



**FOUNDATION INVESTIGATION REPORT
for
REPLACEMENT OF POTTAWATOMI RIVER TRIBUTARY CULVERT
SITE NO. 8-482C
HIGHWAY 6, SPRINGMOUNT
G.W.P. 43-00-00
DISTRICT OF LONDON, ONTARIO**

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FOUNDATION INVESTIGATION REPORT
for
Replacement of Pottawatomi River Tributary Culvert
Site No. 8-482C
Highway 6, Springmount
GWP 43-00-00
District of London, Ontario

1. INTRODUCTION

This report summarizes the results of the foundation investigation carried out for the installation of a Pottawatomi River Tributary replacement culvert, as a part of rehabilitation of Highway 6, from Springmount to Hepworth. This foundation investigation was carried out by Peto MacCallum Ltd. (PML) for McCormick Rankin (MRC), a member of MMM Group Ltd., on behalf of the Ministry of Transportation of Ontario (MTO).

The location of the replacement culvert was selected approximately 20 m south of the existing culvert after the drilling of the boreholes had been completed. In view of the encountered subsurface conditions at this site and the current conditions at Site No: 8-483C located approximately 320 m to the south, the stratigraphy at the investigated locations in this report may vary, but are expected to be representative of the selected culvert location.

The purpose of this report was to summarize the subsurface stratigraphy encountered during the foundation investigation for the new culvert.

2. SITE DESCRIPTION AND GEOLOGY

The existing culvert is located on the Highway 6 northbound and southbound lanes, about 750 m north of the intersection of Highway 6 and 21, in the Town of Springmount. The new culvert will be located about 20 m south of the existing culvert on Highway 6.

Land use in the vicinity of the site includes the existing Highway 6 transportation corridor and commercial sites. The terrain includes level areas vegetated with grass, brush and scattered trees. The topography of the site is generally flat. Site photographs of the existing culvert location are included in Appendix A.



Physiographically the site is located in the region referred to as the Bruce Peninsula. The surficial and bedrock geology consists of a thin till soil cover less than 5 m thick over dolomite bedrock.

3. INVESTIGATION PROCEDURES

The subsurface investigation was carried out on January 11 and 12, 2012. Two boreholes (CT2-1 and CT2-2) were drilled to 5.0 and 3.6 m depths, respectively at the locations shown on Drawing PRT-2, appended.

The boreholes were advanced using continuous flight hollow stem augers with a truck-mounted CME 45 drill rig, supplied and operated by a specialist drilling contractor, working under the full-time supervision of a PML field supervisor.

Soil samples were recovered from the boreholes at regular 0.75 and 1.5 m depth intervals using the standard penetration test method. Standard penetration tests were conducted to assess the strength characteristics of the substrata. Soils were identified in accordance with the MTO soil classification manual procedures. The groundwater conditions in the boreholes were assessed during drilling by visual examination of the soil, the sampler and drill rods as the samples were retrieved and, where encountered, by measuring the groundwater level in the open boreholes.

The boreholes were backfilled with a bentonite/cement mixture, where required, in accordance with the MTO guideline and MOE Reg. 903 for borehole abandonment procedures.

The co-ordinates and ground surface elevations at the boreholes were provided by MMM Group Ltd. All elevations are reported in metres.

The recovered soil samples were returned to our laboratory in Toronto for detailed visual examination, laboratory testing and classification. The laboratory testing program included the following tests:

- Natural moisture content determinations (7)
- Grain size distribution analyses (4)
- Atterberg limits tests (4)



The grain size distribution charts are presented in Figures CT2-GS-1 to CT2-GS-3. The plasticity charts are presented in Figures CT2-PC-1 to CT2-PC-3. All of the test results are shown on the Record of Borehole sheets.

4. SUMMARIZED SUBSURFACE CONDITIONS

Reference is made to the appended Record of Borehole sheets for details of the subsurface conditions including soil classifications, inferred stratigraphy, standard penetration test results as well as groundwater observations. The results of grain size distributions, Atterberg limits tests and moisture content determinations are also shown on the Record of Borehole sheets.

The borehole locations and stratigraphic profile prepared from the borehole data are presented on the foundation Drawing PRT-2.

Boreholes CT2-1 and CT2-2 were drilled in the vicinity of the existing culvert to 5.0 and 3.6 m, elevation 231.5 and 232.9, respectively. As indicated in the section 1 of this report the planned culvert is located 20 m to the south of the existing culvert. Subsurface conditions at the new culvert could vary from those encountered in the boreholes advanced at the existing culvert, however they are considered to be representative based on the geology of the general area.

The subsurface stratigraphy revealed in the boreholes generally comprised a road embankment fill underlain by silt, silty clay/clayey silt and silty sand till. Bedrock was inferred by auger refusal at depths of 5.0 and 3.6 m, elevation 231.5 and 232.9, in boreholes CT2-1 and CT2-2 respectively. Groundwater was observed in both boreholes on completion of drilling.

4.1.1 Fill

From the ground surface, a 2.1 and 1.8 m thick fill unit extending to elevation 234.4 and 234.7 was encountered in boreholes CT2-1 and CT2-2 respectively. The fill includes a surficial 0.3 m thick compact sand and gravel, that is part of the Highway 6 shoulder pavement, underlain by loose sandy silt/sand and gravel, followed by soft to firm silty clay. The silty clay fill contacted in



borehole CT2-1 contained rootlets, topsoil, organic inclusions and plastic debris. SPT N values in the fill ranged from 3 to 16.

The results of grain size distribution analysis for the cohesive silty clay fill containing organics contacted in borehole CT2-1 are included in Figure CT2-GS-1. A plasticity chart of this fill sample is presented in Figure CT2-PC-1. The Atterberg liquid and plastic limits were 61 and 31 respectively, with a plasticity index of 30. The moisture content of the sample was 35%, (elevated due to the presence of organic inclusions).

The results of grain size distribution analysis for the silty clay fill contacted in borehole CT2-2 are included in Figure CT2-GS-2. A plasticity chart of the silty clay fill sample is presented in Figure CT2-PC-2. The Atterberg liquid and plastic limits were 46 and 22 respectively, with a plasticity index of 24. The moisture content of the sample was 25%.

4.1.2 Silt

Below the fill in borehole CT2-1, a localized 0.8 m thick, compact silt stratum was contacted, extending to 2.9 m, elevation 233.6. SPT N value in the silt was 16. The moisture content of the silt sample was 20%.

4.1.3 Silty Clay/Clayey Silt

Below the localized silt stratum in borehole CT2-1 and below the fill in borehole CT2-2, a 1.1 and 1.2 m thick, stiff to very stiff silty clay stratum was contacted to 4.0 m, elevation 232.5, and 3.0 m, elevation 233.5, respectively. SPT N values in this stratum were 10 and 16. A 0.6 m thick very stiff clayey silt stratum was encountered below the silty clay in borehole CT2-2 to the 3.6 m termination depth of the borehole, elevation 232.9.

The results of grain size distribution analyses for the silty clay samples are included in Figure CT2-GS-3. A plasticity chart of the two silty clay samples is presented in Figure CT2-PC-3. The Atterberg liquid limits were 35 and 36, the plastic limit of both test samples was 20 and the



plasticity indices were 15 and 16 respectively. The moisture content of the samples was 20 and 21%.

4.1.4 Silty Sand Till

A cohesionless deposit of silty sand till was encountered below the silty clay at 4.0 m, elevation 232.5 in borehole CT2-1. The unit was 1.0 m thick extending to the termination of the borehole at 5.0 m, elevation 231.5. A single SPT N value in the silty sand till was 61 blows over 180 mm indicating a very dense condition.

The moisture content determination for the recovered sample was 13%.

4.1.5 Bedrock

Bedrock was inferred by auger refusal in boreholes CT2-1 and CT2-2 at 5.0 and 3.6 m, elevation 231.5 and 232.9, respectively. Based on the regional geology, it is inferred that the bedrock comprises of dolomite.

4.1.6 Groundwater

Groundwater was contacted at 0.9 m depth, elevation 235.6, in borehole CT2-1 at the time of drilling. Groundwater was not contacted in borehole CT2-2 at the time of drilling. Groundwater was observed in boreholes CT2-1 and CT2-2 at respective depths of 2.0 and 3.4 m, elevation 234.5 and 233.1 on completion of drilling. The groundwater level is subject to seasonal fluctuations and rainfall patterns.

5. MISCELLANEOUS

Mr. Alan Lo carried out the field investigation for this study under the supervision of Mrs. N .S. Balakumaran, P. Eng. Aardvaark Drilling Ltd. supplied the drill rig for the subsurface



exploration. The laboratory testing of the selected samples was carried out in the PML laboratory in Toronto.

6. CLOSURE

This Foundation Investigation Report was prepared by Mr. H. Gharegrat, P.Eng., and reviewed by Mr. G. Degil, PhD, P.Eng., Senior Foundation Engineer. Mr. C. M. P. Nascimento, P. Eng., Project Manager and MTO Designated Principal Contact, conducted an independent review of the report.

Yours very truly

Peto MacCallum Ltd.



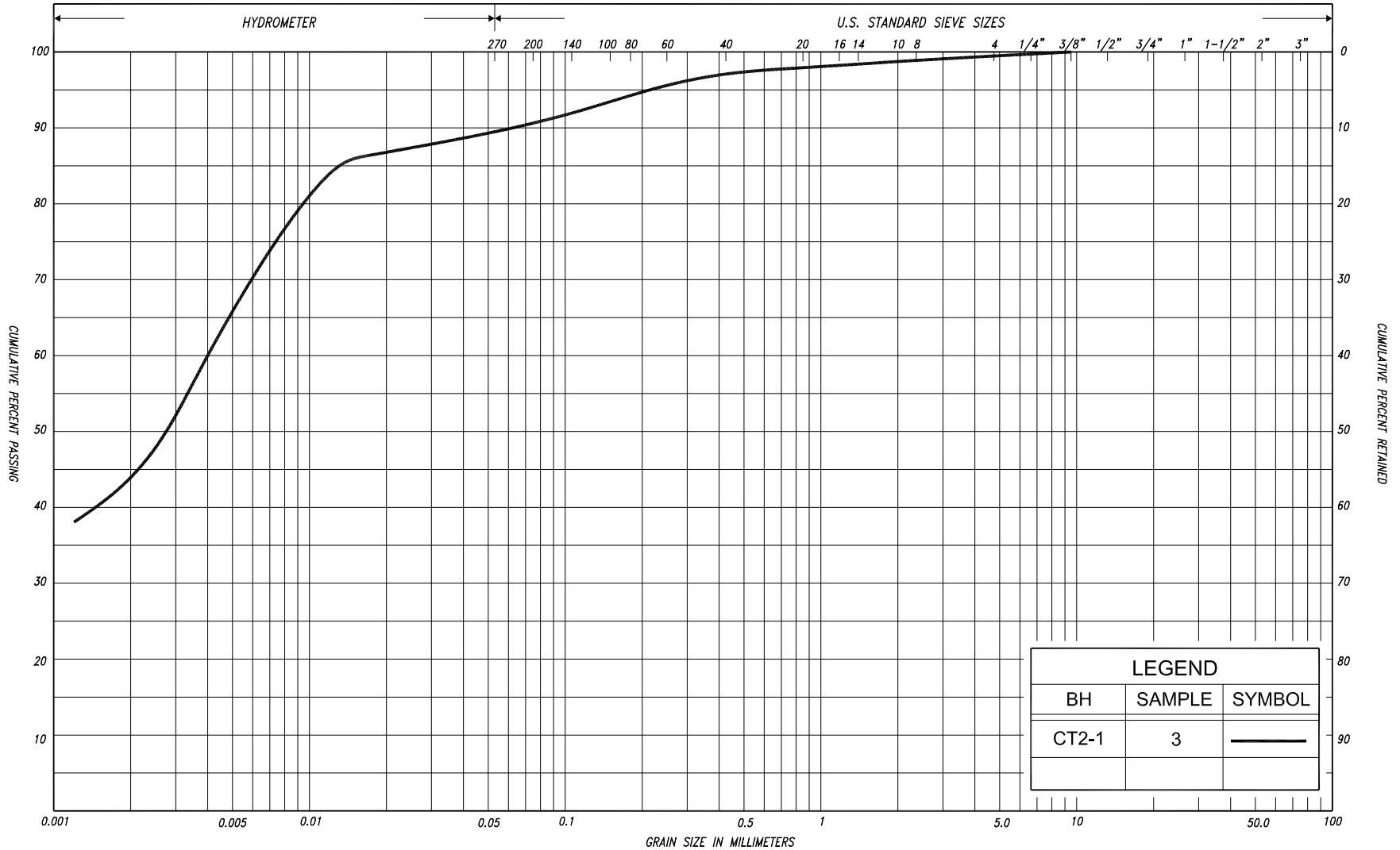
Harry Gharegrat, MS, P.Eng.
Project Engineer



Grigory Degil, PhD, P.Eng.
Senior Foundation Engineer



Carlos M.P. Nascimento, P.Eng
Project Manager and
MTO Designated Principal Contact



LEGEND		
BH	SAMPLE	SYMBOL
CT2-1	3	—

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

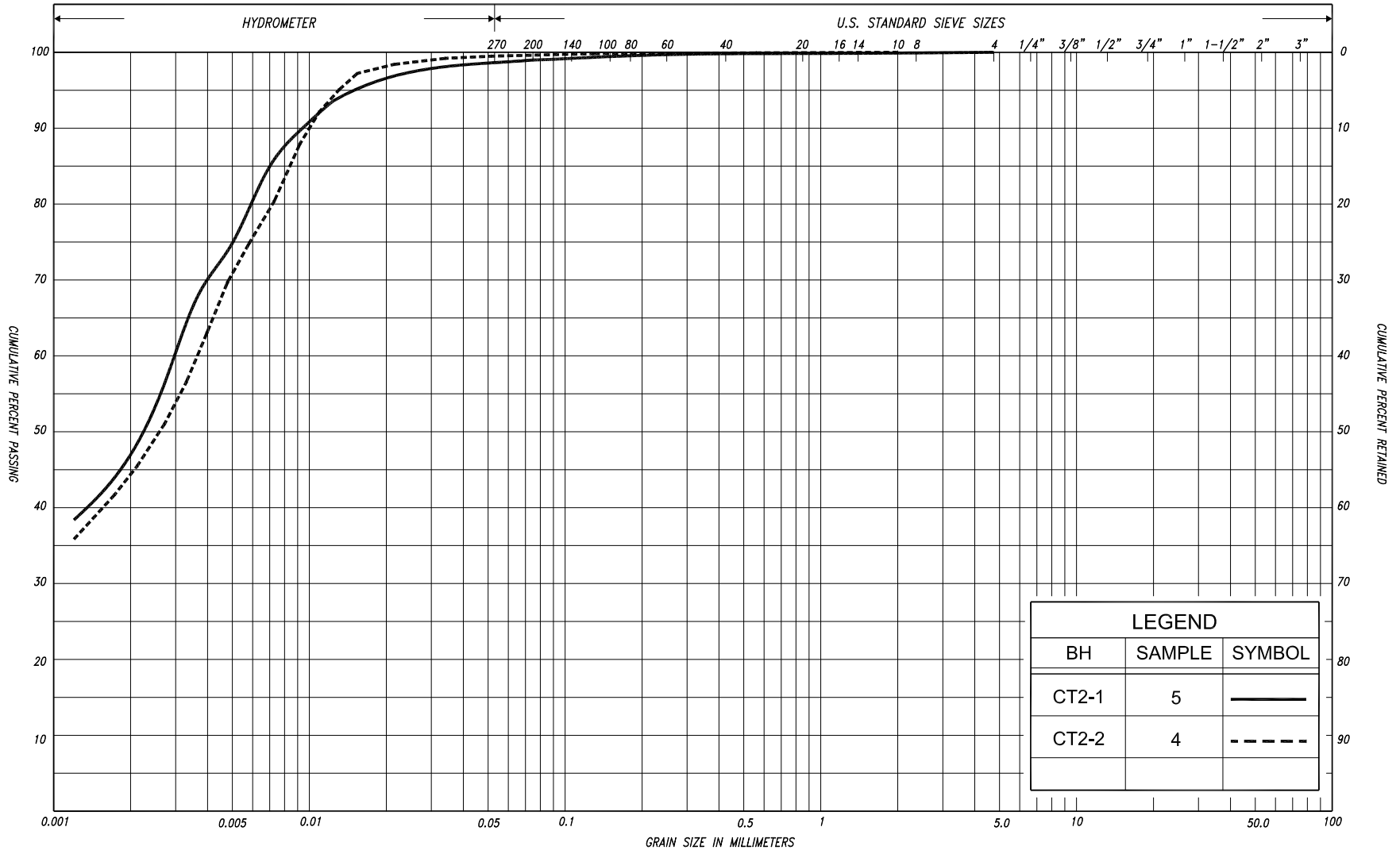


GRAIN SIZE DISTRIBUTION SILTY CLAY, trace sand, trace gravel, organics (CH-OH) (FILL)

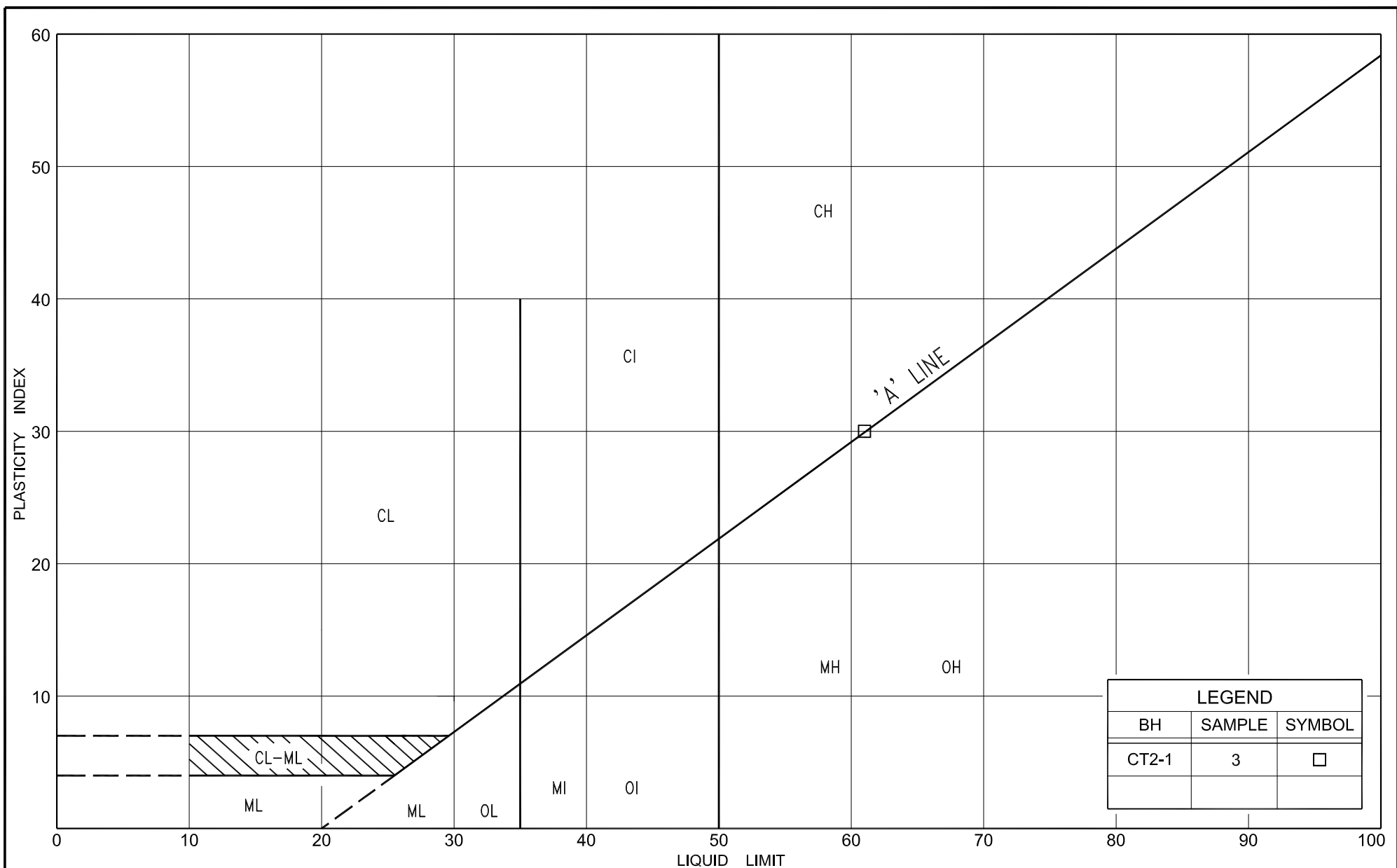
FIG No. CT2-GS-1

HWY: 6

G.W.P. No. 43-00-00



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

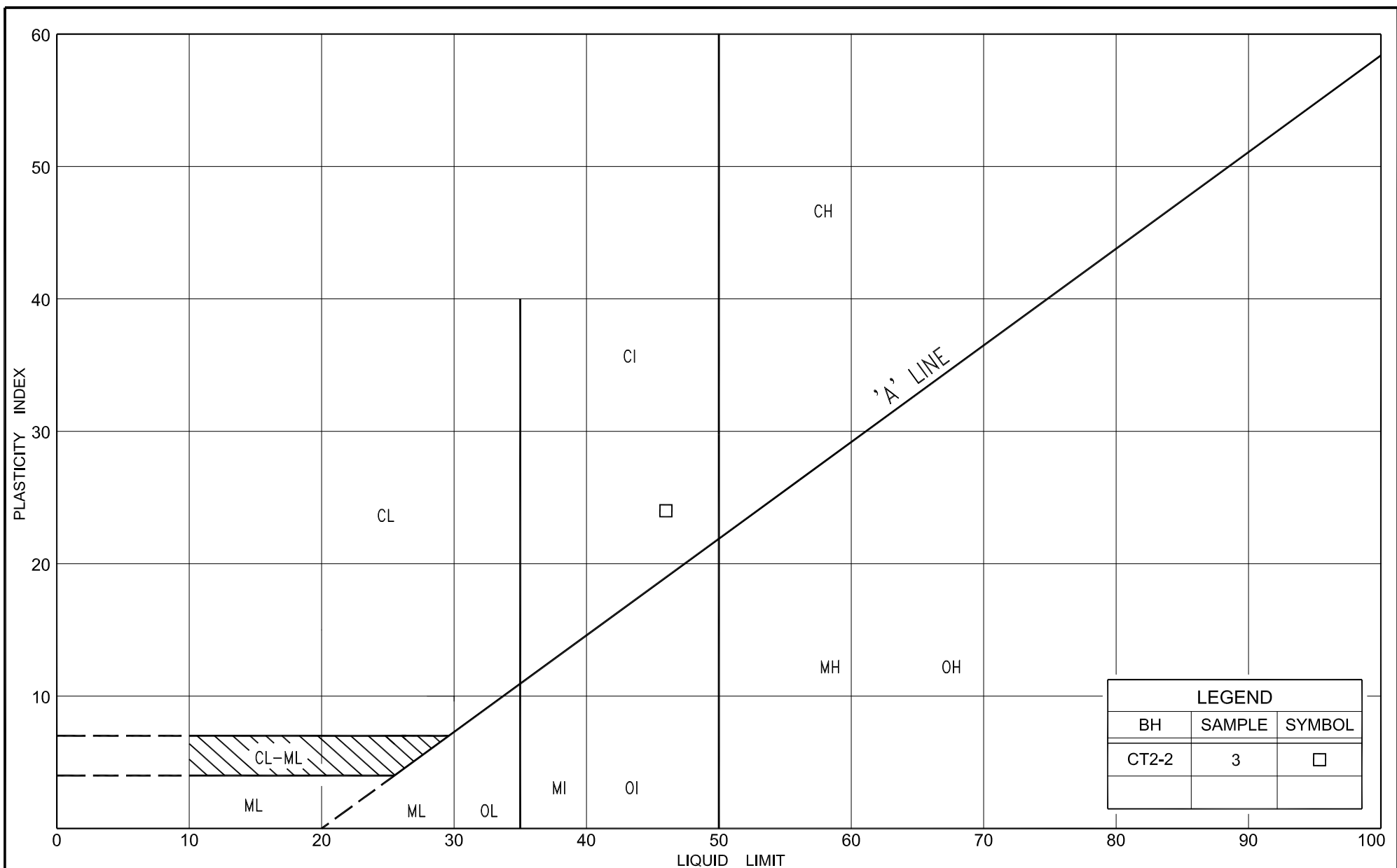


PLASTICITY CHART
 SILTY CLAY, trace sand, trace gravel, organics (CH-OH)
 (FILL)

FIG No. CT2-PC-1

HWY: 6

G.W.P. No. 43-00-00

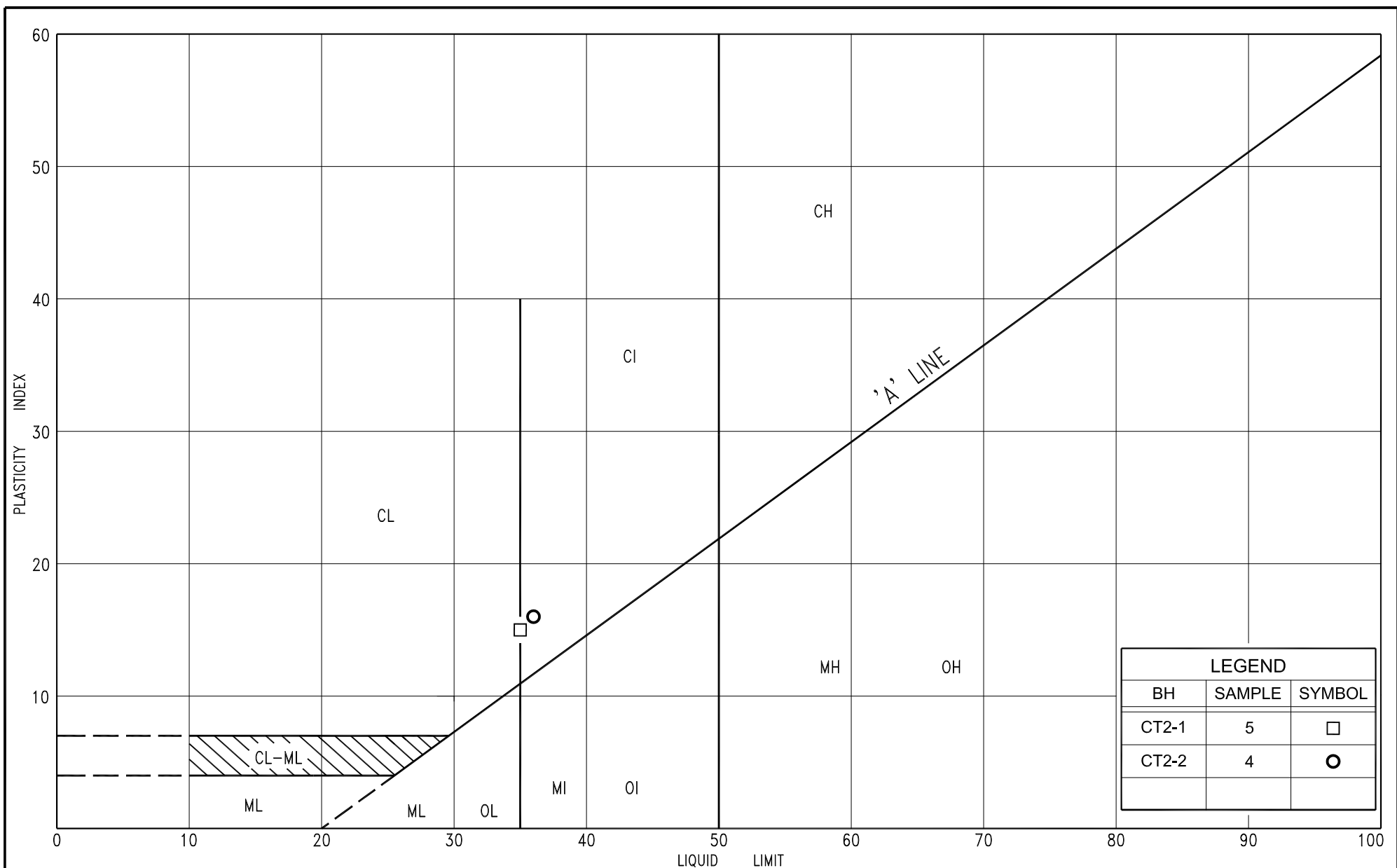


PLASTICITY CHART
 SILTY CLAY, trace sand (CI)
 (FILL)

FIG No. CT2-PC-2

HWY: 6

G.W.P. No. 43-00-00



PLASTICITY CHART

SILTY CLAY, trace sand (CL-CI)

FIG No. CT2-PC-3

HWY: 6

G.W.P. No. 43-00-00

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.

COMPOSITION: SECONDARY SOIL COMPONENTS ARE DESCRIBED ON THE BASIS OF PERCENTAGE BY MASS OF THE WHOLE SAMPLE AS FOLLOWS:

PERCENT BY MASS	0 - 10	10 - 20	20 - 30	30 - 40	> 40
	TRACE	SOME	WITH	ADJECTIVE (SILTY)	AND (AND SILT)

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 (R Q D), FOR MODIFIED RECOVERY, IS:

R Q D (%)	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_i	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	WTP		WETTER THAN PLASTIC LIMIT	j	kN/m ³	SEEPAGE FORCE
e	1, %	VOID RATIO						

RECORD OF BOREHOLE No CT2-1

1 of 1

METRIC

G.W.P. 43-00-00 LOCATION Co-ords: 4 937 284.2 N ; 424 556.0 E ORIGINATED BY A.L.

DIST London HWY 6 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY H.G.

DATUM Geodetic DATE January 11, 2012 CHECKED BY C.N.



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	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										WATER CONTENT (%)	
								20 40 60 80 100										20 40 60	
236.5	Ground Surface																		
0.0	Sand and gravel																		
236.2	Compact Brown (FILL)		1	SS	16														
0.3	Sandy silt, trace clay trace gravel, rootlets																		
	Loose Brown Wet Sand and gravel layer		2	SS	8														
	Silty clay, trace sand trace gravel, rootlets topsoil and organic inclusions, plastic debris clayey silt seams		3	SS	3						150					1 8 47 44			
234.4	Soft Dark moist grey (FILL)																		
2.1	Silt, trace to some clay																		
233.6	Compact Greyish Moist brown																		
2.9	Silty clay, trace sand		5	SS	10											0 1 52 47			
	Stiff Grey Moist																		
232.5	Silty sand, trace gravel cobbles/boulders																		
4.0	Very dense Grey Wet (TILL)		6	SS	61/18cm														
231.5																			
5.0	End of borehole Refusal on probable bedrock																		

RECORD OF BOREHOLE No CT2-2


1 of 1


METRIC

G.W.P. 43-00-00 **LOCATION** Co-ords: 4 937 278.9 N ; 424 566.5 E **ORIGINATED BY** A.L.
DIST London **HWY** 6 **BOREHOLE TYPE** Continuous Flight Hollow Stem Augers **COMPILED BY** H.G.
DATUM Geodetic **DATE** January 12, 2012 **CHECKED BY** C.N.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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				
								SHEAR STRENGTH kPa					WATER CONTENT (%)				
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
236.5	Ground Surface																
0.0	Sand and gravel																
236.2	Compact Brown (FILL)		1	SS	14												
0.3	Sand and gravel trace silt, rootlets		2	SS	7												
	Loose Brown Moist																
234.7	Silty clay, trace sand trace gravel, rootlets		3	SS	5						150				0 1 49 50		
1.8	Firm Grey (FILL) moist																
	Silty clay		4	SS	16										0 0 56 44		
	Very stiff Brown Moist																
233.5	Clayey silt																
3.0	Very stiff Grey Moist		5	SS	22												
232.9	End of borehole																
3.6	Refusal on probable bedrock																
<div>* 2012 01 12</div> <div> Water level measured after drilling</div> <div> Penetrometer test</div>																	

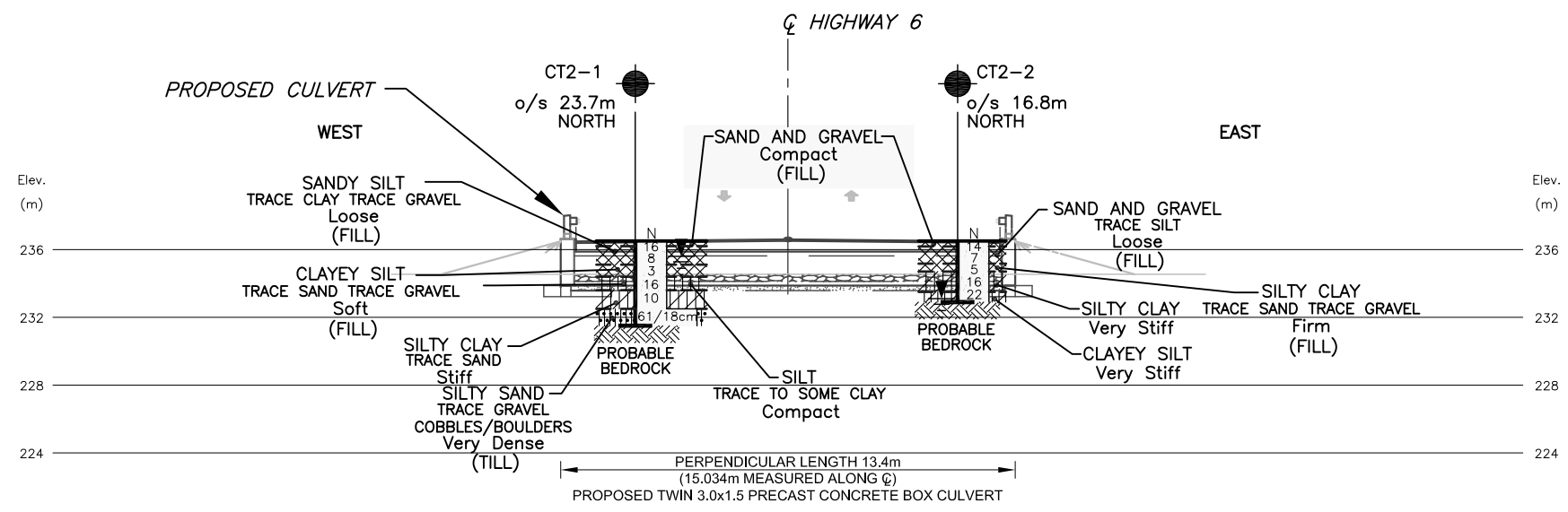
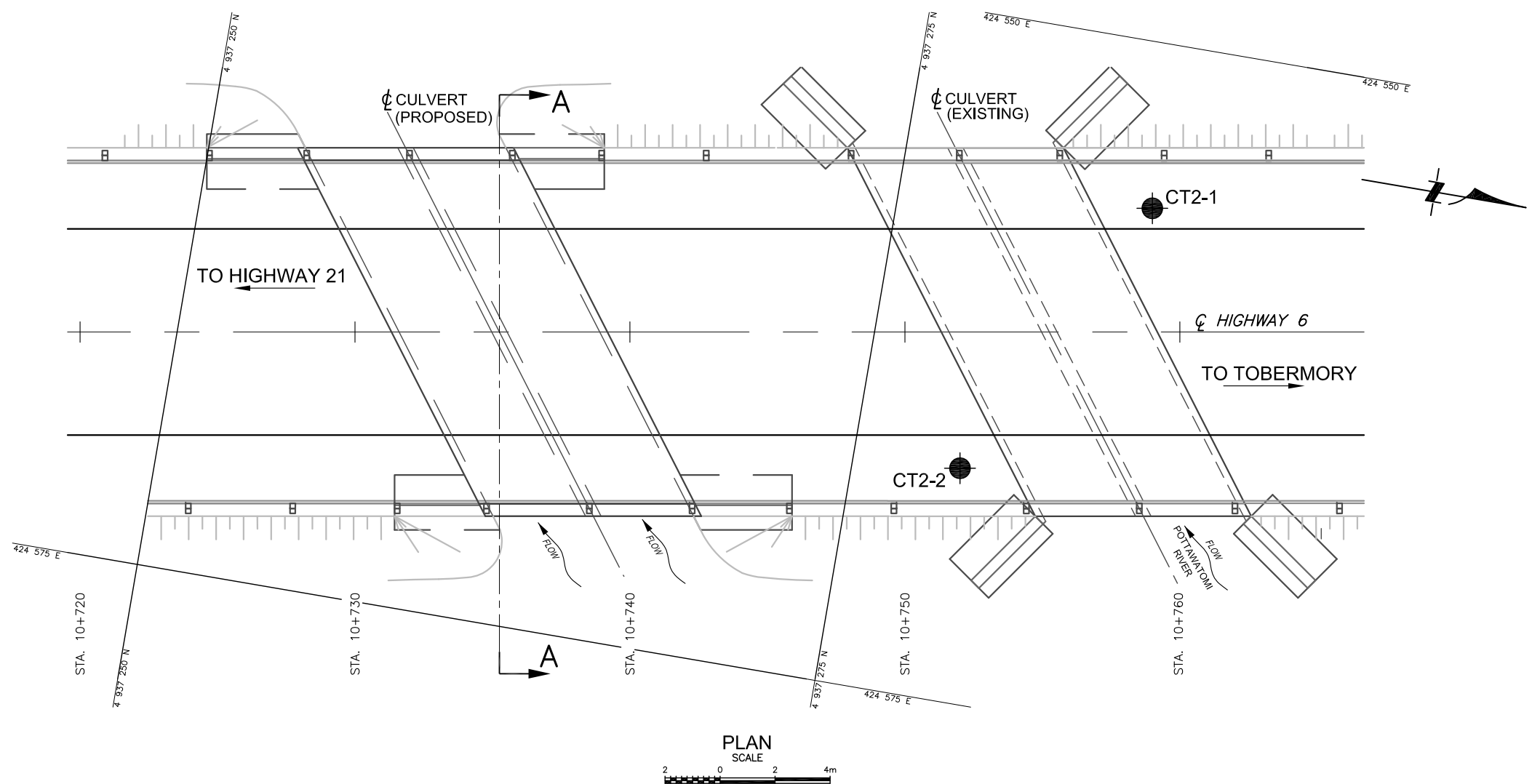
* 2012 01 12

 Water level measured after drilling

 Penetrometer test



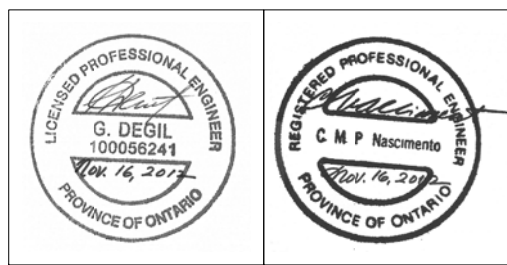
KEY PLAN
NOT TO SCALE



LEGEND			
	Borehole		
N	Blows/0.3m (Std. Pen Test, 475 J/blow)		
CONE	Blows/0.3m (60 Cone, 475 J/blow)		
	WL at time of investigation Jan. 2012		
*	Water level not established		
	Head		
	ARTESIAN WATER		
	Encountered		
	PIEZOMETER		

BH No	ELEVATION	NORTHINGS	EASTINGS
CT2-1	236.5	4 937 284.2	424 556.0
CT2-2	236.5	4 937 278.9	424 566.5

- NOTES:
- PROPOSED REPLACEMENT CULVERT LOCATION SELECTED AFTER COMPLETION OF BOREHOLE DRILLING.
 - THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE TEXT OF REPORT AND RECORD OF BOREHOLE LOGS.
 - THIS DRAWING IS FOR SUBSURFACE INFORMATION ONLY. SURFACE DETAILS AND FEATURES ARE FOR CONCEPTUAL ILLUSTRATION.
 - DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN. STATIONS ARE IN KILOMETRES AND METRES.



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. 41A-224

HWY No 6				DIST London	
SUBM'D	NA	CHECKED HG	DATE NOV. 16, 2012		SITE 8-482C
DRAWN	NA	CHECKED DG	APPROVED CN		DWG PRT-2



APPENDIX A

Site Photographs



Photograph 1: Looking southeast along Highway 6 towards the culvert site. Drill rig on CT2-1. (January 11, 2012)



Photograph 2: Looking north from the east side of Highway 6 towards the existing culvert. (January 11, 2012)