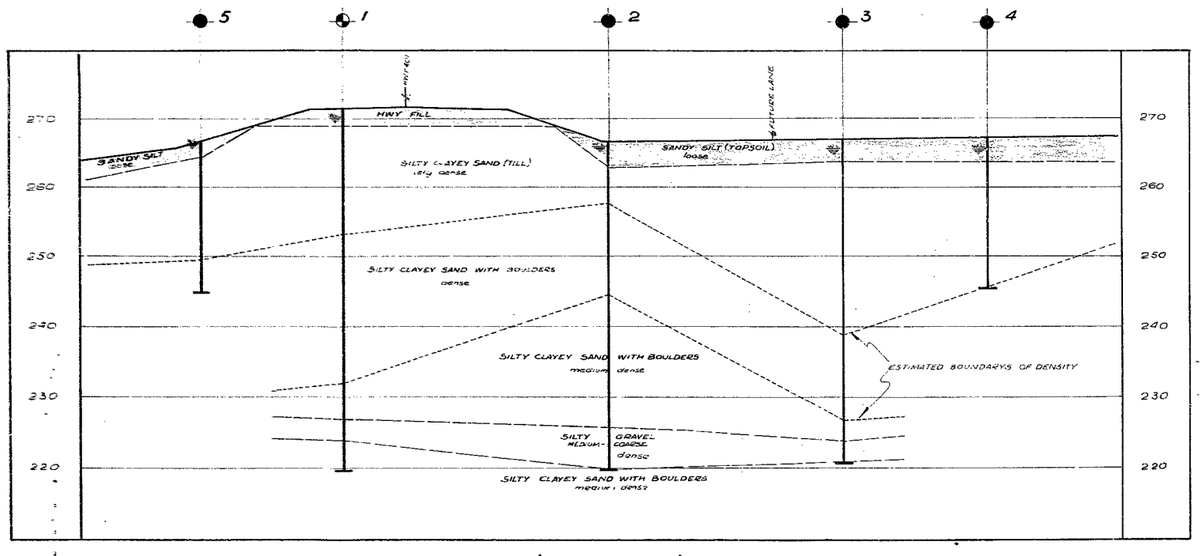
PLAN
SCALE 1inch=20feet



LEGEND

- BORE HOLE
- BORE AND PENETRATION HOLE

HOLE	ELEVATION	STATION	OFFSET
1	271·4	113+68	℄
2	266·8	114+44	℄
3	267·2	115+10	℄
4	267·5	115+51	℄
5	266·9	113+27	℄

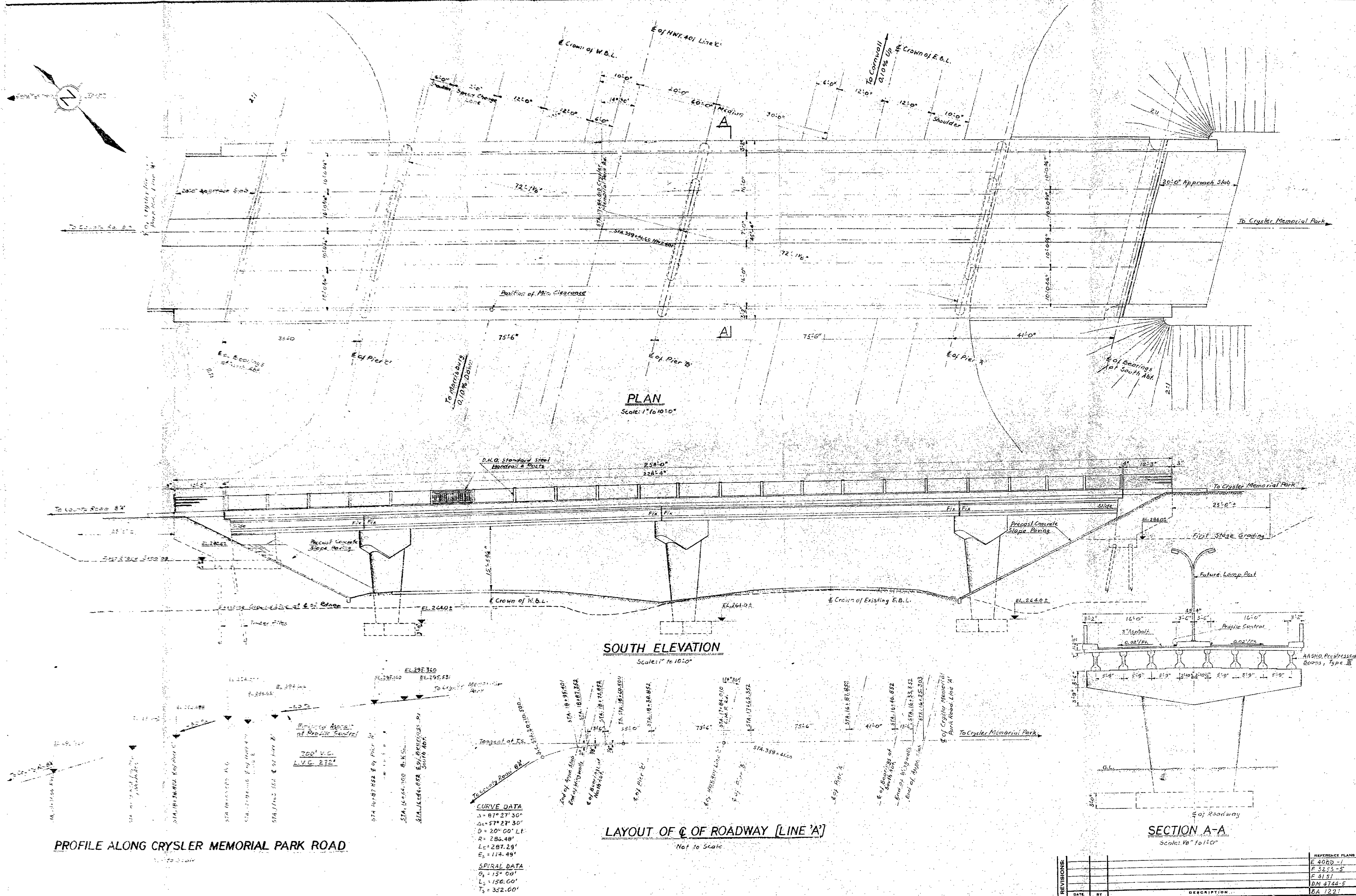


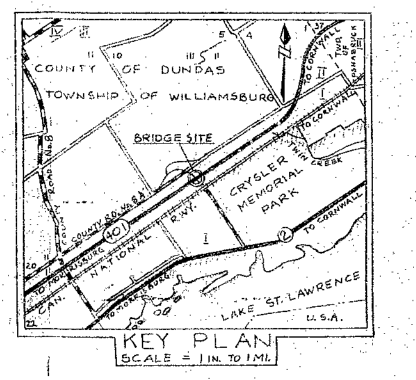
A — A
SCALE VERTICAL 1"=10' HORIZONTAL 1"=20'

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION

CHRYSLER MEMORIAL PARK ROAD AND HIGHWAY №401

ORIGINATED W. KULMATICKAS	DISTRICT NO. 9	DATE 2 JUNE 1961
DRAWN T. Kaquoty	W.P. NO. 1-61	JOB NO. 61-F-43
CHECKED WK	SCALE AS SHOWN	DRAWING NO. 61-F-43A
APPROVED		





61-F-43

O.K.
W.W.K.
W.P. 1-61
Soils

DEPARTMENT OF HIGHWAYS:-ONTARIO-
BRIDGE OFFICE:-TORONTO

CRYSLER MEMORIAL PARK UNDERPASS

5.2 MI. EAST OF HWY. 31

THE KING'S HIGHWAY No. 401 DIST. No. 9
CO. Dundas
TWP. Williamsburg LOT 10 CON. I

PRELIMINARY PLAN

APPROVED

BRIDGE ENGINEER DESIGN ENGINEER

DESIGN	A.P.	CHECK		CONTRACT NUMBERS	
DRAWING	V.B.	CHECK	A.R.B.		
TRACING		CHECK		LOADING H-20 S-16	DRAWING NUMBER D-4919-P
DATE August, 1961					

REFERENCE PLANS
E 4000-1
F 3253-5
F 4151
DM 4744-5
BA 1221

REVISIONS: DATE BY DESCRIPTION

CC: Gen. Files

23-65-304

Mr. A. M. Toye,

Bridge Engineer.

Materials & Research Section.

(Foundations Office).

Attention: Mr. J. McCarthy.

June 2, 1961.

D.H.O. FOUNDATION INVESTIGATIO
REPORT

W.J. 61-P-43 -- W.P. 1-61.

Re: Crysler Memorial Park Road and Hwy. No. 401
(Approx. 6.2 Miles East of Morrisburg),
Twp. of Williamsburg, County of Dundas,
District No. 9.

Accompanying this memo, is our detailed foundation report on the subsoil conditions existing at the above site.

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

If we can be of further assistance in connection with this project, please do not hesitate to contact our office.

L. G. Oderman,
PRINCIPAL FOUNDATION ENGR.
per:

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

AGS/dcf
Attach.
cc: Messrs. A. M. Toye (2)
E. A. Tregaskis
E. G. McMillan
J. Ford
A. D. Walker
J. P. Gruspier
J. Hoy
T. J. Kovich
J. D. Saint
F. Norman
A. Watt
Foundations Office
Gen. Files ✓

TABLE OF CONTENTS

FOUNDATION INVESTIGATION

For

Crysler Memorial Park Road and Hwy. No. 401
(Approx. 6.2 Miles East of Morrisburg),
Twp. of Williamsburg, Cty. of Dundas, Dist. 9
S.J. 61-F-4j — W.P. 1-61.

1. INTRODUCTION:

It is intended to construct an underpass which would carry Crysler Memorial Park Road over Hwy. No. 401. The site of the proposed underpass is located approx. 6.2 miles East of the Town of Morrisburg, Twp. of Williamsburg, County of Dundas. At this location the chainage of the Hwy. No. 401 is 359 + 82 and that of the Crysler Memorial Park Road is 114 + 44.

In order to determine the soil properties and decide on the type of foundation, an investigation was carried out by this Section. Results and the discussion of the field and laboratory investigations, as well as conclusions and recommendations for the future design work, are contained in the following paragraphs of this report.

2. DESCRIPTION OF SITE AND GEOLOGY:

The area in which the structure site is located is flat. As can be seen from the enclosed plan, it is located on both sides of the Hwy. No. 401.

Physiographically, the site is located in the Glengarry Till Plain.

cont'd. /2 ...

3. FIELD AND LABORATORY WORK:

In order to obtain sufficient information on the types and properties of the subsoil, five sampled boreholes, supplemented by one dynamic cone penetration hole, were carried out at this particular site.

Samples were taken at depth intervals of 3, 5 and 10 feet. The dense nature of the soil prevented the taking of relatively undisturbed samples. Samples recovered in the split spoon were used for determining the moisture contents, and grain size curves.

Boreholes 1, 2 and 3, were terminated in the underlying stratum of med. dense clayey, silty sand with boulders at a depth of about 46 feet below existing ground level.

Boreholes 4 and 5 were carried down only to a depth of 20 feet below existing ground level and terminated at the beginning of the stratum of dense clayey, silty sand.

The elevations as well as the locations (chainages) of the boreholes, are given on Dwg. No. 61-F-43A, attached to this report (Appendix I).

Laboratory testing was confined to the determination of moisture contents and grain size distribution curves.

The grain size distribution curves are given under Appendix I.

cont'd. /3 ...

4. SUBSOIL CONDITION:

4.1) General:

The stratigraphy of the soil at the site was found to be quite uniform. Two main types of soil were encountered and they are:-

4.2) Loose sandy silt:

This material forms the top layer on the site and extends to about 3 - 4 feet below ground level. This layer is in a loose state and contains a lot of organic matter; it has no constructional value and will not be discussed any further.

4.3) Very Dense to Med. Dense Silty, Clayey and with Boulders:

Underlying the loose sandy silt is a layer of very dense to med. dense silty, clayey sand with boulders. This material, according to density, may be subdivided into three layers:

The upper 12 to 26 feet below existing ground level may be classified as very dense, with an average 'N' value of 80; the middle stratum down to approx. 32 to 40 feet below existing ground level, as dense with an average 'N' value of 39 , followed by a stratum of med. density with an average 'N' value of 26.

Due to a higher percentage of clay in the middle stratum than in the others, it was found to be slightly plastic. Also, boulders were first encountered in this stratum.

The average percentage of sand of the whole layer is about 42%, gravel forms approx. 14%, silt 24%, and the rest, clay, 20%.

The average moisture content in this layer was found to be 9.8.

A seam approx. 3 feet thick of med. to coarse silty gravel was encountered about -1 feet below ground elevation.

cont'd. /4 ...

5. GROUND WATER CONDITION :

Due to the impervious nature of the very dense silty, clayey sand stratum and extensive rain before the investigation, the water table was found very high (from 4" to 1'-3" below ground level) and confined to the top layer of the loose silty sand.

No artesian water conditions were encountered during the investigation.

6. DISCUSSION AND RECOMMENDATIONS :

As can be seen from the previously described soil stratigraphy, the soil consists mainly of very dense to med. dense silty, clayey sand. Such a material can provide adequate support for spread footings. Based on the number of blows of the Standard Penetration Test, an allowable pressure of 3 Tons/sq.ft. can be used for the design. Footings should be placed at a depth of 5 feet below ground level in order to provide for frost protection.

The footings for the falsework for the construction can be placed on the exposed very dense silty clayey sand layer approx. 3' 0" below ground elevation. Precaution should be taken that the ground on which these temporary footings will be placed is not softened by running or standing water and that it is sound and does not contain organic matter. The safe load that can be attributed to these footings should not exceed 1.5 Tons/sq.ft.

If piles are used for the abutments, displacement piles would be preferred, driven down to elev. 254.0.

No stability problems of the approach fills are anticipated, provided the organic surface layer is removed prior to the embankment placement. The embankment should be well compacted and should have 2:1 slopes.

cont'd. /5 ...

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

Depending on the time of the year, no serious dewatering problems are expected in the footing excavations.

7. SUMMARY:

The stratification of the soil is quite uniform. The upper 3 - 4 foot layer of loose sandy silt with organic matter is underlain by a layer of very dense to med. dense silty, clayey sand.

Because of the very dense character of the upper layer, spread footings are proposed for the structure. The bottom of the footings should not be above elev. 261.9. The safe load can be taken as 3 Tons/sq.ft.

If piles are used for the abutments, displacement piles would be preferred, driven down to elev. 254.0. Problems due to water seeping into the excavations, depending on the time of the year, are not likely to present too much difficulty as the material has a relatively low permeability.

Footings for the falsework can be placed on the exposed very dense silty, clayey sand layer provided it is not softened by water and it is sound material (no organic matter).

The safe load should not be in excess of 1.5 Tons/sq.ft.

No stability problems of the approach embankment fills are anticipated. The top organic layer should be removed prior to the placing of embankments.

cont'd. /6 ...

8. MISCELLANEOUS:

The field work was carried out during the period of May 16, 1961 to May 21, 1961, by the Johnston wheel-mounted Pennsylvania Drill adapted for soil sampling, under the supervision of Mr. W.W. Kulmaticka, Project Engineer, Foundation Sub-Section, Materials & Research Section.

June 1961. REPORT PREPARED BY: ...M. Dewaste.....
for W. W. Kulmaticka,
PROJECT FOUNDATION ENGINEER.

REPORT APPROVED BY: A. Sternac.....
A. O. Sternac,
SUPERVISING FOUNDATION ENGINEER.

APPENDIX I.

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 1-61 BORE HOLE NO. 1

JOB 61-F-43 STATION 113/68 C

DATUM 271.4' COMPILED BY B.K.

BORING DATE May 16/61. CHECKED BY M.K.

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	↓ Groundlevel	271.4	0
	Sand-Highway Fill	268.6	
	Very dense silty, clayey sand.		10
		253.6	
	Dense silty clayey sand.		20
			30
		232.4	40
	Med. dense silty, clayey sand.	227.4	
	Med. to coarse silty gravel.	224.9	
	Med. dense silty, clayey sand.	219.9	50
	End of borehole.		60
	Penetration resistance profile shown; obtained by driving a 2" dia. cone from groundlevel to depth noted with an energy of 350 ft. lb. per blow.		70
			80

STRENGTH AND PENETRATION RESISTANCE
P.S.F.
BLOWS/FT
25 50 75 100
Penetration ends @elev. 206.1

CONSISTENCY
MOIST CONTENT - % DRY WT
5 10 15

SAMPLE	NATURAL UNIT WT. P.C.F.
S1	-
S2	-
S3	-
S4	-
S5	-
S6	-
S7	-
S8	-
S9	-
S10	-

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 1-61 BORE HOLE NO. 2

JOB 61-F-43 STATION 114+44 (℄)

DATUM 266.8' COMPILED BY B.K.

BORING DATE May 17/61. CHECKED BY W.W.K.

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	↓ Groundlevel	266.9	0
	Loose sandy silt with org. matter (Topsoil)	262.9	
	Very dense silty, clayey sand.	257.9	10
	Dense silty, clayey sand.		20
		244.9	
	Med. dense silty, clayey sand.		30
		225.9	40
	Med. to coarse silty gravel.	220.3	50
	End of borehole.		60
			70
			80

STRENGTH AND PENETRATION RESISTANCE
P.S.F.
BLOWS PT
25 50 75 100

CONSISTENCY
MOIST. CONTENT % DRY WT.
0 5 10 15

SAMPLE	NATURAL UNIT WT. P.C.F.
S1	-
S2	-
S3	-
S4	-
S5	-
S6	-
S7	-
S8	-

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 1-61 BORE HOLE NO. 3

JOB 61-F-43 STATION 115/10 ℄

DATUM 267.2' COMPILED BY R.K.

BORING DATE May 18/61. CHECKED BY W.W.K.

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET
	↓ Groundlevel	267.2	0
	Loose sandy silt with org. matter (topsoil)	264.0	
	Very dense silty, clayey sand.		10
			20
		239.2	30
	Dense silty, clayey sand.		
		227.2	40
	Med. dense silty clayey sand.	224.2	
	Med. to coarse silty gravel.	221.2	
	End of borehole.		50

STRENGTH AND PENETRATION RESISTANCE
P.S.F
BLOWS/FT
25 50 75 100

CONSISTENCY
MOIST CONTENT % DRY WT
0 5 10 15

SAMPLE

NATURAL UNIT WT P.C.F

S1
S2
S3
S4
S5
S6

FORM OB-ML-126 (REV 1959) -59-5008

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 1-61 BORE HOLE NO. 4

JOB 61-F-43 STATION 115+51 ℄

DATUM 267.5' COMPILED BY B.K.

BORING DATE May 19/61. CHECKED BY W.W.K.

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	SAMPLE	NATURAL UNIT WT. P.C.F.
	↓ Groundlevel	267.5	0		
	Loose sandy silt with org. matter (Topsoil)	266.9			
	Very dense silty clayey sand.		10	S1	-
				S2	-
		246.0	20	S3	-
	End of borehole.		30		
			40		
			50		

STRENGTH AND PENETRATION RESISTANCE P.S.F. BLOWS/FT. 25 50 75 100

CONSISTENCY MOIST. CONTENT - % DRY WT. 0 5 10 15

FORM OS-ME-128 (REV. 1959.)—59-3008

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 1-61
JOB 61-F-43
DATUM 266.9'
BORING DATE May 20/61.

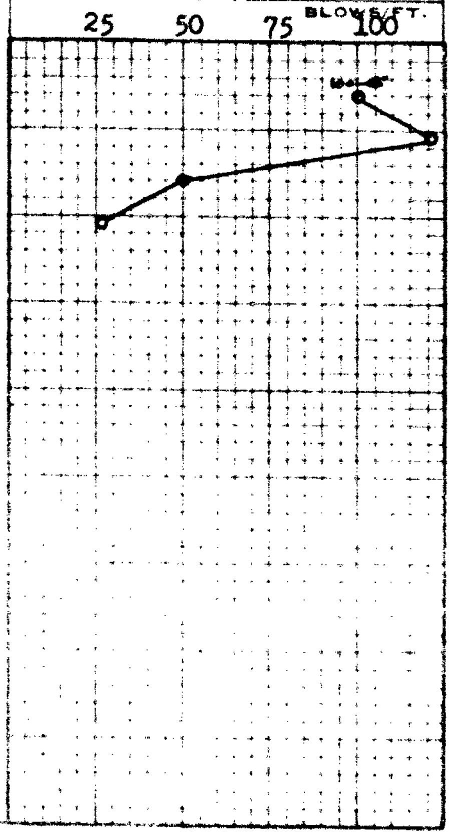
BORE HOLE NO. 5
STATION 113+27 ℄
COMPILED BY B.K.
CHECKED BY W.W.K.

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

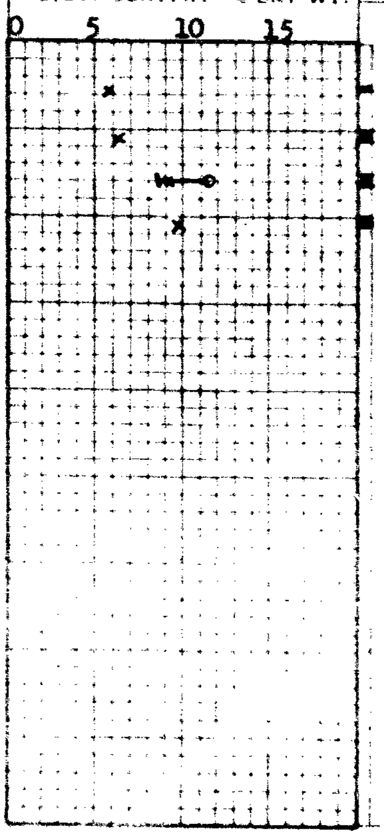
LEGEND
1/2 UNCONFINED COMPRESSION (Qu)
VANE TEST (C) AND SENSITIVITY (S)
NATURAL MOISTURE AND LIQUIDITY INDEX
LIQUID LIMIT
PLASTIC LIMIT

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	SAMPLE	NATURAL UNIT WT. P.C.F.
	↓ Groundlevel	266.9	0		
	Loose sandy silt with org. matter (Topsoil)	264.7			
	Very dense silty, clayey sand.		10	S1	-
				S2	-
				S3	-
		245.9	20	S4	-
	End of borehole.		30		
			40		
			50		

STRENGTH AND PENETRATION RESISTANCE — P.S.F. — BLOWS/FT.



CONSISTENCY — MOIST. CONTENT - % DRY WT.



FORM OB—ML—222
FEB 59
IM-58-5569

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-43
W.P. 1-61

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'	Dense sandy clayey silt.	27	12.2	-	-	-	-	
	S2	6'-7.5'	Very dense silty, clayey sand.	74	8.4	-	-	-	-	
	S3	11'-12.5'	Very dense silty, clayey sand.	121	7.5	-	-	-	-	
	S4	15'-16.5'	Very dense silty, clayey sand.	64	8.1	-	-	-	-	
	S5	20'-21.5'	Dense silty clayey sand.	42	10.9	-	-	-	-	
	S6	25'-26.5'	Dense silty clayey sand.	23	12.7	-	-	-	-	
	S7	30'-31.5'	Dense silty clayey sand.	29	10.6	9.1	10.9	-	-	
	S8	35'-36.5'	Dense silty clayey sand.	32	-	-	-	-	-	
	S9	40'-41.5'	Med. dense silty, clayey sand.	18	9.0	-	-.	-	-	
	S10	50'-51.5'	Med. dense silty, clayey sand.	18	9.8	-	-	-	-	

FORM OB—ML—222
FEB 59
1M-58-5569

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-43
W.P. 1-61

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
2	S1	5'-6.5'	Very dense silty, clayey sand.	131	7.2	-	-	-	-	
	S2	10'-10.5'	Dense silty, clayey sand.	20	7.4	-	-	-	-	
	S3	15'-16.5'	Dense silty, clayey sand.	28	8.1	-	-	-	-	
	S4	20'-21.5'	Dense silty, clayey sand.	48	8.3	-	-	-	-	
	S5	25'-26.5'	Med. dense silty, clayey sand.	27	9.3	-	-	-	-	
	S6	30'-31.5'	Med. dense silty, clayey sand.	21	7.5	8.7	11.0	-	-	
	S7	35'-36.5'	Med. dense silty, clayey sand.	37	9.0	-	-	-	-	
	S8	45'-46.5'	Med. to coarse silty gravel.	43	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-43
W.P. 1-61

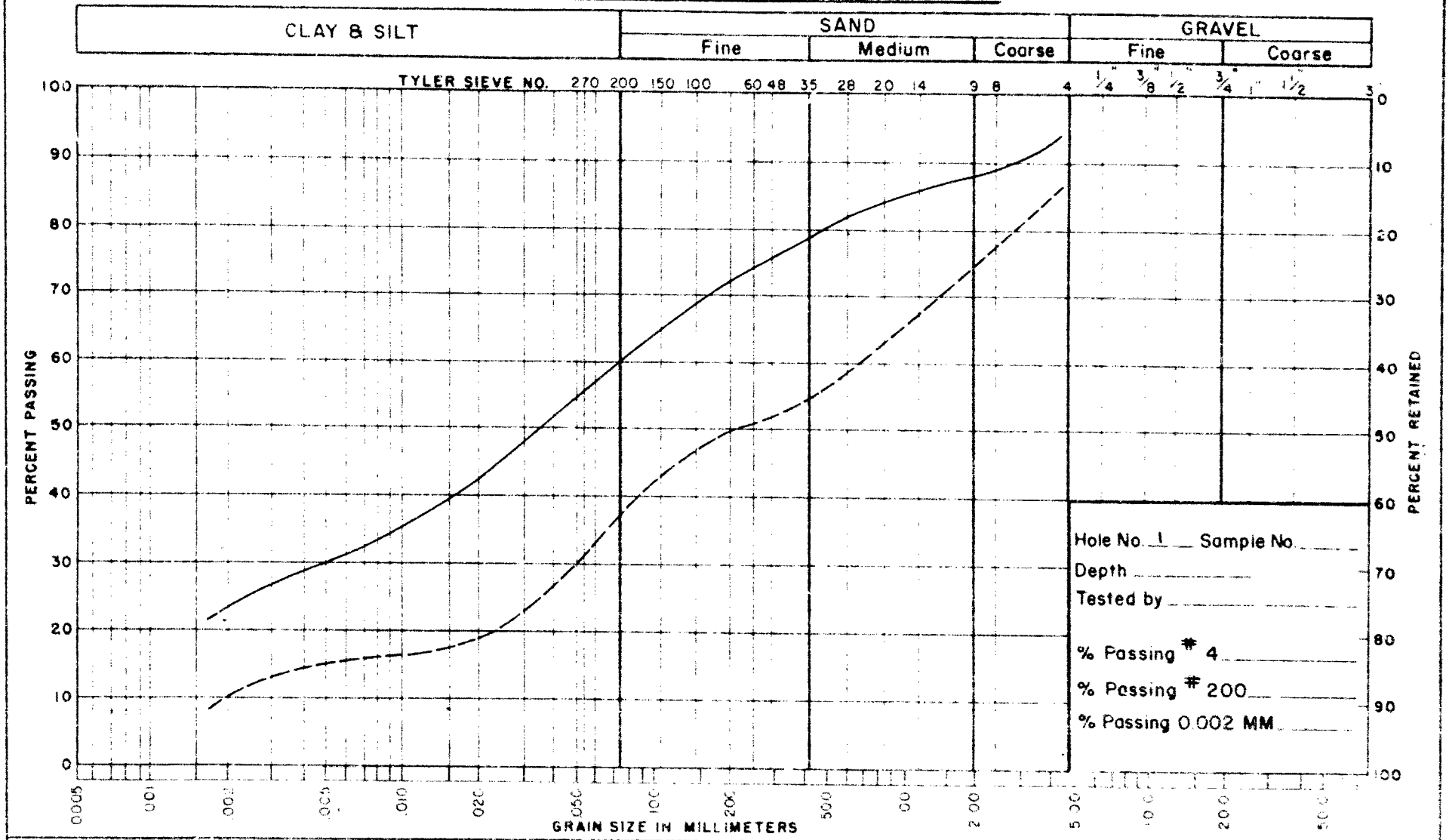
HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
3	S1	7'-8.5'	Very dense silty, clayey sand.	125	5.8	-	-	-	-	
	S2	10'-11.5'	Very dense silty, clayey sand.	71	7.5	-	-	-	-	
	S3	15'-16.5'	Very dense silty, clayey sand.	70	7.0	-	-	-	-	
	S4	25'-26.5'	Very dense silty, clayey sand.	56	8.2	-	-	-	-	
	S5	35'-36.5'	Dense silty, clayey sand.	48	7.8	8.9	11.5	-	-	
	S6	45'-46'	Med. to coarse silty gravel.	34	9.5	-	-	-	-	
4	S1	5'-5.8'	Very dense silty clayey sand.	110-10"	6.5	-	-	-	-	
	S2	10'-10.8'	Very dense silty, clayey sand.	138-10"	7.1	-	-	-	-	
	S3	20'-21.5'	Very dense silty, clayey sand.	47	9.0	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 61-F-43
W.P. 1-61

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	5'-5.5'	Very dense silty, clayey sand.	100-6"	5.9	-	-	-	-	
	S2	10'-11.5'	Very dense silty, clayey sand.	121	6.2	-	-	-	-	
	S3	15'-16.5'	Very dense silty, clayey sand.	50	9.1	8.5	11.3	-	-	
	S4	20'-21.0'	Dense silty, clayey sand.	27	9.9	-	-	-	-	
			S denotes split spoon sample.							

UNIFIED SOIL CLASSIFICATION SYSTEM



NOTES ——— SAMPLE DEPTH 6'-6" TO 7'-6"

– – – – – – SAMPLE DEPTH 25'-0" TO 24'-6"

DEPARTMENT OF HIGHWAYS - ONTARIO

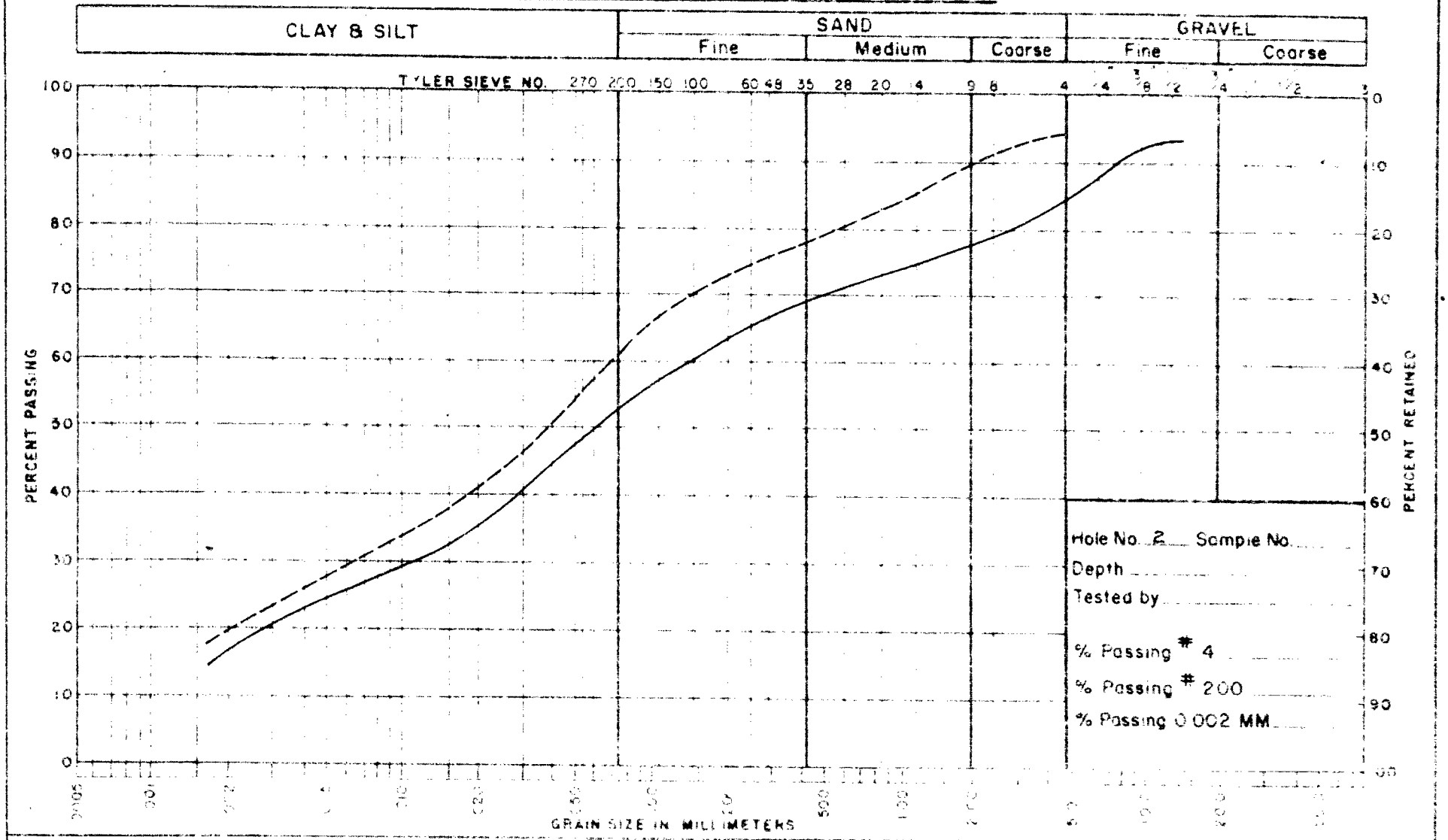
MATERIALS & RESEARCH SECTION

GRAIN SIZE DISTRIBUTION

Job No. 61-F-43 W.P. No.

Location CHRYSLER MEMORIAL PARK INTERCHANGE

UNIFIED SOIL CLASSIFICATION SYSTEM



NOTES ——— SAMPLE DEPTH 10'-0" TO 11'-6"

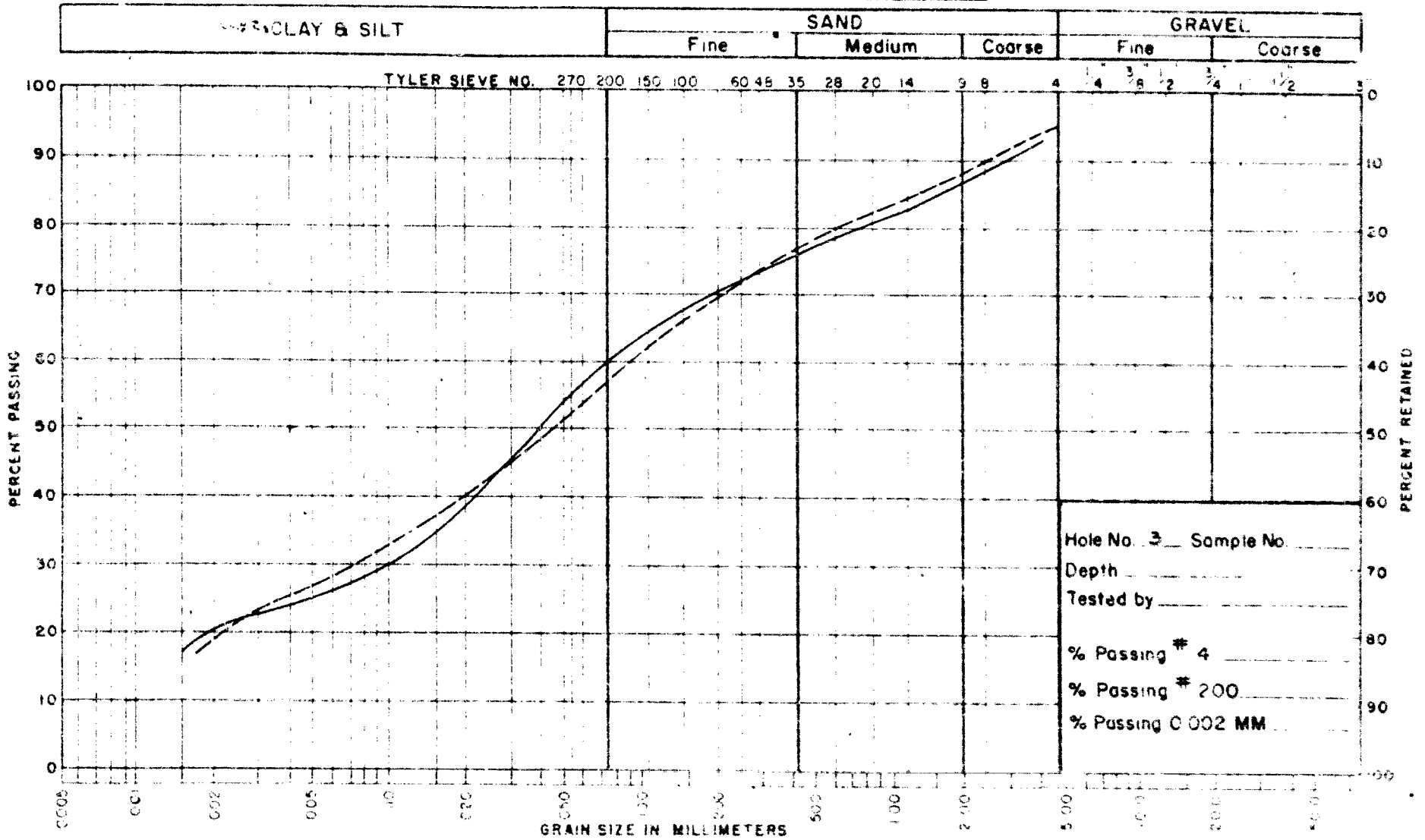
– – – – – SAMPLE DEPTH 30'-0" TO 31'-6"

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

Job No 61-F-43 W.P. No

Location CHRYSLER MEMORIAL PARK INTERCHANGE

UNIFIED SOIL CLASSIFICATION SYSTEM



NOTES ——— SAMPLE DEPTH 15'-0" TO 19'-6"

– – – – SAMPLE DEPTH 25'-0" TO 36'-6"

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION

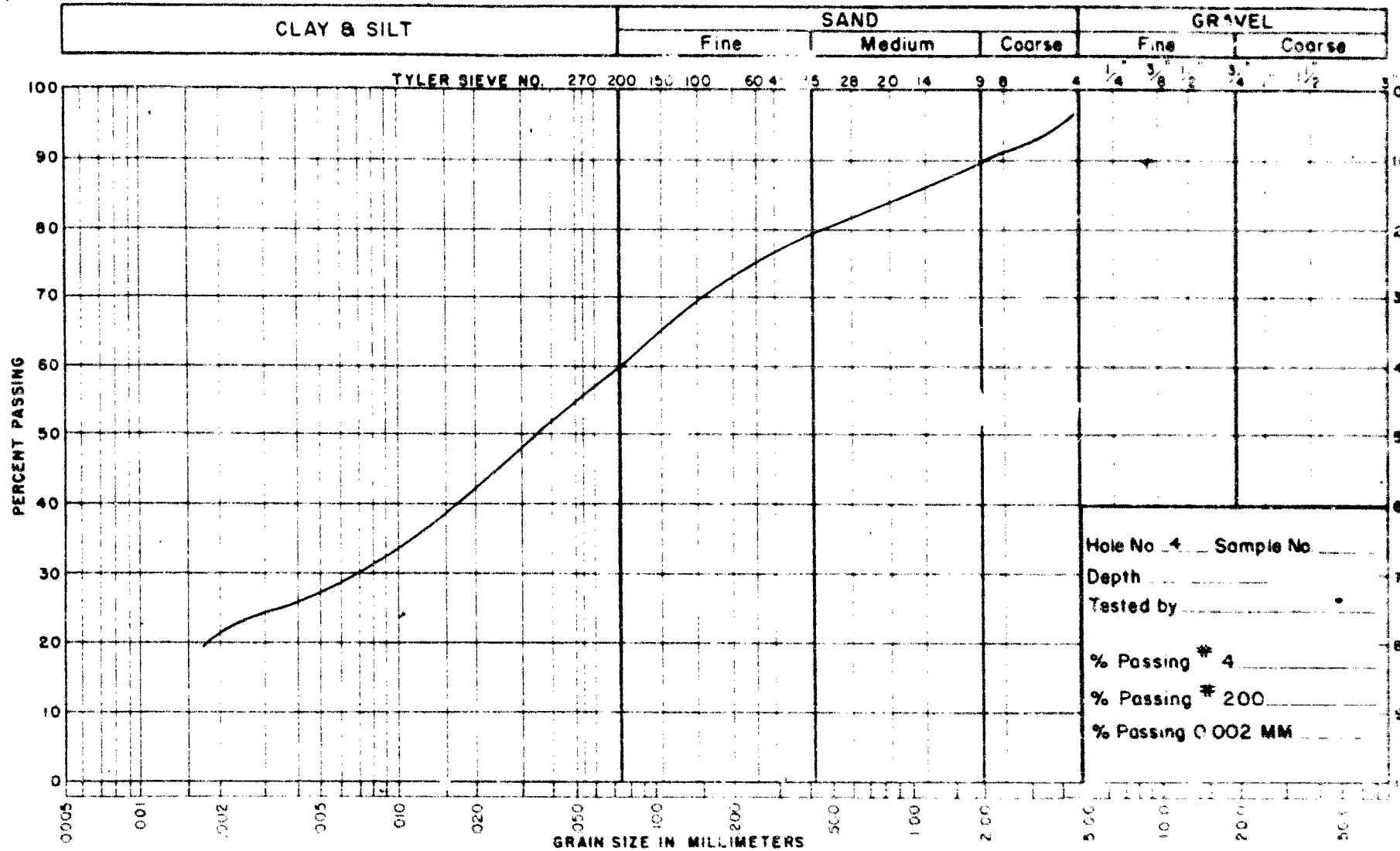
GRAIN SIZE DISTRIBUTION

Job No. 61-F-43 W.P. No.

Location CHRYSLER MEMORIAL PARK INTERCHANGE

FORM OF MI 17
M-9 2013

UNIFIED SOIL CLASSIFICATION SYSTEM



NOTES SAMPLE DEPTH 20'-9" TO 21'-6"

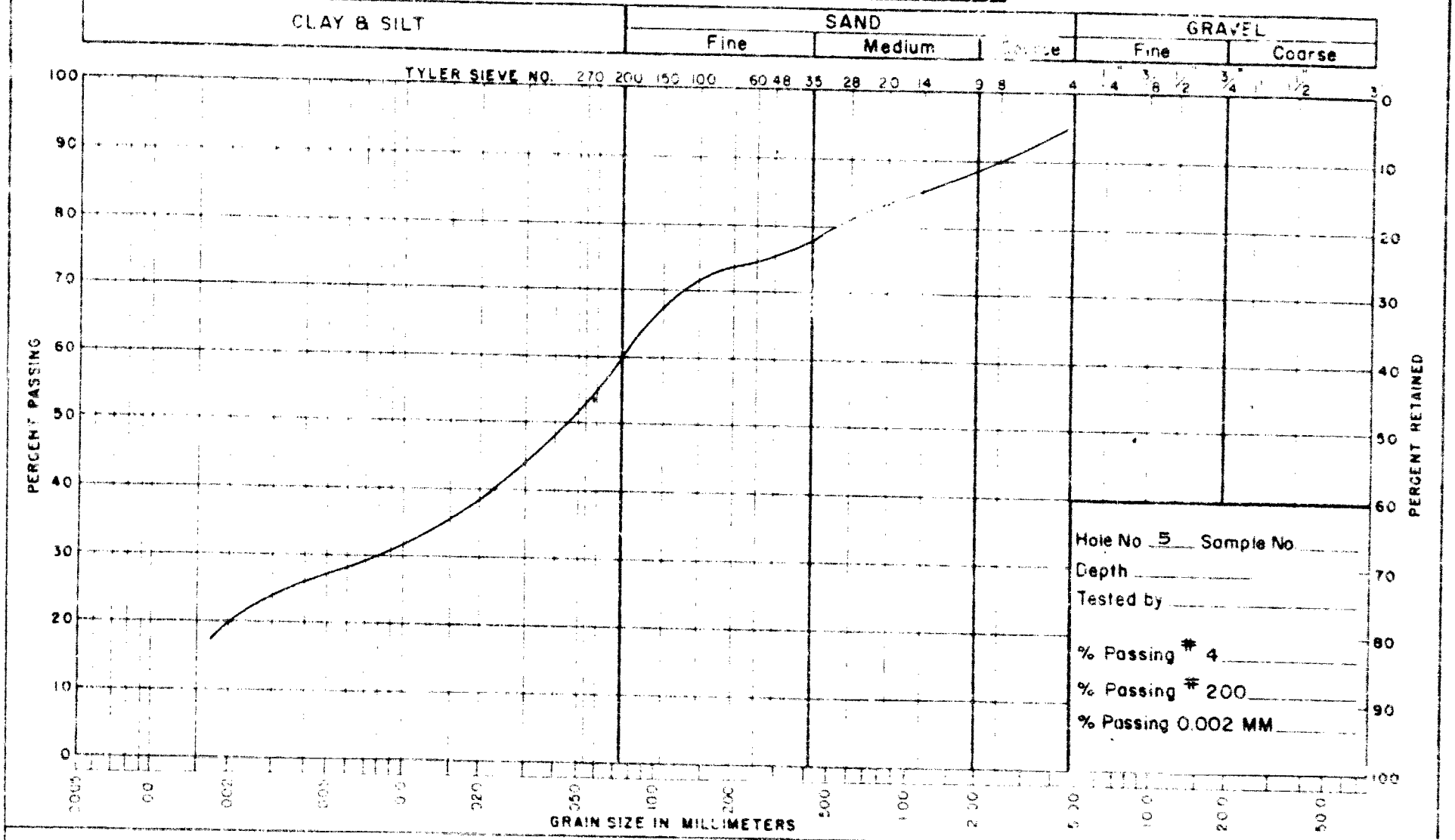
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION

GRAIN SIZE DISTRIBUTION

Job No 61-F-43 W P No

Location CHRYSLER MEMORIAL PARK INTERCHANGE

UNIFIED SOIL CLASSIFICATION SYSTEM



NOTES ——— SAMPLE DEPTH 20'-0" TO 21'-6"

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

Job No 61-F-43 W P No

Location CHRYSLER MEMORIAL PARK INTERCHANGE

OVER

ONTARIO

DEPARTMENT OF HIGHWAYS

Bridge Division,
May 8, 1961.

MEMORANDUM TO:

Mr. L. G. Soderman,
Principal Soils & Foundation Eng.,
Department of Highways,
Materials and Research Section,
Downsview, Ontario.

RE: W.P. 1-61,
Crysler Memorial Park
Interchange, 5.2 Miles
East of Hwy. #31,
Hwy. 401, District #9.

Enclosed is a print showing the locations at which we would like foundation information.

The layout is based on a 4 span structure having a pier in the centre of the median and open abutments.

As this project is behind schedule, we should have this information as soon as possible.

S McCombie

S. McCombie,
Bridge Planning Engineer.

SMcC/mg

c.c. N. D. Smith,
R. Fitzgibbon.

9799

ONTARIO

DEPARTMENT OF HIGHWAYS

Bridge Division,
May 8, 1961.

MEMORANDUM TO:

Mr. L. G. Soderman,
Principal Soils & Foundation Eng.,
Department of Highways,
Materials and Research Section,
Downsview, Ontario.

RE: W.P. 1-61,
Crysler Memorial Park
Interchange, 5.2 Miles
East of Hwy. #31,
Hwy. 401, District #9.

Enclosed is a print showing the locations at which we would like foundation information.

The layout is based on a 4 span structure having a pier in the centre of the median and open abutments.

As this project is behind schedule, we would have this information as soon as possible.

S. McCombie,
Bridge Planning Engineer.

SMcC/mg

c.c. H. D. Smith,
M. Fitzgibbon.

cc: Foundations Office Room 110.

Mr. A. M. Toye,

Bridge Engineer.

Materials & Research Section,

(Foundations Office).

Attention: Mr. J. Curtis.

August 2, 1961.

D.H.O. FOUNDATION INVESTIGATION REPORT.

W.J. 61-F-43 -- W.P. 1-61.

Re: Chrysler Memorial Park Road and Hwy. No. 401,
(Approx. 6.2 Miles East of Morrisburg),
Twp. of Williamsburg, County of Dundas,
District No. 9.

During the foundation investigation of the Chrysler Memorial Park Road and Hwy. No. 401 Bridge, our field party noticed that the chainages indicated on the bridge location plan supplied by the Bridge Office, were in disagreement with the constructed cutting for Chrysler Memorial Park Road. After further investigation, an error of 41'-0" was discovered; however, the investigation was carried out at the correct centre line of the structure.

The Bridge Office recently informed us that the correct chainage is 359 + 41, and not 359 + 82, as was indicated on the plan supplied to us.

WK/MdeF

cc: Foundations Office
Gen. Files.

W. Kulmatickas,
PROJECT FOUNDATION ENGINEER.
For:

A. G. Stermac,
SUPERVISING FOUNDATION ENGINEER

Mr. A. M. Toye,

Bridge Engineer.

Materials & Research Section,

(Foundations Office).

August 29, 1961.

PRELIMINARY PLAN -

No. D-4919-P.

Attention: Mr. C. Grebski.

Re: W.P. 1-61,
Crysler Memorial Park Underpass,
Hwy. 401, District No. 9.

In response to your verbal request, we are forwarding to you the recommended "Construction Sequence" and the "Note" that should appear on the drawing of the above-mentioned bridge.

A) "CONSTRUCTION SEQUENCE"

1. Topsoil should be removed and the pier footings placed and the piers built.

2. End portions of approach embankments, shown hatched on drawing, should be placed and compacted to full height achieving 100% compaction as required by present D.H.O. practice.

3. As long as possible a period of time should be allowed to elapse before the excavation and construction of abutment footings are commenced. This is to allow the immediate and the better part of the consolidation settlements due to the fill weight, to take place.

4. The placed and compacted fill should be excavated down to required elevation, and abutment footings constructed.

5. Abutments and bridge can then be completed.

cont'd. /2 ...

B) NOTE:- ALL TOPSOIL TO BE REMOVED AND GRAVEL FILL IN AREAS SHOWN HATCHED ON DRAWING TO BE PLACED AT 100 PER CENT COMPACTION AS REQUIRED UNDER PRESENT D.H.O. PRACTICE. THE PLACEMENT AND COMPACTION OF THIS GRANULAR FILL HAS TO BE CARRIED OUT AS ONE CONTINUOUS OPERATION AND UNDER SUPERVISION OF MATERIALS & RESEARCH DIVISION, FOUNDATION SECTION.

It is also recommended that provisions be made for jacking up end beams of the structure if this proves to be necessary.

AGS/MdeF
Attach.

A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

cc: Mr. B. Davis
Foundations Office
Gen. Files.

P.S. -- Returned herewith, is Drawing No. D-4919-P.

Mr. Bruce Davis,

Bridge Design Engineer.

Materials & Research Section,

(Foundations Office).

September 5, 1961.

Re: W.P. 1-61,
Crysler Memorial Park Underpass
Hwy. 401, District No. 9.

Attention: Mr. C. S. Grebski.

We have received your memo dated August 31, 1961, regarding the above structure. It is most interesting to note that a piled structure - i.e., piled abutments, could be some $7,000. cheaper than abutments on spread footings. We believe that this is due to an extremely high price of the granular material - namely, to the difference in price between a compacted earth fill and compacted granular fill. Maybe, in areas of cheaper granular material, this difference is smaller and spread footings become more competitive.

We would like to take this opportunity to draw your attention to the fact that friction piles do not necessarily eliminate or diminish settlements. The action of friction piles is not yet fully understood. Quite a number of facts are known, but the behaviour of such piles is sometimes rather different than anticipated. However, it is known that by the use of piles, stresses due to the additional superimposed load are not eliminated but, rather, induced to the soil at a greater depth and most probably, along a different pattern. Consequently, where stresses to a compressible soil are induced, settlements have to result. Many cases are known where settlements of structures on piled foundations were greater than of those on spread footings, although the soil conditions were, for practical purposes, identical. Only entirely end-bearing piles - i.e., piles driven to bedrock or an extremely dense stratum, eliminate settlements.

The experience that maintenance costs are reduced when friction piles are used, could in most cases, be explained by the fact that everything has settled quite uniformly; the piers, the abutments, and the approach fills. The differential settlements are the ones which cause high maintenance costs and sometimes cause damages beyond repair.

A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

AGS/MdeF
cc: Foundations Office
Gen. Files.

OFFICE LOCATION —
DOWNSVIEW AVE.,
KEELE ST. — HIGHWAY 401
TORONTO, ONTARIO.

ONTARIO
DEPARTMENT OF HIGHWAYS

POSTAL ADDRESS —
DEPARTMENT OF HIGHWAYS
PARLIAMENT BUILDINGS,
TORONTO 5, ONTARIO.

Bridge Division,
September 11, 1961.

MEMORANDUM TO:

Mr. A. G. Stermac,
Principal Foundations Eng.,
Department of Highways,
Room 107,
Downsview, Ontario.

RE: W.P. 1-61
Hwy. 401 at Crysler Memorial Park Rd.,
5.2 miles east of Hwy. 31
District 9

Enclosed find two copies of the preliminary plan for the above structure.

The designer appears to have complied with the requirements of the foundation report but we would appreciate any comments you wish to make.

JBC/et

J. B. Curtis,
Bridge Location Engineer.

Glen Selby
Sept 13, 1961
985

For abutments use 12" ø tube piles driven 10' into original ground — use 35 Tons for design load.

SEPT 14th K.J.S.

— no difficulty driving Co/ timber piles.

cc: Foundations Office (Rm. 110)

Mr. A. M. Toye,
Bridge Engineer.
Materials and Research Section,
(Foundations Office)
Attention: Mr. J. B. Curtis,
Bridge Location Engr.

September 21, 1961.
REVIEW OF PRELIMINARY PLAN
by Foundations Office.

Re: W.P. 1-61,
Hwy. 401 at Crysler Memorial Park Rd.,
5.2 Miles East of Hwy. #31,
District #9.

In connection with the Preliminary Plan for the above structure, we would like to make the following additional recommendation:-

Steel tube piles of 12" diameter, should be used and driven to a depth of 10 feet below present ground level. A safe load of 35 tons can be applied on such piles. The pile tip elevation should appear on the drawing.

AGS/MdeF

A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

cc: Mr. B. Davis
Foundations Office
Gen. Files.

61-F-43

Mr Grekski of Bridge office called Mr Stermac and informed that the Bridge Consultants used 39 Tons/pile instead of 35T/pile recommended in Foundation Report.

As there were no calculations left in the report the pile capacities are re worked to ascertain the factor of safety used.

Length of piles recommended → 10.0' below natural ground
Type of piles → 12¾" diameter.

$$Q_u = \frac{4 N A_s}{F_s} + \frac{\bar{N} A_p}{k F_s}$$

$\bar{N}$ = average value
N = at toe
k = 50 for large displacement piles

$$= \frac{4 \times 30 \times \pi \times 1^2}{4 \times F_s} + \frac{60 \times \pi \times 1}{50 \times F_s} = \frac{98}{F}$$

Say F.S = 3

q_a = 35T (approx).

Called Mr Grekski on the phone and gave the following information :-

1) 39 T/pile can be used (The factor of safety will be approx 2.5)
2) Thick wall (t = 0.25") tubular piles should be used because N values in places are as high as >100.

M D

Jan 4th 1962

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: Mr. A. G. Stermac,
Principal Foundation Engineer,
Room 107, Lab. Bldg.

From: Bridge Division,
Downsview, Ontario

Date: December 21, 1964.

Our File Ref.

In reply to

Subject: W.P. 1-61; Site 31-157
Crysler Memorial Park Underpass
5.2 Miles East of Highway 31
Hwy. 401 - Dist. 9

Enclosed please find one copy of the preliminary plan D-5549-P for the above noted structure.

Would you kindly review the bridge foundations proposed and inform me if they are satisfactory.

APW/sp

A. P. Watt,
Regional Bridge Location Engineer.

cc: Foundations Office (Ltr. 110)

Mr. S. McCombie,
Bridge Planning Engr.,
Bridge Division.

Attention: Mr. A. P. Watt

Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

December 28, 1964

Crysler Memorial Park Underpass,
5.2 Miles East of Hwy. #31,
Hwy. #401, District #9, Ottawa.
W.P. 1-61 -- W.J. 61-F-43

We have reviewed Preliminary Plan D-5549-F and submit the following comments:

(1) The drawing shows 12¾" x 0.203" steel tube piles. At this site, we would recommend the use of 12¾" x 0.25" steel tubes in view of the hard driving conditions.

(2) The drawing shows the piles to be driven to el. 254.0. We would like to point out that this elevation which was mentioned in our Foundation Report, is only intended to be a guide for estimating purposes. The actual design capacity will probably be achieved at a higher elevation than 254.0 and should be determined during driving by means of the dynamic pile driving formula. This should be made clear to the contractor.

K. G. Stermac

KGS/MdeF

A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

cc: Foundations Office
Gen. Files

cc: Gen. Files

23-65-304

Mr. A. M. Toye,

Bridge Engineer.

Materials & Research Section,

(Foundations Office).

August 2, 1961.

D.H.C. FOUNDATION INVESTIGATION REPORT.

W.J. 61-F-43 -- W.P. 1-61.

Attention: Mr. J. Curtis.

Re: Chrysler Memorial Park Road and Hwy. No. 401,
(Approx. 6.2 Miles East of Morrisburg),
Twp. of Williamsburg, County of Dundas,
District No. 9.

During the foundation investigation of the Chrysler Memorial Park Road and Hwy. No. 401 Bridge, our field party noticed that the chainages indicated on the bridge location plan supplied by the Bridge Office, were in disagreement with the constructed cutting for Chrysler Memorial Park Road. After further investigation, an error of 41'-0" was discovered; however, the investigation was carried out at the correct centre line of the structure.

The Bridge Office recently informed us that the correct chainage is 359 + 41, and not 359 + 82, as was indicated on the plan supplied to us.

W. Kulmatickas,
PROJECT FOUNDATION ENGINEER.
For:

A. G. Stermac,
SUPERVISING FOUNDATION ENGINEER

WK/MdeP

cc: Foundations Office
Gen. Files.

QR