

Technical Summary

January 2024

Pit Name: Campbell Pit – Area B (Lower)

Provincial Pit Number: 0298

Location: Campbell Pit is located approximately 19 km east of Kamloops via the Trans-Canada Highway, then approximately 2.75 km south on Dallas Drive and Bregoliss Road (Figure 1). Access to the pit can be made from Bregoliss Road.

Legal Land Description: The site is currently a Section 16 Map Reserve (LF# 0256363) held by the British Columbia Ministry of Transportation and Infrastructure (BC MoTI). The legal description of the Map Reserve is “those portions of Sections 30 and 31, Township 19, Range 15, West of the Sixth Meridian, Kamloops Division of Yale District, containing 146.00 hectares, more or less”. UTM coordinates are Grid Zone 10, 5,613,500 Northing, 707,500 Easting. The layout of the Map Reserve boundary is shown in the legal plan (Figure 2).

Subsurface Investigation: Subsurface investigations at Campbell Pit - Lower were carried out in 1998 by Ministry of Transportation & Infrastructure.

In 1998 three (3) test holes and five (5) test pits were excavated to depths ranging from 4.0 to 19.9m. During the test pitting, subsurface soil and groundwater conditions were logged and representative samples of the granular materials were collected for laboratory testing and future reference. Laboratory testing was carried out on five (5) of the samples in the mining area to assess the gradation and durability characteristics. The tests completed were wet sieve analysis, degradation, sand equivalent, magnesium sulphate, specific gravity, and absorption.

Based on the results of the 1998 investigation, one (1) granular area was defined (Figure 3). The detailed results of the subsurface testing are provided in the Test Pit Summaries and test pit locations are shown on the Pit Development Plan (Figure 3).

Material Gradation: Table 1 shows the percentage of the fines (silts and clays), sand and gravel components for the samples tested.

Table 1: Pit Run Gradation

Classification:	Average (%)	Range (%)
Gravel (4.75-75mm)	40	25 – 65
Sand (0.075-4.75mm)	56	32 – 92
Fines (<0.075mm)	4	2 – 8

Material Durability: Table 2 shows the results of the durability tests from the 1998 testing as well as the specifications as required in the Standard Specifications for Highway Construction.

Table 2: Durability Test Results

TEST	AVERAGE	RANGE
Degradation	70.8	59.4-86.6
Sand Equivalent	59.9	59.7-65.9
Magnesium Sulfate (Coarse)	4.95	3.94-5.97
Magnesium Sulfate (Fine)	11.65	11.42-11.87
Specific Gravity (Coarse)	2.737	2.718-2.744
Specific Gravity (Fine)	2.668	2.585-2.699
Absorption (Coarse)	0.71	0.55-0.86
Absorption (Fine)	1.10	0.91-1.21

BC MoTI Specifications	
Sand Equivalent	≥40 for base coarse and fine asphalt mix aggregate ≥20 for surfacing, sub-base and bridge end fill aggregates
Micro Deval	≤30% for sub-base and bridge end fill aggregates ≤25% for surfacing & base course aggregates ≤18% for Class 1 Pavement asphalt mix aggregates ≤20% for Class 2 Pavement asphalt mix aggregates
Absorption	<2.0% for coarse paving aggregates ≤1.0% for coarse and ≤1.5% for fine graded aggregate seals
Relative Density	~2.65 for all aggregate products

Material Suitability: Based on the 1998 investigation results, the material is judged to be suitable for the following purposes:

Table 3: Suitability

	Pit Run	Crush
Campbell Pit (Area B - Lower) Suitability Area	SGSB	25mm WGB* Asphalt Mix Aggregates

*May require sand rejection

The samples tested meet the gradation, sand equivalent, and degradation specifications for base course, subbase course, and asphalt mix aggregate. Based on the absorption results the samples meet the specification for paving aggregates.

Sulphate and Chloride Testing

Table 4 shows the sulphate and chloride test results for select samples from the pit. These results are provided for information and have not been considered for material suitability.

Table 4: Sulphate and Chloride Test Results

Test Pit	Water-Soluble Sulphate	Water-Soluble Chloride
2019 Grab Sample	<0.050	<0.010

Volume Estimates: Table 5 shows the volume estimates that can be expected for gravel from the proposed suitability area. This is based on the measured depths encountered during the subsurface investigation. The potential volumes of granular material were calculated by averaging the total thickness of granular material encountered in test pits and multiplying by the estimated surface area.

Table 5: Volume Estimates

Suitability Area ~2.0ha.	Topsoil	Overburden	Granular Material
Average Layer Thickness (m)	-	-	6
Volume (m³)	-	-	120,000

Pit Development Notes

- All development must be carried out in accordance with the Health, Safety, and reclamation Code for Mines in British Columbia, BC Ministry of Energy, Mines and Low Carbon Innovation (2022, or later edition), the Standard Specifications for Highway Construction, BC Ministry of Transportation and Infrastructure (2020, or later edition) and the Aggregate Operators Best Management Practices Handbook for BC.
- All trees, vegetation, and overburden are to be removed within 2m of the top of the pit faces. Topsoil, overburden, and aggregate cannot be removed within five meters of the reserve boundary.
- The processing area is recommended to be located on the pit floor as identified on the Pit Development Plan, with mining proceeding in a southern direction as indicated.
- Processed aggregate may be stockpiled to the north of the production site, where space permits as indicated on the Pit Development Plan.
- Due to the high relief of the deposit, it is recommended that a bulldozer be utilized to push material to the production area to avoid an excessively high vertical pit face.
- No dumping of debris or petroleum products will be permitted, and the site must be left in a clean and safe condition.
- At the completion of the pit development operations, but prior to the depletion of the pit, the sides of the pit faces, waste piles, and overburden stockpiles must be trimmed to a 1.5H:1V slope. Active pit faces must be reshaped with native granular materials.

- Upon depletion of the pit, all disturbed areas are to be reclaimed. The minimum reclamation procedure should include re-sloping of the pit faces and waste piles to a 2H:1V slope, contouring the area for appropriate drainage, spreading of overburden followed by topsoil, and seeding.
- Should any of the above conditions conflict with the Health, Safety, and Reclamation Code for Mines in British Columbia, then the Code will prevail.

Closure

The findings of this report and the soil conditions noted above are inferred from the extrapolation of limited surface and subsurface data collected during the site investigation. It should be noted that different and possibly poorer soil conditions may exist between the test pit locations and volume estimates may vary from those reported in this report.

Prepared by:

Laura Courtenay
Senior Agg. Resource Specialist

Reviewed by:

Samantha Kinniburgh
Senior Agg. Resource Specialist

Enclosures

Figures:

Figure 1 - Location Plan

Figure 2 - Legal Plan

Figure 3 – Pit Development Plan

Test Pit Summaries

Test Pit Logs (1998)

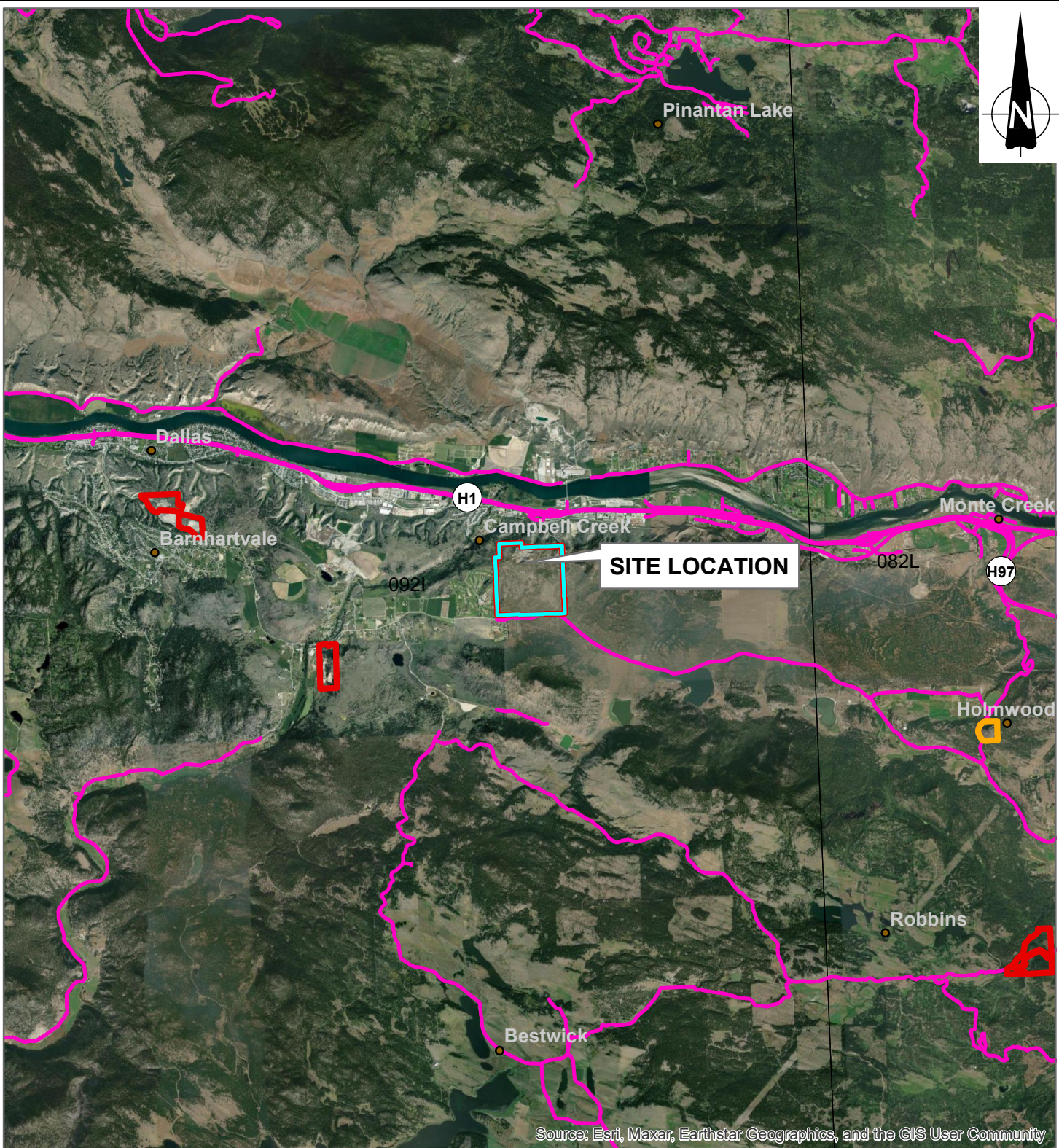
Wet Sieve Analysis Charts

Aggregate Gradation Charts

USC Legend



Photos

Figures

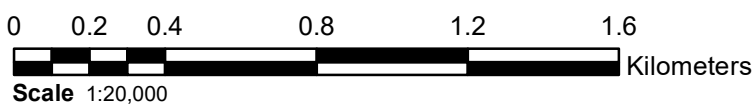
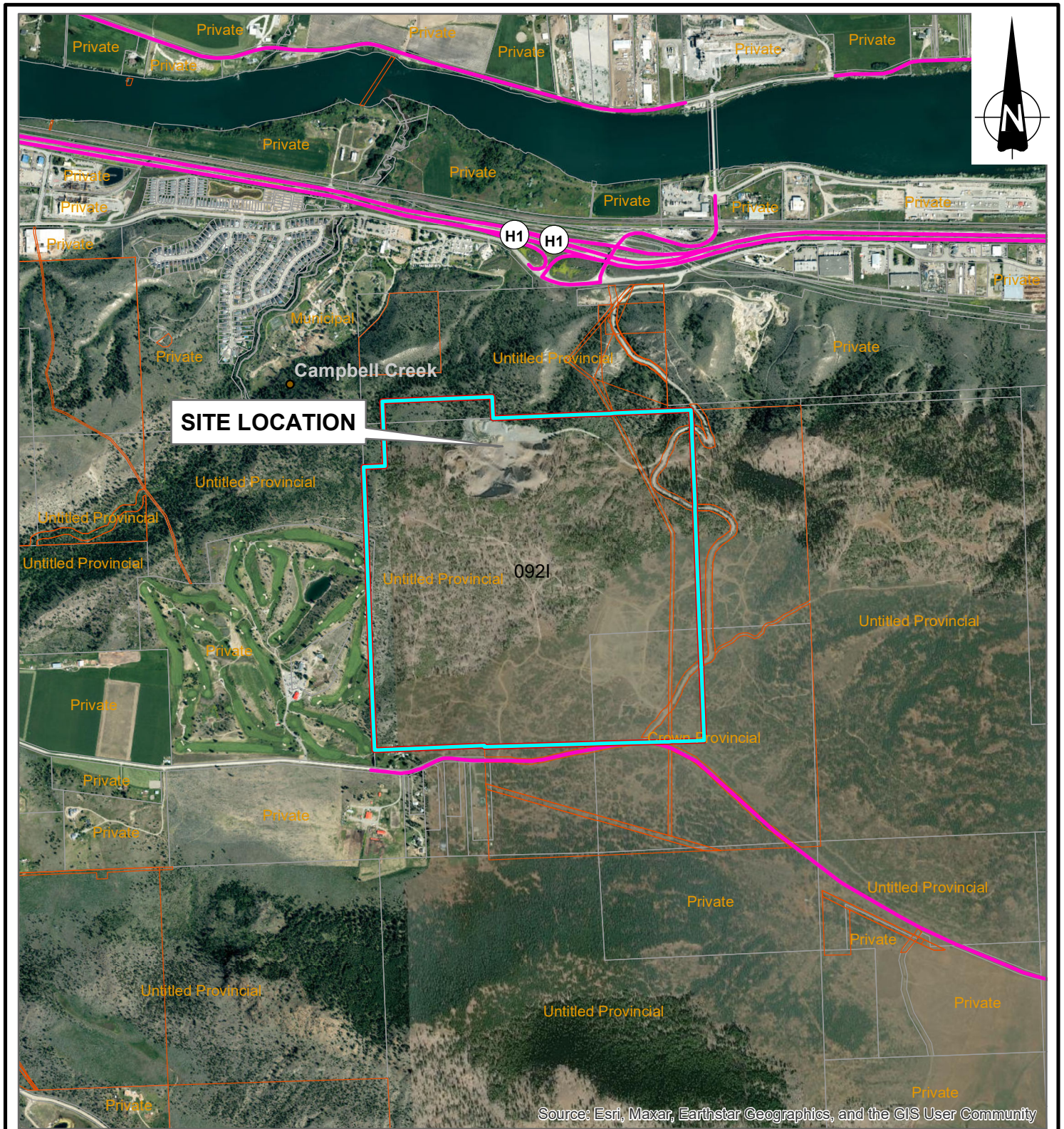




Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



 Ministry of Transportation and Infrastructure Geotechnical and Materials Branch			
LOCATION PLAN (2024) Campbell Pit No. 0298 SA 15 - THOMPSON NICOLA DISTRICT			
DRAWN BY: LACOURTE	PROJECTION: NAD 1983 UTM Zone 10N	SCALE: As Shown	
CHECKED BY: A.Mitchell	DATUM: NAD 1983 UTM Zone 10N	DATE: 2024-01-04	
FileName: GISTemplate_Gravel_R2_2021-11-18	Geotech Project No: 	Reg: 2	Drawing No: FIGURE 1









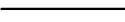
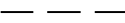







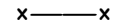

This drawing was originally produced in colour.



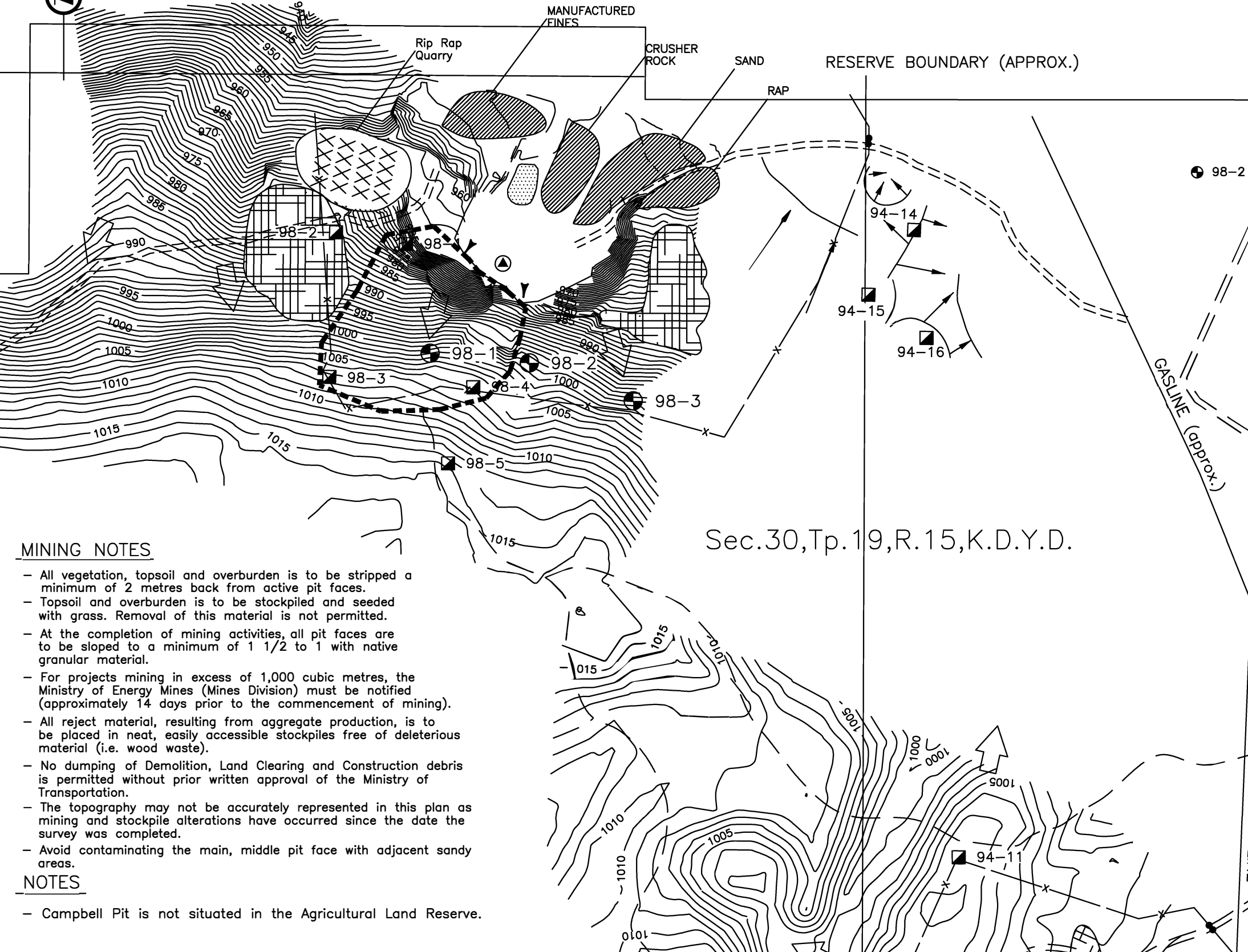
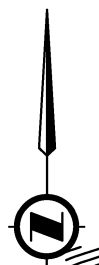
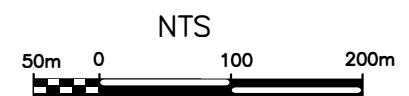
 Ministry of Transportation and Infrastructure Geotechnical and Materials Branch			
LEGAL PLAN (2024) Campbell Pit No. 0298 - Area B SA 15 - THOMPSON NICOLA DISTRICT			
DRAWN BY: LACOURTE	PROJECTION: NAD 1983 UTM Zone 10N	SCALE: As Shown	
CHECKED BY: A. Mitchell	DATUM: NAD 1983 UTM Zone 10N	DATE: 2024-01-04	
FileName: GISTemplate_Gravel_R2_2021-11-18	Geotech Project No: 	Reg: 2	
		Drawing No: FIGURE 2	

This drawing was originally produced in colour.

LEGEND

-  PROCESSING PLANT LOCATION
-  EXCAVATION SITE
-  DEVELOPMENT DIRECTION
-  SUITABILITY BOUNDARY
-  EXTENSION POTENTIAL
-  98-2 TEST HOLE 98-2, DRILLED IN 1998.
-  98-2 TEST PIT 98-2, EXCAVATED IN 1998.
-  94-2 TEST PIT 94-2, EXCAVATED IN 1994.
-  GRAVEL RESERVE BOUNDARY
-  ACCESS ROAD
-  CAT TRACK
-  LEGAL SURVEY MONUMENT
-  BEDROCK OUTCROP (QUARRY SITE)
-  DOWN SLOPE DIRECTION
-  PROCESSED AGGREGATE STOCKPILE AREA
-  OVERBURDEN STOCKPILE SITE
-  STEEL PIT GATE
-  FENCE
-  TREED AREA

"INFORMATION PROVIDED HEREIN IS INTENDED TO BE USED BY THE MINISTRY OF TRANSPORTATION IN CONJUNCTION WITH ALL OTHER DATA RELEVANT TO THE SITE. THE SOIL AND GROUND WATER CONDITIONS SHOWN ARE REPRESENTATIVE AT THE TESTHOLE LOCATIONS ON THE DATES INDICATED. CONDITIONS ARE SUBJECT TO CHANGE WITH TIME. THE MINISTRY OF TRANSPORTATION SHALL NOT BE HELD LIABLE FOR ANY CLAIMS OR ACTIONS ARISING FROM THE USE OR INTERPRETATION OF THE DATA HEREIN PROVIDED."



MINING NOTES

- All vegetation, topsoil and overburden is to be stripped a minimum of 2 metres back from active pit faces.
- Topsoil and overburden is to be stockpiled and seeded with grass. Removal of this material is not permitted.
- At the completion of mining activities, all pit faces are to be sloped to a minimum of 1 1/2 to 1 with native granular material.
- For projects mining in excess of 1,000 cubic metres, the Ministry of Energy Mines (Mines Division) must be notified (approximately 14 days prior to the commencement of mining).
- All reject material, resulting from aggregate production, is to be placed in neat, easily accessible stockpiles free of deleterious material (i.e. wood waste).
- No dumping of Demolition, Land Clearing and Construction debris is permitted without prior written approval of the Ministry of Transportation.
- The topography may not be accurately represented in this plan as mining and stockpile alterations have occurred since the date the survey was completed.
- Avoid contaminating the main, middle pit face with adjacent sandy areas.

NOTES

- Campbell Pit is not situated in the Agricultural Land Reserve.



Date	REVISIONS Description	Initial

REVIEWED BY:		Date
A.T.A.		
APPROVED BY:		Date
G.R.M.		

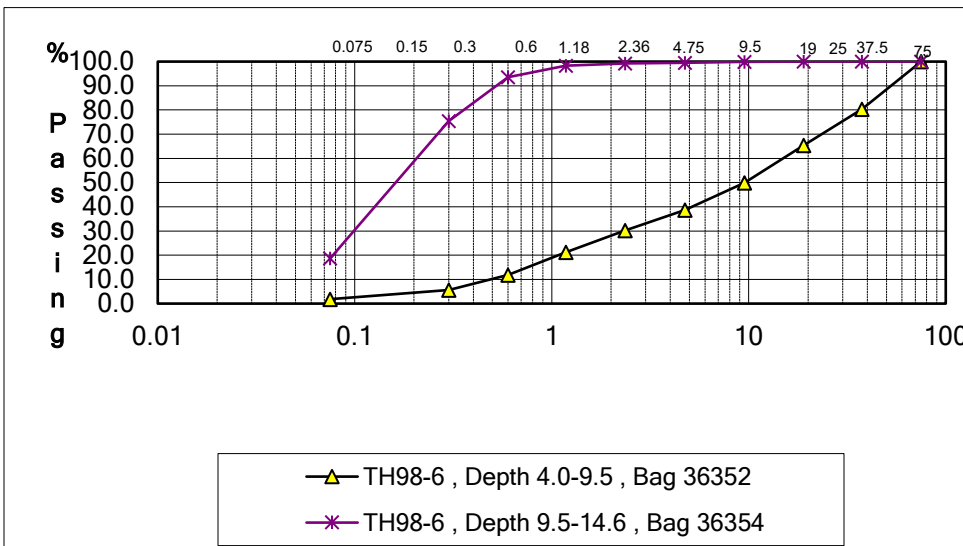
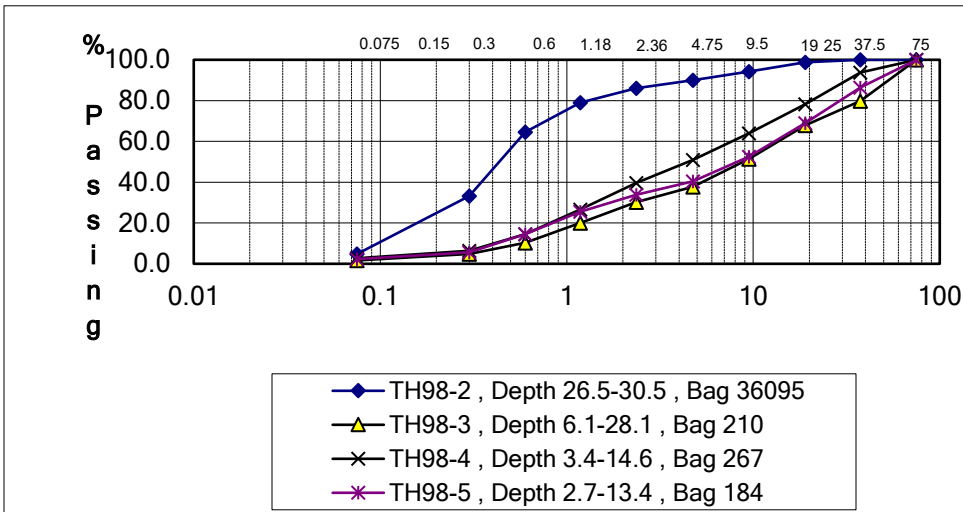
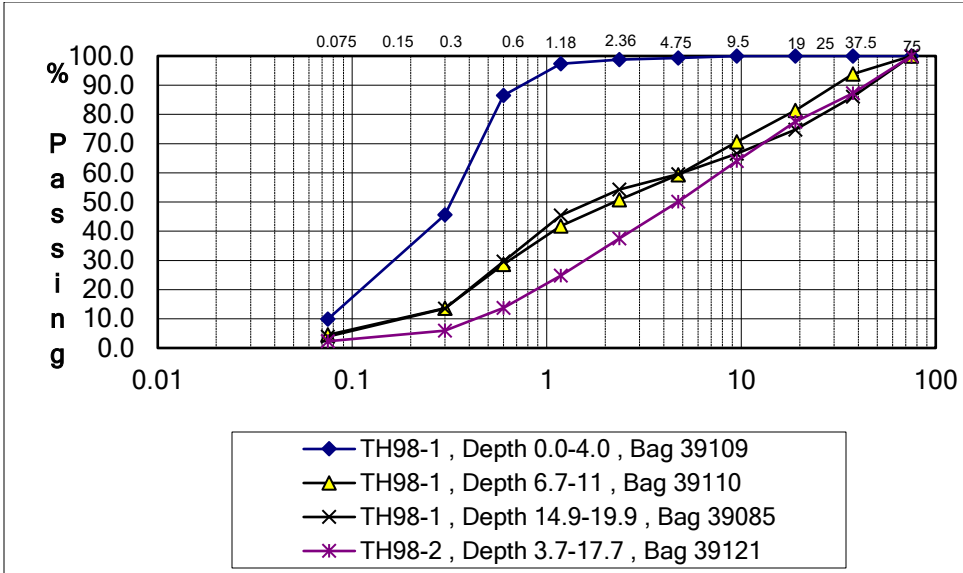
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CAMPBELL PIT #0298 - Area B (Lower)
PIT DEVELOPMENT PLAN
 FILE NO. 50-15-0298

Test Pit Summaries

1	OF		1		AGGREGATE LOG											
PROJECT:			Campbell Pit						SAMPLED BY:			Brad Hogg				
PIT #:			298						METHOD:			Excavator				
DISTRICT:			Thompson Nicola						DATE:			March 5 1998				
TP	DEPTH		SAMPLE BAG No.	SOILS CLASS	ESTIMATED GRADUATION			ESTIMATED ROCK 75mm				SAND F M C	REMARKS			
	FROM	TO			G	S	F	MAX SIZE	75mm-150mm	150mm-375mm	>375mm					
98-01	0	0.3	TS													
	0.3	2.5	584	SP/SM	0	92	8							F,M		
				SM1	10	76	14									LAB TESTED
	2.5	3.5		SP	25	70	5	75						M		
	3.5	5.5		GP	65	32	3	200	5	2				C		Cobble Seams
98-02	0	0.3		TS												
	0.3	1.5		GP	60	37	3	75						M		
	1.5	3.5	583	SP	20	75	5	50						F,M		
	3.5	5.5		GP	55	42	3	150	2					M,C		
				SP	33	64	3									LAB TESTED COMBINED SAMPLE
98-03	0	0.3		TS												
	0.3	1.5		SPSM	0	92	8							F,M		
	1.5	4.0	595	GP	55	42	3	200	5	2	0			M		
	4.0	5.5		SP	30	68	2	75	0	0	0			M,C		
				SP	44	51	5									LAB TESTED COMBINED SAMPLE
98-04	0	0.3		TS												
	0.3	2.5		SP/SM	0	92	8									
	2.5	5.5	594	GP	65	32	3	200	2	1	0			M,C		
				GP	56	42	2									LAB TESTED
98-05	0	0.3		TS												
	0.3	2.5	593	SP	5	92	3	50								
				SP/SM	5	90	5									LAB TESTED
	2.5	5.5		GP	65	32	3	200	5	3	0			M,C		

PROJECT REPORT OF SIEVE ANALYSIS SUMMARIES				PERCENT RETAINED											
Project:		Gravel Management Program						Project No.:		242-08560-2013					
Sample Source:		Campbell Pit (Thompson District)						Client:		0					
Material:		PIT RUN						Date:		00-Jan-00					
Test Pit	Sample Information		Bag #	Percent Retained											
	Depth (m)			Pit Run Sieve Sizes (mm)											
				75	37.5	19	9.5	4.75	2.36	1.18	0.6	0.3	0.075	PAN	check
TH98-1	0.0-4.0		39109	0.0	0.0	0.0	0.1	0.6	0.6	1.4	10.8	40.9	35.7	9.9	100
TH98-1	6.7-11		39110	0.0	6.2	12.4	10.8	11.2	8.6	9.0	13.1	15.0	9.1	4.5	100
TH98-1	14.9-19.9		39085	0.0	14.0	11.2	8.2	7.0	5.3	8.8	15.8	16.1	9.6	3.9	100
TH98-2a	3.7-17.7		39121	0.0	12.7	9.8	13.5	13.9	12.6	12.8	11.0	7.8	3.6	2.3	100
TH98-2b	26.5-30.5		36095	0.0	0.0	1.3	4.4	4.3	4.0	7.0	14.5	31.3	28.5	4.8	100
TH98-3	6.1-28.1		210	0.0	20.2	11.9	16.4	13.6	7.6	10.2	9.8	5.5	3.1	1.6	100
TH98-4	3.4-14.6		267	0.0	6.2	15.5	14.3	13.0	11.2	13.1	12.1	8.0	3.7	2.7	100
TH98-5	2.7-13.4		184	0.0	13.6	17.4	16.5	12.1	6.6	8.3	10.9	9.0	3.3	2.3	100
TH98-6	4.0-9.5		36352	0.0	19.7	15.0	15.4	11.2	8.5	9.1	9.3	6.2	3.8	1.8	100
TH98-6	9.5-14.6		36354	0.0	0.0	0.0	0.1	0.4	0.2	0.9	4.8	18.1	56.8	18.7	100



USC Legend

MATERIALS CLASSIFICATION LEGEND

MAJOR DIVISIONS	SYMBOL	SOIL TYPE						
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	WELL GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES					
		GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES					
		GM*	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES					
		GC*	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES					
	SAND AND SANDY SOILS	SW	WELL-GRADED SANDS OR GRAVELLY SANDS, < 5% FINES					
		SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, < 5% FINES					
		SM*	SILTY SANDS SAND-SILT MIXTURES					
		SC*	CLAYEY SANDS SAND-CLAY MIXTURES					
FINE GRAINED SOILS	SILTS AND CLAYS $w_L < 50$	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY					
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS					
		OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY					
	SILTS AND CLAYS $w_L > 50$	MH	INORGANIC SILTS, MICACEOUS OR DIATOM-ACEOUS FINE SANDY OR SILTY SOILS, PLASTIC SILTS					
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS					
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS					
ORGANIC SOILS	Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS						
TOPSOIL	TS	TOPSOIL WITH ROOTS, ETC.						
COBBLES	SB	ROCK FRAGMENTS AND COBBLES, PARTICLE SIZE 75mm TO 300mm						
LARGE BOULDERS	LB	BOULDERS, PARTICLE SIZE OVER 300mm						
BEDROCK	BR	BEDROCK						
FOR SOILS HAVING 5 - 12% PASSING .075 SIEVE, USE DUAL SYMBOL <table style="width: 100%; border: none;"> <tr> <td style="border: none;">*GM1; GC1; SM1; SC1; 12 - 20%</td> <td rowspan="4" style="border: none; font-size: 3em; vertical-align: middle;">}</td> <td rowspan="4" style="border: none; vertical-align: middle;">PASSING .075mm SIEVE</td> </tr> <tr> <td style="border: none;">GM2; GC2; SM2; SC2; 20 - 30%</td> </tr> <tr> <td style="border: none;">GM3; GC3; SM3; SC3; 30 - 40%</td> </tr> <tr> <td style="border: none;">GM4; GC4; SM4; SC4; 40 - 50%</td> </tr> </table>			*GM1; GC1; SM1; SC1; 12 - 20%	}	PASSING .075mm SIEVE	GM2; GC2; SM2; SC2; 20 - 30%	GM3; GC3; SM3; SC3; 30 - 40%	GM4; GC4; SM4; SC4; 40 - 50%
*GM1; GC1; SM1; SC1; 12 - 20%	}	PASSING .075mm SIEVE						
GM2; GC2; SM2; SC2; 20 - 30%								
GM3; GC3; SM3; SC3; 30 - 40%								
GM4; GC4; SM4; SC4; 40 - 50%								

REV. 90-04-26



PROVINCE of BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION & HIGHWAYS
Geotechnical & Materials Engineering

UNIFIED SOIL CLASSIFICATION LEGEND

Drawn: LU	Date: JULY'97	Scale:
File No.:	ACAD File: ACADSTDS 83025DS\SOIL-APP	

Photos



Photo 1 Looking southwest at the pit face. Crusher set-up at the base of the slope (June 2021).



Photo 2 Looking west down at the crusher set-up and stockpile areas (June 2021).



Photo 3 View from the top of the pit face, looking northeast (May 2023).