

# Technical Summary

February 2024

**Pit Name:** Junction Pit

**Provincial Pit Number:** 0999

**Location:** Junction Pit is located approximately 20 km northeast of Cranbrook adjacent to Highway 93/95 (Figure 1).

**Legal Land Description:** Ministry of Transportation and Infrastructure owned pit, legally described as Lot 1 District Lot 421 Kootenay District Plan 5403. The layout of the pit boundary is shown in the legal plan (Figure 2). UTM coordinates are Grid Zone 11, 5,494,300 Northing, 594,900 Easting.

**Subsurface Investigation:** Subsurface investigations at Junction Pit were carried out in 2009 by Sitkum Consulting Ltd.

In 2009 forty-nine (49) test pits were excavated to depths ranging from 2.1 to 9.3m. 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 forty-four (44) 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 2009 investigations, four (4) granular areas were 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
<b>Area A</b>					
09-01	0.1-7.2	1.6	20.4	78.0	GP

09-02	0.0-8.9	2.0	19.4	78.7	GP
09-03	0.6-9.3	2.7	20.1	77.3	GP
09-04	0.3-8.6	1.3	15.8	82.8	GP
09-05	0.3-9.0	1.8	17.8	80.4	GP
09-06	0.9-8.3	1.0	20.0	79.0	GP
09-07	0.3-8.2	1.8	27.7	70.5	GW
09-08	0.4-8.1	1.6	16.4	81.9	GP
09-09	0.5-9.1	4.4	19.7	75.9	GP
09-10	0.6-9.1	1.8	15.7	82.5	GP
09-11	0.0-6.5	2.6	15.0	82.4	GP
09-31	0.6-8.1	1.2	9.4	89.4	GW
<b>Area A - Averages</b>		<b>2.0</b>	<b>18.1</b>	<b>79.9</b>	-
<b>Area B</b>					
09-16	1.0-6.4	3.1	14.4	82.5	GP
09-17	0.2-5.2	3.6	24.9	71.6	GP
09-20	0.2-4.6	2.0	27.6	70.4	GW
09-21	0.2-3.4	1.1	18.2	80.7	GP
09-22	0.2-7.2	1.3	18.8	79.9	GP
09-23	0.3-6.9	2.6	18.9	78.5	GP
09-24	0.8-7.1	1.2	12.8	86.0	GP
09-25	0.2-7.1	1.6	12.6	85.8	GP
09-26	0.6-2.5	9.0	18.4	72.7	GP-GM
09-26	2.5-6.8	1.6	14.1	84.3	GP
09-27	0.4-6.9	2.5	11.7	85.8	GP
09-28	0.3-6.7	1.3	11.3	87.4	GP
<b>Area B - Averages</b>		<b>2.6</b>	<b>17.0</b>	<b>80.5</b>	-
<b>Area C</b>					
09-32	1.2-2.5	2.7	25.5	71.8	GP
09-32	2.5-4.2	3.6	60.6	35.8	SP
09-32	4.2-7.0	1.1	20.8	78.0	GP
09-33	1.1-4.3	2.3	22.4	75.2	GP
09-33	4.3-7.0	2.5	85.3	12.2	SP
09-34	3.6-5.4	3.8	75.1	21.1	SP
09-35	0.6-6.2	2.8	27.0	70.2	GP
09-36	0.6-7.0	1.4	15.6	83.0	GP
09-37	0.3-5.8	1.0	17.0	82.1	GP
09-38	2.0-5.6	5.4	59.3	35.4	SP-SM
09-39	0.7-3.6	1.8	22.1	76.2	GP

09-39	3.6-7.0	3.3	37.9	58.8	GP
<b>Area C - Averages</b>		<b>2.6</b>	<b>39.0</b>	<b>58.3</b>	-
<b>Area D</b>					
09-44	0.2-3.7	7.2	80.7	12.2	SP-SM
09-45	0.2-3.1	9.9	84.5	5.6	SP-SM
09-46	0.3-2.0	2.5	28.2	69.3	GW
09-46	2.5-7.2	2.0	23.3	74.7	GP
09-47	0.4-4.8	8.9	85.7	5.5	SP-SM
09-48	0.6-3.0	1.3	18.5	80.2	GP
09-48	30.-7.1	1.5	37.5	61.0	GP
09-49	0.3-3.8	11.7	83.1	5.3	SP-SM
<b>Area D - Averages</b>		<b>5.6</b>	<b>55.2</b>	<b>39.2</b>	-

Table 2 (Areas A through D) shows the estimated percent of oversize rock as noted in the field during exploration.

**Table 2 (Areas A through D): Oversize Field Estimates**

Area A

Classification	Average (%)	Range (%)
Boulders (>375mm)	<1	1 - 2
Cobbles (150-375mm)	6	3 – 10
Cobbles (75-150mm)	15	7 - 20

Maximum rock size observed was 470 mm.

Area B

Classification	Average (%)	Range (%)
Boulders (>375mm)	0	0
Cobbles (150-375mm)	2.8	1 – 8
Cobbles (75-150mm)	10.5	7 - 12

Maximum rock size observed was 310 mm.

Area C

Classification	Average (%)	Range (%)
Boulders (>375mm)	<1	0 – 1
Cobbles (150-375mm)	1.8	0 – 5
Cobbles (75-150mm)	9.2	3 - 12

Maximum rock size observed was 400 mm.

Area D

Classification	Average (%)	Range (%)
Boulders (>375mm)	0	0
Cobbles (150-375mm)	0	0
Cobbles (75-150mm)	3.25	0 – 10

Maximum rock size observed was 120 mm.

**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 (Coarse)	9.731	6.912 – 15.252
Sand Equivalent	84.08	80.56 – 88.57
Specific Gravity (Coarse)	2.643	N/A
Specific Gravity (Fine)	2.651	N/A
Absorption (Coarse)	0.82	N/A
Absorption (Fine)	0.93	N/A
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 2009 investigation results, the material is judged to be suitable for the following purposes:

**Table 4: Suitability**

	Pit Run	Crush
<b>Junction Pit Suitability Areas</b>	Bridge End Fill SGSB	25mm WGB Winter Abrasive Asphalt Mix Aggregates Graded Agg Seals

The samples tested meet the gradation, sand equivalent, and micro-deval specifications for base course, subbase course, bridge end fill and asphalt mix aggregate. Based on the absorption results the samples meet the specification for paving aggregates and coarse and fine graded aggregate seals. Blending and mixing of material between the four suitability areas may be required to meet these specifications.

**Volume Estimates:** Table 5 shows the volume estimates that can be expected for gravel from the proposed suitability area (Area A). 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. Area A has been previously cleared, grubbed and stripped and is the recommended mining area until depletion. Area B will require additional development and the relocation of material currently stored in the pit. Areas C and D require additional archaeological assessment prior to ground disturbance.

**Table 5: Volume Estimate – Area A**

Suitability Area ~1.6ha.	Topsoil	Overburden	Granular Material
Average Layer Thickness (m)	-	-	5
Volume (m <sup>3</sup> )	-	-	80,000

### 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.
- A primary crusher capable of reducing all material up to 375mm x 450mm will be required.
- 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 (near TP09-13 or TP09-14) with mining proceeding in a west to northwest direction as indicated.
- The pit floor has several existing processed stockpiles throughout. Processed aggregate may be stockpiled in the centre of the south end of the pit where space permits. Stockpile relocation may be required.

- 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.

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### **Enclosures**

Figures:

- Figure 1 - Location Plan
- Figure 2 - Legal Plan
- Figure 3 - Pit Development Plan

Test Pit Summaries

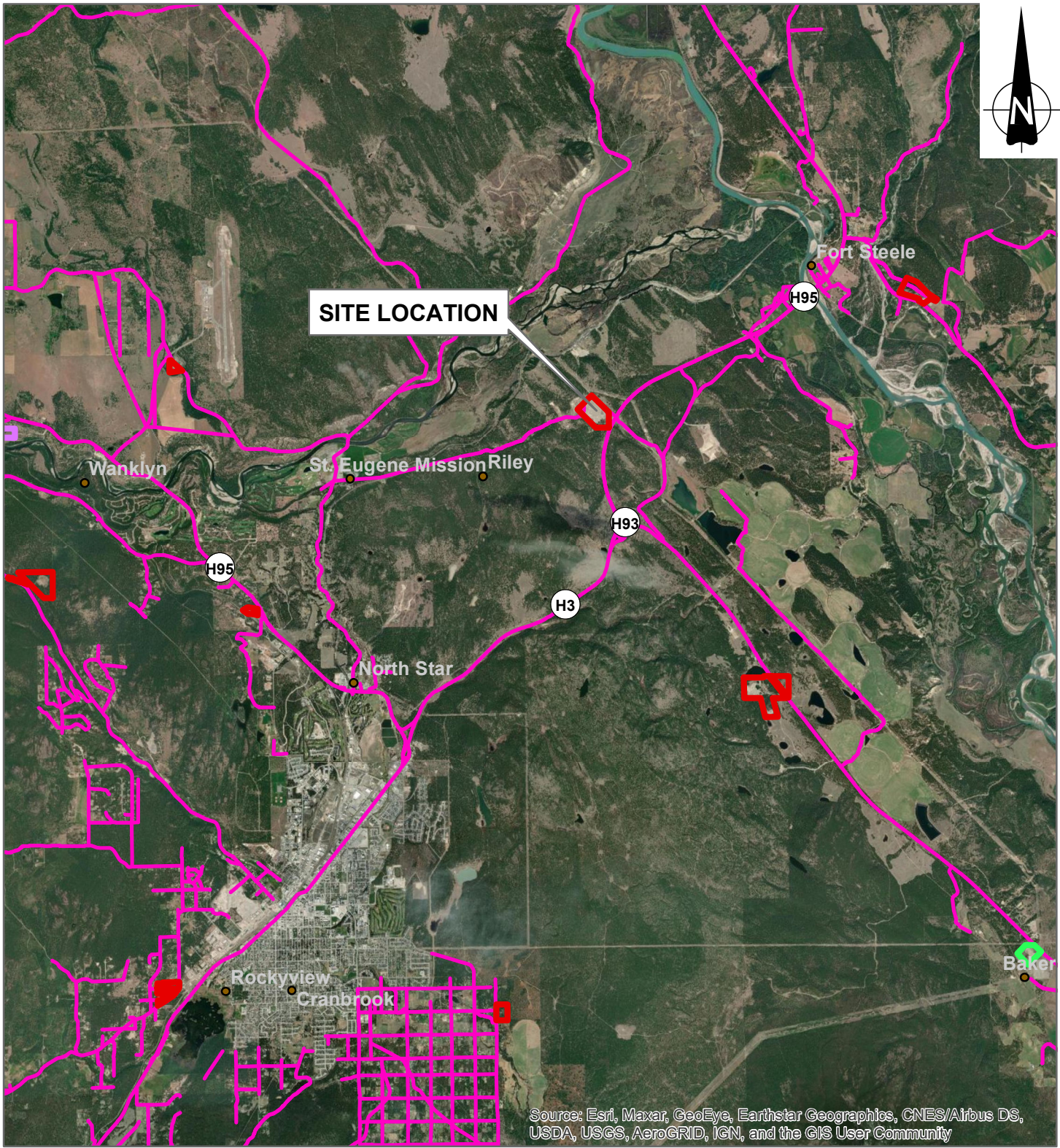
- Test Pit Logs (2009)
- Wet Sieve Analysis Charts (2009)
- Aggregate Gradation Charts (2009)

USC Legend

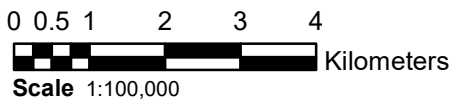
Photos

## Figures







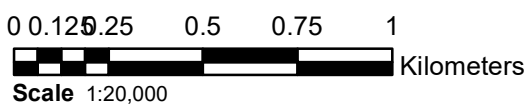
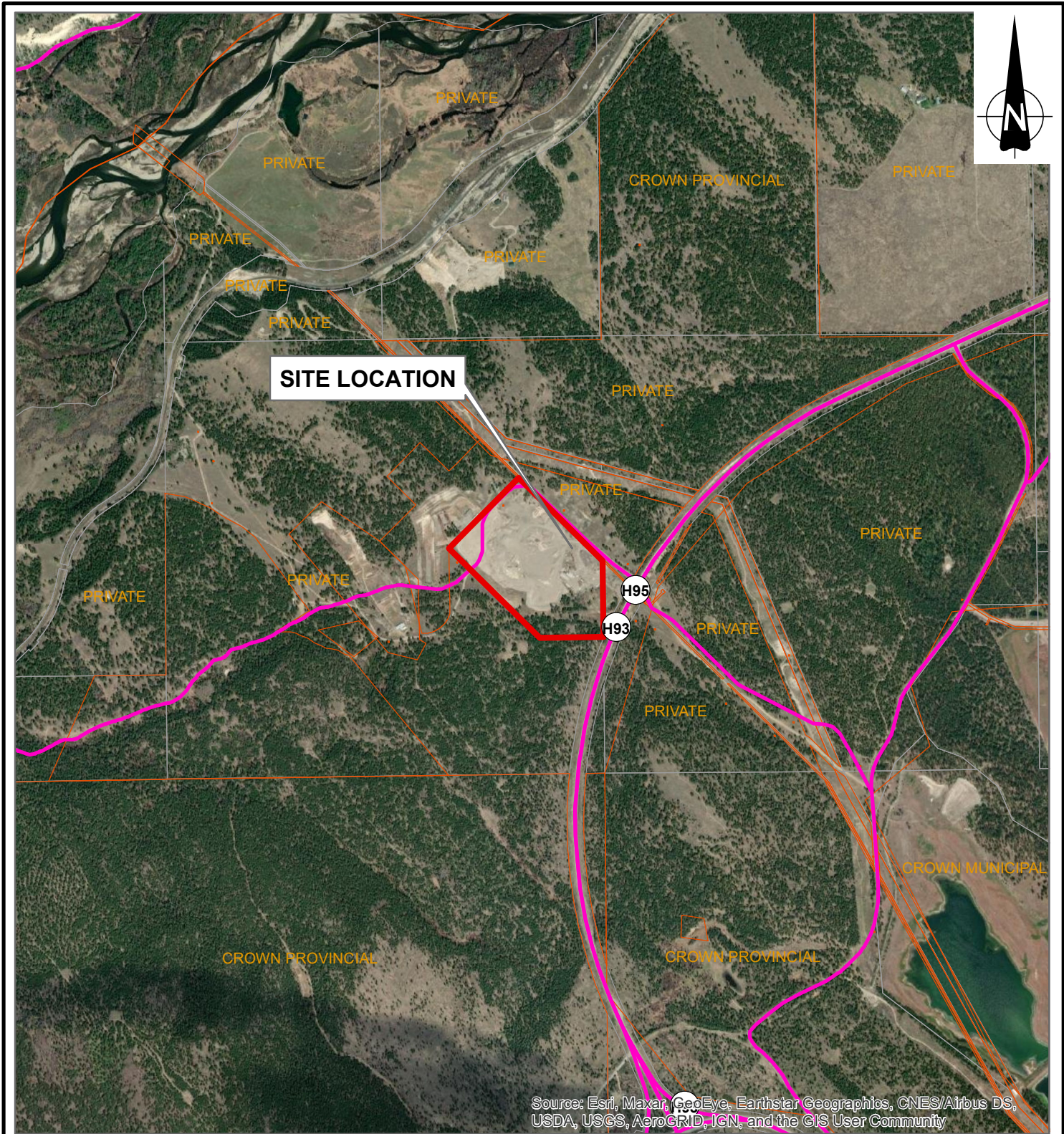
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





This drawing was originally produced in colour.

 Ministry of Transportation and Infrastructure Geotechnical and Materials Branch			
<b>LOCATION PLAN (2021)</b> <b>Junction Pit No. 0999</b> SA 11 - ROCKY MOUNTAIN DISTRICT			
DRAWN BY:	lacourte	PROJECTION:	NAD 1983 UTM Zone 11N
CHECKED BY:	A.Mitchell	DATUM:	NAD 1983 UTM Zone 11N
Scale:	As Shown		
Date:	2021-04-15		
File Name:	Geotech Project No:	Reg:	Drawing No:
GISTemplate_Gravel_R2_2020-12-09_SISV8	SISV8	2	<b>FIGURE 1</b>

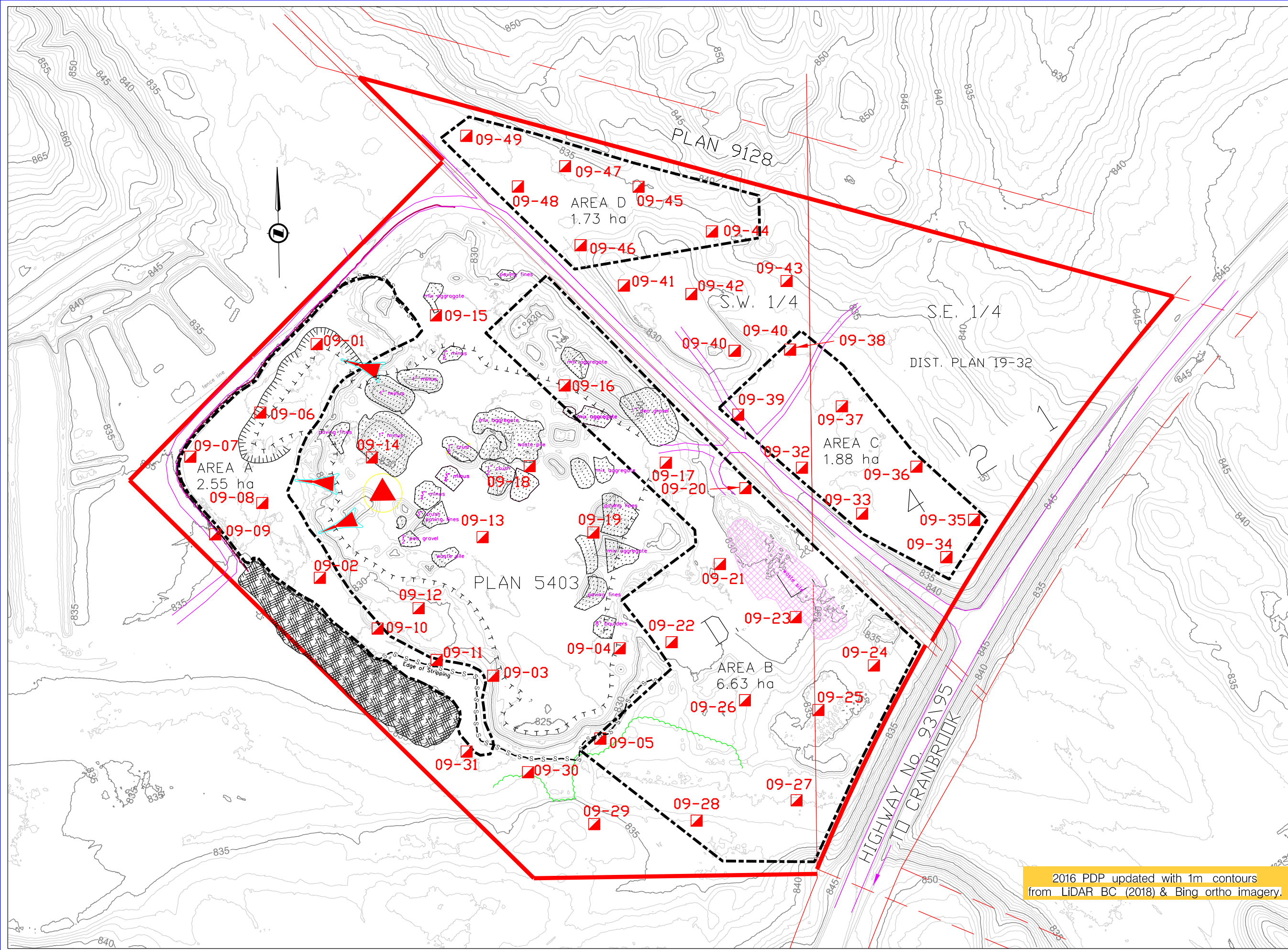
Document Path: Q:\SISV8\_DESIGN\Reference\Gravel\GISTemplate\_Gravel\_R2\_2020-12-09\_GISV8.mxd



 Ministry of Transportation and Infrastructure Geotechnical and Materials Branch			
<b>LEGAL PLAN (2021)</b> <b>Junction Pit No. 0999</b> <b>SA 11 - ROCKY MOUNTAIN DISTRICT</b>			
DRAWN BY: lacourte	PROJECTION: NAD 1983 UTM Zone 11N	SCALE: As Shown	
CHECKED BY: A.Mitchell	DATUM: NAD 1983 UTM Zone 11N	DATE: 2021-04-15	
FileName: GISTemplate_Gravel_R2_2020-12-09_SISV8	Geotech Project No: SISV8	Reg: 2	Drawing No: <b>FIGURE 2</b>

This drawing was originally produced in colour.

Document Path: Q:\SISV8\_DESIGN\Reference\Gravel\GISTemplate\_Gravel\_R2\_2020-12-09\_GISV8.mxd



- ### LEGEND
- PROCESSING PLANT LOCATION
  - DEVELOPMENT DIRECTION
  - SUITABILITY BOUNDARY / FENCE
  - GRAVEL RESERVE BOUNDARY: GE source/ iMap Tenures by Purpose source
  - STRIP EDGE / SECONDARY PAVED ROAD
  - AREA TO CLEARED
  - GPS TEST PIT LOCATION LABEL INDICATES SAMPLE YEAR - PIT #
  - ESTIMATED TEST PIT LOCATION LABEL INDICATES (SAMPLE YEAR - PIT #)
  - ACCESS ROAD: EXISTING / PROPOSED
  - CULVERT: EXISTING / PROPOSED; SIGN POST
  - PROCESSED AGGREGATE STOCKPILE AREA: EXISTING / PROPOSED
  - OVERBURDEN STOCKPILE SITE: EXISTING / PROPOSED
  - GULLY / SWALE / DITCH-BERM
  - BREAK / RIDGE / PIT SCARP
  - SLOPE TOE or PIT FLOOR / TREE LINE
  - SLOPE PERCENT / CONTOUR
  - ROCK / BLUFF / GATE
  - SURFACE FLOW RUNOFF / DIVERTED
  - NON-CLASSIFIED DRAINAGE / DIVERTED
  - CREEK / DIVERTED
  - SEEPAGE / SWAMP

- ### 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 1.5H:1V with native granular material.
  - For projects mining in excess of 1,000 cubic metres the Ministry of Energy and 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 Infrastructure.

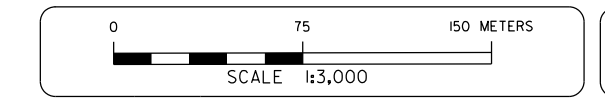
- ### RECLAMATION NOTES
- Remove debris.
  - Slope to a minimum of 2H:1V.
  - Replace topsoil.
  - Seed reclaimed areas with an appropriate grass mixture.
- Contours may not be representative of on site conditions.
- "INFORMATION PROVIDED HEREIN IS INTENDED TO BE USED BY THE MINISTRY OF TRANSPORTATION & INFRASTRUCTURE 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 & INFRASTRUCTURE SHALL NOT BE HELD LIABLE FOR ANY CLAIMS OR ACTIONS ARISING FROM THE USE OR INTERPRETATION OF THE DATA HEREIN PROVIDED."

Date	REVISIONS	Initial
Nov.29.2012	Add stripline, edits (Sitkum)	JW
Aug.2.2016	Georeference & clean data (Sitkum)	KA
Oct.4.2016	Add License to Cut Area	KA/CR
Nov.14.2018	Georeference & add data (Sitkum)	JW/KA
Dec.13.2016	P.D.P. edits (Sitkum)	JW
Aug.9.2021	Add LiDAR 1m contours, SCL & Moll pit data	KA
Jan.31.2024	Add LiDAR 2010 Suitability Areas	KA

REVIEWED BY:	DATE:
.....	.....
APPROVED BY:	DATE:
.....	.....

DRAWN:	JW, IWTS
DATE:	NOV.2013
AutoCAD:	16-612

REVISED:	KA
DATE:	Jan.31, 2024
AutoCAD:	21-612



**Test Pit Summaries, Wet Sieve Analysis Summary, Gradation Charts**

## AGGREGATE LOG

AGGREGATE LOG														
<b>PROJECT:</b>		Junction Pit Investigation						<b>SAMPLED BY:</b>				WM & JS (SCL)		
<b>PIT #:</b>		999						<b>METHOD:</b>				Exc Cat 345		
<b>DISTRICT:</b>		Rocky Mountain						<b>DATE:</b>				Aug. 12 & 20, 2009		
TH / TP	DEPTH (m)		SAMPLE	SOILS CLASS	ESTIMATED GRADUATION			ESTIMATED ROCK 75mm				SAND TYPE	REMARKS	
	FROM	TO			BAG No.	G	S	F	MAX SIZE	75mm 150mm	150mm 375mm			375mm
09-01	0.0	0.1	NS	TS										
	0.1	7.2	JC01a	GP	65	32	3	410	15	10	1	M-C	??? Gravel coarser with depth	
		End											Photos: 207, 209	
09-02	0.0	8.9	JC02a	GP	65	32	3	410	18	10	2	M-C	No O/B (stripped)	
		End											Photos: 210-212	
09-03	0.0	0.6	NS	TS/SM2										
	0.6	9.3	JC03a	GP	70	27	3	300	20	9	0	M-C	Sandier with depth	
		End											Photos: 213-216	
09-04	0.0	0.3	NS	TS										
	0.3	8.6	JC04a	GP	70	27	3	230	18	7	0	M-C	Sandier with depth	
		End											Photos: 217-219	
09-05	0.0	0.3	NS	TS										
	3.0	9.0	JC05a	GP	65	32	3	300	20	6	0	M-C	Photos: 220-223	
		End												
<b>August 20th/2009</b>														
09-06	0.0	0.4	NS	TS										
	0.4	0.9	NS	SP	2	96	2						Sand seams	
	0.9	8.3	JC06a	GP	55	43	2	470	7	3	1	F-M	Coarser below 6.0m	
		End											Photos: 669, 670, 671	
09-07	0.0	0.5	NS	TS										
	0.5	8.2	09-07a	GP	60	38	2	210	15	3	0	F	Sand seams at 3.8m, coarser below	
		End											6.5m; Photos 666, 667, 668	
09-08	0.0	0.4	NS	TS										
	0.4	8.1	09-08a	GP	60	38	2	320	12	3	0	F	Sand seam at 2.0m; coarser w/depth	
		End											Photos: 672, 673, 674	
09-09	0.0	0.5	NS	TS										
	0.5	9.1	09-09a	GP	60	38	2	330	15	5	0	F-M		
		End											Photos: 675, 676, 677	
09-10	0.0	0.6	NS	SP	3	95	2					F	Fine sand	
	0.6	9.1	09-10a	GP	65	32	3	270	15	8	0	F	Photos: 678, 679, 680, 681	
		End											Water table @ 8.8m	

## AGGREGATE LOG

<b>PROJECT:</b>	Junction Pit Investigation	<b>SAMPLED BY:</b>	WM & JS (SCL)
<b>PIT #:</b>	999	<b>METHOD:</b>	Exc. Cat 330
<b>DISTRICT:</b>	Rocky Mountain	<b>DATE:</b>	Aug. 21, 2009

TH / TP	DEPTH (m)		SAMPLE BAG No.	SOILS CLASS	ESTIMATED GRADUATION			ESTIMATED ROCK 75mm				SAND TYPE F M C	REMARKS
	FROM	TO			G	S	F	MAX SIZE	75mm 150mm	150mm 375mm	375mm		
09-11	0.0	6.5	09-11a	GP	70	27	3	320	15	5	0	F-M	Clean gravel
	6.5	7.8	09-11b	GM1	50	33	17	200	10	1	0	F	Overlying till Photos: 681, 682, 683, 684
		End											
09-12	0.0	2.8	NS	GM4	42	8	40					F	Very dense till
		End											Photos: 685, 686
		End											
09-13	0.0	3.9	09-13a	GP	70	27	3	310	15	5	0	F-M	Water table at 3.9m
		End											Photos: 687, 688
		End											
09-14	0.0	0.3	NS	Crush									Interbedded seams of sand
	0.3	3.7	09-14a	GP	50	48	2	270	7	3	0	F	Photos: 689, 690, 691
	3.7	4.8	NS	GM4									Till
		End											
09-15	0.0	0.3	NS	Crush									Photos: 692, 693
	0.3	2.2	09-15a	GP	50	47	3	100	3	0	0	F-M	
	2.2	7.7	09-15b	SP-SM	3	90	7					F-M	
	7.7	8.0	NS	GP									Water table @ 7.5m
		End											
09-16	0.0	1.0	NS	OB									Old overburden pile
	1.0	6.4	09-16a	GP	55	43	2	250	7	3	0	F-M	Water table at 6.3m
		End											Photos: 694, 695, 696
		End											
09-17	0.0	0.2	NS	Crush									
	0.2	5.2	09-17a	GP	55	40	5	270	10	3	0	F-M	Water table @ 5.1m
	5.2	5.8	NS	GM4									Till at bottom
		End											Photos: ~jenn takes over sampling~
09-18	0.0	0.2	NS	Crush									
	0.2	0.8	NS	GP	53	42	5	240	10	2	0	F-M	Photos: 4087, 4088, 4089
	0.8	3.7	09-18a	SP	10	85	5					F-M	Sand layer
		End											Water table at 3.6m
		End											
09-19	0.0	0.3	NS	Crush									Photos: 4090-4091
	0.3	1.9	09-19a	GP	50	45	5	380	15	3	1	M	Sandy gravel
	1.9	3.4	09-19b	SW/SP	15	80	5					F-M	Water table at 3.4m
		End											
09-20	0.0	0.2	NS	Crush									On raised area to the south (in pit)
	0.2	4.6	09-20a	GP	50	45	5	180	10	2	0	F-M	
	4.6	7.1	NS	GM4									Till at bottom
		End											Photos: 4092, 4093, 4094, 4095

## AGGREGATE LOG

AGGREGATE LOG														
<b>PROJECT:</b>		Junction Pit Investigation					<b>SAMPLED BY:</b>				Js (SCL)			
<b>PIT #:</b>		999					<b>METHOD:</b>				Exc. Cat 330			
<b>DISTRICT:</b>		Rocky Mountain					<b>DATE:</b>				23-Aug-09			
TH / TP	DEPTH (m)		SAMPLE	SOILS CLASS	ESTIMATED GRADUATION			ESTIMATED ROCK 75mm				SAND TYPE	REMARKS	
	FROM	TO			BAG No.	G	S	F	MAX SIZE	75mm 150mm	150mm 375mm			375mm
09-21	0.0	0.2	NS	Crushed										Near pit entrance on raised floor
	0.2	3.4	09-21a	GP	55	40	5	250	10	2	0	F-M		One single large boulder (500mm)
	3.4	5.7	NS	GM4										Sandier with depth. Till at bottom. Photos: 4096-4097
		End												
09-22	0.0	0.2	NS	Crushed										Photos: 4098, 4099
	0.2	7.2	09-22a	GP	57	38	5	310	12	2	0	F-M		Sandier with depth
			End											Water table at 7.1m
09-23	0.0	0.1	NS	Crushed										Photos: 4100, 4101, 4102
	0.1	0.3	NS	SP/SM	3	90	7					F-M		Fine sand layer (pinches out to east)
	0.3	6.9	09-23a	GP	55	40	5	220	10	2	0	F-M		Collapsible walls; sandier with depth
			End											Water table at 6.8m
09-24	0.0	0.3	NS	Crushed										Photos: 4103, 4104, 4105
	0.3	0.8	09-24a	SP/SM	3	90	7					F-M		Fine sand lens, pinches out to south
	0.8	7.1			70	27	3	220	10	4	0	M		Sandier with depth
			End											No water table encountered
09-25	0.0	0.2	NS	OB								F		Old stockpile material
	0.2	7.1	09-25a	GP	74	23	3	260	12	8	0	M		Clean gravel; collapsing walls
			End											Photos: 4106, 4107
09-26	0.0	0.6	NS	OB								F-M		Old stockpile material
	0.6	2.5	09-26a	GP/GM1	50	45	5	180	9	1	0	F-M		Finer sand matrix; fine lens
	2.5	6.8	09-26b	GP	70	23	7	250	12	2	0	M		Less grey, more orange sand
			End											Coarser with depth; collapsing walls Photos: 4108, 4109
09-27	0.0	0.4	NS	OB										Photos: 4110, 4111
	0.4	6.9	09-27a	GP	70	25	5	290	12	2	0	F-M		Sand matrix coarser with depth
			End											Gravel walls become collapsible
09-28	0.0	0.3	NS	TS/OB										Photos: 4112, 4113
	0.3	6.7	09-28a	GP	76	22	2	210	12	3	0	M		Collapsing walls, gaping hole
			End											
09-29	0.0	0.4	NS	OB										Photos: 4114, 4115
	0.4	1.7	NS	GM1/4								F		Till; finer matrix, dense
	1.7	4.1	NS	GM4								F		More fines (till) and dry
			End											Some large boulders

## AGGREGATE LOG

PROJECT:		Junction Pit Investigation				SAMPLED BY:				JS (SCL)				
PIT #:		999				METHOD:				Exc. Cat 330				
DISTRICT:		Rocky Mountain				DATE:				Aug. 23, 2009				
TH / TP	DEPTH (m)		SAMPLE	SOILS CLASS	ESTIMATED GRADUATION			ESTIMATED ROCK 75mm				SAND TYPE	REMARKS	
	FROM	TO			BAG No.	G	S	F	MAX SIZE	75mm 150mm	150mm 375mm			375mm
09-30	0.0	0.3	NS	OB										Photos: 4116, 4117
	0.3	1.5	NS	GM1										
	1.5	4.6	09-30a	GP	50	40	10	220	10	2	0	F-M		Silt content high
	4.6	End		GM4								F		Very dense till
09-31	0.0	0.6	NS	OB										Dusty
	0.6	8.1	09-31a	GP	60	30	10	250	10	3	0	F-M		Matrix more coarse with depth
		End												Photos: 4118, 4119
09-32	0.0	0.6	NS	OB										Photos: 4130, 4131, 4132, 4133
	0.6	1.2	NS	SP	20	72	8					F		
	1.2	2.5	09-32a	GP	54	40	6	160	10	1	0	F-M		Sany gravel, fines...
	2.5	4.2	09-32b	SP	20	75	5					F-M		Sand layer; gradual transition to gravel
	4.2	7.0	09-32c	GP	50	45	5	180	10	2	0	M		Coarser with depth
		End												
09-33	0.0	0.2	NS	OB										Photos: 4134, 4135, 4136, 4144
	0.2	0.8	NS	GP/GM	60	30	10	78	3	0	0	F		Thin lens of gravel
	0.8	1.0	NS	SM	0	75	25					F		Thin lens of fine sand
	1.0	1.1	NS	ML	0	0	100					F		Dry clay layer (cream coloured)
	1.1	4.3	09-33a	GP	65	33	2	180	12	2	0	F-M		Clean gravel; collapsing walls
	4.3	7.0	09-33b	SP	20	75	5					M		Sand to bottom
		End												
09-34	0.0	1.2	NS	OB										Photos: 4137, 4138
	1.2	2.3	NS	SP/SM	5	85	10					F		
	2.3	3.6	NS	GP	55	45	5	120	10			F-M		Thin lens of gravel
	3.6	5.4	09-34a	SP	20	75	5					M		Becomes more coarse with depth
	5.4	7.1	NS	GM1	35	63	2	85	5			F-M		Gradual transition
		End												
09-35	0.0	0.6	NS	OB										Photos: 4139, 4140, 4141
	0.6	6.2	09-35a	GP	68	28	4	100	7	2	0	F-M		Super coarse sand layer dipping to E
		End	NS	BR? Till?										Collapsing walls; bedrock or till at bottom
09-36	0.0	0.6	NS	OB										Photos: 4142, 4143
	0.6	7.0	09-36a	GP	70	26	4	220	12	5	0	M		Clean gravel, collapsing walls
		End												



## AGGREGATE LOG

AGGREGATE LOG														
PROJECT:		Junction Pit Investigation					SAMPLED BY:				JS (SCL)			
PIT #:		999					METHOD:				Exc. Cat 330			
DISTRICT:		Rocky Mountain					DATE:				Aug. 23-24, 2009			
TH / TP	DEPTH (m)		SAMPLE	SOILS CLASS	ESTIMATED GRADUATION			ESTIMATED ROCK 75mm				SAND TYPE	REMARKS	
	FROM	TO			BAG No.	G	S	F	MAX SIZE	75mm 150mm	150mm 375mm			375mm
09-37	0.0	0.3	NS	OB										Photos: 4145, 4146
	0.3	5.8	09-37a	GP	60	35	5	400	12	5	1	F-M		Not collapsing as much; silt lens
	5.8	6.9	NS	GM4										Very dense till
		End												
09-38	0.0	0.2	NS	OB										Photos: 4147, 4148
	0.2	2.0		SP/SM	5	75	20					F		Fine sand with gravel lens
	2.0	5.6	09-38a	SM/SP	8	72	20	140	2	0	0	F-M		Gravel seams, pinching east, some clay
		End												Gravel appears to pinch out; on contact?
09-39	0.0	0.7	NS	OB										Sandy loam beneath topsoil
	0.7	3.6	09-39a	GP	60	36	4	90	7	0	0	F-M		Thick lens/seam of sand (20cm)
	3.6	7.0	09-39b	SP	40	58	2	130	10	0	0	F-M		Till at bottom
		End												Photos: 4149, 4150
09-40	0.0	0.8	NS	crushed										In old pit floor
	0.8	1.2	NS	GM1										Photos: 4151, 4152
	1.2	2.2	NS	GM4										Muddy till; water table at 1.2m
	WT	End												
09-41	0.0	0.2	NS	crushed										In old pit floor
	0.2	1.2	NS	SP	40	58	2	120	8	0	0	F-M		Photos: 4153, 4154
	1.2	2.2	NS	GN4										Very dense till (high clay)
	WT	End												Water table at 1.2m
09-42	0.0	0.5	NS	crushed										In old pit floor
	0.5	1.3	NS	SP	40	58	2	110	7	0	0	F-M		Photos: 4155, 4156
	1.3	2.1	NS	GM4										Very dense till (high clay)
	WT	End												Water table at 1.3m
09-43	0.0	0.5	NS	OB										Along forest edge; rooted O/B
	0.5	2.4	09-43a	SP/SM	1	84	15					F-M		Clean sand (fine); silty lens near top
	2.4	3.5	NS	GM4										Dry till, dense
		End												Photos: 4157, 4158
09-44	0.0	0.2	NS	OB										On upper slope
	0.2	3.7	09-44a	SP/SM	1	84	15					F-M		Clean, fine sand; silt lens near top
	3.7	7.2	NS	GM4										Till.
		End												Photos: 4159, 4160
09-45	0.0	0.2	NS	OB										Photos: 4161, 4162
	0.2	3.1	09-45a	SP/SM	1	84	15					F-M		Clean, fine sand. Silt lens near top
	3.1	4.2	NS	GM4										Till, dense, dry.
		End												

## AGGREGATE LOG

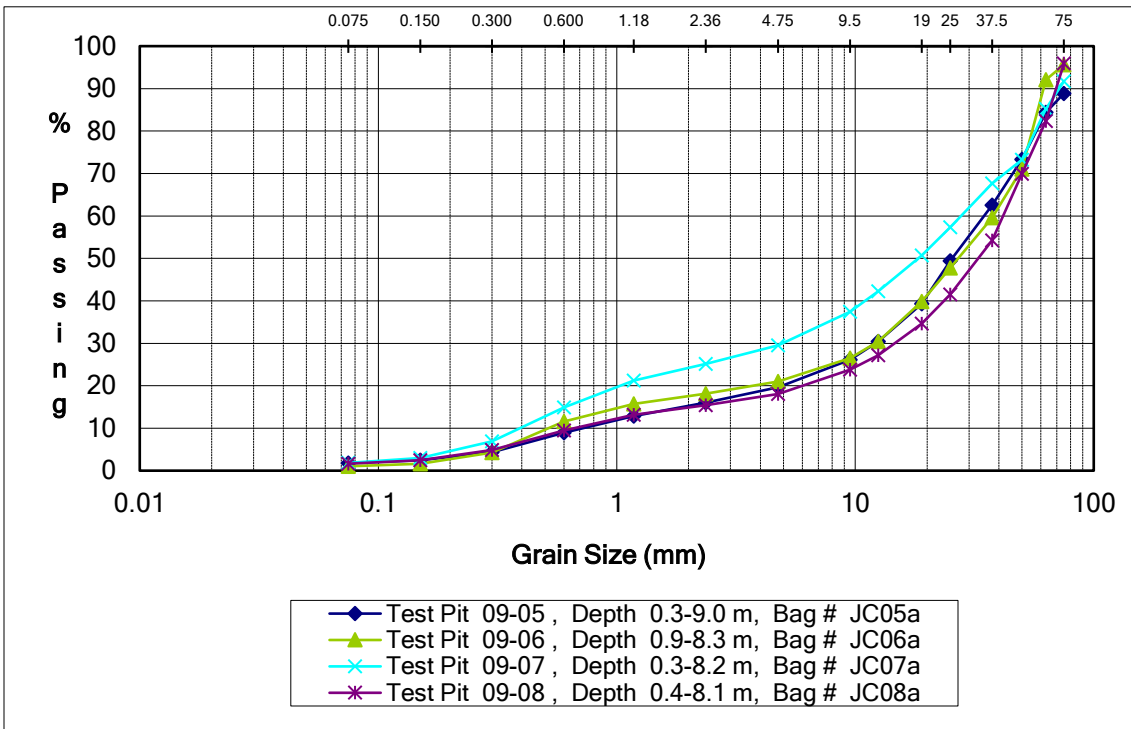
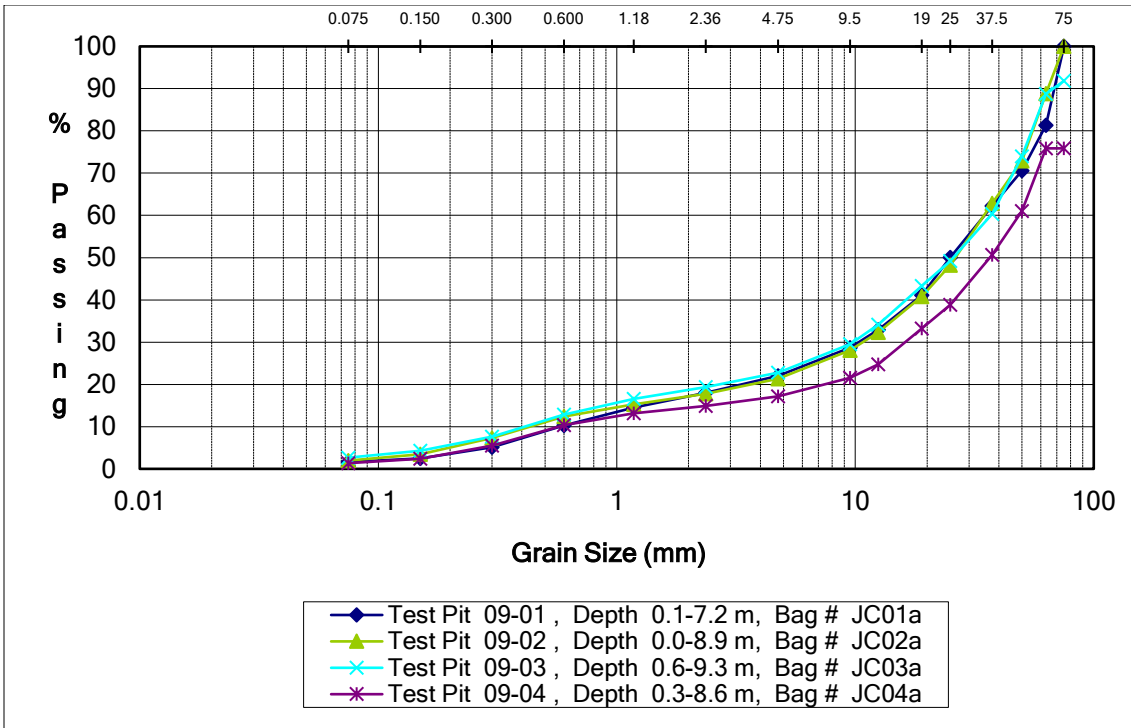
<b>AGGREGATE LOG</b>														
<b>PROJECT:</b>		Junction Pit Investigation						<b>SAMPLED BY:</b>				JS (SCL)		
<b>PIT #:</b>		999						<b>METHOD:</b>				Exc. Cat 330		
<b>DISTRICT:</b>		Rocky Mountain						<b>DATE:</b>				Aug. 24, 2009		
TH / TP	DEPTH (m)		SAMPLE	SOILS CLASS	ESTIMATED GRADUATION			ESTIMATED ROCK 75mm				SAND TYPE	REMARKS	
	FROM	TO			BAG No.	G	S	F	MAX SIZE	75mm 150mm	150mm 375mm			375mm
09-46	0.0	0.3	NS	OB										On upper slope next to road
	0.3	2.0	09-46A	GP	55	40	5	80	3	0	0	F-M		
	2.0	2.5	NS	SP	2	85	13					F-M		Thick sand seam
	2.5	7.2	09-46B	SP/GP	48	50	3	120	10	0	0	M		Photos: 4163, 4164
		End		GM4										Till at bottom.
09-47	0.0	0.4	NS	OB										Photos: 4165, 4166
	0.4	1.0	09-47A	SM	1	80	19					F-M		Clean sand, more yellow; silt lens
	1.0	4.8	09-47A	SM/SP	1	87	12					F-M		Clean sand, more grey
			End		GM4									Till at bottom
09-48	0.0	0.6	NS	OB										Photos: 4167-4170
	0.6	3.0	09-48a	GP	55	46	4	120	10			F-M		Some sand seams
	3.0	7.1	09-48b	SP	40	55	5	90	3			M		Gradual transition to more sand
			End		GM4									Till at bottom
09-49	0.0	0.3	NS	OB										Photos 4171, 4172
	0.3	1.8	09-49A	SM	1	79	20					F		Sand with silt lenses
	1.8	3.8	09-49A	SM/SP	1	89	10					F-M		Sand; less silt
	3.8	5.0	NS	GP/GM4								M		Down to gravel and loose till
			End											

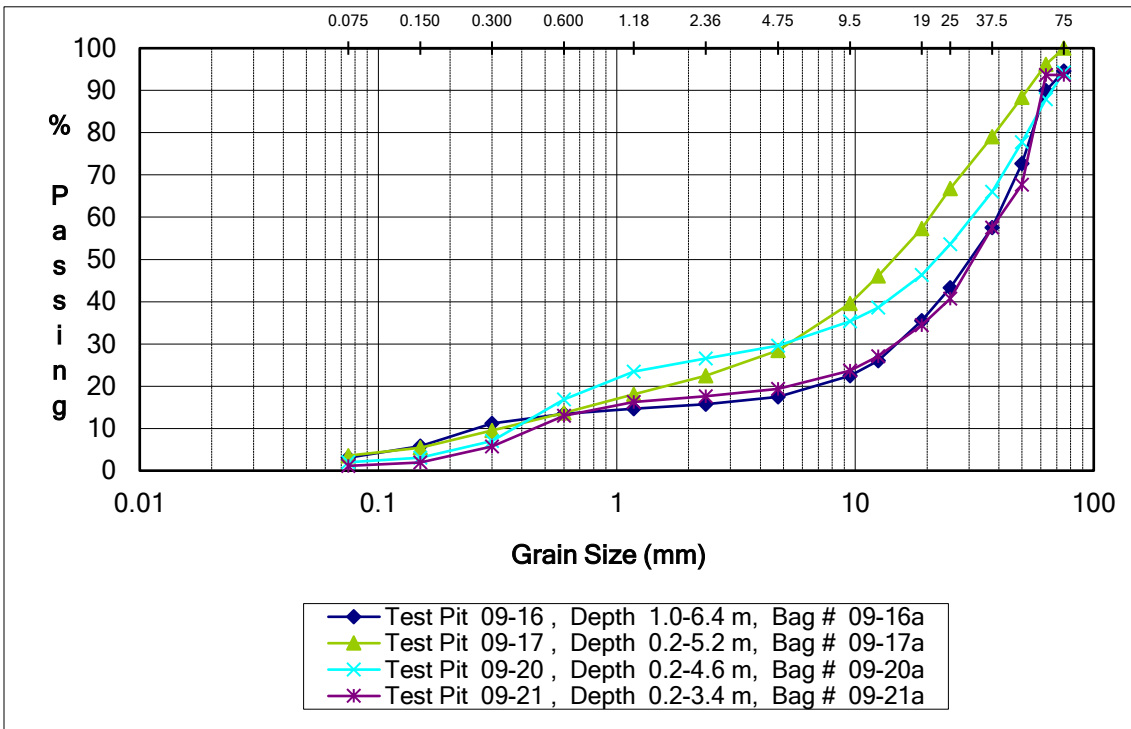
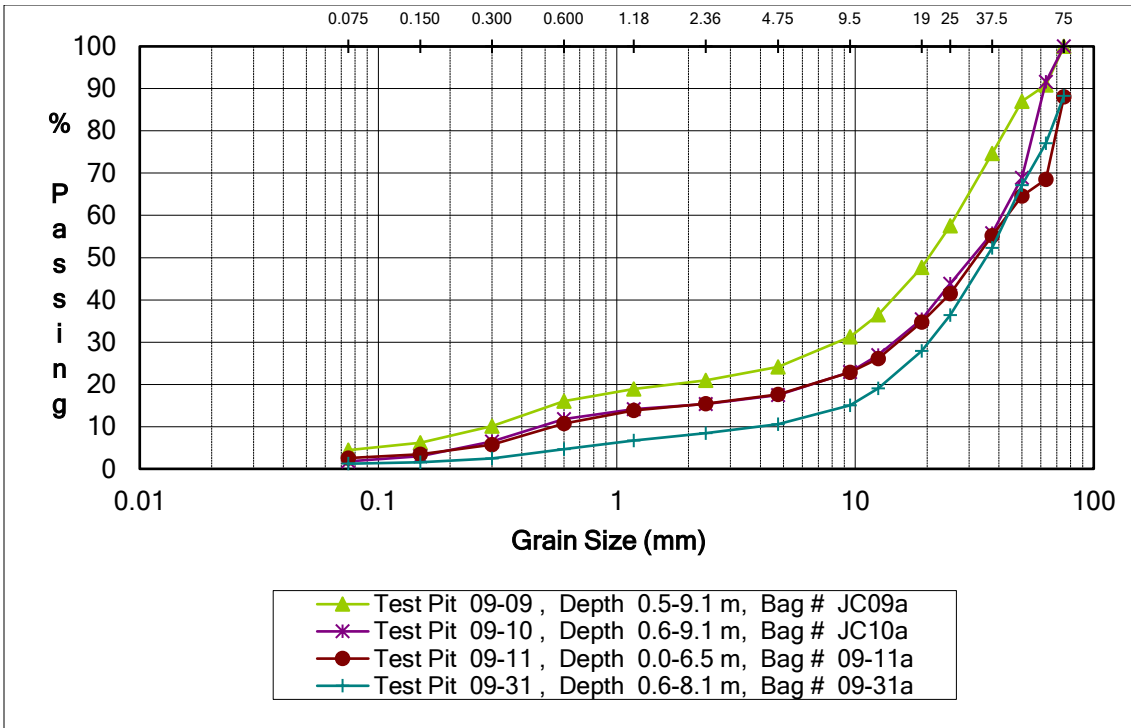
PROJECT REPORT OF SIEVE ANALYSIS SUMMARIES			PERCENT PASSING														
Project:		Juntion Pit Investigation							Project No.:		SCL 09-612						
Sample Source:		Juntion Pit (No. 0999) West							Client:		SCL						
Material:		PIT RUN							Date:		Aug. 26/09						
Sample Information			Percent Passing														
Test Pit	Depth (m)	Bag #	Pit Run Sieve Sizes (mm)														
			75	63	50	37.5	25	19	12.5	9.5	4.75	2.36	1.18	0.6	0.3	0.15	0.075
09-01	0.1-7.2	JC01a	100.0	81.3	70.6	62.2	50.0	41.1	33.0	28.7	22.0	18.0	14.5	10.3	5.1	2.5	1.6
09-02	0.0-8.9	JC02a	100.0	88.8	72.9	62.8	48.2	40.8	32.3	28.1	21.3	17.8	15.3	12.4	7.3	3.5	2.0
09-03	0.6-9.3	JC03a	91.8	88.8	74.0	60.3	49.2	43.3	34.2	29.5	22.7	19.4	16.6	12.9	7.6	4.3	2.7
09-04	0.3-8.6	JC04a	75.9	75.9	61.0	50.6	38.8	33.2	24.7	21.5	17.2	14.9	13.1	10.3	5.5	2.4	1.3
09-05	0.3-9.0	JC05a	88.9	84.4	73.3	62.5	49.4	39.4	30.4	26.1	19.6	16.0	12.9	9.0	4.4	2.4	1.8
09-06	0.9-8.3	JC06a	95.6	92.1	71.0	59.6	47.8	39.9	30.4	26.5	21.0	18.1	15.7	11.6	4.2	1.6	1.0
09-07	0.3-8.2	JC07a	91.7	85.2	73.2	67.7	57.3	50.7	42.3	37.5	29.5	25.2	21.2	14.9	6.9	3.0	1.8
09-08	0.4-8.1	JC08a	95.9	82.3	69.9	54.2	41.5	34.7	27.2	23.8	18.1	15.4	13.2	9.5	4.9	2.4	1.6
09-09	0.5-9.1	JC09a	100.0	90.8	87.0	74.7	57.6	47.7	36.5	31.2	24.1	20.9	18.9	16.1	10.1	6.2	4.4
09-10	0.6-9.1	JC10a	100.0	91.6	68.9	55.8	43.8	35.4	26.9	23.0	17.5	15.3	14.1	11.8	6.5	3.0	1.8
09-11	0.0-6.5	09-11a	88.1	68.5	64.6	55.2	41.5	34.8	26.1	22.9	17.6	15.4	13.8	10.7	5.7	3.5	2.6
09-31	0.6-8.1	09-31a	88.3	77.1	67.1	52.3	36.4	27.9	19.0	15.1	10.6	8.5	6.7	4.7	2.5	1.6	1.2

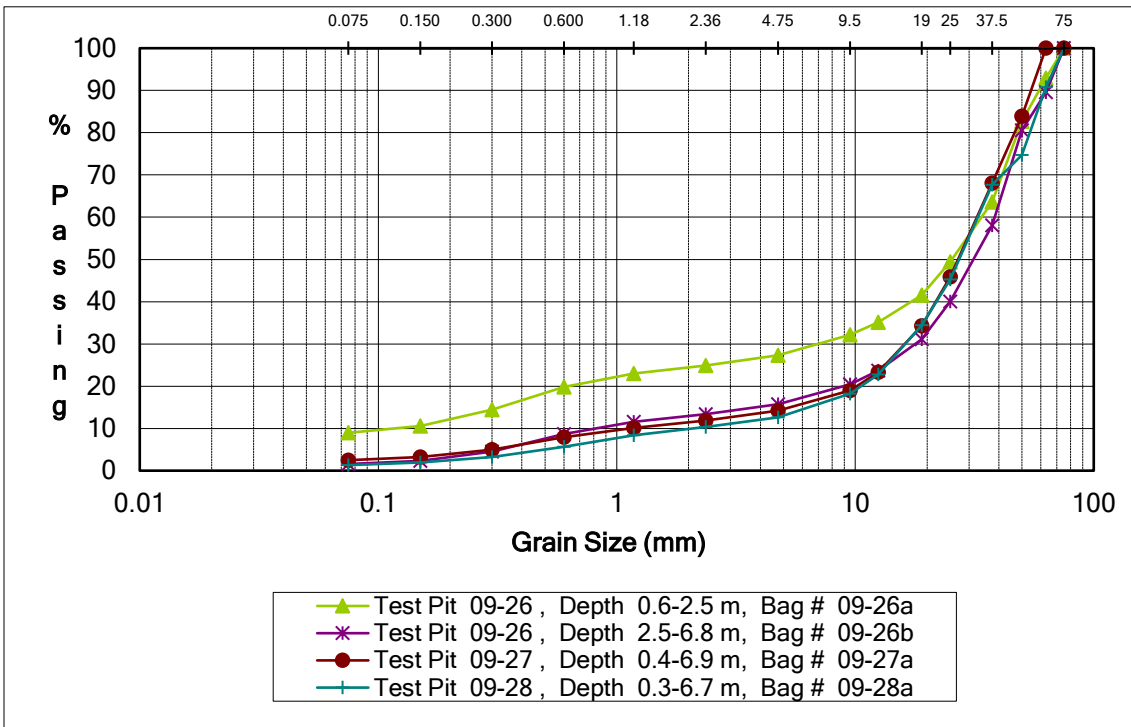
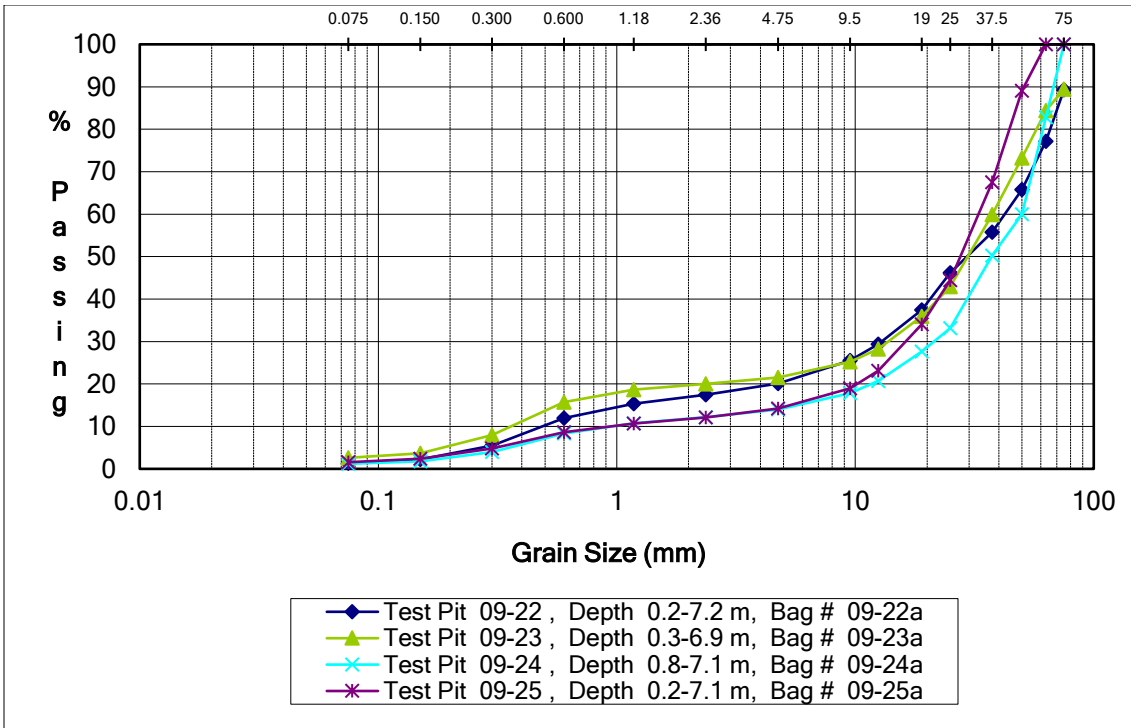
PROJECT REPORT OF SIEVE ANALYSIS SUMMARIES			PERCENT PASSING														
Project:		Juntion Pit Investigation							Project No.:		SCL 09-612						
Sample Source:		Juntion Pit (No. 0999) West							Client:		SCL						
Material:		PIT RUN							Date:		#####						
Sample Information			Percent Passing														
Test Pit	Depth (m)	Bag #	Pit Run Sieve Sizes (mm)														
			75	63	50	37.5	25	19	12.5	9.5	4.75	2.36	1.18	0.6	0.3	0.15	0.075
09-16	1.0-6.4	09-16a	94.6	90.0	72.7	57.5	43.3	35.5	26.0	22.4	17.5	15.7	14.7	13.5	11.1	5.8	3.1
09-17	0.2-5.2	09-17a	100.0	96.2	88.4	79.0	66.8	57.3	46.1	39.6	28.4	22.4	18.0	13.7	9.5	5.5	3.6
09-20	0.2-4.6	09-20a	94.3	87.9	77.8	66.0	53.6	46.4	38.6	35.3	29.6	26.6	23.5	16.9	7.0	3.1	2.0
09-21	0.2-3.4	09-21a	93.7	93.7	67.7	57.6	40.7	34.5	27.1	23.6	19.3	17.6	16.3	13.0	5.7	2.0	1.1
09-22	0.2-7.2	09-22a	89.3	77.2	65.8	55.7	46.2	37.4	29.4	25.5	20.1	17.4	15.3	12.0	5.4	2.3	1.3
09-23	0.3-6.9	09-23a	89.4	84.4	73.2	59.9	42.9	36.0	28.2	25.2	21.5	20.0	18.7	15.7	8.0	3.7	2.6
09-24	0.8-7.1	09-24a	100.0	82.8	60.0	50.2	33.2	27.7	20.7	17.8	14.0	12.2	10.8	8.4	4.0	1.8	1.2
09-25	0.2-7.1	09-25a	100.0	100.0	89.1	67.5	44.4	34.0	23.1	19.0	14.2	12.1	10.7	8.7	4.8	2.4	1.6
09-26	0.6-2.5	09-26a	100.0	92.9	82.7	63.6	49.4	41.5	35.1	32.2	27.3	24.9	23.0	19.8	14.4	10.6	9.0
09-26	2.5-6.8	09-26b	100.0	89.6	80.5	58.1	40.0	31.1	23.7	20.4	15.7	13.4	11.5	8.7	4.5	2.3	1.6
09-27	0.4-6.9	09-27a	100.0	100.0	83.9	68.0	45.9	34.3	23.3	19.0	14.2	11.9	10.1	7.9	5.0	3.2	2.5
09-28	0.3-6.7	09-28a	100.0	90.8	74.8	67.7	45.3	34.4	22.8	18.2	12.6	10.3	8.4	5.6	3.2	1.9	1.3

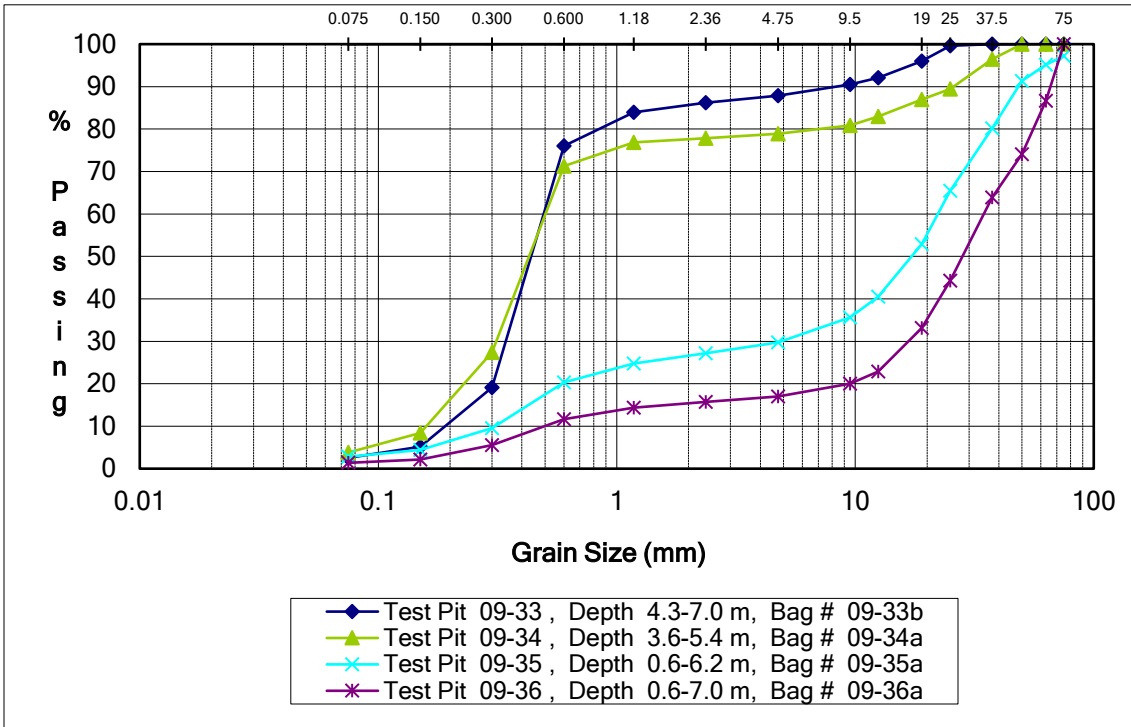
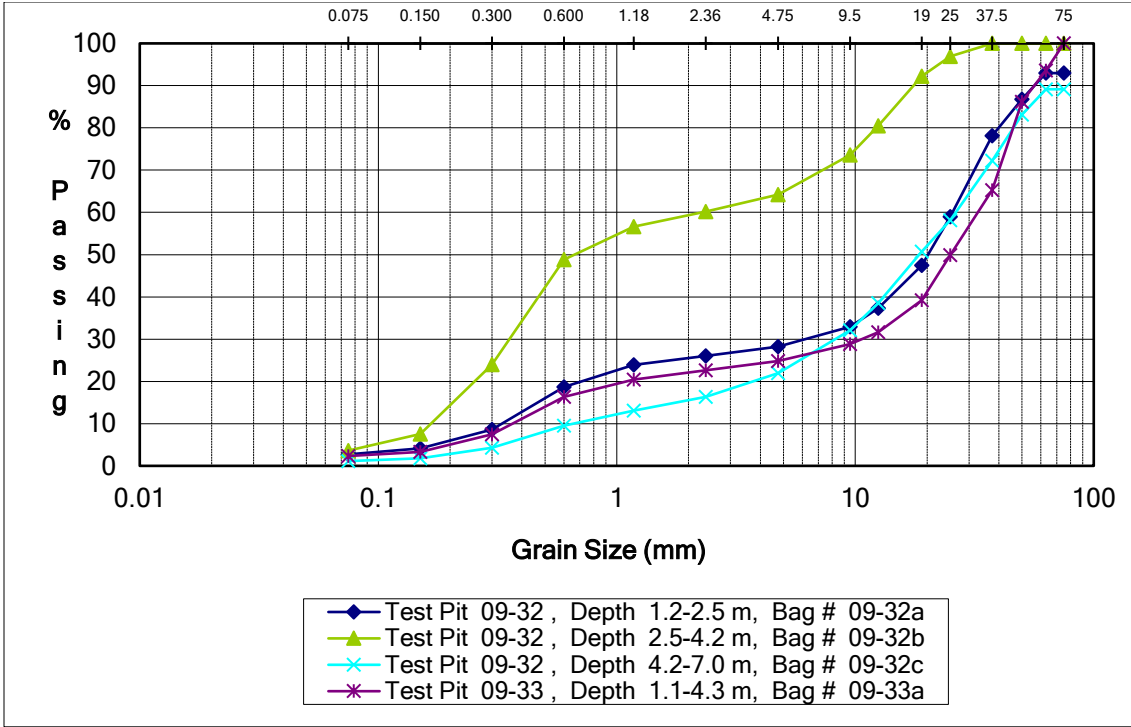
PROJECT REPORT OF			PERCENT PASSING														
SIEVE ANALYSIS SUMMARIES																	
Project:	Juntion Pit Investigation													Project No.:	SCL 09-612		
Sample Source:	Juntion Pit (No. 0999) East													Client:	SCL		
Material:	PIT RUN													Date:	Aug. 27/09		
Sample Information			Percent Passing														
Test Pit	Depth (m)	Bag #	Pit Run Sieve Sizes (mm)														
			75	63	50	37.5	25	19	12.5	9.5	4.75	2.36	1.18	0.6	0.3	0.15	0.075
09-32	1.2-2.5	09-32a	93.0	93.0	86.8	78.2	59.0	47.5	37.3	32.9	28.2	26.0	23.9	18.7	8.6	4.2	2.7
09-32	2.5-4.2	09-32b	100.0	100.0	100.0	100.0	96.9	92.2	80.5	73.6	64.2	60.2	56.7	48.9	24.0	7.5	3.6
09-32	4.2-7.0	09-32c	89.1	89.1	83.1	72.2	58.1	50.7	38.6	32.1	22.0	16.4	13.1	9.5	4.3	1.8	1.1
09-33	1.1-4.3	09-33a	100.0	93.6	86.2	65.3	49.9	39.2	31.6	28.8	24.8	22.6	20.4	16.3	7.5	3.3	2.3
09-33	4.3-7.0	09-33b	100.0	100.0	100.0	100.0	99.6	96.0	92.1	90.5	87.8	86.2	83.9	76.0	19.1	5.2	2.5
09-34	3.6-5.4	09-34a	100.0	100.0	100.0	96.4	89.4	87.0	83.0	80.9	78.9	77.8	76.9	71.3	27.4	8.4	3.8
09-35	0.6-6.2	09-35a	97.2	95.2	91.3	80.2	65.5	52.9	40.5	35.6	29.8	27.2	24.8	20.3	9.6	4.4	2.8
09-36	0.6-7.0	09-36a	100.0	86.7	74.1	63.9	44.3	33.1	22.9	20.0	17.0	15.7	14.3	11.7	5.6	2.1	1.4
09-37	0.3-5.8	09-37a	100.0	100.0	87.0	69.3	47.3	36.5	26.0	22.1	17.9	16.0	13.9	9.8	4.1	1.6	1.0
09-38	2.0-5.6	09-38a	100.0	100.0	95.4	93.1	85.4	78.6	72.2	68.8	64.6	62.6	60.1	52.5	21.3	8.5	5.4
09-39	0.7-3.6	09-39a	95.9	93.1	84.0	68.9	53.4	43.8	34.2	30.0	23.8	20.8	18.0	13.4	5.5	2.3	1.8
09-39	3.6-7.0	09-39b	100.0	97.6	89.3	81.3	71.2	63.1	52.3	48.0	41.2	37.9	35.1	30.1	11.8	5.1	3.3

PROJECT REPORT OF			PERCENT PASSING														
SIEVE ANALYSIS SUMMARIES																	
Project:	Juntion Pit Investigation													Project No.:	SCL 09-612		
Sample Source:	Juntion Pit (No. 0999) East													Client:	SCL		
Material:	PIT RUN													Date:	Aug. 27/09		
Sample Information			Percent Passing														
Test Pit	Depth (m)	Bag #	Pit Run Sieve Sizes (mm)														
			75	63	50	37.5	25	19	12.5	9.5	4.75	2.36	1.18	0.6	0.3	0.15	0.075
09-44	0.2-3.7	09-44a	100.0	100.0	100.0	98.5	96.3	94.6	91.8	90.4	87.8	86.2	84.1	74.2	38.8	17.5	7.2
09-45	0.2-3.1	09-45a	100.0	100.0	100.0	96.8	95.6	95.2	95.0	94.8	94.4	94.2	93.9	93.2	85.3	25.6	9.9
09-46	0.3-2.0	09-46a	100.0	100.0	88.4	84.4	66.7	55.5	43.8	38.3	30.7	26.9	22.9	17.6	8.7	3.6	2.5
09-46	2.5-7.2	09-46b	100.0	92.7	88.8	80.5	62.6	52.2	40.3	34.3	25.3	20.3	16.7	12.2	5.3	2.7	2.0
09-47	0.4-4.8	09-47a	100.0	100.0	100.0	100.0	100.0	99.6	97.8	96.8	94.5	92.2	88.3	74.3	55.6	26.6	8.9
09-48	0.6-3.0	09-48a	100.0	96.3	89.8	74.5	54.8	43.1	30.5	25.9	19.8	17.3	15.1	11.5	4.8	2.0	1.3
09-48	30.-7.1	09-48b	100.0	100.0	96.4	87.4	72.8	64.4	53.5	47.5	39.0	35.1	31.8	26.1	11.6	3.2	1.5
09-49	0.3-3.8	09-49a	100.0	100.0	100.0	98.4	97.1	96.9	96.1	95.6	94.7	93.7	92.3	88.0	57.0	26.9	11.7

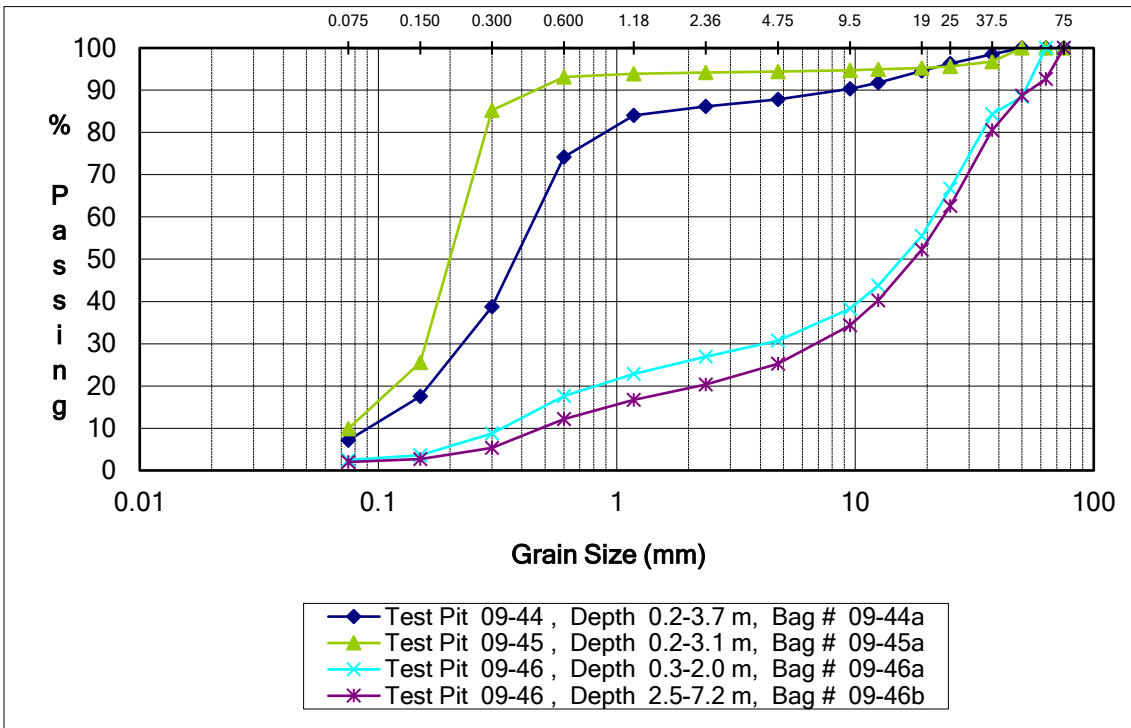
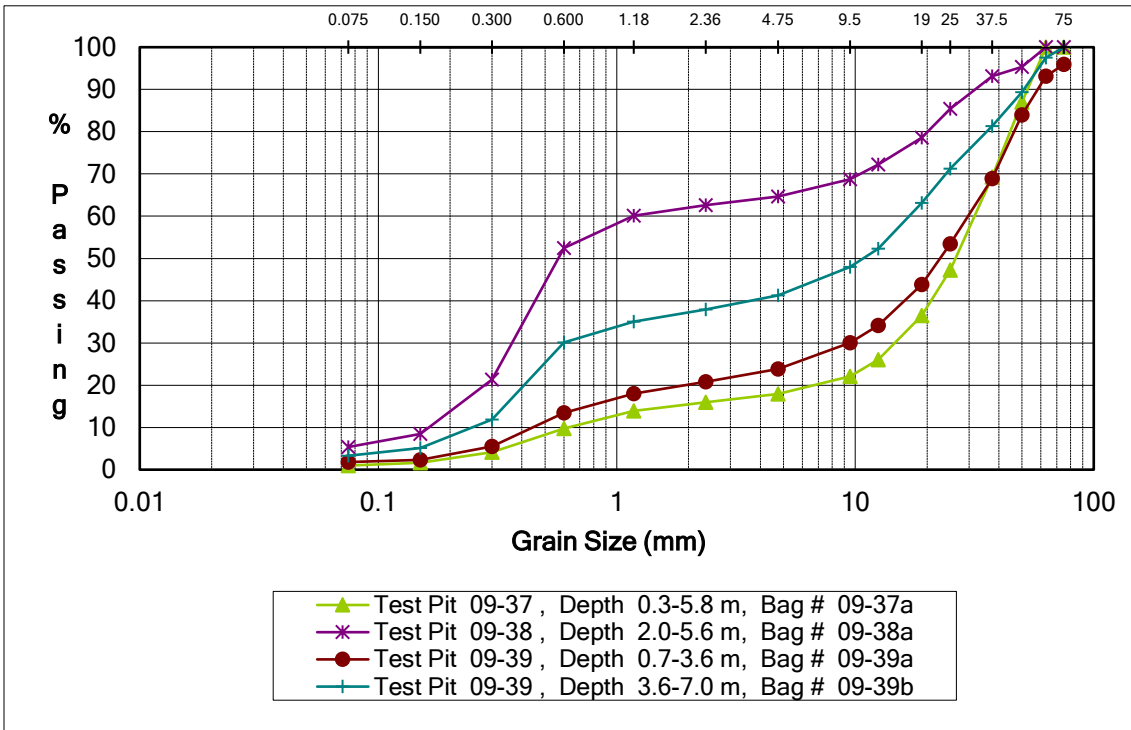


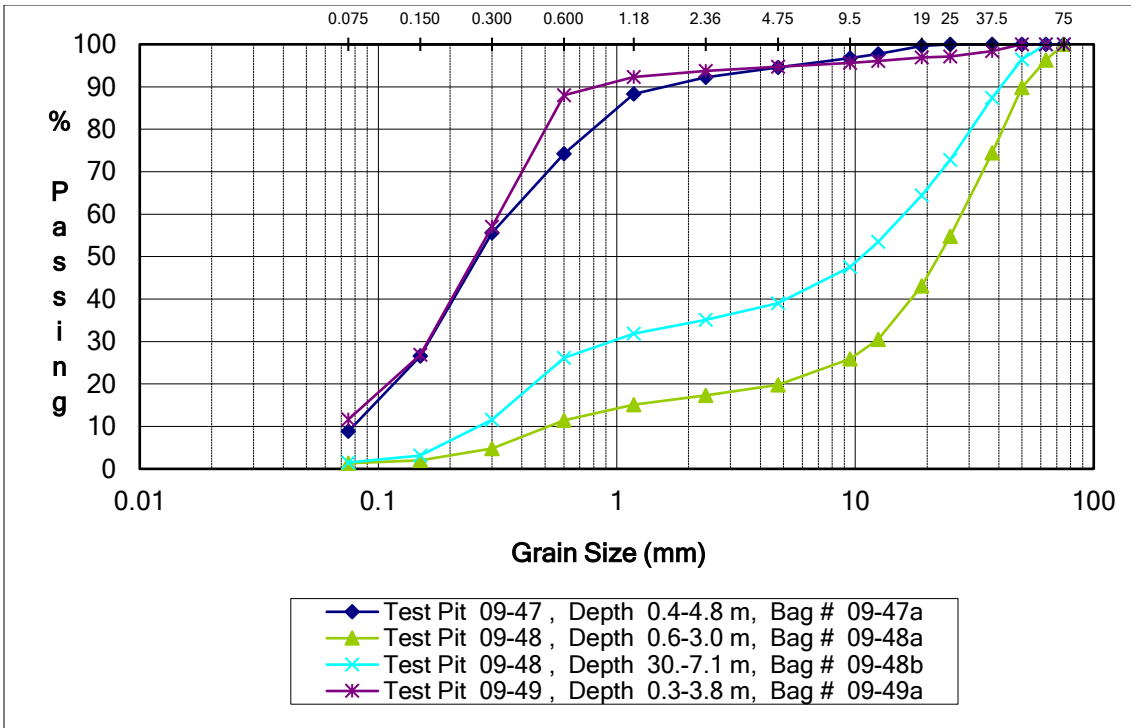












## USC Legend

## 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
<b>UNIFIED SOIL CLASSIFICATION LEGEND</b>
Drawn: LU    Date: JULY'97    Scale:
File No.:    ACAD File: ACAD0709

## Photos



Entrance to Junction Pit off of Mission Fort Steele Rd (May 2023).



Main face of Suitability Area A, facing west (May 2023).



Standing top of face of Suitability Area A, facing south (May 2023).



Same location as previous photo, facing southeast. Recommended crusher setup and stockpiling area to south. (May 2023).



Suitability Area A, facing northeast (May 2023).



Facing south from pit entrance toward Area B. Materials stored in this area will have to be relocated prior to future mining in this area. (April 2022).