

**MONITORING RESULTS AND
SLOPE STABILITY INVESTIGATION
MINNETONKA OUTFALL
WINNIPEG, MANITOBA**

Prepared for:

**The City of Winnipeg
Works and Operations Division
Operations Department - District 5**

Prepared by: Mr. G. Collins, P. Eng.

Reviewed by: Mr. A.D. Myska, P. Eng.



**Job No. 17-010
February 3, 1993**

INDEPENDENT TEST-LAB LIMITED
Geotechnical Engineering and Materials Testing

905 Waverley Street
Winnipeg, Manitoba R3T 5P4
(204) 489-6777 Telex 07-587870 Fax: (204) 453-9012



A Division of — The I.D. Group Inc.
Edmonton, Lloydminster and Winnipeg

ITL INDEPENDENT TEST-LAB LTD
 Geotechnical Engineering and Materials Testing

CLIENT City of Winnipeg - District 5 JOB NO. 17-010 HOLE NO. 1
 PROJECT Slope Stability Investigation SHEET 1 OF 1
 SITE OR SECTION _____ DATE DRILLED March 11/89
 LOCATION Minnetonka Outfall LOGGED BY GVN
 ENGINEER GC
 CONTRACTOR Paddock Drilling - Nodwell Rig HOLE SIZE 200 mm

DEPTH (m)	EL. & WATER, m	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH			TYPE	SAMPLE NO.	BLOW/.3m OR RECOVERY	OTHER TESTS
					100	200	300 kPa				
				Gr. Surface: 221.59m							
1.			(CL)	SITY CLAY: firm, high plastic, brown, moist							
2.13				- silt inclusions	- PP3 @ 2.13 m						
3.				- soft and small stones by 3.35 m							
4.27				- traces of moist till putty by 4.4m	- PP2 @ 4.27 m						
5.33					- PP1 @ 5.33 m						
				HOLE DISCONTINUED							

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CLIENT City of Winnipeg - District 5 JOB NO. 17-010 HOLE NO. 2
 PROJECT Slope Stability Investigation SHEET 1 OF 1
 SITE OR SECTION _____ DATE DRILLED March 11/89
 LOCATION Minnetonka Outfall LOGGED BY GVN
 ENGINEER GC
 CONTRACTOR Paddock Drilling - Nodwell Rig HOLE SIZE 200 mm

DEPTH (m)	EL. & WATER, m	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH			TYPE	SAMPLE NO.	BLOW/3m OR RECOVERY	OTHER TESTS
					100	200	300 kPa				
Gr. Surface: 223.23m					WATER CONTENT %						
					20	40	60	P.L. L.L. W			
.61				RIPRAP							
1.		(CL)	F	CLAY FILL: soft, traces of sand, stones, roots							
2.		(CL)	F	-silt layer, soft, wet by 2.27 m							
2.9		(CL)	F								
3.66		(CL)		SILTY CLAY: firm, med. plastic, with silt, organic materials, wet				- PP6 @ 3.66 m			
4.		(CL)		- high plastic and soft between 3.5 and 4.1 m depth							
5.		(CL)		- frequent stones by 5.33 m							
5.64		(CL)						- PP5 @ 5.64 m			
6.4		(CL)						214 B			
6.71		(CL)		TILL: soft, wet				- PP4 @ 6.71 m			
				HOLE DISCONTINUED							

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CLIENT City of Winnipeg - District 5 JOB NO. 17-010 HOLE NO. 2A
 PROJECT Slope Stability Investigation SHEET 1 OF 2
 SITE OR SECTION _____ DATE DRILLED March 11/89
 LOCATION Minnetonka Outfall LOGGED BY GVN
 ENGINEER GC
 CONTRACTOR Paddock Drilling - Nodwell Rig HOLE SIZE 200 mm

DEPTH (m)	EL. & WATER, m	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH			TYPE	SAMPLE NO.	BLOW/3m OR RECOVERY	OTHER TESTS
					100	200	300 kPa				
				Gr. Surface: 223.62m	WATER CONTENT % $\frac{P.L.}{L.L.}$						
					20	40	60				
1.											
2.											
3.											
4.											
5.											
6.1											
7.				TILL: soft, wet							
				CONTINUED							

- slope indicator si-1

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CLIENT City of Winnipeg - District 5 JOB NO. 17-010 HOLE NO. 2A
 PROJECT Slope Stability Investigation SHEET 2 OF 2
 SITE OR SECTION _____ DATE DRILLED March 11/89
 LOCATION Minnetonka Outfall LOGGED BY GVN
 ENGINEER GC
 CONTRACTOR Paddock Drilling - Nodwell Rig HOLE SIZE 200 mm

DEPTH (m)	EL. & WATER, m	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH			TYPE	SAMPLE NO.	BLOW/.3m DR RECOVERY	OTHER TESTS		
					100	200	300 kPa						
8.7	- slope indicator si-1			TILL: soft, wet - refusal to augering on hard till @ 8.7 m depth									
10.													
11.													
12.09							- bottom of slope indicator installed @ 12.09 m depth						
13.													
14.													
15.													
15.54				HOLE DISCONTINUED									



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CLIENT City of Winnipeg - District 5 JOB NO. 17-010 HOLE NO. 3A
 PROJECT Slope Stability Investigation SHEET 1 OF 2
 SITE OR SECTION _____ DATE DRILLED March 11/89
 LOCATION Minnetonka Outfall LOGGED BY GVN
 ENGINEER GC
 CONTRACTOR Paddock Drilling - Nodwell Rig HOLE SIZE 200 mm

DEPTH (m)	EL. & WATER, m	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH			TYPE	SAMPLE NO.	BLOW/3m OR RECOVERY	OTHER TESTS
					100	200	300 kPa				
				Gr. Surface: 227.57m							
1.			F	150mm TOPSOIL							
2.			F	<u>FILL</u> slightly organic, nuggetty, brown, dry							
3.			F		- SP6 @ 2.74 m						
4.			F	<u>SILTY CLAY:</u> firm, with silt inclusions, grey					T1		
5.			F	- silt pockets	-SP5 @ 4.57 m				T2		
6.			F		-SP4 @ 6.09 m				T3		
7.			F						T4		
8.			F		-SP3 @ 7.62 m				T5		
									T6		
									T7		
									T8		
8.				CONTINUED							

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CLIENT City of Winnipeg - District 5 JOB NO. 17-010 HOLE NO. 3A
 PROJECT Slope Stability Investigation SHEET 2 OF 2
 SITE OR SECTION _____ DATE DRILLED MARCH 13/89
 LOCATION Minnetonka Outfall LOGGED BY GVN
 ENGINEER GC
 CONTRACTOR Paddock Drilling - Nodwell Rig HOLE SIZE 200 mm

DEPTH (m)	EL. & WATER, m	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH			TYPE	SAMPLE NO.	BLOW/3m OR RECOVERY	OTHER TESTS
					100	200	300 kPa				
9.		(CL)		<u>SILTY CLAY:</u> firm, with silt inclusions, grey					T9		
10.				- traces of till @ 10.36 m depth					T10		
10.67				- SP1 @ 10.67 m					T11 T12		
				HOLE DISCONTINUED							

WATER CONTENT % $\frac{P.L.}{L.L.}$
 20 40 60

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CLIENT <u>City of Winnipeg - District 5</u>	JOB NO. <u>17-010</u> HOLE NO. <u>3B</u>
PROJECT <u>Slope Stability Investigation</u>	SHEET <u>2</u> OF <u>2</u>
SITE OR SECTION _____	DATE DRILLED <u>MARCH 13/89</u>
LOCATION <u>Minnetonka Outfall</u>	LOGGED BY <u>GVN</u>
CONTRACTOR <u>Paddock Drilling - Nodwell Rig</u>	ENGINEER <u>GC</u>
	HOLE SIZE <u>200 mm</u>

DEPTH (m)	EL. & WATER, m	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH			TYPE	SAMPLE NO.	BLOW/3m OR RECOVERY	OTHER TESTS
					100	200	300 kPa				
					WATER CONTENT %						
					20	40	60	P.L. L.L.			
9.			slope indicator si-2	<u>SILTY CLAY:</u>							
10.				- becoming SILT TILL with depth							
11.											
12.					- hollow stem refusal by 12.19 m depth (Till)						
13.											
14.											
15.				- bottom of SI-2 casing @ 16.06 m depth							
16.				HOLE DISCONTINUED @ 16.15 m DEPTH							

15 m

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CLIENT City of Winnipeg - District 5 JOB NO. 17-010 HOLE NO. 4B
 PROJECT Slope Stability Investigation SHEET 1 OF 2
 SITE OR SECTION _____ DATE DRILLED MARCH 15/89
 LOCATION Minnetonka Outfall LOGGED BY GVN
 ENGINEER GC
 CONTRACTOR Paddock Drilling - Nodwell Rig HOLE SIZE 200 mm

DEPTH (m)	EL. & WATER, m	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH			TYPE	SAMPLE NO.	BLOW/3m OR RECOVERY	OTHER TESTS
					100	200	300 kPa				
				Gr. Surface: 226.68m	WATER CONTENT % $\frac{P.L.}{L.L.}$						
1.											
2.											
3.											
4.											
5.											
6.				- SPI1 @ 6.4 m							
7.											
8.				- SPI0 @ 7.92 m CONTINUED							

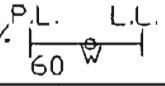

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Geotechnical Engineering and Materials Testing

CLIENT <u>City of Winnipeg - District 5</u>	JOB NO. <u>17-010</u>	HOLE NO. <u>7</u>
PROJECT <u>Slope Stability Investigation</u>	SHEET <u>1</u> OF <u>2</u>	
SITE OR SECTION _____	DATE DRILLED <u>MARCH 15/89</u>	
LOCATION <u>Minnetonka Outfall</u>	LOGGED BY <u>GVN</u>	
	ENGINEER <u>GC</u>	
CONTRACTOR <u>Paddock Drilling - Nodwell Rig</u>	HOLE SIZE <u>200 mm</u>	

DEPTH (m)	EL. & WATER, m	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH			TYPE	SAMPLE NO.	BLOW/.3m OR RECOVERY	OTHER TESTS
					100	200	300 kPa				
				Gr. Surface: 227.26m	WATER CONTENT % $\left\{ \begin{array}{l} \text{P.L.} \\ \text{L.L.} \end{array} \right.$						
1.				<u>SILTY CLAY</u> - PP8 @ 4.88 m depth CONTINUED							
2.											
3.											
4.											
5.											
6.											
7.											
8.											

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CLIENT <u>City of Winnipeg - District 5</u>	JOB NO. <u>17-010</u>	HOLE NO. <u>9</u>
PROJECT <u>Slope Stability Investigation</u>	SHEET <u>1</u> OF <u>2</u>	
SITE OR SECTION _____	DATE DRILLED <u>MARCH 15/89</u>	
LOCATION <u>Minnetonka Outfall</u>	LOGGED BY <u>GVN</u>	
	ENGINEER <u>GC</u>	
CONTRACTOR <u>Paddock Drilling - Nodwell Rig</u>	HOLE SIZE <u>200 mm</u>	

DEPTH (m)	EL. & WATER, m	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH			TYPE	SAMPLE NO.	BLOW/3m OR RECOVERY	OTHER TESTS	
					100	200	300 kPa					
				Gr. Surface: 227.72m	WATER CONTENT % 							
1.				<u>SILTY CLAY</u>								
2.												
3.												
4.												
5.						- PP12 @ 5.03 m depth						
6.												
7.												
8.						CONTINUED						

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CLIENT City of Winnipeg - District 5 JOB NO. 17-010 HOLE NO. 9
 PROJECT Slope Stability Investigation SHEET 2 OF 2
 SITE OR SECTION _____ DATE DRILLED MARCH 15/89
 LOCATION Minnetonka Outfall LOGGED BY GVN
 ENGINEER GC
 CONTRACTOR Paddock Drilling - Nodwell Rig HOLE SIZE 200 mm

DEPTH (m)	EL. & WATER, m	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH				TYPE	SAMPLE NO.	BLOW/.3m OR RECOVERY	OTHER TESTS
					100	200	300	kPa				
9.14				<u>SILTY CLAY</u>								
10. 10.36				<u>CLAY / TILL TRANSITION</u>								
11. 11.53				<u>SILT TILL</u> - PP11 @ 10.87 m depth								
				<u>HOLE DISCONTINUED</u>								



1983-84 ENGINEERING STUDY
ON 6-LAND DRAINAGE OUTFALLS
AND RIVERBANK STABILIZATION
IN DISTRICT #5

Submitted to:

The City of Winnipeg
Works and Operations Division
Operations Department - District #5
604 St. Mary's Road
Winnipeg, Manitoba
R2M 3L5

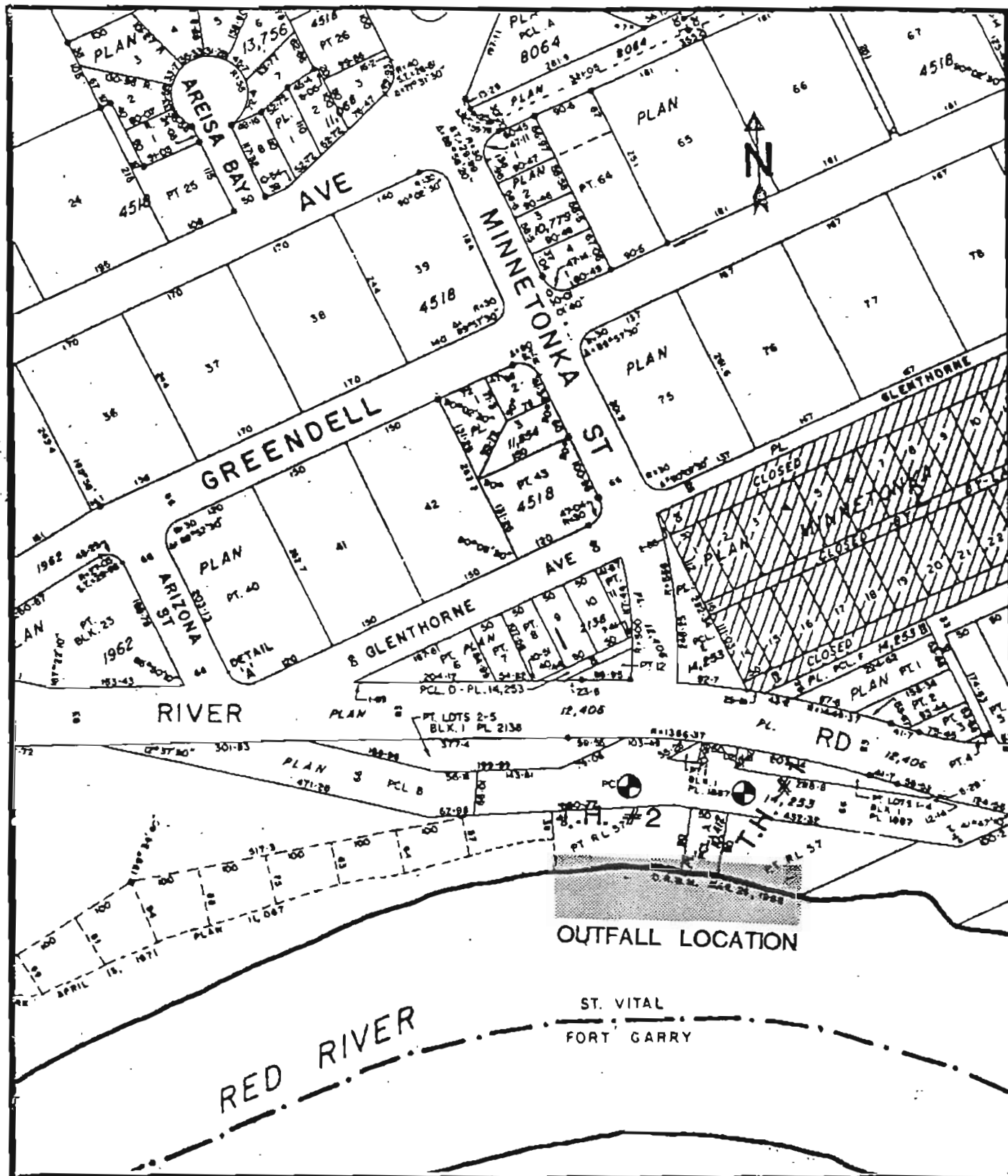
May 3, 1984

I.D. ENGINEERING COMPANY
Professional Engineers

966 Waverley Street
Winnipeg, Manitoba R3T 4M5
(204) 477-1270 Telex: 07-587769



A Division of IDG—The Interdisciplinary Group
Vancouver, Calgary, Edmonton, Lloydminster,
Saskatoon, Winnipeg, and Grand Forks, N.D.



INDEPENDENT TEST-LAB LIMITED
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MINNETONKA STREET AT THE RED RIVER

SITE PLAN

Date: FEB. 13/84

Scale: 1" : 200'

App'd.: KVL

Dwg No.: 1



INDEPENDENT TEST-LAB LIMITED

Geotechnical Engineering and Materials Testing

SOIL LOG SHEET

HOLE NO. 1

CLIENT I.D. ENGINEERING CO.

JOB NO. 05-36

PROJECT RIVER BANK STABILITY ANALYSIS

SITE OR SECTION RIVER RD & MINNETONKA ST.

SHEET 1 OF 3

LOCATION 33 m EAST OF & OF MINNETONKA ST. @
23 m SOUTH OF RIVER RD. SOUTH CURB (11 m EAST OF OUTFALL)

DATE DRILLED NOV. 10 / 83

LOGGED BY BM

CONTRACTOR SUBTERRANEAN LTD. RIG WILLIAMS AUGER

ENGINEER KVL

HOLE SIZE 460 mm Ø

DEPTH (FT)	DEPTH (m)	ELEV. & WATER	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	unconfined compressive strength (k.s.f.)	water content (%)	P.L.	W	L.L.	TYPE	SAMPLE NO.	BLOWS/FT (Q.3m)	RECOVERY	OTHER TESTS	(SEE CODE)	
					SURFACE - GRASS		20	40	60	80	100						
2					FILL - SILTY CLAY - GRAVEL UPTO 50mm - TRACES OF SAND - MORE CLAY WITH DEPTH							R ₁					
4	1				SILTY CLAY - DK. BROWN; STIFF/FIRM - NUGGETTY; LOW PLASTIC							R ₂					
6	2				VERY SILTY CLAY - LT. BROWN; SOFT - NUGGETTY - LOW PLASTIC							T ₃					
8					CLAYEY SILT - TAN SOFT - LOW PLASTIC							R ₄					
10	3				SILTY CLAY - BROWN - STIFF/FIRM - LOW TO MED. - SILT INC.							R ₅					
12					CLAYEY SILT - TAN TO LT. BROWN; LOW TO NON PL.							R ₆					
14	4				SILTY CLAY - DK. BROWN / DK. GREY - FIRM TO STIFF - MED. TO HIGH PLASTIC - SILT INCL.							R ₇					
16	5											R ₈					
18												R ₉					
20	6				SILTY CLAY - DK. GREY / BLUE - STIFF - HIGH PLASTIC - SILT INCL. - OCC. ALKALI INCL.							R ₁₀					
22												R ₁₁					
24	7											R ₁₂					
26	8											R ₁₃					
28												R ₁₄					
30												R ₁₅					



INDEPENDENT TEST-LAB LIMITED

Geotechnical Engineering and Materials Testing

SOIL LOG SHEET

HOLE NO. 2

CLIENT I.D. ENGINEERING CO.

JOB NO. 05-36

PROJECT RIVER BANK STABILITY ANALYSIS

SITE OR SECTION RIVER RD. & MINNETONKA ST.

SHEET 1 OF 3

LOCATION 18 m WEST OF E OF MINNETONKA ST.

DATE DRILLED Nov. 10 / 83

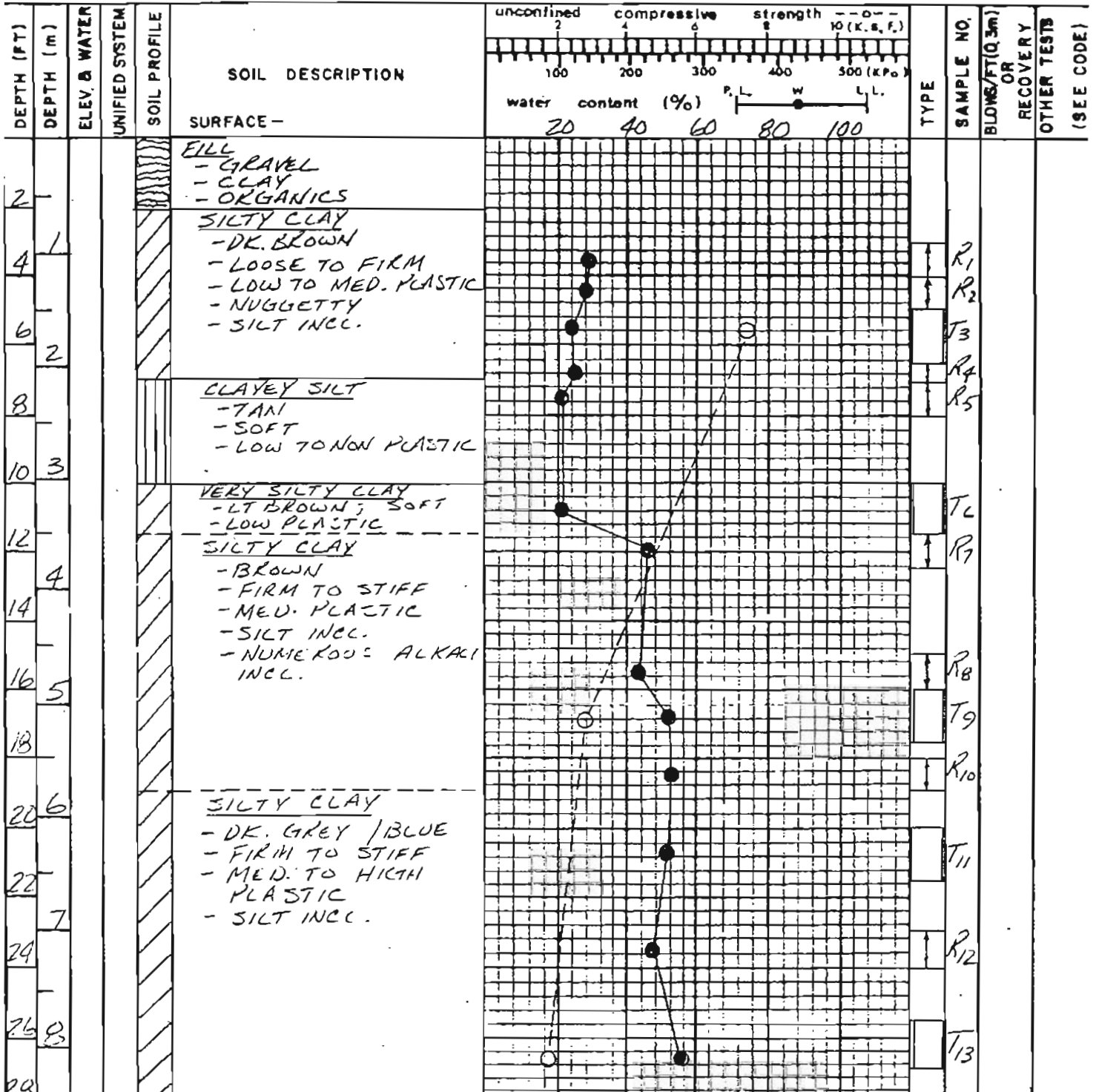
@ 25 m SOUTH OF RIVER RD. SOUTH CURB (41 m WEST OF OUTFALL)

LOGGED BY BM

CONTRACTOR SUBTERRANEAN LTD. RIG WILLIAMS AUGER

ENGINEER KVL

HOLE SIZE 460 mm ϕ





INDEPENDENT TEST-LAB LIMITED

Geotechnical Engineering and Materials Testing

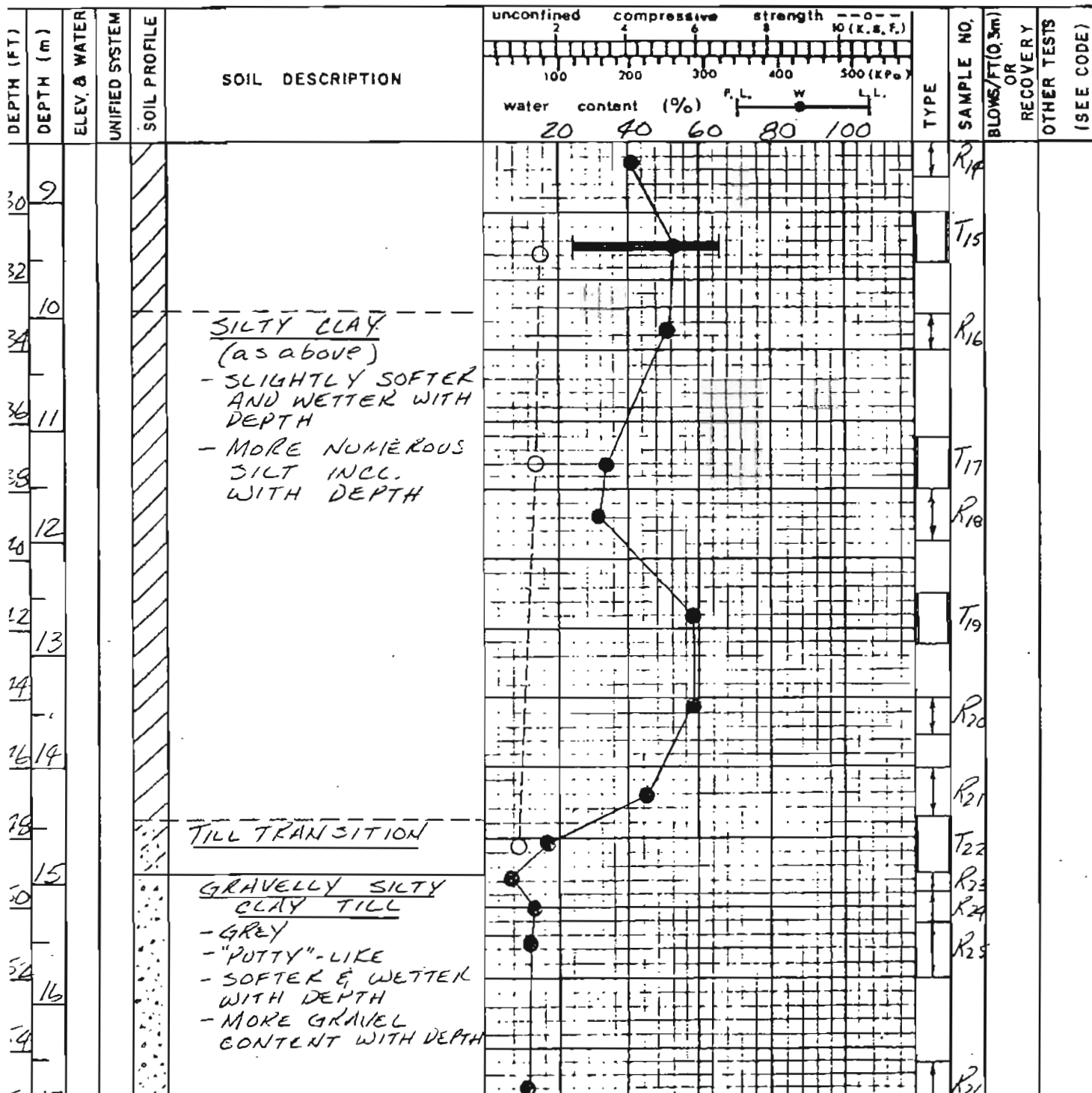
SOIL LOG SHEET

HOLE NO. 2

CLIENT I.D. ENGINEERING CO.
PROJECT RIVER BANK STABILITY ANALYSIS

JOB NO. 05-36

SHEET 2 OF 3





INDEPENDENT TEST-LAB LIMITED

Geotechnical Engineering and Materials Testing

SOIL LOG SHEET

HOLE NO. 2

CLIENT I.D. ENGINEERING CO.
PROJECT RIVERBANK STABILITY ANALYSIS

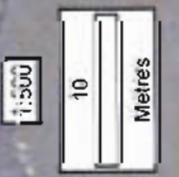
JOB NO. 05-36

SHEET 3 OF 3

DEPTH (FT.)	DEPTH (M)	ELEV. & WATER	UNIFIED SYSTEM	SOIL PROFILE	SOIL DESCRIPTION	unconfined compressive strength		TYPE	SAMPLE NO.	BLOWS/FT (Q.3m)	RECOVERY	OTHER TESTS (SEE CODE)
						10 (K.S.F.)	500 (KPa)					
					SURFACE -							
					GRAVELLY TILL							
					- FREE WATER @ 17.1 m							
					- HARD DRY TILL BELOW THE WATER ZONE							
					HOLE DISC. @ 17.7 m							
	18				- REFUSAL ON PROBABLE BEDROCK							
	19				- BOTTOM OF HOLE CAVING IN							
	20				- WATER @ 17.1 m UPON COMPLETION OF HOLE							
					- WATER DID NOT RISE IN HOLE (AS IN TH #1) 10 min. AFTER COMPLETION OF HOLE							

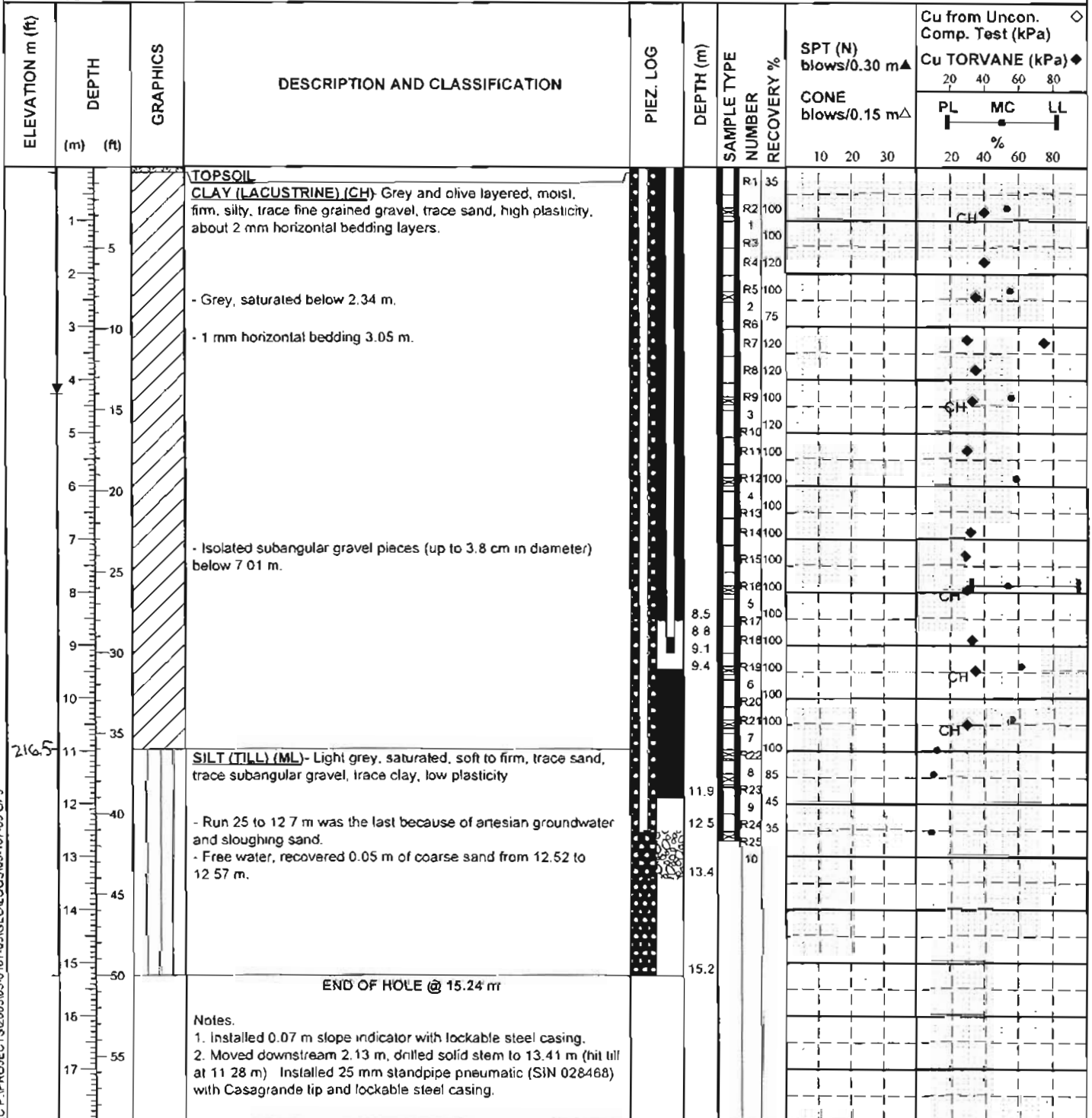


PT ID	NORTHING	EASTING
CORNER1	5520082.16	635129.44
CORNER2	5520083.32	635131.06
CORNER3	5520086.65	635135.59
CORNER4	5520089.61	635133.71
CORNER5	5520087.05	635129.32
CORNER6	5520085.53	635126.12
SEWER	5520090.24	635140.90
SI10301	5520060.29	635126.75
TH02M	5520063.14	635120.56



CLIENT CITY OF WINNIPEG
PROJECT 2003 Outfall Maintenance Program
SITE Minnetonka Outfall
LOCATION See Site Plan
DRILLING METHOD #139 Nodwell

JOB NO. 03-107-05
GROUND ELEV. 227.5m (Approx.)
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 13 May 03



SPT FT. M. CALC P:\PROJECTS\2003\03-0107-05\GEOLOG\03-107-05.GPJ

 SAMPLE TYPE CORE SAMPLER SPLIT SPOON

 CONTRACTOR
Paddock Drilling Ltd.

 INSPECTOR
J. McKay

 APPROVED _____ DATE 23/06/03