

PRELIMINARY FOUNDATION INVESTIGATION REPORT
For

The Proposed Overhead Structure at the
Crossing of Hwy. #31-43 (Winchester By-Pass)
and the C.P.R.

Lines 'D' and 'E'

Townships of Winchester - Mountain - County of Dundas
District No. 9 (Ottawa)

W.O. 72-11072

--

W.P. 335-65

31 G-22

CONTRACT 73-75

31 G-22

GEOCREs No.

1. INTRODUCTION:

The Foundations Office carried out a preliminary foundation investigation for the overhead structure at the crossing of Hwy. #31-43 (Line 'A') and the C.P.R., in the Townships of Mountain and Winchester, County of Dundas. Preliminary foundation report ^(have been) submitted (W.J. 68-F-~~13~~ ^{13, dated April 8,} ~~dated September 23, 1968~~ ^{1968 and W.J. 68-F-13-2}). Alternate alignments have been proposed for the Hwy. #31-43 Winchester By-Pass, (designated Lines 'D' and 'E'). The Foundations Office has been requested to carry out a preliminary foundation investigation for these alternate alignments. The request was contained in a memo (dated June 6, 1972) from Mr. T. C. Kingsland, Regional Structural Planning Engineer, Eastern Region. An investigation was subsequently carried out by this Office to determine the subsoil, bedrock and groundwater conditions along these alignments.

This report contains all the factual data obtained from the investigation together with preliminary recommendations pertaining to the design of the foundations as well as the stability and settlement considerations associated with the approach fills.

2. DESCRIPTION OF THE SITE AND GEOLOGY:

The site is located about 1 mile south of the junction at which Highways 31 and 43 diverge, respectively, north towards Ottawa and west towards Kemptville, almost 1 mile west of the Town of Winchester, in the Townships of Winchester and Mountain. At the site of the crossing the

east to west running double track C.P.R. railroad is carried on a 7 to 10 feet high embankment. North of the C.P.R. the terrain rises gently; south of the tracks, however, the land is relatively flat lying between elevations 238 and 242. The land is being used for farming purposes.

Physiographically, the site is located within the "Winchester Clay Plain" which is known to exhibit such glacial features as drumlins, etc. In general, the pre-dominant stratum in this region is composed of a sensitive marine clay deposited in the past, by the Champlain Sea. The clay, which is encountered at a relatively shallow depth below ground surface, varies from 10 to 40 feet in thickness. It is, in turn, underlain by competent glacial till deposits.

It should be noted that the area is one of considerable geologic complexity. In many places the underlying till protrudes to ground surface and in a few cases there are areas of shallow soil overlying bedrock.

The overburden is underlain by St. Martin minor shale bedrock of the Chazy formation, Ordovician period.

3. FIELD AND LABORATORY WORK:

Four boreholes, each accompanied by a dynamic cone penetration test, were put down during the most recent investigation by means of a conventional diamond drill rig adapted for soil sampling. In addition five boreholes, put down during previous investigations in this area, are included because of their close proximity to the area under investigation.

Samples of the overburden were obtained at specific intervals, in a 2" split spoon sampler, which was hammered into the soil in accordance with the specifications for the Standard Penetration Test. In the cohesive portion of the overburden, the testing programme was supplemented by taking 2" I.D. Shelby tube samples, which were manually pushed into the soil. In addition field vane tests were carried out, where possible, to determine the undrained shear strength of

the cohesive stratum. Bedrock was proven in one of the boreholes by obtaining BX size rock core samples. The groundwater conditions, during the period of the investigation, were recorded by taking readings in the open boreholes.

The subsoil conditions, encountered at the boring locations, are presented on the Record of Borelog sheets. The locations and elevations of the boreholes as surveyed by personnel from the Eastern Region Engineering Surveys Section are shown on Drawing No. 72-11072A. The elevations given in this report are referenced to a geodetic datum. A stratigraphical section along Lines 'D' and 'E' are also shown on this drawing.

All the samples were subjected to a careful visual examination in the field and, subsequently, in the laboratory. Following these examinations, laboratory testing was carried out on selected representative samples to determine the following engineering properties of the overburden:

- Bulk Density
- Natural Moisture Content
- Atterberg Limits
- Grain Size % Distribution
- Undrained Shear Strength
- Consolidation Characteristics

The results of the testing are plotted on the Record of Borelog sheets and summarized on Figures #1 and 2 all of which are contained in the Appendix I of this report.

4. SUBSOIL AND BEDROCK CONDITIONS:

4.1) General:

South of the C.P.R. the surficial stratum is composed of a very stiff to firm silty clay to clayey silt. The thickness of this stratum varies from 5 to 21 feet, increasing in depth in a southerly direction. The silty clay stratum

is underlain by a glacial till whose gradational composition is variable. North of the C.P.R. the silty clay stratum is absent here the glacial till protrudes to within a few feet of the existing ground surface. The till is underlain by shale bedrock.

The boundaries of the various deposits are shown on the accompanying borelog sheets. The stratigraphical profile, along Lines 'D' and 'E', which are plotted on Drawing No. W.O. 72-11072A have been inferred from this data. From ground surface downward the various soil types and bedrock encountered are described as follows:

4.2) Silty Clay to Clayey Silt:

Beaneath a thin (1 foot thick) top soil cover south of the C.P.R. is a brown to grey stratum composed of a silty clay to clayey silt with a trace of sand and gravel. The thickness of this stratum, where encountered, ranged from 5 to 21 feet, in general it increases in depth in a southerly direction. Occasional seams of sand and silt, up to 1/2 inch thick, are present throughout the deposit.

The engineering properties of the stratum, as determined by field and laboratory testing, are summarized in tabular form below:

	<u>Range</u>		<u>Average</u>	
Bulk Density (pcf) (γ)	113	- 124	118	
Liquid Limit (%) (WL)	27	- 41	33	
Plastic Limit (%) (Wp)	13	- 24	20	
Natural Moisture Content (%) (W)	16	- 38	28	
Liquidity Index (I_L)	0.7	- 1.3	0.9	
Initial Void Ratio (e_o)	1.13	- 2.2) 3 TESTS
Compression Index (C_c)	0.32	- 0.50		
Degree of Preconsolidation (psf)				
($P_c - P_o$)	2,900	- 4,300)
Undrained Shear Strength (cu)				
(P.S.F.)				
Field Vanes	650	- > 2,000		
Lab Vanes	700	- 1,350		

Figure 1
The Atterberg limit tests, summarized above, are also plotted on the Plasticity Chart Figure #1. These results indicate that the cohesive stratum is inorganic with a plasticity in the low to intermediate range. The natural moisture content is generally within 1 or 2 percent of the liquid limit.

The consistency of the stratum, as determined by the field and laboratory undrained shear strength testing, is generally stiff to very stiff in the upper portion. However, where the deposit is most extensive the lower zone often has a consistency in the firm range.

The consolidation characteristics of the stratum were determined by carrying out three laboratory oedometer tests. This testing indicated that the silty clay is preconsolidated with respect to the existing overburden pressure, the degree of preconsolidation varies from 4,300 p.s.f. in the upper stiffer portion of the stratum, decreasing to about 2,900 p.s.f. in the lower zone.

4.3) Glacial Till:

South of the C.P.R. the silt, clay stratum is underlain by a glacial till deposit; north of the railway the till protrudes to within a few feet of ground surface. The glacial till was fully penetrated at B.H.#3 only where it was found to be 14.5 feet thick; elsewhere the borings were terminated within the deposit, the maximum penetration was 26 feet at B.H. #9. The gradation of the glacial till was found to be quite variable. In some areas it was composed of a heterogeneous mixture of silt sand and gravel with a trace of clay. In other areas the till has a cohesive matrix of claye- silt which binds sand and gravel. Boulders, up to 12 inches in size, are randomly present throughout the deposit. Grain-size distribution testing was carried out on samples of the till obtained with 2" O.D. sampling equipment; the results are plotted on Figure #2.

Atterberg limit tests were carried out on samples from the till, the results are plotted on the Record of Borelog sheets and on the Plasticity Chart, Figure #1. Based on this

10-type
X
X
testing it is estimated that the cohesive portions of the till has a plasticity in the low range; ~~the natural moisture content~~ ^{the natural moisture} content is typically 1 to 3 percent below the plastic limit.

Standard penetration tests were carried out in the glacial till, the results are plotted on the Borelog sheets. In the cohesive portions of the glacial till the 'N' values range from 4 blows / ft. to greater than 100 blows / ft. Based on these values it is estimated that the consistency ranges from firm, in the upper softened zone, to hard with depth. The 'N' values in the granular zones, however, range from 15 blows / ft. to greater than 100 blows / ft. It is estimated that the relative density varies from compact to very dense.

4.4) Shale Bedrock:

At B.H. #3 bedrock was encountered beneath the till, it was proven by obtaining 5 feet of EX size rock core samples. The surface of the bedrock is at about elevation 212 which corresponds to a depth of 29.5 feet below existing ground surface.

The bedrock is composed of a grey shale which was in a sound condition as evidenced by the high percentage of core recovery.

5. GROUNDWATER CONDITIONS:

Groundwater level observations have been carried out, during the period of the investigation, in the open boreholes. The observations are presented on the Borelog sheets and on Drawing No. W.O. 72-11072A. The observations indicate that the groundwater level ranges from elevation 231 to 248.5, which corresponds to depths of from 0.5 to 9.5 feet below existing ground surface. In general the ground water level decreases in elevation in a southerly direction.

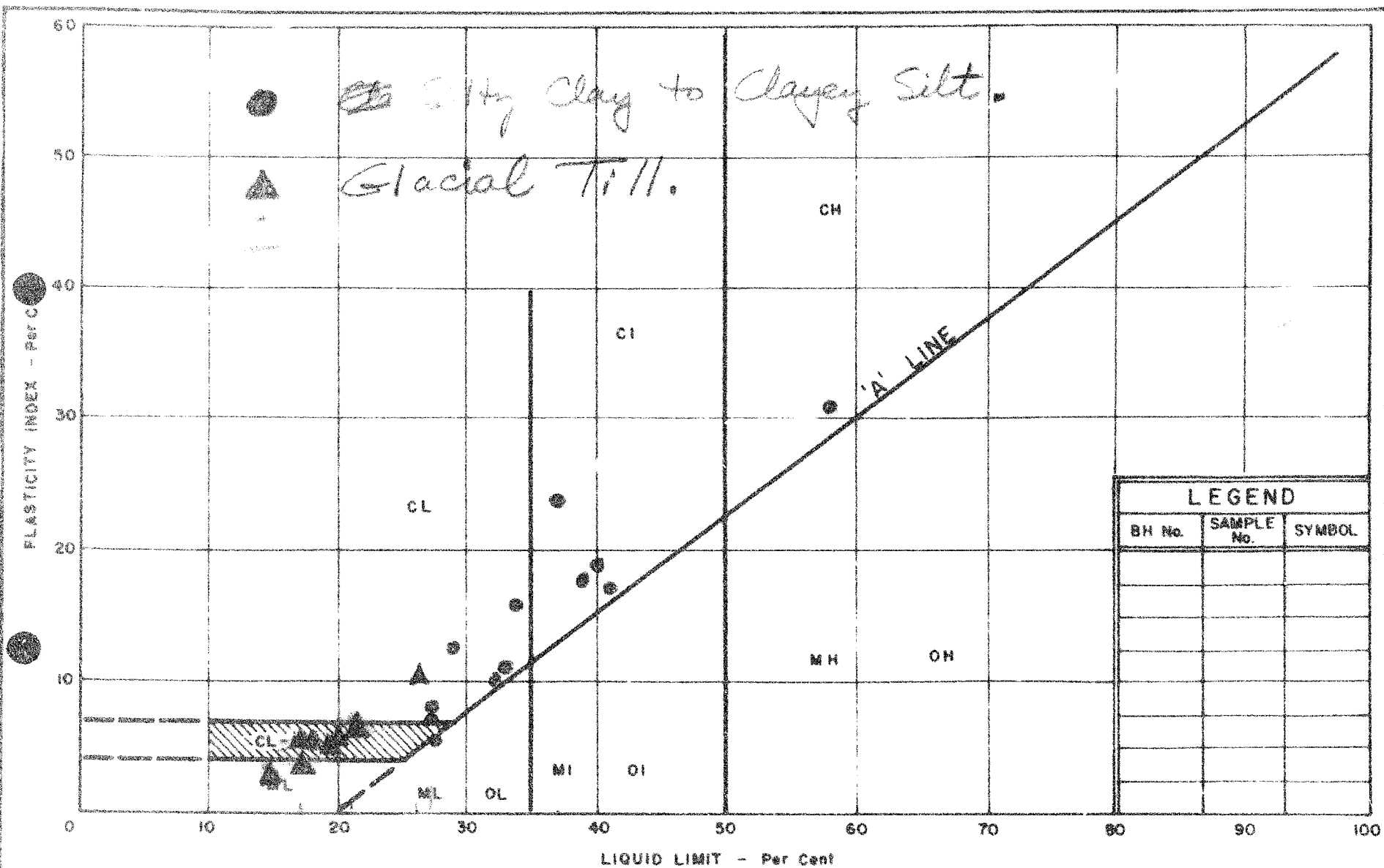
6. DISCUSSION AND RECOMMENDATIONS:

It is understood that a 3 span (55' - 65' - 60') overhead structure is to be constructed at the crossing of

Hwy. #31 - 43 (Winchester By-Pass) and the C.P.R., in the Townships of Winchester and Mountain, County of Dundas. Two possible alignments are being considered, these are designated lines 'D' and 'E'. The profile grade of the proposed highway, in the vicinity of the crossing, will range from elevations 282 to 284. At this grade the approach fills will have a maximum height of 40 feet.

fill
South of the C.P.R. the surficial stratum is composed of a very stiff to firm silty clay to clayey silt. The thickness of this stratum varies from 5 to 21 feet, increasing in depth in a southerly direction. The silty clay is underlain by a glacial fill. North of the C.P.R. the silty clay is absent here the glacial till protrudes to within a few feet of the existing ground surface. The till is underlain by shale bedrock.

The subsoil conditions encountered along Lines 'D' and 'E' are similar. This being the case preliminary recommendations pertaining to the design of foundations, as well as the stability and settlement considerations associated with the approach fills, will in most instances be common and thus will be discussed jointly in the sub-sections to follow. Minor variations due to the differences in the profile grade along the two alignments (refer to sections on Drawing No. W.O. 72-11072A), do occur; these will be referred to later in this report.



DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

PLASTICITY CHART

WP. No.

JOB No. 72-11072

FIGURE NO. 1

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT

SAND

GRAVEL

Fine

Medium

Coarse

Fine

Coarse

DEPARTMENT SIEVE DESIGNATION

27

206

140

100

50

Q

3

0

10 8

24

2

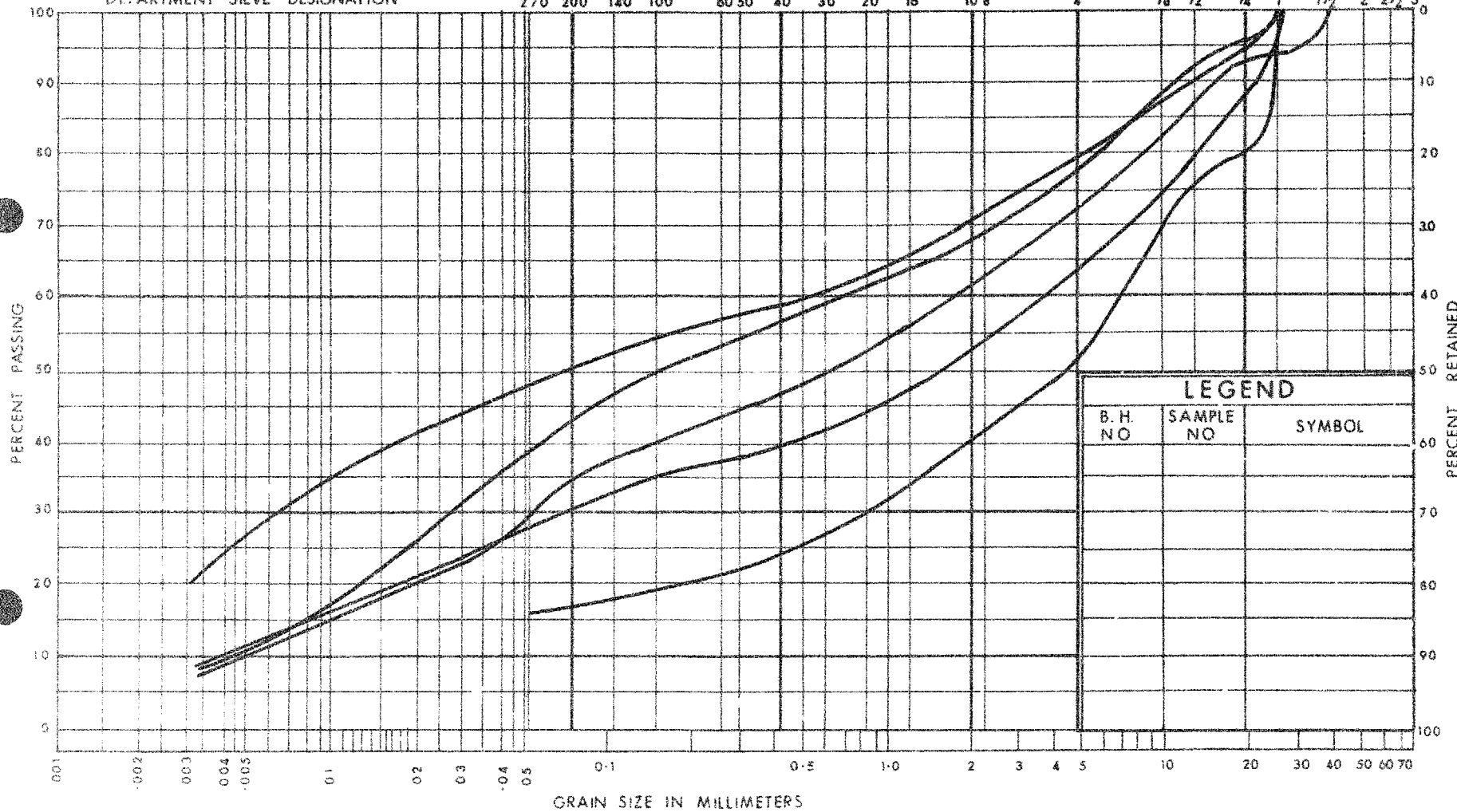
22

7

2 1/2

1

Abstract



LEGEND

B. H.
NO

[illegible]

SYMBOL

DEPARTMENT
OF
TRANSPORTATION AND COMMUNICATIONS



DESIGN SERVICES
BRANCH

GRAIN SIZE DISTRIBUTION GLACIAL TILL

HET MIXTURE OF SAND, GRAVEL, SILT & CLAY

W.P. No. 335-65

JOB No. 72-11072

FIG. N°1

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 1

JOB 72-11072

LOCATION Sta. 251 + 00 @ Hwy. 31 & 43 Line 'E'

ORIGINATED BY ECB

W.P. 335-65

BORING DATE June 21, 1972

COMPILED BY ECB

DATUM Geodetic

BOREHOLE TYPE Washboring-NX Casing

CHECKED BY *ECB*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W W_P W W_L	BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT					
245.2	Ground Level									
244.2	Topsoil									
1.0	Silty clay to clayey silt, trace sand, trace gravel.		1	TW	PM					
	Grey/Brown									
239.2	Very Stiff									
6.0	Heterogeneous mixture of silt, sand & gravel, trace of clay.		2	TW	PM					
	(Glacial Till)		3	SS	17					
			4	SS	23					
230.6	Bouldery Zone (boulders up to 9" in size)		5	RC BX	70%					
16.8	Compact		6	SS	26					
226.4										
18.8	End of Borehole									

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FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 2

JOB 72-11072

LOCATION Sta. 249 + 80 @ Hwy. 31 & h3 Line 'D'

ORIGINATED BY EGB

W.P. 335-65

BORING DATE June 20, 21, 1972

COMPILED BY EGB

DATUM Geodetic

BOREHOLE TYPE Washboring-NX Casing

CHECKED BY So

SOIL PROFILE			SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W W_P — W — W_L	BULK DENSITY γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT					
245.8	Ground Level									
244.8	Topsoil									
1.0	Silty clay to clayey silt, trace sand, trace gravel.		1	TW	PM					
	Grey/Brown									
	Stiff to Very Stiff		2	TW	PM					
236.8	Heterogeneous mixture of silt, sand & gravel with a trace of clay & occ. boulders		3	SS	22					
	(occ. 3" thick layers of silty clay)		3A	SS	39					
	(Glacial Till)		4	SS	15					
	Compact to Very Dense		5	SS	21					
226.3			6	SS	85					
19.5	End of Borehole									

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FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO3

JOB 72-11072

LOCATION Sta. 249 + 00 @ Hwy. 31 & 43 Line 'E'

ORIGINATED BY ECB

W.P. 335-65

BORING DATE June 22, 23, 1972

COMPILED BY ECB

DATUM Geodetic

BOREHOLE TYPE Washboring-NX Casing

CHECKED BY So

SOIL PROFILE			SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT W_L			BULK DENSITY	REMARKS	
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT				PLASTIC LIMIT W_P					
							20	40	60	80	100	WATER CONTENT W				
												W_P	W			W_L
SHEAR STRENGTH P.S.F.							WATER CONTENT %									
○ UNCONFINED + FIELD VANE							10 20 30									
● QUICK TRIAXIAL x LAB VANE																
400 800 1200 1600 2000																
241.9	Ground Level															
240.9	Topsoil														GR. SA. SI. CL.	
1.0	Silty clay to clayey silt (with occasional thin sand seams, a trace of gravel below 9' depth) Grey/Brown Stiff to Very Stiff		1	SS	11	240										
			2	TW	PM											
			3	TW	PM											
			4	TW	PM	230										
226.9	Clayey silt with sand and gravel (Glacial Till) Stiff to Very Stiff Het. mix. of silt, sand & gravel, with a trace of clay (Glacial Till) Compact to Very Dense		5	TW	PM										20 29 38 13	
			6	SS	26	220										
			7	SS	78											
212.2			8	SS	231 8"											
29.7	Shale Bedrock		9	RC BX	100%	210										
207.0	Sound															
34.9	End of Borehole															

ORIGINATED BY ECB

COMPILED BY ECB

COMPILED BY ECB

CHECKED BY

20
15 ϕ 5 % STRAIN AT FAILURE
10

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FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 5 (5, 68-F-13-2)

JOB 72-11072

LOCATION Sta. 247 + 95 o/s 10' Lt. of Hwy. 31 & 43

ORIGINATED BY WH

WP 335-65

BORING DATE Aug. 23 - 26, 1968

Line 'D'

COMPILED BY WH

DATUM Geodetic

BOREHOLE TYPE Diamond Drill - Washboring

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	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	W _P	W	W _L		
243.0	Ground Level															
0.0	Silty clay to clayey silt with trace of sand & gravel and occasional thin silt seams up to 1/2" thick.		1	SS	7	240										240.1 estimated
	Desiccated above El. 236.		2	TW	PM				σ		4320				113	
	Very Stiff to Firm		3A	SS	16											
	Brown to Grey		4	TW	PM	230		x sh	σ						123	
									+ss							
									+sh							
225.0	Glacial Till		5A	SS	6											14 38 42 6
18.0	Clayey silt with sand & some gravel.		6	SS	28						+ss					
	Firm to Very Stiff		7	SS	-	220										
	Grey		8	SS	23											28 29 34 9
215.2																
27.8	End of Borehole Hammer Bouncing					210										

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FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 6 (6, 68-F-13-2)

JOB 72-11072

LOCATION Sta. 246 + 00 o/s 3' Rt. @ Hwy. 31 & 43 Line 'D'

ORIGINATED BY WH

W.P. 335-65

BORING DATE August 23 - 26, 1968

COMPILED BY WH

DATUM Geodetic

BOREHOLE TYPE Diamond Drill - Washboring

CHECKED BY So

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	w_p	w	w_L		
241.0	Ground Level															
0.0	Silty clay to clayey silt with trace of sand and gravel and occasional silt seams up to 1" thick.		1	SS	8	240									119	
	Desiccated above El. 236.		2	TW	PM											236.0
	Very Stiff to Firm		3	TW	PM	230										114
	Brown to Grey		4	TW	PM											113
			5	TW	PM											7 1 83 9
220.0	Glacial Till		6A	SS	23	220										18 36 38 8
21.0	Clayey silt with sand and some gravel. Grey		7	SS	95											
216.0	Very Stiff to Hard.		8	SS	123	10"										
24.8	End of Borehole															
						210										

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FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 7 (7, 68-F-13-2)

JOB 72-11072

LOCATION Sta. 245 + 00 @ Hwy. 31 & 43 Line 'D'

ORIGINATED BY WR

W.P. 335-65

BORING DATE August 23 - 26, 1968

COMPILED BY WH

DATUM Geodetic

BOREHOLE TYPE Diamond Drill - Washboring

CHECKED BY

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100					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	ELEV. SCALE	SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 400 800 1200 1600 2000					WATER CONTENT % 10 20 30			
240.0	Ground Level														
0.0	Silty clay to clay with trace of sand & occ. silt seams up to 1" thick.		1	SS	10										
	Desiccated above el. 236.														
	Very Stiff to Firm		2	TW	FM	230									
	Brown to Grey		3	TW	PM										
219.2	Glacial Till		4	SS	4										
20.8	Clayey silt with sand and some gravel.		5	SS	20										
	Firm to Hard		6	SS	15										
211.2	Grey														
288	End of Borehole Hammer Bouncing					210									

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FOUNDATIONS OFFICE

RECORD OF BOREHOLE N^o 8(3,68-F-13)

JOB 72-11072

LOCATION Sta. 252 + 40 o/s 43' Lt. @ Hwy. 31 & 43 Line 'D'

ORIGINATED BY CM

W.P. 335-65

BORING DATE February 27, 1968

COMPILED BY CM

DATUM Geodetic

BOREHOLE TYPE Diamond Drill - NX

CHECKED BY 15

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT W_L		BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	BLOWS / FOOT 20 40 60 80 100	PLASTIC LIMIT W_P	WATER CONTENT W		
255.0	Ground Level										
251.0	Topsoil										
1.0	Clayey silt with sand and gravel, occasional boulders up to 12"		1	SS	135	10"					
	Hard		2	SS	100	5"					
	Mottled Brown to Grey		3	RC BX	20%						
	(Glacial Till)		4	SS	75						
242.5			4A	RC BX	0%						
			5	SS	115	6"					
12.5	End of Borehole										

CHECKED BY

15 ²⁰ 5 % STRAIN AT FAILURE
10

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

72-11072

TO: Mr. A. G. Stermac,
Principal Foundation Engineer,
Downsview, Ontario.

FROM: Structural Planning Office,
Kingston, Ontario.

ATTENTION: Mr. M. Devata

DATE: June 6, 1972.

OUR FILE REF.


IN REPLY TO

SUBJECT: W.P. 335-65, Site 31-277,
C.P.R. Overhead, Winchester By-pass,
Highways 31 & 43, District 9 - Ottawa

Further to my recent telephone discussion with Mr. Devata, I now enclose two copies of a 100': 1" plan and profiles showing proposed alternative alignments for the railway overhead crossing at the above location. Also enclosed is copy of letter dated June 1, 1972, from Mr. L. O. Dawley, Regional Systems Design, together with a copy of the minutes of a meeting held here on May 31 which will help to clarify the present status of this scheme.

I shall be glad if you will carry out a foundation investigation on Lines 'D' and 'E' shown in red and blue respectively on the plan. The investigation should include work on the south approaches similar to the investigation carried out in 1968 and summarized in your Report WJ 68-F-13-2 dated September 23, 1968, for the south approach embankment on the original Line 'A'. The Foundation Investigation Report for the structure itself was also carried out in 1968 and is No. WJ-68-F-13.

As mentioned in Mr. Dawley's letter of June 1, the foundation investigation is preliminary in that sufficient information is required to enable comparative cost estimates to be prepared for the alternative schemes. A final investigation will be required on the chosen line.



T. C. Kingsland
Regional Structural Planning Engineer

TCK/hl
encls.

c.c. A. J. Percy - Att. L. O. Dawley
K. Bassi
C. S. Grebski
J. Anderson
R. Forrest

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

T. C. Kingsland,
Regional Structural Planning Engineer,
Kingston.

FROM: Systems Design Office,
Kingston.

ATTENTION: STRUCTURE SITE NO. 31-277

DATE: June 1st, 1972.

OUR FILE REF.

IN REPLY TO

SUBJECT:

W.P. 335-65. C. P.R. Overhead, Highway 31 & 43,
Winchester By-Pass; District #9 - Ottawa.

Further to the minutes of the field meeting for the above project dated May 31st, 1972, please find enclosed three copies of a plan and profile showing alternate schemes currently being investigated.

The two schemes presently under investigation are labelled Scheme D coloured in red and Scheme E coloured in blue. Also shown on the plan are alternative Schemes A and C.

As you know, a foundation investigation report has been made for a structure location on Scheme A.

Would you please arrange for an investigation of the foundation conditions with regard to their affect on a structure and approach fills for Schemes D and E.

Could you also provide an estimated cost of a structure located on Schemes D and E.

As discussed with you, this foundation investigation should be only preliminary in nature and a more detailed study may be requested on the recommended scheme.

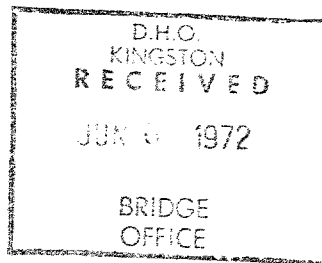
Your earliest attention to this matter would be appreciated.


L. O. Dawley
Design Group Engineer.

LOD/ss

Encl.

c. c. to: R. J. Forrest.



W.B.

Mr. C. S. Grebski,
Bridge Design Engineer,
Bridge Division,
Admin. Bldg.

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

November 25, 1968

C.P.R. Overhead, 1-1/2 Miles S.W. of Winchester
W.P. 335-65 -- Site 31-277 -- W.J. 68-7-13
Highways 31 & 43 -- District No. 3 (Stratford)

We have reviewed the final bridge drawings and
submit the following comments:

The abutment piles should penetrate at least to
a minimum tip elev. 250.0 and, therefore, a note should
be made to this effect on the Contract Documents.

MD/adeP

M. Devata

M. Devata,
SUPERVISING FOUNDATION ENGR.
For:
A. G. Stermac,
PRINCIPAL FOUNDATION ENGR.

cc: Messrs. C. McCombie
G. Scott

Foundations Files ✓
Gen. Files

Department of Highways Ontario

Copy for the information of

Foundation Section

~~Mr. A. Stermac,~~
Principal Foundation Engineer,
Room 107, Lab. Building

Bridge Division,
Downsview, Ontario

November 14, 1968

C.P.R. Overhead
1½ Miles S.W. of Winchester
W.P. 335-65, Site 31-277
Hwys. 31 & 43, District 9

Attached herewith we are submitting the final
bridge drawings which show the foundation design of
this structure.

Kindly give us your comments at your earliest
convenience.

CSG:rd

C.S. Grebski,
Bridge Design Engineer

Attach.

c.c. Foundation Section

MEMORANDUM

To: Mr. A. G. Stermac,
Principal Foundation Engineer,
DOWNSVIEW, Ontario.

FROM: Road Design Division,
KINGSTON, Ontario.

ATTENTION: M. Devata

DATE: April 26, 1968.

OUR FILE REF:

IN REPLY TO

SUBJECT: Foundation Investigation Report - C.P.R. O'Head - New Hwy. #31
Line 'A' Township of Winchester-Mountain - County of Dundas -
District #9 Ottawa - W.J. 68-F-13 - W.P. 335-65

We have reviewed the Foundation Report for this project and our
one comment is as follows:

Under Discussion and Recommendation you state in part, "The
remainder of the fill should be completed to about profile
grade for a distance of about 50 feet behind the abutments
before re-excavating for the footings".

We would appreciate your further comment as to why this type
of construction is required.

E. M. Barrie

E. M. Barrie,
SR. PROJECT DESIGN ENGINEER.

EMB/mac

Exp. 100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1041-1042-1043-1044-1045-1046-1047-1048-1049-1050-1051-1052-1053-1054-1055-1056-1057-1058-1059-1060-1061-1062-1063-1064-1065-1066-1067-1068-1069-1070-1071-1072-1073-1074-1075-1076-1077-1078-1079-1080-1081-1082-1083-1084-1085-1086-1087-1088-1089-1090-1091-1092-1093-1094-1095-1096-1097-1098-1099-1100-1101-1102-1103-1104-1105-1106-1107-1108-1109-1110-1111-1112-1113-1114-1115-1116-1117-1118-1119-1120-1121-1122-1123-1124-1125-1126-1127-1128-1129-1130-1131-1132-1133-1134-1135-1136-1137-1138-1139-1140-1141-1142-1143-1144-1145-1146-1147-1148-1149-1150-1151-1152-1153-1154-1155-1156-1157-1158-1159-1160-1161-1162-1163-1164-1165-1166-1167-1168-1169-1170-1171-1172-1173-1174-1175-1176-1177-1178-1179-1180-1181-1182-1183-1184-1185-1186-1187-1188-1189-1190-1191-1192-1193-1194-1195-1196-1197-1198-1199-1200-1201-1202-1203-1204-1205-1206-1207-1208-1209-1210-1211-1212-1213-1214-1215-1216-1217-1218-1219-1220-1221-1222-1223-1224-1225-1226-1227-1228-1229-1230-1231-1232-1233-1234-1235-1236-1237-1238-1239-1240-1241-1242-1243-1244-1245-1246-1247-1248-1249-1250-1251-1252-1253-1254-1255-1256-1257-1258-1259-1260-1261-1262-1263-1264-1265-1266-1267-1268-1269-1270-1271-1272-1273-1274-1275-1276-1277-1278-1279-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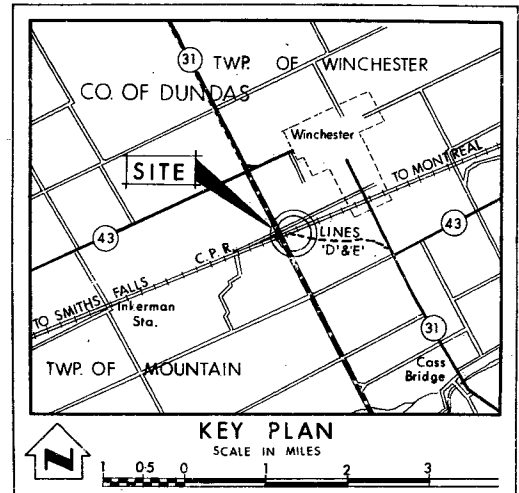
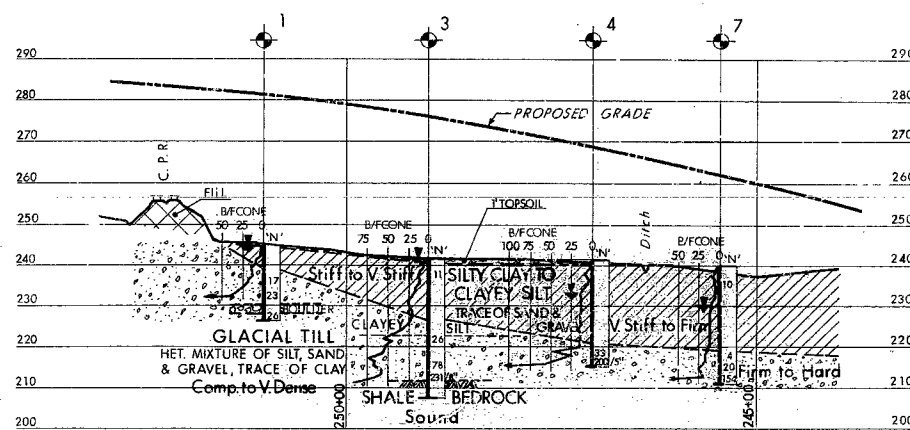
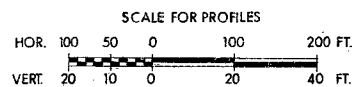
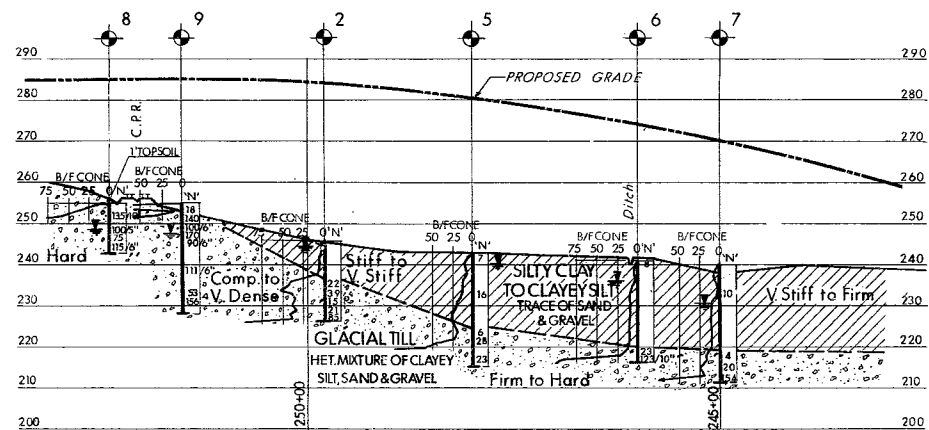
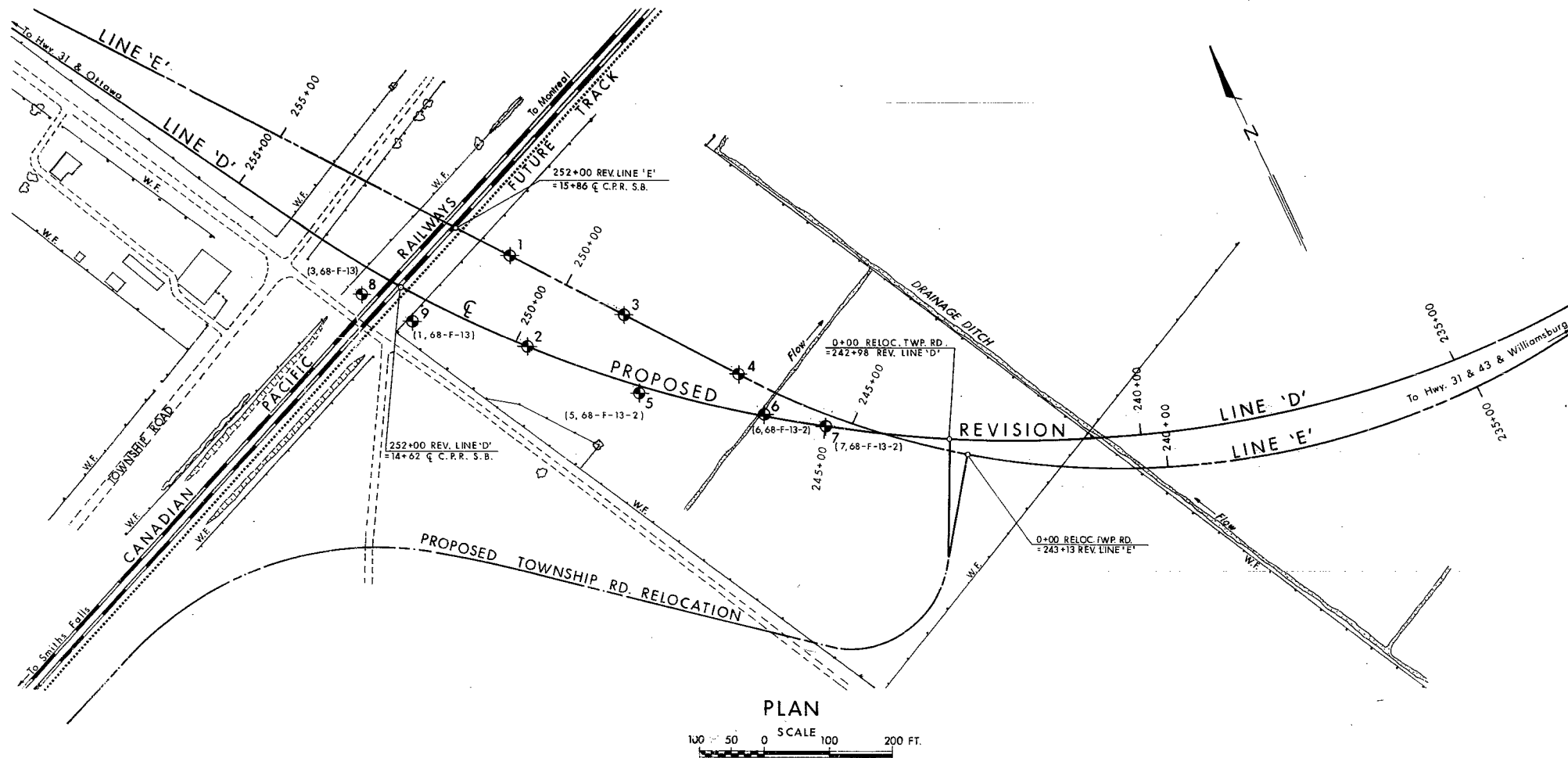
CONT. 73-75

HWY. 31/43

+ C.P.R.

WINCHESTER

31G-22



LEGEND			
	Bore Hole		
	Cone Penetration Test		
	Bore Hole & Cone Test		
	Water Levels established at time of field investigation. FEB. 1968 AUG. 1968 JUN. 1972		
NO.	ELEVATION	STATION	OFFSET
1	245.2	251+00	LINE 'E'
2	245.8	249+80	LINE 'D'
3	241.9	249+00	LINE 'E'
4	241.3	247+00	LINE 'E'
5	243.0	247+95	LINE 'D'
6	241.0	246+00	LINE 'D'
7	240.0	245+00	LINE 'D'
8	255.0	252+40	LINE 'D'
9	255.0	251+44	LINE 'D'

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

DATE	BY	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO
DESIGN SERVICES BRANCH—FOUNDATIONS OFFICE

CANADIAN PACIFIC RAILWAYS
(SOUTH APPROACH EMBANKMENT)

HIGHWAY NO. 31 & 43 LINES 'D' & 'E' DIST. NO. 9
CO. DUNDAS

TWP. WINCHESTER & MOUNTAIN LOT 1 & 24 CON. V & VI

BORE HOLE LOCATIONS & SOIL STRATA

SUBWD. E.C.B. CHECKED W.P. NO. 335-65 DRAWING NO.

DRAWN F.L. CHECKED W.O. NO. 72-11072 72-11072A

DATE NOV. 1, 1972 SITE NO. BRIDGE DRAWING NO.

APPROVED CONT. NO. 73-75

GEOCREP NO. 31G-22