

Technical Summary

January 2024

Pit Name: Cherry Creek

Provincial Pit Number: 0443

Location: The pit is located approximately 2 km northeast of Cherryville on the Sugar Lake Road. (Figure 1).

Legal Land Description: Ministry of Transportation and Infrastructure Section 16 Map Reserve on that part of the Southwest 1/4, except Plan 32827, and that part of the Southeast 1/4, except Plan 32827, Section 33, Township 57, Osoyoos Division Yale District, containing 71.10 hectares, more or less, containing 71.1 hectares more or less. UTM coordinates for the pit are Zone 11, 5568800 Northing, 383800 Easting. (Figure 2).

Subsurface Investigation: Subsurface investigations at Cherry Creek Pit were carried out in August of 2005 and November of 2020 by Ministry of Transportation & Infrastructure.

In 2015 twelve (12) test pits were excavated to depths ranging from 2.2 to 4.6m. 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 twelve (12) of these samples to assess the gradation and durability characteristics. The tests completed were wet sieve analysis, micro deval, sand equivalent, relative density, and absorption.

Based on the results of the 2015 investigation, one granular area has been defined. 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 gradation as a percentage by weight of the fines (silts and clays), sand and gravel components as well as the Unified Soil Classification (USC [included after test pit summary]) for the samples tested.

Table 1: Pit Run Gradation

Test Pit	Depth (m)	Fines (%)* <0.075mm	Sand (%)* 0.075-4.75mm	Gravel (%)* 4.75-75mm	USC
Area A					
15-1	0-4.5	2.4	27.3	70.3	GW
15-2	0-4.5	2.0	35.5	62.5	GW
15-3	1-4.6	2.4	33.2	64.4	GW
15-4	0-4.6	2.7	32.5	64.8	GW
15-5	0-4.6	2.7	36.8	60.5	GW
15-6	0-4.6	3.1	32.6	64.3	GW
15-7	1.4-4.6	2.4	35.2	62.4	GW
15-8	0-2.2	3.0	32.3	64.7	GW
15-9	0-4.6	3.3	35	61.7	GW
15-10	0-4.6	2.0	34.5	63.5	GP
15-11	1-4.6	2.6	36	65.4	GW
15-12	0-4.6	2.3	37.5	60.2	GW
Average – Area A		2.6	34	64	-

* Values are rounded to the nearest whole number so may not add exactly to 100%

Table 2: Oversize Field Estimates

Classification:	Average (%)	Range (%)
Boulders (>375mm)	2	0 - 7
Cobbles (150-375mm)	5	0 - 8
Cobbles (75-150mm)	8	0 - 12

Material Durability: Table 3 shows the results of the durability tests as well as the specifications as required in the Standard Specifications for Highway Construction.

Table 3: Durability Test Results

TEST	AVERAGE	RANGE
Micro-Deval (Fine)	16.0	14.8 – 17.2
Micro-Deval (Coarse)	11.2	10.0 - 12.7
Sand Equivalent %	52	34 - 71
Magnesium Sulfate (Coarse %)	3.58	3.28 – 3.87
Magnesium Sulfate (Fine %)	7.82	6.08 – 9.55
Bulk Relative Density (Coarse)	2.644	2.625 – 2.664
Bulk Relative Density (Fine)	2.626	2.616 – 2.647
Absorption (Coarse)	1.18	1.06 – 1.28
Absorption (Fine)	1.28	1.09 – 1.48

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	$\leq 30\%$ for sub-base and bridge end fill aggregates $\leq 25\%$ for surfacing & base course aggregates $\leq 18\%$ for Class 1 Pavement asphalt mix aggregates $\leq 20\%$ for Class 2 Pavement asphalt mix aggregates
Absorption	$< 2.0\%$ for coarse paving aggregates $\leq 1.0\%$ for coarse and $\leq 1.5\%$ for fine graded aggregate seals
Relative Density	~ 2.65 for all aggregate products

Material Suitability: Based on the 2015 investigation results, the material is judged to be suitable for the following purposes:

Table 4: Suitability

	Pit Run	Crush
Cherry Creek Pit	Bridge End Fill SGSB	25mm WGB Asphalt Mix Aggregates

The samples tested meet the gradation, sand equivalent, and micro-deval specifications for base course, bridge end fill and asphalt mix aggregate.

Volume Estimates: The suitability area for Cherry Creek Pit has been stripped of topsoil and overburden. The estimated granular volume is 300,000 m³. 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.

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 and Mines (2012, 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.
- The water table was found not found in Test Pits 1 through 12, but was encountered in the pit floor at approximately 2 meters deep.
- 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.
- No dumping of debris or petroleum products will be permitted, and the site must be left in a clean and safe condition.
- Stockpiled rip rap and winter sand is not available for use in processing aggregate. Other existing stockpiles are recommended for use.
- 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.

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Enclosures

Figures:

Figure 1 - Location Plan

Figure 2 - Legal Plan

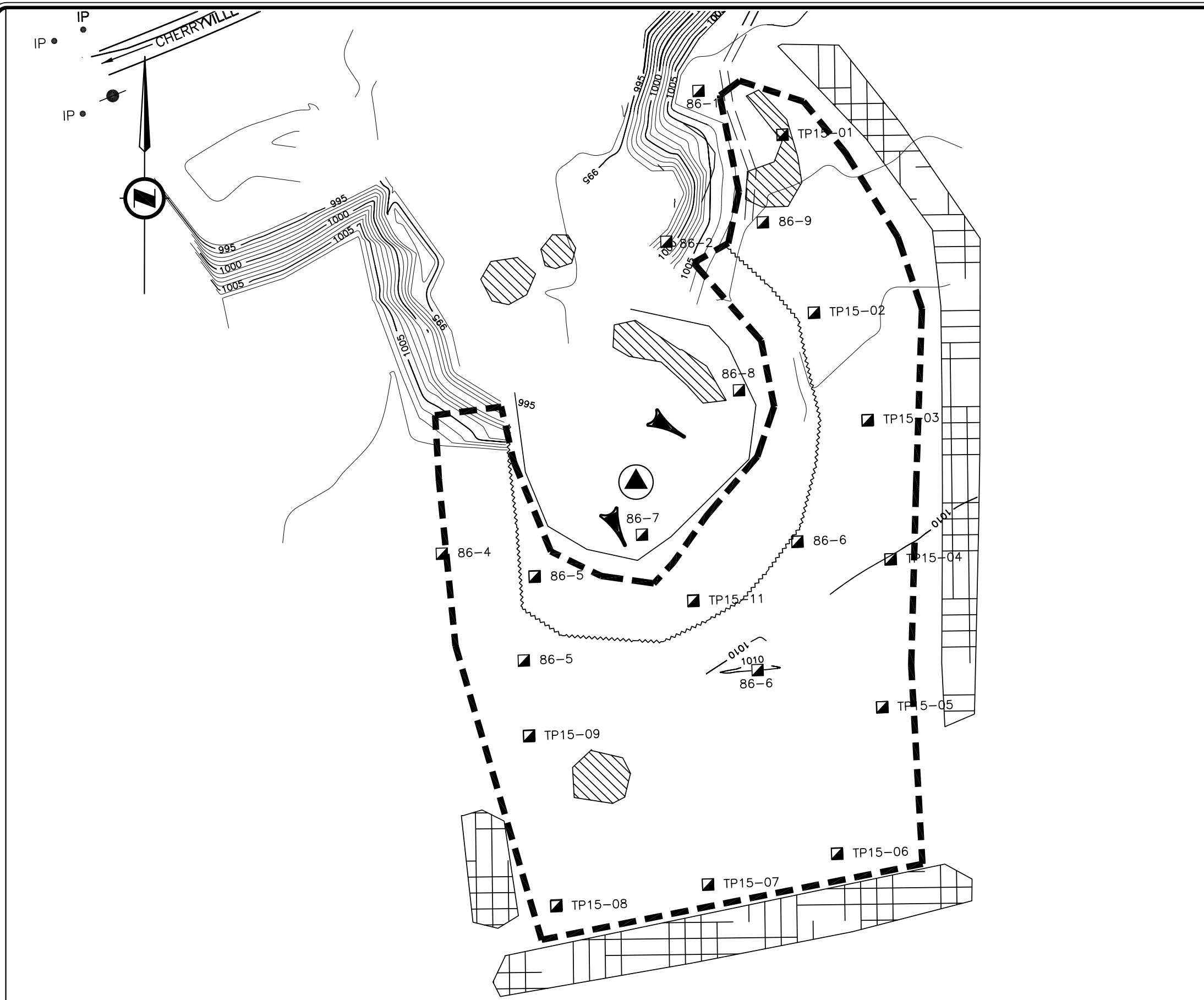
Figure 3 - Development Plan

Test Pit Summary




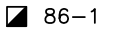

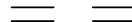


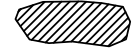


USC Legend

Photos

Figures



LEGEND

-  PROCESSING PLANT LOCATION
-  DEVELOPMENT DIRECTION
-  SUGGESTED MINING AREA
-  86-1 TEST PIT 86-1, EXCAVATED IN 1996.
-  GRAVEL RESERVE BOUNDARY
-  ACCESS ROAD
-  TOP OF PIT FACE
-  PROCESSED MATERIAL STOCKPILE SITE
-  EXISTING STOCKPILE
-  OVERBURDEN STOCKPILE SITE
-  TREED AREA

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 and Highways.

RECLAMATION NOTES

- Remove debris.
- Slope to a minimum of 2 to 1.
- Replace topsoil.
- Seed reclaimed areas with an appropriate grass mixture.

NOTES

1. Test Pit locations are approximate only.
2. Cherry Creek Pit is situated in the Agricultural Reserve.
3. Road and Pit floor was located by GPS survey.



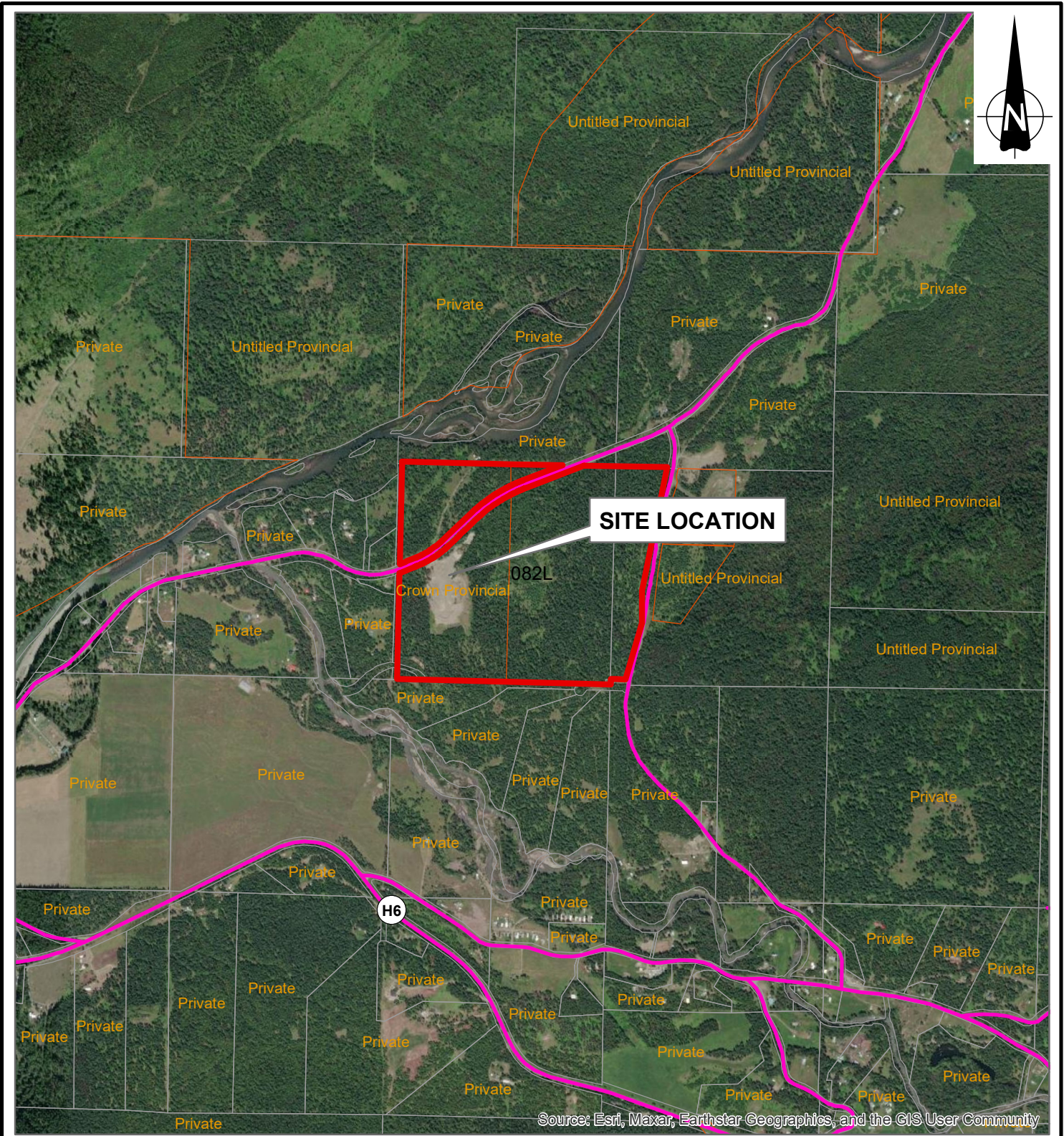
REVISIONS		
Date	Description	Initial
FEB 93	Panterra Pit Survey	
MAR 96	1996 Testpits - Hip Chain Survey	
NOV 99	GPS Pit Floor Survey	
MAR 04	Inserted January 2003 Survey (Pin Point)	

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

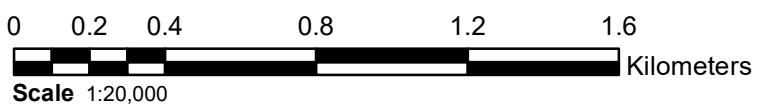
SCALE: NOT TO SCALE
 DRAWN: WSR
 DATE: NOV 2012
 AutoCAD: F3P0443

CHERRY CREEK PIT # 0443
PIT DEVELOPMENT PLAN
 FILE NO. 50-13-0443


FIGURE
 3




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



This drawing was originally produced in colour.



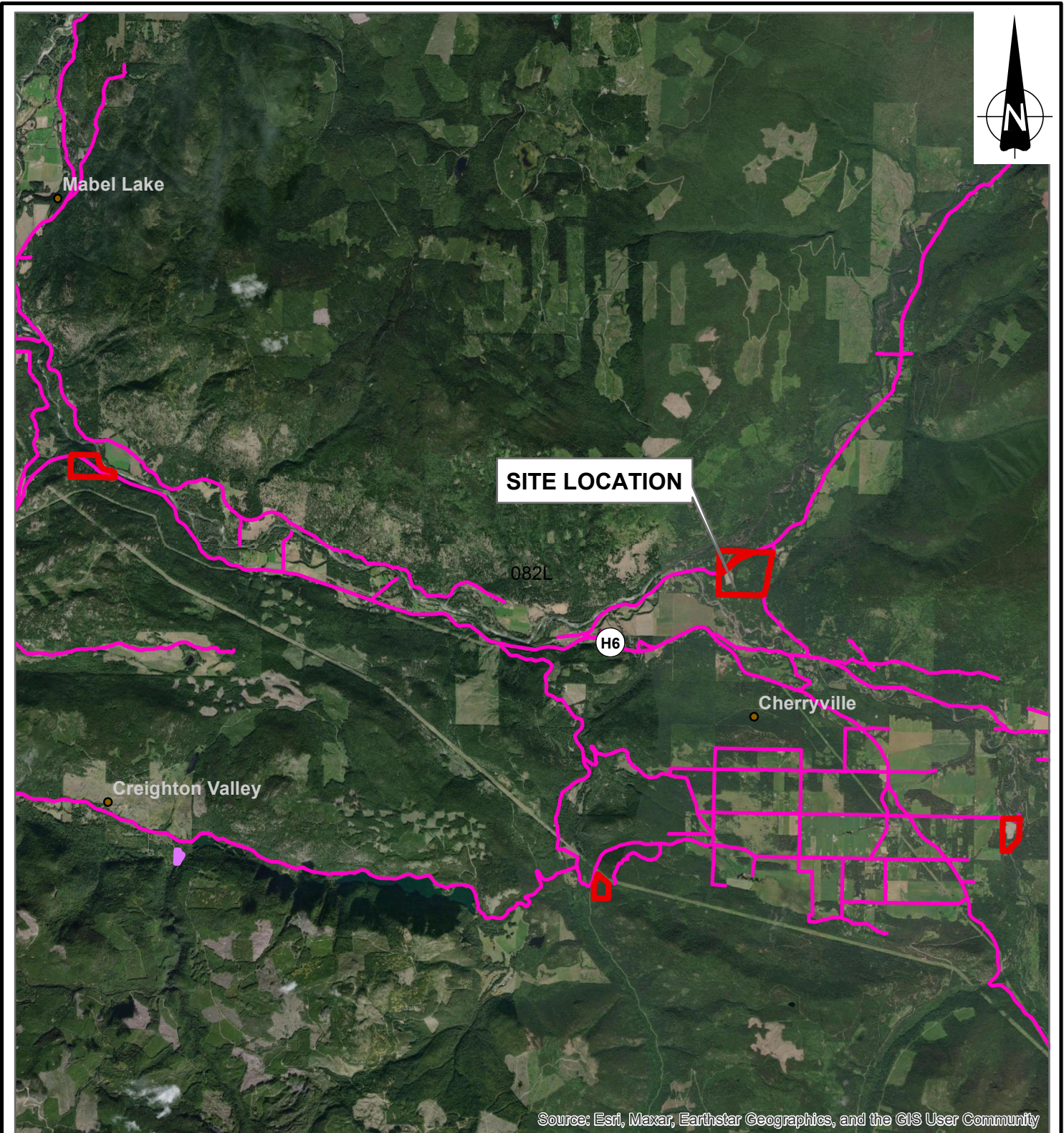
Ministry of Transportation and Infrastructure
Geotechnical and Materials Branch





LEGAL PLAN (2024)
Cherry Creek Pit No. 0443
SA 13 - OKANAGAN SHUSWAP DISTRICT

DRAWN BY: LACOURTE	PROJECTION: NAD 1983 UTM Zone 11N	SCALE: As Shown
CHECKED BY: A.Mitchell	DATUM: NAD 1983 UTM Zone 11N	DATE: 2024-01-10
FileName: GISTemplate_Gravel_R2_2021-11-18	Geotech Project No:	Reg: 2
		Drawing No: FIGURE 2

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 Ministry of Transportation and Infrastructure Geotechnical and Materials Branch		
LOCATION PLAN (2024) Cherry Creek Pit No. 0443 SA 13 - OKANAGAN SHUSWAP DISTRICT		
DRAWN BY: LACOURTE	PROJECTION: NAD 1983 UTM Zone 11N	SCALE: As Shown
CHECKED BY: A. Mitchell	DATUM: NAD 1983 UTM Zone 11N	DATE: 2024-01-10
FileName: GISTemplate_Gravel_R2_2021-11-18	Geotech Project No: 	Reg: 2
		Drawing No: FIGURE 1

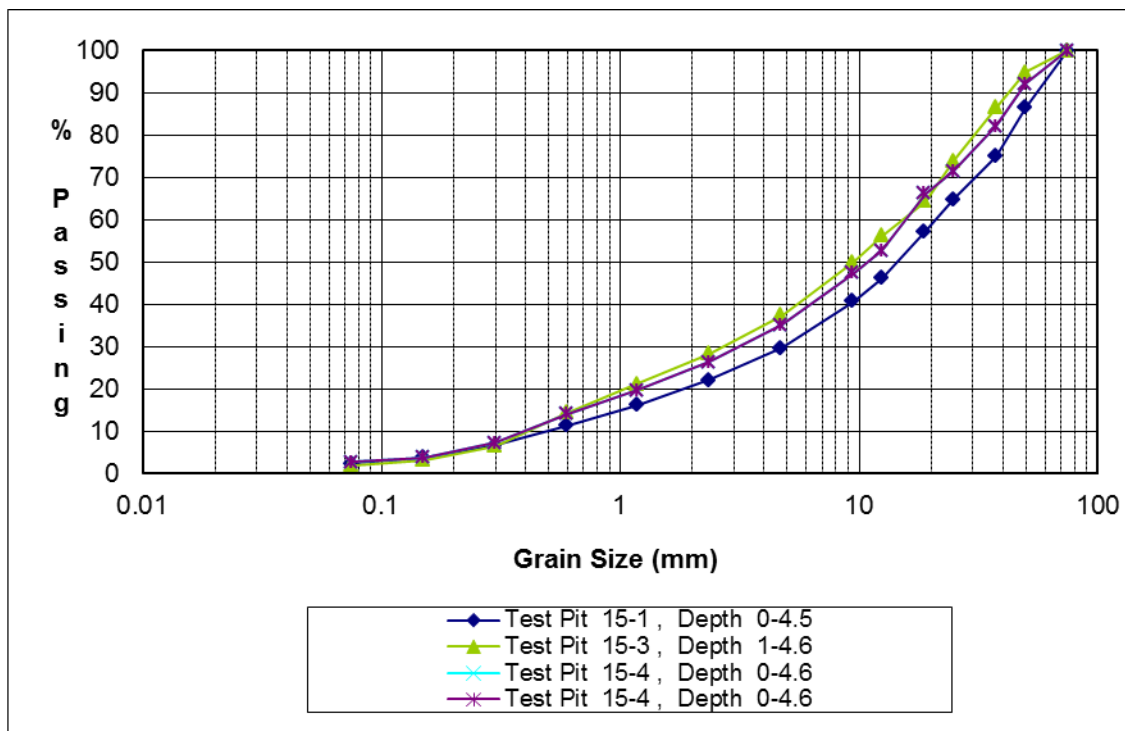
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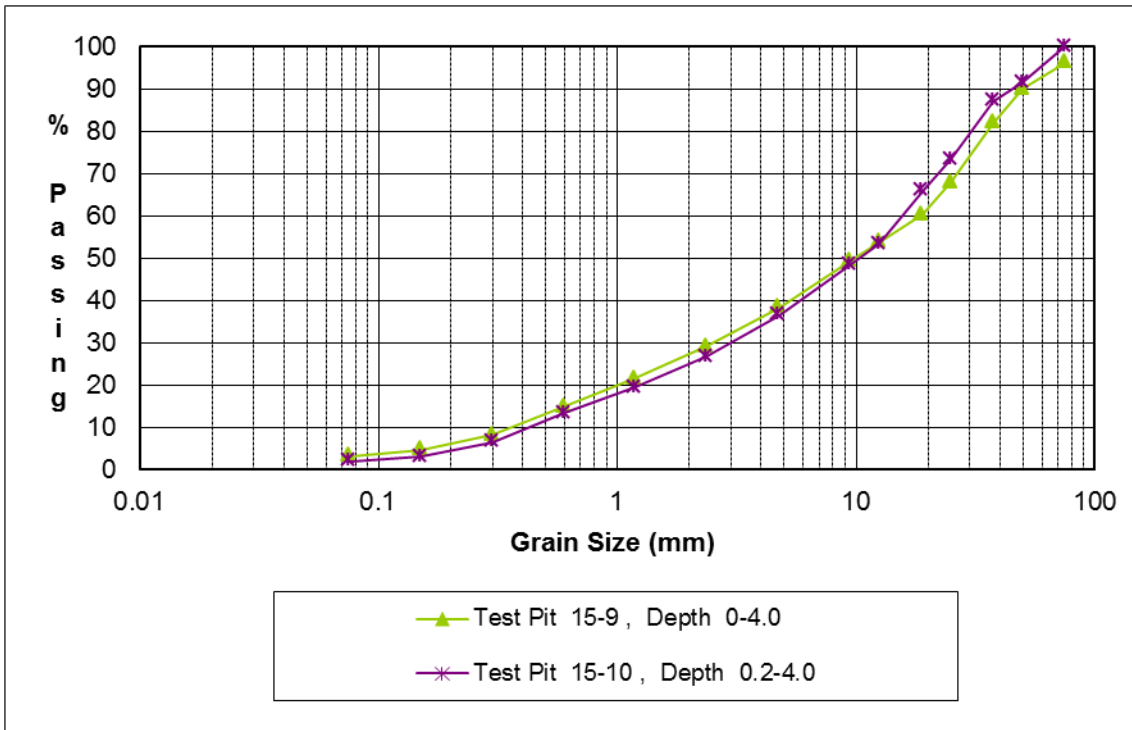
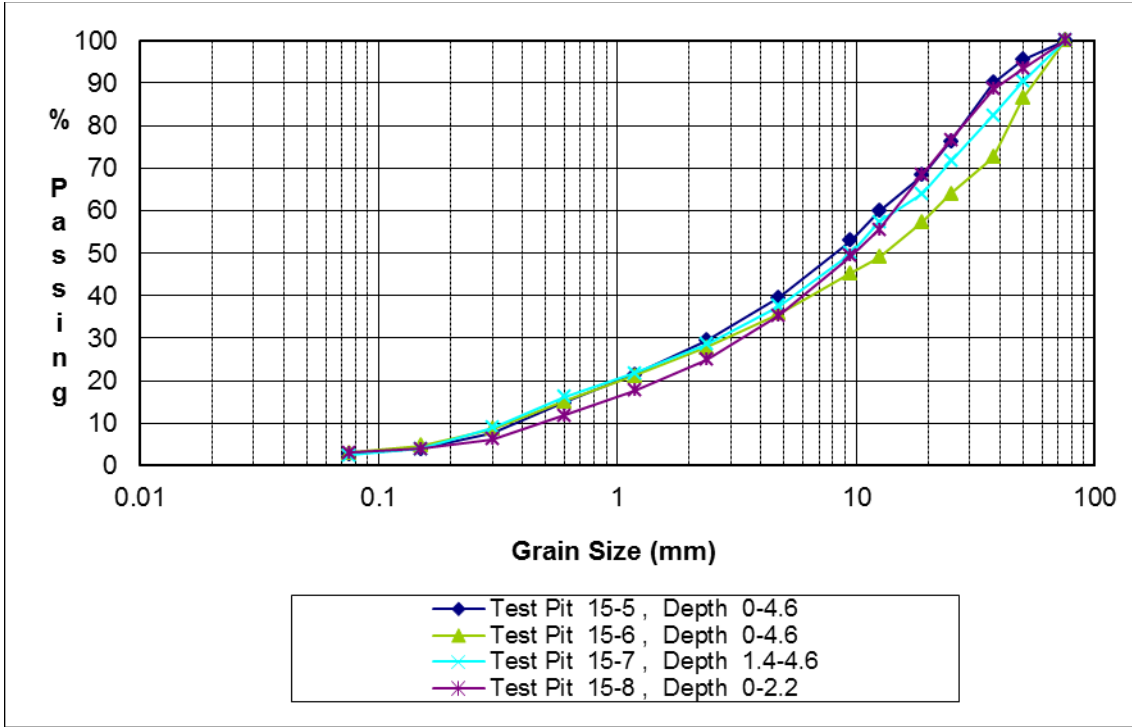
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Test Pit Summaries

1	OF	1.0												
AGGREGATE LOG														
PROJECT:		Cherry Ck Pit				SAMPLED BY:				WSR				
PIT #:		0443				METHOD:				Excavator				
DISTRICT:		Okanagan Shuswap				DATE:				25-Apr-15				
TH / TP	DEPTH		SAMPLE BAG No.	SOILS CLASS	ESTIMATED GRADATION			ESTIMATED ROCK 75mm				SAND TYPE F M C	REMARKS	
	FROM	TO			G	S	F	MAX SIZE	75mm 150mm	150mm 375mm	375mm			
15-01	0.0	4.5	190	GP	68	29	3	400	10	6	3	m	GP 70/27/3	
15-02	0.0	2.0		GP	65	32	3	400	10	6	3	M		
	2.0	2.6	188	GP	52	45	3	400	10	6	3	M	COMBINED SAMPLE	
	2.6	4.5		GP	66	32	2	400	10	6	3	M	GP 62/36/2	
15-03	0.0	1.0		SP	27	72	1	75	0	0	0	M		
	1.0	4.6	189	GP	67	31	2	300	12	6	0	M	GP 65/33/2	
15-04	0.0	2.6		GP	70	28	2	500	12	8	2	M		
	2.6	3.0	187	SP	5	94	1	10	0	0	0	M	COMBINED SAMPLE	
	3.0	4.6		GP	60	38	2	200	5	2	0	M	GP 65/32/3	
15-05	0.0	1.2		GP	65	33	2	300	10	6	0	M		
	1.2	2.3	241	GP	50	48	2	150	6	2	0	M	COMBINED SAMPLE	
	2.3	4.6		GP	66	31	3	400	8	4	2	M	GP 61/37/2	
15-06	0.0	4.6	242	GP	66	31	3	600	8	6	2	M	GP 64/33/3	
15-07	0.0	1.4		GP	68	30	2	700	6	8	7	M		
	1.4	4.6	243		65	33	2	300	10	6	0	M	GP 62/35/3	
15-08	0.0	2.2	244	GP	70	29	1	350	10	8	2	M	GP 65/32/3	
	2.2	4.6		GP	56	41	3	100	5	0	0	M		
15-09	0.0	4.6	245	GP	64	33	3	400	7	4	2	M	GP 65/32/3	
15-10	0.0	4.6	246	GP	66	31	3	400	6	4	2	M	GP 64/34/2	
15-11	0.0	1.0	247	SP	40	58	2	50	0	0	0	M		
	1.0	4.6		GP	66	31	3	300	8	6	2	M	GP 62/36/2	
15-12	0.0	4.6	248	GP	68	30	2	200	6	3	0	M	COMBINED SAMPLE	
				SP	46	53	1	100	6	0	0	M	GP 60/38/2	
15-13	0.0	0.7	OLD CRUSH MATERIAL											PIT FLOOR
	0.7	2.0		GP	56	43	1	200	6	53	1	M	WATER TABLE	
	2.0	?		SP	46	53	1	100	6	0	0	M		

Sample Information			Percent Retained														
Test Pit	Depth (m)	Bag #	Pit Run Sieve Sizes (mm)														
			75	50	37.5	25	19	12.5	9.5	4.75	2.36	1.18	0.6	0.3	0.15	0.075	PAN
15-1	0-4.5	190	0	13.5	11.5	10.1	7.6	11	5.5	11.1	7.5	6	4.8	4.7	2.8	1.5	2.4
15-2	0-4.5	188	0	5.1	8.4	12.5	9.5	8.3	6.1	12.6	9.1	7.2	6.8	7.8	3.4	1.2	2
15-3	1-4.6	189	0	13.1	10.9	8.4	6.7	7.5	5.3	12.5	9.7	7.5	6.3	5.9	2.8	1	2.4
15-4	0-4.6	187	0	7.9	10	10.5	5.3	13.5	5.4	12.2	8.8	6.6	5.7	6.8	3.5	1.1	2.7
15-5	0-4.6	241	0	4.5	5.4	13.7	8	8.5	7	13.4	10.1	7.9	6.7	7	3.8	1.3	2.7
15-6	0-4.6	242	0	13.5	14	8.6	6.6	8.3	3.7	9.6	7.9	6.7	6	6.5	3.9	1.6	3.1
15-7	1.4-4.6	243	0	9.6	8.1	10.6	7.7	6.6	7.4	12.4	9	6.8	5.6	7.2	5	1.6	2.4
15-8	0-2.2	244	0	6.6	4.8	11.9	8.2	13	6.2	14	10.4	7.2	5.9	5.5	2.4	0.9	3
15-9	0-4.6	245	3.8	6.2	8	14.1	7.5	6.5	4.4	11.2	9.2	7.6	6.6	6.7	3.5	1.4	3.3
15-10	0-4.6	246	0	8.4	4.5	13.8	7.3	12.7	4.8	12	9.8	7.2	6.1	6.8	3.6	1	2
15-11	1-4.6	247	0	6	12.4	9.2	7.8	7.2	6.2	12.6	9.8	7.8	6.6	6.6	3.7	1.5	2.6
15-12	0-4.6	248	0	8.3	8.4	10.5	7.1	9.4	4.5	12	9.8	7.7	6.9	7.6	4	1.5	2.3





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 *GM1; GC1; SM1; SC1; 12 - 20% GM2; GC2; SM2; SC2; 20 - 30% GM3; GC3; SM3; SC3; 30 - 40% GM4; GC4; SM4; SC4; 40 - 50%			
		} PASSING .075mm SIEVE	

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

Photos



Facing south from the pit entrance. Stockpiles and material in this area of the pit may need to be relocated for stockpiling (May 2022).



Facing southwest toward main pit face. Recommended crusher setup here (May 2022).



Facing southeast toward main pit face. Recommend crusher setup here (May 2022).



Facing north from the same location as the previous photo (May 2022).



Facing west toward treeline near center of pit (May 2022).



Overgrowth beyond the main pit face to the south (May 2022).



Aggregates in main face (May 2022).