



**Ministry of Transportation and
Infrastructure**

Geotechnical and Materials Engineering

Southern Interior Region

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Ben Hynes Pit No. 1102

2023 Technical Information Report

Location: Located approximately 53 km south of Golden off Hwy 95, on the Ben Hynes Loop Road (southern end). The approximate UTM coordinates for the pit are Zone 11, 539750 metres East and 5646500 metres north.



Legal Description: Ministry of Transportation-owned pit, legally described as; A part of L 1 Section 22, Township 23, Range 18, W5M, Kootenay District, PL 11801.

Gradation: The average and range of laboratory samples as well as oversize rock field estimates for material (within the suitability areas) from the 1987 testing program at Ben Hynes Pit are as follows:

Laboratory Samples

Classification	Average (%)	Range (%)
Gravel (4.75-75mm)	68	62-72
Sand (0.075-4.75mm)	26	21-35
Fines (<0.075mm)	6	3-10

Oversize Field Estimates

Classification	Average (%)	Range (%)
Boulders (>375mm)	2	1-5
Cobbles (150-375mm)	14	5-20
Cobbles (75-150mm)	19	10-25

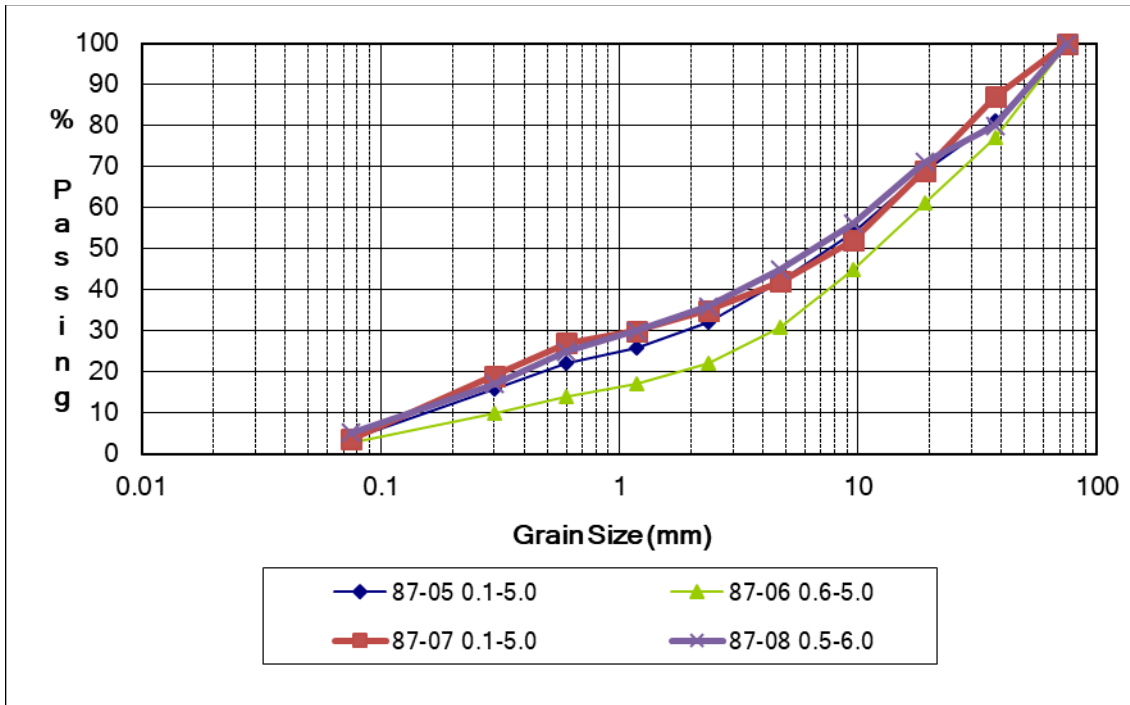
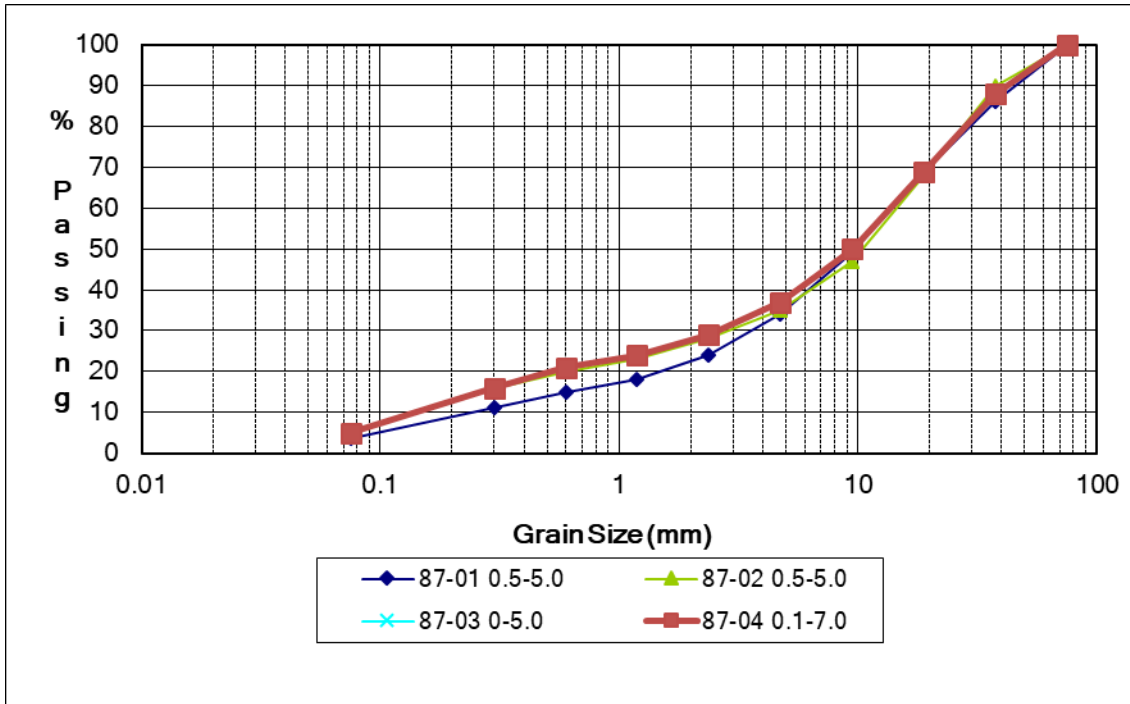
It was deduced from historical information that the samples tested in 1987 were a combination of the two differing subsurface layers (as recorded in the test pit summaries as GP-GM and GP).

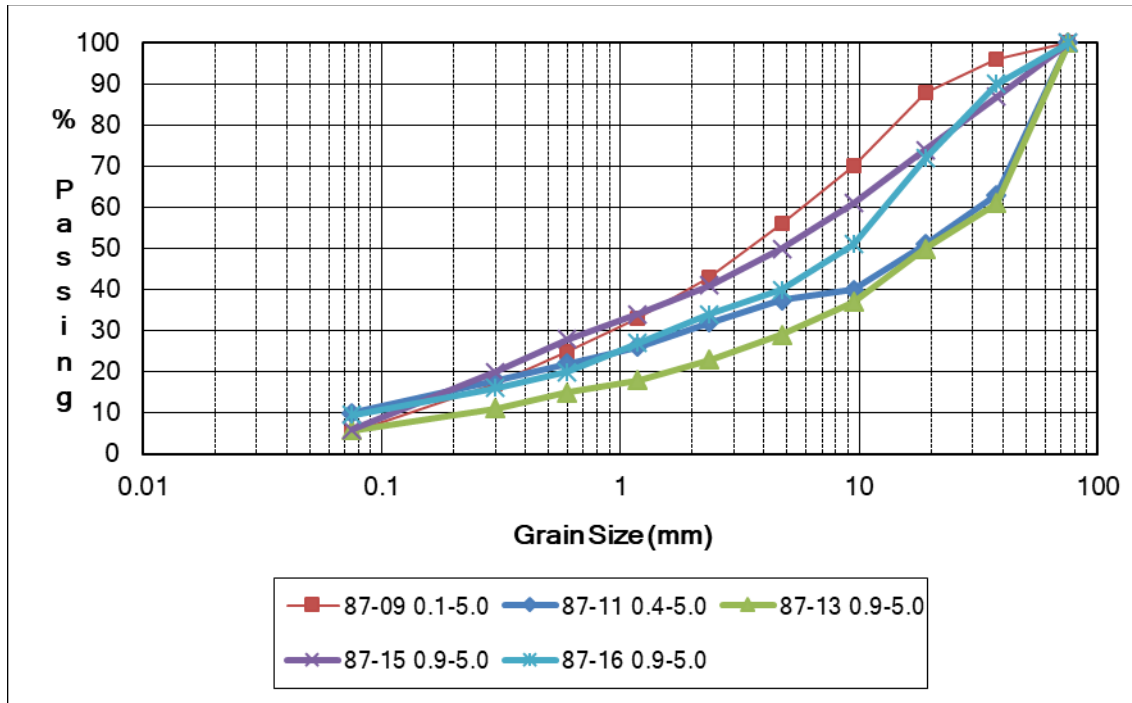
Maximum rock size observed was 400mm.

Wet Sieve Analysis Chart:

PROJECT REPORT OF SIEVE ANALYSIS SUMMARIES			PERCENT PASSING									
Project:			Project No.:									
Sample Source:			Client:									
Material:			Date:									
			June 4/86									
Sample Information			Percent Passing									
Test Pit	Depth (m)	Bag #	Pit Run Sieve Sizes (mm)									
			75	37.5	19	9.5	4.75	2.36	1.18	0.6	0.3	0.075
87-01	0.5-5.0	0	100.0	86.0	69.0	49.0	34.0	24.0	18.0	15.0	11.0	3.6
87-02	0.5-5.0	0	100.0	90.0	68.0	47.0	35.0	28.0	23.0	20.0	16.0	5.1
87-03	0-5.0	0	100.0	89.0	76.0	59.0	46.0	37.0	29.0	23.0	14.0	2.5
87-04	0.1-7.0	0	100.0	88.0	69.0	50.0	37.0	29.0	24.0	21.0	16.0	4.9
87-05	0.1-5.0	0	100.0	81.0	69.0	54.0	42.0	32.0	26.0	22.0	16.0	3.6
87-06	0.6-5.0	0	100.0	77.0	61.0	45.0	31.0	22.0	17.0	14.0	10.0	2.8
87-07	0.1-5.0	0	100.0	87.0	69.0	52.0	42.0	35.0	30.0	27.0	19.0	3.6
87-08	0.5-6.0	0	100.0	80.0	71.0	56.0	45.0	36.0	30.0	25.0	17.0	5.2
87-09	0.1-5.0	0	100.0	96.0	88.0	70.0	56.0	43.0	33.0	25.0	17.0	5.2
87-11	0.4-5.0	0	100.0	37.5	63.0	51.0	40.0	32.0	26.0	22.0	18.0	10.0
87-13	0.9-5.0		100.0	61.0	50.0	37.0	29.0	23.0	18.0	15.0	11.0	5.7
87-15	0.9-5.0		100.0	87.0	74.0	61.0	50.0	41.0	34.0	28.0	20.0	5.9
87-16	0.9-5.0		100.0	90.0	72.0	51.0	40.0	34.0	27.0	20.0	16.0	9.5

Aggregate Gradation Charts:





Summary of Test Pit Logs (with results bolded in the chart):

1 OF 1															
AGGREGATE LOG															
PROJECT:		Ben Hynes Pit						SAMPLED BY:		SH					
PIT #:		1102						METHOD:		Backhoe					
DISTRICT:		Rocky Mountain						DATE:		17-Sep-87					
TH / TP	DEPTH		SAMPLE BAG No.	SOILS CLASS	ESTIMATED GRADATION			ESTIMATED ROCK 75mm				SAND TYPE			REMARKS
	FROM	TO			G	S	F	MAX SIZE	75mm 150mm	150mm 375mm	375mm	F	M	C	
87-01	0	0.5		Fill										Roots, sticks etc	
	0.5	5	X7414	GP	63	35	2	300	10	1	0			Clean, Well Graded Gravel GP 66/30/4	
87-02	0	0.5		GP-GM	60	35	5		10	1	0			Pit floor	
	0.5	5	X7415	GP	63	35	2	300	10	1	0			Clean, Well Graded Gravel GP-GM 65/30/5	
87-03	0	5	X7416	GP	63	35	2	300	10	1	0			Clean, Well Graded Gravel GP 53/44/3	
87-04	0	0.1		TS											
	0.1	5	X7417	GP	63	35	2		15	1	0			GW 63/32/5	
	5	7	"	GP-GM	64	30	6		15	1	0			Siltier with depth	
87-05	0	0.1		TS											
	0.1	5	X7418	GP	63	35	2	300	15	1	0			GW 58/38/4	
87-06	0	0.6		TS											
	0.6	2.5	X7419	GP	72	25	3	400	20	2	0			GP 69/28/3	
	2.5	5	"	GP	77	20	3	400	20	5	2				
87-07	0	0.1		TS											
	0.1	2	X7420	GP	63	35	2	300	10	1	0			GP 58/38/4	
	2	5	"	GP	58	40	2	300	10	1	0	M		Sandier	
87-08	0	0.5		TS											
	0.5	1.5	X7421	GP-GM	67	25	8		10	5	0			Slightly silty gravel	
	1.5	6	"	GP	63	35	2		10	1	0			GP-GM 56/39/5	
87-09	0	0.1		TS											
	0.1	5	X7422	GP	51	47	2		5	1	0			Sandier than previous holes, less oversize SP-SM 44/51/5	
87-10	0	0.1		TS											
	0.1	1.2	X7423	GP	78	20	2		15	2	0			Clean, coarse gravel GW 57/39/4	
	1.2	5	"	GP	68	30	2		10	1	0			Inconsistent seam of 100% gravel (25mm to 75mm). Sand increases with depth.	

2	OF	2											
AGGREGATE LOG													
PROJECT:		Ben Hynes Pit					SAMPLED BY:		SH				
PIT #:		1102					METHOD:		Backhoe				
DISTRICT:		Rocky Mountain					DATE:		17-Sep-87				
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		
87-11	0	0.4		TS									
	0.4	2	X7424	GP-GM	72	21	7	400	20	20	2		Slightly silty. Bony.
	2	5	"	GP	71	25	4	400	20	20	2		GP-GM 59/31/10
87-12	0	0.9		TS									
	0.9	2	X7425	GP-GM	72	21	7	400	20	20	2		GP-GM 57/36/7
	2	5	"	GP	71	25	4	400	20	20	2		
87-13	0	0.9		TS									
	0.9	2	X7426	GP-GM	72	21	7		25	20	5		GP-GM 71/23/6
	2	5	"	GP	71	25	4		20	20	5		
87-14	0	0.9		TS									
	0.9	1.5	X7427	GP-GM	68	25	7		20	20	1		GP-GM 57/35/8
	1.5	5	"	GP	72	25	3		20	10	1		
87-15	0	0.9		TS									
	0.9	1.5	X7428	GP-GM	72	21	7		20	10	1		GP-GM 50/44/6
	1.5	5		GP	62	35	3		10	5	1		
87-16	0	0.9		TS									
	0.9	2	X7429	GP-GM	65	25	10		20	15	1		silty gravel
	2	5		GP	67	30	3		20	15	1		GP-GM 59/31/10

Aggregate Quality: A summary of aggregate quality tests performed on samples from the tested area are as follows:

TP or Year	Micro-Deval (%) (C/F)	Sand Equivalent (%)	Bulk Relative Density (C/F)	Absorption (%) (C/F)
October 2012 (Pit Run)	8.19			
1987		61.5-71.1	2.665-2.699/2.631-2.673	0.68-1.01/0.65-1.16
Average	8.19	67.1	2.681/2.649	0.84/1.01

Granular Volume:

Estimated Volume: 40,000m³

- The estimated volume has been determined by multiplying the surface area of the suitability boundary by an average depth of 5.0 metres.

Pit Development and Recommendations:

- The mining area has been previously developed by the Ministry of Transportation and Infrastructure (MoTI). Any additional development will be the responsibility of the contractor and shall be completed as per the pit development plan or as directed by the Ministry Representative.
- Due to a high percentage of oversize rock contained within the deposit the use of a primary crusher is required during aggregate production.
- There are **TWO identified Do Not Disturb** areas within the Ben Hynes gravel reserve boundary. A 30 metre '**No Development**' buffer zone is illustrated on the Pit Development Plan around the Do Not Disturb areas. **There shall be no development or disturbance within these areas.**
- The crusher is recommended to be located on the higher floor as identified on the Pit Development Plan, with mining proceeding in an eastern direction as indicated. The asphalt plant should be located on the lower floor of the pit as indicated in the Pit Development Plan.
- In order to avoid an excessively high pit face, a bulldozer may be required to push material into the production area and aid in re-sloping to a MEM standard post-production.
- The access road running from North to South at the west end of the pit needs to be maintained and/or restored post-production.
- Processed aggregate may be stockpiled in the upper portion of the pit, or where space permits on the lower floor should some of the previous existing aggregate stockpiles have moved or been utilized.
- At the completion of mining, active pit faces shall be sloped to a minimum of 1 ½:1 with pit run granular material.
- **All reject materials resulting from aggregate production are to be placed in separate stockpiles free from deleterious material and in an easily accessible location. No stockpiling against the pit face is permitted without the permission from the Aggregate Resource Manager.**

Site Photographs:



View looking west of suitability area in upper floor of pit. (July 2018)



View looking south from edge of developed pit face onto crusher floor setup area, upper floor (July 2018)



View of main pit face, facing northeast (June 2023).



Facing east from previous photo (June 2023).



View toward access road, crusher setup and stockpile space is available in the main pit floor area (June 2023).

Steven Lee
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