

DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT. 1976

GEOCRES No. 31L-59

DIST. 13 REGION

W.P. No. 17-93-01

CONT. No. 95-214

W. O. No.

STR. SITE No. 44-366

HWY. No. 11

LOCATION Hwy 11 & McGillivray
Greer Tributary

No of PAGES -

=====

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.

REMARKS:

METRIC
DIMENSIONS ARE IN METRES
AND / OR MILLIMETRES
UNLESS OTHERWISE SHOWN

DISTRICT 13 NORTH BAY
CONT No
WP No 51-75-00
MCGILLVRA CREEK TRIBUTARY
CULVERT
PROPOSED HWY. 11 S.B.L.
GENERAL ARRANGEMENT

northland
engineering
limited
Consulting Engineers and Planners

GENERAL NOTES

1. CLASS OF CONCRETE TO BE 30MPa.
2. CLEAR COVER TO REINFORCING STEEL
BOTTOM OF TOP SLAB 50 ± 10
BOTTOM OF BOTTOM SLAB 100 ± 25
REMAINDER 70 ± 20

UNLESS OTHERWISE NOTED

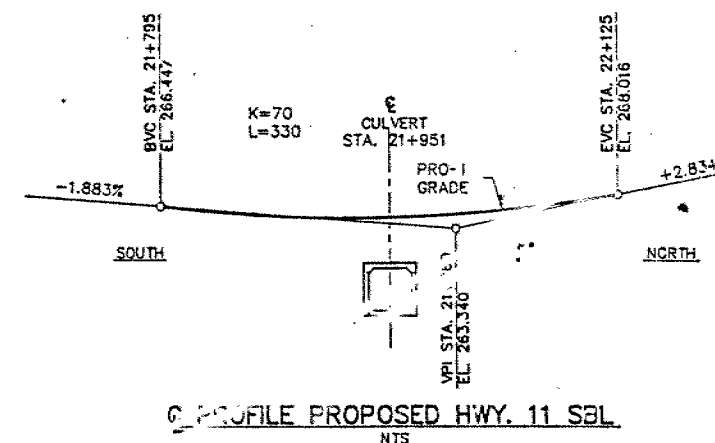
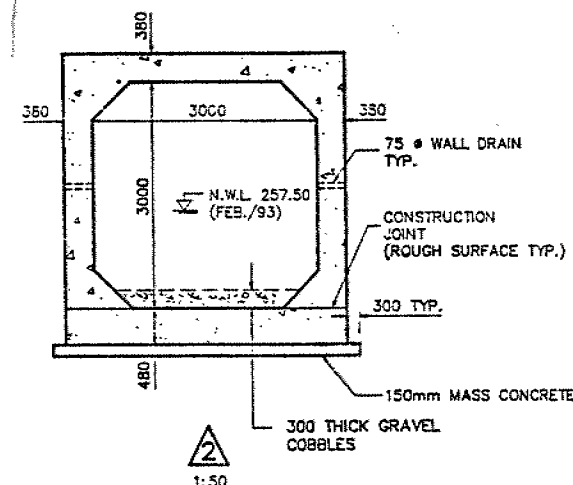
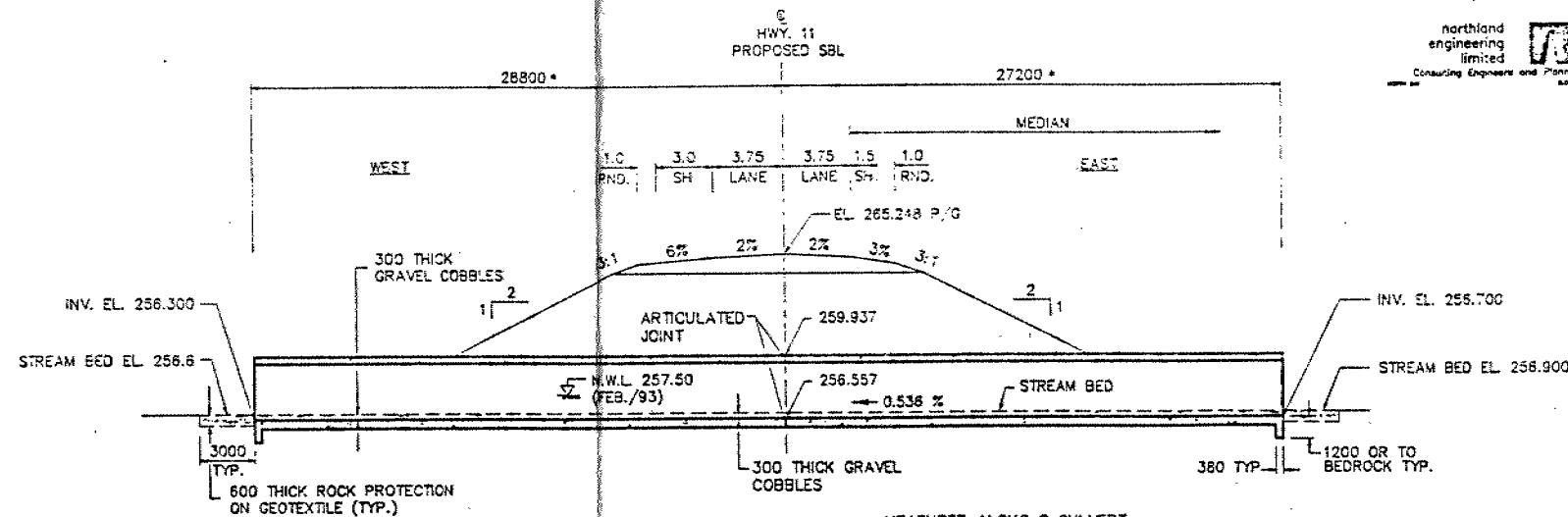
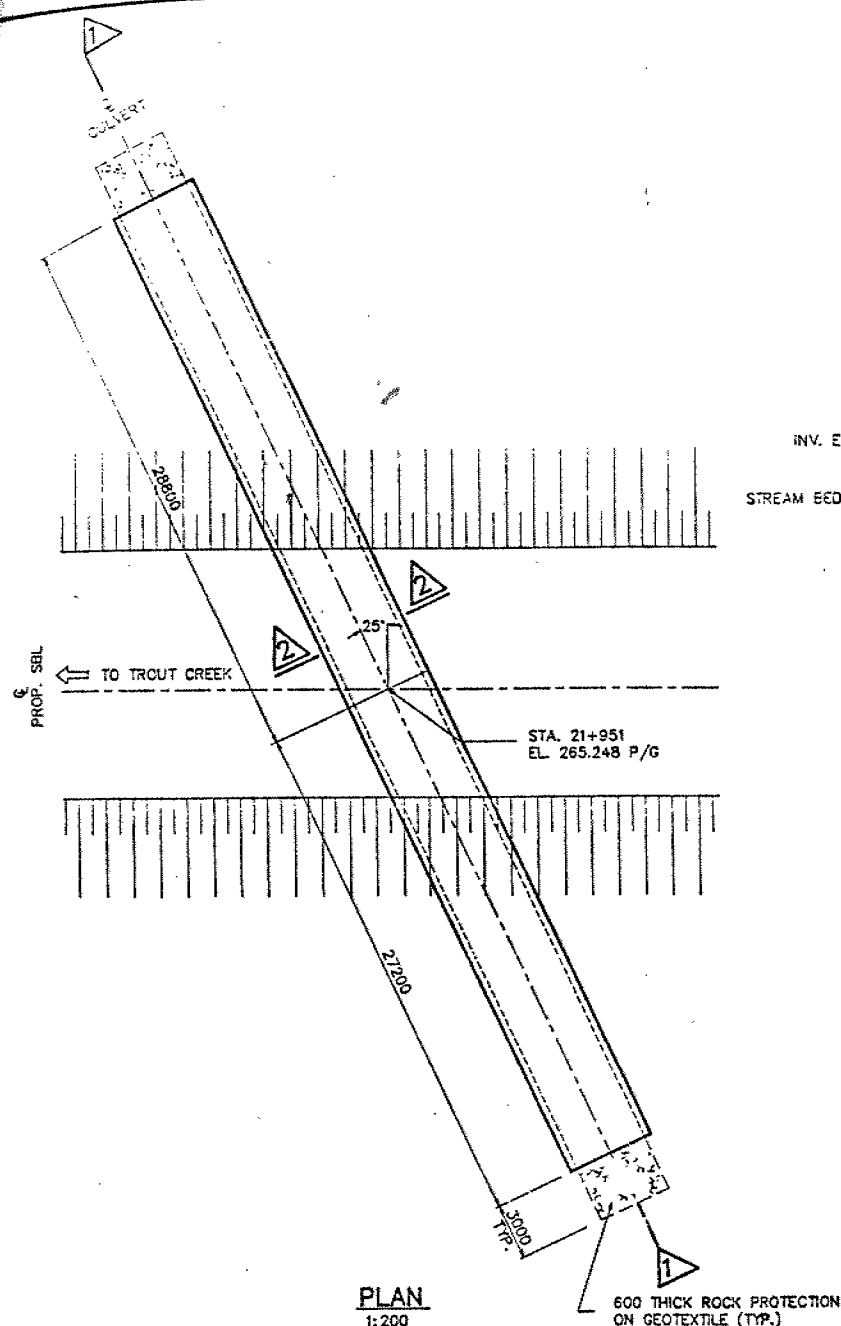
3. REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED. BARS MARKED WITH SUFFIX C DENOTE COATED BARS.
4. MAX. SIZE OF GRAVEL COBBLES TO BE 150 mm

LEGEND

ALT DENOTES ALTERNATE
IF DENOTES INSIDE FACE
OF DENOTES OUTSIDE FACE
EF DENOTES EACH FACE

CONSTRUCTION NOTES

1. NO CONCRETE SHALL BE PLACED UNTIL THE DEPTH OF THE EXCAVATION AND THE CHARACTER OF THE FOUNDATION HAVE BEEN APPROVED BY THE ENGINEER.
2. BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH SIDES OF CULVERT KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
3. SITE No. AND DATE FIGURES SUPPLIED BY MTO



LIST OF DRAWINGS

1. GENERAL ARRANGEMENT
2. CULVERT DETAILS
3. STANDARD DETAILS

B.M. EL. 269.729
TOP OF HCM 67-443
STA. 12+557.7 49.4 RT.

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	S.H.	CHK S.K.P.	CODE QHBC 1991
DRAWN	D.A.H.	CHK S.K.P.	SIZE 44-366 STRUCT
			1 SCHEME

METRIC
DIMENSIONS ARE IN METRES
AND / OR MILLIMETRES
UNLESS OTHERWISE SHOWN

DISTRICT 13 NORTH BAY
CONT No
WP No 51-75-00

McGILLVRA CREEK TRIBUTARY
CULVERT
PROPOSED HWY. 11 S.B.L.
CULVERT DETAILS

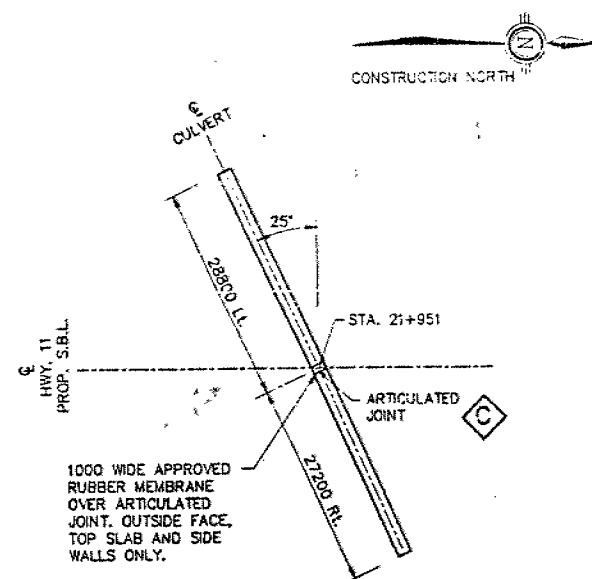
northland
engineering
limited
Consulting Engineers and Planners

GENERAL NOTES

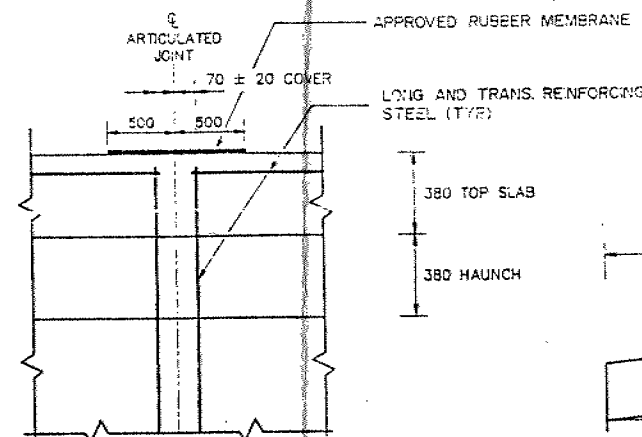
1. CLASS OF CONCRETE TO BE 30MPa.
2. CLEAR COVER TO REINFORCING STEEL
BOTTOM OF TOP SLAB 50 ± 10
3. REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED. BARS MARKED WITH SUFFIX, DENOTE COATED BARS.
4. LONGITUDINAL REINFORCING STEEL SHALL BE DISCONTINUED AT ARTICULATED JOINT.
5. LEGEND
ALT DENOTES ALTERNATE
IF DENOTES INSIDE FACE
OF DENOTES OUTSIDE FACE
EF DENOTES EACH FACE

CONSTRUCTION NOTES

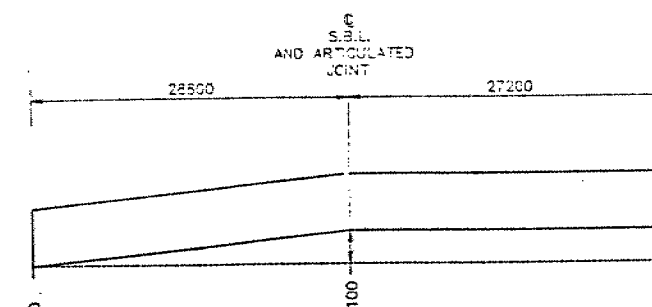
1. BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH SIDES OF CULVERT KEEPING THE HEIGHT OF BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
2. NO CONCRETE SHALL BE PLACED UNTIL THE DEPTH OF THE EXCAVATION AND THE CHARACTER OF THE FILL HAVE BEEN APPROVED BY THE ENGINEER.
3. SITE No. AND DATE FIGURES SUPPLIED BY MTO



KEY PLAN
1:500

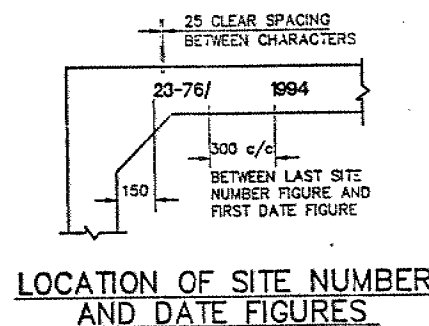
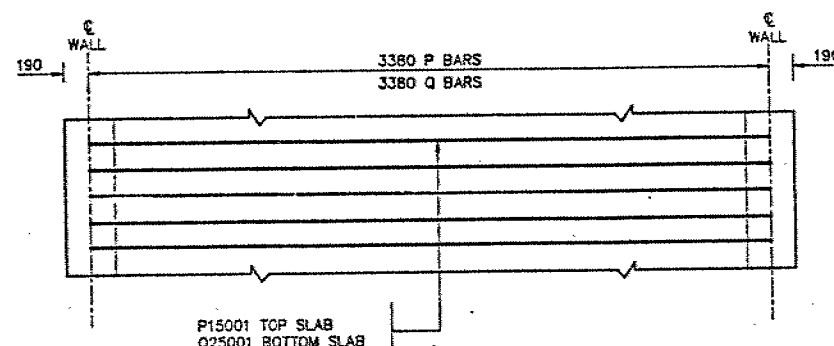


NTS

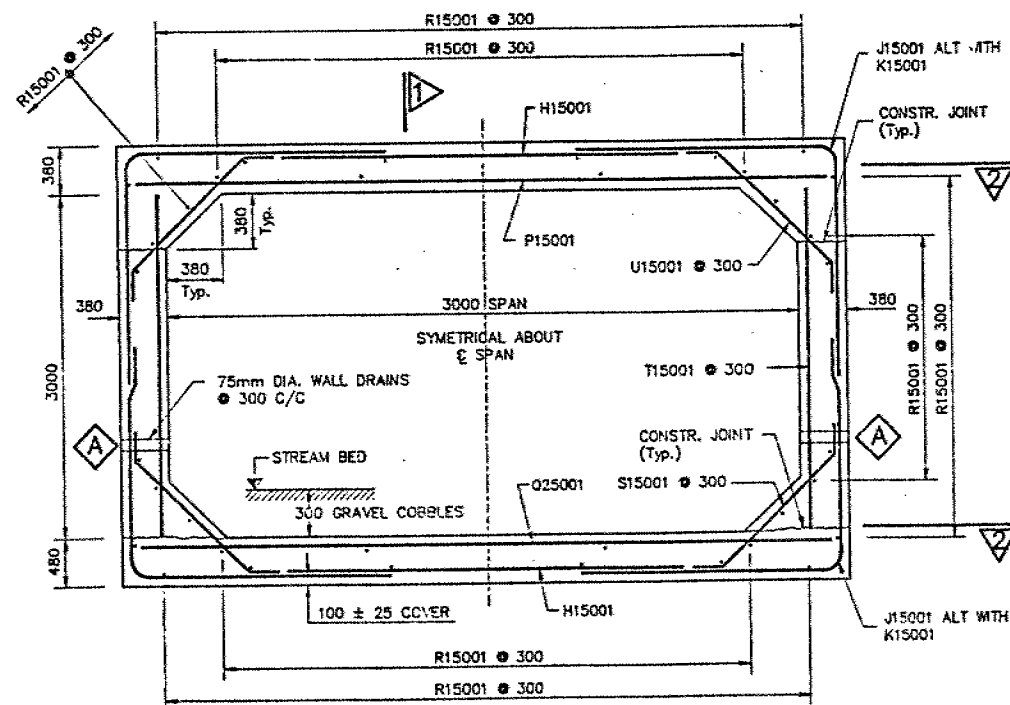
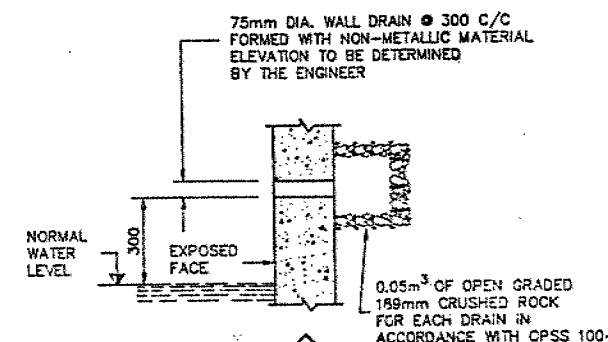


FOR DESIGN GRADE
AND ELEVATION - SEE
GENERAL ARRANGEMENT
DWG.

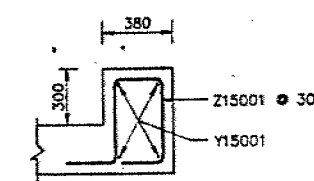
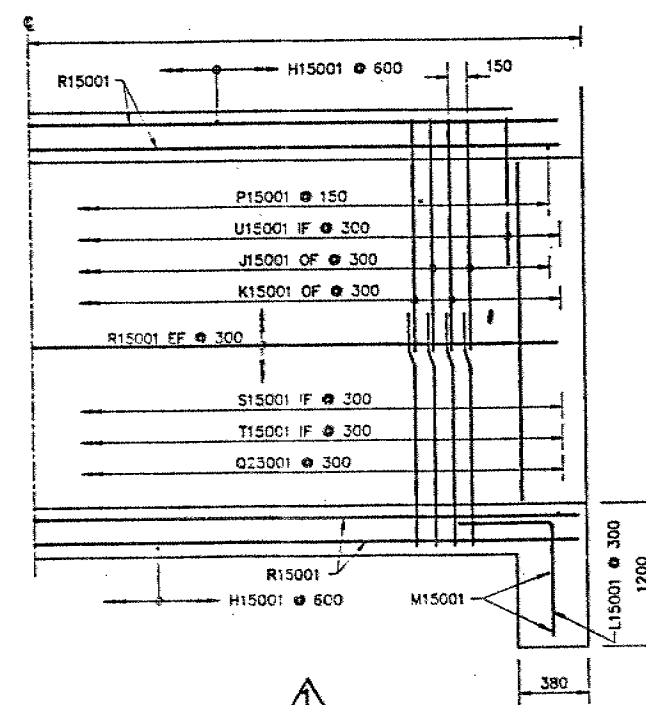
CULVERT CAMBER DIAGRAM



**LOCATION OF SITE NUMBER
AND DATE FIGURES**



TYPICAL CULVERT SECTION



MARK	No. REQ'D	C/C	LENGTH	DETAILS	REMARKS
H15001	190	600	2000	STRAIGHT	TOP OF TOP SLAB BOTTOM OF BOTTOM SLAB
J15001	748	300	4140	1820 R=270	J-BARS ALTERNATE V K-BARS
K15001	744	300	3640	1320 R=270	K-BARS ALTERNATE V J-BARS
P15001	373	150	3380	STRAIGHT	BOTTOM OF TOP SLAB
Q25001	188	300	3380	STRAIGHT	TOP OF BOTTOM SLAB
R15001	880	300	6000	STRAIGHT 88 SETS @ 10 PER SET	LONGITUDINAL, DISCONTINUED @ ARTICULATED JNT.
S15001	376	300	1700	45° 1340 45° 180	HAUNCH
T15001	376	300	3000	STRAIGHT	INSIDE FACE OF WALL
U15001	376	300	1600	45° 1240 45° 180	HAUNCH
L15001	26	300	1500	1000 300	DOWELS TO APRON WALL
M15001	4	400	3620	STRAIGHT	APRON WALL
Y15001	8	SEE 2	3620	STRAIGHT	HEADER WALL
Z15001	26	300	1705	225 190 230	HEADER WALL

NOTE: - ALL DIMENSIONS SHOWN TO CENTRE LINE OF BAR
-- REPRESENTS VERTICAL DIMENSION

QUANTITIES			
ITEM	WALLS & SLABS	RETAINING WALL	TOTAL
MASS OF REINFORCING STEEL tonnes	26.39	—	26.39
VOLUME OF CONCRETE cubic metres	327	—	327

STANDARD DRAWING JUNE 1993		SS114-2
RIGID FRAME BOX CULVERT		
DATE	BY	DESCRIPTION
DESIGN SH	CHK SKP	CODE OHBDC 1991 LOAD
DRAWN DAN	CHK SKP	SITE 44-366 STRUCT

FILE COPY



Ministry
of
Transportation

FOUNDATION DESIGN SECTION

**foundation
investigation and
design report**

ENGINEERING MATERIALS OFFICE
FOUNDATION DESIGN SECTION

17-93-01
WP ~~51-75-01~~ DIST 13
HWY 11 STR SITE 44-366

Tributary to McGillvray Creek Culvert
Proposed Southbound Lanes, Highway 11

CONT 95-214

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FOUNDATION INVESTIGATION REPORT

for

Tributary to McGillvray Creek Culvert
Proposed Southbound Lanes, Highway 11

W.P. ~~51-75-01~~ 17-93-01

District 13, North Bay

INTRODUCTION

This report summarizes the information obtained from the foundation investigation carried out at the above noted site. The investigation was carried out at the request of the Northern Region Structural Section to design a culvert required for the proposed four laning of Highway 11. The field work was carried out on 93 02 10 and 93 02 11 and consisted of three (3) sampled boreholes and three (3) dynamic cone penetration tests along the length of the proposed culvert site. In addition, one (1) sampled borehole and one (1) dynamic cone penetration test were advanced approximately 50 m north of the culvert location where high fill is expected.

SITE DESCRIPTION

The site is located on the proposed southbound lanes of Highway 11, approximately 2.0 km south of the intersection of Highway 534 and 50 m west of the existing Highway 11 embankment in the Township of South Himsworth, District of Parry Sound.

The immediate area is moderately rolling with scattered surficial boulders and mainly grassy vegetation. The property on which the site is located is presently used as livestock pasture. According to the Northern Ontario Engineering Geology Terrain Study published by the Ministry of Natural Resources, the site is located in a Sandy Glaciolacustrine Plain.

The existing Highway 11 embankment is 8 m to 10 m high at this location with the watercourse accommodated by a 3.05 m x 3.05 m x 32 m rigid frame concrete box culvert.

INVESTIGATION PROCEDURES

Soil data and inherent properties were obtained by in-situ and laboratory testing. The procedures employed are discussed below.

Field

The field work for the investigation was carried out on 93 02 10 and 93 02 11 and consisted of four (4) sampled boreholes and four (4) dynamic cone penetration tests advanced to depths of 3.3 to 7.9 m. 2.3 m of rock core was obtained in BH 2.

The boreholes were advanced using conventional hollow stem augering techniques with a track mounted continuous flight auger machine. The sampling program consisted of disturbed samples taken directly from the auger in the surface soil and by split spoon sampler in accordance with Standard Penetration Test (ASTM D1586) for the subsurface strata. Standard Penetration ('N') values were recorded for assessment of the denseness of the materials encountered. All subsoil samples were identified in the field and returned to the laboratory for further examination and appropriate testing.

Groundwater level was monitored in open boreholes throughout the investigation. Water level in the creek was also measured during the time of the investigation. All boreholes were backfilled upon completion of the field work.

Surveying required to ascertain borehole locations and elevations was carried out by the Northern Region Surveys and Plans Section.

Laboratory

The laboratory testing on selected soil samples consisted of the following:

- Atterberg Limit Test
- Grain Size Distribution
- Natural Moisture Content Determination
- Organic Content Determination

Laboratory results are given in the following section of this report and are illustrated on Record of Borehole sheets included in the Appendix.

SUBSURFACE CONDITIONS

General

The Record of Borehole sheets in the Appendix illustrate the subsurface conditions at the borehole locations. The locations and elevations of the boreholes are shown in Dwg. No. ~~517501-A~~. 179301-A

The subsurface stratigraphy in BH 1 to 3 typically comprises of a 2.7 to 5 m thick layer of silt overlying a 1.6 to 2.9 m sand deposit. Depth to bedrock in these boreholes ranges from 5.3 to 7.9 m. In BH 4, a 3 m thick layer of sandy silt was found overlying a minor layer (0.3 m thick) of non-cohesive glacial till. Bedrock was encountered at shallow depth (3.3 m). In order to verify bedrock, 2.3 m of rock core was taken from BH 2. A subsurface profile is shown in Dwg. No. ~~517501-B~~. 179301-B

Following are the specific descriptions of the materials encountered in the investigation:

Silt, Some Sand, Trace Clay, Occasional Clayey and Sandy Zones

This material was encountered at the surface in BH 1 to BH 3 to a depth of 3.7 m to 5.0 m. It is typically described as Silt, Some Sand, Trace Clay. In BH 3 occasional clayey pockets and sandy zones were recorded. The Standard Penetration Resistance 'N' values range from 3 to 24 blows/0.3 m indicating very loose to compact denseness. Occasional rootlets and organics were found in this stratum in both BH 1 and BH 2. Typical properties of this material as determined by laboratory tests carried out on representative samples are summarized as follows :

<u>Property</u>	<u>Range</u>	<u>No. of Test</u>
Natural Moisture Content (w%)	19.0-65.5	9
Liquid Limit (w_L)	20-31	4
Plastic Limit (w_p)	15-28	4
Grain Size Distribution (%)		7
Gravel	0-3	
Sand	9-41	
Silt & Clay	58-91	
Organic Content (%)	2.1-4.3	2

Sandy Silt, Some Clay

This non-cohesive stratum was contacted at the surface in BH 4 to a depth of 3.0 m. It is typically described as Sandy Silt, Some Clay. The Standard Penetration Resistance 'N' values ranged from 5 to 10 blows/0.3 m, indicating a loose to compact denseness. Laboratory tests carried out on a representative sample indicated a natural moisture content of 29.5% and grain size distribution of 0% gravel, 36% sand and 64% silt and clay.

Silty Sand, Trace to Some Gravel

This material was encountered in BH 1 to 3 overlying bedrock. The Standard Penetration Resistance 'N' values ranged from 20 to 68 blows/0.3 m, indicating a compact to very dense state of denseness. Laboratory tests carried out on a representative sample indicated a natural moisture content of 12% and grain size distribution of 16% gravel, 53% sand and 31% silt and clay.

Heterogeneous Mixture of Sandy Silt Trace Gravel (Glacial Till)

This material was encountered from 3.0 m to 3.3 m in BH 4. It lies directly over bedrock and the Standard Penetration Resistance 'N' value was 25 blows/8 cm with the split spoon sampler bouncing on bedrock. Laboratory tests carried out on a representative sample indicated a natural moisture content of 10% and grain size distribution of 19% gravel, 49% sand and 32% silt and clay.

Bedrock

Bedrock was encountered at shallow depth at El. 255.7 m (BH 4) on the west side and found sloping down to El 251.1 m (BH 1) at the east end.

Bedrock was cored in BH 2. The rock cores obtained were used for rock quality determination and classification. Detailed description of the rock are attached in the Appendix. Bedrock is a slightly weathered to unweathered granite. Core recoveries and Rock Quality Designations are 100%. The rock is considered strong.

Groundwater

During the time of the investigation, the water level in the creek was at El. 257.5 m. It is probable that the creek elevation rises considerably during periods of high runoff.

Ground water level was measured in the boreholes to be between El. 258.0 and EL. 259.0 m approximately.

Groundwater levels are subject to seasonal fluctuations and hence may vary from the elevations given in this report.

DISCUSSION and RECOMMENDATIONS

General

Due to the proposed twining of Highway 11, a new culvert is required over a tributary of McGillvray Creek at the proposed southbound lane. The culvert will act as a link between the creek and the existing culvert on Highway 11 just to the east of the site. The proposed culvert will be a 3 m x 3 m rigid frame box culvert and the proposed invert elevations are 256.3 m at 31 m left of centreline and 256.6 m at 27 m right of centreline. The approach fills will be approximately 7.0 m in height, decreasing gradually to the north and rapidly to the south.

Foundation

Based on the proposed invert elevations for the culvert and assuming a slab thickness of 0.3 m, the box culvert will be founded on a nominal thickness of granular pad over bedrock at the downstream end and up to 5.0 ±m of silt and silty sand above bedrock at the upstream end. As the largest fill loading occurs at the centreline of the proposed SBL, differential settlement is expected due to compression of the sand stratum. To cater for this, it is recommended that a camber be provided at the upstream half of the culvert. The culvert should be constructed higher than desired final grade as follows:

west end (downstream)	0 mm
centreline	100 mm
east end (upstream)	100 mm

For a box culvert founded on native silt or silty sand, the following design capacities as per O.H.B.D.C. are recommended:

Factored Capacity at U.L.S.= 600 kPa

Bearing Capacity at S.L.S. Type II = 75 kPa

A 2.0 m earth cover should be provided for frost protection unless the culvert is structurally designed to resist the frost action.

Construction

As the culvert is to be constructed at the existing creek location, provision for controlling the water level in the excavation will be required. An oversized excavation is recommended which can allow sump pumping in perimeter ditches to maintain the ground water a minimum of 0.5 m below the culvert bottom. Some provision, such as a dam and pump, is required to divert the creek itself around the work area.

Below the water level, only relatively free draining backfill material should be used. Earth fill material will be acceptable above the water level. Culvert inlet and outlet treatments should comply with MTO standards.

Temporary excavations up to 3 ±m will be required. Cut slopes should be formed to 2H:1V gradient or flatter.

Slope Stability

According to the design profile, the approach fill slopes will be up to 7.0 ±m high. Embankment slopes should be constructed at 2H:1V in the approach areas. Regular slope vegetation should be established as soon as possible after the fill operation to control surface erosion, as per OPSD-218.01.

MISCELLANEOUS

The fieldwork for this investigation was carried out under the supervision of D. Kwok, Project Foundation Engineer and L. Sheppard, Pavement Design and Evaluation Officer, using the equipment owned and operated by Dominion Soil Investigation Inc. Bedrock was classified by MTO petrographer D. Williams.

The project was carried out by D. Kwok under the general supervision of B. Iyer, Senior Foundation Engineer. The report was co-written by D. Kwok and L. Sheppard, reviewed by B. Iyer, and approved by M. Devata, Chief Foundation Engineer.



A handwritten signature in black ink, appearing to read "D. Kwok", written over a horizontal line.

D. Kwok, P. Eng.
Project Foundation Engineer



A handwritten signature in black ink, appearing to read "M. Devata", written over a horizontal line.

M. Devata, P. Eng.
Chief Foundation Engineer

APPENDIX

<div style="display: flex; justify-content: space-between;"> 17-93-01 RECORD OF BOREHOLE No 1 1 OF 1 METRIC </div>													
W.P. <u>St-75-01</u>		LOCATION <u>Co-ords. N 5 102 779.0 E 316 113.4</u>		ORIGINATED BY <u>DK/LS</u>									
DIST <u>13</u> HWY <u>11</u>		BOREHOLE TYPE <u>H.S. Auger & Cone Test</u>		COMPILED BY <u>LS</u>									
DATUM <u>Geodetic</u>		DATE <u>93 02 11</u>		CHECKED BY <u>BI</u>									
SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT		UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	20 40 60 80 100	W _P W W _L	WATER CONTENT (%) 10 20 30			
258.6	Ground Surface												
0.0	Silt, Some Sand Trace Clay Loose to Very Loose Numerous Decomposed roots Compact		1	AS	-								
			2	SS	3								
			3	SS	3								
			4	SS	7								
			5	SS	12								
254.0	Silty Sand Some Gravel Brown to Grey Compact		6	SS	25								
4.6													
			7	SS	20								
251.1	End of Borehole												
7.5	Auger Refusal Probable Bedrock * 93 02 11 Unstabilized water level measured upon completion												

17-93-01										RECORD OF BOREHOLE No 2										1 OF 1										METRIC									
W.P. 3T-75-0T										LOCATION Co-ords. N 5 102 742.0 E 316 091.3										ORIGINATED BY DK/LS																			
DIST 13 HWY 11										BOREHOLE TYPE H.S. Auger, Dynamic Cone & NQ Core Barrel										COMPILED BY LS																			
DATUM Geodetic										DATE 93 02 10										CHECKED BY BJ																			
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT			UNIT WEIGHT 7 kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL																							
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH kPa 20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE				WATER CONTENT (%) 10 20 30 w _p w w _L																											
259.1	Ground Surface																																						
0.0	Silt Some Sand Trace Clay Brown to Grey Very Loose		1	AS	-																																		
			2	SS	4																																		
			3	SS	4																																		
			4	SS	4																																		
			5	SS	6																																		
255.4																																							
3.7	Silty Sand Trace Gravel Brown Compact to Dense		6	SS	68																																		
253.8																																							
5.3	Granitic Bedrock		7	RC	REC	100%																																	
			8	RC	REC	100%																																	
251.5																																							
7.6	End of Borehole * Water Level measured on 93 02 11																																						

<div style="display: flex; justify-content: space-between;"> 17-93-01 RECORD OF BOREHOLE No 3 1 OF 1 METRIC </div>														
W.P. <u>51-75-01</u>		LOCATION <u>Co-ords. N 5 102 791.5 E 316 069.5</u>		ORIGINATED BY <u>DK/LS</u>										
DIST <u>13</u> HWY <u>11</u>		BOREHOLE TYPE <u>H.S. Auger & Dynamic Cone Penetration Test</u>		COMPILED BY <u>LS</u>										
DATUM <u>Geodetic</u>		DATE <u>93 02 10</u>		CHECKED BY <u>BJ</u>										
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT 7 kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40					
251.1	Ground Surface													
0.0	Clayey		1	AS	-									
	Silt		2	SS	24									0 9 78 13
	Brown, Compact		3	SS	16									
	Trace Clay		4	SS	18									1 41 39 19
	Sandy		5	SS	13									0 36 53 11
256.1			6	SS	10									
5.0	Silty Sand													
	Trace Gravel		7	SS	30									
	Brown, Dense													
253.2														
7.9	End of Borehole													
	Auger Refusal Probable Bedrock													
	Water level measured three hours after the completion of drilling													

RECORD OF BOREHOLE No 4										1 OF 1		METRIC			
W.P. <u>17-93-01</u>		LOCATION <u>Co-ords. N 5 102 711.7 E 316 067.7</u>		ORIGINATED BY <u>DK/LS</u>		DIST. <u>13</u> HWY. <u>11</u>		BOREHOLE TYPE <u>H.S. Auger & Dynamic Cone Penetration Test</u>		COMPILED BY <u>LS</u>		DATUM <u>Geodetic</u> DATE <u>93 02 09</u>		CHECKED BY <u>BI</u>	
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH kPa	WATER CONTENT (%)						
259.0	Ground Surface														
0.0	<div style="text-align: center;"> <p>brown grey</p> <p>Sandy Silt, Some Clay</p> <p>Loose to Compact</p> </div>		1	AS	-										
			2	SS	7										
			3	SS	5										
			4	SS	10										
256.0			5	SS	25	/Bcm									
255.7	See Note 1 for description														
3.3	End of Borehole Auger Refusal Probable Bedrock Note 1: Heterogeneous mixture of Sandy Silt Trace Gravel (Glacial Till) reddish brown very dense • Water Level measured on 93 02 10														

ROCK CORE DESCRIPTION

WP 51-75-01 17-93-01

Page 1 of 1

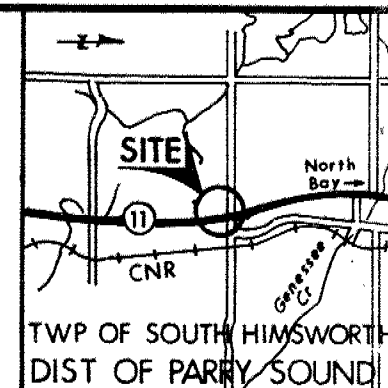
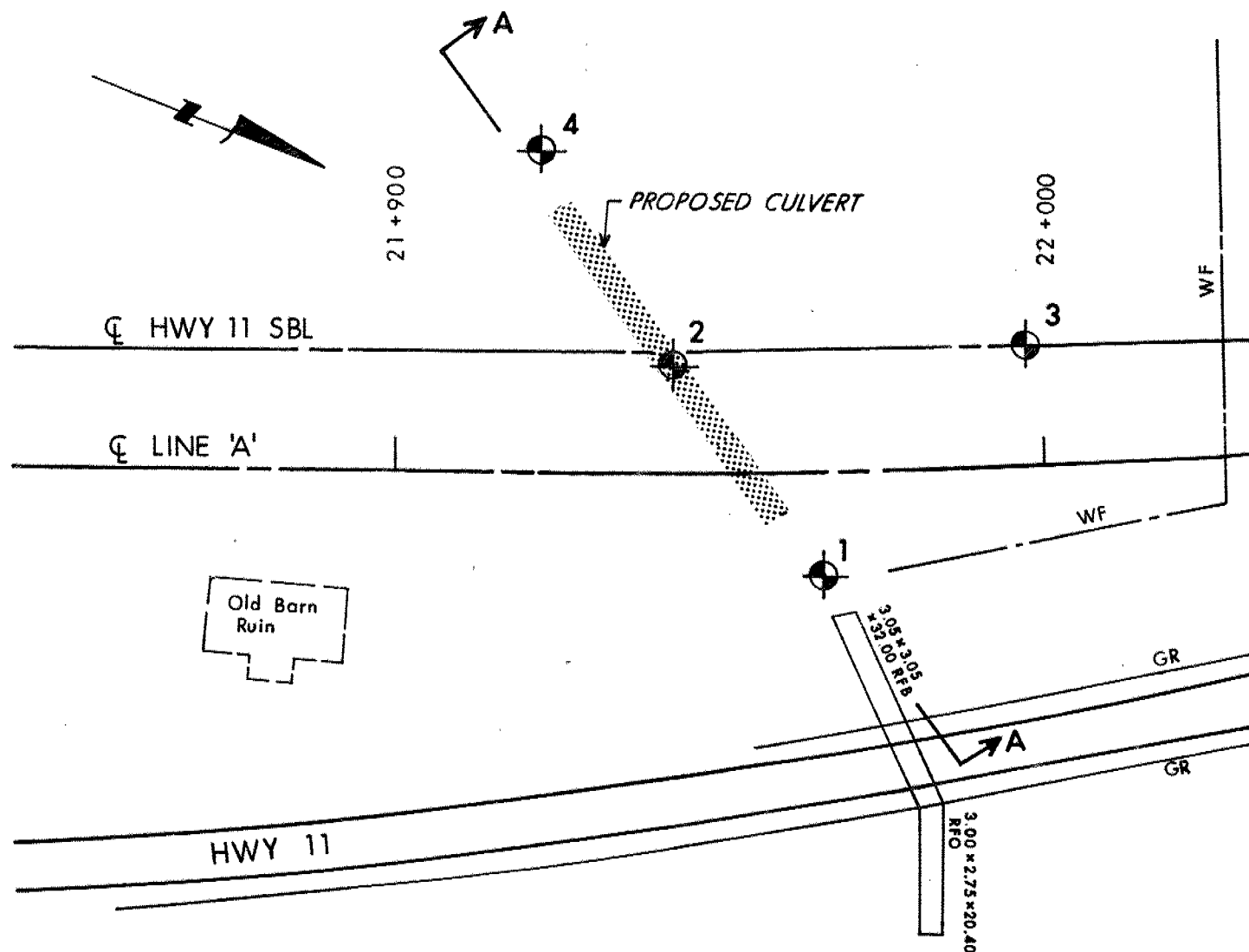
CORE RECOVERY					CORE DESCRIPTION	
BH#	RC#	DEPTH (m)	% CR*	% RQD*	DEPTH (m)	DESCRIPTION
2	7	5.33-6.86	100	100	5.33-7.57	GRANITE (biotite-bearing, garnetiferous, and gneissic), moderate reddish orange to moderate orange pink to dark grey; fine to coarse grained; strong; unweathered to slightly weathered; fractures wide to close spaced, near vertical to flat, planar to undulating, smooth to rough.
	8	6.86-7.57	100	100		

*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



KEY PLAN
SCALE
1km 0 1km

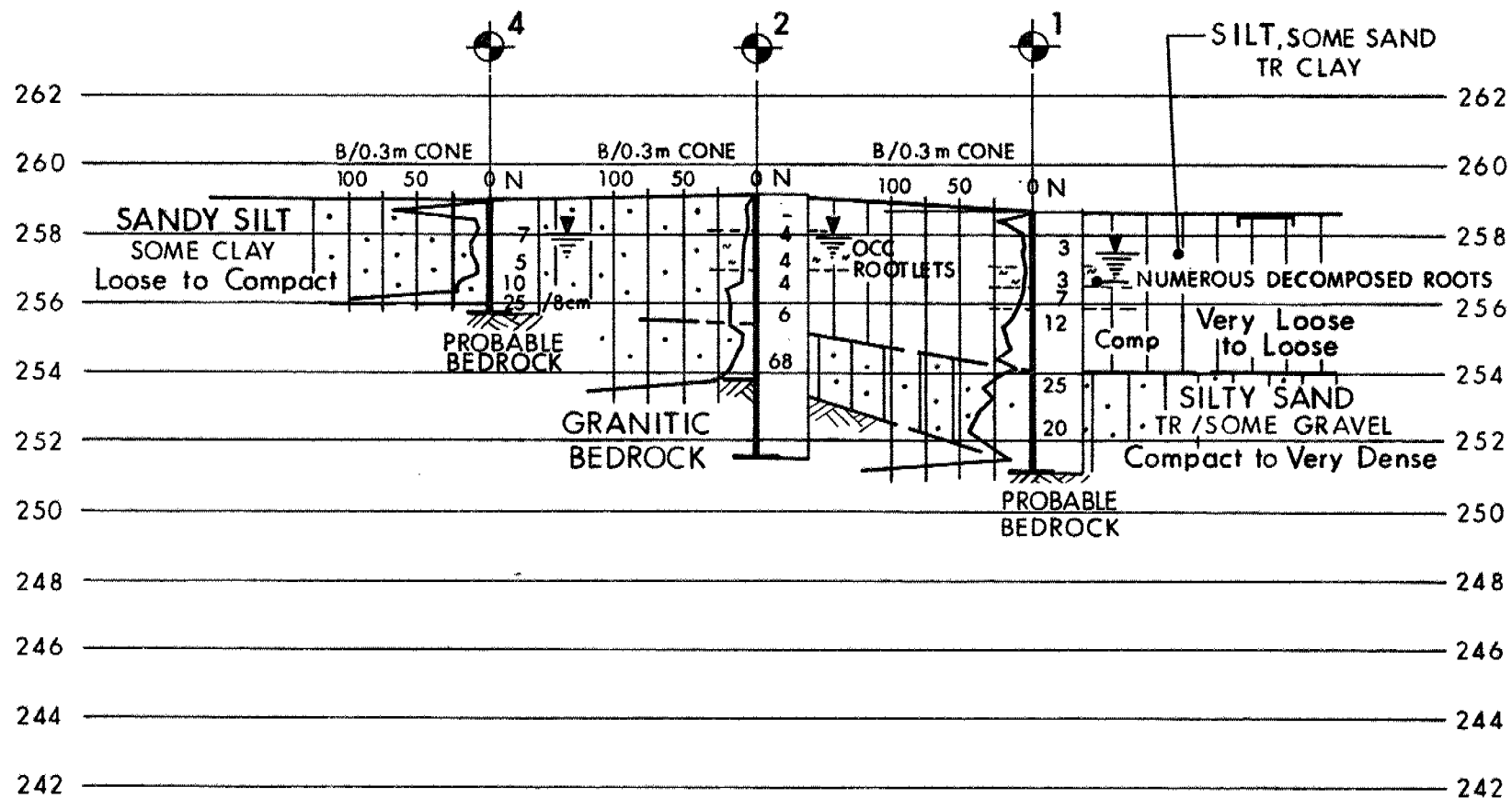
LEGEND

 Bore Hole & Cone

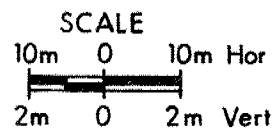
Note:
For subsurface information refer
to ~~517501-B~~ 179301-B

PLAN
SCALE
10m 0 10m

Geocres No 31L-59
WP ~~517501~~ 17-93-01
Dist 13
Dwg No ~~517501-A~~
179301-A



SECTION A-A



Note :

- For Plan refer to ~~517501-A~~ 179301-A
- For Subsoil information of BH-3 refer to Record of Borehole sheets

Geocres No 31L-59

WP ~~517501~~ 17-93-01

Dist 13

Dwg No ~~517501-B~~

179301-B