



TABLE A
ROCK CORE DESCRIPTIONS

LOCATION (BH)	CORE RECOVERY				CORE DESCRIPTION	
	RC	DEPTH (m)	REC (%)	RQD (%)	DEPTH (m)	DESCRIPTION
BRIDGE PIER - SBL Borehole P1-SBL	5	5.0 – 6.1	100	86	5.0 – 9.7	GABBRO: Dark green to black and grey, fine to medium crystalline, high strength, slightly weathered to unweathered, close to moderate spaced flat to dipping cross joints, rough planar with occasional horizontal slickensides, with some vertical fissures, tight to open to 1 mm, generally slightly altered with black silty infilling, occasional white scale, good to excellent quality.
	6	6.1 – 7.6	95	91		
	7	7.6 – 9.1	100	88		
	8	9.1 – 9.7	96	85		

RQD = Rock Quality Designation

Originated: JFW
 Compiled: FP
 Checked: AS / CN



TABLE A
ROCK CORE DESCRIPTION

LOCATION (BH)	CORE RECOVERY				CORE DESCRIPTION	
	RC	DEPTH (m)	REC (%)	RQD (%)	DEPTH (m)	DESCRIPTION
BRIDGE PIER - NBL Borehole P2-NBL	5	4.9 – 6.2	96	87	4.9 – 8.9	GABBRO: Dark green to black and grey, fine to medium crystalline, high strength, slightly weathered to unweathered, close to moderate (locally wide) spaced flat to dipping (locally vertical) cross joints, rough planar (locally with horizontal slickensides, tight to slightly altered with black silty infilling, occasional white scale, fair to excellent quality.
	6	6.2 – 6.9	100	96		
	7	6.9 – 7.6	100	100		
	8	7.6 – 8.9	100	63		

RQD = Rock Quality Designation

Originated: JFW
 Compiled: FP
 Checked: AS / CN

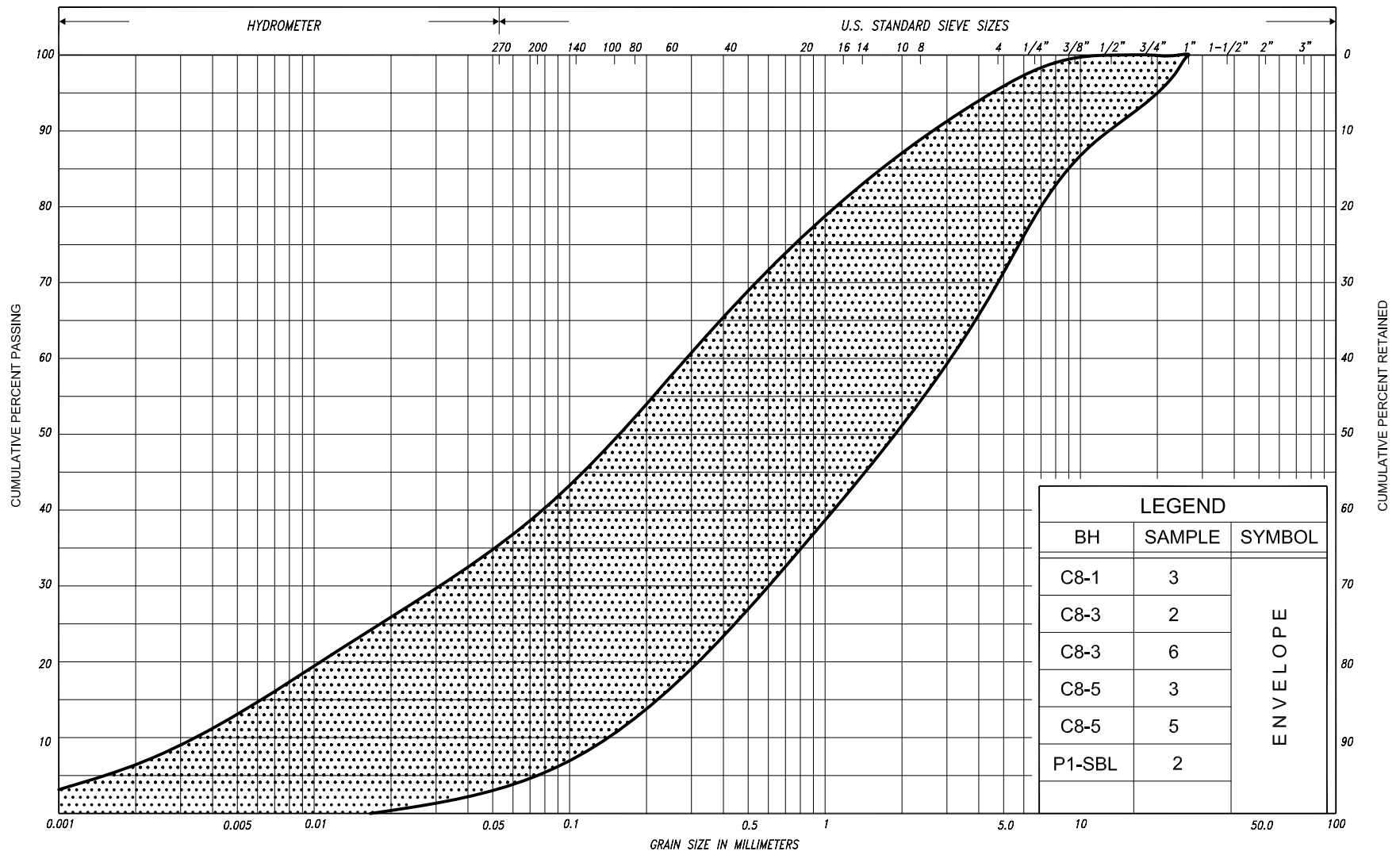


TABLE A
ROCK CORE DESCRIPTIONS

LOCATION (BH)	CORE RECOVERY				CORE DESCRIPTION	
	RC	DEPTH (m)	REC (%)	RQD (%)	DEPTH (m)	DESCRIPTION
C8-1	5	2.8 – 3.1	100	73	2.8 – 5.9	GABBRO: Dark green to black and grey, fine to medium crystalline, high strength, slightly weathered to unweathered, close to moderate spaced flat to dipping cross joints, rough planar with occasional horizontal slickensides, with some vertical fissures, tight to open to 1 mm, generally slightly altered with black silty infilling, occasional white scale, fair to excellent quality.
	6	3.1 – 4.3	100	70		
	7	4.3 – 5.9	100	99		
C8-3	7	4.9 – 6.0	98	15	4.9 – 8.1	GABBRO: Dark green to black and grey, fine to medium crystalline, high strength, slightly weathered to unweathered, very close to close spaced (moderate below 7.2 m) flat to dipping cross joints, rough planar with occasional horizontal slickensides, with numerous vertical fissures (some compound), tight to open (5 mm), generally slightly altered with black silty infilling, very poor to poor becoming excellent quality.
	8	6.0 – 7.6	100	29		
	9	7.6 – 8.1	100	100		
C8-5	7	5.2 – 6.3	100	100	5.2 - 8.3	GABBRO: Dark green to black and grey, fine to medium crystalline, high strength, slightly weathered to unweathered, close to moderate spaced flat to dipping (locally vertical) cross joints, rough planar, locally open (to 1 mm), tight to slightly altered with black silt infilling, occasional green scale on parting surface, good to excellent quality.
	8	6.3 – 7.2	100	85		
	9	7.2 – 8.3	100	95		

RQD = Rock Quality Designation

Originated: JFW
 Compiled: FP
 Checked: AS / CN



SILT & CLAY					FINE		MEDIUM		COARSE		GRAVEL			COBBLES	UNIFIED	
CLAY	FINE		MEDIUM		COARSE		SAND					GRAVEL			COBBLES	M.I.T.
	SILT					FINE		MEDIUM		COARSE		GRAVEL			COBBLES	U.S. BUREAU
CLAY		SILT			V. FINE	FINE	MED.	COARSE		GRAVEL					COBBLES	U.S. BUREAU

GRAIN SIZE DISTRIBUTION
 SAND, some to with gravel
 trace to with silt, trace clay

FIG No. P-GS-1
 HWY: 69
 G.W.P. No. 5203-06-00

EXPLANATION OF TERMS USED IN REPORT

N VALUE: THE STANDARD PENETRATION TEST (SPT) N VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 51mm O.D. SPLIT BARREL SAMPLER TO PENETRATE 0.3m INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WITH A MASS OF 63.5kg, FALLING FREELY A DISTANCE OF 0.76m. FOR PENETRATIONS OF LESS THAN 0.3m N VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. AVERAGE N VALUE IS DENOTED THUS \bar{N} .

DYNAMIC CONE PENETRATION TEST: CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (51mm O.D. 60° CONE ANGLE) DRIVEN BY 475 J IMPACT ENERGY ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 0.3m ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSENESS.

CONSISTENCY: COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH (c_u) AS FOLLOWS:

c_u (kPa)	0 - 12	12 - 25	25 - 50	50 - 100	100 - 200	> 200
	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD

DENSENESS: COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF DENSENESS AS INDICATED BY SPT N VALUES AS FOLLOWS:

N (BLOWS/0.3m)	0 - 5	5 - 10	10 - 30	30 - 50	> 50
	VERY LOOSE	LOOSE	COMPACT	DENSE	VERY DENSE

ROCKS ARE DESCRIBED BY THEIR COMPOSITION AND STRUCTURAL FEATURES AND / OR STRENGTH.

RECOVERY: SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH OF THE CORING RUN.

MODIFIED RECOVERY: SUM OF THOSE INTACT CORE PIECES, 100mm+ IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (RQD), FOR MODIFIED RECOVERY, IS:

RQD (%)	0 - 25	25 - 50	50 - 75	75 - 90	90 - 100
	VERY POOR	POOR	FAIR	GOOD	EXCELLENT

JOINTING AND BEDDING:

SPACING	50mm	50 - 300mm	0.3m - 1m	1m - 3m	> 3m
JOINTING	VERY CLOSE	CLOSE	MOD. CLOSE	WIDE	VERY WIDE
BEDDING	VERY THIN	THIN	MEDIUM	THICK	VERY THICK

ABBREVIATIONS AND SYMBOLS

FIELD SAMPLING

S S	SPLIT SPOON	T P	THINWALL PISTON
W S	WASH SAMPLE	O S	OSTERBERG SAMPLE
S T	SLOTTED TUBE SAMPLE	R C	ROCK CORE
B S	BLOCK SAMPLE	P H	T W ADVANCED HYDRAULICALLY
C S	CHUNK SAMPLE	P M	T W ADVANCED MANUALLY
T W	THINWALL OPEN	F S	FOIL SAMPLE
F V	FIELD VANE		

STRESS AND STRAIN

u_w	kPa	PORE WATER PRESSURE
u	1	PORE PRESSURE RATIO
σ	kPa	TOTAL NORMAL STRESS
σ'	kPa	EFFECTIVE NORMAL STRESS
τ	kPa	SHEAR STRESS
$\sigma_1, \sigma_2, \sigma_3$	kPa	PRINCIPAL STRESSES
ϵ	%	LINEAR STRAIN
$\epsilon_1, \epsilon_2, \epsilon_3$	%	PRINCIPAL STRAINS
E	kPa	MODULUS OF LINEAR DEFORMATION
G	kPa	MODULUS OF SHEAR DEFORMATION
μ	1	COEFFICIENT OF FRICTION

MECHANICAL PROPERTIES OF SOIL

m_v	kPa^{-1}	COEFFICIENT OF VOLUME CHANGE
C_c	1	COMPRESSION INDEX
C_s	1	SWELLING INDEX
C_α	1	RATE OF SECONDARY CONSOLIDATION
c_v	m^2/s	COEFFICIENT OF CONSOLIDATION
H	m	DRAINAGE PATH
T_v	1	TIME FACTOR
U	%	DEGREE OF CONSOLIDATION
σ'_{vo}	kPa	EFFECTIVE OVERBURDEN PRESSURE
σ'_p	kPa	PRECONSOLIDATION PRESSURE
τ_f	kPa	SHEAR STRENGTH
c'	kPa	EFFECTIVE COHESION INTERCEPT
ϕ'	-°	EFFECTIVE ANGLE OF INTERNAL FRICTION
c_u	kPa	APPARENT COHESION INTERCEPT
ϕ_u	-°	APPARENT ANGLE OF INTERNAL FRICTION
τ_R	kPa	RESIDUAL SHEAR STRENGTH
τ_r	kPa	REMOULDED SHEAR STRENGTH
S_t	1	SENSITIVITY = $\frac{c_u}{\tau_r}$

PHYSICAL PROPERTIES OF SOIL

ρ_s	kg/m^3	DENSITY OF SOLID PARTICLES	n	1, %	POROSITY	e_{max}	1, %	VOID RATIO IN LOOSEST STATE
γ_s	kN/m^3	UNIT WEIGHT OF SOLID PARTICLES	w	1, %	WATER CONTENT	e_{min}	1, %	VOID RATIO IN DENSEST STATE
ρ_w	kg/m^3	DENSITY OF WATER	S_r	%	DEGREE OF SATURATION	I_D	1	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
γ_w	kN/m^3	UNIT WEIGHT OF WATER	w_L	%	LIQUID LIMIT	D	mm	GRAIN DIAMETER
ρ	kg/m^3	DENSITY OF SOIL	w_p	%	PLASTIC LIMIT	D_n	mm	n PERCENT - DIAMETER
γ	kN/m^3	UNIT WEIGHT OF SOIL	w_s	%	SHRINKAGE LIMIT	C_u	1	UNIFORMITY COEFFICIENT
ρ_d	kg/m^3	DENSITY OF DRY SOIL	I_p	%	PLASTICITY INDEX = $w_L - w_p$	h	m	HYDRAULIC HEAD OR POTENTIAL
γ_d	kN/m^3	UNIT WEIGHT OF DRY SOIL	I_L	1	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$	q	m^3/s	RATE OF DISCHARGE
ρ_{sat}	kg/m^3	DENSITY OF SATURATED SOIL	I_C	1	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$	v	m/s	DISCHARGE VELOCITY
γ_{sat}	kN/m^3	UNIT WEIGHT OF SATURATED SOIL	DTPL		DRIER THAN PLASTIC LIMIT	i	1	HYDRAULIC GRADIENT
ρ'	kg/m^3	DENSITY OF SUBMERGED SOIL	APL		ABOUT PLASTIC LIMIT	k	m/s	HYDRAULIC CONDUCTIVITY
γ'	kN/m^3	UNIT WEIGHT OF SUBMERGED SOIL	WTPL		WETTER THAN PLASTIC LIMIT	j	kN/m^3	SEEPAGE FORCE
e	1, %	VOID RATIO						

RECORD OF BOREHOLE No P1-SBL

1 of 1

METRIC

G.W.P. 5203-06-00 LOCATION Coords: 5 096 737.8 N; 221 558.4 E
DIST 54 HWY 69 BOREHOLE TYPE C.F.H.S.A. and NQ Diamond Coring
DATUM Geodetic DATE February 18 and 24, 2009

ORIGINATED BY F.P.

COMPILED BY A.S.

CHECKED BY B.R.G.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)				
								○ UNCONFINED		+ FIELD VANE			w _p w w _L				
187.7	Ground Surface																
0.0	Peat, coarse fibrous		1	CS	-												
187.4	Dark brown		2	SS	10/8cm												
0.3	Sand, with silt trace clay, trace gravel cobbles and boulders																
	Compact Brown Moist		3	CS	-												
			4	CS	-												
182.7	Gabbro bedrock																
5.0	Slightly weathered to unweathered		5	RC NQ	REC 100%												
	High strength																
	Good to excellent quality		6	RC NQ	REC 95%												
			7	RC NQ	REC 100%												
			8	RC NQ	REC 96%												
178.0	End of borehole																
9.7	Sample 2: Sampler bouncing on cobbles and boulders, Numerous cobbles and boulders detected during drilling																
	 * 2009 02 24																
	▽ Water level observed during drilling																
	▼ Water level measured after drilling																
	C.F.H.S.A. denotes Continuous Flight Hollow Stem Augers																

RECORD OF BOREHOLE No P2-NBL

1 of 1

METRIC

G.W.P. 5203-06-00 LOCATION Coords: 5 096 748.1 N; 221 594.9 E
Hwy 69 (New), Sta. 20+809, o/s 18.8m Rt CL Med. ORIGINATED BY F.P.
DIST 54 HWY 69 BOREHOLE TYPE C.F.H.S.A. and NQ Diamond Coring COMPILED BY A.S.
DATUM Geodetic DATE February 24 and 25, 2009 CHECKED BY B.R.G.

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									
								○ UNCONFINED	+ FIELD VANE								
						● QUICK TRIAXIAL	× LAB VANE				WATER CONTENT (%)						
187.4	Top of Snow						20	40	60	80	100						
0.0 187.1	Snow/ice																
0.3 186.6	Peat, coarse fibrous		1	CS	-	▼* ▽*											
0.8	Dark brown																
	Sand with gravel, trace silt cobbles and boulders																
	Compact Brown Wet		2	SS	26												
			3	SS	20/8cm												
			4	SS	15/15cm												
182.5 4.9	Gabbro bedrock																
	Slightly weathered to unweathered		5	RC NQ	REC 96%											RQD 87%	
	High strength		6	RC NQ	REC 100%											RQD 96%	
	Fair to excellent quality		7	RC NQ	REC 100%											RQD 100%	
			8	RC NQ	REC 100%											RQD 63%	
178.5 8.9	End of borehole																
	Samples 3 and 4: Sampler bouncing on cobbles and boulders.																

RECORD OF BOREHOLE No C8-1

1 of 1

METRIC

G.W.P. 5203-06-00 LOCATION Coords: 5 096 737.5 N; 221 518.9 E
Hwy 69 (New), Sta. 20+807.3, o/s 58m Lt CL Med. ORIGINATED BY F.P.
DIST 54 HWY 69 BOREHOLE TYPE C.F.H.S.A. and Rotary Diamond Coring COMPILED BY A.S.
DATUM Geodetic DATE February 18 and March 02, 2009 CHECKED BY B.R.G.

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 (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										WATER CONTENT (%)		
								○ UNCONFINED + FIELD VANE												
								● QUICK TRIAXIAL × LAB VANE												
188.0	Ground Surface						20	40	60	80	100						GR SA SI CL			
0.0	Peat, coarse fibrous		1	SS	1	* * <														

RECORD OF BOREHOLE No C8-3

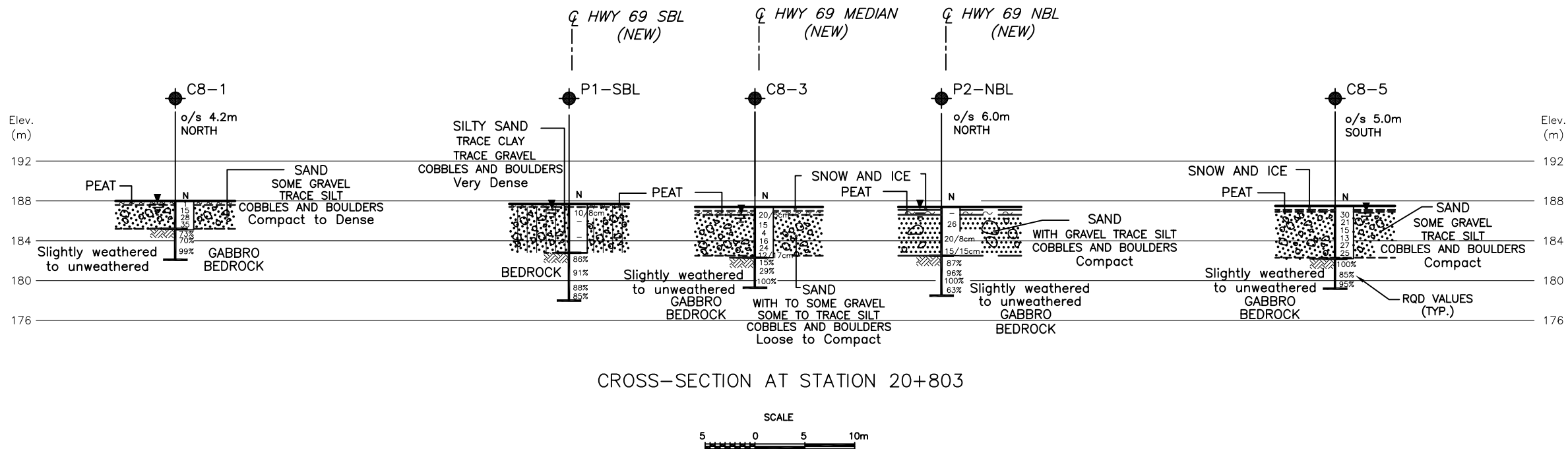
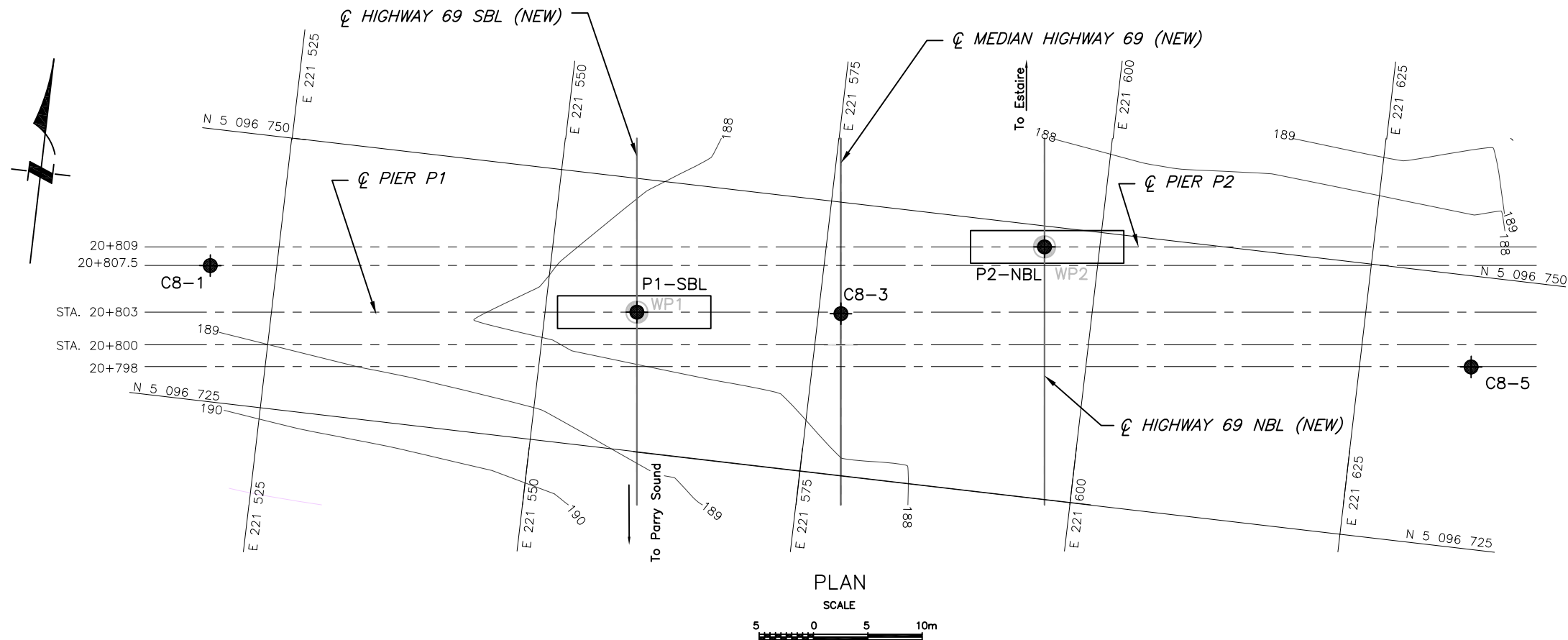
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METRIC

G.W.P. 5203-06-00 LOCATION Coords: 5 096 739.8 N; 221 577.1 E
DIST 54 HWY 69 BOREHOLE TYPE C.F.H.S.A. and Rotary Diamond Coring ORIGINATED BY F.P.
DATUM Geodetic DATE February 26 and 28, 2009 COMPILED BY A.S.
CHECKED BY B.R.G.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					w _p	w	w _L		
								○ UNCONFINED	● QUICK TRIAXIAL	+ FIELD VANE	× LAB VANE	WATER CONTENT (%)					
187.7 0.0	Top of Snow																
187.3 0.4	Snow and ice																
186.9 0.8	Peat, coarse fibrous																
	Dark brown Wet		1	SS	20/5cm												
	Sand, with gravel some silt, trace clay cobbles and boulders		2	SS	15												
	Loose to Grey Wet compact		3	SS	4												
			4	SS	16												
			5	SS	24												
182.8 4.9	with silt, some gravel		6	SS	12/17cm												
	Gabbro bedrock		7	RC NQ	REC 98%											15 61 20 4	
	Slightly weathered to unweathered		8	RC NQ	REC 100%												RQD 15%
	Hight strength																
	Very poor to poor becoming excellent quality		9	RC NQ	REC 100%												RQD 29%
																	RQD 100%
179.6 8.1	End of borehole																
	Samples 1 & 6: Sampler bouncing																
	* 2009 02 28																
	▽ Water level observed during drilling																
	▼ Water level measured after drilling																
	C.F.H.S.A. denotes Continuous Flight Hollow Stem Augers																

RECORD OF BOREHOLE No C8-5										1 of 1		METRIC					
G.W.P. 5203-06-00		LOCATION		Coords: 5 096 741.7 N; 221 635.2 E Hwy 69 (New), Sta. 20+798, o/s 58m Rt CL Med.						ORIGINATED BY F.P.							
DIST 54 HWY 69		BOREHOLE TYPE		C.F.H.S.A. and Rotary Diamond Coring						COMPILED BY A.S.							
DATUM Geodetic		DATE		February 26, 2009						CHECKED BY B.R.G.							
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	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 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE										
187.5 0.0	Top of Snow						20	40	60	80	100						
187.1 0.4	Snow and ice						20	40	60	80	100						
186.9 0.6	Peat, coarse fibrous Dark brown						20	40	60	80	100						
	Sand some gravel, trace silt cobbles and boulders Compact Grey Wet		1	SS	30												
			2	SS	21							○					
			3	SS	15							○				11 83 (6)	
	with gravel some silt, trace clay		4	SS	13							○					
			5	SS	27							○				24 61 12 3	
			6	SS	25							○					
182.3 5.2	Gabbro bedrock		7	RC NQ	REC 100%												RQD 100%
	Slightly weathered to unweathered Hight strength Good to excellent quality		8	RC NQ	REC 100%												RQD 85%
			9	RC NQ	REC 100%												RQD 95%
179.2 8.3	End of borehole																
<p>* 2009 02 28</p> <p>▽ Water level observed during drilling</p> <p>▼ Water level measured after drilling</p> <p>C.F.H.S.A. denotes Continuous Flight Hollow Stem Augers</p>																	



NOTES:

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE TEXT AND RECORD OF BOREHOLE LOGS.
2. THIS DRAWING IS FOR SUBSURFACE INFORMATION ONLY. SURFACE DETAILS AND FEATURES ARE FOR CONCEPTUAL ILLUSTRATION.
3. DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN. STATIONS ARE IN KILOMETRES AND METRES.



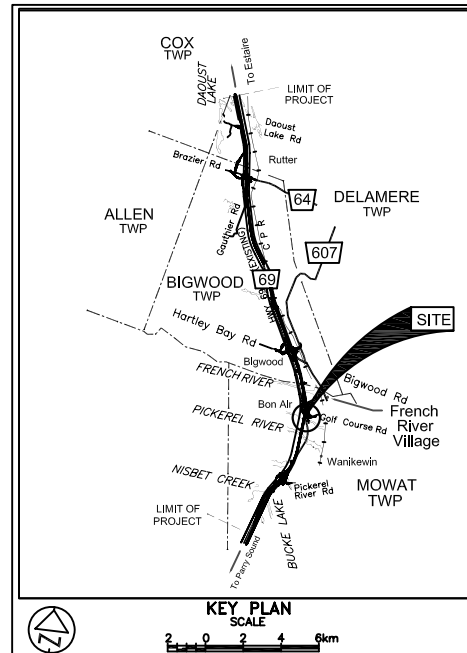
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CONT No
GWP No 5203-06-00
OJIBWAY CANYON - BRIDGE PIERS
HIGHWAY 69 FOUR-LANING
STA. 20+803 (SBL) & 20+809 (NBL) MOWAT TWP
BOREHOLE LOCATIONS AND SOIL STRATA



SHEET

PMI Peto MacCallum Ltd.
CONSULTING ENGINEERS



LEGEND

- Borehole
- ⊕ Dynamic Cone Penetration Test (Cone)
- ⊕ Borehole & Cone
- N Blows/0.3m (Std. Pen Test, 475 J/blow)
- CONE Blows/0.3m (60° Cone, 475 J/blow)
- W L at time of investigation Feb-Mar 2009
- Head
- ARTESIAN WATER
- Encountered
- PIEZOMETER

BH No	ELEVATION	CO-ORDS	
		NORTHING	EASTING
C8-1	188.0	N 5 096 737.5	E 221 518.9
C8-3	187.7	N 5 096 739.8	E 221 577.1
C8-5	187.5	N 5 096 741.7	E 221 635.2
P1-SBL	187.7	N 5 096 737.8	E 221 558.4
P2-NBL	187.4	N 5 096 748.1	E 221 594.9

- NOTE -

The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.

REVISIONS	DATE	BY	DESCRIPTION

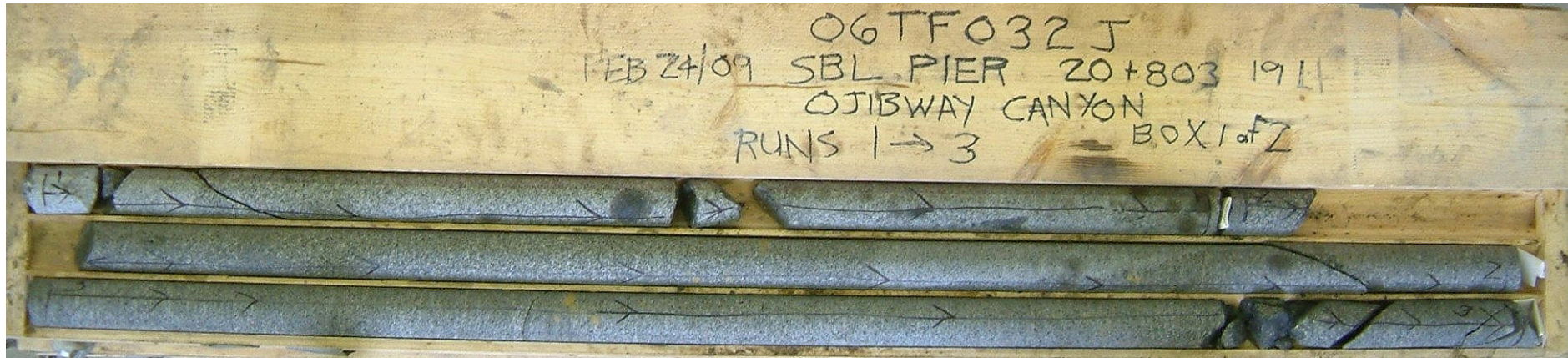
Geocres No. 411-269

HWY No	69	DIST	54
SUBM'D	AS	CHECKED	AS
DRAWN	NA	CHECKED	CN
DATE	APR. 26, 2011	APPROVED	BRG
SITE	---	DWG	P-1



APPENDIX A

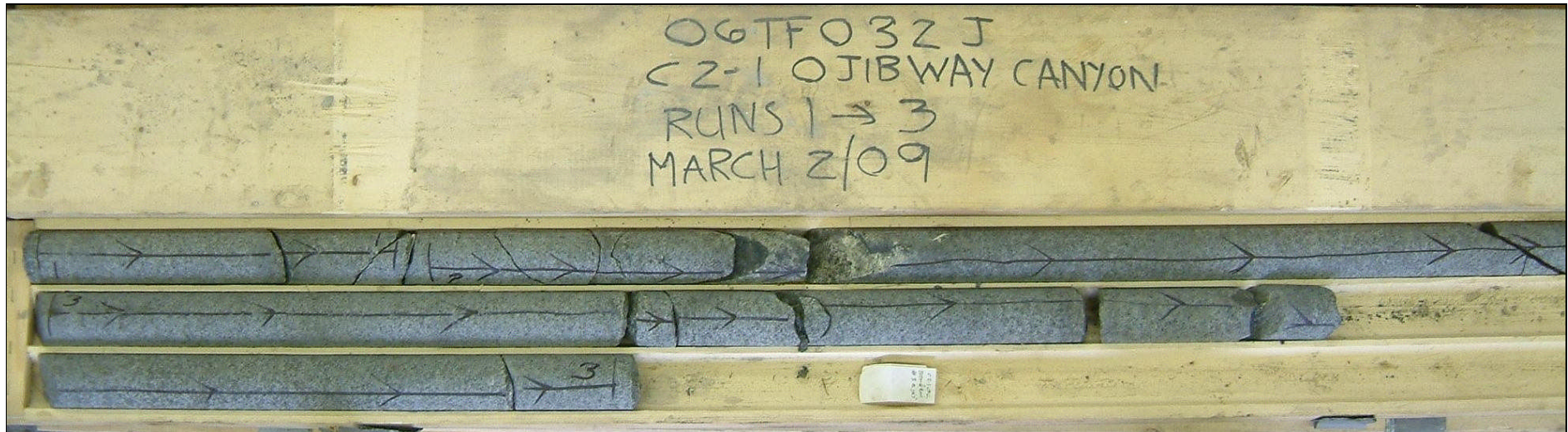
ROCK CORE PHOTOGRAPHS



Photograph 1: Bridge Pier 1 at station 20+803 (SBL), borehole P1-SBL, samples RC-5 to RC-8.



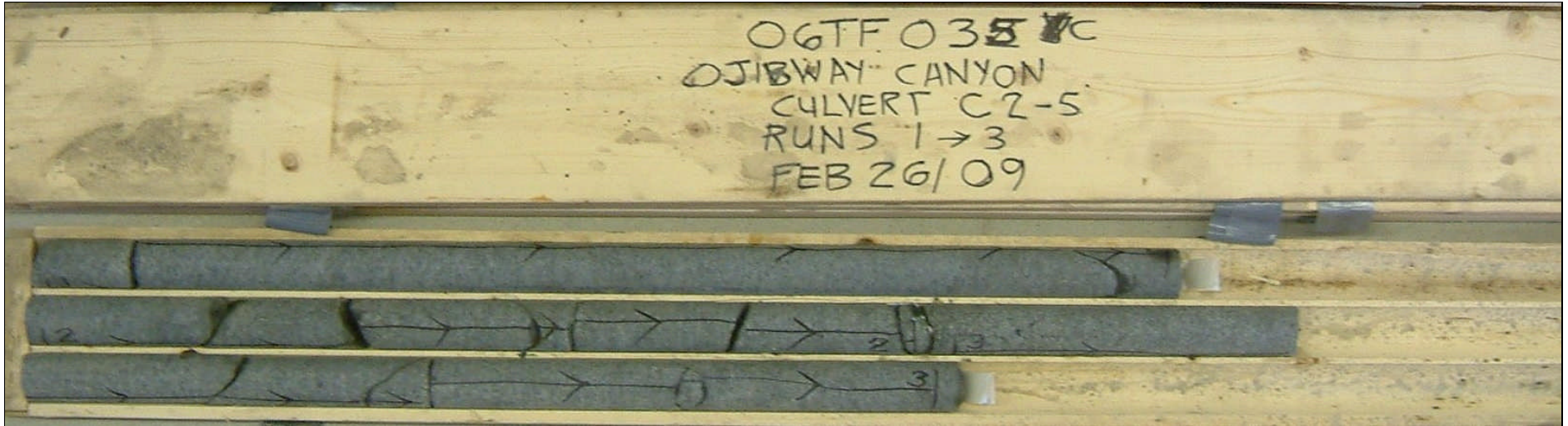
Photograph 2: Bridge Pier at station 20+809 (NBL), borehole P2-NBL, samples RC-5 to RC-8.



Photograph 3: Culvert C8, borehole C8-1, RC-5 to RC-7.



Photograph 4: Culvert C8, borehole C8-3, RC-7 to RC-9.



Photograph 5: Culvert C8, borehole C8-5, RC-7 to RC-9