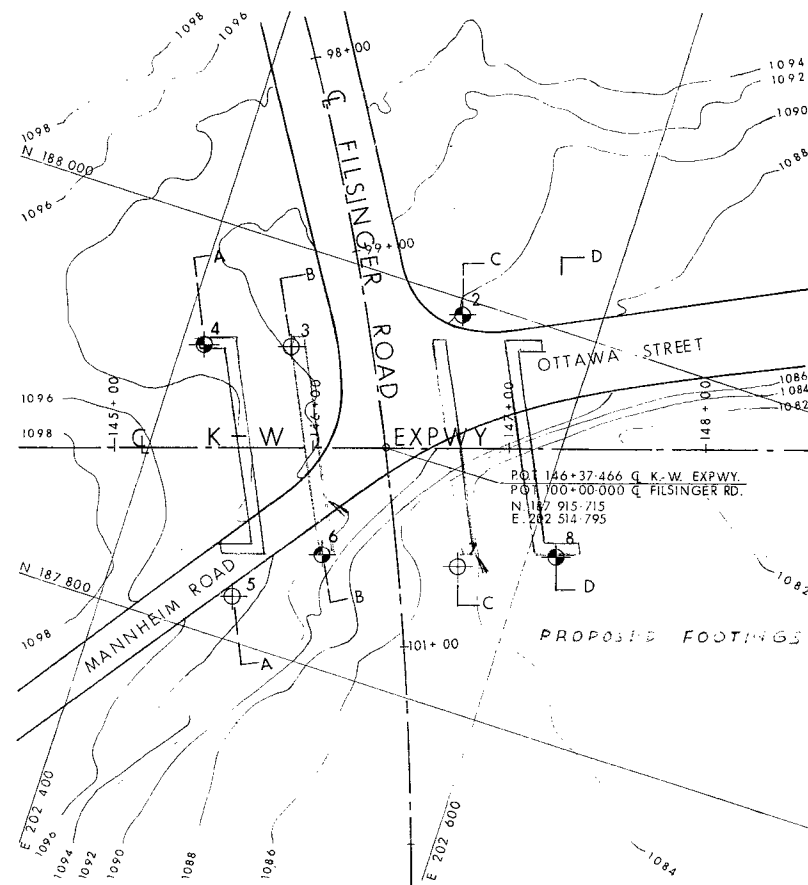
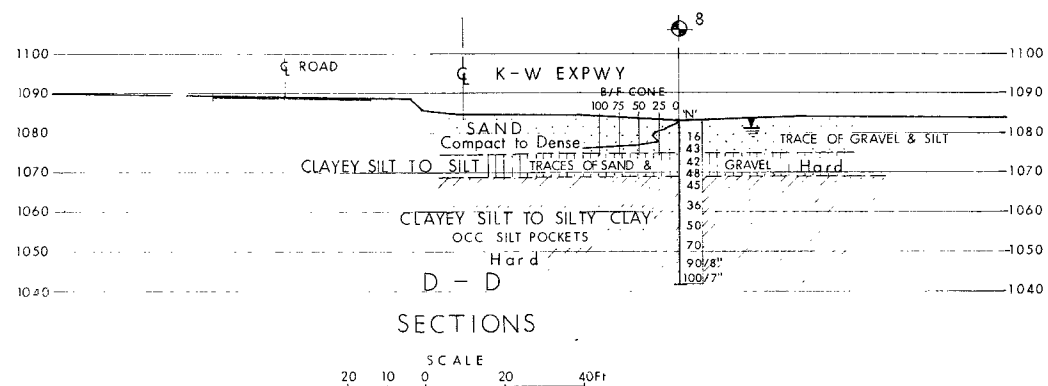
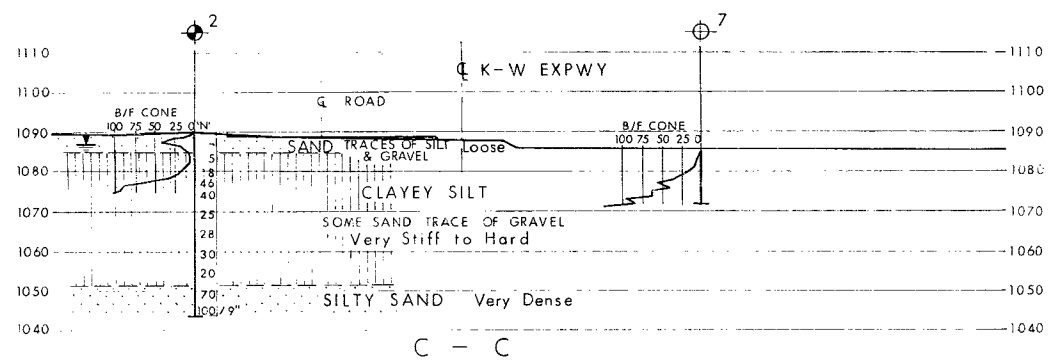
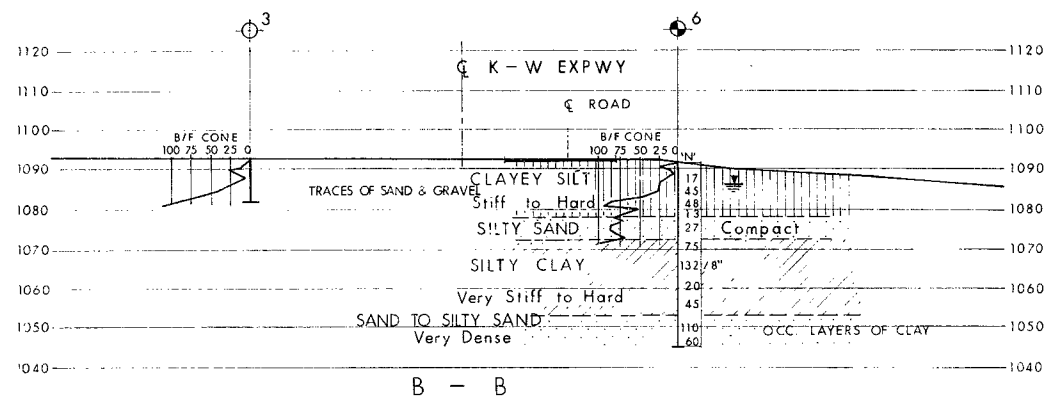
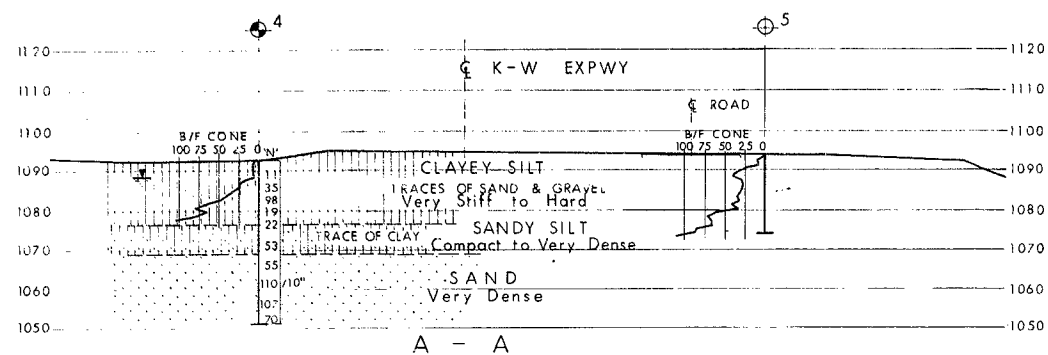
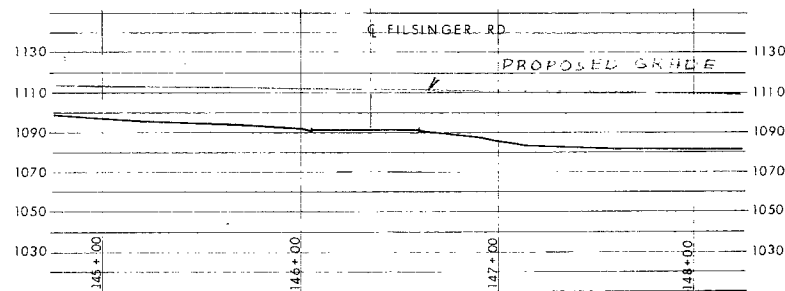


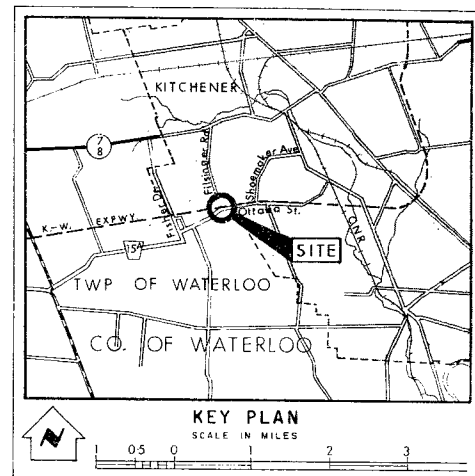
#67-F-102
W.P. #628-64
KITCHENER
WATERLOO EXP.
FILSINGER
ROAD.



PLAN



PROFILE



LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation, NOV. 1967.

NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
2	1090.0	187,991	202,531
3	1091.5	187,950	202,454
4	1092.5	187,937	202,411
5	1094.2	187,821	202,464
6	1091.3	187,854	202,500
7	1084.2	187,875	202,567
8	1082.8	187,890	202,614

NOTE

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

REVISIONS	DATE	BY	DESCRIPTION

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

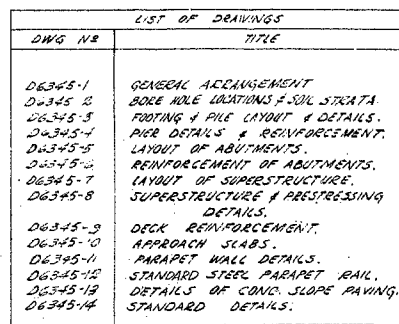
FILSINGER ROAD

KING'S HIGHWAY NO. K-W EXPWY DIST. NO. 4
CO. WATERLOO
TWP. WATERLOO LOT CON.

BORE HOLE LOCATIONS & SOIL STRATA

SUBWD A. S. CHECKED	WP NO. 628-64	W&T DRAWING NO.
DRAWN A. B. CHECKED	JOB NO. 67-F-102	67-F-102 A
DATE DEC. 15, 1967	SITE NO.	BRIDGE DRAWING NO.
APPROVED <i>A. J. Thomas</i>	CONT. NO.	

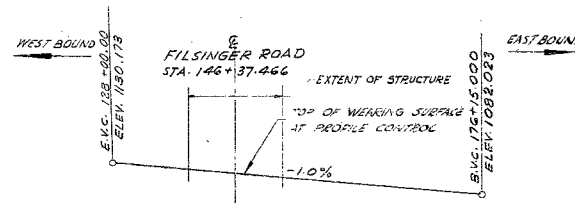
REF. NO. 5962-43-M242 M. M. DILLON LTD.



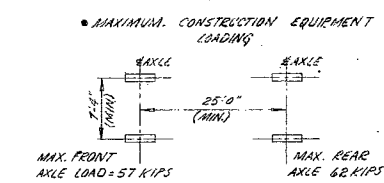
Technical drawing of a bridge cross-section showing a continuous cast-in-place prestressed deck over three columns. The drawing includes dimensions for spans (12'-0" to 17'-0"), deck width (36'-0"), and column spacing (36'-0"). It also shows details like "LIMIT OF CONST. TRAFFIC", "CONCRETE FINISH SURFACE 2.0%", and "CONTINUOUS CAST IN PLACE PRESTRESSED DECK 2.0%". A note refers to "FOR DETAILS OF JUNCTION BOX & INSERTS SEE ELEC. DWGS."

GENERAL NOTES:

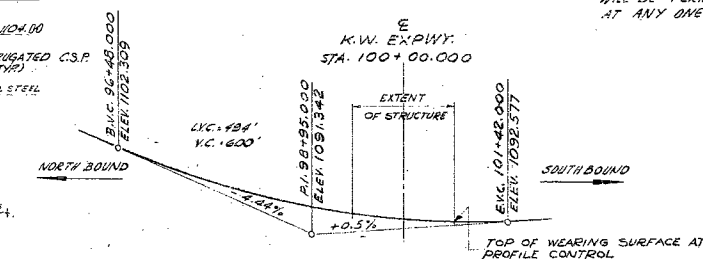
- CLASS OF CONCRETE
DECK CURBS, PARAPET & COLUMNS 5000 PSI.
ELSEWHERE 3000 PSI.
- COVER TO REINFORCEMENT
FOOTINGS 3"
PIER COLUMNS (TO OUTSIDE OF SPINALS) — 3"
ABUTMENTS & HANDRAILS (EXPOSED FACES) — 2"
(UNEXPOSED FACES) — 3"
DECK: TOP 2"
BOTTOM 1 1/2"
CURBS 2"
PARAPET 1 1/2"
- CONSTRUCTION NOTES
THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS TO THE SPECIFIED ELEV. WITH A TOLERANCE OF ± 1/8 INCH.
NO CONCRETE SHALL BE PLACED ABOVE ABUTMENT BEARING SEATS UNTIL PRESTRESSING AND GROUTING HAVE BEEN COMPLETED.



PROFILE OF K.W. EXPWY.
NOT TO SCALE




- CONSTRUCTION TRAFFIC ON THE STRUCTURE WILL BE RESTRICTED TO THE ABOVE LOADING LIMITS & WILL BE PERMITTED ONLY ON DESIGNATED AREAS OF THE STRUCTURE.
- MAXIMUM SPEED OF CONSTRUCTION VEHICLES SHALL BE 10 M.P.H. & ONLY ONE VEHICLE WILL BE PERMITTED ON A STRUCTURE AT ANY ONE TIME.

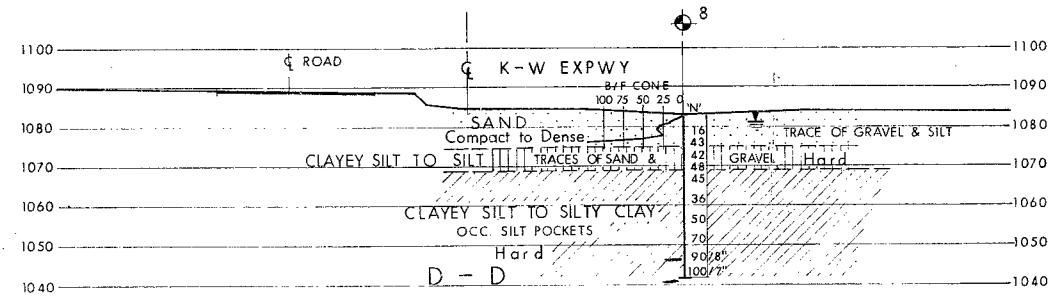
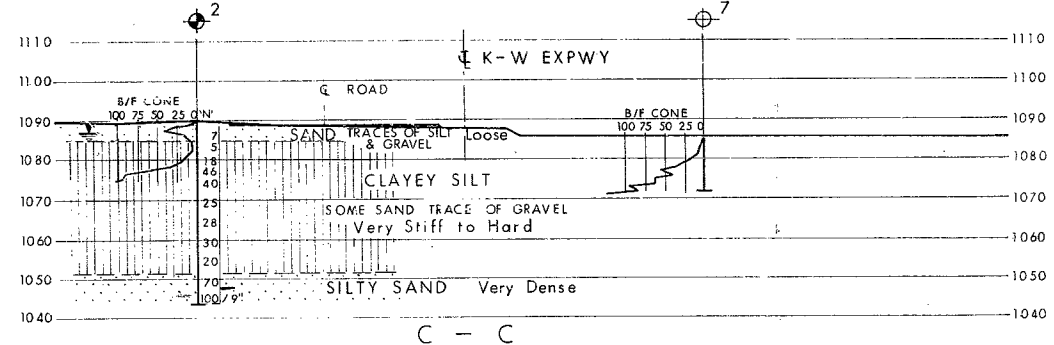
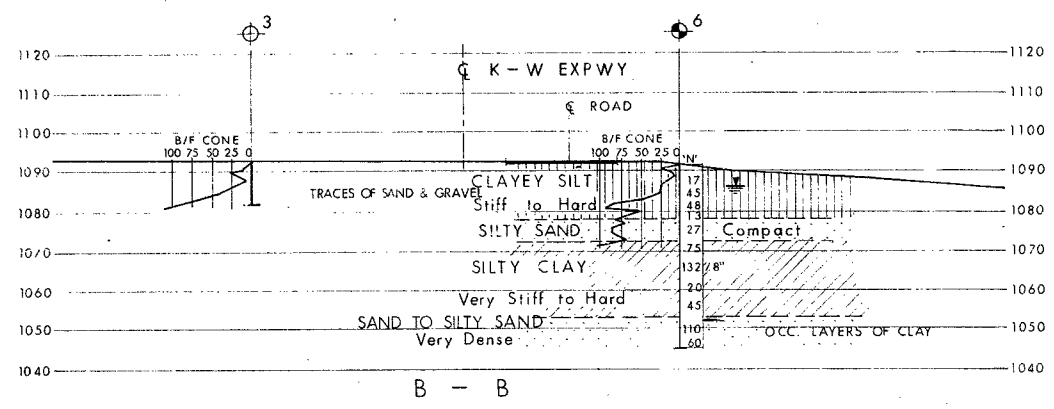
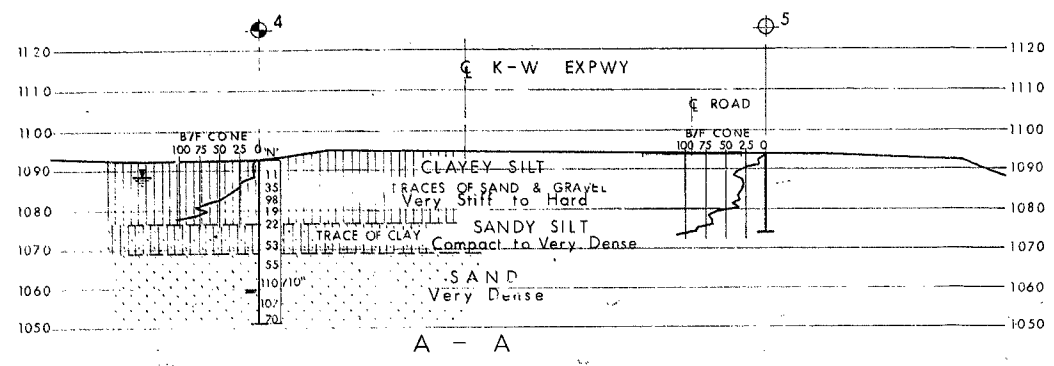


PROFILE OF FILSINGER RD.
NOT TO SCALE



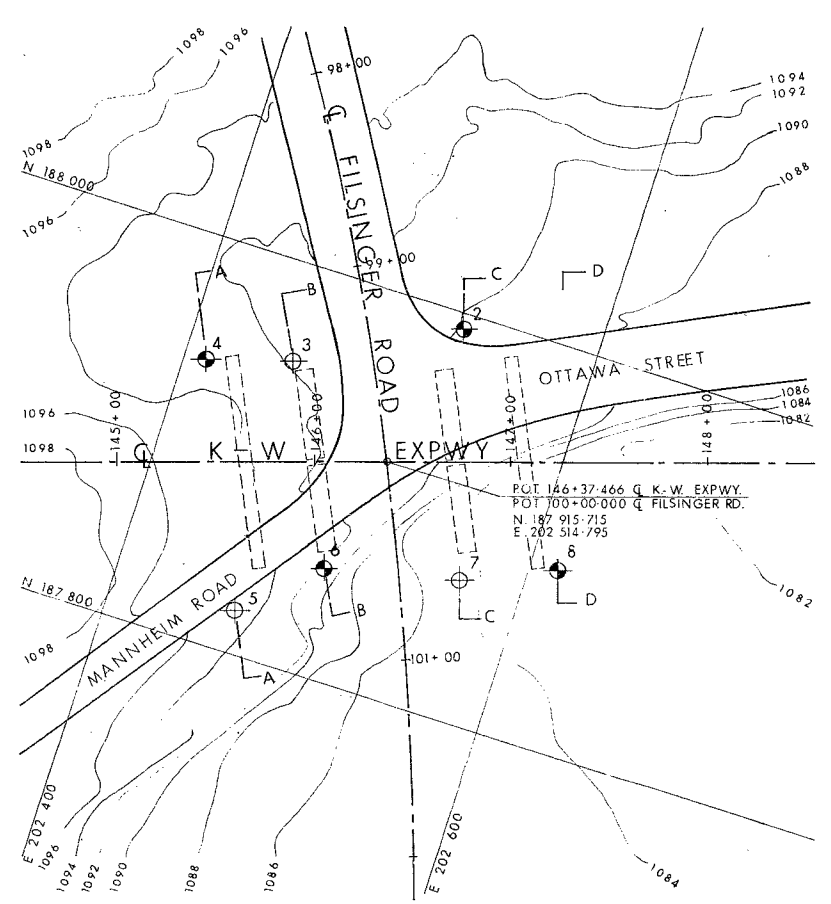
DEPARTMENT OF HIGHWAYS ONTARIO				
BRIDGE DIVISION				
 M. M. DILLON LIMITED CONSULTING ENGINEERS		100-400 7-6000-00		
KITCHENER-WATERLOO EXPRESSWAY FILSINGER RD. OVERPASS				
KING'S HIGHWAY		HENRY STURM BLVD.	SITE No. 4	
CO. WATERLOO				
CITY OF KITCHENER		LOT	CON.	
GENERAL ARRANGEMENT				
APPROVED _____		SITE No. 33-228	W.P. No. 628-64	
BRIDGE ENGINEER		CONTRACT No.		
DESIGN	B.N.M.		CHECK	B.P.D.
DRAWING	A.S. & M.C.		CHECK	B.N.M.
DATE	MARCH 68		LOADING	HS20 44
		DRAWING No.	D-6345-1	

[illegible]



SECTIONS

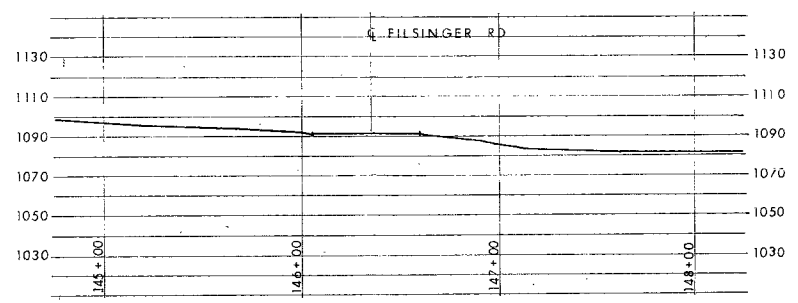
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PLAN

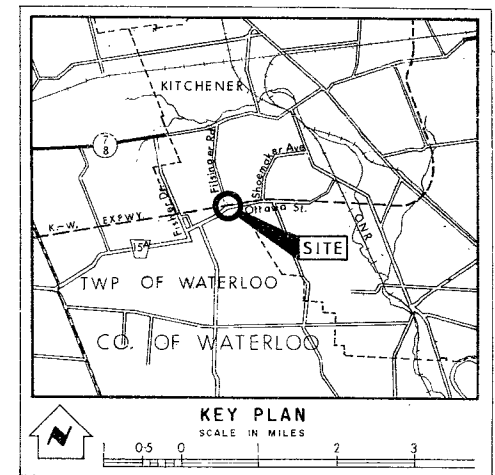
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NOTE
The complete soil investigation report for this structure may be examined at the Bridge Office and Foundation Office, Townships, and at the Hamilton District Office.



PROFILE

SCALE
40 20 0 40 80 Ft



LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation, NOV. 1967.

NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
2	1090.0	187,991	202,531
3	1091.5	187,950	202,454
4	1092.5	187,937	202,411
5	1094.2	187,821	202,464
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7	1084.2	187,875	202,567
8	1082.8	187,890	202,614

NOTE

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REVISIONS	DATE	BY	DESCRIPTION

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

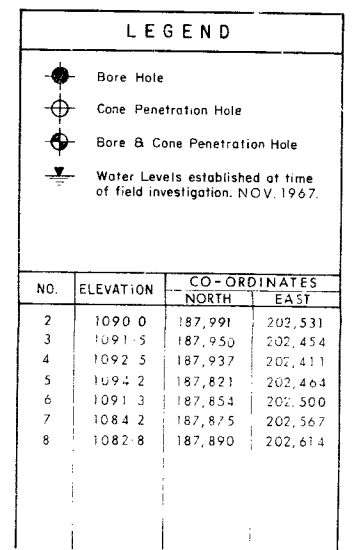
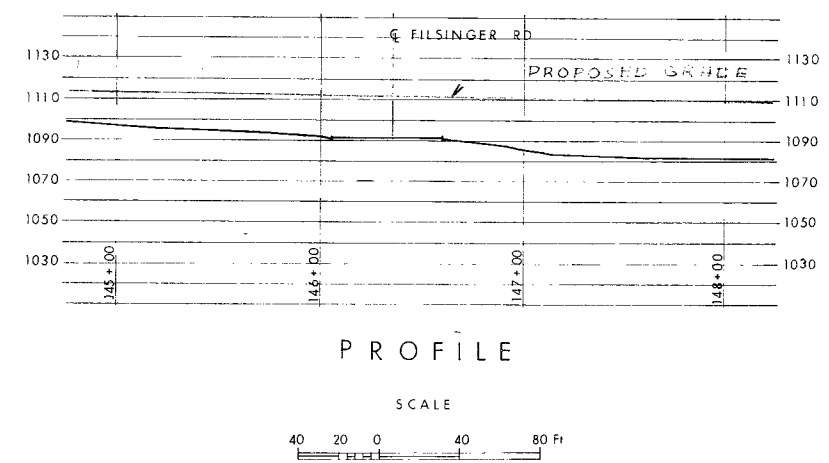
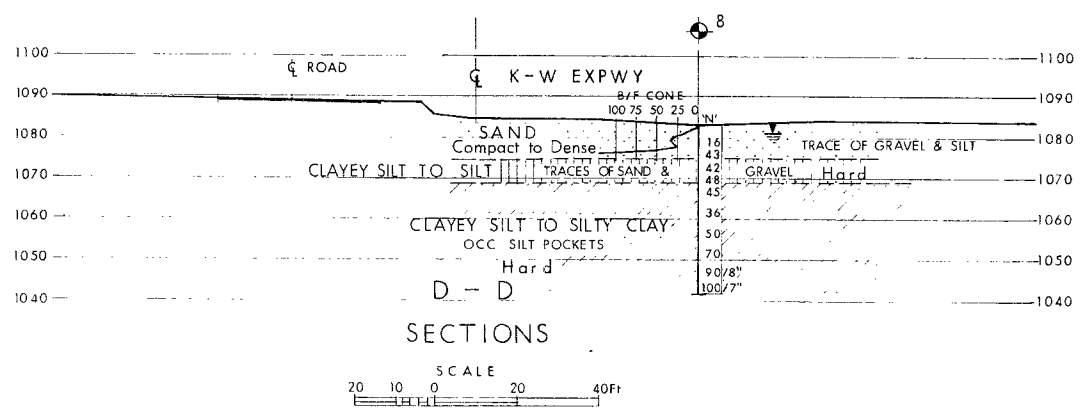
FILSINGER ROAD

KING'S HIGHWAY NO. K-W EXPWY DIST. NO. 4
CO. WATERLOO
TWP. WATERLOO LOT CON.

BORE HOLE LOCATIONS & SOIL STRATA

SUBWD. A. S. CHECKED	W.P. NO. 628-64	M.B.T. DRAWING NO.
DRAWN A. B. CHECKED	JOB NO. 67-F-102	67-F-102 A
DATE DEC. 15, 1967	SITE NO. 33-228	BRIDGE DRAWING NO.
APPROVED <i>[Signature]</i>	CONT. NO.	D-6345-2

#67-F-102
W.P. #628-64
KITCHENER
WATERLOO EXP.
FILSINGER
ROAD.



- NOTE -

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

REVISIONS			
	DATE	BY	DESCRIPTION

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

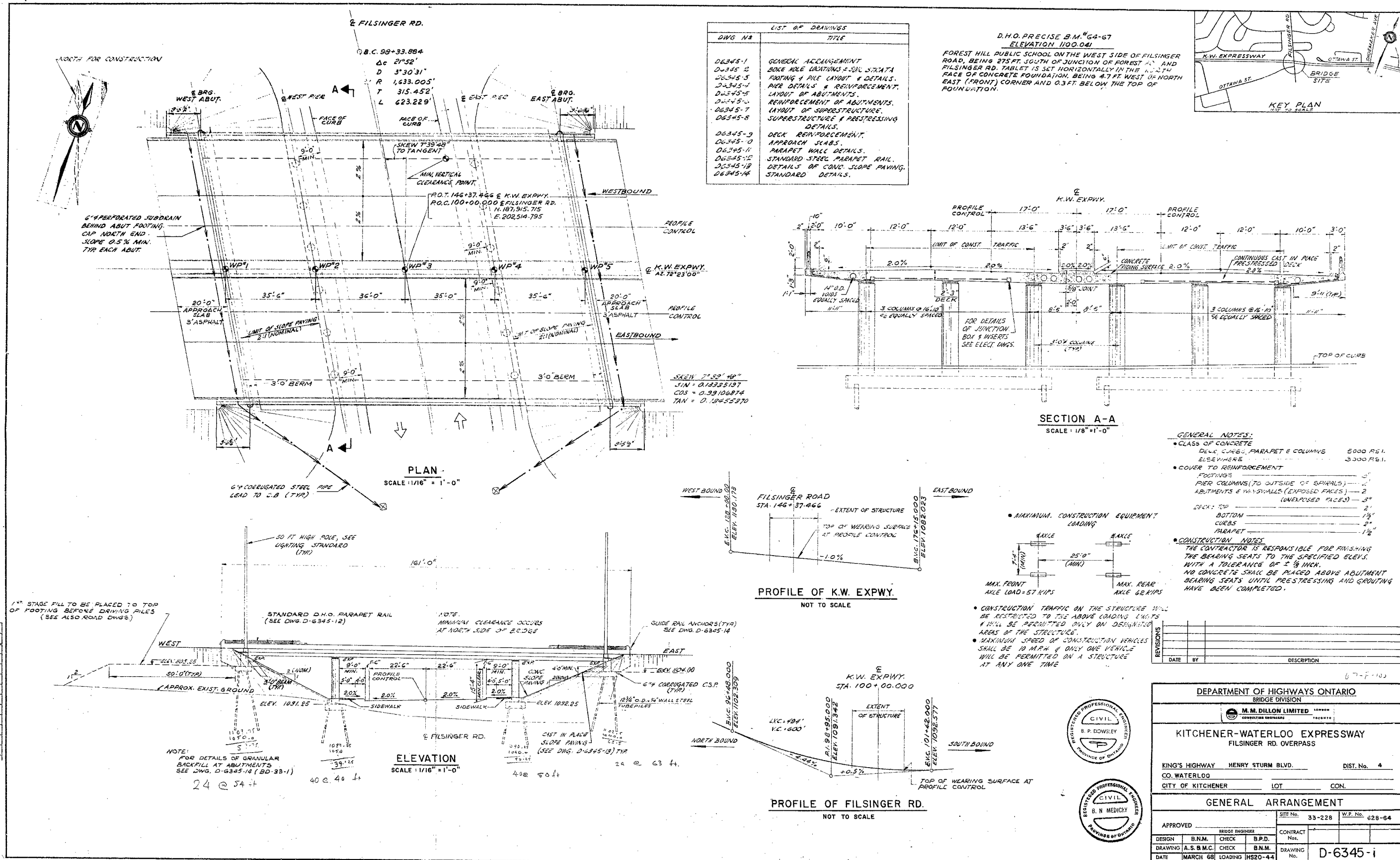
FILSINGER ROAD

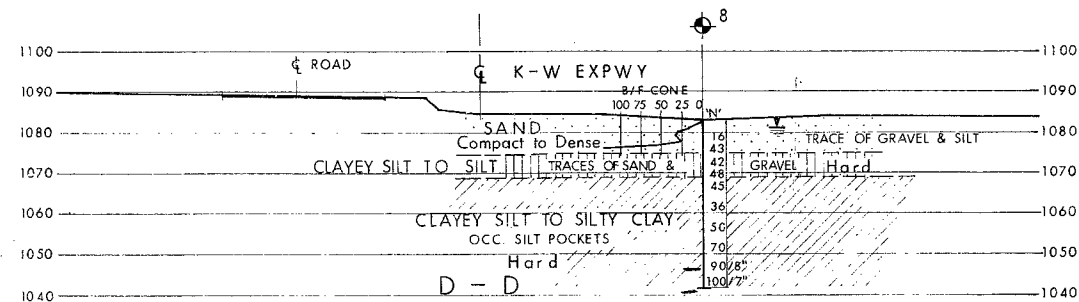
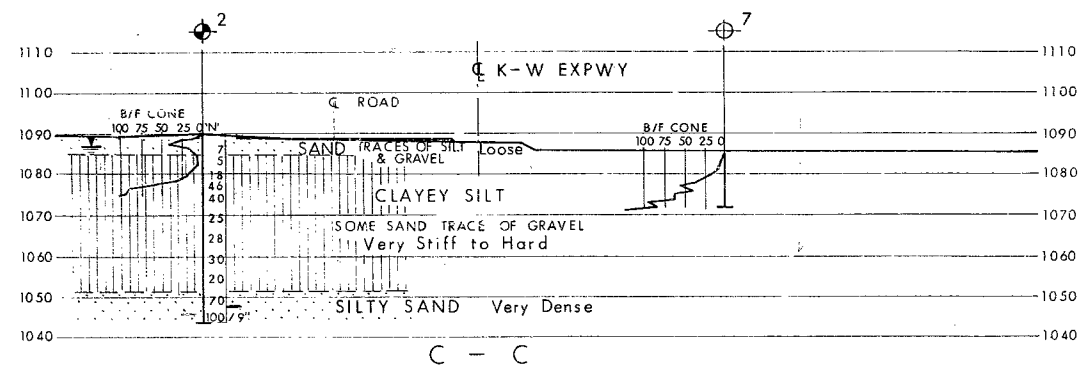
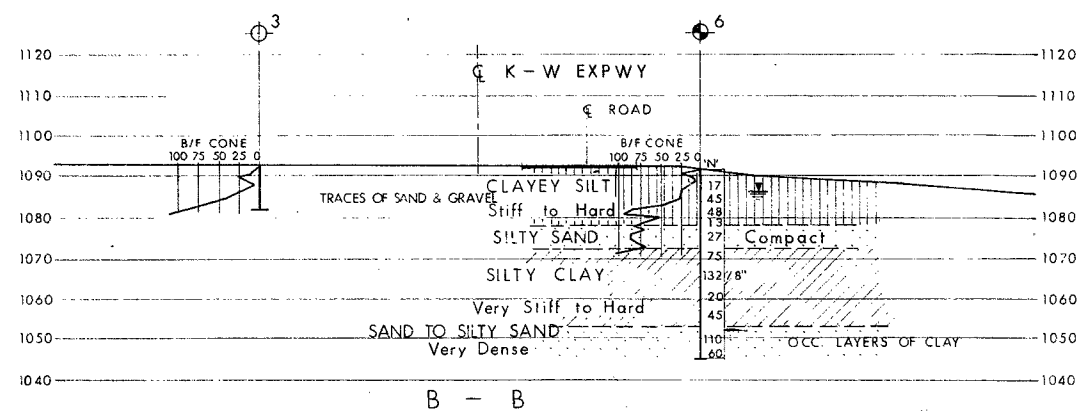
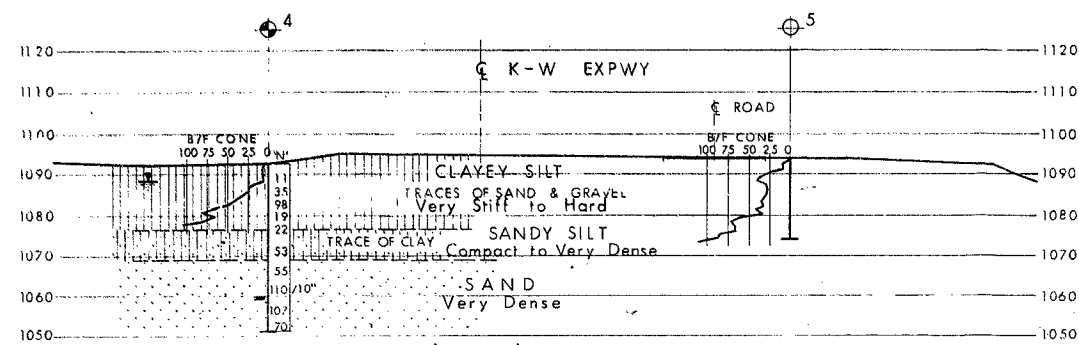
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CO. WATERLOO
TWP. WATERLOO LOT _____ CON. _____

BORE HOLE LOCATIONS & SOIL STRATA

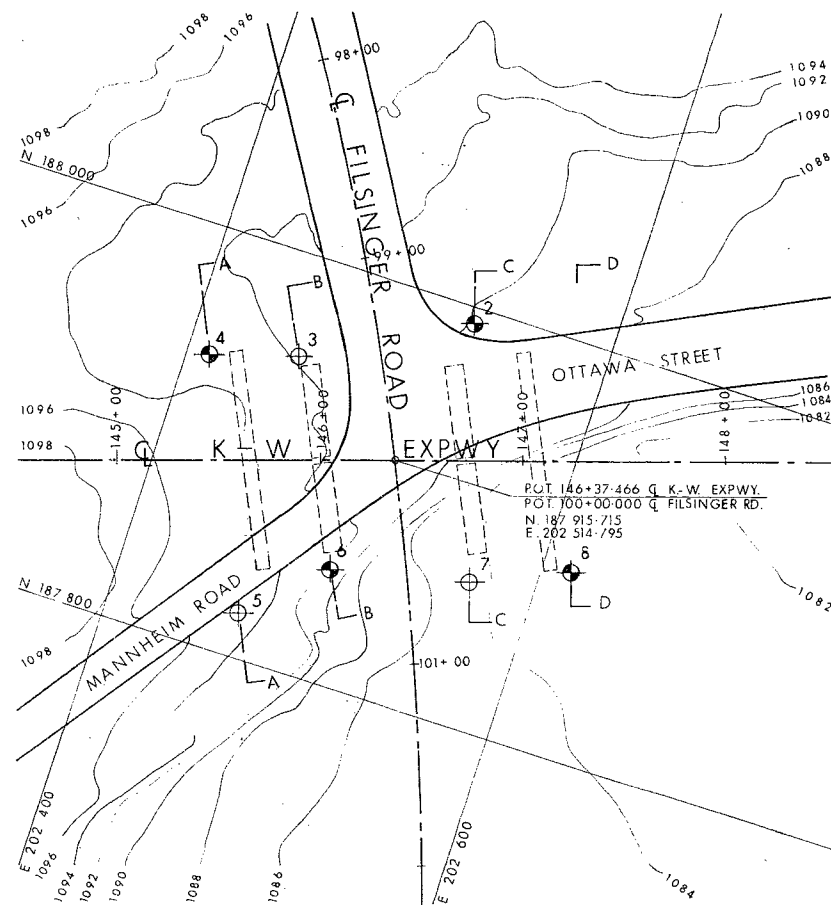
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DRAWN A B	CHECKED	JOB NO 67 - F - 102	67-F-102 A
DATE DEC 15, 1967	SITE NO	BRIDGE DRAWING NO	
APPROVED <i>A. G. Thomas</i>	CONT NO		

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[illegible]



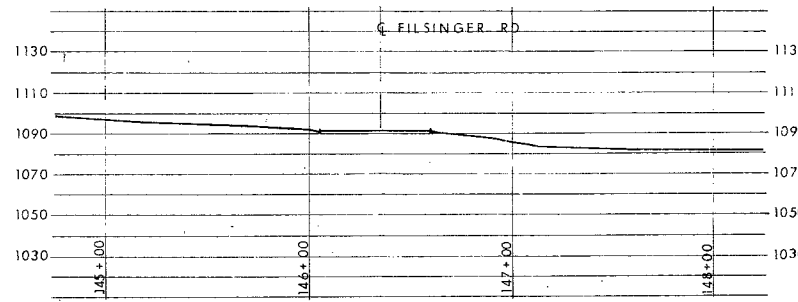
SECTIONS



PLAN



NOTE
The complete soil investigation report for this structure may be examined at the Bridge Office and Foundation Office, Townsville, and at the Hamilton District Office.



PROFILE



LEGEND			
	Bore Hole		
	Cone Penetration Hole		
	Bore & Cone Penetration Hole		
	Water Levels established at time of field investigation, NOV. 1967.		
NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
2	1090.0	187,991	202,531
3	1091.5	187,950	202,454
4	1092.5	187,937	202,411
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REVISIONS	DATE	BY	DESCRIPTION

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

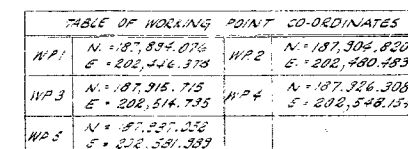
FILSINGER ROAD

KING'S HIGHWAY NO. K-W EXPWY DIST. NO. 4
CO. WATERLOO
TWP. WATERLOO LOT CON.

BORE HOLE LOCATIONS & SOIL STRATA

SUBM'D. A. S. CHECKED	W.P. NO. 628-64	M.B.T. DRAWING NO.
DRAWN A. B. CHECKED	JOB NO. 67-F-102	67-F-102 A
DATE DEC. 15, 1967	SITE NO. 33-228	BRIDGE DRAWING NO.
APPROVED <i>[Signature]</i>	CONT. NO.	D-6345-2

REF. NO. 5962-43-M242 M.M. DILLON LTD.



NOTES:

1. NUMBER & LENGTH OF PILES:

NWST	ABUT	84	PILES, LENGTH = 44'
NWST	PIER	40	PILES, LENGTH = 84'
EAST	PIER	40	PILES, LENGTH = 36'
EAST	ABUT	84	PILES, LENGTH = 43'

2. THE WORKING LOAD ON THE PILES SHALL BE CHECKED
ACCORDING TO THE HILLY FORMULA (20-570 03/18/16.9)

3. DESIGN LOAD PER PILE 60 TONS

4. ALL PILES ARE 12 $\frac{3}{4}$ " O.D., 0.250" WALL THICKNESS STEEL
TUBE PILES. PILES TO BE FILLED WITH 3000 P.S.I.
CONCRETE AFTER INSTALLATION AND INSPECTION
IS COMPLETED.

[illegible]

SECTION B-B

SCALE: 3/8" = 1' - 0"

SECTION B-B
SCALE: $3/8" = 1' - 0"$

[illegible][illegible]

DEPARTMENT OF HIGHWAYS ONTARIO
BRIDGE DIVISION

M. M. DILLON LIMITED LONDON
CONSULTING ENGINEERS TORONTO

KITCHENER-WATERLOO EXPRESSWAY
FILSINGER RD. OVERPASS

KING'S HIGHWAY HENRY STURM BLVD. DIST. No. 4

KING'S HIGHWAY HENRY STORM DEV.
CO. WATERLOO

CITY OF KITCHENER LOT CON.

FOOTING & PILE LAYOUT & DETAILS

SITE No.	33-228	W.P. No.	628-6
----------	--------	----------	-------

APPROVED 33-228 628-6

APPROVED				BRIDGE ENGINEER		CONTRACT		5	
REGIONAL				CIVIL		Nos.			

DESIGN	B.N.M.	CHECK	B.P.D.	1905,		
DRAWING	M.R.C.	CHECK	G.N.K.	DRAWING	D 6345 3	

DRAWING	M.B.C.	CHECK	S.O.R.	DRAWING	D-6345-3
DATE	MARCH 68	LOADING	HS20-44	No.	

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

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

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

Attention: Mr. S. McCombie

DATE: December 28, 1967

OUR FILE REF.

IN REPLY TO

JAN - 3 1968

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For

Filsinger Road Overpass
Kitchener-Waterloo Expressway
District No. 4 (Hamilton)
W.J. 67-F-102 -- W.P. 628-64

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 feel free to contact our Office.

AGS/MaeF
Attach.

cc: Messrs. B. R. Davis (2)
H. A. Tregaskes
D. W. Farren
W. Zonnenberg
H. Greenland
W. S. Melinyshyn
J. Roy
W. D. Bradley
M. M. Dillon Ltd.
University of Waterloo

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

Foundations Files
Gen. Files ✓

TABLE OF CONTENTS

1. INTRODUCTION.
 2. DESCRIPTION OF SITE.
 3. FIELD WORK.
 4. LABORATORY TESTING.
 5. SOIL TYPES AND SOIL CONDITIONS:
 - 5.1) General.
 - 5.2) Clayey Silt.
 - 5.3) Silty Clay.
 - 5.4) Silty Sand.
 - 5.5) Fine to Medium Sand.
 6. GROUNDWATER.
 7. DISCUSSION AND RECOMMENDATIONS.
 8. SUMMARY.
 9. MISCELLANEOUS.
-

FOUNDATION INVESTIGATION REPORT

For

Filsinger Road Overpass
Kitchener-Waterloo Expressway
District No. 4 (Hamilton)
W.J. 67-F-102 -- W.P. 628-64

1. INTRODUCTION:

The Foundation Section was requested to carry out a foundation investigation at the above site. The request was contained in a memorandum dated October 20, 1967, from Mr. W. S. Melnyshyn, Regional Bridge Location Engineer.

This Section subsequently carried out a field investigation to determine the subsoil conditions.

Presented in this report are the results of our field and laboratory investigations, together with our recommendations pertaining to the foundations of the new structure.

2. DESCRIPTION OF SITE:

The site is located at the intersection of Ottawa Street and Filsinger Road in the City of Kitchener. On the southern side of Ottawa Street the land is mainly used for farming, while the northern side is residential. The topography is generally flat with the exception that the southern side is about 10 feet lower in elevation. An overpass structure is to be built at the above site.

Physiographically, the site is located in the region referred to as the 'Waterloo Hills.'

3. FIELD WORK:

A total of four sampled boreholes along with seven dynamic cone penetration tests, was carried out during the course of the field work. Drilling equipment consisted of a conventional diamond drill adapted for soil sampling purposes.

3. FIELD WORK: (cont'd.) ...

Disturbed samples were recovered at required depths by means of a split-spoon sampler driven into the soil by means of a 140-lb. hammer imparting an energy of 350 ft.-lbs. per blow according to the specifications of the Standard Penetration Test. All samples were visually examined in the field before being transported to the laboratory.

The locations and elevations of all borings were surveyed by personnel from M. M. Dillon Ltd., Consulting Engineers, and are shown on Drawing 67-F-102A, together with the estimated stratigraphical profiles in the Appendix of this report.

LABORATORY TESTING:

All samples were subjected to a careful visual inspection in the laboratory. Laboratory tests were then taken on selected representative samples to determine:

- 1) Natural Water Content
- 11) Grain-Size Distribution
- 111) Atterberg Limits

The results of these tests are summarized and plotted on the Record of Borelog sheets contained in the Appendix of this report.

5. SOIL TYPES AND SOIL CONDITIONS:

5.1) General:

Subsoil conditions over the site area were found to be generally variable. Four soil types were encountered, namely, clayey silt - traces of sand and gravel, silty clay, silty sand, and fine to medium sand. For estimated boundaries, refer to Drawing 67-F-102A.

contd. /3 ...

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

5.2) Clayey Silt:

This deposit consisted of clayey silt with traces of sand and gravel, and was encountered in all four boreholes. The thickness of this stratum varied from 6 feet to over 30 feet. 'N' values from Standard Penetration tests ranged from 5 to 70 blows per foot, indicating a consistency from firm to hard. The natural moisture content ranged from 15% to 24%.

Atterberg Limit tests gave the following results:

Liquid Limit	--	19% to 33%
Plastic Limit	--	12% to 20%

The above results indicate that the deposit is a CL or clayey silt material. These results are plotted in Fig. 1 in the Appendix of this report.

The average grain-size distribution is as follows: 4% gravel, 10% sand, 46% silt, 40% clay. These are plotted on figure (2) of the Appendix.

5.3) Silty Clay:

This deposit was encountered in boreholes 6 and 8. The thickness varied from 20 to 27 feet. 'N' values ranged from 20 blows per foot to 132 blows for 8 inches, indicating a stiff to hard consistency. The natural moisture content ranged from 17% to 29%.

Atterberg Limit tests gave the following results:

Liquid Limit	--	20% to 54%
Plastic Limit	--	13% to 23%

A mechanical analysis gave the following results: gravel 0%, sand 2%, silt 39%, and clay 59%.

The above results are plotted on Figure 3 in the Appendix of this report.

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

5.4) Silty Sand:

This deposit also contained occasional layers of clay in borehole #6. The thickness of this deposit varied from 4 feet to over 8 feet. 'N' values ranged from 22 to 100/9", indicating a compact to a very dense relative density. The natural moisture content varied from 15% to 20%.

5.5) Fine to Medium Sand:

This deposit also contained a trace of gravel. This deposit was encountered in all four boreholes and ranged from 5 feet to over 20 feet in thickness. 'N' values varied from 7 blows/foot to 110 blows for 10 inches, indicating a relative density from loose to very dense. The natural moisture content ranged from 6% to 18%.

6. GROUNDWATER:

The groundwater level, as observed in the boreholes, ranged between elevations 1082 and 1088.5 or 1'0" to 5'0" below the ground surface.

7. DISCUSSION AND RECOMMENDATIONS:

It is proposed to construct an overpass structure, 142 feet long, at the intersection of Filsinger Road and Ottawa Street.

A spread footing type foundation is considered not suitable for the above structure since a fill of about 4 to 10 feet will be added, and since a very dense stratum exists about 30 to 40 feet down. A pile type foundation is, therefore, recommended.

It is recommended to drive 12-3/4" O.D. x 1/4" wall steel tube piles into the very dense stratum. These piles, if driven to

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

elevation 1060[±] in the case of the east and west abutments, and to elevation 1055[±] for the piers, should achieve an allowable load of 60 tons per pile. All the footings should be at least 4.0 feet below the finished grade for frost protection purposes.

No major dewatering problems are anticipated.

No stability problems are anticipated provided standard 2:1 slopes are maintained.

Differential settlements are anticipated to be of a negligible order.

8. SUMMARY:

A foundation investigation at the above site of the proposed overpass structure is reported.

Subsoil at the above site consists of four soil types, namely, clayey silt - traces of sand and gravel, silty clay, silty sand, and fine to medium sand.

It is recommended to drive 12-3/4" O.D. x 0.25" walled tubular steel piles into the very dense stratum between elevations 1055[±] to 1060[±].

No major dewatering problems are anticipated.

No stability problems are anticipated provided standard 2:1 slopes are maintained.

Differential settlements are anticipated to be of a negligible order if the above recommendations are followed.

9. MISCELLANEOUS:

The field work for this report was carried out during the period November 10 - 17, 1967, under the supervision of Mr. A. M. Seppala, Project Foundation Engineer, who also wrote this report.

Equipment was owned and operated by Canadian Longyear Limited.

Mr. K. G. Selby, Supervising Foundation Engineer, reviewed this report.

December 1967

APPENDIX 1

FOUNDATION SECTION

ORIGINATED BY AMS

COMPILED BY _____ **AMS**

BOREHOLE TYPE Washbore - BX Casing

CHECKED BY

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 3

FOUNDATION SECTION

JOB 67-F-102

LOCATION Co-ord. N 187,950; E 202,454.

ORIGINATED BY AMS

W.P. 628-64

BORING DATE November 14, 1967

COMPILED BY AMS

DATUM Geodetic

BOREHOLE TYPE Cone Test only

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT ——— w _L PLASTIC LIMIT ——— w _p WATER CONTENT ——— w				REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		25 50 75 100 125	<p>wp w wL</p> <p>WATER CONTENT %</p>					
1091.5	Ground Level												
0.0						1090							
1080.5													
11.0	End of cone test					1080							

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

JOB 67-F-102

LOCATION Co-ord. N 187.937: E 202.411.

ORIGINATED BY AMS

W.P. _____ 628-64

BORING DATE November 13, and 14, 1967

COMPILED BY _____ AMS

DATUM Geodetic

BOREHOLE TYPE Washbore - BX Casing

CHECKED BY

[illegible]

MATERIALS & TESTING DIVISION

FOUNDATION SECTION

LOCATION Co-ord. N 187,821; E 202,464

ORIGINATED BY AMS

BORING DATE November 14, 1967

COMPILED BY _____ AMS

BOREHOLE TYPE Cone Test only

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT ——— w _L PLASTIC LIMIT ——— w _P WATER CONTENT ——— w w _p w w _L ————— ————— WATER CONTENT %	BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.			
1094.2	Ground Level						25 50 75 100 125			
0.0										
						1090				
						1080				
1074.3										
19.9	End of Cone Test					1070				

CHECKED BY

[illegible]

CHECKED BY

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	25	50	75	100	125	PLASTIC LIMIT ——— w_p		
1084.9	Ground Level						SHEAR STRENGTH P.S.F.					WATER CONTENT % w_p ——— w ——— w_L	P.C.F.		
0.0						1080									
1071.3															
12.9	End of Cone Test					1070									

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

JOB 67-F-102

LOCATION Co-ord. N 187,890; E 202,614

W. P. 628-64

BORING DATE November 16 and 17, 1967

DATUM Geodetic

BOREHOLE TYPE Washbore - BX Casing

FOUNDATION SECTION

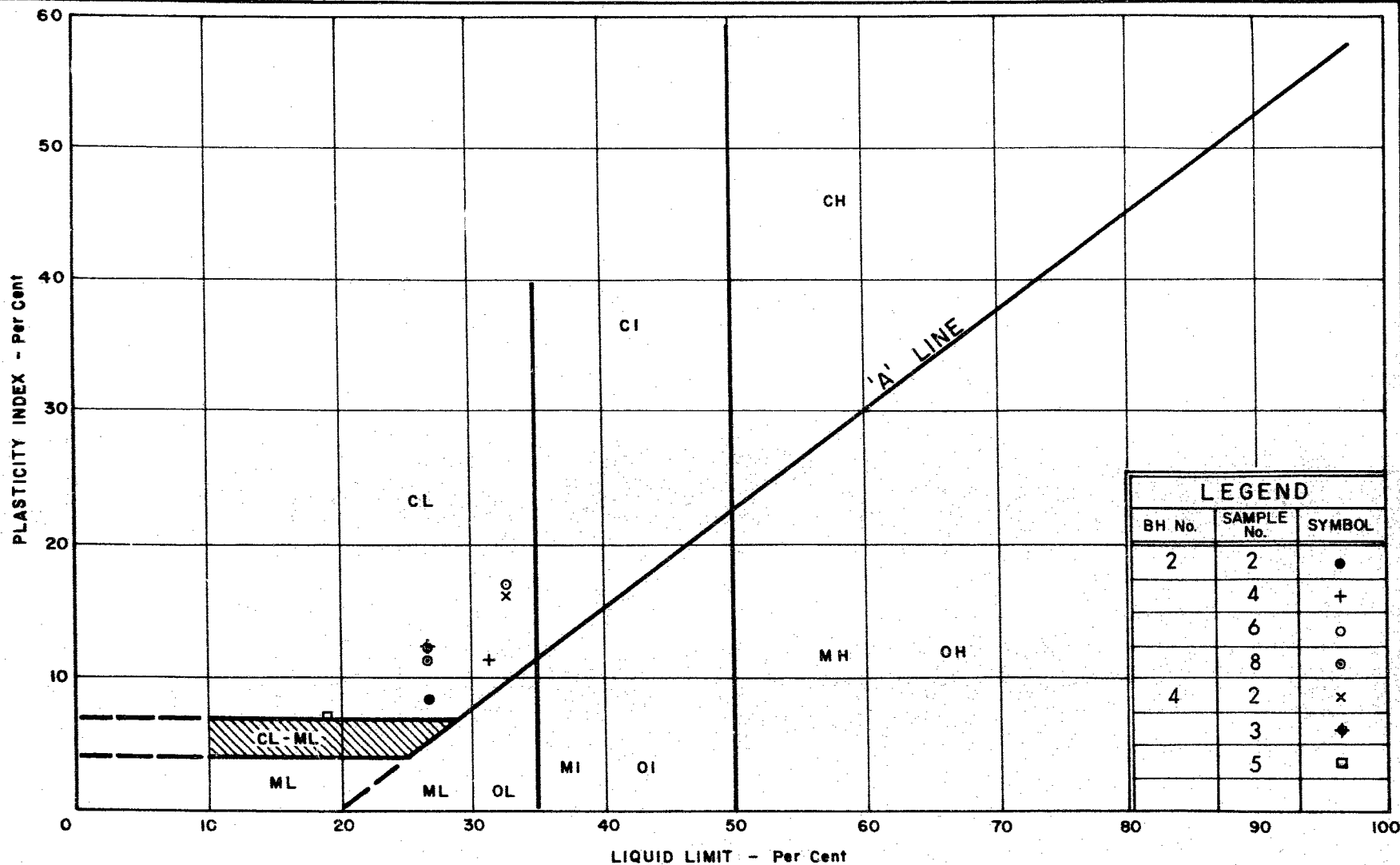
ORIGINATED BY AMS

COMPILED BY **AMS**

CHECKED BY AK

RECORD OF BOREHOLE NO. 8

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— W		BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	BLOWS / FOOT	WATER CONTENT %			
1082.8	Ground Level										
0.0	Fine to medium sand, trace of gravel & silt.	• • • • •	1	SS	16	1080					Gr.Sa.Si.Cl
1074.8	Compact to dense.	• • • • •	2	SS	43						▽1081.2
8.0	Clayey silt to silt, traces of sand and gravel. Hard.		3	SS	42						17 70 (13)
1068.8			4	SS	48	1070					
14.0	Clayey silt to silty clay, occ. silt pockets. Hard.	/ / / / /	5	SS	45						
		/ / / / /	6	SS	16	1060					
		/ / / / /	7	SS	50						
		/ / / / /	8	SS	70	1050					
		/ / / / /	9	SS	90/8"						0 2 39 59
1041.7		/ / / / /	10	SS	100/7"						
41.1	End of Borehole					1040					



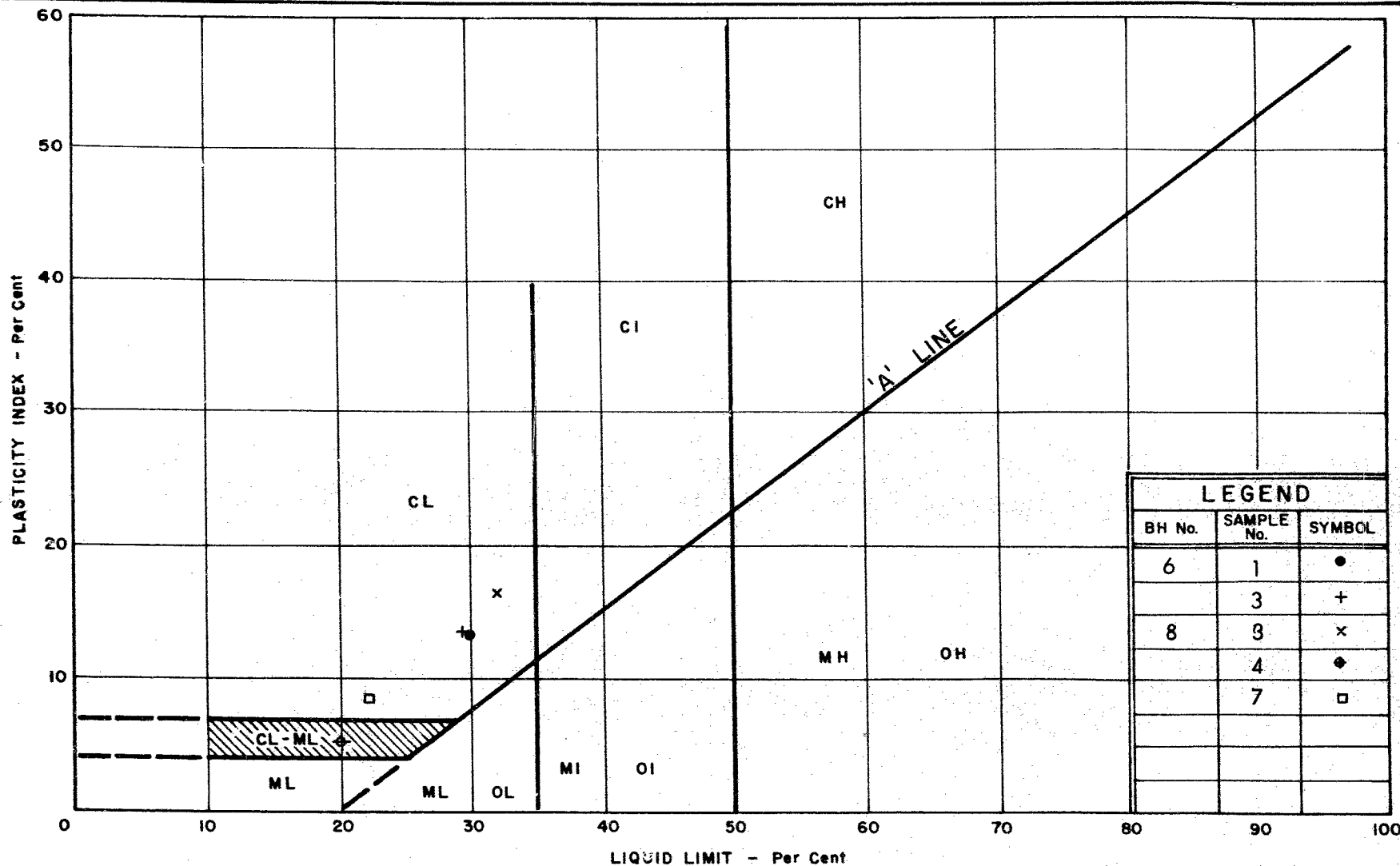
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PLASTICITY CHART CLAYEY SILT

W.P. No. 628-64

JOB No. 67-F-102

Fig. 1a



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MATERIALS and
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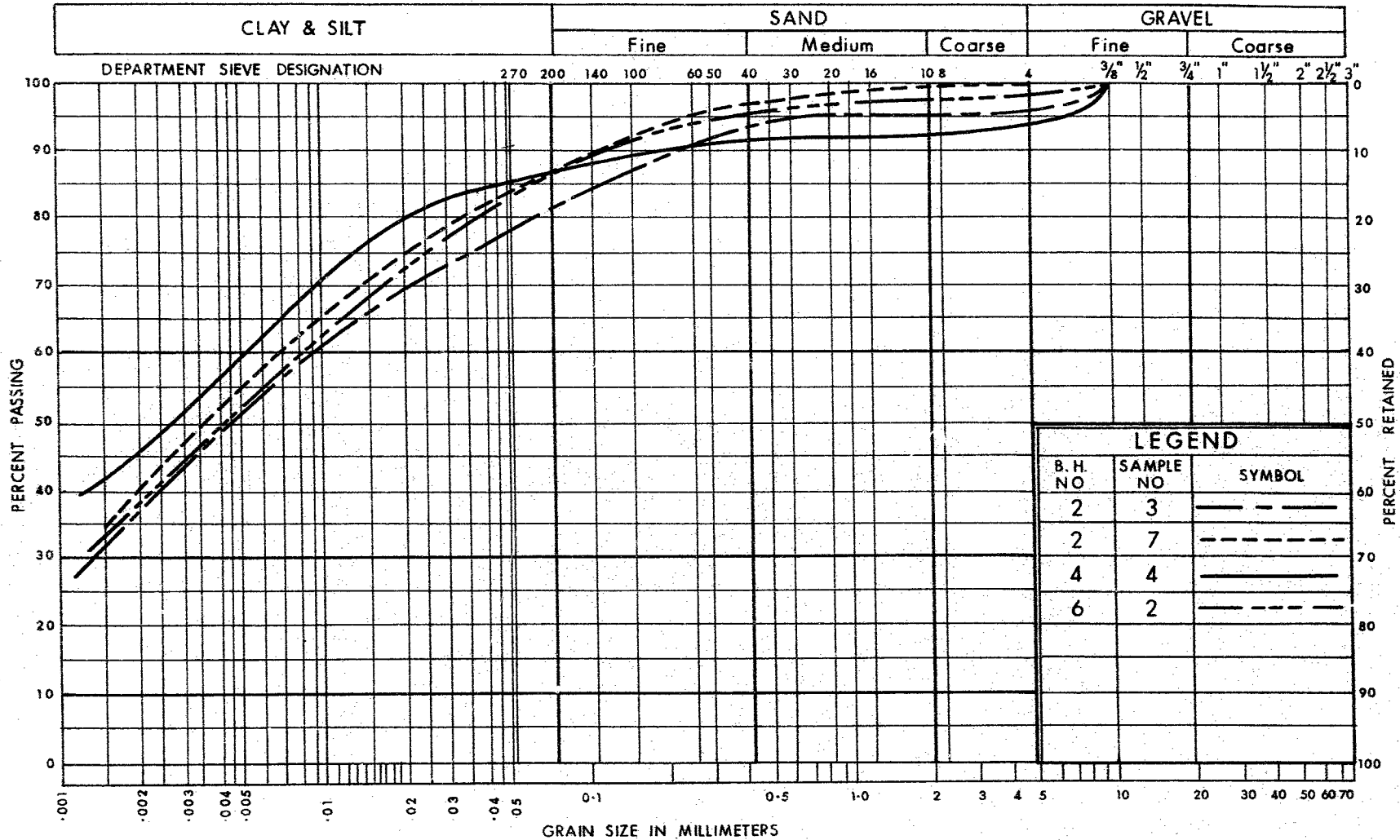
PLASTICITY CHART CLAYEY SILT

W.P. No. 628 - 64

JOB No. 67 - F - 102

Fig. 1b

UNIFIED SOIL CLASSIFICATION SYSTEM



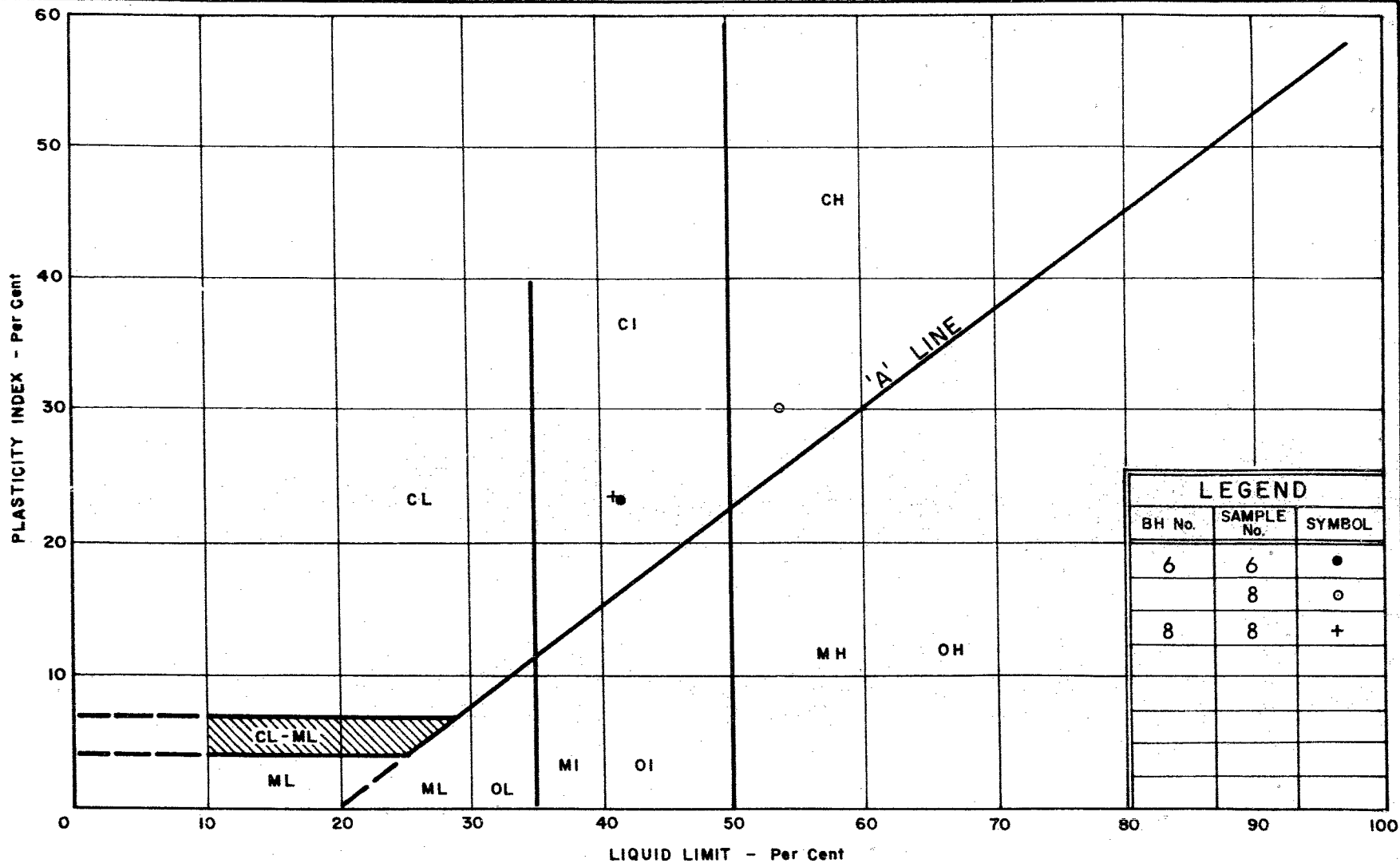
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DIVISION

GRAIN SIZE DISTRIBUTION
CLAYEY SILT
TRACES OF SAND & GRAVEL

W.P. No. 628 - 64

JOB No. 67-F-102

Fig. 2



LEGEND		
BH No.	SAMPLE No.	SYMBOL
6	6	•
	8	○
8	8	+



DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

PLASTICITY CHART SILTY CLAY

W.P. No. 628 - 64

JOB No. 67-F - 102

Fig. 3

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
$\log_e a$ OR $\ln a$	NATURAL LOGARITHM OF a
$\log_{10} a$ OR $\log a$	LOGARITHM OF a TO BASE 10
t	TIME
g	ACCELERATION DUE TO GRAVITY
V	VOLUME
W	WEIGHT
M	MOMENT
F	FACTOR OF SAFETY

STRESS AND STRAIN

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

EARTH PRESSURE

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

FOUNDATIONS

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

SLOPES

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

110
401 & Keele Street
Downsview, Ontario

November 24, 1967

Canadian Longyear Limited
35 Brydon Drive
Rexdale, Ontario

Dear Sirs:

This is to confirm our request of November 8, 1967 for the supply of a Diamond Drill together with all necessary equipment, as specified under the terms of our Contract Agreement, at Kitchener, Ontario, Filsinger Rd. on Nov. 10/67.

This project bears Job Number 67-F-102.

Yours truly,

K. G. Selby

KGS:mt

K. G. Selby
Supervising Foundation Engineer
for: A. G. Stermac
Principal Foundation Engineer

Department of Highways Ontario

Copy for the information of

Mr. A. Stermac,
Principal Foundation Engineer

Mr. W. Hollingshyn,
Regional Bridge Location Engineer,
Central Region,
Administration Building

Bridge Division,
Downsview, Ontario

October 20, 1967

Kitchener-Waterloo Expressway
Pilsinger Rd. Overpass
W.P. 628-64, Site 33-228
District No. 4

Attached herewith are prints of the Preliminary Bridge Plan Drawing B-5562-P1 for the above-mentioned structure.

The estimated cost of the proposed structure is \$269,500. This cost includes tender, materials, engineering and sundry construction.

The above cost is based on the use of piles, pending receipt of the Soils Report. If piling can be eliminated or reduced, the above estimate will have to be reviewed.

Any comments or revisions you may have should be submitted within three weeks.

Jrd

C.S. Grebaki,
Bridge Design Engineer

van.

S. McCombie
A. Stermac (2)
E. Forrest
E. Cross

FDN. REPORT IS NOW AVAILABLE

NO COMMENTS.

JAN 19th 1968

11-6-8 Sully

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

September 12, 1968

Filsinger Rd. Overpass
Kitchener-Waterloo Expressway
W.P. 628-64, Site 33-228
Henry Sturm Blvd., District 4

67-F-102

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.

CSG:rd

C.S. Grebski,
Bridge Design Engineer

Attach.

c.c. Foundation Section

alg

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

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

January 24, 1969

-- FILSINGER ROAD OVERPASS --
Kitchener-Waterloo Expressway
W.P. 628-64 -- Site 33-228 -- W.J. 67-F-102
Henry Sturm Blvd. -- District #4 (Hamilton)

We have reviewed the final bridge drawings D-6345-1, 2 and 3 of the above mentioned structure. We have also reviewed the foundation report W.J. 67-F-102 and have revised our estimates for the pile penetrations. We now recommend that the length of piling supplied be as follows:

West Abutment: 24 Piles - Length: 63 ft.
West Pier : 40 Piles - Length: 50 ft.
East Pier : 40 Piles - Length: 40 ft.
East Abutment: 24 Piles - Length: 54 ft.

Regarding the foundation design, we have no other comments.

K. G. Selby

KGS/MdeF

K. G. Selby,
SUPERVISING FOUNDATION ENGR.
For:
A. G. Stermac,
PRINCIPAL FOUNDATION ENGR.

cc: Foundations Files ✓
Gen. Files

W.P. 628-64
RECEIVED
FEDERAL BRIDGE
DIVISION
JAN 27 1969
KWE

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

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

January 24, 1969

-- FILSINGER ROAD OVERPASS --
Kitchener-Waterloo Expressway
W.P. 628-64 -- Site 33-228 -- W.J. 67-F-102
Henry Sturm Blvd. -- District #4 (Hamilton)

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K. G. Selby

KGS/MdeP

K. G. Selby,
SUPERVISING FOUNDATION ENGR.
For:
A. G. Stermac,
PRINCIPAL FOUNDATION ENGR.

cc: Foundations Files
Gen. Files

cc