DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT. 1976

GEOCRES No. 30M4-71

DIST. 4 REGION

W.P. No. 387-85-00

CONT. No.

W. O. No.

STR. SITE No. N/A

HWY. No. 20

LOCATION HWY 20 FROM HWY 53/56 EASTERLY TO 0.3 KM WEST OF SOUTH GRIMSBY BY BINBROOK TWP. RD.

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.

REMARKS:

Ministry of Transportation Ontario

SHEET 1 OF 1

FIELD BORING LOG

FOUNDATION DESIGN SECTION

DRILLING CO. Malones Soil Samples | DATUM ELEV. Geodetic | B.H. No. 1
DRILLER Barry Copper / Gord Lace | GROUND ELEV. 201.4 (see survey plan) | JOB No. WP 387-85-00
ENGINEER Neil Mullen | CASING SIZE HS Auger | DATE Aug. 4/93
SITE LOCATION Hwy 20 and Chapel Hill Road, Stoney Creek.
HOLE LOCATION Sta. 20+481 Rt. 12m, on slope of road embankment
REMARKS Doug out part of slope to provide a level surface for the MV.

DEPTH FROM	DEPTH TO	DESCRIPTION	SAMPLE TYPE, No. & RECOVERY	METHOD OR BLOWS & DISTANCE
		Dry Hole		
0'0"	2'6"	Auger Native		5
2'6"	4'0"	© Silty, Clay, Brown, Firm, Moist, trace of organics	SS1	4-(2-3)
2'6"	5'0"	Auger		11
5'0"	6'6"	© Silty Clay, Brown, Stiff, Moist	SS2	2-(6-6)
6'6"	7'6"	Vane		
		C_{uv} = (60+ + 60+) x 1' = 120+ KPa (did not turn)		
		C_{ur} = did not do		
7'0"	7'6"	Auger		15
7'6"	9'0"	© Silty, Clay, Brown, Stiff, Moist	SS3	5-(7-8)
7'6"	10'0"	Auger		14
10'0	11'6"	© Glacial Till, Grey, Moist, Stiff, Heterogeneous Mixture of Clay, Silt, Sand and Gravel.	SS4	4-(5-9)
10'0"	12'6"	Auger		
12'6"	12'10"	© Glacial Till, Grey, Heterogeneous Mixture of Clay, Silt, Sand + Gravel	SS5	75/4"
12'10"	13'2"	Auger, Bedrock Moist, Hard	AS6	
		END OF BOREHOLE		
		Refusal (Probable Bedrock)		
		GWL = Dry		

GS MA

GS MA

PH-D-202 87-12

Ministry of Transportation Ontario

FIELD BORING LOG

FOUNDATION DESIGN SECTION

DRILLING CO. Malones Soil Samples | DATUM ELEV. Geodetic | B.H. No. 2
DRILLER Barry Copper / Gord Lace | GROUND ELEV. 202.7 (See Survey Note) | JOB No. WP 387-85-00
ENGINEER Neil Mullen | CASING SIZE HS Auger | DATE Aug. 4/93
SITE LOCATION Hwy 20 at Chapel Hill Rd, Stoney Creek
HOLE LOCATION Sta. 20+506 Rt 9m, 4m beyond Cable Fence, on top of slope
REMARKS

DEPTH FROM	DEPTH TO	DESCRIPTION	SAMPLE TYPE, No. & RECOVERY	METHOD OR BLOWS & DISTANCE
		Dry Hole		
0'0"	2'6"	Auger		6
GS 2'6"	4'0"	(NO) Silty Sand, Brown, moist, Loose (FILL)	SS1	3-3-3
2'6"	50"	Auger (NATIVE)		12
5'0"	6'6"	(C) Silty Clay, Grey/Brown, moist, stiff	SS2	5-7-5
5'0"	7'6"	Auger		11
GS MA 7'6"	9'0"	(C) Silty Clay, Brown, Moist, stiff	SS3	3-5-6
9'0"	10'0"	Vane		
		C_{uo} = (60+60)x1' = 120 kPa (did not turn)		
		C_{ur} = did not do		
7'6"	10'0"	Auger		12
10'0"	11'6"	(C) Silty Clay, Brown/Grey, moist, stiff	SS4	4-6-7
10'0"	12'6"	Auger		12
12'6"	14'0"	(C) Silty Clay, Grey, moist, stiff, trace of gravel	SS5	4-5-7
12'6"	15'0"	Auger		16
GS MA 15'0"	16'6"	(C) Glacial Till, Grey, moist, stiff, Heterogeneous Mixture of Clay, Silt, Sand and Clay	SS6	5-5-11
15'0"	17'0"	Auger hit bedrock at 16'7"		
17'0"	22'0"	Bedrock — dolostone	RC7	
		Colour — Grey		
		Bedding —		
		Jointing —		
		CORE RUN = 5'		
		REC (L_1) = 5' / 100%	(L/L) %	
		RQD (L_2) = 88	(40/L) %	

PH-D-202 87-12

RQD(%)	Description
0-25	Very Poor
25-50	Poor
50-75	Fair
75-90	Good
> 90	Excellent

$$53\overline{)60}$$

$$
\begin{array}{r}
0.883 \\
60\overline{)53.000} \\
\underline{480} \\
500 \\
\underline{480} \\
200 \\
\underline{180} \\
20
\end{array}
$$

Ministry of Transportation Ontario

FIELD BORING LOG

FOUNDATION DESIGN SECTION

DRILLING CO. _____ DATUM ELEV. _____ B.H. No. 2

DRILLER _____ GROUND ELEV. _____ JOB No. WP 387-85-00

ENGINEER _____ CASING SIZE _____ DATE Aug. 4/93

SITE LOCATION _____

HOLE LOCATION as above

REMARKS _____

DEPTH FROM	DEPTH TO	DESCRIPTION	SAMPLE TYPE, No. & RECOVERY	METHOD OR BLOWS & DISTANCE
		WP 387-85-00		
		Water Level, BH1: 11'4" at 2pm Aug 4/93		
		Water Level, BH2: 11' 8" at 2pm Aug 4/93		
		BH2		
17'0"	22'0"	ROCK CORE	RC 7	
		CORE RUN : 5'0"		
		REC : 60/60 = 100%		
		RQD : 53/60 =		
		1 Hammer Break, to fit in box.		
		END OF BOREHOLE		
		GWL = Dr.		

PH-D-202 87-12

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 1

JOB 73-11092 LOCATION Sta. 377+77 O/S 30' RT. ℄ Hwy. 56 Line 'B' ORIGINATED BY WJA

W.P. 277-60 BORING DATE November 14, 15, 1973 COMPILED BY WJA

DATUM Geodetic BOREHOLE TYPE Washboring, NX Casing CHECKED BY J.L.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE
664.3	Ground Level					
0.0	Clayey Silt Some Sand Brown Stiff to Tr. Organics Hard		1	SS	11	660
			2	SS	67	
655.3	Grey					
9.0	Clayey Silt to Silt Trace Sand Grey Very Dense		3	SS	89	655
			4	SS	99	
650.8	Silt Tr. Clay					
13.5	Clayey Silt Trace Sand Grey, Hard		5	SS	118	650
647.8			6	SS	43	
16.5	Bedrock Dolomite With Fractured Seams		7	RC	100%	645
642.8						
21.5	End of Borehole					640

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT — 20 40 60 80 100

SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE

LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W W_P W W_L

WATER CONTENT % 20 40 60

664.3 645.3

BULK DENSITY γ P.C.F.

REMARKS GR. SA. SI. CL.

663.3

0 14 66 20

0 2 76 22

0 1 90 9

01 71 28

20 15 10 5 % STRAIN AT FAILURE

OFFICE REPORT ON SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS–ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 2

JOB 73-11002 — LOCATION Sta. 378+37 0/S 18' Lt. ℄ Hwy. 56 Line 'B' — ORIGINATED BY WJA

W.P. 277-60 — BORING DATE November 1º - 30, 1973 — COMPILED BY WJA

DATUM Geodetic — BOREHOLE TYPE Washboring, NX Casing — CHECKED BY e.j.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT (20 40 60 80 100) / SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL ◆ FIELD VANE ✖ LAB VANE	LIQUID LIMIT W_L — PLASTIC LIMIT W_P — WATER CONTENT W — WATER CONTENT % (20 40 60)	BULK DENSITY γ P.C.F.	REMARKS 664.0 GR. SA. SI. CL.
663.7	Ground Level									663.5
	Clayey Silt Some Sand Tr. Organics Hard Brown		1	SS	74	660				0 8 68 24
658.5										
5.2	Clayey Silt to Silt Tr. Sand Grey – Very Loose		2	SS	51					0 1 94 5
655.5						655				
8.2	Clayey Silt Tr. Sand Grey, Hard		3	SS	38					0 1 70 29
			4	SS	38					0 1 60 39
648.2	With Sand, Some Gr.		5	SS	100/4"	650				
15.5	Bedrock – Dolomite With Fractured Seams		6	RC	100%	645				643.5
643.2										
20.5	End of Borehole					640				

OFFICE REPORT – SOIL EXPLORATION

LS 30/10 S % STRAIN AT FAILURE

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS–ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 3

JOB 73-11092 — LOCATION Sta. 378+27 O/S 28' Rt. ℄ Hwy. 56 Line 'B' — ORIGINATED BY WJA

W.P. 277-60 — BORING DATE November 22, 1973 — COMPILED BY WJA

DATUM Geodetic — BOREHOLE TYPE Washboring, NX Casing — CHECKED BY

ELEV. / DEPTH	SOIL PROFILE: DESCRIPTION	STRAT. PLOT	SAMPLES: NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE, BLOWS/FOOT (20 40 60 80 100); SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL ◆ FIELD VANE ✕ LAB VANE	LIQUID LIMIT w_L, PLASTIC LIMIT w_p, WATER CONTENT w (w_p — w — w_L); WATER CONTENT % (20 40 60)	BULK DENSITY γ P.C.F.	REMARKS: GR. SA. SI. CL.
664.3	Ground Level									
	Clayey Silt Some Sand Orange-Brown Tr. Gravel Firm to Hard Tr. Organics		1	SS	7	660				663.3 4 17 68 11
			2	SS	64					7 2 69 22
656.3	Grey									
8.2	Clayey Silt to Silt		3	SS	52	655				0 0 94 6
653.3	Grey Very Dense									
11.2	Clayey Silt Grey Hard		4	SS	50					0 0 75 25
649.1	Probable Bedrock		5	SS	100/7"	650				
15.4	End of Borehole					645				

OFFICE REPORT — SOIL EXPLORATION

20 / 15 ◇ S / 10 % STRAIN AT FAILURE

cc: Gen. Files 28-4

Mr. C. S. Moase,
Manager,
Special Services Section.

Mr. A. G. Stermac,
Principal Foundation Engr.,
Foundation Section,
Materials & Research Division.
August 16, 1963

D.H.O. FOUNDATION INVESTIGATION REPORT --
Proposed Patrol Garage, Hwy. 20, Elfrida,
Twp. Binbrook, Dist. No. 4 -- W.J. 63-F-83.

A patrol garage is planned to be built on Lot 2, Con. I, Twp. of Binbrook, adjacent to old Hwy. 20. A foundation investigation was requested by the Special Services Section in a memo. dated July 23, 1963. In order to determine the subsoil conditions at this site and decide on the type and elevations of footings to be recommended, an investigation consisting of three sampled borings and three dynamic cone penetration tests was carried out on August 6, 1963. Attached to this report is a drawing (63-F-83A), showing the locations and elevations of boreholes, together with the inferred stratigraphy of subsoil.

Subsoil conditions in the area are generally uniform and favourable. Underlying a thin layer of topsoil, is a deporit of glacial till consisting of silty clay with traces of sand and fine gravel. This till material is in a hard to stiff state of consistency. It is brown to brownish-grey in colour. This layer was investigated to a depth of 21 ft.

No ground water level could be observed in any of the boreholes during the time of the investigation, due to low permeability of the subsoil.

cont'd. /2 ...

Spread footings are recommended. A safe bearing load of up to 2 tons per square feet can be used. Footings should be provided at least five feet below the ground surface for adequate frost protection. No dewatering problems are anticipated.

For all service, parking and other areas to be paved or gravelled, the topsoil should be stripped and replaced with 6" of sand cushion or rock screenings and topped with 15" of G.B.C. 'A'.

A 2" thickness of HL-6 is recommended for all paved areas as a base course, with 1½" thickness of HL-3 as a wearing surface. Recommendations pertaining to construction of roadways, gravel areas and surfacing materials, were given by the Regional Materials Engineer, Mr. T. J. Kovich.

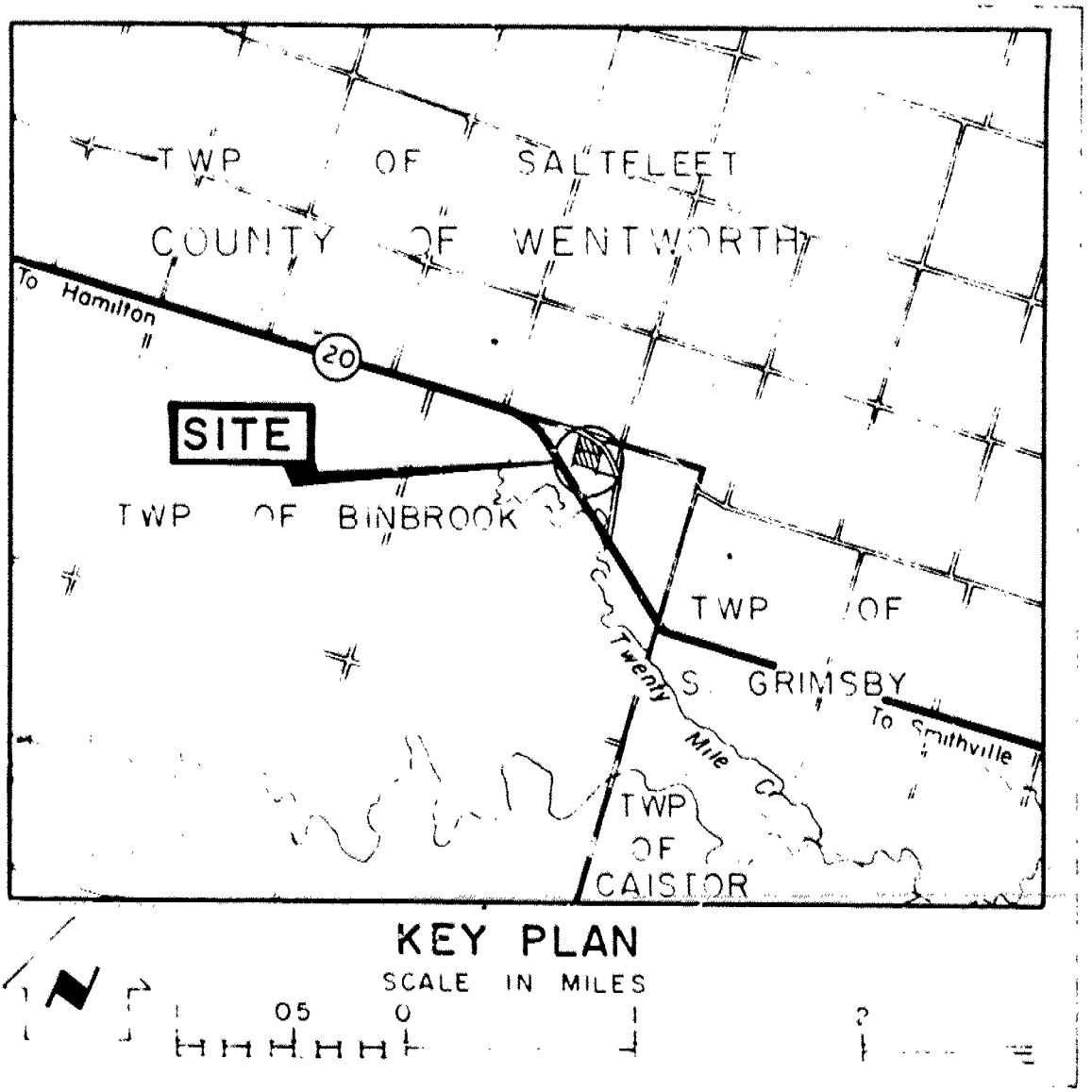
The field work, performed during the period August 6 to 8, 1963, together with the preparation of this report, was undertaken by Mr. B. M. Ghadiali, Project Foundation Engineer. The investigation was carried out under the general supervision of Mr. M. Devata, Senior Foundation Engineer.

Equipment used was owned and operated by Johnston Drilling Co. Ltd.

We trust that the given recommendations are sufficient for your future design work. However, should there be any additional questions you would like to discuss, please feel free to call on our Office.

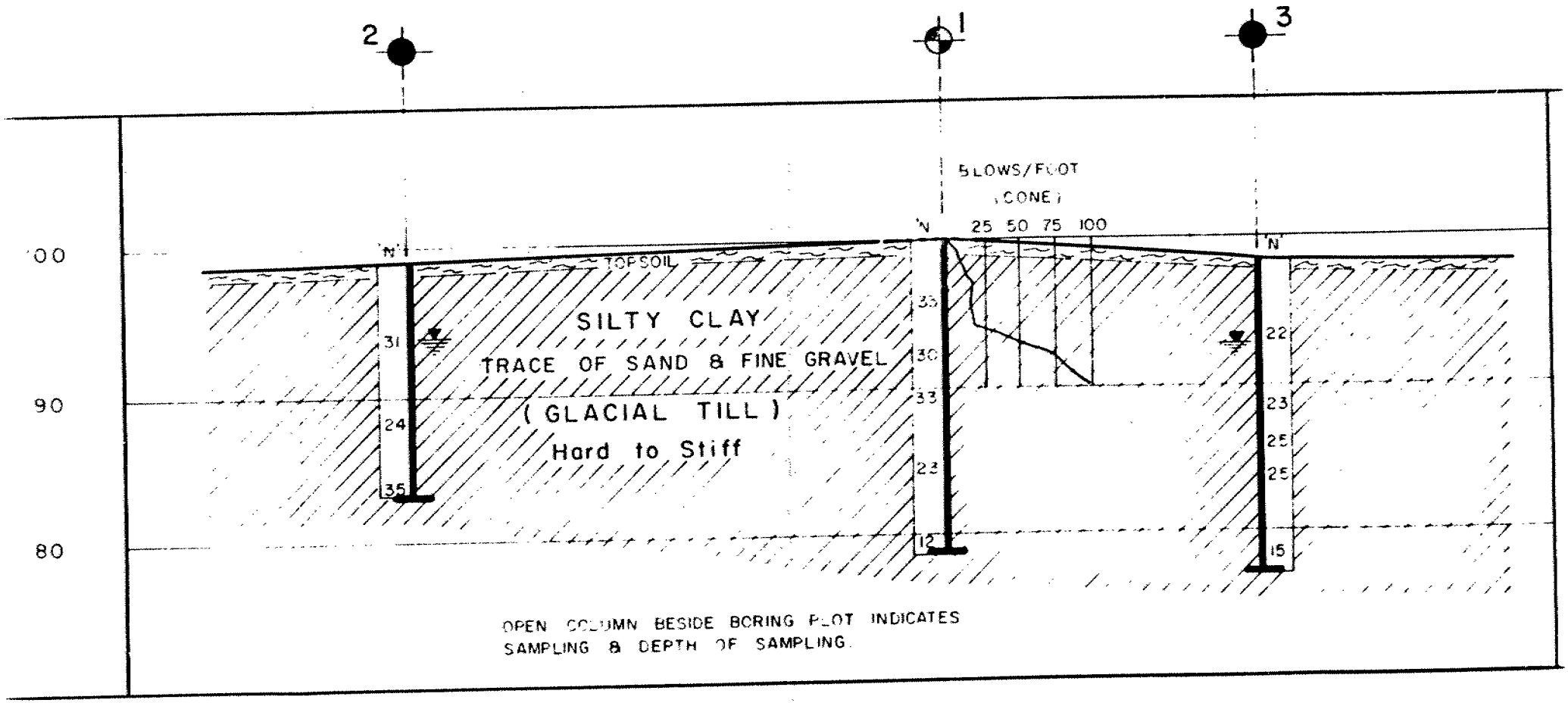
A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

AGS/MdeP
Attach.
cc: Messrs. C. S. Moase (4)
E. J. Orr
H. D. McMillan
H. Greenland
T. J. Kovich
A. Watt
Foundations Office
Gen. Files



LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation Aug 7, 1963



A — A

SCALES

HORIZONTAL: 100 50 0 100 200 300 FT

VERTICAL: 10 5 0 10 20 30 FT

memorandum

235-3696 Ontario

To: M.S. Devata
Chief Foundation Engineer
Foundation Design Section
Central Building, Room 315

Date: 93 08 11

Attn: T. Sangiuliano

From: Soils and Aggregates Section
Engineering Materials Office
Central Building, Room 311

File No: 3162-2-4-113

Re: **Borehole Core Description**
Highway 20/Chapel Hill Road, Stoney Creek
W.P. 387-85-00

As requested by you, core from one (1) borehole was logged. A description is appended. Bedrock is **DOLOSTONE** of the Lockport Formation. Depth to bedrock and depth to unweathered to slightly weathered bedrock in each borehole are tabulated below:

Borehole number	Depth to bedrock in metres below ground surface	Depth to unweathered to slightly weathered bedrock in metres below ground surface
2	5.2	5.2

If you have any questions, please contact me.

D A Williams.

David A. Williams,
Petrographer.

DAW/jlp
Attachment

ROCK CORE DESCRIPTION
WP 387-85-00

CORE RECOVERY					CORE DESCRIPTION	
BH#	RC#	DEPTH (m)	% CR*	% RQD*	DEPTH (m)	DESCRIPTION
2	7	5.18-6.71	100	85	5.18-6.71	**DOLOSTONE** with vugs up to 3 cm in diameter containing calcite crystals, light grey to medium grey to pale yellowish brown; fine to medium grained; medium strong; unweathered to slightly weathered; fractures moderate to close spaced, flat to dipping, undulating to planar, smooth to rough.

***CR** = CORE RECOVERY
***RQD** = ROCK QUALITY DESIGNATION

Note: Depths are approximated where core recovery is less than 100%
Logged by: DAW, Soils and Aggregates Section

GLACIAL TILL
2 TSF
2TSP

WILLIAM L. SEARS AND ASSOCIATES LIMITED
CONSULTING PROFESSIONAL ENGINEERS

455 SEAMAN STREET
STONEY CREEK, ONTARIO
L8E 2R2

3044 27
55

April 1, 1993

Mr. Augustine Liu
Sr. Structural Engineer
Structural Section
Central Region
1201 Wilson Avenue
Atrium Tower, 4th Floor
Downsview, Ontario
M3M 1J8

Attention: Mr. Augustine Liu

Re: **Highway 20 - From the intersection of Hwys. 53/56/20 to 0.30 km west of South Grimsby-Binbrook Township**
W.P. 387-85-00
Proposed Gabion Retaining Wall
Our File: #1091014

Dear Sir,

We submit, herewith, our design for the proposed gabion wall located along the south side of Highway No. 20 from station 20+481 to station 20+506 for your review and comments.

Enclosed, please find the results for the gabion wall calculations, a typical cross section for the proposed wall, and a plan view showing the wall's location. Additional cross sections of the existing terrain will follow when our field personnel have completed their survey.

The proposed gabion wall was designed using the Maccaferri Gabion Calculation Program and the results are shown on pages 1 to 4 as attached. These pages include a description of the wall, soil and gabion parameters, ground profile, etc. The stability of the retaining wall was found to be adequate based upon the available information shown on pages 1 and 2. Additional gabion mat was provided along the bench at the downhill toe of the wall and along the bank in order to protect against any potential scouring from the nearby stream. It should be noted that existing soils data was derived from that shown on the plans (borehole at station 20+485 15.0 m Rt.) and from the current geotechnical report for Highway No. 20. For the purposes of calculation the soil was presumed to consist of silty clay with a unit weight of 1.9 tonnes per cubic metre.

Should you have any questions regarding the above, or feel that we should obtain additional soils information to compliment our design, please do not hesitate to contact our office. We look forward to your comments.

Yours very truly,

R. Hein, P. Eng.

RH/rh
Encl.

c.c. Mr. H. Shah
Mr. C. Curtis

Hwy 20 - from Intersection Hwys 53/56/20 to 0.3 km West of South Grimsby - Binbrook Township
WP 387-85-00.

DESCRIPTION OF WALL AND SOIL PARAMETERS

Wall data

- Number of gabion courses		3
- Wall batter	deg	6

Soil parameters

- Soil friction angle	deg	22
- Unit weight	t/m3	1.9
- Cohesion	t/m2	1
- Limit pressure	t/m2	

Backfill material

1) downhill	Y/N	N
2) underneath	Y/N	N
- Backfill friction angle	deg	32
- Backfill unit weight	t/m3	2.4
- Slope of cut	deg	75

GROUND PROFILE

		Section 1		Section 2
Backfill slope				
- Slope	deg	18.5	deg	3.5
- Surcharge load	t/m2	0	t/m2	1.5
- Horizontal distance between the inner top of the wall and the change in slope and/or surcharge	m			2
Downhill slope				
- Slope angle	deg			34
- Downhill foundation depth	m			.8

GABION PARAMETERS

- Gabion fill unit weight	t/m3	2.5
- Empty gabion unit weight	Kg/m3	9
- Tensile strength of mesh	t/m	4.3

	ϕ	γ (Kn/m³)
* Grav 'A'	35°	22.8
Grav 'B'	30°	21.2

USE OF FILTER CLOTH

- Placement :	at the back	Y/N	N
	on foundation	Y/N	N
	at interface cut-backfill	Y/N	Y ✓
- Reduction in soil friction angle (percentage)		%	80 ✓

SEISMIC ACTIONS

- Is the structure in seismic areas?	Y/N	N ✓
- Coefficient of seismic intensity (0.04-0.07-0.1)		0

WALL COORDINATES

1)	Y :	1	Xa:	0	Xb:	2 ✓
2)	Y :	2	Xa:	0	Xb:	2 ✓
3)	Y :	3	Xa:	.5	Xb:	1.5 ✓

RESULTS

Check against sliding

- sliding forces	Fs = t/m	6.13
- antisliding forces	Fa = t/m	10.55
- safety factor against sliding	fs1=	1.72

Check against overturning

- overturning moment	Mo = tm/m	5.89
- restoring moment	Mr = tm/m	19.52
- safety factor against overturning	fov=	3.32

Check against bearing failure

- normal force on foundation	N = t/m	13.73
- shear force on foundation	T = t/m	4.54
- eccentricity	e = m	.05
- normal stress on outer foundation border	e1 = t/m2	7.85
- normal stress on inner foundation border	e2 = t/m2	5.87
- soil allowable stress	ea = t/m2	12.35 ✓

Soil Pressure 2000 PSF or 96 KPa. 100 KPa

may reduce ... downhill slope

RESULTS cont'd

Check against overall stability

- safety factor against overall stability	fos=	2.81

Normal/shear stresses inside the wall

- at each level the values for normal/shear stresses are lower than the allowable ones

Acting forces due to the wall and the soil

- batter of the acting thrust plane	a = deg	96.00
- wall weight	Ww = t/m	8.75
- wall weight moment referred to point O	Mw = tm/m	9.89
- 'encased' soil weight	Ws = t/m	1.34
- 'encased' soil moment referred to point O	Ms = tm/m	2.70
- surcharge weight on 'encased ' soil	Wc = t/m	0.00
- moment of the surcharge weight on 'encased' soil ref. to point O	Mc = tm/m	0.00
- weight of soil between foundation and the shear plane	Wf = t/m	.40

Active thrust : forces and parameters

- active thrust coefficient	Ka =	.450
- active thrust height	Ha = m	3.21
- active thrust value	Pa = t/m	6.82
- horizontal component of Pa	Pah= t/m	6.13
- moment of Pah referred to point O	Mah= tm/m	5.89
- vertical component of Pa	Pav= t/m	2.99
- moment of Pav referred to point O	Mav= tm/m	6.32

Passive thrust : forces and parameters

- passive thrust coefficient	Kp =	4.193

Passive thrust acting down to point O

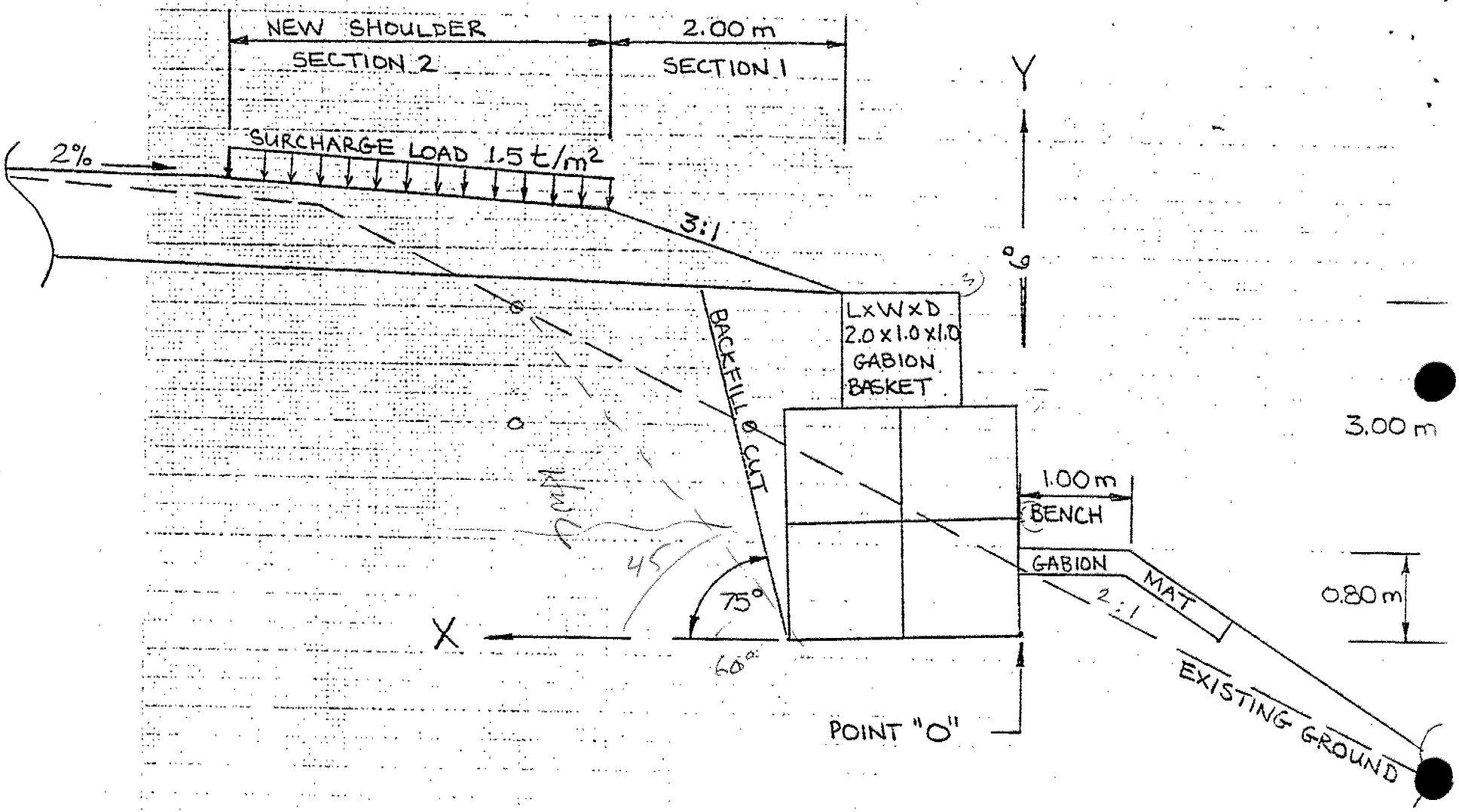
- passive thrust height	Hp' = m	.80
- passive thrust value	Pp' = t/m	2.52
- horizontal component of Pp	Pph' = t/m	2.34
- vertical component of Pp	Ppv' = t/m	.94
- moment of Pph' referred to point O	Mp' = tm/m	.62

RESULTS cont'd

Passive thrust acting at the sliding plane level

- passive thrust height	Hp'' = m	1.00
- passive thrust value	Pp'' = t/m	4.02
- horizontal component of Pp''	Pph''= t/m	3.73
- vertical component of Pp''	Ppv''= t/m	1.51

Sect	H (m)	N (t/m)	T (t/m)	M (tm/m)	emax (t/m2)	σav (t/m2)	σal (t/m2)
1	1.00	8.27	2.39	-.73	4.54	1.20	4.96
2	2.00	2.16	.49	-.06	2.28	.49	3.64

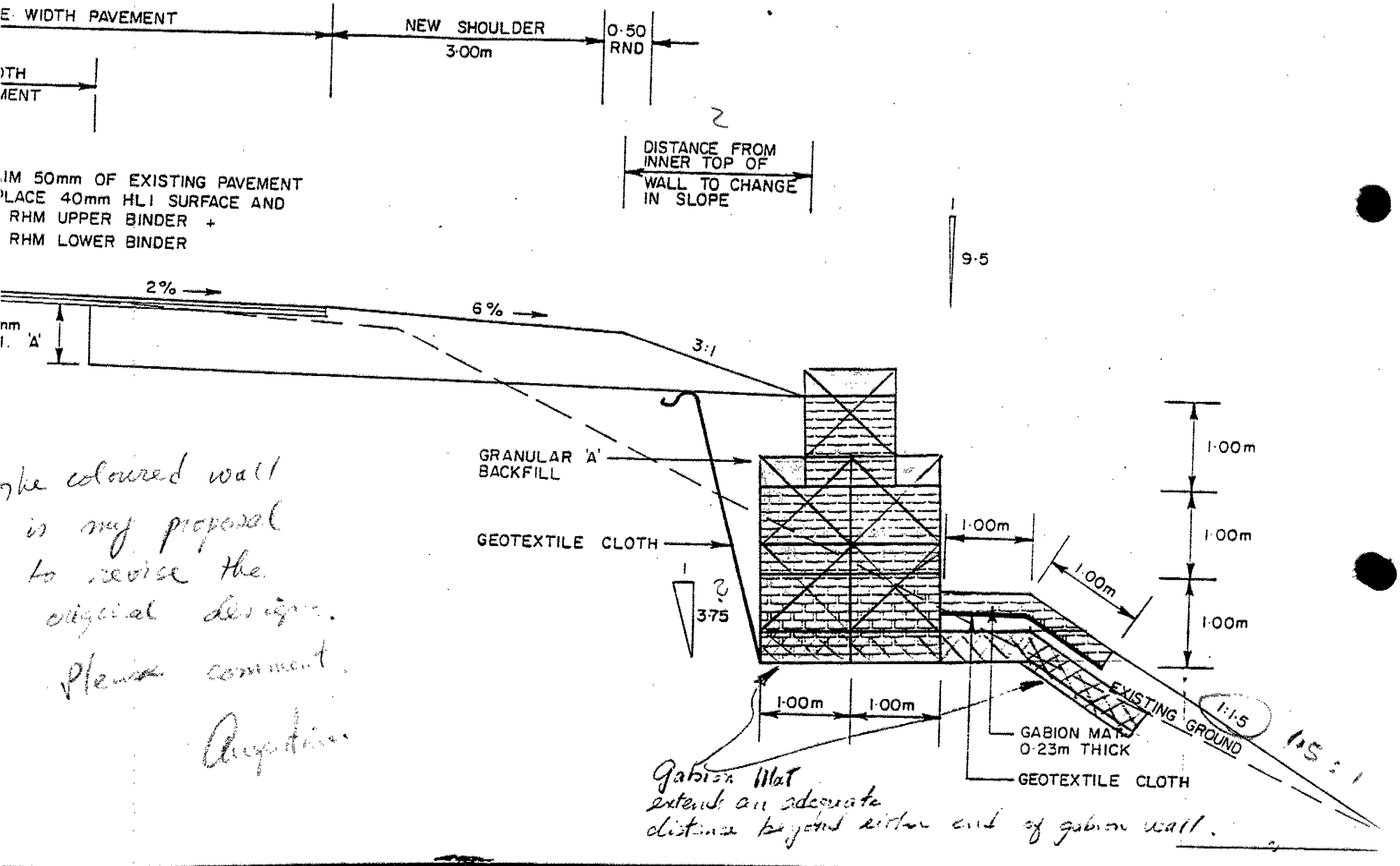


PROPOSED GABION RETAINING WALL

FROM STA. 20+481 TO STA. 20+506

HWY No. 20

NOT TO SCALE



The coloured wall in my proposal to revise the original design. Please comment. Acceptance.

Gabion Mat extends an adequate distance beyond either end of gabion wall.

85 - 1.2 m br.si.cl. M.P.

20+475 3.6 m Lt. of C.L.

0 - 220 mm asph.
220 - 700 mm cr.gr.
700 - 1.5 m br.si.cl. M.P.

20+475 13.0 m Lt. of C.L.

0 - 150 mm dk.br.si.cl.tps.
150 - 1.2 m br.si.cl. M.P.

20+485 5.7 m Rt. of C.L.

0 - 280 mm cr.gr.
280 - 1.5 m br.si.cl. M.P.
test 91-WB-66

20+485 15.0 m Rt. of C.L.

0 - 90 mm dk.br.si.cl.tps.
90 - 1.2 m br.si.cl. M.P.

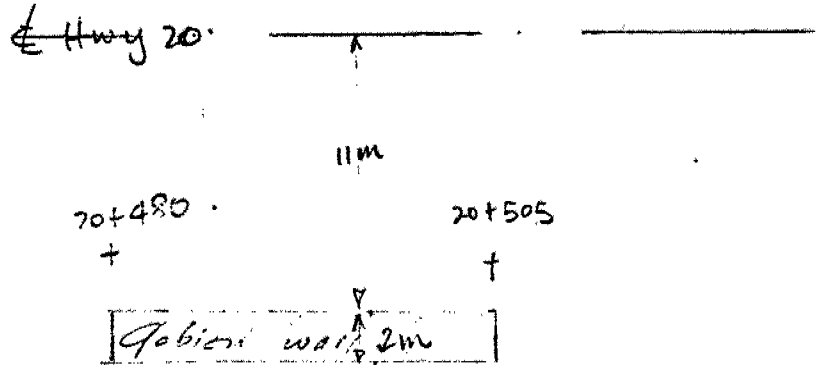
20+535 3.6 m Rt. of C.L.

0 - 220 mm asph.
220 - 570 mm cr.gr.
570 - 800 mm br.si.gr.
800 - 1.5 m br.si.cl. M.P.

20+535 18.0 m Rt. of C.L.

0 - 80 mm dk.br.si.cl.tps.
80 - 1.2 m br.si.cl. M.P.

medium [illegible]



Soft clay = 1 ton/ft²
= 200 lb/ft²
= 96 kN/m²
10 tonne/m²

1 tonne = 9.81 kN