Ministry of Transportation and Infrastructure

Geotechnical and Materials Engineering

Southern Interior Region
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Auger Pit No. 0965

2017 Technical Information Report

Location: Located approximately 12 km east of Greenwood adjacent to Highway 3.

Legal Description: Lot 1, Plan 15066, D.L. 1052, SDYD. Auger Pit is owned by the Ministry of Transportation and Infrastructure.
UTM co ordinates Zone 11, 5444265 Northing, 385332 Easting.

Gradation: The average and range of laboratory samples as well as oversize rock field estimates for material sampled within the proposed suitability area is as follows:

Laboratory Results:

Classification:	Average (%)	Range (%)
Gravel (4.75-75mm)	45.7	37-64.5
Sand (0.075-4.75mm)	52.0	33.6-60.8
Fines (<0.075mm)	2.3	1.6-4.0

Oversize Rock Estimates:

Classification:	Average (%)	Range (%)
Boulders (>375mm)	0	0
Cobbles (150-375mm)	1.5	1-10
Cobbles (75-150mm)	6.3	1-12

The maximum size rock observed within the suitability area was 370 mm.

Aggregate Logs:

1 OF 2

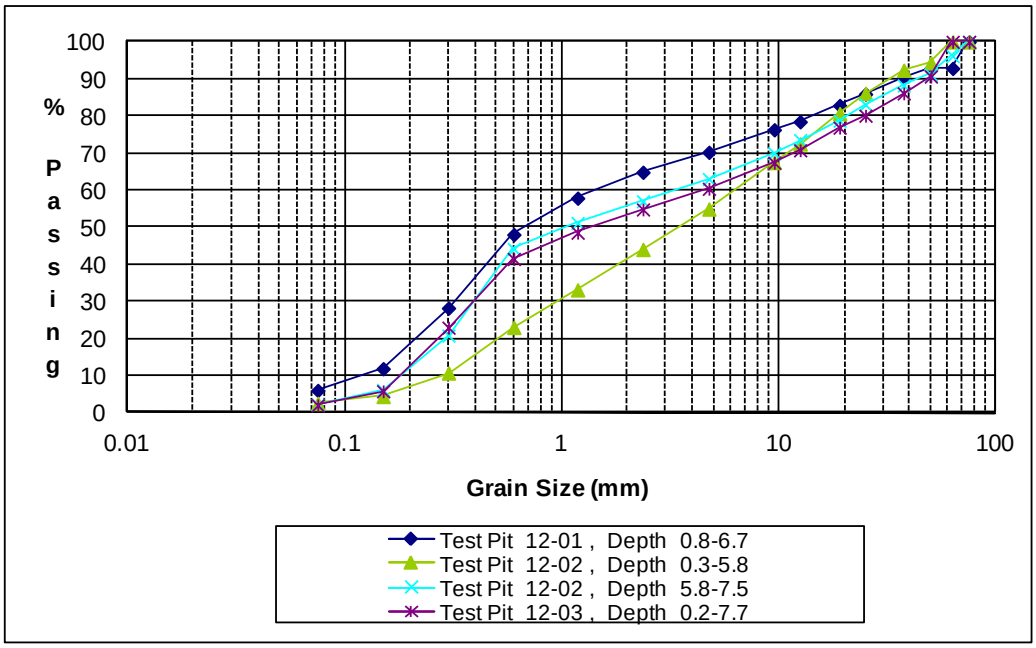
AGGREGATE LOG

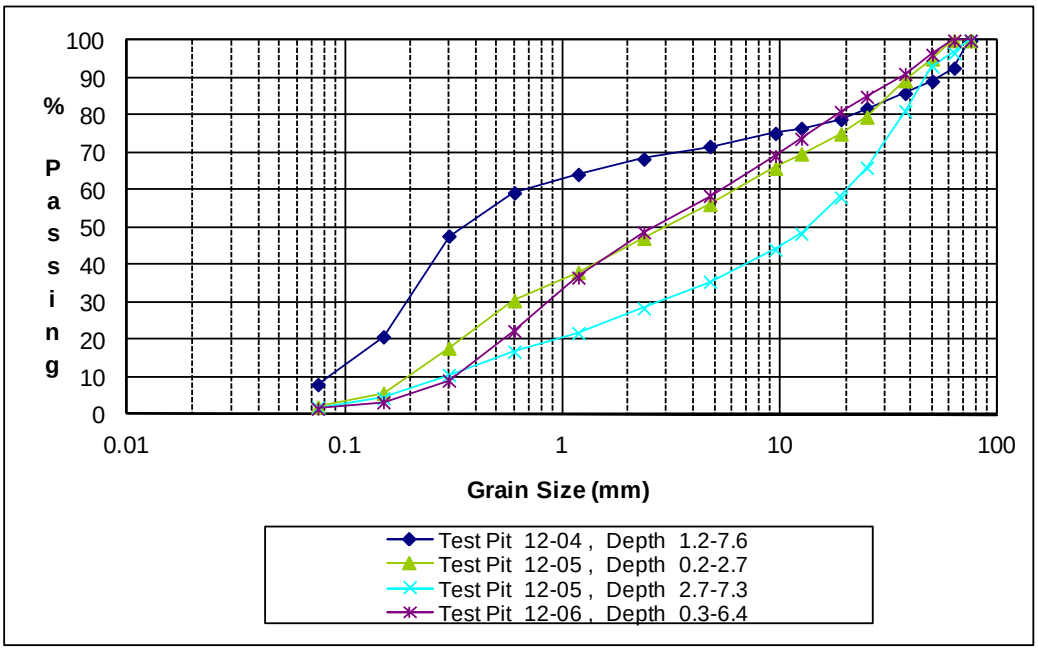
PROJECT: 12-501 Auger **SAMPLED BY:** Karen & Wayne
PIT #: 0965 **METHOD:** EXCAVATOR
DISTRICT: West Kootenay **DATE:** October 23rd, 2012

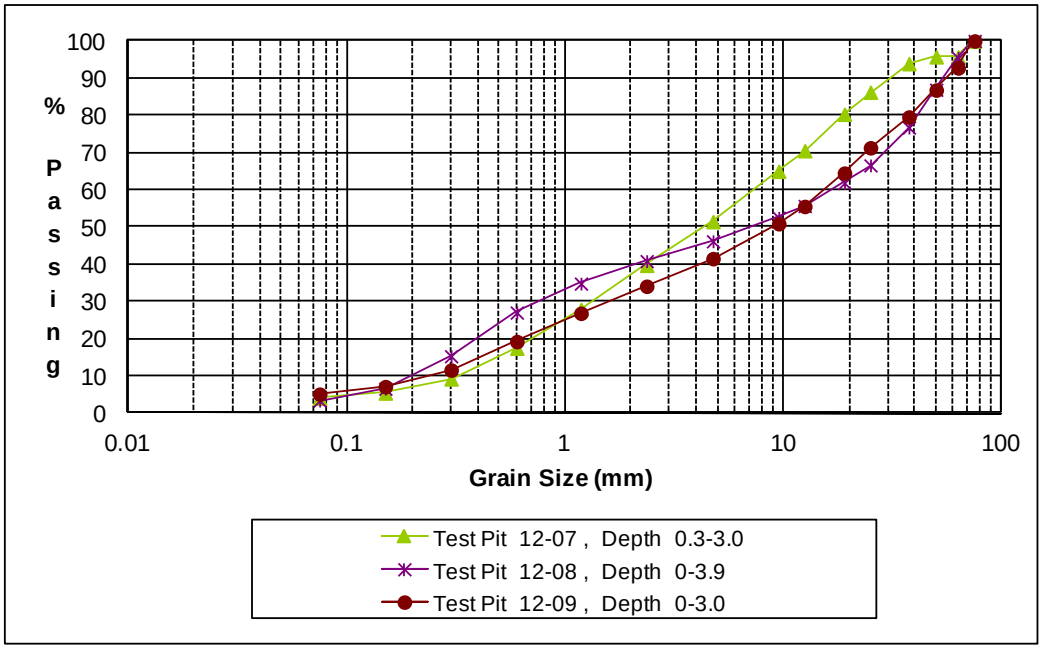
TH / TP	DEPTH (m)		SAMPLE	SOILS CLASS	ESTIMATED GRADUATION			ESTIMATED ROCK 75mm				SAND TYPE	REMARKS
	FROM	TO	BAG No.		G	S	F	MAX SIZE	75mm 150mm	150mm 375mm	375mm	F M C	
12-01	0	0.8	NS	OB									
WP 12-1	0.8	1.5	A12-01A	GP	50	48	2	250	3	2	0	C	Interbedded sands and gravels;
	1.5	2.8	"	SP	3	95	2	150	0	0	0	M	Sand layers clean;
	2.8	3.7	"	SP	40	58	2	280	5	1	0	M	Gravels get coarser with depth;
	3.7	5.4	"	SP	6	92	2	270	2	1	0	M	Located on upper pit floor;
	5.4	6.7	"	GP	55	43	2	300	8	3	0	C	Photos 1605 - 1609
		End											
12-02	0	0.3	NS	OB									
WP 12-2	0.3	5.8	A12-02A	GP	60	38	2	200	10	1	0	C	Isolated occurrence of silt and clay
	5.8	7.5	A12-02B	SP	5	48	2	150	1	0	0	M-F	lense in SW corner of pit, 4.8 m deep;
		End											Upper 2 m = best gravel;
													Located on upper pit floor;
													Photos 1610 - 1615
12-03	0	0.2	NS	OB									
WP 12-3	0.2	1.1	A12-03A	GP	50	47	3	280	5	2	0	M	Interbedded sands and gravels;
	1.1	4.0	"	GP	55	43	2	270	10	2	0	C	Sand 0.5-2.5 m; gravels 0.5-2.0 m;
	4.0	7.7	"	SP	25	73	2	175	2	1	0	M-F	Located on upper pit floor;
		End											Photos 1616 - 1621
12-04	0	1.2	NS	OB									OB = Asphalt mix; Located on road;
WP 12-4	1.2	3.3	A12-04A	GP	55	42	3	330	7	1	0	C	Interbedded sands and gravels;
	3.3	3.8	"	SP	7	91	2	360	2	<1	0	M-F	Sand 1.0-3.0 m; gravels 0.4-1.5 m;
	3.8	7.0	"	GP	55	42	3	330	7	1	0	C	Isolated silt and clay lenses
	7.0	7.6	"	SP	7	91	2	360	2	<1	0	M-F	on N & S sides of pit, 3.6 m deep;
		End											Photos 1622 - 1629
12-05	0	0.2	NS	OB									OB = Asphalt mix;
WP 12-5	0.2	2.7	A12-05A	GP	52	45	3	230	7	1	0	M-F	Similar to Pit 2, but sand layers <0.3m
	2.7	7.3	A12-05B	GP	70	35	2	310	10	1	<1	C	and pockets mixed into gravel;
	7.3	8.0	A12-05A	GP	50	48	2	290	5	<1	0	M-F	Located on upper pit floor;
		End											Photos 1630 - 1634
12-06	0	0.3	NS	OB									
WP 12-6	0.3	2.4	A12-06A	GP	55	33	2	230	7	1	0	M-C	Interbedded sands and gravels;
	2.4	3.4	"	SP	2	96	2	150	<2	0	0	F-M	Sand 0.1-0.5 m; gravels 0.2-0.7 m;
	3.4	6.4	"	GP	65	33	2	280	10	1	0	C	Gravels more consistent at 3.4m;
													Collapsing sidewalls; Located on
													upper pit floor; Photos 1635 - 1640

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	F M C	
12-07	0	0.3	NS	OB									
WP 12-7	0.3	3.0	A12-07A	GP	50	47	3	370	8	2	0	M	Gravels more consistent at 3.0 m;
	3.0	7.1	A12-07B	GP	70	28	2	200	12	1	0	C	Tiny silt pockets; Collapsing sidewalls;
		End											Located on upper pit floor;
													Photos 1641 - 1645
12-08	0	3.9	A12-08A	GP	53	45	2	370	10	1	0	C	Hit water at 5.3 m;
WP 12-8	3.9	6.6	NS	SM1	5	75	20	140	<1	0	0	F	Small clay clumps (<1%) in fine sands;
		End											Collapsing sidewalls;
													Located on lower pit floor;
													Photos 1646 - 1650
12-09	0	3.0	A12-09A	GM2	40	45	15	290	7	1	0	C	Hit water at 5.4 m;
WP 12-9	3.0	3.7	NS	ML	10	50	40	170	1	<1	0	F	Gravels have sand pockets mixed in;
	3.7	>5.7	NS	SM1	3	77	20	10	0	0	0	F	Collapsing sidewalls;
		End											Located on lower pit floor;
													Photos 1651 - 1656
12-10	0	3.9	NS	OB	50	46	4	420	5	5	<1	C	OB = Stripping pushed up;
WP12-10	3.9	7.0	NS	SM1	3	77	20	340	<1	<1	0	F	Clean fine sands at 3.9 m with tiny
		End											small clumps of clay;
													Located on near spoil site near road;
													Photos 1657 - 1660

Aggregate Gradation Charts:







Aggregate Quality: A summary of aggregate quality tests performed on 2012 samples obtained from the pit are as follows:

Test	Average	Range
Micro-Deval	13.37	11.74-16.19
Sand Equivalent	85.3	82.35-91.43
Bulk Relative Density (Coarse)	2.663	
Bulk Relative Density (Fine)	2.657	
Absorption (Coarse) %	1.29	
Absorption (Fine) %	0.59	

Granular Volume:

Estimated Volume: 30,000m^3

The Estimated Volume has been calculated by mining the suitability area to an average depth of 7.3 metres.

Pit Development and Recommendations:

- The mining area has been worked previously; some minor development may necessary and will be the responsibility of the contractor.
- **Auger Pit has been mined and used extensively in the past. Selective mining may be required in order to ensure a consistent end product is produced.**
- Crusher setup is recommended to be located at the base of slope near Test Pit 12-08 with mining in a south and eastern directions.
- Processed aggregate stockpile space is limited in the pit. Potential locations are indicated on the pit development plan.
- At the completion of mining, all slopes shall be trimmed to a minimum slope of 1 ½:1 with native granular material. **Reject material from aggregate production is not be used to slope or infill pit faces without the prior approval of the Ministry Aggregate Resource Manager.**

Site Photographs:

Material from Test Pit 12-02

Material from Test Pit 12-03

Material from Test Pit 12-05

Test Pit 12-06

Test Pit 12-07

South view of pit, 2016.

Samantha Kinniburgh
Senior Aggregate Resource Specialist