

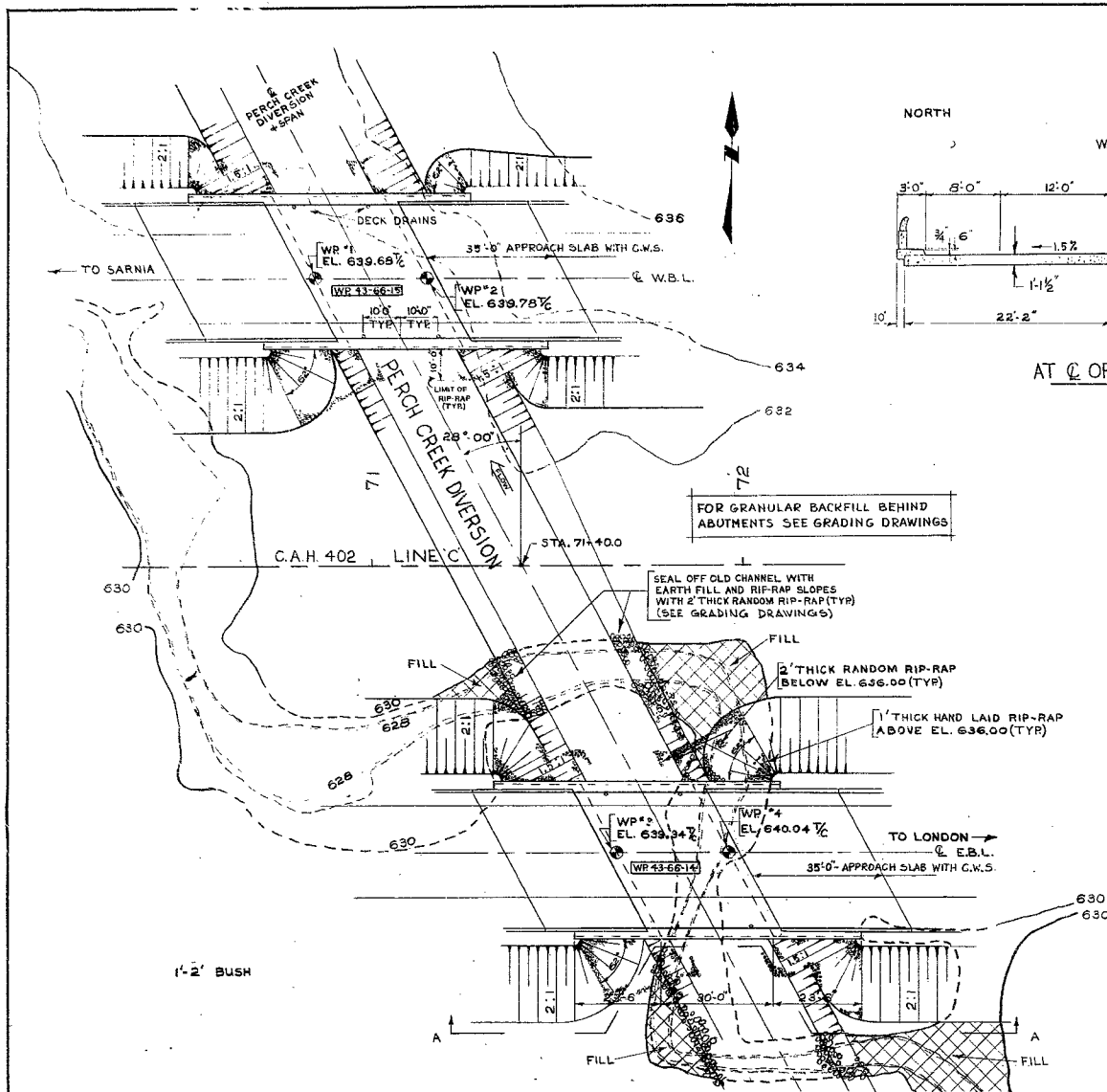
#69-F-114

W.P. 43-66-14 AND 15

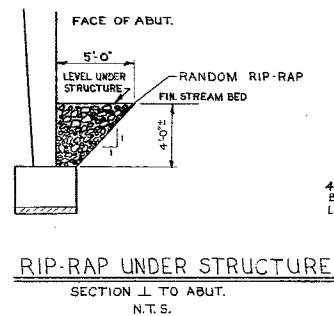
H.W.Y. #402, LINE 'C'

EAST BRANCH AND C.A.H.

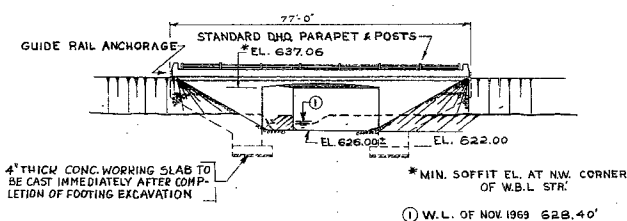
PERCH CREEK.



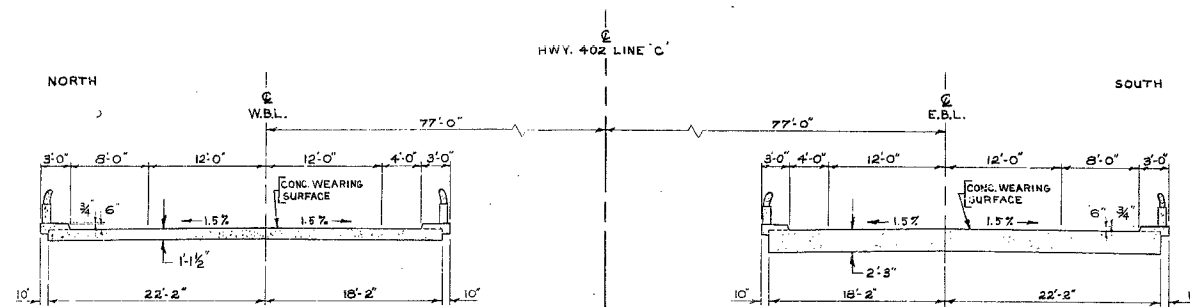
PLAN
SCALE: 1"=40'-0"



RIP-RAP UNDER STRUCTURE
SECTION 1 TO ABUT.
N.T.S.



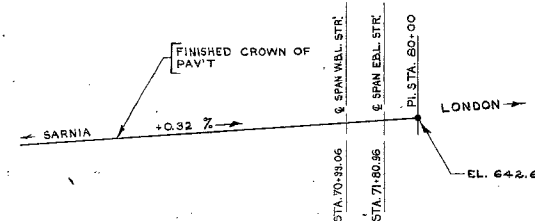
ELEVATION AA
SCALE: 1"=20'-0"



TYPICAL DECK SECTIONS
SCALE: 1/8"=1'-0"

- NOTES**
1. $\frac{1}{2}$ DENOTES ELEVATIONS ARE SHOWN TO TOP OF CONCRETE WEARING SURFACE.
 2. W.P. DENOTES WORKING POINT.
 3. C.W.S. DENOTES CONCRETE WEARING SURFACE.

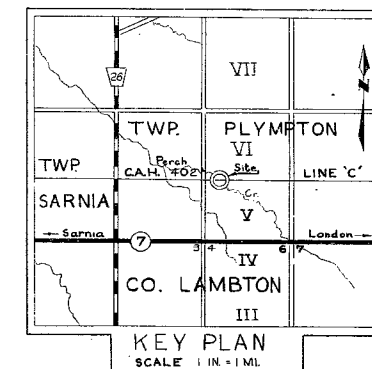
28'-00' SKEW
SIN. .4694716
COS. .8823476
TAN. .5317034
SEC 1.1325731



PROFILE OF HWY. 402 LINE 'C'
N.T.S.

LIST OF DRAWINGS

- D-6808-1 GENERAL LAYOUT
- D-6808-2 BOREHOLE LOCATIONS & SOIL STRATA
- D-6808-3 FOOTINGS
- D-6808-4 FRAME, WINGWALLS & CURB
- D-6808-5 PARAPET WALL DETAILS
- D-6808-6 35' APPROACH SLAB
- D-6808-7 STANDARD STEEL PARAPET RAILS
- D-6808-8 STANDARD DETAILS



KEY PLAN
SCALE: 1 IN. = 1 MI.

NOTE

CLASS OF CONCRETE

DECK, CURBS AND PARAPET WALLS 4000 PSI.
REMAINDER 3000 PSI. OR AS NOTED ON DRWG'S.

CLEAR COVER ON REINF. STEEL

FOOTINGS, WINGWALLS, ABUTMENTS, DECK: TOP, BOTT.
3" 3" 2 1/2" 2"

CONSTRUCTION NOTES

FALSEWORK SUPPORTING WINGWALLS SHALL NOT BE REMOVED UNTIL CONCRETE IN THE DECK SLAB HAS ATTAINED A MINIMUM STRENGTH OF 3,000 P.S.I.

BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH ABUTMENTS AT EACH STRUCTURE KEEPING THE HEIGHTS OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATIONS BE GREATER THAN 2 FEET.

FALSEWORK SUPPORTING THE DECK SHALL NOT BE REMOVED UNTIL AFTER THE BACKFILL HAS BEEN PLACED BEHIND THE ABUTMENTS, TO AT LEAST STREAMBED ELEVATION (i.e. EL. 626.0 ±).

SIDES OF FOOTING TO BE CAST AGAINST UNDISTURBED GROUND.

B.M. 636.93

GEODETIC DATUM

N.W. IN SW. ROOT 0.5' ELM
158' LT. 72+30

REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO
BRIDGE DIVISION

PERCH CREEK (COW CREEK) BRIDGES

E.B.L. & W.B.L. BRIDGES

1.3 MILES EAST OF COUNTY RD. NO. 26

KING'S HIGHWAY No. 402

DIST. No. 1

CO. LAMBTON

TWP. PLYMPTON

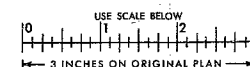
LOT 4

CON. 5

GENERAL LAYOUT

APPROVED	BRIDGE ENGINEER	SITE No. 14-357	W.P. No. 43-66-14 & 15
DESIGN J.S.Z.	CHECK J.L.K.	CONTRACT No.	
DRAWING R.E.B.	CHECK J.S.Z.	DRAWING No.	D-6808-1
DATE DEC. 1870	LOADING HS. 20-44		

FOR REDUCED PLAN



DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

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

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

ATTENTION: Mr. S. McCombie

DATE: March 6, 1970

OUR FILE REF.

IN REPLY TO

MAR 13 1970

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For
Proposed Crossing at Perch Creek
East Branch & C.A.H. #402, Line 'C'
Twp. of Plympton, Co. of Lambton
District No. 1 (Chatham, Ont.)
W.J. 59-F-114 -- W.P. 43-66-14 & 15

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

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

AGS/11aF

Attech.

cc: Messrs. B. R. Davis
H. A. Frogashes
D. W. Farran
W. Zonnenberg
R. G. Brown
A. P. Watt (2)
J. Roy
B. A. Singh

Foundations Files
Gen. Files

A. G. Sternac
A. G. Sternac
PRINCIPAL FOUNDATION ENGINEER

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 2. DESCRIPTION OF THE SITE.
 3. FIELD AND LABORATORY INVESTIGATION PROCEDURES.
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 - 4.2) Sand.
 - 4.3) Clayey Silt with Some Sand and Traces of Gravel.
 - 4.4) Silty Clay with Traces of Sand.
 5. GROUNDWATER CONDITIONS.
 6. DISCUSSION AND RECOMMENDATIONS:
 - 6.1) General.
 - 6.2) Structure Foundations.
 - 6.3) Approach Embankments.
 7. MISCELLANEOUS.
-

FOUNDATION INVESTIGATION REPORT
For
Proposed Crossing at Perch Creek
East Branch & C.A.H. #402, Line 'C'
Twp. of Plympton, Co. of Lambton
District No. 1 (Chatham, Ont.)
W.J. 69-F-114 -- W.P. 43-66-14 & 15

1. INTRODUCTION:

A request for a foundation investigation at the crossing of the proposed C.A.H. #402, Line 'C' and the proposed Perch Creek East Branch diversion, was received from Mr. A. P. Watt, Regional Bridge Planning Engineer, in a memorandum dated January 12, 1970.

A field investigation was subsequently carried out by this Section to determine the subsoil conditions existing at the site. This report contains the results of this investigation and our recommendations pertaining to the design of the proposed structure foundations and approach embankments.

2. DESCRIPTION OF THE SITE:

The site of the proposed structure is located in the Twp. of Plympton, Co. of Lambton, Lot 4, Concessions V and VI, approx. 0.75 mile North of Hwy. #7 and 1.3 miles East of County Road No. 26.

The proposed structure site lies in a depression, which was probably eroded into the otherwise flat ground surface by the meandering Perch Creek. This flat-bottomed valley is approx. 7 ft. deep and bush-covered.

Physiographically, the site is located in the region referred to as the St. Clair Clay Plain.

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES:

A total of four sampled boreholes and eight dynamic cone penetration tests was carried out during the course of the field work. Boring was achieved by means of a Bombardier-mounted continuous flight auger machine adapted for soil sampling purposes.

'Undisturbed' samples were recovered in 2-inch I.D. Shelby tubes which were pushed into the soil hydraulically. 'Disturbed' samples were obtained in 2-inch O.D. split-spoon samplers which were hammered into the soil, utilizing a free-falling hammer with an energy of 350 ft.-lbs. per blow. Dynamic cone penetration tests were performed using the same driving energy.

All boreholes were surveyed in the field by personnel from London Region Engineering Surveys Section. The locations and elevations of the borings are shown on Drawing No. 63-F-114A which accompanies this report.

All samples were visually examined and classified at the site as well as in the laboratory. Following this inspection, laboratory tests were carried out on selected representative samples to determine the following physical properties:

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

The test results are summarized on the Record of Borehole sheets contained in the Appendix of this report.

4. SOIL TYPES AND SOIL CONDITIONS:

4.1) General:

Generally, uniform subsoil conditions were found to prevail over the site investigated. The subsoil consists of a deep deposit of cohesive material (clayey silt and silty clay),

4. SOIL TYPES AND SOIL CONDITIONS: (cont'd.) ...

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

followed by probable bedrock. The boundaries between different deposits are shown on the Record of Borehole sheets attached to the Appendix. The estimated stratigraphical profile of Drawing 69-F-114A is based upon this information.

From ground level downward, the various strata are described in some detail with regard to soil types and soil properties, as follows:

4.2) Sand:

This material was encountered in B.H. #16 from ground level to approx. El. 625. The material in the deposit consists mainly of brown-coloured sand.

4.3) Clayey Silt with Some Sand and Traces of Gravel:

This deposit was intersected in all borings and extends from immediately below the topsoil, or the above mentioned sand stratum, down to approx. El. 590. A similar type deposit was encountered again at approx. El. 568, and was found to extend down to the assumed bedrock level (526). The material in the deposit consists of clayey silt with some sand and traces of gravel. A plot of Plasticity Index versus Liquid Limit (Fig. 1) shows the points to fall within the CL zone.

A desiccated zone with a thickness ranging from 3 to 10 ft. was found to extend from the upper surface of the stratum. This zone is brown in colour due to oxidation and, apart from the upper 3 - 4 ft. (frost affected zone), has a very stiff to hard consistency; Standard Penetration Test 'N' values ranged from 20 to 45 blows per foot. The undrained shear strength is in excess of 2000 PSF. This zone is highly overconsolidated due to desiccation and/or weathering. The moisture content, in general, is at or below the plastic limit. Below the desiccated layers, the colour of the soil gradually changes to grey.

4. SOIL TYPES AND SOIL CONDITIONS: (cont'd.) ...

4.3) Clayey Silt with Some Sand and Traces of Gravel: (cont'd.) ...

The undrained shear strength of the undesiccated portion of the deposit decreases with depth. Field and laboratory shear strength measurements indicate that, the shear strength of the material is in the order of 3000 PSF at El. 615 and 1500 PSF at El. 590. In the lower portion (below El. 568) of the clayey silt stratum the shear strength increases with depth, being in the order of 1500 PSF at El. 563 and 4000 PSF at El. 540. The consistency of the overall deposit may be described as firm to hard.

Physical properties of the overall deposit, as determined from field and laboratory tests, are as follows:

Natural Moisture Content (%)	:	10 - 20
Liquid Limit (%)	:	26 - 33
Plastic Limit (%)	:	14 - 21
Unconfined Shear Strength (PSF)	:	1865 to >6000
Bulk Density (PCF)	:	129 - 138
'N' Value (Blows/Ft.)	:	13 - 73

Typical grain-size distribution curves are included in the Appendix of this report (Fig. 2).

4.4) Silty Clay with Traces of Sand:

Between the upper and lower zones of the clayey silt deposit, an approx. 22 ft. thick silty clay with traces of sand stratur, was encountered.

The following average physical properties were obtained from field and laboratory tests:

4. SOIL TYPES AND SOIL CONDITIONS: (cont'd.) ...

4.4) Silty Clay with Traces of Sand: (cont'd.) ...

Natural Moisture Content (%)	:	24 - 27
Liquid Limit (%)	:	35 - 46
Plastic Limit (%)	:	20 - 24
'N' Value (Blows/ft.)	:	13 - 29

The consistency of the deposit may be described as stiff to very stiff.

5. GROUNDWATER CONDITIONS:

The following water levels were observed during the field work:

B.H. #9	:	El. 631.5'
B.H. #12	:	Dry
B.H. #13	:	El. 628.3'
B.H. #16	:	El. 628.8'

It is pointed out that, the foregoing quoted figures may not represent the true groundwater levels, due to the relatively impermeable nature of the subsoil and the short duration of the field work.

Natural gas was observed in B.H. #9 when contact was made with the bedrock.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to cross the diverted Perch Creek - East Branch, by a twin, single-span structure at this location. The proposed profile grade of J.A.E. #402 will be approximately 16 ft. above the creek bed elevation of 626.5.

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

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

As described in the previous paragraphs of this report, the subsoil at the site consists of a deep deposit of clayey silt and silty clay. The upper portion of the deposit is a very stiff to hard desiccated surface crust. Below this depth, the shear strength of the material decreases until a minimum value is reached, then increases with depth. The desiccated surface crust appears to be suitable for spread footing type foundations.

Because of the compressible nature of the subsoil, it is inevitable that consolidation settlements will occur over a long-term period due to the imposed loads of structure and embankment. Past experience, however, indicates that these settlements will be of a minor nature.

6.2) Structure Foundations:

In view of the foregoing, it is recommended that the proposed structure be founded on spread footings placed within the very stiff to hard desiccated zone of the subsoil at or below El. 622'. A safe net pressure of 2.5 t.s.f. may be assumed for design purposes. If this recommendation is adopted, the foundations should be protected against undermining by scour. The depth of scour should be determined by the Hydrology Section.

The desiccated zone is susceptible to softening on contact with water; therefore, it is recommended that the base of the footing excavations be protected by a concrete working slab, immediately on exposure.

All foundations should be protected against frost action by at least 4 feet of earth cover.

No major dewatering problems are anticipated.

As an alternative, the footings may be supported on No. 14 treated timber piles driven to the elevation necessary to achieve

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

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

the required pile capacity. In determining the safe capacity of a No. 14 timber pile, the following equation may be used:

$$Q = 0.4 L \text{ (Tons)}$$

where Q = safe capacity of one pile

L = embedded length in original ground (Ft.)

As a second alternative, the structure footings may be supported on steel H-piles driven to bedrock. For 12 BP @ 53, a safe design load of 70 tons per pile may be assumed.

6.3) Approach Embankments:

The shear strength of the subsoil is such that it will be able to safely support the 16-ft. high approach embankments constructed with standard 2:1 side slopes. The fill should consist of well compacted acceptable material.

Due to the consolidation of the subsoil caused by embankment and structure loading, settlements will take place. Based on the performance of structures and embankments built in the same general area and with somewhat similar subsoil conditions, it is estimated that, the maximum settlement will be in the order of 3 to 4 inches over a long-term period.

The topsoil and any soft organic material which may be encountered, should be removed in accordance with the pertinent D.H.O. Standards within the construction area.

7. MISCELLANEOUS:

The field investigation was carried out during the period February 9 - 13, 1970, under the supervision of Mr. P. Payer, Project Foundation Engineer, who also prepared this report.

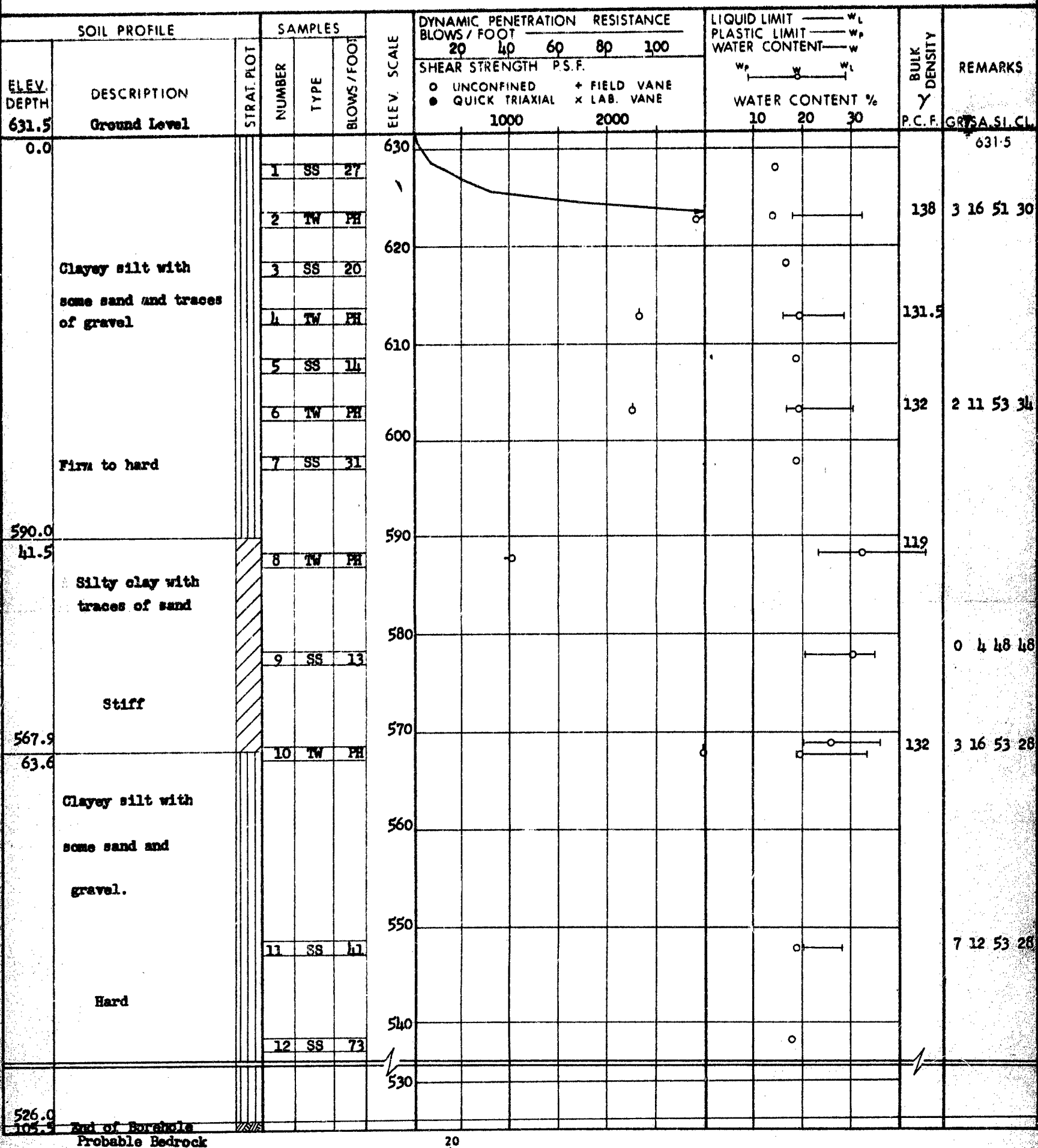
Equipment was owned and operated by Dominion Soil Investigation Limited.

This report was reviewed by Mr. K. G. Selby, Supervising Foundation Engineer.

March, 1970

APPENDIX I

DEPARTMENT OF HIGHWAYS- ONTARIO		RECORD OF BOREHOLE No. 9		FOUNDATION SECTION	
MATERIALS & TESTING OFFICE					
JOB <u>69-F-114</u>	LOCATION <u>Sta. 70 + 97 97' Lt.</u>	ORIGINATED BY <u>PP</u>			
W.P. <u>43-66-14 & 15</u>	BORING DATE <u>Feb. 9 & 10, 1970</u>	COMPILED BY <u>PP</u>			
DATUM <u>Geodetic</u>	BOREHOLE TYPE <u>Cont. Flight Auger</u>	CHECKED BY <u>PP</u>			



FOUNDATION SECTION

ORIGINATED BY PP

COMPILED BY PP

CHECKED BY 

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION		RESISTANCE		LIQUID LIMIT ——— w_L		BULK DENSITY	REMARKS		
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	BLOWS / FOOT	20	40	60	80	100			PLASTIC LIMIT ——— w_p	WATER CONTENT ——— w
635.3	Ground Level						SHEAR STRENGTH P.S.F.					WATER CONTENT % w_p ——— w ——— w_L			
0.0	Probably Clayey silt						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE								
625.1															
9.9	End of Cone Test														

FOUNDATION SECTION

ORIGINATED BY PP

COMPILED BY PP

CHECKED BY 

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT ——— w_L	PLASTIC LIMIT ——— w_p	WATER CONTENT ——— w	BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		20 40 60 80 100	SHEAR STRENGTH P.S.F.	w_p ——— w ——— w_L WATER CONTENT %			
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE					
631.6	Ground Level					630						
0.0	Probably Clayey silt											
620.8												
10.8	End of Cone Test					620						

FOUNDATION SECTION

CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT		SHEAR STRENGTH P.S.F.					
633.2	Ground Level													
0.0	Clayey silt with some sand and traces of gravel Stiff - Hard		1	SS	29	630							129	2 15 53 30
			2	SS	45									
			3	SS	31									
			4	TW	PH	620								
			5	SS	22									
			6	SS	20									
			7	SS	24									
			8	SS	15	610								
			9	SS	28									
			10	SS	23	600								
591.7		End of Borehole		11	TW	PH								
41.5						590								

FOUNDATION SECTION

ORIGINATED BY PP
COMPILED BY PP
CHECKED BY 50

[illegible]

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 15

FOUNDATION SECTION

JOB 69-F-114LOCATION Sta. 72 + 15 99' Rt.ORIGINATED BY PPW.P. 43-66-14 & 15BORING DATE Feb. 11, 1970COMPILED BY PPDATUM GeodeticBOREHOLE TYPE Cone Test OnlyCHECKED BY [Signature]

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	WATER CONTENT % w_p — w — w_L				
631.1	Ground Level															
0.0	Probably Clayey silt					630										
618.1						620										
13.0	End of Cone Test					610										

SHEAR STRENGTH P.S.F.

- UNCONFINED + FIELD VANE
● QUICK TRIAXIAL x LAB. VANE

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 16

FOUNDATION SECTION

JOB 69-F-114

LOCATION Sta. 72 + 50 99' Rt.

ORIGINATED BY PP

W.P. 43-66-14 & 15

BORING DATE Feb. 11 & 12, 1970

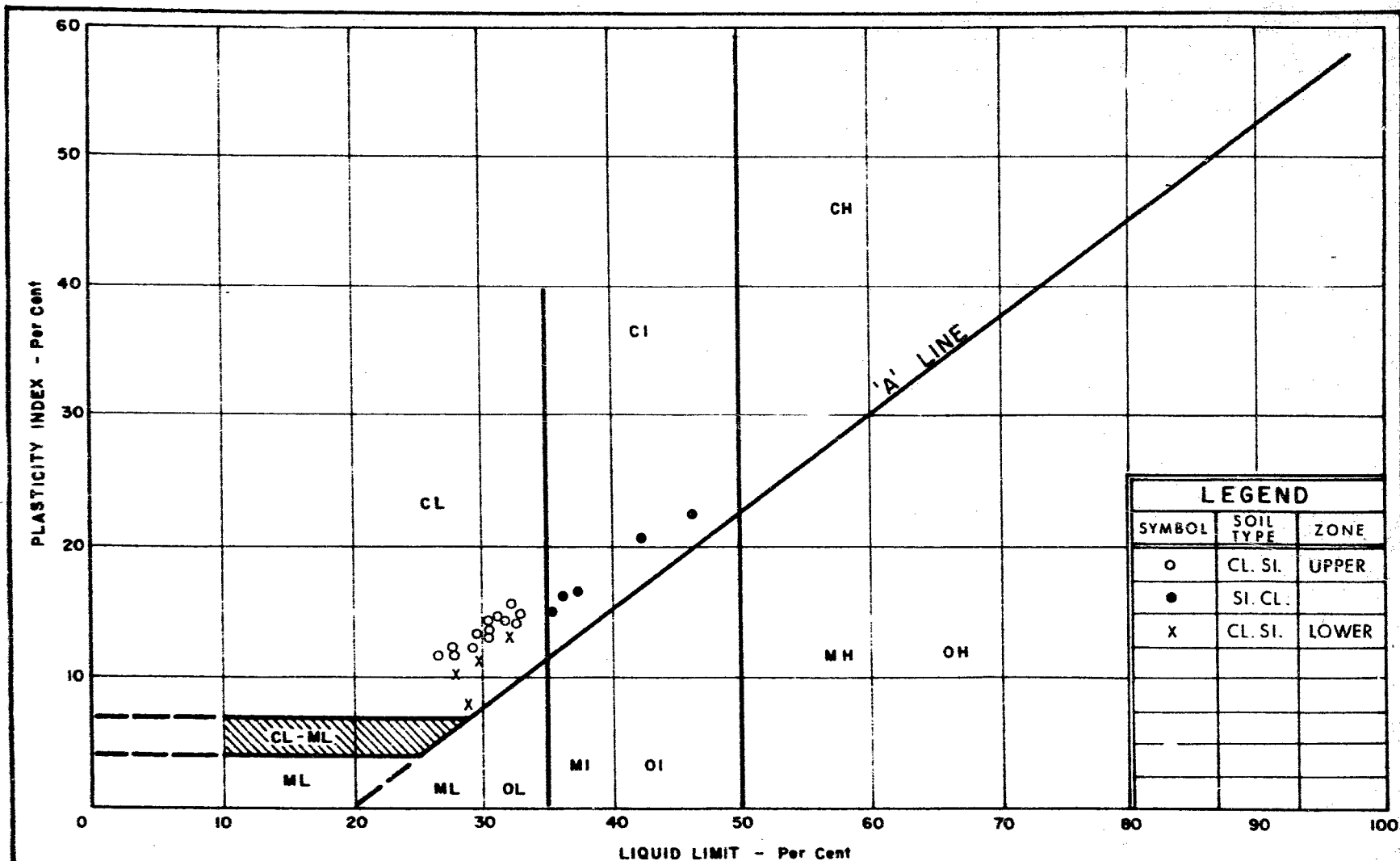
COMPILED BY PP

DATUM Geodetic

BOREHOLE TYPE Cont. Flight Auger

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — w _L PLASTIC LIMIT — w _p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS								
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	w _p — w — w _L	WATER CONTENT % 10 20 30											
							SHEAR STRENGTH P.S.F.																	
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE																	
630.0	Ground Level																							
0.0	Sand																628.8							
624.8			1	SS	41																			
5.2	Clayey silt with some sand and traces of gravel.		2	TW	PH																			
			3	SS	32																			
			4	TW	PH																			
			5	SS	42																			
	Very stiff to hard		6	TW	PH																			
			7	SS	28																			
590.0																								
40.0	Silty clay with traces of sand		8	TW	PH																			
	Very stiff		9	SS	29																			
568.0																								
62.0	Clayey silt with some sand and traces of gravel		10	TW	PH																			
	Very stiff to hard		11	TW	PH																			
528.2	End of Borehole																							



DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

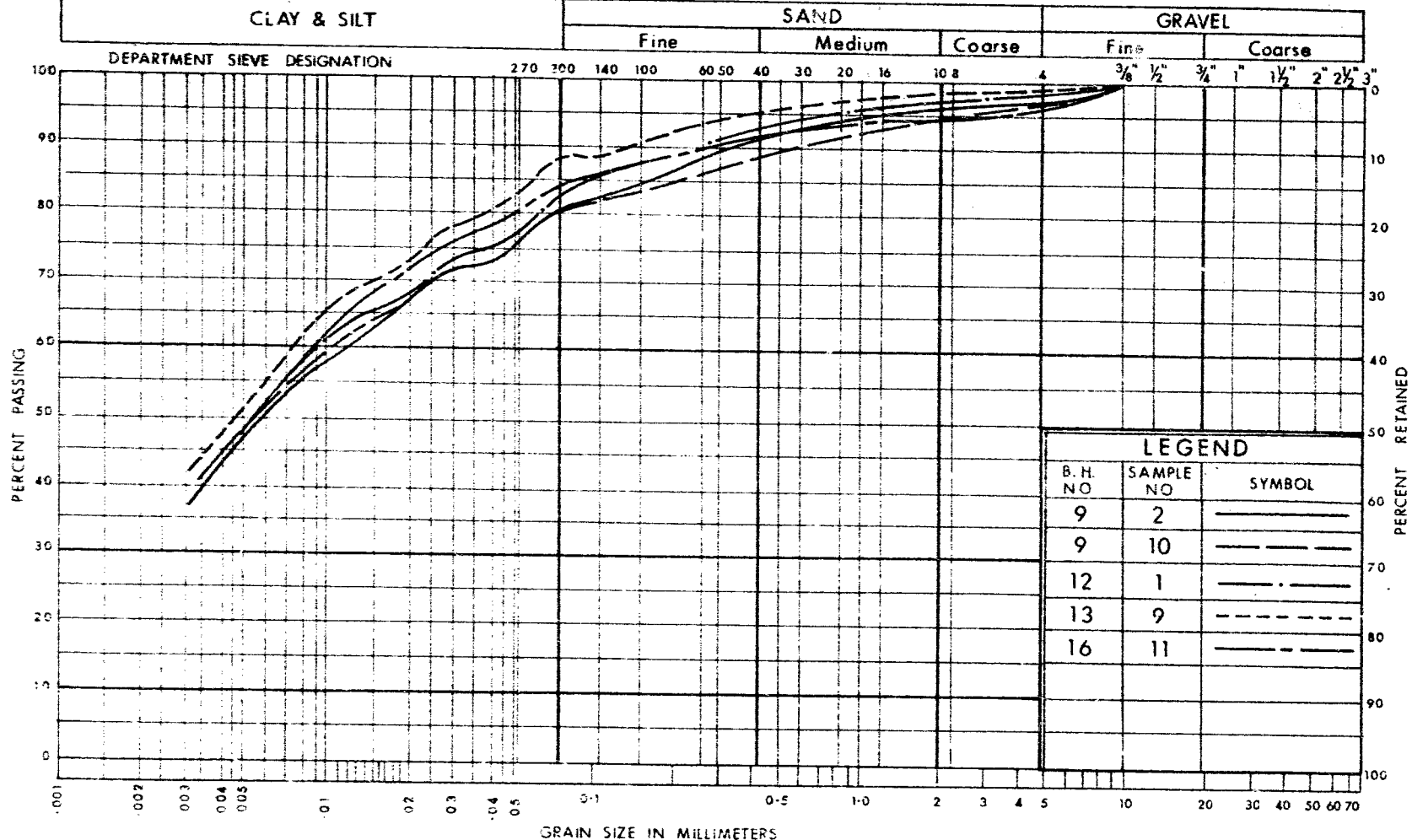
PLASTICITY CHART CLAYEY SILT (UPPER & LOWER ZONES) & SILTY CLAY

WP No. 43-66-14 & 15

JOB No. 69-F-114

FIG. 1

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

GRAIN SIZE DISTRIBUTION
CLAYEY SILT

W.P. No. 43-66-14 & 15

JOB No. 69-F-114

FIG. 2

ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

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

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

DESCRIPTION OF SOIL

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

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

TYPE OF SAMPLE

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

SOIL TESTS

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

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

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

GENERAL

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

STRESS AND STRAIN

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

EARTH PRESSURE

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

FOUNDATIONS

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

SLOPES

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

MEMORANDUM

TO: Mr. B. R. Davis
Bridge Engineer
Bridge Office
Admin. Bldg.

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

ATTENTION: Mr. S. McCombie

DATE: July 23, 1970

OUR FILE REF.

IN REPLY TO

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For
Proposed Crossing at Perch Creek
East Branch & C.A.H. #402, Line 'C'
Twp. of Plympton, Co. of Lambton
District No. 1 (Chatham, Ont.)
W.J. 69-F-114 -- W.P. 43-66-14 & 15
(report distribution Mar. 13/70)

Enclosed please find revised Drawing #69-F-114A, additional Drawing #69-F-114B and copies of Record of Borehole Nos. 1-8 inclusive. These should be attached to your copy(s) of the foundation report.

The addition of this information has been deemed necessary due to the fact that the structure has been shifted from the location which was proposed at the time of preparing our report.

Please destroy original Drawing #69-F-114A.

KCS:lm
Attach.

cc: Messrs. B. R. Davis
H. A. Tregaskes
D. W. Farren
W. Zonnenberg
F. C. Brown
A. P. Watt (2)
J. Roy
B. A. Singh

Foundations Files
Gen. Files

K. G. Selby
K. G. Selby
SUPERVISING FOUNDATION ENGINEER

For:
A. G. Stermac
PRINCIPAL FOUNDATION ENGINEER

DEPARTMENT OF HIGHWAYS- ONTARIO

MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 1

FOUNDATION SECTION

JOB 69-F-114 LOCATION Hwy. 402 Line "C" STA 70 + 04, 57' Lt. / ORIGINATED BY A.P.
 W.P. 43-66-14 & 15 BORING DATE Dec. 17, 69 COMPILED BY A.P.
 DATUM Geodetic BOREHOLE TYPE dynamic cone penetration test CHECKED BY AR

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F. GR. SA. SI. CL.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAI. PLOT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	SHEAR STRENGTH P.S.F.					WATER CONTENT %				
630.8	Ground Level					630	20 40 60 80 100 UNCONFINED + FIELD VANE QUICK TRIAXIAL x LAB. VANE					w_p — w — w_L WATER CONTENT %				
0.0	Probably Clayey Silt					620										
620.8						610										
11.0	End of cone test															

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 2

FOUNDATION SECTION

JOB 69-P-111 LOCATION Hwy. 402 Line 'C' STA 69 + 84 99' Lt.ORIGINATED BY A.P.W.P. 43-66-14 & 15BORING DATE Dec. 15, 1969COMPILED BY A.P.DATUM GeodeticBOREHOLE TYPE Washboring NX casing & coneCHECKED BY SR

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	20	40	60	80	100		
630.5	Ground Level													
0.0	SAND					630								
627.0			1	SS	30									
3.5			2	SS	65									
	Clayey silt		3	SS	39	620								
	some sand and traces		4	SS	31									
	of gravel		5	TW	PH									
	very stiff to hard		6	SS	27	610								
			7	SS	28									
			8	SS	24	600								
			9	SS	27									
590.0			10	TW	PH	590								
40.5	Silty clay with													
	traces of sand		11	SS	21	580								
	stiff to													
	very stiff													
568.0			12	TW	PH	570								
62.5	Clayey silt some													
	sand and traces					560								
	of gravel													
	hard		13	SS	60	550								
528.7			14	SS	31	530								
101.8	Shale Bedrock		15	RC	90% REC.									
104.0	End of borehole													

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No.3

FOUNDATION SECTION

JOB 69-P-114

LOCATION Hwy. 402, Line 18' STA 70 + 19, 99' Lt.

ORIGINATED BY A.P.

W.P. 43-66-14 & 15

BORING DATE Dec. 17/69

COMPILED BY A.P.

DATUM Geodetic

BOREHOLE TYPE dynamic cone penetration test

CHECKED BY

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w		BULK DENSITY γ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	SHEAR STRENGTH P.S.F.					WATER CONTENT %			
							BLOWS/FOOT: 20 40 60 80 100 UNCONFINED + FIELD VANE QUICK TRIAXIAL x LAB. VANE					w_p — w — w_L WATER CONTENT %			
633.0	Ground Level														
0.0	Probably Clayey Silt						630								
619.2							620								
13.8	End of cone test						610								

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 4

FOUNDATION SECTION

JOB 69-F-114 LOCATION Hwy. 402 Line 'C' STA 70 + 45 59 Lt.
W.P. 43-66-14 & 15 BORING DATE Dec. 16/69
DATUM Geodetic BOREHOLE TYPE Bombardier flight auger & coneORIGINATED BY A.P.COMPILED BY A.P.CHECKED BY MR

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.					WATER CONTENT %				
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE					w_p — w — w_L				
632.0	Ground Level															
0.0	Clayey silt some sand and traces of gravel stiff to hard		1	SS	9	630										
			2	SS	29											
			3	SS	46	620										
			4	SS	47											
			5	SS	30											
			6	TW	PH	610										
			7	SS	19											
			8	SS	22	600										
			9	SS	23											
			10	TW	PM	590										
590.0	Silty clay with traces of sand Stiff to very Stiff					590										
42.0																
						580										
						570										
568.0	Clayey silt some sand & traces of gravel Hard					560										
04.0																
						550										
530.3	End of borehole Probable bedrock					530										
101.7																

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 5

FOUNDATION SECTION

JOB 69-M-114 LOCATION Hwy. 402, Line 'C' STA 71 + 21, 66' Rt. ORIGINATED BY A.P.
 W.P. 43-66-14 & 15 BORING DATE Dec. 17/69 COMPILED BY A.P.
 DATUM Geodetic BOREHOLE TYPE Dynamic cone penetration test CHECKED BY AK

SOIL PROFILE		STRAT. PLOT	SAMPLES		BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION		NUMBER	TYPE			20	40	60	80	100	SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE w_p — w — w_L WATER CONTENT %				
630.9	Ground Level					630										
0.0	Probable clayey silt					620										
619.9																
11.0	End of cone test					610										

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 6

FOUNDATION SECTION

JOB 69-R-114

LOCATION Hwy. 402 Line 'C' STA 71 + 42 99' Rt.

ORIGINATED BY A.P.

W.P. 43-66-14 & 15

BORING DATE Dec. 12, 1969

COMPILED BY A.P.

DATUM Geodetic

BOREHOLE TYPE washboring, NX casing & cone

CHECKED BY *AK*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — w _L PLASTIC LIMIT — w _p WATER CONTENT — w			BULK DENSITY Y P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT					w _p — w _L	WATER CONTENT %				
							20 40 60 80 100										
							SHEAR STRENGTH P.S.F.										
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE										
632.4	Ground Level																
0.0	Clayey silt, some sand, very stiff		1	SS	21	630											
626.4			2	SS	49												
6.0	Sand & Gravel- Dense to V. Dense		3	SS	71												
622.4			4	SS	58	620											
10.0	Clayey silt some sand and traces of gravel		5	SS	52												
	very stiff to hard		6	TW	PH	610											
			7	SS	38												
			8	TW	PM	600											
			9	SS	45												
			10	SS	38	590											
590.0																	
42.4	Silty clay with traces of sand		11	TW	PH	580											
	stiff to Hard																
	Hard		12	SS	32	570											
568.0																	
64.4	Clayey silt some sand and traces of gravel					560											
	Hard		13	SS	37	550											
544.4																	
88.0	End of borehole					540											
	Probable boulder																

FOUNDATION SECTION

CHECKED BY *AK*

20
15- ϕ -5 % STRAIN AT FAILURE
10

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 8

FOUNDATION SECTION

JOB 69-F-114

LOCATION Hwy. 402 Line 'C' STA 70 + 78, 70' RT.

ORIGINATED BY A.P.

W.P. 43-66-14 & 15

BORING DATE Dec. 12/69

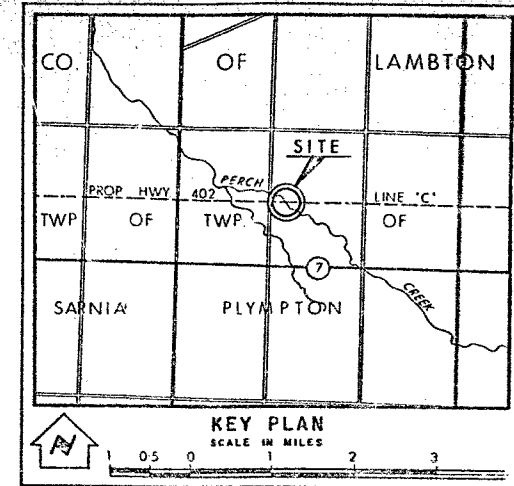
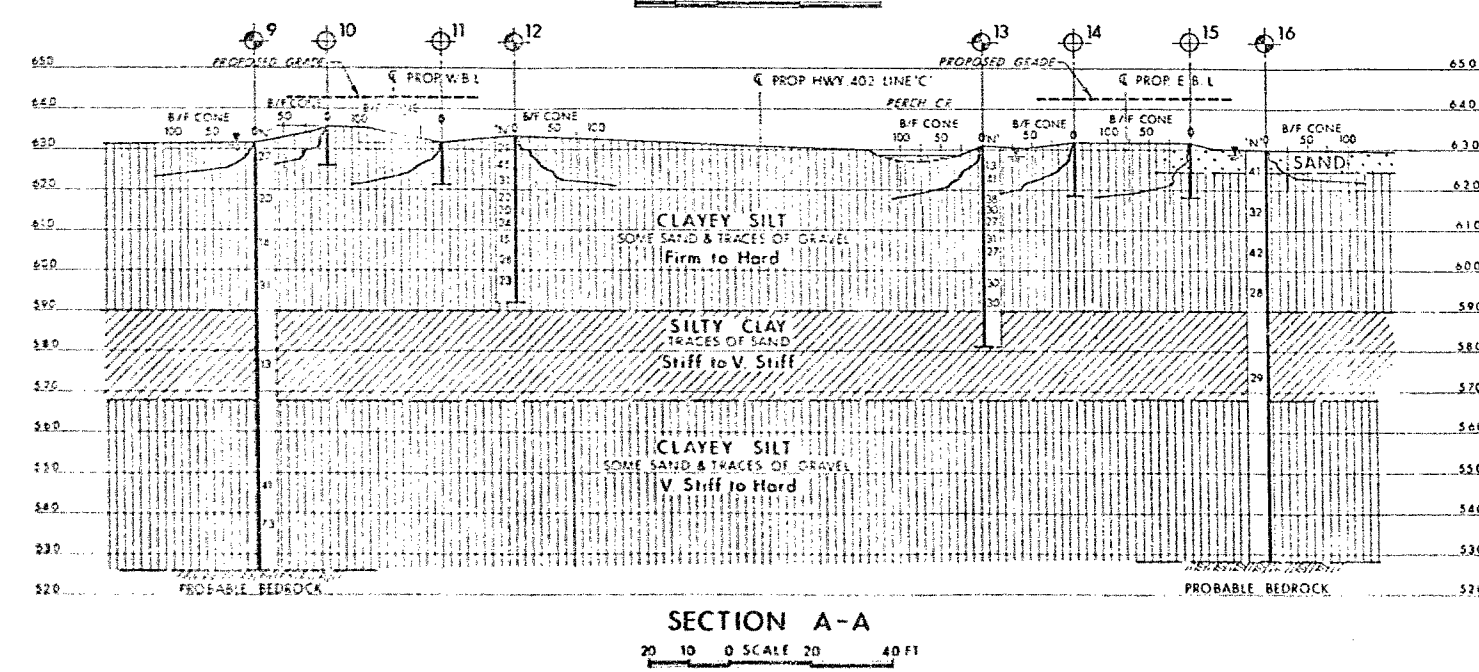
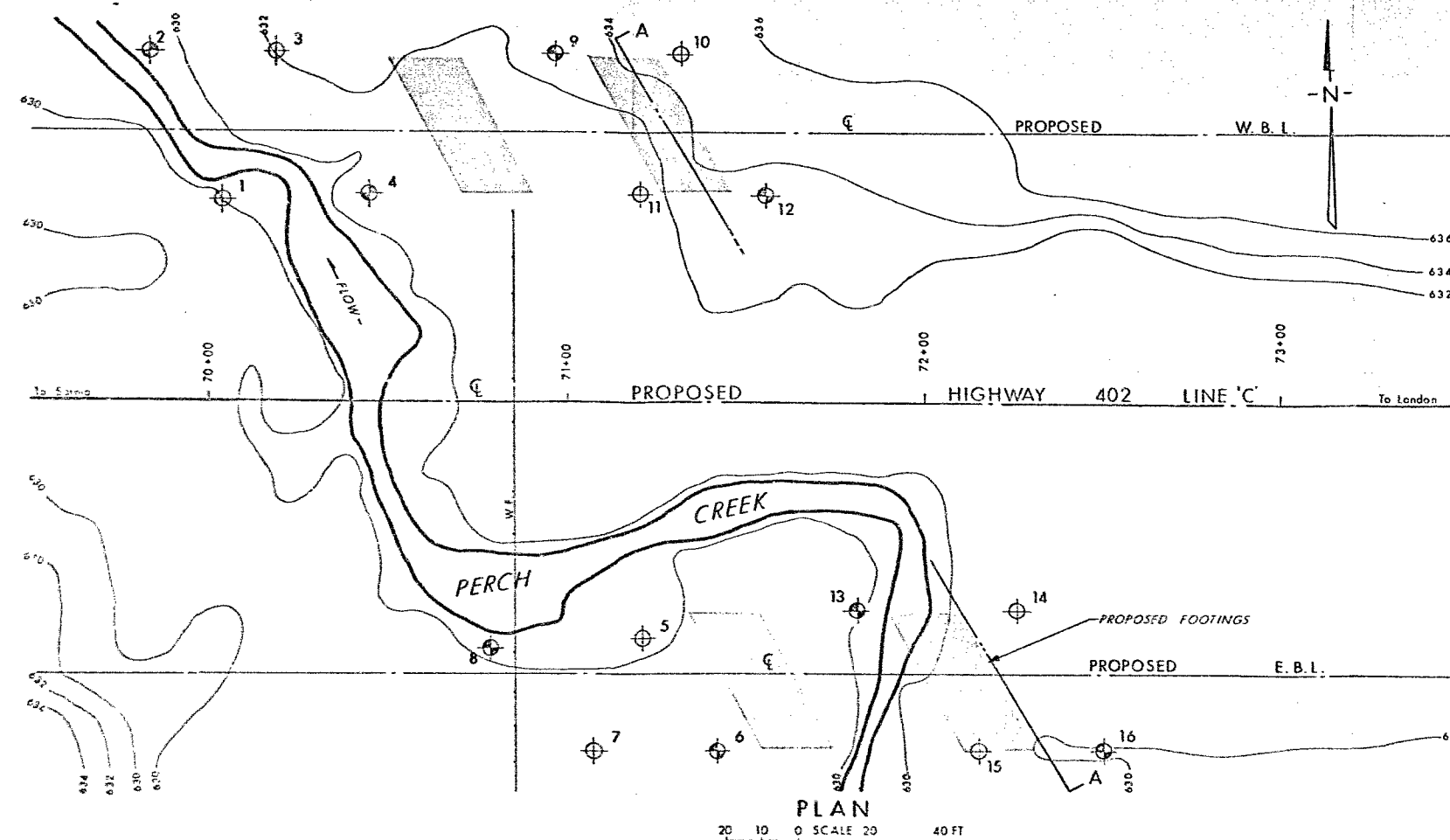
COMPILED BY A.P.

DATUM Geodetic

BOREHOLE TYPE Bombardier flight auger & cone

CHECKED BY *AL*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w		BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	WATER CONTENT %			
630.0	Ground Level														
0.0	Clayey silt some sand and traces of gravel		1	SS	9										
			2	SS	36										
			3	SS	43	620									
			4	SS	38										
			5	TW	PH										
			6	SS	26	610									
			7	TW	PH										
			8	SS	25	600									
			9	SS	25										
590.0			10	TW	PH	590									
40.0	Silty clay with traces of sand														
	Stiff		11	SS	14	580									
568.0			12	TW	PM	570									
62.0															
	Clayey silt some sand and traces of gravel														
	Very stiff to hard		13	SS	18	550									
528.5	Weathered shale		14	SS	32	530									
101.5	End of borehole														



LEGEND			
	Bore Hole		
	Cone Penetration Hole		
	Bore & Cone Penetration Hole		
	Water Levels established at time of field investigation, FEB. 1970		
NOTE: Water Level in Bore Holes 4, 6 & 12 not established at time of field investigation.			
NO.	ELEVATION	STATION	OFFSET
9	631.5	70+97	97' LT.
10	635.3	71+32	99' LT.
11	631.6	72+21	59' LT.
12	633.2	71+56	59' LT.
13	630.4	71+81	59' RT.
14	631.5	72+26	59' RT.
15	631.1	72+15	99' RT.
16	630.0	72+50	99' RT.

NOTE
The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

REVISIONS	DATE	BY	DESCRIPTION
1			BORE HOLES 1 to 16 ADDED ON PLAN

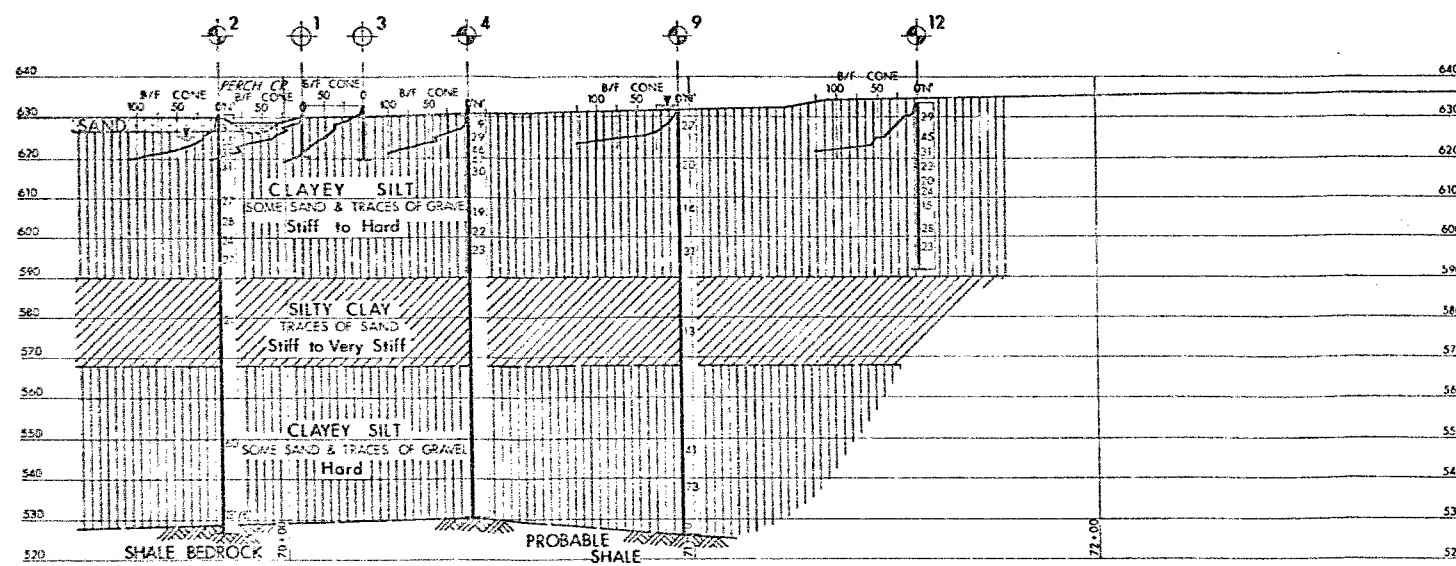
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE - FOUNDATION SECTION

PERCH CREEK

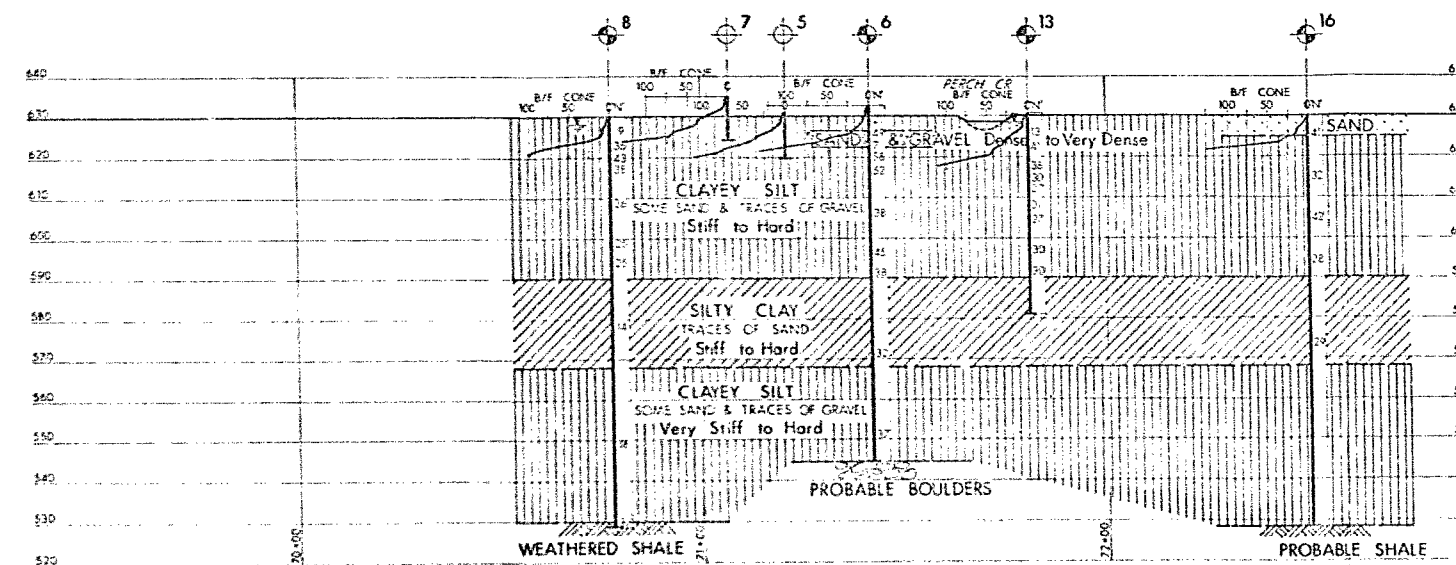
KING'S HIGHWAY NO. 402 LINE 'C' DIST. NO. 1
CO. LAMBTON
TWP. PLYMPTON LOT 4 CON. 5 & 6

BORE HOLE LOCATIONS & SOIL STRATA

SUBM'D P.P.	CHECKED	WP NO. 43-66-14.15	M.B.T. DRAWING NO.
DRAWN S.O.	CHECKED	JOB NO. 69-F-114	69-F-114A
DATE 5 MAR 1970	SITE NO.	BRIDGE DRAWING NO.	
APPROVED <i>[Signature]</i>	CONT. NO.		



PROFILE W.B.L.



PROFILE E.B.L.

PROFILES
SCALE
20 40 60 FT

SEE DRAWING No. 69-F-114A



KEY PLAN
SCALE IN MILES

LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation, DEC. 1969

NO.	ELEVATION	STATION	OFFSET
1	630.8	70+04	57' LT.
2	630.5	69+84	99' LT.
3	633.0	70+19	99' LT.
4	632.0	70+45	59' LT.
5	630.9	71+21	66' RT.
6	632.4	71+42	99' RT.
7	634.9	71+07	99' RT.
8	630.0	70+78	70' RT.

NOTE

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

NO.	DATE	BY	DESCRIPTION

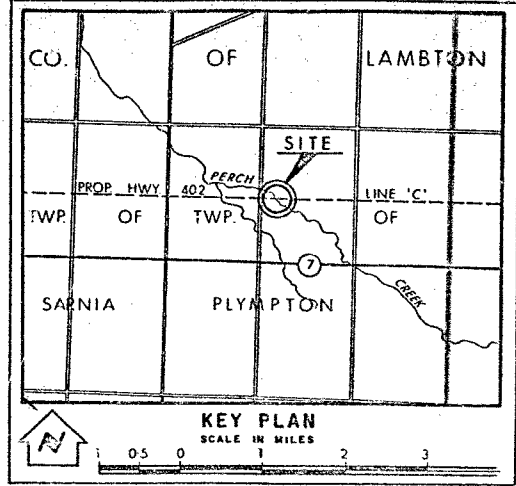
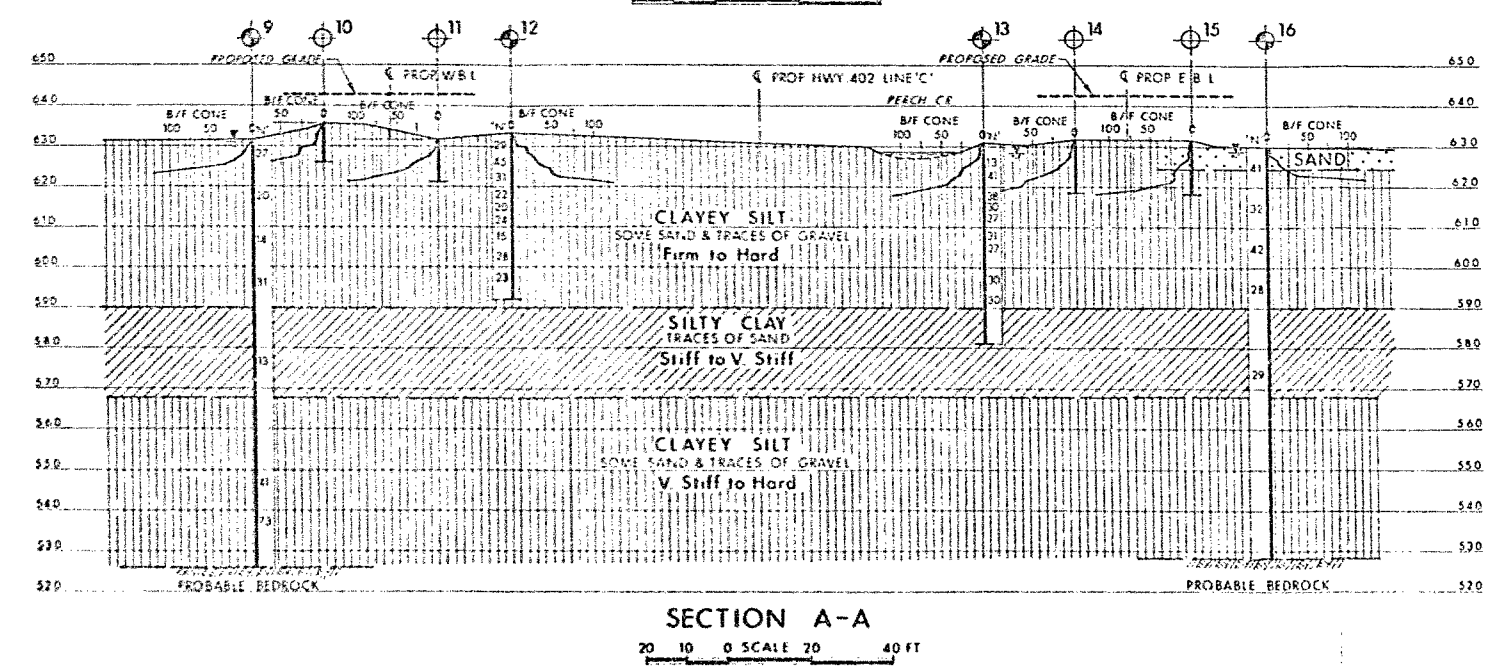
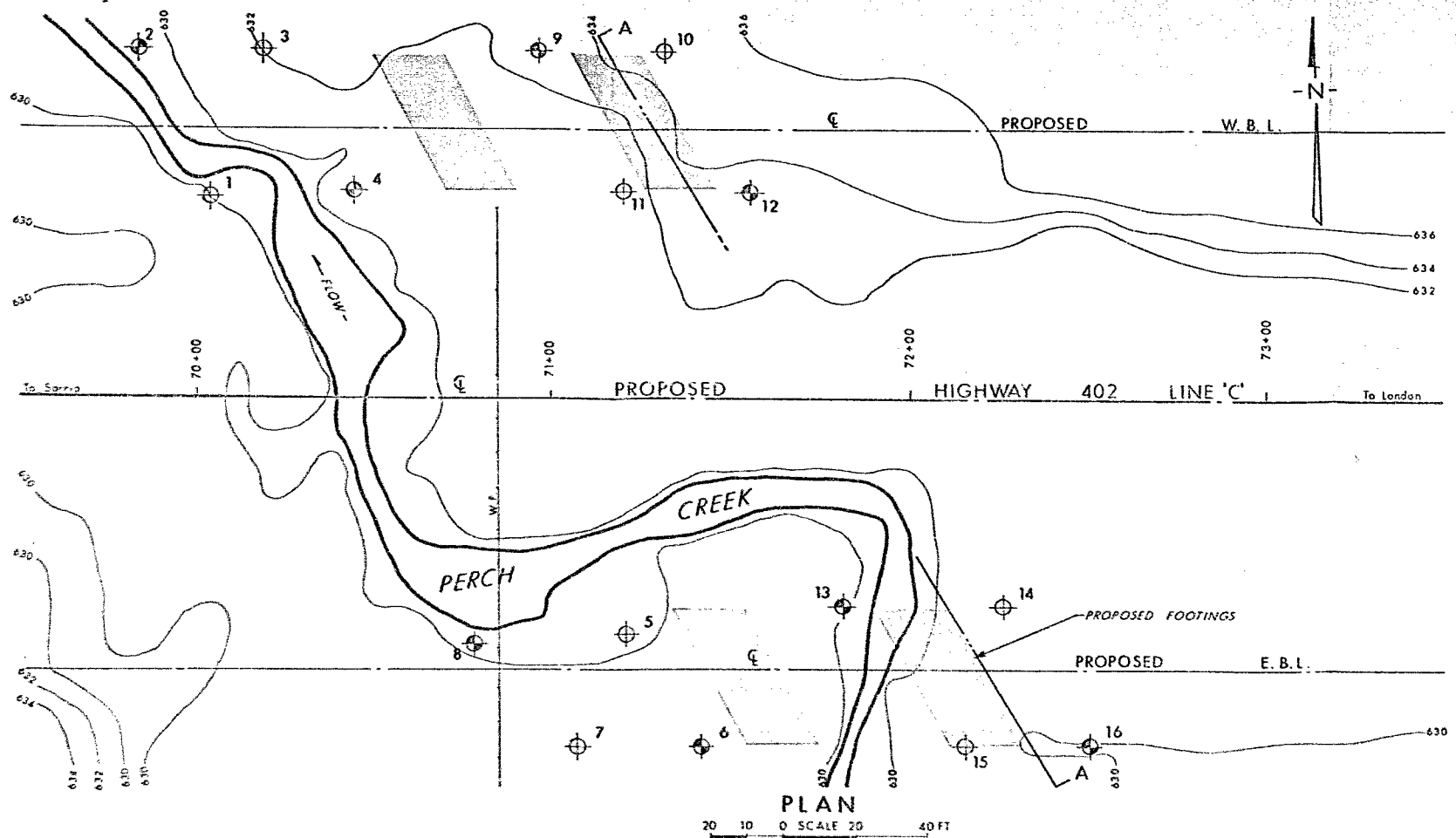
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE - FOUNDATION SECTION

PERCH CREEK

KING'S HIGHWAY NO. 402 LINE 'C' DIST. NO. 1
CO. LAMBTON
TWP. PLYMPTON LOT 4 CON. 5 & 6

PROFILES & SOIL STRATA

SUBMD. P.P. CHECKED	W.P. NO. 13-66-13.8.15	M.S.T. DRAWING NO.
DRAWN S.R. CHECKED	JOB NO. 69-F-114	69-F-114B
DATE JULY 15, 1970	SITE NO.	BRIDGE DRAWING NO.
APPROVED <i>A. J. Thomas</i>	CONT. NO.	



LEGEND			
	Bore Hole		
	Cone Penetration Hole		
	Bore & Cone Penetration Hole		
	Water Levels established at time of field investigation, FEB. 1970		
NOTE: Water Level in Bore Holes 4, 6 & 12 not established at time of field investigation.			
NO.	ELEVATION	STATION	OFFSET
9	631.5	70+97	97' LT.
10	635.3	71+32	99' LT.
11	631.6	72+21	59' LT.
12	633.2	71+56	59' LT.
13	630.4	71+81	59' RT.
14	631.5	72+26	59' RT.
15	631.1	72+15	99' RT.
16	630.0	72+50	99' RT.

NOTE
The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

REVISIONS	DATE	BY	DESCRIPTION
1	1970	ST	BORE HOLES 1 to 8 ADDED ON PLAN

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

PERCH CREEK

KING'S HIGHWAY NO. 402 LINE 'C' DIST. NO. 1
CO. LAMBTON
TWP. PLYMPTON LOT 4 CON. 5 & 6

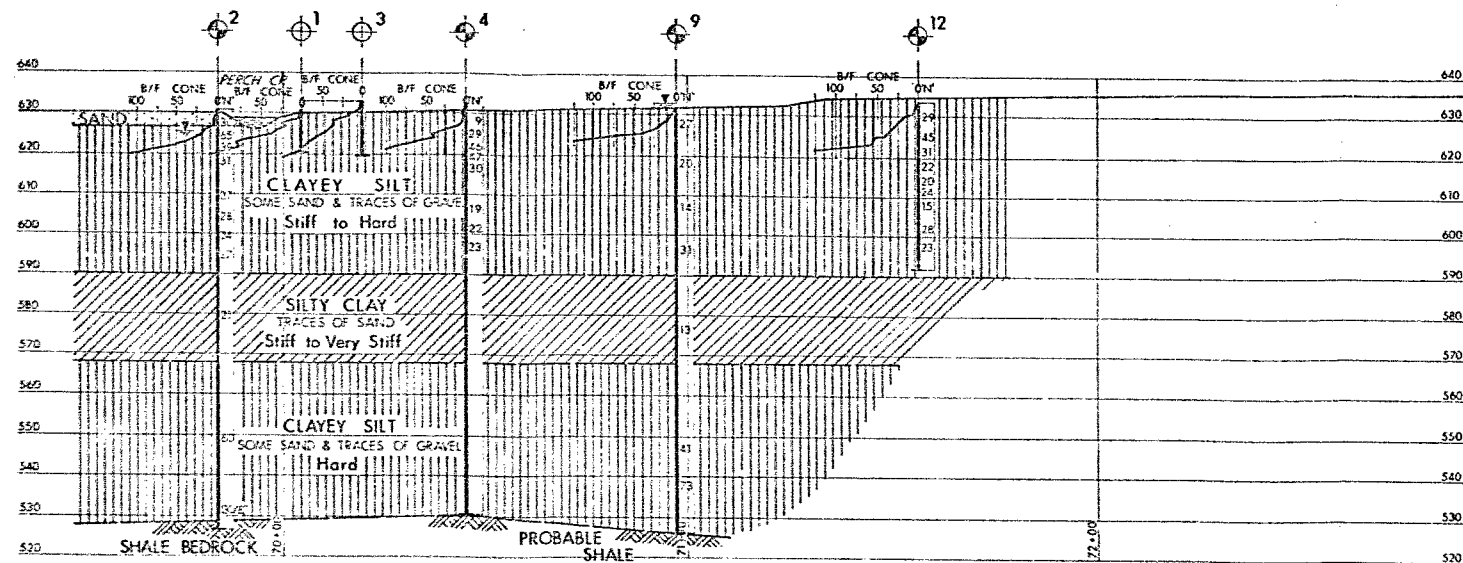
BORE HOLE LOCATIONS & SOIL STRATA

SUBMIT P.P.	CHECKED	W.P. NO. 43-66-14 & 15	M.B.T. DRAWING NO.
DRAWN S.D.	CHECKED	JOB NO. 69-F-114	69-F-114A
DATE 5 MAR 1970	SITE NO.	BRIDGE DRAWING NO.	
APPROVED <i>A. G. Thomas</i>	CONT. NO.		

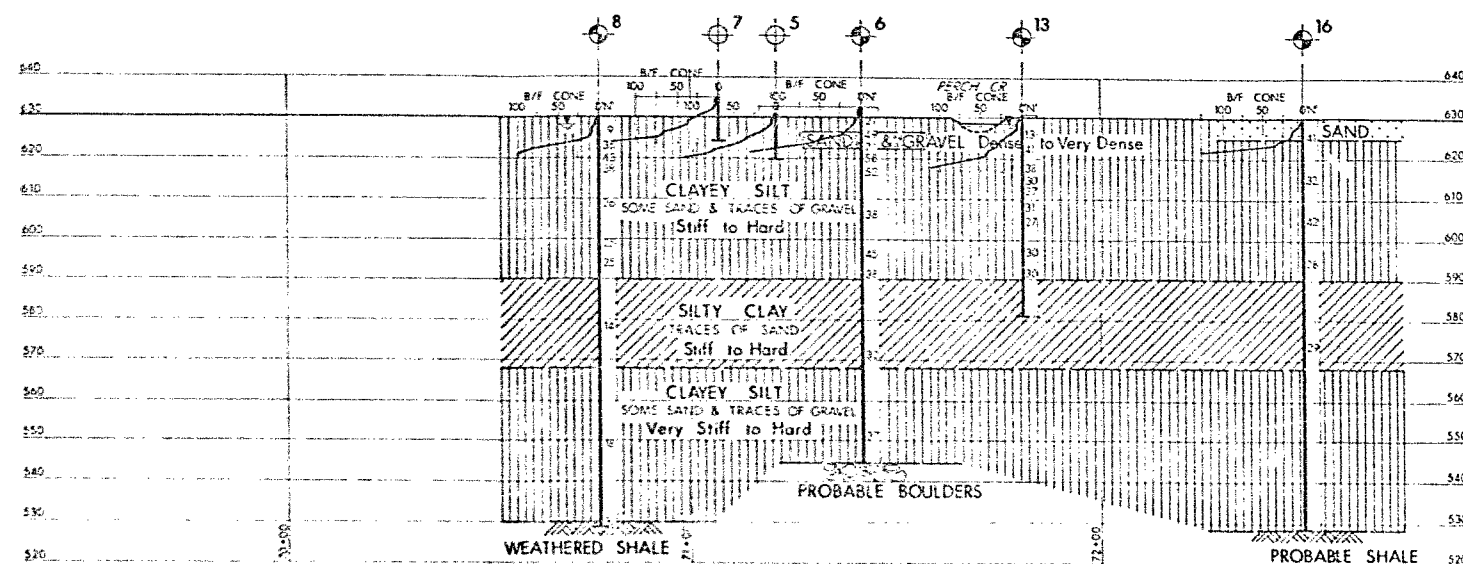
EXTRA

SET

OF DWGS.



PROFILE W.B.L.



PROFILE E.B.L.

PROFILES
SCALE 20 10 0 20 40 FT

SEE DRAWING No. 69-F-114A



KEY PLAN
SCALE IN MILES

LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation, DEC. 1969

NO.	ELEVATION	STATION	OFFSET
1	630.8	70+04	57'LT
2	630.5	69+84	99'LT
3	633.0	70+19	99'LT
4	632.0	70+45	59'LT
5	630.9	71+21	66'RT
6	632.4	71+42	99'RT
7	634.9	71+07	99'RT
8	630.0	70+78	70'RT

NOTE

The boundaries between soil strata have been established only of Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

REVISIONS	DATE	BY	DESCRIPTION

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

PERCH CREEK

KING'S HIGHWAY NO. 402 LINE 'C' DIST. NO. 1
CO. LAMBTON
TWP. PLYMPTON LOT 4 CON. 5 & 6

PROFILES & SOIL STRATA

SUBNO. P.P.	CHECKED	W.P. NO. 43-06-14815	M.B.T. DRAWING NO.
DRAWN S.R.	CHECKED	JOB NO. 69-F-114	69 F-114B
DATE JULY 15, 1970	SITE NO.	BRIDGE DRAWING NO.	
APPROVED <i>ag</i>	CONT. NO.		

MEMORANDUM

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

FROM: C.S. Grebski

ATTENTION:

DATE: December 9, 1970

OUR FILE REF.

IN REPLY TO

SUBJECT: Perch Creek (Cow Creek) Bridges
E.B.L. & W.B.L. Bridges
W.P. 43-66-14 & -15, Site No. 14-357
Highway 402, District No. 1

69-F-114

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

Kindly give us your comments at your earliest convenience.

C.S. Grebski
C.S. Grebski,
Bridge Design Engineer

CSG:rd

Attach.

c.c. Foundation Office

DEC 11 1970

NO COMMENTS

1.4.2.

K.48

15 Jan 71

MEMORANDUM

69-F-114

To: Mr. J. McDonnell,
Field Planning Engineer,
Bridge Office,
Admin. Bldg.

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

ATTENTION

DATE: January 15, 1970

OUR FILE REF

IN REPLY TO

SUBJECT: Re: W.P. 43-6-14 & 15 -- Bridge Site 14-352
Porch Creek East Branch, E.B.L. and W.B.L.
1.3 Miles East of County Road No. 26
Ewy. #462 -- District No. 1 (Chatham)

Following the memo from Mr. J. Jants, dated January 12, 1970, we have reviewed the field information obtained during the recent investigation at the above-mentioned site.

Due to the variable nature of the surficial deposits, which are mainly alluvial in origin, it will not be possible for us to prepare a foundation report for the new structure until a completely new field investigation is carried out. The new structure site is some 100 ft. from the one we were originally asked to investigate.

We assure that you require this new work to be done, and we will take the necessary action. We anticipate that our report will be completed by March 13, 1970.

H. G. Selby

Chief

H. G. Selby,
SUPERVISING FOUNDATION ENGR.
for:

cc: Mr. J. A. P. Watt
A. Crowley

A. G. Stenetz,
PRINCIPAL FOUNDATION ENGR.

Foundations File
Per. Files

VISUAL CLASSIFICATION SHEET

PROJECT <u>69-F-114</u> SITE <u>SARNIA</u> BOREHOLE No. <u>9</u> GROUND ELEVATION _____																
SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION					DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE												
				GRAVEL	SAND	SILT & CLAY										
1	3.0											BZ.			CL. SL. WITH SOME SAND & GRAVEL	
3	13.0											GREY			— " —	
5	23.0											"			— " —	
7	33.0											"			— " —	
9	53.0											GREY			SL. CL. TRACES OF SAND AND POCKETS OF SILT	
11	83.0											GREY			CL. SL. WITH SOME SAND & GRAVEL	
12	93.0											"			— " —	

NOTES:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT <u>69-F-114</u>										SITE <u>SARWIA</u>										BOREHOLE No. <u>13</u>										GROUND ELEVATION _____									
SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION					DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL																							
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE																																			
				GRAVEL	SAND	SILT & CLAY																																	
1	3.0														CL. SL. WITH SOME SAND & TRACES OF GRAVEL																								
2	6.0														— 1 —																								
4	12.0														CL. SL. WITH SOME SAND & TRACES OF GRAVEL																								
5	15.0														— 1 —																								
6	18.0														— 1 —																								
7	21.0														— 1 —																								
8	24.0														— 1 —																								
10	33.0														— 1 —																								
11	38.0														— 1 —																								

NOTES:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

VISUAL CLASSIFICATION SHEET

PROJECT <u>69-F-114</u> SITE <u>SARNIA</u> BOREHOLE No. <u>16</u> GROUND ELEVATION _____																
SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION					DRY STRENGTH	SHINE	DILATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE												
				GRAVEL	SAND	SILT & CLAY										
1	5.0											BZ.			CL. SI. WITH SOME SAND & TRACES OF GRAVEL	
3	15.0											GREY			— 1 —	
5	25.0											— 11 —			— 1 —	
7	35.0											— 11 —			— 11 —	
9	55.0											— 11 —			— 11 —	

NOTES:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

VISUAL CLASSIFICATION SHEET

PROJECT <u>69-F-114</u> SITE <u>SARWIA</u> BOREHOLE No. <u>12</u> GROUND ELEVATION _____														
SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION			DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE										
				GRAVEL SAND SILT & CLAY										
1	3.0									BZ.			CL. SL. WITH SOME SAND & TRACES OF GRAVEL	
2	6.0									— " —			— " —	
3	9.0									— " —			— " —	
5	15.0									GREY			— " —	
6	18.0									— " —			— " —	
7	21.0									— " —			— " —	
8	25.0									— " —			— " —	
9	30.0									— " —			— " —	
10	35.0									"			SL. SL. TO SL. CL.	

NOTES:— VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:—

MEMORANDUM

69-F-114

TO: Mr. A. Stermac,
Principal Foundation Engr.,
Met. & Testing Office,
Lab. Bldg., DOWNSVIEW.

FROM: Bridge Planning,
Southwestern Region.

ATTENTION:

DATE: January 12th, 1970.

OUR FILE REF.

IN REPLY TO

SUBJECT:

W.P. 43-66-14, -15, Bridge Site 14-357,
Perch Creek East Branch, E.B.L. & W.B.L.,
1.3 miles East of County Road No. 26,
Highway 402,
District 1 - Chatham.

On November 21st, 1969, we requested a foundation investigation for the above location based on preliminary portion plan in the vicinity of the bridge.

Upon receiving the site plan E-4866-1 and pre-engineering cross sections for the proposed stream diversion, it became evident that the ideal location for the structures is somewhat to the east of the location shown on the preliminary plan submitted earlier. Please re-evaluate the foundation investigation already completed in the field considering the proposed new location of the structure.

I have enclosed two copies of bridge site plan E-4866-1 with the new probable footing locations marked in red.

SA/ra
Encl.

S. JANTS
Bridge Planning Technician,
Southwestern Region.

c.c. J. McCombie.
L. Crowley.

MEMORANDUM

To: Mr. A. Stermac,
Principal Foundation Engr.,
Mat. and Testing Office,
DOWNSVIEW, Ontario.

FROM: Bridge Planning,
Southwestern Region.

ATTENTION:

DATE: February 6th, 1970.

OUR FILE REF.

IN REPLY TO

SUBJECT:

W.P. 43-66-14, -15, Bridge Site 14-357,
Perch Creek East Branch, E.B.L. & W.B.L.,
1.3 miles east of County Road No. 26,
Highway 402,
District 1 - Chatham.

For your information, please find enclosed a revised bridge site plan E-4866-1 for the above structure. On this plan the contour lines have been extended further to the east than on the plan I sent you on January 12th, 1970.

S. Jants

S. JANTS
Bridge Planning Technician,
Southwestern Region.

SJ/ss
Atch.

c.c. S. McCombie.

MEMORANDUM

To: Mr. A. Starnac,
Princ. Foundation Engr.,
Met. and Testing Office,
Lab Bldg., DOWNSVIEW.

From: S. Jants,
Bridge Planning Technician,
London Regional Office.

ATTENTION:

DATE: November 21st, 1969.

OUR FILE REF.

IN REPLY TO

SUBJECT:

43-66-14 EBL 43-66-15 W.B.L

W.P. ~~43-66-02~~, G.D., Bridge Site 14-357
Perch Creek East Branch, E.B. & W.B.L.,
1.3 miles east of County Road #26,
Highway 402,
District 1 - Chatham.

Would you kindly arrange to have a foundation investigation conducted at the above location.

I have enclosed two copies of the preliminary plan with the probable footing locations marked in red. The E-plan for this site is not prepared yet and I will send you two marked copies of it when available.

S. Jants

SS/cs
Atch.

S. JANTS
Bridge Planning Technician,
London Regional Office.

c.c. S. McCombie.
A. Crowley.

COMPLETION DATE JAN 28/70